Hardware Maintenance Manual

xSeries 380

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Note:

Before using this information and the product it supports, be sure to read the general information under “Notices” on page 310.

First Edition (July 2001)

About this manual

This manual contains diagnostic information, a Symptom-to-FRU index, service information, error codes, error messages, and configuration information for the IBM® @server xSeries 380.

Important: This manual is intended for trained servicers who are familiar with IBM PC Server products. Before servicing an IBM product, review "Safety information" on page 257.

Important safety information

Before installing this product, read the Safety Information book.

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Antes de instalar este produto, leia o Manual de Informações sobre Segurança.

安装本产品前请先阅读《安全信息》手册。

Prije instalacije ovog proizvoda pročitajte priručnik sa sigurnosnim uputama.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs hæftet med sikkerhedsforskrifter, før du installerer dette produkt.

Lue Safety Information -kirjanen, ennen kuin asennat tämän tuotteen.

Avant de procéder à l'installation de ce produit, lisez le manuel Safety Information.

Vor Beginn der Installation die Broschüre mit Sicherheitshinweisen lesen.

Πριν εγκαταστήσετε αυτό το προϊόν, διαβάστε το εγχειρίδιο Safety Information.

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

Przed zainstalowaniem tego produktu należy przeczytać broszurę Informacje Dotyczące Bezpieczeństwa.

Prima di installare questo prodotto, leggere l'opuscolo contenente le informazioni sulla sicurezza.

本製品を導入する前に、安全情報資料を御読みください。

이 제품을 설치하기 전에, 안전 정보 책자를 읽어보십시오.

Пред да го инсталирате овој производ прочитајте ја книгата со безбедносни информации.

Lees voordat u dit product installeert eerst het boekje met veiligheidsvoorschriften.

Les heftet om sikkerhetsinformasjon (Safety Information) før du installerer dette produktet.

Antes de instalar este produto, leia o folheto Informações sobre Segurança.

Перед установкой продукта прочтите брошюру по технике безопасности (Safety Information).

Pred inštaláciou tohto produktu si pre ítajte Informa nú brožúrku o

Preden namestite ta izdelek, preberite knjižico Varnostne informacije.

Antes de instalar este producto, lea la Información de Seguridad.

Läs säkerhetsinformationen innan du installerar den här produkten.

在安裝本產品之前，也請先閱讀「安全性資訊」小冊子。

Installálás el tt olvassa el a Biztonsági el írások kézikönyvét !

Online support

Use the World Wide Web (WWW) to download Diagnostic, BIOS Flash, and Device Driver files.

File download address is:

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

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.pc.ibm.com/support/index.html

The IBM PC Company Home Page is:

http://www.pc.ibm.com

Contents

General checkout

The server diagnostic programs are stored on an LS120 diskette. These programs are the primary method of testing the major components of the server: The system board, Ethernet controller, video controller, RAM, keyboard, mouse (pointing device), diskette drive, serial ports, hard drives, and parallel port. You can also use them to test some external devices. See "Diagnostics" on page 15.

Also, if you cannot determine whether a problem is caused by the hardware or by the software, you can run the diagnostic programs to confirm that the hardware is working properly.

When you run the diagnostic programs, a single problem might cause several error messages. When this occurs, work to correct the cause of the first error message. After the cause of the first error message is corrected, the other error messages might not occur the next time you run the test.

Notes:

1. If multiple error codes are displayed, diagnose the first error code displayed.
2. If the computer hangs during POST, note any LED indicators and front panel display messages, and:
   a. Check all cable connections.
   b. Reseat:
      1) Adapters
      2) Processor(s)
      3) Power pods
      4) D2Ds
      5) Boards
   c. Escalate following normal procedures.
3. If system does not power on:
   a. Check power cords
   b. Check power supply LEDs
   c. Reseat all boards and D2Ds.
   d. Check front panel cable connections.
4. For safety information, see "Safety information" on page 257.
5. For intermittent problems:
   a. Check the system event log; see "Using the SEL Viewer utility" on page 100.
   b. Run diagnostics.

Checkout procedure

- Power-off the computer and all external devices.
- Check all cables and power cords.
- Power-on all external devices.
- Power-on the computer.

- Record any POST error messages displayed on the screen and front panel display messages.
- Check the system event log (see “Using the SEL Viewer utility” on page 100). If an error was recorded by the system, see “Symptom-to-FRU index” on page 227.
- Start the Diagnostic Programs. See “Diagnostics” on page 15.

If you receive an error, go to “Symptom-to-FRU index” on page 227.

If the diagnostics does not detect an error and you still suspect a problem:

1. Check all cable connections.
2. Reseat:
   a. Adapters
   b. Processor(s)
   c. Power pods
   d. D2Ds
   e. Boards
3. Escalate following normal procedures.

General information

The IBM xSeries 380 server is a high-performance, four way symmetric multiprocessing (SMP) server that is ideally suited for 64-bit application development environments.

Features and specifications

The following table provide a summary of the features and specifications for the xSeries 380 server.

Table 1. Features and specifications.

Processor:

- Intel® Itanium® processor
- 2 MB[1] (733MHz) or 4 MB (800MHz) of level-3 cache
- 133 MHz front-side bus (FSB)
- Support for up to four processors

Memory:

- Standard: 1 GB[1] (4-256MB DIMMS)
- Maximum: 64 GB (64 1GB DIMMS)
- Type: PC100 version 1.2 buffered, ECC, SDRAM
- Slots: 64 dual in-line

Drives standard:

- Diskette: IDE 120 MB (LS120)
- CD-ROM: IDE
- Hard disk drives: Two 36 GB hot-swap low voltage differential SCSI (LVDS) drives installed

PCI expansion slots:

- Eight hot-swap 66 MHz 64-bit[2]
- Two non-hot-swap 33 MHz 64-bit located in restricted area (unsupported)

Environment:

- Air temperature:
  - — 5° to 35°C (50° to 95°F)
- Heat output:
  - — Approximate heat output in British thermal units (BTU) per hour: 6174 BTU/hr

Hot-swap power supplies

- Four 800 Watt (110-208 V ac)

Video:

- ATI RAGE controller
- Compatible with SVGA and VGA
- 8 MB[1] video memory

Size:

- Height: 31.12 cm (12.25 inches, 7u)
- Depth: 44.45 cm (17.5 inches)
- Width: 71.12 cm (28.0 inches)
- Weight: 68.1 kg (150 lbs) depending on configuration of ATI RAGE controller

Redundant cooling:

- Six hot-swap fan assemblies
  - — Four 172 mm fans
  - — Two 120 mm fans

Installation requirements:

- Front clearance: 7.62 cm (3 in.)
- Rear clearance: 20.32 cm (8 in.)

Integrated functions:

- Ultra3 low voltage directive SCSI (LVDS) controller
- Integrated service processor
- Video port
- Mouse port
- Keyboard
- Parallel port
- Two serial ports
- Two Universal Serial Bus (USB) ports
- System controls and indicators
- Basic Input/Output System (BIOS), Power on Self Test (POST), and Setup Utility stored in a flash memory device.

[1] KB equals approximately 1000 bytes. MB equals approximately 1000000 bytes. GB equals approximately 1000000000 bytes.

[2] To determine if an adapter is supported for Hot Plug operation on the x Series 380, please visit http://www.pc.ibm.com/us/compat/hotplug/index.shtml for devices validated by IBM, or check with your hardware adapter vendor for information and support.

Notices used in this book

The Caution and Danger notices also appear in the multilingual safety information book, provided on the *IBM® xSeries Documentation CD*. Each notice is numbered for easy reference to the corresponding notices in the safety booklet.

The notice definitions are as follows:

- **Notes:** These notices provide important tips, guidance, or advice.
- **Important:** These notices provide information or advice that might help you avoid inconvenient or problem situations.
- **Attention:** These notices indicate possible damage to programs, devices, or data. An attention notice is placed just before the instruction or situation in which damage could occur.
- **Caution:** These notices indicate situations that can be potentially hazardous to you. A caution notice is placed just before the description of potentially hazardous procedure step or situation.
- **Danger:** These notices indicate situations that can be potentially lethal or extremely hazardous to you. A danger notice is placed just before the description of potentially lethal or extremely hazardous procedure step or situation.

What the xSeries 380 offers

The unique design of the xSeries 380 server combines the following features:

- Multiprocessor performance

  The system supports one to four Itanium processors with 2 MB (733MHz) or 4 MB (800MHz) of level-3 cache.

- Large system memory

  Memory resides on two memory boards. Each memory board contains slots for 32 DIMMs. The memory controller supports PC 100-registered Version 1.2 Buffered SDRAM DIMMs. DIMM sizes supported are 256 MB, 512 MB, and 1 GB. Each memory board can support from 1GB to 32 GB. The xSeries 380 server can support up to 64 GB of system memory.

- System-management capabilities

  Three controllers provide the system-management capabilities of your server: the Baseboard Management Controller (BMC), Chassis Bridge Controller (CBC), and the Hot-Swap Controller (HSC).

  By using the Firmware Update utility the three controllers are field upgradeable.

  The BMC monitors for system platform management events and logs their occurrence in the System Event Log (SEL). System platform management events include over-temperature and over-voltage conditions as well as fan failures

  The HSC implements the SAF-TE command set, controls the fault lights, and provides a path for management information from the SCSI interface. It retrieves drive fault status, backplane temperature, and fan failure information from the Intelligent Platform Management Bus (IPMB). Then queries the status of the power distribution board from the BMC, and controls drive power-on and power-down, to facilitate hot-swapping PCI adapters, fans, and hard disk drives.

  The CBC serves as a bridge between the internal Intelligent Platform Management Bus (IPMB) and the external Intelligent Chassis Management Bus Controller (ICMBC). The internal IPMB transports management information within a system, and the external ICMBC transports server management information between various chassis in a server(s) and peripherals cluster configuration.

Reliability, availability, and serviceability features

Three of the most important considerations in server design are reliability, availability, and serviceability (RAS). The RAS features help you to ensure the integrity of the data that is stored on your server, the availability of the server when you need it, and the ease with which you can diagnose and repair problems.

The following is an abbreviated list of the RAS features that the server supports:

- Power-on self-test (POST)
- Automatic restart after a power failure
- Brownout protection
- Dual hot-swap LVDS SCSI hard disk drives
- Error checking and correcting (ECC) memory
- Error codes and messages
- Menu driven setup, system configuration and diagnostic programs

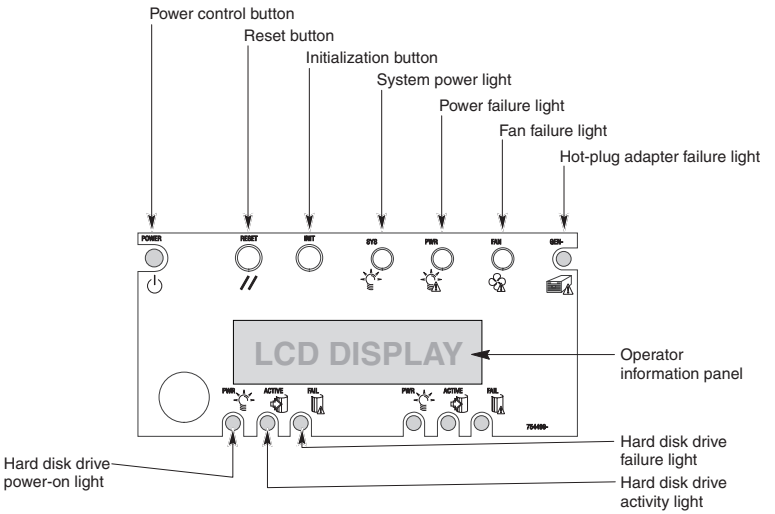
- System-management capabilities
- Predictive failure alerts (available with installation of Intel Server Control (ISC) utility)
- Redundant and hot-swap fans
- Diagnostic LEDs
- Redundant and hot-swap power supplies

Controls and indicators

The following section identifies the controls and indicators on the front and rear of your server.

Note: The illustrations in this document might differ slightly from your hardware.

Front view



CD eject/load button:
Press this button to eject or retract the CD tray so that you can insert or remove a CD.

CD activity light:
When this light is on, the CD drive is being accessed.

Front panel:
The front panel contains status lights.

Diskette drive activity light:
When this light is on, the diskette drive is being accessed.

Diskette eject button:
Press this button to eject a diskette from the drive.

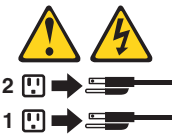
Power control button:
Press this button to manually turn the server on or off.

Note: Powering down the server with the Power button does not remove all power from the system. The +12 Volt standby power is still available to the system even when it has been powered down. To remove standby power from the system you must unplug both power cables from the chassis.

Statement 5

CAUTION:

The power control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.



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

Initialization button:
Press this button to cause the system to perform a crash dump, provided the operating system supports copying or moving of the register information.

System power light:
When this light is on, power is present in the server. When this light is off, it indicates power is turned off or the power source is disrupted.

Power failure light:
When lit continuously, this LED indicates a catastrophic power failure. When blinking, it indicates a non-catastrophic power failure.

Fan failure light:
When this light is flashing, it indicates a fan has failed.

Hot-swap adapter failure light:
When this light is on, it indicates a hot-plug adapter has failed.

Operator information panel:
System monitor information appears on this display.

Hard disk drive failure light:
When this light is on, a hard disk drive has failed. When flashing, this light indicates a drive reset is in progress.

Hard disk drive activity light:
When this light is on, the server is accessing the hard disk drive.

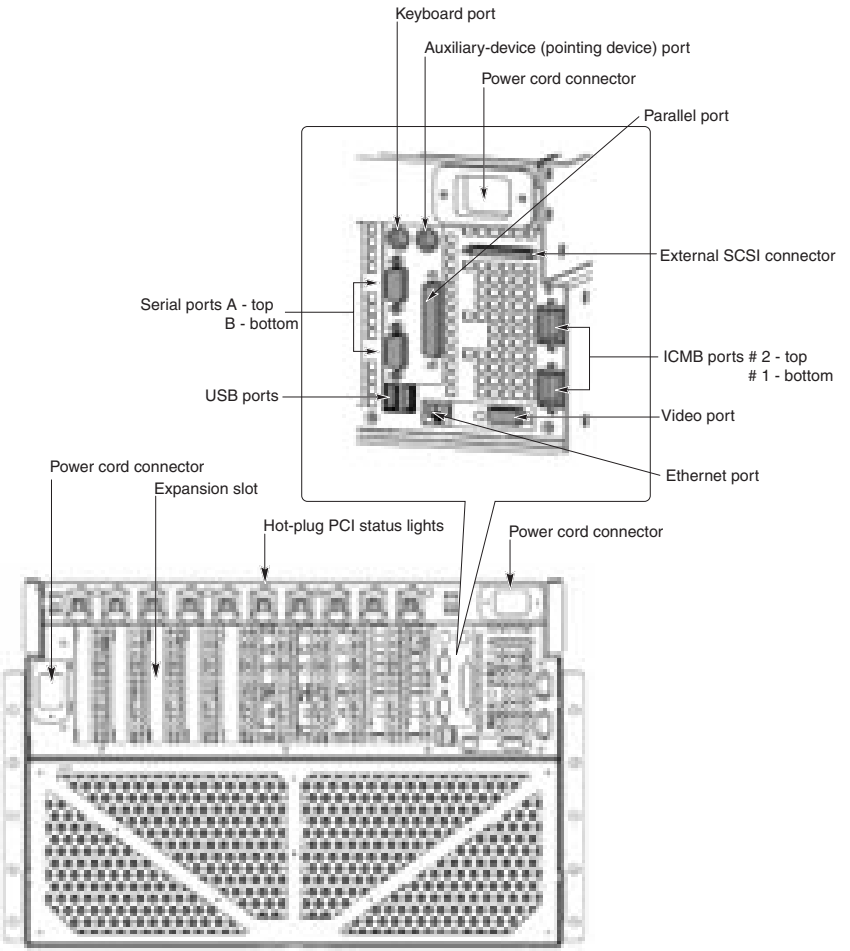
Hard disk drive power-on light:
When this light is on, power is present to the hard disk drive.

Power supply activity light:
When this light is on, the power supply is functioning properly. When this light is blinking, the power supply is in standby mode.

Power supply predictive failure light:
When this light is blinking, the power supply is about to fail.

Power supply failure light:
When this light is on, the power supply has failed. When this light is blinking, the power supply has reached its current limit of power output.

Rear view


Keyboard port
Auxiliary-device (pointing device) port
Power cord connector
Parallel port
External SCSI connector
Serial ports A - top
B - bottom
ICMB ports # 2 - top
1 - bottom
USB ports
Video port
Ethernet port
Power cord connector
Expansion slot
Hot-plug PCI status lights
Power cord connector

Power cable connector:
Connector used to connect one of the two power cables to the server.

Expansion slots:
Expansion slots for PCI adapters.

Hot-swap PCI status lights:
These lights display the status of the PCI adapter installed in the expansion slot.

Keyboard port:
This port connects the keyboard to the server.

Auxiliary-device (pointing device) port:
Used to connect a mouse or pointing device to the server.

Parallel port:
Used to connect parallel devices to the server.

External SCSI connector:
Used to connect external SCSI devices to the server.

ICMB ports:
Used to connect Intelligent Chassis Management Bus, and external bus for passing management information between servers.

Video port:
Used to connect a monitor to the server.

USB ports:
Universal Serial Bus

Ethernet port:
Used to connect the server to Ethernet network.

Serial ports:
Used to connect modems or other serial devices to the server.

Starting the server

This section provides instructions on how to start your sever for the first time, starting the server after shutting it off and how to shut off the server.

Turning on the server for the first time

Starting the server for the first time refers to the act of plugging the power cables of the server into the power source and configuring the system before installing and starting the operating system.

Note: Both cables must be connected from the rear of the server to the power source. There is no redundancy on power cables for the xSeries 380 server. These cables connect to a Power Distribution Unit, which in turn connects to the power source. Optional cords are available to connect the server directly to the power source.

The first time you start the server you will need to enter the BIOS Setup Utility, set the correct date and time, then let the server run its Power On Self Test (POST) and pass control to the Boot Manager. For more information refer to "The Extensible Firmware Interface (EFI) Boot Manager" on page 86.

Complete the following steps to start your server for the first time:

1. Make sure all external devices, such as the monitor, keyboard, and mouse are connected.

2. Remove the drive protection card from the LS120 disk drive.
3. Plug the two power cables into the rear of the server.
4. Plug the opposite end of the two power cables that come with the server into a Power Distribution Unit (PDU) (IBM part number 37L6884, 37L6883, or 37L6886, depending on power source), OR use the optional power cords (see "Power cords" on page 254) to plug the server directly into the power source.
5. Turn on the monitor.
6. Press the power button on the front of the server.
7. Open the CD-ROM drive drawer.
8. Insert the operating systems bootable CD.
9. Let the server complete the boot process, then refer to the documentation that came with your operating system for instructions on how to complete the installation.

Turning the server on

This section provides information about how to turn the server on again after the initial start up has been completed.

Complete the following steps to turn on the server:

1. Verify that the power cord(s) or cable(s) are plugged into either the PDU or the appropriate wall outlet.
2. Turn on the monitor by pressing the monitor power button.
3. Press the power button located on the front panel of the server. See "Front view" on page 7 for the location of this button.

Attention: If the following message displays during POST, press Reset before continuing system startup:

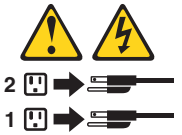
```
ERRORS FOUND IN MEMORY SUBSYSTEM, FAILING ROWS WILL BE MAPPED OUT ON THE
NEXT RESET.  IT IS STRONGLY SUGGESTED THAT YOU RESET THE SYSTEM NOW.

ALLOWING THE SYSTEM TO CONTINUE TO BOOT MAY RESULT IN UNSTABLE SYSTEM
BEHAVIOR AND/OR HARD DISK CORRUPTION.

Hit F1 to load defaults or F2 to run setup or ESC to continue.
```

Turning the server off

Statement 5

CAUTION:

The power control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.



Complete the following steps to turn off the server:

Note: Turning off the server refers to the act of disconnecting the server from the power source.

1. Refer to your operating system documentation for the proper procedure to shut down the operating system.

   Note: Each operating system is different. Some will allow an immediate shut down, while others require an orderly shutdown procedure.

2. Press and hold the power control button on the front of the server for several seconds. This will put the server in stand-by mode.

   Note: After you turn off the server, wait at least 5 seconds before you turn on the server again.

3. Disconnect the server from the power source.

Stand-by mode

Stand-by puts the server in a wait state. When in a wait state, the server is not running the operating system and all core logic is shut down except for the service processor.

Complete the following steps to put the server into the stand-by mode:

1. Refer to your operating system documentation for the proper procedure to shutdown the operating system.

   Note: Each operating system is different. Read all the documentation about shutting down the operating system before continuing.

2. Press the power control button on the front of the server.

Diagnostics

This section provides basic troubleshooting information to help you resolve some common problems that might occur with your server.

If you cannot locate and correct the problem using the information in this section, refer to the “Symptom-to-FRU index” on page 227.

Note: For optimum display update performance, it is recommended that Console Redirect be set to "disabled" before running diagnostics. For information on how to disable Console Redirect, see Table 8 on page 96.

Running diagnostic programs

To run the AMIDiagnostic program complete the following:

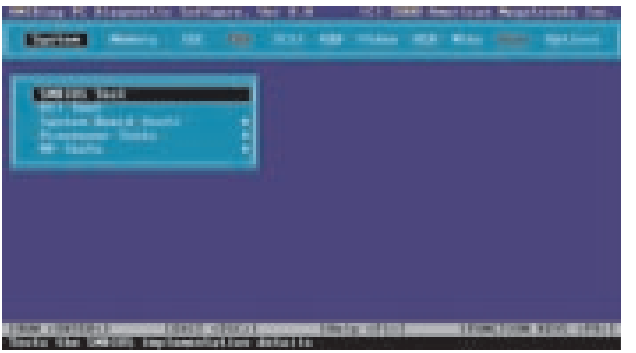
1. Insert the LS120 diskette containing the diagnostic program into the diskette drive.
2. Boot the system to the EFI shell.
3. Select fs0: as the default drive by typing

   `fs0:`

   and pressing Enter.
4. Start the diagnostic program by typing amidiag and pressing Enter.
5. Use the arrow keys to select the test.
6. Press Enter to run the test.

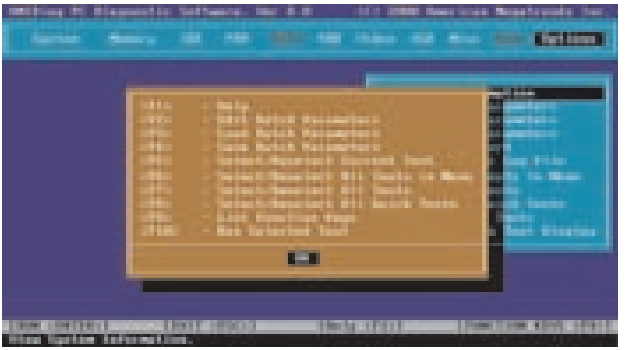
AMIDiag Menus

The AMIDiag main menu is shown below.



Select a menu options by pressing the ↑ or ↓ keys and pressing <Enter> when the menu is highlighted. Press the → or ← keys to display a different AMIDiag menu.

Using AMIDiag keys



Key	Description
<Esc>	Halts the current test if a test is running. Exits AMIDiag if no test is running.
<Enter>	Run the highlighted AMIDiag test.
F1	Displays Help screens.
F2	Edit batch parameters.
F3	Load batch parameters.
F4	Save batch parameters.
F5	Select or deselect the current test.
F6	Select or deselect the tests on a specific AMIDiag menu.
F7	Select or deselect all AMIDiag tests.
F8	Select or deselect all tests necessary to run a system quick test.
F9	Displays a list of the AMIDiag function keys.
F10	Run the selected test or tests.

Selecting AMIDiag tests

Processor Problems	
Make sure the computer has the proper CPU and it is operating properly.	Run the Basic Functionality test and the CPU Compatibility Test on the System menu.
Check the CPU speed.	Run the Processor speed test on the System menu.
Check the math coprocessor.	Run the Coprocessor test on the System menu.
Make sure the computer clock is running properly.	Run the Timer test and the Real Time Clock test on the System menu.

Processor Problems	
Make sure the system configuration is not corrupted.	Run the CMOS Validity test on the System menu.
Make sure the PCI adapter slots are functioning correctly.	Run the PCI system test on the System menu.

Memory Problems	
Random memory (or performance) problems occur but BIOS POST did not find any memory problems.	Run the Pattern test, the Random Pattern Test and the Cache Memory test on the Memory menu.
The BIOS finds memory errors or memory problems occur constantly.	Run the Walking 1s test on the Memory menu.
Intermittent cache memory problems.	Run the Cache Memory test on the Memory menu.
Identify and report data corruption because of hardware parity problems.	Run the Parity test on the Memory menu.
Identify shorts on data lines and data bits stuck at 0.	Run the Walking 0s test on the Memory menu.

Keyboard Problems	
Make sure the keyboard interface works.	Run the Keyboard Controller test on the Keyboard Menu.
Make sure each keyboard key sends the correct signal to the computer.	Run the Scan/ASCII Code test on the Keyboard Menu.
Make sure the keyboard LEDs work.	Run the Keyboard LED test on the Keyboard Menu.

SCSI Drive Problems	
Make sure that the SCSI drive is reading correctly.	Run the SCSI Disk Read test on the SCSI menu.
Make sure that the SCSI drive is writing correctly.	Run the SCSI Disk Write test on the SCSI menu.
Make sure that the SCSI tape drive is reading correctly.	Run the SCSI Tape Read test on the SCSI menu.
Make sure that the SCSI tape drive is writing correctly.	Run the SCSI Tape Write test on the SCSI menu.
Rewind the tape cartridge in the SCSI tape drive.	Run the SCSI Tape Rewind test on the SCSI menu.

CD-ROM Drive Problems	
Make sure that the CD-ROM drive is reading correctly.	If the computer has a SCSI CD-ROM drive, run the SCSI CD-ROM Read test on the SCSI menu. If the computer has an ATAPI or IDE CD-ROM drive, run the CD Data test on the IDE menu.
To test the CD-ROM drive tray,	Choose the CD Tray Test on the IDE or SCSI group menu.
Make sure that the CD-ROM can play audio CDs correctly.	If the computer has a SCSI CD-ROM drive, choose the SCSI CD-ROM Play test on the SCSI menu. If the computer has an ATAPI or IDE CD-ROM drive, choose the CD Audio Test on the IDE menu.

Video Problems	
Video display problems.	Run the Video Memory test on the Video menu.
Make sure the video display attributes (blinking, bold, and reverse video) memory are operating correctly.	Run the Attribute test on the Video menu.
Make sure text displays correctly.	Run the 40x25 and 80x25 Display tests on the Video menu.
Make sure graphics display correctly.	Make sure the correct video drivers are loaded. Run the Video 320x200, 640x200, 640x350, 640x480, and Color tests on the Video menu.
Make sure Super VGA graphics display correctly.	Run the VESA Video Mode and VESA Video Memory test on the Video menu.

Serial Port Problems	
A mouse attached to a serial port does not work. A device attached to a serial port does not work.	Run the Serial port test on the Misc. menu.

Parallel Port Problems	
A printer connected to the parallel port does not work.	Run the Parallel port test on the Misc. menu.

Running AMIDiag tests

To run this test or test group...	Do the following
Run all AMIDiag tests.	Press <F7>, then <F10>.
Run a complete overall system quick test .	Press <F8>, then <F10>.
Run all motherboard diagnostic tests.	Select the System menu. Press <F6>, then <F10>.
Run all memory diagnostic routines.	Select the Memory menu. Press <F6>, then <F10>.
Run all IDE drive diagnostic routines.	Select the IDE menu. Press <F6>, then <F10>.
Run all floppy diagnostic routines.	Select the Floppy menu. Press <F6>, then <F10>.
Run all keyboard diagnostic routines.	Select the Keyboard menu. Press <F6>. Press <F10>.
Run all video diagnostic routines.	Select the Video menu. Press <F6>. Press <F10>.
Run all serial, parallel, and mouse diagnostic routines.	Select the Misc. menu. Press <F6>. Press <F10>.
Print a report about system configuration and test errors.	Select the Options menu. Select Generate Reports. Select the print device.
Exit AMIDiag. Press <Esc>.	Choose Yes at the prompt.

Running AMIDiag in Batch Mode

Running AMIDiag in Batch Mode

When your computer is experiencing an intermittent problem that no diagnostic software test has been able to identify, run AMIDiag tests over an extended period of time. Many computer problems are not evident (especially memory problems) when a test is run only once. AMIDiag allows you to run diagnostic routines on only a certain part of the computer, a specific part of memory, or a specific part of a disk drive. AMIDiag also allows you to build script (.INI) files that contain test configuration information. After you have created an AMIDiag script file, you can run the AMIDiag diagnostic routines listed in the .INI file automatically.

Batch Mode Steps

Step	Action
1	Select the AMIDiag tests to be run.
2	Select the test parameters, such as the drives, the I/O ports, or other parameters. These parameters differ for each test.
3	Run the tests after you configure the test by pressing <F10>.
4	You can save the current AMIDiag test configuration to a .INI file.
5	You can then run this set of AMIDiag tests at any time.

Error log viewer

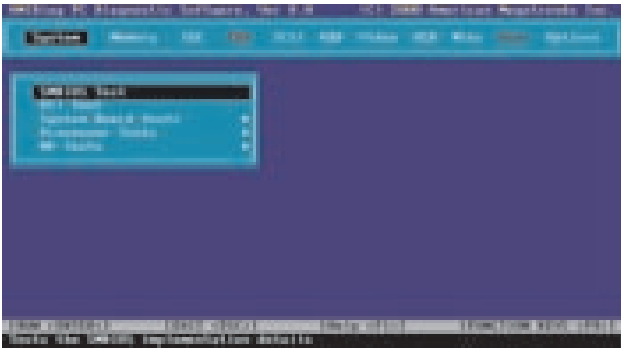
AMIDiag allows you to display the error log while still running AMIDiag. The AMIDiag error log contains all diagnostic errors that AMIDiag has found during the current AMIDiag session. The error log viewer offers some text search capability.

To display the error log, select Display Error Log File on the AMIDiag Options menu. Enter the name of the error log file. The default error log filename is AMIDIAG.LOG. The AMIDiag error log file will be displayed.

You can access Help for more information about an error. To do so, browse to the desired error in the error window (on the right side of the screen) and press <F1>.

System diagnostics

The following screen appears when System is selected from the AMIDiag Main Menu:



Note: Each test on the System menu can generate error codes.

Processor test

The processor test makes sure that the CPUs are functioning properly. The processor test includes:

- Basic Functionality Test
- Processor Speed Test
- CPU Mode Switching Test
- CPU Compatibility Test
- Coprocessor Test

Basic functionality test: The basic functionality test makes sure that the CPU(s) in the computer are operating correctly and efficiently in all address modes.

Select Processor Test from the System Board menu and press <Enter>.

Processor Speed Test: This test determines and displays the CPU clock speed. The screen displays the expected processor speed and the actual CPU clock speed, not the speed index displayed by many benchmark programs. The CPU speed is determined by measuring the time taken to execute a specific instruction. The time calculation uses a separate clock source with a known frequency. The effects of cache memory and prefetch queues are disregarded in this calculation.

The Expected speed is taken from the SMBIOS information in the computer.

Set the test parameters: Choose YES for the CPU Speed Comparison, Expected CPU Speed, and Run Test parameters.

CPU Mode Switching Test: This test tests the ability of the processor to switch between 64bit and 32bit processor modes.

CPU Compatibility Test: This test tests the ability of the processor to run legacy 32bit code. This is very important because the computer's BIOS runs in this compatibility environment.

Coprocessor Test: This test checks the functionality of the math coprocessor. Select Coprocessor Test from the System menu and press <Enter>. This test loads and stores the control and status word, checks data transfer between the CPU and the math coprocessor, and tests exception checking while the data transfer is in progress.

DMA controller test

This test is a series of read and write tests on the memory address registers and page registers of DMA controllers 1 and 2. The DMA (Direct Memory Access) controller manages the flow of information directly to and from system memory and an "intelligent" peripheral device, without passing through the CPU. On error, AMIDiag displays the register number, data written, and data read. To perform this test, select DMA Controller Test from the System menu and press <Enter>.

Interrupt controller test

The Interrupt Controller Test performs a series of read and write tests on interrupt mask registers and checks for stray interrupts after masking off all interrupts. AMIDiag displays the register numbers, the data read, and the data written if there are errors in the read/write test. Select Interrupt Controller Test from the System menu and press <Enter>.

Timer test

This test checks the accuracy of the timer count by calibrating it against the periodic interrupt of the Real Time Clock (RTC). Select Timer Test from the System menu and press <Enter>.

Real time clock test

This test checks the regularity of the real time clock interrupt by calibrating it against the timer 0 interrupt. On some systems, this test resets the date and time function. Always verify the correct date and time after exiting AMIDiag. To perform this test, select Real Time Clock Test from the System menu and press <Enter>.

CMOS validity test

This test checks the validity of the data in CMOS RAM and makes sure that the CMOS RAM checksums are correct. This test also makes sure that the battery is in good condition. Select CMOS Validity Test from the System menu and press <Enter>.

PCI system test

The PCI System Test makes sure that the PCI bus and all PCI devices in the computer are working properly. The PCI Bus Test includes:

- PCI Bus Scan
- PCI Device Access Test
- PCI Configuration Verification Test
- PCI Bus Stress Test

PCI Bus Scan: This test scans for all PCI devices in the computer.

PCI Device Access Test: This test accesses all PCI devices in the computer by vendor ID and class code.

PCI Configuration Verification Test: This test verifies the transactions across the PCI bus by reading the 256 byte PCI Configuration Space associated with each detected PCI device.

PCI Bus Stress Test: This test generates a heavy load of transactions over the PCI bus by transferring large volumes of data from system memory to a PCI device (the PCI VGA controller).

Multiprocessor test

Select this test when running AMIDiag in a computer that has more than one CPU. This test performs a variety of diagnostics on both CPUs. To perform this test, select Multiprocessor Test from the System menu and press <Enter>. Follow the directions on the screen. The multiprocessor test includes:

- CPU-Processor Test
- FPU-Processor Test
- Memory Consistency Test
- I/O Access Test

SMIBIOS test

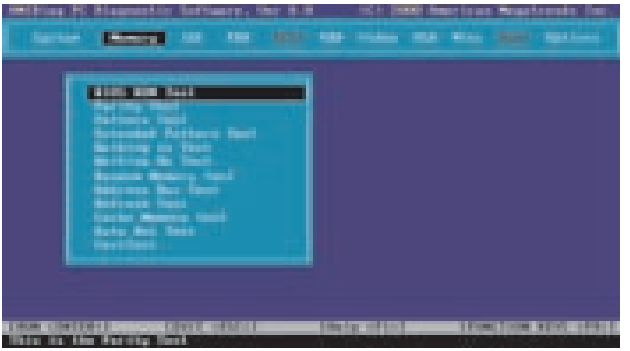
The SMBIOS (System Management BIOS) test makes sure that the DMI information in your computer is stored in the proper manner and is essentially correct. The SMBIOS file stores system configuration information, and specification information about your computer and all peripheral devices attached to your computer.

System error codes

For system error codes, see “System error codes” on page 230.

Memory diagnostics

All memory tests write to all areas of installed DRAM system memory up to 64 GB. The memory tests determine the size of system memory. The memory diagnostics are shown below:



Notes:

1. Each test on the Memory menu can generate error codes.
2. Each test on the menu can be aborted by pressing <Esc>.

DMI memory fault isolation

DMI Memory Fault Isolation

AMIDiag isolates faulty memory modules. AMIDiag displays

```
The faulty memory chip is on SIMM x
```

BIOS ROM test

The BIOS ROM Test checks the data path of the BIOS ROM and makes sure the ROM is write-protected. Select Memory from the Main Menu, select BIOS ROM Test. Press <Enter> to start the BIOS ROM Test.

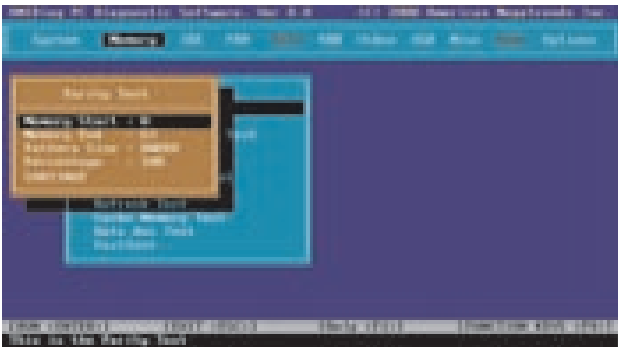
Parity test

Run this test to find bad memory locations. This test finds parity errors in all system memory. This test is the best way to identify and report data corruption because of DRAM system memory hardware problems. This test diagnoses the parity error detection circuitry in DRAM.

Parity All data is stored in patterns of binary digits (1s and 0s). Each byte has eight binary digits (bits). Parity is either even or odd. The parity of a block of data storage is the sum of all the set binary digits in that unit. If there are eight bits in each unit (a byte), the parity is the sum of all bits that are set to 1. PC system memory is organized into bytes that have even or odd parity. This parity is achieved by adding a bit, called the parity bit, which is made even or odd by the hardware circuitry to make sure all data units have the same parity. Most system memory actually has 9 bits (8 data bits and one parity bit). Adding a parity bit is a method of assuring that the data is correct.

Test Description ISA systems include memory parity checking circuitry. When the CPU accesses a memory location that has a parity error, a bit is set in a specific register and an NMI (nonmaskable interrupt) is generated. AMIDiag captures the NMI and checks the specific register for the parity error indicator while accessing different memory regions. If a parity error occurs in the memory area where AMIDiag is located, the system may hang.

Run the Test Select Memory from the Main Menu and Parity Test. Press <Enter> to start the Parity Test. A list of parameters appears, as shown below:



You can specify the beginning and ending memory locations in the Memory Start and Memory End fields. You can also specify the size of the bit pattern written to memory in this test in the Pattern Size field. By changing the bit pattern size, otherwise undetected memory errors will be discovered. You should change this parameter to ALL to perform the most thorough memory error detection test. The bit pattern sizes are 8 bits, 16 bits, 32 bits, or all bit pattern sizes. The default is 32 bits.

The amount of memory already tested is displayed as the test runs. If the displayed percentage is less than 100%, the displayed percentage is the amount of system memory between the Memory Start and Memory End values.

Pattern test

This test is the most exhaustive memory test in AMIDiag. This test consists of seven test routines that write a series of test patterns to memory, then read the patterns back and compare the read results with the pattern that was written. This test uses worst-case bit patterns, such as AA55h. The memory reads and write instructions test every bit of DRAM system memory.

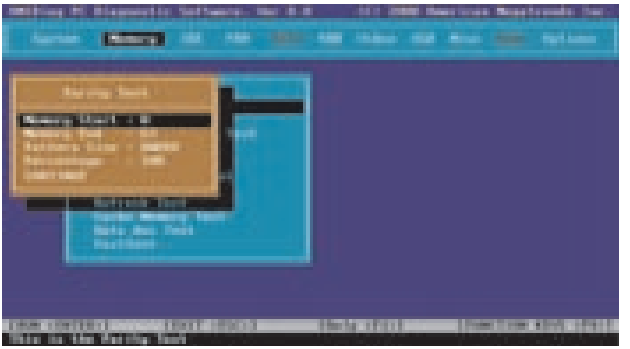
Test Description Each memory chip in your computer is designed to hold 1, 4, or 9 bits of data. If the memory chip does not retain data, there is an inconsistency in the data written to and read from memory. For example, the hexadecimal number 11 can be written to a memory location. If the chip that holds the least significant bit (bit 0) of this number is faulty, 10 hex is read from memory instead of 11 hex. This is called bit dropping. If bit 0 of this location sets a bit instead of dropping it, the system may read 11 hex when the actual data was 10h. If a program is loaded to the faulty memory location, it either fails or produces erroneous results. If data is loaded into this memory area, the data becomes corrupted.

When to Use The Pattern Test is most useful when the computer has random memory (or performance) problems and BIOS POST tests cannot find memory problems. If the system has random problems you cannot identify, run the Pattern Test for several passes or even continuously. This rigorous memory test runs for a long time, but when it is difficult to determine exactly where the error is, the test must be extremely thorough. This test performs a long read and write test of memory space and identifies most memory faults. The diagnostic routines in the pattern test find system memory problems. These tests can run for an hour, depending on the CPU type and the amount of system memory. A picture of memory appears. Test progress is shown by flashing each tested memory segment as the test runs on that segment.

Pattern Test The test order is:

Test Name	Description
Bit Stuck High test	Searches for bits stuck high.
Bit Stuck Low test	Searches for bits stuck low.
Checkerboard test	Write bit patterns successively to non-contiguous memory areas.
CAS Line test	Tests the Column Address Strobe signal line.
Incremental test	Tests memory by writing incremental patterns and reading them.
Decremental test	Tests memory by writing decremental patterns and reading them.
Incremental Decremental test	Tests memory by writing incremental and decremental patterns and reading them back.
Run the Test	

Select **Memory** from the Main Menu, Pattern Test, and press <Enter>. A list of parameters appears:



You can specify the beginning and ending memory locations in the Memory Start and Memory End fields. You can also specify the size of the bit pattern written to memory in the Pattern Size field. By changing the bit pattern size, otherwise undetected memory errors can be discovered. Change this parameter to ALL to perform the most thorough memory error detection test.

Bit Pattern Sizes: The bit pattern sizes are 8 bits, 16 bits, 32 bits, or all bit pattern sizes. The default is 32 bits. If the displayed percentage is less than 100%, the specified percentage is the amount of system memory between the Memory Start and Memory End values that has been tested. If no errors occur, select Return to main menu when this test finishes. Select Browse error list if errors occur.

Extended pattern test

This test is composed of two test routines that write data to memory, read the data back and compare the data. The subtests repeat until you press <Esc>. They are:

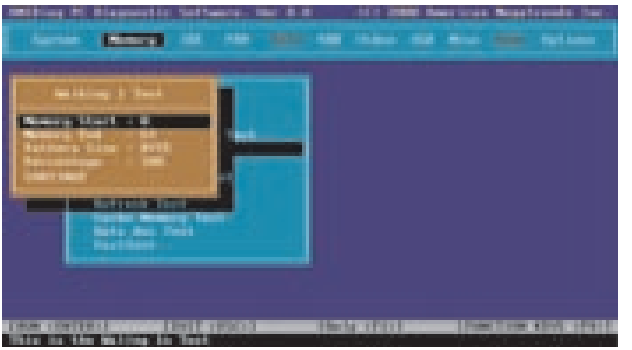
Test Name	Description
Write/Read Cycle	This subtest runs diagnostics using both read and write instructions.
Read Cycle	This subtest runs diagnostics using read instructions.

To run the test, select **Memory** from the Main Menu, Extended Pattern Test, and press <Enter>. If no errors occur, select **Return to main menu** when this test finishes. Select **Browse error list** if errors occur.

Walking 1s test

This test uses the Walking 1s Left Test and the Walking 1s Right Test routines to identify shorts on data lines and data bits stuck at 1. Run this test if the BIOS finds memory errors or memory problems constantly occur.

To run the test, select **Memory** from the Main Menu, Walking 1s Test, and press <Enter>. A list of parameters appears:



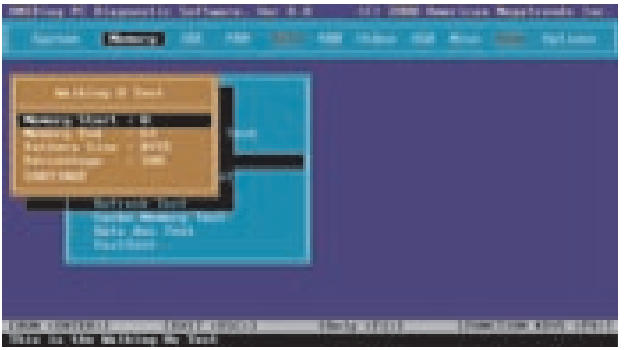
You can specify the beginning and ending memory locations in the Memory Start and Memory End fields. If the displayed percentage is less than 100%, the percentage is the amount of system memory between the Memory Start and Memory End values tested.

You can also specify the size of the bit pattern that is written to memory in this test in the Pattern Size field. By changing the bit pattern size, otherwise undetected memory errors will be discovered. You should change this parameter to ALL to perform the most thorough memory error detection test. The bit pattern sizes are 8 bits, 16 bits, 32 bits, or all bit pattern sizes. The default is 8 bits. This test sequentially turns on all bits in system memory in a rolling pattern. The pattern is constructed so that only one bit of each byte is 1 at any time.

Walking 0s test

The Walking 0s test writes shifting patterns to memory to find memory errors. This test uses two test routines to identify open data lines. The two routines are the Walking 0s Left Test and the Walking 0s Right Test. Run this test if the BIOS POST routines report memory errors or the system has constantly recurring memory problems.

Run the TestSelect Memory from the Main Menu and Walking 0s Test. Press <Enter> to start the Walking 0s Test. A list of parameters appears, as shown below:



You can specify the beginning and ending memory locations memory in the Memory Start and Memory End fields. If the displayed percentage is less than 100%, the percentage is the amount of system memory between the Memory Start and Memory End values tested.

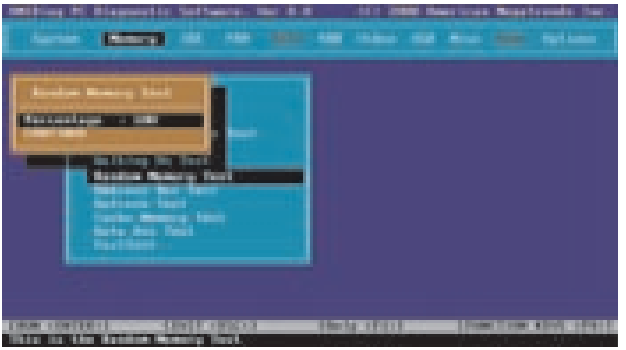
You can also specify the size of the bit pattern that is written to memory in this test in the Pattern Size field. The bit pattern sizes are 8 bits, 16 bits, 32 bits, or all bit pattern sizes. The default is 8 bits. This test writes a rolling zero pattern to all memory locations. The pattern is constructed so that only one bit of each byte is 0 at any time.

Random memory test

The Random Read/Write Test uses five test routines to write a random bit pattern to a randomly-selected DRAM system memory location and read the same memory location, looking for the same bit pattern that was written. The test cycles through each of the five routines. The routines are:

Subtest	Description
Initialize Randomize Test	Begin the random memory test.
Validate Randomize Test	Validate information found in the random memory test.
Initialize Random Increment Test	Begin the incremental random memory test.
Random Increment Read/Write	Begin the incremental random read/write memory test.
Validate Memory	Validate information found in the random read/write memory test.

To run the test, select **Memory** and **Random Memory Test** and press <Enter>. A list of parameters appears:



This test finds soft errors in memory that are normally hidden by the cache memory algorithms. This test defeats the caching strategy and accesses system memory directly. This test also finds cache loading problems.

Address test

This test checks for shorts and opens on address lines. The address lines are used to access data at a specified memory location. Data can be written to or read from the wrong memory location if there is a short or malfunction in the address lines because of a hardware problem. If the data is a part of the program being executed, the program itself may malfunction. Select Memory from the Main Menu and Address Test. Press <Enter> to start the Address Test. This test writes a value in one memory locations and scans the entire range of system memory to find the value.

Refresh test

The type of memory used in almost all computer system memory is called DRAM (Dynamic Random Access Memory). DRAM uses a small electric charge to store memory. This charge must be refreshed approximately every 15.625 microseconds. Certain programs detect the memory refresh interval and use the refresh rate for delay loops. This AMIDiag test checks the DRAM system memory refresh interval rate.

When to Use Run the Refresh Test if a program that uses timing loops based on the memory refresh rate does not work properly in your system. Many BIOS routines use such timing loops, specifically routines that access the disk drives. Select Memory from the Main Menu and Refresh Test. Press <Enter> to start the Refresh Test. If an error occurs in this test, AMIDiag displays the current refresh rate and the ideal refresh rate.

