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DECstation 5000 Model 100 Series Pocket Service Guide

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Using This Guide

This guide contains the information that you need for field maintenance of the DECstation 5000 Model 100 Series RISC workstation. Field maintenance consists of identifying and replacing failed field replaceable units (FRUs).

Chapters

This guide contains the following chapters:

Chapter 1	Troubleshooting Information
Chapter 2	Troubleshooting Tools
Chapter 3	Part Numbers

Chapter 1, Troubleshooting Information, describes the types of information that help you identify failed FRUs. The types of troubleshooting information are:

- Error messages
- Addresses
- ULTRIX error logs
- Diagnostic LEDs
- Registers

Chapters

Some of the troubleshooting information is automatically displayed, by the system, such as exception messages and diagnostic LEDs. Other information must be specifically generated or accessed by the engineer, such as test error messages, ULTRIX error logs, and registers.

Chapter 2, Troubleshooting Tools, describes the tools that you use to test the system and its components. The troubleshooting tools are:

- Self tests
- Console tests
- Test scripts
- Troubleshooting flowcharts

Chapter 3, Part Numbers, contains tables listing the part numbers for the following types of components:

- Basic system components
- Internal drives
- TURBOchannel option modules
- Monitors
- Input devices
- Cords, cables, and connectors
- Loopback connectors, plugs, test media, and small hardware
- Hardware documentation

Conventions

This guide uses the following conventions:

`Monospace type`	`Anything that appears on your monitor screen is set in monospace type, like this.`
Boldface type	**Anything you are asked to type is set in boldface type, like this.**
Italic type	*Any part of a command that you replace with an actual value is set in italic type, like this.*

1

TROUBLESHOOTING INFORMATION

Error Messages

An error message can be either an exception message that is automatically displayed when something goes wrong during normal system operation or a test failure message that is displayed when an automatic or user-initiated test fails.

This section describes the following error message types:

- Test failure messages
- Console exception messages
- Memory test error messages

Test failure messages

The test failure message format is:

```
?TFL slot_number/test_name
(n:description)[module]
```

?TFL	Identifies a test error message
slot_number	Identifies the module that reported the error
test_name	The test that failed
n	Indicates which part of the test failed
description	Describes the failure
module	The module identification number

Table 1-1 lists the test values that can appear in the test failure message when some component part of the base system (slot number 3) fails. The table also lists the recommended corrective action.

For information about test names and corrective action when a TURBOchannel option module fails (slot number 0, 1, or 2), refer to the documentation for the indicated module.

Table 1-1 Base system test error messages

Test Name	Component Tested	Corrective Action
cache/data cache/fill cache/isol cache/reload cache/seg fpu	CPU module	Replace the CPU module. If the problem persists, replace the system module.
mem mem/float10	Memory modules	Troubleshoot according to Figure 2-14.
mem/select	Memory and system module	Replace the memory module failed. If the problem persists, replace the system module.
misc/halt	System module	Replace the system module.
misc/kbd	Keyboard and system module	Troubleshoot according to Figure 2-23.
misc/mouse	Mouse and system module	Troubleshoot according to Figure 2-23.
misc/pstemp	Power supply	Troubleshoot according to Figure 2-21.
misc/wbpart	Memory modules	Troubleshoot according to Figure 2-14.

Table 1-1 (Cont.) Base system test error messages

Test Name	Component Tested	Corrective Action
ni/cllsn ni/common ni/crc ni/cntrs ni/dma1 ni/dma2 line>ni/esar ni/ext-lb ni/int ni/int-lb ni/m-cst ni/promisc ni/regs ni/setup	Base system Ethernet controller	Troubleshoot according to Figure 2-17.
rtc/nvr rtc/period rtc/regs rtc/time	System module	Replace the system module.
scc/access scc/enable scc/io scc/regs scc/pins scc/tx-rx	Serial line controllers and devices attached to them	Troubleshoot according to Figure 2-19.
scsi/cntl scsi/sdiag scsi/target	Base system SCSI controller or device	Troubleshoot according to Figure 2-15.
tlb/prb tlb/reg	CPU module	Replace the CPU module.

Console exception messages

This is a typical console exception message:

```
? PC:  0x451<vtr=nrml>
? CR:  0x810<ce=0,ip4,exc=AdEL>
? SR:  0x30030000
       <cu1,cu0,cm,ipl=8>
? VA:  0x451
? ER:  0x100003f0
? MER: 0x2000
```

PC — The address of the exception instruction

CR — The contents of the cause register. The last term is the exception type. The exception types are as follows:

MOD, TLBL, or TLBS: An invalid address was probably used in a console command.

AdEL or AdES: A console command probably attempted access on a boundary that was not a word.

IBE or DBE: Timeout bus error if MER bits 16, 15, 11, 10, 9, and 8 are all clear. Memory error if one or more of those MER bits is set.

SR — The contents of the status register

VA — The virtual address of the exception

ER — The contents of the error address register

MER — The contents of the memory error register

Memory test error messages

This is a typical memory test error message:

```
?TFL:3/mem(PER,cause=0000001C,
DBE=0040000c,
Bank 2, D16-31,d23-d16)
```

Bank	The slot number of the problem memory module
D16-31	The module farthest from the power supply failed.
D0-15	The module nearest the power supply failed.

Addresses

Slot numbers

Table 1-2 Slot numbers in commands and messages

Slot No.	Hardware Identified
0	Option module in slot 0 (farthest from the power supply)
1	Option module in slot 1 (middle option slot)
2	Option module in slot 2 (nearest the power supply)
3	Base system hardware, which includes - System module - CPU module - Memory modules - Base system SCSI controller - Base system Ethernet controller

Memory addresses

These addresses appear in memory error printouts.

Table 1-3 Memory module slot address ranges

Slot No.	2-Mbyte Module Addresses	8-Mbyte Module Addresses
0	0000000-03FFFFF	0000000-0FFFFFF
1	0400000-0FFFFFF	1000000-1FFFFFF
2	0800000-0FFFFFF	2000000-2FFFFFF
3	0C00000-0FFFFFF	3000000-3FFFFFF
4	1000000-1FFFFFF	4000000-4FFFFFF
5	1400000-1FFFFFF	5000000-5FFFFFF
6	1800000-1FFFFFF	6000000-6FFFFFF
7	1C00000-1FFFFFF	7000000-7FFFFFF

Hardware physical addresses

These addresses appear in error printouts.

