MicroVAX 3100 Platform

CPU Reference Information

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This manual gives reference information for maintaining systems that use the KA45 or the KA47 CPU module.

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The postpaid Reader's Comments forms at the end of this document request your critical evaluation to assist in preparing future documentation.

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Preface

This manual provides reference information for systems that use the KA45 or the KA47 CPU module.

Audience

This manual is for Digital™ Services personnel who provide support and maintenance for systems that use the KA45 or the KA47 CPU module. It is also for customers who have a self-maintenance agreement with Digital Equipment Corporation.

Structure of This Manual

This manual is divided into six chapters, a glossary, and an index:

- Chapter 1 describes the console commands that you can enter at the console prompt.
- Chapter 2 describes the console codes and message that the console program generates.
- Chapter 3 describes the power-up test and self-test error codes that the firmware generates.
- Chapter 4 describes the error codes and messages that the utilities generate.
- Chapter 5 describes the error codes and messages that the system exerciser test generates.
- Chapter 6 describes the meaning of the codes shown on the LED display.

Associated Documents

The following documents contain more information about the MicroVAX 3100 platform systems:

- *MicroVAX 3100 Model 30 Cover Letter, EK-A0515-CL*
- *MicroVAX 3100 Model 30 Installation Information, EK-A0520-IN*
- *MicroVAX 3100 Model 30 Operator Information, EK-A0521-UG*
- *MicroVAX 3100 Model 30 Customer Technical Information, EK-A0522-TD*
- *MicroVAX 3100 Model 30 Troubleshooting and Diagnostic Information, EK-A0516-TM*
- *MicroVAX 3100 Model 40 and Model 80 Cover Letter, EK-A0517-CL*
- *MicroVAX 3100 Model 40 and Model 80 Installation Information, EK-A0523-IN*
- *MicroVAX 3100 Model 40 and Model 80 Operator Information, EK-A0524-UG*
- *MicroVAX 3100 Model 40 and Model 80 Customer Technical Information, EK-A0525-TD*
- *MicroVAX 3100 Model 40 and Model 80 Troubleshooting and Diagnostic Information, EK-A0518-TM*
- *VMS™ Factory Installed Software User Guide, EK-A0377-UG*

Related Documents

The following documents contain additional maintenance information about the KA45 and KA47 CPU systems:

- *KA45 CPU System Maintenance, EK-A0513-MG*
- *KA47 CPU System Maintenance, EK-A0514-MG*
- *Guide to MicroVAX 3100 Platform Maintenance Information Kit, EK-A0512-MG*
- *BA42-A Enclosure Maintenance, EK-A0510-MG*
- *BA42-B Enclosure Maintenance, EK-A0511-MG*

- *IPB, EK-MV310-IP*
- *Options, EK-A0519-MG*
- *TZ30 Cartridge Tape Drive Service Manual, EK-OTZ30-SV*

Conventions

The following conventions are used in this manual:

Convention	Description
Ctrl/*x*	Ctrl/*x* indicates that you hold down the Ctrl key while you press another key or mouse button (indicated here by *x*).
x	A lowercase italic *x* indicates the generic use of a letter. For example, *xxx* indicates any combination of three alphabetic characters.
n	A lowercase italic *n* indicates the generic use of a number. For example, 19*nn* indicates a 4-digit number in which the last 2 digits are unknown.
{}	In format descriptions, braces indicate required elements. You must choose one of the elements.
[ ]	In format descriptions, brackets indicate optional elements. You can choose none, one, or all of the options.
( )	In format descriptions, parentheses delimit the parameter or argument list.
...	In format descriptions, horizontal ellipsis points indicate one of the following: • An item that is repeated • An omission such as additional optional arguments • Additional parameters, values, or other information that you can enter
|	In format descriptions, a vertical bar separates similar options, one of which you can choose.
italic type	Italic type emphasizes important information, indicates variables, and indicates the complete titles of manuals.
boldface type	Boldface type in examples indicates user input. Boldface type in text indicates the first instance of terms defined either in the text, in the glossary, or both.

Convention	Description
nn nnn.nnn nn	A space character separates groups of 3 digits in numerals with 5 or more digits. For example, *10 000* equals *ten thousand*.
n.nn	A period in numerals signals the decimal point indicator. For example, *1.75* equals *one and three-fourths*.
MONOSPACE	Text displayed on the screen is shown in monospace type.
Radix indicators	The radix of a number is written as a word enclosed in parentheses, for example, 23(decimal) or 34(hexadecimal).
>>>	Three right angle brackets indicate the console prompt.
UPPERCASE	A word in uppercase indicates a command.
Note	A note contains information that is of special importance to the user.
Caution	A caution contains information to prevent damage to the equipment.

1

Console Commands

This chapter describes the console commands that you can enter when the system is in console mode.

1.1 BOOT

Passes control to the VMB program, which resides on the system ROM. The format of this command is as follows:

B[OOT] [/[R5:]<bflg>] <ddau>[:]

where:

- *R5:* represents a register, through which the hexadecimal value represented by <bflg> is passed to the VMB.
- *<bflg>* is the boot flag value.
- *<ddau>* is the name of the boot device. It passes to the VMB in register R0.

  The Ethernet network boot device name is ESA0; SCSI boot device names have the following format:

  ddcull

  where:

  - *dd* is the device mnemonic
  - *c* is the controller destination (always A)
  - *u* is the SCSI ID value of the boot device
  - *ll* is the logical unit number

  The console program accepts device names in lowercase characters, but it is recommended that you use uppercase characters. You can specify more than one boot device, and you can type a colon at the end of the device names as shown in the command format. You can specify up to two devices

on the command line. You must separate device names by typing either a space or a comma.

If the NVR contains a default boot device name, the console program passes the descriptor for this device to the VMB. The VMB then boots the system from the specified device.

If you do not specify a device name or qualifiers or both in the command, the system attempts to boot from the default boot device specified in the NVR. If the default boot device is not defined ([NULL]), the console program passes a descriptor for device ESA0 to the VMB program. This triggers the VMB program to boot the system over the network.

1.2 CONTINUE

Allows you to exit from console mode and enter (or reenter) program mode (the operating system). The format of this command is as follows:

C[ONTINUE]

The address to which control passes is one of the following:

- The address stored in the program counter when the system went into console mode.
- The address that the user specifies using the DEPOSIT command.

1.3 DEPOSIT

Transfers the specified data to the specified address. The format of this command is as follows:

D[EPOSIT] [[/B | /W | /L | /Q | /A]] [[/P | /V | /I]] [/G] [/U] [/N:<n>] [[<addr> | <sym> | + | - | * | @] [<datum>]]

where:

- */B /W /L /Q /A /P /V /I /G /U /N:<n>* are deposit command qualifiers (see Table 1–1).

  If you do not specify a size or address qualifier, the console program uses the size and address qualifier of the previous memory-specific command. If you specify conflicting qualifiers, the console program ignores the command and generates an error message. The effects of the miscellaneous qualifiers are not valid outside the command in which they are specified.

Note

The /U (unprotect) qualifier allows access to almost any address. If you do not use the /U qualifier, you can access address locations in the range 2000.0000 to 3FFF.FFFF (excluding the TOY clock). The /U qualifier is intended for use only by firmware developers.

- <*addr*> is the hexadecimal address into which you want to deposit the data.
- <*sym*> is a mnemonic that represents the address into which you want to deposit data (see Table 1–2).
- + - * @ are operators that you can use for relative memory addressing (see Table 1–3).
- <*datum*> is the value you want to deposit in the address location you specify.

Table 1–1 DEPOSIT Command Qualifiers

	Qualifier Type	
Size	**Address**	**Miscellaneous**
/B (byte)	/V (virtual memory)	/N:<n> (repeat count)
/W (word)	/P (physical memory)	/U (unprotect)
/L (longword)	/I (internal register)	
/Q (quadword)	/G (general purpose register)	
/A (ASCII)		

Table 1–2 Memory Address Mnemonics

Mnemonic	IPR Number	Type[1]	Description
KSP	0	RW	Kernel **stack pointer** (SP)
ESP	1	RW	Executive stack pointer
SSP	2	RW	Supervisor stack pointer

[1]R indicates read; W indicates write.

(continued on next page)

Table 1–2 (Cont.) Memory Address Mnemonics

Mnemonic	IPR Number	Type[1]	Description
USP	3	RW	User stack pointer
ISP	4	RW	Interrupt stack pointer
P0BR	8	RW	P0 base register
P0LR	9	RW	P0 length register
P1BR	10	RW	P1 base register
P1LR	11	RW	P1 length register
SBR	12	RW	System base register
SLR	13	RW	System length register
PCBB	16	RW	Process control block base
SCBB	17	RW	System control block base
IPL	18	RW	Interrupt priority level
ASTLVL	19	RW	AST level
SIRR	20	W	Software interrupt request
SISR	21	RW	Software interrupt summary
ICCS	24	RW	Interval clock control
NICR	25	W	Next interval count (not implemented)
ICR	26	R	Interval count (not implemented)
TODR	27	RW	Time of year (not implemented)
CCR	37	RW	Cache control
MSER	39	RW	Memory system error register
SAVPC	42	R	Console saved PC
SAVPSL	43	R	Console saved PSL
MAPEN	56	RW	Memory management enable
TBIA	57	W	Translation buffer invalidate all
TBIS	58	W	Translation buffer invalidate single
SID	62	R	System identification
TBCHK	63	W	Translation buffer check
	64 to 127		Reserved

[1]R indicates read; W indicates write.

Table 1–3 Memory Addressing Mnemonics

Symbol	Addressing Method Description
*	The memory address specified by the most recent DEPOSIT or EXAMINE command.
+	The memory address immediately following the address specified by the most recent DEPOSIT or EXAMINE command. For physical or virtual memory address, the address specified is the address of the most recent DEPOSIT or EXAMINE command plus the size that the most recently specified size qualifier indicates (1 for byte, 2 for word, 4 for longword.)
-	The memory address immediately before the address specified by the most recent DEPOSIT or EXAMINE command. For physical or virtual memory address, the address specified is the address of the most recent DEPOSIT or EXAMINE command minus the size that the most recently specified size qualifier indicates (1 for byte, 2 for word, 4 for longword).
@	Indirect addressing. The format is @<address>, where <address> is a hexadecimal address used as a pointer to another address. If you do not specify an address, the address that the command uses is the address used by the most recent memory referencing command.

Table 1–4 shows some examples of memory addressing.

Table 1–4 Examples of Memory Addressing

Example	Description
DEPOSIT R0 200	Stores the value 200 in the register R0.
DEPOSIT/P @R0 200	Stores the value 200 in the address pointed to by the register R0. The /P qualifier specifies that the value in the R0 register is a physical address reference.
DEPOSIT/V @R0 200	Stores the value 200 in the address pointed to by the register R0. The /V qualifier specifies that the value in the R0 register is a virtual address reference.
DEPOSIT @ 200	Stores the value 200 in the address specified by the most recent memory referencing command.

1.4 EXAMINE

Displays, in hexadecimal format, the contents of the specified address. The format of this command is as follows:

E[XAMINE] [/B | /W | /L | /Q | /A]] [[/P | /V | /I]] [/G] [/U] [/N:<n>] [[<addr> | <sym> | + | - | * | @] [<datum>]]

where:

- */B /W /L /Q /A /P /V /I /G /U /N:<n>* are qualifiers. The EXAMINE command uses the same set of qualifiers as the DEPOSIT command (see Table 1–1).
- *<addr>* is the hexadecimal address into which you want to deposit the data.
- *<sym>* is a mnemonic that represents the address that you want to examine. The EXAMINE command uses the same mnemonics as the DEPOSIT command (see Table 1–2).
- + - * @ are operators that you can use for relative memory addressing. The EXAMINE command uses the same operators for memory addressing as the DEPOSIT command (see Table 1–3).
- *<datum>* is the value you want to deposit in the address location you specify.

1.5 FIND

Forces the console program to search the main RAM memory (starting at physical address zero) for the following:

- A page-aligned 128K-byte segment of main memory
- A **restart parameter block** (RPB)

If the console program finds a 128K-byte memory segment or an RPB, the console program places the starting address of the segment or RPB, plus 512, in the stack pointer (SP) register. If the console program does not find a memory segment or RPB, the console program issues an error message. The format of this command is as follows:

F[IND] [/MEMORY | /RPB]

where:

- */MEMORY* is a qualifier that specifies a search for a 128K-byte, page-aligned segment of memory.
- */RPB* is a qualifier that specifies a search for an RPB.

The FIND command searches for an RPB if you do not enter a qualifier.

1.6 HALT

Displays a halt message followed by the console prompt. The format of this command is as follows:

H[ALT]

1.7 HELP

Displays a list of the console commands that the system supports. The format of this command is as follows:

HE[LP] or **?**

Figure 1–1 shows the help display.

Figure 1–1 Help Display

```
BOOT [/[R5:]<bflg>] <ddau>
CONTINUE
DEPOSIT [{/B|/W|/L|/Q|/A}] [{/P|/V|/I}] [/G] [/U] [/N:<n>]
    [{<addr>|<sym>|+|-|*|@} [<datum>]]
EXAMINE [{/B|/W|/L|/Q|/A}] [{/P|/V|/I}] [/G] [/U] [/N:<n>]
    [{<addr>|<sym>|+|-|*|@}]
FIND [{/MEMORY|/RPB}]
HALT
HELP
INITIALIZE
LOGIN
REPEAT <cmd>
SET BOOT <ddau>
SET BFLG <bflg>
SET DIAGENV <1-3>
SET FBOOT <0-1>
SET HALT <1-3>
SET KBD <0-15>
SET MOP <0-1>
SET PSE <0-1>
SET PSWD
SET SCSI <0-7>
SET TRIG <0-1>
SHOW { BOOT|BFLG|CONFIG|DEV|DIAGENV|FBOOT|ETHER|ERROR|
       ESTAT|HALT|KBD|MEM|MOP|PSE|SCSI|TRIG }
START <addr>
TEST [/UTIL] <devnam|devnbr>
UNJAM
X <addr> <cnt> ...
?
```

1.8 INITIALIZE

Performs a processor initialization sequence. The format of this command is as follows:

I[NITIALIZE]

Table 1–5 gives the values of the registers that the processor initialization sequence sets.

Table 1–5 Initial Values of Processor Registers

Register	Value
PSL	041F.0000
ASTLVL	4
SISR	0
ICCS	0
MAPEN	0

The processor initialization sequence also sets registers R0 to R13 to 0, the interrupt stack pointer (ISP) to 200, and the program counter (PC) to 200.

1.9 LOGIN

Allows you to put the system in privileged console mode. When the console security feature is enabled (see Section 1.11.8), and you put the system in console mode, the system operates in unprivileged console mode. You can access only a subset of the console commands. To access the full range of console commands, you must use this command. The format of this command is as follows:

LO[GIN]

When you enter the command, the system prompts you for a password as follows:

```
PSWD0 >>
```

You must enter the current console security password. If you do not enter the correct password, the system displays the error message, ILL PSWD. When you enter the console security password, the system operates in privileged console mode. In this mode, you can use all the console commands. The system exits from privileged console mode when you enter one of the following console commands:

- BOOT
- CONTINUE
- HALT
- START

1.10 REPEAT

Allows you to specify a command that you want to repeat continuously. The format of this command is as follows:

R[EPEAT] <cmd>

where:

- *<cmd>* is the command that you want to repeat. You can repeat only the following commands:
  - DEPOSIT
  - EXAMINE
  - TEST

To stop a REPEAT command, press Ctrl/C.

1.11 SET

Sets the console NVR parameter to the specified value. The format of this command is as follows:

SE[T]<parameter-name><value>[<value>]

The following subsections describe the SET commands.

1.11.1 SET BFLG

Sets the default boot flags. The format of this command is as follows:

SE[T] BF[LG] <bflg>

where:

- *<bflg>* is a hexadecimal number up to eight characters long. The boot flag is placed in register R5. The console program does not check the validity of the hexadecimal number you enter. Table 1–6 shows the valid boot flags for **virtual memory system** (VMS) systems.

