IBM Netfinity Servers

S06J-0791-00

IBM Netfinity 7000 - Type 8651
Models RH0, RM0, TH0, TM0

Hardware Maintenance
Manual Supplement

October 1997

We Want Your Comments!
(Please see page 192)

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IBM

> **Note**
>
> Before using this information and the product it
> supports, be sure to read the general information
> under "Notices" on page 196.

First Edition (October 1997)

About This Supplement

This supplement contains diagnostic information, Symptom-to-FRU Indexes, service information, error codes, error messages, and configuration information for the Netfinity 7000 - Type 8651.

> **Important**
>
> This manual is intended for trained servicers who are familiar with IBM PC Server products.
>
> Before servicing an IBM product, be sure to review "Safety Information" on page 180.

Online Support

Use the World Wide Web (WWW) or the IBM PC Company BBS to download Diagnostic, BIOS Flash, and Device Driver files.

File download address is:

http://www.us.pc.ibm.com/files.html

The IBM PC Company BBS can be reached at (919) 517-0001.

IBM Online Addresses:

The HMM manuals online address is:

http://www.us.pc.ibm.com/cdt/hmm.html

The IBM PC Company Support Page is:

http://www.us.ibm.com/support/index.html

The IBM PC Company Home Page is:

http://www.pc.ibm.com

Related Publications

The following publications are available for IBM products. For more information, contact IBM or an IBM Authorized Dealer.

For Information About	See Publication
PC Servers	IBM PC Servers Hardware Maintenance Manual (S30H-2501)
PS/2 Computers	IBM Personal System/2 Hardware Maintenance Manual (S52G-9971)
PS/ValuePoint Computers	IBM PS/ValuePoint Hardware Maintenance Service and Reference (S61G-1423)
Laptop, Notebook, Portable, and ThinkPad Computers (L40, CL57, N45, N51, P70/P75, ThinkPad 300, 350, 500, 510, 710T, Expansion Unit, Dock I, Dock II)	IBM Mobile Systems Hardware Maintenance Manual Volume 1 (S82G-1501)
ThinkPad Computers (ThinkPad 340, 355, 360, 370, 700, 701, 720, 750, 755)	IBM Mobile Systems Hardware Maintenance Manual Volume 2 (S82G-1502)
ThinkPad Computers (ThinkPad 365, 560, 760, SelectaDock)	IBM Mobile Systems Hardware Maintenance Manual Volume 3 (S82G-1503)
Monitors (Displays) (February 1993)	IBM PS/2 Display HMM Volume 1 (SA38-0053)
Monitors (December 1993)	IBM Color Monitor HMM Volume 2 (S71G-4197)
IBM Monitors (P/G Series) (July 1996)	IBM Monitor HMM Volume 3 (S52H-3679)
IBM 2248 Monitor (February 1996)	IBM Monitor HMM Volume 4 (S52H-3739)
Disk Array technology overview and using the IBM RAID Configuration Program	Configuring Your Disk Array booklet (S82G-1506)
Installation Planning for Personal System/2 computers	Personal System/2 Installation Planning and Beyond (G41G-2927)
Installation Planning for Advanced Personal System/2 Servers	Advanced PS/2 Servers Planning and Selection Guide (GG24-3927)

Contents

IBM Netfinity 7000 - Type 8651

> **Attention**
>
> Due to the weight of the server, do not attempt to lift the server by yourself. To avoid possible injury while lifting the server, get three or more additional people to help you.
> The tower model of the server has casters for easier moving. To prevent unexpected movement of the server, make sure that the casters are locked into place, except when you are moving the server.

General Checkout

This general checkout procedure is for IBM Netfinity 7000 - Type 8651 computers.

Diagnostic error messages appear when a test program finds a problem with a hardware option. For the test programs to properly determine if a test *Passed*, *Failed*, or *Aborted*, the test programs check the error-return code at test completion.

General error messages appear if a problem or conflict is found by an application program, the operating system, or both. For an explanation of these messages, refer to the information supplied with that software package.

A failed system might be part of a shared DASD cluster (two or more systems sharing the same external storage device(s)). Prior to running diagnostics, verify that the failing system is not part of a shared DASD cluster.

A system might be part of a cluster if:

 The customer identifies the system as part of a cluster.
 One or more external storage units are attached to the system and at least one of the attached storage units is additionally attached to another system or unidentifiable source.
 One or more systems are located near the failing system.

If the failing system is suspect to be part of a shared DASD cluster, all diagnostic tests can be run except diagnostic tests which tests the storage unit (DASD residing in the storage unit) or the storage adapter attached to the storage unit.

Notes

1. For systems that are part of a shared DASD cluster, one test at a time in looped mode. Do not run all tests in looped mode, as this could enable the DASD diagnostic tests.

2. If multiple error codes are displayed, diagnose the first error code displayed.

3. If the computer hangs with a POST error, go to the "Symptom-to-FRU Index" on page 156.

4. If the computer hangs and no error is displayed, go to "Undetermined Problems" on page 168.

5. Power Supply problems, see "Status Indicators" on page 18.

6. Safety information, see "Safety Information" on page 180.

7. For intermittent problems, check the error log; see, "Error Log" on page 8.

(CONTINUED)

```
┌─────┐
│ 001 │
└─────┘
```

IS THE SYSTEM PART OF A CLUSTER?
Yes   No
```
 │    │
 │   ┌─────┐
 │   │ 002 │
 │   └─────┘
 │   Go to Step 004.
┌─────┐
│ 003 │
└─────┘
```
Schedule maintenance with the customer. Shut down all
systems related to the cluster. Run storage test.

```
┌─────┐
│ 004 │
└─────┘
```

┌── **Note** ─────────────────────────────────┐
│   │
│ Use the Setup program to define the CD-ROM drive │
│ as the First Boot Device. Refer to "Defining the │
│ Startup Device" on page 44   │
│   │
└───┘

– Power-off the computer and all external devices.
– Check all cables and power cords.
– Set all display controls to the middle position.
– Power-on all external devices.
– Power-on the computer.
– Insert the System CD-ROM into the CD-ROM drive;
  then, press Ctrl+Alt+Del.
– Check for the following responses:

    1. One beep.
    2. Readable instructions or the Main Menu.

DID YOU RECEIVE THE CORRECT RESPONSES?
Yes   No
```
 │    │
 │   ┌─────┐
 │   │ 005 │
 │   └─────┘
 │   Find the failure symptom in "Symptom-to-FRU Index"
 │   on page  156.
┌─────┐
│ 006 │
└─────┘
```
– Run the Netfinity 7000 Diagnostics Test. If necessary,
  refer to "Starting the Diagnostic Programs" on page 13
  and "Using the Test Selection" on page 14.
  If you receive an error, go to "Symptom-to-FRU Index"
  on page 156.

Diagnostics

The following tools are available to help you identify and resolve hardware-related problems:

Power-on self-test (POST)
POST beep codes
Test programs
Error messages
Error Log (Event Log)
Option Diskettes

Power-On Self-Test (POST)

Each time you power-on the system, it performs a series of tests that check the operation of the system and some options. This series of tests is called the *power-on self-test*, or *POST*. POST does the following:

Checks some basic system-board operations
Checks the memory operation
Starts the video operation
Detects and initializes ISA devices
Detects and configures EISA devices
Detects and configures PCI devices
Verifies that the diskette drive, hard disk drive, and
other installed devices are working

Check the indicator lights on the front of the server and the back of the power supplies. Verify that all of the amber lights are off. If an amber lights are on, see "Status Indicators" on page 18 Verify that both green LEDs on the back of the power supplies are on. Verify that all server devices are operating properly. If a device is not operating properly, ensure that it is not defective and is installed correctly. Replace defective devices and reinstall any device that is not installed correctly.

If POST finishes without detecting any problems, a single beep sounds and the first screen of the operating system or application program appears. If no operating system is installed, the system prompts you to insert bootable media. Refer to the information that came with the ServerGuide package for instructions on installing an operating system.

If POST detects a problem, an error message appears on the screen. A single problem can cause several error messages to appear. When you correct the cause of the first error message, the other error messages probably will not appear on the screen the next time you power-on the system.

POST Beep Codes

POST generates one or more beeping sounds to indicate that the tests detect an error.

One beep and the appearance of text on the monitor indicate successful completion of the POST. If the server

halts before POST completes, one or more beeps are emitted to indicate that POST detects an error. For a complete list of beep codes, see "Beep Codes" on page 156.

Test Programs

Use the test (diagnostic) programs to test the IBM components of the system and some external devices. The amount of time required to test all components depends on the number of components. The more optional adapters and devices attached to the system, the longer the testing takes.

If you cannot determine whether a problem is caused by the hardware or by the software, you can run the test programs to confirm that the hardware is working correctly.

The Server diagnostic programs identify most problems associated with the major components of the system. These programs test the system board, hard disk drives, diskette drives, CD-ROM drives, RAM, serial and parallel ports, video adapter, printer, keyboard, and mouse.

Test options let you run groups of tests in a batch, specify parameters to use for each test (for example, video modes, port addresses, and so on), specify the number of passes you want to run (one to continuous), log the test results to a text format file, and save all test settings for future use.

Error Log

The error log (VIEWLOG.EXE) contains all the POST, system, and intermittent errors that occur in the server.

Note

The error log's default configuration setting is enable.

Use the ViewLOG.exe program located in the root directory on IBM Netfinity 7000 System CD-ROM to:

  View the error log
  Copy the error log to a diskette.

To reset the error log (when full), use the Resetlog.exe program located in the root directory on IBM Netfinity 7000 System CD-ROM . The program will prompt you for a yes/no to confirm the action before deleting the log.

Error Messages

Messages generated by the software—the operating system or application programs—generally are text messages, but they also can be numeric. Basically, there are four types of error messages. These include POST error messages, diagnostic error messages, POST beep codes, and software-generated messages.

Error Message	Description
POST Error Messages	Appear when, during startup, POST finds problems with the hardware or detects a change in the hardware configuration. A list of these error messages is given in "Symptom-to-FRU Index" on page 156.
POST Beep Codes	Are sounds emitted from the speaker, if POST finds a problem. One beep indicates the POST completed successfully. If the server halts while running POST, one or more beeps indicate that a problem was found by the POST. A list of the beep error codes is given in "Symptom-to-FRU Index" on page 156.
Diagnostic Error Messages	Appear when a test program finds a problem with a hardware option. Normally, these messages are text, but they can be numeric. The test programs will generate one of the following return codes: **0** — A return code of "0" indicates that the device passed its test. **1** — A return code of "1" indicates that the device failed its test. **2 or higher** — A return code of "2" or higher indicates that the test stopped.
Software-Generated Error Messages	Appear if a problem or conflict is found by an application program, the operating system, or both. For an explanation of these messages, refer to the information that comes with your software package.

Option Diskettes

An optional device or adapter might come with a diskette. Option Diskettes usually contain diagnostic files or configuration files that the system needs to recognize and activate the option.

If the optional device or adapter comes with an Option Diskette, you might need to install some configuration (.CFG) files or diagnostic files (.EXE or .COM). See "ISA or EISA Option Diskettes" on page 27 for instructions on installing the configuration files.

The Startup Menu of the Diagnostic Tests

The Startup Menu is the starting point for all of the diagnostic tests. It contains the following selections:

Run Netfinity 7000 Diagnostics When you select this choice from the Startup Menu, the Diagnostics Menu appears. The Diagnostics Menu contain the following selections:

– **Test** allows you to specify an individual module (or device such as a diskette drive) for testing, or specify a group of tests for several modules. In addition, you can specify how many times to run an individual test and how the test program should note and log any errors it finds.

– **Errors** displays the error messages that the system has captured.

– **Summary** lists all tests that have been run, the run times, the number of times passed, the number of times failed, and the error messages.

– **Configuration** allows you to save a test configuration to run at a later time.

– **Options** allows you to set or change defaults that affect the reporting, error logging, and presentation of the error information.

Run Netfinity 7000 Memory Test (Quick - 5 min/64 MB): Provides a quick test of the system memory.

Run Netfinity 7000 Memory Test (Extensive - 15 min/64 MB): Provides a more extensive test of the system memory.

Run Advanced System Management Adapter Diagnostics. Provides a more extensive test of the processor(s).

Program Navigation

You can maneuver within the test programs by typing the first letter of a menu choice, or using the function keys.

Function Keys

Function Key	Description
Enter	Selects an item.
Down Arrow (↓)	Moves the cursor down.
Up Arrow (↑)	Moves the cursor up.
Right Arrow (→)	Moves the cursor to the right.
Left Arrow (←)	Moves the cursor to the left.
F1	Displays the appropriate Help information. Use the Up Arrow (↑) or Down Arrow (↓) key to scroll through the information.
Esc	Returns to the previous menu.

The following additional keys are active on the Test window. Press the TAB key from the Test window to view a description of all keys.

Function Key	Description
Enter	Selects a test module and displays the sub-test menu, or runs an enabled sub-test.
SPACE	Toggles (switches) test modules and sub-tests between enabled or disabled.
F2	Runs the current enabled sub-test.
F3	Disables the current test module or sub-test.
F4	Enables the current test module or sub-test.
F5	Accesses global run-time flags and module run-time flags. Refer to "Run-Time Flags" on page 13 for information.
F6	Accesses test module .CFG parameters.
F7	Displays the error messages that the system has captured.
F8	Displays all tests that have been run, the run times, the number of times passed, the number of times failed, and the error messages.
F9	Displays the version number of the test module.
ALT+F2	Runs all enabled sub-tests in all test modules.
ALT+F3	Disables all sub-tests and all test modules.
ALT+F4	Enables all sub-tests and all test modules.
ALT+F6	Displays the .PKG parameters.

Command Line Options

The Command Line Options allow you to define specific conditions for running the diagnostic programs from the DOS command line or at startup time.

At the operating system prompt, type `t xxxx yyyy` (where `xxxx` represents a test and `yyyy` is a flag.

The test can be identified either by the module name or by it's position in the .PKG file, for example:

Module Name	Description
Floppy	Run all enabled sub-tests in the floppy test module.
Floppy.1	Run the first sub-test of the floppy test module, if enabled.
1-5	Run all enabled sub-tests of the first 5 test modules in the .PKG file.

A command line option can contain the following flags:

Option	Description
/?	Prints the contents of the help file.
/AUTO (*filename*)	Configures the test menu based on the hardware detected in the system. The system saves the configuration in the file name you provide.
/CF (*filename*)	Specifies the configuration file to use.
/DT (*nn*)	Displays all sub-tests. If the sub-test is enabled, a + displays next to the sub-test. If disabled, a – displays next the sub-test. *nn* is the number of lines to display. Press **Enter** to display the next screen of sub-tests.
/GROUP (*chars*)	Runs the sub-tests that have the character string that you specify.
/HOURS (*nn.n*)	Defines the length of time to continue testing.
/N (*n*)	Defines the number of times the test will loop.
/OVER	Overrides the disable flag on each sub-test.
/PC (*product code*)	Provides the diagnostics program product code.
/PKG (*filename*)	Processes the file name you provide instead of the default, T.PKG.
/Q	No output to screen during testing.
/SAVE (*filename*)	Saves the configuration to the file name you provide.
/SELF (*filename*)	Configures the test menu based on the hardware detected in the system and saves it to the file name you provide.
/SHUFFLE (*nn*)	Shuffles the run-list on each pass. *nn* is the number of passes.

Run-Time Flags: The run-time flags are the commands that control execution of the tests. The **Edit Run-Time Flags** selection on the Options Menu provides access for editing the run-time flags.

Flag	Description
/T	Required flag.
/CF (*filename*)	The file name you provide contains parameters that supplement or override parameters in the .PKG file.
/HE	Halt on error.
/PE	Prompt on error.
/(*n*)	Number of loops to execute.
/Q	No messages to console.
/RR (*filename*)	Redirects error messages, advisory messages, and status messages to the file name you provide.
/RE (*filename*)	Redirects error messages to the file name you provide.
/RA (*filename*)	Redirects advisory messages to the file name you provide.
/RS (*filename*)	Redirects status messages to the file name you provide.
/RX (*filename*)	Redirects statistics to the file name you provide.
/SF (*filename*)	Redirects the summary file to the file name you provide.
/SS (*filename*)	Summarize loops and failures after each test to the file or printer.
/W (*nn*)	Wait only *nn* seconds if the test is defined to halt on error.

Starting the Diagnostic Programs

To start the test programs from the System CD-ROM:

1. Use the Setup program to define the CD-ROM drive as the First Boot Device. Refer to "Defining the Startup Device" on page 44
2. Insert the System CD-ROM into the CD-ROM drive.
3. Power-on the system. Or, if the system is powered on, press **Ctrl**+**Alt**+**Del**.

   The system begins the power-on self-test (POST). If a user password has been set, the system prompts you to enter it.

 4. Use the Up Arrow (↑) or Down Arrow (↓) key to select
    Run System Diagnostics from the Startup Menu.
 5. Use the Up Arrow (↑) or Down Arrow (↓) key to move
    the highlight bar to your desired Startup Menu
    selection.
 6. Press **Enter**.

The Test Window: When you select **Test** from the
Diagnostics Menu, the Test window appears. The Test
window allows you to select test modules and define
testing parameters. Highlighted selections indicate a
module or device selected for testing.

Using the Test Selection
To start the Test selection from the Startup Menu:

 1. Start the diagnostic programs, see "Starting the
    Diagnostic Programs" on page 13.
 2. Select **Run Server Diagnostics** from the Startup
    Menu; then, press **Enter**.
 3. Use the ← and → to select **Test**. Use the Up Arrow
    (↑) or Down Arrow (↓) key to move the highlight bar
    from one selection to the next within the Test window.

    You can also enter the number of your desired test to
    move the highlight bar.
 4. Press **Enter** at the highlight bar of the desired test
    module.
 5. Press the Spacebar at the highlight bar to enable the
    desired sub-test.
 6. Press **F2** to run the selected sub-test.
 7. Select the number of passes and the length of
    processing time; then, press **Enter**.

    If you want to run all enabled sub-tests, you can do
    so by pressing **ALT**+**F2**.

Creating Test Scripts: Scripting allows you to select specific groups of tests, sub-test, and parameters. You can then save your selections for later use as a test *script*.

To set up a test script:

1. Select **Run Server Diagnostics** from the Startup Menu; then press **Enter**
2. Select **Test** from the Diagnostics Menu.
3. Select the tests, sub-tests, and parameters.
4. Select **Configuration** from the Diagnostics Menu.
5. Select **Save Test Configuration**.
6. Type in a file name and press **Enter**.
7. To load and run the test program with this test setting, type: `T /CF` *filename* and then, press **Enter**.

Options: The following is a brief description of each option that appears on the Options Menu.

Option	Description
Line Printer	Sends error messages to a line printer.
Halt on Error	If you select **Yes**, you can resume testing after a halt by pressing any key. If you select **No**, any error detected is logged (only if you enabled the Test Log) and the program continues testing without halting.
Prompt on Error	If you select **Yes**, a beep sounds whenever the test program detects an error.
Summarize Loops/Fails	Summarize the number of times the test has been run and the number of failures. Can optionally redirect to file or printer.
Interactive Waiting	This option allows you to define a period of time after which tests defined to halt on error will continue.
Edit Run-Time Flags	Gives access for editing of all global run-time flags.
Run All Tests	Automatically enables all tests.
Use Run-List	Allows you to specify a sequence of tests and loops.
Run DOS Command	Allows you to enter a DOS command.

Configuration Menu: The following is a brief description of each option that appears on the Configuration Menu.

Option	Description
Configure Test Menu from List	Provides a menu of configuration files.
Configure Test Menu from File	Prompts you to enter the file name of the configuration.
Self-Configure Test Menu	Automatically configures the test menu based on the hardware detected in the system.
Auto-Integrate Test Pack	Automatically configures the test menu based on the hardware detected in the system and runs integration utilities.
Display System Hardware	Lists all system hardware.
Save Test Configuration	This selection allows you to save the test configuration.
Change Menu Color	Provides access to the menu colors.
Change Test View.INI Parameters	Provides access to all Test View parameters maintained in the .INI file.

POST Error Codes and Messages

Error Codes and Messages might appear on the screen during the power-on self-test (POST).

Sometimes the first error to occur causes additional errors. In this case, the system displays more than one error message. Always follow the suggested action instructions for the *first* error message that appears.

POST error codes are also written to the error log in the Extended BIOS Data Area and can be viewed using the event log utility. For a complete list of error codes and messages, see "Symptom-to-FRU Index" on page 156.

SCSI Messages

> **Note**
>
> If the server has a CD-ROM drive, but does not have a hard disk drive, ignore any message that indicates that the BIOS is not installed.

SCSI Messages	Description

All	One or more of the following might be causing the problem.
	
	    A failing SCSI device (adapter, drive, controller)
	    An improper SCSI configuration
	    Duplicate SCSI IDs in the same SCSI chain
	    An improperly installed SCSI terminator
	    A defective SCSI terminator
	    An improperly installed cable
	    A defective cable
	
	Action: Verify that:
	
	    The external SCSI devices are turned on. External SCSI devices must be turned on before the system.
	    The cables for all external SCSI devices are connected correctly.
	    The last device in each SCSI chain is terminated correctly. (See "SCSI Drives" on page 129 for more SCSI chain information.)
	    The SCSI devices are configured correctly.
	
	If the above are correct, run the diagnostics for additional information about the failing device.

Status Indicators

Status indicators on the server can help to identify problems with some system components such as power supplies and hot-swap drives.

Cooling-Failure Status Indicators: The cooling-failure light on the front of the server blinks slowly if one of the fans fails or is predicted to fail (for example, starts to slow down).

If more than one fan fails or if the ambient temperature exceeds the warning threshold, the cooling-failure light will blink rapidly; depending upon the version of system management code, an error might be logged in the system management error log.

If an ambient temperature exceeds the operating system shutdown threshold, the cooling-fan light will continue to blink rapidly; depending upon the version of system management code, the operating system might start to shutdown.

If an ambient temperature exceeds the server shutdown threshold, the cooling-fan light will continue to blink rapidly and the server will shutdown immediately.

Power Supply Status Indicators: To determine the status of a power supply, examine the following indicators:

    Green Power-On light on the front of the server
    Amber Power-Failure light on the front of the server
    Green AC Power light on the back of the power supply
    Green DC Power light on the back of the power supply

If the green Power-On light on the front of the server is on, and the amber Power-Failure light on the front of the server is off, all power supplies are operational.

If the green Power-On light on the front of the server is on, and the amber Power-Failure light on the front of the server is on, a power supply has failed. Check the lights on each of the power supplies.

> **Note**
>
> To ensure that the power supply is operational, both lights must be on. Also check the power up sequence, see "Power Up Sequence" on page 19.

The status conditions that the lights on the power supply indicate are:

AC Power Light	DC Power Light	Description
On	On	The power supply is on and operating correctly.
On	Off	Either the Power On/Off button is in the Off position (the Power-On light on the front of the server is off and the DC Power lights on all the power supplies are off) or this power supply has failed (the DC Power light on at least one of the power supplies is on).
Off	Off	The server is not connected to an active wall outlet.

Power Up Sequence: To check the power up sequence, do the following.

1. Power-off the server.
2. Disconnect the power cord and wait 10 seconds until all unit LEDs go off; then, reconnect the power cord to reset the power supply units.
3. Check standby mode (system is plugged in but not powered on). One AC Good LED on each power supply should be on and the control panel LEDs are off.
4. Press the power button on the control panel. The power supply DC Good LEDs will illuminate and the control panel power failure light (LED) will briefly flash yellow and the power-on light will turn solid green.
5. Check power-on mode for the following:
   Power supply fans and system fans are on.
   Power supply units are warm and the control panel power-on LED and the two LEDs on each power supply are green.

Note

If any of the two power supply LEDs are off in any of the preceding steps, replace the power supply.

Hot-Swap Drive Status Indicators: You can
use the status LEDs on the hot-swap drives to obtain
status information for the drives.

> **Drive In-Use light** (Center Green LED): The server is
> writing to or reading from the hard disk.
> **Drive Fault light** (Amber LED): The SCSI drive is
> faulty. In a disk-array model, this amber LED blinks
> when the drive is part of a disk array and is being
> rebuilt.

The SCSI drive status condition LED indications are:

Drive In-Use LED	Drive Fault LED	Status
Off	Off	Hot-swap drive is present.
Blinking	Off	Hot-swap drive is present; power to the drive is on. The drive is in use.
Off	On	The drive has a problem, and can be replaced.
Off	Blinking slowly	Disk-array models only: The drive *should not* be replaced at this time. The drive has just been replaced, and the disk array is being rebuilt. Power to the drive is on.

> ─ **Note** ─
>
> If an installed drive is not recognized by the server,
> check the cable.

Using the File Editor
The file editor allows you to modify text files. By modifying
files, such as your AUTOEXEC.BAT or CONFIG.SYS files,
you can improve the test system's performance and
eliminate unnecessary lines of information in those files.

> ─ **Note** ─
>
> Always make a backup copy on a self-starting diskette
> of the AUTOEXEC.BAT and CONFIG.SYS files *before*
> making any changes.

The File Editor is an ASCII text editor that uses the
following function keys:

Key	Description
Arrows	Use the arrow keys to move the cursor to the place in the text where you want to make changes.
Home	To move the cursor to the start of the current line, press Home once. To move to the beginning of the current screen, press Home twice. To move to the beginning of the file, press Home three times.
End	To move the cursor to the end of the current line, press End once. To move the cursor to the end of the current screen, press End twice. To move the end of the file, press End three times.
F2	To be in search mode, press F2. You are prompted to enter the search word or words on a reverse highlighted line at the bottom of the File Edit Screen. After typing in the search word, press Enter.
F3	To find the next occurrence of a search word, press F3.
F4	To mark the start of a block of text (if you have not previously marked it), press F4. If you previously marked the block of text, pressing this key unmarks the text block.
F5	To complete the block marking (started with F4), press F5. If you did not previously press F4 to start marking a block of text, F5 is ignored.
F6	To move an active (marked) block of text, first press F6 while the cursor is within the active block. Then, move the cursor to the new location where the active block is to be moved, and press F6 again. If there is no active block of text, F6 is ignored.
F7	To copy an active (marked) block of text to the new location, move the cursor to the new location and press F7. If there is no active block of text, F7 is ignored.
F8	To delete an active (marked) block of text, move the cursor within the active block and press F8. If there is no active text block, F8 is ignored.
F10	To save all changes and exit the file, press F10.
Insert	Insert is the default text-editing mode of the File Editor. To toggle between replace and insert modes, press Insert.

To access the File Editor:

1. Select **File Editor** from the Utilities Menu; then, press **Enter**.

2. Insert a diskette into drive A or drive B before selecting the file that you want to edit; then, select the file from the Files Selection box.
3. Press **Enter**.
4. Make your changes.
5. When you are done, press **F10** to update the file with the changes that you made, or press **Esc** to quit the editing process without saving the changes.

Note

When you are using the File Editor, you can press F1 to display all of the available keyboard functions.

Features

The features in the server vary according to the model.
The following is a summary of the features that are
available with the IBM Netfinity 7000 - Type 8651.

Microprocessors

    Intel Pentium Pro with:
- Level-1 cache, 16 KB
- Level-2 cache, 512 KB (min.)

    Expandable to four Pentium Pro microprocessors

Memory

    256 MB (min.) of system memory, expandable to 4 GB
    Industry standard, 60 ns
    Sixteen memory sockets
    Four-way interleaved
    Error correcting code support

Diskette Drive

    Standard: One 3.5-inch, 1.44 MB

CD-ROM Drive:

    Standard: IDE CD-ROM Drive

Keyboard

    Some models only

Mouse

    Some models only

Upgradable POST and BIOS

    Flash ROMs on the system board

Information Panel

    Two 16-character lines of status information

Expansion Slots and Bays

    Ten expansion slots:
- Six 32-bit PCI slots
- Four 32-bit EISA/ISA slots (three available)

    Eighteen expansion bays:
- Twelve hot-swap hard disk drive bays
- Four removable-media drive bays
- One dedicated, 3.5-inch diskette drive bay
- One dedicated IDE CD-ROM drive bay

Video

    SVGA controller
    Video memory, 512 KB, expandable to 1 MB
    Compatibility:
- Color graphics adapter (CGA)
- Enhanced graphics adapter (EGA)
- Video graphics array (VGA)
- Hercules graphics

Hard Disk Drives

    Number of drives and drive capacities[1] are model dependent
    Can support up to 12 hot-swap hard disk drives

Systems Management

    Advanced Systems Management Adapter

Integrated Functions

    LED usability support
    SVGA video connector

Two serial connectors
Parallel connector
Mouse connector
Keyboard connector
Battery-backed clock and time/date calendar
Two UltraSCSI connectors

Hot-Swap Power Supplies

Two 400-watt supplies standard with:
– Automatic range voltage selection (115–230 V ac)
– Built-in overload and surge protection
For redundant power, an optional 400-watt power supply must
be installed.

SCSI Controllers

Two built-in bus-master UltraSCSI controllers

Hot-Swap System Fans

Three system fans

Security Features

Door lock
Secure mode
Intrusion switches
Intrusion logging

---

1   When referring to hard disk drive capacity, MB stands for
   1 000 000 bytes and GB stands for 1 000 000 000 bytes. Total
   user-accessible capacity may vary depending on operating
   environments.

Additional Service Information

The following additional service information supports
Netfinity 7000 - Type 8651 servers.

Configuration Conflicts

The resources used by the server consist of IRQs, DMA channels, I/O ports (for example, serial and parallel), and memory. This information is useful when a resource configuration conflict occurs.

Conflicts in the configuration occur if:

An installed device requires the same resource as another device. (For example, if you install an ISA network adapter and an EISA network adapter, both requesting *IRQ 5*, you can configure only one of the adapters.)

A device resource is changed (for example, changing jumper settings).

A device function is changed (for example, assigning *COM 1* to two different serial ports).

An installed software program requires the same resource as a hardware device (for example, a device driver that uses the address required by the SVGA video controller).

The steps required to resolve a configuration error depend on the number and variety of hardware devices and software programs install. If a hardware configuration error is detected, a *configuration error* message appears after the server completes POST, but before the operating system starts. You can bypass the error or start one of the configuration utility programs. Press **Esc** to bypass the error and load the operating system.

The Setup program and the System Configuration Utility program configure only the system hardware. These programs do not consider the requirements of the operating system or the application programs. See "Resolving Software Configuration Conflicts" on page 34 for additional information.

Configuring EISA, ISA, and PCI Adapters

Before installing a new device or program, read the documentation that comes with it. Reading the instructions helps you to determine the steps required for installation and configuration. The following is a preview of the actions that might be required to configure the server.

If you want to install PCI adapters, they must be 5-volt devices.

Run the System Configuration Utility program when you first set up and configure the system, if you have added or removed any hardware options, or if you receive an error message instructing you to do so.

1. Start the System Configuration Utility program and:
   a. Record the current configuration settings.
   b. Install configuration files (.*CFG*).

   See "Starting the System Configuration Utility Program" on page 45 and "Recording the System Configuration Utility Program Settings" on page 49 for information about starting the System Configuration Utility program and recording current configuration settings. Instructions for installing configuration files are also included in "Starting the System Configuration Utility Program" on page 45. If the .*CFG* files did not come with the adapter, see "Configuration Files."
2. Set jumpers or switches on the system board.
3. Set jumpers or switches on the device.

   See the instructions that come with the adapter.
4. Install the adapter in the server.

   See "Adapters" on page 60.
5. Install software programs.

   See the installation instructions that come with the software.
6. Resolve configuration conflicts.

   See "Configuration Conflicts" on page 26.

ISA or EISA Option Diskettes: Some ISA and most EISA devices come with Option Diskettes. These diskettes can contain any or all of the following types of information:

   Configuration files (.*CFG*)
   Diagnostic files
   Device drivers
   Sample applications (mini-applications)

Configuration Files: The server requires a configuration file to configure ISA or EISA adapters. The configuration file reserves the system resources that the adapter needs to function properly. Some ISA adapters

come with a diskette that contains the *.CFG* file for the adapter. The System CD-ROM contains the *.CFG* file for some devices and options. If an Option Diskette comes with the device, refer to the device documentation for instructions to configure the device.

If you want to install ISA adapters that did not come with their own *.CFG* files, use the System Configuration Utility program to create a unique *.CFG* file for each adapter.

Note

The unique *.CFG* files are slot sensitive. That is, they should not be used to configure identical adapters in multiple systems unless you install the adapters in the same expansion slots within each system.

To create a unique *.CFG* **file for an ISA adapter:**

1. At the System Configuration Utility program Main Menu screen, select **Add and Remove Boards**.
2. Press **F6** (Define ISA).
3. At the ISA Definition screen, type in the adapter manufacturer and description (for example, IBM Token Ring).

   Refer to the adapter documentation for information about specific configuration parameters, such as interrupt request levels (IRQs) or direct memory access (DMA) channels, that are required for the adapter. Then, follow the instructions on the screen to enter the appropriate parameters.
4. After you type in all of the appropriate parameters, press **F10** to save the data.
5. At the Main Menu screen, select **Save Configuration** to save the configuration in NVRAM.

Note

Save the configuration files to a diskette for backup.

