

DECsystem 5100 PrestoServe/NVRAM Option Information

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- Reorient the receiving antenna.
- Move the computer away from the receiver.
- Plug the computer into a different outlet so that computer and receiver are on different branch circuits.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful: *How to Identify and Resolve Radio-TV Interference Problems*. This booklet is available from the US Government Printing Office, Washington, DC 20402, Stock No. 004-000-00398-5

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About This Manual

The *DECsystem 5100 PrestoServe/NVRAM Option Information* manual describes how to install, operate, and troubleshoot the PrestoServe/NVRAM option.

NOTE

The PrestoServe/NVRAM option must be installed and serviced only by Customer Services personnel or self-maintenance customers.

Audience

This manual is intended for Digital Customer Services personnel, self-maintenance customers, and general users.

Organization

This manual has four chapters and an index.

- Chapter 1, PrestoServe/NVRAM Option, describes the PrestoServe/NVRAM option.
- Chapter 2, Installation, describes how to install the NVRAM modules.
- Chapter 3, Operation, describes how to run the power-up self-test, interpret its results, and use the PrestoServe/NVRAM option console commands.
- Chapter 4, Troubleshooting, describes fault isolation, how to handle failed NVRAM modules, and how to recover cache data.

Related Documentation

You can order the following documentation from Digital:

Document	Order Number
DECsystem 5100 Maintenance Guide	EK-422AA-MG
DECsystem 5100 Operator's Guide	EK-421AA-OG

Conventions

The following conventions are used in this manual:

Convention	Meaning
CAUTION	Provides information to prevent damage to equipment or software.
NOTE	Provides general information about the current topic.

1

PrestoServe/NVRAM Option

This chapter describes the PrestoServe/NVRAM option.

1.1 PrestoServe/NVRAM Option

The PrestoServe/NVRAM option is a hardware and software option on the DECsystem 5100 that improves input/output (I/O) response and throughput. The PrestoServe/NVRAM option operates using specially designed, nonvolatile RAM (NVRAM) as a disk write cache. This memory cache has a battery backup to prevent data loss caused by power failures, system crashes, and normal maintenance procedures.

As a write cache for disks, the PrestoServe/NVRAM option provides substantial improvement in performance while maintaining full file system compatibility. Any application that performs synchronous writes to disk through the ULTRIX file system (such as Network File System (NFS) operations) can benefit from the PrestoServe/NVRAM option. Digital licenses PrestoServe from Legato Systems, Inc.

1.2 Ordering Information

The PrestoServe/NVRAM option consists of the following modules:

Part Number	Description
DJ-51MPS-AA	PrestoServe DECsystem 5100, factory-installed
DJ-51MPS-AF	PrestoServe DECsystem 5100, field-installed

1.3 NVRAM Modules

The PrestoServe/NVRAM option consists of two 512 Kbyte modules. Two modules are required because of the width of the DECsystem 5100 memory bus (64 bits). One module contains even words and is located towards the rear of the machine (the *rear NVRAM SIMM*). The other module contains odd words and is located towards the front of the machine (the *front NVRAM SIMM*). These modules must be installed in the last bank of populated memory.

2

Installation

This chapter describes how to install the NVRAM modules.

2.1 Installing the NVRAM Modules

The PrestoServe/NVRAM option can be installed either at the factory, or on-site by Customer Services personnel or self-maintenance customers.

CAUTION

Always wear an antistatic wrist strap and use an antistatic mat when replacing field replaceable units (FRUs).

To install the NVRAM modules:

1. Remove the system unit cover by performing the following steps:
 - a. Turn the system power off (O). See Figure 2-1.
 - b. Label and disconnect all the cables connected to the system unit.
 - c. Loosen the two captive cover screws on the back panel of the system unit (Figure 2-1).
 - d. Slide the cover forward, and up from the system unit.

2-2 Installation

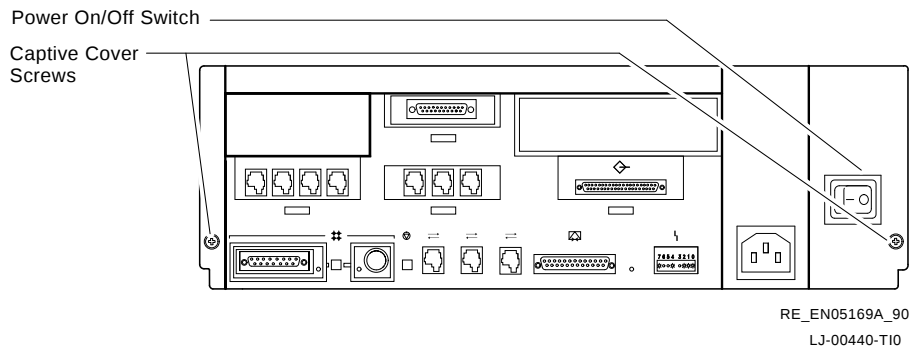


Figure 2-1 Location of On/Off Switch and Cover Screws

2. Remove the upper drive mounting panel as follows:

CAUTION

It is important to note which cables connect to which drives. When disconnecting cables, write the type of drive and its position on a piece of tape and wrap the tape around the connector before you disconnect the cable. This will help you to reinstall the upper drive mounting panel.

- a. Disconnect the power harnesses from the H7822 power supply and disconnect the SCSI bus cable from the drives on the upper drive mounting panel (Figure 2-2).
- b. Unscrew the four captive screws (Figure 2-3).
- c. Lift the upper drive mounting panel from the lower drive mounting panel and gently set it aside.
- d. Note the position of the metal partition, then remove it from the lower drive mounting panel.

NOTE

Depending on your system configuration, the upper drive mounting panel can contain one, two, or three 3.5-inch hard disk drives.