Table 1–6 Boot Flags Used by VMS

Flag	Definition
00000001	RPB$V_CONV—Conversational boot. At various points in the system boot procedure, the bootstrap code requests parameters and other input from the console terminal. If the DIAG is also on, the diagnostic supervisor then goes into MENU mode and prompts the user for devices to test.
00000002	RPB$V_DEBUG—Debug. If this flag is set, VMS maps the code for the XDELTA debugger into the system page tables of the operating system.
00000004	RPB$V_INIBPT—Initial breakpoint. If RPB$V_DEBUG is set, VMS executes a BPT instruction immediately after enabling mapping.
00000008	RPB$V_BBLOCK—This skips the files-11 boot and performs only the boot block type boot.
00000010	RPB$V_DIAG—Diagnostic boot. The secondary bootstrap is an image called [SYSMAINT]DIAGBOOT.EXE.
00000020	RPB$V_BOOBPT—Bootstrap breakpoint. Stops the primary and secondary bootstraps with a breakpoint instruction before testing the memory.
00000040	RPB$V_HEADER—Image header. Takes the transfer address of the secondary bootstrap image from that file's image header. If RPB$V_HEADER is not set, transfers control to the first byte of the secondary boot file.
00000080	RPB$V_NOTEST—Memory test inhibit. Sets a bit in the PFN bit map for each page of memory present. Does not test the memory.
00000100	RPB$V_SOLICT—File name. Prompts for the name of a secondary bootstrap file.
00000200	RPB$V_HALT—Halt before transfer. Executes a halt instruction before transferring control to the secondary bootstrap.
00000400	RPB$V_NOPFND—No PFN deletion (not implemented); intended to inform the VMB not to read a file from the boot device that identifies bad or reserved memory pages, so that the VMB does not mark these pages as valid in the PFN bitmap.
00000800	RPB$V_MPM—Specifies that multiport memory is to be used for the total executive memory requirement. No local memory is to be used. This is for tightly-coupled multiprocessing. If the DIAG is also on, then the diagnostic supervisor goes into AUTOTEST mode.

(continued on next page)

Table 1–6 (Cont.) Boot Flags Used by VMS

Flag	Definition
00001000	RPB$V_PFILE (overlays RPB$V_USEMPM)—File name. Prompts for the name of the parameters file on a network bootstrap operation.
00002000	RPB$V_MEMTEST—Specifies that a more extensive algorithm must be used when testing main memory for hardware nonrecoverable (RDS) errors.
00004000	RPB$V_FINDTEST—Requests use of MA780 memory if the MS780 is insufficient for booting. Used for 11/782 installations.
00008000	RPB$V_AUTOTEST—Used by the diagnostic supervisor.
00010000	RPB$V_CRDTEST—Requests pages with CRD errors to be removed from the bitmap.
X0000000	RPB$V_TOPSYS—The X position specifies the top-level directory number for system disks with multiple systems.

1.11.2 SET BOOT

Sets the default boot device. The format of this command is as follows:

SE[T] BO[OT] <ddau>

- *<ddau>* is the boot device name. This parameter must be a valid boot device name that the BOOT command accepts (see Section 1.1).

When you enter a period (.) as a value, the console program resets the boot device to the default boot device. If you enter the SHOW BOOT command, the system responds with the following display:

```
BOOT = (NULL)
```

If you enter a BOOT command when the default boot device is reset, the system attempts to boot from the network (boot device ESA0).

1.11.3 SET DIAGENV

Sets the diagnostic environment. The format of this command is as follows:

SE[T] DI[AGENV] <1-3>

where:

- *<1-3>* represents a number in the range 1 to 3 that you enter to set the diagnostic environment (see Table 1–7).

Note

The SET DIAGENV command is not effective unless there is a loopback connector installed on asynchronous modem control port 2 on the back of the system unit.

Table 1–7 Diagnostic Environment Values

<1-3>	Description
1	Customer environment. This is the default test environment.
2	Digital Services environment. In this environment, the console program sets up the diagnostic conditions that enable Digital Services personnel to test the system. Special loopback connectors are required to perform certain tests and utilities.
3	Manufacturing environment. In this environment, the console program sets up the diagnostic conditions that enable Manufacturing personnel to test the system. Special loopback connectors and writeable media are required to perform certain tests and utilities.

1.11.4 SET FBOOT

Sets the diagnostic startup mode. The format of this command is as follows:

SE[T] F[BOOT] <0-1>

The parameter <0-1> is a number in the range 0 to 1 that determines the type of diagnostic startup (see Table 1–8).

Table 1–8 FBOOT Values

<0-1>	Description
0	Normal diagnostic startup tests
1	Fast diagnostic startup tests

Note

Minimal diagnostic testing is performed during a fast diagnostic startup operation.

1.11.5 SET HALT

Sets the default recovery action, that is, the action that the console program takes when you turn on the system or following an error. The format of this command is as follows:

SE[T] H[ALT] <1-3>

where:

- *<1-3>* represents a number in the range 1 to 3 that you enter to set the default halt action (see Table 1–9).

Table 1–9 Halt Action Values

Value	Halt Action	Meaning
1	Restart	The system tries to restart the operating system. If it fails to restart the operating system, it tries to boot. If the system fails to boot, it halts.
2	Boot	The system tries to boot. If it fails to boot, it halts.
3	Halt	The system halts and displays the console prompt. This is the default value.

1.11.6 SET KBD

This command is not applicable to MicroVAX 3100 systems.

1.11.7 SET MOP

Enables or disables the network listener. The format of this command is as follows:

SE[T] MO[P] <0-1>

where:

- *<0-1>* represents a number in the range 0 to 1 that you enter to set the network listener condition (see Table 1–10).

Table 1–10 Network Listener Values

Value	Description
0	Disabled
1	Enabled (default)

Note

For remote triggering and remote console connection, you must set the MOP and TRIG values to 1, console security must be enabled (PSE = 1), and you must have a valid password set up.

1.11.8 SET PSE

Allows you to enable or disable the console security feature of the system. The format of this command is as follows:

SE[T] PSE <0-1>

where:

- *<0-1>* represents a number in the range 0 to 1 that you enter to enable or disable the console security feature (see Table 1–11).

Table 1–11 Console Security Feature Values

Value	Description
0	Disabled
1	Enabled

Note

For remote triggering and remote console connection, you must set the MOP and TRIG values to 1, console security must be enabled (PSE = 1), and you must have a valid password set up.

When the console security feature is enabled, only a subset of the console commands are available to the user. To enable the complete set of console commands once the console security feature is enabled, you must use the LOGIN command (see Section 1.9).

1.11.9 SET PSWD

Allows you to set or change the console security password. The console security password is used for:

- Remote trigger verification—When the password is set, the network listener must verify the password before processing a remote trigger request to boot the system.
- Putting the system in privileged console mode—When the password is set, you must use the LOGIN command and enter the correct password to access the full range of console commands.

Note

For remote triggering and remote console connection, you must set the MOP and TRIG values to 1, console security must be enabled (PSE = 1), and you must have a valid password set up.

The format of this command is as follows:

SE[T] PSW[D]

When you are entering the console security password for the first time, the system prompts you for the password, then asks you for confirmation of the password as follows:

```
PSWD1 >>>
PSWD2 >>>
```

The password you enter must be exactly sixteen hexadecimal characters.

Note

The password is not displayed on the screen.

When you want to change the console security password, you must put the system in privileged console mode, using the LOGIN command (see Section 1.9).

When the system is in privileged console mode, you can use the SET PSWD command to change the password. The system prompts you for the current password, a new password, and confirmation of the new password as follows:

```
PSWD0 >>>
PSWD1 >>>
PSWD2 >>>
```

Caution

If the owner of the system forgets the password, you must short-circuit two contacts on the CPU module to clear the password (see *KA45 CPU System Maintenance*, Section 3.2.4 or *KA47 CPU System Maintenance*, Section 3.2.4).

1.11.10 SET RADIX

Sets the default input radix. The format of this command is as follows:

SE[T] R[ADIX] <value>

The parameter <value> determines the radix type (see Table 1–12).

Table 1–12 Radix Values

Value	Description
0	Default RADIX for the associated command
10	Decimal
16	Hexadecimal

Note

You can use the introducers %X and %D on the command line at any time to change the default radix. These introducers inform the console program that the next value is of the radix that the introducer specifies. The introducer %X specifies hexadecimal; %D specifies decimal.

Note

If the radix is set to hexadecimal (radix 16) and you want to change it to decimal (radix 10), use the command, SET RADIX A.

1.11.11 SET SCSI

Sets the SCSI ID of the SCSI controller. The format of this command is as follows:

SE[T] S[CSI] <0-7>

where:

- *<0-7>* is a number in the range 0 to 7, that is, the ID you want to assign to the SCSI controller. The SCSI ID of the SCSI controller is set to 6 before the system is shipped.

1.11.12 SET TRIG

Enables or disables the remote trigger utility. When the remote trigger utility is enabled, a remote system can force the local system to boot from the local system's default boot device. The format of this command is as follows:

SE[T] T[RIG] <0-1>

where:

- *<0-1>* is a number in the range 0 to 1 that determines the remote trigger condition (see Table 1–13).

Table 1–13 Remote Trigger Values

Value	Description
0	Disabled
1	Enabled

Note

For remote triggering and remote console connection, you must set the MOP and TRIG values to 1, console security must be enabled (PSE = 1), and you must have a valid password set up.

1.12 SHOW

Displays the value of the console NVR parameter you specify. The format of this command is as follows:

SH[OW]<parameter-name>

where:

- *<parameter-name>* is the NVR parameter that you want to view. See the following subsections for more information.

1.12.1 SHOW BFLG

Displays the default boot flags. The format of this command is as follows:

SH[OW] BF[LG]

The following is an example of the display that this command produces when no default boot flags are set:

```
BFLG = 00000000
```

1.12.2 SHOW BOOT

Displays the default boot device. The format of this command is as follows:

SH[OW] BO[OT]

The following is an example of the display that this command produces:

```
BOOT = DKA200
```

1.12.3 SHOW CONFIG

Displays the system configuration. The format of this command is as follows:

SH[OW] CONF[IG]

The command displays information about devices that the firmware has tested. It also displays the device errors that the most recent device test detected. Figure 1–2 is an example of the display that the SHOW CONFIG command produces.

Figure 1–2 SHOW CONFIG Display

```
KA45-A V1.0
08-00-2B-16-44-48
8MB
DEVNBR  DEVNAM    INFO
------  --------  ------------------------------------
1          NVR    OK
3           DZ    OK
4        CACHE    OK
5          MEM    OK      ❶       ❷       ❸       ❶
                  8MB = SY=8MB, S0/1=0MB, S2/3=0MB, S4/5=0MB
6          FPU    OK
7           IT    OK
8          SYS    OK
9           NI    OK
10        SCSI    OK
                  3-RZ23L  6-INITR
12        COMM    OK
                  DSW41/42 1 CHANNEL V3.11-47
14       ASYNC    DHW41/42 V1.5
```

❶ Basic CPU Module Memory

❷ Memory Expansion Increment 1 (Connectors 1H and 1L)

❸ Memory Expansion Increment 2 (Connectors 2H and 2L)

❶ Memory Expansion Increment 3 (Connectors 3H and 3L)

1.12.4 SHOW DEVICE

Displays the current status of the Ethernet and SCSI devices in the system. The format of this command is as follows:

SH[OW] DE[VICE]

The display includes the Ethernet address and information about the SCSI devices connected to the SCSI bus. Figure 1–3 is an example of the display that the SHOW DEVICE command produces.

Figure 1–3 SHOW DEVICE Display

```
   ❶       ❷       ❸       ❹       ❺     ❻     ❼       ❽
VMS/VMB   ADDR    DEVTYPE  NUMBYTES  RX/FX  WP  DEVNAM   REV
-------   ----    -------  --------  -----  --  ------   --
ESA0      08-00-2B-16-44-48
DKA300    A/3/0   DISK     ......    FX          RZ23L    1F25
..HostID.. A/6 INITR
```

❶ VMS/VMB Device Name

❷ Ethernet or SCSI Address of the Device

❸ Device Type— For example disk drive (DISK) or tape drive (TAPE)

❹ Number of Megabytes

❺ Media Type—Removable (RX) or fixed (FX)

❻ Write Protected

❼ Option Name

❽ Revision Number

1.12.5 SHOW DIAGENV

Displays the current diagnostic environment. The format of this command is as follows:

SH[OW] DI[AGENV]

Table 1–7 gives the values and the meaning of each value. The following is an example of the display that this command produces:

```
DIAGENV = 2
```

1.12.6 SHOW ERROR

Displays the errors that the most recent self-test or system exerciser test detected. The format of this command is as follows:

SH[OW] ER[ROR]

Figure 1–4 is an example of the display that the SHOW ERROR command produces for a system exerciser test.

Figure 1–4 SHOW ERROR Display

```
❶ ❷  ❸   ❹    ❺
?  000   1    NVR  0003
?? 130  10   SCSI  0018
130 000E 00000003 00120012 00180000 FFFF001B 00000000 00000000 FFFFFFFF❻
```

❶ A question mark (?) indicates a soft error, that is, an error that you do not have to correct before you boot the system. Two question marks (??) indicate a hard error, that is, an error that you must correct before you boot the system.

❷ The FRU number of the failing device.

❸ The device number.

❹ The device mnemonic.

❺ A device specific error code.

❻ Additional error information about the preceding error. See Section 3.9.1, error format 000E, for an explanation of the elements in this error format example.

Section 3.9 gives the self-test error codes.

1.12.7 SHOW ESTAT

Displays a set of summary screens (see *KA45 CPU System Maintenance*, Section 3.5.2 or *KA47 CPU System Maintenance*, Section 3.5.2) associated with the most recent system exerciser test. The format of this command is as follows:

SH[OW] ES[TAT]

If the system exerciser test hangs or halts, you can use this command to determine the status of the system before it hangs or halts.

1.12.8 SHOW ETHERNET

Displays the hardware Ethernet address. The format of this command is as follows:

SH[OW] ET[HERNET]

The following is an example of the display that this command produces:

```
ETHERNET = 08-00-2B-26-45-AD
```

When the Ethernet address is not valid, the console program displays the following line on the console terminal:

```
ETHERNET = XX-XX-XX-XX-XX-XX
```

1.12.9 SHOW FBOOT

Displays the current diagnostic startup type. The format of this command is as follows:

SH[OW] F[BOOT]

Table 1–8 gives the values and the description of each value.

1.12.10 SHOW HALT

Displays the current status of the halt action flag. The format of this command is as follows:

SH[OW] H[ALT]

Table 1–9 gives the values and the corresponding halt action. The following is an example of the display that this command produces:

```
HALT = 00000002
```

1.12.11 SHOW KBD

This command is not applicable to MicroVAX 3100 systems.

1.12.12 SHOW MEM

Displays information about the memory in the system. The format of this command is as follows:

SH[OW] ME[M]

Figure 1–5 is an example of the display that the SHOW MEM command produces.

Figure 1–5 SHOW MEM Display

```
MEM_TOP = 00800000 ❶
MEM_BOT = 00000000 ❷

    MEM_NOT_AVAIL
-----------------
007C3600:007fffff ❸
```

❶ The total amount of memory in the system, including the console data structures.

- The first address of a 256K-byte block of contiguous memory, generally used by the VMB.
- This line and subsequent lines show the address ranges of the memory areas that are not available to the operating system. These memory areas include the memory area that is reserved for the console program.