Diagnostic Files: The Diagnostic program that comes with the server is the primary method of testing the server. Some optional devices and adapters come with option-specific diagnostic files. These files provide a more specialized test of the option. Refer to the documentation that comes with the option for information about installing and running option-specific diagnostics.

Device Drivers: Device drivers are programs designed to support a specific type of hardware device. They provide instructions that enable the server to interact with the device, or to take advantage of a device's special features. The device driver might ship with the operating system, the application program, or on an option diskette. Not all devices require device drivers. Refer to the

documentation that comes with the option for additional information.

Sample Applications: Some optional devices provide small applications or sample files. These applications demonstrate the capabilities of the device and serve as software examples for programming the device. Refer to the documentation that comes with the option for additional information.

Configuring the Advanced Systems Management Adapter

The Advanced Systems Management Adapter comes completely installed and configured. Use these instructions only if you need to change the default parameters to meet your specific processing requirements. This process can be divided into two parts:

    Configuring system resources
    Configuring the adapter

Configuration Considerations:

    The adapter uses only adapter COM B for external communication, therefore a modem or null-modem cable must be connected to adapter COM B.
    If you want to share adapter COM B with the system, adapter COM B must be assigned one of the following I/O addresses:
        3F8 (COM 1)
        2F8 (COM 2)
        3E8 (COM 3)
        2E8 (COM 4)
    If you want adapter COM B dedicated to the adapter only, you must disable adapter COM B through the adapter configuration program to prevent the system from accessing it. The adapter comes configured with adapter COM B disabled.
    The adapter COM A is not used by the adapter. If you want the system to use adapter COM A, the adapter must be configured through the adapter configuration program.
    Each port I/O address covers eight contiguous address bytes as shown in Table 1 on page 30.
    Make sure there are no conflicts between the adapter port I/O addresses and interrupts that you configure, and previously assigned system I/O addresses and interrupts.
    The adapter comes configured with I/O address 200–205 and interrupt 5.

The adapter can be configured to the following I/O address ranges and interrupts:

Table 1. Adapter I/O Address Ranges and Interrupts

I/O Address Ranges (hex)	Interrupts
100–107	3
120–127	4
140–147	5
168–16F	9
188–18F	10
200–207	11
220–227	14
240–247	15
268–26F	
300–307	

Note: Any listed I/O address range can be assigned with any listed interrupt as long as there are no conflicts with previously assigned system I/O addresses and interrupts.

Configuring System Resources: Use the System Configuration Utility program to assign system resources to the Advanced Systems Management Adapter. See "System Configuration Utility Program" on page 44 for detailed instructions.

1. Start the System Configuration Utility program and select **Change Configuration Settings**; then, select the adapter and press **F6** to change adapter configuration values.
2. Refer to the list in Table 1 and assign I/O addresses and interrupts for the adapter ports.

Configuring the Adapter

1. Use the ServerGuide package to create the Advanced Systems Management Adapter configuration diskette. Refer to the information that came with ServerGuide for instructions.
2. Press the Power On/Off Button to power-off the server.
3. Remove the server top cover.
4. Make sure the adapter configuration diskette is not write–protected.
5. Insert the adapter configuration diskette into your primary diskette drive.
6. Press **Ctrl**+**Alt**+**Del** to restart your system.

   The program displays the Flash Utility menu:

```
          Flash Utility

Select one:

Configure Advanced System Management Adapter
View Advanced System Management Adapter Configuration
Update Advanced System Management Adapter
Set Up COM Ports
Configure OS Watchdog Timer
Exit

 Enter   F1=Help   F3=Exit
```

7. Check the dot on the two LED displays on the adapter for the indications listed in Table 2.

CR1   CR2
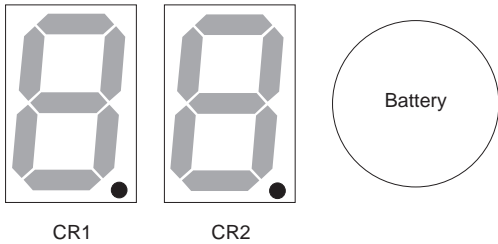
Table 2. Adapter LED Indicators	
CR1 Dot On	**CR1 Dot Off**
Problem indication.	Normal. Check CR2 Dot.
CR2 Dot Blinking	**CR2 Dot Off**
Normal; microcode is loaded. Go to step 8.	Microcode is not loaded. Select **Update Service Processor** on the Flash Utility menu and follow the prompts. Then return to step 7.

8. Refer to the configuration data you recorded and complete the following steps.
   a. Choose **Configure Advanced System Management Adapter** from the Flash Utility menu and select the port and IRQ that you entered in the configuration data worksheet. The utility program writes an SM.INI file to the diskette. This file is used during the device driver installation.
   b. Follow the on-screen prompts and choose **Setup COM Ports** from the Flash Utility menu. Select the COM port I/O addresses and interrupts that you entered on the configuration worksheet.
9. Follow the on-screen prompts to exit from the adapter configuration utility program.
10. Replace the server top cover.

```
┌──── Attention ──────────────────┐
│                                 │
│  For proper cooling and airflow, replace the top │
│  cover before turning on the server.  Operating the │
│  server for extended periods of time (over 30 │
│  minutes) with the top cover removed might │
│  damage server components. │
│                                 │
└─────────────────────────────────┘
```

Device Driver Installation: See the root directory
READ.TXT file on the System CD-ROM for information on
the adapter device drivers.

Configuring the Server

When you start the server for the first time after you add or
remove an internal option or an external SCSI device, you
might see a message telling you that the configuration has
changed.

Some options have device drivers that you need to install.
Refer to the documentation that comes with the option for
information about installing any required device drivers.

If you have installed a new microprocessor, you might
want to upgrade the operating system. Refer to the
ServerGuide package. If the server has a RAID adapter
installed, refer to the documentation provided with the
RAID adapter.

Run the System Configuration Utility to save the new
configuration information.

External SCSI Devices

You can attach a SCSI storage expansion enclosure to the
server.

Cabling Requirements: If you plan to install
external SCSI devices, you must order additional SCSI
cables and a SCSI adapter that has an external connector.
You must have the correct external SCSI cables. The
cables must have the proper connectors for the SCSI
adapter and the external devices.

Refer to the information provided with your adapter to
determine the number of internal and external connectors,
channels, and SCSI devices that the adapter supports.

For information about the maximum length of SCSI cable
between the terminated ends of the cable, see ANSI SCSI
Standards:

>   X3.131-1986 (SCSI)
>   X3.131-1994 (SCSI-2)
>   X3T10/1071D

Adhering to these standards ensures that the server
operates properly.

Setting SCSI IDs for External Devices: Each
SCSI device that is connected to a SCSI controller must
have a unique SCSI ID, so that the SCSI controller can
identify the devices and ensure that different devices do
not attempt to transfer data at the same time. SCSI
devices that are connected to different SCSI controllers
can have duplicate SCSI IDs. Refer to "SCSI IDs" on
page 130 and to the instructions that come with the SCSI
devices for more information about setting a SCSI ID.

Installation Procedure: **To attach an external
device:**

1. Power-off the server and all attached devices.
2. Follow the instructions that come with the option to
   prepare it for installation and to connect it to the
   server.

Hardware Configuration Conflicts

Use the following information to help resolve hardware
configuration conflicts:

1. Run the System Configuration Utility program to view
   and change the resources that are used by the
   system board functions. Record the current settings
   before making any changes.
2. Determine which adapter or device is causing the
   error. Use the Change Configuration Settings
   selection in the System Configuration Utility program
   to update system configuration information (.*CFG*)
   files. (See "Step 3: Change Configuration Settings"
   on page 48 for instructions.)
3. Change configuration resource allocations. Use the
   Change Configuration Settings selection in the
   System Configuration Utility program to view or
   change system-board resource allocations. (See
   "Step 3: Change Configuration Settings" on page 48
   for instructions.)
4. Change adapter jumpers or switches. Jumpers and
   switches define the system resources that a device
   can use. If the settings are incorrect or set to use a
   resource that cannot be shared, a conflict occurs and
   the device remains deactivated. Use the
   Switch/Jumper Settings selection in the System
   Configuration Utility program to verify switches (see
   "Step 5: View Switch/Jumper Settings" on page 48).
   Read the documentation that comes with the device.
5. Change system board jumpers or switches.
6. Remove the device or adapter. Some configurations
   are not supported (for example, you cannot operate
   the server with two ISA SVGA adapters installed).

Resolving Software Configuration
Conflicts: The memory-address space and IRQs used
by some hardware options might conflict with addresses
defined for use through application programs.

If there is a conflict, one or more of the following conditions
might exist:

> The system cannot load the operating system.
> The system does not work.
> An application program does not operate, or it returns
> an error.
> Screen messages indicate that a conflict exists.

You can resolve conflicts by changing either the software
or the hardware configuration.

> **Notes**
>
> A corrupt CMOS can cause the operating system
> to crash after the operating system boots. (See
> "Printing and Restoring CMOS Default Settings"
> on page 43.)
> Use the Change Configuration Settings selection
> in the System Configuration Utility program to
> view the addresses used by the system-board
> functions and adapters. (See "Step 3: Change
> Configuration Settings" on page 48.)

If a device driver is causing a memory-address conflict,
refer to the operating-system documentation or the
documentation supplied with the device drivers.

SCSISelect Utility Program

> **Note**
>
> If a RAID adapter is installed in the server use the
> Configuration diskettes that come with the RAID
> adapter to view or change SCSI settings for attached
> devices.

The server comes with a menu-driven configuration utility
program called SCSISelect that allows you to view and
change SCSI settings.

You can use the SCSISelect Utility program to:

> View and change the default values
> Verify and change configuration conflicts
> Perform a low-level format on a SCSI hard disk

Starting the SCSISelect Utility Program:
You can access this program when you start the server.
The SCSISelect prompt appears after the Netfinity 7000
screen appears briefly and then disappears. Press **Ctrl**+**A**
immediately after the SCSISelect prompt appears.

Use the Up Arrow (↑) and Down Arrow (↓) key to move
the highlight bar to the various menu choices. Press **Esc**
to return to the previous menu. Also, you can press the
F5 key to switch between color and monochrome modes (if
the monitor permits). To change the settings of the
displayed items, follow the instructions on the screen.

SCSISelect Utility Program Options: The
following options appear on the SCSISelect Utility program
menu:

> Configure/View Host Adapter Settings
> SCSI Disk Utilities

Configure/View Host Adapter Settings: To view or
change the SCSI controller settings, select
Configure/View Host Adapter Settings and follow the
directions on the screen. This menu has the following
selections:

> Host Adapter SCSI ID

> Select this choice to change the SCSI ID of the SCSI
> controller from its default value of 7.
> SCSI Parity Checking

> The default value is *Enabled.* Do not change this
> value.
> Host Adapter SCSI Termination

> Select this choice to configure SCSI controller
> termination. The default value is *Low On/High On.*
> Boot Device Configuration

> Select this choice to configure startable device
> parameters. Before you can make updates, you must
> know the ID of the device whose parameters you
> want to configure.
> SCSI Device Configuration

> Select this choice to configure SCSI device
> parameters. Before you can make updates, you must
> know the ID of the device whose parameters you
> want to configure.
> Advanced Configuration Options

> Select this choice to view or change the settings for
> advanced configuration options. These options
> include enabling support for large hard disk drives
> and drives with UltraSCSI speed.

To reset the host adapter default values, press **F6** and
follow the directions on the screen.

SCSI Disk Utilities: To see the IDs that are assigned
to each SCSI device or to format a SCSI device, select
SCSI Disk Utilities from the SCSISelect Utility program
menu.

To use the utility program, select a drive from the list.
Read the screens carefully before making a selection.

```
               Unexpected SCSI Command Failure

Target SCSI ID:         4

SCSI CDB Sent:          3              E      7     2

Host Adapter Status:       h - No host adapter error

Target Status:          2h - Check condition

Sense Key:              2h - Not ready

+Sense Code:            4h

+Sense Code Qualifier:     2h



              Press 'Esc' to continue.
```

Performing a Low-Level Disk Format: Select
the *Format Disk* feature of the SCSISelect Utility program
to perform a low-level format on a hard disk drive.

Depending on the hard disk capacity, the low-level format
program could take several hours.

When To Use the Low-Level Format Program:
Use the Low-Level Format program:

   When you are installing software that requires a
   low-level format
   When you get recurring messages from the diagnostic
   tests directing you to run the low-level format program
   on the hard disk
   As a last resort before replacing a failing hard disk
   drive

Note

For information about backing up all of your files, see
your operating-system documentation.

Starting the Low-Level Format Program

Important:

The low-level format program erases *all* data and
programs.

> **Note**
>
> Refer to the RAID adapter documentation for instructions for performing a low-level format on a hard disk drive attached to the PCI RAID adapter.

1. If the hard disk is working, make a backup copy of all the files and programs on the hard disk.
2. Select **Format Disk**; then, follow the instructions on the screen.

   > **Note**
   >
   > Hard disk drives normally contain more tracks than their stated capacity (to allow for defective tracks). A message appears on the screen if the defect limit is reached. If this happens, replace the hard disk drive

3. To install an operating system after the hard disk drive is formatted, refer to the ServerGuide documentation that comes with the server.

Security

To control access to your server, you can implement several security measures, including password protection.

Password Overview: Two types of passwords are available with the server: administrator and user. You can set both passwords using the Setup program and the System Configuration Utility program.

If you have a password set, `Enter Password` appears on the screen to prompt you. (The passwords do not appear on the screen as you type them.) If you enter the wrong password, `Enter Password` appears again. After three incorrect attempts, you must power-off the server and start again.

Notes

You can use any combination of up to seven characters (A–Z, a–z, and 0–9) for the passwords.
The system does not differentiate between lowercase and uppercase characters.
For additional security, do not make the user and administrator passwords the same. Keep a record of your password in a secure place.

The following information summarizes the levels of security with the different levels of password protection.

Type of Password	Results
No password set	No password required to start system. No password required to access the System Configuration Utility program and Setup program. User can access all System Configuration Utility program functions. Secure mode is not functional.
User password only	User must enter password to complete the system startup. Password required to access the System Configuration Utility program and the Setup program, and to disable secure mode. User can access all System Configuration Utility program functions.
Administrator password only	No password required to start system. Password required to access Setup program. User can access the System Configuration Utility program, but password is required to access sensitive system configuration utility functions. Secure mode is not operational.
Administrator *and* user passwords	User must enter either password to complete the system startup. User must enter either password to access System Configuration Utility program or Setup program. Administrator password required to access sensitive system configuration utility functions. User password required to disable secure mode.

You might prefer to set the administrator password in the Setup program before you configure the system. This will help secure the configuration data by restricting access to some System Configuration Utility program functions. See "Administrator Password" on page 40 for instructions for setting the administrator password.

User Password: A user password is not required, but a user password helps to protect the information stored in the server. It allows you to enable secure mode and write-protect the boot sector of a hard disk drive. Write-protecting the boot sector is a form of virus protection.

If a user password is set and then forgotten, you can clear the password from memory using a system-board configuration switch.

To set a user password in the Setup program:

1. Start the Setup program.
2. Select **Set User Password** on the Security Menu screen.

   The Set User Password screen appears.
3. Type the password in the **Enter New Password** data field.
4. Press **Enter**.

   The cursor moves to the **Confirm New Password** data field.
5. To verify that you typed the new password correctly, type the password in the **Confirm New Password** data field. If you did not type the correct password, you must reenter the password in the **Enter New Password** data field.
6. If you typed the correct password, press **Enter** to save it.

The password becomes effective immediately after you save it.

Administrator Password: Before you set an administrator password, you might want to first set the drive-startup sequence, as described in "Setting the Drive-Startup Sequence" on page 41.

If an administrator password is set and then forgotten, you can clear the password from memory using a system board configuration switch.

To set an administrator password in the Setup program:

1. Start the Setup program.
2. Select **Set Administrator Password** from the Security Menu screen.

   The Set Administrator Password screen appears.
3. Type a password in the **Enter New Password** data field.

   Note

   To remove an administrator password, press **Ctrl**+**D**.

   ---

4. Press **Enter**.

   The cursor moves to the **Confirm New Password** data field.
5. To verify that you typed the correct password, type the password in the **Confirm New Password** data field. If you did not type the correct password, you

must reenter the password in the **Enter New Password** data field.

6. If you typed the correct password, press **Enter** to save it.

The password becomes effective immediately after you save it.

Setting the Drive-Startup Sequence: The

drive startup sequence allows you to control the startup sequence of the drives in the server. Each time you power-on the server, it checks the drives as it looks for the operating system. The order in which the system checks the drives is the drive-startup sequence.

The default startup is to first check the primary CD-ROM drive for a self-starting (bootable) CD-ROM. If one is present, the operating system or program is loaded from the CD-ROM. If not, the system then checks the primary diskette drive for an operating system. If one is present, it loads the operating system from that diskette drive.

If you start the system from a CD-ROM, the CD-ROM drive becomes drive A, regardless of the defined sequence. If you start the system from a diskette, the drive that contains the diskette becomes drive A, regardless of the defined sequence, and the first hard disk drive that you select in the startup sequence becomes drive C.

If you elect to switch the startup sequence, you can use either the Setup program or the System Configuration Utility program. Refer to "Defining the Startup Device" on page 44 for instructions on using the Setup program.

To change the startup sequence using the System Configuration Utility:

1. Start the System Configuration Utility program.
2. Select **Change Configuration Settings**.
3. Select **System Board**.
4. Scroll through the settings and locate the **Boot Subsystem Group**; then, follow the instructions on the screen.

Secure Mode: Secure mode helps to protect the

system against unauthorized use. Secure mode inhibits keyboard and mouse input, and disables the power switch and reset button. Secure mode takes effect when the keyboard and mouse remain inactive for an amount of time that you determine. You can gain access to the system only after you enter the correct user password.

> **Note**
>
> You must set a user password before you can enable secure mode.

Refer to the following for information on the options available for the secure mode.

Options	Description
Hot Key Option	Specifies a set of keyboard commands that will place the system immediately into secure mode.
Lockout Timer	Specifies a keyboard and mouse inactivity timeout period of 1 to 128 minutes (in one-minute increments). If the timer is enabled, and no keyboard or mouse activity occurs for the specified period, keyboard and mouse input is inhibited.
Secure Boot Mode	Specifies if the keyboard and mouse will be disabled after POST completes and the operating system has loaded. You must enter the user password to unlock the keyboard and mouse.
Video Blanking	Specifies whether secure mode will cause the monitor to go blank.
Floppy Writes	Specifies whether writing to a diskette is enabled or disabled when the system is in secure mode.
Reset/Power Switch Locking	Specifies if the power switch and reset button are disabled when the system is in secure mode.

Setup Program

The Setup program stores configuration values in nonvolatile random-access memory (NVRAM) and in the battery-backed memory of the real-time clock. Entries that you make in the System Configuration Utility program overwrite the entries made in the Setup program.

You perform much of the system configuration through the System Configuration Utility program, not the Setup program.

In most cases, the server operates using the default settings, and you need to change the settings only to resolve configuration conflicts or to enable or change device function.

Review the information that comes with the device before making changes. Also, record the current settings before making any changes.

The Setup program consists of the following menu bar selections:

Main: Select this choice to set the System Time and Date. This menu also allows you to view or change configuration settings for the CD-ROM drive and diskette drive.

Advanced: Select this choice to view the settings of integrated peripherals and to identify the type and speed of the microprocessors.

Security: Select this choice to set passwords. Press **F1** for online Help information while in the Setup program.

Starting the Setup Program: To access the Setup program:

1. Power-on the server and watch the screen.
2. The system prompts you to `Press <F1> if you want to run SETUP`. As soon as you see that prompt, press **F1**.

   When POST completes, you will enter Setup.

   > **Note**
   >
   > If a configuration error occurs, a prompt appears before the operating system starts (see "Configuration Conflicts" on page 26).

3. If you have set a user or administrator password, the system prompts you to enter it. If you have set both passwords, enter either one.

Changing Settings: To view or change the settings:

1. Use the Up Arrow (↑) or Down Arrow (↓) key to advance through the items on the screen. Press **Enter** to select an item.
2. Follow the instructions on the screen to view or change the configuration.

   You must *correctly* exit from the Setup program to save the configuration information.
3. Press **F10** to save the configuration values and exit from the Setup program.
4. Press **Enter** to confirm.

Printing and Restoring CMOS Default

Settings: If a printer is attached to the server, you can use the **Print Screen** key to print the configuration settings.

You can restore default settings by using the Setup program.

To restore default settings:

1. Power-on the server.

2. Press **F1** to enter the Setup program.
3. Press **F5** to restore the default configuration values.
4. Press **F10** to save the configuration values and exit from the Setup program.
5. Press **Enter** to confirm.

Disabling the Diskette Drive and CD-ROM

Drive: After configuring the system, it can be secured against casual or unauthorized access by running the Setup program to disable the diskette drive and CD-ROM drive.

To disable the diskette drive using the Setup program:

1. Power-on the server.
2. Press **F1** to enter the Setup program.
3. Select **Floppy Options**.
4. Select the drives that you want to disable.
5. Press **F10** to save the configuration values and exit from the Setup program.
6. Press **Enter** to confirm.

To disable the CD-ROM drive using the Setup program:

1. Power-on the server.
2. Press **F1** to enter the Setup program.
3. Select **Primary IDE Master**.
4. Select **IDE Device Configuration**.
5. Select **Disable**.
6. Press **F10** to save the configuration values and exit from the Setup program.
7. Press **Enter** to confirm.

Defining the Startup Device:

The default initial startup device is the CD-ROM drive. After configuring the system, you can define the startup sequence to meet specific processing needs.

To define the startup sequence:

1. Turn on the server.

2. Press **F1** to enter the Setup program.

3. Select **Boot Options**.

4. Select the startup sequence.

5. Press **F10** to save the configuration values and exit from the Setup program.

6. Press **Enter** to confirm.

System Configuration Utility Program

The System Configuration Utility program provides a convenient method to configure various system settings. This program automatically configures system adapters and maintains system parameters. Because the System Configuration Utility program assigns system resources, conflicts between adapters are less likely to occur.

If a conflict does occur, see "Configuration Conflicts" on page 26.

You must use the System Configuration Utility program anytime you want to change resource allocations, such as:

Adding, deleting, or moving ISA or EISA devices
Resolving conflicts
Maintaining security functions

The System Configuration Utility program automatically configures PCI devices, Plug and Play devices, and system memory.

Each time that you use the System Configuration Utility program to configure your server, the configuration information is saved to the nonvolatile random-access memory (NVRAM) and in a backup file (with an extension of *.CMS*). Only devices that you install and configure correctly appear on the System Configuration Utility program screens.

Before making changes, review this section and the information included with the devices you are adding. Also, record the current settings (see "Recording the System Configuration Utility Program Settings" on page 49) before making any changes. The values that you enter using the System Configuration Utility program override the entries in the Setup program.

In most cases, the server will operate using the default settings, and you need to change the settings only to resolve configuration conflicts or to enable or change device function (for example, define the drive startup sequence).

Starting the System Configuration Utility Program: To access the System Configuration Utility program:

1. Insert the System CD-ROM into the CD-ROM drive.

2. Turn on the system. Or, if the system is turned on, press **Ctrl**+**Alt**+**Del**.

   The system begins the power-on self-test (POST). If you have set a user password, the system prompts you to enter it.

   Notes:

   a. If a user password is set, you *must* enter it to access the System Configuration Utility program. If you have set user and administrator passwords, you can enter either one. If you have set an administrator password, you *must* enter the administrator password to change and save configuration data.

b. If a configuration error occurs, a prompt appears
      before the operating system starts (see
      "Configuration Conflicts" on page 26).

3. Select **Run System Configuration Utility** from the
   Startup Menu.

4. Press **Enter** when the system configuration utility title
   screen appears.

   A screen similar to the following appears when you
   start the system configuration utility program.

```
  SYSTEM CONFIGURATION UTILITY, Release x.xx


                 Step 1: About System Configuration

                 Step 2: Add and Remove Boards

                 Step 3: Change Configuration Settings

                 Step 4: Save Configuration

                 Step 5: View Switch/Jumper Settings

                 Step 6: Exit



 [Select=ENTER]   [Exit=Esc]   [Help=F1]   [Utilities=F9]
```

   Use the following commands to navigate through the
   screens and make selections.

Action	Press Key
Change between major menus	← or →
Highlight an item	↑ or ↓
Select an item	Enter
End activity without changing configuration	Esc
Get help	F1

Defining Configuration Settings: The following
information explains the menu selections.

Utilities: Press **F9** from the Main Menu screen to
access the Utilities screen. The **Utilities** choice controls
some aspects of how the system generates configuration
data. For example, the System Configuration Utility
program can prompt the user to manually add boards.

Press the **Spacebar** to select an option. Refer to the
following table for information on the choices on this menu.

Option	Description
Advanced/Dealer Mode	Maintains settings not typically set by an average user.
Force New Configuration	Generates all new configuration data for PCI devices. If you do not select this option, the system uses the existing configuration settings.
Load .CFG Files Manually	Prompts you to add adapters manually.
Specifies Name for .CMS, .INF, and .SET Files	Prompts you for the base file name to use when creating these files during a save operation.

Press the PF key to select one of the following options.

PF Key	Description
F5	Copies the contents of a .CMS file to NVRAM. This erases any configuration information previously stored in NVRAM.
F6	Displays the identifiers of adapters physically installed in the system.
F7	Displays the ISA definition screen.

Step 1: About System Configuration: Select **About System Configuration** for an overview of the program. You can select this choice from a menu for specific information about each function.

You can also press **F1** for online Help information while performing a configuration function.

Step 2: Add and Remove Boards: Select **Add and Remove Boards** to add, remove, or move any adapter. The System Configuration Utility program automatically detects and adds most adapters. This step provides a list of all correctly configured devices. You can press **F6** to add ISA devices to the configuration.

The server requires configuration files to correctly configure ISA and EISA adapters.

Note

If you have set an administrator password, you *must* enter the administrator password to access this selection and change and save configuration values. If you have not set an administrator password, the system prompts you to set one. Follow the instructions on the screen to set an administrator password or press **Esc** to continue without setting one.

Step 3: Change Configuration Settings: Select
this choice to change the configuration, if necessary. If
you change a setting in this step, you might need to
change a switch or jumper setting on the system board or
on a device.

All settings will remain in the default position if you do not
use this selection to change the configuration.

Advanced Options: Press **F9** to display the Advanced
Options Menu screen from the Change Configuration
Settings choice. This screen provides options to display
configuration data. You can select the following choices:

Option	Description
Global Resource Map	Lists allocated resources.
Board Details	Provides details on the adapter highlighted on the Change Configuration Settings screen.
System Details	Displays configuration data on the entire system and its present state of configuration.
Physical Board ID Map	Lists the identifiers of adapters physically installed in the system.

Step 4: Save Configuration System Configuration
Utility program configuration settings*:* Select this choice
to save the configuration settings to nonvolatile
random-access memory (NVRAM) and in a backup file
(with an extension of .*CMS*).

> ――― **Note** ―――
>
> Be certain that you want to save this configuration
> data, because once you select this choice, the save
> process begins immediately.

If you elect to not save your changes, you can select **Exit**
from the System Configuration Utility menu to exit from the
program and maintain your existing configuration values.

Step 5: View Switch/Jumper Settings: Select
View Switch/Jumper Settings to display the current
settings of switches and jumpers on any adapter that has
switches or jumpers.

Step 6: Exit: Select this choice when you are finished
using the system configuration utility program. If you have
changed configuration settings, you can optionally press
F10 to restart the system so that the new settings take
effect. Otherwise, press **Enter** to exit from the System
Configuration Utility program.

Recording the System Configuration Utility

Program Settings: Record the default configuration settings on a separate sheet; then, store the sheet in a safe place for future reference. If you have a printer attached to your server, you can use the **Print Screen** key to print these settings. The settings are helpful when you install additional options, or if the system requires service. Also, record the new settings each time you make changes.

Specifications

Size (Tower Model)

    Depth: 718 mm (28.3 in.)
    Height: 555 mm (21.9 in.)
    Width: 483 mm (19.1 in.)
    Front clearance: 305 mm (12.0 in.)
    Rear clearance: 127 mm (5.0 in.)
    Side clearance: 76 mm (3.0 in.)

Size (Rack Model)

    Depth: 673 mm (26.5 in.)
    Height: 484 mm (19.1 in.) (approximately 11 EIA Units)
    Width: 437 mm (17.2 in.) (482 mm with mounting flanges)

Weight

    Unpacked, minimum configuration:
    54.5 kg (120 lb.)
    Unpacked, maximum configuration:
    72.6 kg (160 lb.)

Electrical Input

    Sine-wave input (50 to 60 Hz)
    is required
    Input voltage
    – Low range
       - Minimum: 90 V ac
       - Maximum: 137 V ac
    – High range
       - Minimum: 180 V ac
       - Maximum: 265 V ac
    – Input kilovolt-amperes (KVA) approximately
       - Minimum configuration as shipped: 0.2 KVA
       - Maximum configuration: 0.78 KVA

Environment

    Air temperature
    – System on: 0° to 35° C
      (0° to 95° F)
      Altitude: 0 to 914 m (3000 ft.)
    – System on: 0° to 32° C
      (0° to 89.6° F)
      Altitude: 914 m (3000 ft.) to 2133 m (7000 ft.)
    – System off: 10° to 43° C
      (50° to 110° F)
      Maximum altitude: 2133 m (7000 ft.)
    Humidity
    – System on:
      8% to 80%; maximum wetbulb
      23° C (73.4° F)
    – System off:
      8% to 80%; maximum wetbulb 27° C (80.6° F)

Altitude: 0 to 2133 m (0 to 7000 ft.)

Electrostatic Discharge

Tested to 20 KV

Immunity

Verified to comply with
EN 50082-2

Sound

Sound Power, idling:
– - 6.2 bel for open bay system (no hard drives installed)
– - 6.3 bel for typical system configuration (1 bay filled with hard drives)

Sound Power, operating:
– - 6.2 bel for open bay system (no hard drives installed)
– - 6.4 bel for typical system configuration (1 bay filled with hard drives)

Sound Pressure, idling:
– - 46 dBA for open bay system (no hard drives installed)
– - 46 dBA for typical system configuration (1 bay filled with hard drives)

Sound Pressure, operating:
– - 46 dBA for open bay system (no hard drives installed)
– - 47 dBA for typical system configuration (1 bay filled with hard drives)

These levels are measured in controlled acoustical environments according to ISO 7779 and are reported in accordance with ISO 9296. The declared sound power levels indicate an upper limit, below which a large portion of machines operate. Sound pressure levels in your location might exceed the average 1-meter values stated because of room reflections and other nearby noise.

Heat Output

Approximate heat output in
British thermal units (BTU) per hour:
– Minimum configuration: 1023.9 BTU
– Maximum configuration: 2764.6 BTU

Safety Standards

UL 1950
CSA C22.2 No. 950-M93
EN 60950 and countries deviations
IEC 950
NOM-019

Locations

The following information supports the IBM Netfinity 7000 - Type 8651 server.

1 MB Processor Card (FRU No. 12J3352)

> **Note**
>
> To remove the processor card, see "Processor or Memory Board" on page 121.
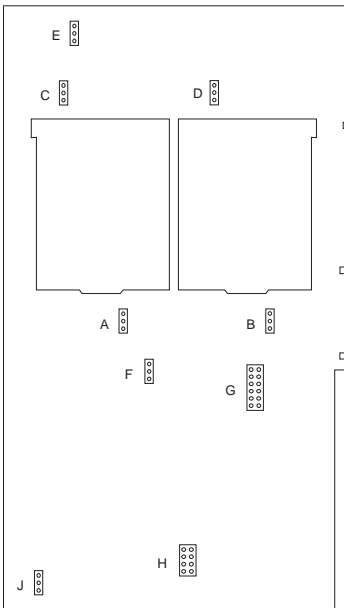
SCAN Jumpers

> **Note**
>
> The default settings for the scan jumpers is skip. These settings do not affect the the normal operation and there is no need to change them.

Fan Sink Connectors

C

3 +5V | Fan Fail | Ground 1

J8A1 & J8A2

D

3 +5V | Fan Fail | Ground 1

J8C1 & J8C2

E

3 FailK2 | PRc1_PRC2 | MBFANFAIL 1

J9B1
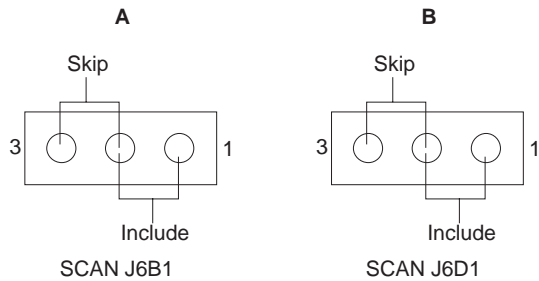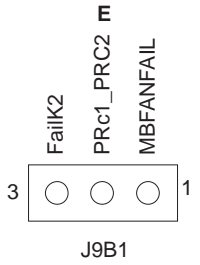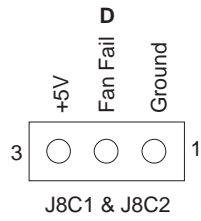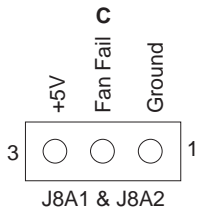
Active/Passive Jumper

> **Note**
>
> The default setting for the active/passive jumper is passive and should not be changed.