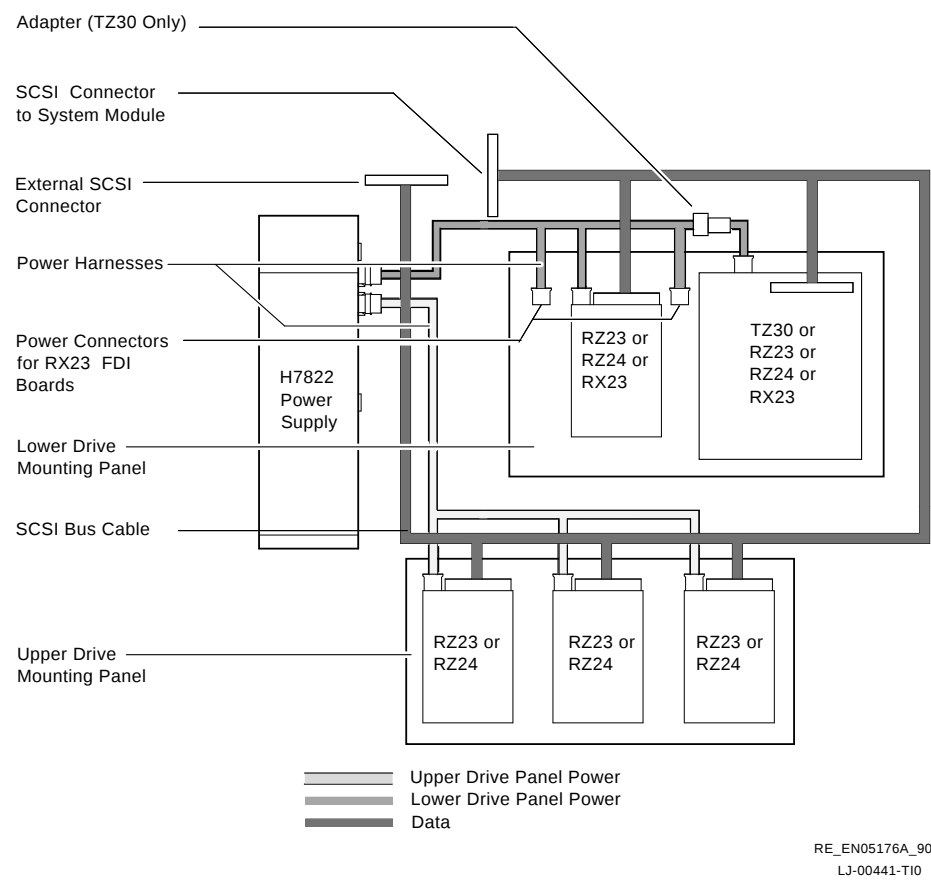
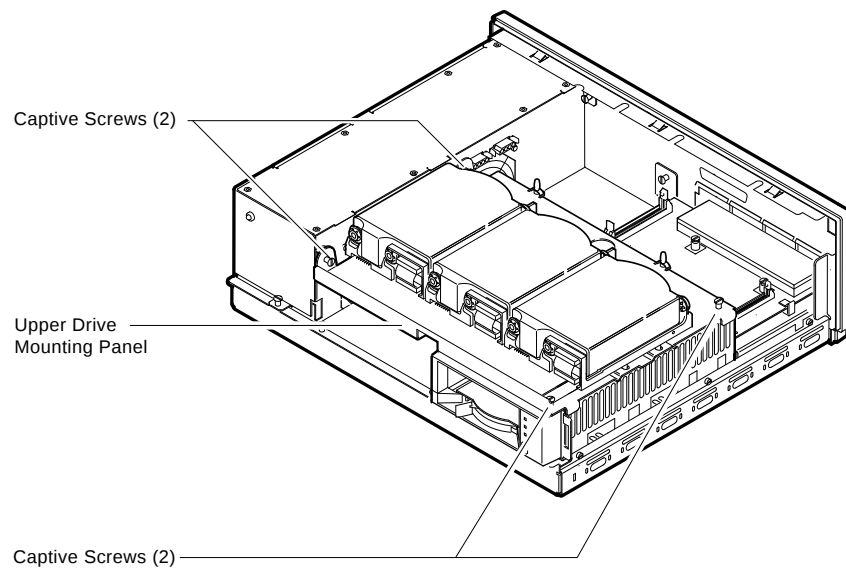


Figure 2-2 Drive Mounting Panel Power and Signal Cabling

2-4 Installation



RE_EN05177A_90
LJ-00442-T10

Figure 2-3 Releasing the Upper Drive Mounting Panel

3. Remove the lower drive mounting panel as follows:

Depending on the configuration, the DECsystem 5100 that you are servicing may contain an option installed on the lower drive mounting panel. If the option is installed, then begin with step a. If the option is not installed, then begin with step b.

- a. Disconnect the cables at the option.

NOTE

The lower drive mounting panel can contain devices in combinations that are restricted by the following rules:

- **You can install the RZ2n disk drives and the RX2n diskette drive in either the left or right compartments.**

- You can install the TZ30 tape drive in the right compartment only.

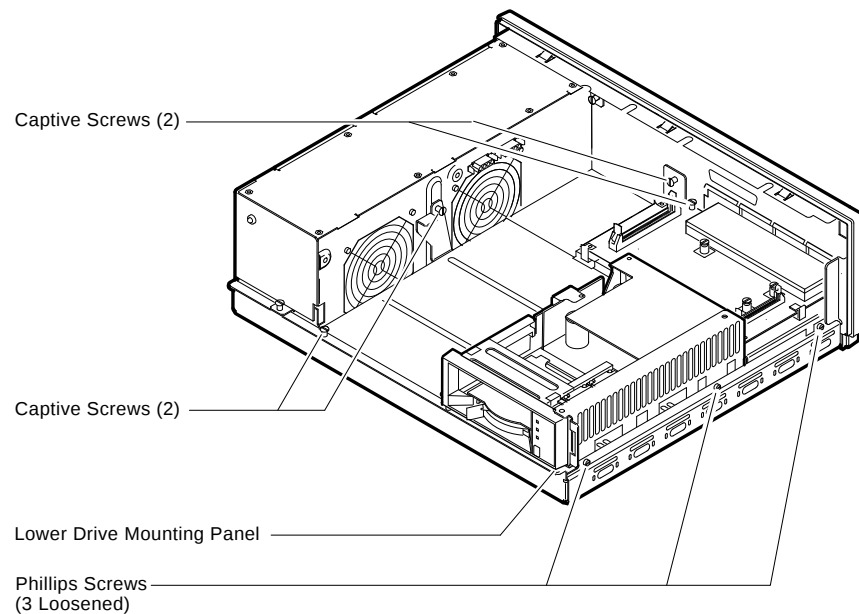
CAUTION

Wear an antistatic wrist strap and use an antistatic mat when replacing FRUs.