Data bus test

This test makes sure that the data bus is working properly. Choose Data Bus test from the Memory menu and press <Enter> to run this test.

Cache memory test

This test identifies and tests all internal and secondary cache memory and then performs a random pattern test within the range of the cache memory size to detect cache memory problems. This test does not run if cache memory is not installed or is disabled. This test always display the exact cache memory size.

Cache MemoryMost modern systems have cache memory, a small amount of relatively fast SRAM (static RAM) that temporarily stores frequently used data from system memory (relatively slow DRAM). Cache memory is used because it speeds access to data and code in memory.

Caching is a method of speeding access to information in a slower device by temporarily storing the information in a faster device. For example, data stored in 70 ns DRAM can be stored temporarily in 12 - 18 ns SRAM cache memory for quicker access. The system that determines which data is stored in SRAM cache memory is called a caching algorithm.

When to Use This test determines the cache memory size and tests the cache memory chips. Make sure cache memory is enabled before running this test. Cache is usually enabled via BIOS Setup.

If an error occurs in this test, AMIDiag displays the current refresh rate and the ideal refresh rate.

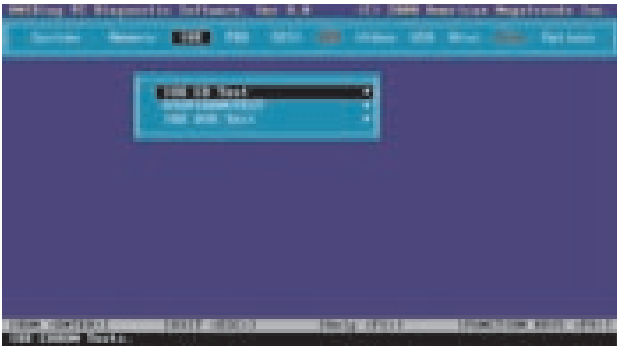
Memory test error codes

For memory test error codes, see “Memory test error codes” on page 233.

IDE device diagnostics

The IDE Device Diagnostics work only with CD-ROM, DVD and ATAPI removable devices that use the ATAPI interface. The tests are:

IDE test	Subtest menu
IDE CD Tests	• IDE CD Tray Test • IDE CD Data Test • IDE CD Audio Test • IDE CD Data Integrity Test
IDE DVD Tests	• DVD Seek Test • DVD Read Test
ATAPI Removables Tests	• ATAPI Remv Write Test • ATAPI Remv Read Test • ATAPI Remv Seek Test • ATAPI Remv Soft Eject Test



IDE CD tests

The IDE CD-ROM drive tests include:

- IDE CD Tray Test
- IDE CD Data Test
- IDE CD Audio Test
- IDE CD Data Integrity Test

IDE CD tray test

This test works only on CD-ROM drives with the ATAPI interface. Select this test to make sure that the CD-ROM drive can eject a CD. The CD tray should open and close. The CD-ROM drive must have an auto-eject feature for this test to work.

IDE CD data test

This test works only on CD-ROM drives with the ATAPI interface. This test reads all logical blocks on a CD if the starting and ending block are not specified. Place any CD in the CD-ROM drive before running this test and follow the screen instructions. This test does not play audio CDs.

IDE CD audio test

A speaker must be attached to the CD-ROM drive before running this test. This test plays all logical blocks if the starting and ending block are not specified. Place an audio CD in the CD-ROM drive. Follow the instructions.

IDE CD data integrity test

This test verifies the data transferred from the CD to the computer. Unlike the CD Read test, this test requires a definition of the CD that must be provided as an external file. This external file is supplied with AMIDiag, which will specify the filename (CDTEST.INI) when you choose this test.

This test verifies the integrity of the data on the CD by comparing the data with the pattern defined in the .INI file. Errors are generated if the read pattern does not match the one specified in the .INI file. Select CD Data Integrity test from the IDE menu and press <Enter>. Follow the instructions on the screen.

IDE CD test error codes

For the IDE CD test error codes, see "IDE CD test error codes" on page 235.

ATAPI removables test

This test verifies that the removable disk drive is operating correctly. The removable drive can be an LS120 drive or an Iomega ZIP drive. The tests include:

- Write test
- Read test
- Seek test
- Soft eject test

Write test

Write TestThis test verifies the ability of the LS120 drive or ZIP drive to write data correctly to an LS120 or ZIP disk, respectively. You should use a disk that you know is good for this test. This test is normally hidden from view because it destroys the data on the disk. Select the drive(s) to be tested and run the test.

Warning: This test destroys all data on the disk.

Read test

This test verifies the ability of the LS120 or ZIP drive to read data correctly in both block and random sequential format from an LS120 or ZIP disk, respectively. You should use a disk that you know is good for this test. Select the drive or drives to be tested and run the test. You can select the starting and ending clocks of data to be read or you can select the percentage of the drive to be read in a sequential or random order. You can also run a random or sequential read test.

Seek test

This test verifies the ability of the LS120 or ZIP drive to seek blocks of data sequentially or randomly. Since most of these drives have a caching mechanism, drive performance during the sequential seek should be faster than specified by the drive vendor. The drive performance during the random seek test should be approximately the same as specified by the drive vendor. Select the test parameters and ruin the test. You can specify the number of times this test is to be run (repeat count), or you can specify Quick Test to test only 1% of the disk.

Soft eject test

This test verifies that the auto eject feature of the LS120 drive or ZIP drive is working properly. You can set the Repeat Count parameter to run this test a number of times. Select the test parameters and choose Continue to run the test.

ATAPI removables test error codes

For the ATAPI removables test error codes, see "ATAPI removables test error codes" on page 237.

IDE DVD tests

The IDE DVD drive tests include:

- IDE DVD Seek Test
- IDE DVD Read Test

IDE DVD seek test

This test works only on DVD drives with the ATAPI interface. Select this test to make sure that the DVD drive can seek to all sectors of the DVD medium. You can change the size to seek by adjusting the Block Interleave parameter value.

IDE DVD read test

This test works only on DVD drives with the ATAPI interface. Select this test to make sure that the DVD drive can read to all sectors of the DVD medium. This test works with both encrypted and unencrypted DVDs.

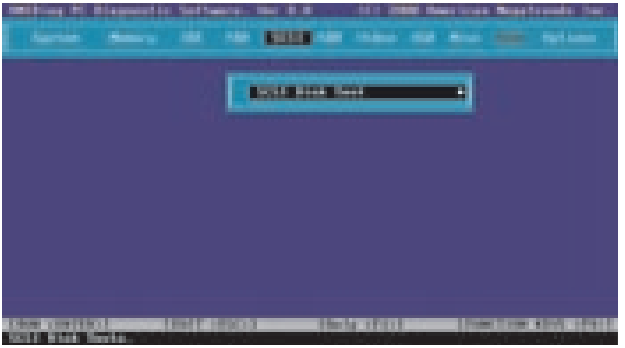
IDE DVD drive test error codes

For these codes, see "IDE DVD drive test error codes" on page 238.

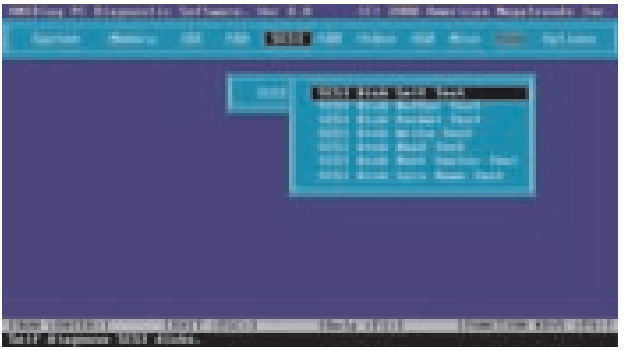
SCSI diagnostics

AMIDiag tests all SCSI devices installed in your computer. SCSI tests run on all legacy SCSI or Wide and Ultra Wide SCSI devices. The SCSI tests detect and test a combination of up to 120 SCSI hard disk drives.

Test	Subtest
SCSI DISK Tests	• SCSI Disk Format Test • SCSI Disk Buffer Test • SCSI Disk Self Test • SCSI Disk Write Test • SCSI Disk Read Test • SCSI Disk Boot Sector Test • SCCI Disk Bad Block Repair • SCSI Disk Spin Down Test

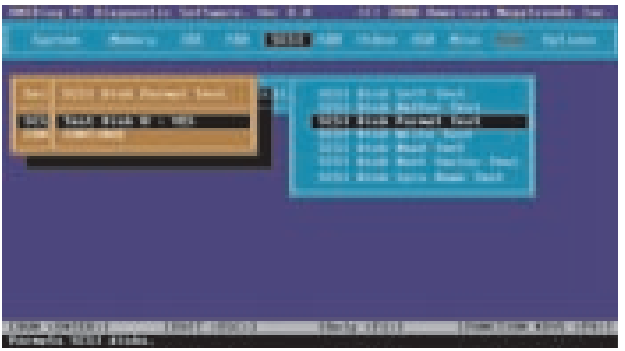


The SCSI hard disk drive tests menu is shown below.



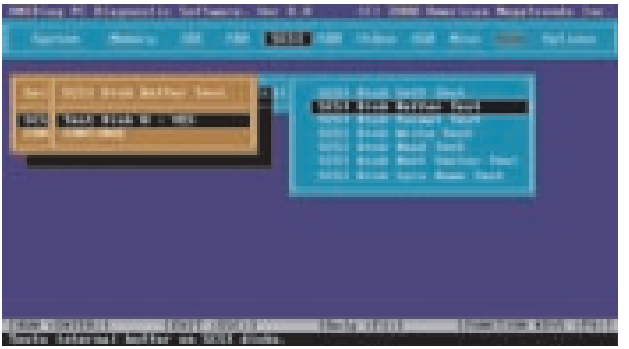
SCSI disk format test

This test will format your SCSI disk and all data will be lost. There is no reason to run this test unless you want to reformat your Disk.



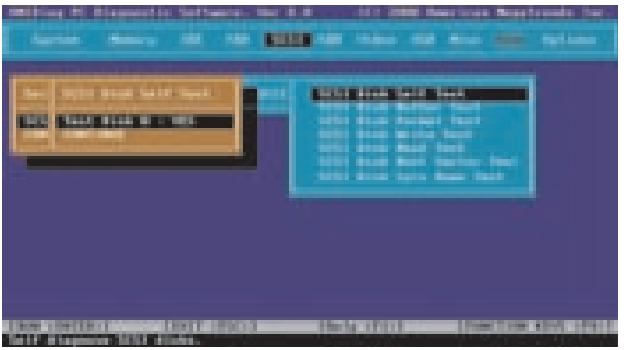
SCSI disk buffer test

This test write logical blocks of data to the internal buffer on the disk drive. The same logical blocks of data are then read from the drive buffer and compared to the original data. This test does not alter the data on the disk drive in any way. Disk drive data integrity is not compromised by this test. If the SCSI hard disk drive does not have an internal buffer, this test cannot be selected.



SCSI disk self test

Most SCSI disk drive manufacturers provide a diagnostics test in the firmware on the SCSI drive. Choose this option to execute the diagnostic tests that reside on the SCSI disk drive. If this test is successful, you will be assured that the drive is operating in accordance with the drive manufacturer's specifications.



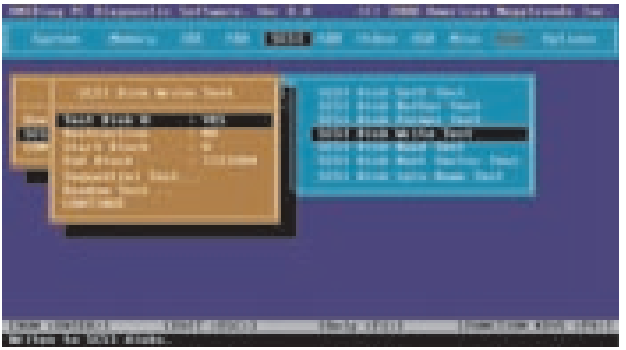
To run the test, select SCSI Disk Self Diagnostic Test and press <Enter>. Choose the parameters on the screen and choose Continue. The SCSI Disk Self diagnostics test cannot be aborted. You must wait until the entire disk self test completes.

SCSI disk write test

This test writes logical blocks to the SCSI drive sequentially. You can run this test in a destructive or non-destructive mode. Select NO in the Destructive test parameter field to run a non-destructive test. The SCSI test parameter screen appears:

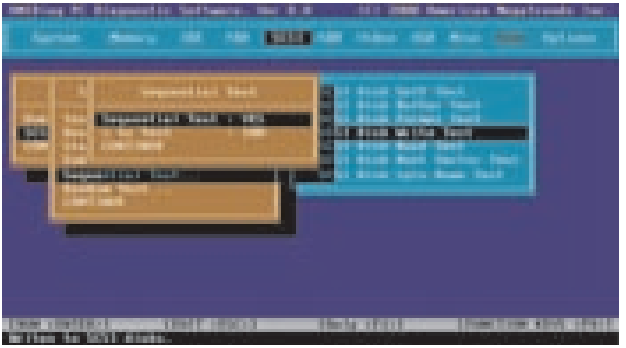
Parameter	Description
overall %	Specifies drivewise :/ as set for each drive.
Common:	Use the term % to specify all drives.
SCSI Disk n	Specify an individual drive parameter.

The following screen appears if you specify a drive:



Back up the hard drive to be tested before running this test in destructive mode.

Coverage Prompt When you choose Sequential Test or Random Test a prompt for the percent of the drive to be tested appears:



This test uses the SCSI Write command with a 10-byte CDB. If you do not specify a starting and ending block number, this test starts reading at block 0 and continues to the last block. Select SCSI Disk Write Test and press <Enter>. A default parameter screen is displayed. As the test progresses, the current block number, number of blocks tested, and number of blocks left are updated. The random test is performed on the specified percentage of blocks between the specified start and end blocks.

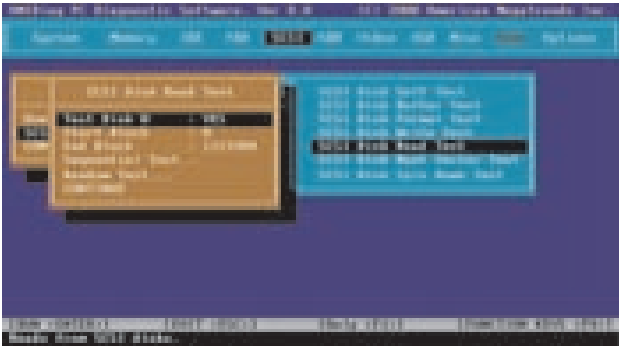
SCSI disk read test

This test sequentially and randomly reads logical blocks from the SCSI hard disk drive. This test uses the SCSI Read command with a 10-byte CDB (Command Data Block). If you do not specify a starting and ending block number, block 0 through the last block are tested. Select SCSI Disk Read Test and press <Enter>. A default parameter screen appears:

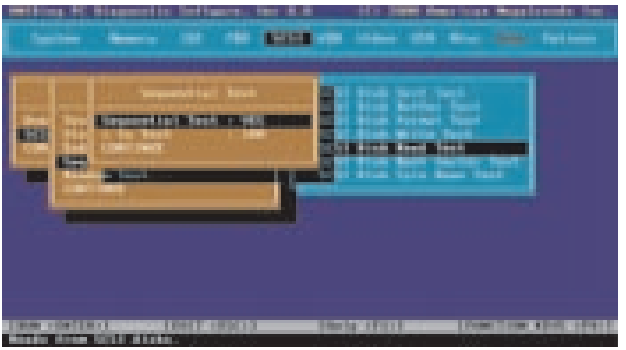
Parameter	Description
overall %	Specifies the drivewise: / or common :/ as set for each drive. If Drivewise is selected, the drive parameters are specified for each drive used. If common is selected, all drive parameters used the % parameters, which are entered in the % for Common fields. This reduces the need to set each drive parameters if the computer has a large number of drives.

Parameter	Description
Common:	Use the term % to specify all drives
SCSI Disk n	Specify an individual drive parameter.

The following screen appears if you specify a drive:



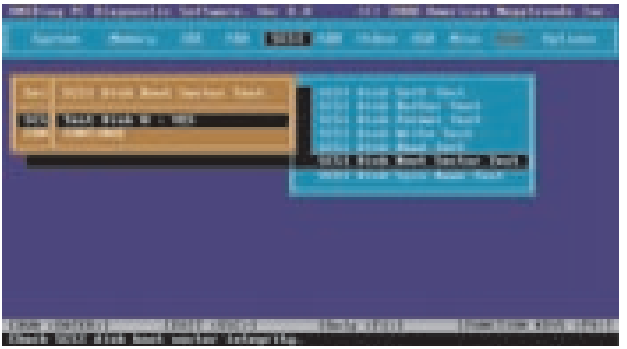
When you choose Sequential Test or Random Test a prompt for the percent of the drive to be tested appears:



Test Parameters The start and end block number fields are 0 and the last block on the disk or the values set the last time this test was run. As the test runs, the current block number, number of blocks tested, and number of blocks left are updated. Also, the block tested is marked with a different character. The random test is performed on the specified percentage of blocks between the specified start and end blocks.

SCSI disk boot sector test

This test makes sure that you can boot from the selected SCSI disk drive. Select SCSI Disk Boot Test from the SCSI menu and press <Enter>. Follow the instructions on the screen.

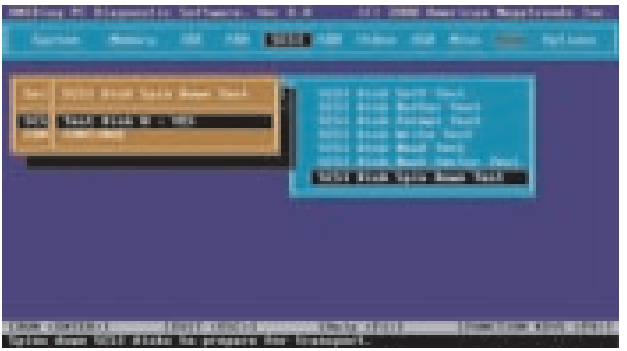


SCSI disk bad block repair

Choose this option to repair bad blocks on the selected hard disk drive. Select SCSI Disk Bad Block Repair from the SCSI menu and press <Enter>. Follow the instructions on the screen.

SCSI disk spin down test

Choose this option to test the ability of the SCSI disk to spin down. Select SCSI Disk Spin Down Test from the SCSI menu and press <Enter>. Follow the instructions on the screen.



SCSI CD tests

The SCSI CD tests include:

- SCSI CD ROM Buffer Test
- SCSI CDROM Self Test
- SCSI CDROM Tray Test
- SCSI CD Read Test
- SCSI CD Play Test
- SCSI CD Data Test

SCSI CD-ROM drive buffer test

This diagnostic makes sure that the memory buffer on the CD-ROM drive is working correctly.

SCSI CD-ROM drive self test

Most SCSI CD-ROM drive manufacturers provide a diagnostics test on the drive. Choose this option to execute the diagnostic tests that reside on the drive. If this test is successful, the drive is operating in accordance with the drive manufacturer's specifications.

To run the test, select SCSI CD-ROM Self Diagnostics Test and press <Enter>. Choose the parameters on the screen and choose Continue. This test cannot be aborted. You must wait until the entire test completes.

SCSI CD-ROM drive tray test

Select this test to make sure that the CD-ROM drive can eject a CD. The CD tray should open and close. The CD-ROM drive must have an auto-eject feature for this test to work.

SCSI CD-ROM drive read test

This test reads logical blocks of data from the CD-ROM drive. This test issues the SCSI Read command with a 10-byte CDB. Select SCSI CD-ROM Read Test and press <Enter>. A parameter screen appears:

Select SCSI Disk	
Overall % Parameters	100
SCSI Disk 0	
CONTINUE	

Parameter	Description
overall %	Specifies drivewise :/ as set for each drive.
Common:	Use the term % to specify all drives
SCSI CD-ROM n	Specify an individual drive parameter.

SCSI CD-ROM Read Test	
Test CDROM0	: YES
Start Block	: 000000000
End Block	: 002028000
Sequential Test	
Random Test	
CONTINUE	

If the Sequential Test or Random Test, you are prompted for the percentage of the drive to be tested. Choose a percentage and choose CONTINUE.

Sequential Test	
Sequential Test	: YES
% to test	: 100
CONTINUE	

If the starting and ending block are not specified, this test reads from block 0 to the last block. This test fails if an audio CD is placed in the drive. This test supports multi-format CDs with data and audio tracks. The random test is performed on the specified blocks between the start and end blocks.

SCSI CD-ROM drive play test

Before running this test: connect a speaker to the CD-ROM drive and insert an audio CD in the CD-ROM drive.

This test makes sure that the CD-ROM drive can play audio CDs. This test issues the SCSI Play command to the CD-ROM drive. You can select the sequence of tracks played. Follow the screen directions to play an audio CD. A default parameter screen appears when you select SCSI CD-ROM Play Test:

Select SCSI Disk	
Overall % Parameters	100
SCSI Disk 0	
CONTINUE	

Parameter	Description
overall %	Specifies drivewise :/ as set for each drive.
Common:	Use the term % to specify all drives
SCSI CD-ROM n	Specify an individual drive parameter.

The following appears if you specify an individual drive:

SCSI CD-ROM Play Test	
Test CDROM0	: YES
Start Block	: 000000000
End Block	: 020280000
CONTINUE	

SCSI CD-ROM drive data test

This test makes sure that the SCSI CD-ROM drive reads data correctly. Select SCSI CDROM Data test. Set the Test CDROM n parameter to Yes and choose Continue to run this test.

SCSI tape tests

The SCSI Tape tests include:

- SCSI Tape Buffer Test
- SCSI Tape Self Test

- SCSI Tape Write Test
- SCSI Tape Read Test
- SCSI Tape Rewind Test

SCSI tape buffer test

This test write logical blocks of data to the internal buffer on the tape drive. The same logical blocks of data are then read from the tape drive buffer and compared to the original data. This test does not alter the data on the tape in the tape drive in any way. Data integrity is not compromised by this test. If the tape drive does not have an internal buffer, this test cannot be selected.

SCSI tape self test

Most SCSI tape drive manufacturers provide a diagnostics test in the firmware on the SCSI tape drive. Choose this option to execute the diagnostic tests that reside on the SCSI tape drive. If this test is successful, you are assured that the tape drive is operating in accordance with the drive manufacturer's specifications.

To run the test, select SCSI Tape Self Diagnostics Test and press <Enter>. Choose the parameters on the screen and choose Continue. The SCSI Tape Self diagnostics test cannot be aborted. You must wait until the entire disk self test completes.

SCSI tape write test

This test erases old data and writes new data to the tape cartridge. This test issues SCSI write commands to the tape drive block by block sequentially.

Warning: This test destroys all data on the tape cartridge.

The test parameters are Repeat Count (number of times to run this test) and Quick Test (test only 1% of the tape cartridge). Select the tape drive to be tested. Select the starting and ending data block to be tested or the percentage of the tape cartridge to be tested. Choose Continue to run the test.

SCSI tape read test

This test reads sequential logical blocks from the SCSI tape. The reading terminates when end of medium marker, end of partition marker, or blank data is encountered. This test issues the SCSI Read command with a 6-byte CDB. Select *SCSI Tape Read Test* and press <Enter>. A default parameter screen appears:

Select SCSI Disk	
Overall % Parameters	100
SCSI Disk 0	
CONTINUE	

Parameter	Description
overall %	Specifies drivewise :/ as set for each drive.
Common:	Use the term % to specify all drives
SCSI Tape n	Specify an individual drive parameter.

The following screen appears when you specify an individual drive:

SCSI Tape Read Test	
Test Tape 0	: YES
Start Block	: 000000000
End Block	: 002028000
CONTINUE	

A prompt for the percent of the drive to be tested appears. Specify the percentage of the drive to be tested and choose CONTINUE.

If the tape is not positioned at the beginning or the starting block, a tape rewind command is issued before the test is performed. The rewind operation may take some time.

SCSI tape rewind test

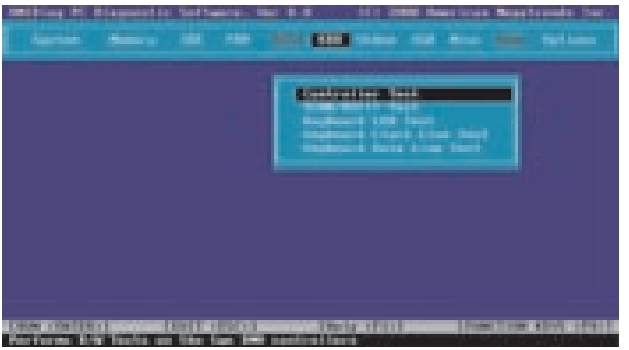
This test makes sure that the SCSI tape drive can rewind a tape. Select SCSI Tape Rewind Test and press <Enter>.

SCSI test error codes

For the SCSI test error codes, see "SCSI test error codes" on page 239.

Keyboard diagnostics

The keyboard diagnostics tests are as follows:



Keyboard controller test

The Controller Test issues a Self-Test command to the keyboard controller and makes sure that the response is OK. It then sends the Diagnostic Echo command to the keyboard and waits for a return from the keyboard. Select Keyboard from the Main Menu and Controller Test.

Scan/ASCII code test

The Scan and ASCII Code Test determines if a pressed keys match the Scan and ASCII codes for that key. Every time you press a key to verify its code, both the scan code and ASCII code of the pressed key is displayed. The key symbol is also displayed.

Perform this test to identify faulty keys. Use the tables on the following screens to verify that the displayed scan and ASCII codes are correct.

To run the test, select Keyboard from the Main Menu and Scan/ASCII Code Test. Press <Enter> to display a keyboard layout. Scan code and ASCII Code appear above the keyboard layout.

Press the keys on the keyboard. The scan codes and ASCII codes display in the appropriate fields for each key as it is pressed. Use this test to verify the codes with their respective keys. Press <Ctrl> <Break> to exit this test.

Lower case keyboard scan/ASCII codes

Keystroke	Scan Code	ASCII Code	Keystroke	Scan Code	ASCII Code
Esc	01	1B	1	02	31
2	03	32	3	04	33
4	05	34	5	06	35
6	07	36	7	08	37
8	09	38	9	0A	39
0	0B	30	-	0C	2D
=	0D	3D	Backspace	0E	08
Tab	0F	09	q	10	71
w	11	77	e	12	65
r	13	72	t	14	74
y	15	79	u	16	75
i	17	69	o	18	6F
p	19	70	[	1A	5B
}	1B	5D	Return	1C	0D
Ctrl	‡	‡	a	1E	61
s	1F	73	d	20	64
f	21	66	g	22	67
h	23	68	j	24	6A
k	25	6B	l	26	6C
;	27	3B	'	28	27
'	29	60	Shift	‡	‡
\	2B	5C	z	2C	7A
x	2D	78	c	2E	63
v	2F	76	b	30	62
n	31	6E	m	32	6D
,	33	2C	.	34	2E
/	35	2F	*	37	2A
Alt	‡	‡	Space	39	20
Caps Lock	‡	‡	F1	3B	00

Keystroke	Scan Code	ASCII Code	Keystroke	Scan Code	ASCII Code
F2	3C	00	F3	3D	00
F4	3E	00	F5	3F	00
F6	40	00	F7	41	00
F8	42	00	F9	43	00
F10	44	00	F11	85	00
F12	86	00	Num Lock	‡	‡
Scroll Lock	‡	‡	Home	47	00
	48	00	PgUp	49	00
_	4A	2D		4B	00
Center key	4C	00		4D	00
+	4E	00		4F	00
	50	00	PgDn	51	00
Ins	52	00	Del	53	00
SysReq	no key	no key	Key 45	56	5C
Enter	E0	0D	/	E0	2F
Print Screen	‡	‡	Pause	‡	‡
Home	47	E0		48	E0
PgUp	49	E0		4B	E0

‡ No keystroke, but perform another action.

Uppercase (shift) keyboard scan/ASCII codes

Keystroke	Scan Code	ASCII Code	Keystroke	Scan Code	ASCII Code
Shift Esc	01	1B	!	02	21
@	03	40	#	04	23
$	05	24	%	06	25
^	07	5E	&	08	26
*	09	2A	(	0A	28
)	0B	29	_	0C	5F
+	0D	2B	Shift Backspace	0E	08
Shift Tab	0F	00	Q	10	51
W	11	57	E	12	45
R	13	52	T	14	54
Y	15	59	U	16	55
I	17	49	O	18	4F
P	19	50	{	1A	7B
}	1B	7D	Shift Return	1C	0D
Shift Ctrl	‡	‡	A	1E	41

Keystroke	Scan Code	ASCII Code	Keystroke	Scan Code	ASCII Code
S	1F	53	D	20	44
F	21	46	G	22	47
H	23	48	J	24	4A
K	25	4B	L	26	4C
:	27	3A	"	28	22
~	29	7e	|	2B	7C
Z	2C	5A	X	2D	58
C	2E	43	V	2F	56
B	30	42	N	31	4E
M	32	4D	<	33	3C
>	34	3E	?	35	3F
*	37	2A	Shift Alt	‡	‡
Shift Space	39	20	Shift Caps Lock	‡	‡
Shift F1	54	00	Shift F2	55	00
Shift F3	56	00	Shift F4	57	00
Shift F5	58	00	Shift F6	59	00
Shift F7	5A	00	Shift F8	5B	00
Shift F9	5C	00	Shift F10	5D	00
Shift F11	87	00	Shift F12	88	00
Shift Num Lock	‡	‡	Shift Scroll Lock	‡	‡
Shift 7	47	37	Shift 8	48	38
Shift 9	49	39	Shift -	4A	2D
Shift 4	4B	34	Shift 5	4C	35
Shift 6	4D	36	Shift +	4E	2B
Shift 1	4F	31	Shift 2	50	32
Shift 3	51	33	Shift 0	52	30
Shift .	53	2E	Shift Sys Req	no key	no key
Shift key 45	56	7C	Shift Enter	E0	0D
Shift /	E0	2F	Shift Print Screen	‡	‡
Shift Pause	‡	‡	Shift Home	47	E0
Shift	48	E0	Shift PgUp	49	E0
Shift	4B	E0	Shift	4D	E0
Shift End	4F	E0	Shift	50	E0
Shift PgDn	51	E0	Shift Ins	52	E0
Shift Del	53	E0			

‡ These combinations do not provide a keystroke for the application but perform another action.

Ctrl keyboard ASCII/scan codes

Keystroke	Scan Code	ASCII Code	Keystroke	Scan Code	ASCII Code
Ctrl Esc	01	1B	Ctrl 1	--	--
Ctrl 2 (NUL)	03	00	Ctrl 3	--	--
Ctrl 4	--	--	Ctrl 5	--	--
Ctrl 6 (RS)	07	1E	Ctrl 7	--	--
Ctrl 8	--	--	Ctrl 9	--	--
Ctrl 0	--	--	Ctrl _	0C	1F
Ctrl Backspace (Del)	0E	7F	Ctrl Tab	94	00
Ctrl Tab	0F	00	Ctrl Q	10	51
Ctrl q (DC1)	10	11	Ctrl w (ETB)	11	17
Ctrl e (ENQ)	12	05	Ctrl r (DC2)	13	12
Ctrl t (DC4)	14	14	Ctrl y (EM)	15	19
Ctrl u (NAK)	16	15	Ctrl i (HT)	17	9
Ctrl o (SI)	18	0F	Ctrl p (DLE)	19	10
Ctrl [(ESC)	1A	1B	Ctrl] (GS)	1B	1D
Ctrl Return	1C	0A	Ctrl a	1E	01
Ctrl s (DC3)	1F	13	Ctrl d (EOT)	20	04
Ctrl f (ACK)	21	06	Ctrl g (BEL)	22	07
Ctrl h (Backspace)	23	08	Ctrl j (LF)	24	0A
Ctrl k (VT)	25	0B	Ctrl 1	26	0C
Ctrl ;	--	--	Ctrl ’	--	--
Ctrl ‘	--	--	Ctrl Shift	‡	‡
Ctrl \ (FS)	2B	1C	Ctrl z (SUB)	2C	1A
Ctrl x (CAN)	2D	18	Ctrl c (ETX)	2E	03
Ctrl v (SYN)	2F	16	Ctrl b (STX)	30	02
Ctrl n (SO)	31	0E	Ctrl m (CR)	32	0D
Ctrl .	--	--	Ctrl .	--	--
Ctrl /	--	--	Ctrl *	96	00
Ctrl Alt	‡	‡	Ctrl Space	39	20
Ctrl Caps Lock	--	--	Ctrl F1	5E	00
Ctrl F2	5F	00	Ctrl F3	60	00
Ctrl F4	61	00	Ctrl F5	62	00
Ctrl F6	63	00	Ctrl F7	64	00

Keystroke	Scan Code	ASCII Code	Keystroke	Scan Code	ASCII Code
Ctrl F8	65	00	Ctrl F9	66	00
Ctrl F10	67	00	Ctrl F11	89	00
Ctrl F12	8A	00	Ctrl Num Lock	--	--
Ctrl Scroll Lock	--	--	Ctrl Hme	77	00
Ctrl	8D	00	Ctrl PgUp	84	00
Ctrl Keypad -	8E	00	Ctrl	73	00
Ctrl Center	8F	00	Ctrl	74	00
Ctrl Keypad +	90	00	Ctrl End	75	00
Ctrl	91	00	Ctrl PgDn	76	00
Ctrl Ins	92	00	Ctrl Del	93	00
Ctrl Sys Req	(no key)	(no key)	Ctrl Key 45	--	--
Ctrl Enter	E0		Ctrl /	95	00
Ctrl Print Screen	72	00	Ctrl Break	00	00
Ctrl Home	77	E0	Ctrl	8D	E0
Ctrl PgUp	84	E0	Ctrl	73	E0
Ctrl	74	E0	Ctrl End	75	E0
Ctrl	91	E0	Ctrl PgDn	76	E0
Ctrl Ins	92	E0	Ctrl Del	93	E0

‡ These combinations do not provide a keystroke but perform another action.

-- No function assigned to this keystroke combination.

Alt keyboard scan/ASCII codes

Keystroke	Scan Code	ASCII Code	Keystroke	Scan Code	ASCII Code
Alt Esc	01	00	Alt 1	78	00
Alt 2	79	00	Alt 3	7A	00
Alt 4	7B	00	Alt 5	7C	00
Alt 6	7D	00	Alt 7	7E	00
Alt 8	7F	00	Alt 9	80	00
Alt 0	81	00	Alt -	82	00
Alt =	83	00	Alt Backspace	0E	00
Alt Tab	A5	00	Alt q	10	00
Alt w	11	00	Alt e	12	00
Alt r	13	00	Alt t	14	00
Alt y	15	00	Alt u	16	00

Keystroke	Scan Code	ASCII Code	Keystroke	Scan Code	ASCII Code
Alt I	17	00	Alt o	18	00
Alt p	19	00	Alt [	1A	00
Alt]	1B	00	Alt Return	1C	00
Alt Ctrl	‡	‡	Alt a	1E	00
Alt s	1F	00	Alt d	20	00
Alt f	21	00	Alt g	22	00
Alt h	23	00	Alt j	24	00
Alt k	25	00	Alt l	26	00
Alt ;	27	00	Alt '	28	00
Alt `	29	00	Alt Shift	‡	‡
Alt \	2B	00	Alt z	2C	00
Alt x	2D	00	Alt c	2E	00
Alt v	2F	00	Alt b	30	00
Alt n	31	00	Alt m	32	00
Alt ,	33	00	Alt .	34	00
Alt /	35	00	Alt *	37	00
Alt Space	39	00	Alt Caps Lock	‡	‡
			Alt F1	68	00
Alt F2	69	00	Alt F3	6A	00
Alt F4	6B	00	Alt F5	6C	00
Alt F6	6D	00	Alt F7	6E	00
Alt F8	6F	00	Alt F9	70	00
Alt F10	71	00	Alt F11	7B	00
Alt F12	8C	00	Alt Num Lock	‡	‡
Alt Scroll Lock	‡	‡	Alt Keypad -	4A	00
Alt Keypad +	4E	00	Alt Keypad Numbers	#	00
Alt Del	--	--	Alt SysReq	(no key)	(no key)
Alt key 45	--	--	Alt Enter	A6	00
Alt /	A4	00	Alt Print Screen	‡	‡
Alt Pause	‡	‡	Alt Home	97	00
Alt	98	00	Alt PgUp	99	00
Alt	9B	00	Alt	9D	00
Alt End	9F	00	Alt	A0	00
Alt PgDn	A1	00	Alt Ins	A2	00
Alt Del	A3	00			

‡ Does not provide a keystroke but performs another action.

--No function assigned to this keystroke combination.

Keyboard LED test

This test makes sure that all keyboard LEDs are working. As each LED is turned on, you must report if the LED is lit.

Keyboard clock line test

The Keyboard Clock Line Test makes sure the keyboard clock line is working properly. Select Keyboard and Keyboard Clock Line Test. Press <Enter> to start the Keyboard Clock Line Test. The Clock Line Test screen should appear when the test completes. The Keyboard clock line test error codes are shown below.

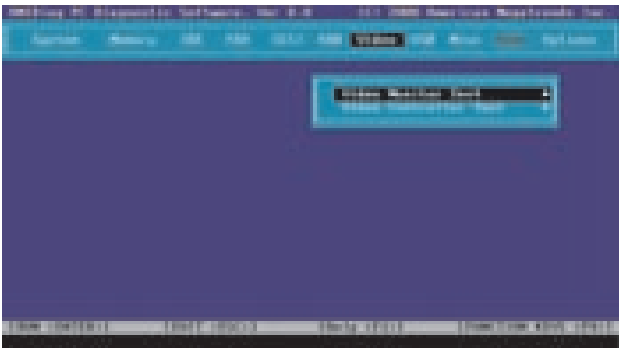
Keyboard data line test

The Keyboard Data Line Test makes sure the keyboard data line is working properly. Select Keyboard from the Main Menu and Keyboard Data Line Test. Press <Enter> to start the Keyboard Data Line Test. The Keyboard data line test error codes are shown below.

Keyboard test error codes

For the keyboard test error codes, see “Keyboard test error codes” on page 242.

Video diagnostics



Running video tests

The video test you run depend on the type of monitor installed on your computer. The type of monitor the test can be run on is specified below.

Video controller tests

These tests are designed for the controller aspect of the video diagnostics.

VGA controller test

This test verifies the functionality of the graphics controller in VGA mode. These tests include:

- vertical synchronization,
- horizontal synchronization,
- graphics controller test,
- attribute controller test, and
- DAC register test.

Video memory test

This test tests the base 256 KB of video memory via a memory pattern test. This test can be run on all monochrome and all color monitors.

AGP test

This test makes sure that the Accelerated Graphics Port (AGP), the AGP graphics adapter card, and the AGP connectors and circuitry are all working correctly. Select AGP Test from the Video menu and press <Enter>. Follow the directions on the screen.

Video monitor test

These tests verify the video controller output in addition to the communication between the controller and the display device.

Attribute test

This test tests the video display attributes. This test displays a screen with a blinking line, reverse video line, high intensity line, and lines in 8 colors in video mode 3 (mode 7 if monochrome).This test can be run on all monochrome and all color monitors.

Page selection test

This test tests all 8 video pages. This test displays a screen of 0s, then 1s, then 2s, then 3s, and so on, in black and white, indicating that each video page is being used correctly. This test only runs on color monitors.

Color test

This test displays the possible colors in foreground, background, and border. This test can be run on all color monitors.

Text mode tests

The text mode tests are: 40 x 25 Display Test

Test Name	Test Description	Type of Monitor
80 x 25 Display Test	Tests the 80 x 25 character set of the display adapter, displaying the entire character set in black and white, then in reverse video in video mode 3 (mode 7 if monochrome).	All monochrome and all color monitors.
40 x 25 Display Test	Tests the 40 x 25 character set of the display adapter in black and white, displaying the entire character set in black and white, then in reverse video.	All monochrome and all color monitors.

Graphics mode tests

The following subtests appear in all Graphics Mode Tests (320 x 200, 640 x 200, 640 x 350, 640 x 480):

Subtest	Description
Text and Attribute Test	Makes sure all characters are displayed in the proper color.
Grid Test	Verifies the graphic dot spacing for each mode.
Aspect Ratio and Display Centering	Centers the monitor display.
Circular Pattern Test	Centers the monitor display.
Resolution	Reports the screen resolution.
Animation and Flicker	Reports the video adapter card speed.
Pixel Throughput	Reports the speed at which complex patterns are drawn on the screen.

These video tests may not appear correctly when displaying high resolution VESA video modes on a multisync monitor. The monitor must be adjusted for each individual video mode. After the video mode you will be using appears, you must center the monitor by choosing the Aspect Ratio and Display Centering subtest.

The graphics mode tests are:

Test Name	Test Description	Type of Monitor
320 x 200 Graphics Test	Displays a black and white 9 x 13 window and redisplays it in reverse video. Then displays a three-color screen, a screen of random colors, then a black and white screen, and finally 256 colors	All color monitors.
640 x 200 Graphics Test	Displays three black and white boxes, then goes from a black screen to a white screen, and back to a black screen.	All color monitors
640 x 350 Graphics Test	Displays a 16 color screen, then fills the screen with random colors, then returns to a blank screen.	EGA and VGA adapters only.

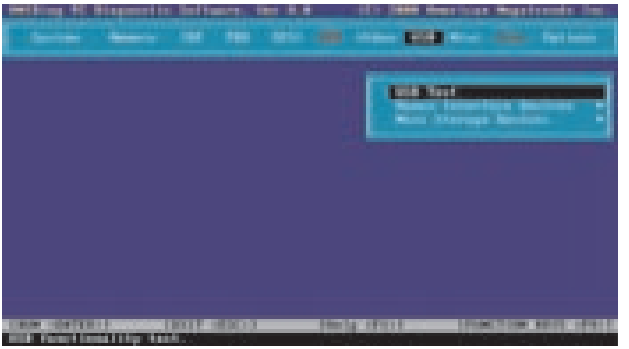
Test Name	Test Description	Type of Monitor
640 x 480 Graphics Test	Displays a 16 color screen, then fills the screen with random colors, then returns to a blank screen.	Only VGA adapters.

Video test error codes

For the video test error codes, see "Video test error codes" on page 243.

USB diagnostics

The USB tests diagnose problems with USB peripherals.



USB test

Select USB Test from the USB menu to diagnose problems with USB peripherals and to make sure that USB support is provided in the system BIOS.

Human interface devices

From this screen, you can diagnose problems with a USB keyboard, USB mouse or USB Hub.

USB keyboard tests

This test diagnoses USB keyboard hardware functionality and determines the data transfer rate between the USB host controller and the USB keyboard. This test tests the USB keyboard key codes and keystrokes.

To run the test, select Device Test from the USB menu. Select USB Keyboard test and press <Enter>. There are four sub tests available for USB keyboard test:

- USB Keyboard Control Test,
- USB Keyboard Code Test,
- USB Keyboard LED Test, and
- USB Keyboard PnP Test.

The following test parameters appear:

Parameter	Action
Test This Device	Select YES to run the USB Keyboard Test. The default is YES if AMIDiag found a USB keyboard.
PnP Test	Select YES to run the USB Keyboard PnP (Plug and Play) Test. The default is YES if AMIDiag found a USB keyboard. This test makes sure that the USB keyboard plug and play feature works properly. The Plug and Play feature automatically configures the USB device when the device is attached to the computer.

USB mouse tests

This test performs USB Mouse tests on both UHCI and OHCI systems.

To run the test, select Device Test from the USB menu. Select USB Mice test and press <Enter>. There are three sub tests available for USB mice test:

- USB Mouse Control Test,
- USB Mouse Sensitive Test, and
- USB Mouse PnP Test.

Parameter	Action
Test This Device	Select YES to run the USB Keyboard Test. The default is YES if AMIDiag found a USB keyboard.
Sensitivity Test	Select YES to run the Sensitivity test.
PnP Test	Select YES to run the USB Mice PnP (Plug and Play) Test. The default is YES if AMIDiag found a USB mouse. This test makes sure that the USB mouse plug and play feature works properly. The Plug and Play feature automatically configures the USB device when the device is attached to the computer.

USB hub test

This test verifies the functionality of an external USB Hub. It does not test the built in Root/Hub on the USB controller.

The following test parameters appear:

Parameter	Action
Test This Device	Select YES to run the USB Hub Test. The default is YES if AMIDiag found a USB Hub.
Port Number X	These are the parameters for each port on the external hub.
Device Connected	Select YES if there is a device attached to this port on the USB Hub. The default is YES if AMIDiag found a USB device attached to the port.
Device Speed	Select UNKNOWN if you are not certain the protocol speed of the USB device. Most USB Keyboards and USB Mice use a LOW speed setting (10kbps), where most USB Mass Storage Devices (floppy drives, CDROMs, etc.) use the FULL speed setting. IF AMIDiag detects a device attached to the port, it should set this parameter to the detected value.

Mass storage devices

From this screen, you can diagnose problems with a USB Floppy Drive, USB Zip/LS120 Drive or a USB CDROM.

Floppy tests

These tests are designed to verify the functionality of the USB Floppy Drive.

Floppy basic test: This tests whether or not the system can communicate with the USB Floppy Drive.

Floppy format test: This test determines the ability of the floppy drive to perform low-level formatting. The floppy format test is performed in interactive mode only. This test also determines if the magnetic media inside the floppy diskette is OK.

Warning: This test destroys all data on the floppy. This floppy must be reformatted via the DOS Format command before it can be used again.

Floppy speed test: This test determines the drive rotation speed. The 1.2 MB and 1.44 MB drive speed should be 360 RPM. The 360 KB and 720 KB drive speed should be 300 RPM.

Floppy sequential test: This test checks the sequential seek, read, and write capability of the drive. The floppy disk used in this test must be formatted on the current operating system before running the test.

Floppy random test: This test checks the drive's random seek, read, and write ability. The diskette used in this test must be formatted on the operating system currently being used before running the test.

Floppy seek test: This test verifies the track-to-track seeking capability of the floppy drive. This test sends Seek instructions alternately to the outer and inner sections of the floppy drive.

Floppy change line test: This test verifies the disk change line capability of the floppy drive. A drive with disk line change capability allows the operating system to recognize that a new floppy disk has been inserted without accessing filesystem. The floppy disk used in this test must be formatted on the operating system currently being used before running the test.

CD-ROM drive USB tests

These tests are designed to verify the functionality of the USB CD-ROM drive.

CD-ROM drive basic test: This tests whether or not the system can communicate with the USB CDROM Drive.

CD-ROM drive data test: This test reads all logical blocks on a CD if the starting and ending block are not specified. Place any data CD in the CD-ROM drive before running this test and follow the screen instructions. This test does not play audio CDs.

CD-ROM drive audio test: A speaker must be attached to the CD-ROM drive before running this test. This test plays all logical blocks if the starting and ending block are not specified. Place an audio CD in the CD-ROM drive. Follow the instructions.

CD-ROM drive eject test: Select this test to make sure that the CDROM drive can eject a CD. The CD tray should open and close. The CDROM drive must have an auto-eject feature for this test to work.

USB test error codes

For the USB test error codes, see “USB test error codes” on page 244.

Miscellaneous diagnostics

The Miscellaneous Diagnostics include:

Serial port test

The Serial Port test makes certain that all the serial ports in the computer are functioning properly.

AMIDiag can test up to four serial ports (COM 1 Through COM 4). All the parameters, including parity, number of data/stop bits, can be selected for each serial port.

The test routines check all COM port controller at speeds from 300 to 115,200 bps (up to 460,800 bps if a 16550 UART is installed). Select the number of data bits, number of stop bits, and parity type for each serial port. Set the parameters for the ports to be tested. Highlight a field using the - and ¯ keys and set the parameters. Select Continue and press <Enter>.

Serial port hardware test

The serial port tests includes:

- Serial Port Hardware Test
- Internal Loopback Test
- External LoopBack Test
- FIFO Test
- Baud Rate Test

Internal loopback test

This test verifies the proper functionality of the transmitter and receiver register in the serial port using the internal loopback mechanism.