1.12.13 SHOW MOP

Displays the status of the network listener flag. The format of this command is as follows:

SH[OW] MO[P]

Table 1–10 gives the values and the meaning of each MOP value. The following is an example of the display that this command produces:

```
UTC       = 00000000E0D8BAE0
AccurTDF  = 10000000000186A0
BytesRx   = 0000000000000000
BytesTx   = 0000000000000078
FramesRx  = 0000000000000000
FramesTx  = 0000000000000002
McBytsRx  = 0000000000000000
McFrmsRx  = 0000000000000000
FrmDefer  = 0000000000000000
Frm1Coll  = 0000000000000000
FrmMColl  = 0000000000000000
TerXsCol  = 0000000000000000
TerCarCk  = 0000000000000000
TerShCkt  = 0000000000000000
TerOpCkt  = 0000000000000000
TerFrLng  = 0000000000000000
TerNoDef  = 0000000000000000
RerFCSEr  = 0000000000000000
RerFrmEr  = 0000000000000000
RerFrLng  = 0000000000000000
UnknDest  = 0000000000000000
DataOvrn  = 0000000000000000
SyBuffUn  = 0000000000000000
UsBuffUn  = 0000000000000000
HrtBtErr  = 0000000000000001

MOP = 00000001
```

1.12.14 SHOW PSE

Displays the condition of the console security feature of the system. The format of the command is as follows:

SH[OW] PSE

Table 1–11 gives the values and a description of each value.

1.12.15 SHOW RADIX

Displays the current default radix value. The format of this command is as follows:

SH[OW] R[ADIX]

Table 1–12 shows the values and the meaning of each value.

1.12.16 SHOW SCSI

Displays the current SCSI ID that the firmware assigns to the system's SCSI controller. The format of this command is as follows:

SH[OW] S[CSI]

The normal SCSI ID of the system's SCSI controller is 6 when the system is shipped. The following is an example of the display that this command produces:

```
SCSI = 00000006
```

1.12.17 SHOW TRIG

Displays the status of the remote trigger flag. The format of this command is as follows:

SH[OW] TR[IG]

Table 1–13 gives the values and a description of each value. The following is an example of the display that this command produces:

```
TRIGGER = 00000000
```

1.13 START

Allows you to specify the address from which program execution starts. The format of this command is as follows:

S[TART] <addr>

where:

- *<addr>* is the address from which program execution starts.

You must specify the <addr> parameter.

1.14 TEST

Allows you to invoke the diagnostic tests, extended tests, and utilities. The format of this command is as follows:

T[EST] [/UTIL] <devnam | devnbr>

where:

- */UT[IL]* is a qualifier that invokes a utility
- *<devnam>* is the device name
- *<devnbr>* is the device number

1.15 UNJAM

Provides a system reset. The format of this command is as follows:

U[NJAM]

The firmware returns all the devices to known, initial states. All registers and logic states are set to 0.

1.16 X (transfer)

Note

This command is intended for use by host software that communicates with the system through a console device connected to MMJ port 0 or MMJ port 3. Do not enter this command at the console prompt.

Transfers binary data to and from physical memory. The format of this command is as follows:

X<address><count><CR><checksum><data_stream><checksum>

where:

- *<address>* is the physical address (in hexadecimal format), to which or from which the data is transferred.

- <*count*> is the number of bytes to transfer. It is an 8-bit hexadecimal number. When the high order bit of this parameter is 1, the data is transferred from physical memory to the console device. When the high order bit of this parameter is 0, the data is transferred from the console device to physical memory.
- <*CR*> is a carriage return.
- <*checksum*> is the two's complement of the command string.
- <*data_stream*> is the returned data.
- <*checksum*> is the two's complement of the data stream.

1.17 ! (comment)

Note

You use this command when writing host software that communicates with the system through a console device connected to MMJ port 0 or MMJ port 3.

Prefixes a comment. The format of this command is as follows:

! <comment>

where:

- <*comment*> is the comment text.

You can place the exclamation point (!) anywhere on a command line. The console program ignores all text after an exclamation point (!).

2

Console Codes and Messages

This chapter describes the codes and messages that the console program generates. Table 2–1 gives the codes and the corresponding description.

Table 2–1 Console Codes and Messages

Code (Hexadecimal)	Message Text	Description
02	?02 EXT HLT	The halt button on the system or the Break key on the special console terminal has been pressed.
04	?04 ISP ERR	Interrupt stack inaccessible or invalid during an interrupt or an exception.
05	?05 DBL ERR1	A machine check occurred while the processor was reporting on a machine check.
06	?06 HLT INST	A kernel mode HALT instruction was executed.
07	?07 SCB ERR3	SCB interrupt vector bits 1 to 0 are equal to 3.
08	?08 SCB ERR2	SCB interrupt vector bits 1 to 0 are equal to 2.
0A	?0A CHM FR ISTK	A change mode instruction was executed when PSL(IS) was set.
0B	?0B CHM TO ISTK	The exception vector for the change mode had bit 0 set.
0C	?0C SCB RD ERR	A hard memory error occurred while the processor was trying to read an exception or interrupt vector.

(continued on next page)

Table 2–1 (Cont.) Console Codes and Messages

Code (Hexadecimal)	Message Text	Description
10	?10 MCHK AV	An access violation or invalid translation occurred during the processing of a machine check.
11	?11 KSP AV	An access violation or invalid translation occurred during the processing of an invalid kernel stack pointer exception.
12	?12 DBL ERR2	A machine check occurred while the processor was trying to report a machine check.
13	?13 DBL ERR3	A machine check occurred while the processor was trying to report a machine check.
19	?19 PSL EXC5	PLS bits 26 to 24 indicate a value of 5 for an interrupt or exception.
1A	?1A PSL EXC6	PLS bits 26 to 24 indicate a value of 6 for an interrupt or exception.
1B	?1B PSL EXC7	PLS bits 26 to 24 indicate a value of 7 for an interrupt or exception.
1D	?1D PSL REI5	PLS bits 26 to 24 indicate a value of 5 on an REI.
1E	?1E PSL REI6	PLS bits 26 to 24 indicate a value of 6 on an REI.
1F	?1F PSL REI7	PLS bits 26 to 24 indicate a value of 7 on an REI.
20	?20 TOY ERR	TOY clock failure.
21	?21 CORRPTN	Console memory corrupted.
22	?22 ILL REF	The requested reference violates virtual memory protection, the address is not mapped, the reference is invalid in the specified address space, or the value is invalid in the specified destination.
23	?23 ILL CMD	The command string cannot be parsed. This message is also displayed when the system is in unprivileged console mode, and you enter an illegal command (see *KA45 CPU System Maintenance*, Section 3.2.4 or *KA47 CPU System Maintenance*, Section 3.2.4.)

(continued on next page)

Table 2–1 (Cont.) Console Codes and Messages

Code (Hexadecimal)	Message Text	Description
24	?24 INV DGT	The number has an invalid digit.
25	?25 LTL	The command was too large for the console to put it in the buffer. The message is issued only when a carriage return is received.
26	?26 ILL ADR	The address specified falls outside the limits of the addressing space.
27	?27 LEN VIO	Virtual address length violation. The specified virtual address was not within the virtual address range specified.
28	?28 VAL TOO LRG	The value specified does not fit in the destination.
29	?29 ILL SW	The qualifier is not known in the specified syntax.
2A	?2A SW CONF	Conflicting qualifiers.
2B	?2B UNK SW	The qualifier is not known to the parser.
2C	?2C UNK SYM	The symbolic address in the EXAMINE or DEPOSIT command is not recognized.
2D	?2D AMB SYM	Ambiguous symbol. The symbol was not unique enough to be identified.
2E	?2E CHKSM	The command or data checksum in the X command is invalid.
2F	?2F HLTED	The operator entered a HALT command.
30	?30 FND ERR	The FIND command failed to find the RPB or 128K bytes of page-aligned contiguous memory.
31	?31 TMOUT	During the X command, data failed to arrive in the time expected.
32	?32 MEM ERR	Parity error or other memory error.
33	?33 UNXINT	Unexpected interrupt or exception. For some interrupts, this message is followed by the PC, PLS, and interrupt vector.
34	?34 ILL PSWD	Illegal trigger password specified.
35	?35 PSWD NOTEN	Password system not enabled.

(continued on next page)

Table 2–1 (Cont.) Console Codes and Messages

Code (Hexadecimal)	Message Text	Description
36	?36 NO PSWD DEF	No password defined.
37	?37 NOT IMPL	The requested function has not been implemented. The requested command is no longer available. Some of the commands that were available for backward compatibility have been removed and replaced with new commands. An example of this is SET DTE, which has been replaced with the DTE console command.
38	?38 IPR NOT IMPL	The request internal processor register is not implemented.
39	?39 IPR NOWRT	The request internal processor register write operation is not allowed. The internal processor register is read only.
3A	?3A IPR NORD	The requested internal processor register read operation is not allowed. The internal processor register is write only.
3B	?3B NVR RDERR	An internal read error occurred while attempting to read the NVR, or there was an internal software request that tried to access an NVR location that is not within the range of the NVR.
3C	?3C NVR WRTERR	An internal write error occurred during the data verification phase of the NVR write operation, or there was an internal software request to write to an NVR location, which was not within the range of the NVR.
83	83 BOOT SYS	Bootstrap message.
84	?84 FAIL	General failure message.
85	?85 RESTART SYS	Restarting system software message.
86	?86 RMT TRGGR	Remote trigger request.

3

Power-Up Test and Self-Test Error Codes and Messages

This chapter describes the error codes and messages that the power-up test and the self-tests generate.

3.1 NVR Test (Test 1) Error Codes and Messages

Table 3–1 lists the error codes and messages that the NVR test produces.

Table 3–1 NVR Test (Test 1) Error Codes and Messages

Error Code (Decimal)	Error Code (Hexadecimal)	Description
0004	4	Battery fault
0008	8	NVR register test failure
0012	C	Battery low, VRT failure, and NVR test failure
0016	10	TOY register test failure
0032	20	Failure to set valid RAM and time bit
0036	24	VRT bit failure and battery fault
0044	2C	Battery low, VRT failure, and NVR test failure
0048	30	TOY register test failure and VRT failure
0064	40	Battery check test failure; hard error
0065	41	Battery check test failure; soft error
0072	48	Battery check test failure and NVR register test failure
0096	60	VRT bit failure and battery check test failure

(continued on next page)

Table 3–1 (Cont.) NVR Test (Test 1) Error Codes and Messages

Error Code (Decimal)	Error Code (Hexadecimal)	Description
0104	68	Battery check, VRT, and NVR register test failures
0128	80	Update in progress fails to clear; hard error
0129	81	Update in progress fails to clear; soft error
0160	A0	Update in progress failure and VRT bit failure

3.2 DZ Test (Test 3) Error Codes and Messages

Section 3.2 lists the error codes and messages that the DZ test produces.

Table 3–2 DZ Test (Test 3) Error Codes and Messages

Error Code (Decimal)	Error Code (Hexadecimal)	Description
0016	10	Reset test failure
0032	20	Read LPR test failure
0048	30	Modem test failure
0064	40	Polled test failure
0080	50	Interrupt driver transfer test failure
0096	60	Unexpected LK401 device detected
0112	70	Unexpected mouse device detected
0128	80	INIT driver failure
0144	90	No memory to use as data area

3.2.1 DZ Test (Test 3) Additional Error Information

You can get additional error information by using the SHOW ERROR command. The format of the additional error information for this command is as follows:

```
001 000a ssssssss cccccccc lprlprlp llllllll xxxxxxxx tttttttt
```

where:

- *001* is the FRU number
- *000A* is the format number

- *ssssssss* is an error subcode (see Table 3–3)
- *cccccccc* is the value of the DZ **control status register** (CSR)
- *lprlprlp* is the contents of the line parameter register
- *lllllll* is the serial line number
- *xxxxxxxx* is the returned data
- *tttttttt* is the expected data

If a data transfer times out, the polled test and the interrupt test return the additional error information in the following format:

```
001 000B ssssssss cccccccc lprlprlp lllllll rrrrrrrr eeeeeeee
```

where:

- *001* is the FRU number
- *000B* is the format number
- *ssssssss* is an error subcode (see Table 3–3)
- *cccccccc* is the value of the DZ CSR
- *lprlprlp* is the contents of the line parameter register
- *lllllll* is the serial line number
- *rrrrrrrr* is the number of characters transmitted
- *eeeeeeee* is the value of the DZ transmit control register

Table 3–3 DZ Test (Test 3) Error Subcodes

Error Subcode (Hexadecimal)	Description
READ LPR Failures	
0021	Baud rate is incorrectly set
0022	Character width is incorrectly set
0023	Parity bit is incorrectly set
0024	Receiver on bit is incorrectly set

(continued on next page)

Table 3–3 (Cont.) DZ Test (Test 3) Error Subcodes

Error Subcode (Hexadecimal)	Description
Modem Test Failures	
0031	RTS to CTS loopback failure
0032	DSRS t. DSR and CD loopback failure
0033	LLKB to SPDMI loopback failure
0034	DTR to RI loopback failure
Polled Test Failures	
0041	Transfer timeout
0042	Data is not valid
0043	Parity error
0044	Framing error
0045	Overrun error
0046	Character received is not the same as the character transmitted
Interrupt Test Failures	
0051	Transfer timeout
0052	Data is not valid
0053	Parity error
0054	Framing error
0055	Overrun error
0056	Character received is not the same as the character transmitted

3.3 CACHE Test (Test 4) Error Codes and Messages

Table 3–4 lists the error codes and messages that the CACHE test produces.

Table 3–4 CACHE Test (Test 4) Error Codes and Messages

Error Code (Decimal)	Error Code (Hexadecimal)	Description
0512	200	Data store read/write error
0768	300	Tag store read/write error
1024	400	Valid bit is not set
1280	500	Tag store does not contain an entry for the diagnostic memory space
1536	600	Unexpected tag parity error
1792	700	Cache does not provide expected data during cache hit tests
2048	800	Cache data parity error
2304	900	Tag not valid during cache hit tests
2560	A00	Data not valid during cache hit tests
2816	B00	Cache data write-through test fails because of invalid data in the cache data store
3702	C00	Cache data write-through test fails because of invalid data in memory

3.3.1 CACHE Test (Test 4) Additional Error Information

To get more error information, enter the SHOW ERROR command. The format of the additional error information that this command provides is as follows:

```
001 000A aaaaaaaa eeeeeeee rrrrrrrr
```

where:

- *001* is the FRU number
- *000A* is the device number
- *aaaaaaaa* is the address within the data or tag store that failed the test
- *eeeeeeee* is the expected data
- *rrrrrrrr* is the returned data

3.4 MEM Test (Test 5) Error Codes and Messages

Table 3–5 lists the error codes and messages that the MEM test produces.

Table 3–5 MEM Test (Test 5) Error Codes and Messages

Error Code (Decimal)	Error Code (Hexadecimal)	Description
0064	40	Memory modules MS44-CA and MS44-AA or MS44L-AA mixed as a pair
0066	42	Memory option connectors not filled in ascending order
0068	44	MS44-CA (16M byte) memory module found; not allowed in a Model 30 or Model 40 system
0070	46	MS44-AA or MS44L-AA memory modules inserted in a higher connector number than the MS44-CA memory modules
0072	48	MS44-AA or MS44L-AA memory modules or MS44-CA memory modules (Model 80 only) are not in pairs
0256	100	Byte mask test failure
0514	202	Data compare error during forward pass
0516	204	Parity error during forward pass
0770	302	Data compare error during reverse pass
0772	304	Parity error during reverse pass
1028	404	Parity test 1 error
1288	504	Parity test 2 error

3.4.1 MEM Test (Test 5) Additional Error Information

You can get more error information by using the SHOW ERROR command. The format of the additional error information that this command provides is as follows:

```
xxx 5 MEM yyyy
xxx 00A bbbbbbbb cccccccc dddddddd eeeeeeee
```

where the codes on the first line are as follows:

- *xxx* is the FRU number (see Table 3–6)
- *5* is the device number
- *MEM* is the device mnemonic

- *yyyy* is the hexadecimal error code

The codes on the second line are as follows:

- *xxx* is the FRU number
- *00A* is the format type of extended error information
- *bbbbbbbb* is the contents of the Memory System Error Register (MSER)
- *cccccccc* is the address of the failing memory location
- *dddddddd* is the expected data
- *eeeeeeee* is the received data

Table 3–6 FRU Values for Faulty Memory Modules

FRU (Decimal)	Memory Module Connector[1]
040	1L
041	1H
042	2L
043	2H
044	3L
045	3H

[1]See *KA45 CPU System Maintenance*, Section 1.2 or *KA47 CPU System Maintenance*, Section 1.2 for connector location.