- Unscrew the four captive screws and remove the three Phillips screws on the left side of the unit (Figure 2-4). Store the screws in a safe place.
- Slide the panel forward (with the devices attached), then lift the panel from the system unit and gently set it aside.

NOTE

When you remove the lower drive mounting panel, the option remains attached to the lower drive mounting panel.



RE_EN05181A_90
LJ-00443-T10

Figure 2-4 Releasing the Lower Drive Mounting Panel

2-6 Installation

4. Identify the connectors of the memory bank in which you want to install the NVRAM modules. For bank locations, and memory module and NVRAM module configurations, see Table 2-1, Table 2-2, and Figure 2-7.

Table 2-1 MS44 Information

Variation	MS44-xx	Description
MS44-AA	4-Mbyte SIMM module	FRU for Customer Services
MS44-BA	8 Mbytes (2 × MS44-AA)	1 bank of memory for upgrade
MS44-CA	16-Mbyte SIMM module	FRU for Customer Services
MS44-DA	32 Mbytes (2 × MS44-CA)	1 bank of memory for upgrade

Table 2-2 Memory Module and NVRAM Module Configurations

Bank 0	Bank 1	Bank 2	Bank 3	Memory Size in Megabytes	NVRAM Size in Megabytes
MS44-BA	NVRAM	—	—	8	1
MS44-BA	MS44-BA	NVRAM	—	16	1
MS44-BA	MS44-BA	MS44-BA	NVRAM	24	1
MS44-DA*	NVRAM	—	—	32	1
MS44-DA*	MS44-BA	NVRAM	—	40	1
MS44-DA*	MS44-BA	MS44-BA	NVRAM	48	1
MS44-DA*	MS44-DA*	NVRAM	—	64	1
MS44-DA*	MS44-DA*	MS44-BA	NVRAM	72	1
MS44-DA*	MS44-DA*	MS44-DA*	NVRAM	96	1

*MS44-DA memory modules are always located before MS44-BA memory modules.

NOTE

Memory module and NVRAM module configurations of 56 Mbytes and 80 Mbytes are not possible.

The NVRAM modules must be installed in the next available bank (the highest numbered available bank).

CAUTION

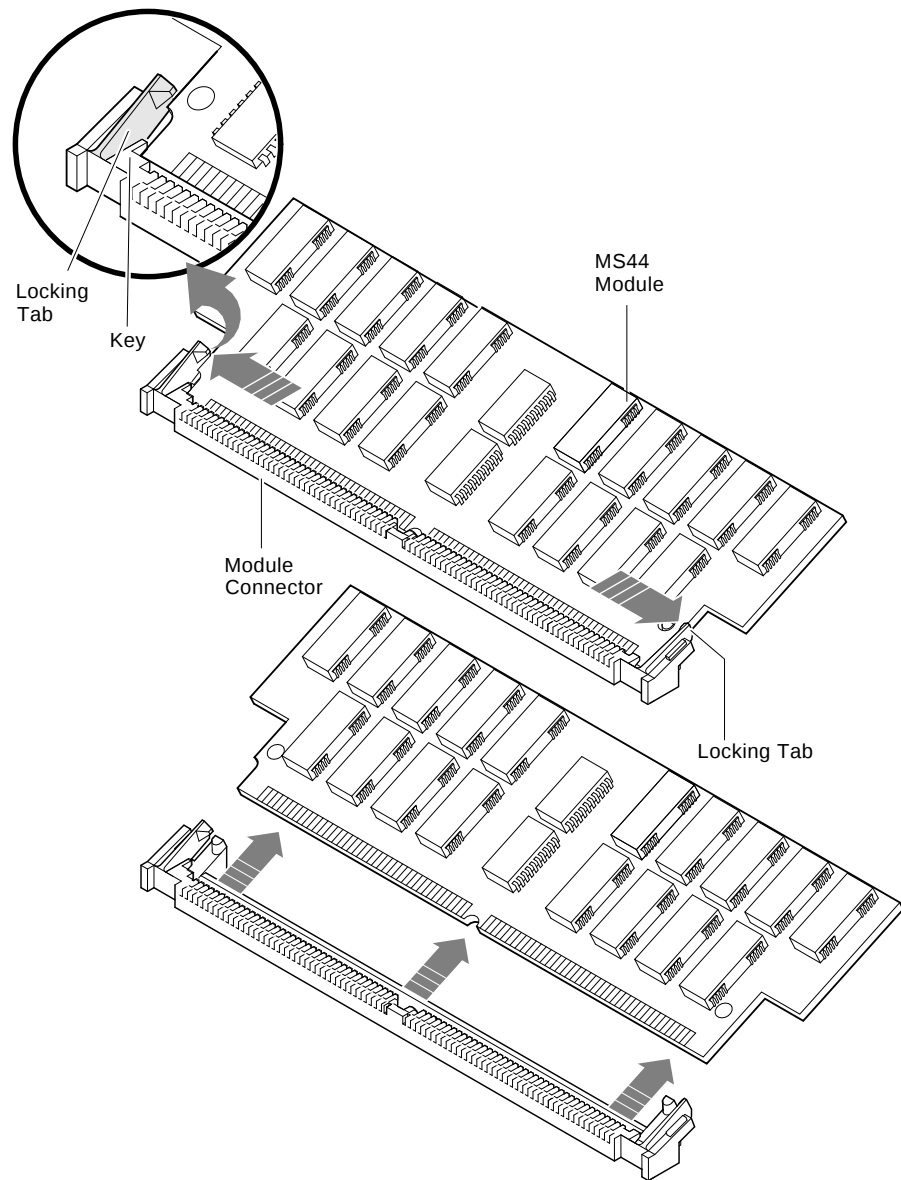
To remove MS44 memory modules ensure that the two locking tabs are disengaged, otherwise damage to the connectors will occur. You must remove the modules contained in the highest available banks first, in order to access the locking tabs of the other memory modules (Figure 2-5).