Table 1-4 Hardware physical addresses

Address Range	Indicated Hardware
0x00000000-0x07FFFFFF	Memory array banks 0 to 7
0x08000000-0x0BFFFFFF	Reserved
0x0C000000-0x0DFFFFFF	Memory registers
0x0E000000-0x0FFFFFFF	CPU control ASIC registers
0x10000000-0x13FFFFFF	Slot 0, option module
0x14000000-0x17FFFFFF	Slot 1, option module
0x18000000-0x1BFFFFFF	Slot 2, option module

Table 1-4 (Cont.) Hardware physical addresses

Address Range	Indicated Hardware
0x1C000000-0x1FFFFFFF	Base system, slot 3 in commands and messages, includes the elements listed below
0x1C000000-0x1C03FFFF	System ROM
0x1C040000-0x1C07FFFF	I/O control registers and DMA pointers
0x1C080000-0x1C0BFFFF	Ethernet address PROM
0x1C0C0000-0x1C0FFFFF	Ethernet interface
0x1C100000-0x1C13FFFF	SCC(0) registers
0x1C140000-0x1C17FFFF	Reserved
0x1C180000-0x1C1BFFFF	SCC(1) registers
0x1C1C0000-0x1C1FFFFF	Reserved
0x1C200000-0x1C23FFFF	Real-time clock
0x1C240000-0x1C29FFFF	Reserved
0x1C300000-0x1C33FFFF	SCSI interface
0x1C340000-0x1C37FFFF	Reserved
0x1C380000-0x1C3BFFFF	SCSI DMA
0x1C3C0000-0x1FBFFFFF	Reserved
0x1FC00000-0x1FC3FFFF	Boot ROM
0x1FC40000-0x1FFFFFFF	Reserved

ULTRIX Error Logs

To examine the ULTRIX error logs from the ULTRIX prompt, type

/etc/uerf -R | more

Table 1-5 Error log event types

Code	Event Type
100	Machine check
101	Memory error
102	Disk error
103	Tape error
104	Device controller error
105	Adapter error
106	Bus error
107	Stray interrupt
108	Asynchronous write error
109	Exception or fault
113	CPU error and status information
130	Error and status registers
200	Panic (bug check)
250	Informational ASCII message
251	Operational message
300	System startup message
310	Time change message
350	Diagnostic information

Error log information varies by event type. The following lists cover three typical event types: memory parity error, CPU write timeout, and bus timeout.

Memory parity error log fields

The following memory error log fields are pertinent when a memory parity error occurs:

The ERROR SYNDROME field identifies the memory parity error.

The MEM REG fields give the following memory failure information:

HARD CNT shows how many errors recurred on both read and write operations.

SOFT CNT shows how many errors recurred on read but cleared on write.

TRAN CNT shows how many errors did not recur on read.

DATA BIT IN ERROR or PARITY BIT IN ERROR indicates whether a data bit or a parity bit failed.

HIGH BYTE IN ERROR or LOW BYTE IN ERROR identifies the byte where the error occurred.

MEMORY PARITY ERROR lists the error type (hard, soft, transient).

D0-15 or D16-31 tells whether the low (left) or high (right) SIMM failed.

BANK tells which bank of memory failed.

The PHYSICAL ADDRESS field identifies the block being read at failure.

CPU write timeout

The following error and status register error log fields are pertinent when a CPU write timeout occurs:

OS EVENT TYPE refers to the error and status registers for a CPU write timeout.

PANIC MESSAGE indicates a CPU write timeout.

The CAUSE register gives no information for a CPU write timeout.

The BAD VIRT ADR register identifies the address of the timeout.

The SIR register shows the write timeout error.

Bus timeout

The following error and status register error log fields are pertinent when a bus timeout occurs:

OS EVENT TYPE refers to the error and status registers for a bus timeout.

PANIC MESSAGE indicates a bus timeout.

The CAUSE register tells that the error occurred during data load or store.

The BAD VIRT ADR register tells the address of the timeout.

Diagnostic LEDs

Table 1-6 LED error codes

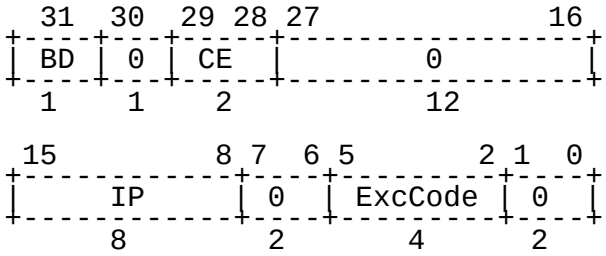
LED Error Code (1=On)	Troubleshooting Procedure
1111 1111 0011 1111 0011 1110 0011 1101	Troubleshoot according to Figure 2-3.
0011 0111	Replace the CPU module. If the LEDs display 0011 0111 when the power-up self-test stops, replace the system module.
0011 0110	Troubleshoot according to Figure 2-5.
0010 0011 0001 0011 0000 0011 0000 0000	Troubleshoot according to Figure 2-6.
0011 1011 0010 1011 0001 1011 0000 1011	Troubleshoot according to Figure 2-7.

Registers

There are two types of registers: CPU registers and system registers. CPU register information is automatically displayed on the screen when an exception occurs. To access system registers from the console prompt (>>), enter the e command.

Cause register

The cause register is a CPU register and is displayed in exception error messages only. You cannot access the cause register independently. The cause register has the following format:



BD = 1	Indicates that the last exception occurred in a branch delay slot
CE	The coprocessor unit number reference for a coprocessor unusable exception
IP = 1	Indicates that an interrupt is pending
ExcCode	Shows the exception code. See Table 1-7.
0	Reserved.

Table 1-7 Cause register exception codes

Number	Mnemonic	Description
0	Int	Interrupt
1	Mod	TLB modification exception
2	TLBL	TLB miss exception (load or instruction fetch)
3	TLBS	TLB miss exception (store)
4	AdEL	Address error exception (load or instruction fetch)
5	AdES	Address error exception (store)
6	IBE	Bus error exception (instruction fetch)
7	DBE	Bus error exception (data reference: load or store)
8	Sys	Syscall exception
9	Bp	Breakpoint exception
10	RI	Reserved instruction exception
11	CpU	Coprocessor unusable exception
12	OV	Arithmetic overflow exception
13-15		Reserved

System registers

To examine a system register from the console prompt (>>), enter the e command:

e [*options*] [*console_address*]

Table 1-8 System registers

Register	Console Address	Description
SSR	0xBC040100	System support register
MER	0xAC400000	Memory error register
SIR	0xBC040110	System interrupt register
Mask	0xBC040120	System interrupt mask register
MSR	0xAC800000	Memory size register
EAR	0xAE000004	Error address register

Table 1-9 Memory Error Register (MER) 0x0C400000

Bits	Access	Description
31:17		Reserved
16	R/W	Page boundary error
15	R/W	Transfer length error
14	R/W	PARDIS memory error disable
13:12		Reserved
11:8	R/W	Byte(s) with parity error
7:0		Reserved

Table 1-10 System Interrupt Register (SIR) 0x1C040110

Bits	Access	Description
31	R/W0C	Comm port 1 transmit page end interrupt
30	R/W0C	Comm port 1 transmit DMA memory read error
29	R/W0C	Comm port 1 receive half page interrupt
28	R/W0C	Comm port 1 receive DMA page overrun
27	R/W0C	Comm port 2 transmit page end interrupt
26	R/W0C	Comm port 2 transmit DMA memory read error
25	R/W0C	Comm port 2 receive half page interrupt
24	R/W0C	Comm port 2 receive DMA overrun
23	R/W0C	Reserved
22	R/W0C	Reserved
21	R/W0C	Reserved
20	R/W0C	Reserved
19	R/W0C	SCSI DMA interrupt (DMA buffer pointer loaded)
18	R/W0C	SCSI DMA overrun error
17	R/W0C	SCSI DMA memory read error
16	R/W0C	LANCE DMA memory read error
15	R	Reserved
14	R	NVR mode jumper
13	R	Reserved
12	R	CPU I/O-write timeout interrupt

Table 1-10 (Cont.) System Interrupt Register (SIR) 0x1C040110

Bits	Access	Description
11	R	Reserved
10	R	NRMOD manufacturing mode jumper
9	R	SCSI interrupt from 53C94 SCSI controller
8	R	Ethernet interrupt
7	R	SCC(1) serial interrupt (comm port 2 and keyboard)
6	R	SCC(0) serial interrupt (comm port 1 and mouse)
5	R	TOY interrupt
4	R	PSWARN power supply warning indicator
3	R	Reserved
2	R	SCSI data ready
1	R	PBNC
0	R	PBNO

Note

Comm port 1 is the same as serial line 2.
Comm port 2 is the same as serial line 3.