3.5 FPU Test (Test 6) Error Codes and Messages

Table 3–7 lists the error codes and messages that the **floating-point unit** (FPU) test produces.

Table 3–7 FPU Test (Test 6) Error Codes and Messages

Error Code (Decimal)	Error Code (Hexadecimal)	Description
0258	102	MOVF instruction test failure

(continued on next page)

Table 3–7 (Cont.) FPU Test (Test 6) Error Codes and Messages

Error Code (Decimal)	Error Code (Hexadecimal)	Description
0260	104	Unexpected exception during MOVF instruction test
0514	202	MNEGF instruction test failure
0516	204	Unexpected exception during MNEGF instruction test
0770	302	ACBF instruction test failure
0772	304	Unexpected exception during ABCF instruction test
1026	402	ADDF2/ADDF3 instruction test failure
1028	404	Unexpected exception during ADDFx instruction test failure
1282	502	CMPF instruction test failure
1284	504	Unexpected exception during CMPF instruction test
1538	602	CVTFD/CVTFG instruction test failure
1540	604	Unexpected exception during CVTFD/CVTFG instruction test
1794	702	CVTFx instruction test failure
1796	704	Unexpected exception during CVTFx instruction test
2050	802	CVTxF instruction test failure
2054	804	Unexpected exception during CVTxF instruction test
2306	902	DIVF2/DIVF3 instruction test failure
2308	904	Unexpected exception during DIVFx instruction test
2562	A02	EMODF instruction test failure
2564	A04	Unexpected exception during EMODF instruction test
2818	B02	MULF2/MULF3 instruction test failure

(continued on next page)

Table 3–7 (Cont.) FPU Test (Test 6) Error Codes and Messages

Error Code (Decimal)	Error Code (Hexadecimal)	Description
2820	B04	Unexpected exception during MULFx instruction test
3074	C02	POLYF instruction test failure
3076	C04	Unexpected exception during POLYF instruction test
3330	D02	SUBF2/SUBF3 instruction test failure
3332	D04	Unexpected exception during SUBFx instruction test
3586	E02	TSTF instruction test failure
3588	E04	Unexpected exception during TSTF instruction test

3.5.1 FPU Test (Test 6) Additional Error Information

You can get more error information by using the SHOW ERROR command. The format of the additional error information that this command provides is as follows:

```
001 0000 vvvvvvvv eeeeeeee eeeeeeee eeeeeeee eeeeeeee eeeeeeee
eeeeeeee
```

where:

- *001* is the FRU number.
- *0000* is the format number.
- *vvvvvvvv* is the vector of the unexpected interrupt (see Table 3–8)
- *eeeeeeee* is the exception data. The system displays this data only for machine checks and arithmetic traps.

Table 3–8 gives the vectors for the different types of exceptions.

Table 3–8 FPU Test (Test 6) Exception Vectors

Vector Number	Exception Type
0004	Machine check
0010	Privileged instruction
0014	Customer reserved instruction
0018	Reserved operand
001c	Reserved addressing mode
0034	Arithmetic trap

3.6 IT Test (Test 7) Error Codes and Messages

Table 3–9 lists the error codes and messages that the **interval timer** (IT) test produces.

Table 3–9 IT Test (Test 7) Error Code and Message

Error Code (Decimal)	Error Code (Hexadecimal)	Description
0002	2	Interval timer is not interrupting at the correct rate

3.7 SYS Test (Test 8) Error Codes and Messages

Table 3–10 lists the error codes and messages that the SYS test produces.

Table 3–10 SYS Test (Test 8) Error Codes and Messages

Error Code (Decimal)	Error Code (Hexadecimal)	Description
0002	2	System ROM test failure
0128	80	Invalidate filter RAM error

3.7.1 SYS Test (Test 8) Additional Error Information

You can get additional error information when an invalidate filter RAM error occurs using the SHOW ERROR command. The format of the additional error information is as follows:

```
001 0010 aaaaaaaa rrrrrrrr eeeeeeee
```

where:

- *001* is the FRU number
- *0010* is the format number
- *aaaacaaa* is the address of the failing invalidate filter
- *rrrrrrrr* is the returned data
- *eeeeeeee* is the expected data

3.8 NI Test (Test 9) Error Codes and Messages

Table 3–11 lists the error codes and messages that the NI test produces.

Table 3–11 NI Test (Test 9) Error Codes and Messages

Error Code (Decimal)	Error Code (Hexadecimal)	Description
Network Address ROM Failures		
0016	10	Read access failure
0018	12	Null address
0020	14	Incorrect group address
0022	16	Incorrect checksum
0024	18	Incorrect group 2
0026	1A	Incorrect group 3
0028	1C	Incorrect test patterns
LANCE Register Test Failures		
0032	20	Address port read/write error
0034	22	CSR0 read/write error
0036	24	CSR1 read/write error
0038	26	CSR2 read/write error
0040	28	CSR3 read/write error

(continued on next page)

Table 3–11 (Cont.) NI Test (Test 9) Error Codes and Messages

Error Code (Decimal)	Error Code (Hexadecimal)	Description
LANCE Initialization Failures		
0048	30	Initialization failure
0050	32	Receiver disabled
0052	34	Transmitter disabled
0054	36	Receiver enabled
0056	38	Transmitter enabled
LANCE Internal Loopback/DMA[1] Failures		
0064	40	Initialization failure
0066	42	Failure during transmit operation
0068	44	Failure during receive operation
0070	46	Packet comparison failure
0072	48	DMA initialization failure
0074	4A	DMA transmit failure
0076	4C	DMA receive failure
0078	4E	Unknown transmit or receive failure
LANCE Interrupt Failures		
0080	50	Initialization failure
0082	52	Transmit failure
0084	54	Receive failure
0086	56	Packet comparison failure
0088	58	NI bit in INT_REQ register is not set
0090	5A	NI bit in INT_REQ register is not clear
0092	5C	NI ISR not entered
0094	5E	NI ISR entered many times

[1]Direct memory access (DMA)

(continued on next page)

Table 3–11 (Cont.) NI Test (Test 9) Error Codes and Messages

Error Code (Decimal)	Error Code (Hexadecimal)	Description
LANCE CRC[2] Failures		
0096	60	Initialization failure
0098	62	Transmit failure
0100	64	Receive failure
0102	66	Packet comparison failure
0104	68	LANCE generated incorrect CRC
0106	6A	LANCE rejected correct CRC
0108	6C	LANCE accepted incorrect CRC
0110	6E	Other LANCE CRC error
LANCE RX MISS/BUFF Failures		
0112	70	Initialization failure
0114	72	Transmit failure
0116	74	Unknown receive failure
0118	76	MISS error not flagged
0120	78	BUFF error not flagged
LANCE Collision Failures		
0128	80	Initialization failure
0130	82	Unknown transmit error
0132	84	RETRY not flagged
0134	86	Transmitter disabled
LANCE Address Filtering Failures		
144	0090	Initialization failure
146	0092	Transmit failure
148	0094	Receive failure

[2]**Character recognition code** (CRC)

(continued on next page)

Table 3–11 (Cont.) NI Test (Test 9) Error Codes and Messages

Error Code (Decimal)	Error Code (Hexadecimal)	Description
LANCE Address Filtering Failures		
150	0096	Packet comparison failure
152	0098	Broadcast filtering failure
154	009A	Promiscuous mode failure
156	009C	Null destination accepted
158	009E	Correct logical address rejected
LANCE External Loopback Failures		
0160	A0	Initialization failure
0162	A2	Transmit failure
0164	A4	Receive failure
0166	A6	Packet comparison failure
0168	A8	Unknown transmit error
0170	AA	Unknown receive error
0172	AC	No loopback connector
LANCE TX BUFF Failures		
0176	B0	Initialization failure
0178	B2	BUFF error not flagged
0180	B4	Transmitter enabled
0182	B6	Unknown transmit error
DMA Register Failures		
0208	D0	MAP_BASE register error
0210	D2	I/O write access to map registers failure
0212	D4	I/O read access to map registers failure
0214	D6	Parity error not flagged

(continued on next page)

Table 3–11 (Cont.) NI Test (Test 9) Error Codes and Messages

Error Code (Decimal)	Error Code (Hexadecimal)	Description
LANCE DMA Failures		
0224	E0	Nonexistent DMA not flagged
0226	E2	Invalid DMA not flagged
0228	E4	Valid DMA failure
0230	E6	DMA failure during initialization
0232	E8	DMA failure during transmit operation
0234	EA	DMA failure during receive operation

3.8.1 NI Test (Test 9) Additional Error Information

To get more error information, enter the SHOW ERROR command. The format of the additional error information depends on the type of test that fails. The second element of the SHOW ERROR display gives the format number of the SHOW ERROR display. The elements in each format type are as follows:

Error Format: 0001
Error Type: Register error.

```
001 0001 aaaaaaaa bbbbbbbb cccccccc
```

where:

- *001* is the FRU number
- *0001* is the error format number
- *aaaaaaaa* is the address of the register
- *bbbbbbbb* is the expected data or data written
- *cccccccc* is the returned data or data read

Error Format: 0002
Error Type: DMA error.

```
001 0002 0000aaaa bbbbbbbb cccccccc dddddddd eeeeeeee
```

where:

- *001* is the FRU number
- *0002* is the error format number
- *aaaa* is the actual value of LANCE register CSR0

- *bbbbbbbb* is the contents of the parity control register, PAR_CTL
- *cccccccc* is the DMA address of the device (24 bits)
- *dddddddd* is the physical address of the MAP register
- *eeeeeeee* is the contents of the MAP register

Error Format: 000B
Error Type: Network address ROM, address group error.

001 000B aaaaaaaa bbbbbbbb cccccccc 0000dddd

where:

- *001* is the FRU number
- *000B* is the error format number
- *aaaaaaaa* is the first address of the network address ROM
- *bbbbbbbb* is the contents of the first 4 bytes of the network address
- *cccccccc* is the next 2 bytes of the network address and the 2-byte checksum of the network address ROM
- *dddd* is the calculated checksum

Error Format: 000C
Error Type: Network address ROM, test pattern error.

001 000C aaaaaaaa bbbbbbbb cccccccc

where:

- *001* is the FRU number
- *000C* is the error format number
- *aaaaaaaa* is the first address of the network address ROM test patterns
- *bbbbbbbb* is the first 4 bytes of the test patterns
- *cccccccc* is the last 4 bytes of the test patterns

Error Format: 000D
Error Type: Initialization error

001 000D 0000aaaa bbbbbbbb 0000cccc dddddddd eeeeeeee

where:

- *001* is the FRU number
- *000D* is the error format number

- *0000aaaa* is the actual value of LANCE register CSR0
- *bbbbbbbb* is the physical address of the initialization block
- *0000cccc* is the mode of the initialization block
- *dddddddd* is the most significant longword of the logical address filter
- *eeeeeeee* is the least significant longword of the logical address filter

Error Format: 000E
Error Type: Transmit error.

001 000E 0000aaaa bbbbbbbb cccccccc dddddddd

where:

- *001* is the FRU number
- *000E* is the error format number
- *0000aaaa* is the actual value of LANCE register CSR0
- *bbbbbbbb* is the physical address of the current transmit descriptor
- *cccccccc* is the most significant longword of the transmit descriptor
- *dddddddd* is the least significant longword of the transmit descriptor

Error Format: 000F
Error Type: Receive error.

001 000F 0000aaaa bbbbbbbb cccccccc dddddddd

where:

- *001* is the FRU number
- *000F* is the error format number
- *0000aaaa* is the actual value of LANCE register CSR0
- *bbbbbbbb* is the physical address of the current receive descriptor
- *cccccccc* is the most significant longword of the receive descriptor
- *dddddddd* is the least significant longword of the receive descriptor

Error Format: 0010
Error Type: Packet error.

001 0010 0000aaaa bbbbbbbb cccccccc dddddddd

where:

- *001* is the FRU number

- *0010* is the error format number
- *0000aaaa* is the actual value of the LANCE register CSR0
- *bbbbbbbb* is the length of the packet
- *cccccccc* is the packet pattern or packet index
- *dddddddd* is the CRC of the packet

Error Format: 0011
Error Type: Interrupt error.

```
001 0011 0000aaaa bbbbbbbb cccccccc
```

where:

- *001* is the FRU number
- *0011* is the error format number
- *0000aaaa* is the actual value of the LANCE register CSR0
- *bbbbbbbb* is the contents of the interrupt mask register, INT_MSK
- *cccccccc* is the contents of the interrupt request register, INT_REQ

3.9 SCSI Test (Test 10) Error Codes and Messages

Table 3–12 lists the error codes and messages that the SCSI test produces.

Table 3–12 SCSI Test (Test 10) Error Codes and Messages

Error Code (Decimal)	Error Code (Hexadecimal)	Description
SCSI Interrupt Test Failures		
0002	2	SCSI reset register test failure
0004	4	SCSI configuration registers test failure
0006	6	SCSI FIFO[1] register test failure
0008	8	SCSI transfer count registers test failure
0010	A	SCSI interrupt/status registers test failure
0020	14	No cause failure

[1]**First in/first out (FIFO)**

(continued on next page)

Table 3–12 (Cont.) SCSI Test (Test 10) Error Codes and Messages

Error Code (Decimal)	Error Code (Hexadecimal)	Description
SCSI Interrupt Test Failures		
0022	16	High IPL, mask disabled failure
0024	18	High IPL, mask enabled failure
0026	1A	Low IPL, mask disabled failure
0028	1C	Low IPL, mask enabled failure
SCSI Data Transfer Test Failures		
0030	1E	PROM[2] function failure
0032	20	DMA mapping failure
0034	22	Non-DMA inquiry failure
0036	24	Not enough data returned
0038	26	DMA inquiry failure
0040	28	Non-DMA/DMA comparison failure
0042	2A	DMA inquiry nonalignment failure
0044	2C	Non-DMA/DMA nonalignment comparison failure
0046	2E	Synchronous inquiry failure
0048	30	Non-DMA synchronous comparison failure
SCSI Minimal Device Test Failure		
0050	32	SCSI minimal device test failure
SCSI Map Error Test Failures		
0060	3C	DMA mapping failure
0062	3E	DMA inquiry failure
0064	40	Map error does not clear
0066	42	Map error does not set

[2]**Programmable read only memory** (PROM)

(continued on next page)

Table 3–12 (Cont.) SCSI Test (Test 10) Error Codes and Messages

Error Code (Decimal)	Error Code (Hexadecimal)	Description
SCSI Map Error Test Failures		
0068	44	Parity error does not clear
0070	46	PROM function failure
Miscellaneous SCSI Test Failures		
0080	50	SCSI PROM function failure
0082	52	SCSI INIT driver failure

3.9.1 SCSI Test (Test 10) Additional Error Information

To get additional error information, enter the SHOW ERROR command. The format of the additional error information depends on the type of test that fails. The second element of the SHOW ERROR display gives the format number of the SHOW ERROR display. Each element in the format types is described as follows:

Error Format: 0001
Error Type: Register error.

```
001 0001 aaaaaaaa bbbbbbbb cccccccc dddddddd
```

where:

- *001* is the FRU number of the CPU module
- *0001* is the error format number
- *aaaaaaaa* is the error code
- *bbbbbbbb* is the address of the register or location under test
- *cccccccc* is the expected data or data written
- *dddddddd* is the returned data or data read