The two NVRAM modules are *always* installed in the same bank and they must be installed in the next available bank. If all the banks in the system are full, then the last bank of memory must be removed and the NVRAM modules must be installed in the last bank (bank 3).

In a typical configuration, the DECsystem 5100 contains MS44 memory and NVRAM modules located in the following positions (also see Figure 2-6):

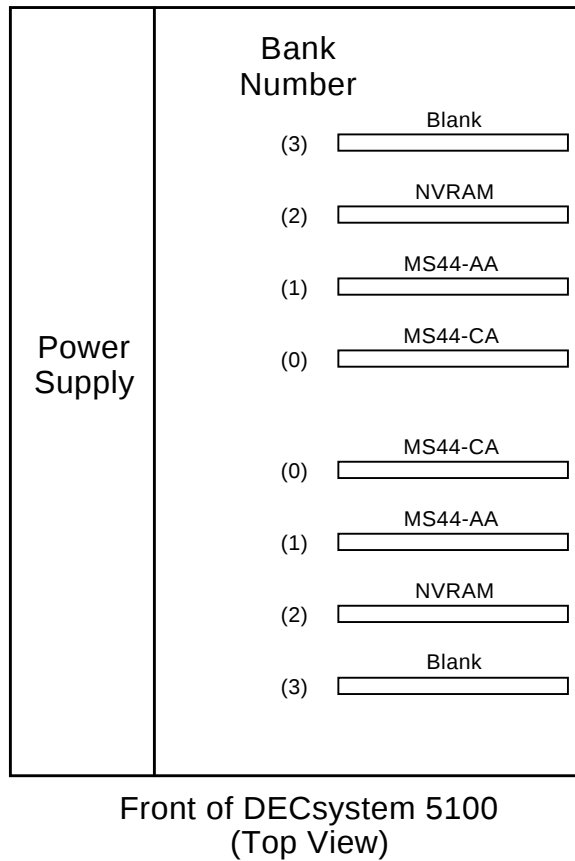
- Bank 0 has two MS44-CAs (32 Mbytes).
- Bank 1 has two MS44-AAs (8 Mbytes).
- Bank 2 has the NVRAM modules.
- Bank 3 is empty.

2-8 Installation



LJ-00445-T10

Figure 2-5 Removing NVRAM Module



LJ-00469-T10

Figure 2-6 Location of Memory Banks

The DECsystem 5100 contains a total of 40 Mbytes of memory and 1 Mbyte of NVRAM. Notice that the two MS44-CA modules are installed in the lowest numbered memory bank (bank 0) before the two MS44-AA modules (bank 1). The NVRAM modules are installed in the next available bank (bank 2).

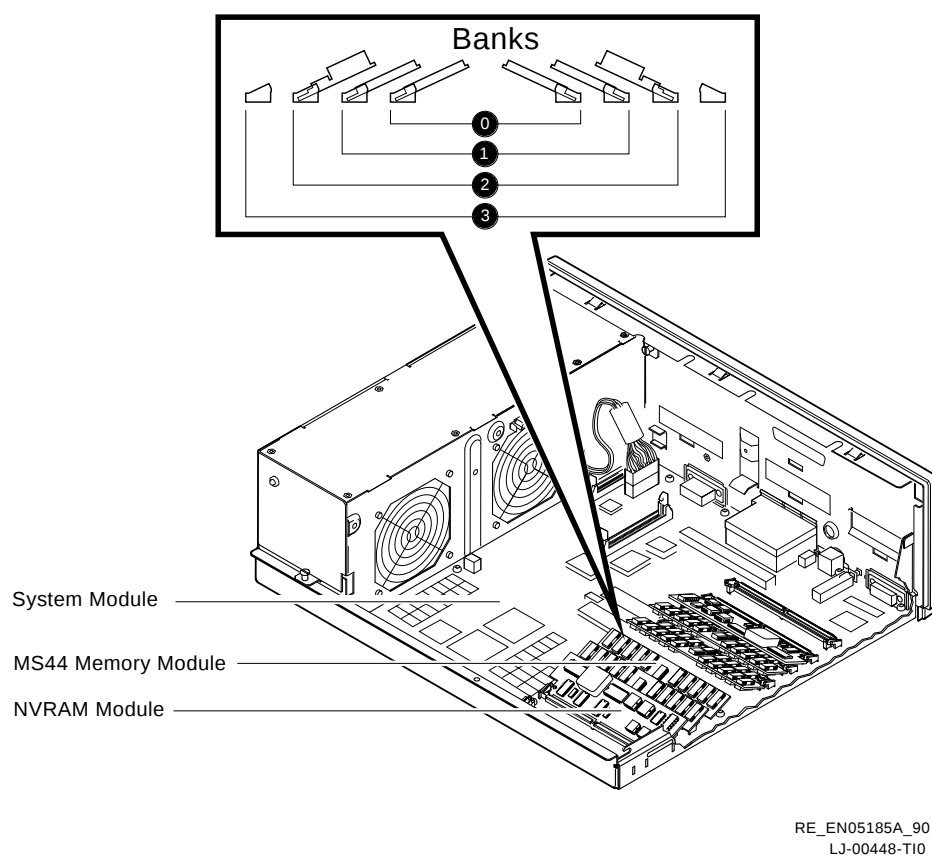


Figure 2-7 Sample Configuration

CAUTION

Wear an antistatic wrist strap and use an antistatic mat when replacing FRUs.