External loopback test

This test verifies the proper functionality of the transmitter and receiver register in the serial port. This test requires an external loopback connector to be physically connected to the serial port.

FIFO test

This test verifies the proper functionality of the FIFO in the serial port. This test is enabled only for UART 16550 and above.

Baud rate test

This test verifies the accuracy of the data being transferred by the serial port at different baud rates.

Serial port test error codes

For the serial port test error codes, see "Serial port test error codes" on page 247.

Parallel port test

The Parallel Port test makes certain that all the parallel ports in the computer are functioning properly. AMIDiag can test up to three parallel ports (LPT1 through LPT3). This test checks every part of the parallel port controller and allows you to set parameters for the characteristics of the individual parallel ports for testing. All parameters can be modified for each parallel port.

The Parallel Port Test includes:

- Parallel Port Hardware Test
- Interrupt Test
- Printer Test
- ECP Test
- EPP Test

Parallel port hardware test

This test verifies the parallel port registers as well as the read/write capabilities of the parallel port data buffer.

Interrupt test

This test checks data transfer in interrupt driver mode (an interrupt is generated when the parallel port receives an ACK).

Printer test

This test the printer's capability to print different patterns and characters. The following subtests are performed:

- Pattern Printing Test
- Bold Character Test
- Compressed Mode Test
- Form Feed Test

Note: This test supports Postscript-enabled laser and inkjet printers.

ECP test

This test verifies the functionality of the ECP Mode Registers and ECP FIFO Registers.

EPP test

This test verifies the parallel port in EPP Mode.

Parallel port test error codes

For the parallel port error test codes, see “Parallel port test error codes” on page 247.

PS/2 mouse test

This test checks the computer's ability to communicate with a PS/2 mouse. It does not test the functionality of the mouse itself.

PS/2 mouse test error codes

For the PS/2 mouse test error codes, see “PS/2 mouse test error codes” on page 248.

ACPI test

This test makes sure that all ACPI-compliant devices in the computer are working properly. Select ACPI Test from the Misc. menu and press <Enter> Follow the instructions on the screen.

This diagnostics consists of the following tests:

- System Address Map test
- ACPI Tables test
- Definition Blocks test

The Advanced Configuration and Power Interface (ACPI) is a part of the Intel Operating System Directed Power Management (OSPM) specification for laptop, mobile, server, desktop, and home computers. ACPI includes the existing BIOS power management standards, APM APIs, PnP (Plug and Play) BIOS APIs, and other standards into one coherent power management and configuration specification.

ACPI also provides an orderly transition from legacy hardware to ACPI hardware. ACPI and AMIBIOS allow both older legacy standards and ACPI to exist together in a computer. New system architectures will stretch the limits of the current Plug and Play interface. ACPI evolves the existing motherboard configuration interface to support advanced system architectures in a more robust and more efficient manner.

ACPI test error messages

- Definition Block test failed at XXXX
- System Address Map test failed
- Root System Description Table test failed
- Fixed ACPI Description Table test failed
- Firmware ACPI Control Structure test failed
- Differentiated System Description Table test failed
- Secondary System Description Table test failed

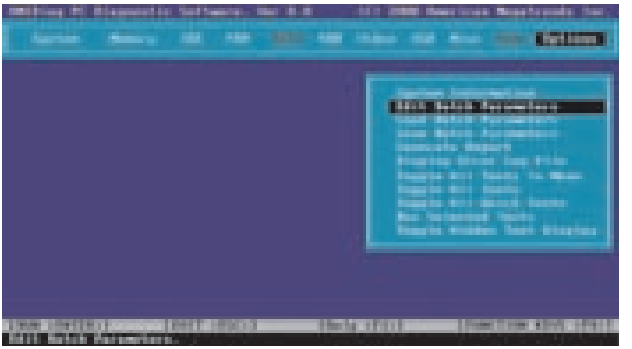
- Persistent System Description Table test failed
- Multiple APIC Description Table test failed
- Smart Battery Table test failed

ACPI test error codes

For the ACPI test error codes, see "ACPI test error codes" on page 248.

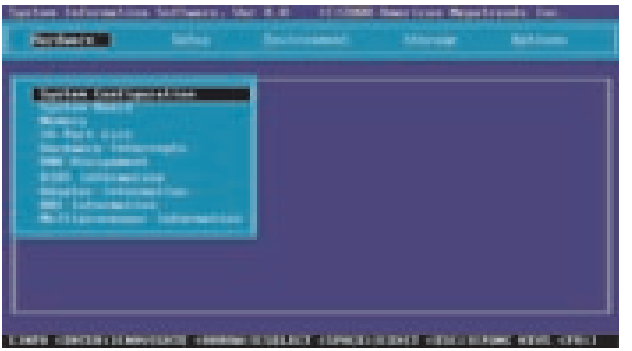
Options menu

The Options menu items are as follows:



System information

The System Information main screen is as follows:



The System Information utility detects and reports sound cards, PCI, USB, and SCSI devices. You can run Sysinfo from within AMIDiag by selecting System Information from the AMIDiag Options menu.

When to use Sysinfo

Use Sysinfo to determine the hardware and software environment. The environment may not be what you expect.

This example is just one of many ways that Sysinfo can be very useful.

Accuracy

If Sysinfo reports that an attached component or device is not present, verify that the system BIOS supports the device and that the device has been installed through the computer manufacturer or dealer. Make sure the motherboard in your computer supports the device.

Sysinfo limitations

Sysinfo gathers system information by directly accessing hardware, using standard APIs (Application Programming Interfaces), and traditional software scanning methods. However, even though a device is present in the computer, the device may not be supported by the system BIOS in the computer or the necessary drivers may not be loaded.

Reports

To print the entire Sysinfo report, select Edit Report Parameters from the Sysinfo Options menu and select LPT1 as the Report destination. Press <F7> to select all Sysinfo menus when Sysinfo is running, then press <F10> to run all selected menu items. The entire Sysinfo report on your computer will be printed.

Finding information

Select an option by pressing the → or ← keys, then press <Enter>.

To display information about	Menu	Menu Option
Adapter cards installed in the computer	Hardware	Adapter Information
Basic system configuration	Hardware	System Configuration
BIOS version	Hardware	BIOS Information
Device drivers	Environment	Device Drivers
Display (system monitor)	Setup	Display Setup
DMA channel assignments	Hardware	DMA Assignment
EFI information	Environment	EFI Environment
Quitting Sysinfo	Options	Exit Sysinfo
Hardware interrupt assignments	Hardware	Hardware Interrupts
I/O port assignments	Hardware	I/O Ports
Logical drive assignments	Storage	Logical Drives
Map of memory	Environment	Memory Map
Type and amount of memory	Hardware	Memory
Motherboard information	Hardware	Motherboard
Multimedia (CD-ROM, sound cards)	Setup	Multimedia information
Multiprocessing information	Hardware	Multiprocessor information
network information	Setup	Network information
PCI information	Setup	PCI information

To display information about	Menu	Menu Option
Physical drives assigned in the computer	Storage	Physical Drives
Plug and Play information	Setup	P-n-Play Information
Power management information	Setup	Power Management Information
Printing system configuration information	Options	See the procedure for this at "Reports" on page 59.
SCSI device information	Setup	SCSI information
Software interrupt assignments	Environment	Software Interrupts
System configuration information	Hardware	System Configuration

Sysinfo keys

Key	Description
N	Go to the next screen.
<Enter>	Select a menu option.
P	Return to the previous screen.
→ ← ↑ ↓	Scroll through screen items.
<Esc>	Quit this screen or exit Sysinfo and return to AMIDiag.
<F1>	Display a Help screen.
<F2>	Edit report parameters.
<F3>	Load report parameters.
<F4>	Save report parameters.
<F5>	Select or deselect current menu item.
<F6>	Select or deselect all items in a menu.
<F7>	Select or deselect all Sysinfo menu items.
<F9>	Display a description of the function keys.
<F10>	Run selected items.

Function keys

You can execute several Sysinfo menu items and send the Sysinfo results to a file or to the printer. To use this option, you must first select the Sysinfo menu items that you want information on. Highlight a menu item and press <F5> to select an item. You can press <F7> to deselect all Sysinfo menu items. Press <F6> to select or deselect all menu items on a specific Sysinfo menu.

Exit Sysinfo

Select the Options menu and Exit Sysinfo to return to AMIDiag.

Edit batch parameters

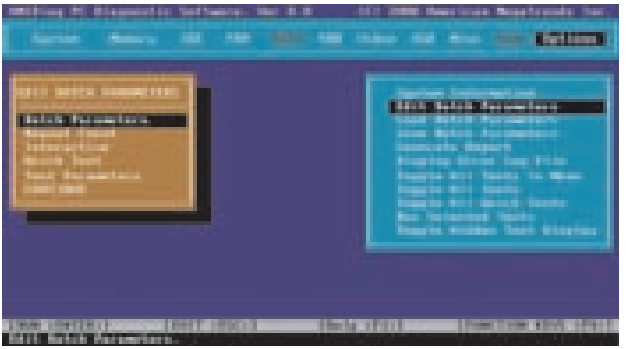
You can customize a set of AMIDiag diagnostic routines to run on your computer. You can save this customized set of diagnostic tests as a batch file to be run later.

To set or display AMIDiag runtime parameters, select Edit Batch Parameters from the AMIDiag Options menu. You can set:

- Type of AMIDiag test to be run
- Number of times each test is run
- Test parameters (for example, you can specify the starting and ending hard disk drive heads and cylinders to be tested)

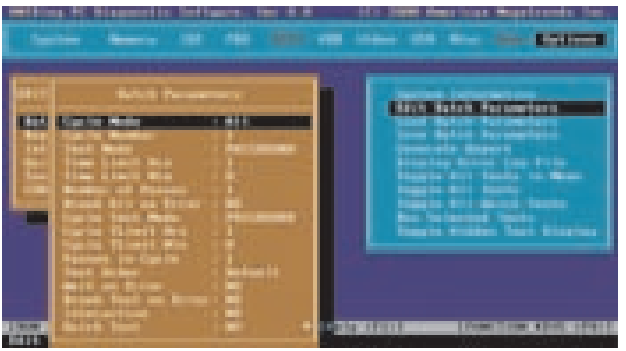
Edit batch parameters menu

The following box appears when you select Edit Batch Parameters:



Batch parameters

Choose Batch Parameters and press <Enter>. The following appears. Each field is explained below.



Cycle mode

Specifies the number of test cycle scripts in the file. In each cycle there can be a different set of test parameters.

Cycle number

This field can be set to All or One. Specifies whether to test through all of the cycles or just one cycle.

Test mode

The mode refers to the overall control, not individual cycles. The test modes are:

Mode	Description
Continuous	The specified tests are executed until <Esc> or <Ctrl> <Break> is pressed.
Timebound	Specify how long the test is to run. Type the hours in the Time Limit Hrs field and the minutes in the Time Limit Min and press <Enter>. The maximum hours is 999. The maximum minutes is 59.
Passbound	Set the number of passes (up to 65,535) for the selected AMIDiag tests in the Number of Passes field. You can press <Enter> to accept the default (run each selected diagnostic test once).

Test limit hrs

Specifies the time period in hours in case of cycle Timebound test mode.

Test limit min

Specifies the time period in minutes in case of cycle Timebound test mode.

Number of passes

Specifies the number of passes of cycles, in case of pass bound test mode.

Cycle test mode

Specifies the test mode in a cycle. The cycle test modes are:

Mode	Description
Timebound	Specify how long the test is to run. Type the hours in the Time Limit Hrs field and the minutes in the Time Limit Min and press <Enter>. The maximum hours is 999. The maximum minutes is 59.
Passbound	Set the number of passes (up to 65,535) for the selected AMIDiag tests in the Number of Passes field. You can press <Enter> to accept the default (run each selected diagnostic test once).

Cycle TLimit Hrs

Specifies the time period in hours in case of Timebound test mode.

Cycle TLimit Min

Specifies the time period in minutes in case of Timebound test mode.

Passes in cycle

Specifies the number of passes in a cycle, in case of cycle pass bound test mode. Individual tests also have a count specifying how many times they are to be executed.

Test order

The test order parameters are:

Parameter	Description
Default	The selected AMIDiag tests are executed in exactly the same order they were selected in.
Random	The selected AMIDiag tests are executed in a random manner.
Testwise	The selected AMIDiag tests are executed in the order they appear on the AMIDiag menus.

Test order example

Assume that you want to run Test A three times, Test B two times, and Test C just one time. The AMIDiag tests would be run in the following manner, depending on the Test Order parameter:

Test order parameter	Actual order of tests as they are run
Default	A, B, C, A, B, A
Testwise	A, A, A, B, B, C
Random	A, B, B, A, C, A

Wait on error

This field can be set to YES or NO. If set to YES, AMIDiag waits for you to press any key after finding every error.

Break on error

This field can be set to YES or NO. If set to YES, AMIDiag stops running after it finds an error.

Interactive test

Select Interactive Test parameter to run the interactive tests in interactive mode. Your input is required in an interactive test. The default value for this parameter is always No. The actions are:

Interactive Test Setting	Description
No	For all AMIDiag diagnostic tests hat support the interactive flag: if the test cannot be executed without your input, the test will not run. If the test can be run without your input but it is impossible to decide if the test has passed or failed without your input, the test will execute, but it will always pass.

Interactive Test Setting	Description
Yes	If the test cannot be run without your input, it will run now and will wait for your input as appropriate. If the test can be run without your input, but it is impossible to decide if the test has passed or failed without your input, the test will execute and it will wait for your decision whether the test passed.

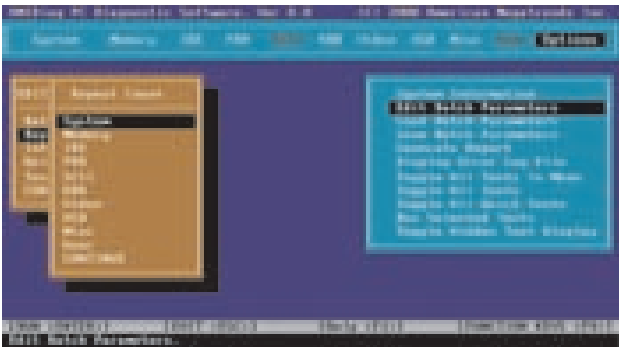
Quick test

This parameter specifies that tests must be run in quick test mode. Abbreviated versions of the diagnostic tests are executed in quick test mode. The selected test are run in quick test mode if the test supports quick mode. You can use the quick test parameter in two ways:

Quick Test Use	Description
Complete a system test in a shorter time.	Select the diagnostic tests you want to run or you can press <F7> to select all diagnostic tests on an AMIDiag menu. Set the Quick Test parameter to Yes. If you press <F10> to run the tests, all tests except the tests that support quick test will run normally. The tests that support quick tests run in quick mode. If your computer has several IDE and SCSI hard disk and CD-ROM drives, testing all drives will take a long time. When you select quick test, the IDE and SCSI devices will be tested quickly, saving lots of time.
Use quick test mode for fast system verification	Press <F8> when the AMIDiag main menu is displayed to set this parameter to Yes and to select the tests defines as System Quick Test Components. You can either script this test by pressing <F4> or running the tests in batch mode by pressing <F10>.

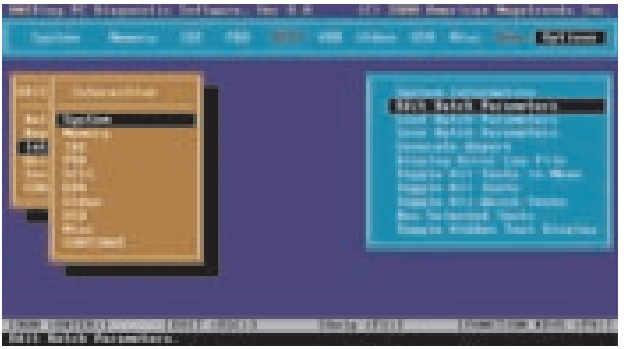
Repeat count

The following appears when you select Repeat Count from the Edit Batch Parameters box. Choose the number of times that you want to run the AMIDiag tests on the associated AMIDiag menus. You can run each test 1 - 255 times. If you have set the Passbound parameters (see the previous screen) to 5 and you set the repeat count to 5, the test will be run a total of 25 times.



Interactive test

Choose Interactive Test. The screen that appears is similar to the Repeat Count screen, as shown below:



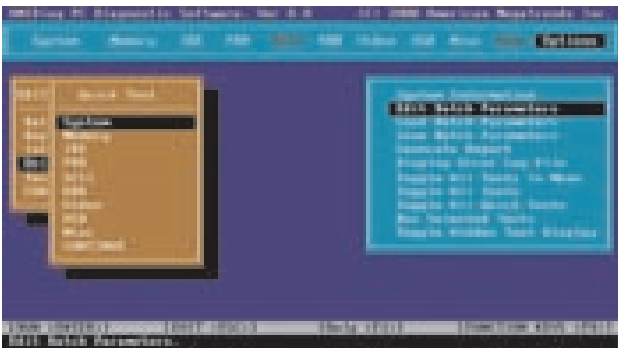
Select the test group. A list of all tests appears. Tests that support interactive test have Yes beside them. Highlight the tests to be run and press <Enter>.

Aborting tests

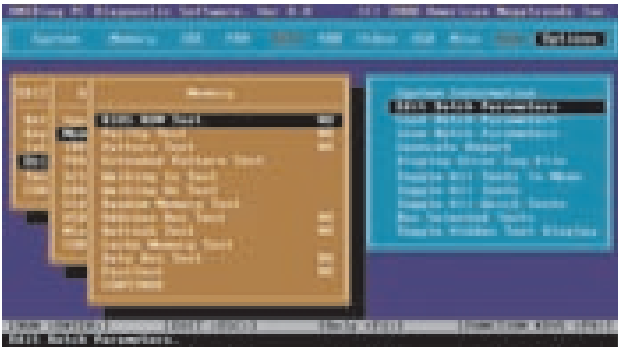
Press <Esc> to abort the testing process. Testing stops after any test in progress has been completed.

Quick test

Choose Quick Test. The screen that appears is similar to the Repeat Count screen, as shown below:

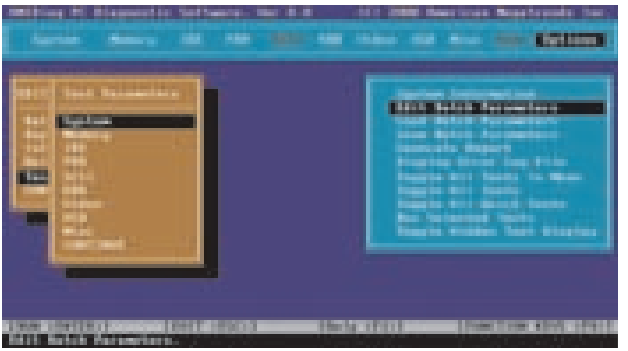


Select the test group. A list of all tests appears. Tests that support quick test have Yes beside them. Highlight the tests to be run and press <Enter>.

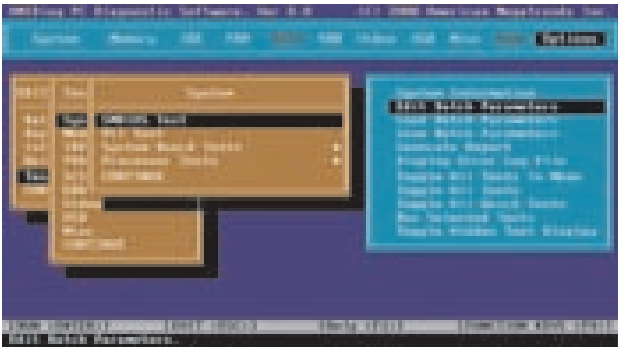


Test parameters

The following box appears when you select Test Parameters from the Edit Batch Parameters box. Each item in this box is the name of an AMIDiag menu. When you select an AMIDiag menu name from this menu and press <Enter>, all AMIDiag tests on the menu are listed. Choose the tests to be run in batch mode by highlighting the test and pressing <Enter>.

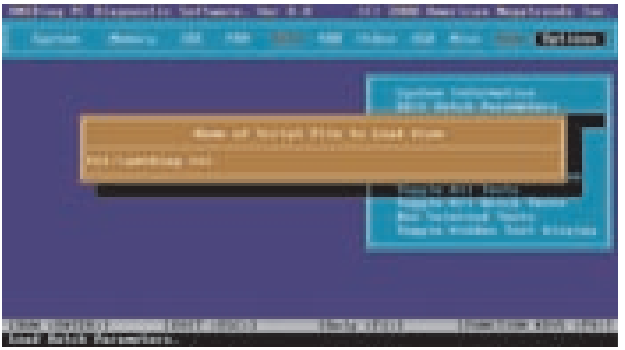


For example, if you select System, the following screen appears. If you highlight a test, such as Basic Functionality Test, the test parameters for that test are displayed. Set the parameters and select another diagnostic test. Select CONTINUE when you have set all test parameters for the AMIDiag test to be run in batch mode.



Load batch parameters

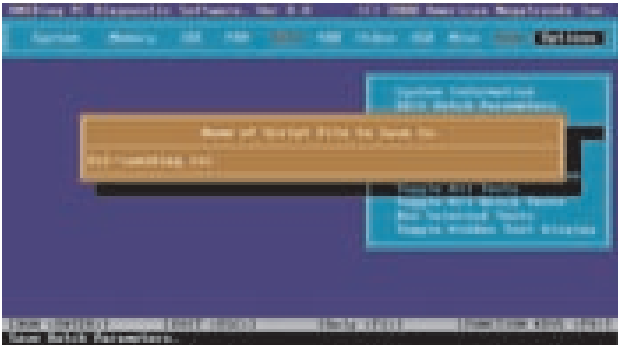
You can load previously saved AMIDiag batch diagnostic test parameters by choosing this option. The following appears when you select this option:



Press <Enter> to accept the default batch parameter file (AMIDIAG.INI) or type the appropriate AMIDiag batch parameter filename. You can use any valid filename. The filename extension does not have to be .INI. You can then run the AMIDiag diagnostic tests that are specified in this file by pressing <F10>.

Save batch parameters

You can save all batch mode parameters, selected tests, selected devices, and error logging information to an AMIDiag batch parameter file via this option. You can then load this ASCII file later and use the same saved options to run another AMIDiag test session later. This option allows you to use the same test parameters every time you perform an AMIDiag session. The following appears when you select this option:



Press <Enter> to accept the default batch parameter file (AMIDIAG.INI) or type the appropriate AMIDiag batch parameter filename.

Configuration files

The following diagnostic information concerns configuration files.

Test configuration files

The structure of the test configuration files is similar to standard INI files. These files must conform to the following guidelines:

- No spaces are permitted in the section name or entry name.
- The string corresponding to an entry can be any text string.
- If no match is found for an entry, a default string is used.
- Strings are not case-sensitive.
- Invalid entries are ignored.
- Script file comment lines start with ';'. The ; does not have to be in the first column.

Type of files

The types of test configuration files are:

- AMITESTS.INI
- USRTESTS.INI (optional)

AMITESTS.INI: This file contains information about the test configuration when AMIDiag was shipped. Most AMIDiag tests are implemented as external programs, so AMIDiag can run in a limited memory environment. Information about how a test is integrated into AMIDiag menus is stored in this file. You must not modify or delete this file.

USRTESTS.INI: This optional script file must be in the same directory as AMIDIAG. USRTESTS.INI specifies the external user-generated AMIDiag tests and their properties. USRTESTS.INI must have a TestInfo section. The information in this file can be written to your specifications. The TestInfo entries are:

Entry	Description
[TestInfo]	Information about new tests to be added. TestCount = Number of new tests. HotKeyEnabled = YES or NO Test1 = Section Header for Test1 Test2 = Section Header for Test2 There must be a separate section for each test. **Note:** If the value for HotKeyEnabled is Yes, hidden destructive tests will display when you press Alt-H. If No, you cannot enable destructive tests using a hot key. This applies to all tests defined in AMITESTS.INI and USRTESTS.INI.
[{TestSectionHeader}]	Information about a test module. Group — One of the group names. For the tests specified in usrtest.ini, the group name must be USER. Name ID — Test name that displays in the menu. If tests have the same file, this parameter identifies the test. Description — A 1-80 character test description displayed at the bottom of the screen. ExePath — The full pathname for the file. Parameters can be passed to the program either using this line or the following two identifiers: SubMenu — YES or NO. If Yes, an arrow displays beside the test name in the menu to indicate a second level test selection menu is present. **Note:** The following parameters are effective for the USRTESTS.INI file only. InitCommand — The command line parameters passed to the file during the initialization stage. RunCommand — The command line parameters passed to the file during run test stage. InitSuccCode — If specified, this user test is enabled only when the return code after initialization is as specified. PassExitCode — If specified, the test control module reports an error only when the return code is not as specified. If not specified, the return code is considered by the control module as "Undefined." In such a case, there is no failing condition. Tenable — YES or NO. If Yes, this appears normally in the USER menu. If No, this test will be hidden and can be enabled using Hot Key. If No, the AMIDiag program decides whether it can be enabled or not, based on the value in the HotKeyEnabled (described in the previous section of this table.)

Test parameter script file

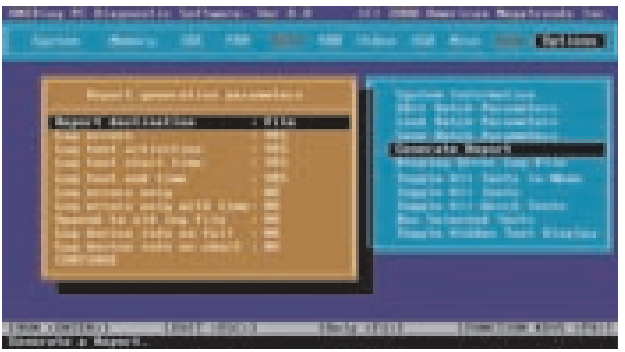
This file describes the test parameters, both batch mode parameters and individual test parameters. This file can be created by AMIDiag. It can be edited by any text editor. This sections and entries in this file are:

Section	Entries	
[Cycles]	Count	Specifies the number of test cycles.
	Cycle Mode	All or One.
	CycleNumber	Specifies the cycle number.
	Mode	Passboard, Time bound, or Continuous.
	Passes	Specifies number of passes.
	Hours	Specifies the hour part of time period.
	Minutes	Specifies the minute part of time period.
	BreakAllOnError	Breaks from batch mode on first error.
[CYCLEn:BatchParams]	Specifies batch mode parameters for cycle n.	
	ModeInCycle	Passbound, Timebound, or Continuous
	PassesInCycle	Specifies the number of passes in a cycle.
	HoursInCycle	Specifies the hour part of time period in a cycle.
	MinutesInCycle	Specifies the minute part of the time period in a cycle.
	Order	Default, Random, or Testwise
	WaitOnError	YES or NO
	BreakOnError	YES or NO
	TestInteractiveAll	YES or NO. This is the global control for interactive tests. If this is set to Yes, TestInteractive is force to Yes for all interactive tests regardless of what their individual TestInteractive parameter value is.
	QuickTestAll	YES or NO. The default is No. This is the global control for the Quick Test. If this is set to Yes, Quick Test is forced for all tests that support Quick Test regardless of what their individual Quick Test parameter value is.
[CYCLEn:ErrorLog]	Error Log parameters	
	LogErrors	YES or NO
	LogActivity	YES or NO
	StartTimeStamp	YES or NO

Section	Entries	
	EndTimeStamp	YES or NO
	LogErrorsOnly	YES or NO
	LogErrorsOnlyWithTime	YES or NO
	LogAppend	YES or NO
	LogFailDeviceInfo	YES or NO
	LogDeviceInfoOnAbort	YES or NO
	Device	NONE, FILE, COMn, or LPTn
	File	Full pathname of the log file.
	Heading	Title of the log.
[CYCLEn:TestName]	Individual test parameters	
	Repeat	Number of times to repeat the test in one pass of a cycle.
	TestInteractive	YES or NO. Effective if the value of TestInteractiveAll is No.
	QuickTest	YES or NO. Effective if the value of QuickTestAll is No.
	Other parameters…	Parameters specific to a test.
[CYCLEn:ExecBat]	Specify the .bat file to be executed at the end of cycle n.	
	BatPath	The full pathname for the .BAT file. Parameters can be passed to the .BAT file in this line.Parameters can be passed to the .BAT file in this line.

Generate report

Select Generate Report to specify the output device: disk file, printer, or serial port. The report generation parameters are:



Choose CONTINUE after setting report parameters.

Report destination

Choose where the report is sent. Select NONE, File, COM1, or LPT1. If you select File, enter a valid filename when prompted.

Log errors

Select YES to direct AMIDiag to write all errors to the selected output device. The settings are YES or NO.

Log test activities

Select YES to log all test activities (the test, how many times) to the output device. The settings are YES or NO.

Log test start time

Select YES to write the time that a test starts to the error logging device. The settings are YES or NO.

Log test end time

Select YES to write the time that a test ends to the error logging device. The settings are YES or NO.

Log errors only

Select YES to direct AMIDiag to write log errors only to the selected output device. The settings are YES or NO.

Log errors only with time

Select YES to direct AMIDiag to write errors and the time they occurred to the selected output device. The settings are YES or NO.

Append to old log file

Select YES to direct AMIDiag to append the current log file to a previous log file. The settings are YES or NO.

Log device info on fail

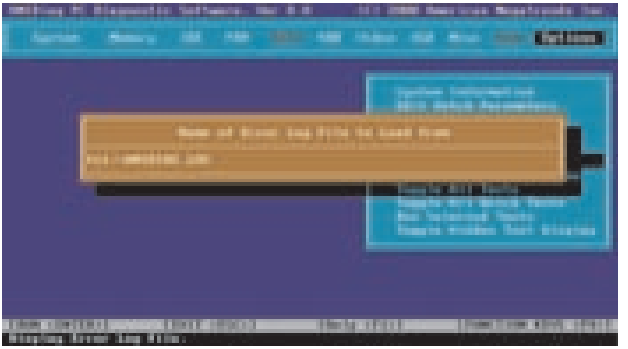
If a system error occurs and the system fails while AMIDiag logs an error, you can log the information about the device on which you log error messages. The settings are YES or NO.

Log device info on abort

If you choose to abort the report generation, you can log the information about the device on which you log error messages. The settings are YES or NO.

Display error log file

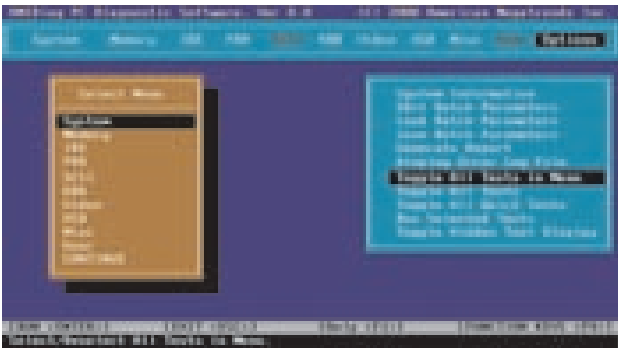
AMIDiag allows you to display the error log while still running AMIDiag. The AMIDiag error log contains all diagnostic errors that AMIDiag has found during the current AMIDiag session. The log file viewer offers some text search capability.



To display the error log, select Display Error Log File from the AMIDiag Options menu. Enter the name of the error log file. The default filename is AMIDIAG.LOG. The AMIDiag error log file will display.

Toggle all tests in menu

Select this option to display the list of test menus and select a menu. When you select a menu, the tests for that menu display.



Toggle all tests

Choose this option to select all tests.

Toggle all quick tests

Choose this option to select all quick tests. Quick tests are abbreviated versions of the complete test. They test one percent of the items.

Run selected tests

Choose this option to run the tests that you have selected.

Toggle hidden test display

Select this option to display all hidden tests.

Memory tests

There are three types of individual memory tests:

- First Row Memory Test
- Base Memory Test
- Extended Memory Test

Each of these tests has different functions and is explained in the following sections.

First row memory test

The First Row Memory Test will test the first 64 MB of the first populated row of memory configured. The scanning order for the first row of memory is described in the following table.

Order	Row	Board	DIMM
1	C	Upper	5-8
2	D	Upper	13-16
3	E	Upper	21-24
4	F	Upper	29-32
5	8	Upper	1-4
6	9	Upper	9-12
7	A	Upper	17-20
8	B	Upper	25-28
9	4	Lower	5-8
10	5	Lower	13-16
11	6	Lower	21-24
12	7	Lower	29-32
13	0	Lower	1-4
14	1	Lower	9-12
15	2	Lower	17-20
16	3	Lower	25-28

Upon completion of the first row memory test, the memory testing continues with the base memory test.

If the first row test fails, there are several possible failing cases. Two failing scenarios are described in the following sections.

Case 1

The first row memory test encounters a MBE (Multi Bit Error) in the first populated row of memory configured. Irrespective of the number of DIMMs populated in the

system, if the first row test encounters a MBE, the BIOS will display an error message on the front panel LCD and halt the system.

User notification: This memory test occurs during POST and prior to video sync. Therefore, any error found during this test will result in the following message displayed on the LCD panel.

```
"First row test"

"Failed, sys halt"
```

User action: This memory failure must be fixed and can only be fixed by replacing the bad row of DIMMs.

Replace the first row of DIMMs. Determine the location of the defective row using the table at “First row memory test” on page 74. Starting with #1 in the "Order" column, determine the "DIMM" locations (5-8 in this example) and memory board (upper in this example). If memory is populated in these DIMM locations then this is the first row and has defective memory. If not, the next set, if populated, becomes the first row. Repeat until you have determined the first memory row. On replacing the DIMMs, make sure the size and manufacturer match.

Clear CMOS via the front panel or via clear CMOS jumper in order to clear previous defective DIMM history. For more information on how to clear CMOS, see “Clearing the CMOS register” on page 220.

Power on the system.

Error logging: The defective row/DIMM(s) found during this test cannot be logged to the SEL or reported on screen.

Case 2

The system is populated with only one row of memory and the first row memory test encounters a SBE (Single Bit Error). In this case, the BIOS will write these rows into CMOS history, map out the only row of DIMMs, and halt the system.

User notification: This memory test occurs during POST and prior to video sync. Therefore, any error found during this test will result in the following message displayed on the LCD panel and the system will halt.

`"First row test" –`	displayed on the upper LCD line
`"0064 MB" –`	displayed on the lower LCD line
`"ALL DIMM MAP OUT" –`	displayed on the upper LCD line

Example 1: Consider a system that is populated with only one row of 128 MB DIMMS in the upper board row 1-4. If an SBE was detected in DIMM 1 during the first row memory test, the following message will appear on the LCD:

`"First row test" –`	displayed on the upper LCD line
`"0064 MB" –`	displayed on the lower LCD line
`"ALL DIMM MAP OUT" –`	displayed on the upper LCD line

User action:

1. Replace the first row of DIMMs. On replacing the DIMMs, make sure the size and manufacturer match.

2. Clear CMOS via the front panel or via clear CMOS jumper (see "Clearing the CMOS register" on page 220) in order to clear previous defective DIMM history.
3. Power on the system.

Error logging: The defective row/DIMM(s) found during this test case cannot be logged to the SEL or reported on screen.

Base memory test

The Base Memory Test will take effect after the completion of the first row test with no errors, or with single bit errors, and if the system contains more memory to test. The base memory test will test the first 2 GB of memory. If this memory is found to be defective, the BIOS will detect the defective memory row(s), write these rows into CMOS for further processing, and display an appropriate error message on the front panel LCD. The BIOS will then force a reset of the system. During the next boot, this written history will be read from CMOS and the defective rows will be mapped out of the data path. The BIOS does not differentiate between SBEs and MBEs. In both cases the system will reset and map out the defective row, upon detection.

Combining the memory errors encountered in the first row test with base memory test leads to several possible cases. Some failing cases are described below.

Case 1

The system is populated with more than one row of memory and the first row memory test encounters a SBE (Single Bit Error). In this case, the BIOS will write these rows into CMOS history and map out the first row of DIMMs and continues with base memory testing. If the base memory test does not encounter any memory errors, then the system will continue to boot.

User notification: The first row that contains the defective DIMM will be mapped out and the system will continue to boot with the remaining memory. An error message will be displayed to video for the mapped out defect DIMM.

`"First row test" –`	displayed on the upper LCD line during first row test
`"0064 MB" –`	displayed on the lower LCD line during first row test
`"BASE MEMORY TEST" –`	displayed on the upper LCD line
	Note: The "base memory test" message may appear and disappear very quickly.

Later an error message for the defective DIMM will be displayed on the video as follows:

```
8C9X: "DIMMS mapped out: Upper Board, n-n+3"
```

Where 'n' refers to the DIMM number.

Example: Consider a system populated that is with two rows of 128 MB DIMMs in the upper board rows 1-4 and 5-8. If a single bit memory error was detected in DIMM 5 during the first row memory test and if no errors were found during the base memory test, the following message will appear on the video during POST:

```
1024 MB Total Memory Installed

512 MB Configured

512 MB Tested
```

The first line is the total memory installed (regardless of condition). The second line is the total memory usable (and is less than the first line, only if defective DIMMs were found). The third line counts the memory as the test is being performed. When the test is completed, the number in this line should equal the number in the second line.

The following error message for the defective DIMM 5 will be displayed on the video as follows:

```
"8C95: DIMMs mapped out: Lower Board, 5 - 8"
```

User action: If the user is satisfied with the configured memory on the system, no action is required. Otherwise, follow these steps:

1. Determine the location of the row of defective DIMMs from the error message or by running the EFI based SELViewer Utility. Replace the defective DIMMs (in the example it is 5-8). On replacing the DIMMs, make sure the size and manufacturer match.
2. Clear CMOS via the front panel or via clear CMOS jumper (see "Clearing the CMOS register" on page 220) in order to clear previous bad DIMM history.
3. Power on the system to continue.

Error logging: The defective row /DIMM(s) found during this test case will be logged to the SEL and reported on the screen.

Case 2

The system is populated with more than one row of memory and the first row memory test encounters a SBE (Single Bit Error). The base row test encounters memory errors on all the rows. In this case, the BIOS will write the failing row from first row test into CMOS history, map out the first row of DIMMs, and continues with base memory testing. The base memory test will write the failing rows into CMOS history and map out the defective rows upon reset. If all the memory in base memory (< 2 GB) is mapped out due to memory errors, then the system will display a message on the LCD and halt the system.

User notification: This memory test occurs during POST and prior to video sync. Therefore, any error found during this test will result in the following message displayed on the LCD panel and the system will halt.

`"First row test" –`	displayed on the upper LCD line
`"0064 MB" –`	displayed on the lower LCD line
`"BASE MEMORY TEST" –`	displayed on the upper LCD line
`"ERRORS IN MEMORY" –`	displayed on the upper LCD line
`"RESETTING SYSTEM" –`	displayed on the lower LCD line (prior to resetting if an error was found)

Upon reset, you will see the following messages on the LCD:

`"First row test" –`	displayed on the upper LCD line
`"0064 MB" –`	displayed on the lower LCD line
`"ALL DIMM MAP OUT" –`	displayed on the upper LCD line

Example: Consider a system is populated with two rows of 128 MB DIMMS in the upper board row 1-4 and row 5-8. If an SBE was detected in DIMM 5 during the first

row test and an SBE\MBE was detected in DIMM 1 during the base memory test, then the following message will appear on the LCD:

```
"First row test"

"0064 MB"

"BASE MEMORY TEST"

"ERRORS IN MEMORY"

"RESETTING SYSTEM"
```

Upon reset, you will see the following messages on the LCD and the system will halt:

```
"First row test"

"0064 MB"

"ALL DIMM MAP OUT"
```

User action: Determine the first row of DIMMs using the scanning order defined in the table at "First row memory test" on page 74. Replace the first row of DIMMs with known good DIMMs. On replacing the DIMMs, make sure the size and manufacturer match.

Clear CMOS via the front panel or via clear CMOS jumper (see "Clearing the CMOS register" on page 220) in order to clear previous defective DIMM history.

Power on the system.

Note: The defective rows of DIMM found during base memory test can be determined once the system boots from the "DIMMs mapped out" message. Then, those DIMMs can be replaced, if needed.

Error logging: The defective row/DIMM(s) found during the base memory test will be logged to the SEL. This includes both single-bit errors (SBE) and multi-bit errors (MBE).

Case 3

The system is populated with more than one row of memory, the first row memory test encounters a SBE (Single Bit Error), and the base row test encounters memory errors but not on all the rows. In this case, the BIOS will write the failing row from first row test into CMOS history, map out the first row of DIMMs, and continues with base memory testing. The base memory testing will write the failing rows into CMOS and map out the defective rows upon reset. Since not all the memory in base memory test (< 2 GB) gets mapped out, then the system will continue to boot with the remaining good memory found during the base memory test.

User notification: The defective rows found during first row test and base memory test will be mapped out and the system will continue to boot with the remaining base memory. An error message will be displayed to video for the mapped out defect DIMM.

Example: Consider a system that is populated with three rows of 128 MB DIMMs in the upper board rows 1-4, row 5-8, and row 9-12. If a memory error was detected in DIMM 5 during the first row memory test and a memory error was encountered in DIMM 1 during base test, the following messages will appear on the LCD:

```
"First row test" –          displayed on the upper LCD line
```

"0064 MB" –	displayed on the lower LCD line
"BASE MEMORY TEST" –	displayed on the upper LCD line
"ERRORS IN MEMORY" –	displayed on the upper LCD line
"RESETTING SYSTEM" –	displayed on the lower LCD line (prior to resetting if an error was found)

Upon reset, you will see the following messages on the LCD:

"First row test" –	displayed on the upper LCD line
"0064 MB" –	displayed on the lower LCD line
"BASE MEMORY TEST" –	displayed on the upper LCD line

The system will continue to boot and the following messages will appear on the screen during POST:

```
1536 MB Total Memory Installed

512 MB Configured

512 MB Tested
```

The first line is the total memory installed (regardless of condition). The second line is the total memory usable (and is less than the first line, only if defective DIMMs were found). The third line counts the memory as the test is being performed. When the test is completed, the number in this line should equal the number in the second line.

```
8C99: DIMMs mapped out: Upper Board, 1 - 4

8C9D: DIMMs mapped out: Upper Board, 5 - 8
```

User action: If the user is satisfied with the configured memory on the system, no action is required. Otherwise, follow these steps:

1. Determine the location of the row of defective DIMMs from the error message or by running the EFI based SELViewer Utility. Replace the defective DIMMs (in the example it is 5-8 and 1-4). Make sure the size and the manufacturer of DIMMs match.
2. Clear CMOS via the front panel or via clear CMOS jumper (see "Clearing the CMOS register" on page 220) in order to clear previous defective DIMM history.
3. Power on the system to continue.

Error logging: The defective row /DIMM(s) found during this test case will be logged to the SEL and reported on the screen.

Case 4

This is a special case where memory errors encountered in the first row test and base memory test can lead to an infinite loop of system resets. This special case occurs under the following conditions:

1. First row test encounters an SBE, base memory test encounters memory errors and the jumper is set to 'clear CMOS' position
2. First row test encounters an SBE, base memory test encounters memory errors and a front panel button combination to clear CMOS has been completed.

   OR

3. First row test encounters an SBE, base memory test encounters memory errors and a bad CMOS checksum was seen by BIOS.

User notification: The BIOS will try to map out defective rows found during base memory test but will end up in an infinite reset loop.

"First row test" –	displayed on the upper LCD line
"0064 MB" –	displayed on the lower LCD line
"BASE MEMORY TEST" –	displayed on the upper LCD line
"ERRORS IN MEMORY" –	displayed on the upper LCD line
"RESETTING SYSTEM" –	displayed on the lower LCD line (prior to resetting)

Upon reset, the above messages will display again on the LCD and will keep repeating in an infinite loop.

User action:

1. Use the out-of-band mechanism of reading System Event Log (Intel's Server Management software, specifically DPC, can be used for this) to determine the location of the row of defective DIMMs from the SELViewer Utility. Replace the defective DIMMs. If you do not have out-of-band access to SEL, then remove all DIMMs from the system and populate the system one row at a time.
2. Clear CMOS via the front panel or via clear CMOS jumper (see "Clearing the CMOS register" on page 220) in order to clear previous defective DIMM history.
3. Power on the system to continue.

Error logging: The defective row/DIMM(s) found during this test case will be logged to the SEL and reported on screen.

Extended memory test

The extended memory test takes effect after both the first row test and the base memory test have passed. The Extended Memory Test will test the physical memory above 2 GB to a maximum of the total installed memory. Any errors found will be detected to the failing memory row and recorded into the CMOS history bits for processing during the next reset. Since this occurs after system POST, the BIOS will not reset the system. Instead, error messages will be displayed on the video screen.

There is a 2 GB fixed gap between the memory address 2 GB to 4 GB that is reserved for PCI. This 2 GB of memory addresses, as seen by the processor, will not be tested.

User notification

There are two sets of messages associated with this test. The first occurs when the test is being performed. The message is as follows:

```
XXXXX MB Total Memory Installed

XXXXX MB Configured

XXXXX MB Tested

Memory Errors Detected
```

Note: The "memory errors detected" message will appear only if extended memory test finds errors.

The first line is the total memory installed (regardless of condition). The second line is the total memory usable (and is less than the first line, only if defective DIMMs were found). The third line counts the memory as the test is being performed. When the test is completed, the number in this line should equal the number in the second line. A fourth line, "Memory Errors Detected", will occur only if the memory test found errors on this latest test pass. It will not occur if the memory test found errors on previous boots; however, in that case, the size in the second line will be smaller than the first line.

Note: There is a 2 GB fixed gap between the memory address 2 GB to 4 GB, which is occupied by PCI gap, system flash address, and other fixed addresses. This 2 GB of memory address space will not be available for 'Configured' memory. For example, if a system has total installed memory of 64 GB, the maximum usable memory in the system will be (64 GB - 2 GB) = 62 GB. In this case, the "Configured" line will read 62 GB. As mentioned above, the "Tested" line will count up and its final value will always be equal to the "Configured" line (assuming all the memory is good, this will be 62 GB in this example). Please refer to the 82460GX Chipset EDS for further details on the system memory map.

A second set of messages will be seen later in the POST, which indicates where the memory test found errors. The sequence is as follows:

```
Error in memory subsystem: (Lower/Upper) Board, DIMM XX

ERRORS FOUND IN MEMORY SUBSYSTEM. FAILING ROWS WILL BE MAPPED OUT ON THE
NEXT RESET. IT IS STRONGLY SUGGESTED THAT YOU RESET THE SYSTEM NOW.

ALLOWING THE SYSTEM TO CONTINUE TO BOOT MAY RESULT IN UNSTABLE SYSTEM
BEHAVIOR AND/OR HARD DISK CORRUPTION.

Hit <F1> to load defaults or <F2> to run SETUP or <ESC> to continue
```

Important: Failure to reset the system as explained above may cause damage to your system.

The following examples assume that the total memory installed is 32 GB (32768 MB).

Example #1: The system boots with 32 GB of memory installed and, no defects found, will report the following:

```
32768 MB Total Memory Installed

32768 MB Configured

32768 MB Tested
```

Example #2: Consider a system populated that has the entire upper board memory slots with 1 GB DIMMs. The first row test and the base row test passed without errors. The extended memory test detected a memory error in DIMM 17. The following messages will appear:

```
32768 MB Total Memory Installed

32768 MB Configured

32768 MB Tested

Memory Errors Detected
```

A second set of messages will be seen later in the POST that indicates where the memory test found errors. The sequence is as follows:

```
8C81: Error in memory subsystem: Upper Board, DIMM 17
```

```
8C82: ERRORS FOUND IN MEMORY SUBSYSTEM. FAILING ROWS WILL BE MAPPED OUT ON
THE NEXT RESET. IT IS STRONGLY SUGGESTED THAT YOU RESET THE SYSTEM NOW.
ALLOWING THE SYSTEM TO CONTINUE TO BOOT MAY RESULT IN UNSTABLE SYSTEM
BEHAVIOR AND/OR HARD DISK CORRUPTION.

Hit <F1> to load defaults or <F2> to run SETUP or <ESC> to continue
```

Important: Failure to reset the system as explained above may cause damage to your system.