F

Active

3 | 1
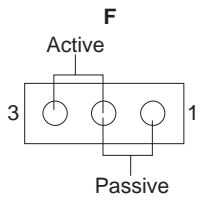
Passive

Passive/Active J4B1

Processor Speed Jumper

G

SEL0
SEL1
SEL2
Park
Park
Park

○ ○ ○ ○ ○ ○ 12
1 ○ ○ ○ ○ ○ ○

J4D1

**200/66 MHz Jumper
Setting**
SEL 0=Jumper
SEL 1=No Jumper
SEL 2=Jumper
Park 0=Jumper
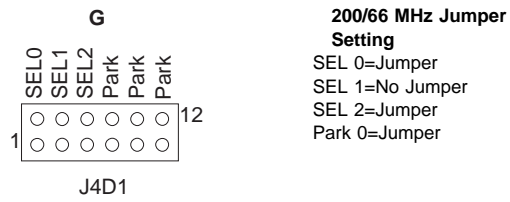
L2 Cache Jumper

```
┌─ Note ──────────────────────────────────┐
│  512 KB jumper setting = 1 and 2, 3 and 4 │
│  1 MB jumper setting = 5 and 6, 7 and 8   │
└──────────────────────────────────────────┘
```

H

512KB   1MB

2 |○ ○| |○ ○| 8
1 |○ ○| |○ ○|

J1C1
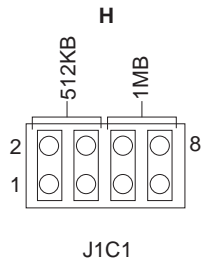
Fan Fail Harness Connectors

J

FailK1   PRc1_PRC2

3 | ○   ○   ○ | 1

J1A1
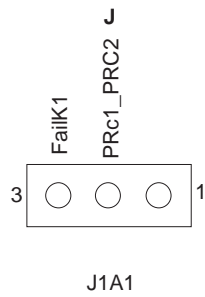
5-Volt Regulator Card
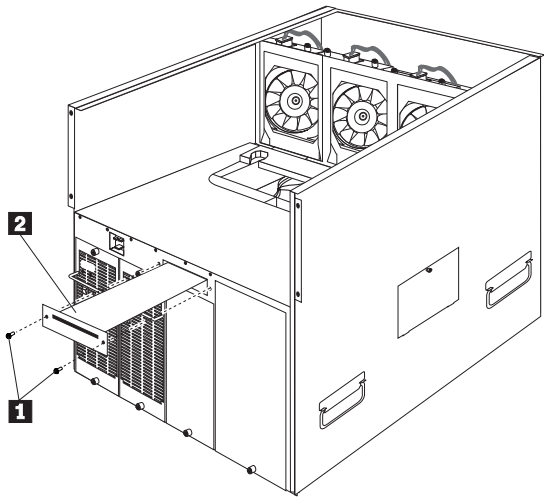
      1   5-Volt Regulator Card Screws
      2   5-Volt Regulator Card

To remove the 5-volt regulator card, do the following:

1. Power-off the server and all power supplies.
2. Remove the 2 voltage regulator card screws 1 and pull the 5-volt regulator card 2 out of the server.

5.25-Inch Removable-Media Drive

Note

The server's EMI integrity and cooling are both
protected by having the left front bays covered or
occupied. When you install a drive, save the filler
panel from the bay, in case you later remove the drive
and do not replace it with another.
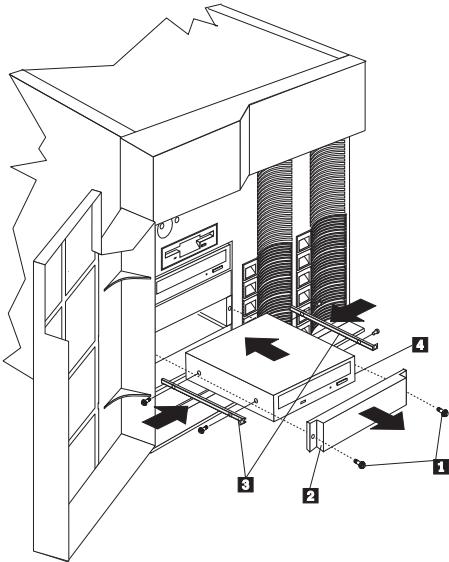
```
1    Screws
2    Filler panel with EMI shield
3    Slide rails
4    Drive
```

To install a removable-media drive in one of the left front
bays:

1. Power-off the server and peripheral devices and
   remove the top cover (see "Cover (Top)" on
   page 72).
2. Remove the media bay trim bezel, which covers the
   screws `1` on the bay filler panels `2` :
   a. Release the two tabs at the bottom edge of the
      bezel and pull the bottom of the bezel slightly
      away from the server.
   b. Pull the bezel down to release the two tabs at
      the top edge of the bezel. Set the bezel aside.
3. Remove the screws `1` and filler panel `2` from the
   bay opening. Save the panel and screws for later
   use.
4. Touch the static-protective bag containing the drive to
   any unpainted metal surface on the server; then,

remove the drive from the bag and place it on a
static-protective surface.

5. Set any jumpers or switches on the drive according to
the documentation that comes with the drive.

6. Use screws of the appropriate size and length to
attach a slide rail 3 to each side of the drive 4 .

> ─ **Note** ───────────────────────────
>
> The slide rails and screws are included in the
> drive accessory kit that comes with the server.

7. Place the drive so that the slide rails engage in the
bay guide rails. Push the drive into the bay and
attach it with the two screws 1 from the filler panel.
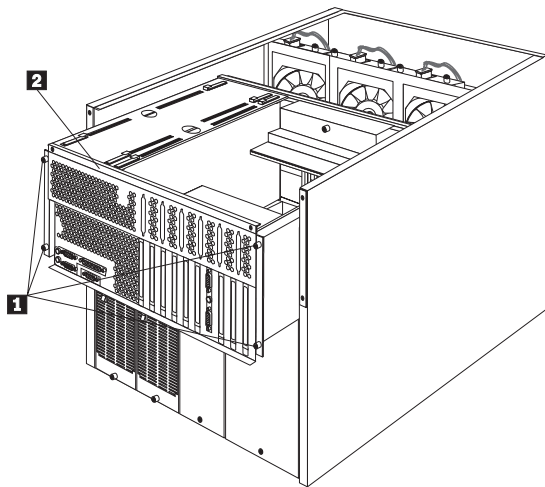
1	Air baffle
2	Shuttle-support rail
3	Drive
4	Opening in shuttle
5	4-drop SCSI cable
6	SCSI ports A and B
7	Screws
8	Shuttle

8. Loosen the four screws 7 on the shuttle at the back
of the server.

9. Pull the shuttle 8 toward the back of the server.

10. Observe the way the edges of the air baffle 1 fit
inside the shuttle-support rails 2 ; then, slide the air
baffle toward the rear of the server and lift it out of
the server.

11. If you have not previously done so, install the 4-drop
SCSI cable:

   a. Disconnect the SCSI cable from either SCSI port
   A or B 6 on the system board. (SCSI port A is
   connected to the hot-swap backplane for the

right bank, Bank A, of hot-swap drives, and SCSI port B is connected to the hot-swap backplane for the left bank, Bank B, of hot-swap drives.

Note

If you disconnect the SCSI cable from SCSI port A, the server will not support drives in Bank A. If you disconnect the SCSI cable from SCSI port B, the server will not support drives in Bank B.

---

   b. Locate the 4-drop SCSI cable 5 . The 4-drop SCSI cable is shipped (disconnected) in the bottom of the server between the open bays and the power supply area. It is folded and restrained with a cable clamp.
   c. Open the cable clamp holding the 4-drop SCSI cable and route the prefolded cable through the opening 4 in the front of the shuttle.
   d. Connect the 4-drop SCSI cable to the vacant SCSI port 6 on the system board.
12. Connect one of the connectors on the 4-drop SCSI cable to the back of the drive 3 .
13. Connect a power cable to the back of the drive. Power cables for removable-media drives come installed in the server. The connectors are keyed and can be inserted only one way.
14. If you are installing another 5.25-inch drive, do so at this time. Otherwise, continue with the next step.

Attention

If the air baffle is not installed correctly, the server will overheat.

---

15. Install the air baffle 1 . Make certain that the edges of the air baffle fit inside the shuttle-support rails 2 .
16. Push the shuttle 8 toward the front of the server and tighten the four screws 7 at the back of the shuttle.
17. Install the bezel that you removed from the removable-media bay area:
   a. Insert the two tabs on the top of the bezel in the matching holes on the server.
   b. Push the bottom of the bezel toward the server until the two tabs at the bottom of the bezel snap into place.

AC Power Assembly

```
┌─ Attention ──────────────────────────────┐
│                                          │
│  There are no serviceable parts inside the AC Power │
│  Assembly FRU.                           │
│                                          │
└──────────────────────────────────────────┘
```
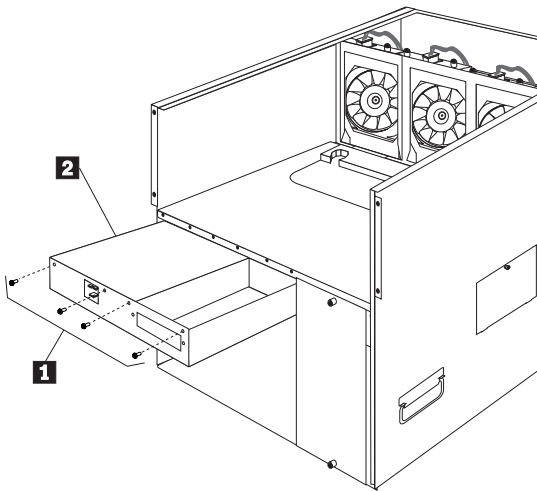

1   AC Power Assembly Screws
2   AC Power Assembly

To remove the AC Power Assembly, do the following:

1. Remove the power supplies, see "Hot-Swap Power Supply Removal" on page 90.
2. Remove the 5-volt regulator card, see "5-Volt Regulator Card" on page 55.
3. Support the power assembly while removing the 4 screws 1 ; then, pull the assembly 2 out of the server.

Adapters

Three types of adapters are available for the server:

    Extended industry-standard architecture (EISA)
    Industry-standard architecture (ISA)
    Peripheral component interconnect (PCI)
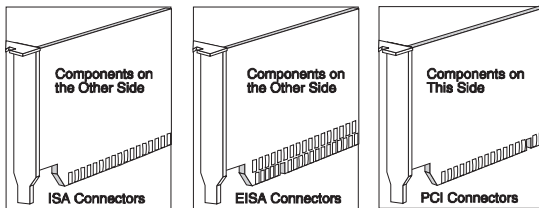
> **Notes**
>
> 1. The server has ten expansion slots. Four of the expansion slots support EISA/ISA adapters and six of the expansion slots support PCI adapters. Refer to the label on the rear of the server for the numbering of the PCI and EISA/ISA expansion slots in the server.
> 2. The server comes with an Advanced Systems Management Adapter installed in one EISA/ISA slot.

Adapter Considerations

    Review the documentation that comes with the adapter and follow those instructions in addition to the instructions in this manual. If you need to change the switch or jumper settings on the adapter, follow the instructions that come with the adapter documentation.

    You can install 8-, 16-, or 32-bit EISA or ISA adapters in EISA/ISA slots 1–4 only. You can install full-length adapters in all EISA/ISA expansion slots.

    You can install PCI adapters in PCI slots 1–6 only. You can install full-length adapters in all PCI expansion slots.

    To optimize system performance, if you have high-performance adapters, such as network adapters, install them in PCI slots 4–6.

    The server supports 5.0 V PCI adapters; it does **not** support 3.3 V PCI adapters.

    For ease of cabling, install any SCSI adapter that you plan to connect to a SCSI hot-swap backplane in PCI slot 1.

    The server uses a rotational interrupt technique to configure PCI adapters. This technique enables you to install a variety of PCI adapters that currently do not support sharing of PCI interrupts.

If you install a RAID adapter, follow the instructions in the RAID adapter documentation for configuring the adapter.

If you install a RAID adapter that comes with a backup battery pack, you must enable the backup battery pack before you can use the RAID adapter.
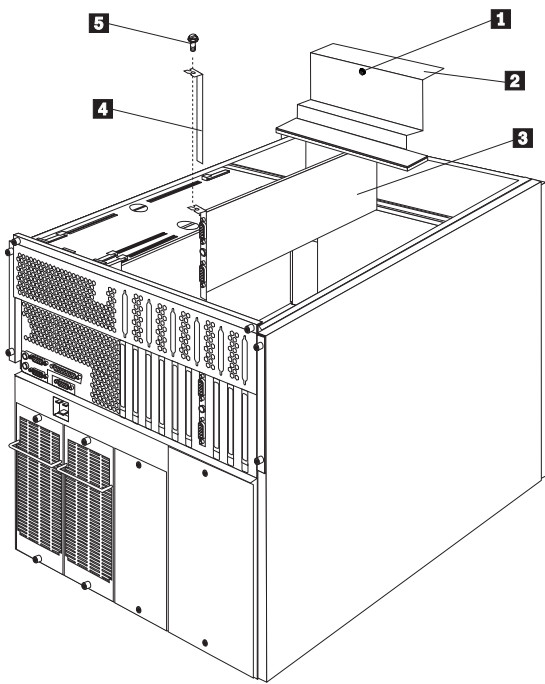
1   Captive screw
2   Adapter-support panel
3   Adapter
4   Expansion-slot cover
5   Expansion-slot screw

Adapter Installation: To install an adapter:

1. Power-off the server and peripheral devices and disconnect all external cables and power cords; then, remove the top cover (see "Cover (Top)" on page 72).
2. Remove the adapter-support panel 2 by loosening the screw 1 and lifting the panel out of the server.
3. Determine which expansion slot you will use for the adapter.

   ┌─── **Note** ──────────────────────────────┐
   │   │
   │ Check the instructions that come with the adapter │
   │ for any requirements or restrictions.   │
   │   │
   └──┘

4. Remove the expansion-slot cover 4 :

a. Remove the screw   5   on the top of the
   expansion-slot cover   4 .
b. Slide the expansion-slot cover out of the server.
c. Store these items in a safe place for future use.

> **Attention**
>
> Expansion-slot covers must be installed on
> all vacant slots. This maintains the
> electromagnetic emissions characteristics of
> the system and ensures proper cooling of
> system components.

5. Place the adapter, component-side up, on a flat,
   static-protective surface.
6. Set any jumpers or switches as described by the
   adapter manufacturer.
7. Refer to the documentation that comes with the
   adapter for any cabling instructions. It might be
   easier for you to route any cables before you install
   the adapter.
8. Install the adapter:
   a. Carefully grasp the adapter   3   by its top edge
      or upper corners, and align it with the expansion
      slot on the system board.

   > **Attention**
   >
   > Be careful not to damage the EMC gasket
   > when you install the adapter.

   b. Press the adapter *firmly* into the expansion slot.
      The tapered foot of the adapter-retaining bracket
      must fit into the mating slot in the expansion-slot
      frame.

   > **Attention**
   >
   > When you install an adapter in the server,
   > be sure that it is completely and correctly
   > seated in the system-board connector before
   > you apply power. Incomplete insertion might
   > cause damage to the system board or the
   > adapter.

   c. Align the rounded notch in the retaining bracket
      with the threaded hole in the expansion-slot
      frame. The retaining bracket on the adapter fits
      into the space that was occupied by the
      expansion-slot cover.
   d. Insert the expansion-slot screw   5   that you
      removed earlier into the threaded hole, and push
      the rounded notch up against the screw.
   e. Tighten the expansion-slot screw firmly.
   f. Connect any needed cables to the adapter.
9. Reinstall the adapter-support bracket   2   and tighten
   the screw   1 .

***Verifying Compatibility between Network
Adapters and Device*** Drivers*:*   The server supports
several types of network adapters. If you are having
trouble with the installation or operation of a network
adapter or network operating system, ensure that the
network-adapter device driver supports dual processors.
Refer to the network-adapter documentation for additional
information about adapter compatibility requirements.

Cabling Example for the ServeRAID

Adapter: You can install an optional ServeRAID
adapter in the server to enable you to configure the
hot-swap hard disk drives into disk arrays. The following
procedure describes the cable routing that is necessary
when you install the ServeRAID adapter.

Note

For ease of cabling, install the optional ServeRAID
adapter in PCI slot 1. It might be easier for you to
route the cables before you install the adapter.

---
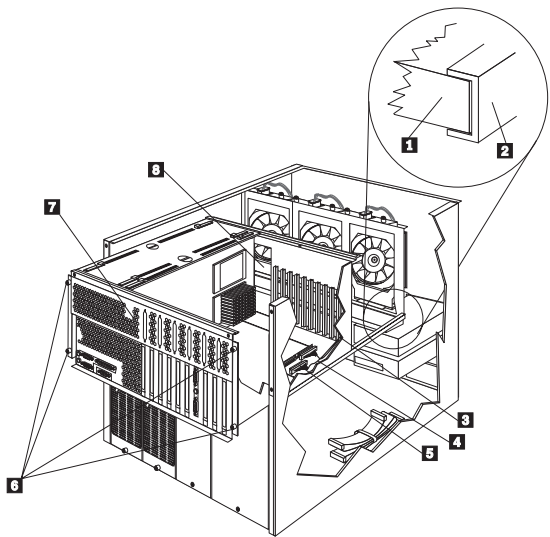
1 Air baffle
2 Shuttle-support rails
3 Opening in shuttle
4 SCSI port A
5 SCSI port B
6 Captive screws
7 Shuttle
8 Opening in shuttle

To correctly rout the ServerRAID adapter cable, do the following:

1. Loosen the four screws 6 on the shuttle at the back of the server.
2. Pull the shuttle 7 toward the back of the server.
3. Observe the way the edges of the air baffle 1 fits inside the shuttle-support rails 2 ; then, slide the air baffle toward the rear of the server and lift it out of the server.
4. Disconnect the SCSI cable from SCSI port B 5 on the system board.
5. Slide the disconnected end of the cable out through the opening 3 in the shuttle.
6. Reroute the SCSI cable through the opening 8 in the center of the shuttle.
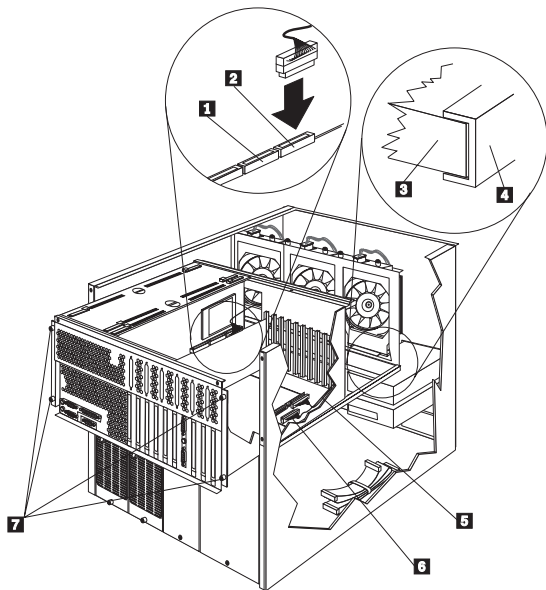
1   Channel 2
2   Channel 1
3   Air baffle
4   Shuttle-support rails
5   SCSI port A
6   SCSI port B
7   Captive screws

7. If you have already installed the ServeRAID adapter, connect the cable to Channel 2 1 on the ServeRAID adapter. If you have not yet installed the ServeRAID adapter, connect the cable after you install the adapter.

8. Repeat this procedure to disconnect the SCSI cable from SCSI port A 5 on the system board and connect it to Channel 1 2 on the ServeRAID adapter.

Attention

If the air baffle is not installed correctly, the server will overheat.

---

9. Install the air baffle 3 . Make certain that the edges of the air baffle fit inside the shuttle support rails 4 .

10. Push the shuttle toward the front of the server and tighten the four screws 7 at the back of the shuttle.

Advanced Systems Management Adapter Battery

```
┌─ Attention ──────────────────────────┐
│ the lithium battery on the Advanced Systems │
│ Management Adapter must be handled correctly to │
│ avoid possible danger. │
└──────────────────────────────────────┘
```

If you replace the battery, you must adhere to the following instructions and the requirements in the "Battery Notice (Lithium)" on page 185.

When replacing the battery, use only FRU 33F8354 or an equivalent type lithium battery recommended by the manufacturer of the battery currently installed in the server. Dispose of the battery as required by local ordinances or regulations and the manufacturer's instructions.

1. Power-off the server and peripheral devices and disconnect all external cables and power cords; then remove the top cover (see "Cover (Top)" on page 72).
2. Locate the battery on the Advanced Systems Management Adapter.

```
┌─ Note ───────────────────────────────┐
│ The Advanced Systems Management Adapter is │
│ installed in EISA slot 1. │
└──────────────────────────────────────┘
```

⚠️

```
┌─ Caution ────────────────────────────┐
│ This product contains a lithium battery.  The │
│ lithium battery presents a fire, explosion, or │
│ severe burn risk if handled incorrectly. │
│                                        │
│ When replacing the battery, use only IBM FRU │
│ Number 33F8354 or an equivalent type lithium │
│ battery recommended by the manufacturer of the │
│ battery currently installed in your server.  Dispose │
│ of the battery as required by local ordinances or │
│ regulations and the manufacturer's instructions. │
└──────────────────────────────────────┘
```

   a. To remove the disc battery, push the battery from the edge toward the center; then lift the battery out of the battery socket.
   b. To insert the new battery, tilt the battery into the battery socket and press in and down on the battery. Be sure the battery is secure in the battery socket.

Central Electronics Complex (CEC)
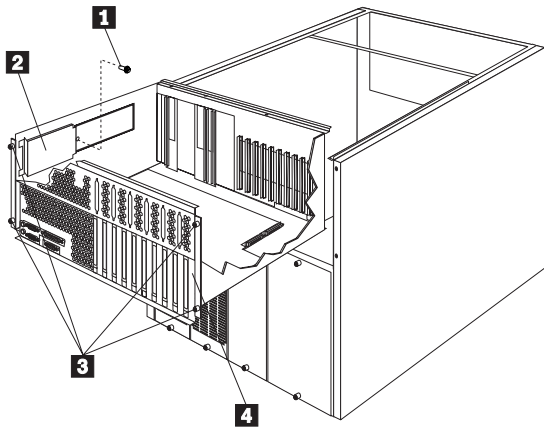
1   Cable Retainer Screws
2   Cable Retainer
3   CEC Screws
4   CEC

To remove the central electronics complex (CEC), do the following:

1. Power-off the server.
2. Remove the top cover, see "Cover (Top)" on page 72.
3. Remove the processor and memory boards, see "Processor or Memory Board" on page 121.
4. Remove the adapters, see "Adapters" on page 60.
5. Remove the cable retainer screw 1 and remove the cable retainer 2 .
6. Cut and remove the cable tie.
7. Disconnect the cables from the system board.
8. Loosen the 4 central electronics complex (CEC) screws 3 .
9. While lifting up on the CEC 4 slide the CEC out the back of the server.

Controls

Power On/Off Button

Reset Button

Door Lock (On Side Cover)

Diskette Eject Button

CD-ROM Eject Button
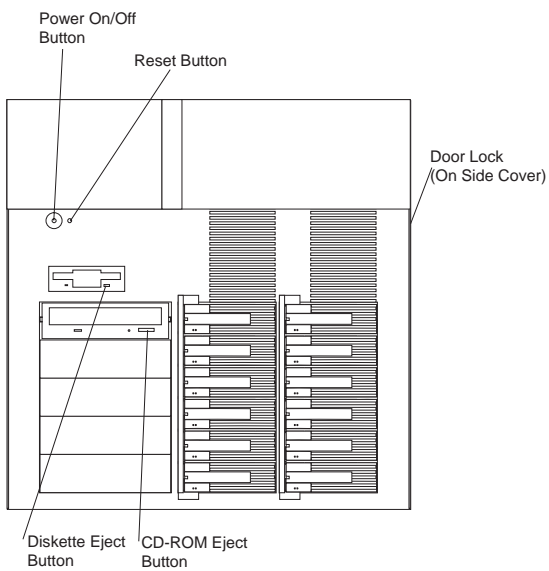
Door Lock: You can lock the door on the server to deter tampering with the internal components.

Power On/Off Button: Press this button to manually power the server on or off.

The server is designed to automatically restart after a power disruption. The Power On/Off button does not power-off the electrical power supplied to the server. To remove all electrical current from the server, you must unplug the server power cord from the electrical outlet.

Note

The Power On/Off button is disabled when secure mode is selected from the System Configuration Utility program. Secure mode prevents accidental or unauthorized powering off of the server using the Power On/Off button.

Reset Button: Press this button to reset the system and run the power-on self-test (POST).

Note

The Reset button is disabled when secure mode is selected from the System Configuration Utility program. Secure mode prevents accidental or unauthorized resetting of the server using the Reset button.

Diskette-Eject Button: Press this button to eject a diskette from the drive.
CD-ROM Eject Button: Press this button to eject the CD-ROM tray from its drive so that you can insert or remove a CD.

Control Panel FRUs

Intrusion Switch Connectors

Jumper pins 1 and 2 to bypass switch connectors J4 and J5. Jumper pins 2 and 3 to enable switch connectors J4 and J5.

J4 J5

J14 J9

Control Card

NMI

Reset

Power ON/OFF

CR1: Power-On Light
Green: Server Powered On

CR2: Power Failure Light
Amber Blinking: Power Subsystem Failure
(Refer to trouble shooting the Power Supply section)

CR3: Cooling Failure Light
Amber Blinking:
- One or more fans have failed
- Ambient temperature is outside normal operating range (35℃)

CR4: Hot-Swap Drive Subsystem Failure Light
Amber Blinking:
- Hard Drive has failed or
- Hard drive temperature is outside operating range (60℃)

CR1 CR4
CR2 CR3

LED Card

VFD

Cover (Sides)

1   Tabs
2   Side Cover

To remove the side cover, do the following:

1. Power-off the server.
2. Release each of the three tabs 1 on the top edge of the side cover 2 .
3. Pivot the top of the side cover away from the server and remove the cover from the server.

   > **Important**
   >
   > A small access door is located in the side of the chassis under the side cover (one on each side of the chassis). The access door must be in place during normal operation of the server.

Cover (Top)
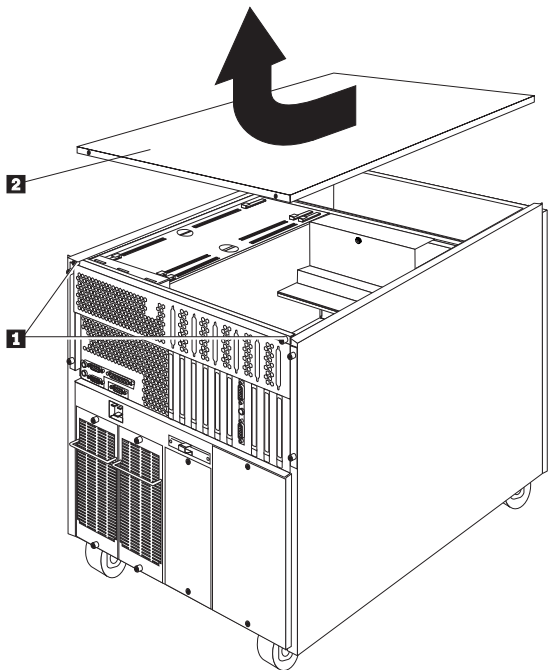
    1   Top Cover Screws

    2   Top Cover

To remove the server top cover:

1. Power-off the server and all attached devices and disconnect all external cables and power cords.
2. Loosen the two screws 1 on the back edge of the top cover.
3. Slide the top cover 2 slightly toward the rear of the server; the cover will stop after about 25 cm (1 in.). Lift the cover off the server and set the cover aside.

> **Attention**
>
> For proper cooling and airflow, replace the top cover before powering on the server. Operating the server for extended periods of time (over 30 minutes) with the top cover removed might damage server components.

Diskette Drive
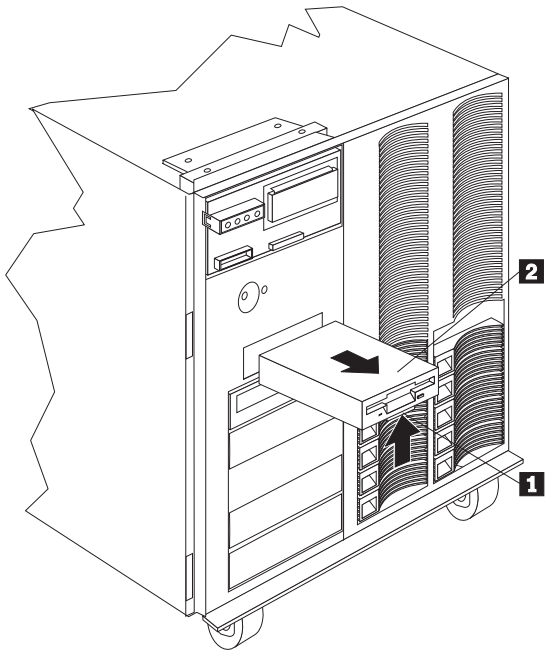
   1   Tab
   1   Diskette Drive

To remove the diskette drive, to the following:

1. Press and release the tab 1 .
2. Pull the drive out of the system 2 .
3. Diskette the diskette drive cables.

Door
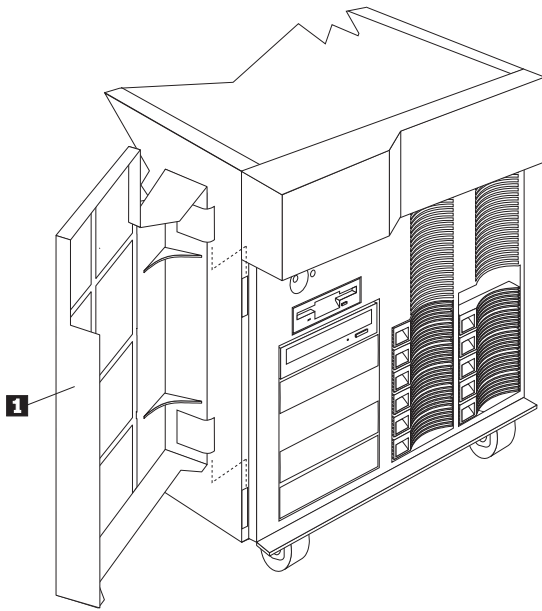
    `1`   Door

To remove the door, do the following;

1. Unlock and open the door `1` .
2. List the door `1` up and away from the server.

Expansion Bays

Diskette
Drive Bay

CD-ROM
Drive Bay

Bank B, Bay 1

Bank A, Bay 1

Bank A, Bay 2

Bank A, Bay 3

Bank A, Bay 4

Bank A, Bay 5

Bank A, Bay 6

Bank B, Bay 6

Removable Media
Bays
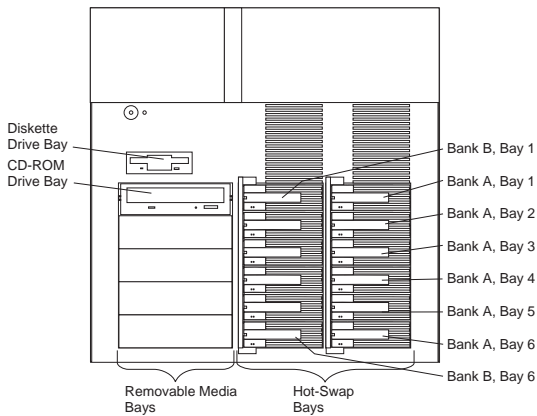
Hot-Swap
Bays

Hot-Swap Bays: The hot-swap drive bays support up to 12 UltraSCSI hard disk drives. The hot-swap feature enables you to remove and replace hard disk drives without powering off the server. These bays are grouped into two banks.

Removable-Media Drive Bays: The server has five drive bays for removable-media devices such as tape-backup drives, compact disc read-only memory (CD-ROM) drives, optical drives, or additional diskette drives. One of these drive bays contains a CD-ROM drive. These bays are used for non-hot-swap drives.

Diskette Drive Bay: This dedicated bay contains a 3.5-inch, 1.44 MB diskette drive. This drive uses 1 MB and 2 MB diskettes. For optimum use, format 1 MB diskettes to 720 KB and format 2 MB diskettes to 1.44 MB.