5. To install the first NVRAM module, follow the steps shown in Figure 2-8:

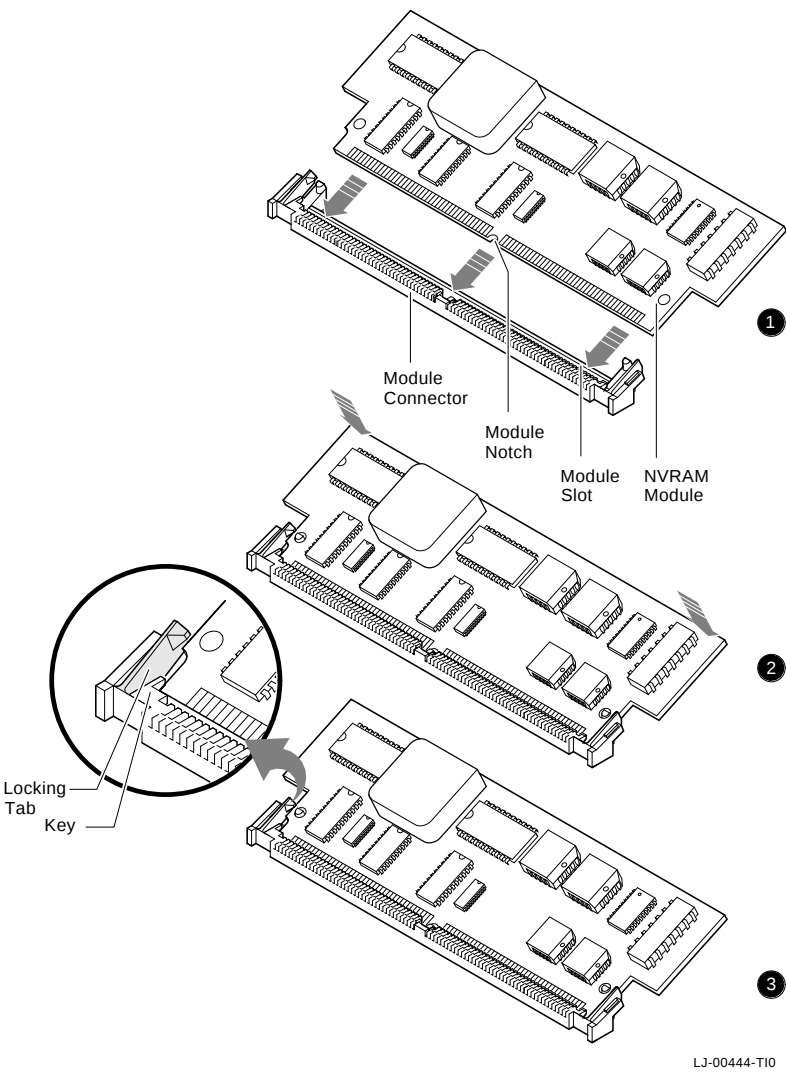


Figure 2-8 NVRAM Module Installation

- ① Align the module with the key.
- ② Insert the module, with the side containing the bar code label facing up, into the connector on the system module. Gently press down on the module.
- ③ Verify that the locking tabs are engaged.

If the memory needs to be reconfigured, refer to Table 2-1 and Table 2-2. For detailed information concerning memory reconfigurations, refer to the *DECsystem 5100 Maintenance Guide*.

CAUTION

The connectors are keyed so that you can install the NVRAM module with the correct orientation. Do not force the modules into the connectors if the key in the module does not align with the connector.

6. Repeat the procedures in step 5 for the second NVRAM module, and install it into the other connector of the same bank.
7. Reassemble the system unit.
8. Run the diagnostic tests (Chapter 3) to make sure that the NVRAM module is operating correctly.

3

Operation

This chapter describes how to run the power-up self-test and interpret its results. It also describes the commands used for the operation of the PrestoServe/NVRAM option and how to move the NVRAM modules.

3.1 Running the Power-Up Self-Test

The power-up self-test checks each component, subsystem, and connection in the system.

To run the power-up self-test, turn the system unit's power switch on (I). Figure 3-1 shows the location of the system unit on/off switch.

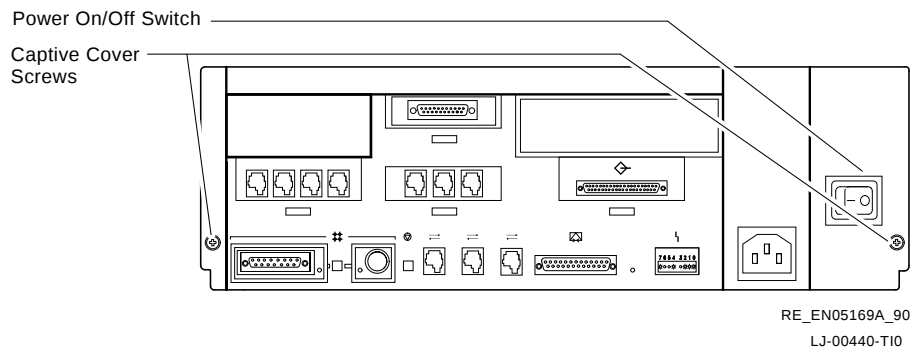


Figure 3-1 Location of On/Off Switch

3-2 Operation

The system begins to build a power-up self-test display on the console terminal. Example 3-1 shows the power-up self-test display when it completes successfully.

```
26..25..24..23..22..21..20..19..18..17..16..15..14..14..14..①
13..12..11..10..9..8..7..6..5..4..3..
KN230 Vn.n②
08-00-2b-55-55-55③
0x1000000④
>>⑤
```

Example 3-1 Successful Power-Up Self-Test Display

- ① Tests or groups of tests on specific system functions
- ② The version of the system module console program –
The V indicates that this is an official release of the product. The digits *n.n* indicate the release number.
- ③ The Ethernet address of the system
- ④ The memory size in hexadecimal format –
Table 3-1 shows the values for the various memory configurations.