The first line will be seen for each DIMM that on which the extended memory test has found an error. This message will NOT be seen on subsequent POSTs.

The second and the third line will be seen each time a memory error was found by the extended memory test.

User action

Upon getting the notification of memory errors during extended memory testing, Intel strongly recommends that the server be reset by pressing the reset button. On the subsequent boot, the defective DIMMs, found during extended memory testing, will be mapped out and will not be available as part of the usable memory. Failure to do the reset would result in an unstable behavior of the system.

Under 'User Notification' in Example #2, the following error message can be seen if the system is reset.

```
32768 MB Total Memory Installed

30720 MB Configured

30720 MB Tested

8C9B: DIMMs mapped out: Upper Board, 17-20
```

Note: In the above example, we do NOT see "Memory Errors Detected", because the defective memory has been mapped out. This is shown because the second line configured size is less than the first.

Error logging

For the extended memory test, four error records will be written for multi-bit errors, one for each DIMM. For single-bit-errors during the extended memory test, error records will be one per DIMM. By specifications, the DIMM number will be one less than the silk-screened number on the printed-circuit board.

Memory test duration

The time it takes for memory test depends on the size of memory and the exact population scheme. The more memory that is tested, the longer this test takes, with a full test taking a significant amount of time. To alleviate this problem, skipping memory locations can be done, but this does not exercise the entire memory subsystem. To reach a compromise, there will be CMOS Setup options available to the user. These CMOS options will allow a user to select a quick memory test or an exhaustive one. Refer to “Setup dialog” on page 83 for more information on the options.

Aborting the memory test

Users are given the option to abort the memory test by pressing the spacebar. The following string will appear on the bottom of the screen when executing the extended memory test:

```
Press spacebar to abort memory test.
```

However, this method will only work for the extended memory test. It will not work for the first row or base memory tests. The total amount of memory installed in the system will still be reported on the video screen.

Setup dialog

The BIOS setup (F2) menu has the following selections:

```
->Advanced->Chipset Configuration->Memory Related Items:
```

Name	Selection	Comments
System ECC	Enabled	Default
	Disabled	
First Row Test Interval	4 cache line per 16 MB	Default
	Every location	
Base Memory Test Interval	4 cache line per 16 MB	Default
	Every location	
Extended Memory Test Interval	4 cache line per 16 MB	Default
	Every location	
Defective DIMM Mapout	Enabled	Default – Enables map out
	Disabled	Disables map out
Clear Bad Memory Row Info	Disabled	Default – Don't clear history
	Enabled	Clear history

The test interval entries determine how much of the target memory is tested. The default in all cases is 4 cache line per 16 MB (fastest mode). In the alternate mode, each cache line is tested.

The 'Defective DIMM Mapout' is used to turn off mapout completely. If this is disabled, defective DIMMs will be detected, but not mapped out on the next BOOT.

The 'Clear Bad Memory Row Info' is used to clear the history, and retest all memory. This option is used when defective memory has been replaced, and the user wishes to place it in service again. This option automatically goes back to 'disabled' after the next boot.

Configuration

This section provides information on configuring the xSeries 380 server.

Power-on sequence and Power-On Self Test (POST)

Turning on the system causes POST to run and control to pass to the Boot Manager. From the Boot Manager, you can choose to invoke the Extensible Firmware Interface (EFI) Shell or you can choose to go to the Boot Maintenance Menu. For information on the Boot Manager, refer to "The Extensible Firmware Interface (EFI) Boot Manager" on page 86. For information on the EFI Shell, refer to "The Extensible Firmware Interface (EFI) Shell" on page 89.

Follow these steps to power up the xSeries 380 server:

1. Press the Power on/off button on the Front Control Panel. Pressing this button causes the server fans to start up and POST to begin running. You can monitor boot progress in two different places: the video display on a monitor attached to the system and the LCD display located on the Front Control Panel. Information appears in the LCD display first.
2. POST, which is stored in flash memory, begins running. POST checks the drive carriers, processors, memory, keyboard, and most installed peripheral devices. During the memory test, POST displays the amount of memory it is able to access and test. The length of time needed to test memory depends on the amount of memory installed.
3. The LCD displays boot progress as follows:

   Note: The LCD display on your system may indicate a different boot progression depending on firmware levels.

   - Boot, First Row Test (should always be 64MB)
   - Base Memory Test (2GB max)
   - External Memory Test (will report out if enough memory is available)
   - CMOS Test
   - Keyboard Bat Test
   - Initialize Timer
   - PCI Bus Scan
   - Initialize Video
   - Keyboard Test
   - Initialize IDE
   - Serial Test
   - Prepare to Boot

- Processor Speed

4. Video appears on the monitor attached to the system and begins to display boot progress.
   - AMI BIOS banner: displays the loaded versions of the BIOS, PAL, SAL, and EFI.
   - QLogic banner: allows you the opportunity to enter the QLogic SCSI utility by entering the key combination <Alt-Q>. The QLogic SCSI utility allows you to manage and configure the server's SCSI devices. For information on the screens available in this utility, refer to "QLogic SCSI utility" on page 97.
5. POST concludes and passes control to the Boot Manager.
6. From the Boot Manager, you can use arrow keys to highlight the option that invokes the EFI Shell, or you can highlight and select the Boot Maintenance Menu. Selecting the Boot Maintenance Menu lets you configure boot options and other boot environment variables.
7. Follow the instructions in your operating system documentation to load and start an operating system.

The Extensible Firmware Interface (EFI) Boot Manager

The EFI Boot Manager allows you to control the server's booting environment. Depending on how you have configured the boot options, after the server is powered up the Boot Manager presents you with different ways to bring up the system. For example, you can boot to the EFI Shell, to an operating system located on the network or residing on media in the server, or the Boot Maintenance Menu.

EFI Shell
A simple, interactive environment that allows EFI device drivers to be loaded, EFI applications to be launched, and operating systems to be booted. The EFI shell also provides a set of basic commands used to manage files and the system environment variables. For more information on the EFI Shell, refer to "The Extensible Firmware Interface (EFI) Shell" on page 89.

Boot Options
Files that you include as boot options. You add and delete boot options by using the Boot Maintenance Menu. Each boot option specifies an EFI executable with possible options. For information on the Boot Maintenance Menu options, refer to Table 2 on page 87.

Boot Maintenance Menu
A menu of items allowing you configure boot options and configure other boot environment variables. The following table describes each menu item in the Boot Maintenance Menu.

Table 2. Boot Maintenance Menu Options.

Option	Description
Boot from a File	Automatically adds EFI applications as boot options or allows you to boot from a specific file. When you choose this option, the system searches for an EFI directory in all EFI System Partitions in the system. For each EFI directory the system finds, it searches through that directories subdirectories. Within each subdirectories, the system looks for the first file that is an executable EFI Application. Each file that meets this criterion can be automatically added as a boot option. In addition, legacy boot options for A: and C: are also added if those devices are present. Using this option, you can also launch a specific application without adding it as a boot option. In this case the EFI Boot Manager searches the root directories and the \EFI\TOOLS directories of all of the EFI System Partitions present in the system for the specified EFI Application.
Add a Boot Option	Adds a boot option to the EFI Boot Manager. You specify the option by providing the name of the EFI application. Along with the name you can also provide either ASCII or UNICODE arguments the file might use. Given the EFI application name and any options, the EFI Boot Manager searches for the executable file in the same partitions and directories as described in "Boot from a File" option. When the file is found, it is executed.
Delete Boot Options	Allows you to delete a specific boot option or all boot options.
Change Boot Order	Allows you to control the relative order in which the EFI Boot Manager attempts boot options. For help on the control key sequences you need for this option, refer to the help menu.
Manage BootNext Setting	Allows you to select a boot option to use one time (the next boot operation).
Set Auto Boot Timeout	Allows you to define the value in seconds that pass before the system automatically boots without user intervention. Setting this value to zero disables the timeout feature.
Close Redir & Return EMP Mode to Active	Allows you to switch the COM2 from the system port (used for redirection) and gives control of the COM2 port to EMP (Emergency Management Port).
Cold Reset	Performs a platform-specific cold reset of the system. A cold reset traditionally means a full platform reset.
Exit	Returns control to the EFI Boot Manager main menu. Selecting this option will display the active boot devices, including a possible integrated shell (if the implementation is so constructed).

Saving boot records

If boot records for Linux or Microsoft operating systems are lost, it may cause reinstallation of the operating system. These boot records are saved in NVRAM (on

the Legacy I/O board) when Linux or Microsoft operating systems are installed. These boot records must be available in order to boot to these operating systems.

Boot records may be lost upon replacement of the Legacy I/O board, replacement of the battery or replacement of the T-Docking board.

Linux boot records can be built using the Boot Manager "Add a boot" option. Microsoft operating systems have an EFI based utility (nvrboot.efi) that saves this boot record to the hard drive.

Important: Microsoft boot records should be saved as soon as the operating system is installed. Microsoft boot records cannot be rebuilt with Boot Manager's "Add a boot" option.

Linux

To rebuild a boot record under Linux when the boot record is deleted or lost:

1. Boot the server to the boot option maintenance menu.
2. Select "Add a boot".
3. Select the system partition "No Volume Label (VenHW(unknown)Device=80/HD(Part1,...)"
4. Select file menu "eli.efi"
5. Enter new description type "Linux"
6. Enter boot option data type "N"
7. Press Enter.
8. From the boot options maintenance menu, select "Save Settings to NVRAM".
9. Exit the boot options menu.
10. Exit the main menu.

Microsoft

The following sections describe how to save and rebuild boot records under a Microsoft operating system.

Save boot record: To save (export) a boot record under Microsoft:

1. Boot to the EFI shell.
2. Select "fsx:" where x=(Device:80)/HD
3. CD MSUtil
4. Run "nvrboot"
5. Run "x" (Export)
6. Select boot option that is used for "Microsoft Windows Whistler Advanced Server"
7. For Export file path, enter fn.ft. This will write the file to fsx:\.

The boot record is saved in the root directory. To save the boot record to a LS120 diskette, copy nvrboot.efi to the floppy drive and run "nvrboot" from the floppy.

Restore boot record: To restore (import) a boot record under Microsoft:

1. Boot to the EFI shell.
2. Select "fsx:" where x=(Device:80)/HD
3. CD MSUtil

4. Run "nvrboot"
5. Run "i" (Import)
6. For Import file path, enter fn.ft (of exported file on fsx:\). The boot record will be restored to the next available boot record slot.

The Extensible Firmware Interface (EFI) Shell

The EFI Shell is an EFI application that allows other EFI applications to be launched. The combination of the EFI firmware and the EFI Shell provide an environment that can be modified to easily adapt to many different hardware configurations. The EFI shell described in Table 3 is a simple, interactive environment that allows EFI device drivers to be loaded, EFI applications to be launched, and operating systems to be booted. Additionally, the shell also provides a set of basic commands used to manage files and the EFI NVRAM shell and boot variables.

After booting the server to the EFI Shell, you have some built-in shell commands available to you. The "?" or Help provides a brief description of the commands.

In addition to shell commands made available to you, the EFI environment allows you to create your own shell commands and EFI applications. For detailed information about the EFI Shell, its commands, and the ability to develop within the environment, refer to the EFI Developer's Guide. To find this guide, you must download the "EFI sample implementation source code" from the sample implementation download area of the Extensible Firmware Interface Web Site. Go to the following URL and click on the "EFI sample implementation source code" Once you download the sample, locate the Microsoft Word file named "Efi_dg.doc" in the "Notes" folder. To develop your own shell commands, download the EFI Application Toolkit from the Tools hyperlink on the following website:

http://developer.intel.com/technology/efi

Table 3. EFI Shell Commands.

Command	Description
<drive_name>:	Changes drives. For example, entering a: and pressing the <ENTER> key changes the drive to the LS120 drive.
alias [-bdv] [sname] [value]	Sets or gets alias settings
attrib [-b] [+/- rhs] [file]	Views or sets file attributes
bcfg -?	Configures boot driver and load options in EFI NVRAM
cd [path]	Changes the current directory
cls [background color]	Clear screen
comp file1 file2	Compares two files
cp [-r] file [file] ... [dest]	Copies files and directories; [-r] = recursive
date [mm/dd/yyyy]	Gets or sets the date
dblk device [Lba] [Blocks]	Performs a hex dump of BlkIo Devices
dh [-b] [-p prot_id] | [handle]	Dumps handle information
dmpstore	Dumps the variable store
echo [[-on | -off] | [text]	Echoes text to the standard output device or toggles script echo
Edd30 [On | Off]	Enables or disables EDD 3.0 Device Paths on next reboot
edit [filename]	Edits a file

Table 3. EFI Shell Commands.

Command	Description
endfor	Provides a delimiter for loop constructs (scripts only)
endif	Provides a delimiter for IF THEN constructs (scripts only)
err [level]	Sets or displays the error level
for var in <set>	Provides loop constructs (scripts only)
guid [-b] [sname]	Dumps known guid ids
help [-b] [internal_command]	Displays help information
if [not] condition then	Provides conditional constructs (scripts only)
load driver_name	Loads a driver
ls [-b] [dir] [dir] ...	Obtains directory listings
map [-bdvr] [sname[:]] [handle]	Maps sname to device path
mem [address] [size] [;MMIO]	Dumps Memory or Memory Mapped IO
memmap [-b]	Dumps memory map
mkdir dir [dir]	Creates a new directory
mm address [Width] [;Type] [n]	Memory Modify: type=Mem, MMIO, IO, PCI, [n] for noninteractive mode when inside a .nsh file
mode [col row]	Sets or gets the current text mode
mount BlkDevice [sname[:]]	Mounts a file system on a block device
PalProc arg1 [arg2] [arg3] [arg4]	Makes a PAL call
pause	Prompts to quit or continue (scripts only)
pci [bus_dev] [func]	Displays PCI device information
reset [reset_string]	Performs a cold reset
rm file/dir [file/dir]	Removes files or directories
set [-bdv] [sname] [value]	Sets or gets environment variables
stall microseconds	Delays for the specified number of microseconds
time [hh:mm:ss]	Gets or sets the time
type [-a] [-u] [-b] file	Displays the contents of a file
ver	Displays version information
vol fs [volume_label]	Sets or displays a volume label

Using BIOS Setup

This section describes the BIOS Setup Utility. Use this utility to change the server configuration defaults. You can run the utility with or without an operating system present on the server. Setup stores most of the configuration values in battery-backed CMOS. The rest of the values are stored in flash memory. The values take effect when you boot the server. POST uses these values to configure the hardware. If the values

and the hardware do not agree, POST generates an error message and you must then run Setup to specify the correct configuration.

Run Setup to modify such server board features as:

- Select parallel port
- Select serial port
- Set time/date (to be stored in RTC)
- Configure IDE hard drive
- Enable SCSI BIOS

Starting setup

To start Setup during the power-on sequence, follow these steps:

1. Press the Power button on the Front Control Panel of the server. For the location of the Power button, see “Front view” on page 7.
2. When POST shows the message "Hit <F2> if you want to run SETUP", enter <F2>. If the server has an administrator password configured, the system prompts you to enter the password. If the server does not have a password configured the **Main** screen of the BIOS Setup Utility appears. For information on the Setup screens, refer to “Primary screens” on page 92.

Record setup settings

Before you alter any settings you should be sure that you have recorded the current values. If the default values ever need to be restored (after a CMOS clear, for example), you must run Setup again. Referring to recorded original settings could make your task easier.

Navigating Setup Utility screens

The BIOS Setup Utility consists of five primary menus. Each menu occupies a single screen and presents a list of menu items. Some menu items are sub-menus, while others are settings that you can change from the screen. Table 4 describes how to navigate the utility screens and menus:

Table 4. Using Setup screens.

Press	To
←	Scroll left through the main menu screens.
→	Scroll right through the main menu screens.
ENTER	Select a sub-menu item or accept a drop-down choice.
TAB	Select a field within a value (e.g. date field).
F9	Select the default value.
F10	Save your changes and exit Setup.
ESC	Go back to a previous screen.
↑	Scroll up through menu items or value lists.
↓	Scroll down through menu items or value lists.

Primary screens

The BIOS Setup Utility uses these five primary screens:

Main Displays the BIOS version, processor type, and lets you configure the system time and date. For details on this screen, see Table 5.

Advanced Lets you configure boot settings, configure peripheral devices, select the IDE controller and hard disk drive, select the type of floppy drive, and configure the chipset settings. For details on this screen, see Table 6 on page 93.

Security Lets you establish supervisor and user passwords. For details on this screen, see Table 7 on page 95.

System Management Lets you configure Console Redirection and Service Boot options. For details on this screen, see Table 8 on page 96.

Exit Exits the utility with and without saving utilities as well as allows management of custom settings. For details on this screen, see Table 9 on page 96.

Main

Table 5 describes the menu items available on the **Main** screen. Default values appear in brackets.

Table 5. BIOS Setup Main Screen Menu Items.

Menu Item	Default Value	Description
BIOS Version	[bios_version_number]	The currently loaded version of BIOS. You cannot change this value. It appears for informational purposes only.
Processor Type	[Intel Itanium processor]	The processor type. You cannot change this value. It appears for informational purposes only.
Processor Retest	[Disabled] Enabled	If "Enabled", BIOS will activate and retest all processors on the next system boot. This option will be automatically reset to "Disabled" on the next system boot.
Language	[English (US)] Francais (FR) Deutsch (GR) Italiano (IT) Espanol (SP)	The default language used by the BIOS.
System Time	[hh:mm:ss]	The time in hour:minute:second format.
System Date	[day mm/dd/yyyy]	The day and date in month/day/year format.

Advanced

Table 6 on page 93 describes the menu items available on the **Advanced** screen. Five menu items exist on this screen. Each of these items contains sub-menus that in turn can also lead to subsequent sub-menus. Default values appear in brackets.

Table 6. BIOS Setup Advanced Screen Menu Items.

Primary Menu Item	Sub Menu Item	Value	Description
Boot Configuration	Plug & Play O/S	[No] Yes	Configures boot settings. If the operating system that runs on the server supports plug and play operation, set this value to Yes.
	Reset Config Data	[No] Yes	Resets the configuration data after a reboot operation.
	Numlock	[On] Off	Locks the number keypad.
	ADM Graphics Mode	[Disabled] Enabled	Enables or disables the ADM graphics mode.
Peripheral Configuration	Serial Port A	[Auto] Enable Disable	Determines Serial Port A configuration at boot time. `Auto` causes the server to determine the Base I/O address and interrupt to use for the port. `Enable` requires you to supply the Base I/O address and the interrupt value. `Disable` causes the server to disable the port.
	Serial Port B	[Auto] Enable Disable	Determines Serial Port B configuration at boot time. `Auto` causes the server to determine the Base I/O address and interrupt to use for the port. `Enable` requires you to supply the Base I/O address and the interrupt value. `Disable` causes the server to disable the port.
	Parallel Port	[Auto] Enable Disable	Determines Parallel Port configuration at boot time. `Auto` causes the server to determine the Base I/O address and interrupt to use for the port. `Enable` requires you to supply the Base I/O address and the interrupt value. `Disable` causes the server to disable the port.
	Mode	[Bi-directional] Output Only PP ECP	Defines the transfer mode for the Parallel Port. `Bi-directional` allows data transfer to and from the server `Output Only` allows data transfer from the server only. `EPP` specifies Enhanced Parallel Port mode. `ECP` specifies Enhanced Port mode.
	Onboard SCSI	[Enabled] Disabled	Enables or disables the onboard SCSI.
	Onboard NIC	[Enabled] Disabled	Enables or disables the onboard NIC.

Table 6. BIOS Setup Advanced Screen Menu Items.

Primary Menu Item	Sub Menu Item	Value	Description
IDE Configuration	IDE Controller	[Both] Disabled Primary Secondary	Selects the IDE controller and hard disk drive type installed in your system. `Both` enables both IDE controllers. `Disabled` disables the integrated IDE controller. `Primary` enables only the primary controller. `Secondary` enables only the secondary controller.
	Hard Disk Pre-Delay	[Disabled] 3, 6, 9, 12, 15, 21, 30 seconds	Configures the hard disk pre-delay. `Enabled` causes the BIOS to insert a time delay before attempting to detect IDE drives in the system. `Disabled` disables the pre-delay.
	Primary IDE Master	[*drive_id*] Not Installed	A drive-specific identifier for the primary IDE master device currently installed in the system. Clicking on the value displays two subsequent sub-menu items: **Type** and **Use ARMD Drive As**. **Type** specifies how the server perceives the device (automatically, IDE or as an ATPI device). **Use ARMD Drive As** specifies how to use the device (floppy, auto or hard drive).
	Secondary IDE Master	[*drive_id*] Not Installed	A drive-specific identifier for the secondary IDE master device currently installed in the system. Clicking on the value displays a subsequent sub-menu item: **Type**. **Type** specifies how the server perceives the device (automatically, IDE or as an ATPI device).
Chipset Configuration	Request Bus Parking	[Disabled] Enabled	Determines whether or not to park on the system bus.
	BINIT Input	[Disabled] Enabled	Enables all host bus agents to enable BINIT observation logic.
	In-Order Queue Depth	[08] 01	Defines the in-order queue depth. When set to one, all agents on the host bus limit their in-order queue depth to one with no pipelining support.
	BSP Jumper Selected	[Disabled] Enabled	
	CPU Work Arounds	[Auto] Manual	Enters submenus that allow you to configure Processor Dispersal, DET stalls and other processor settings.
	Memory Related Items		Enters submenus that allows you to configure System ECC, First Row Test Interval, Base Memory Test Interval, Ext. Memory Test Interval, Defective DIMM Mapout and Clear Bad Memory Row Info.

Table 6. BIOS Setup Advanced Screen Menu Items.

Primary Menu Item	Sub Menu Item	Value	Description
Event Log Configuration	Event Logging	[Enabled] Disabled	Enabled allows logging of system events.
	Enable BERR	[Enabled] Disabled	Enable/disable BERR event generation.
	Enable SERR	[Enabled] Disabled	Enable/disable SERR event generation
	Enable PERR	[Enabled] Disabled	.Enable/disable PERR event generation.
	Enable BINIT	[Enabled] Disabled	Enable/disable BINIT event generation.
	Enable HostBus DATA ERROR	[Enabled] Disabled	Enable/disable Data Error checking in the processor.
	Enable HostBus ADDR PARITY	[Enabled] Disabled	Enable/disable Address Parity checking in the processor.
	Clear All MCA Error Record	[Disabled] Enabled	Enabled will clear MCA Error Records logged in the NVRAM.

Security

Table 7 describes the menu items available on the **Security** screen. Default values appear in brackets.

Table 7. BIOS Setup Security Screen Menu Items.

Menu Item	Default Value	Description
Administrator Password Is	[Not Installed] Installed	The current administrator password. To set the administrator password, use the **Set Administrator Password** menu item.
User Password Is	[Not Installed] Installed	The current user password. To set the user password, use the **Set User Password** menu item. The value will display "Installed" if a password was entered.
Set Admin Password	N/A	Clicking this menu item displays a dialog box in which you can define the administrator password.
Set User Password	N/A	Clicking this menu item displays a dialog box in which you can define the user password. Setting a password in this menu item will allow you to set up security features such as Inactivity Timer, Security Hot Key, Clear User Password, Unattended Start and Video Blanking.

Note: The BIOS Setup Security Screen Menu allows for User and Administrative passwords to be created. The maximum length of the User and Administrative

passwords is seven characters. The passwords cannot have characters other than alphanumeric (a-z, A-Z, 0-9).

Important: When initially creating the User and Administrative passwords, the system BIOS will permit illegal characters to be entered. Upon reboot however, the user will not be allowed to enter the setup screens or continue with the boot process using these illegal passwords. To work around this issue, the user must clear the password using the hardware jumper located on the Legacy I/O board. Please see "Clearing system password" on page 221 for information on clearing passwords.

System Management

Table 8 describes the menu items available on the System Management screen. Default values appear in brackets.

Table 8. BIOS Setup System Management Screen Menu Items.

Menu Item	Default Value	Description
Console Redirection	N/A	Selecting this option allows you to configure for console redirection
Service Boot	[Disabled] Enabled	Enabling this item will allow you to boot into Service Partition Boot mode. The item will be automatically reset to "Disabled" on the next system boot.

Exit

Table 9 describes the menu items available on the **Exit** screen. Default values appear in brackets.

Table 9. BIOS Setup Exit Screen Menu Items.

Menu Item	Description
Exit Saving Changes	Lets you exit setup with or without saving your changes in CMOS. Clicking on the menu item causes the system to prompt you for a Yes or No response. Yes saves your changes and exits the utility. No discards your changes and exits the utility.
Exit Discarding Changes	Lets you exit setup with or without discarding your changes. Clicking on the menu item causes the system to prompt you for a Yes or No response. Yes discards your changes and exits the utility. No saves your changes and exits the utility.
Load Setup Defaults	Lets you load setup with factory defaults. Clicking on the menu item causes the system to prompt you for a Yes or No response. Yes loads the system setup defaults. No aborts the action.

Table 9. BIOS Setup Exit Screen Menu Items.

Menu Item	Description
Load Custom Defaults	Lets you load setup with custom defaults. Clicking on the menu item causes the system to prompt you for a Yes or No response. Yes loads setup values from a file previously saved through the **Save Custom Defaults** menu item. You must specify the file name. No aborts the action.
Save Custom Defaults	Lets you save the current set of values into a file that you could later load using the **Load Custom Defaults** menu item. Clicking on the menu item causes the system to prompt you for a Yes or No response. Yes writes setup values to a file you specify. The file can be used later to load setup values through the **Load Custom Defaults** menu item. No aborts the action.
Discard Changes	Lets you discard the changed values you have accumulated during this setup session. Clicking on the menu item causes the system to prompt you for a Yes or No response. Yes discards the setup values for the current setup utility session. No aborts the action.

QLogic SCSI utility

The QLogic SCSI Utility allows you to configure the SCSI capabilities of the server. You enter this utility during the reboot operation after the BIOS Setup Utility. To enter the QLogic SCSI Utility, perform the following:

1. Enter and complete the BIOS Setup Utility. For information on the BIOS Setup Utility, see "Using BIOS Setup" on page 90.
2. During the system reset performed after you exit the BIOS Setup Utility, watch the monitor for the prompt that allows you to enter the QLogic Setup Utility. The prompt asks you to press the <ALT+Q> key sequence.
3. When you see the prompt for the QLogic Setup Utility, press the <ALT+Q> key sequence.
4. Navigate through the QLogic Setup Utility screens using the following keys shown in Table 10.

Table 10. Using QLogic Setup Utility Screens.

Press	To
Enter	Select an option
ESC	Go back to a previous screen.
↑	Select the previous value in a menu option list.
↓	Select the next value in a menu option list.

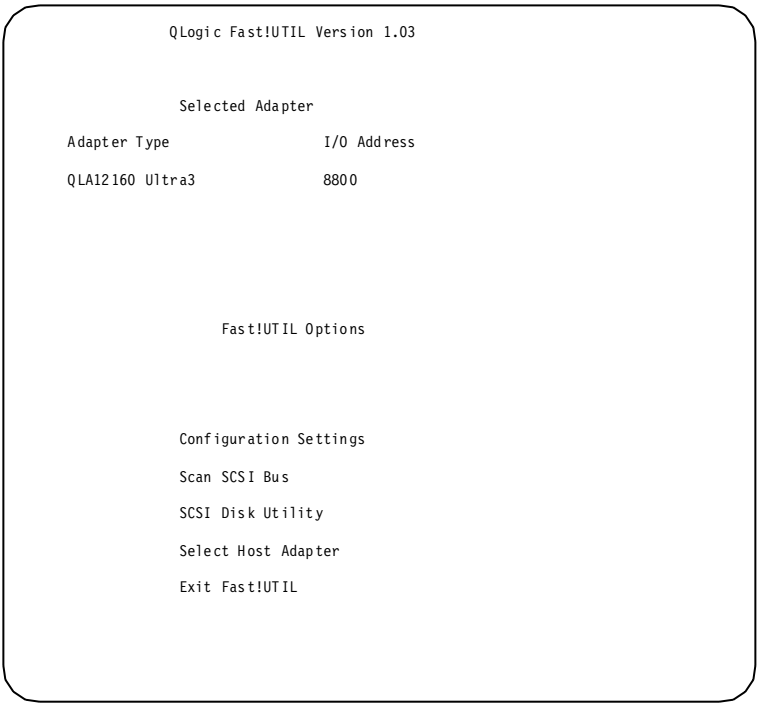


Figure 1. Fast!UTIL Options Screen

The xSeries 380 System Utilities CD

The xSeries 380 Utilities CD contains the SEL viewer utility and the server management utility. However, for the most recent versions of these utilities, they may be downloaded from http://www.ibm.com/pc/support. Be sure to follow the instructions in any associated "ReadMe" files.

Upgrading the Firmware

Use the Firmware Update Utility to upgrade the firmware. This utility is an EFI application program that updates the following server code one at a time:

- Baseboard Management Controller (BMC)
- Hot Swap Controller (HSC)
- Chassis Bridge Controller (CBC)
- BIOS

For the most recent firmware downloads, update utilities and instructions, refer to the web site http://www.ibm.com/pc/support.

Important: • When replacing the T-Docking board or the I/O Legacy board, the BIOS and firmware levels must be upgraded to the latest level.

- Be sure to carefully read all "ReadMe" files associated with firmware at the web site.

Note: A 1.44 floppy diskette may not be large enough to hold this downloaded material.

System Event Log

SEL overview

The System Event Log (SEL) is a non-volatile repository for event messages. Event messages contain information about system events and anomalies that occur on the server. They can be triggered by BIOS, event generators, or sensors. Some event messages are the result of normal happenings, such as a normal server boot, or possible minor problems, like a disconnected keyboard. Other events may indicate internal failures, such as a component overheat condition.

Where appropriate, thresholds, or ranges of acceptable values, exist. As with the other system events, if at any time a parameter crosses one of these defined thresholds, an event message is generated. Thresholds can be defined through Intel Server Control (ISC), but not through DPC or EFI-based SEL Viewer utility.

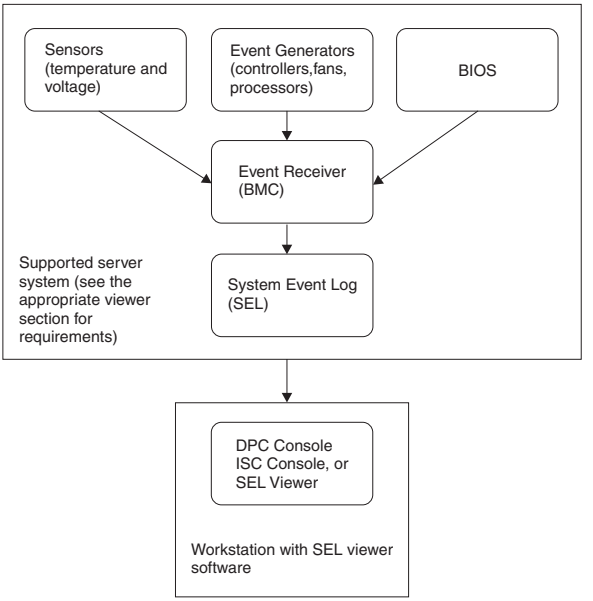
Note: The Intel Server Control (ISC) is not currently supported by IBM and is available from the Intel web site.

Regardless of the event (from system boot to critical failure), the appropriate management controller generates the event message. Event messages are passed to the Baseboard Management Controller (BMC), the primary management controller on the Intel server systems. The BMC passes the Event Message to the System Event Log (SEL) where it becomes available for querying by a SEL Viewer utility.

The SEL Viewer provides an interface for the server administrator to view information in the SEL. A SEL Viewer is available through the Direct Platform Control (DPC) Console, Intel Server Control (ISC), or the EFI-based SEL Viewer utility. The same information is available through each of the interfaces. The administrator can use this information to monitor the server both for warnings, and for potential critical problems, such as when a processor has failed or a temperature threshold has been crossed.

Note: Direct Platform Control (DCP) is included in the ISC package available at the Intel web site.

The following diagram provides an outline of the event message flow from the source of the event to the SEL Viewer. The elements pictured in Figure 1 are described in the following sections.



Using the SEL Viewer utility

The System Event Log (SEL) viewer utility is an EFI-based program (SELView.EFI) for viewing the system event log records stored in the non-volatile server management storage device of Itanium-based servers. The SEL Viewer utility can be found on the System Utilities CD (see "The xSeries 380 System Utilities CD" on page 98).

Using the SEL Viewer utility, you can do the following:

- Examine all system event log entries stored in the non-volatile storage area of the server.
- Examine previously stored system event log entries from a file.
- Save the system event log entries to a file.
- Clear the System Event Log (SEL) entries from the non-volatile storage area.
- Sort the SEL records by various fields such as Timestamp, Sensor Type Number, Event Description, and Generator ID.
- SEL Viewer can display the SEL records in raw hex format, as read from the server.

Running the SEL Viewer utility

Note:

- You can run the utility directly from the System Utilities CD or from a diskette you create from the CD. If you choose to run the utility from a diskette, follow the instructions in the READ.TXT file on the CD.
- For the most recent utility downloads, update utilities and instructions, refer to the web site http://www.ibm.com/pc/support. When using

utilities downloaded from this web site, be sure to follow the instructions in any associated "ReadMe" files.

Follow these steps to run the SEL Viewer Utility:

1. Insert the System Utilities CD into the CD-ROM drive.
2. Type the following command from the EFI shell prompt:

   ```
   issue: map -r
   ```

3. Locate the FS*x* where *x* is the CD-ROM drive (FF).
4. Issue FS*x*: where *x* is the CD-ROM drive.
5. Type the following:

   ```
   CD Selview
   ```

6. Run the utility by typing the following command:

   ```
   Selview
   ```

File Open and save System Event Log files. You can also exit from the utility from this menu.

SEL Manage System Event Log files by reloading data, displaying properties, clearing log entries, and sorting files by various fields.

Help Provides information on the utility.

Graphical User Interface

The SEL Viewer main window, as shown in Figure 2 on page 102, is based on a multi-column format. The data is displayed in several columns as follows:

- Count of the system event being displayed. Starting with 1, and increasing by one for each event. The title of this column is "Num".
- Timestamp.
- Sensor type and number.
- Event description (based on IPMI Specification and BIOS EPS).
- Generator ID.

When the utility is first invoked, it loads the SEL records from the server. The status box, shown in Figure 3 on page 103, is displayed to indicate that the SEL Viewer is loading SEL records from the server. All SEL record information is displayed as one system event per row. The interpretation of the event, event type, and event data is presented in the Event Description column. If there are no entries in the SEL, a message is displayed as shown in Figure 4 on page 103.

The SEL Viewer displays the event logs in an interpreted, easy-to-understand textual form. It requires the associated .STR and .HLP files for the current language and locale. The SEL Viewer parses the .STR file to get the appropriate string messages that are displayed in the program. Since .STR is a Unicode file, it allows internationalization of the SEL Viewer.

The SEL Viewer can display event logs in raw hexadecimal format as read from the server. Figure 5 on page 103 shows SEL records displayed in hexadecimal format. Table 11 explains the abbreviations used in the hexadecimal mode display.

Table 11. Abbreviations Used in Hex Mode Display.

RID	Record ID
RT	Record Type

Table 11. Abbreviations Used in Hex Mode Display.

TS	Time Stamp
GID	Generator ID
ER	Event Message Format Revision
ST	Sensor Type
S#	Sensor Number
EDIR	Event Dir and Event Type
ED1	Event Data 1
ED2	Event Data 2
ED3	Event Data 3

The SEL Viewer main window contains a display pane that displays all the SEL records. It also contains a pull-down menu, used for selecting the functions available in the SEL Viewer. The user can move between the display pane and pull-down menu using the function key <F10>. From the menu, the user can use the arrow keys to move around the various menu items, and use return key to select a particular menu item. A brief help message about the option selected from the menu is displayed at the bottom of the SEL Viewer main window.

The display pane supports arrow keys, <PgDn>, <PgUp>, <Home>, and <End> keys to pane across the display pane.

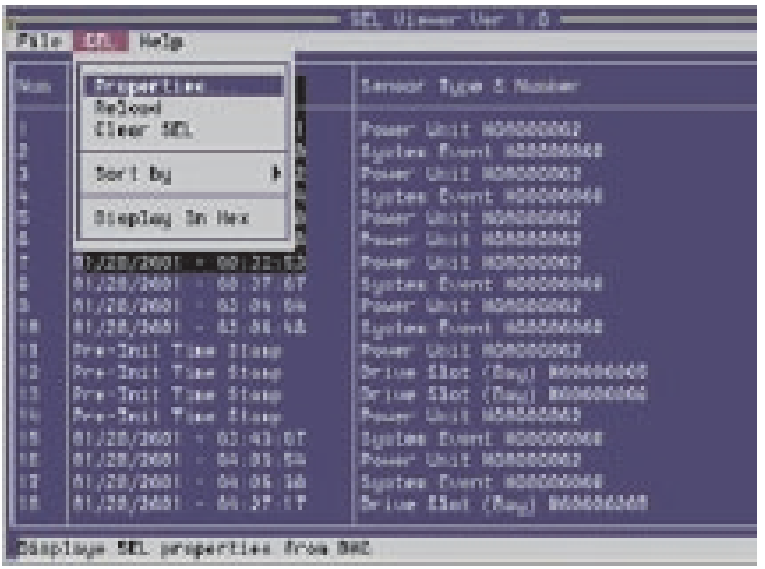


Figure 2. SEL Viewer Utility main window

Figure 3. Status box

Figure 4. Message for empty event log

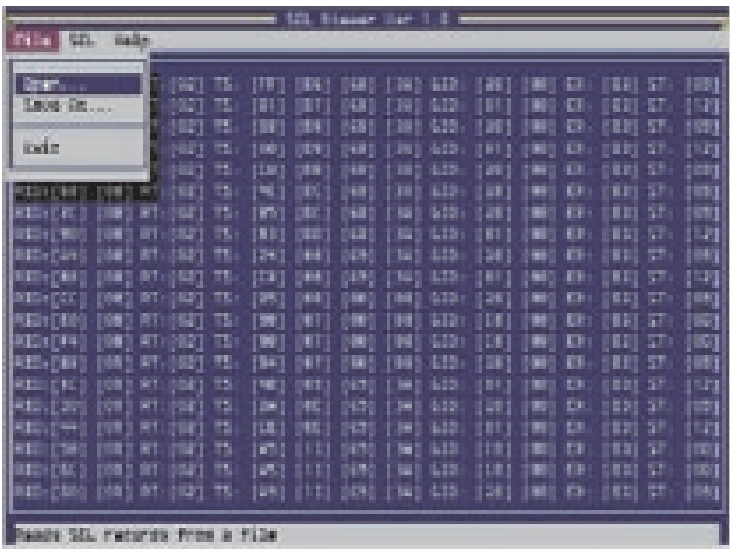


Figure 5. SEL records displayed in hex format

Pull-Down Menu – File: The **File** pull-down menu includes options for opening and saving system event records from, and to data files, respectively. These options are further described in the sections below.

File Menu Item – Open: This option allows the user to open an existing SEL data file for viewing. Selecting this option prompts the user to specify a filename having the ".sel" file name extension. The SEL file is displayed on the original mode that it was saved on either raw hexadecimal or interpreted format.

The Open dialog box provides the user with the ability to browse drives and directories for existing files, as shown in Figure 6 on page 104. If the selected file cannot be opened, this program displays error messages accordingly.

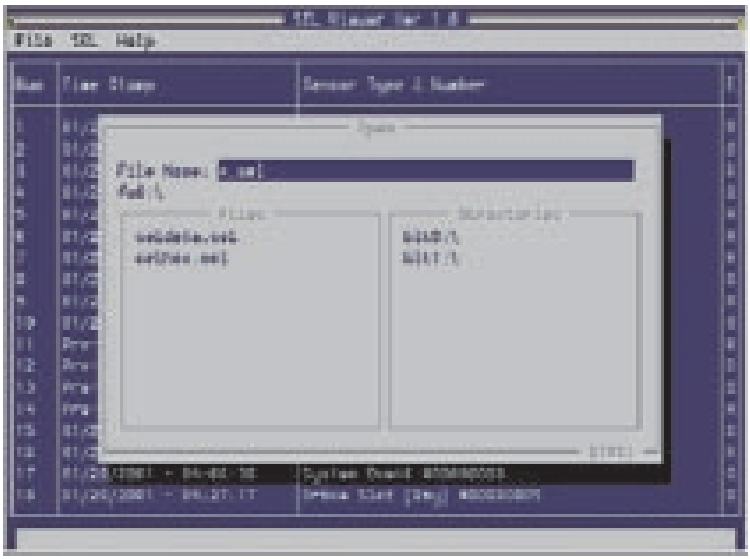


Figure 6. File Open window

File Menu Item – Save As: This option allows the user to save the SEL data to a file, with the ".sel" file name extension, either in interpreted text format or in raw hex format, depending on the mode in which records are currently displayed.

The interpreted text format files contain the SEL properties in the first lines followed by a blank line and the column headings. The SEL file format is specified as an ASCII-readable file, with each field delimited to a TAB and each system event ending with a carriage return/line feed. The columns might not line up to allow for this file to be opened by programs such as Microsoft Excel.

The raw hex format files also contain the SEL properties in the first lines followed by a blank line. These files contain the SEL records in raw hexadecimal format, as read from the server. This SEL file format is specified as an ASCII-readable file, with each system event ending with a carriage return/line feed.

This option also provides the user with the ability to select drives and directories by browsing, as shown in Figure 6. If the SEL data cannot be saved or the file cannot be created or overwritten, the program displays error messages accordingly.

File Menu Item – Exit: This option allows the user to exit the utility.

Pull-Down Menu – SEL: The SEL pull-down menu includes options for reloading SEL entries from the server, clearing the SEL entries, viewing SEL properties, and sorting the entries by different column fields. These options are further described in the sections below.

SEL Menu Item – Reload: This option allows the user to reload the SEL entries from the server. This operation is similar to the one performed when the SEL Viewer is first invoked. The records are displayed either in the hex format or in the interpreted format, depending on the set display mode. The status box shown in Figure 3 on page 103 is displayed to indicate that the SEL Viewer is loading SEL records from the

server, and the message shown in Figure 4 on page 103is displayed if the SEL is empty.

SEL Menu Item – Properties: This option allows the user to view the SEL properties as shown in Figure 7. The text "Warning: System Event Log is FULL" is displayed if the SEL is full; otherwise, the text is omitted. The "Number of Entries" and "Free Space Remaining" are displayed as decimal values.

Figure 7. SEL properties

SEL Menu Item – Clear SEL: This option clears the SEL entries from the non-volatile storage area of the server as well as the entries from the main window table. A dialog message prompts the user for the confirmation of clearing the SEL, as shown in Figure 8.

Figure 8. Confirmation for clearing SEL

SEL Menu Item – Display in Hex/Display in Text: This option allows the user to toggle between the raw hexadecimal mode display and the interpreted mode display. In hex mode display, all the SEL records are displayed in raw hex format as shown in Figure 5 on page 103. In interpreted mode display, all the SEL records are decoded and displayed in text format, as shown in Figure 2 on page 102. The menu item name toggles between "Display in hex" and "Display in text" to allow changing from one display mode to the other. When the display mode is changed, SEL Viewer automatically loads the SEL entries from the server, and displays it in the new display mode. Display mode is toggled between text and hex, automatically, when the SEL entries are read from a file, depending on whether the file contains hex data or text data.

SEL Menu Item – Sort By: This option allows the SEL entries, displayed in the SEL Viewer main window, to be sorted by different fields. This option, when selected, presents the user with a list of fields by which the entries can be sorted. Upon choosing the appropriate field, sorting is done by that field.

Pull-Down Menu – Help : The help menu displays detailed information about the program-usage to the user. In addition, it also displays the utility version information and IPMI driver version number.

Help Menu Item – General Help: This option displays a detailed description on how to use the SEL Viewer. The help window is divided into two windows. The top window

lists all the main topics and the bottom one displays the description about the topic currently selected. Users can select different topics using the arrow keys. To move between windows, use <F10> or <Tab> keys. To dismiss the help window, press <Esc> key.

Help Menu Item – About: This option displays utility version and copyright information about this utility. It also displays the IPMI driver version that is currently loaded.

SEL data tables

The following tables provide information on the SEL viewer data on the xSeries 380 server platform.

Generator ID codes

The following table lists the generator ID codes.

Generator ID	Description
20 00	BMC
28 00	CBC
C0 00	HSC

Sensor codes

The following table lists the sensor codes.

Sensor Type	Sensor Number	Sensor Name
00		**Spare sensor**
	09	Spare sensor 1
	14	Spare sensor 2
01		**Temperature**
	01	Backplane (HSC TeeDock) Temperature
	02	HSC SCSI Backplane Temperature
	21	Processor 0 Core Temperature
	22	Processor 1 Core Temperature
	23	Processor 2 Core Temperature
	24	Processor 3 Core Temperature
	25	Upper Memory Board Temperature
	26	Lower Memory Board Temperature
	27	Sideplane Temperature
	28	I/O Board Temperature
	29	Processor Board Temperature 1
	2A	Processor Board Temperature 2

Sensor Type	Sensor Number	Sensor Name
02		**Voltage**
	07	Baseboard +1.5 Volt
	08	Baseboard +1.8 Volt
	0A	Baseboard +2.8 Volt
	0B	Baseboard +3.3 Volt
	0C	Baseboard +3.3 Volt SB
	0D	Baseboard +5 Volt
	0E	Baseboard +5 Volt SB
	0F	Baseboard +12 Volt
	10	Baseboard -12 Volt
	11	Processor Board +1.5 Volt
	12	Processor Board +1.8 Volt
	13	Processor Board +3.3 Volt
	15	SCSI TERM Volt 00
	16	SCSI TERM Volt 01
	17	SCSI TERM Volt 02
	18	SCSI TERM Volt 10
	19	SCSI TERM Volt 11
	1A	SCSI TERM Volt 12
	41	Processor 0 Power Good
	42	Processor 1 Power Good
	43	Processor 2 Power Good
	44	Processor 3 Power Good
	45	Processor Board 1.5 Volt Power Good
	46	Processor Board 1.5 Volt FOK
	47	Processor Board 1.8 Volt Power Good
	48	Processor Board 1.8 Volt FOK
	49	Processor Board Sys Power Good
	4A	Processor Board Chipset
	4B	Power Supply Power OK
	4C	Upper Memory Board Power Good
	4D	Lower Memory Board Power Good
	60	Hot Swap 48 Volt FOK

Sensor Type	Sensor Number	Sensor Name
04		**Fan**
	1B	F172 Tach Fan 1
	1C	F172 Tach Fan 2
	1D	F172 Tach Fan 3
	1E	F172 Tach Fan 4
	1F	F120 Tach Fan 5
	20	F120 Tach Fan 6
06		Security violation attempt
	04	Secure Mode Violation Attempt
07		**Processor**
	35	Processor 0 Status
	36	Processor 1 Status
	37	Processor 2 Status
	38	Processor 3 Status
08		**Power supply**
	4E	Power Supply 1
	4F	Power Supply 2
	50	Power Supply 3
	51	Power Supply 4
	52	Upper Memory Board D2D_0
	53	Upper Memory Board D2D_1
	54	Lower Memory Board D2D_0
	55	Lower Memory Board D2D_1
	56	SP 3.3 Volt CPU
	57	SP 3.3 Volt_1 D2D
	58	SP 3.3 Volt_2 D2D
	59	SP 5 Volt_1 D2D
	5A	SP 5 Volt_2 D2D
	5B	Hot Swap 12 Volt D2D
09		**Power unit**
	01	Power Unit Status
	02	Power Unit Redundancy
0D		**Hot swap drive**
	03	Hot Swap Drive 1 Status
	04	Hot Swap Drive 2 Status
	05	Hot Swap Drive 1 Present
	06	Hot Swap Drive 2 Present

Sensor Type	Sensor Number	Sensor Name
0F		**POST error**
	05	BIOS POST code (See POST Table below)
13		**Critical interrupt**
	06	FP NMI (Front Panel Diag Int)
15		**Module/Board**
	5D	Processor Board Present
	5E	Upper Memory Board Present
	5F	Lower Memory Board Present
21		**Slot/Connector**
	39	Hot Plug PCI Slot 3
	3A	Hot Plug PCI Slot 4
	3B	Hot Plug PCI Slot 5
	3C	Hot Plug PCI Slot 6
	3D	Hot Plug PCI Slot 7
	3E	Hot Plug PCI Slot 8
	3F	Hot Plug PCI Slot 9
	40	Hot Plug PCI Slot 10
23		**Watchdog**
	03	BMC Watchdog
C7		**OEM C7**
	2B	Processor 0 Fan Boost Temperature
	2C	Processor 1 Fan Boost Temperature
	2D	Processor 2 Fan Boost Temperature
	2E	Processor 3 Fan Boost Temperature
	2F	Upper Memory Board Fan Boost Temperature
	30	Lower Memory Board Fan Boost Temperature
	31	Sideplane Fan Boost Temperature
	32	I/O Board Fan Boost Temperature
	33	Processor Board 1 Fan Boost Temperature
	34	Processor Board 2 Fan Boost Temperature
	35	TeeDock Board Fan Boost Temperature

Event description codes

The purpose of the Event Description field varies, depending on the Generator ID. When the Generator ID is:

1. 20 00
2. 28 00
3. C0 00

The first byte of the Event Description is used to indicate the type of event that occurred, such as the crossing of a threshold or the removal of a device.