2

TROUBLESHOOTING TOOLS

Self-tests

The system automatically runs a power-up test sequence when you turn the power on. The system runs a quick test or thorough test sequence according to the value of the testaction environtmental variable (q for quick, t for thorough). Quick is for normal startup; thorough for troubleshooting.

You can run a self-test sequence from the console prompt without cycling system power.

For the quick test, type:

sh *slot_number*/**pst-q**

For the thorough test, type:

sh *slot_number*/**pst-t**

Console Mode Tests

From the console prompt (>>), enter the t command to run an individual test or the sh command to run a test script.

Console commands

From the console prompt, enter **?** to see a list of available console commands and their formats.

Table 2-1 Console command functions

Command	Function
?[*cmd*]	Displays one or more console commands and formats
boot [**-z***seconds*] [**-n**][*bootpath*] [**-a**][*args...*]	Boots the system
cat *slot_number/ script_name*	Displays the contents of a script
cnfg [*slot_number*]	Displays system configuration information
d [**-(** **b** | **h** | **w**)] [**-S***count*] *rng*	Deposits data into memory
e [**-b | h | w**] [**-c**] [**-d**] [**-o**] [**-u**] [**-x**] [**-S***count*] *rng*	Examines memory contents
erl [**-c**]	Displays the error message log
go [*address*]	Transfers control to a specific address
init [*slot_number*] [**-m**]	Resets the system or a module

Table 2-1 (Cont.) Console command functions

Command	Function
ls [*slot_number*]	Displays the scripts and other files in a module
passwd [**-c**] [**-s**]	Sets and clears the console password
printenv [*variable*]	Prints environment variables
restart	Attempts to restart the operating system software that is specified in the restart block
script *name*	Creates a temporary script of console commands
setenv *variable value*	Sets an environment variable
sh [**-b**] [**-e**] [**-l**] [**-v**] [**-S**] [*slot_number/script*] [*arg...*]	Runs a script
t [**-l**] *slot_number/test_name* [*arg1*]...[*argn*]	Runs a test
test	Runs a comprehensive test script that checks the system hardware
unsetenv *variable*	Removes an environment variable

t command

To run a single test from the console prompt type

t [**-l**] *slot_number*/*test_name* [*arg1*] [...] [*argn*]

t	is the test command.
-l	The test repeats until you press Ctrl-c or reset the system with the init command or by cycling power.
slot_number	Replace with the slot number of the module to be tested.
test_name	Replace with the name of the test to be run.
arg1...argn	Specify individual test conditions.

Table 2-2 lists the tests for the base system modules. To display a list of tests for an option module from the console prompt (>>), type

t *slot_number*/**?**

Table 2-2 Base system module tests and utilities

Test or Utility	Command
System module tests:	
Halt button	**t 3/misc/halt** [*number*]
Nonvolatile RAM (NVR)	**t 3/rtc/nvr** [*pattern*]
Overheat detect	**t 3/misc/pstemp**
Real-time clock period	**t 3/rtc/period**
Real-time clock register	**t 3/rtc/regs**
Real-time	**t 3/rtc/time**
Serial communication chip (SCC) access	**t 3/scc/access**
Serial communication chip (SCC) DMA	**t 3/scc/dma** [*line*] [*loopback*] [*baud*]
SCC interrupts	**t 3/scc/int** [*line*]
SCC I/O	**t 3/scc/io** [*line*] [*loopback*]
SCC pins	**t 3/scc/pins** [*line*] [*loopback*]
SCC transmit and receive	**t 3/scc/tx-rx** [*line*] [*loopback*] [*baud*]

Table 2-2 (Cont.) Base system module tests and utilities

Test or Utility	Command
CPU module tests:	
Cache data	**t 3/cache/data** [*cache*] [*address*]
Cache fill	**t 3/cache/fill** [*cache*] [*offset*]
Cache isolate	**t 3/cache/isol** [*cache*]
Cache reload	**t 3/cache/reload** [*cache*] [*offset*]
Cache segment	**t 3/cache/seg** [*cache*] [*address*]
CPU-type utility	**t 3/misc/cpu-type**
Floating-point unit	**t 3/fpu**
Translation lookaside buffer (TLB) probe	**t 3/tlb/prb**
TLB registers	**t 3/tlb/reg** [*pattern*]
Memory module tests:	
Floating 1/0 memory	**t 3/mem/float10** [*address*]
Memory module	**t 3/mem** [*module*] [*threshold*] [*pattern*]
RAM address select lines	**t 3/mem/select**
Partial write	**t 3/misc/wbpart**
Zero memory utility	**t 3/mem/init**

Table 2-2 (Cont.) Base system module tests and utilities

Test or Utility	Command
Base system Ethernet controller tests:	
Collision	**t 3/ni/cllsn**
Cyclic redundancy code (CRC)	**t 3/ni/crc**
Display MOP counters utility	**t 3/ni/ctrs**
Ethernet-DMA registers	**t 3/ni/dma1**
Ethernet-DMA transfer	**t 3/ni/dma2**
Ethernet station address ROM (ESAR)	**t 3/ni/esar**
External loopback	**t 3/ni/ext-lb**
Internal loopback	**t 3/ni/int-lb**
Interrupt request (IRQ)	**t 3/ni/int**
Multicast	**t 3/ni/m-cst**
Promiscuous mode	**t 3/ni/promisc**
Registers	**t 3/ni/regs**
Base system SCSI controller and drives tests:	
SCSI controller	**t 3/scsi/cntl**
SCSI send diagnostics	**t 3/scsi/sdiag** *scsi_id* [**d**] [**u**] [**s**]
SCSI target	**t 3/scsi/target** *scsi_id* [**w**] [**l***loops*]
Keyboard and mouse tests:	
Keyboard	**t 3/misc/kbd**
Mouse	**t 3/misc/mouse**

SCSI controller (cntl) test

To test the operation of a SCSI controller from the console prompt, enter

t *slot_number*/**scsi** /**cntl**

Table 2-3 SCSI controller error codes

(code: description)	Meaning
(1: rd cnfg)	Values written to and read from configuration register did not match.
(2: fifo flg)	First in, first out (FIFO) load and FIFO flags did not match.
(3: cnt xfr)	Write and read operation on TCL register reported a mismatch.
(4: illg cmd)	Command was illegal and did not generate an interrupt.
(5: int reg)	Controller cannot clear internal interrupt register.
(6: rd cnfg)	Mismatch occurred when reading the write/read configuration register.

SCSI send diagnostics (sdiag) test

To run the self-test for an individual SCSI device from the console prompt, enter

t *slot_number*/**scsi** /**sdiag***scsi_id* [**d**] [**u**] [**s**]

Table 2-4 SCSI send diagnostics error codes and descriptions

(code: description)	Meaning
(1: dev ol)	Test could not bring the unit on line.
(2: dev ol)	Test could not bring the unit on line.
(3: sdiag)	Device failed the send diagnostics test.