Front Bezel
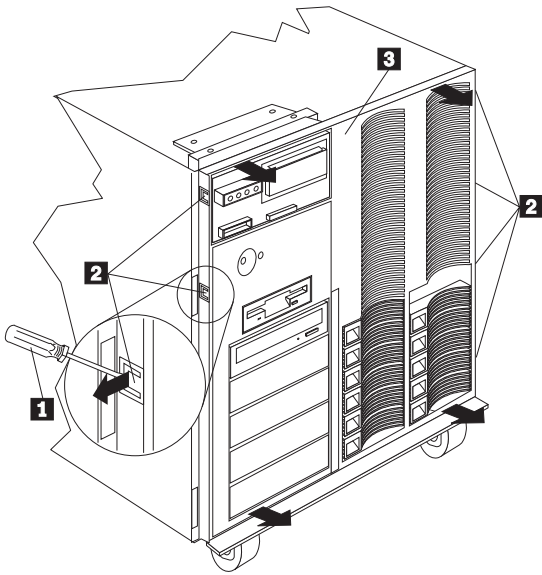
    1   Flat Blade Screwdriver
    2   Front Bezel Snaps
    3   Front Bezel

To remove the front bezel, do the following:

 1. Using flat blade screwdriver   1 , pry the snaps   2
    away from the side of server.
 2. Pivot the front bezel   1   away from the server.

Front Bezel Cap
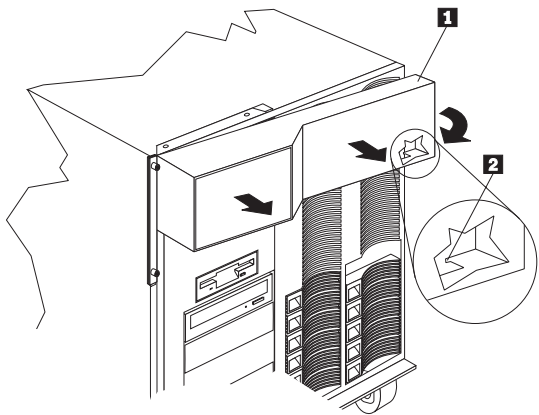
    1   Front Bezel Cap
    2   Front Bezel Cap Molded Tab

To remove the front bezel cap, do the following:

1. Looking from the front of the server, pull the right side of the front bezel cap 1 out and away from the server (releasing the front bezel cap molded tab 2).
2. Pivot the front bezel cap 1 from the server.

Hot-Swap Drive Installation

The two banks of bays on the right front of the server support hot-swap drives only.

Attention

You do not have to power-off the server to install hot-swap drives in these bays. However, you must power-off the server when performing any steps that involve installing or removing cables, except where instructed to do so when you are replacing a hot-swap fan. (See "Hot-Swap Fan Replacement" on page 83).

---
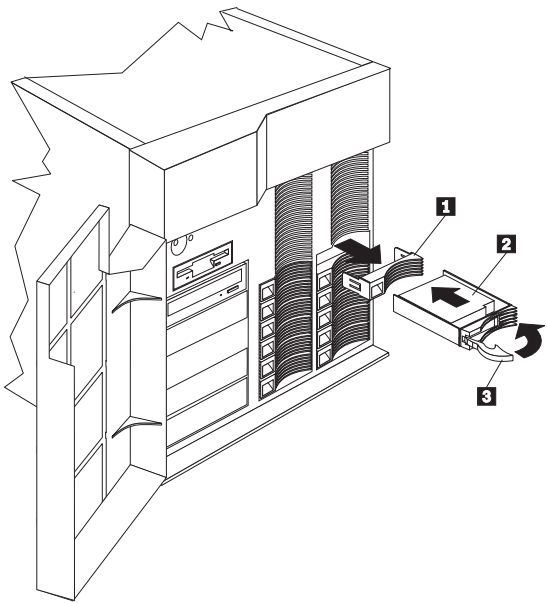
1   Filler panel
2   Hot-swap hard disk drive
3   Drive tray handle (open position)

To install a drive in a hot-swap bay, do the following:

1. Unlock and open the server door.

> **Attention**
>
> To maintain proper system cooling, do not
> operate the server for more than two minutes
> without either a drive or a filler panel installed in
> each bay.

2. Remove the filler panel 1 from one of the empty
   hot-swap bays by inserting your finger into the
   depression at the left side of the filler panel and
   pulling it away from the server.
3. Install the hard disk drive 2 in the hot-swap bay:
   a. Ensure the tray handle 3 is open (that is,
      perpendicular to the drive).
   b. Align the drive/tray assembly so that it engages
      the guide rails in the bay.
   c. Gently push the drive assembly into the bay until
      the drive connects to the backplane.
   d. Push the tray handle to the right until it locks.
4. Check the hard disk drive status indicators to verify
   that the hard disk drives are operating properly. See
   "Status Indicators" on page 18 for details.
5. Close and lock the server door.
6. If the server has a RAID adapter installed, refer to the
   RAID adapter documentation for details about
   configuration requirements.

Hot-Swap Drive Replacement

> **Note**
>
> You do not have to power-off the server to remove a drive from the hot-swap bays.

If the amber Hard Disk Status light for a drive is lit continuously, that individual drive is faulty and needs to be replaced.

> **Attention**
>
> Before you hot-swap a drive, make sure it is defective. If you partially or completely remove a good drive instead of a defective one, the server might lose valuable data.
>
> This situation is especially relevant if the server has a RAID adapter installed and you assigned RAID level 1 or 5 to the logical drives in the disk array. However, the RAID adapter can rebuild the data that you need, provided that certain conditions are met. Refer to the RAID adapter documentation for further details.

To replace a drive in a hot-swap bay, do the following:

1. Unlock and open the server door.

   > **Attention**
   >
   > To maintain proper system cooling, do not operate the server for more than two minutes without either a drive or a filler panel installed for each bay.

2. Remove the defective hard disk drive 1 by placing the handle 2 on the drive to the open position (perpendicular to the drive) and pulling the hot-swap tray from the bay.
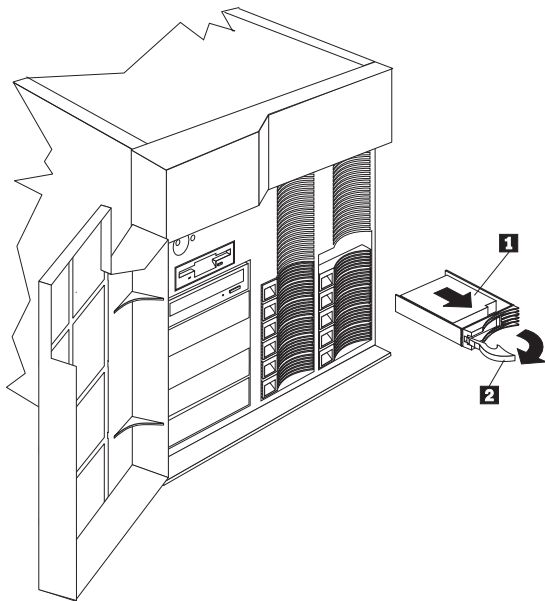
    1   Hard disk drive
    2   Drive tray handle (open position)

3. Remove the hard disk drive from the tray:
    a. If the drive is a half-high drive, remove the two
        screws 6 that hold the connector 5 to the
        hot-swap tray 3 ; then, remove the connector
        from the back of the drive.
    b. Remove the four screws 1 or 2 that attach
        the drive 4 to the hot-swap tray, and remove
        the drive from the tray.
4. Place the new hard disk drive on the hot-swap tray
    and attach the drive to the tray using four screws, as
    follows:
    a. If the drive is a half-high drive, use screws 1 to
        attach the drive to the tray. If the drive is a
        slim-high drive, use screws in holes 2 to attach
        the drive to the tray.
    b. As you tighten each screw, press on the metal
        spring nearest the screw at the point indicated
        by the arrow on the illustration.
    c. If the drive is a half-high drive, plug the
        connector 5 to the back of the drive and
        secure the connector to the drive with screws
         6 .
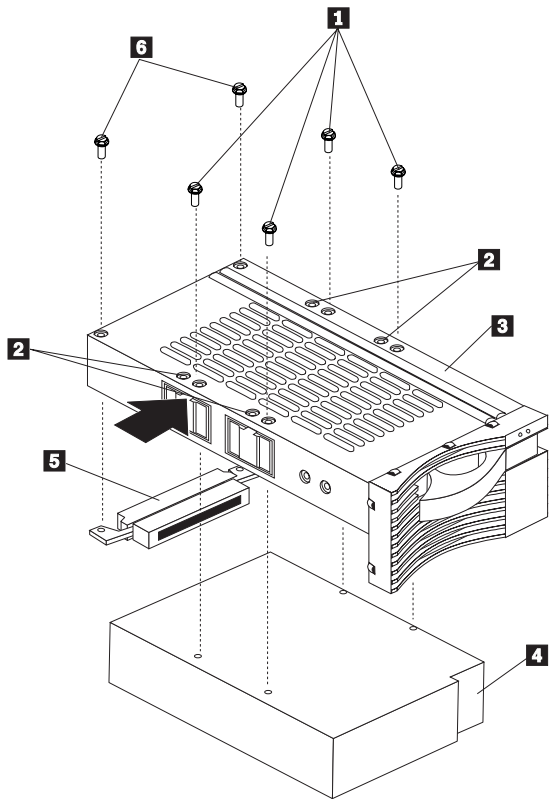
1 Screws for half-high drive
2 Screw holes for slim-high drive
3 Drive tray
4 Drive
5 Connector for half-high drive
6 Screws for half-high drive connector

5. Install the hard disk drive in the hot-swap bay:
   a. Ensure the tray handle is open (that is, perpendicular to the drive).
   b. Align the drive/tray assembly so that it engages the guide rails in the bay.
   c. Push the drive assembly into the bay until the drive connects to the backplane.
   d. Push the tray handle to the right until it locks.
6. Check the hard disk drive status indicators to verify that the hard disk drives are operating properly. See "Status Indicators" on page 18 for details.
7. Close and lock the server door.

Hot-Swap Fan Replacement

The server comes with three hot-swap fans.

> **Note**
>
> You do not need to power-off the server to replace a
> hot-swap fan.

The following illustration shows the replacement of a
hot-swap fan. Refer to this illustration while performing the
steps in this procedure.
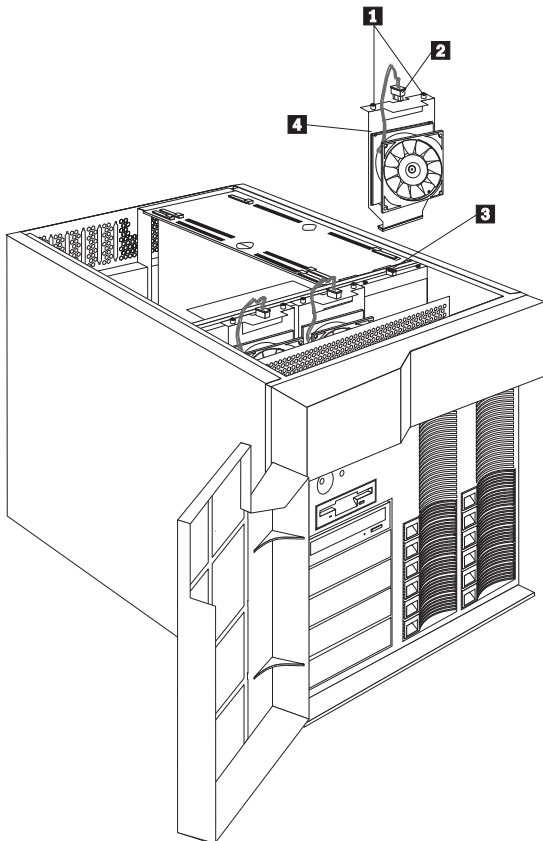
1   Screws
2   Power cord
3   Power connector
4   Hot-swap fan assembly

To replace a hot-swap fan, do the following:

1. Remove the top cover (see "Cover (Top)" on page 72).

   > **Attention**
   >
   > To ensure proper system cooling, the top cover should be removed for no more than 30 minutes during this procedure.

2. Determine which fan assembly 4 needs to be replaced.

3. Disconnect the fan power cable 2 .

   > **Attention**
   >
   > The power cable to the fan should be disconnected before you remove the fan assembly from the server; otherwise, the fan might start turning while you are holding it.

4. Loosen the two screws 1 on top of the fan assembly and lift the fan assembly from the server.

   > **Note**
   >
   > If the fan rotor is very dusty, it might cause the fan to stop. Try cleaning the fan before you replace it with a new fan.

5. Slide the replacement fan assembly into the server.

6. Tighten the two screws 1 that hold the fan in place.

7. Connect the fan power cable 2 to the power connector 3 .

8. Replace the top cover.

Hot-Swap Power Supplies

DC Power
Light

AC Power
Light

Power Supply
Power Switch

Power Supplies

Optional
Power Supply
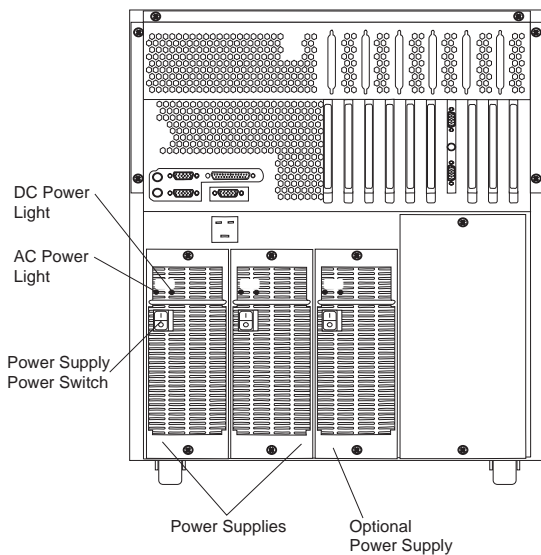
Hot-Swap Power Supplies: The server comes with
two hot-swap power supplies installed. You can
install a third hot-swap power supply to provide
redundant power. (See "Hot-Swap Power Supply
Installation" on page 86 for instructions.)
Power Switch: This switch turns the power supply
on and off.

Attention

Do not remove or install a power supply without
first turning the Power switch on the power
supply to the Off position.

AC and DC Power Lights: These green lights provide status information about the power supply.

AC Power Light	DC Power Light	Description
On	On	The power supply is on and operating correctly.
On	Off	Either the Power On/Off button is in the Off position (the DC Power lights on all the power supplies are off) or this power supply has failed (the DC Power light on at least one of the power supplies is on).
Off	Off	The server is not connected to a working electrical outlet.
Note: To ensure that the power supply is operational, both lights must be on. Also check the power up sequence, see "Power Up Sequence."		

Power Up Sequence:

To check the power up sequence, do the following.

1. Power-off the server.
2. Disconnect the power cord and wait 10 seconds until all unit LEDs go off; then, reconnect the power cord to reset the power supply units.
3. Check standby mode (system is plugged in but not powered on). One AC Good LED on each power supply should be on and the control panel LEDs are off.
4. Press the power button on the control panel. The power supply DC Good LEDs will illuminate and the control panel power failure light (LED) will briefly flash yellow and the power-on light will turn solid green.
5. Check power-on mode for the following:
   Power supply fans and system fans are on. Power supply units are warm and the control panel power-on LED and the two LEDs on each power supply are green.

Note

If any of the two power supply LEDs are off in any of the preceding steps, replace the power supply.

Hot-Swap Power Supply Installation:

The server comes with two power supplies. You can add a third power supply to provide redundant power. After you install power supplies, check the power-supply status indicators to verify that the power supplies are operating

properly. See "Power Supply Status Indicators" on
page 18 for details.

───── **Caution** ─────────────────────────────

Never remove the cover on a power supply.
Hazardous voltage, current, and energy levels are
present inside the power supplies. There are no
serviceable parts inside the power supplies.

Refer to the following illustration while performing the steps in this procedure.

```
┌─ Note ──────────────────────────────────┐
│                                          │
│  You do not need to power-off the server to install │
│  hot-swap power supplies.                │
│                                          │
└──────────────────────────────────────────┘
```
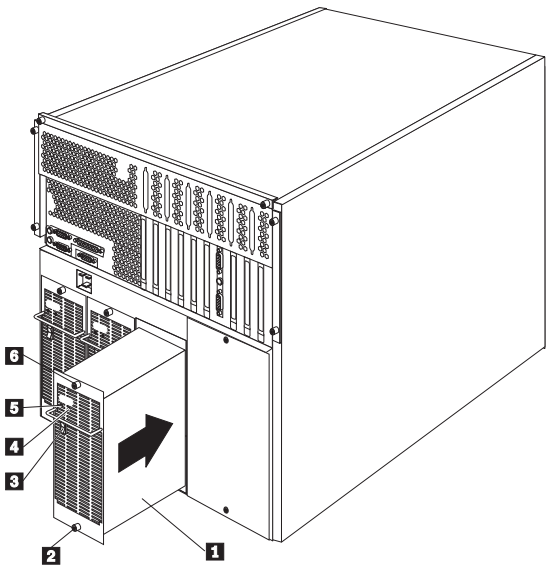

    1   Power supply
    2   Bottom screw
    3   Power switch on power supply
    4   DC Power light
    5   AC Power light
    6   Top screw

To add a power supply, do the following:

```
┌─ Attention ─────────────────────────────┐
│                                          │
│  Before you install a power supply, set the Power │
│  switch on the power supply to the Off position. │
│                                          │
└──────────────────────────────────────────┘
```

1. Set the Power switch 3 on the back of the power supply to the Off position.
2. Locate the filler panel on the power-supply bay (at the back of the power-supply chassis).

   ```
   ┌─ Attention ──────────────────────────┐
   │                                       │
   │  For proper system cooling, do not operate the │
   │  server for more than two minutes without a power │
   │  supply or a filler panel installed for each of the │
   │  power-supply bays.                   │
   │                                       │
   └───────────────────────────────────────┘
   ```

3. Remove the two screws from the filler panel.

4. Remove the filler panel from the power-supply bay and save it and the two screws you removed for future use.
5. Support the power supply ⎿1⏌ by the handle on the back.
6. Slide the power supply into the chassis.

> **Attention**
>
> When you install a power supply, first, tighten completely the top screw that attaches the power supply to the server; then, tighten the bottom screw. Failure to do so can damage the power supply.

7. Tighten completely the top screw ⎿6⏌ on the power supply; then, tighten the bottom screw ⎿2⏌.
8. Set the Power switch on the power supply ⎿3⏌ to the On position.
9. Verify that the AC Power light ⎿5⏌ and DC Power light ⎿4⏌ on the power supply are lit, indicating that the power supply is operating correctly.

Hot-Swap Power Supply Removal: The server comes with two power supplies. You can add a third power supply to provide redundant power. Each power supply has two status indicators; refer to "Power Supply Status Indicators" on page 18 for information about the status indicators.

Refer to the illustration in "Hot-Swap Power Supply Installation" on page 86 while performing the steps in this procedure.

To remove a hot-swap power supply:

1. Locate the power supply 1 that you want to remove.

   ┌─ **Attention** ──────────────────────────┐
   │   │
   │ Do not remove a power supply without first │
   │ turning the Power switch on the power supply to │
   │ the Off position.   │
   │   │
   └──┘

   .
2. Set the Power switch 3 on the power supply you are removing to the Off position.

   ┌─ **Attention** ──────────────────────────┐
   │   │
   │ When you remove a power supply, first, │
   │ loosen completely the bottom screw that │
   │ attaches the power supply to the server; │
   │ then, loosen the top screw. Failure to do so │
   │ can damage the power supply.   │
   │ For proper system cooling, do not operate │
   │ the server for more than two minutes without │
   │ a power supply or a filler panel installed for │
   │ each of the power-supply bays.   │
   │   │
   └──┘

3. Loosen completely the bottom screw 2 on the the back of the power supply; then, loosen the top screw 6 .

   ⚠

   ┌─ **Caution** ────────────────────────────┐
   │   │
   │ Never remove the cover on a power supply. │
   │ Hazardous voltage, current, and energy levels │
   │ are present inside the power supplies. There are │
   │ no serviceable parts inside the power supplies. │
   │   │
   └──┘

4. Grasp the handle on the power supply; then, slide the power supply out of the chassis.
5. If you are not installing a replacement power supply, install a power-supply filler panel.

   If you are replacing the power supply:

> **Attention**
>
> Before you install a power supply, set the
> Power switch on the power supply to the Off
> position.

a. Set the Power switch on the power supply to the
   Off position.
b. Support the power supply by the handle on the
   back.
c. Slide the power supply into the chassis.

> **Attention**
>
> When you install a power supply, first,
> tighten completely the top screw that
> attaches the power supply to the server;
> then, tighten the bottom screw. Failure to
> do so can damage the power supply.

d. Tighten completely the top screw 6 on the
   power supply; then, tighten the bottom screw
    2 .
e. Set the Power switch 3 on the power supply to
   the On position.
 f. Verify that the AC Power light 5 and DC Power
    light 4 are lit, indicating that the power supply
    is operating correctly.

Input/Output Connectors and Expansion Slots
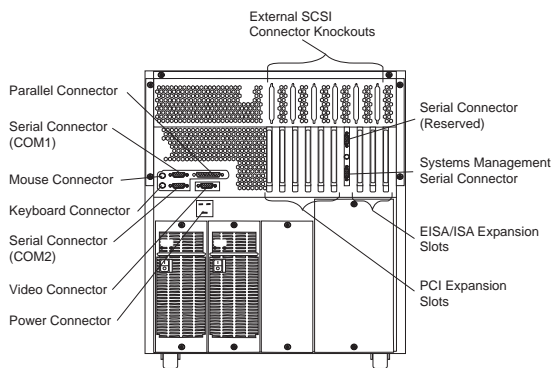
Keyboard Connector: The cable from the keyboard connects here.

Mouse Connector: This is where the mouse cable connects to the server. This port sometimes is called an auxiliary-device or pointing-device port.

Serial Connectors: The server has two, 9-pin serial connectors (COM1 and COM2).

The serial signal cable for a modem or other serial device usually connects here. If you are using a 25-pin signal cable, you need a 9-pin-to-25-pin adapter cable.

Video Connector: The monitor signal cable attaches to this 15-pin connector.

Parallel Connector: This is where the signal cable for a parallel printer or other parallel device connects to the server.

Expansion Slots: The server has four extended industry standard architecture (EISA)/industry standard architecture (ISA) expansion slots and six peripheral component interconnect (PCI) expansion slots. You can install PCI or EISA/ISA adapters to provide communication, specialized graphics, and sound.

The server comes with an Advanced Systems Management Adapter installed in one of the ISA expansion slots. The remaining three EISA/ISA expansion slots and the six PCI expansion slots are available for future expansion.

External SCSI Connector Knockouts: An optional external SCSI cable can be attached to an internal SCSI connector by using one of these knockouts.

Power Connector: The system power cord connects here.

Input/Output Ports

The input/output (I/O) connectors are for attaching external devices, such as printers, keyboards, and displays, to the server. The I/O connectors on the server include:

Two serial-port connectors
One parallel-port connector
One video-port connector
One keyboard-port connector
One auxiliary-device-port connector
SCSI-port connectors

Refer to the illustration in "Input/Output Connectors and Expansion Slots" on page 92 for the locations of the connectors.

Serial Port: The server comes with two serial ports. (Refer to "Input/Output Connectors and Expansion Slots" on page 92 for the locations of the connectors.) These ports are used to communicate with printers, plotters, external modems, scanners, and auxiliary terminals. These ports also enable you to transfer data between computers.

Serial ports can transfer data *asynchronously*, which means that they can transmit any number of characters at any time, with no restriction on the duration of the pauses between characters.

The serial ports can transmit and receive data and commands at rates of from 300 bits per second up to 345 600 bits per second. To use a serial port at 345 600 bits per second, you need a special shielded cable.

Each serial port has a 9-pin, male D-shell connector on the back of the server. The pin-number assignments of this connector conform to the industry standard.
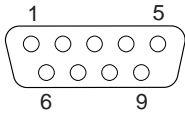
The following table shows the pin-number assignments for the serial-port connectors.

Table 3. Serial Port Pin-Number Assignments			
Pin	**Signal**	**Pin**	**Signal**
1	Data carrier detect	6	Data set ready
2	Receive data	7	Request to send
3	Transmit data	8	Clear to send
4	Data terminal ready	9	Ring indicator
5	Signal ground		

When you power-on the server, the POST routine assigns the serial ports to specific communication port addresses.

Some application programs use only certain ports, and some modems are designed for use only at certain communication port addresses. You might need to use the System Configuration Utility program to change communication port address assignments to resolve conflicts.

Parallel Port: The parallel port usually is used to communicate with printers, and transfers data one byte at a time using DMA. The parallel port has a 25-pin, female D-shell connector on the back of the server. (Refer to "Input/Output Connectors and Expansion Slots" on page 92 for the location of the connector.)
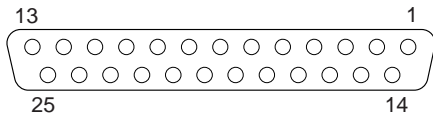
The following table shows the pin-number assignments for the parallel-port connector.

Table 4. Parallel Port Pin-Number Assignments			
Pin	**Signal**	**Pin**	**Signal**
1	STROBE	14	-AUTO FEED XT
2	Data 0	15	-ERROR
3	Data 1	16	-INIT
4	Data 2	17	-SLCT IN
5	Data 3	18	Ground
6	Data 4	19	Ground
7	Data 5	20	Ground
8	Data 6	21	Ground
9	Data 7	22	Ground
10	-ACK	23	Ground
11	BUSY	24	Ground
12	PE (paper end)	25	Ground
13	SLCT (select)		

When you power-on the server, the POST routine assigns the parallel port a specific port address. You can change the parallel-port assignment by using the System Configuration Utility programs.

Video Port: The system board in the server has one SVGA video port. This port is used to attach a video monitor. The video port has a 15-pin analog connector on the back of the server. (Refer to "Input/Output Connectors and Expansion Slots" on page 92 for the location of the connector.)
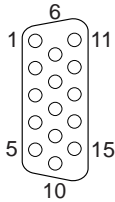
The following table shows the pin-number assignments for the video connector.

Table 5. Video Port Pin-Number Assignments	
Pin	**Signal**
1	Red
2	Green or monochrome
3	Blue
4	Not connected
5	Ground
6	Ground
7	Ground
8	Ground
9	Not connected
10	Ground
11	Not connected
12	Not connected
13	Horizontal synchronization (Hsync)
14	Vertical synchronization (Vsync)
15	Not connected

Keyboard and Auxiliary-Device Ports: The
system board has one keyboard port and one
auxiliary-device port that supports a mouse or other
pointing device. (Refer to "Input/Output Connectors and
Expansion Slots" on page 92 for the locations of the
connectors.)
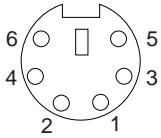
The following table shows the pin-number assignments for
the connectors used by the keyboard and auxiliary-device
ports.

Table 6. Keyboard and Auxiliary-Device Port Pin-Number Assignments	
Pin	**Signal**
1	Data
2	Not connected
3	Ground
4	+5 V dc
5	Clock
6	Not connected

UltraSCSI Ports: The server has two UltraSCSI bus-master controllers on the system board. Each controller supports up to 15 SCSI devices. You can use the 68-pin, SCSI connectors for these controllers to expand the capabilities of the server by attaching different types of SCSI devices, such as drives or printers.

Table 7 on page 99 shows the pin-number assignments for the 68-pin SCSI connectors.

Table 7. 68-Pin SCSI Port Pin-Number Assignments			
Pin	**Signal**	**Pin**	**Signal**
1	Ground	35	Data 12
2	Ground	36	Data 13
3	Ground	37	Data 14
4	Ground	38	Data 15
5	Ground	39	Data P1
6	Ground	40	Data 0
7	Ground	41	Data 1
8	Ground	42	Data 2
9	Ground	43	Data 3
10	Ground	44	Data 4
11	Ground	45	Data 5
12	Ground	46	Data 6
13	Ground	47	Data 7
14	Ground	48	Data P0
15	Ground	49	Ground
16	Ground	50	Ground
17	+Term power	51	+Term power
18	+Term power	52	+Term power
19	Reserved	53	Reserved
20	Ground	54	Ground
21	Ground	55	-Attention
22	Ground	56	Ground
23	Ground	57	-Busy
24	Ground	58	-Acknowledge
25	Ground	59	-Reset
26	Ground	60	-Message
27	Ground	61	-Select
28	Ground	62	-Control/Data
29	Ground	63	-Request
30	Ground	64	-Input/Output
31	Ground	65	Data 8
32	Ground	66	Data 9
33	Ground	67	Data 10
34	Ground	68	Data 11

Internal Drives

If you add different types of drives, the system can read multiple types of media and store more data. Several types of drives are available, such as:

Diskette
Hard disk
CD-ROM
Tape

The server contains hardware that lets you replace a failed hard disk drive without powering off the server. Therefore, you have the advantage of continuing to operate the system while a hard disk drive is removed or installed. These drives are known as *hot-swap* drives.

Each hot-swap drive bay has two indicator lights on the front of the server. If the amber Hard Disk Status light for a drive is lit continuously, that individual drive is faulty and needs to be replaced. When the Hard Disk Status light indicates a drive fault, you can replace a hot-swap drive without powering off the server.

Each hot-swap drive that you plan to install must have a hot-swap-drive tray attached. The drive must have a single connector attachment (SCA) connector. Hot-swap-drive trays come with the hot-swap drives.

Internal Drive Bays: Internal drives are installed in *bays*. The server comes with a preinstalled diskette drive and CD-ROM drive. The CD-ROM drive is installed in one of the five bays in the left front of the server. You can install hot-swap hard disk drives only in the 12 bays on the right front of the server.

Diskette Drive Bay
CD-ROM Drive Bay
Bank B, Bay 1
Bank A, Bay 1
Bank A, Bay 2
Bank A, Bay 3
Bank A, Bay 4
Bank A, Bay 5
Bank A, Bay 6
Bank B, Bay 6
Removable Media Bays
Hot-Swap Bays
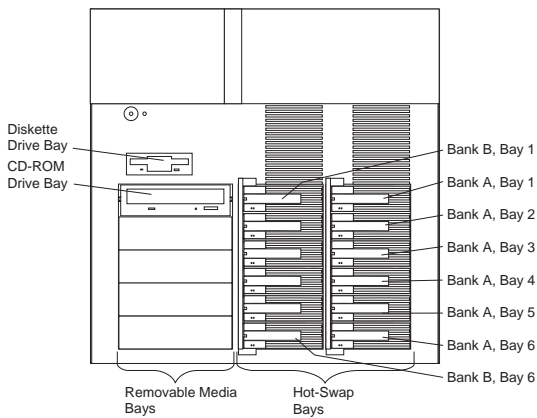
Considerations

The server comes with one CD-ROM drive and one 3.5-inch, 1.44 MB diskette drive.

The left front bays support 5.25-inch, half-high, removable-media drives. Any two adjacent 5.25-inch, half-high bays can be converted to a single full-high bay.

> **Note**
>
> The server's EMI integrity and cooling are both protected by having the left front bays covered or occupied. When you install a drive, save the filler panel from the bay, in case you later remove the drive and do not replace it with another.

You cannot install hot-swap drives in the left front bays.

If you are installing a device with a 50-pin connector in one of the left front bays, you will need a 68-to-50-pin converter (option number 32G3925).

The server supports twelve 1-inch (26 mm) slim or six 1.6-inch (42 mm) half-high, 3.5-inch hot-swap hard disk drives in the hot-swap bays.

The hot-swap bays connect to two SCSI *backplanes*. The backplanes are the printed circuit boards behind the bays. Each backplane supports up to six hard disk drives.

LED Card Bracket Assembly
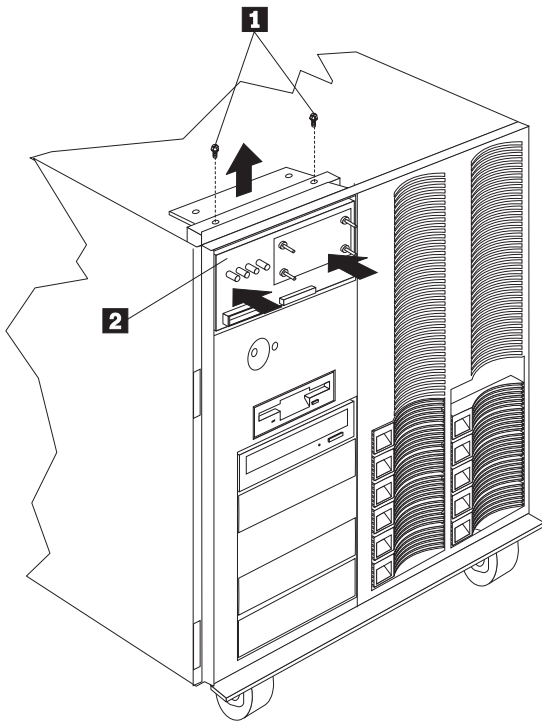
1 LED Card Bracket Assembly Screws
2 LED Card Bracket Assembly

To remove the LED card bracket assembly, do the
following:

1. Remove the front bezel cap, see "Front Bezel Cap"
   on page 77.
2. Remove the two LED card bracket assembly screws
   1 .
3. Slide the LED card bracket assembly 2 into the
   system; then, lift the LED card bracket assembly 2
   out of the top of the server.

- **Note**

  To remove the LED light guide with icons from
  the LED card bracket assembly, see "LED Light
  Guide with Icons" on page 103.
  To remove the vacuum florescent display panel
  from the the LED card bracket assembly, see
  "Vacuum Florescent Display Panel" on page 153.