Table 3-1 Memory Size Indication

Hexadecimal Value	Memory Size in Megabytes
0x800000	8
0x1000000	16
0x1800000	24
0x2000000	32
0x2800000	40
0x3000000	48
0x4000000	64
0x4800000	72
0x6000000	96

- ⑤ The console prompt –
If security is enabled and a valid password exists, the following prompt will appear on the console: S>

Refer to the *DECsystem 5100 Operator's Guide* for a description of the console security features.

Example 3-2 shows the power-up self-test display if the system detects memory errors.

```

26..25..24..23..22..21..20..19..18..17..16..15..14..14..
13..12..11..10..9..8..7..6..5..4..3..
KN230 Vn.n
08-00-2b-55-55-55
0x1000000
Bad mem: 0x1400 ①
>>

```

Example 3-2 Power-Up Self-Test Display with Memory Error

- ① A message to indicate that some bad memory exists but the system may still be operable.

3.1.1 Unsuccessful Power-Up Self-Test

If during the power-up self-test, one of the individual tests fails, the system halts and displays an error report summary. When one or both of the NVRAM modules fail the power-up diagnostics, the following error report summary is displayed on the console terminal. Example 3-3 shows a typical error report summary resulting from the failure of test group 4. An error report summary contains five elements of diagnostic information.

3-4 Operation

```
26..25..24..23..22..21..20..19..18..17..16..15..14..14.. ❶
13..12..11..10..09..08..07..06..05..04..
?09 06 ff 0001❷
P1= ffffffff P2= a3400044 P3= a3400044 P4= 00000000 P5= 00000000 ❸
P6= 00000000 P7= 00000000 P8= 00000000 P9= 00000000 P10=00000000 ❸
gp= 34e6d146 sp= a000f794 fp= 00000000 sr= 04800000 ❸
epc=bfc2a1f0 badvaddr=00060000 cause=1000000 ❸
03..❹
>> ❺
```

Example 3-3 Unsuccessful Power-Up Self-Test Example

- ❶ Power-up self-test in progress.
- ❷ The number after the question mark (?) indicates which test failed.
(In Example 3-3, test 09 failed.)
- ❸ Four-line error report summary on the failing test, test 0x9 (NVRAM test).
- ❹ The power-up self-test continuing after error.
- ❺ The console prompt –
If security is enabled and a valid password exists, the following prompt will appear on the console: S>

3.1.2 Interpreting the Power-Up Self-Test Results

For information concerning power-up self-test failures, refer to the *DECsystem 5100 Maintenance Guide*.

3.2 Commands

The following section describes the console commands related to the PrestoServe/NVRAM option.

NOTE

Note that the command interpreter is case-sensitive and, as a rule, lowercase is used.

3.2.1 Configuration Command

The configuration (conf) command displays the system configuration. The format of this command is shown here:

conf [- (b | f | m | s | g)]

The -b option directs the system to display a brief system configuration. Example 3-4 shows an example of a brief system configuration display.

```
>> conf -b
```

```
hardware: revision 1
firmware: revision 4
Ethernet hardware address: 08-00-2b-12-7f-58
option board: not present
dynamic memory: total size 8MBs
non-volatile memory: 1 MBs at 0xa0c00000
scsi peripherals
  unit type      product          removable/fixed
  0  tape        TLZ04 1989(C) DEC  removable
  1  disk         RZ56          (C) DEC  fixed
  2  disk         RZ23          (C) DEC  fixed
  3  disk         RZ24          (C) DEC  fixed
  4  cdrom        CD-ROM CDU-541    removable
  5  tape         TZK10         removable
  6  disk         RZ23          (C) DEC  fixed
  7  host adapter
```

```
>>
```

Example 3-4 Brief System Configuration Display

3-6 Operation

The -f option directs the system to display a full system configuration table. Example 3-5 shows an example of a full system configuration display.

```
>> conf -f
```

```
hardware: revision 1
firmware: revision 4
cpu: revision 2.32
fpu: revision 3.32
security switch: secure mode
password: clear
eeprom: valid
Ethernet hardware address: 08-00-2b-12-7f-58
option board: not present
dynamic memory: total size 8MBs
    bank0 4MB SIMMs size: 8MBs      0 bad pages
non-volatile memory: 1 MBs at 0xa0c00000
scsi peripherals
  unit type      product      removable/fixed  capacity
  0  tape        TLZ04 1989 (C)DEC  removable
  1  disk        RZ56      (C) DEC  fixed      634 MBs
  2  disk        RZ23      (C) DEC  fixed      100 MBs
  3  disk        RZ24      (C) DEC  fixed      200 MBs
  4  cdrom       CD-ROM CDU-541  removable      571 MBs
  5  tape        TZK10
  6  disk        RZ23      (C) DEC  fixed      100 MBs
  7  host adapter
```

```
>>
```

Example 3-5 Full System Configuration Display

The -m option directs the system to display the memory configuration. Example 3-6 shows an example of a memory configuration display.

```
>> conf -m

dynamic memory: total size 8MBs
                 bank0 4MB SIMMs size: 8MBs          0 bad pages
non-volatile memory: 1 MBs at 0xa0c00000
>>
```

Example 3-6 Memory Configuration Display

The -s option directs the system to display a table of the SCSI devices in the system. Example 3-7 shows an example of a SCSI device table.

```
>> conf -s

scsi peripherals
  unit type      product          removable/fixed  capacity
  0  tape        TLZ04 1989 (C)DEC  removable
  1  disk        RZ56          (C) DEC         fixed           634 MBs
  2  disk        RZ23          (C) DEC         fixed           100 MBs
  3  disk        RZ24          (C) DEC         fixed           200 MBs
  4  cdrom       CD-ROM CDU-541    removable       571 MBs
  5  tape        TZK10
  6  disk        RZ23          (C) DEC         fixed           100 MBs
  7  host adapter
```

Example 3-7 SCSI Device Table

3-8 Operation

The -g option directs the system to display a general system configuration. Example 3-8 shows an example of a general system configuration display.

```
>> conf -g

hardware: revision 1
firmware: revision 4
Ethernet hardware address: 08-00-2b-12-7f-58
option board: not present
dynamic memory: total size 8MBs
non-volatile memory: 1 MBs at 0xa0c00000
```

Example 3-8 General System Configuration Display

3.3 Using the prcache Console Command

The prcache command is part of the system firmware's privileged console commands. Use this command to diagnose problems, to obtain information about the cache configuration, and to perform maintenance operations on the PrestoServe/NVRAM option. The prcache command is executed from the console prompt (>>).