External loopback test

To check an Ethernet controlleer and its connections from the console prompt, install a ThickWire loopback connector and enter the following command:

t *slot_number* /**ni** /**ext-lb**

Table 2-5 External loopback test codes and descriptions

(code: description)	Meaning
(1: (LANCE-init [*xxxxxxxx*]))	LANCE initialization failed. *xxxxxxxx* is a LANCE failure code.
(3: (xmit [*xxxxxxxx, yyyyyyyy*] *zzzzz*))	LANCE initialization failed. *xxxxxxxx,yyyyyyyy* is a LANCE failure code. *zzzzz* describes the likely cause of the failure.
(4: rcv [*xxxxxxxx,yyyyyyyy*])	System did not receive packet. *xxxxxxxx, yyyyyyyy* describes the receive failure.
(6: pkt-data !=)	Transmitted packet was not received.
(7)	Fatal error occurred.

Transmit and receive test

To test the transmit and receive function of a serial port from the console prompt (>>), install a communications adapter with an MMJ loopback connector and enter the following command:

t 3/scc/tx-rx [*line*] *line loopback* [*baud*] [*parity*] [*bits*]

line	Specify line 0, 1, 2, or 3.
loopback	Specify intl for internal or extl for external.
baud	Specify 300, 1200, 2400, 3600, 4800, 9600, 19200, or 38400.
parity	Specify none, odd, or even.
bits	Specify 8, 7, or 6 bits per character.

Table 2-6 SCC transmit and receive test codes and descriptions

(code: description)	Meaning
1: Ln*N* tx bfr not empty. status=*xx*	System could not write a single character because the transmit buffer was not empty. The error occurred on line *N*. *xx* is the contents of SCC read register 0.
2: Ln*N* char not rcvd. status=*xx*	Expected CHAR AVAIL signal not received. The error occurred on line *N*. *xx* is the contents of SCC read register 0.
3: Ln*N* expctd=*xx*, rcvd=*yy*, status=*zz*	The character received was different from the character transmitted. The error occurred on line *N*. *xx* is the transmitted value. *yy* is the received value. *zz* is the contents of SCC read register 0.
4: Ln*N* Rx err. errs=*xx*	Receiving character in FIFO reported an error. The error occurred on line *N*. *xx* is the associated input character FIFO error bits.

SCC pins test

To test the pins on a communications connector from the console prompt, install a modem loopback connector on the communications connector and enter the following command:

t 3/scc/pins *line attachment*

line	Specify line 2 (right connector) or 3 (left).
attachment	Identify the loopback connector: 29-24795, H8571, hm, or H3200

Table 2-7 Pin pairs tested by loopback connectors

Loopback Connector	Pin Pairs Tested	Meaning
29-24795	4-5 23-6-8	RTS to CTS SS to DSR and CD 6-23 failure implies 6 broken. 8-23 failure implies 8 broken. 6-23 8-23 failure implies 23 broken.
H3200	4-5 6-20 12-23	RTS to CTS DSR to DTR SI to SS
H8571-A	4-5 20-6-8	RTS to CTS DTR to DSR and CD 6-20 failure implies 6 broken. 8-20 failure implies 8 broken. 6-20 8-20 failure implies 20 broken.
hm (H8571-A)	4-5	RTS to CTS

Table 2-8 SCC pins test codes and descriptions

(code: description)	Meaning
1:Ln*N* Invld param [*xx*]	The loopback specifier was invalid. The error occurred on serial line *N*. *xx* is the first two characters of the invalid value.
2:Ln*N* Strtup R-*xx* xptd=*yy* actl=*zz* | *pins* |	Test failed to generate the expected SCC status bits. The error occurred on serial line *N*. *xx* is the number of the SCC register that contains the status bits. *yy* is the expected status bits. *zz* is the actual status bits. | *pins* | is the pin pairs tested.
3: Ln*N* *xxxxx*	Pins failed to respond properly. *xxxxx* is the numbers of one or more pin pairs that failed the test.

Test scripts

To run a test script from the console prompt (>>), type

sh [*options*] *slot_number*/*test_name*

sh	The shell command
options:	
-b	Executes script directly, not through a subshell
-e	Script halts on error.
-l	Test loops until Ctrl-c or system reset.
-v	Echos script to console
-S	Suppresses script-not-found error messages
slot_number	Replace with the slot number of the module to be tested.
test_name	Replace with the name of the script to be run.

To see a list of all test scripts for a module, type

ls *slot_number*/**?**

Flow Charts

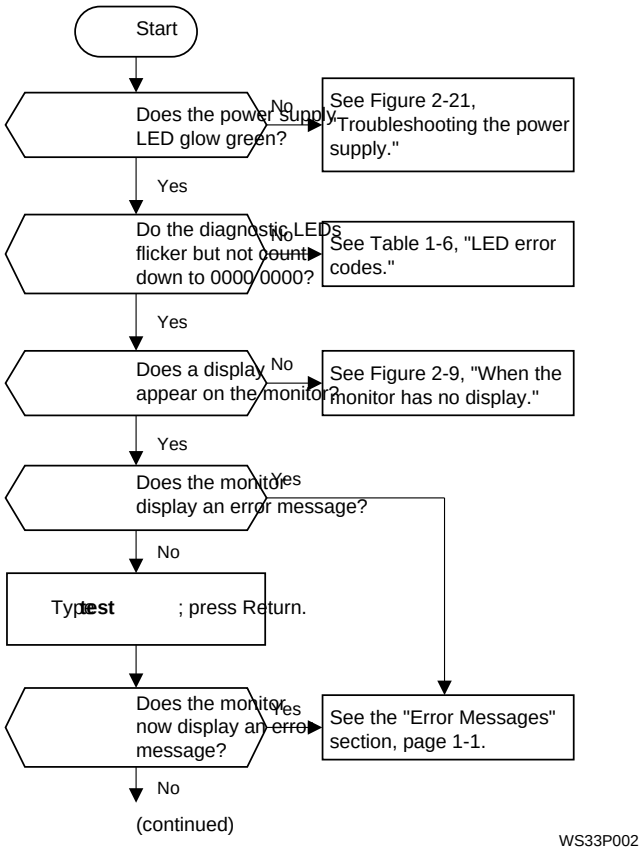


Figure 2-1 Troubleshooting procedure, 1 of 2

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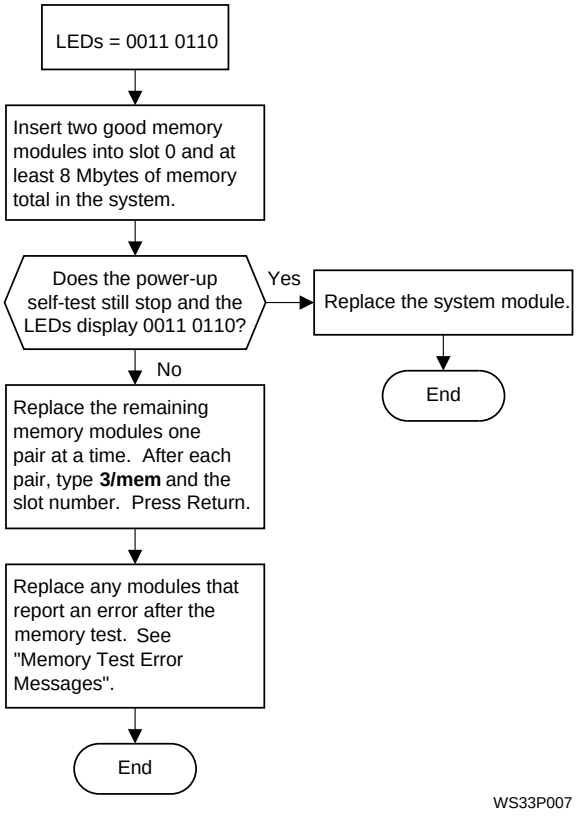