LED Light Guide with Icons
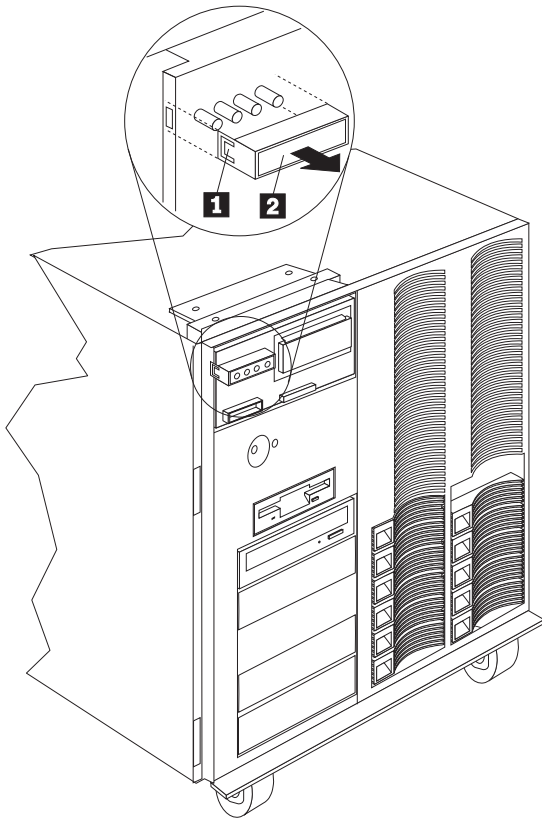
.1 Latch
.2 LED Light Guide with Icons

To remove the LED light guide, do the following:

1. Remove the front bezel cap, see "Front Bezel Cap" on page 77.
2. Release the latch .1 and remove the LED light guide .2 from the LED Card Bracket Assembly.

Media/Switch Panel Trim
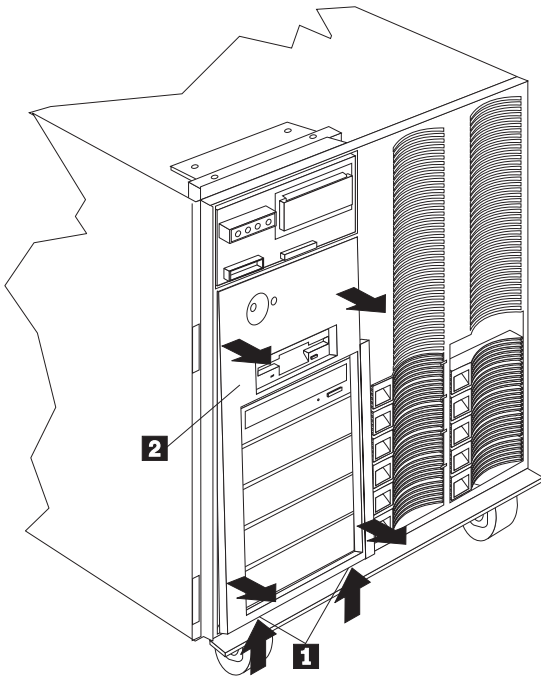
      1   Media/Switch Panel Trim
      1   Media/Switch Panel Trim Latches

To remove the media/switch panel trim, do the following:

1. Press and release the media/switch panel trim latches
   1 .
2. Pivot the bottom of the media/switch panel trim 2
   away from the server.

Memory Board/Memory-Module Kits

```
┌── Notes ──────────────────────────────────┐
│                                           │
│   The server uses 60 ns, 168-pin, error correction │
│   code (ECC), dual inline memory modules  │
│   (DIMMs).                                │
│   The memory board contains four banks (0–3), │
│   arranged in 16 DIMM connectors and supports │
│   4-way memory interleaving.              │
│   You can install a maximum of 4 GB of memory in │
│   the server, with 256 MB memory modules in all │
│   16 connectors (J2 through J17).         │
│   Each bank contains connectors for four memory │
│   modules.  The memory-module kit sizes available │
│   for the server are 64 MB, 128 MB, and 256 MB. │
│   As a minimum, the server requires 1 full bank of │
│   memory.                                 │
│   To ensure proper server operation, you must │
│   maintain 4, 8, 12, or 16 memory modules in the │
│   server.                                 │
│   All the DIMMs installed in a bank must be the │
│   same size, but different banks can have different │
│   sized DIMMs                             │
│                                           │
└───────────────────────────────────────────┘
```

J17 Bank 3, Interleave 3	Bank 3, Interleave 1 J15
J13 Bank 2, Interleave 3	Bank 2, Interleave 1 J11
J9 Bank 1, Interleave 3	Bank 1, Interleave 1 J7
J5 Bank 0, Interleave 3	Bank 0, Interleave 1 J3
J16 Bank 3, Interleave 2	Bank 3, Interleave 0 J14
J12 Bank 2, Interleave 2	Bank 2, Interleave 0 J10
J8 Bank 1, Interleave 2	Bank 1, Interleave 0 J6
J4 Bank 0, Interleave 2	Bank 0, Interleave 0 J2
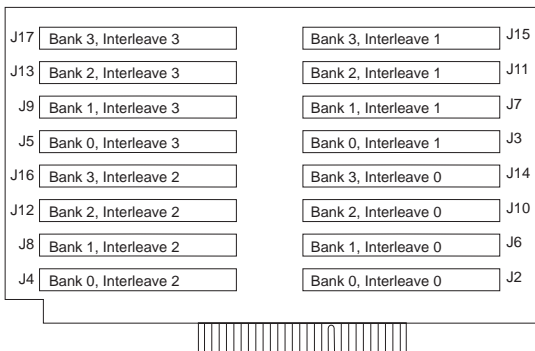
Several examples of memory module configurations are:

The base memory is four 64 MB DIMMs. The DIMMs
are installed in bank 0, connectors J2-J5.
You want four 64 MB DIMMS, eight 128 MB DIMMs,
and four 256 MB DIMMs in the server. Leave the 64
MB DIMMS in bank 0, connectors J2-J5 and install
the 128 MB DIMMS in bank 1, connectors J6-J9 and
bank 2 connectors J10-J13 and the 256 MB DIMMs in
bank 3, connectors J14-J17.
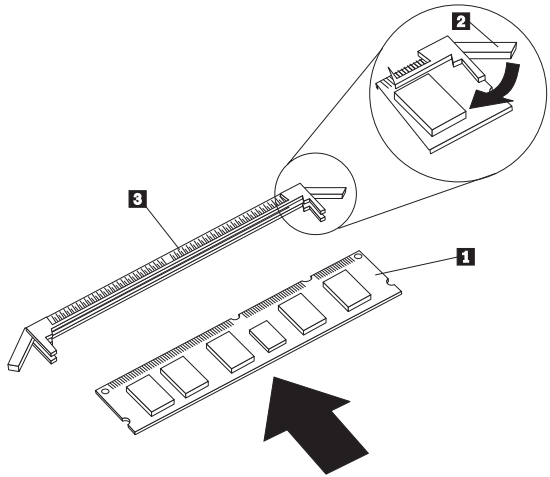
    1   Memory module (DIMM)
    2   Retaining clip
    3   Memory-module connector

To install the memory module:

1. Place the memory board, component-side up, on a
   flat, static-protective surface.
2. Locate the memory-module connectors on the
   memory board.
3. Touch the static-protective package containing the
   memory-module kit to any unpainted metal surface on
   the server. Then, remove the memory-module kit
   from the package.
4. Install the kit:

   > ─── **Attention** ───────────────────
   >
   > To avoid breaking the retaining clips or damaging
   > the memory-module connectors, handle the clips
   > gently.

   a. Start with the lowest-numbered connectors (bank
      0).
   b. Turn the memory module (DIMM) 1 so that the
      pins align correctly with the memory-board
      connector.
   c. Insert the DIMM into the memory-module
      connector 3 by pressing on one end of the

DIMM and then on the other end of the DIMM. Be sure to press straight into the connector.

   d. Repeat the preceding step to make sure the DIMM is seated correctly.

   e. Make sure the retaining clips are in the closed position.

   f. If a gap exists between the DIMM and the retaining clips `2`, the DIMM has not been properly installed. In this case, open the retaining clips and remove the DIMM; then, reinsert the DIMM.

   g. Repeat these steps for each memory module that you install.

> **Note**
>
> To ensure proper server operation, you must install memory modules in groups of four. All the memory modules installed in a bank must be the same size, but different banks can have different sized memory modules installed.

5. Reinstall the memory board and board-support panel.

> **Attention**
>
> When you install the memory board in the server, be sure that it is completely and correctly seated in the system-board connector before you apply power. (The latches on the boards will be horizontal.) Incomplete insertion might cause damage to the system board or the memory board.

Microprocessor

The server comes with two processor boards and one microprocessor. It supports a maximum of four microprocessors (two on each of the processor boards). The system board contains two processor-board connectors: one is primary; the other is secondary. You must maintain a processor board in each connector.

The server can operate as an SMP server. With SMP, certain operating systems and application programs can distribute the processing load among the microprocessors. This enhances performance for applications, such as database transaction processing, Internet applications, and groupware.

```
┌─ Notes ─────────────────────────────────┐
│                                          │
│ Be sure you have:                        │
│                                          │
│      Thoroughly reviewed the documentation that │
│      comes with the microprocessor, so that you can │
│      determine whether you need to update the │
│      server's basic input/output system (BIOS). The │
│      latest level of BIOS for the server is available │
│      through the World Wide Web and the IBM PC │
│      Company Bulletin Board System (BBS). See │
│      "Online Support" on page iii for the appropriate │
│      World Wide Web addresses and bulletin-board │
│      telephone numbers.                  │
│      Obtained an SMP-capable operating system │
│      (optional). For a list of supported operating │
│      systems, see http://www.us.pc.ibm.com/servers/ │
│      on the World Wide Web.              │
│      To avoid damage and ensure proper server │
│      operation when you install a new or additional │
│      microprocessor, use the same speed and voltage │
│      as those of the currently installed microprocessor. │
│      Microprocessor internal and external clock │
│      frequencies must be identical.      │
└──────────────────────────────────────────┘
```

A microprocessor/heat-sink assembly might contain the following components.
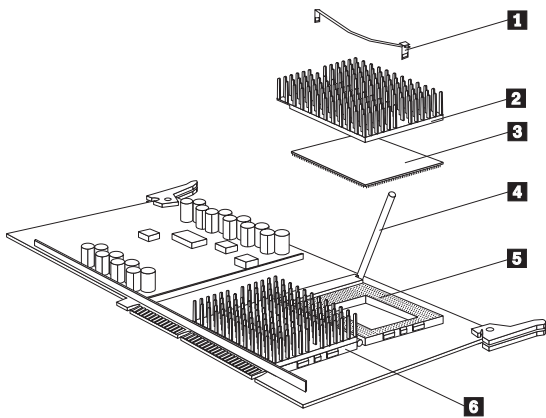
1	Heat-sink retention clip
2	Heat sink
3	Microprocessor
4	Latch
5	Secondary microprocessor socket, empty, with latch in open position
6	Primary microprocessor socket, with latch in closed, locked position

You will work with these components while performing the steps in this section.

Microprocessor Installation: To install a microprocessor:

1. Power-off the server and peripheral devices and disconnect all external cables and power cords; then, remove the top cover (see "Cover (Top)" on page 72).

    ---- **Caution** ----------------------------------

    If the server has been operating, the heat sinks on the installed microprocessors will be hot. Let the components cool for 10 minutes before continuing with the procedures.

    ----

2. Determine the processor board on which you want to install the microprocessor.

> **Note**
>
> The server comes with a microprocessor preinstalled in the primary socket ▌6▐ of the primary processor board. If you are installing a second microprocessor in the server, install it in the primary socket on the secondary processor board. If you are installing a third microprocessor, install it in the secondary socket ▌5▐ on the primary processor board. If you are installing a fourth microprocessor, install it in the secondary socket on the secondary processor board. Refer to "Processor or Memory Board" on page 121 for the locations of the primary and secondary processor boards.

3. Remove the processor board on which you want to install another microprocessor (see "Processor or Memory Board" on page 121).

   Notes:
   a. All microprocessors in the server board must have the same speed to ensure proper operation.
   b. While you are handling boards and microprocessors, place them on a grounded, static-protective or conductive-foam surface.

4. Lift the latch ▌4▐ on the empty microprocessor socket ▌5▐ .

   > **Attention**
   >
   > To avoid damaging the microprocessor during installation, make sure that the socket latch is fully opened to the vertical position before you insert the microprocessor.
   > Do not touch or bend the exposed pins on a microprocessor.
   > Do not force the pins into the socket. If you feel any resistance, remove the microprocessor and check the orientation and alignment.

   To install the microprocessor:
   a. Center the microprocessor ▌3▐ over the socket.
   b. Carefully insert the microprocessor into the socket. Ensure that the pins on the microprocessor align with the holes in the socket.
   c. Move the latch ▌4▐ downward until the microprocessor is completely locked into the socket. Make sure the latch is in the fully closed position.

5. If the heat sink comes with grease, open the thermal grease packet. Place the contents of the packet on

top of the microprocessor. In most cases the heat sink comes with a pad.

6. Spread the grease evenly over the surface of the microprocessor. Ensure that the grease does not extend beyond the microprocessor edges.

7. Discard the empty thermal grease packet.

8. Install the heat sink and heat-sink clip:

   a. Align the heat sink 2 above the microprocessor.

   b. Clip one end of the heat-sink clip 1 over the flange. Then, place the clip over the top of the heat sink and press down until it is secure on both sides of the socket.

9. If you are also installing or removing video memory or memory module kits, do so now; otherwise, continue with this procedure.

10. Reinstall the processor board and the board-support panel.

Attention

When you install processor boards in the server, be sure that they are completely and correctly seated in the system-board connectors before you apply power. (The latches on the boards will be horizontal.) Incomplete insertion might cause damage to the system board or the processor boards that you are installing.

Make sure you orient the processor board correctly before pressing it into its connector. Failure to do so could damage the processor board or the connector on the system board.

Non-Maskable Interrupt (NMI) Button

The NMI button is the third button from the left on the control panel card which is behind the front bezel. The NMI button is used to create a Non-Maskable Interrupt on the system.

If this button is pushed, the system will respond with a "TRAP" error message and the system will hang. This button is for low-level debug purposes only, and should not be used during the course of normal hardware troubleshooting.

Power Backplane Card
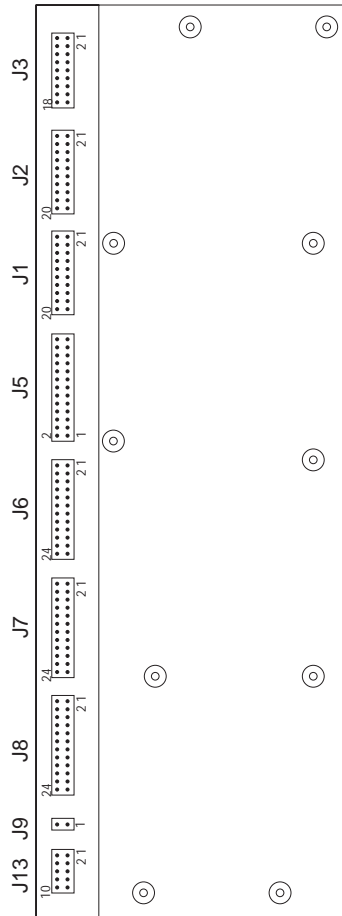
J1, J2	Power Backplane to Planar Power Interface
J3	Power Backplane to Planar Signal Interface
J5	Power Backplane to System Management Interface
J6	Power Backplane to DASD Interface
J7	Power Backplane to DASD Interface
J8	Power Backplane to Media Devices
J9	Power Backplane to 5V SB Interface
J13	Power Backplane to Fan

Connectors: If power supplies are OK and the power backplane voltages are incorrect, replace the power backplane.

If the voltages are correct, and the Symptom-to-FRU index does not solve the problem, go to "Undetermined Problems" on page 168.

J1, J2

Connection	Connector Pins	Maximum Pin Current
+5V	1	6A
DC Return	2	6A
+5V	3	6A
DC Return	4	6A
+5V	5	6A
DC Return	6	6A
+5V	7	6A
DC Return	8	6A
+5V	9	6A
DC Return	10	6A
+12V	11	6A
DC Return	12	6A
+12V	13	6A
DC Return	14	6A
+3.4V	15	6A
DC Return	16	6A
+3.4V	17	6A
DC Return	18	6A
+3.4V	19	6A
DC Return	20	6A

J3

Connection	Connector Pins	Maximum Pin Current
+12V	1	1A
-5V	2	1A
SYS On	3	<1A
I C SDA	4	<1A
I C CLK	5	<1A
+5 1V Sense	6	<1A
+12 1V Sense	7	<1A
+5V SB	8	<1A
DC Return	9	6A
System Power Good	10	<1A
DC Return	11	6A
I C Present	12	<1A
+3 4V Sense	13	<1A

Connection	Connector Pins	Maximum Pin Current
Sense Return	14	<1A
SYS EPOW#	15	<1A
DC Return	16	6A
I2C INT#	17	<1A
Spare	18	<1A

J5

Connection	Connector Pins	Maximum Pin Current
I C Reset#	1	<1A
DC Return	2	1A
5V SB	3	<1A
DC Return	4	1A
5V SB	5	<1A
DC Return	6	1A
I C CLK	7	<1A
DC Return	8	1A
I C SDA	9	<1A
SYS EPOW#	10	<1A
I C INT#	11	<1A
System Power Good	12	<1A
DC Return	13	1A
SYS On	14	<1A
Spare 1	15	N/A
5V SB	16	1A
(C CLK DASD#	17	<1A
DC Return	18	1A
I C SDA DASD	19	<1A
I C INT DASD	20	<1A
Spare	21	N/A
5V B	22	N/A
Spare	23	N/A
Spare	24	N/A
Spare	25	N/A
Spare	26	N/A

J6

Connection	Connector Pins	Maximum Pin Current
+12V B	1	5A
DC Return	2	5A
12V B	3	5A
DC Return	4	5A
+12V B	5	5A
DC Return	6	5A

Connection	Connector Pins	Maximum Pin Current
+12V B	7	5A
DC Return	8	5A
+5V SB	9	<1A
SYS EPOW#	10	<1A
+5V B	11	5A
DC Return	12	5A
+5V B	13	5A
DC Return	14	5A
+5V B	15	5A
DC Return	16	5A
A0 DASD 3	17	<1A
A1 DASD 3	18	<1A
A2 DASD 3	19	<1A
Spare 1	20	N/A
I C CLK DASD	21	<1A
DC Return	22	5A
I C SDA DASD	23	<1A
I C INT DASD#	24	<1A

J7

Connection	Connector Pins	Maximum Pin Current
+12V C	1	5A
DC Return	2	5A
12V C	3	5A
DC Return	4	5A
+12V C	5	5A
DC Return	6	5A
+12V C	7	5A
DC Return	8	5A
+5V SB	9	<1A
SYS EPOW#	10	<1A
+5V B	11	5A
DC Return	12	5A
+5V B	13	5A
DC Return	14	5A
+5V B	15	5A
DC Return	16	5A
I C A0	17	<1A
I C A1	18	<1A
I C A0	19	<1A
Spare 1	20	N/A
I C CLK DASD	21	<1A
DC Return	22	5A
I C SDA DASD	23	<1A
I C INT DASD#	24	<1A

J8

Connection	Connector Pins	Maximum Pin Current
+12V B	1	5A
DC Return	2	5A
12V B	3	5A
DC Return	4	5A
+12V B	5	5A
DC Return	6	5A
+12V B	7	5A
DC Return	8	5A
+5V SB	9	<1A
SYS EPOW#	10	<1A
+5V B	11	5A
DC Return	12	5A
+5V B	13	5A
DC Return	14	5A
+5V B	15	5A
DC Return	16	5A
A0 DASD 1	17	<1A
A1 DASD 1	18	<1A
A2 DASD 1	19	<1A
Spare 1	20	N/A
I C CLK DASD	21	<1A
DC Return	22	5A
I C SDA DASD	23	<1A
I C INT DASD#	24	<1A

J9

Connection	Connector Pins	Maximum Pin Current
5V SB	1	<1A
DC Return	2	<1A

J13

Connection	Connector Pins	Maximum Pin Current
VFan A	1	1A
DC Return	2	1A
TACH A	3	<1A
VFan B	4	1A
DC Return	5	1A
TACH B	6	<1A
VFan C	7	1A
DC Return	8	1A
TACH C	9	<1A
Spare	10	N/A

Power Backplane Removal

⚠️

— Caution —

Hazardous voltage, current, and energy levels are present inside the power backplane.

To remove the power backplane assembly, do the following:

1. Power-off the server and all attached devices and disconnect all external cables and power cords.
2. Loosen the 4 screws at the rear of the Central Electronics Complex (CEC) and slide it back.
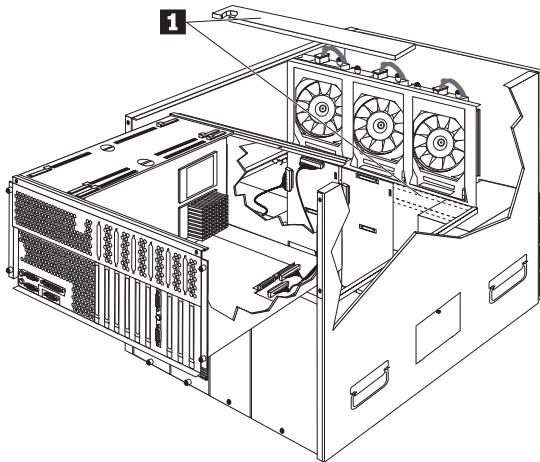
3. Remove the air baffle **1**

   — Note —

   If the air baffle is not installed correctly, the server will overheat.

4. Remove the power supplies, see "Hot-Swap Power Supply Removal" on page 90.
5. Remove the 5-volt voltage regulator card, see "5-Volt Regulator Card" on page 55.
6. Remove the AC power assembly, see "AC Power Assembly" on page 59.
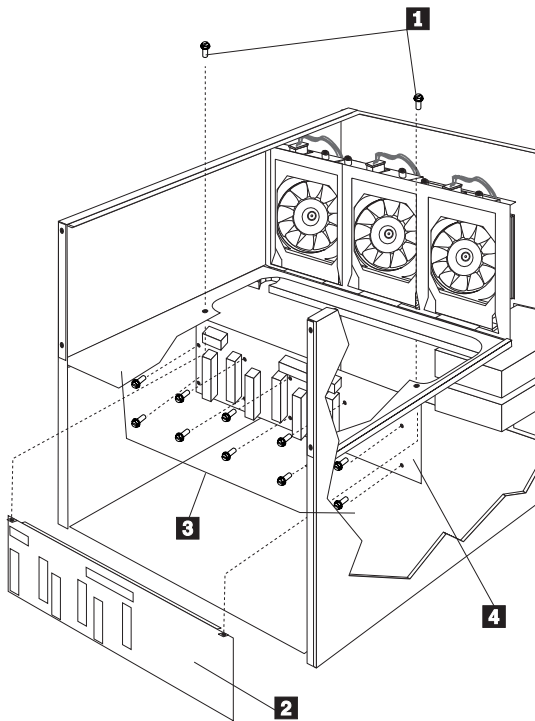
    1   Power Backplane Cover Screws
    2   Power Backplane Cover
    3   Back Plane Screws
    4   Back Plane

7. Disconnect the cables from the power backplane.
8. Remove the 2 power backplane cover screws 1 and
    remove the power backplane cover 2 .
9. Slide the CEC back into position.
10. Remove the 10 power backplane screws 3 and
    remove the power backplane 4 .

Preinstallation Steps (All Bays)

Before you install drives in the server, verify that you have all the cables and any other equipment specified in the documentation that comes with the internal drive. You might also need to perform certain preinstallation activities. Some of the steps are required only during the initial installation of an option.

1. Choose the bay in which you want to install the drive.
2. Check the instructions that come with the drive to see if you need to set any switches or jumpers on the drive.
3. To install the drive, go to "5.25-Inch Removable-Media Drive" on page 56 or "Hot-Swap Drive Installation" on page 78.

Processor or Memory Board
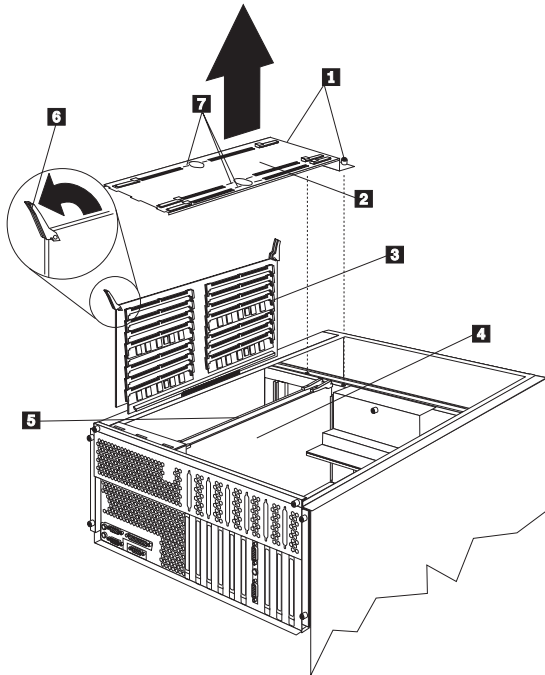
1   Captive screws
2   Board-support panel
3   Memory board
4   Primary processor board
5   Secondary processor board
6   Insertion/extraction latch on board
7   Scribe marks

> ### Note
>
> Components on the boards are not shown in the illustration.

Processor or Memory Board Removal: To remove one of the processor boards or the memory board:

1. Power-off the server and peripheral devices and disconnect all external cables and power cords :then, remove the top cover (see "Cover (Top)" on page 72).
2. Remove the board-support panel:
   a. Loosen the screws 1 on the board-support panel 2 and remove the board-support panel by lifting it and pulling the edge away from the three slots at the back of the chassis.
   b. Store the panel until you are ready to reinstall it.
3. Select the processor board 4 or 5 or memory board 3 that you want to remove.

4. Disconnect the processor board or memory board from the system board by rotating the two corner latches ⌐6⌐ on the top of the board outward to a 90-degree angle from the board.
5. Grasp the two corner latches and carefully lift the board out of the slot.

> **Note**
>
> Avoid touching the component and connectors on the board.

6. Place the board on a flat, static-protective surface.

Processor or Memory Board Installation:

To reinstall a processor or memory board:

1. Locate the appropriate processor-board or memory-board connector on the system board. (Refer to the illustration in "Processor or Memory Board" on page 121.)
2. Hold the board that you are installing by the two corner latches ⌐6⌐.
3. Slide the board into the appropriate slot guides.

> **Note**
>
> Be sure the component side of the primary processor board ⌐4⌐ is facing toward the adapter cards and the component side of the secondary processor board ⌐5⌐ is facing toward the memory board ⌐3⌐.

> **Attention**
>
> Make sure you orient the board correctly before latching it into its connector on the system board. Failure to do so could damage the board or the connector on the system board.

4. Rotate the two corner latches on the top of the board until the latches are aligned with the top edge of the board (closed position) and the board is locked into place.

> **Attention**
>
> When you install processor boards or memory boards in the server, be sure that they are completely and correctly seated in the system-board connectors before you apply power. (The latches on the boards will be horizontal.) Incomplete insertion might cause damage to the system board or the board that you are installing.

5. Reinstall the board-support panel ⌐2⌐:
   a. Align the board-support panel so that the tabs on the rear edge of the panel fit into the guide slots.

b. Close the panel. Check to make sure that the boards in the slots under the panel are aligned with the scribe marks `7` on either side of the holes in the center of the panel.

c. Tighten the screws `1` on the board-support panel.

SCSI Backplane
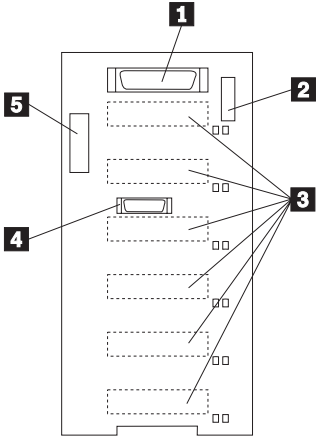
1 Wide (16-bit) SCSI connector
2 J10 Option jumper block
3 SCSI hot-swap drive connectors (on opposite side
   of backplane)
4 Repeater card connector
5 Power connector

Jumper Settings: Processor Board Option
Jumper Block (J10)

Pins	Description
1-2	Reserved.
3-4	Placing a jumper on these two pins disables SCSI terminator for optional SCSI repeater card.
5-6	Placing a jumper on these two pins enables SCSI IDs 8-D
7-8	Reserved.
9-10	Reserved.
11-12	Placing a jumper on these two pins reverses the SCSI IDs on the backplane.
Note: The default is no jumpers installed on the J10 jumper block.	

SCSI IDs that you can use for hot-swap drives.

J10 Pins 5-6	J10 Pins 11-12	Bay 1	Bay 2	Bay 3	Bay 4	Bay 5	Bay 6
No jumper[1]	No jumper[1]	0	1	2	3	4	5
No jumper	Jumper	5	4	3	2	1	0
Jumper	No jumper	13	12	11	10	9	8
Jumper[2]	Jumper[2]	-	-	-	-	-	-
Notes:							
1. This is the default jumper setting.							
2. This combination is not supported.							

Removal: To remove the SCSI Backplane, do the following:

1. Power-off the server.
2. Remove the top cover, see "Cover (Top)" on page 72.
3. Remove the side cover, see "Cover (Sides)" on page 71.

   Note

   If the air baffle is not installed correctly, the server will overheat.

   ---
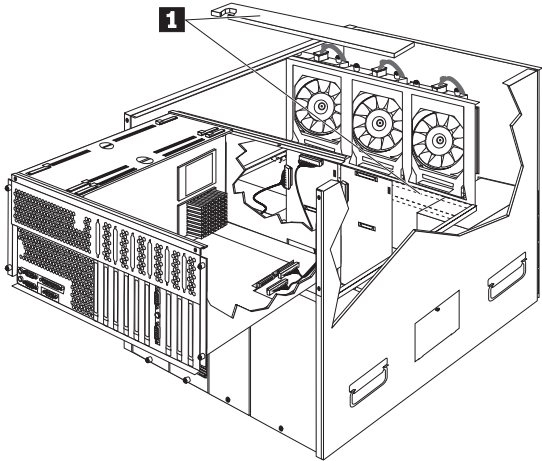
4. Remove the air baffle 1 .
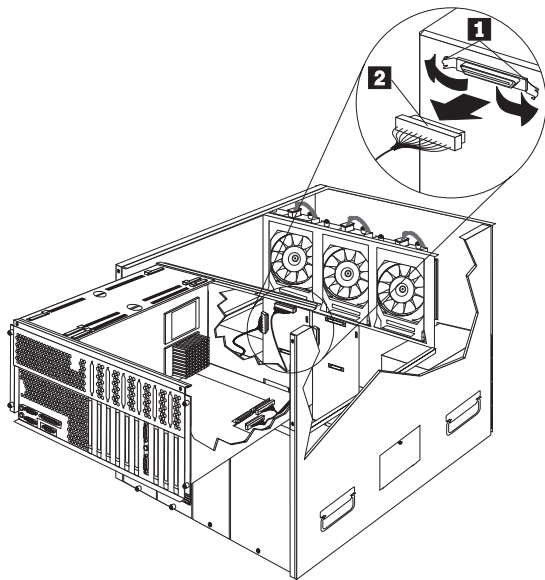
    1   Cable Retainers
    2   Backplane Cable

5. Slide the CEC back to access the backplane cable.
6. Release the backplane cable retainers 1 and
   disconnect the backplane cable 2 ;then, disconnect
   the the backplane cable.
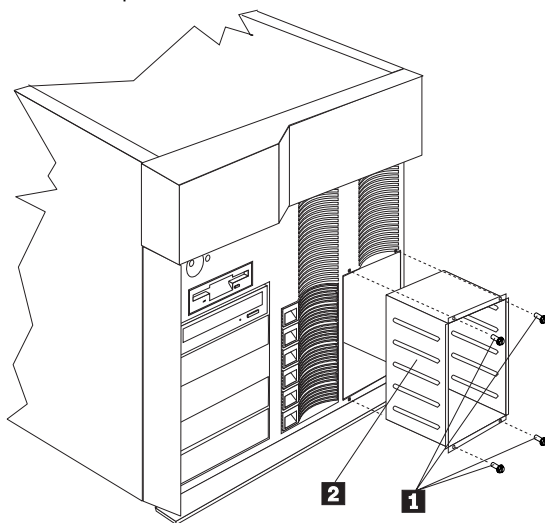
    1   Hot-Swap Drive Cage Screws
    2   Hot-Swap Drive Cage

7. Remove the 4 hot-swap drive cage screws 1 and
   pull the hot-swap drive cage 2 out of the server.
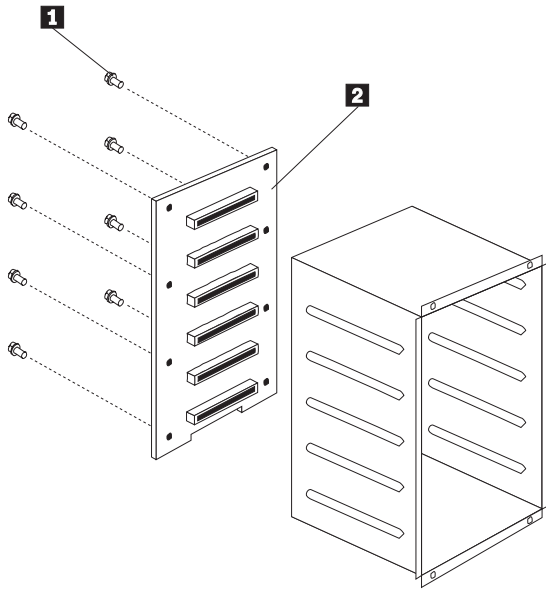
     1   Hot-Swap Backplane Screws
     2   Hot-Swap Backplane

8. Remove the 8 hot-swap backplane screws 1 and
   remove the hot-swap backplane 2 .

SCSI Drives

Some drives have a special design called *small computer system interface*, or SCSI. This design allows you to attach multiple drives to a single SCSI connector.