Error Format: 000B
Error Type: Register error

```
001 000B aaaaaaaa bbbbbbbb cccccccc
```

where:

- *001* is the FRU number of the CPU module

- *000B* is the error format number
- *aaaaaaaa* is the error code
- *bbbbbbbb* is the address of the register or location under test
- *cccccccc* is the information about the error (see Table 3–13)

Error Format: 000C
Error Type: Interrupt error

```
001 000C aaaaaaaa bbbbbbbb cccccccc dddddddd eeeeeeee ffffffff
```

where:

- *001* is the FRU number of the CPU module
- *000C* is the error format number
- *aaaaaaaa* is the error code
- *bbbbbbbb* is the information about the error (see Table 3–13)
- *cccccccc* is the contents of the interrupt mask register
- *dddddddd* is the contents of the interrupt request register
- *eeeeeeee* is the contents of the controller status register
- *ffffffff* is the contents of the controller interrupt register

Error Format: 000D
Error Type: Interrupt data returned to the self-test following a SCSI command.

```
aaa 000D bbbbcccc ddddeeee ffffgggg hhhhhhhh
```

where:

- *aaa* is the FRU number as follows:
  - 001 for the CPU module
  - 100 plus (the device ID multiplied by 10) plus the logical unit number
- *000D* is the error format number
- *bbbb* is the logical unit number
- *cccc* is the device ID
- *dddd* is the actual command operation code
- *eeee* is the current command operation code
- *ffff* is the error code

- *gggg* is the mode of operation (see Table 3–14)
- *hhhhhhhh* is the number of data bytes received

Error Format: 000E
Error Type: SCSI command fails.

```
aaa 000E bbbbcccc ddddeeee ffffgggg hhhhiiii jjjjjjjj kkkkllll
mmmmmmmm
```

where:

- *aaa* is the FRU number as follows:
  - 001 for the CPU module
  - 100 plus (the device ID multiplied by 10) plus the logical unit number
- *000E* is the error format number
- *bbbb* is the logical unit number
- *cccc* is the device ID
- *dddd* is the actual command operation code
- *eeee* is the current command operation code
- *ffff* is the error code
- *gggg* is the mode of operation (see Table 3–14)
- *hhhh* is byte 14 of the request sense packet (device FRU)
- *iiii* is information about the error (see Table 3–13)
- *jjjjjjjj* is the SCSI bus phase at the time of the error
- *kkkk* is the contents of the controller status register at the time of the error
- *llll* is the contents of the controller interrupt register
- *mmmmmmmm* is the request sense key

Error Format: 000F
Error Type: The status phase returns an incorrect status. A bad sense key is detected after a request sense.

```
aaa 000F bbbbcccc ddddeeee ffffgggg hhhhiiii jjjjjjjj kkkkkkkk
```

where:

- *aaa* is the FRU number as follows:
  - 001 for the CPU module

  - 100 plus (the device ID multiplied by 10) plus the logical unit number
- *000F* is the error format number
- *bbbb* is the logical unit number
- *cccc* is the device ID
- *dddd* is the actual command operation code
- *eeee* is the current command operation code
- *ffff* is the error code
- *gggg* is the mode of operation (see Table 3–14)
- *hhhh* is byte 14 of the request sense packet (device FRU)
- *iiii* is information about the error (see Table 3–13)
- *jjjjjjjj* is the status byte returned in status phase
- *kkkkkkkk* is the request sense key

Error Format: 0010
Error Type: Insufficient sense bytes received after request sense command execution

```
aaa 0010 bbbbcccc ddddeeee ffffgggg hhhhiiii jjjjjjjj kkkkkkkk
```

where:

- *aaa* is the FRU number as follows:
  - 001 for the CPU module
  - 100 plus (device ID multiplied by 10) plus the logical unit number
- *0010* is the error format number
- *bbbb* is the logical unit number
- *cccc* is the device ID
- *dddd* is the actual command operation code
- *eeee* is the current command operation code
- *ffff* is the error code
- *gggg* is the mode of operation (see Table 3–14)
- *hhhh* is byte 14 of the request sense packet (device FRU)
- *iiii* is information about the error (see Table 3–13)

- *jjjjjjjj* is the number of bytes of sense data returned from the request sent
- *kkkkkkkk* is the request sense key

Error Format: 0011
Error Type: Data out phase does not send enough bytes

```
aaa 0011 bbbbcccc ddddeeee ffffgggg hhhhiiii jjjjkkkk llllllll
mmmmmmmm
```

where:

- *aaa* is the FRU number as follows:
  - 001 for the CPU module
  - 100 plus (the device ID multiplied by 10) plus the logical unit number
- *0011* is the error format number
- *bbbb* is the logical unit number
- *cccc* is the device ID
- *dddd* is the actual command operation code
- *eeee* is the current command operation code
- *ffff* is the error code
- *gggg* is the mode of operation (see Table 3–14)
- *hhhh* is byte 14 of the request sense packet (device FRU)
- *iiii* is information about the error (see Table 3–13)
- *jjjj* is the contents of the controller status register at the time of the error
- *kkkk* is the contents of the controller interrupt register at the time of the error
- *lllllll* is the number of bytes sent in the data in or out phases
- *mmmmmmmm* is the number of bytes that should have been sent in the data in or out phases

Error Format: 0012
Error Type: Unsupported message detection.

```
aaa 0012 bbbbcccc ddddeeee ffffgggg hhhhiiii jjjjjjjj kkkkllll
mmmmmmmm
```

where:

- *aaa* is the FRU number as follows:
  - 001 for the CPU module
  - 100 plus (device ID multiplied by 10) plus the logical unit number
- *0012* is the error format number
- *bbbb* is the logical unit number
- *cccc* is the device ID
- *dddd* is the actual command operation code
- *eeee* is the current command operation code
- *ffff* is the error code
- *gggg* is the mode of operation (see Table 3–14)
- *hhhh* is byte 14 of the request sense packet (device FRU)
- *iiii* is information about the error (see Table 3–13)
- *jjjjjjjj* is the first byte of the message in phase, in which the error occurred
- *kkkk* is the contents of the controller interrupt register at the time of the error
- *llll* is the contents of the controller status register at the time of the error
- *mmmmmmmm* is the request sense key

Error Format: 0013
Error Type: Map test error

```
aaa 0013 bbbbcccc dddddddd eeeeeeee ffffffff gggggggg hhhhhhhh
iiiiiiii
```

where:

- *aaa* is the FRU number as follows:
  - 001 for the CPU module
  - 100 plus (the device ID multiplied by 10) plus the logical unit number
- *0013* is the error format number
- *bbbb* is the logical unit number
- *cccc* is the device ID

- *dddddddd* is the DMA address of the location that contains the SCSI command
- *eeeeeeee* is the DMA address of the location that contains the SCSI data
- *ffffffff* is the contents of the parity control register
- *gggggggg* is the map register address
- *hhhhhhhh* is the contents of the map register
- *iiiiiiii* is the error code

Error Format: 0014
Error Type: Data transfer test error. The number of bytes received in two transfers is different.

```
aaa 0014 bbbbbbbb cccccccc dddddddd
```

where:

- *aaa* is the FRU number as follows:
  - 001 for the CPU module
  - 100 plus (the device ID multiplied by 10) plus the logical unit number
- *0014* is the error format number
- *bbbbbbbb* is the first number of bytes
- *cccccccc* is the second number of bytes
- *dddddddd* is the error code

Error Format: 0015
Error Type: Data transfer test error. The data bytes received in two transfers are compared and are different.

```
aaa 0015 bbbbbbbb cccccccc
```

where:

- *aaa* is the FRU number as follows:
  - 001 for the CPU module
  - 100 plus (the device ID multiplied by 10) plus the logical unit number
- *0015* is the error format number
- *bbbbbbbb* is the number of the byte that failed
- *cccccccc* is the error code

Some of the error formats give error information codes. Table 3–13 lists these information codes.

Table 3–13 Error Information Codes

Error Code (Decimal)	Error Code (Hexadecimal)	Description
0001	1	Valid group code bit in the controller status register is clear
0002	2	Valid group code bit in the controller status register is set
0003	3	Terminal count bit in the controller status register is clear
0004	4	Terminal count bit in the controller status register is set
0005	5	Parity error bit in the controller status register is clear
0006	6	Parity error bit in the controller status register is set
0007	7	Gross error bit in the controller status register is clear
0008	8	Gross error bit in the controller status register is set
0009	9	Interrupt bit in the controller status register is clear
0010	A	Interrupt bit in the controller status register is set
0011	B	Selected bit in the controller status register is clear
0012	C	Selected bit in the controller status register is set
0013	D	Select with attention bit in the controller interrupt register is clear
0014	E	Select with attention bit in the controller interrupt register is set
0015	F	Reselect bit in the controller interrupt register is clear
0016	10	Reselect bit in the controller interrupt register is set
0017	11	Function complete bit in the controller interrupt register is clear
0018	12	Function complete bit in the controller interrupt register is set
0019	13	Bus service bit in the controller interrupt register is clear

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Table 3–13 (Cont.) Error Information Codes

Error Code (Decimal)	Error Code (Hexadecimal)	Description
0020	14	Bus service bit in the controller interrupt register is set
0021	15	Disconnect bit in the controller interrupt register is clear
0022	16	Disconnect bit in the controller interrupt register is set
0023	17	Illegal command bit in the controller interrupt register is clear
0024	18	Illegal command bit in the controller interrupt register is set
0025	19	SCSI reset bit in the controller interrupt register is clear
0026	1A	SCSI reset bit in the controller interrupt register is set
0027	1B	Arbitration not won
0028	1C	Selection timeout
0029	1D	Invalid sequence in sequence step register
0030	1E	FIFO flags are not clear
0031	1F	FIFO flags are clear
0032	20	Unexpected ISR hit
0033	21	SCSI interrupt request set in system interrupt request register
0034	22	SCSI bit in the controller status register is unexpectedly set
0035	23	Interrupt service routine not entered
0036	24	SCSI interrupt not detected
0037	25	Interrupt bit in the controller status register does not clear
0038	26	SCSI bit in the system interrupt request register does not clear
0039	27	Incorrect request sense key
0040	28	Incorrect status returned from status phase
0041	29	Insufficient sense data returned from a request sense command

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Table 3–13 (Cont.) Error Information Codes

Error Code (Decimal)	Error Code (Hexadecimal)	Description
0042	2A	Phase did not go to command phase
0043	2B	Phase did not go to message out phase
0044	2C	Phase did not go to message in phase
0045	2D	Command phase changed too soon
0046	2E	Data out phase changed too soon
0047	2F	Message in phase changed too soon
0048	30	Message out phase changed too soon
0049	31	Stuck in command phase
0050	32	Stuck in message in phase
0051	33	Stuck in message out phase
0052	34	Stuck in data out phase
0053	35	Stuck in data in phase
0054	36	Should not be in message out phase
0055	37	No interrupt after sending the SCSI command
0056	38	No interrupt after sending command complete
0057	39	No interrupt after sending message accepted
0058	3A	No interrupt after sending the transfer information
0059	3B	All data out bytes were not sent
0060	3C	Command complete message was sent, but the device did not release the SCSI bus
0061	3D	Unexpected message reject from device
0062	3E	Incorrect FIFO flag count
0063	3F	Unsupported message
0064	40	Bus device reset was sent, but device did not release the bus
0065	41	Illegal phase
0066	42	Should not be in data phase
0067	43	Device trying to reconnect

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Table 3–13 (Cont.) Error Information Codes

Error Code (Decimal)	Error Code (Hexadecimal)	Description
0068	44	Unexpected disconnect message received
0069	45	Unknown device is trying to reconnect
0070	46	Incorrect identity message received on reconnection
0071	47	Number of retries for this command exceeded
0072	48	Too many bytes sent in data out phase
0073	49	Too many bytes sent in data in phase
0074	4A	Reconnection timeout
0075	4B	SCSI parity error
0076	4C	SCSI map error

Some of the error formats give mode values. Table 3–14 lists these mode values.

Table 3–14 Mode Values

Mode (Hexadecimal)	Description
0000	Asynchronous mode with programmed I/O
0001	Asynchronous mode with DMA
0002	Synchronous mode with DMA

3.10 COMM Test (Test 12) Error Codes and Messages

Table 3–15 lists the error codes and messages that the COMM test produces.

Table 3–15 COMM Test (Test 12) Error Codes and Messages

Error Code (Decimal)	Error Code (Hexadecimal)	Description
0001	1	Self-test successful

(continued on next page)

Table 3–15 (Cont.) COMM Test (Test 12) Error Codes and Messages

Error Code (Decimal)	Error Code (Hexadecimal)	Description
0002	2	Transmit underflow
0004	4	Transmitter busy
0006	6	Receiver busy
0008	8	Transmitter error
0010	A	Loss of carrier detect
0012	C	Receiver overflow
0014	E	Receive CRC error
0016	10	Receive abort
0018	12	Receive nonoctet aligned
0020	14	Receive parity error
0022	16	Receive frame error
0024	18	Receive length too long
0026	1C	Receive DLE follow
0030	1E	No external loopback connector
0032	20	Invalid test specified
0034	22	System timeout waiting for response
0036	24	COMM module timeout
0038	26	System invalid test
0040	28	Communications option self-test failure
0042	2A	Communications option copy to RAM failure
0044	2C	Communications option RAM test failure
0046	2E	Communications option dual RAM access test failure
0048	30	Communications option interrupt test failure
0050	32	Communications option reset test failure
0052	34	Communications option internal loopback failure
0054	36	Communications option external loopback failure

(continued on next page)

Table 3–15 (Cont.) COMM Test (Test 12) Error Codes and Messages

Error Code (Decimal)	Error Code (Hexadecimal)	Description
0056	38	Communications option modem signal test failure
0058	3A	Communications option H3199 loopback connector failure
0060	3C	Communications option H3248 loopback connector failure
0062	3E	Communications option H3250 loopback connector failure
0064	40	Communications option H3074 loopback connector failure
0066	42	Communications option host internal buffer test failure
0068	44	Communications option external buffer loopback failure
0070	46	Data comparison error
0128	80	IMP IDMA timeout
0130	82	IMP SCC transmit timeout
0132	84	IMP SCC receive timeout
0134	86	IMP command timeout
0136	88	IMP ERR timeout
0138	8A	IMP PB8 timeout
0140	8C	IMP SCM2 timeout
0142	8E	IMP SCM1 timeout
0144	90	IMP watchdog timeout
0146	92	IMP SCP timeout
0148	94	IMP timer 2 timeout
0150	96	IMP SCC3 timeout
0152	98	IMP PB9 timeout
0154	9A	IMP timer 1 timeout
0156	9C	IMP SCC2 timeout

(continued on next page)

Table 3–15 (Cont.) COMM Test (Test 12) Error Codes and Messages

Error Code (Decimal)	Error Code (Hexadecimal)	Description
0158	9E	IMP IDMA timeout
0160	A0	IMP SDMA timeout
0162	A2	IMP SCC1 timeout
0164	A4	IMP PB10 timeout
0166	A6	IMP PB11 timeout
0168	A8	IMP internal loopback system test failure
0170	AA	IMP external loopback system test failure
0172	AC	IMP timer 1 timeout
0174	AE	IMP timer 2 timeout
0176	B	IMP transmit ready timeout
0178	B2	IMP receive ready timeout
0180	B4	IMP invalid SCC channel
0182	B6	System data comparison error
0184	B8	IMP carrier detect assert timeout
0186	BA	IMP carrier detect deassert timeout
0188	BC	IMP CTS assert timeout
0190	BE	IMP CTS deassert timeout
0192	C0	IMP IDL assert timeout
0194	C2	IMP IDL deassert timeout
0196	C4	IMP incorrect cable connected
0198	C6	IMP no test indicator
0200	C8	IMP no data set ready
0202	CA	IMP no ring indicator
0204	CC	IMP no speed indicator
0206	CE	IMP no carrier detect
0208	D0	IMP no clear to send
0210	D2	IMP power-up block initialization error
0212	D4	IMP DSR assert timeout

(continued on next page)

Table 3–15 (Cont.) COMM Test (Test 12) Error Codes and Messages

Error Code (Decimal)	Error Code (Hexadecimal)	Description
0214	D6	IMP DSR deassert timeout
0216	D8	IMP reset error
0218	DA	IMP mode initialization error
0220	DC	System memory allocation error
0222	DE	System memory error
0224	E0	UTIL invalid utility number
0226	E2	UTIL invalid cable code
0228	E4	Timeout communications option set response RA
0230	E6	Timeout communications option clear command CA
0232	E8	Timeout communications option set scheduler run SR
0234	EA	Timeout communications option set transmit ready TR
0236	EC	Timeout communications option set receive ready RR
0238	EE	Communications option exception occurred
0240	F0	Communications option command register timeout
0242	F2	Communications option clear to send lost
0244	F4	System test memory allocation error
0246	F6	System test memory free error
0248	F8	Communications option reports invalid configuration
0250	FA	System ROM test failure
0252	FC	System ROM checksum failure
0255	FF	Ctrl/C entered at the console terminal
0256	100	Communications option receive error; CRC follow error

(continued on next page)

Table 3–15 (Cont.) COMM Test (Test 12) Error Codes and Messages

Error Code (Decimal)	Error Code (Hexadecimal)	Description
0258	102	Communications option MC68302 component not in REV B
0260	104	Test request sequence error
0262	106	IMP timeout waiting for host to clear RA
0264	108	IMP timeout waiting for host to clear SR
0266	10A	ROM test error
0268	10C	Reserved operation: FBUG secure error
0270	10E	Port PB3 signal remains high
0272	110	Timer 3 not counting
0274	112	Communications options diagnostic did not complete
0276	114	Communications options SDMA bus error occurred
0278	116	Timeout while waiting for IRQ assertion
0280	118	Maximum number of transmit restart operations (10) exceeded

3.10.1 COMM Test Sequence Numbers

The COMM test consists of a sequence of tests. Table 3–16 gives the number and a description of each test.