Figure 2-5 When the LED display is 0011 0110

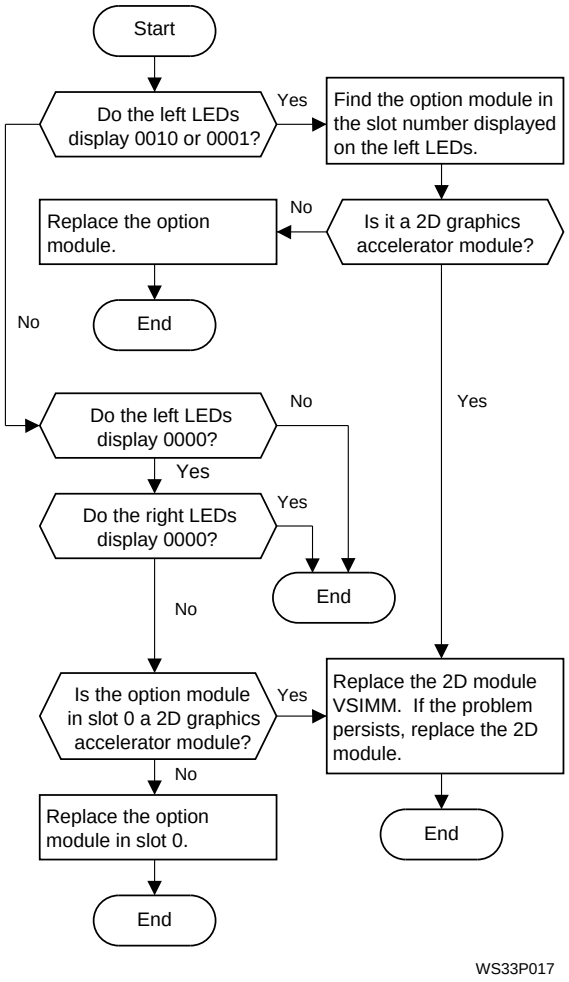

Figure 2-6 When the LED display is 0010 0011, 0001 0011, 0000 0011, or 0000 0000

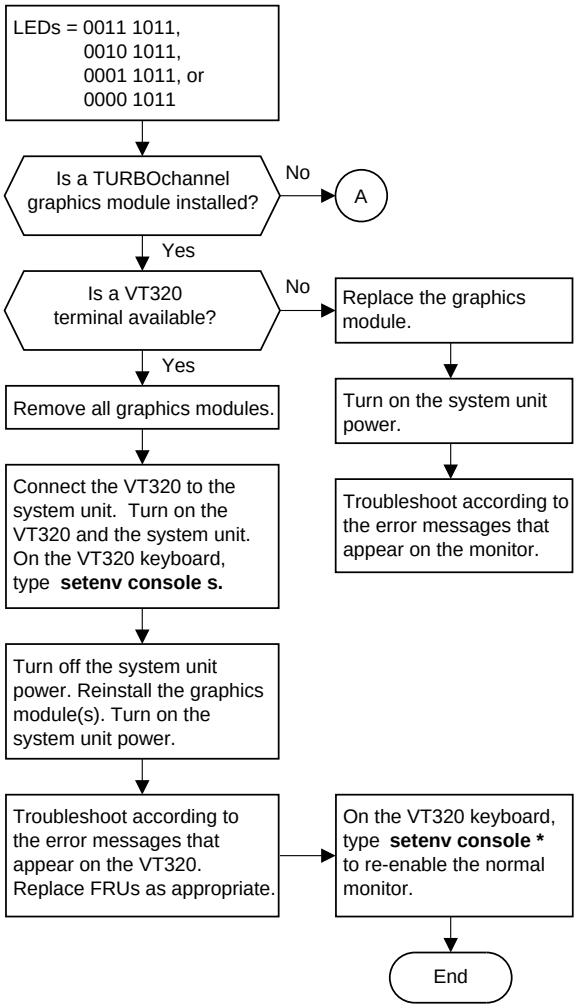

Figure 2-7 When the LED display is 0011 1011, 0010 1011, 0001 1011, or 0000 1011, 1 of 2

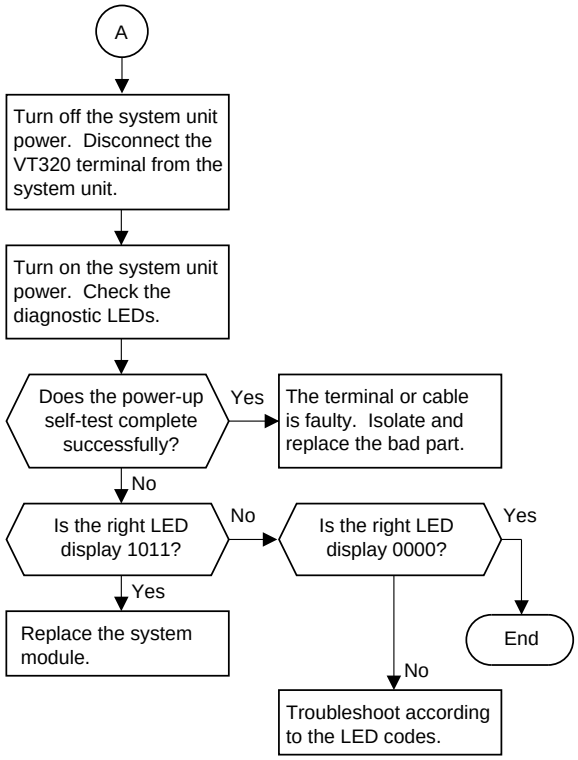

Figure 2-8 When the LED display is 0011 1011, 0010 1011, 0001 1011, or 0000 1011, 2 of 2

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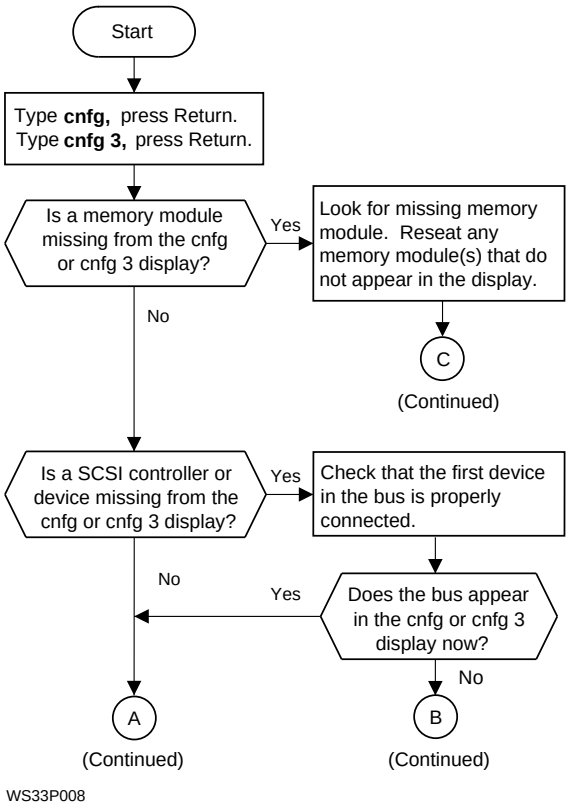