> **Note**
>
> Any information about SCSI drives also applies to other SCSI devices, such as scanners and printers.

A 16-bit (wide) SCSI cable connects each hot-swap backplane to an integrated SCSI controller on the system board. An additional 16-bit 4-drop SCSI cable is shipped (disconnected) in the bottom of the server between the open bays and the power supply area. It is folded and restrained with a cable clamp.

If you want to install SCSI devices in the left front bays, you can do one of following:

Use one of the SCSI controllers on the system board to control the SCSI devices in the left front bays. In order to do this, you will need to disconnect the SCSI cable that controls one of the backplanes and install the additional 4-drop SCSI cable that is shipped (disconnected) inside the server. If you disconnect the SCSI cable from the backplane, you cannot install hot-swap drives in any of the bays supported by that backplane and, thus, can have a maximum of six hot-swap drives installed in the server. The 4-drop SCSI cable can then be used to support the SCSI devices in the left front bays.

Attach the 4-drop SCSI cable to one of the SCSI controllers on the system board and use that controller to control the SCSI devices in the left front bays. Install an optional SCSI adapter and use the SCSI controller on the adapter to control one of the SCSI hot-swap backplanes.

> **Note**
>
> For ease of cabling, if you install an optional SCSI adapter to control a SCSI hot-swap backplane, install it in PCI slot 1. Refer to "Cabling Example for the ServeRAID Adapter" on page 63 for more information.

Install optional repeater adapters on the backplanes and daisy chain the backplanes, so they can be controlled by one of the SCSI controllers on the system board. You can then install the extra 4-drop SCSI cable and use the other SCSI controller on the system board to support the SCSI devices in the left front bays.

SCSI IDs: Each SCSI device that is connected to an individual integrated SCSI controller needs a unique identification (ID) so that the controller can identify the devices and ensure that different devices do not attempt to transfer data at the same time. (The integrated SCSI controllers on the system board operate independently.) If you need to set IDs for SCSI devices, refer to the instructions that come with those devices.

The server automatically sets SCSI IDs for hot-swap hard disk drives, according to the jumper settings on the SCSI backplanes. The server uses the hard disk drive SCSI IDs to send status information to the indicator lights above each hot-swap bay.

Each of the two SCSI backplanes in the server supports one bank (six) of hot-swap bays. Table 8 shows the default SCSI IDs that the backplanes assign for hot-swap hard disk drives.

Table 8. Automatically Assigned SCSI IDs											
Bank	A	A	A	A	A	A	B	B	B	B	B	B
Bay	1	2	3	4	5	6	1	2	3	4	5	6
ID	0	1	2	3	4	5	0	1	2	3	4	5
Note: The default SCSI ID for each SCSI backplane is 15. The default SCSI ID for each SCSI controller is 7.											

You can change the default ID addresses of the drives by changing the jumper settings on the SCSI backplane.

The processing sequence for SCSI devices is set through the SCSISelect Utility program (refer to the SCSI information provided on the System CD-ROM for more information). The sequence proceeds from the lowest SCSI ID to the highest (0 to 6, then 8 to 15).

Termination (Internal SCSI Devices): The devices at both ends of the SCSI bus must be terminated. If you attach SCSI devices (internal or external), you must terminate the last device in the chain.

Note

All the hot-swap drives in the server have automatic termination.

If you install SCSI devices in the removable-media bays, you must terminate the last device on the bus (cable) and disable the termination on the other devices connected to the internal SCSI controller. The SCSI controller is already terminated.

For example, when you install the first SCSI device in a removable-media bay, set its termination to Enable and install the device in bay 4 (the bottom bay). Then, when

you install additional SCSI devices in removable-media bays 1, 2, and 3, set their termination to Disable.

Refer to the information that come with the SCSI device for instructions about setting device jumpers or switches that control termination.

Server Installation/Removal

During the installation procedure, you must install parts on the rack and the server. This process can be divided into two parts:

Preparing the rack
Installing the server in the rack

Preparing the Rack

> **Caution**
>
> Four people are required to move or lift the server.

In this section, you will use the following parts:

IBM Installation Template
Two slide-bracket nut bar assemblies
One cable-management arm
Eight M4x8 pan head screws
Eight M6x16 screws
One cable management arm
One arm to shuttle (CEC) bracket with cap fastener
Two M6x16 hex flange screws
Two M6 hex flange nuts
Two 10-32 x 0.5-Inch screws
One nut bar
Two M6x16 hex flange screws
Four M6x16 screws
Six nut clips

> **Attention**
>
> To ensure rack stability, plan the installation of servers
> in the rack starting from the bottom.

To attach the mounting hardware to the rack:

1. Remove the rack front door. Refer to the rack
   documentation for instructions.
2. Mark the positions of the slide-bracket assemblies,
   bezel brackets, and the cable-management arm on
   the rack:
   a. Position the installation template on the front
      mounting rails on the rack, aligning the holes.
   b. Mark the holes for the slide-bracket assemblies
      and bezel brackets.
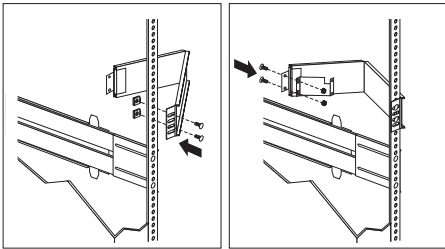
   c. Install two cage nuts to each of the two front
      mounting brackets for the bezel brackets.
   d. Attach the template to the rear mounting rails.
      Mark the locations for the slide-bracket
      assemblies and cable-management arm.

3. Attach a slide-bracket assembly to the front of the rack:

   Notes:

   > Get another person to help you attach the slide-bracket assemblies to the rack.
   > The slide-bracket assemblies can be installed on either the left or right side of the rack.
   > Refer to the illustrations for examples of the proper alignment of the slide-bracket assemblies.

   a. Position the slide-bracket assembly behind the mounting rail so that the slides will extend out from the front of the rack.
   b. If necessary, loosen the screws at the rear of the slide bracket assembly and adjust the length of the slide-bracket to fit the mounting rail. Tighten the screws.
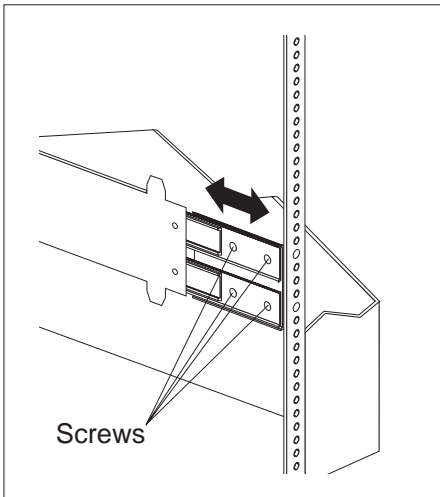
c. Position a nut bar behind the slide-bracket assembly.

d. Insert screws (16M by 16 mm) through the mounting rail, slide-bracket assembly, and nut bar. Do not tighten the screws.
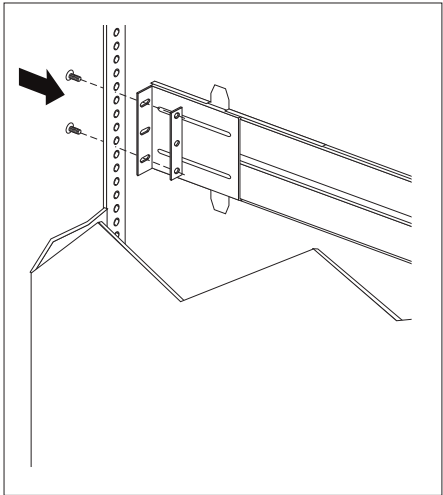
4. Attach the slide bracket assembly to the rear of the rack:

a. Position the slide-bracket assembly inside the mounting rail.

b. Position a nut bar behind the slide-bracket assembly.

c. Insert screws through the mounting rail, slide-bracket assembly, and nut bar. Do not tighten the screws.
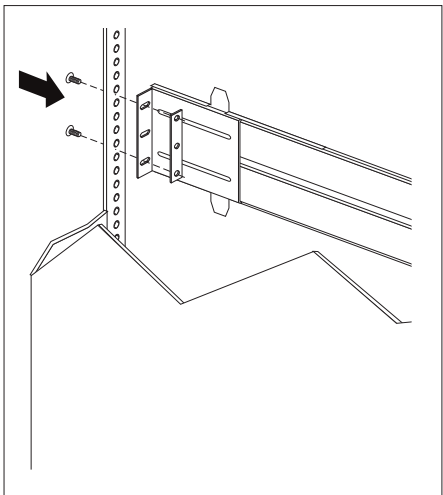
5. Attach the other slide-bracket assembly to the front and rear of the rack.
6. Push the slide-bracket assemblies to the outermost positions on the rack.
7. Tighten all screws to secure both slide-bracket assemblies. If you are using a torque screwdriver, use the following torque setting: 8–11 Nm (70.8–97.0 in/lbs).
8. Attach the cable-management arm to the rear of the rack:
   a. Position the cable-management arm bracket on the outside of the mounting rail.
   b. Insert screws (M6 by 16 mm) through the cable-management arm bracket, mounting rail, and cage nuts. Tighten the screws.
   c. Position the server bracket on the cable-management arm.
   d. Insert screws through the cable-management arm and the server bracket. Tighten the screws.

Installing the Server in the Rack: In this section, you will use eight screws (M4 by 8).

To install the server in the rack:

1. Fully extend the slide-bracket assemblies until they lock.
2. Remove the side access doors from the server by loosening the captive screws.
3. Lift and position the server so that the bayonet slots on the server are above the bayonets on the slide-bracket assemblies.
4. Lower the server and slip the bayonets into the bayonet slots.
5. Insert screws through one slide-bracket assembly and server side. Tighten the screws. Repeat this step for the other slide-bracket assembly on the opposite side of the server. This secures the server.
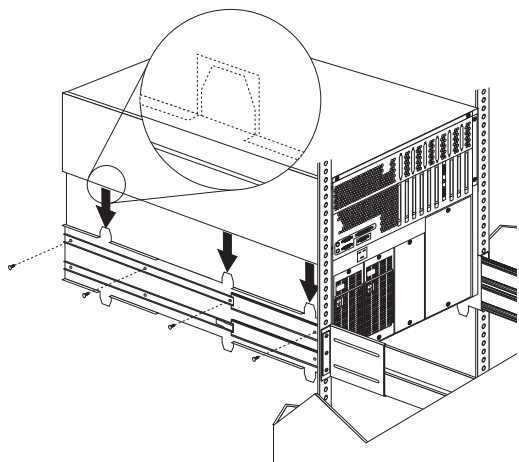
6. Install the side access doors on the server.

> **Attention**
>
> For proper cooling and airflow, replace the side
> access doors before powering on the server.
> Operating the server with the side access doors
> removed might damage server components.

> **Note**
>
> When the drawer is fully extended, safety latches
> on the slide-brackets lock into place. To release
> the safety latch, press the latch on each side of
> the rack.

7. Press the safety latches and slide the drawer about
   halfway into the rack.
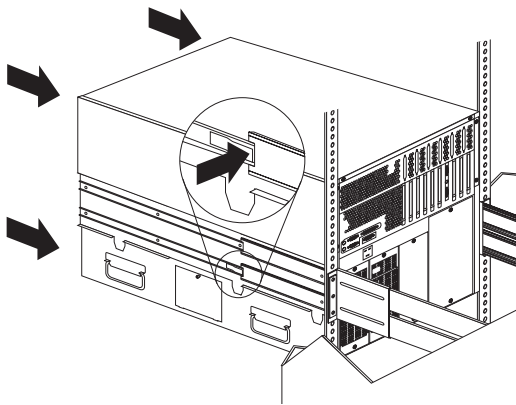
8. Attach the cable-management arm to the server using
   the captive screws.
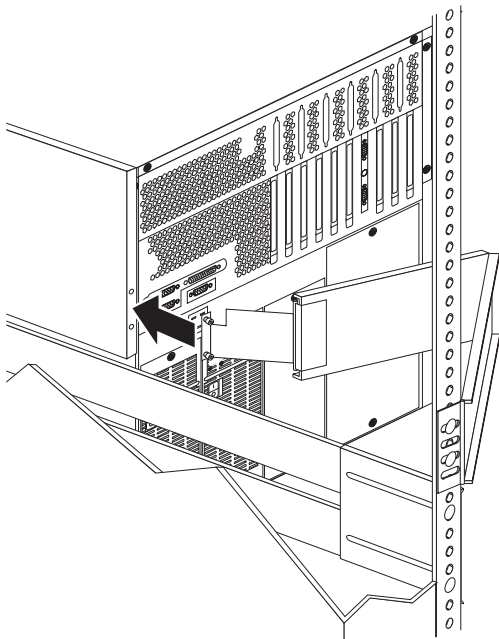
9. Attach the monitor, keyboard, and power cables to
   the corresponding connectors on the server. Refer to
   the rack documentation for instructions.
10. Attach the cables to the cable-management arm using
    cable ties.

11. Secure the drawer in the rack:
    a. Attach two cage nuts to the front mounting rail.
    b. Slide the drawer into the rack.
    c. Secure the server to both sides of the rack by inserting screws (M6 by 16 mm) through the bezel brackets, mounting rails, and cage nuts.
12. Install the rack front door.
13. To complete the installation, refer to the documentation that came with the rack.
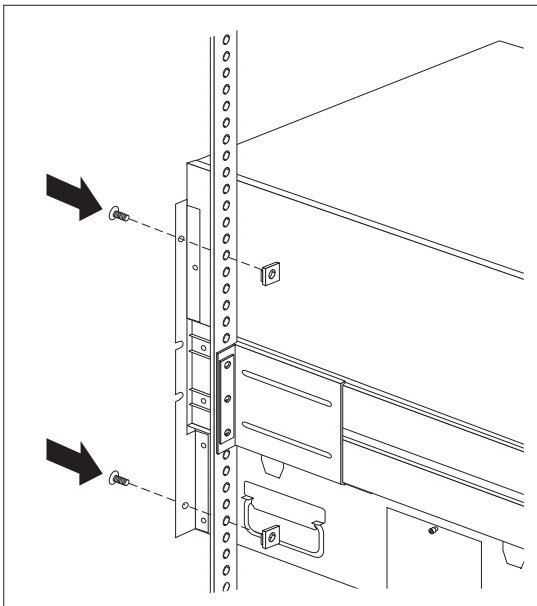
Removing the Server from a Rack

Attention

Four people are required to move or lift the server.

To remove the server from a rack:

1. If you have a modem or fax machine attached to the server, disconnect the telephone line from the electrical outlet and the server.

   Note

   If you are in the United Kingdom, you must perform this step before disconnecting the power cord.

2. Disconnect all cables and power cords from the rear of the server.
3. Disconnect all power cords from the rack.
4. Remove the screws from the bezel brackets on each side of the front bezel. Set them aside for later use.
5. Slide the server about halfway out of the rack.
6. Loosen the captive screws that secure the cable-management arm.
7. Fully extend the slide-bracket assemblies until they lock.
8. Remove the screws that attach the server to each slide-bracket assembly.
9. Remove the side access doors from the server by loosening the captive screws.
10. Using the four handles on the side of the server, lift the server from the slide bracket assemblies and place the server on a flat, nonconductive surface.
11. Install the side access doors on the server.

    Attention

    For proper cooling and airflow, replace the side access doors before powering on the server. Operating the server with the side access doors removed might damage server components.

Disassembling the Drawer Hardware: If you are not going to reinstall the server or install another drawer model, remove the brackets from the server and the rack.

1. Remove and save the slide-bracket assemblies and screws for future use.
2. Remove the screws that attach the left slide rail to the front and rear mounting rails.
3. Remove the screws that attach the right slide rail to the front mounting brackets.
4. Remove the screws that attach the slide rail and cable-management arm to the rear of the rack.

5. Refer to the documentation that comes with the rack for additional instructions.

Status Indicators
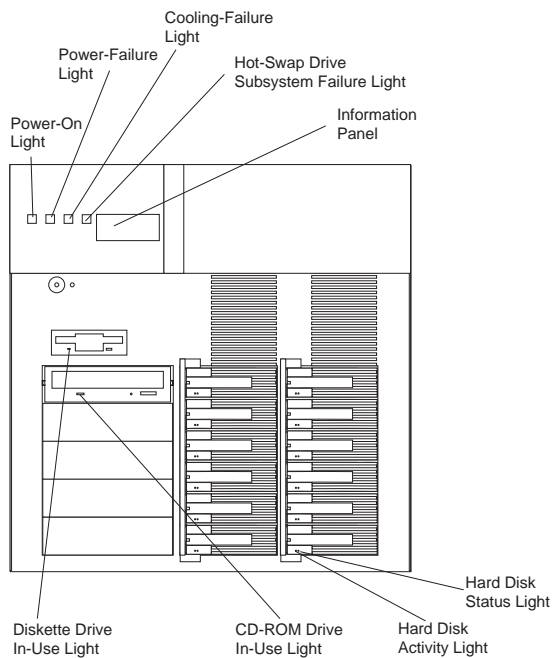
CD-ROM Drive In-Use Light: When this light is lit, the CD-ROM drive is being accessed.

Diskette Drive In-Use Light: When this green light is lit, the diskette drive is being accessed.

Power-On Light: When this green light is lit, system power is present in the server.

> **Note**
>
> If this light is off, it does not mean there is no electrical current present in the server. To remove all electrical current from the server, you must unplug the server power cord from the electrical outlet.

Power-Failure Light: When this amber light flashes, a power supply or the power-supply controller has failed. Refer to "Status Indicators" on page 18 for more information.

Cooling-Failure Light: When this amber light flashes, a fan problem has occurred or the server has overheated. Refer to "Status Indicators" on page 18 for more information.

Hot-Swap Drive Subsystem Failure Light: When this amber light flashes, a hard disk drive has failed

or one of the SCSI backplanes has overheated. Refer to "Status Indicators" on page 18 for more information.

Information Panel: System monitor information appears on this vacuum fluorescent display (VFD).

Hard Disk Lights: Each of the 12 hot-swap drive bays has a set of two status lights. These status lights indicate the following:

> **Hard Disk Status Light:** When the amber light for a hard disk drive is lit continuously, the drive has failed. When the light flashes slowly (one flash per second), the drive is being rebuilt. When the light flashes rapidly (three flashes per second), the controller is identifying the drive.

> **Hard Disk Activity Light:** When the green light for a hard disk drive is flashing, the drive is being accessed.

System Board
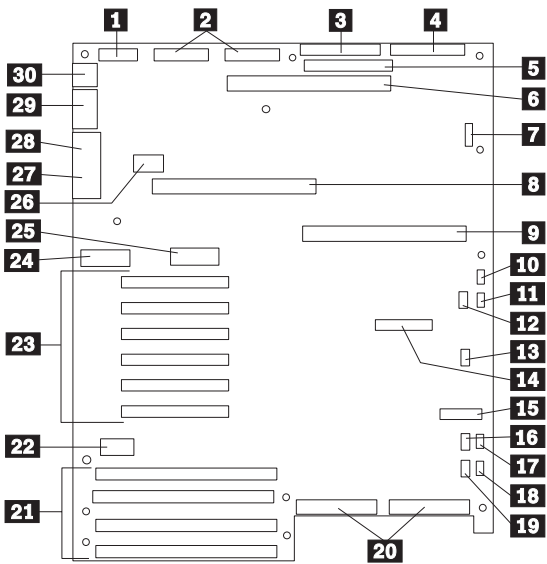
1	Power control and status cable
2	+5V, +12V, and 3.3V power connectors (identical)
3	Diskette-drive connector
4	Front-panel connector
5	IDE connector
6	Memory-board connector
7	Not used
8	Secondary processor-board connector
9	Primary processor-board connector
1	Fan 1 connector (not used, jumper required)
11	Fan 2 connector (not used, jumper required)
12	Hard disk drive LED 1 connector
13	Not used
14	Not used
15	Server management connector
16	IC2
17	Fan 3 connector (not used, jumper required)
18	Fan 4 connector (jumper required unless optional thermal upgrade kit is used)
19	Hard disk drive LED 2 connector
2	SCSI channels A (right) and B (left) connectors
21	EISA/ISA slots 1–4 for adapters (slot 1 toward top of illustration, slot 4 toward bottom)
22	Not used
23	PCI slots 1–6 for adapters (slot 1 toward top of illustration, slot 6 toward bottom: Bus 0 = slots 1–3; Bus 1 = slots 4–6)
24	Configuration switches and jumpers
25	Real-time clock

26	Video memory DRAM connector
27	VGA monitor connector
28	Parallel-port connector
29	Serial-port connectors A (COM1) and B (COM2)
3	PS/2-compatible keyboard and mouse connectors

> ─── **Note** ───
>
> The SCSI-A controller is cabled to hot-swap bank B;
> the SCSI-B controller is cabled to hot-swap bank A.

System Board Removal
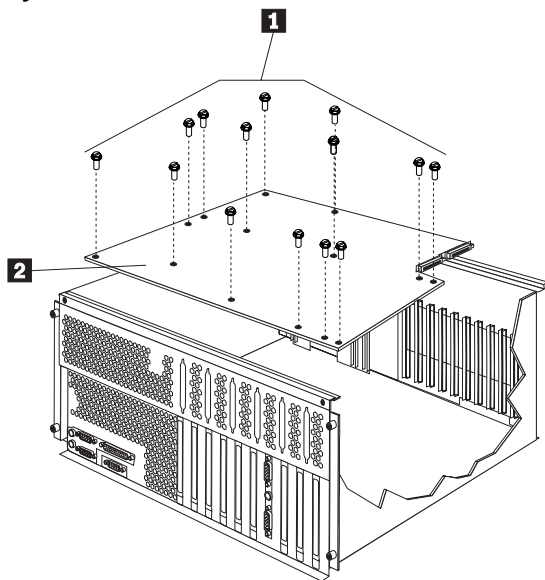
   1 System Board Screws
   2 System Board

To remove the system board, do the following:

1. Remove the top cover, see "Cover (Top)" on page 72.
2. Remove the processor and memory boards, see "Processor or Memory Board" on page 121.
3. Remove the adapters, see "Adapters" on page 60.
4. Remove the CEC, see "Central Electronics Complex (CEC)" on page 67.
5. Remove the 14 system board screws 1 and remove the system board 2 .

System-Board Configuration Jumpers

Jumper	Pins	Description
J6A1, BIOS Recovery	1-2[1]	Sets BIOS boot block to normal startup mode.
	2-3	Enables the BIOS flash memory recovery mode.
J6A1, BIOS Boot Block	1-2[1]	Sets the BIOS boot block as write-protected.
	2-3	Sets the BIOS boot block as programmable.
J6A2, Video Sleep	1-2[1]	Sets address of Video Sleep Register to 03C3H.
	2-3	Sets address of Video Sleep Register to 46E8H.
J6A4, BIOS Write	1-2	Disables BIOS update of flash memory.
	2-3[1]	Enables BIOS update of flash memory.
Note: [1]This is the factory default setting.		

Enabling BIOS Recovery Mode (J6A1): The flash memory contains a protected area that cannot be corrupted. The code in this area enables the server to start from a diskette when the BIOS becomes corrupted, for example, if a power failure occurs during a flash update. After starting, the Flash Memory Update Utility automatically recovers the system BIOS from the BIOS recovery files on the diskette.

Notes:

1. The BIOS recovery jumper, J6A1, must be set to pins 2 and 3 to enable the BIOS flash memory recovery mode.
2. If you have mapped the BIOS of an adapter to any part of the E0000H address range, you must either map it to another area before completing a recovery procedure, or physically remove the adapter from the system.
3. Before you run the recovery procedure, verify that the BIOS write jumper, J6A4, is set to its default position at pins 2 and 3.

To recover the BIOS::

1. Power-off the server and peripheral devices and remove the top cover (see "Cover (Top)" on page 72).
2. Identify the BIOS recovery jumper, J6A1.
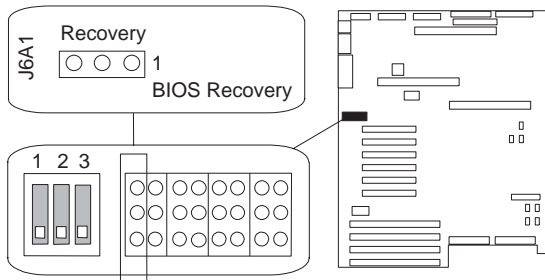
3. If the primary processor board blocks access to the jumper, remove it (see "Processor or Memory Board" on page 121).
4. Move the jumper to pins 2 and 3. This enables the recovery mode.
5. If you removed the primary processor board, install it.
6. Replace the top cover.
7. Insert the flash memory update diskette into the primary diskette drive (usually drive A).
8. Connect the power cable to the server.
9. Start the server.

    After the server successfully completes POST, the speaker emits a single beep and the recovery process starts (the process takes about three minutes). During the recovery process, no messages are displayed on the monitor, and the keyboard is disabled. When the recovery process is complete, the server emits two beeps.
10. Power-off the server and all peripheral devices, remove the top cover (see "Cover (Top)" on page 72), and move the jumper back to its original position (pins 1 and 2, factory default).

BIOS Boot Block Jumper Setting (J6A1)

> **Note**
>
> Do not mistake this jumper block for the ones on either side.

To be able to program the boot block:

1. Power-off the server and peripheral devices and remove the top cover (see "Cover (Top)" on page 72).
2. Identify the BIOS boot block jumper, J6A1.
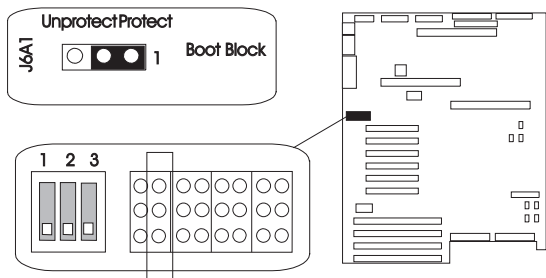
3. If the primary processor board blocks access to the jumper, remove it (see "Processor or Memory Board" on page 121).
4. Set the BIOS boot block jumper:
   a. To remove the write-protection from the BIOS boot block, move the jumper to pins 2 and 3.
   b. To set the write-protection on the BIOS boot block, move the jumper to pins 1 and 2 (factory default).
5. If you removed the primary processor board, install it.

Video-Sleep-Register Address Setting (J6A2):

The Video-Sleep-Register jumper determines which I/O port the SVGA controller uses for its internal AT mode setup port. The starting address of the default port is 03C3H (pins 1 and 2). When this jumper is set to pins 2 and 3, the Video-Sleep-Register address changes to 46E8H.

If no keyboard activity occurs after a specified timeout period (1 to 128 minutes, as specified through the Setup program), the Video-Sleep-Register jumper blanks out the monitor screen. When this happens, you must enter a password to reactivate the monitor and keyboard.

To change the location of the Video Sleep Register:

1. Power-off the server and peripheral devices and remove the top cover (see "Cover (Top)" on page 72).
2. Identify the Video-Sleep-Register jumper, J6A2.
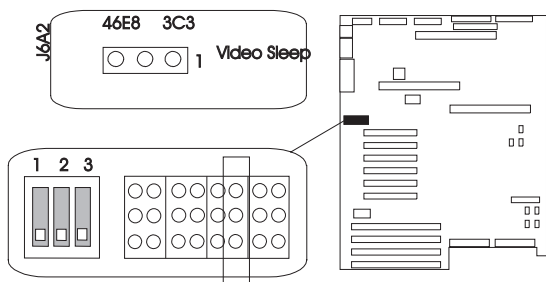
3. If the primary processor board blocks access to the jumper, remove it (see "Processor or Memory Board" on page 121).
4. Set the address of the Video-Sleep Register:
   a. To set the address to 03C3H (factory default), move the jumper to pins 1 and 2.
   b. To set the address to 46E8H, move the jumper to pins 2 and 3.
5. If you removed the primary processor board, install it.

BIOS Write Jumper Setting (J6A4)
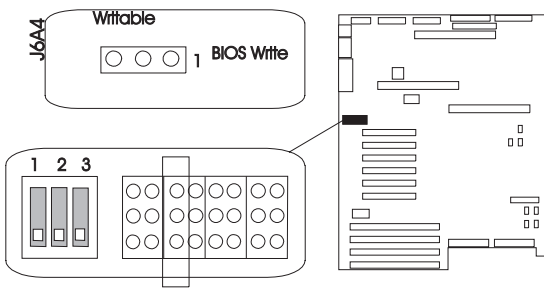
This jumper enables updating the BIOS in flash memory with a special utility. The factory default leaves this function enabled so that you can update the BIOS from a startable diskette without having to open the server covers and change the jumper.

System-Board Configuration Switch

Settings: Some configuration actions are controlled through switches on the system board. Table 9 summarizes the switch settings that correspond to these actions.

Table 9. Configuration Switch Settings

Switch	Position	Function
S6A1-1	On	Resets NVRAM and the Real-Time Clock (RTC) to the factory defaults on system startup.
	Off[1]	Retains current CMOS settings on system startup.
S6A1-2	On	Clears the user and administrative passwords on system startup.
	Off[1]	Passwords can be entered or changed.
S6A1-3	Off[1]	Reserved

Notes:

1. This is the factory default.

2. Do not change the settings for switches S6A1-4, S6A1-5, S6A1-6, or S6A1-8. These switch settings should remain as set at the factory.

NVRAM and RTC Settings (Switch S6A1-1):

Setting the CMOS switch to On clears the current values of NVRAM and the RTC when the server is reset. This returns NVRAM and the RTC to the factory default.

When the CMOS switch is set to Off, the default, the current settings are preserved during system reset.

To reset the server's NVRAM and RTC settings to the factory default values:

1. Power-off the server and peripheral devices and remove the top cover (see "Cover (Top)" on page 72).
2. If the primary processor board blocks access to the switch, remove it (see "Processor or Memory Board" on page 121).
3. Locate the configuration switches on the system board.

```
       OFF  ON
S6A1-1  [□▯]  CLEAR CMOS      OFF
S6A1-2  [□▯]  CLEAR PASSWORD  OFF
        [□▯]  RESERVED        OFF
          S6A1
```
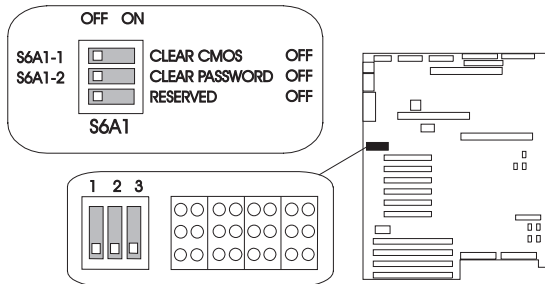
4. Slide switch S6A1-1 to On.
5. If you removed the primary processor board, replace it.
6. If ISA cards are installed, remove them.

7. Replace the top cover.
8. Connect the power cords to the server and the monitor.
9. Power-on the server and the monitor; then, wait for POST to complete. This automatically reprograms the NVRAM and RTC to their factory settings.
10. Power-off the server and the monitor.
11. Disconnect the power cords from the server and monitor.
12. Remove the top cover.
13. If the primary processor board blocks access to the switch, remove it (see "Processor or Memory Board" on page 121).
14. Slide switch S6A1-1 to Off.
15. If you removed the primary processor board, replace it.
16. If you removed the ISA cards, do the following.
    a. Boot the IBM Netfinity 7000 System CD-ROM and select System Configuration.
    b. Add the ISA cards to the configuration.
    c. Save the configuration.
    d. Install the ISA cards you removed in 6.

Clearing All Passwords (Switch S6A1-2): Setting the password switch to On clears the administrative and user passwords.

When the password switch is set to Off, which is the default, you can enter an administrative or user password, or both.

To clear the administrative and user passwords or allow a password to be set:

1. Power-off the server and peripheral devices and remove the top cover (see "Cover (Top)" on page 72).
2. If the primary processor board blocks access to the switch, remove it (see "Processor or Memory Board" on page 121).