Table 3–16 COMM Test

Test Number (Decimal)	Test Number (Hexadecimal)	Description
1	1	Exception vector initialization
2	2	User interrupt vector initialization
3	3	Local register RDB initialization
4	4	Up block initialization
5	5	Option register initialization

(continued on next page)

Table 3–16 (Cont.) COMM Test

Test Number (Decimal)	Test Number (Hexadecimal)	Description
6	6	Base register initialization
7	7	Power-up switch initialization
8	8	Get hardware configuration
9	9	System control register initialization
10	A	MC68302 core confidence test
11	B	Clear watchdog timer counter
12	C	Port A initialization
13	D	Port B initialization
14	E	ISDN configuration
15	F	Local scratch RAM SCR initialization
16	10	Interrupt data block initialization
17	11	Process control block initialization
18	12	Interrupt controller initialization
19	13	Read cable code
20	14	IDMA transfer test
21	15	Initialize rings
22	16	SCC1 ISR enable
23	17	SCC2 ISR enable
24	18	SCC3 ISR enable
25	19	Timer 1 test
26	1A	Timer 2 test
27	1B	Initialize mode
28	1C	Initialize CP
29	1D	SCC internal loopback test
30	1E	Modem signal test
31	1F	SCC external loopback test
32	20	ISDN test
33	21	Run-time register RDB initialization

(continued on next page)

Table 3–16 (Cont.) COMM Test

Test Number (Decimal)	Test Number (Hexadecimal)	Description
34	22	Run-time SCR RAM initialization
35	23	Run-time read adapter cable code
36	24	Run-time interrupt controller initialization
37	25	Run-time IDB initialization
38	26	Run-time PCB initialization
39	27	Run-time communication
40	28	Run-time initialize transmit and receive rings
41	29	Run-time SCC1 ISR
42	2A	Run-time SCC2 ISR
43	2B	Run-time SCC3 ISR
44	2C	Run-time timer 1 start
45	2D	Run-time timer 2 start
46	2E	Run-time timer 3 start
47	2F	Run-time RAM dual access initialization
48	30	Run-time transfer vector initialization

3.10.2 COMM Test (Test 12) Additional Error Information

To get additional error information, enter the SHOW ERROR command. The format of the additional error information depends on the type of test that fails. The second element of the SHOW ERROR display gives the format number of the SHOW ERROR display. Each element in each format type is described as follows:

Error Format: 0001
Error Type: Communications option RAM test errors

```
020 001 aaaa0000 00000000 00000000 00000000 bbbb0000 ccccdddd
eeeeffff
```

where:

- *020* is the FRU number
- *001* is the error format number
- *aaaa* is the test status

- *bbbb* is the data size (1=byte access, 2=word access, 4=longword access)
- *cccc* is the least significant part of the address
- *dddd* is the most significant part of the address
- *eeee* is the returned data
- *ffff* is the expected data

Error Format: 0002
Error Type: Communications option self-test errors.

```
020 0002 aaaabbbb ccddeeff gghhiijj kkkkllll mmmmnnnn ooooppppp
qqqqrrrr
```

where:

- *020* is the FRU number
- *0002* is the error format number
- *aaaa* is the test status
- *bbbb* is the MC68302 diagnostic test number
- *cc* is the cable code SCC1
- *dd* is the cable code SCC2
- *ee* is the hardware revision
- *ff* is the software revision
- *gg* is the channel under test (1, 2, or 3)
- *hh* is the electrical interface
- *ii* is the loopback mode (00=internal loopback, 01=external loopback)
- *jj* is the external channel count
- *kkkk* is the SCC mode
- *llll* is the communications protocol
- *mmmm* is the data size
- *nnnn* is the channel speed
- oooo is the least significant part of the address
- *pppp* is the most significant part of the address
- *qqqq* is the expected data

- *rrrr* is the received data

Error Format: 0003
Error Type: Communications option dual access test errors.

```
020 0003 aaaabbbb ccddeeff gghhiijj kkkkkkkk mmmmnnnn oooopppp
qqqqrrrr
```

where:

- *020* is the FRU number
- *0003* is the error format number
- *aaaa* is the test status
- *bbbb* is the MC68302 diagnosti· test number
- *cc* is the cable code SCC1
- *dd* is the cable code SCC2
- *ee* is the hardware revision
- *ff* is the software revision
- *gg* is the channel under test (1, 2, or 3)
- *hh* is the electrical interface
- *ii* is the loopback mode (00=internal loopback, 01=external loopback)
- *jj* is the external channel count
- *kkkk* is the SCC mode
- *llll* is the communications protocol
- *mmmm* is the data size
- *nnnn* is the channel speed
- *oooo* is the least significant part of the address
- *pppp* is the most significant part of the address
- *qqqq* is the expected data
- *rrrr* is the returned data

Error Format: 0004
Error Type: Communications option interrupt test errors

```
020 0004 aaaabbbb ccddeeff gghhiijj kkkkllll mmmmnnnn oooopppp
qqqqrrrr
```

where:

- *020* is the FRU number
- *0004* is the error format number
- *aaaa* is the test status
- *bbbb* is the MC68302 diagnostic test number
- *cc* is the cable code SCC1
- *dd* is the cable code SCC2
- *ee* is the hardware revision
- *ff* is the software revision
- *gg* is the channel under test (1, 2, or 3)
- *hh* is the electrical interface
- *ii* is the loopback mode (00=internal loopback, 01=external loopback)
- *jj* is the external channel count
- *kkkk* is the SCC mode
- *llll* is the communications protocol
- *mmmm* is the data size
- *nnnn* is the channel speed
- *oooo* is the least significant part of the address
- *pppp* is the most significant part of the address
- *qqqq* is the expected data
- *rrrr* is the returned data

Error Format: 0005
Error Type: Communications option modem signal test errors

```
020 0005 aaaabbbb ccddeeff gghhiijj kkkkllll mmmmnnnn oooopppp
qqqqrrrr
```

where:

- *020* is the FRU number
- *0005* is the error format number
- *aaaa* is the test status

- *bbbb* is the MC68302 diagnostic test number
- *cc* is the cable code SCC1
- *dd* is the cable code SCC2
- *ee* is the hardware revision
- *ff* is the software revision
- *gg* is the channel under test (1, 2, or 3)
- *hh* is the electrical interface
- *ii* is the loopback mode (00=internal loopback, 01=external loopback)
- *jj* is the external channel count
- *kkkk* is the SCC mode
- *llll* is the communications protocol
- *mmmm* is the data size
- *nnnn* is the channel speed
- *oooo* is the least significant part of the address
- *pppp* is the most significant part of the address
- *qqqq* is the expected data
- *rrrr* is the returned data

Error Format: 0006
Error Type: Communications option loopback test errors

```
020 0006 aaaabbbb ccddeeff gghhiijj kkkkkkkk mmmmnnnn ooooppppp
qqqqrrrr
```

where:

- *020* is the FRU number
- *0006* is the error format number
- *aaaa* is the test status
- *bbbb* is the MC68302 diagnostic test number
- *cc* is the cable code SCC1
- *dd* is the cable code SCC2
- *ee* is the hardware revision

- *ff* is the software revision
- *gg* is the channel under test (1, 2, or 3)
- *hh* is the electrical interface
- *ii* is the loopback mode (00=internal loopback, 01=external loopback)
- *jj* is the external channel count
- *kkkk* is the SCC mode
- *llll* is the communications protocol
- *mmmm* is the data size
- *nnnn* is the channel speed
- *oooo* is the least significant part of the address
- *pppp* is the most significant part of the address
- *qqqq* is the expected data
- *rrrr* is the returned data

Error Format: 0007
Error Type: Communications option reset test errors

```
020 0007 00070000
```

where:

- *020* is the FRU number
- *0007* is the error format number
- *00070000* indicates that the reset test is running

Error Format: 0008
Error Type: Communications option null request test errors

```
020 0008 0008
```

where:

- *020* is the FRU number
- *0008* is the error format number
- *0008* indicates that the null request test is running

Error Format: 0009
Error Type: Used when an exception occurs

```
020 0009 0000aaaa bbbbcccc dddd0000 00000000 0000eeee ffffgggg
00000000
```

where:

- *020* is the FRU number
- *0009* is the error format number
- *0000aaaa* is the contents of the command status register
- *bbbb* is the most significant part of the stack pointer
- *cccc* is the exception vector
- *dddd* is the least significant part of the stack pointer
- *eeee* is the contents of the status register
- *ffff* is the least significant part of the program counter
- *gggg* is the most significant part of the program counter
- *00000000* is not used

Error Format: 000A
Error Type: Communications option initialization.

```
020 000A 00040003 00060005 00080007 00100009 00120011 00140013
00160015
```

where:

- *020* is the FRU number
- *000A* is the error format number
- The remaining elements in the format indicate that the communications option is executing diagnostic instructions.

3.11 ASYNC Test (Test 14) Error Codes and Messages

Table 3–17 lists the error codes and messages that the ASYNC test produces.

Table 3–17 ASYNC Test Error Codes and Messages

Error Code (Decimal)	Error Code (Hexadecimal)	Description
0256	100	Master reset test failure
0512	200	DHUID test failure
0768	300	Write_Read_CSR test failure
1024	400	Internal Self-test failure
1280	500	Recv_Interr test failure
1536	600	Selftest_Fail test failure
1792	700	Result_Bytes test failure
2048	800	FIFO_Size test failure
2304	900	Trans_Interr test failure
2560	A00	Polled_Wrapback test failure[1]
2816	B00	Full_FIFO test failure[1]
3072	C00	Interrupt test failure[1]
3328	D00	Polled_Modem test failure[1]
3584	E00	External_Interrupt_modem test failure[1]
4096	1X00[1]	Extended mode test failure[1]

[1]These tests also run in extended test mode.
X is in the range A to E for tests that run in extended mode as follows:

A for the polled_wrapback test
B for the full_FIFO test
C for the interrupt test
D for the polled_modem test
E for the interrupt_modem test

3.11.1 ASYNC Test (Test 14) Additional Error Information

To get additional error information, enter the SHOW ERROR command. The format of the additional error information is as follows:

```
021 0000 ssssssss cccccccc lprlprlp llllllll rrrrrrrr eeeeeeee
```

where:

- *021* is the FRU number
- *0000* is the format type; always zero
- *ssssssss* is an error subcode
- *cccccccc* is the value of the ASYNC CSR (3E000000)
- *lprlprlp* is the contents of the line parameter register
- *lllllll* is the serial line number
- *rrrrrrrr* is the returned data
- *eeeeeeee* is the expected data

The error subcode has the format:

```
etis
```

where:

- *e* is a mode indication; when set, extended test mode is selected
- *t* is the number of the test in which the error occurred
- *i* is an indication of where the error occurred; when set, the error occurred in the initial_port function
- *s* is the error subcode (see Table 3–18)

Table 3–18 ASYNC Test (Test 14) Error Subcodes

Error Subcode (Hexadecimal)	Description
Master_reset Test	
101	Master reset bit in CSR remains set
102	Internal self-test failure
DHUID Test	
201	Asynchronous option is configured in DHV11 mode

(continued on next page)

Table 3–18 (Cont.) ASYNC Test (Test 14) Error Subcodes

Error Subcode (Hexadecimal)	Description
Write_Read CSR Test	
301	Cannot select line 15 in CSR
302	Cannot select line 0 in CSR
Internal_Selftest Test	
401	Master reset bit in CSR remains set
Recv_Interr Test	
503	No receiver interrupt was generated
Selftest_Fail Test	
602	Internal self-test failure

(continued on next page)

Table 3–18 (Cont.) ASYNC Test (Test 14) Error Subcodes

Error Subcode (Hexadecimal)	Description
Result_Bytes Test	
701	Self-test result bytes not in the receiver FIFO
702	No data available in the receiver FIFO
703	Unexpected data in the receiver FIFO
704	Data in receiver FIFO is not valid
705	Receiver buffer does not contain diagnostic information
706	Low OCART failure
707	High OCART failure
708	RAM failure
709	RTS/CTS/DCD error on channels 0 to 7
70A	RTS/CTS/DCD error on channels 8 to 15
70B	DTR/RI-DSR error on channels 0 to 7
70C	DTR/RI-DSR error on channels 8 to 15
70D	Undefined error
70E	Incorrect sequence code
70F	Incorrect chip version
FIFO_Size Test	
801	FIFO size not equal to 64 bytes
Trans_Interr Test	
901	Illegal transmitter interrupt

(continued on next page)

Table 3–18 (Cont.) ASYNC Test (Test 14) Error Subcodes

Error Subcode (Hexadecimal)	Description
Polled_Wrapback Test	
A01	TXACTION bit not set after data transmission
A02	No data available in receiver FIFO
A03	Unexpected data in receiver FIFO
A04	FIFO_Error Test: data in receiver FIFO is not valid
A05	FIFO_Error Test: receiver buffer contains diagnostic information
A06	FIFO_Error Test: no data available in receiver FIFO
A07	FIFO_Error Test: framing error
A08	FIFO_Error Test: overrun error
A09	FIFO_Error Test: undefined error
A0A	FIFO_Error Test: incorrect line number in received data
A0B	FIFO_Error Test: received character is not the same as transmitted character
A11	Initial_Port Test: transmit FIFO not empty
A12	Initial_Port Test: unexpected characters in receiver FIFO

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Table 3–18 (Cont.) ASYNC Test (Test 14) Error Subcodes