NOTE

The PrestoServe/NVRAM option is diagnosed during the power-up self-tests. It can also be diagnosed by using the extended self-test commands. Refer to Chapter 4 for more information.

The syntax for the prcache console command is:

```
prcache -f
prcache -u
prcache -z
```

- The prcache -f command shows the status of the PrestoServe/NVRAM option. It displays information about the cache size, starting address, system ID, state (either clean or dirty), and battery status.
- The prcache -u command enables the PrestoServe/NVRAM option batteries by unarming the battery disconnect circuits.
- The prcache -z command clears the PrestoServe/NVRAM option cache and disables the NVRAM modules' batteries by arming the battery disconnect circuits. The command issues a prompt which asks you if the cache is cleared.

The following example of the `prcache -f` command shows that the PrestoServe/NVRAM option contains valid data (dirty) and that the batteries are enabled:

```
>> prcache -f 

Nvram disk cache: 1 MBs at 0xa3400000
Nvram disk cache ID is 0x127ed2
Nvram disk cache is dirty
Rear nvram SIMM battery okay
Rear nvram SIMM battery disconnect circuit un-armed
Front nvram SIMM battery okay
Front nvram SIMM battery disconnect circuit un-armed
>>
```

The following example of the `prcache -u` command enables the batteries, and the example of the `prcache -f` command shows that the cache is clean and that the batteries are enabled:

CAUTION:

The `prcache -u` command connects the batteries to the cache. Turning the system off when the batteries are connected, will cause them to drain unnecessarily.

```
>> prcache -u 
>> prcache -f 

Nvram disk cache: 1 MBs at 0xa3400000
Nvram disk cache ID is 0x127ed2
Nvram disk cache is clean
Rear nvram SIMM battery okay
Rear nvram SIMM battery disconnect circuit un-armed
Front nvram SIMM battery okay
Front nvram SIMM battery disconnect circuit un-armed
>>
```

The following example of the `prcache -z` command clears the PrestoServe/NVRAM option cache and disables the batteries. The example of the `prcache -f` command shows that the cache does not contain valid data (clean) and that the batteries are disabled.

```
>> prcache -z 
Zero the nvram disk cache, are you sure (Y/N) [N]? Y 
```

3-10 Operation

```
>> prcache -f Return

Nvram disk cache: 1 MBs at 0xa3400000
Nvram disk cache ID is 0x127ed2
Nvram disk cache is clean
Rear nvram SIMM battery okay
Rear nvram SIMM battery disconnect circuit armed
Front nvram SIMM battery okay
Front nvram SIMM battery disconnect circuit armed
>>
```

3.4 Moving the NVRAM Modules

When the PrestoServe/NVRAM option cache contains valid data, and the NVRAM modules have been moved to another system, the power-up diagnostics identify that the NVRAM modules were moved. The following example shows the power-up diagnostic that is displayed:

```
26..25..24..23..22..21..20..19..18..17..16..15..14..14..
13..12..11..10..09..08..07..06..05..04
?09 0a ff 0000
?rear nvram SIMM ID does not match system ID
?front nvram SIMM ID does not match system ID

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0x30000000
>>
```

When you boot the system and the PrestoServe/NVRAM option cache contains valid data, the system gives you the following options:

- Discard the PrestoServe/NVRAM option cache data.
- Write the data to the intended disks.
- Halt the machine.

If the PrestoServe/NVRAM option cache contains valid data, but the NVRAM modules have been interchanged, the system cannot boot, and the following information is displayed on the console terminal:

```

26..25..24..23..22..21..20..19..18..17..16..15..14..14..14..
13..12..11..10..09..08..07..06..05..04
?09 0a ff 0000
?rear nvram SIMM ID does not match system ID
?front nvram SIMM ID does not match system ID
?rear nvram BOARD is in the wrong bank
?front nvram BOARD is in the wrong bank
03..

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0x30000000
>> boot Return
2..?booting not possible
?rear and front nvram SIMMs must be swapped
?rear nvram SIMM ID does not match system ID
?front nvram SIMM ID does not match system ID
?rear nvram BOARD is in the wrong bank
?front nvram BOARD is in the wrong bank
>>

```

You must move the NVRAM modules to their correct positions to recover the cache data.

CAUTION:

Data loss could occur if you discard the data then proceed to boot the operating system.

If you do not want the data in the PrestoServe/NVRAM option cache, use the `prcache -z` command to discard the data. You can then boot the system.

4

Troubleshooting

Before proceeding, the following guidelines should be followed:

- Always observe electrostatic discharge (ESD) procedures when handling modules.
- When transferring NVRAM modules, always note their positions and treat them as a pair.

4.1 Executing the PrestoServe/NVRAM Option Diagnostic (test 0x9)

Use the following test command to execute the PrestoServe/NVRAM option diagnostic (test 0x9):

```
>> test -v 0x9
```

When the PrestoServe/NVRAM option cache contains valid data (dirty), then the limited read-only test is executed and it does not alter the contents of the PrestoServe/NVRAM option cache. The diagnostic does a read test on the PrestoServe/NVRAM option cache and uses a scratch area for a write test.

When the PrestoServe/NVRAM option cache is clean, an extensive read/write test is executed and the entire contents of the PrestoServe/NVRAM option cache is altered. The diagnostic then performs data pattern tests and address short tests. It also tests the battery disconnect circuitry by disabling the circuits. The diagnostic then enables the battery disconnect circuitry and checks the status register to ensure that the batteries are disconnected.