3. Locate the configuration switches on the system board.
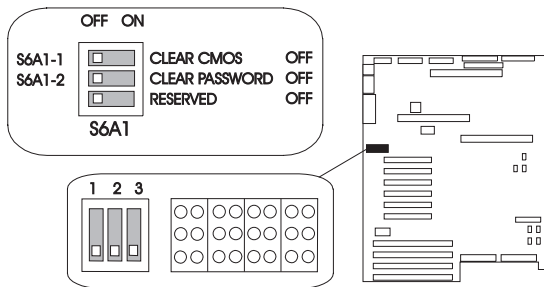
4. Slide switch S6A1-2 to On.
5. If you removed the primary processor board, replace it.
6. Connect the power cords to the server and the monitor.
7. Power-on the server and the monitor; then, wait for POST to complete. This automatically clears the administrative password.
8. Power-off the server and the monitor.
9. Disconnect the power cords from the server and monitor.
10. If the primary processor board blocks access to the switch, remove it (see "Processor or Memory Board" on page 121).
11. Slide switch S6A1-2 to Off.
12. If you removed the primary processor board, replace it.
13. Run the System Configuration Utility program to specify a new administrative password, user password, or both (see "Security" on page 38).

Vacuum Florescent Display Panel

> **Note**
>
> For additional vacuum florescent display panel information, see "Control Panel FRUs" on page 70.
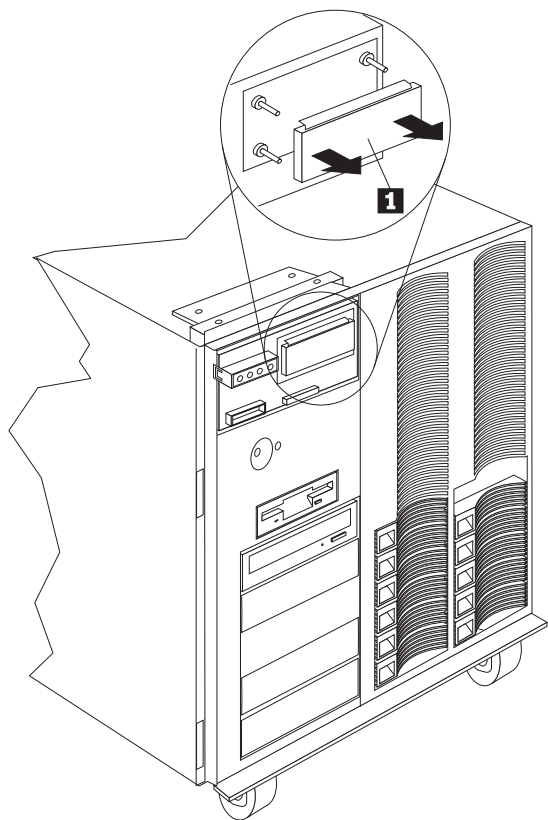
1   Vacuum Florescent Display Panel

To remove the vacuum florescent display panel, do the following:

1. Remove the front bezel cap, see "Front Bezel Cap" on page 77.
2. Gently pull the mounting studs out of the back of the florescent display panel 1 .

Video Memory

To install video memory:

1. Remove both processor boards to allow you to
   access the DRAM on the system board. (See
   "Processor or Memory Board" on page 121.)
2. Install the DRAM in the socket:
   a. Locate the dot ▮2▮ on the DRAM.
   b. Carefully align the dot on the DRAM with the
      beveled corner of the video-memory socket ▮1▮
      on the system board. (There is also a dot ▮2▮
      on the system board at the beveled corner of the
      socket to help you align the DRAM correctly.)
   c. Press the DRAM down firmly into the socket.
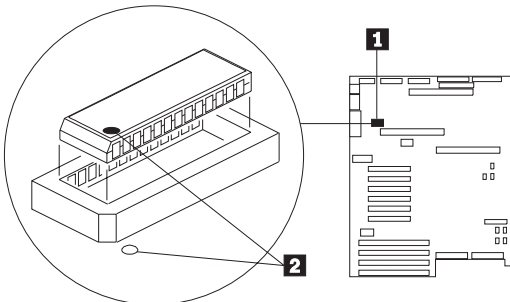
3. If you are also installing or removing a microprocessor or memory module kits, do so now; otherwise, continue with this procedure.
4. Reinstall the processor boards and the board-support panel.

Attention

When you install processor boards in the server, be sure that they are completely and correctly seated in the system-board connectors before you apply power. (The latches on the boards will be horizontal.) Incomplete insertion might cause damage to the system board or the processor boards that you are installing.

Make sure you orient the processor board correctly before pressing it into its connector. Failure to do so could damage the processor board or the connector on the system board.

Symptom-to-FRU Index

This index supports Netfinity 7000 - Type 8651 servers.

> **Note**
>
> Always start with "General Checkout" on page 5.

The Symptom-to-FRU lists symptoms, errors, and the possible causes. The most likely cause is listed first. Use this Symptom-to-FRU Index to help you decide which FRUs to have available when servicing the computer. The POST BIOS displaying POST error codes and messages on the screen.

> **Note**
>
> For IBM devices not supported by index, refer to the manual for that device.

Beep Codes

Beep Code	FRU/Action
1 Beep (Refresh failure)	1. **Check memory in J2, J3, J4, J5** 2. Memory DIMMs 3. Memory Board
2 Beeps (Parity can't be reset)	1. **Check memory** 2. Memory DIMMs 3. Memory Board
3 Beeps (First 64 KB memory failure)	1. **Check memory** 2. Memory DIMMs 3. Memory Board 4. Processor Board 5. System Board
4 Beeps (Timer not operational)	1. **Check processor board** 2. Check System Board 3. System Board
5 Beeps (Processor failure)	1. **Reseat processor module** 2. Processor Board 3. System Board
6 Beeps (8042 gate a20 is off v_mode)	1. **Reseat processor module** 2. System Board 3. Processor Board
7 Beeps (Exception interrupt error)	1. **Check cables** 2. Processor Board 3. System Board
8 Beeps (Display memory read/write error	1. **Check/Install Video RAM** 2. System Board

Beep Code	FRU/Action
9 Beeps (ROM checksum error)	1. **Update BIOS** 2. System Board
10 Beeps (Shutdown register read/write error)	1. **System Board**
11 Beeps (I2C Error)	1. **Reseat Processor and Memory Module** 2. Check cabling for Information Panel and Advanced Server Management Adapter 3. Advanced Server Management Adapter 4. Front Panel 5. System Board

Error Codes

Error Code	FRU/Action
0002 (Primary boot device not found)	1. **Cables** 2. Primary Boot Device
0010 (Cache memory failure, do not enable cache)	1. **Processor Module** 2. Processor Board
0015 (Primary output device not found)	1. **Primary Output Device**
0016 (Primary input device not found)	1. **Primary Input Device**
0041 (EISA ID mismatch for slot)	1. **Reseat EISA Adapter** 2. Run System Configuration Utility program 3. EISA Adapter
0042 (ISA configuration contains invalid information)	1. **Reseat ISA Adapter** 2. Run System Configuration Utility program 3. ISA Adapter 4. System Board
0043 (EISA invalid configuration for slot)	1. **Reseat EISA Adapter** 2. Run System Configuration Utility program
0044 EISA configuration not assured)	1. **Reseat EISA Adapter** 2. Run System Configuration Utility program
0045 (EISA expansion board not ready in slot)	1. **Reseat EISA Adapter** 2. EISA Adapter 3. System Board

Error Code	FRU/Action
0047 (EISA CMOS configuration not set)	1. **Run System Configuration Utility program** 2. EISA Adapter 3. System Board
0048 (EISA CMOS checksum failure)	1. **Run System Configuration Utility program** 2. Clear CMOS and NVRAM 3. System Board
0049 (EISA NVRAM invalid)	1. **Run System Configuration Utility program** 2. System Board
0050 (Plug and Play Memory Conflict)	1. **Run System Configuration Utility program** 2. ISA Adapter
0051 (Plug and Play 32 bit Memory Conflict)	1. **Run System Configuration Utility program** 2. ISA Adapter
0052 (Plug and Play IRQ Conflict)	1. **Run System Configuration Utility program** 2. ISA Adapter
0053 (Plug and Play DMA Conflict)	1. **Run System Configuration Utility program** 2. ISA Adapter
0054 (Plug and Play Error Log is Full)	1. **Run System Configuration Utility program** 2. Clear CMOS and NVRAM
0055 (Bad Plug and Play Serial ID Checksum)	1. **Run System Configuration Utility program** 2. ISA Adapter
0056 (Bad Plug and Play Resource Data Checksum)	1. **Run System Configuration Utility program** 2. ISA Adapter
0060 (Keyboard is locked - please unlock it)	1. **Unlock keyboard** 2. Keyboard 3. System Board
0070 (CMOS time and date not set)	1. **Set time and date** 2. Real-Time Clock Module
0080 (Option ROM has bad checksum)	1. **Reseat adapter** 2. Adapter

Error Code	FRU/Action
0081 (Custom Binary Cheksum failure)	1. **Update User BIOS from latest Flash Diskette** 2. System Board
0083 (Shadow of PCI ROM failed)	1. **Reseat adapter** 2. Adapter
0084 (Shadow of EISA ROM failed)	1. **Reseat adapter** 2. Adapter
0085 (Shadow of ISA ROM failed)	1. **Reseat adapter** 2. Remove adapter
0131 (Floppy Drive A:)	1. **Cable** 2. Drive
0132 (Floppy Drive B:)	1. **Cable** 2. Drive
0135 (Floppy disk controller failed)	1. **System Board**
0140 (Shadow of system BIOS failed)	1. **Update User BIOS from latest Flash Diskette** 2. System Board
0162 (Unable to apply BIOS Update for Slot 1 Processor 1)	1. **Check for correct processor level** 2. Processor 1 on Processor Board 1
0163 (Unable to apply BIOS Update for Slot 1 Processor 2)	1. **Check for correct processor level** 2. Processor 2 on Processor Board 1
0164 (Unable to apply BIOS Update for Slot 2 Processor 1)	1. **Check for correct processor level** 2. Processor 1 on Processor Board 2
0165 (Unable to apply BIOS Update for Slot 2 Processor 2)	1. **Check for correct processor level** 2. Processor 2 on Processor Board 2
0166 (BIOS does not support current stepping for Slot 1 Processor 1)	1. **Check for correct processor level** 2. Processor 1 on Processor Board 1
0167 (BIOS does not support current stepping for Slot 1 Processor 2)	1. **Check for correct processor level** 2. Processor 2 on Processor Board 1
0168 (BIOS does not support current stepping for Slot 2 Processor 1)	1. **Check for correct processor level** 2. Processor 1 on Processor Board 2

Error Code	FRU/Action
0169 (BIOS does not support current stepping for Slot 2 Processor 2)	1. **Check for correct processor level** 2. Processor 2 on Processor Board 2
0170 (Disable CPU slot)	1. **Check for correct processor level** 2. Processor 1 on Processor Board 1
0171 (CPU Failure - Slot 1 CPU 1)	1. **Processor in Socket 1** 2. Processor Board in Slot 1
0172 (CPU Failure - Slot 1 CPU 2)	1. **Processor in Socket 2** 2. Processor Board in Slot 1
0173 (CPU Failure - Slot 2 CPU 1)	1. **Processor in Socket 1** 2. Processor Board in Slot 2
0174 (CPU Failure - Slot 2 CPU 2)	1. **Processor in Socket 2** 2. Processor Board in Slot 2
0175 (CPU modules are incompatible)	1. **Use compatible processor modules**
0176 (CPU failure - Slot 1, CPU # 1)	1. **Reseat processor module** 2. Processor Module 3. Processor Board
0177 (CPU failure - Slot 1, CPU # 2)	1. **Reseat processor module** 2. Processor Module 3. Processor Board
0178 (CPU failure - Slot 2, CPU # 1)	1. **Reseat processor module** 2. Processor Module 3. Processor Board
0179 (CPU failure - Slot 2, CPU # 2)	1. **Reseat processor module** 2. Processor Module 3. Processor Board
0180 (Attempting to boot with failed CPU)	1. **Processor Module**
0181 (Base System Processor (BSP) switched, system may not be in uni-processor mode)	1. **Information only**

Error Code	FRU/Action
0191 (CMOS battery failed)	1. **Real-Time Clock Module** 2. System Board
0195 (CMOS system options not set)	1. **Run System Configuration Utility program**
0198 (CMOS checksum invalid)	1. **Run System Configuration Utility program**
0200 (Invalid voltage jumper for processor in Slot 1 Processor 1)	1. **Check jumper settings**
0201 (Invalid voltage jumper for processor in Slot 1 Processor 2)	1. **Check jumper settings**
0202 (Invalid voltage jumper for processor in Slot 2 Processor 1)	1. **Check jumper settings**
0203 (Invalid voltage jumper for processor in Slot 2 Processor 2)	1. **Check jumper settings**
0204 (CPU Removed - Slot 1 CPU 1)	1. **Information only**
0205 (CPU Removed - Slot 1 CPU 2)	1. **Information only**
0206 (CPU Removed - Slot 2 CPU 1)	1. **Information only**
0207 (CPU Removed - Slot 2 CPU 2)	1. **Information only**
0208 (CPU not responding - Slot 1 CPU 1)	1. **Processor 1 on Processor Board 1**
0209 (CPU not responding - Slot 1 CPU 2)	1. **Processor 2 on Processor Board 1**
0210 (CPU not responding - Slot 2 CPU 1)	1. **Processor 1 on Processor Board 2**
0211 (CPU not responding - Slot 2 CPU 2)	1. **Processor 2 on Processor Board 2**
0220 (Fan Failure Slot 1 Processor 1)	1. **Fan Heat Sink on Processor 1 on Processor Board 1**

Error Code	FRU/Action
0221 (Fan Failure Slot 1 Processor 2)	1. **Fan Heat Sink on Processor 2 on Processor Board 1**
0222 (Fan Failure Slot 2 Processor 1)	1. **Fan Heat Sink on Processor 1 on Processor Board 2**
0223 (Fan Failure Slot 2 Processor 2)	1. **Fan Heat Sink on Processor 2 on Processor Board 2**
0230 (Invalid processor for module in Slot 1 Processor 1)	1. **Run Flash Update** 2. Processor 1 on Processor Board 1
0231 (Invalid processor for module in Slot 1 Processor 2)	1. **Run Flash Update** 2. Processor 2 on Processor Board 1
0232 (Invalid processor for module in Slot 2 Processor 1)	1. **Run Flash Update** 2. Processor 1 on Processor Board 2
0233 (Invalid processor for module in Slot 2 Processor 2)	1. **Run Flash Update** 2. Processor 2 on Processor Board 2
0234 (Processor cache jumper setting does not match cache size for module in Slot 1 Processor 1)	1. **Check jumper settings on processor board in slot 1** 2. Processor 1 on Processor Board 1 3. Processor Board 1
0235 (Processor cache jumper setting does not match cache size for module in Slot 1 Processor 2)	1. **Check jumper settings on processor board in slot 1** 2. Processor 2 on Processor Board 1 3. Processor Board 1
0236 (Processor cache jumper setting does not match cache size for module in Slot 2 Processor 1)	1. **Check jumper settings on processor board in slot 1** 2. Processor 1 on Processor Board 2 3. Processor Board 2
0237 (Processor cache jumper setting does not match cache size for module in Slot 2 Processor 2)	1. **Check jumper settings on processor board in slot 1** 2. Processor 2 on Processor Board 2 3. Processor Board 2

Error Code	FRU/Action
0289 (System memory size mismatch)	1. **Run System Setup** 2. Memory DIMM 3. Memory Board
0295 (Address line short detected)	1. **Memory DIMM** 2. Memory Board
0297 (Memory size decreased)	1. **Run System Setup** 2. Memory DIMM 3. Memory Board
0299 (ECC error correction failure	1. **Reseat memory and memory board** 2. Memory Board 3. System Board
0301 (ECC single bit correction failed, correction disabled)	1. **Reseat memory and memory board** 2. Memory Board 3. System Board
0302 (ECC double bit error)	1. **Reseat memory and memory board** 2. Memory Board 3. System Board
0304 (Invalid memory configuration. Memory failure during POST or invalid combination on DIMM sizes.)	1. **Reseat memory and memory board** 2. Memory Board 3. System Board
0309 (ECC Memory Failure)	1. **Reseat memory and memory board** 2. Memory Board 3. System Board
0310 (ECC Memory Size Changes Bank 1)	1. **Reseat memory and memory board** 2. Memory Board 3. System Board
0314 (ECC Memory Size Changes Bank 0	1. **Refer to the 04XX error codes displayed with this error code to determine the failing DIMM**
0315 (ECC Memory Size Changes Bank 1	1. **Refer to the 04XX error codes displayed with this error code to determine the failing DIMM**
0316 (ECC Memory Size Changes Bank 2	1. **Refer to the 04XX error codes displayed with this error code to determine the failing DIMM**

Error Code	FRU/Action
0317 (ECC Memory Size Changes Bank 3	1. **Refer to the 04XX error codes displayed with this error code to determine the failing DIMM**
0320 (Adding/removing PCI adapters has changed available memory)	1. **Reseat memory and memory board** 2. Memory Board 3. System Board
0322 (An error has caused the memory resizing to fail, insufficient memory to continue.)	1. **Reseat memory and memory board** 2. Memory Board 3. System Board
0370 (Keyboard controller error)	1. **Reboot system** 2. System Board
0373 (Keyboard stuck key detected)	1. **Ensure nothing is resting on the keyboard** 2. Keyboard
0375 (Keyboard and mouse swapped)	1. **Swap keyboard and mouse**
0380 (ECC DIMM failure, board is in slot 1 DIMM #)	1. **Replace memory as indicated**
0392 (ECC DIMM failure, board is in slot 2 DIMM #)	1. **Replace memory as indicated**
0400 (DIMM error Bank 0)	1. **See 040X Interleave error for failing DIMM**
0401 (DIMM error Bank 1)	1. **See 040X Interleave error for failing DIMM**
0402 (DIMM error Bank 2)	1. **See 040X Interleave error for failing DIMM**
0403 (DIMM error Bank 3)	1. **See 040X Interleave error for failing DIMM**
0404 (DIMM error Interleave 0)	1. **Memory DIMM**
0405 (DIMM error Interleave 1)	1. **Memory DIMM**
0406 (DIMM error Interleave 2)	1. **Memory DIMM**
0407 (DIMM error Interleave 3)	1. **Memory DIMM**
0408 (Unsupported Interleave 2 to 1)	1. **See 040X Interleave error for failing DIMM**
0430 (Timer channel 2 failure)	1. **System Board**

Error Code	FRU/Action
0440 (Gate-A20 failure)	1. **System Board**
0441 (Unexpected interrupted in protected mode)	1. **Use correct device driver**
0445 (Master interrupt controller error)	1. **System Board**
0446 (Slave interrupt controller error)	1. **System Board**
0450 (Master DMA controller error)	1. **System Board**
0451 (Slave DMA controller error)	1. **System Board**
0452 (DMA Controller Error)	1. **System Board**
0460 (Fail-safe timer NMI failure)	1. **Adapter** 2. System Board
0461 (Software port NMI failure)	1. **Check software/device driver**
0465 (Bus timeout NMI in slot)	1. **Check adapter** 2. Adapter 3. System Board
0467 (Expansion board NMI in slot)	1. **Check adapter** 2. Adapter
0501 (PCI system error)	1. **PCI Device** 2. System Board
0510 (PCI parity error)	1. **PCI device** 2. System Board
0511 (PCI System Error)	1. **PCI Adapter** 2. System Board
0710 (System board device resource conflict)	1. **Run System Configuration Utility program**
0711 (Static device resource conflict)	1. **Run System Configuration Utility program**
0780 (PCI Segment 1 memory request exceeds 998 MB)	1. **PCI Adapter**
0781 (PCI Segment 1 I/O request exceeds 12 K)	1. **PCI Adapter**
0782 (PCI I/O request exceeds amount available	1. **PCI Adapter**

Error Code	FRU/Action
0783 (PCI memory request exceeds amount available	1. **PCI Adapter**
0784 (Illegal bus for memory request below 1 MB)	1. **PCI Adapter**
0785 (Memory request below 1 MB exceeds 1 MB)	1. **PCI Adapter**
0800 (PCI I/O port conflict)	1. **Run System Configuration Utility program**
0801 (PCI memory conflict)	1. **Run System Configuration Utility program**
0802 (PCI IRQ conflict)	1. **Run System Configuration Utility program**
0803 (PCI error log is full, the log will be cleared automatically)	1. **Rerun diagnostics**
0804 (PCI ROM not found, may be OK for this card)	1. **Information** 2. PCI Adapter
0805 (Insufficient Memory to Shadow PCI ROM)	1. **Remove PCI Adapter**
0806 (Memory Allocation Failure for Second PCI Segment)	1. **PCI Adapter** 2. System Board
0809 (PCI Error Log Full)	1. **Run System Configuration Utility program** 2. Clear NVRAM and CMOS
0810 (Floppy disk controller resource conflict)	1. **Run System Configuration Utility program**
0811	1. **Primary IDE Controller** 2. System Board
0812	1. **Secondary IDE Controller** 2. System Board
0815 (Parallel port resource conflict)	1. **Run System Configuration Utility program**
0816 (Serial port 1 resource conflict)	1. **Run System Configuration Utility program**

Error Code	FRU/Action
0817 (Serial port 2 resource conflict)	1. **Run System Configuration Utility program**
0900 (NVRAM checksum error, NVRAM cleared)	1. **Run System Configuration Utility program**
0903 (NVRAM DATA invalid, NVRAM cleared)	1. **Run System Configuration Utility program**
0905 (NVRAM cleared by jumper)	1. **Run System Configuration Utility program**
0906 (Password Cleared By Jumper)	1. **Information** 2. Set Password
0982 (I/O expansion board NMI in slot)	1. **Adapter** 2. System Board
0984 (Expansion board disabled in slot)	1. **Run System Configuration Utility program** 2. Adapter 3. System Board
0985 (Fail-safe timer NMI)	1. **Adapter** 2. System Board
0986 (System reset caused by Watchdog Timer)	1. **Adapter** 2. System Board
0987 (Bus timeout NMI in slot)	1. **Adapter** 2. System Board

Error Symptoms

Symptom	FRU/Action
All front panel lights are off and the server is running OK.	1. **Front Panel Cable** 2. Front Panel Display 3. Front Panel Card 4.
Front panel cooling failure light blinking.	1. **Fan(s)**
Front panel hot-swap drive failure light blinking.	1. **Hot-Swap Drive** 2. **Hot-Swap Backplane**
System powers up and down or powers down after 3 or 4 seconds.	1. **Reseat Advanced Systems Management Adapter Cable** 2. Advanced Systems Management Adapter Cable 3. Advanced Systems Management Adapter 4. System Board

Undetermined Problems

You are here because the diagnostic tests did not identify
the failure, the Devices List is incorrect, or the system is
inoperative.

Notes

1. If you suspect a software mismatch is causing
    failures (solid or intermittent), be sure to see
    "Configuration Conflicts" on page 26.
2. A corrupt CMOS can cause undetermined
    problems, go to "NVRAM and RTC Settings
    (Switch S6A1-1)" on page 150 and follow the
    procedure to reset the server's NVRAM and RTC
    settings.

Check the LEDs on all the power supplies. If the LEDs
indicate the power supplies are working correctly, return
here and do the following:

1. Power-off the computer.
2. Remove or disconnect the following (one at a time)
    until you find the failure (power-on the computer and
    reconfigure each time).
    - Any external devices
    - Surge suppressor device (on the computer)
    - Modem, printer, mouse, or non-IBM devices
    - Each adapter
    - Drives
    - Memory-Module Kits (Minimum requirement = 1
      bank of 64 MB DIMMs)

    Note

    Minimum operating requirements vary for each
    computer. For example, an IML drive in the drive
    startup sequence (IML systems only).
    ---

3. Power-on the computer. If the problem remains,
    suspect the following FRUs in the order listed:
    - System Board
    - Processor Board
    - Front Panel

Note

If the problem goes away when you remove an
adapter from the system, and replacing that adapter
does not correct the problem, suspect the system
board then the processor board(s)

Parts Listing (Models RH0, RM0, TH0, TM0 - Type 8651)

Note

For Models RH0 and RM0 rack mounting FRUs, see "Rack Mounting FRUs (Models RH0, RM0 - Type 8651)" on page 175.

Front View

Rear View
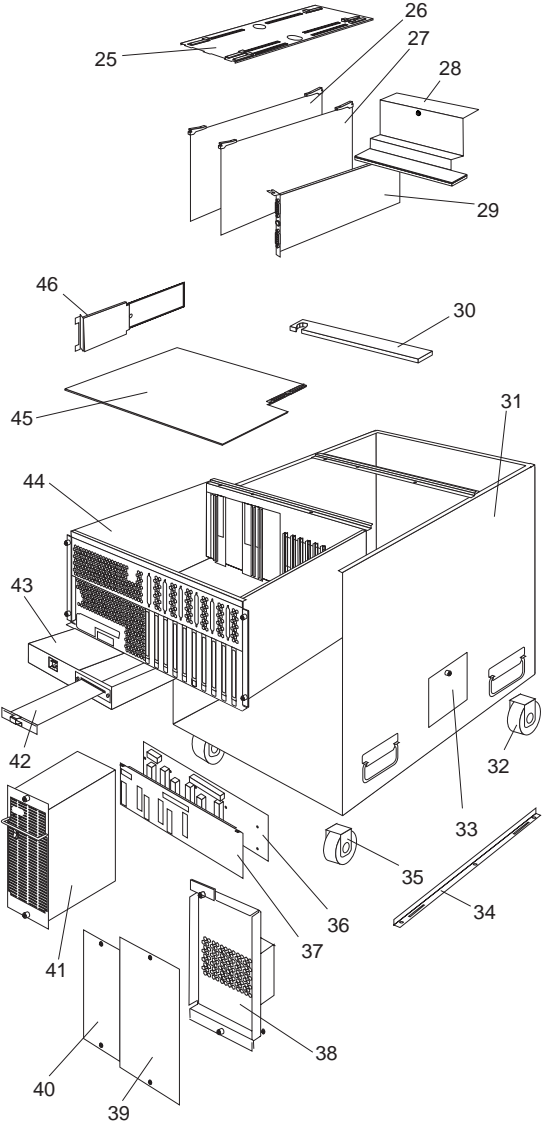
Index	System (Models RH0, RM0, TH0, TM0 - Type 8651)	FRU No.
1	Top Cover (Models TH0, TM0, RH0, RM0)	12J3063
2	Front Bezel Cap (Models TH0, TM0)	12J7041
3	Status Cover Lens (Models TH0, TM0, RH0, RM0)	12J7031
4	LED Card Assembly with Mounting Bracket (Models TH0, TM0, RH0, RM0)	93H6432
5	Keylock with Keys and Pawl (Models TH0, TM0)	01K6641
6	LED Light Guide with Icons (Models TH0, TM0, RH0, RM0)	12J7033
7	Vacuum Florescent Display Panel (Models TH0, TM0, RH0, RM0)	12J4633
8	Lock Linkage (Models TH0, TM0)	01K6636
9	Control Panel Card (Models TH0, TM0, RH0, RM0)	93H6052
10	Front Bezel without Door Assembly (Models TH0, TM0, RH0, RM0)	12J3064
11	DASD Backplane Board (Models TH0, TM0, RH0, RM0)	76H6880
12	DASD 6-Drive Cage Assembly (Models TH0, TM0, RH0, RM0)	03K8788
13	4 GB Hard File (Models TH0, TM0)	76H5817
13	9 GB Hard File (Models TH0, TM0)	76H5818
14	Hard File Tray (Slim) (Models TH0, TM0, RH0, RM0)	12J3276
14	Hard File Tray (Half High) (Models TH0, TM0, RH0, RM0)	12J3758
15	Hard File Drive Bezels (Models TH0, TM0, RH0, RM0)	12J3072
16	5.25-Inch Blank Bezels (Models TH0, TM0, RH0, RM0)	12J3073
17	8X-16X CD-ROM Drive (IDE) (Models TH0, TM0, RH0, RM0)	76H6105
17	8X-16X CD-ROM Drive (IDE) (Models TH0, TM0, RH0, RM0)	76H6107
18	1.44MB Diskette Drive (Models TH0, TM0, RH0, RM0)	76H4091
19	Door Hinge (Models TH0, TM0)	01K6637
20	Door Assembly (Models TH0, TM0)	01K6639
21	Media/Switch Panel Trim (Models TH0, TM0, RH0, RM0)	12J7036
23	Side Cover (Models TH0, TM0)	12J3281
24	Fan Assembly 120mm with Connector and Bracket (Models TH0, TM0, RH0, RM0)	12J3091
25	Memory and Processor Board Retaining Bracket (Models TH0, TM0, RH0, RM0)	12J3075
26	Memory DIMM Card (Models TH0, TM0, RH0, RM0)	93H4961

Index	System (Models RH0, RM0, TH0, TM0 - Type 8651)	FRU No.
27	512 KB Processor Card without Processor (Models TM0, RM0)	12J3480
27	1 MB Processor Card without Processor (Models TH0, RH0)	12J3352
28	I/O Card Retaining Bracket (Models TH0, TM0, RH0, RM0)	12J3076
29	Advanced Systems Management Adapter (Models TH0, TM0, RH0, RM0)	12J4743
30	Air Deflector Shield (Models TH0, TM0, RH0, RM0)	12J7030
31	Base Frame Assembly (Models TH0, TM0, RH0, RM0)	12J3062
32	Foot Fixed Caster (Models TH0, TM0)	12J3279
33	Side Access Cover (Models TH0, TM0, RH0, RM0)	12J7042
34	Foot Swivel Caster (Models TH0, TM0)	12J3283
35	Side Cover Bracket (Models TH0, TM0)	12J7040
36	Power Backplane Card (Models TH0, TM0, RH0, RM0)	93H6040
37	Power Backplane Cover (Models TH0, TM0, RH0, RM0)	12J3266
38	Blank Filler Panel (Models TH0, TM0, RH0, RM0)	12J3069
??	Thermal Upgrade Fan, connects to Fan 4 Connector on the System Baord (Models TH0, TM0, RH0, RM0)	01K6947
39	Power Supply Filler Plate (Models TH0, TM0, RH0, RM0)	12J3068
40	400 Watt Power Supply Assembly with Bracket (Models TH0, TM0, RH0, RM0)	76H6589
41	5-Volt Regulator Card with Bracket (Models TH0, TM0, RH0, RM0)	93H6046
42	AC Power Assembly (Models TH0, TM0, RH0, RM0)	12J3264
43	Central Electronics Complex (CEC) (Models TH0, TM0, RH0, RM0)	12J3070
44	Planar without Memory and Processor Card (Models TH0, TM0, RH0, RM0)	01K7075
44	Planar with 1 MB VRAM (Models TH0, TM0, RH0, RM0)	01K7267
45	Central Electronics Complex (CEC) Cable Retaining Bracket (Models TH0, TM0, RH0, RM0)	12J3285
	10 Amp AC Box (Models TH0, TM0, RH0, RM0)	03K8966
	64 MB ECC 3.3v Buffer DIMM (Models TH0, TM0, RH0, RM0)	12J3474
	128 MB ECC 3.3v Buffer DIMM (Models TH0, TM0, RH0, RM0)	12J3476
	256 MB ECC 3.3v Buffer DIMM (Models TH0, TM0, RH0, RM0)	12J3478

Index	System (Models RH0, RM0, TH0, TM0 - Type 8651)	FRU No.
	512 KB Heat Sink with Tape and Clip (Models TH0, TM0, RH0, RM0)	75H9661
	1 MB Heat Sink with Tape and Clip (Models TH0, TM0, RH0, RM0)	01K6950
	200MHz Processor with 512 KB Cache and Heat Sink (Models TM0, RM0)	76H4889
	200MHz Processor with 1 MB Cache and Heat Sink (Models TH0, RH0)	12J3846
	Advanced Systems Management Adapter Battery (Models TH0, TM0, RH0, RM0) See "Advanced Systems Management Adapter Battery" on page 66 .	33F8354
	CD-ROM 16/8 Bit SCSI Converter (Models TH0, TM0, RH0, RM0)	92F0324
	Control Card Bracket (Models TH0, TM0, RH0, RM0)	12J7032
	Decorative Rear Cover (Models TH0, TM0)	12J3282
	Diskette Tray (Models TH0, TM0, RH0, RM0)	12J3065
	EISA Card Guide (Models TH0, TM0, RH0, RM0)	12J3298
	Half High Drive Extender (Models TH0, TM0, RH0, RM0)	12J3286
	Hard File Fan (10K RPM Drives) (Models TH0, TM0, RH0, RM0)	01K6947
	Hard File Repeater Card (Models TH0, TM0, RH0, RM0)	12J3690
	I/O Shield (Models TH0, TM0, RH0, RM0)	12J5678
	Keyboard with Cable (Models TH0, TM0) See "Keyboards (101/102 Key)" on page 177 .	
	Line Cord Strain Relief Assembly (Models TH0, TM0, RH0, RM0)	01K6934
	Media Mounting Bracket (Models TH0, TM0, RH0, RM0)	12J5681
	Miscellaneous Parts Kit (Models TH0, TM0, RH0, RM0)	12J3079
	32X5/16-Inch Screws (6 each)	
	PL M3X8 Hex Screws (3 each)	
	FEM-Nut 4-40 Screws (2 each)	
	Floppy M3 Screws (2 each)	
	Hard File 6-32 Screws (2 each)	
	EMC Ground Contacts (4 each)	
	I/O Blank (1 each)	
	Planar Edge Support (1 each)	
	Power Switch Bracket (1 each)	
	EMC Contact (1 each)	