Event Description	Event Type	Definition
01 – – –	N/A	Threshold crossed
02 – – –	N/A	Transition to idle, active, or busy
03 – – –	N/A	State asserted or deasserted
04 – – –	N/A	Predictive failure asserted or deasserted
05 – – –	N/A	Limit exceeded
06 – – – *	N/A	Performance lag
07 – – – *	N/A	Presence, Disabled, IERR, Thermal Trip, or FRB3
08 – – –	N/A	Device added or removed
09 – – –	N/A	Device enabled or disabled
0A – – –	N/A	Transition to running or test, on or off-line

* The PHP sensors will have an Event Description beginning with either E6 or E7 with an offset of 00 or 05 (hexadecimal view). This may be translated as follows:

Event Description	Offset	Definition
06	00	PHP slot fault de-asserted
06	05	PHP slot powered on
07	00	PHP slot fault asserted
07	05	PHP slot powered off

SEL format for MCA events

The following information relates to the SEL format for MCA events.

SEL Event Log format: The following table shows the Machine Check Abort (MCA) errors that will be logged, and the corresponding SEL Event Log Format.

Error Type (signal)	SEL Event Log Format (Generator ID, Msg Rev, Sensor Type, Sensor#, EvDirEv Type, variable data bytes 1, 2, 3)
Single Bit Error (CPEI)	0x31, 0x03, 0x0C, 0x01, 0x6F, Data1=0x80, Board #=Data2[Bit7-6] DIMM#=Data2[5-0], Data3=0xFF
Multiple Bit Error (BERR)	0x31, 0x03, 0x0C, 0x02, 0x6F, Data1=0x81, Board #=Data2[Bit7-6] DIMM#=Data2[5-0], Data3=0xFF
Host Bus BERR (BERR)	0x31, 0x03, 0x13, 0x07, 0x6F, Data1=0xA7, BUS #=Data2, DEV#=Data3[Bit7-3], FUN#=Data3[2-0]
Host Bus XSERR (BERR)	0x31, 0x03, 0x13, 0x08, 0x6F, Data1=0xA7, BUS #=Data2, DEV#=Data3[Bit7-3], FUN#=Data3[2-0]
Host Bus Address Parity (AERR or BINIT)	0x31, 0x03, 0x13, 0x04, 0x6F, Data1=0xA8, BUS #=Data2, DEV#=Data3[Bit7-3], FUN#=Data3[2-0]
Host Bus Request Parity (BINIT)	0x31, 0x03, 0x13, 0x03, 0x6F, Data1=0xA8, BUS #=Data2, DEV#=Data3[Bit7-3], FUN#=Data3[2-0]

Error Type (signal)	SEL Event Log Format (Generator ID, Msg Rev, Sensor Type, Sensor #, EvDirEv Type, variable data bytes 1, 2, 3)
Host Bus ASZ (BINIT)	0x31, 0x03, 0x13, 0x05, 0x6F, Data1=0xA8, BUS #=Data2, DEV# = Data3[Bit7-3], FUN#=Data3[2-0]
Host Bus XBINIT (BINIT)	0x31, 0x03, 0x13, 0x06, 0x6F, Data1=0xA8, BUS #=Data2, DEV# = Data3[Bit7-3], FUN#=Data3[2-0]
Host Bus SBE (CMCI)	0x31, 0x03, 0x13, 0x09, 0x6F, Data1=0xA7, BUS #=Data2, DEV# = Data3[Bit7-3], FUN#=Data3[2-0]
Host Bus MBE (BERR)	0x31, 0x03, 0x13, 0x0A, 0x6F, Data1=0xA8, BUS #=Data2, DEV# = Data3[Bit7-3], FUN#=Data3[2-0]
PCI Expander Bus Parity (SERR)	0x31, 0x03, 0x13, 0x0B, 0x6F, Data1=0xA1, BUS #=Data2, DEV# = Data3[Bit7-3], FUN#=Data3[2-0]
PCI Inbound Delayd Timeout	0x31, 0x03, 0x13, 0x0C, 0x6F, Data1=0xA5, BUS #=Data2, DEV# = Data3[Bit7-3], FUN#=Data3[2-0]
PCI Addr Parity (SERR)	0x31, 0x03, 0x13, 0x0D, 0x6F, Data1=0xA4, BUS #=Data2, DEV# = Data3[Bit7-3], FUN#=Data3[2-0]
PCI Data Parity (SERR)	0x31, 0x03, 0x13, 0x0E, 0x6F, Data1=0xA4, BUS #=Data2, DEV# = Data3[Bit7-3], FUN#=Data3[2-0]
PCI PERR (PERR)	0x31, 0x03, 0x13, 0x0F, 0x6F, Data1=0xA4, BUS #=Data2, DEV# = Data3[Bit7-3], FUN#=Data3[2-0]
PCI DPE (PERR)	0x31, 0x03, 0x13, 0x10, 0x6F, Data1=0xA4, BUS #=Data2, DEV# = Data3[Bit7-3], FUN#=Data3[2-0]
PCI RTA	0x31, 0x03, 0x13, 0x11, 0x6F, Data1=0xA7, BUS #=Data2, DEV# = Data3[Bit7-3], FUN#=Data3[2-0]
PCI RMA	0x31, 0x03, 0x13, 0x12, 0x6F, Data1=0xA7, BUS #=Data2, DEV# = Data3[Bit7-3], FUN#=Data3[2-0]
PCI SSE (SERR)	0x31, 0x03, 0x13, 0x13, 0x6F, Data1=0xA5, BUS #=Data2, DEV# = Data3[Bit7-3], FUN#=Data3[2-0]
PCI PE (Parity Error)	0x31, 0x03, 0x13, 0x14, 0x6F, Data1=0xA4, BUS #=Data2, DEV# = Data3[Bit7-3], FUN#=Data3[2-0]
OEM System Boot Event	0x01, 0x03, 0x12, 0x08, 0x6F, Data1=0x01, Data2=0xFF, Data3=0xFF

There are two sensor types in the previous table:

1. Sensor type "0C" for memory which includes Single Bit Errors (SBE) and Multi-Bit Errors (MBE).
2. Sensor type '13' for PCI related errors.

Interpretation of SEL format for memory related errors: The following table defines the data byte formats for memory-related errors logged by the BIOS.

Field	IPMI definition	BIOS-specific implementation
Generator ID	**7:1** System software ID or IPMB slave address. 1=ID is system software ID; 0=ID is IPMB slave address.	**7:4** 0x3 for system BIOS **3:1** 0 Format revision. Revision of the data format for OEM data bytes 2 and 3. For this revision of the specification, set this field to 0. All other revisions are reserved for now. **0** 1 = ID is system software ID. As a result, the generator ID byte will start from 0x31 and go up to 0x3f, in increments of 2 for events logged by the BIOS.
EvMRev	Event Message Revision	This field is used to identify different revisions of the Event Message format. The revision number shall be 03h for Event Messages that comply with the format given in this specification.
Sensor Type		0xC for memory errors
Sensor Number	Number of sensor that generated this event	Unique value for each type of event because IPMI specification requires as such. This field has no other significance. Should not be displayed to the end-user if the event is logged by BIOS.
Event Direct / Event Type	0x6F if event offsets are specific to the sensor	**7** 0= Assertion Event, 1 = Deassertion Event **6:0** 0x6F
Event Data 1	**7:6** 00 = unspecified byte 2; 10 = OEM code in byte 2. **5:4** 00 = unspecified byte 3; 10 = OEM code in byte 3. (BIOS will not use encodings 01 and 11 for errors covered by this document.). **3:0...** Offset from Event Trigger for discrete event state.	Follow IPMI definition. If either of the two data bytes following this do not have any data, that byte should be set to 0xff, and the appropriate field in event data 1 should indicate that it is unspecified. 3:0 is 0 for single bit error and 1 for multi-bit error.
Event Data 2	**7:0** OEM code 2 or unspecified.	For format rev 0, if this byte is specified, **7:6** Zero based Memory Board number. Matches the number of type 16 entry in SMBIOS table. For example, card 0 corresponds to the first type 16 entry in SMBIOS tables. If all DIMMs are onboard, this field will always be 0. **5:0** Zero based DIMM number on the card. DIMM 0 corresponds to the first type 17 record in SMBIOS tables for that memory card.
Event Data 3	**7:0** OEM code 3 or unspecified.	If format rev is 0 and if this byte is specified, Syndrome Byte.

SMBIOS physical memory array (type 16): SMBIOS physical memory array (type 16) is included for reference.

Offset	Spec Version	Name	Length	Value	Description
00h	2.1+	Type	BYTE	16	Physical Memory Array type
01h	2.1+	Length	BYTE	0Fh	Length of the structure

Offset	Spec Version	Name	Length	Value	Description
02h	2.1+	Handle	WORD	Varies	The handle, or instance number, associated with the structure
04h	2.1+	Location	BYTE	ENUM	The physical location of the Memory Array, whether on the system board or an add-in board. See System Management BIOS Reference Specification, v2.3.1, section 3.3.17.1 for definitions.
05h	2.1+	Use	BYTE	ENUM	Identifies the function for which the array is used. See System Management BIOS Reference Specification, v2.3.1, section 3.3.17.2 for definitions.
06h	2.1+	Memory error correction	BYTE	ENUM	The primary hardware error correction or detection method supported by this memory array. See System Management BIOS Reference Specification, v2.3.1, section 3.3.17.2 for definitions.
07h	2.1+	Maximum capacity	WORD	Varies	The maximum memory capacity, in kilobytes, for this array. If the capacity is unknown, this field contains 8000 0000h.
0Bh	2.1+	Memory error information handle	WORD	Varies	The handle, or instance number, associated with any error that was previously detected for the array. If the system does not provide the error information structure, the field contains FFFEh; otherwise, the field contains either FFFFh (if no error was detected) or the handle of the error-information structure. See also System Management BIOS Reference Specification, v2.3.1.
0Dh	2.1+	Number of memory devices	WORD	Varies	The number of slots or sockets available for Memory Devices in this array. This value represents the number of Memory Device structures that comprise this Memory Array. Each Memory Device has a reference to the 'owning' Memory Array.

Memory array — location:

Note: Enumerated values are controlled by the DMTF, not this specification.

Byte value	Meaning
01h	Other
02h	Unknown
03h	System board
04h	ISA add-on card
05h	EISA add-on card
06h	PCI add-on card
07h	MCA add-on card
08h	PCMCIA add-on card
09h	Proprietary add-on card
0Ah	NuBus
A0h	PC-98/C20 add-on card
A1h	PC-98/C24 add-on card
A2h	PC-98/E add-on card
A3h	PC-98/Local bus add-on card

Memory array — use:

Note: Enumerated values are controlled by the DMTF, not this specification.

Byte value	Meaning
01h	Other
02h	Unknown
03h	System memory
04h	Video memory
05h	Flash memory
06h	Non-volatile RAM
07h	Cache memory

Memory array — error correction types:

Note: Enumerated values are controlled by the DMTF, not this specification.

Byte value	Meaning
01h	Other
02h	Unknown
03h	None
04h	Parity
05h	Single-bit ECC
06h	Multi-bit ECC
07h	CRC

SMBIOS memory device (type 17): SMBIOS memory device (type 17) is included here for reference.

Offset	Spec Version	Name	Length	Value	Description
00h	2.1+	Type	BYTE	17	Memory Array type.
01h	2.1+	Length	BYTE	Varies	Length of the structure, a minimum of 15h.
02h	2.1+	Handle	WORD	Varies	The handle, or instance number, associated with the structure.
04h	2.1+	Memory Array Handle	WORD	Varies	The handle, or instance number, associated with the Memory Array to which this device belongs.
06h	2.1+	Memory Error Information Handle	WORD	Varies	The handle, or instance number, associated with any error that was previously detected for the device. If the system does not provide the error information structure, the field contains FFFEh; otherwise, the field contains either FFFFh (if no error was detected) or the handle of the error-information structure. See System Management BIOS Reference Specification, v2.3.1.
08h	2.1+	Total Width	WORD	Varies	The total width, in bits, of this memory device, including any check or error-correction bits. If there are no error-correction bits, this value should be equal to Data Width. If the width is unknown, the field is set to FFFFh.
0Ah	2.1+	Data Width	WORD	Varies	The data width, in bits, of this memory device. A data width of 0 and a total width of 8 indicates that the device is being used solely to provide 8 error-correction bits. If the width is unknown, the field is set to FFFFh.

Offset	Spec Version	Name	Length	Value	Description
0Ch	2.1+	Size	WORD	Varies	The size of the memory device. If the value is 0, no memory device is installed in the socket; if the size is unknown, the field value is FFFFh. The granularity in which the value is specified depends on the setting of the most-significant bit (bit 15). If the bit is 0, the value is specified in megabyte units; if the bit is 1, the value is specified in kilobyte units. For example, the value 8100h identifies a 256 KB memory device and 0100h identifies a 256 MB memory device.
0Eh	2.1+	Form Factor	BYTE	ENUM	The implementation form factor for this memory device. See System Management BIOS Reference Specification, v2.3.1, section 3.3.18.1 for definitions.
0Fh	2.1+	Device Set	BYTE	Varies	Identifies when the Memory Device is one of a set of Memory Devices that must be populated with all devices of the same type and size, and the set to which this device belongs. A value of 0 indicates that the device is not part of a set; a value of FFh indicates that the attribute is unknown. **Note:** A Device Set number must be unique within the context of the Memory Array containing this Memory Device.
10h	2.1+	Device Locator	BYTE	STRING	The string number of the string that identifies the physically labeled socket or board position where the memory device is located, e.g., "SIMM 3".
11h	2.1+	Bank Locator	BYTE	STRING	The string number of the string that identifies the physically labeled bank where the memory device is located, e.g., "Bank 0" or "A".
12h	2.1+	Memory Type	BYTE	ENUM	The type of memory used in this device, See System Management BIOS Reference Specification, v2.3.1, section 3.3.18.2 for definitions.
13h	2.1+	Type Detail	WORD	Bit field	Additional detail on the memory device type, See System Management BIOS Reference Specification, v2.3.1, section 3.3.18.3 for definitions.
15h	2.3+	Speed	WORD	Varies	Identifies the speed of the device, in megahertz (MHz). If the value is 0, the speed is unknown. **Note:** n MHz = (1000 / n) nanoseconds (ns)
17h	2.3+	Manufacturer	BYTE	STRING	Number for the manufacturer of this memory device.
18h	2.3+	Serial Number	BYTE	STRING	Number for the serial number of this memory device. This value is set by the manufacturer and normally not changeable.
19h	2.3+	Asset Tag	BYTE	STRING	String number for the asset tag of this memory device.
1Ah	2.1+	Part Number	BYTE	STRING	String number for the part number of this memory device. This value is set by the manufacturer and normally not changeable.

Memory device — form factor:

Note: Enumerated values are controlled by the DMTF, not this specification.

Byte value	Meaning
01h	Other

02h	Unknown
03h	SIMM
04h	SIP
05h	Chip
06h	DIP
07h	ZIP
08h	Proprietary Card
09h	DIMM
0Ah	TSOP
0Bh	Row of chips
0Ch	RIMM
0Dh	SODIMM
0Eh	SRIMM

Memory device — type:

Note: Enumerated values are controlled by the DMTF, not this specification.

Byte value	**Meaning**
01h	Other
02h	Unknown
03h	DRAM
04h	EDRAM
05h	VRAM
06h	SRAM
07h	RAM
08h	ROM
09h	FLASH
0Ah	EEPROM
0Bh	FEPROM
0Ch	EPROM
0Dh	CDRAM
0Eh	3DRAM
0Fh	SDRAM
10h	SGRAM
11h	RDRAM

Memory device —type detail:

Note: Bit-field values are controlled by the DMTF, not this specification. Multiple bits are set if more than one attribute applies.

Word bit position	**Meaning**
Bit 0	Reserved, set to 0

Bit 1	Other
Bit 2	Unknown
Bit 3	Fast-paged
Bit 4	Static column
Bit 5	Pseudo-static
Bit 6	RAMBUS
Bit 7	Synchronous
Bit 8	CMOS
Bit 9	EDO
Bit 10	Window DRAM
Bit 11	Cache DRAM
Bit 12	Non-volatile
Bits 13:15	Reserved, set to 0

Interpretation of SEL format for PCI bus related errors: The following table defines the data byte formats for PCI bus-related errors logged by the BIOS.

Field	IPMI definition	BIOS-specific implementation
Generator ID	**7:1** System software ID or IPMB slave address. 1=ID is system software ID; 0=ID is IPMB slave address.	**7:4** 0x3 for system BIOS **3:1** 0 Format revision. Revision of the data format for OEM data bytes 2 and 3. For this revision of the specification, set this field to 0. All other revisions are reserved for now. **0** 1 = ID is system software ID. As a result, the generator ID byte will start from 0x31 and go up to 0x3f, in increments of 2 for events logged by the BIOS.
EvMRev	Event Message Revision	This field is used to identify different revisions of the Event Message format. The revision number shall be 03h for Event Messages that comply with the format given in this specification.
Sensor Type		0x13 for critical interrupt.
Sensor Number	Number of sensor that generated this event	Unique value for each type of event because IPMI specification requires as such. This field has no other significance. Should not be displayed to the end-user if the event is logged by BIOS.
Event Direct / Event Type	0x6F if event offsets are specific to the sensor	**7** 0= Assertion Event, 1 = Deassertion Event **6:0** 0x6F
Event Data 1	**7:6** 00 = unspecified byte 2; 10 = OEM code in byte 2. **5:4** 00 = unspecified byte 3; 10 = OEM code in byte 3. (BIOS will not use encodings 01 and 11 for errors covered by this document.). **3:0...** Offset from Event Trigger for discrete event state.	Follow IPMI definition. If either of the two data bytes following this do not have any data, that byte should be set to 0xff, and the appropriate field in event data 1 should indicate that it is unspecified. 3:0 is 04 for PCI PERR and 05 for PCI SERR.

Field	IPMI definition	BIOS-specific implementation
Event Data 2	**7:0** OEM code 2 or unspecified.	For format rev 0, if this byte is specified, it contains the PCI bus number on which the failing device resides. If the source of the PCI error cannot be determined, this byte contains 0xff and the event data 1 byte indicates that byte 2 is unspecified.
Event Data 3	**7:0** OEM code 3 or unspecified.	For format rev 0, if this byte is specified, it contains the PCI device/function address in the standard format: **7:3** Device number of the failing PCI device **2:0** PCI function number. Will always contain a zero if the device is not a multifunction device. If the source of the PCI error cannot be determined, this byte contains 0xff and the event data 1 byte indicates that byte 3 is unspecified.

Interpretation of SEL format for FRB-2 error events: The following table defines the data byte formats for FRB-2 errors logged by the BIOS.

Field	IPMI definition	BIOS-specific implementation
Generator ID	**7:1** System software ID or IPMB slave address. 1=ID is system software ID; 0=ID is IPMB slave address.	**7:4** 0x3 for system BIOS **3:1** 0 Format revision. Revision of the data format for OEM data bytes 2 and 3. For this revision of the specification, set this field to 0. All other revisions are reserved for now. **0** 1 = ID is system software ID. As a result, the generator ID byte will start from 0x31 and go up to 0x3f, in increments of 2 for events logged by the BIOS.
EvMRev	Event Message Revision	This field is used to identify different revisions of the Event Message format. The revision number shall be 03h for Event Messages that comply with the format given in this specification.
Sensor Type		0x7 for processor-related errors.
Sensor Number	Number of sensor that generated this event	Unique value for each type of event because IPMI specification requires as such. This field has no other significance. Should not be displayed to the end-user if the event is logged by BIOS.
Event Direct / Event Type	0x6F if event offsets are specific to the sensor	**7** 0= Assertion Event, 1 = Deassertion Event **6:0** 0x6F
Type code	0x6F if event offsets are specific to the sensor	0x6F

Field	IPMI definition	BIOS-specific implementation
Event Data 1	**7:6** 00 = unspecified byte 2; 10 = OEM code in byte 2. **5:4** 00 = unspecified byte 3; 10 = OEM code in byte 3. (BIOS will not use encodings 01 and 11 for errors covered by this document.). **3:0...** Offset from Event Trigger for discrete event state.	If event data 2 and event data 3 contain OEM codes, bits 7:6 and bits 5:4 contain 10. For platforms that do not include the POST code information with FRB-2 log, both these fields will be 0. BIOS either should specify both bytes or should mark both bytes as unspecified. Byte 3:0 is 03 for FRB-2 failure during POST.
Event Data 2	**7:0** OEM code 2 or unspecified.	For format rev 0, if this byte is specified, it contains bits 7:0 of the POST code at the time FRB-2 reset occurred (port 80 code).
Event Data 3	**7:0** OEM code 3 or unspecified.	For format rev 0, if this byte is specified, it contains bits 15:8 of the POST code at the time FRB-2 reset occurred (port 81 code). .If the BIOS only uses one byte POST codes, this byte will always be zero.

BIOS error codes/messages

The following list defines the BIOS error codes. All BIOS error codes/messages, when encountered, appears on the video and are logged in the SEL unless it is full.

The system event log record for these BIOS error codes has a sensor type of '0F'. To decode a BIOS error codes/message, use the last two bytes in the event description to identify the specific error.

Code	Description
0100	Timer Error
0103	CMOS Battery Low
0104	CMOS Settings Wrong
0105	CMOS/GPNV Checksum Bad
0106	CMOS Display Type Wrong
0108	Unlock Keyboard
0109	Keyboard Error
010A	KB/Interface Error
010B	Memory Size Decrease
010E	Cache Memory Error
0117	Pri Master Drive - ATAPI Incompatible
0118	Pri Slave Drive - ATAPI Incompatible
0119	Sec Master Drive - ATAPI Incompatible
011A	Sec Slave Drive - ATAPI Incompatible
011B	CMOS Date/Time Not Set
011E	Cache Memory Error
0120	NVRAM cleared By jumper
0121	Password cleared By jumper
0141	PCI Memory Conflict

Code	Description
0142	PCI IO Conflict
0143	PCI IRQ Conflict
0144	Shadow of PCI ROM Failed
0145	PCI ROM not found, may be OK for this card
0146	Insufficient Memory to Shadow PCI ROM
8100	BIST Failure : Processor in socket M0
8101	BIST Failure : Processor in socket M1
8102	BIST Failure : Processor in socket M2
8103	BIST Failure : Processor in socket M3
8110	Internal error (IERR): Processor in socket M0
8111	Internal error (IERR): Processor in socket M1
8112	Internal error (IERR): Processor in socket M2
8113	Internal error (IERR): Processor in socket M3
8120	Thermal trip failure: Processor in socket M0
8121	Thermal trip failure: Processor in socket M1
8122	Thermal trip failure: Processor in socket M2
8123	Thermal trip failure: Processor in socket M3
8130	Processor in socket M0 Disabled
8131	Processor in socket M1 Disabled
8132	Processor in socket M2 Disabled
8133	Processor in socket M3 Disabled
8140	Processor in socket M0: failed FRB level 3 timer
8141	Processor in socket M1: failed FRB level 3 timer
8142	Processor in socket M2: failed FRB level 3 timer
8143	Processor in socket M3: failed FRB level 3 timer
8150	Processor in socket M0: failed initialization on last boot
8151	Processor in socket M1: failed initialization on last boot
8152	Processor in socket M2: failed initialization on last boot
8153	Processor in socket M3: failed initialization on last boot
8190	Watchdog timer failed on last boot
8191	2:1 core to bus speed ratio: Processor L2 cache disabled
8192	L2 cache size mismatch
8193	CPUID, Processor stepping are different
8194	CPUID, Processor family are different
8195	Front side bus speed mismatch. System Halted
8196	CPUID, Processor model are different
8300	Baseboard Management Controller failed to function
8305	Hotswap Controller failed to function

Code	Description
84F1	Intelligent System Monitoring Forced Shutdown
84F2	Server Management Interface Failed
84F3	Baseboard Management Controller in Update Mode
84F4	Sensor Data Record Empty
84FF	System Event Log Full
8C02	ERRORS FOUND IN MEMORY SUBSYSTEM. FAILING ROWS WILL BE MAPPED OUT ON THE NEXT RESET. **Attention:** **IT IS STRONGLY SUGGESTED THAT YOU RESET THE SYSTEM NOW. ALLOWING THE SYSTEM TO CONTINUE TO BOOT MAY RESULT IN UNSTABLE SYSTEM BEHAVIOR AND/OR HARD DISK CORRUPTION.**
8C51	Error in memory subsystem: Lower Board, DIMM 1
8C52	Error in memory subsystem: Lower Board, DIMM 2
8C53	Error in memory subsystem: Lower Board, DIMM 3
8C54	Error in memory subsystem: Lower Board, DIMM 4
8C55	Error in memory subsystem: Lower Board, DIMM 5
8C56	Error in memory subsystem: Lower Board, DIMM 6
8C57	Error in memory subsystem: Lower Board, DIMM 7
8C58	Error in memory subsystem: Lower Board, DIMM 8
8C59	Error in memory subsystem: Lower Board, DIMM 9
8C5A	Error in memory subsystem: Lower Board, DIMM 10
8C5B	Error in memory subsystem: Lower Board, DIMM 11
8C5C	Error in memory subsystem: Lower Board, DIMM 12
8C5D	Error in memory subsystem: Lower Board, DIMM 13
8C5E	Error in memory subsystem: Lower Board, DIMM 14
8C5F	Error in memory subsystem: Lower Board, DIMM 15
8C60	Error in memory subsystem: Lower Board, DIMM 16
8C61	Error in memory subsystem: Lower Board, DIMM 17
8C62	Error in memory subsystem: Lower Board, DIMM 18
8C63	Error in memory subsystem: Lower Board, DIMM 19
8C64	Error in memory subsystem: Lower Board, DIMM 20
8C65	Error in memory subsystem: Lower Board, DIMM 21
8C66	Error in memory subsystem: Lower Board, DIMM 22
8C67	Error in memory subsystem: Lower Board, DIMM 23
8C68	Error in memory subsystem: Lower Board, DIMM 24
8C69	Error in memory subsystem: Lower Board, DIMM 25
8C6A	Error in memory subsystem: Lower Board, DIMM 26
8C6B	Error in memory subsystem: Lower Board, DIMM 27
8C6C	Error in memory subsystem: Lower Board, DIMM 28

Code	Description
8C6D	Error in memory subsystem: Lower Board, DIMM 29
8C6E	Error in memory subsystem: Lower Board, DIMM 30
8C6F	Error in memory subsystem: Lower Board, DIMM 31
8C70	Error in memory subsystem: Lower Board, DIMM 32
8C71	Error in memory subsystem: Upper Board, DIMM 1
8C72	Error in memory subsystem: Upper Board, DIMM 2
8C73	Error in memory subsystem: Upper Board, DIMM 3
8C74	Error in memory subsystem: Upper Board, DIMM 4
8C75	Error in memory subsystem: Upper Board, DIMM 5
8C76	Error in memory subsystem: Upper Board, DIMM 6
8C77	Error in memory subsystem: Upper Board, DIMM 7
8C78	Error in memory subsystem: Upper Board, DIMM 8
8C79	Error in memory subsystem: Upper Board, DIMM 9
8C7A	Error in memory subsystem: Upper Board, DIMM 10
8C7B	Error in memory subsystem: Upper Board, DIMM 11
8C7C	Error in memory subsystem: Upper Board, DIMM 12
8C7D	Error in memory subsystem: Upper Board, DIMM 13
8C7E	Error in memory subsystem: Upper Board, DIMM 14
8C7F	Error in memory subsystem: Upper Board, DIMM 15
8C80	Error in memory subsystem: Upper Board, DIMM 16
8C81	Error in memory subsystem: Upper Board, DIMM 17
8C82	Error in memory subsystem: Upper Board, DIMM 18
8C83	Error in memory subsystem: Upper Board, DIMM 19
8C84	Error in memory subsystem: Upper Board, DIMM 20
8C85	Error in memory subsystem: Upper Board, DIMM 21
8C86	Error in memory subsystem: Upper Board, DIMM 22
8C87	Error in memory subsystem: Upper Board, DIMM 23
8C88	Error in memory subsystem: Upper Board, DIMM 24
8C89	Error in memory subsystem: Upper Board, DIMM 25
8C8A	Error in memory subsystem: Upper Board, DIMM 26
8C8B	Error in memory subsystem: Upper Board, DIMM 27
8C8C	Error in memory subsystem: Upper Board, DIMM 28
8C8D	Error in memory subsystem: Upper Board, DIMM 29
8C8E	Error in memory subsystem: Upper Board, DIMM 30
8C8F	Error in memory subsystem: Upper Board, DIMM 31
8C90	Error in memory subsystem: Upper Board, DIMM 32
8C91	DIMMs mapped out: Lower Board, 1 - 4
8C92	DIMMs mapped out: Lower Board, 9 - 12

Code	Description
8C93	DIMMs mapped out: Lower Board, 17 - 20
8C94	DIMMs mapped out: Lower Board, 25 - 28
8C95	DIMMs mapped out: Lower Board, 5 - 8
8C96	DIMMs mapped out: Lower Board, 13 - 16
8C97	DIMMs mapped out: Lower Board, 21 - 24
8C98	DIMMs mapped out: Lower Board, 29 - 32
8C99	DIMMs mapped out: Upper Board, 1 - 4
8C9A	DIMMs mapped out: Upper Board, 9 - 12
8C9B	DIMMs mapped out: Upper Board, 17 - 20
8C9C	DIMMs mapped out: Upper Board, 25 - 28
8C9D	DIMMs mapped out: Upper Board, 5 - 8
8C9E	DIMMs mapped out: Upper Board, 13 - 16
8C9F	DIMMs mapped out: Upper Board, 21 - 24
8CA0	DIMMs mapped out: Upper Board, 29 - 32
FFFE	Invalid Error Number
FFFF	Reached Termination during Error Processing

Server management configuration utility

The Server Management Configuration Utility (SM Config) is an EFI-based program used to view or modify the Server Management firmware configuration data. The firmware configuration is maintained by the BMC. The executable program for the utility is named SMconfig.efi.

SM Config lets you:

- Configure the Emergency Management Port (EMP) for remote server management over a modem or direct serial connection.

  Note: Remote management is not supported by IBM. This code is available only from Intel.

- Configure the Direct Platform Control over LAN feature (DPC\LAN) for remote server management over the network.

  Note: Remote management is not supported by IBM. This code is available only from Intel.

- Configure power restoration policies when the system loses AC power.
- Set the accelerated cool-down timeout.
- Set the Fault Resilient Boot (FRB) timeout.
- Configure the Advanced Configuration and Power Interface (ACPI) features.
- Enable or disable Platform Event Filtering (PEF) and Platform Event Paging (PEP).

Running the server management configuration utility

The server management configuration utility can be found on the system utilities CD (see "The xSeries 380 System Utilities CD" on page 98).

Note:

- You can run the utility directly from the System Utilities CD or from a diskette you create from the CD. If you choose to run the utility from a diskette, follow the instructions in the READ.TXT file on the CD.
- For the most recent utility downloads, update utilities and instructions, refer to the web site http://www.ibm.com/pc/support. When using utilities downloaded from this web site, be sure to follow the instructions in any associated "ReadMe" files.

Follow these steps to run the SEL Viewer Utility:

1. Insert the System Utilities CD into the CD-ROM drive.
2. Type the following command from the EFI shell prompt:

   ```
   issue: map -r
   ```
3. Locate the FS*x* where *x* is the CD-ROM drive (FF).
4. Issue FS*x*: where *x* is the CD-ROM drive.
5. Type the following:

   ```
   CD SMConfig
   ```
6. Run the utility by typing the following command:

   ```
   SMConfig
   ```

The utility automatically loads configuration data from the smconfig.ini file. This data is used to build the contents of the Config Data pull-down menu in the utility. The smconfig.ini file is the default file, but you could load a different file of configuration data on the command line. For example, if you built an initialization file called "mydata.ini" you would load it with the command:

```
smconfig mydata.ini
```

Alternatively, you could load the data from "mydata.ini" with the File Open command described below.

Main window

The SM Config pull-down menu lets your select the main features of the utility. To access menu items, use the arrow keys. Press the <Enter> key to select a menu item. A brief description of each menu item is displayed in the tip-view window (displayed at the bottom of the screen) when you select it.

File open

Use the File menu to open a different ini file of configuration data. You can specify a file name with path and extension, select a file name from a file list, or browse directories and drives from a list. Use the <Tab> key to move between these options. Use the left and right arrow keys to move between the file and directory lists, and the <Esc> key to cancel altogether. The <Ins> and left/right arrow keys are supported in the edit box for entering a file name.

When you open an ini file, SM Config validates the contents of the file and updates the Config menu with the configuration items in the file. (See the following “Updating/viewing config data” on page 125 section for details about configuration items in the default smconfig.ini file.)

Updating/viewing config data

The Config menu contains a dynamic list of options that corresponds to the configuration classes in the current ini file. Each configuration class in the ini file represents a configuration item, such as EMP or PEP.

When you select an item from the Config menu, the utility reads the configuration data of that item from the BMC and creates a setup page containing values read from the BMC. The setup pages may have drop-down boxes, edit boxes, and/or buttons. Use the <Tab>, <F5>, or Down arrow keys to move forward, and use <F6> or Up arrow keys to move backwards between each item.

Press the <Enter> key while on a drop-down box to display the other options available. Then use the arrow keys to move up or down and press the <Enter> key to select an item from the drop-down box. Each item in the drop-down boxes displays a brief description in the tip-view window. Use the <Esc> key to exit from any level of the configuration to a previous level.

Save the configuration data by selecting the <Save> button and pressing <Enter>. Use the <Cancel> button or <Esc> key to abort changes and return to the main window.

Platform setup

The Platform setup page lets you configure platform-specific features, including the accelerated cool-down period.

Accelerated cool down: This feature lets you enable the system to cool down more rapidly when the system is powered off. Set the accelerated cool-down timeout in seconds (range is 0 to 65535). If accelerated cool-down is enabled (that is, the cool-down time is not 0), the BMC leaves the system fans running for the specified time after the system is powered down.

Power setup

The Power setup page lets you configure power features.

Power restore policy: Determines what happens when the system loses and then regains AC power. The choices are:

- Always on: The system is powered on after AC power is restored.
- Always off: The system will be left powered off after AC power is restored.
- Restore Power state: The system is restored to its previous on or off state before AC power was lost. This is the default.

Power restore delay: The delay in seconds before the power restore policy is enacted. The range is 0 to 15 seconds.

Power cycle delay: The delay in seconds between power cycles. The range is 0 to 255 seconds, where 0 is the default value. For this period of time after the system is turned off, the BMC ignores the front panel power switch if anyone attempts to turn the system back on.

Fault Resilient Booting (FRB) setup

Fault Resilient Booting (FRB) allows a multiprocessor system to boot in case the bootstrap processor (BSP) fails.

FRB3 timeout: FRB3 refers to the level of FRB in which a timer is started at system power up or hard reset. The BIOS stops this timer in the power-on self test (POST) by asserting the FRB timer halt signal to the BMC. If the timer is not stopped, the BSP is disabled, the system is reset and another processor becomes the BSP.

Advanced Configuration Power Interface (ACPI) setup

Configure the ACPI features as described below.

Button model: Sets the power and/or sleep button model used by the system:

- Power Button Only. The system supports a single power button.
- Power and Sleep Buttons. The system supports both power and sleep buttons.

State notify: Specifies whether other server management controllers in the system will be notified upon ACPI power state changes.

- Enable. Enables notification.
- Disabled. Disables notification.

Fan control: Controls fan operation when the system enters the S1 sleep state:

- Do Not Stop Fans. Does not stop fans on sleep state.
- Stop Fans. Stops fans on sleep state.

Platform Event Filtering (PEF) setup

Platform Event Filtering lets you configure the actions to take when certain platform events occur. You can specify which events to filter.

PEF enable: Enables or disables Platform Event Filter (PEF).

Logging enable: Enables or disables system event logging when an event filter is triggered.

PEP actions: Enables or disables Platform Event Paging (PEP) actions when an event filter is triggered. PEP sends a phone page when an event triggers the filter.

Power down: Enables or disables system power down when an event filter is triggered.

Reset: Enables or disables a system reset when an event filter is triggered.

Power cycle: Enables or disables a system power cycle when an event filter is triggered.

LAN alert: Enables or disables sending of a LAN alert message when an event filter is triggered.

Filter entries: This option lets you enable or disable pre-configured event filters. Select this button and press <Enter> to display another setup page with a table of pre-configured event filters.

Use the arrow keys to move among the options, and press the <Space Bar> to enable or disable a filter entry. A filter entry is enabled when an arrowhead is displayed to the left of the filter entry. The arrowhead is removed when the filter entry is disabled.

Use the <Tab> key to move between the filter entries and the <OK> button. Select <OK> to go back to the PEF setup page. Use the <Esc> key to abort any selection altogether.

Note: You must select <Save> in the PEF setup page to actually set the filter entries.

Platform Event Paging (PEP) setup

The Platform Event Paging (PEP) setup lets you configure the following features.

Blackout period: Enter the time, in minutes, between successive phone pages. The range is 0 to 255 minutes, where 0 disables the blackout period.

Modem Page string: Enter the paging string, which contains both the paging service number and the characters that are sent once the connection has been made. The length of the paging string is determined at run-time from firmware and it is kept in the internal use area of the BMC FRU information.

Emergency Management Port (EMP) setup

The EMP setup enables remote server management over a modem or with a direct serial connection. Specify the following features.

Access mode: Sets the times during system operation when EMP access over the specified port is available. The choices are:

- Pre-boot only. The EMP is automatically activated when the system is powered off and during POST.
- Always Active. The serial port is always dedicated for EMP use.
- Always Disabled. The EMP is deactivated.

Restricted access mode: Enables or disables restricted mode access. When restricted mode is enabled, control operations that could disable or alter a running system via the EMP are disabled.

Connection mode: Configures the method to connect to the EMP:

- Direct Connect Mode is for applications that connect the EMP port directly to another computer system.
- Modem Mode is for applications that connect the EMP port to an external modem.

Data Carrier Detect (DCD) mode: Enables or disables monitoring of the Data Carrier Detect (DCD) signal. When DCD Mode is enabled, the EMP is activated and/or reinitialized whenever the serial port's DCD signal becomes de-asserted.

Baud rate: Configures the maximum rate in bits per second that data is transmitted through the EMP port. Baud rates are 19200, 38400, 57600, and 115200.

Flow control: You can disable the flow control or set it to CTS/RTS.

Modem init string: The initialization string is transmitted every time the EMP initializes. The maximum length is 32 bytes and it is usually set to "ATE1Q0V1X4&D2&C1S0=0".

Modem hangup string: The Hangup String is sent to the modem when the EMP terminates the session. The EMP automatically sends an <Enter> character after this string. The maximum length is 8 bytes and it is usually set to "ATH".

Modem ESC sequence: The Modem ESC Sequence string is sent to the modem before sending a command string to the modem. The maximum length is 8 bytes and it is usually set to "+++".

Modem phone number: Enter the phone number of the modem connected to this server. The maximum length is 32 bytes. The Modem Phone Number can be retrieved and reported via in-band management connections.

Set password: If set, this password restricts EMP access through the direct serial connection or modem. Select the Set Password button to display the password setup page for clearing or setting the password. Valid characters for this password are A-Z, a-z, and 0-9. The maximum line-length allowed is 16 characters.

The password setup page consists of two edit boxes, one to enter a password, another to confirm, and an <OK> button. If a password already exists, both of the edit boxes display "********". To clear the old password, clear both edit boxes by selecting each box and pressing the <Backspace> key. To set a new password, enter the new password in both of the edit boxes. Select the <OK> button when done to go back to the previous setup page.

Note: You must select <Save> in the previous setup page to clear or set the new password to the BMC.

DPC/LAN (Direct Platform Control/LAN) setup

The Direct Platform Control (DPC)/Local Area Network (LAN) setup page lets you configure the following BMC LAN-Alert features.

LAN access mode: Sets the remote access mode. The choices are:

- Disabled. A remote system cannot initiate a LAN session.
- Enabled. A remote system can initiate a LAN session regardless of system state or health.
- Restricted. Control operations, such as power down, front panel NMI, and reset cannot be performed.

Host IP address: The Host IP Address is the logical or Internet Address of this server. You must enter the IP address if DHCP is disabled (see the DHCP option below). Enter the IP address as dotted notation, e.g., 192.168.0.2

Subnet mask: The Subnet Mask is the logical or Internet address of this server's subnet. The mask is used to determine if the alert destination is in the local subnet or another subnet relative to the server. You must enter the subnet mask if DHCP is disabled (see the DHCP option below). Enter the IP address as dotted notation, e.g., 255.255.0.0

Gateway IP address: This is the IP address of the gateway, or router system for the subnet. It is required when DHCP is disabled (see the DHCP option below). Enter the IP address as dotted notation, e.g., 192.168.0.2.

Alert IP address: The Alert IP Address is the logical or Internet address of the system(s) to which an Alert message will be sent. For a single node destination, enter the unicast or specific IP address. For an alert to be broadcast within a particular subnet, enter the subnet IP address. Enter the IP address as dotted notation, e.g., 192.168.0.2.

SNMP community string: Specify the SNMP Community String for the community field in the Header section of the SNMP trap sent for a LAN alert. The default string is "Public". The string must be 5 to 16 characters long.

Set password:

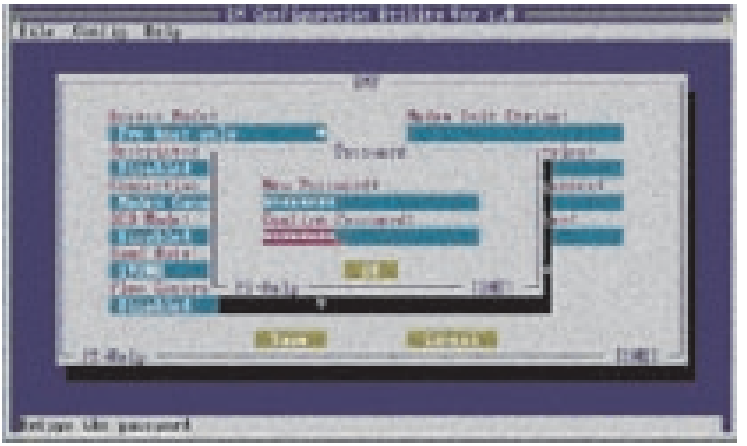


Figure 9. EMP password dialog box

If set, this password restricts DPC LAN access. Select the Set Password button to display the password setup page for clearing or setting the password. Valid characters for this password are any ASCII values [32-126] (the characters space through tilde, or ' ' through '~'). The maximum length allowed is 16 characters.

The password setup page consists of two edit boxes, one to enter a password, another to confirm, and an <OK> button. If a password already exists, both of the edit boxes display "********". To clear the old password, clear both edit boxes by selecting each box and pressing the <Backspace> key. To set a new password, enter the new password in both of the edit boxes. Select the <OK> button when done to go back to the previous setup page.

Note: You must select <Save> in the previous setup page to clear or set the new password to the BMC.

DHCP: Enables or disables the Dynamic Host Configuration Protocol (DHCP), which allows the server to automatically assign the Host IP address, Gateway IP address and Subnet Mask. If DHCP is disabled, you must enter the Host IP address, Gateway IP address, and Subnet Mask fields.

DPC and the DPC console

The Direct Platform Control (DPC) Console is the user interface to the serial based Emergency Management Port (EMP) and the on-board LAN port.

Note: DPC is available from the Intel web site. Be sure to follow any instructions when installing DPC.

DPC is a server management application that supports remote system management via LAN, or an RS232 serial connection to the server's COM2 port over a modem or a direct serial cable. The DPC Console provides the remote management of Intel servers via modem or LAN with a capability to run DOS or EFI based programs and diagnostics.

The SEL Manager plug-in in DPC provides access to the SEL in the server and will have the functionality to display the SEL records.

Using the FRUSDR Load Utility

Note: To view IBM-specific VPD data, the FRUSDR.ini file must be located in the same directory as the utility files. The FRUSDR.ini file is available from the web site http://www.ibm.com/pc/support.

The Field Replacement Unit (FRU) and Sensor Data Record (SDR) Load (FRUSDR) Utility (FRUSDR.EFI) is an Extensible Firmware Interface (EFI) program that updates or modifies the server management subsystem's product level FRU and SDR repository.

You should run the FRUSDR Load Utility each time you upgrade or replace the hardware in your server; excluding add-in boards, hard drives, and RAM. The utility programs the sensors the server uses to monitor server management.

Using the FRUSDR Load Utility, you can do the following:

- Discover the product configuration based on instructions in a master configuration file.
- Display the FRU information.
- Update the non-volatile storage device associated with the baseboard management controller (BMC) that holds the SDR and FRU information.
- Generically handle FRU devices that might not be associated with the BMC.
- Supply command lines and interactive input through the standard input device.
- View and direct results to the standard output device.

Running the FRUSDR Load utility

Follow these steps to run the FRUSDR Load Utility:

1. Boot to the EFI Shell.
2. Copy the FRUSDR package to an LS120 disk or to the hard drive. You can find the FRUSDR package on the servicer CD.
3. Load the Intelligent Platform Manager Interface (IPMI) driver by typing the following command:

   ```
   load ipmi.efi
   ```

   Note: The IPMI driver file name might change independently of the FRUSDR Load Utility.
4. Run the utility by entering a frusdr command based on the following syntax:

   ```
   frusdr [option] [/p]
   ```

   The frusdr command accepts single options only. You can accompany any option with the /p switch to cause the output to pause between blocks of displayed output. For descriptions of the FRUSDR Load Utility command-line options, see "FRUSDR Load Utility command-line options" on page 131.

   Note: You can run the utility directly from the configuration software CDROM or from diskettes you create from the CDROM included in the Country Kit shipped with the system. If you choose to run the FRUSDR Load Utility from a diskette, you must copy the utility from the CDROM and follow the instructions in the included README.TXT file.
5. Use the FRUSDR Load Utility to manage server management subsystem's product level FRU and SDR repository.
6. Reboot the system by powering off and powering on the server. The reboot operation is necessary because the firmware must reload to properly initialize the

sensors after programming and thus effect the changes you have made to the FRU and SDR repository.

FRUSDR Load Utility command-line options

The basic command line format is:

```
frusdr [/?] [/h] [/p] [/d {fru, sdr}] [/Cfg filename.cfg]
```

where

/? or /h	Displays usage information.
/d {FRU, SDR}	Only displays requested area.
/Cfg filename.cfg	Uses custom CFG file.
/p	Pause between blocks of data.