Figure 2-11 When hardware does not appear in the cnfg display, 1 of 3

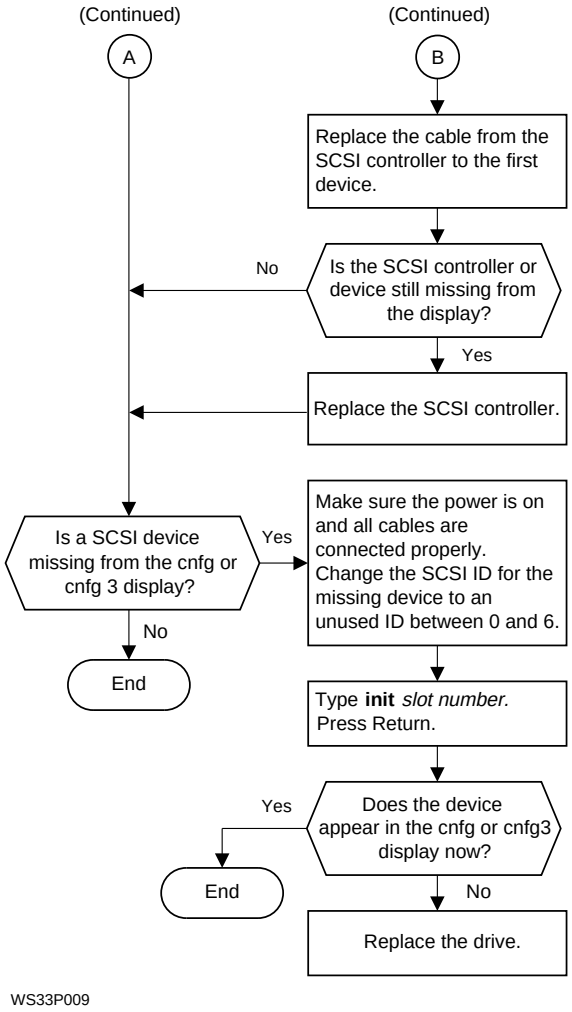

Figure 2-12 When hardware does not appear in the cnfg display, 2 of 3

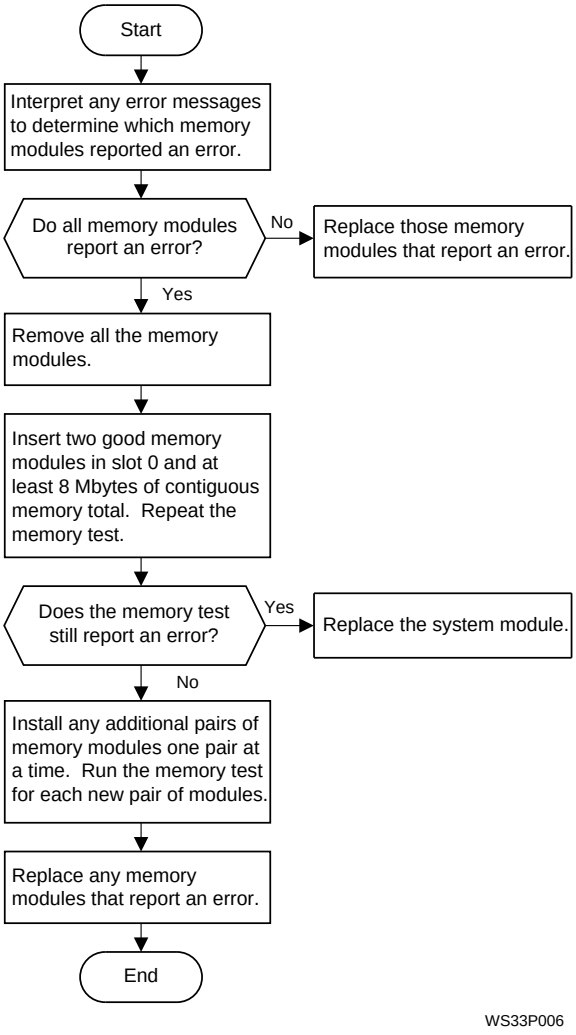

Figure 2-14 Troubleshooting memory modules

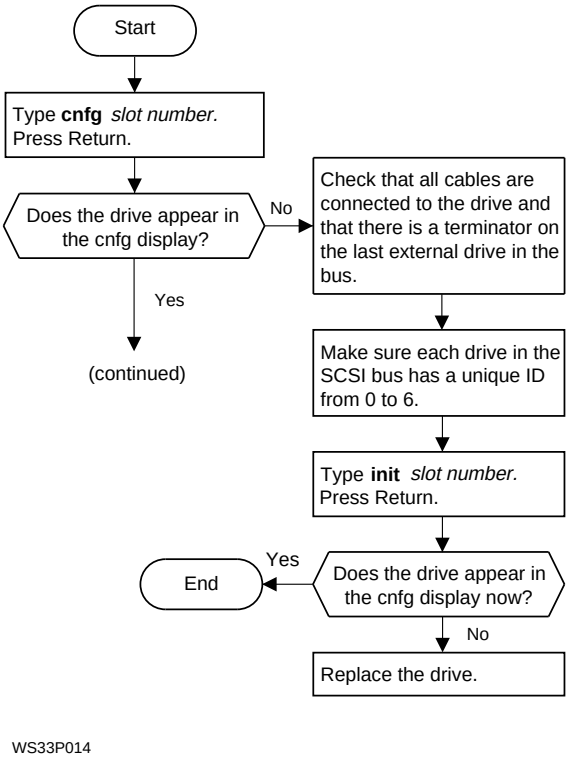

Figure 2-15 Troubleshooting SCSI controllers and devices, 1 of 2

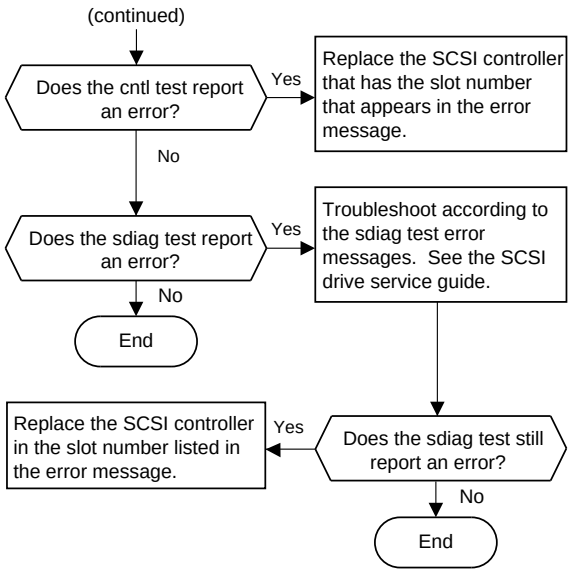

Figure 2-16 Troubleshooting SCSI controllers and devices, 2 of 2

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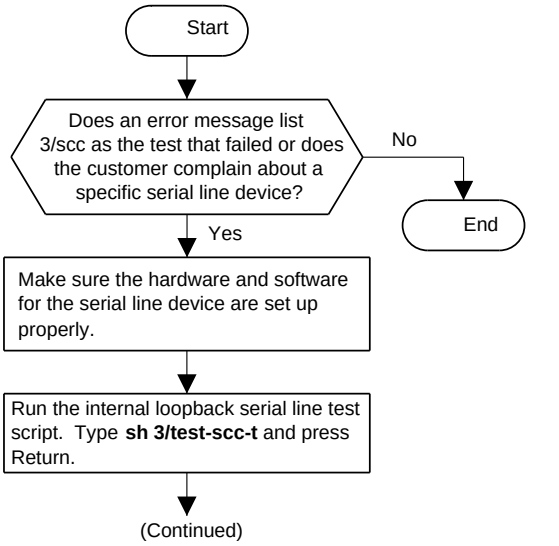