Index	System (Models RH0, RM0, TH0, TM0 - Type 8651)	FRU No.
	I/O Brackets (2 each)	
22	Side Cover Lock Hole Plug (1 each)	
	Mouse (Models TH0, TM0)	76H0889
	Power Cord (Models TH0, TM0, RH0, RM0) See"Power Cords" on page 178 .	
	PCI Card Guide (Models TH0, TM0, RH0, RM0)	12J3077
	SCSI Adapter (Models TH0, TM0, RH0, RM0)	76H3587

Rack Mounting FRUs (Models RH0, RM0 - Type 8651)
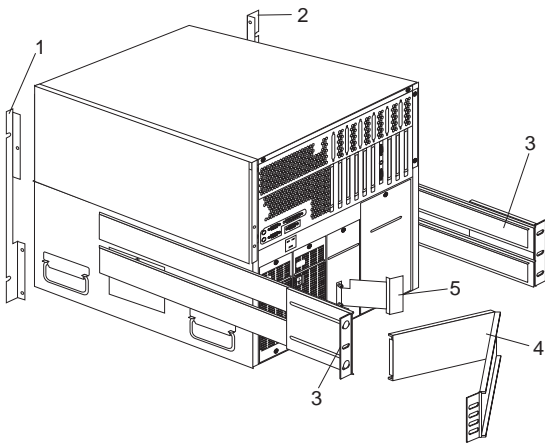
Index	Mounting (Rack Models RH0, RM0 - Type 8651)	FRU No.
1	Chassis Flange Right (Models RH0, RM0)	12J7038
2	Chassis Flange Left (Models RH0, RM0)	12J7039
3	Rack Slides (Models RH0, RM0)	12J3086
4	Cable Management Arm (Models RH0, RM0)	12J3088
5	Cable Management Arm Bracket (Models RH0, RM0)	12J3089
	Miscellaneous Rack Kit (Models RH0, RM0)	12J3090
	8/32-Inch Screws (21 each)	
	10X32X.5-Inch Screws (13 each)	
	10X32X1.0-Inch Screws (3 each)	
	8/32 Nuts (5 each)	
	#8 Lock-Washers (5 each)	
	10/32 Bar Nuts (5 each)	
	Floating Nuts (3 each)	
	Nut Bar (Models RH0, RM0)	01K6662

Cables

Cable	FRU No.
C2 Switch to Control Panel Cable (Models TH0, TM0)	12J3082
CD-ROM Cable (IDE) (Models TH0, TM0, RH0, RM0)	12J3272
Floppy and Control Panel Cable (Models TH0, TM0, RH0, RM0)	01K6454
Hard File Fan Cable (10K RPM Drives) (Models TH0, TM0, RH0, RM0)	01K6523
LED Card to Control Panel Cable (Models TH0, TM0, RH0, RM0)	12J7035
Power Backplane to all Bays Cable (Models TH0, TM0, RH0, RM0)	12J8384
Power Backplane to Control Card Cable (Models TH0, TM0, RH0, RM0)	12J7037
Power Backplane to Fans Cable (3X) (Models TH0, TM0, RH0, RM0)	12J3092
Power Backplane to Hard File Power Cable (Models TH0, TM0, RH0, RM0)	12J3270
Power Backplane to Planar Cable Assembly (Models TH0, TM0, RH0, RM0)	12J3268
Rear Cover C2 Cable (Models TH0, TM0)	01K6459
Service Processor 34P/26P Interface Cable (Models TH0, TM0, RH0, RM0)	12J3263
SCSI Adaptor to Bulkhead Cable (Models TH0, TM0, RH0, RM0)	12J3305
SCSI Hard File Fast/Wide Cable (1X) (Models TH0, TM0, RH0, RM0)	12J3274
SCSI Media Cable (4X) (Models TH0, TM0, RH0, RM0)	12J3275
SCSI Planar to Bulkhead Cable (Models TH0, TM0, RH0, RM0)	01K6458
SCSI to Hard File (2X) Cable (Models TH0, TM0, RH0, RM0)	12J3273

Keyboards (101/102 Key)

Keyboards (101/102 Key)	FRU No.
Arabic	1391490
Belgium-Dutch	1391414
Belgium-French	1391526
Bulgarian	1399583
Czechoslovakian	1399570
Danish	1391407
Dutch	1391511
Finnish	1391411
French	1391402
German	1391403
Greek	1399046
Hebrew	1391408
Hungarian	1399581
Iceland	1391495
Italy	1393395
Latvia	1391406
Norwegian	1391409
Polish	1399580
Portuguese	1391410
Romanian	1399582
Russian-Cyrillic	1399579
Serbian-Cyrillic	1399578
Slovak	1399571
Slovenia/Croatia/Bosnia	1393669
South Africa	1396790
Spanish	1391405
Swedish	1391411
Swiss-French	1391412
Swiss-German	1391412
Turkish 179	75H9538
Turkish 440	75H9539
U.K. English	1391406
U.S. English	76H0896
U.S. English (E/ME/A use only)	1396790

Power Cords

Power Cords	FRU No.
China (PRC)	01K9851
Japan	01K9853
Thailand	12J5120
Israel	12J5122
Bangladesh, Burma, India, Pakistan, South Africa, SriLanka	12J5124
Chile, Ethiopia, Italy, Libya, Somalia	12J5126
Argentina, Australia, New Zealand, Papua New Guinea, Paraguay, Uruguay, Western Samoa	12J5128
Antigua, Bahrain, Brunei, Channel Islands, Cyprus, Dubai, Fiji, Ghana, Hong Kong, Iraq, Ireland, Kenya, Kuwait, Malawi, Malaysia, Malta, Nepal, Nigeria, Polynesia, Qatar, Sierra Leone, Singapore, Tanzania, Uganda, United Kingdom, Yemen, Zambia	12J5987
Afghanistan, Algeria, Andorra, Angola, Austria, Belgium, Benin, Bulgaria, Burkina Faso, Burundi, Cameroon, Central African Rep., Chad, Czech Republic, Egypt, Finland, France, French Guiana, Germany, Greece, Guinea, Hungary, Iceland, Indonesia, Iran, Ivory Coast, Jordan, Lebanon, Luxembourg, Macau, Malagasy, Mali, Martinique, Mauritania, Mauritius, Monaco, Morocco, Mozambique, Netherlands, New Caledonia, Niger, Norway, Poland, Portugal, Romania, Senegal, Slovakia, Spain, Sudan, Sweden, Syria, Togo, Tunisia, Turkey, former USSR, Vietnam, former Yugoslavia, Zaire, Zimbabwe	55H6643
Denmark, Switzerland, Liechtenstein	55H6646
Bahamas, Barbados, Bermuda, Bolivia, Brazil, Canada, Cayman Islands, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Korea (South), Liberia, Mexico, Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Saudi Arabia, Suriname, Taiwan, Trinidad (West Indies), United States of America, Venezuela	76H4865

Related Service Information

> **Important**
>
> The service procedures are designed to help you isolate problems. They are written with the assumption that you have model-specific training on all computers, or that are familiar with the computers, functions, terminology, and service information provided in this supplement and the PS/2 Hardware Maintenance Manual (part number 83G8990, form number S52G-9971-02).

Safety Information

The following section contains the safety information that you need to be familiar with before servicing an IBM mobile computer.

General Safety

Follow these rules to ensure general safety:

Observe good housekeeping in the area of the machines during and after maintenance.

When lifting any heavy object:

1. Ensure you can stand safely without slipping.
2. Distribute the weight of the object equally between your feet.
3. Use a slow lifting force. Never move suddenly or twist when you attempt to lift.
4. Lift by standing or by pushing up with your leg muscles; this action removes the strain from the muscles in your back. *Do not attempt to lift any objects that weigh more than 16 kg (35 lb) or objects that you think are too heavy for you.*

Do not perform any action that causes hazards to the customer, or that makes the equipment unsafe.

Before you start the machine, ensure that other service representatives and the customer's personnel are not in a hazardous position.

Place removed covers and other parts in a safe place, away from all personnel, while you are servicing the machine.

Keep your tool case away from walk areas so that other people will not trip over it.

Do not wear loose clothing that can be trapped in the moving parts of a machine. Ensure that your sleeves are fastened or rolled up above your elbows. If your hair is long, fasten it.

Insert the ends of your necktie or scarf inside clothing or fasten it with a nonconductive clip, approximately 8 centimeters (3 inches) from the end.

Do not wear jewelry, chains, metal-frame eyeglasses, or metal fasteners for your clothing.

Remember: Metal objects are good electrical conductors.

Wear safety glasses when you are: hammering, drilling soldering, cutting wire, attaching springs, using solvents, or working in any other conditions that might be hazardous to your eyes.

After service, reinstall all safety shields, guards, labels, and ground wires. Replace any safety device that is worn or defective.

Reinstall all covers correctly before returning the machine to the customer.

Electrical Safety

⚠️

Caution

Electrical current from power, telephone, and communication cables can be hazardous. To avoid personal injury or equipment damage, disconnect the attached power cords, telecommunication systems, networks, and modems before you open the server covers, unless instructed otherwise in the installation and configuration procedures.

Observe the following rules when working on electrical equipment.

Important

Use only approved tools and test equipment. Some hand tools have handles covered with a soft material that does not insulate you when working with live electrical currents.

Many customers have, near their equipment, rubber floor mats that contain small conductive fibers to decrease electrostatic discharges. Do not use this type of mat to protect yourself from electrical shock.

- Find the room emergency power-off (EPO) switch, disconnecting switch, or electrical outlet. If an electrical accident occurs, you can then operate the switch or unplug the power cord quickly.
- Do not work alone under hazardous conditions or near equipment that has hazardous voltages.
- Disconnect all power before:
  - Performing a mechanical inspection
  - Working near power supplies
  - Removing or installing main units
- Before you start to work on the machine, unplug the power cord. If you cannot unplug it, ask the customer to power-off the wall box that supplies power to the machine and to lock the wall box in the off position.
- If you need to work on a machine that has *exposed* electrical circuits, observe the following precautions:
  - Ensure that another person, familiar with the power-off controls, is near you.

    Remember: Another person must be there to switch off the power, if necessary.
  - Use only one hand when working with powered-on electrical equipment; keep the other hand in your pocket or behind your back.

Remember: There must be a complete circuit to cause electrical shock. By observing the above rule, you may prevent a current from passing through your body.

– When using testers, set the controls correctly and use the approved probe leads and accessories for that tester.
– Stand on suitable rubber mats (obtained locally, if necessary) to insulate you from grounds such as metal floor strips and machine frames.

Observe the special safety precautions when you work with very high voltages; these instructions are in the safety sections of maintenance information. Use extreme care when measuring high voltages.
Regularly inspect and maintain your electrical hand tools for safe operational condition.
Do not use worn or broken tools and testers.
Never assume that power has been disconnected from a circuit. First, *check* that it has been powered-off.
Always look carefully for possible hazards in your work area. Examples of these hazards are moist floors, nongrounded power extension cables, power surges, and missing safety grounds.
Do not touch live electrical circuits with the reflective surface of a plastic dental mirror. The surface is conductive; such touching can cause personal injury and machine damage.
Do not service the following parts *with the power on* when they are removed from their normal operating places in a machine:

– Power supply units
– Pumps
– Blowers and fans
– Motor generators

and similar units. (This practice ensures correct grounding of the units.)
If an electrical accident occurs:

– **Use caution; do not become a victim yourself.**
– **Switch off power.**
– **Send another person to get medical aid.**

Safety Inspection Guide

The intent of this inspection guide is to assist you in identifying potentially unsafe conditions on these products. Each machine, as it was designed and built, had required safety items installed to protect users and service personnel from injury. This guide addresses only those items. However, good judgment should be used to identify potential safety hazards due to attachment of non-IBM features or options not covered by this inspection guide.

If any unsafe conditions are present, you must determine how serious the apparent hazard could be and whether you can continue without first correcting the problem.

Consider these conditions and the safety hazards they present:

Electrical hazards, especially primary power (primary voltage on the frame can cause serious or fatal electrical shock).

Explosive hazards, such as a damaged CRT face or bulging capacitor

Mechanical hazards, such as loose or missing hardware

The guide consists of a series of steps presented in a checklist. Begin the checks with the power off, and the power cord disconnected.

Checklist:

1. Check exterior covers for damage (loose, broken, or sharp edges).
2. Power-off the computer. Disconnect the power cord.
3. Check the power cord for:
   a. A third-wire ground connector in good condition. Use a meter to measure third-wire ground continuity for 0.1 ohm or less between the external ground pin and frame ground.
   b. The power cord should be the appropriate type as specified in the parts listings.
   c. Insulation must not be frayed or worn.
4. Remove the cover.
5. Check for any obvious non-IBM alterations. Use good judgment as to the safety of any non-IBM alterations.
6. Check inside the unit for any obvious unsafe conditions, such as metal filings, contamination, water or other liquids, or signs of fire or smoke damage.
7. Check for worn, frayed, or pinched cables.
8. Check that the power-supply cover fasteners (screws or rivets) have not been removed or tampered with.

Handling Electrostatic Discharge-Sensitive Devices

Any computer part containing transistors or integrated circuits (ICs) should be considered sensitive to electrostatic discharge (ESD). ESD damage can occur when there is a difference in charge between objects. Protect against ESD damage by equalizing the charge so that the machine, the part, the work mat, and the person handling the part are all at the same charge.

Notes:

1. Use product-specific ESD procedures when they exceed the requirements noted here.

2. Make sure that the ESD protective devices you use have been certified (ISO 9000) as fully effective.

When handling ESD-sensitive parts:

Keep the parts in protective packages until they are inserted into the product.
Avoid contact with other people.
Wear a grounded wrist strap against your skin to eliminate static on your body.
Prevent the part from touching your clothing. Most clothing is insulative and retains a charge even when you are wearing a wrist strap.
Use the black side of a grounded work mat to provide a static-free work surface. The mat is especially useful when handling ESD-sensitive devices.
Select a grounding system, such as those listed below, to provide protection that meets the specific service requirement.

Note: The use of a grounding system is desirable but not required to protect against ESD damage.

 – Attach the ESD ground clip to any frame ground, ground braid, or green-wire ground.
 – Use an ESD common ground or reference point when working on a double-insulated or battery-operated system. You can use coax or connector-outside shells on these systems.
 – Use the round ground-prong of the AC plug on AC-operated computers.

Grounding Requirements

Electrical grounding of the computer is required for operator safety and correct system function. Proper grounding of the electrical outlet can be verified by a certified electrician.

Battery Notice (Lithium)

Caution

The lithium battery can cause a fire, explosion, or severe burn. Do not recharge it, remove its polarized connector, disassemble it, heat it above 100°C (212°F), incinerate it, or expose its cell contents to water. Dispose of the battery as required by local ordinances or regulations. Use only the battery in the appropriate parts listing. Use of an incorrect battery can result in ignition or explosion of the battery.

A pilha de lítio representa risco de incêndio, explosão ou queimaduras graves. Não recarregue, desmonte ou exponha a pilha a temperaturas superiores a 100°C (212°F), não a incinere ou ponha o conteúdo da respectiva célula em contacto com a água nem remova o respectivo conector polarizado. Destrua a pilha de acordo com as normas ou regulamentações locais. Utilize apenas a pilha com o "part-number" indicado nas listas apropriadas. A utilização de uma pilha incorrecta pode resultar na igniçãou explosão da mesma.

锂电池可以引起火薯、爆炸、或严重烧伤。请不要把它再充电，拆除两极分化的连接物，拆散、加热超过 100°C (212°F)，梵化、或把电池内含物暴露于水中。根据本地的条例或规则把电池处理。电池只可以使用于名单适当的部件。不正确的使用电池可以导致电池燃烧或爆炸。

Elle présente des risques d'incendie, d'explosion ou de brûlures graves. Ne la rechargez pas, ne retirez pas son connecteur polarisé et ne la démontez pas. Ne l'exposez pas à une temperature supérieure à 100°C, ne la faites pas brûler et n'en exposez pas le contenu à l'eau. Mettez la pile au rebut conformément à la réglementation en vigueur. Une pile inappropriée risque de prendre feu ou d'exploser.

Caution Continued

Die Systembatterie ist eine Lithiumbatterie. Sie kann sich entzünden, explodieren oder schwere Verbrennungen hervorrufen. Batterien dieses Typs dürfen nicht aufgeladen, zerlegt, über 100 C erhitzt oder verbrannt werden. Auch darf ihr Inhalt nicht mit Wasser in Verbindung gebracht oder der zur richtigen Polung angebrachte Verbindungsstecker entfernt werden. Bei der Entsorgung die örtlichen Bestimmungen für Sondermüll beachten. Beim Ersetzen der Batterie nur Batterien des Typs verwenden, der in der Ersatzteilliste aufgeführt ist. Der Einsatz falscher Batterien kann zu Entzündung oder Explosion führen.

A l tium elemek tÔzet, robban st vagy komoly g si s rÔl seket okozhatnak. Nem szabad ÃjratÈlteni, polariz lt csatlakoz¢j b¢l elt vol tani, sz tszedni, 100°C (212°F) feletti hÑm rs kletre felhev teni, el getni, vagy az elem cell j nak tartalm t nedvess g hat s nak kitenni. Az elem megsemmis t s nek a helyi rendelkez sek s szab lyzatok alapj n kell tÈrt nnie. Csak a tartoz kok list j ban meghat rozott t pusÃ elemeket haszn lja. Nem megfelelÑ elem haszn lata eset n az elem felhevÔlhet s sz trobbanhat.

La batteria di supporto e una batteria al litio e puo incendiarsi, esplodere o procurare gravi ustioni. Evitare di ricaricarla, smontarne il connettore polarizzato, smontarla, riscaldarla ad una temperatura superiore ai 100 gradi centigradi, incendiarla o gettarla in acqua. Smaltirla secondo la normativa in vigore (DPR 915/82, successive disposizioni e disposizioni locali). L'impiego di una batteria non adatta potrebbe determinare l'incendio o l'esplosione della batteria stessa.

Литиевая батарея может вызвать пожар, взрыв или серьезный ожог. Не перезаряжайте ее, не снимайте полюсный разъем, не разбирайте ее, не нагревайте выше 100 градусов Цельсия, не поджигайте и не мочите.
Использованный блок батарей можно помещать в отходы только в соответствии с национальным законодательством или нормативами. При замене блока батарей разрешается использовать только батареи, указанные в списке комплектующих.
Использование несоответствующей батареи мо-жет привести к ее взрыву или загоранию.

Caution Continued

Li bat ria m e zaprÑ;iniÙ po iar, v»buch alebo Ùa k popÉleniny. Bat riu nanabÑjajte neodstranujte polarizovan konektory, nerozoberajte, nezohrievajte nad 100îC (212îF), nespopolnujte ju alebo nepokladajte ;lÉnky bat rie do vody. Zbavte sa bat rie pod´a po adovan»ch lokÉlnych predpisov a pravidiel. Pou ite iba v»robcom odporú;anú bat riu. Pou itie nevhodnej bat rie m - e zaprÑ;iniÙ vznietenie alebo v»buch bat rie.

La bateria de repuesto es una bateria de litio y puede provocar incendios, explosiones o quemaduras graves. No la recargue, ni quite el conector polarizado, ni la desmonte, ni caliente por encima de los 100°C (212°F), ni la incinere ni exponga el contenido de sus celdas al agua. Deséchela tal como dispone la normativa local.

Battery Notice (Nickel Cadmium)

!\[warning triangle\]

Caution

Some batteries contain nickel and cadmium. Do not disassemble it, recharge it, throw it into fire or water, or short-circuit it. Dispose of the battery as required by local ordinances or regulations. Use only the battery in the appropriate parts listing. Use of an incorrect battery can result in ignition or explosion of the battery.

Algumas pilhas contêm uma pequena quantidade de níquel e cádmio. Não desmonte, recarregue ou ponha a pilha em contacto com fogo ou água nem lhe provoque curto-circuitos. Destrua a pilha de acordo com as normas ou regulamentações locais. Utilize apenas a pilha com o "part-number" indicado nas listas apropriadas. A utilizaçãode uma pilha incorrecta pode resultar na ignição ou explosão da mesma.

Certaines batteries de secours contiennent du nickel et du cadmium. Ne les démontez pas, ne les rechargez pas, ne les exposez ni au feu ni à l'eau. Ne les mettez pas en court-circuit. Pour les mettre au rebut, conformez-vous à la réglementation en vigueur. Lorsque vous remplacez la pile de sauvegarde ou celle de l'horloge temps réel, veillez à n'utiliser que les modèles cités dans la liste de pièces détachées adéquate. Une batterie ou une pile inappropriée risque de prendre feu ou d'exploser.

Die Bereitschaftsbatterie, die sich unter dem Diskettenlaufwerk befindet, kann geringe Mengen Nickel und Cadmium enthalten. Sie darf nur durch die Verkaufsstelle oder den IBM Kundendienst ausgetauscht werden. Sie darf nicht zerlegt, wiederaufgeladen, kurzgeschlossen, oder Feuer oder Wasser ausgesetzt werden. Die Batterie kann schwere Verbrennungen oder Verätzungen verursachen. Bei der Entsorgung die örtlichen Bestimmungen für Sondermüll beachten. Beim Ersetzen der Bereitschafts- oder Systembatterie nur Batterien des Typs verwenden, der in der Ersatzteilliste aufgeführt ist. Der Einsatz falscher Batterien kann zu Entzündung oder Explosion führen.

Az elemek egyes fajt i kis mennyis g¡ nikkelt s
kadmiumot tartalmaznak. Nem szabad sz tszedni,
ÃjratÈlteni, t¡zbe vagy v zbe dobni illetve rÈvidre z rni.
Az elem megsemmis t s nek a helyi rendelkez sek s
szab lyzatok alapj n kell tÈrt nnie. Csak a tartoz kok
list j ban meghat rozott t pusÃ elemeket haszn lja.
Nem megfelelÑ elem haszn lata eset n az elem
felhevÔlhet s sz trobbanhat.

Alcune batterie di riserva contengono una piccola
quantità di nichel e cadmio. Non smontarle, ricaricarle,
gettarle nel fuoco o nell'acqua né cortocircuitarle.
Smaltirle secondo la normativa in vigore (DPR 915/82,
successive disposizioni e disposizioni locali). Quando
si sostituisce la batteria dell'RTC (real time clock) o la
batteria di supporto, utilizzare soltanto i tipi inseriti
nell'appropriato Catalogo parti. L'impiego di una
batteria non adatta potrebbe determinare l'incendio o
l'esplosione della batteria stessa.

Niektor bat rie majú mal mno stvo niklu (Ni) a kadmia
(Cd). Bat riu nerozoberajte, nenabÑjajte, neukladajte
do ohña alebo vody a neskratujte ju.Zbavte sa bat rie
pod´a po adovan»ch lokÉlnych predpisov a pravidiel.
Pou ite iba v»robcom odporú;anú bat riu. Pou itie
nevhodnej bat rie m - e zaprÑ;iniÙ vznietenie alebo
v»buch bat rie.

Algunas baterías de reserva contienen una pequeña
cantidad de níquel y cadmio. No las desmonte, ni
recargue, ni las eche al fuego o al agua ni las
cortocircuite. Deséchelas tal como dispone la
normativa local. Utilice sólo baterías que se
encuentren en la lista de piezas. La utilización de una
batería no apropiada puede provocar la ignición o
explosión de la misma.

Laser compliance statement

Some IBM Personal Computer models are equipped from the factory with a CD-ROM drive. CD-ROM drives are also sold separately as options. The CD-ROM drive is a laser product. The CD-ROM drive is certified in the U.S. to conform to the requirements of the Department of Health and Human Services 21 Code of Federal Regulations (DHHS 21 CFR) Subchapter J for Class 1 laser products. Elsewhere, the drive is certified to conform to the requirements of the International Electrotechnical Commission (IEC) 825 and CENELEC EN 60 825 for Class 1 laser products.

When a CD-ROM drive is installed, note the following.

CAUTION:

Use of controls or adjustments or performance of procedures other than those specified herein might result in hazardous radiation exposure.

O uso de controles, ajustes ou desempenho de procedimentos diferentes daqueles aqui especificados pode resultar em perigosa exposição à radiação.

凡未在这里指明的任何控制用法、调整、行为，

都会导致严重后果。

Pour éviter tout risque d'exposition au rayon laser, respectez les consignes de réglage et d'utilisation des commandes, ainsi que les procédures décrites.

Werden Steuer- und Einstellelemente anders als hier festgesetzt verwendet, kann gefährliche Laserstrahlung auftreten.

Az itt előírt eljárásoktól, beállításoktól és vezérlésektől eltérni a lézersugárzás veszélye miatt kockázatos !

L'utilizzo di controlli, regolazioni o l'esecuzione di procedure diverse da quelle specificate possono provocare l'esposizione a

Использование элементов настройки и выполнение процедур иных, чем указано здесь, может привести к опасному радиационному облучению.

Použitie kontrôl, úprav alebo iných vykonaní od iných výrobcov, ako je v tomto špecifikované, mohlo by mať za následok nebezpečenstvo vystavenia sa vyžiarovaniu.

El uso de controles o ajustes o la ejecución de procedimientos distintos de los aquí especificados puede provocar la exposición a radiaciones peligrosas.

Opening the CD-ROM drive could result in exposure to hazardous laser radiation. There are no serviceable parts inside the CD-ROM drive. **Do not open.**

Some CD-ROM drives contain an embedded Class 3A or Class 3B laser diode. Note the following.

DANGER:

Laser radiation when open. Do not stare into the beam, do not view directly with optical instruments, and avoid direct exposure to the beam.

Radiação por raio laser ao abrir. Não olhe fixo no feixe de luz, não olhe diretamente por meio de instrumentos óticos e evite exposição direta com o feixe de luz.

开启时会有激光发射时，请勿盯视激光光束，请勿直接查看视觉仪器，并且避免直接接触在激光光束之中。

Rayonnement laser si carter ouvert. Évitez de fixer le faisceau, de le regarder directement avec des instruments optiques, ou de vous exposer au rayon.

Laserstrahlung bei geöffnetem Gerät. Nicht direkt oder über optische Instrumente in den Laserstrahl sehen und den Strahlungsbereich meiden.

Kinyitáskor lézersugár ! Ne nézzen bele se szabad szemmel, se optikai eszközökkel. Kerülje a sugárnyalábbal való érintkezést !

Aprendo l'unità vengono emesse radiazioni laser. Non fissare il fascio, non guardarlo direttamente con strumenti ottici e evitare l'esposizione diretta al fascio.

Открывая, берегитесь лазерного излучения. Не смотрите на луч, не разглядывайте его с помощью оптических инструментов, а также избегайте прямого воздействия лазерного луча.

Keď je laserová jednotka otvorená. Vyhnite sa priamemu pohľadu a nehľadte priamo s optickými nástrojmi do lúča a vyhnite sa priamemu vystaveniu lúčov.

Radiación láser al abrir. No mire fijamente ni examine con instrumental óptico el haz de luz. Evite la exposición directa al haz.

Send Us Your Comments!

We want to know your opinion about this manual (part number 84H7201). Your input will help us to improve our publications.

Please photocopy this survey, complete it, and then fax it to **IBM HMM Survey** at **919-543-8167 (USA)**.

Name _____

Phone Number _____

1. Do you like this manual?
   Yes   No

2. What would you like to see added, changed, or deleted in this manual?

3. What is your service experience level?
   Less than five years
   More than five years

4. Which Servers do you service most?

Thanks in advance for your response!

Problem Determination Tips

Due to the variety of hardware and software combinations that can be encountered, use the following information to assist you in problem determination. If possible, have this information available when requesting assistance from Service Support and Engineering functions.

Machine type and model
Processor or hard disk upgrades
Failure symptom
  – Do diagnostics fail?
  – What, when, where, single, or multiple systems?
  – Is the failure repeatable?
  – Has this configuration ever worked?
  – If it has been working, what changes were made prior to it failing?
  – Is this the original reported failure?
Reference/Diagnostics Diskette Version
  – Type and version level
Hardware configuration
  – Print (print screen) configuration currently in use
  – BIOS level
Operating system software
  – Type and version level

Important

To eliminate confusion, identical systems are considered *identical* only if they:

1. Are the exact machine type and models
2. Have the same BIOS level
3. Have the same adapters/attachments in the same locations
4. Have the same address jumpers/terminators/cabling
5. Have the same software versions and levels
6. Have the same Reference/Diagnostics Diskette (version)
7. Have the same configuration options set in the system
8. Have the same setup for the operation system control files

Comparing the configuration and software set-up between "working and non-working" systems will often lead to problem resolution.

Phone Numbers, U.S. and Canada

> **Note**
>
> EMEA customers should contact their Dealer or IBM Service organization.

Before you place a call to the Support Center, refer to "Problem Determination Tips" on page 193.

Authorized Dealers or Servicers

Number	Information
919-517-0001	Bulletin Board Service - PC Company
800-528-7705	Bulletin Board Service - TSS Only
800-937-3737	IBM Business Partner Education
800-426-2472	IBM Customer Engineer Technical Support
800-IBM-DEAL	IBM Dealer Support Center
800-342-6672	IBM Direct Desktop Software Sales
303-924-4015	IBM Part Number ID and Look Up
800-426-7763	IBM PC HelpCenter
800-237-5511	IBM Software Defect Support (CSDs)
800-327-5711	IBM Software Ordering (Publications)
800-426-1484	IBM Supplies Technical Hotline
800-388-7080	IBM Warranty Parts Claims Center

U.S. Customers and Helpware Subscribers

Number	Information
919-517-0001	Bulletin Board Service - PC Company
800-426-8322	Customer Education Business Unit
800-999-0052	Customized Operational Services
800-237-4824	EduQuest (Educational Computers)
800-964-8523	End User HelpDesk Support
800-742-2493	IBM Anti-Virus Services
800-447-4700	IBM Authorized Dealer Referrals
800-426-2468	IBM Dealer Referral
800-426-3333	IBM Information Referral Service
800-IBM-SERV	IBM Service
800-772-2227	IBM PC HelpCenter and HelpDesk
800-426-7282	IBM Technical Manuals
800-426-9402 (Ext. 150)	Multimedia Information Center
800-241-1620	Multimedia HelpCenter
800-342-6672	OS/2 Information Line
800-237-5511	OS/2 Support Services
800-284-5933	Prodigy
914-962-0310	Prodigy User Questions
800-547-1283	Technical Coordinator Program SystemXtra for Personal Systems LAN Automated Distribution/2 OS/2 Bulletin Board OS/2 Application Assistance Center
800-551-2832	Technical Solutions Magazine

IBM Canada Customer and Servicer Support

Number	Information
800-661-PSMT	Business Partner Marketing Support
905-316-5556	Business Partner Marketing Support - Toronto
514-938-6048	Business Partner Marketing Support - French
800-465-4YOU	Customer Relations
800-IBM-SERV	Customer Service Dispatch
800-263-2769	Customer Service Parts
800-465-2222	Customer Support Center (ISC)
416-443-5701	Customer Service Repair Centre
800-505-1855	Dealer Support Group (DSG)
800-465-7999	HelpClub Registration / IBM Direct
800-465-3299	HelpFax
905-316-3299	HelpFax - Toronto
800-565-3344	HelpPC
905-513-3355	IBM Certification Administrator Mail to: 50 Acadia Drive Markham, Ontario L3R 0B3
800-661-2131	IBM Education (A+ Course)
800-268-3100	IBM Information Network Support
800-387-8343	IBM PC Service Partners
800-487-7426	International Warranty Registration
800-663-7662	Lexmark Product Information
800-IBM-9990	PartnerLine
800-263-2769	Parts Orders, Exchange or Emergency
416-443-5808 (Fax)	Parts Regular Orders, Exchange
416-443-5755	Parts Orders, Inquiries
514-938-3022	PC Co Bulletin Board - Montreal
905-316-4255	PC Co Bulletin Board - Markham
604-664-6464	PC Co Bulletin Board - Vancouver
204-934-2735	PC Co Bulletin Board - Winnepeg
800-661-7768	PS Marketing Support (PSMT)
800-565-3344	PS/1 Warranty Customer Helpline
800-387-8483	PS/1 Warranty Service (DOAs)
800-465-1234	Publications Ordering
905-316-4148	Service Management Support
905-316-4100 (Fax)	Service Management Support
905-316-4150	Service (Warranty) Manager
905-316-4100 (Fax)	Service (Warranty) Manager
905-316-4872	Service Quality Programs
905-316-4100 (Fax)	Service Quality Programs
800-661-2131	Skill Dynamics (Education)
800-565-3344	ThinkPad EasyServe
416-443-5835 (Fax)	Warranty Claim Fulfillment
905-316-2445	Warranty Claim Reimbursement
905-316-3515 (Fax)	Warranty Claim Reimbursement
416-443-5778	Warranty Claim Parts Inquiry
800-505-1855	Warranty Provider Support Hotline
800-267-7472	Warranty Service, ThinkPad

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