Display FRU information

The /D FRU command displays the contents of a FRU. Any additional arguments specify the Address of the FRU to be displayed. If no Address is specified, the BMC FRU will be displayed. The arguments that make up the Address are the NVS_TYPE, DEV_CNTR, and DEV_ID -- which can be found in the FRU file header of each FRU file. Arguments must be specified in the order listed. If DEV_CNTR is specified it must start with \'C\'. If DEV_CNTR is not specified it defaults to \'C20\'.

Usage:

```
FRUSDR /D FRU [(NVS_TYPE) [DEV_CNTR] (DEV_ID)]
```

FRUSDR /D FRU IMBDEVICE CCO 01	Hot-Swap Backplane
FRUSDR /D FRU IMBDEVICE C20 0D	Processor Board
FRUSDR /D FRU IMBDEVICE 10	I/O Baseboard
FRUSDR /D FRU	BMC (Legacy board)
FRUSDR -D FRU	BMC (Legacy board)
FRUSDR -D FRU imbdevice 11	Sideplane
FRUSDR -D FRU imbdevice 0E	Memory board A
FRUSDR -D FRU imbdevice 0F	Memory board B
FRUSDR -D FRU imbdevice 10	I/O Baseboard
FRUSDR -D FRU imbdevice 0D	Processor board
FRUSDR -D FRU imbdevice CC0 01	Hot Swap Backplane
FRUSDR -D FRU imbdevice CC0 00	Docking plane

The configuration file may be used to load multiple FRU and SDR files. In the configuration file, each FRU and SDR file name must be called out. Additionally, each FRU area and field to be programmed must also be specified. The configuration file may be used to prompt or request information from the user, and to inquire from the user which FRU areas to program.

The pause command may be used with all other commands. It will cause the data being displayed on the screen to pause after a pre-determined amount is written. In some cases, if there isn't enough data being displayed to warrant a pause, then the pause command will be ignored.

Cleanup and exit

Finally, if any update was successfully performed, a single message will be displayed and the utility exits with an exit code of 0.

If the utility fails, then it will exit with an error message and exit code.

Installing components

This chapter provides the basic information that is needed to install hardware components in the xSeries 380 server.

Attention: A trained service technician is required to install or replace all components except:

- Fans
- Hard drives
- Power supply

For a list of supported options for your server, see the ServerProven list at: http://www.ibm.com/pc/compat/

Note: Remove the four rubber grip carrying handles on the sides of the chassis before attempting to slide the chassis into a rack.

Statement 1

DANGER

Electrical current from power, telephone, and communication cables is hazardous. To avoid a shock hazard:

- **Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.**
- **Connect all power cords to a properly wired and grounded electrical outlet.**
- **Connect to properly wired outlets any equipment that will be attached to this product.**
- **When possible, use one hand only to connect or disconnect signal cables.**
- **Never turn on any equipment when there is evidence of fire, water, or structural damage.**
- **Disconnect the attached power cords, telecommunications systems, networks, and modems before you open the device covers, unless instructed otherwise in the installation and configuration procedures.**

To connect:	To disconnect:
1. Turn everything OFF.	1. Turn everything OFF.
2. First, attach all cables to devices.	2. First, remove power cords from outlet.
3. Attach signal cables to connectors.	3. Remove signal cables from connectors.
4. Attach power cords to outlet.	4. Remove all cables from devices.
5. Turn device ON.	

Statement 4

CAUTION:

≥18 kg (37 lbs)

≥32 kg (70.5 lbs)

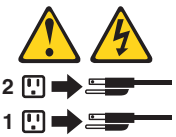
≥55 kg (121.2 lbs)

Use safe practices when lifting.

Statement 5

CAUTION:

The power control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.



Statement 10

CAUTION:
Do not place any object weighing more than 82 kg (180 lbs.) on top of rack-mounted devices.

Statement 14

CAUTION:
Hazardous voltage, current, and energy levels might be present. Only a qualified service technician is authorized to remove the covers where the following label is attached.

Statement 15

CAUTION:
Make sure that the rack is secured properly to avoid tipping when the server unit is extended.

Statement 16

CAUTION:
Some accessory or option board outputs exceed Class 2 or limited power source limits and must be installed with appropriate interconnecting cabling in accordance with the national electric code.

Before you begin

Before you begin to install options in your server, read the following information:

- Become familiar with the safety and handling guidelines provided in Related service information on page 177. These guidelines will help you work safely while working with your server or options.
- Make sure you have an adequate number of properly grounded electrical outlets for your server, monitor, and any other options that you intent to install.
- You do not need to turn off the server to install or replace hot-swap power supplies, hot-swap drives, or hot-swap fans.
- Ensure that you have an adequate number of properly grounded electrical outlets for your server, monitor, and any other options that you intend to install.
- Back up all-important data before you make changes to disk drives.

- For a list of supported options for the xSeries 380, refer to http://www.ibm.com/pc/us/compat on the World Wide Web.

System reliability considerations

Attention:

Temperature: The operating temperature of the server, when installed in an equipment rack, must not go below 10°C (50°F) or rise above 35°C (95°F). Extreme fluctuations in temperature can cause a variety of problems in your server.

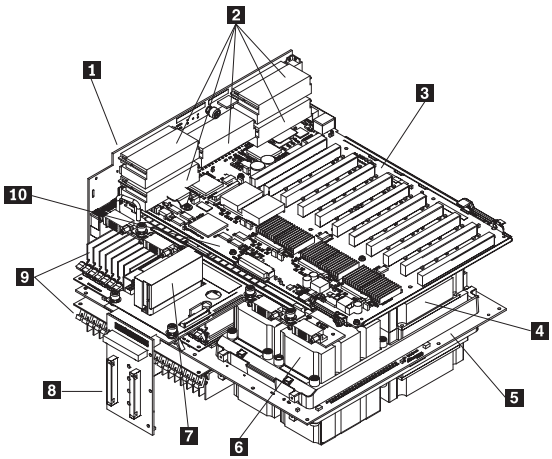
Ventilation: The equipment rack must provide sufficient airflow to the front of the server to maintain proper cooling. It must also include ventilation sufficient to exhaust a maximum of 3,150 BTUs per hour for the server. The rack selected and the ventilation provided must be suitable to the environment in which the server will be used.

To help maintain proper cooling and system reliability, ensure that:

- Each of the drive bays has either a drive or a filler panel installed.
- Each of the power supply bays has either a power supply or a filler panel installed.
- A removed hot-swap drive is replaced within ten minutes of removal.
- Cables for optional adapters are routed according to the instructions that are provided with the adapters.
- A failed fan is replaced within 48 hours.

xSeries 380 boardset description

The server boardset consists of a set of printed circuit boards (PCBs). The following illustration shows how the PCBs are configured without the visual obstruction of the chassis metalwork:



1 Sideplane

2 3.3/5.0V DC-DC Converters

3 I/O Baseboard
4 Processor Power Pods
5 Processor Baseboard
6 Processor Cartridges
7 +12V DC-DC Converter
8 SCSI Backplane
9 Memory Board
10 T-Docking Boards

Features description

Table 12 describes the features of the xSeries 380.

Table 12. xSeries 380 Features.

Feature	Description
Processor Board	The processor board supports up to four Intel Itanium processors and four 48V power pods.
Intel Itanium processor packaged in a slot M LIF socket	Up to four 733 or 800 MHz Intel Itanium processors, packaged in Slot M pin array cartridges. System cache is 4 MB.
Memory Boards	Two plug-in boards contain main memory supporting PC100 Version 1.2 buffered SDRAM. Each memory board supports from 512 MB to 32 GB of error correction code memory using 32 72-bit dual inline memory modules. Each board interfaces to the processors through connectors on the side of the processor baseboard.
I/O Baseboard	Eight 64-bit/66 MHz Hot Plug PCI slots. Two 64-bit/33 MHz PCI slots (accessible by qualified service technician only). ATI RAGE† XL PCI super video graphics array controller with 8 MB of video memory. The QLogic† ISP 12160 LVDS SCSI controller supports two LVDS channels. One channel is used internally to provide support for the internal SCSI drives (connected to the SCSI backplane). The second LVDS channel is routed to the rear of the chassis to support external devices.
Legacy I/O Board	This board contains all legacy I/O connections and plugs into the I/O baseboard. PS/2-compatible keyboard and mouse ports. PS/2-compatible parallel port. The PCI-enhanced Integrated Drive Electronics (IDE) interface has two IDE buses supporting the LS-120 (Primary IDE 0) and CD-ROM drive (Secondary IDE 1). Two universal serial bus ports. Two PS/2-compatible, 9-pin serial ports.

Table 12. xSeries 380 Features.

Feature	Description
SCSI Backplane	The SCSI Backplane supports up to two 1-inch SCA2-type LVDS SCSI drives, mounted in carriers.
Front Panel	The Front Panel provides the user interface to the server. Push-button switches control power-up, reset, and initialization functions. LEDs indicate power on, power supply failure, hard drive failure, or a fan failure. An LCD panel provides information about boot status and available number of processors.
Sideplane	• Electrically connects the Processor Baseboard and I/O baseboard. • Contains the connectors for the 5 V and 3.3 V DC-to-DC converters. • Distributes DC power to the I/O Baseboard. • Interconnects to the T-Docking Board.
T-Docking Board	The T-Docking Board connects to the I/O Baseboard through the interconnect cable. The T-Docking Board also connects to the SCSI Backplane. The board distributes the power load of the server among three to four 800-watt autoranging power supplies, contains the socket for the 12V DC-to-DC converter for the LVDS drives, and provides power to the 172 mm and 120 mm fans.

Processor overview

Each Intel Itanium processor is packaged in a Slot M pin array cartridge. Depending on configuration, your system has one to four processors. Each processor is powered by a 48V power pod, located adjacent to the processor on the processor board. Attached to the top of each processor is a heat sink that dissipates thermal energy.

Attention: Processors should only be installed, removed, or replaced by a trained servicer who is familiar with IBM products.

When shipping, unpacking, or handling Intel Itanium processors, be sure to follow the guidelines described in “Handling electrostatic discharge-sensitive devices” on page 260.

Memory overview

Memory resides on two memory boards. Each memory board contains slots for 32 DIMMs and is attached to the processor board through a 300-pin connector. The memory controller supports PC 100-registered Version 1.2 Buffered SDRAM DIMMs. DIMM sizes supported are 256 MB, 512 MB, and 1 GB. Each memory board can support from 512 MB to 32 GB. The xSeries 380 server can support up to 64 GB of system memory.

DIMM installation sequence

Attention: DIMMs should only be installed, removed, or replaced by a trained servicer who is familiar with IBM products.

DIMMs must be installed on a memory board in groups of four as shown in "DIMMs" on page 187.

Note: BIOS automatically detects, sizes, and initializes the memory array, depending on the type, size, and speed of the installed DIMMs, and reports memory size and allocation to the system through configuration registers.

Peripherals

The server connects to supported peripheral devices through interfaces located on the Legacy I/O Board. The Super I/O device on this board supports two serial ports, one parallel port, and PS/2-compatible keyboard and mouse ports. For a detailed view of the Legacy I/O Board connections, see the illustration at "Rear view" on page 10.

Serial ports Port A is physically the top connector (as you look at the back of the system), while port B is the bottom connector. See "Rear view" on page 10 for the location of these ports.

Parallel port The 25-pin connector of the parallel port provides one IEEE 1284-compatible 25-pin bi-directional EPP. BIOS programming of the Super I/O registers enables the parallel port and determines the port address and interrupt. When disabled, the interrupt is available to add-in boards.

Keyboard port The 6-pin keyboard port lets you connect a PS/2-compatible keyboard to the server. You must be sure the keyboard is plugged into the system before powering it up. During power up, the BIOS detects the keyboard and configures its controller accordingly. The keyboard controller is functionally compatible with the 8042A micro controller. See "Rear view" on page 10 for the location of the keyboard port.

Mouse port The 6-pin mouse port lets you connect a PS/2-compatible mouse to the server. You must be sure the mouse is plugged into the system before powering it up. During power up, the BIOS detects the mouse and configures its controller accordingly. See "Rear view" on page 10 for the location of the mouse port.

Add-in board slots

The I/O baseboard has eight 64-bit/66 MHz Hot Plug PCI and two 64-bit/33 MHz PCI expansion slots contained in the following four PCI segments:

- F16,0 provides for PCI slots 1 and 2, video, and the PXB that controls the Super I/O functions.
- F16,1 provides for PCI slots 3 through 5 and the dual-channel LVDS controller.
- F16,2 provides for slots 6 through 8.
- F16,3 provides for slots 9 and 10.

Video

The onboard, integrated ATI RAGE XL 64-bit SVGA chip contains an SVGA controller that is fully compatible with industry video standards. The standard system

configuration comes with 8 MB of 10-nanosecond onboard video memory. You cannot add video memory to this system.

The video controller supports pixel resolutions of up to 1600 x 1200 and up to 16.7 million colors. The controller also provides hardware accelerated bit block transfers of data.

The SVGA controller supports analog VGA monitors (single and multiple frequency, interlaced and noninterlaced) with a maximum vertical retrace noninterlaced frequency of 100 Hz.

The video port is located on the Legacy I/O panel. See "Rear view" on page 10 for the location of this port.

SCSI controller

A QLogic ISP12160A Ultra3 SCSI chip is a highly integrated bus master, dual-channel SCSI I/O processor for SCSI initiator and target applications. The chip supports dual channel, Ultra3 (Fast-80) SCSI functionality and is pin compatible with QLogic's ISP12160 Ultra3 SCSI processor as well as QLogic's ISP1280 dual SCSI processor. This device interfaces the PCI bus to two Ultra3 SCSI buses and contains an onboard RISC processor. The ISP12160A is a fully autonomous device, capable of managing multiple I/O operations and associated data transfers from start to finish without host intervention. The ISP12160A provides power management feature support in accordance with the PCI Bus Power Management Interface Specification.

For detailed information on the ISP12160A Ultra3 SCSI chip, refer to the ISP12160A/33 and ISP12160A/66 Intelligent, Dual SCSI Processors Data Sheet and the ISP12160/ISP12160A Intelligent, Dual SCSI Processors Designer's Guide. QLogic produces both of these documents.

IDE controller

The I/O Firmware Bridge (IFB) is a multifunction device on the Legacy I/O board that acts as a PCI-based Fast IDE controller. The device controls:

- PIO and IDE DMA/bus master operations
- Mode 4 timing
- Transfer rates up to 22 MB/sec (33 MB/sec using ultra DMA transfers)
- Buffering for PCI/IDE burst transfers
- Master/slave IDE mode

Server management

The server management features are implemented using three microcontrollers: the Baseboard Management Controller (BMC) and the Chassis Bridge controller (CBC) on the Legacy I/O board, and the Hot-Swap Controller (HSC) on the T-docking Board.

The firmware of the three microcontrollers are field upgradeable using the Firmware Update utility. For information on the Firmware Update Utility, refer to "Upgrading the Firmware" on page 98.

Baseboard Management Controller (BMC)

The Baseboard Management Controller (BMC) is a microcontroller with associated circuitry that resides on the Legacy I/O board. The primary purpose of the BMC is to autonomously monitor for system platform management events, and log their

occurrence in the non-volatile System Event Log (SEL). These events include over-temperature and over-voltage conditions as well as fan failures.

The following is a list of the major functions of the BMC:

- Access to the monitored information so system management software can poll and retrieve the present status of the platform.
- Functions for the front-side system controls and indicators. These functions include control of system power, hard-resets, Power LED displays, cooling fault detection, general fault detection, and power fault LED displays. The BMC provides this control both when the system is powered down and is functioning on standby power only, and when the system is powered up.
- Access to the non-volatile Sensor Data Record (SDR) Repository. SDRs provide information that the system management software uses to automatically configure itself for the number and type of Intelligent Platform Management Interface (IPMI) sensors in the system (e.g. temperature and voltage sensors).
- System power control
- Platform Event Paging (PEP) / Platform Event Filtering (PEF)
- Power distribution board monitoring
- Temperature and voltage monitoring
- Fan failure monitoring
- Processor presence monitoring
- Speaker 'Beep' capability on standby and when system is powered up
- Intel Itanium processor SEEPROM interface
- Processor temperature monitoring
- Hot plug PCI slot status monitoring
- Processor bus speed setting
- Chassis fan failure light control
- Chassis power fault light control
- Chassis power light control
- SDR/SEL timestamp clock
- Boardset FRU information interface
- Fault Resilient Booting (FRB)
- System management watchdog timer
- Front control panel diagnostic interrupt handling (labeled as the Init button)
- Diagnostic interrupt (Init status monitor)
- Event receiver
- System interface to the IPMB
- Secure mode control, including video blank option monitoring and control and front control panel lock/unlock initiation.
- IPMI Management Controller Initialization Agent
- Magic Packet† and Wake on LAN† / Power on LAN support
- Emergency Management Port (EMP) interface

Hot Swap Controller (HSC)

The Hot Swap Controller (HSC) resides on the T-docking board. The primary functions of the HSC are as follows:

- Implements the SAF-TE command set
- Controls the fault lights
- Provides a path for management information through the SCSI
- Retrieves drive fault status, backplane temperature, and fan failure information through IPMB
- Queries the status of the power distribution board by retrieving information from the BMC through the IPMB
- Controls drive power-on and power-down, facilitating hot-swapping.

Chassis Bridge Controller (CBC)

The CBC Controller resides on the Legacy I/O board. It serves as a bridge between the internal Intelligent Platform Management Bus (IPMB) and the external Intelligent Chassis Management Bus (ICMB). The internal IPMB transports server management information within a system, and the external ICMB transports server management information between various chassis in a cluster configuration that can contain multiple servers and peripherals.

Hot-swap option installation

This section contains the information necessary to install, remove, and replace the hot-swap options in your server. The options in the following list are the only options which you can install, remove, or replace. A qualified technician must service all other options.

Statement 14

CAUTION:
Hazardous voltage, current, and energy levels might be present. Only a qualified service technician is authorized to remove the covers where the following label is attached.

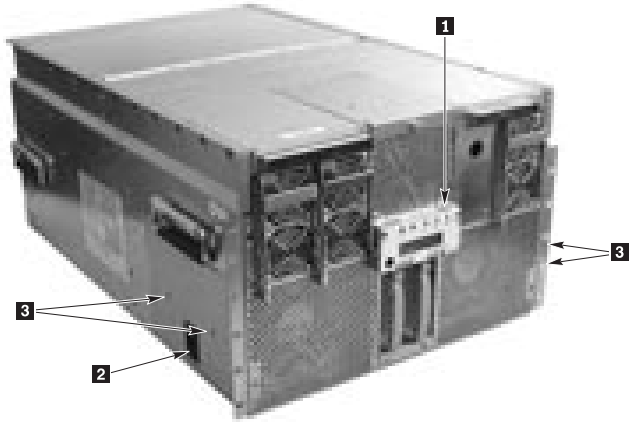
User replaceable options are:

- 172 mm Fan
- 120 mm Fan
- Hard Disk Drive
- Power Supply
- PCI Adapters

Replacing a hot-swap 172mm fan

The four 172 mm cooling fans are mounted in pairs on each side of the chassis. You can remove and install these fans without turning the server system power off. Each fan uses an amber LED to indicate the fan has failed. When an LED illuminates, you need to replace the fan.

Note: The illustrations in this document might differ slightly from your hardware.



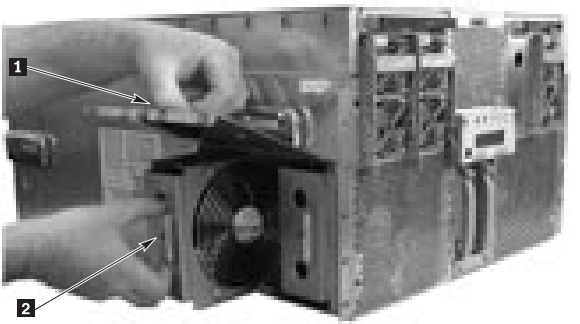
Complete the following steps to replace a 172 mm fan:

1. Review the information in "Before you begin" on page 136.
2. If the server is rack-mounted, slide the server out far enough to expose the fan-access doors near the front sides of the chassis.

   Statement 15

   CAUTION:
   Make sure that the rack is secured properly to avoid tipping when the server unit is extended.
3. Locate the fan you are replacing. If it is a failed fan, the amber LED will be illuminated on the front panel (**1**), and the amber LED on the failed fan itself will be illuminated. The individual fan LEDs may be seen through view-ports in the fan covers (**3**).
4. Slide the plastic latch (**2**) upward.



5. Pull the door open (**1**).

   Attention: Do not leave the door open for an extended time. Cooling of the system could be reduced.

6. Grasp the fan assembly through the finger holes and pull the assembly (**2**).
7. Slide the new fan-assembly into place, with the connector oriented to engage the connector inside of the fan bay.
8. Close and latch the fan-access door.
9. Slide the chassis back into the rack.

Replacing a hot-swap 120mm fan

The two 120 mm fans are mounted on the top front of the server. These fans can be replaced without shutting down the system. A failed fan will be indicated by an amber LED on the front panel, and an amber LED on the failed fan itself.

Note: The illustrations in this document might differ slightly from your hardware.

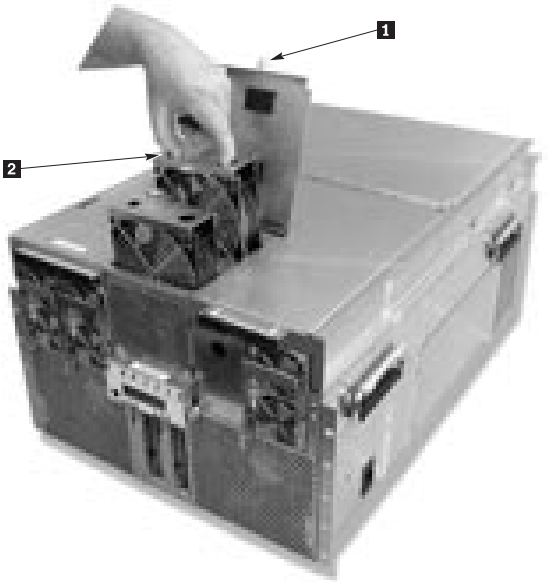
Complete the following steps to replace a 120 mm fan:

1. Review the information in "Before you begin" on page 136.
2. If the server is rack-mounted, slide the server out of the rack.

   Statement 15

   CAUTION:
   Make sure that the rack is secured properly to avoid tipping when the server unit is extended.



3. Locate the fan you are replacing. If it is a failed fan, the amber LED will be illuminated on the front panel, and the amber LED on the failed fan itself will be illuminated. The individual fan LEDs may be seen through view-ports in the fan cover.
4. Loosen the captive screw (**1**) on the fan-access door and open the door.
5. Grasp the fan assembly with the finger holes (**2**) and pull the fan assembly out of the server.

   Attention: Do not leave the door open for an extended time. Cooling of the system could be reduced.
6. Slide the new fan assembly into place and push to engage the connector.
7. Close the fan-access door and tighten the thumbscrew.
8. Slide the server back into the rack.

Hot-swapping a hard drive

The xSeries 380 server supports a variety of single-ended SCSI SCA-type hard disk drives. The area below the system's controls and indicators (front side) houses up to two drives. Each drive slot can contain a single industry-standard SCSI-2 or SCSI-3 one-inch high hard disk drive from the factory.

The procedures in this section describe how to determine drive status, remove a faulty drive, and install a new drive.

Attention:

- When you handle electrostatic discharge (ESD) sensitive devices, take precautions to avoid damage from static electricity. For details on handling these devices, see "Handling electrostatic discharge-sensitive devices" on page 260.

- To maintain proper system cooling, do not operate the server for more than 10 minutes without either a drive or a filler panel installed in each bay.
- To secure a hard disk drive into the drive tray you must have four screws, 5/16" long with a #2 phillips drive recess.

Determining drive status

Status LEDs arranged in sets of three over each of the two bays monitor the status of each drive. See "Controls and indicators" on page 7 for a description of the LEDs.

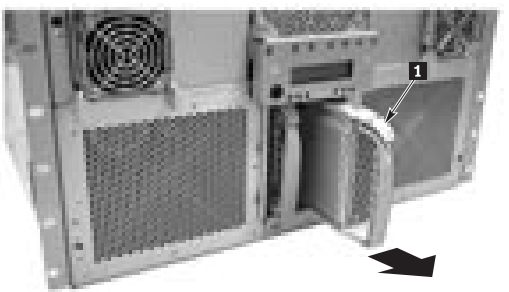
Table 13. SCSI Drive Status LED Descriptions.

SCSI Drive Present, Power On (Green LED)	SCSI Drive Active (Green LED)	SCSI Drive Faulty (Amber LED)	Description and Action If Needed
On	Off	Off	Drive is present with power.
On	Blinking	Off	Drive is present with power and is being accessed.
Off	Off	On	Steady amber fault light indicates drive has a problem.
On	Off	Blinking slowly	Drive SHOULD NOT be replaced at this time. A slowly blinking amber fault light indicates that a newly-replaced drive is in recovery mode (drive array being rebuilt). Power to drive is on.
Off	Off	Off	There is no drive installed in the bay.

Removing a hard disk drive

Complete the following actions to remove a hard disk drive.

1. Examine the amber LEDs above the Hard Drive Bays to determine which drive has failed. See Table 13 for information on how to interpret the LEDs.
2. Remove the plastic bezel on the front of the server.



3. Push on the drive carrier latch (**1**) of the failed drive and use the handle to pull the assembly toward you.

4. Carefully slide the assembly out of the bay and place it on a clean, ESD-protected work surface.

Note: The illustrations in this document might differ slightly from your hardware.

Installing a hard disk drive

Complete the following actions to install a hard disk drive.

1. Remove the plastic bezel on the front of the server.
2. Orient the hard drive carrier assembly in front of the bay guide rails so that the latch is toward the top. Make sure that the carrier is placed correctly into the guide rails to avoid damage.
3. Using the drive carrier handle, firmly push the assembly into the bay until the drive docks with the backplane connector and the carrier latch locks.
4. Replace the plastic bezel on the front of the server.

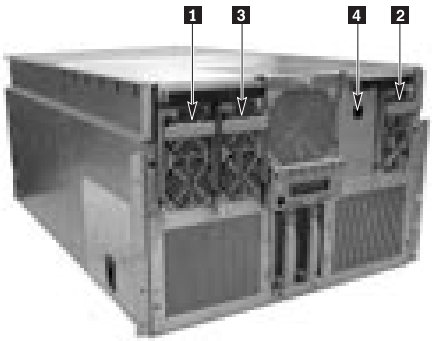
Attention: Do not press on the perforated metal bracket of the carrier when you push the assembly into the bay or you might damage the metal fingers of the bracket.

Hot-swap power supplies

In a fully configured system, the power system contains four 800-watt autoranging power supplies.

Attention: Because of chassis airflow disruption, the power supply bay should not be vacant for more than five minutes when server power is on. Exceeding the five-minute limit might cause system cooling to fall below the minimum required level and possibly cause damage to system components.

Note: If you have only three power supplies installed, they must occupy the first three power supply bays as you face the chassis and count from the left. The following illustration shows the power supply installation order.



1 First Power Supply
2 Second Power Supply
3 Third Power Supply
4 Fourth Power Supply (Optional)

Determining power supply status

Each power supply has three LEDs that indicate whether power is supplied to the power supply and the health of the power supply. Table 14 provides more detail on the three LEDs. For location of the LEDs, see "Controls and indicators" on page 7.

Table 14. Power Supply LEDs.

PWR (Power) Green LED	PFAIL (Predictive Failure) Amber LED	FAIL (Power Supply Failure) Amber LED	Description
Off	Off	Off	No AC power to any power supplies
Off	Off	On	• No AC power to a specific power supply • Power supply failure
Blinking	Off	Off	AC present / Standby output on
On	Off	Off	DC outputs on and okay
On	Off	Blinking	Current limit
On	Blinking	Off	Predictive failure

Power supply removal

Note: Any unused power supply slots must be covered with a filler panel. Uncovered slots can disrupt the airflow used for cooling the system.

The following information describes the steps to remove a power supply.

1. Locate the power supply you want to remove.

2. Push the thumb latch (1) to unlock the power supply handle and pull the handle (2) down to undock the supply.
3. Pull the power supply forward, out of the chassis and set the power supply aside.

Attention: Do not remove covers of power supplies. They contain no serviceable parts.

Power supply installation

The following information describes the steps to install a power supply.

1. Remove the new power supply from the protective packaging, and place it on a clean ESD-protected surface.
2. With the handle in the open position, slide the replacement power supply into the power supply bay until it stops.
3. Rotate the handle up to lock the power supply into place.
4. Check the new power supply LEDs to verify the power supply is functioning properly.

Hot-plug PCI adapters

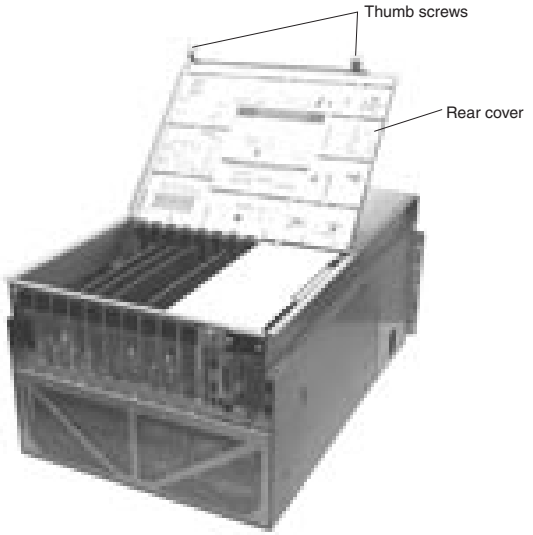
The xSeries 380 server has eight hot plug PCI I/O slots in the I/O Baseboard.

Note: You can determine if IBM has validated an adapter for hot-plug operation at http://www.ibm.com/pc/us/compat/hotplug/index.shtml. Otherwise, contact the adapter vendor for information and support.

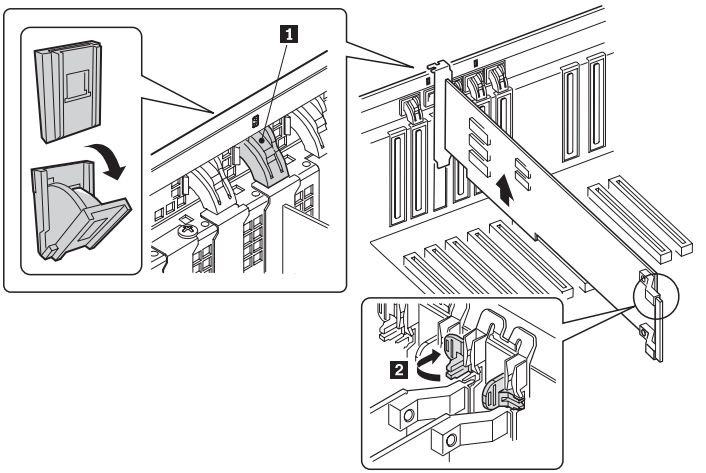
You can replace a hot plug PCI I/O board without shutting down the server. However, you must use the operating system or a resident GUI to shut down or power off the PCI I/O slot before you replace it. This section provides instructions on replacing a hot-plug PCI adapter.

Note: Expansion slot covers must be installed on all vacant slots to maintain the electromagnetic emission characteristics of the server and to ensure proper cooling of the system.

1. Review the information in "Before you begin" on page 136.
2. If the server is operating, use the operating system or GUI application to power down the PCI slot that contains the board you are going to remove.
3. Slide the server out of the rack.
4. Loosen the thumbscrews on the rear cover and open the cover.



5. If you are removing an expansion slot cover, remove it by pushing it out from inside the chassis.
6. If you are removing a PCI card, disconnect any cables attached to the board you are removing.



7. Press on the center of the retention mechanism that secures the end of the board nearest the rear of the chassis. When the mechanism clicks open, rotate it downward (**1**).
8. Release the plastic retaining mechanism (**2**) that secures the end of the board nearest the front of the chassis.

9. Carefully grasp the adapter board and gently slide it up and out of the system. Make sure that you do not scrape the board against other components.
10. Store the board in an anti-static protective wrapper.
11. If you are not installing a replacement PCI card, install an expansion slot cover over the vacated slot by aligning the cover with the slot from the rear of the chassis and pressing the cover into the slot.
12. If you are installing a replacement PCI card, remove it from its protective wrapper, being careful not to touch the components or gold edge connectors.
13. Be sure that the plastic retaining mechanism that secures the end of the board nearest the front of the chassis is open so that it will allow a board to be inserted.

    Note: Each PCI slot has four indicator LEDs: two on the outside and two on the inside of the system. The LEDs will operate differently depending upon the operating system installed. Please refer to the operating system's manual.
14. Be sure that the plastic PCI hot plug mechanism that secures the end of the board nearest the rear of the chassis is in the open position. If not, press the center of the mechanism until it clicks open and then rotate the mechanism downward.
15. Align and insert the new PCI adapter into the slot and press it firmly into place.

    Attention: Some accessory/option board outputs exceed Class 2 or limited power source limits and must use appropriate interconnecting cabling in accordance with the national electric code during installation.
16. Close the plastic latching mechanism that secures the end of the board nearest the front of the chassis.
17. Rotate the locking tab on the rear of the slot until it clicks into place. This position both secures the end of the board and allows it to be activated with the operating system or GUI application.
18. Close the rear part of the top cover and tighten the two thumbscrews.
19. Connect any required cabling to the board.
20. If the server is operating, use the operating system or GUI application to power up the PCI I/O slot into which you installed the PCI I/O board.
21. If the system is installed in an equipment rack, push the system back into place.

Input/output ports

This section provides information about the input/output (I/O) ports on the rear of the server. These ports include the following:

- One video port
- One keyboard port
- One auxiliary pointing-device (mouse) port
- One parallel port
- Two serial ports
- Two universal serial bus (USB) ports
- One external SCSI port

Video port

The integrated ATI RAGE XL 64-bit SVGA chip contains an SVGA controller that is fully compatible with industry video standards. The standard system configuration comes with 16 MB of video memory. You cannot add video memory to this system.

The following table shows the pin-number assignments for the video connector on the system board.

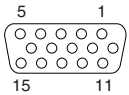
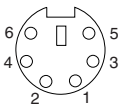


Table 15. Video-port connector pin-number assignments.

Pin	Signal	Pin	Signal	Pin	Signal
1	Red	6	GND	11	NC
2	Green	7	GND	12	DDCDAT
3	Blue	8	GND	13	HSYNC
4	N/C	9	N/C	14	VSYNC
5	GND	10	GND	15	DDCCLK

Keyboard and mouse ports

The PS/2-compatible connectors for the keyboard and mouse share a common housing, but they are not functionally equivalent.



The following table shows the pin-number assignments for the keyboard connector on the system board.

Table 16. Keyboard connector pin-number assignments.

Pin	Keyboard signal	Pin	Keyboard signal
1	KEYDAT	4	FUSED_VCC (+5 V)
2	NC	5	KEYCLK
3	GND	6	NC

Table 17. Mouse connector pin-number assignments.

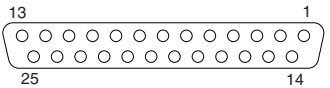
Pin	Mouse signal	Pin	Mouse signal
1	MSEDAT	4	FUSED_VCC (+5 V)
2	NC	5	MSECLK

Table 17. Mouse connector pin-number assignments.

Pin	Mouse signal	Pin	Mouse signal
3	GND	6	NC

Parallel port

The server has one parallel port. The 25-pin connector of the parallel port provides one IEEE 1284-compatible 25-pin bi-directional EPP. BIOS programming of the Super I/O registers enables the parallel port and determines the port address and interrupt. When disabled, the interrupt is available to add-in boards.



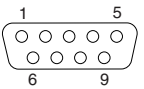
The following table shows the pin-number assignments for the parallel connector on the system board.

Table 18. Parallel port connector pin out.

Pin	Signal	Pin	Signal	Pin	Signal
1	STROBE_L	7	Data bit 5	13	SLCT
2	Data bit 0	8	Data bit 6	14	AUFDXT_L
3	Data bit 1	9	Data bit 7	15	ERROR_L
4	Data bit 2	10	ACK_L	16	INIT_L
5	Data bit 3	11	Busy	17	SLCTIN_L
6	Data bit 4	12	PE	18-25	GND

Serial ports

The server has two standard serial (communication) ports: serial port A and serial port B.



The following table shows the pin-number assignments for the serial-port connector on the system board. These pin-number assignments conform to the industry standard.

Table 19. Serial port connector pin out.

Pin	Signal	Description
1	DCD	Data carrier detected
2	RXD	Receive data
3	TXD	Transmit data
4	DTR	Data terminal ready

Table 19. Serial port connector pin out.

Pin	Signal	Description
5	GND	Ground
6	DSR	Data set ready
7	RTS	Request to send
8	CTS	Clear to send
9	RIA	Ring indication active

Universal Serial Bus (USB) ports

The server has two Universal Serial Bus (USB) ports, which configure automatically.

The following table shows the pin-number assignments for the USB-port connectors.

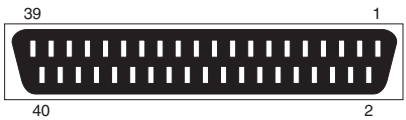
Table 20. USB connector pin out.

Pin	Signal	Notes
A1	VCC	Over current monitor line port 0
A2	DataL0	Differential data line paired with DATAH0
A3	DataH0	Differential data line paired with DATAL0
A4	GND	Cable ground
B1	VCC	Over current monitor line port 1
B2	DATAL1	Differential data line paired with DATAH1
B3	DATAH1	Differential data line paired with DATAl1
B4	GND	Cable ground

SCSI port

The server has one external small computer system interface (SCSI) port.

The QLogic ISP 12160 LVDS SCSI controller supports two LVDS channels. One channel is used internally to provide support for the internal SCSI drives (connected to the SCSI backplane). The second LVDS channel is routed to the rear of the chassis to support external devices.



The following table shows the pin-number assignments for the 68-pin SCSI connector.

Table 21. Wide SCSI connector pin out.

Pin	Signal	Pin	Signal	Pin	Signal
1	S1 (+DB 12)	24	S24 (+ACK)	47	S47 (-DB 7)

Table 21. Wide SCSI connector pin out.

Pin	Signal	Pin	Signal	Pin	Signal
2	S2 (-DB 13)	25	S25 (+RST)	48	S48 (-DB P)
3	S3 (+DB 14)20S20	26	S26 (+MSG)	49	S49
4	S4 (+DB 15)	27	S27 (+SEL)	50	S50
5	S5 (+DB P1)	28	S28 (+C/D)	51	S51 (TERMPWR)
6	S6 (+DB 0)	29	S29 (+REQ)	52	S52 (TERMPWR)
7	S7 (+DB 1)	30	S30 (+I/O)	53	S53 (RESERVED)
8	S8 (+DB 2)	31	S31 (+DB 8)	54	S54
9	S9 (DB 3)	32	S32 (+DB 9)	55	S55 (-ATN)
10	S10 (+DB 4)	33	S33 (DB 10)	56	S56
11	S11 (+DB5)	34	S34 (DB 11)	57	S57 (-BSY)
12	S12 (+DB 6)	35	S35 (-DB 12)	58	S58 (-ACK)
13	S13 (+DB 7)	36	S36 (-DB 13)	59	S59 (-RST)
14	S14 (+DB P)	37	S37 (-DB 14)	60	S60 (-MSG)
15	S15	38	S38 (-DB 15)	61	S61 (-SEL)
16	S16 (DIFFSENS)	39	S39 (-DB P1)	62	S62 (-C/D)
17	S17 (TERMPWR)	40	S40 (-DB 0)	63	S63(-REQ)
18	S18 (TERMPWR)	41	S41 (-DB 1)	64	S64 (-I/O)
19	S19 (RESERVED)	42	S42 (-DB 2)	65	S65 (-DB 8)
20	S20	43	S43 (-DB 3)	66	S66(-DB 9)
21	S21 (+ATN)	44	S44 (-DB 4)	67	S67 (-DB 10)
22	S22 S22	45	S45 (-DB 5)	68	S68 (-DB 11)
23	S23 (+BSY)	46	S46 (-DB 6)		

IDE

The following table contains the IDE connector pinouts.

Table 22. IDE connector pinout.

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	RSTDRV	11	DD3	21	DRQ	31	IRQ
2	GND	12	DD12	22	GND	32	Reserved (N/C)
3	DD7	13	DD2	23	DIOW	33	DA1
4	DD8	14	DD13	24	GND	34	Reserved (N/C)
5	DD6	15	DD1	25	DIOR	35	DA0
6	DD9	16	DD14	26	GND	36	DA2
7	DD5	17	DD0	27	IORDY	37	CS1P_L
8	DD10	18	DD15	28	CSEL (1 KW p/d)	38	DS3P_L
9	DD4	19	GND	29	DACK	39	DHACT_L
10	DD11	20	Keyed	30	GND	40	GND

If no IDE drives are present, no IDE cable should be connected. If only one IDE drive is installed, it must be connected at the end of the cable.

PCI

The following tables give information on the 33MHz 64-bit and 66 MHz 64-bit PCI connectors.

Table 23. 33MHz 64-bit PCI connectors (slots 1 and 2).

Pin	Signal	Pin	Signal	Pin	Signal
A1	TRST_L	A64	C/BE7_L	B33	C/BE2_L
A2	+12V	A65	C/BE5_L	B34	GND
A3	TMS	A66	+5V	B35	IRDY_L
A4	TDI	A67	PAR64	B36	+3.3V
A5	+5V	A68	AD62	B37	DEVSEL_L
A6	INTA_L	A69	GND	B38	GND
A7	INTC_L	A70	AD60	B39	LOCK_L
8A	+5V	A71	AD58	B40	PERR_L
A9	RESERVED	A72	GND	B41	+3.3V
A10	+5V	A73	AD56	B42	SERR_L
A11	RESERVED	A74	AD54	B43	+3.3V
A12	GND	A75	+5V	B44	C/BE1_L
A13	GND	A76	AD52	B45	AD14
A14	RESERVED	A77	AD50	B46	GND
A15	RESET_L	A78	GND	B47	AD12
A16	+5V	A79	AD48	B48	AD10
A17	GRANT_L	A80	AD46	B49	M66EN
A18	GND	A81	GND	B50	5V KEYWAY
A19	RESERVED	A82	AD44	B51	5V KEYWAY
A20	AD30	A83	AD42	B52	AD8
A21	+3.3V	A84	+5V	B53	AD7
A22	AD28	A85	AD40	B54	+3.3V
A23	AD26	A86	AD38	B55	AD5
A24	GND	A87	GND	B56	AD3
A25	AD24	A88	AD36	B57	GND
A26	IDSEL	A89	AD34	B58	AD1
A27	+3.3V	A90	GND	B59	+5V
A28	AD22	A91	AD32	B60	ACK64_L
A29	AD20	A92	RESERVED	B61	+5V
A30	GND	A93	GND	B62	+5V
A31	AD18	A94	RESERVED	B63	RESERVED
A32	AD16	B1	-12V	B64	GND

Table 23. 33MHz 64-bit PCI connectors (slots 1 and 2).

Pin	Signal	Pin	Signal	Pin	Signal
A33	+3.3V	B2	TCK	B65	C/BE6_L
A34	FRAME_L	B3	GND	B66	C/BE4_L
A35	GND	B4	TDO	B67	GND
A36	TRDY_L	B5	+5V	B68	AD63
A37	GND	B6	+5V	B69	AD61
A38	STOP_L	B7	INTB_L	B70	+5V
A39	+3.3V	B8	INTD_L	B71	AD59
A40	SDONE	B9	PRSNT1_L	B72	AD57
A41	SB0_L	B10	RESERVED	B73	GND
A42	GND	B11	PRSNT2_L	B74	AD55
A43	PAR	B12	GND	B75	AD53
A44	AD15	B13	GND	B76	GND
A45	+3.3V	B14	RESERVED	B77	AD51
A46	AD13	B15	GND	B78	AD49
A47	AD11	B16	CLK	B79	+5V
A48	GND	B17	GND	B80	AD47
A49	AD9	B18	REQ_L	B81	AD45
A50	5V KEYWAY	B19	+5V	B82	GND
A51	5V KEYWAY	B20	AD31	B83	AD43
A52	C/BEO_L	B21	AD29	B84	AD41
A53	+3.3V	B22	GND	B85	+5V
A54	AD6	B23	AD27	B86	AD39
A55	AD4	B24	AD25	B87	AD37
A56	GND	B25	+3.3V	B88	+5V
A57	AD2	B26	C/BE3_L	B89	AD35
A58	AD0	B27	AD23	B90	AD33
A59	+5V	B28	GND	B91	GND
A60	REQ64_L	B29	AD21	B92	RESERVED
A61	+5V	B30	AD19	B93	RESERVED
A62	+5V	B31	+3.3V	B94	GND
A63	GND	B32	AD17		

Table 24. 33MHz 64-bit PCI connectors (slots 3 through 10).

Pin	Signal	Pin	Signal	Pin	Signal
A1	TRST_L	A64	C/BE7_L	B33	C/BE2_L
A2	+12V	A65	C/BE5_L	B34	GND

Table 24. 33MHz 64-bit PCI connectors (slots 3 through 10).

Pin	Signal	Pin	Signal	Pin	Signal
A3	TMS	A66	+3.3V	B35	IRDY_L
A4	TDI	A67	PAR64	B36	+3.3V
A5	+5V	A68	AD62	B37	DEVSEL_L
A6	INTA_L	A69	GND	B38	GND
A7	INTC_L	A70	AD60	B39	LOCK_L
A8	+5V	A71	AD58	B40	PERR_L
A9	RESERVED	A72	GND	B41	+3.3V
A10	+3.3V	A73	AD56	B42	SERR_L
A11	RESERVED	A74	AD54	43B	+3.3V
A12	3.3V Keyway	A75	+3.3V	B44	C/BE1_L
A13		A76	AD52	B45	AD14
A14	RESERVED	A77	AD50	B46	GND
A15	RESET_L	A78	GND	B47	AD12
A16	+3.3V	A79	AD48	B48	AD10
A17	GRANT_L	A80	AD46	B49	M66EN
A18	GND	A81	GND	B50	GND
A19	RESERVED	A82	AD44	B51	GND
A20	AD30	A83	AD42	B52	AD8
A21	+3.3V	A84	+3.3V	B53	AD7
A22	AD28	A85	AD40	B54	+3.3V
A23	AD26	A86	AD38	B55	AD5
A24	GND	A87	GND	B56	AD3
A25	AD24	A88	AD36	B57	GND
A26	IDSEL	A89	AD34	B58	AD1
A27	+3.3V	A90	GND	B59	+ 3.3V
A28	AD22	A91	AD32	B60	ACK64_L
A29	AD20	A92	RESERVED	B61	+5V
A30	GND	A93	GND	B62	+5V
A31	AD18	A94	RESERVED	B63	RESERVED
A32	AD16	B1	-12V	B64	GND
A33	+3.3V	B2	TCK	B65	C/BE6_L
A34	FRAME_L	B3	GND	B66	C/BE4_L
A35	GND	B4	TDO	B67	GND
A36	TRDY_L	B5	+5V	B68	AD63
A37	GND	B6	+5V	B69	AD61
A38	STOP_L	B7	INTB_L	B70	+3.3V
A39	+3.3V	B8	INTD_L	B71	AD59

Table 24. 33MHz 64-bit PCI connectors (slots 3 through 10).

Pin	Signal	Pin	Signal	Pin	Signal
A40	SDONE	B9	PRSNT1_L	B72	AD57
A41	SB0_L	B10	RESERVED	B73	GND
A42	GND	B11	PRSNT2_L	B74	AD55
A43	PAR	B12	3.3V Keyway	B75	AD53
A44	AD15	B13		B76	GND
A45	+3.3V	B14	RESERVED	B77	AD51
A46	AD13	B15	GND	B78	AD49
A47	AD11	B16	CLK	B79	+3.3V
A48	GND	B17	GND	B80	AD47
A49	AD9	B18	REQ_L	B81	AD45
A50	GND	B19	+3.3V	B82	GND
A51	GND	B20	AD31	B83	AD43
A52	C/BEO_L	B21	AD29	B84	AD41
A53	+3.3V	B22	GND	B85	+5V
A54	AD6	B23	AD27	B86	AD39
A55	AD4	B24	AD25	B87	AD37
A56	GND	B25	+3.3V	B88	+3.3V
A57	AD2	B26	C/BE3_L	B89	AD35
A58	AD0	B27	AD23	B90	AD33
A59	+ 3.3V	B28	GND	B91	GND
A60	REQ64_L	B29	AD21	B92	RESERVED
A61	+5V	B30	AD19	B93	RESERVED
A62	+5V	B31	+3.3V	B94	GND
A63	GND	B32	AD17		

FRU information (service only)

The following information describes procedures for removing and installing most components inside the system. Only a qualified service technician is authorized to remove the server covers and to access any of the components inside the server.