Figure 2-19 Troubleshooting a printer, modem, or other serial line device, 1 of 2

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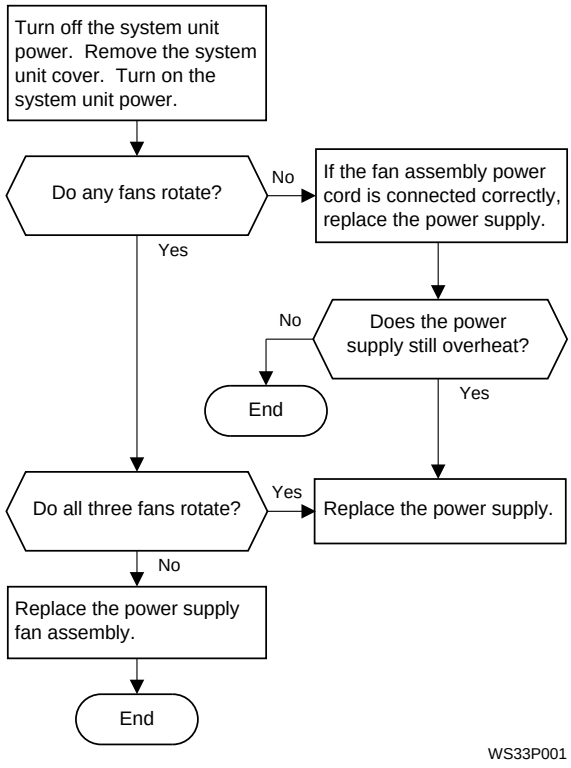

Figure 2-22 If the system unit overheats

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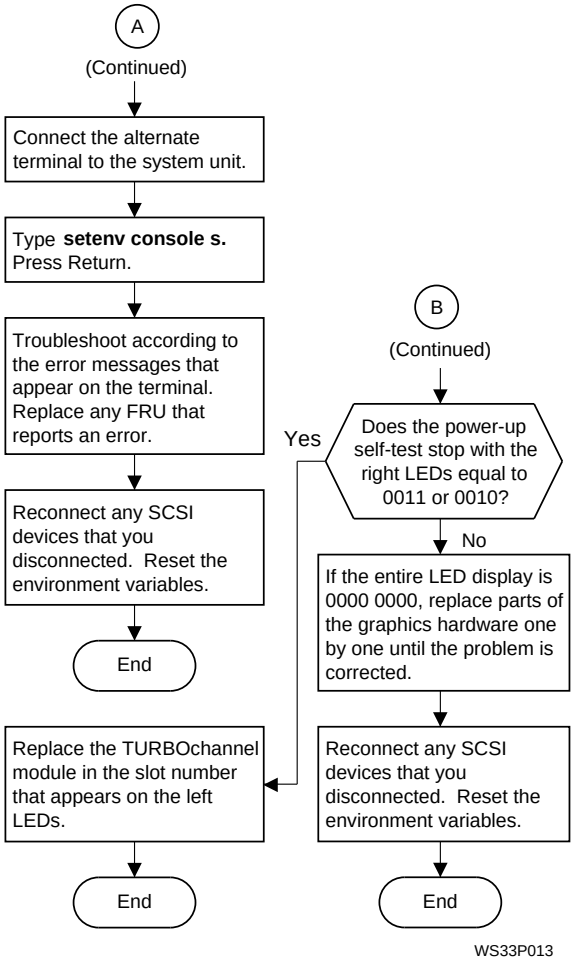

Figure 2-27 When ULTRIX is running but the monitor has no display, 3 of 3

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PART NUMBERS

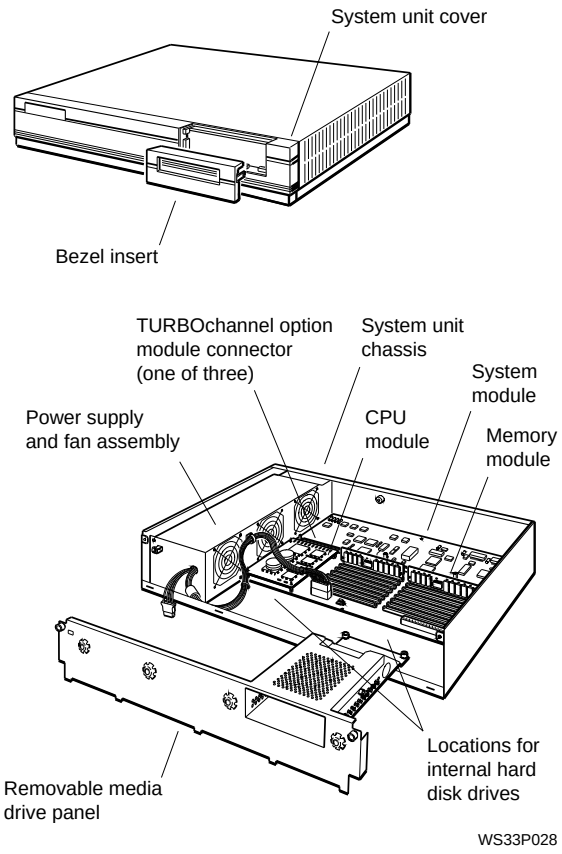

Figure 3-1 DECstation 5000 Model 100 Series Major FRUs

Table 3-1 Part numbers: Basic system components

Item	Part No.	Customer Order No.
System module	70-28336-01	—
CPU module only, 20 MHz	54-20615-01	KN02-BC
CPU module only, 25 MHz	54-20615-02	KN02-CC
Power supply assembly	H7826-AA	—
Power supply fan assembly	70-28334-01	—
Memory module, 2Mb, single	57-30735-02	—
Memory module, 4Mb pair, (two 2Mb modules)	—	MS01-AA
Memory module, 8Mb, single	57-34320-01	—
Memory module, 16Mb pair (two 8Mb modules)	—	MS01-CA
System unit cover	70-28337-01	—
System unit chassis	70-28320-01	—
Removable media drive panel	70-28338-01	—

Table 3-2 Part numbers: Internal drives

Item	Part No.	Customer Order No.
RX23 diskette drive	—	RX23-FL
RX23 diskette drive unit	RX23-A0	—
RX23 diskette drive adapter card	54-19288-01	—
RZ23 hard disk drive	RZ23-E0	—
RZ23L half-height hard disk drive	RZ23L-E0	RZ23L-FL
RZ24 hard disk drive	—	RZ24-FL
RZ24 hard disk drive PCB	29-28144-01	—
RZ24 hard disk drive head disk assembly (HDA)	29-28145-01	—
RRD42 optical compact disc drive	RRD42-AA	RRD42-FL