Error Subcode (Hexadecimal)	Description
Full_FIFO Test	
B01	TXACTION bit not set after data transmission
B02	No data available in receiver FIFO
B03	Unexpected data in receiver FIFO
B04	FIFO_Error Test: data in receiver FIFO is not valid
B05	FIFO_Error Test: receiver buffer contains diagnostic information
B06	FIFO_Error Test: no data available in receiver FIFO
B07	FIFO_Error Test: framing error
B08	FIFO_Error Test: overrun error
B09	FIFO_Error Test: undefined error
B0A	FIFO_Error Test: incorrect line number in received data
B0B	FIFO_Error Test: received character is not the same as transmitted character
B11	Initial_Port Test: transmit FIFO not empty
B12	Initial_Port Test: unexpected characters in receiver FIFO

(continued on next page)

Table 3–18 (Cont.) ASYNC Test (Test 14) Error Subcodes

Error Subcode (Hexadecimal)	Description
Interrupt Test	
C01	An illegal transmitter interrupt has occurred
C02	Transmit FIFO is not empty
C03	Receiver interrupt not generated
C04	An illegal receiver interrupt has occurred
C05	Interrupt service routine: no data available in receiver FIFO
C06	Interrupt service routine: invalid data in receiver FIFO
C07	Interrupt service routine: received character is not the same as the transmitted character
C08	Interrupt service routine: TXACTION bit is not set after data transmission
C11	Initial_Port: transmitter FIFO not empty
C12	Initial_Port: unexpected characters in receiver FIFO
Polled_Modem Test	
D01	No modem support
D02	RTS_DTR_CLEAR failure in low OCART
D03	RTS_DTR_SET failure in low OCART
D04	DSRS_CLEAR failure in high OCART
D05	DSRS_SET failure in high OCART
D09	RTS_CTS_DTD failure in low OCART
D0A	RTS_CTS_DTD failure in high OCART
D0B	DTR_RI_DSR failure in low OCART
D0C	DTR_RI_DSR failure in high OCART
D11	Initial_Port: transmitter FIFO not empty
D12	Initial_Port: unexpected characters in receiver FIFO

(continued on next page)

Table 3–18 (Cont.) ASYNC Test (Test 14) Error Subcodes

Error Subcode (Hexadecimal)	Description
Interrupt_Modem Test	
E01	Receiver buffer does not contain modem information
E02	No data available in receiver FIFO
E03	Unexpected data in receiver FIFO
E04	Data in receiver FIFO is invalid
E05	Incorrect line number in received data
E0F	Received status does not equal transmitted data
E11	Initial_Port: transmitter FIFO not empty
E12	Initial_Port: unexpected characters in receiver FIFO
Extended Mode Test	
1001	Driver/receiver board not installed
1002	Options register shows invalid configuration

4

Utilities Error Codes and Messages

This chapter describes the error codes that the test utilities generate.

4.1 SCSI Utility Error Messages

Table 4–1 lists the error messages that the SCSI utilities produce.

Table 4–1 SCSI Utility Error Messages

Error Message	Description
SCSI_E_badparam	Illegal parameter entered
SCSI_E_err	Generic utility error
SCSI_E_devtyp	Incorrect device type for this utility
SCSI_E_media	Problem with the removable media
SCSI_E_lun	Logical unit number is not present
SCSI_E_inq_err	Inquiry command error
SCSI_E_modsns_err	Mode sense command error
SCSI_E_modsel_err	Mode select command error
SCSI_E_tur_err	Test unit ready command error
SCSI_E_rwnd_err	Rewind command error
SCSI_E_wrt_err	Write command error
SCSI_E_rd_err	Read command error
SCSI_E_rdcap_err	Read capacity command error
SCSI_E_st_unt_err	Start unit command error
SCSI_E_ver_err	Verify command error
SCSI_E_fmt_unt_err	Format unit command error

(continued on next page)

Table 4–1 (Cont.) SCSI Utility Error Messages

Error Message	Description
SCSI_E_reass_err	Reassign command error

Table 4–2 Additional SCSI Information Values for Utilities

Code (Decimal)	Description
176	Incorrect utility number supplied by the user
177	Incorrect device number supplied by the user
178	Incorrect logical unit number supplied by the user
179	Incorrect number of parameters supplied by the user
180	Device number specified is the same as the SCSI controller
181	Utility does not run in this mode of operation
182	A SCSI command did not return enough data
183	Device specified is not a disk
184	Device specified is not a tape
185	Media is not removable
186	Media is removable
187	Media is write-protected
188	Device is not ready
189	Data read back by SCSI command is incorrect
190	Logical unit is not present
191	Driver initialization failure
192	Error in format page
193	Error in flex .e page
194	PROM function error
195	Insufficient disk capacity
196	Error receiving character from console
197	Illegal floppy drive
198	Illegal floppy media

4.2 COMM Utility Error Codes

Table 4–3 describes the error codes that the COMM utilities produce.

Table 4–3 SCSI Utility Error Messages

Code (Decimal)	Code (Hexadecimal)	Description
224	E0	Invalid utility request
226	E2	Invalid test request
255	FF	Ctrl/C entered

5

System Exerciser Error Codes and Messages

This chapter describes the error codes and messages that the system exerciser tests generate.

5.1 DZ System Exerciser Error Messages

The system exerciser generates error messages for failures detected during the DZ test. The format of these error messages is as follows:

```
?? 3 DZ  X   ABCD        0 00:00:00
```

where:

- *??* indicates a hard error
- *3* is the test number
- *DZ* is the test name
- *X* is the error code (see Table 5–1)
- *ABCD* represent the four asynchronous communication lines as follows:
  - A is MMJ port 3
  - B is asynchronous modem control port 2
  - C is MMJ port 1
  - D is MMJ port 0
- *0 00:00:00* is the length of time that the test is running in days hours:minutes:seconds

Table 5–1 DZ System Test Error Codes

Error Code	Meaning
1	Not all characters are transmitted
2	First character not received
3	Timeout
4	More characters received than expected
5	Parity error
6	Framing error
7	Overrun error
8	Data compare error

The system exerciser produces summary screens that show the progress or results of the most recent system exerciser test (see *KA45 CPU System Maintenance*, Section 3.5.2 or *KA47 CPU System Maintenance*, Section 3.5.2).

5.2 NI System Exerciser Error Messages

The system exerciser generates error messages for failures detected during the NI test. The format of these error messages is as follows:

```
?? 9 NI   X    00YY        0 00:00:00
```

where:

- *??* indicates a hard error
- *9* is the test number
- *NI* is the test mnemonic
- *X* is the source of the error (see Table 5–2)
- *00YY* the error code (see Table 5–3)
- *0 00:00:00* is the length of time that the test is running in days hours:minutes:seconds

Table 5–2 Error Source Indicators

Value	Source
1	Test
2	System test monitor
3	Device driver
4	VAXELN
5	System

Table 5–3 NI System Exerciser Error Codes

Source[1]	Code (Hexadecimal)	Description
1	02	Initialization failure
1	04	LANCE underflow reported
1	06	DMA transmit failure
1	08	Unknown transmit error
1	0A	Receive failure
1	12	DMA receive failure
1	14	Unknown receive error
1	16	Data compare error
2	02	WST$INIT failure
4	02	Incorrect memory allocation
4	04	Create device failure
4	06	Create area failure
5	02	Unknown transmit error
5	04	Incorrect transmit status
5	06	Own bit of transmit descriptor indicates LANCE
5	08	Incorrect receive status from LANCE
5	0A	Timeout while waiting for receiver interrupt

[1]See Table 5–2.

(continued on next page)

Table 5–3 (Cont.) NI System Exerciser Error Codes

Source[1]	Code (Hexadecimal)	Description
5	0C	Memory error during initialization
5	0E	BABL error during initialization
5	10	MISS error during initialization
5	12	Parity error during initialization
5	14	MAP error during initialization
5	16	Memory error during receive operation
5	18	BABL error during receive operation
5	1A	MISS error during receive operation
5	1C	Parity error during receive operation
5	1E	MAP error during receive operation
5	20	Memory error during transmit operation
5	22	BABL error during transmit operation
5	24	MISS error during transmit operation
5	26	Parity error during transmit operation
5	28	MAP error during transmit operation

[1]See Table 5–2.

The system exerciser produces summary screens that show the progress or results of the most recent system exerciser test (see *KA45 CPU System Maintenance*, Section 3.5.2 or *KA47 CPU System Maintenance*, Section 3.5.2).

5.3 SCSI System Exerciser Error Messages

Table 5–4 lists the error codes that the system exerciser produces for SCSI devices.

Table 5–4 SCSI System Exerciser Error Codes

Code (Decimal)	Code (Hexadecimal)	Description
90	5A	WST call failure
92	5C	ELN call failure
100	64	Inquiry failure during bus sizing
102	66	Not enough data returned during bus sizing
104	68	Start unit failure during bus sizing
106	6A	Test unit ready failure during bus sizing
108	6C	Mode select failure during bus sizing
110	6E	Read capacity failure during bus sizing
112	70	Mode sense failure during bus sizing
114	72	Media is write-protected in the Manufacturing environment
116	74	Not enough mode sense data returned during bus sizing
118	76	Read failure during bus sizing
120	78	Not enough read data during bus sizing
122	7A	Verify failure during bus sizing
130	82	Read failure when checking for key
132	84	Rewind failure when checking for key
134	86	Incorrect number of bytes read when checking for key
140	8C	Read failure when checking for boot block
142	8E	Incorrect number of bytes read when checking for boot block
150	96	NonDMA inquiry failure during data transfer test
152	98	Synchronous DMA inquiry failure during data transfer test
154	9A	Comparison failure on number of bytes in data transfer test

(continued on next page)

Table 5–4 (Cont.) SCSI System Exerciser Error Codes

Code (Decimal)	Code (Hexadecimal)	Description
156	9C	Comparison failure on data in data transfer test
160	A0	Device test failure
162	A2	Incorrect number of bytes read during device test
164	A4	Incorrect number of bytes written during device test
166	A6	Comparison failure on data during device test
168	A8	Reselection timeout during device test

The system exerciser produces summary screens that show the progress or results of the most recent system exerciser test (see *KA45 CPU System Maintenance*, Section 3.5.2 or *KA47 CPU System Maintenance*, Section 3.5.2).

5.4 COMM System Exerciser Error Messages

The error codes and messages that the system exerciser reports for the COMM test are the same as the error codes and messages that the self-test reports (see Section 3.10).

The system exerciser produces summary screens that show the progress or results of the most recent system exerciser test (see *KA45 CPU System Maintenance*, Section 3.5.2 or *KA47 CPU System Maintenance*, Section 3.5.2).

5.5 ASYNC System Exerciser Error Messages

The system exerciser generates error messages for failures detected during the ASYNC test. The format of these error messages is as follows:

```
?? 14 ASYNC   21    ABCD        0 00:00:00
```

where:

- *??* indicates a hard error
- *14* is the test number
- *ASYNC* is the test mnemonic
- *21* is the FRU number of the asynchronous communications option

- *ABCD* is an error code as follows:
  - A is not used
  - B is the number of the failing subtest (see Table 5–5)
  - CD is an error code associated with the failing subtest (see Table 5–5)
- *0 00:00:00* is the length of time that the test is running in days hours:minutes:seconds

Table 5–5 ASYNC System Exerciser Error Codes

Code (Hexadecimal)	Description
ASYNC Master Reset Test Failure (B=0)	
0001	Error calling ELN kernel
0002	ASYNC main initialization; success boolean set to false after the WST routine
0003	ASYNC main report; success boolean set to false after the WST routine
0004	ASYNC main summary; success boolean set to false after the WST routine
0005	ASYNC main progress; success boolean set to false after the WST routine
0006	Invalid value in configuration register
0007	External testing requested with no input/output panel attached
000E	ASYNC main check; success boolean set to false after the WST routine
001E	ASYNC main eop; success boolean set to false after the WST routine

(continued on next page)

Table 5–5 (Cont.) ASYNC System Exerciser Error Codes

Code (Hexadecimal)	Description
ASYNC Master Reset Test Failure (B=1)	
0101	No valid data in receiver FIFO
0102	Internal hardware self-test failure
0103	Receiver FIFO should be empty
0104	Internal self-test did not complete
0105	RBUF does not contain diagnostic information
0106	Incorrect sequence of diagnostic information
0107	Low OCART error during internal self-test
0108	High OCART error during internal self-test
0109	RAM error during internal self-test
010A	RTS/CTS/DCD error on channels 0 to 7 during internal self-test
010B	RTS/CTS/DCD error on channels 8 to 15 during internal self-test
010C	DTR/RI-DSR error on channels 0 to 7 during internal self-test
010D	DTR/RI-DSR error on channels 8 to 15 during internal self-test
010E	Undefined status error during internal self-test
010F	Invalid circuit version code detected during internal self-test
0110	Receiver done bit not set
ASYNC CSR Test Failure (B=2)	
0201	CSR register read failure following a write test

(continued on next page)

Table 5–5 (Cont.) ASYNC System Exerciser Error Codes

Code (Hexadecimal)	Description
ASYNC Fifo_Byte Test Failure (B=3)	
0301	No valid data in receiver FIFO
0302	FIFO size register shows FIFO is not empty
0303	Receiver FIFO is not empty
0304	Transmitter action not set before timeout
0305	Receiver data available bit not set before timeout
0306	Transmit FIFO overrun error
0307	Parity error
0308	Frame error
0309	Data received on an incorrect port
030A	Received data not the same as the expected data
030E	Success boolean set to false after the WST routine

(continued on next page)

Table 5–5 (Cont.) ASYNC System Exerciser Error Codes

Code (Hexadecimal)	Description
ASYNC Fifo_257 Test Failure (B=4)	
0401	No valid data in receiver FIFO
0402	FIFO size register indicates receiver FIFO is not empty
0403	Receiver FIFO is not empty
0404	Transmitter action not set
0405	Receiver data available bit not set
0406	Transmitter FIFO overrun error
0407	Parity error
0408	Frame error
0409	Data received on an incorrect port
040A	Received data not the same as the expected data
040B	Failure to force overrun error
040C	Receiver data available bit not set before timeout
040D	Background monitor error code in receiver FIFO
040E	Success boolean set to false after the WST routine
0410	Receiver done bit not set

(continued on next page)

Table 5–5 (Cont.) ASYNC System Exerciser Error Codes

Code (Hexadecimal)	Description
ASYNC Simultaneous_Transmission Test Failure (B=5)	
0501	No valid data
0502	Incorrect value in FIFO size register
0503	Receiver FIFO not empty
0506	Overrun error
0507	Parity error
0508	Frame error
0509	Transmitter action set when transmitter disabled
050A	Timeout error while waiting for interrupts
050B	Received data does not equal transmitted data
050D	Background monitor error
050E	Success boolean set to false after the WST routine
0511	Too many characters in the receiver FIFO
0516	Greater overrun than expected
0517	Parity error; more characters than expected
0518	Frame error; more characters than expected
051B	Incorrect data; more characters than expected
051D	Background monitor error; more characters than expected
0521	Not enough characters in the receiver FIFO
0526	Less overrun than expected
0527	Parity error; less characters than expected
0528	Frame error; less characters than expected
052B	Incorrect data; less characters than expected
052D	Background monitor error; less characters than expected

(continued on next page)

Table 5–5 (Cont.) ASYNC System Exerciser Error Codes

Code (Hexadecimal)	Description
ASYNC Transmit_Interrupt Test Failure (B=6)	
0602	Incorrect value in FIFO size register
0603	Receiver FIFO not empty
0609	Transmitter action set when transmitter disabled
060A	Timeout error while waiting for interrupts
060E	Success boolean set to false after the WST routine
ASYNC Polled_Modem Test Failure (B=7)	
0701	Modem support bit in status register is set
0702	Incorrect value in FIFO size register
0703	Receiver FIFO not empty
0705	RTS and DTR signals failed to clear within the timeout period
0706	DSRS signal failed to clear within the timeout period
0707	DSR and RI signals not set within the timeout period
0708	DSR, RI, and CTS and DCD or both signals not set within the timeout period
0709	CTS and DCD signals not set within the timeout period
070A	SPDMI signal not set within the timeout period
070B	Illegal response detected in high OCART when clearing the DTR signal
070C	Illegal response detected in high OCART when setting the DTR signal
070E	Success boolean set to false after the WST routine

(continued on next page)

Table 5–5 (Cont.) ASYNC System Exerciser Error Codes

Code (Hexadecimal)	Description
ASYNC Interrupt_Modem Test Failure (B=8)	
0801	No valid data in receiver FIFO
0802	Incorrect value in the FIFO size register
0803	Receiver FIFO not empty
0808	Not diagnostic information but an error returned
0809	Data received on an incorrect port
0810	Receiver done bit is not set
0811	Receiver data available bit set when it should not be set
080A	Received character is not the same as the transmitted character
080C	Receiver data available bit not cleared when the last character is removed
080E	Success boolean set to false after the WST routine
ASYNC RX_Isr Test Failure (B=A)	
0A01	Data transmitted on an unused line

The system exerciser produces summary screens that show the progress or results of the most recent system exerciser test (see *KA45 CPU System Maintenance*, Section 3.5.2 or *KA47 CPU System Maintenance*, Section 3.5.2).