4-2 Troubleshooting

Example 4-1 shows what is displayed after test 0x9 is executed and the PrestoServe/NVRAM option cache is dirty (contains valid data).

```
>> test -v 0x9
-009-04 nvram float 1's and 0's tst
-009-05 wrt addr to addr
-009-06 chk nvram w/ addr -> 5's
-009-07 chk nvram w/ 5's -> A's
-009-08 chk nvram w/ A's -> F's
-009-09 chk nvram w/ F's
-009-0a nvram read-only tst
-009-0b tst nvram batt
```

Example 4-1 PrestoServe/NVRAM Option Cache is Dirty (Contains Valid Data) - test 0x9

Example 4-2 shows what is displayed after test 0x9 is executed and the PrestoServe/NVRAM option cache is clean (contains no data).

```
>> test -v 0x9
-009-04 nvram float 1's and 0's tst
-009-05 wrt addr to addr
-009-06 chk nvram w/ addr -> 5's
-009-07 chk nvram w/ 5's -> A's
-009-08 chk nvram w/ A's -> F's
-009-09 chk nvram w/ F's
-009-0b tst nvram batt
-009-0c tst nvram bat disc circuit
```

Example 4-2 PrestoServe/NVRAM Option Cache is Clean (Contains No Data) - test 0x9

4.1.1 PrestoServe/NVRAM Option Installed but Not Configured

If the PrestoServe/NVRAM option is installed but not configured, the following message will be displayed after the prcache command is issued:

```
?nvram option not available
```

Check to see if the environment variable boot mode is set to "d". If it is, at the console prompt in privileged mode type:

```
>> setenv bootmode *
```

Turn the system off (O), then turn the system back on (I). A power-up diagnostic countdown should appear at the console terminal:

NOTE

The power-up diagnostics should configure the PrestoServe/NVRAM option into the system.

```
26..25..24..23..22..21..20..19..18..17..16..15..14..14..14..
13..12..11..10..09..08..07..06..05..04..03..
```

```
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0x30000000
>>
```

Use the prcache command to see if the PrestoServe/NVRAM option is present. The following message will be displayed again if the PrestoServe/NVRAM option is still not configured:

```
?nvram option not available
```

Check to see if the PrestoServe/NVRAM option is installed correctly. It may have been installed in the wrong memory bank, or one or both of the NVRAM modules may be faulty. Refer to Chapter 2 for a description of how to install the PrestoServe/NVRAM option.

4.2 Handling Failed NVRAM Modules (FRU Part Number 54-20474-01)

If one or both of the NVRAM modules fails the power-up diagnostics, the following example will be displayed on the console terminal:

```
26..25..24..23..22..21..20..19..18..17..16..15..14..14..14..
13..12..11..10..09..08..07..06..05..04..
?09 06 ff 0001

P1= ffffffff P2= a3400044 P3= a3400044 P4= 00000000 P5= 00000000
P6= 00000000 P7= 00000000 P8= 00000000 P9= 00000000 P10=00000000
gp= 34e6d146 SP= a000f794 fp= 00000000 sr= b0480000
epc=bfc2a1f0 badvaddr=00060000 cause=10000000

03..

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0x30000000
>>
```

4-4 Troubleshooting

Use the `conf -m` command to determine which modules (rear, front, or both) are bad:

```
>> conf -m 
dynamic memory: total size 48MBs
    bank0 16MB SIMMs size: 32MBs      0 bad pages
    bank1  4MB SIMMs size:  8MBs      0 bad pages
    bank2  4MB SIMMs size:  8MBs      0 bad pages
non-volatile memory: 1 MBs at 0xa3400000
    front SIMM: bad
    rear SIMM: ok
>>
```

4.2.1 Disable Battery/Zero the PrestoServe/NVRAM Option Cache

Before removing failed NVRAM modules, use the `prcache -z` command to zero the PrestoServe/NVRAM option cache and disable the batteries.

```
>> prcache -z 
Zero the nvram disk cache, are you sure (Y/N) [N]? Y 
```

Replace the failed NVRAM modules.

NOTE

When one or both NVRAM modules fail, NVRAM data is lost.

After the new NVRAM modules are installed, the following power-up diagnostic is displayed:

```
26..25..24..23..22..21..20..19..18..17..16..15..14..14..14..
13..12..11..10..09..08..07..06..05..04..03..
KN230 Vn.n
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0x3000000
>>
```

4.3 Recovering PrestoServe/NVRAM Option Cache Data After Replacing the System Module

If the system powers down abnormally and fails to reboot, you may have to replace the system module. Before removing any modules, note the locations of the NVRAM and memory modules on the system. Then transfer the NVRAM and memory modules to the same location on the new system. After the new system module is installed, the following power-up diagnostics are displayed:

```
26..25..24..23..22..21..20..19..18..17..16..15..14..14..
13..12..11..10..09..08..07..06..05..04..
?09 0a ff 0000
?rear nvram SIMM ID does not match system ID
?front nvram SIMM ID does not match system ID
03..

KN230 Vn.n
08-00-2b-18-73-52
0x1800000
>>
```

Use the `prcache -f` command as follows to determine if the PrestoServe/NVRAM option cache contains data:

```
>> prcache -f Return

Nvram disk cache: 1 MBs at 0xa3400000
?rear nvram SIMM ID does not match system ID
?front nvram SIMM ID does not match system ID
Nvram disk cache is dirty
Rear nvram SIMM battery okay
Rear nvram SIMM battery disconnect circuit un-armed
Front nvram SIMM battery okay
Front nvram SIMM battery disconnect circuit un-armed
>>
```

When you boot the system and the PrestoServe/NVRAM option cache contains data, the system gives you the following options:

- Discard the PrestoServe/NVRAM option cache data.
- Write the data to the intended disks.
- Halt the machine.

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