Note: Before servicing this server, read "Before you begin" on page 136.

Statement 1

DANGER

Electrical current from power, telephone, and communication cables is hazardous. To avoid a shock hazard:

- **Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.**
- **Connect all power cords to a properly wired and grounded electrical outlet.**
- **Connect to properly wired outlets any equipment that will be attached to this product.**
- **When possible, use one hand only to connect or disconnect signal cables.**
- **Never turn on any equipment when there is evidence of fire, water, or structural damage.**
- **Disconnect the attached power cords, telecommunications systems, networks, and modems before you open the device covers, unless instructed otherwise in the installation and configuration procedures.**

To connect:	To disconnect:
1. Turn everything OFF.	1. Turn everything OFF.
2. First, attach all cables to devices.	2. First, remove power cords from outlet.
3. Attach signal cables to connectors.	3. Remove signal cables from connectors.
4. Attach power cords to outlet.	4. Remove all cables from devices.
5. Turn device ON.	

Statement 3

CAUTION:

When laser products (such as CD-ROMs, DVD drives, fiber optic devices, or transmitters) are installed, note the following:

- **Do not remove the covers. Removing the covers of the laser product could result in exposure to hazardous laser radiation. There are no serviceable parts inside the device.**
- **Use of controls or adjustments or performance of procedures other than those specified herein might result in hazardous radiation exposure.**

DANGER

Some laser products contain an embedded Class 3A or Class 3B laser diode. Note the following. Laser radiation when open. Do not stare into the beam, do not view directly with optical instruments, and avoid direct exposure to

Statement 4

CAUTION:

≥18 kg (37 lbs)

≥32 kg (70.5 lbs)

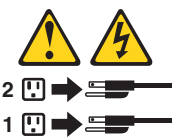
≥55 kg (121.2 lbs)

Use safe practices when lifting.

Statement 5

CAUTION:

The power control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.



Statement 10

CAUTION:
Do not place any object weighing more than 82 kg (180 lbs.) on top of rack-mounted devices.

Statement 13

DANGER

Overloading a branch circuit is potentially a fire hazard and a shock hazard under certain conditions. To avoid these hazards, ensure that your system electrical requirements do not exceed branch circuit protection requirements. Refer to the information that is provided with your IBM device for electrical

Statement 14

CAUTION:
Hazardous voltage, current, and energy levels might be present. Only a qualified service technician is authorized to remove the covers where the following label is attached.

Statement 15

CAUTION:
Make sure that the rack is secured properly to avoid tipping when the server unit is extended.

Statement 16

CAUTION:
Some accessory or option board outputs exceed Class 2 or limited power source limits and must be installed with appropriate interconnecting cabling in accordance with the national electric code.

IMPORTANT: Anchor the equipment rack: The equipment rack must be anchored to an unmovable support to prevent it from falling over when one or more servers are extended in front of it on slides. The anchors must be able to withstand a force of up to 113 kg (250 lbs.). You must also consider the weight of any other device installed in the rack.

Main AC power disconnect: You are responsible for installing an AC power disconnect for the entire rack unit. This main disconnect must be readily accessible, and it must be labeled as controlling power to the entire unit, not just to the server(s).

Grounding the rack installation: To avoid the potential for an electrical shock hazard, you must include a third wire safety grounding conductor with the rack installation. If the server power cord is plugged into an AC outlet that is part of the rack, then you must provide proper grounding for the rack itself. If the server power cord is plugged into a wall AC outlet, the safety grounding conductor in the power cord provides proper grounding only for the server. You must provide additional, proper grounding for the rack and other devices installed in it.

Overcurrent protection: The server is designed for an AC line voltage source with up to 20 amperes of overcurrent protection. If the power system for the equipment rack is installed on a branch circuit with more than 20 amperes of protection, you must provide supplemental protection for the server. If more than one server is installed in the rack, the power source for each server must be from a separate branch circuit. The overall current rating of a server configured with three power supplies is under 16 amperes.

ATTENTION: Temperature: The operating temperature of the server, when installed in an equipment rack, must not go below 5°C (41°F) or rise above 35°C (95°F). Extreme fluctuations in temperature can cause a variety of problems in your server.

Ventilation: The equipment rack must provide sufficient airflow to the front of the server to maintain proper cooling. The rack must also include ventilation sufficient to exhaust a maximum of 3,150 BTUs per hour for the server. The rack selected and the ventilation provided must be suitable to the environment in which the server will be used.

WARNING: Do not attempt to modify or use an AC power cord that is not the exact type required. You must use a power cord that meets the following criteria:

- Rating: For U.S./Canada cords must be UL Listed/CSA Certified type SJT, 12-3 AWG. For outside U.S./Canada cords must be flexible harmonized (<HAR>) or VDE certified cord with 3 x 1.5mm conductors rated 250 VAC.
- Connector, wall outlet end: Cords must be terminated in grounding-type male plug designed for use in your region. It must have certification marks showing certification by an agency acceptable in your region and for U.S. must be rated 125% of overall current rating of the server.
- Connector, server end: The connector that plugs into the AC receptacle on the server must be an IEC 320, sheet C19, type female connector.
- Cord length and flexibility: Cords must be less than 4.5 meters (14.76 feet) long.

Tools and supplies needed

The following tools and supplies may be required to service the xSeries 380:

- Phillips (cross-head) screwdriver (#2).
- Small flat-bladed screwdriver.
- Jumper-removal tool or needle-nosed pliers.
- Torque wrench. (If available, use torque screwdriver P/N 16F1661 and Phillips head #2 bit P/N 16F1664.)
- Antistatic wrist strap and conductive foam pad (recommended).

Before you remove server covers

Before removing covers at any time to work inside the system, observe these safety guidelines.

1. Turn off all peripheral devices connected to the system.
2. Power down the system:
   a. If the server is running an operating system, use its commands or GUI to logoff (if necessary) and exit the operating system. Successfully exiting the operating system causes the following prompt to appear:

      Shell>

   b. After this prompt appears, press and hold the Power button for several seconds. Holding the Power button in powers down the server.

   Note: Powering down the server with the Power button does not remove all power from the system. The +12 Volt standby power is still available to the system even when it has been powered down. To remove standby power from the system you must unplug both power cables from the chassis.
3. After the server shuts down, unplug both AC power cords to remove standby power from the server.
4. Label and disconnect all peripheral cables and all telecommunication lines connected to I/O connectors or ports on the back of the system.

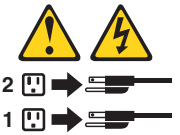
5. Provide some electrostatic discharge (ESD) protection by wearing an antistatic wrist strap attached to chassis ground of the system – any unpainted metal surface – when handling components.

Note: Become familiar with the information in "Related service information" on page 257 before servicing the xSeries 380.

Statement 5

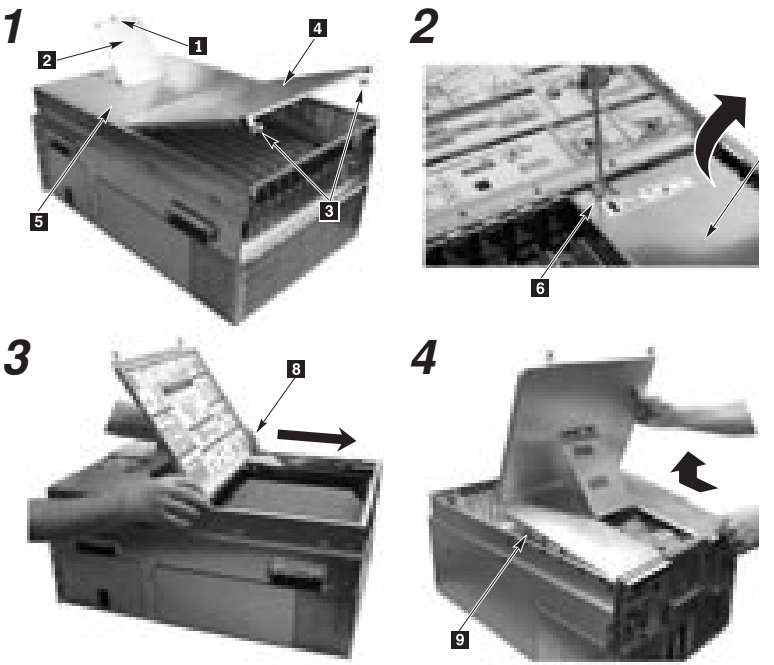
CAUTION:

The power control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.



Top cover

The server comes with a removable top cover. Removal of this cover is necessary when installing or removing many components. You do not have to remove the top cover when removing or installing PCI hot plug and non-hot plug adapter boards, the Legacy I/O board, fans, hard drives, power supplies, or components inside the Processor/Memory Complex.



1	A	Thumbscrew, 120 mm fan cover	2	F	Screw, non-hot plug PCI adapter board cover
	B	120 mm fan cover		G	Non-hot plug PCI adapter board cover
	C	Thnumbscrew, top cover back half	3	H	Apply pressure to slide top cover open (see arrow)
	D	Top cover, back half	4	I	Lift cover and remove as shown by the arrow. Note placement of hooks under the front half of the top cover when replacing.
	E	Top cover, front half			

Attention: For proper cooling and airflow, do not operate the server with the cover removed. Always reinstall the cover before turning on the server.

Top cover removal

Note:

- Read "Before you begin" on page 136.
- Read "Safety information" on page 257.
- Read "Handling electrostatic discharge-sensitive devices" on page 260.

Complete the following steps to remove the top cover.

1. Turn off all peripheral devices connected to the system.
2. Power down the system:

a. If the server is running an operating system, use its commands or GUI to logoff (if necessary) and exit the operating system. Successfully exiting the operating system causes the following prompt to appear:

   Shell>

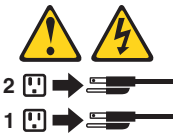
b. After this prompt appears, press and hold the Power button for several seconds. Holding the Power button in powers down the server.

Note: Powering down the server with the Power button does not remove all power from the system. The +12 Volt standby power is still available to the system even when it has been powered down. To remove standby power from the system you must unplug both power cables from the chassis.

Statement 5

CAUTION:

The power control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.



3. After the server shuts down, unplug both AC power cords to remove standby power from the server.
4. If the system is mounted in a rack, pull the chassis out of the rack as far as it will go.

Statement 15

CAUTION:
Make sure that the rack is secured properly to avoid tipping when the server unit is extended.

5. Loosen the thumbscrew at the front of the chassis that secures the 120 mm fan bay and fold the fan cover open.
6. Loosen the two thumbscrews that secure the top cover to the rear of the chassis and fold the rear half of the top cover open.
7. Loosen the screw that secures the non-hot plug PCI adapter board cover and remove that cover.
8. Slide the entire top cover toward the rear of the chassis to disengage the hooks from the chassis housing.

9. Lift the top cover off the chassis.

Top cover installation

Perform the following steps to install the top cover.

1. Before installing the top cover, check that you have not left loose tools or parts inside the system.
2. Check that cables, add-in boards, and other components are properly installed.
3. Make sure that the 120 mm fan cover is lifted and open.
4. Fold the rear half of the top cover open and set the front half down on the chassis, aligning the hooks on both sides of the front half of the cover with the slots in the chassis.
5. Slide the top cover toward the front of the chassis to engage the hooks into the chassis housing.
6. Close the 120 mm fan cover and tighten the thumbscrew. If the door does not close then the top cover hooks have not fully engaged into the chassis.
7. Replace the PCI non-hot swap cover and tighten the screw that secures it to the top cover.
8. Close the rear half of the top cover and tighten the two thumbscrews.
9. If the system is mounted in a cabinet rack, push the chassis into the rack.

Hard drive bay

The hard drive bay provides mounting features for two hot swap hard drives, the Front Panel Interface board, and the hot swap backplane board. You can easily remove and install the bay from the chassis by removing the front bezel and four mounting screws.

Hard drive bay removal

Complete the following actions to remove a hard drive bay.

Note:

- Read “Before you begin” on page 136.
- Read “Safety information” on page 257.
- Read “Handling electrostatic discharge-sensitive devices” on page 260.

1. Power down the system:
   a. If the server is running an operating system, use its commands or GUI to logoff (if necessary) and exit the operating system. Successfully exiting the operating system causes the following prompt to appear:

      Shell>

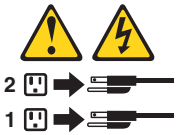
   b. After this prompt appears, press and hold the Power button for several seconds. Holding the Power button in powers down the server.

   Note: Powering down the server with the Power button does not remove all power from the system. The +12 Volt standby power is still available to the system even when it has been powered down. To remove standby power from the system you must unplug both power cables from the chassis.

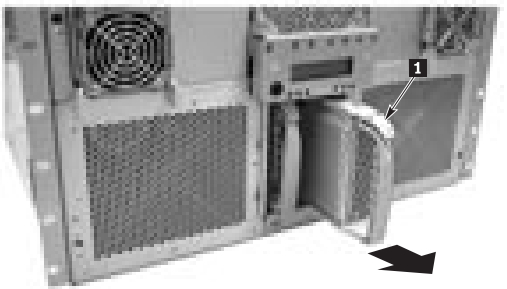
   Statement 5

CAUTION:

The power control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.



2. After the server shuts down, unplug both AC power cords to remove standby power from the server.
3. Remove the front bezel.



4. Remove each hard disk drive from the drive bay by first grasping its handle and depressing the drive locking tab (**1**), and then sliding the drive out of the bay.

5. Remove the four #2 Phillips screws (**1**) from the top and bottom of the drive bay.
6. Grasp the bay by the Front Panel display housing and gently pull the drive out of the chassis.

Hard drive bay installation

Complete the following actions to install a hard drive bay.

Note:

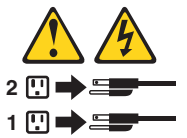
- Read "Before you begin" on page 136.
- Read "Safety information" on page 257.
- Read "Handling electrostatic discharge-sensitive devices" on page 260.

1. Verify that the AC power cables have been disconnected from the chassis.

   Statement 5

   CAUTION:

   The power control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.



2. If the front bezel is not already removed, remove the bezel.
3. Align the hard drive bay such that the connector side is facing into the chassis and push the bay into the front of the chassis.
4. Ensure the drive bay seats into the front connector on the T-Docking Board.
5. Replace the four screws at the top and bottom of the bay.
6. Replace any disk drives into drive bay as required.
7. Replace the front bezel.

LS120 FD diskette drive

The LS120 FD Drive is housed in a two-piece, drive carrier assembly. The assembly is accessible when the top cover is removed. The following sections describe how to remove and install the drive.

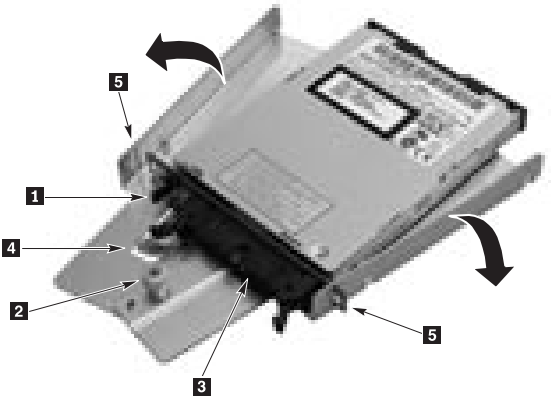
LS120 FD diskette drive removal

Complete the following actions to remove the LS120 FD diskette drive.

Note:

- Read "Before you begin" on page 136.
- Read "Safety information" on page 257.
- Read "Handling electrostatic discharge-sensitive devices" on page 260.

1. Remove the top cover. See "Top cover removal" on page 168.



1	Cable connector
2	Thumbscrew
3	Cable connector
4	Tab
5	Slots

2. Disconnect the drive's data and power cables (1 and 3) from the able adapter PCB at the rear of the drive.

3. Loosen the thumbscrew (2) found at the rear of the drive carrier assembly.
4. Slide the drive carrier assembly toward the rear of the chassis so that the front part of the drive clears the opening in the chassis and remove.
5. Depress the tab (4) and spread the two halves of the drive carrier assembly apart so that the ends of the drive cable adapter PCB come out of their respective slots (5).
6. Unplug the drive cable adapter PCB from the back of the drive.
7. Remove the drive from the two halves of the drive carrier assembly.
8. Place the drive in an antistatic protective wrapper if you are not reinstalling the same drive.

LS120 FD diskette drive installation

Complete the following actions to install an LS120 FD diskette drive.

1. Remove the new drive from its protective wrapper, and place it component-side down on an antistatic surface.
2. Plug the drive cable adapter PCB into the rear of the drive.
3. When locating the two halves of the drive carrier, be sure that following conditions are met:
   - The end with the thumbscrew is oriented toward the rear of the drive.
   - The two ends of the drive cable adapter PCB are inserted into the slots in the carrier.
   - The four metal tabs (two on each half of the drive carrier) are aligned with the holes in the drive.
   - Ensure that the tab is locked.
4. Pick up the entire drive carrier assembly, being careful that you keep the pieces together, and place it on the chassis surface just inside the drive slot.
5. Grasp the sides of the assembly and slide it forward such that the front part of the drive comes through the opening in the chassis. Make sure that the thumbscrew at the rear of the drive carrier assembly aligns with the hole in the surface of the chassis.
6. Tighten the thumbscrew at the rear of the drive carrier assembly.
7. Install the drive's data and power cables into the cable adapter PCB.
8. Install the top cover. See “Top cover installation” on page 170.

CD-ROM drives

The CD-ROM Drive is housed in a two-piece drive carrier assembly. The drive carrier assembly is accessible when the top cover is removed. The following sections describe how to remove and install the drive.

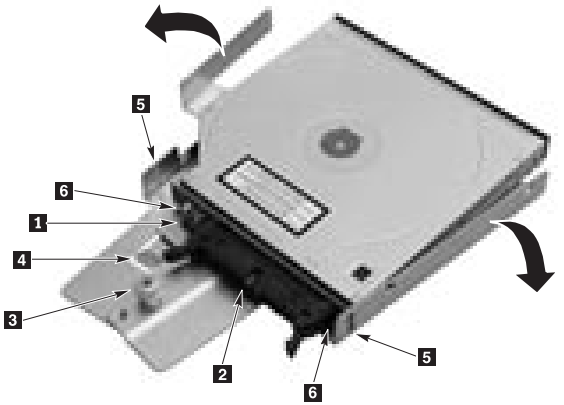
CD-ROM drive removal

Complete the following actions to remove the CD-ROM drive.

Note:

- Read “Before you begin” on page 136.
- Read “Safety information” on page 257.
- Read “Handling electrostatic discharge-sensitive devices” on page 260.

1. Remove the top cover (see "Top cover removal" on page 168).



1	Cable connector
2	Cable connector
3	Thumbscrew
4	Tab
5	Metal tabs
6	Screws

2. Disconnect the drive's data and power cables (1 and 2) from the drive cable adapter PCB at the rear of the drive.
3. Loosen the thumbscrew (3) found at the rear of the drive carrier assembly.
4. Slide the drive carrier assembly towards the rear of the chassis so that the front part of the drive clears the opening in the chassis and remove.
5. Depress the tab (4) and remove the drive carrier assembly from the drive by using slight movements to unseat the carrier's metal tabs from the sides of the drive (5). The drive carrier assembly consists of two halves that are joined by a small plastic pin. You might want to remove the plastic pin in order to remove the drive from the carrier assembly.
6. Use a small Phillips screwdriver and remove the two screws (6) holding the drive cable adapter PCB.
7. Disengage the drive cable adapter PCB from the drive.
8. Place the drive in an antistatic protective wrapper if you are not reinstalling the same drive.

CD-ROM drive installation

Statement 3

CAUTION:

When laser products (such as CD-ROMs, DVD drives, fiber optic devices, or transmitters) are installed, note the following:

- **Do not remove the covers. Removing the covers of the laser product could result in exposure to hazardous laser radiation. There are no serviceable parts inside the device.**
- **Use of controls or adjustments or performance of procedures other than those specified herein might result in hazardous radiation exposure.**

DANGER

Some laser products contain an embedded Class 3A or Class 3B laser diode. Note the following. Laser radiation when open. Do not stare into the beam, do not view directly with optical instruments, and avoid direct exposure to

Complete the following actions to install a CD-ROM drive.

1. Remove the new drive from its protective wrapper, and place it component-side down on an antistatic surface.
2. Install the drive cable adapter PCB to the CD-ROM drive by connecting it into the back of the CD-ROM drive and securing the two small screws at the ends of the PCB.
3. Install the drive carrier assembly over the drive such that the following conditions are met:
   - The end with the thumbscrew is oriented toward the rear of the drive.
   - The two ends of the drive cable adapter PCB are inserted into the slots in the carrier.
   - The four metal tabs (two on each half of the drive carrier) are aligned with the holes in the drive.
   - Ensure that the tab is locked.
4. Pick up the drive carrier assembly and place it face up (carrier side down) on the chassis such that the front of the drive is aligned with the opening in the front of the chassis.
5. Grasp the sides of the assembly and slide it forward such that the front part of the drive comes through the opening in the chassis. Make sure that the thumbscrew at the rear of the drive carrier assembly aligns with the hole in the surface of the chassis.
6. Tighten the thumbscrew at the rear of the drive carrier assembly.
7. Install the top cover (see “Top cover installation” on page 170).

Processor/memory complex

The Processor/Memory complex mounts memory boards to the processor board and forms a module that you can remove from the main system chassis. To access this module, you need to remove the access door on the right side of the chassis as you face its front, remove four securing screws on the left side of the chassis, and slide the Processor/Memory complex out of the system.

Note: Fully loaded, the Processor/Memory Complex weighs 16.33 kg (36 lbs). Minimally configured, the complex weighs 10.89 kg (24 lbs).

Statement 4

CAUTION:

≥18 kg (37 lbs)

≥32 kg (70.5 lbs)

≥55 kg (121.2 lbs)

Use safe practices when lifting.

Processor/memory complex removal

Complete the following actions to remove the processor/memory complex.

Note:

- Read "Before you begin" on page 136.
- Read "Safety information" on page 257.
- Read "Handling electrostatic discharge-sensitive devices" on page 260.

1. Power down the system:
   a. If the server is running an operating system, use its commands or GUI to logoff (if necessary) and exit the operating system. Successfully exiting the operating system causes the following prompt to appear:

      Shell>

   b. After this prompt appears, press and hold the Power button for several seconds. Holding the Power button in powers down the server.

   Note: Powering down the server with the Power button does not remove all power from the system. The +12 Volt standby power is still available to the system even when it has been powered down. To remove standby power from the system you must unplug both power cables from the chassis.
2. After the server shuts down, unplug both AC power cords to remove standby power from the server.

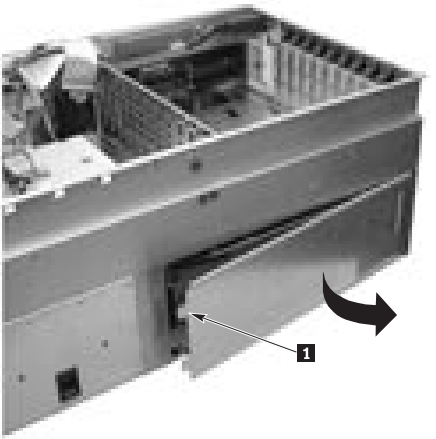
   Statement 14

CAUTION:
Hazardous voltage, current, and energy levels might be present. Only a qualified service technician is authorized to remove the covers where the following label is attached.

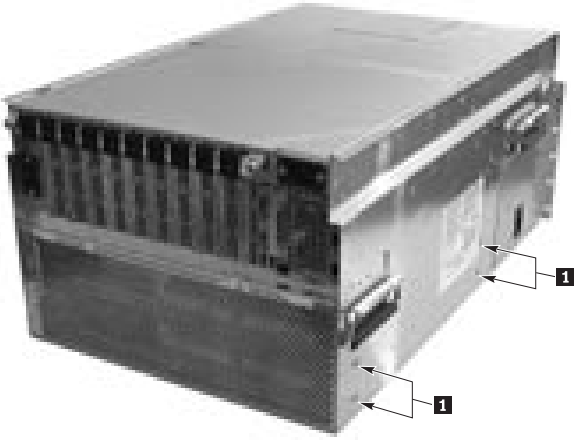
3. If the system is rack-mounted, pull the chassis out of the rack to expose the Processor/Memory Bay on the right side of the chassis as you face its front.

Statement 15

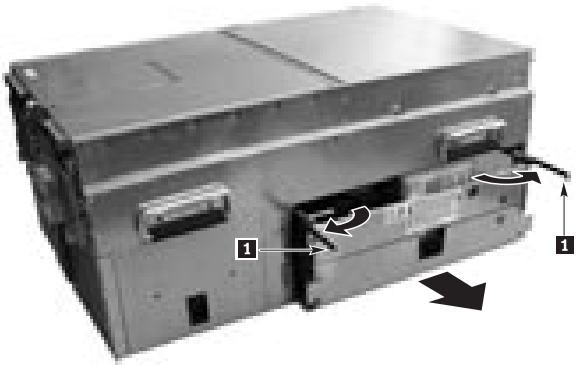
CAUTION:
Make sure that the rack is secured properly to avoid tipping when the server unit is extended.



4. Loosen the two screws (**1**) on the left side of the Processor/Memory Complex cover located on the right side of the chassis as you face its front. Loosening these screws causes the left side of the cover to spring open.
5. Grasp the cover and press it back toward the chassis as you shift the cover to the left. Shifting the cover to the left clears the right side of the cover from behind the chassis side.
6. Once the cover is clear of the chassis, set it aside.



7. Remove four screws (**1**) that secure the complex to the chassis. These screws are located on the right side of the chassis as you face the back of the system.



8. Rotate the two extraction levers (**1**) on the sides of the module to eject it from the Sideplane connector.
9. Carefully remove the module and place it on a clean ESD-protected surface.

Processor/memory complex installation

Complete the following actions to install the processor/memory complex.

1. Orient the Processor/Memory Complex such that the high-density connector used for attachment to the Sideplane is positioned to slide into the Processor/Memory Bay.
2. With the two extraction levers in the open position (ends pointing towards you), slide the Processor/Memory Complex fully into the Processor/Memory Bay.
3. Push the extraction levers toward the chassis so that they seat the Processor/Memory Complex into the Sideplane inside the chassis. Be sure that

you engage the right and left levers at the same time and using even amounts of pressure.

4. Install the four screws that secure the Processor/Memory Complex into the chassis. These screws are secured in the left side of the chassis as you face its front.
5. Locate the Processor/Memory Complex Cover and orient it such that the right lip of the cover is inserted behind the right edge of the bay.
6. Press the left side of the cover toward the chassis (you will feel some normal resistance) and secure the two screws at the left of the cover.
7. If the system is rack-mounted, slide the chassis back into the rack.

Heat sink

The Intel Itanium processor requires a heat sink to dissipate energy. The heat sink resides on top of the processor. Before adding a processor to the system, you need to be sure the heat sink is attached to the top of the processor.

Note: A processor is shipped with the heat sink attached.

Attention: When handling Intel Itanium processors, be sure to follow the guidelines described in "Handling electrostatic discharge-sensitive devices" on page 260.

Power pods, processors and thermal blanks

The server may have from one to four processors in the processor/memory complex.

Each processor (3) has its associated power pod (2). Processors and power pods should only be removed or installed in pairs. Be sure that you install a thermal blank (1) if you intend to leave removed any processor/power pod pair.

Attention: Hazardous voltage, current, and energy levels are present inside the power supply. There are no user-serviceable parts inside it; servicing should be done by a trained servicer who is familiar with IBM products.

The xSeries 380 server can have from one to four processors. Each processor is paired with an associated power pod. Thermal blanks must be installed where a processor is absent. You can remove and install processors on the Processor/Memory Complex.

Attention: If a processor slot does not have a processor and its associated power pod installed, it must have a thermal blank installed to properly direct cooling airflow.

Be sure that the frame of the Processor/Memory Complex is resting completely flat on a smooth surface before installing or removing a processor or a thermal blank.

Power pod, processor or thermal blank removal

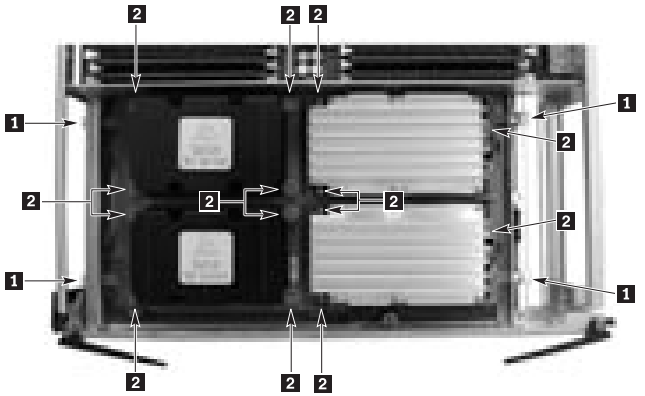
Complete the following actions to remove a processor or thermal blank.

Note:

- Read "Before you begin" on page 136.
- Read "Safety information" on page 257.
- Read "Handling electrostatic discharge-sensitive devices" on page 260.

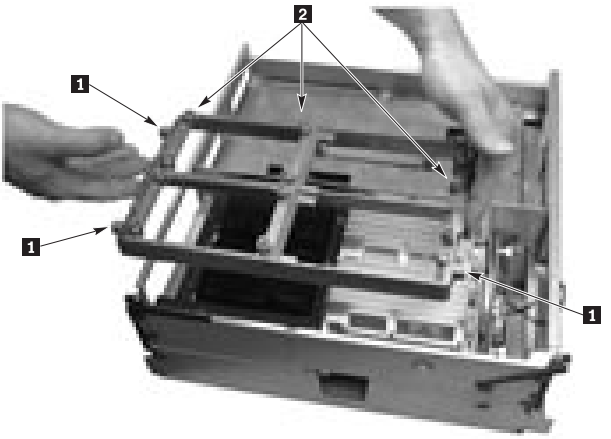
1. Remove the Processor/Memory Complex. See "Processor/memory complex removal" on page 177.
2. Orient the complex such that you have access to the surface from which you are removing processors or thermal blanks.
3. Loosen the four thumbscrews that secure the triple-beam to the sides of the Processor/Memory Complex.

4. Remove the sheet metal baffle located to the front of the processors or thermal blanks in the Processor/Memory Complex. To remove the baffle, open the plastic latch blocking the opening (**1**) and pull in the flexible retaining tabs (**2**) and slide the baffle out.



5. With the four thumbscrews (**1**) from step 3. loosened, loosen the 14 captive screws (**2**) in the triple-beam.

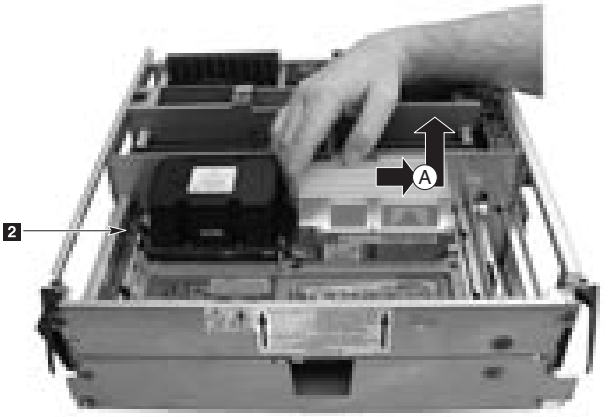
6. If you are removing a thermal blank, skip this step. Otherwise, remove the Y cable to the power pods by releasing the connectors (**1** and **2**).



1 Thumbscrews

2 Captive screws

7. Lift the triple-beam up and away from the Processor/Memory Complex.
8. If you are removing a thermal blank, lift the blank out of the complex. Otherwise, perform the remaining steps.



9. To remove the power pod associated with the processor, pull the power pod back (**1**) to disengage it from its connector. Then, lift the power pod out of the system. If you are only removing a power pod, stop here. To install a power pod, start with Step 6. and continue through Step 10 on page 184.
10. Press the black extraction lever (**2**) to eject the pin array cartridge from its socket as you lift the processor cartridge out of the system.
11. Place the cartridge on a clean ESD-protected work surface.

Processor or thermal blank installation

Note: There is no required or recommended installation sequence for processors.

Complete the following actions to install a processor or thermal blank.

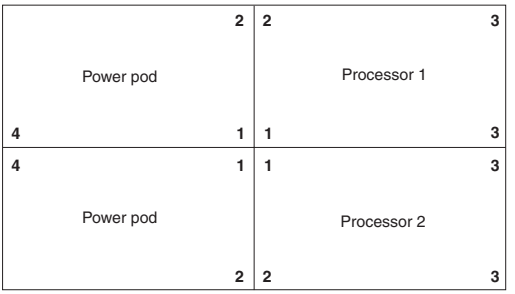
Note:

- Read "Before you begin" on page 136.
- Read "Safety information" on page 257.
- Read "Handling electrostatic discharge-sensitive devices" on page 260.

1. Remove the Processor/Memory Complex. See "Processor/memory complex removal" on page 177.
2. Orient the complex such that you have access to the surface to which you are installing processors or thermal blanks.
3. If you are installing a thermal blank, position the blank into place over the four posts on the Processor Baseboard and skip to step six.
4. Verify that the metal ejector pin in the LIF socket is flush in the socket.
5. Position the processor inside the four posts on the Processor Baseboard, pins toward the rear and over the LIF socket. Gently press the processor into position.
6. Place the power pod into position on the processor baseboard. Ensure that the engaging tab is to the rear of the retention module (RM) and then slide it forward to engage its connector on the processor.

   Note: Place the power pod flat with the clip outside of the retention module, then slide forward to engage fully with processor.

7. Place the triple beam into position by lowering it down over the processors/power pod or the thermal blank.



8. Secure the triple beam into place by first tightening the 14 screws on top of the beam and then the four thumbscrews on the end of the beam (torque screws to 10-12 inch-pounds). If available, use torque screwdriver P/N 16F1661 and Phillips head #2 bit P/N 16F1664.

   Important: Tighten the 14 screws according to the recommended sequence above: first tighten the screws at the 1 position; next tighten the screws at the 2 position; then tighten the screws at the 3 position; and finally tighten the screws at the 4 position.

9. If you are installing a thermal blank, skip this step. Otherwise, connect the Y-cable to each power pod. You might have to loosen the triple beam in order to fit the cable.
10. Ensure that the plastic latch blocking the opening to the processor is in the open position. Install the sheet metal baffle into the opening next to the processor side of the board. Orient the baffle such that the cover faces up and the drop down leg is placed first into the access hole. Slide the baffle in until the flexible tabs snap into place. Be sure to close the plastic latch to secure the Processor/Memory Complex halves.
11. Insert the Processor/Memory Complex into the chassis. See "Processor/memory complex installation" on page 179.

Memory boards

Two memory boards reside in the Processor/Memory Complex: one is on top of the complex and the other underneath. Only a qualified service technician can remove or install these memory boards.

Note: It is not necessary to populate both memory boards as long as DIMMs reside in slots 1-4 of at least one board. However, for optimal performance be sure that both memory boards in the server have the same amounts of the same type of installed memory.

Memory board removal

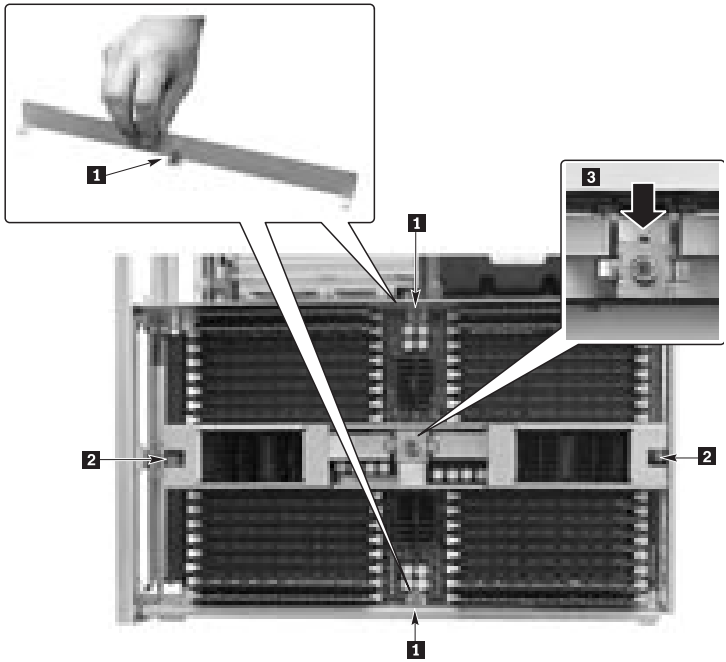
Complete the following actions to remove the memory board.

1. Remove the Processor/Memory Complex (see "Processor/memory complex removal" on page 177).

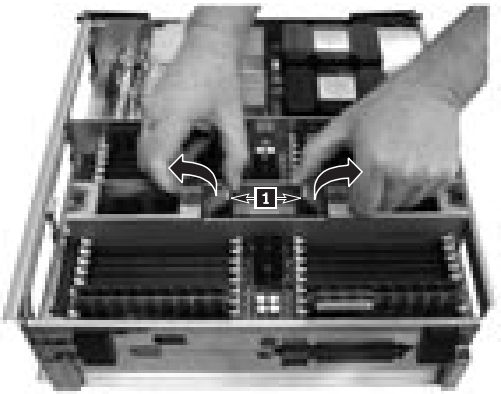
   Note: There are two memory boards in the Processor/Memory Complex. They are plugged into the top and underside of the processor baseboard. Steps

2 on page 185 through 8 on page 186 describe the removal process for either memory board.

2. If desired, remove the DIMMs from the memory board you are removing as described in "DIMMs" on page 187.
3. Remove the DC-DC converters from the memory board as described in "Memory board DC-DC converters" on page 190.



4. Loosen the captive screws that secure both board clamps to the sides of the memory board and lift them out of the Processor/Memory Complex (1).
5. Loosen the two captive screws in the handle that spans the middle of the memory board (2).
6. Loosen the thumbscrew on the center bracket that locks the memory board extraction levers down (3) and slide bracket out of the way of the extraction levers.



7. Simultaneously pull up on the extraction levers to disengage the memory board from the processor baseboard (**1**).

   Note: Both extraction levers must be raised evenly while disengaging the memory from the Processor Baseboard. The memory board must remain parallel to the Processor Baseboard during extraction.

8. Place the memory board on a clean ESD-protected surface.

Memory board installation

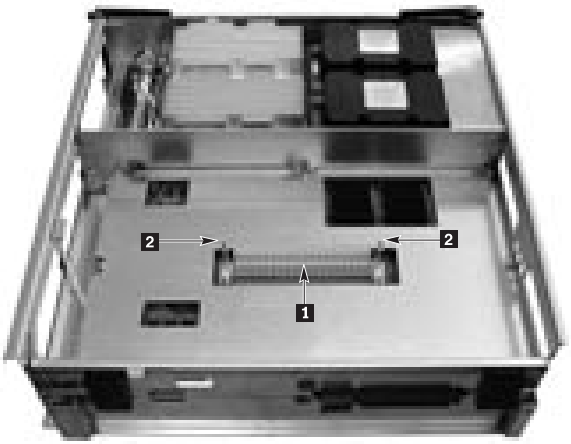
Note: There are two memory boards in the Processor/Memory Complex. They are plugged into the top and underside of the processor baseboard. Steps 2 on page 187 through 9 on page 187 describe the installation process for one memory board.

Complete the following actions to install a memory board.

Note:

- Read "Before you begin" on page 136.
- Read "Safety information" on page 257.
- Read "Handling electrostatic discharge-sensitive devices" on page 260.

1. Remove the Processor/Memory Complex as described in "Processor/memory complex removal" on page 177.



2. While holding the extraction levers in the raised position, place, the memory board over the Processor Baseboard connector (1) and guide pins (2). The extraction levers must be raised so that they can engage the guide pins.
3. Engage both guide pins at the same time. Ensure that the memory board remains parallel to the Processor Baseboard. Slowly depress the levers until the memory board connector fully engages.
4. Tighten the two captive screws that secure the extraction handle assembly.
5. Place the two board clamps along the sides of the memory board such that the screws align with their respective holes and secure them.
6. Slide the bracket with the thumbscrew that locks the extraction lever over the extraction levers and tighten the screw.
7. Replace the DC-DC converters as described in "Memory board DC-DC converters" on page 190.
8. If you removed any DIMMs replace them as described in "DIMMs".
9. Replace the Processor/Memory Complex as described in "Processor/memory complex installation" on page 179.

   Note: A torque wrench is required for this procedure. If available, use torque driver P/N 16F1661 and Phillips head #2 bit P/N 16F1664.

DIMMs

The DIMMs reside on the memory board in the Processor/Memory complex. To remove or install the DIMMS, remove the Processor/Memory Complex from the chassis and follow the DIMM installation order and grouping requirements required for the DIMMS.

DIMM removal

Complete the following actions to remove a DIMM.

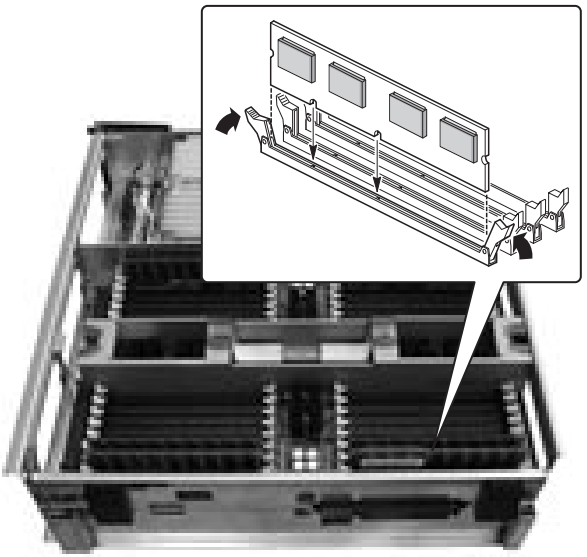
Attention: Use extreme care when removing a DIMM. Too much pressure can damage the socket. Apply only enough pressure on the plastic ejector levers to release the DIMM.

Note:

- Read "Before you begin" on page 136.
- Read "Safety information" on page 257.
- Read "Handling electrostatic discharge-sensitive devices" on page 260.

1. Expose the memory boards by removing the Processor/Memory complex as described in "Processor/memory complex removal" on page 177.

   Note: It is not necessary to remove the memory boards from the Processor/Memory Complex to add or replace DIMMs.



2. Gently push the plastic ejector levers out and down to eject a DIMM from its socket.
3. Hold the DIMM only by its upper edges, being careful not to touch its components or gold edge connectors. Carefully lift it away from the socket and store it in an antistatic package.
4. Repeat steps 2. and 3. for each DIMM you want to remove.

DIMM installation

Attention: Use extreme care when installing a DIMM. Applying too much pressure can damage the socket. DIMMs are keyed and can be inserted in only one way.

Mixing dissimilar metals might cause memory failures later, resulting in data corruption. Install DIMMs with gold-plated edge connectors only in gold-plated sockets.

Maximum DIMM height is 4.445 cm (1.75 inches). Do not install DIMMs that exceed this height.

Complete the following actions to install a DIMM.

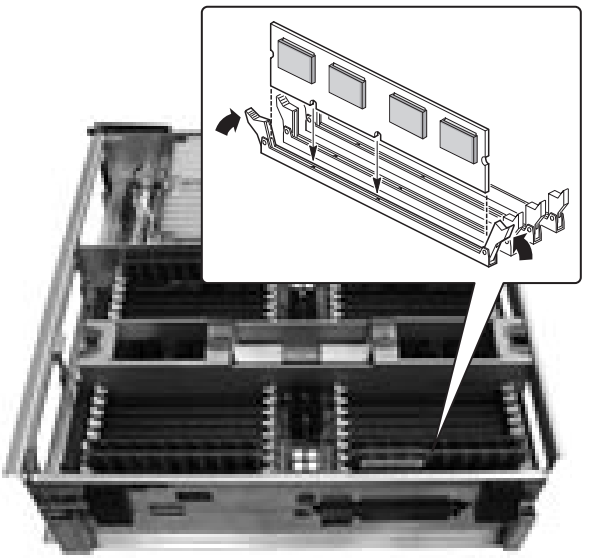
Note:

- Read “Before you begin” on page 136.
- Read “Safety information” on page 257.
- Read “Handling electrostatic discharge-sensitive devices” on page 260.

Attention: DIMM slots on the memory module must be installed only in certain configurations. Numbers next to DIMM slots correspond to installation sequence. DIMMs must be installed by groups of four and must be inserted in the sequence shown in the second illustration at step 4. below.

Note: For optimal DIMM performance, be sure that both memory boards in the server have the same amounts of the same type of installed memory.

1. Expose the memory boards by removing the Processor/Memory Complex as described in “Processor/memory complex removal” on page 177.
2. Holding the DIMM only by its upper edges, remove it from its antistatic package.
3. Orient the DIMM so that the two notches in the bottom edge of the DIMM align with the keyed socket on the memory board.



4. Insert the bottom edge of the DIMM into the socket, then press down firmly on the DIMM until it seats correctly.

5. Gently push the plastic ejector levers on the socket ends to the upright position.
6. Repeat steps 2 on page 189 through 5. for each DIMM you want to install.
7. Install the Processor/Memory complex as described in "Processor/memory complex installation" on page 179.

Memory board DC-DC converters

The memory board DC-DC converters are located on the side of the Processor/Memory Complex inside the system chassis. The server uses two converters per memory board. You can access them by removing the Processor/Memory Complex.

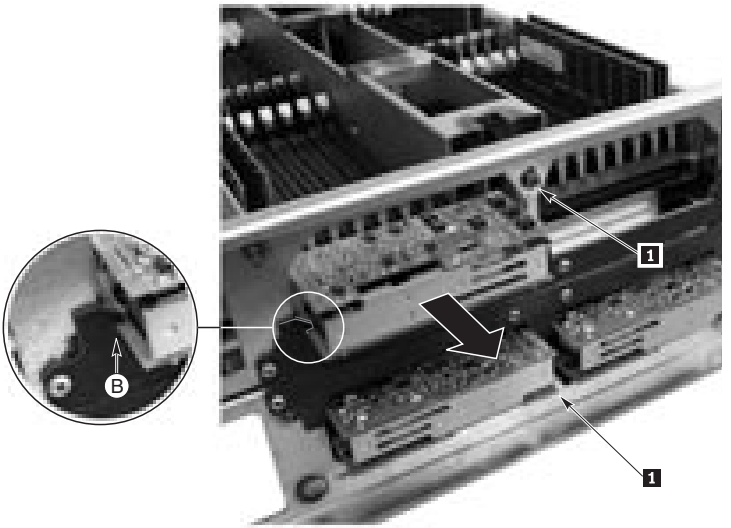
Memory board DC-DC converter removal

Note:

- Read "Before you begin" on page 136.
- Read "Safety information" on page 257.
- Read "Handling electrostatic discharge-sensitive devices" on page 260.

Complete the following actions to remove the memory board DC-DC converter:

1. Remove the Processor/Memory Complex as described in "Processor/memory complex removal" on page 177.
2. Orient the Processor/Memory Complex so that the side with the DC-DC converters is toward you and facing upward.



3. Loosen but do not remove the slide clamp screw that secures the converters you wish to remove (**1**).
4. Slide each clamp that secures a pair of converters downward.
5. Pull each converter straight out from its socket (see arrow). Be sure that you keep the converter level as you remove it from its socket. Each converter has a keyed guide that is attached to the side of the Processor/Memory Complex (**2**). Align the DC-DC converters with these guides before reinstalling.