The contents of the BPS register indicates the data rate. Table 5–6 shows the BPS register values and the corresponding data rates.

Table 5–6 Data Rate Indication in BPS Register

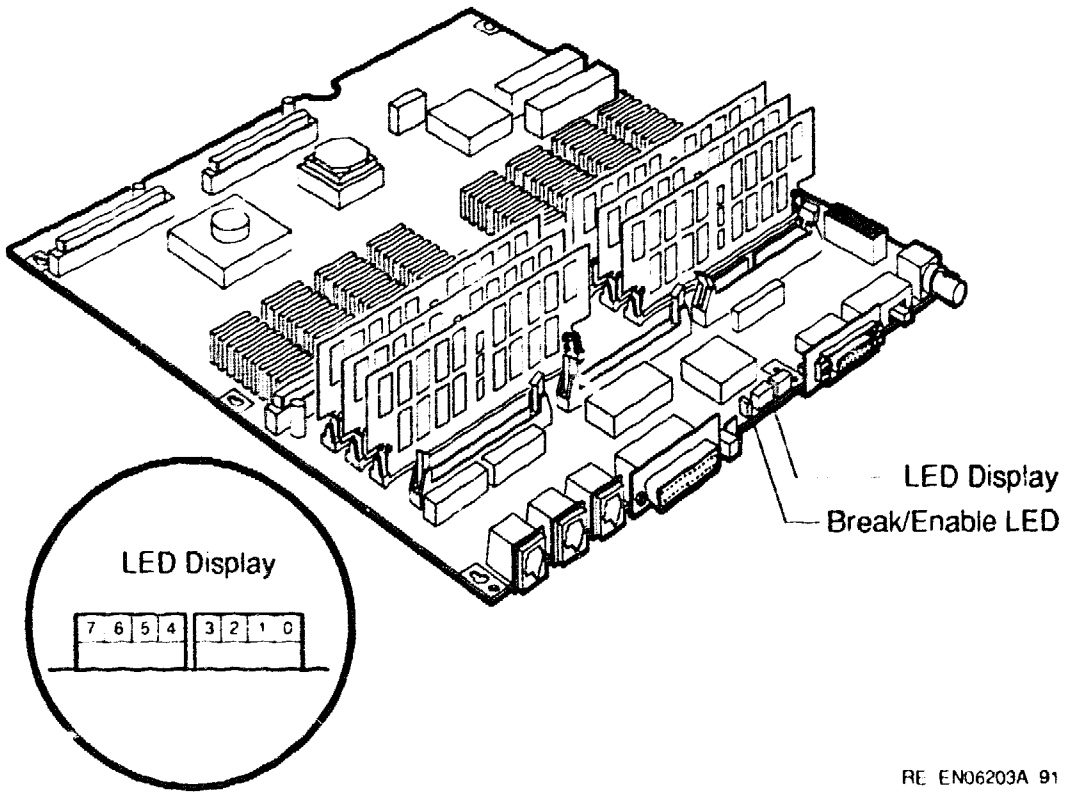
Bits 3:0	Data Rate
0000	50
0001	75
0010	110
0011	134.5
0100	150
0101	300
0110	600
0111	1200
1000	1800
1001	2000
1010	2400
1011	4800
1100	7200
1101	9600
1110	19200
1111	38400

6

LED Display Codes

This chapter describes the codes that the KA45 CPU module or the KA47 CPU module display on the LED display. Figure 6–1 shows the location of the LED display on the KA45 CPU module.

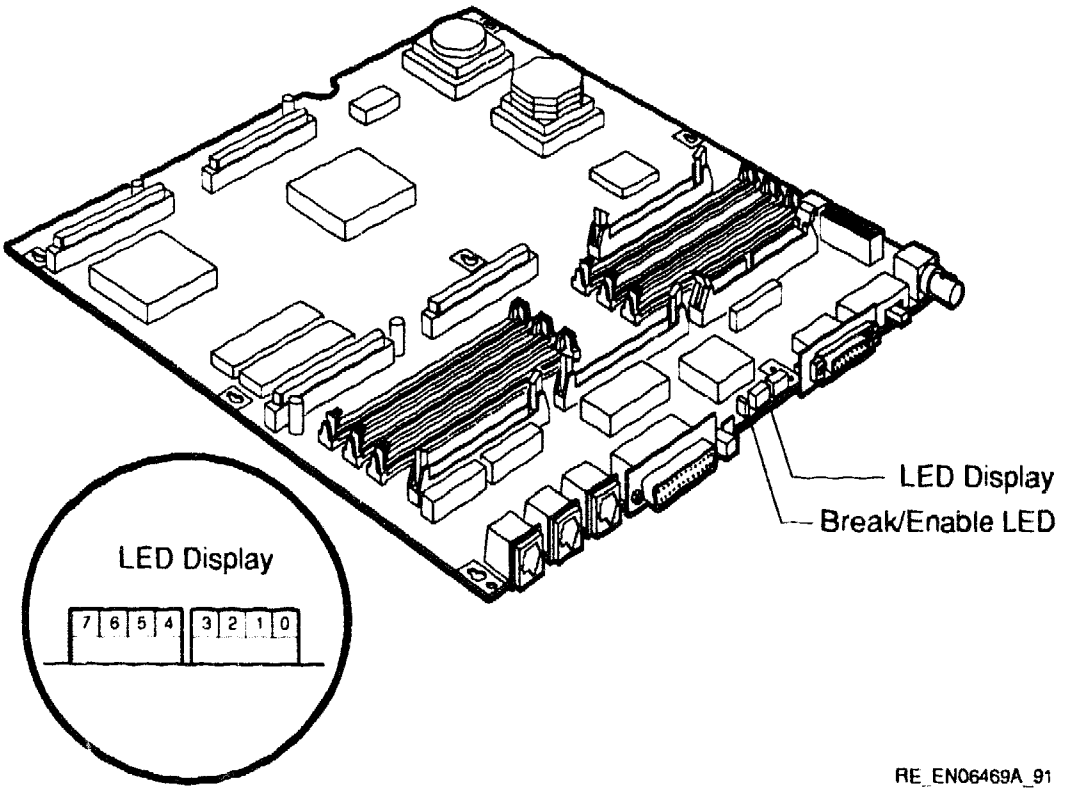
Figure 6–1 Location of LED Display on KA45 CPU Module



LED Display Codes

Figure 6–2 shows the location of the LED display on the KA47 CPU module.

Figure 6–2 Location of LED Display on KA47 CPU Module



In general, the LED display shows codes in two fields. The four LEDs on the left (when viewed from the back of the system unit) display the device number, whereas the four LEDs on the right display a subtest number. The console program generates codes in the range E0h to FFh.

When the console terminal does not display the console prompt, the code on the LED display shows a status that indicates the part of the test diagnostic firmware that the KA45 CPU module is executing.

When the console terminal displays the console prompt, the code on the LED display indicates the device that fails a test. Table 6–1 lists the power-up test and initialization codes.

Table 6–1 Power-Up Test and Initialization Codes

LED Display[1]	Code (Hexadecimal)	Description
1111 1111	FF	Power applied, but no ROM instructions executed
1111 1110	FE	Starting system initialization and self-test
1111 1101	FD	Initializing the system memory
1111 1100	FC	Sizing the system memory
1111 1011	FB	Running the byte mask test on the system memory
1111 1010	FA	Running the full data path test on the system memory
1111 1001	F9	Initializing the console data structures
1111 1000	F8	Running the auto configuration code on the system
1111 0111	F7	Testing the NVR device
1111 0110	F6	Testing the DZ device
1111 0100	F4	Initializing the console device
1111 0011	F3	Passing control to the console program

[1]The number 1 indicates that the LED is on; the number 0 indicates that the LED is off.

Table 6–2 lists the codes that the LED display shows during the NVR device test.

Table 6–2 NVR Test (Test 1) Error Codes

LED Display [1]	Code (Hexadecimal)	Description
0001 0000	10	TOY clock test failure
0001 0001	11	NVR test failure

[1]The number 1 indicates that the LED is on; the number 0 indicates that the LED is off.

LED Display Codes

Table 6–3 lists the codes that the LED display shows during the DZ device test.

Table 6–3 DZ Test (Test 3) Error Codes

LED Display[1]	Code (Hexadecimal)	Description
0011 0000	30	DZ test code executing
0011 0001	31	Reset test failure
0011 0010	32	Modem test failure
0011 0011	33	Polled test failure
0011 0100	34	Interrupt test failure

[1]The number 1 indicates that the LED is on; the number 0 indicates that the LED is off.

Table 6–4 lists the codes that the LED display shows during the CACHE device test.

Table 6–4 CACHE Test (Test 4) Error Codes

LED Display[1]	Code (Hexadecimal)	Description
0100 0001	41	Data store read/write error
0100 0010	42	Tag store read/write error
0100 0011	43	Valid bit not set
0100 0100	44	Tag validation error
0100 0101	45	Unexpected tag parity error
0100 0110	46	Cache memory does not provide expected data during cache hit test
0100 0111	47	Parity error
0100 1000	48	Tag not valid during cache hit test
0100 1001	49	Data not expected during cache hit test
0100 1010	4A	Write through test failure; the information in the data store is incorrect
0100 1011	4B	Write through test failure; the information in the memory is incorrect
0100 1100	4C	Write error

[1]The number 1 indicates that the LED is on; the number 0 indicates that the LED is off.

Table 6–5 lists the codes that the LED display shows during the MEM device test.

Table 6–5 MEM Test (Test 5) Error Codes

LED Display[1]	Code (Hexadecimal)	Description
0101 0000	50	Byte mask test failure
0101 0001	51	Error occurred in the forward pass
0101 0010	52	Error occurred in the reverse pass
0101 0011	53	Error in parity test 1
0101 0100	54	Error in parity test 2

[1]The number 1 indicates that the LED is on; the number 0 indicates that the LED is off.

Table 6–6 lists the codes that the LED display shows during the SYS device test.

Table 6–6 SYS Test (Test 8) Error Codes

LED Display[1]	Code (Hexadecimal)	Description
1000 0000	80	ROM verification test failure
1000 0001	81	Interrupt controller test failure
1000 0010	82	Invalidate filter test failure

[1]The number 1 indicates that the LED is on; the number 0 indicates that the LED is off.

Table 6–7 lists the codes that the LED display shows during the NI device test.

Table 6–7 NI Test (Test 9) Error Codes

LED Display[1]	Code (Hexadecimal)	Description
1001 0000	90	Executing NI device test code
1001 0001	91	Network address test failure
1001 0010	92	Register test failure
1001 0011	93	Initialization test failure
1001 0100	94	Internal loopback/DMA test failure
1001 0101	95	Interrupt test failure
1001 0110	96	CRC test failure
1001 0111	97	Receiver MISS/BUFFER test failure
1001 1000	98	Collision test failure
1001 1001	99	External loopback test failure
1001 1010	9A	Address filtering test failure
1001 1011	9B	Transmit buffer test failure

[1]The number 1 indicates that the LED is on; the number 0 indicates that the LED is off.

LED Display Codes

Table 6–8 lists the codes that the LED display shows during the SCSI device test.

Table 6–8 SCSI Test (Test 10) Error Codes

LED Display[1]	Code (Hexadecimal)	Description
1010 0000	A0	Executing SCSI device test code
1010 0001	A1	Register test failure
1010 0010	A2	Interrupt test failure
1010 0011	A3	Data transfer test failure
1010 0100	A4	Map error test failure
1010 0101	A5	Minimal device test failure

[1]The number 1 indicates that the LED is on; the number 0 indicates that the LED is off.

Table 6–9 lists the codes that the LED display shows during the COMM device test.

Table 6–9 COMM Test (Test 12) Error Codes

LED Display[1]	Code (Hexadecimal)	Description
1100 0000	C0	Executing COMM device test code
1100 0001	C1	Option ROM test failure
1100 0010	C2	Option RAM test failure
1100 0011	C3	Option self-test test failure
1100 0100	C4	Option dual RAM access test failure
1100 0101	C5	Option dual ROM/RAM access test failure
1100 0110	C6	Option interrupt test failure
1100 0111	C7	Option integrated loopback test failure
1100 1000	C8	Option reset test failure

[1]The number 1 indicates that the LED is on; the number 0 indicates that the LED is off.

Table 6–10 lists the codes that the LED display shows during the ASYNC device test.

Table 6–10 ASYNC Test (Test 14) Error Codes

LED Display[1]	Code (Hexadecimal)	Description
1110 0000	E0	Executing ASYNC device test code
1110 0001	E1	Master_reset test failure
1110 0010	E2	DHUID test failure
1110 0011	E3	Write_read_csr test failure
1110 0100	E4	Internal self-test failure
1110 0101	E5	Recv_interr test failure
1110 0110	E6	Selftest_fail test failure
1110 0111	E7	Result_bytes test failure
1110 1000	E8	FIFO_size test failure
1110 1001	E9	Trans_interr test failure
1110 1010	EA	Polled_wrapback test failure
1110 1011	EB	Full_FIFO test failure
1110 1100	EC	Interrupt test failure
1110 1101	ED	Polled modem test failure
1110 1110	EE	Interrupt modem test failure

[1]The number 1 indicates that the LED is on; the number 0 indicates that the LED is off.

Glossary

The glossary defines some of the technical terms used in this manual.

ASCII

American standard code for information interchange.

Bootstrap

A link between console mode (the system firmware) and programming mode (the operating system).

CPU

Central processing unit. The main unit of a computer containing the circuits that control the interpretation and execution of instructions. The CPU holds the main storage, arithmetic unit, and special registers.

CRC

Character code recognition. The use of pattern recognition techniques to identify characters by automatic means.

CSR

Control status register. A register used to control the operation of a device and record the status of an operation or both.

DMA

Direct memory access. A method of accessing a device's memory without interacting with the device's CPU.

FIFO

First-in/first-out. A method used for processing or recovering data in which the oldest item is processed or recovered first.

FPU

Floating-point unit. A unit that handles the automatic positioning of the decimal point during arithmetic operations.

FRU

Field replaceable unit.

IT

Interval timer.

MMJ

Modified modular jack.

NVR

Nonvolatile random access memory. A memory device that retains information in the absence of power.

PROM

Programmable read-only memory. A read-only memory device that can be programmed.

RAM

Random access memory. A read/write memory device.

ROM

Read-only memory. A memory device that cannot be altered during the normal use of the computer.

RPB

Restart parameter block.

SCSI

Small computer system interface. An interface designed for connecting disks and other peripheral devices to computer systems. SCSI is defined by an American National Standards Institute (ANSI) standard.

SP

Stack pointer. An address location that contains the address of the processor-defined stack. The processor-defined stack is an area of memory set aside for temporary storage or for procedure and interrupt service linkages.

TOY

Time of year.

VMB

Virtual machine bootstrap. The VMB program loads and runs the operating system.

VMS

Virtual memory system. The operating system for a VAX computer.

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