Table 3-3 Part numbers: TURBOchannel option modules

Item	Part No.	Customer Order No.
1-plane Monochrome Graphics Frame Buffer (MFB)	54-20609-01	PMAG-AB
8-plane Color Graphics Frame Buffer (CFB)	54-19815-01	PMAG-BB
8-plane 2D Graphics Accelerator	54-20314-01	PMAG-CB
8-plane 3D Graphics Accelerator	54-20185-01	PMAG-DB
24-plane 3D Graphics Accelerator	54-20185-02	PMAG-EB
96-plane High-performance 3D Graphics	54-20114-01	PMAG-FB
8-to-24-plane Upgrade	—	PMAG-GB
24-bit Z-buffer Option Module	—	PMAG-HA
8-plane Z-buffer	54-20410-AA	—
16-plane Z-buffer	54-20352-AA	—
ThickWire Ethernet Option Module	54-19874-01	PMAD-AB
SCSI Controller Option Module	54-19876-01	PMAZ-AB

Table 3-4 Part numbers: Monitors

Item	Part No.	Customer Order No.
VR262, 19-inch monochrome monitor, 120 volts	—	VR262-AA
VR262, 19-inch monochrome monitor, 240 volts	—	VR262-A3
VR297, 16-inch color monitor, 120 volts	—	VR297-DA
VR297, 16-inch color monitor, 240 volts, Northern Hemisphere	—	VR297-D3
VR297, 16-inch color monitor, 240 volts, Southern Hemisphere	—	VR297-D4
VR299, 19-inch color monitor, 120 volts	—	VR299-DA
VR299, 19-inch color monitor, 240 volts, Northern Hemisphere	—	VR299-D3
VR299, 19-inch color monitor, 240 volts, Southern Hemisphere	—	VR299-D4
VR319, 19-inch monochrome monitor, 120/240 volts, Northern Hemisphere	—	VR319-DA
VR319, 19-inch gray-scale monitor, 120/240 volts, Northern Hemisphere	—	VR319-CA
VR319, 19-inch monochrome monitor, 240 volts, Southern Hemisphere	—	VR319-D4
VR319, 19-inch gray-scale monitor, 240 volts, Southern Hemisphere	—	VR319-C4

Table 3-4 (Cont.) Part numbers: Monitors

Item	Part No.	Customer Order No.
VRT16, 16-inch color monitor, 120/240 volts, Northern Hemisphere	—	VRT16-DA
VRT16, 16-inch color monitor, 240 volts, Southern Hemisphere	—	VRT16-D4
VRT19, 19-inch color monitor, 120 volts	—	VRT19-DA
VRT19, 19-inch color monitor, 240 volts, Northern Hemisphere	—	VRT19-D3
VRT19, 19-inch color monitor, 240 volts, Southern Hemisphere	—	VRT19-D4

Table 3-5 Part numbers: Input devices

Item	Part No.	Customer Order No.
Keyboard, flat	—	LK201
Keyboard, curved	—	LK401
Mouse	—	VSXXX-AA
Tablet and stylus	—	VSXXX-AB
Lighted programmable function keyboard (LPFK) package, 120 volts	—	VSX20-AA
Lighted programmable function keyboard (LPFK) package, 240 volts	—	VSX20-A3
Programmable function dials (PFD) package, 120 volts	—	VSX30-AA
Programmable function dials (PFD) package, 240 volts	—	VSX30-A3
Combination LPFK and PFD package, 120 volts	—	VSX10-AA
Combination LPFK and PFD package, 240 volts	—	VSX10-A3

Table 3-6 Part numbers: Loopback connectors, plugs, test media, and small hardware

Item	Part No.	Customer Order No.
MMJ loopback connector	12-25083-01	—
ThickWire loopback connector	12-22196-02	—
SCSI chain terminator	12-30552-01	—
ThinWire T-connector	12-25869-01	—
ThinWire terminators	12-26318-01	—
Jumper to clear NVR	12-14314-00	—
Comm-line-to-MMJ adapter	12-33190-01	—
SCSI controller terminator	12-33626-01	—
CPU standoff post	12-35477-01	—
CPU standoff rivet	12-35477-02	—
Comm modem loopback	29-24795-00	—
RX23 bezel insert	74-42126-01	—
Blank bezel insert	74-42126-02	—
RRD42 bezel insert	74-42126-03	—
TZK10 bezel insert	74-42126-04	—

Table 3-7 Part numbers: Cords, cables, and connectors

Item	Part No.	Customer Order No.
Monitor-to-system-unit power cord (U.S.)	17-00442-26	—
System unit or expansion box power cord	17-00606-10	BN19P-K
SCSI expansion-box-to-expansion-box cable	17- 01351-04	BC19J-1E
Keyboard-mouse cable	17-02640-01	—
Serial line cable	—	BC16E-10
SCSI system-unit-to-expansion-box cable	17-02641-02	BC09D-06
SCSI internal data cable for upgrade (RZ23)	17-03175-01	—
ThickWire transceiver cable	17-01321-01	BNE4C-02
ThinWire cable, 12 ft	17-01241-12	BC16M-12
ThinWire LAN kit	22-00112-01	BC16T-12
DESTA ThickWire-to-ThinWire Ethernet adapter	70-22781-02	DESTA-BA
Twisted pair (10 base T) adapter	—	H3350-AA
Video cable, color	17-02906-01	BC29G-09

Table 3-7 (Cont.) Part numbers: Cords, cables, and connectors

Item	Part No.	Customer Order No.
Video cable, grayscale	17-02878-01	—
Video cable, monochrome	17-03054-01	—
SCSI internal data cable	17-03055-01	—
SCSI internal power cable	17-03064-01	—

Table 3-8 Part numbers: Hardware documentation

Item	Part No.	Customer Order No.
DECstation 5000 Model 100 User Documentation Kit	—	EK-PM32A-DK-001
Kit includes the following documents:		
DECstation 5000 Model 100 Installation Guide	—	EK-PM32B-IN-001
DECstation 5000 Model 100 Operator's Guide	—	EK-PM32C-OG-001
DECstation 5000 Model 100 Workstation Reference Card	—	EK-PM32D-RC-001
DECstation 5000 Model 100 Maintenance Guide	—	EK-PM32G-MG-001
DECstation 5000 Model 100 Pocket Reference Guide	—	EK-PM32E-PS-001
TURBOchannel Maintenance Guide	—	EK-TRBOC-MG-003

Table 3-8 (Cont.) Part numbers: Hardware documentation

Item	Part No.	Customer Order No.
Components and Add-Ons:		
RX23 Disk Drive Service Manual	—	
RZ23 Disk Drive Service Manual	—	
RZ23L Disk Drive Service Manual	—	
RZ24 Disk Drive Service Manual	—	
RRD42 Owner's Manual	—	
Installing and Using the LN03	—	EK-0LN03-UG
LN03 PLUS User's Guide	—	EK-LN03S-UG
ScriptPrinter Installation Guide	—	EK-LN03R-UG
ScriptPrinter Operator's Guide	—	EK-LN03R-OG