Memory board DC-DC converter installation

Note:

- Read "Before you begin" on page 136.
- Read "Safety information" on page 257.
- Read "Handling electrostatic discharge-sensitive devices" on page 260.

Complete the following actions to install the memory board DC-DC converter:

1. Remove the Processor/Memory Complex as described in "Processor/memory complex removal" on page 177.
2. Carefully align the plug on the Processor DC-DC converter with the socket on the Processor/Memory Complex and press the plug firmly into place. Be sure to keep the converter level as you align the bottom edge of the PCB with the keyed guide. Repeat this step if you are installing a second DC-DC converter.
3. Lift the slide clamp and secure it into place by tightening the screw.
4. If you need to replace converters on the other memory board beneath the complex, turn the complex over and then replace the converters following steps2. and 3..
5. Reinstall the Processor/Memory Complex as described in "Processor/memory complex installation" on page 179.

Processor baseboard

The Processor Baseboard resides between the two halves of the Processor/Memory Complex. The board accommodates one to four processors and two memory boards. Removal of the Processor Baseboard involves disassembly of the entire Processor/Memory Complex.

Processor baseboard removal

Note:

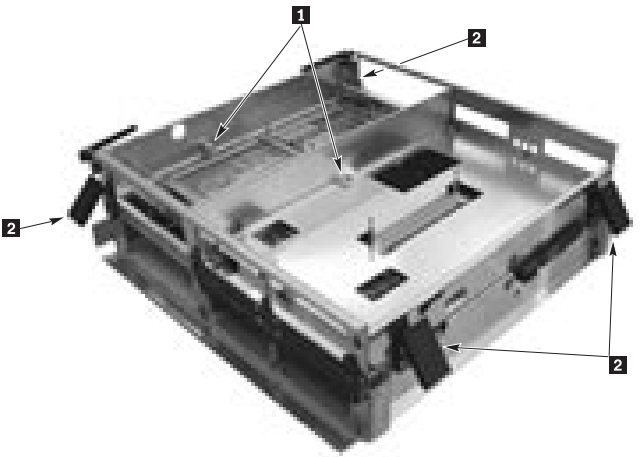
- Read "Before you begin" on page 136.
- Read "Safety information" on page 257.
- Read "Handling electrostatic discharge-sensitive devices" on page 260.

Complete the following actions to remove the processor baseboard:

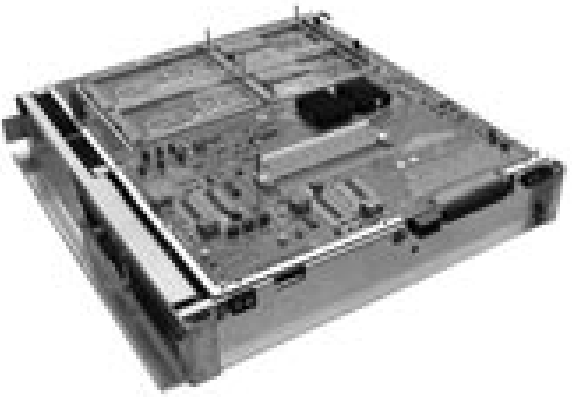
1. Remove the Processor/Memory Complex from the system as described in "Processor/memory complex removal" on page 177.
2. Remove the topside memory board from the Processor/Memory Complex as described in "Memory board removal" on page 184.
3. Remove the topside processors as described in "Power pod, processor or thermal blank removal" on page 181.
4. Carefully turn the Processor/Memory Complex over so that you can work on its underside.
5. Repeat steps 2. and 3. to remove components and hardware from this side of the Processor Baseboard.

   Note: If the server does not have three or four processors, the underside of the Processor Baseboard will have thermal blanks in place of the processors and power pods. These assemblies are easily removed when you lift the triple beam off the board.

6. With all components and hardware removed from both sides of the Processor/Memory Complex, carefully turn it over again so that it is oriented with its face up.



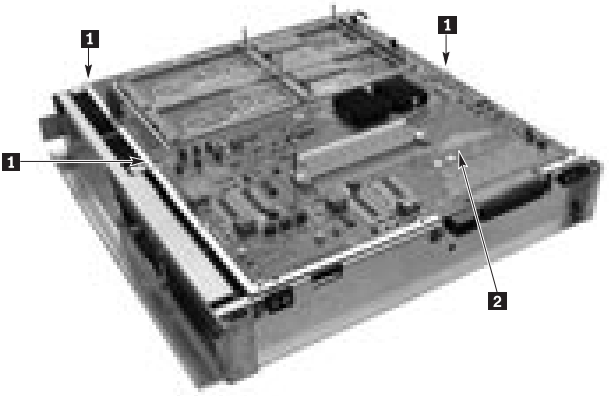
7. Loosen the two captive screws securing the Processor Baseboard between the two halves of the Processor/Memory Complex (1).
8. Open the four plastic latches (2) that secure the two halves of the Processor/Memory Complex together and lift the top half up and remove.



9. Position the bottom half of the Processor/Memory Complex as shown above.

10. Lift the Processor Baseboard free of the Processor/Memory Complex and place on a clean ESD-protected work surface.

Processor baseboard installation in a system with three or four processors



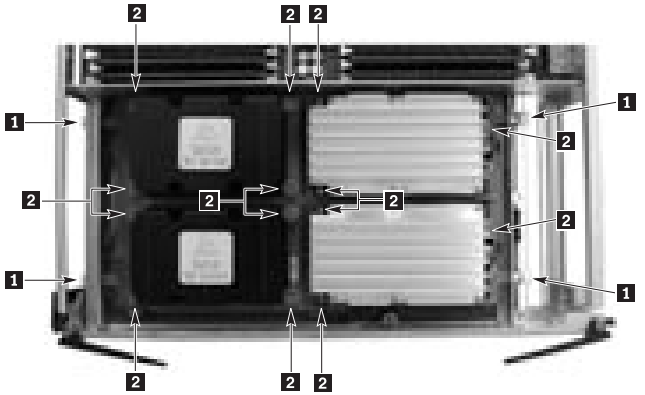
Note: The topside of the board has an Acacia Tree figure (**2**) silk-screened onto its surface. If placed correctly, the Acacia Tree silkscreen will be visible.

Complete the following actions to install a processor baseboard in a system with three or four processors.

1. Place the bottom half of the Processor/Memory Complex on a clean ESD-protected work surface. The bottom half of the complex has wider rails as compared to the top half. Be sure that the rail side of the complex is in contact with the work surface.
2. Carefully place the Processor Baseboard topside up into position on the bottom half of the Processor/Memory Complex. Be sure that the guide pins align with the holes on the Processor Baseboard (**1**).

   Note: The Processor Board must be squarely aligned in the Processor/Memory Complex.
3. Place the top half of the Processor/Memory Complex over the Processor Baseboard. Be sure that the guide pin relations are correct. The Processor Baseboard should be between the two Processor/Memory Complex halves.
4. Snap shut the four plastic latches that secure the two halves of the Processor/Memory Complex together.
5. Tighten the two captive screws that help secure the Processor Baseboard to the Processor/Memory Complex.
6. Carefully turn the Processor/Memory Complex over so that you can work on its underside.
7. Locate and place the triple beam into position. (Do not install processors or power pods yet).

   Note: Securing the triple beam into position without the processors and power pods reduces the possibility of stress occurring on the Processor Baseboard when you install processors and the memory board on the topside.



8. Secure the triple beam by tightening the four thumbscrews on the ends of the beam (**1**). Do not tighten the other 14 (**2**) screws yet.
9. Carefully turn the Processor/Memory Complex over so that you can work on its topside.
10. Install the processors and power pods into the top half of the Processor/Memory Complex as described in "Processor or thermal blank installation" on page 183.
11. Install the memory board into the top half of the Processor/Memory Complex as described in "Memory board installation" on page 186.
12. Carefully turn the Processor/Memory Complex over so that you can work on the underside.
13. Remove the triple beam by loosening the 4 thumbscrews found on the ends of the beam and lifting the triple beam off the complex.
14. Install the processors and power pods into the bottom half of the Processor/Memory Complex as described in "Processor or thermal blank installation" on page 183.
15. Install the memory board into the bottom half of the Processor/Memory Complex as described in "Memory board installation" on page 186.
16. Install the Processor/Memory Complex into the server as described in "Processor/memory complex installation" on page 179.

Processor baseboard installation in a system with one or two processors

Complete the following actions to install a board in a system with one or two processors:

1. Place the bottom half of the Processor/Memory Complex on a clean ESD-protected work surface. The bottom half has wider rails as compared to the top half. Be sure that the rail side of the complex is in contact with the work surface.
2. Carefully place the Processor Baseboard topside up into position on the bottom half of the Processor/Memory Complex. If placed correctly, the Acacia Tree silkscreen will be visible.
3. Place the top half of the Processor/Memory Complex over the Processor Baseboard. Be sure that the guide pin relations are correct. The Processor Baseboard should be between the two Processor/Memory Complex halves.

4. Snap shut the four plastic latches that secure the two halves of the Processor/Memory Complex together.
5. Tighten the two captive screws that help secure the Processor Baseboard to the Processor/Memory Complex.
6. Carefully turn the Processor/Memory Complex over so that you can work on the underside.
7. Install the thermal blanks into the bottom half of the Processor/Memory Complex as described in “Processor or thermal blank installation” on page 183.
8. Install the memory board into the bottom half of the Processor/Memory Complex as described in “Memory board installation” on page 186.
9. Carefully turn the Processor/Memory Complex over so that you can work on the topside.
10. Install the processors and power pods into the top half of the Processor/Memory Complex as described in “Processor or thermal blank installation” on page 183.
11. Install the memory board into the top half of the Processor/Memory Complex as described in “Memory board installation” on page 186.
12. Install the Processor/Memory Complex into the server as described in "Processor/memory complex" on page 110.

I/O baseboard

The I/O Baseboard resides in the upper rear of the chassis and plugs into the Sideplane. After removing all the PCI I/O boards, you can remove the I/O Baseboard.

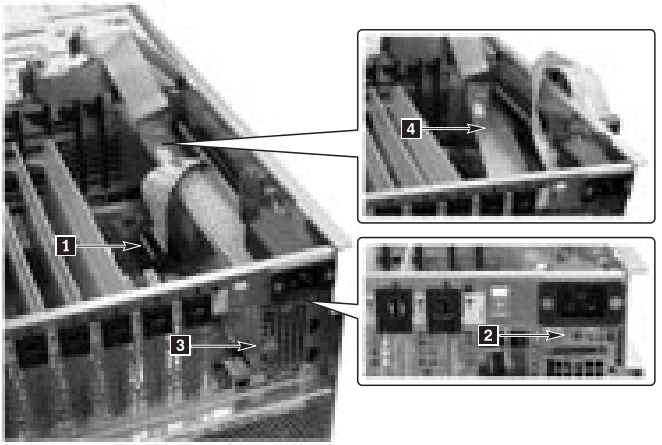
I/O baseboard removal

Note:

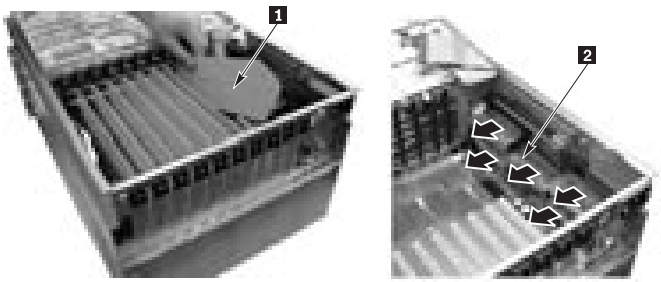
- Read “Before you begin” on page 136.
- Read “Safety information” on page 257.
- Read “Handling electrostatic discharge-sensitive devices” on page 260.

Complete the following actions to remove the I/O baseboard:

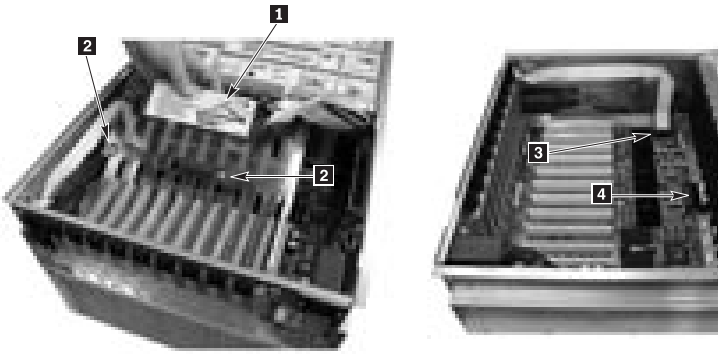
1. Disconnect the power cables.
2. Open the rear cover of the server and remove the non-hot plug PCI adapter board cover.
3. Remove the top cover as described in “Top cover removal” on page 168.
4. Remove the Legacy I/O board as described in “Legacy I/O board removal” on page 203.
5. Disconnect the cable to the external SCSI port from the I/O Baseboard.
6. Loosen the captive screw to disconnect and remove the external SCSI port from the chassis I/O connector at the rear of chassis.
7. Remove all non-hot plug PCI adapter boards.
8. Remove all hot plug PCI I/O boards as described in “PCI hot plug LED board removal” on page 202.



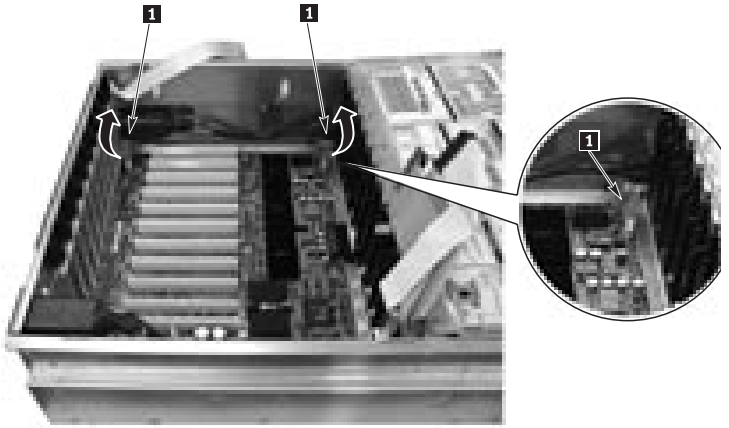
9. Loosen the thumbscrew at the back of the chassis holding the protective cover over the DC-DC converters on Sideplane (**3**), and remove the protective cover (**4**).



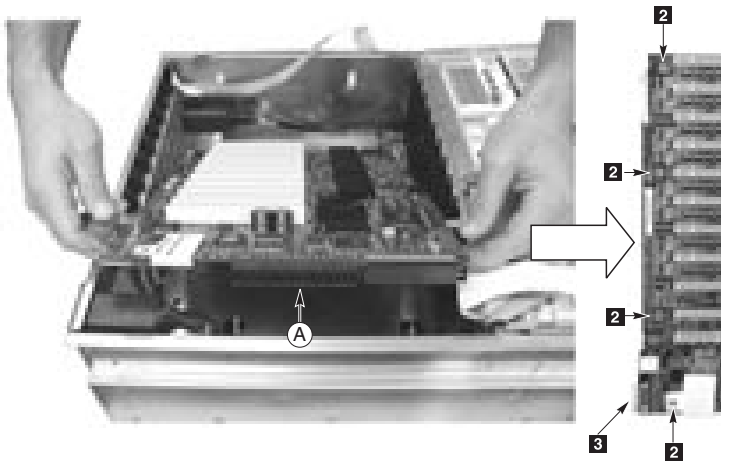
10. Remove all PCI slot plastic dividers (**1**).
11. Remove the 5 Volt and 3.3 Volt DC-DC converters from the Sideplane (**2**).



12. Loosen the two captive screws (2) that hold the plastic shield (1) over the I/O Baseboard. These screws also secure the baseboard tray to the server chassis.
13. Remove the plastic shield.
14. Disconnect the PCI LED cable (3) and T-docking board interface cable (4) from the I/O Baseboard.



15. Use the two extraction/installation levers on the sides of the I/O Baseboard to pull it clear of the connector on the Sideplane (1).
16. Once loose, slide the I/O Baseboard in the direction of the levers against the chassis frame.



17. Lift the connector end out of the chassis first (1), then lift the rest of the I/O Baseboard out of the chassis.
18. Place on a clean ESD-protected work surface. Remove the nine screws (2) and the two hex jackscrews that secure the video connector (3) from the I/O Baseboard to separate it from the I/O Baseboard tray.

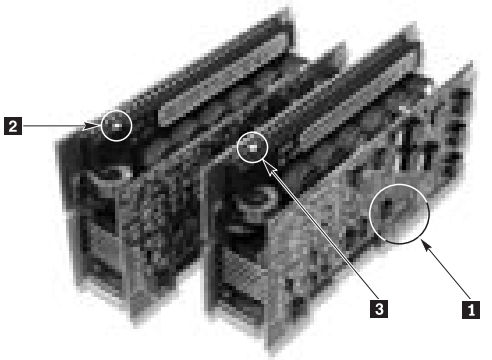
I/O baseboard installation

Note:

- Read "Before you begin" on page 136.
- Read "Safety information" on page 257.
- Read "Handling electrostatic discharge-sensitive devices" on page 260.

Complete the following actions to install the I/O baseboard:

1. Install the I/O Baseboard into the I/O Baseboard tray and by tightening the nine screws and two jackscrews.
2. Orient the I/O Baseboard and tray assembly such that the connector end faces the Sideplane.
3. Angle the I/O Baseboard such that the side with the two extraction/installation levers lowers into the chassis first.
4. Slide the lever end of the I/O Baseboard against chassis frame then lower the connector end into the chassis.
5. Slide the I/O Baseboard towards the Sideplane until levers align with the locking slots.
6. Rotate the levers downward to press the I/O Baseboard securely into the Sideplane.
7. Install the plastic shield over the I/O Baseboard and tighten the two thumbscrews that secure the shield and the board in the chassis.



8. Install the 5 Volt and 3.3 Volt DC-DC converters on the Sideplane. The voltages are marked on the power supplies (1) and near the sockets on the baseboard.

   Note: Do not exert excessive force if the converters don't install easily. Blocked pins (2 (5.0 volt converter's connector) and 3 (3.3 volt converter's connector)) and corresponding blank pins on the Sideplane board's sockets prevent incorrect insertion. Attempting to forcibly insert the wrong DC-DC converter in a Sideplane socket can bend the socket's pins.
9. Install the protective cover over the converters in the Sideplane, and secure the cover with the thumbscrew.
10. Connect the cable to the external SCSI port at both ends: one to the I/O Baseboard and the other to the rear of the chassis with the captive thumbscrew.
11. Connect the SCSI interconnect cable to the front of the I/O Baseboard.

12. Install the Legacy I/O board and cables as described in "Legacy I/O board installation" on page 205.
13. Install the non-hot plug PCI adapter boards.
14. Install the hot plug PCI slot dividers and the hot plug PCI I/O boards as described in "PCI hot plug LED board installation" on page 203.
15. Install the top cover as described in "Top cover installation" on page 170.
16. Attach the non-hot plug PCI adapter board cover and secure it with its screw.
17. Close the PCI I/O access door, and secure it with the two captive thumbscrews.
18. Reconnect the power cables.

Sideplane

The Sideplane is attached inside the left wall at the rear of the chassis as you face its front. The chassis receives the I/O Baseboard as well as the T-Docking board.

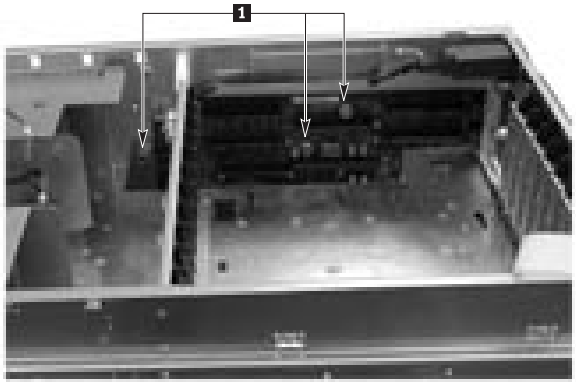
Sideplane removal

Note:

- Read "Before you begin" on page 136.
- Read "Safety information" on page 257.
- Read "Handling electrostatic discharge-sensitive devices" on page 260.

Complete the following actions to remove the sideplane:

1. Remove the I/O Baseboard as described in "I/O baseboard removal" on page 196.
2. Remove the T-Docking Board as described in "T-Docking board removal" on page 205.
3. Remove the Processor/Memory Complex as described in "Processor/memory complex removal" on page 177.



4. Loosen the captive thumbscrews) on the sideplane (**1**) that secure it and its mounting plate to the chassis.

   Note: Do not remove the screws that hold the Sideplane to the mounting plate.

5. Slide the Sideplane towards the front of the chassis. As you slide the board, keep the front bottom edge of the board in contact with the carrier tray as the board is rotated up and out of the chassis.

6. Tilt the Sideplane up and out of the chassis.
7. Remove the screws from Sideplane to separate it from its mounting plate.

Sideplane installation

Note:

- Read "Before you begin" on page 136.
- Read "Safety information" on page 257.
- Read "Handling electrostatic discharge-sensitive devices" on page 260.

Complete the following actions to install the sideplane:

1. Connect the Sideplane to its mounting plate by tightening the mounting plate screws.
2. Lower the sideplane and tray assembly into the side of the chassis, and slide it toward the rear of the chassis back into position. The front lower corner of the board is the rotation point you should use when positioning the board into place.
3. Tighten the captive thumbscrew on the sideplane to secure it to the chassis.
4. Reinstall the T-Docking board as described in "T-Docking board installation" on page 210.
5. Reinstall the I/O Baseboard as described in "I/O baseboard installation" on page 199.
6. Reinstall the Processor/Memory Complex as described in "Processor/memory complex installation" on page 179.

PCI hot plug LED board

The PCI Hot Plug LED board resides just on the inside of the top rear of the chassis. This board enables PCI hot plug boards to be plugged into and out of the system without it being shut down.

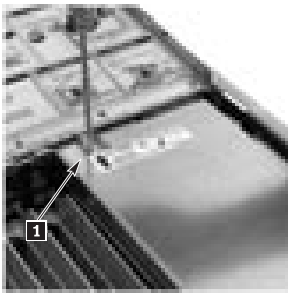
PCI hot plug LED board removal

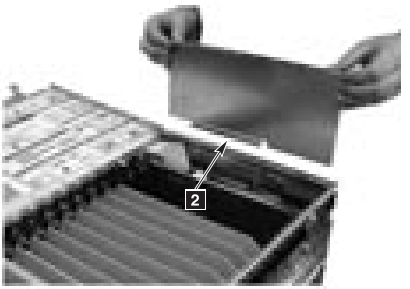
Note:

- Read "Before you begin" on page 136.
- Read "Safety information" on page 257.
- Read "Handling electrostatic discharge-sensitive devices" on page 260.

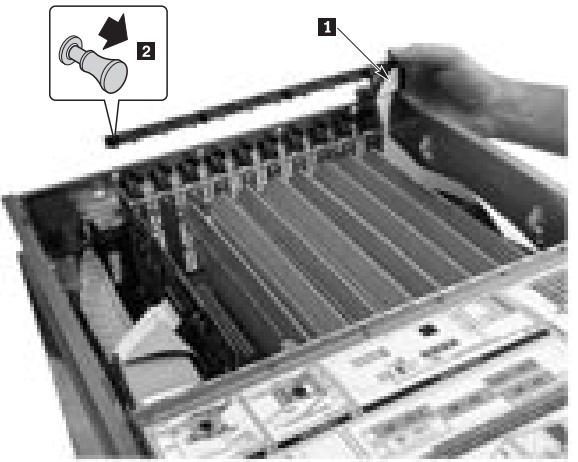
Complete the following actions to remove the PCI hot plug LED board:

1. Loosen the two thumbscrews in the back of the chassis that secure the rear cover.
2. Lift the rear cover to expose the non-hot plug PCI adapter board cover.





3. Loosen the screw that secures the non-hot plug PCI adapter board cover (**1**).
4. Grasp the cover by its exposed, long side and lift the cover away from the chassis. You can completely remove the cover if you want by unseating the slotted hinge (**2**). Access is now available to the PCI Hot Plug LED board.



5. Disconnect the cable attached to the PCI Hot Plug LED Board (**1**).
6. Locate and remove the four small, black plastic retaining pins on the board. The pins are evenly spaced across the length of the board. To unlock the pin, grasp the head of the pin from the inside and pull it until lit clicks (**2**).

7. Carefully pull the PCI Hot Plug LED board away from the inside of the chassis and place it on a clean ESD-protected work surface.

PCI hot plug LED board installation

Note:

- Read "Before you begin" on page 136.
- Read "Safety information" on page 257.
- Read "Handling electrostatic discharge-sensitive devices" on page 260.

Complete the following actions to install the PCI hot plug LED board:

1. Carefully place the PCI Hot Plug LED board on the inside back of the server chassis. Position the board such that the four black pin receptacles line up with their respective holes.
2. Press the pins through the holes in the board and through their receptacles in the chassis.
3. Connect the cable to the PCI Hot-Plug LED Board.
4. Attach the non-hot plug PCI adapter board cover to the chassis if necessary and secure it with the screw.
5. Close the rear part of the top cover and secure it by tightening the two thumbscrews in the back.

Legacy I/O board

The Legacy I/O board is plugged into the I/O Baseboard in the rear of the chassis. It is accessible only when you remove or lift the non-hot plug PCI adapter board cover.

Legacy I/O board removal

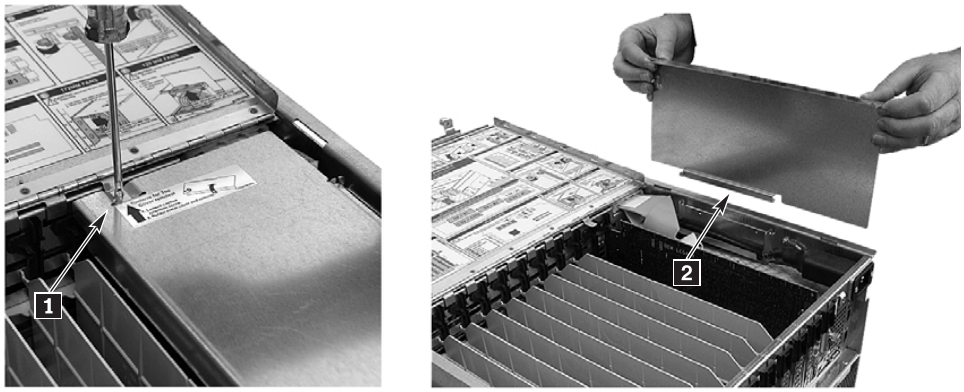
Note:

- Read "Before you begin" on page 136.
- Read "Safety information" on page 257.
- Read "Handling electrostatic discharge-sensitive devices" on page 260.

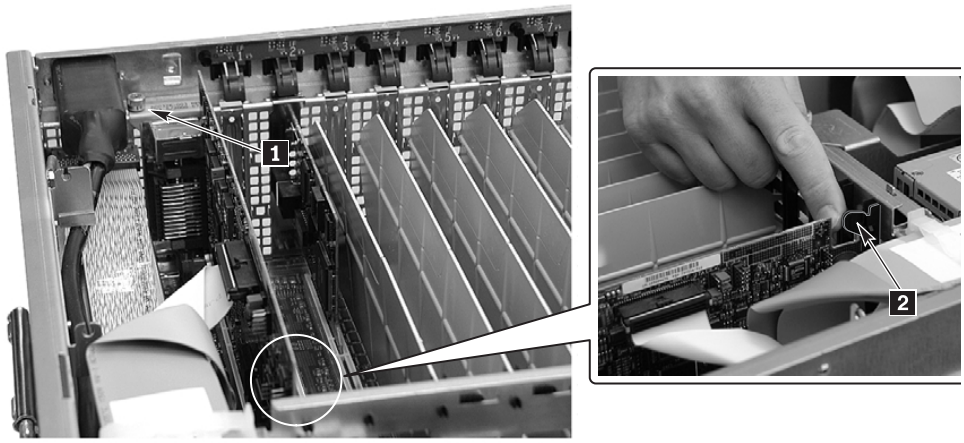
Complete the following actions to remove the Legacy I/O board:

Important:
- When replacing the T-Docking board or the I/O Legacy board, the BIOS and firmware levels must be upgraded to the latest level.
- Replacing the Legacy I/O board may cause loss of boot record data. See "Saving boot records" on page 87.

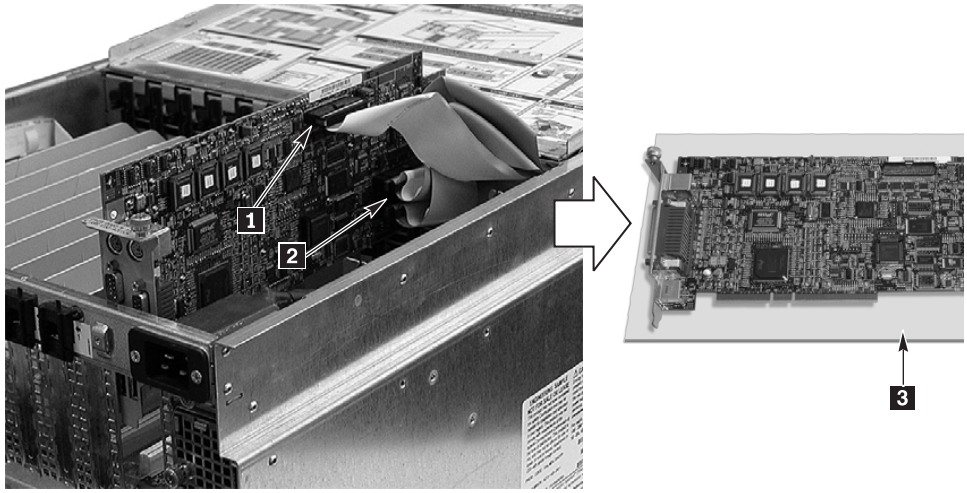
1. Label and disconnect all peripheral cables attached to the Legacy I/O board's back panel on the back of the system.
2. Loosen the two thumbscrews in the back of the chassis that secure the rear cover.
3. Lift the rear cover to expose the non-hot plug PCI adapter board cover.



4. Loosen the screw that secures the non-hot plug PCI adapter board cover (**1**).
5. Grasp the cover by its exposed, long side and lift the cover away from the chassis. You can completely remove the cover if you want by unseating the slotted hinge (**2**). Access is now available to the Legacy I/O board.



6. Loosen and remove the thumbscrew that secures the end of the board at the rear of the chassis (**1**).
7. Release the plastic retaining mechanism that secures the end of the board nearest the front of the chassis (**2**).



8. Carefully grasp the board and gently slide it up part way so that you can access the cables described in the next two steps.
9. Disconnect the server management cable (1) from the Legacy I/O board.
10. Disconnect both IDE cables (2) from the Legacy I/O board by grasping the ends of the cables and rocking them out of their respective connectors.
11. Carefully place the board on a clean ESD-protected work surface or inside proper packaging (3).

Legacy I/O board installation

Note:

- Read "Before you begin" on page 136.
- Read "Safety information" on page 257.
- Read "Handling electrostatic discharge-sensitive devices" on page 260.

Complete the following actions to install the Legacy I/O board:

1. Be sure that the plastic retaining mechanism that secures the end of the board nearest the front of the chassis is open so that it will allow a board to be inserted.
2. Being careful not to touch the components or gold edge connectors on the Legacy I/O board, remove it from its protective wrapper. Place the board component-side up on a clean ESD-protected work surface within reach of the primary and secondary IDE cables in the server.
3. Connect the primary and secondary IDE cables to their respective connectors on the Legacy I/O board.
4. Connect the server management cable to the Legacy I/O board.
5. Press the board down firmly until it seats in its slot.
6. Tighten the rear screw that secures the board to the chassis.
7. Close the plastic latching mechanism that secures the end of the board nearest the front of the chassis.
8. Install the non-hot plug PCI adapter board cover by aligning the slotted hinge into the chassis housing, closing the cover, and securing the cover screw.
9. Close the rear part of the top cover and secure it by tightening the two thumbscrews in the back.

T-Docking board

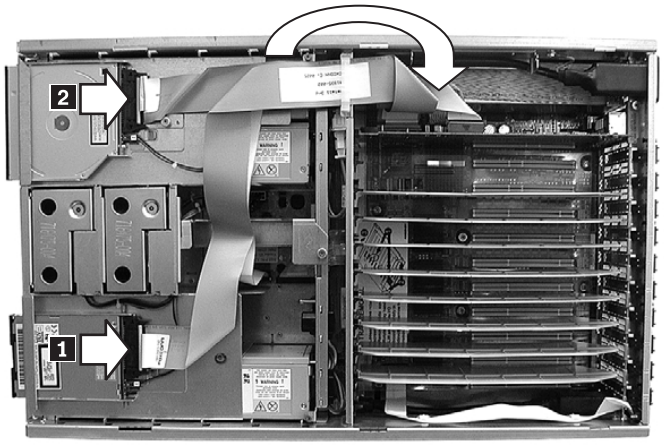
The T-Docking board resides in the upper front half of the chassis above the 172 mm fans.

T-Docking board removal

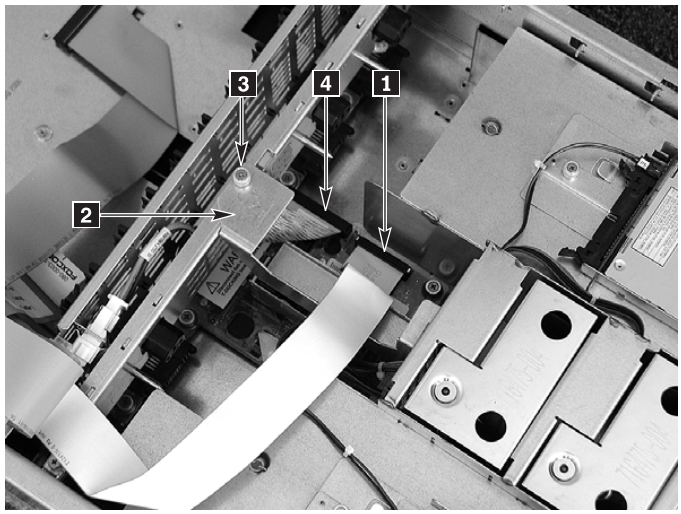
Complete the following actions to remove the T-Docking board:

Important: When replacing the T-Docking board or the I/O Legacy board, the BIOS and firmware levels must be upgraded to the latest level.

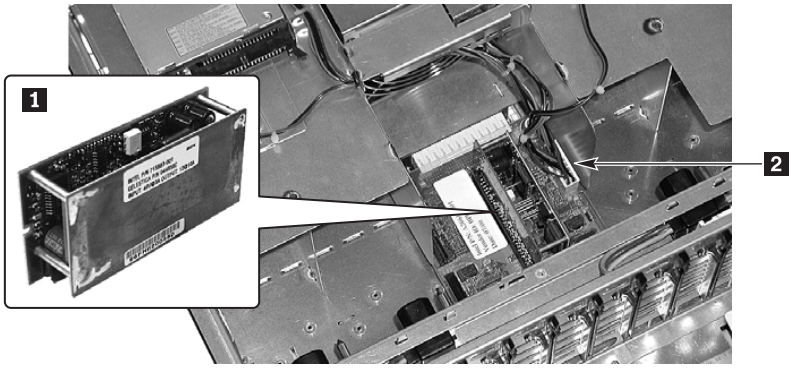
1. Remove the top cover as described in "Top cover removal" on page 168.
2. Remove all power supplies as described in "Power supply removal" on page 149.



3. On the top of the system, unlatch the LS120 diskette drive cable (**1**) and the CD-ROM drive cable (**2**) and fold them over into the I/O bay area.

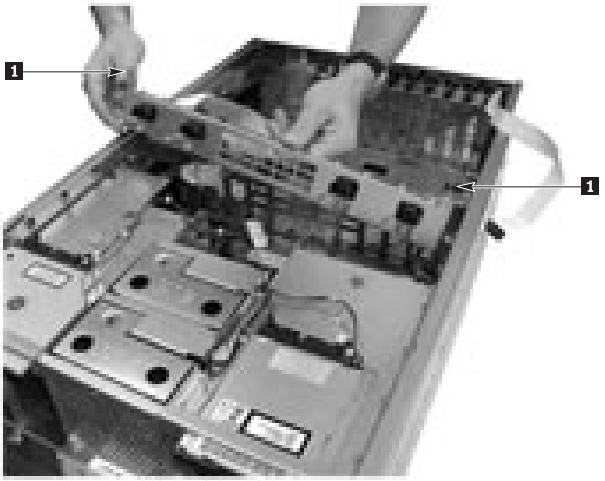


4. Disconnect the server management cable (**1**) and the SCSI cable (**4**) from the T-Docking Board.
5. Loosen the captive screw (**3**) on the T-docking board top bracket (**2**) and remove the bracket.

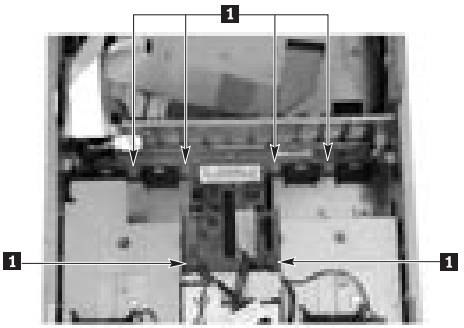


6. Remove the 12-Volt DC-DC converter (**1**) from the board by grabbing the two crossbars and gently pulling the DC-DC converter upward.

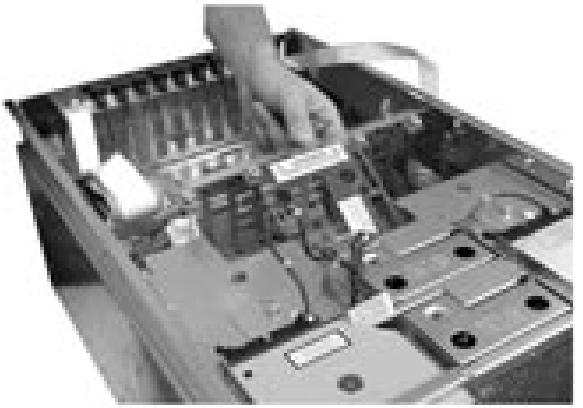
7. Remove the fan, CD-ROM, and LS-120 drive cable power connector from the T-docking board by squeezing the lock tab and carefully pulling the connector upwards (**2**).



8. Loosen the two top captive screws from the AC power distribution bracket (**1**).
9. Lift the AC distribution bracket up and drape over the mid-panel.

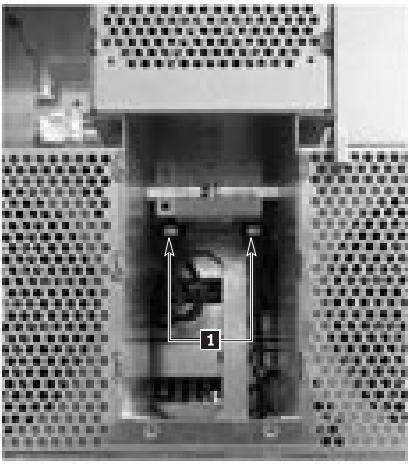


10. Loosen the six (6) captive thumbscrews securing the T-docking board plastic overlay (**1**).

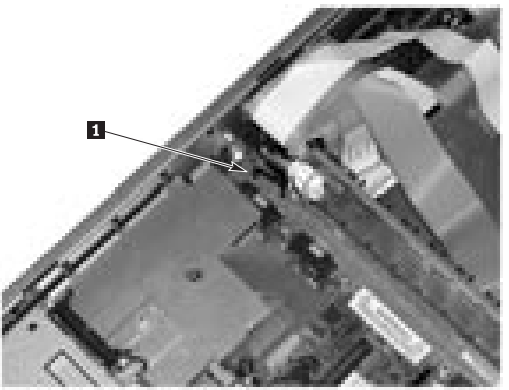


11. Grasp the rear edge of the Plastic Overlay and lift to remove.
12. Remove the two hot swap drives from the Hard Drive Bay.

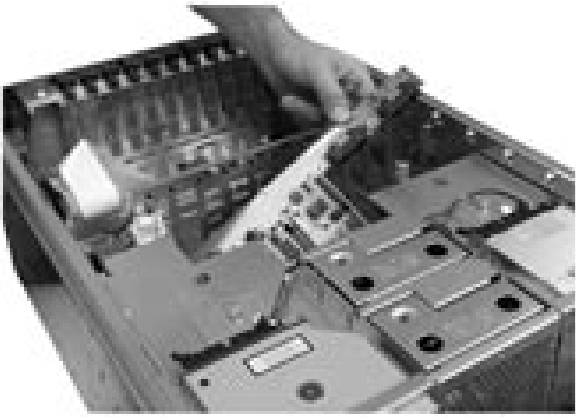
13. Remove the four screws securing the Hard Drive Bay (**1**) and pull the bay completely out of the chassis.



14. Disconnect the two 172 mm fan cables from the bottom side of the T-Docking board by opening the connector latches. You can access these cables from within the emptied Hard Drive Bay (**1**).



15. Lift the small pull handle mounted to the top of the T-Docking Board near the Sideplane (**1**) to disengage the T-Docking Board from the Sideplane.



16. Grasp the T-Docking board by the right-rear edge and lift up to remove it from the chassis.

T-Docking board installation

Complete the following actions to install the T-docking board:

1. Remove the U-shaped pull handle on the original T-docking board and attach to the replacement board.
2. Place the T-Docking board into position inside the chassis. Take care to locate the board over the alignment pin in the middle and not over the SCSI cable.
3. Engage the connector on the side of the T-Docking Board to the Sideplane. Be sure that the connector on the T-Docking Board is aligned correctly with the Sideplane before pressing the board down.
4. Connect the 172 mm fan cables to the underside of the T-Docking board. You can access the connection from within the emptied Hard Drive Bay. Make sure that the connector latches are secure.
5. Reinsert the Hard Drive Bay and secure it with the four front screws.
6. Reinsert the two hot swap drives into the Hard Drive Bay.
7. Connect the SCSI interconnect cable to the I/O Baseboard and T-Docking board.
8. Connect the 120 mm fan, CD-ROM, LS-120 power cable into the top of the T-Docking Board.
9. Install the DC-DC converter to the top of the T-Docking board.
10. Align the AC input bracket and tighten the two screws to secure the bracket.
11. Install the DC-DC converter's retaining bracket between the 120 mm fan housing and the AC input bracket.
12. Connect the data cables to the CD-ROM and LS120 diskette drives.
13. Install the power supplies.
14. Install the top cover as described in "Top cover installation" on page 170.

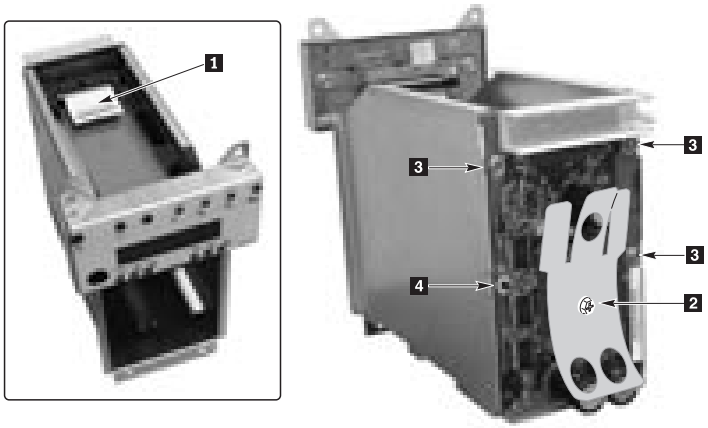
SCSI backplane

The SCSI Backplane resides behind the Hard Drive Bay. You can access it by removing the Hard Drive Bay.

SCSI backplane removal

Complete the following actions to remove the SCSI backplane:

1. Remove the Hard Drive Bay as described in "Hard drive bay installation" on page 172.



2. Disconnect the LCD panel cable (**1**) from the SCSI Backplane.
3. Remove the cap stabilizer retaining screw (**2**) and the cap stabilizer and set aside. (The cap stabilizer and its retaining screw will be used on the new board.)
4. Remove the three screws (**3**) that secure the SCSI Backplane to the Hard Drive Bay.
5. Carefully place the SCSI Backplane on a clean ESD-protected work surface or in antistatic packaging.

SCSI backplane installation

Complete the following actions to install the SCSI backplane:

1. Carefully align the SCSI Backplane in the slots on the rear of the Hard Drive Bay. Be sure that the four holes in the SCSI Backplane align with the holes and alignment pin (**4**) in the bay.
2. Secure the SCSI Backplane to the bay by torquing the three screws (**3**) to 8 inch-pounds.
3. Open the cable connector lock tabs to 45° and connect the LCD panel cable to the SCSI Backplane (**1**).
4. Position the cap stabilizer and secure with the cap stabilizer retaining screw (**2**).
5. Install the Hard Drive Bay as described in "Bay" on page 100.

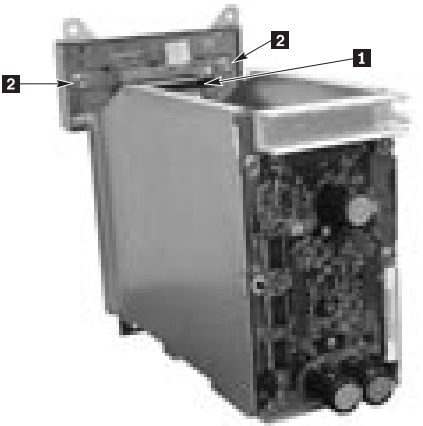
Front panel board

The Front Panel Board resides on the front of the Hard Drive Bay. You can access it by removing the Hard Drive Bay.

Front panel board removal

Complete the following actions to remove the front panel board:

1. Remove the Hard Drive Bay as described in “Hard drive bay removal” on page 170.



2. Disconnect the cable (1) from the connector on the rear of the Front Panel Board.
3. Remove the two screws (3) that secure the Front Panel Board to the Hard Drive Bay.
4. Carefully place the Front Panel Board on a clean, antistatic work surface or in antistatic packaging.

Board installation

Complete the following actions to install the front board:

1. Carefully align the Front Panel Board with the front of the Hard Drive Bay.
2. Secure the Front Panel Board to the bay by tightening the two screws.
3. Connect the cable (1) to the connector on the rear of the Front Panel Board.
4. Install the Hard Drive Bay as described in “Hard drive bay installation” on page 172"Bay" on page 100.

Battery

The lithium battery on the Legacy I/O board powers the real-time clock (RTC) for three to four years in the absence of power. When the battery weakens, it loses voltage and the system settings stored in CMOS RAM in the Real Time Clock (such as the date and time) can be wrong.

Statement 2

CAUTION:

When replacing the lithium battery, use only IBM Part Number 33F8354 or an equivalent type battery recommended by the manufacturer. If your system has a module containing a lithium battery, replace it only with the same module type made by the same manufacturer. The battery contains lithium and can explode if not properly used, handled, or disposed of.

Do not:

- **Throw or immerse into water.**
- **Heat to more than 100°C (212°F)**
- **Repair or disassemble**

Dispose of the battery as required by local ordinances or regulations.

Battery removal

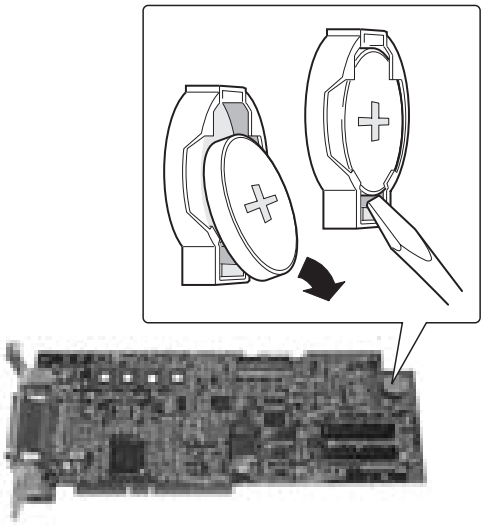
Note:

- Read "Before you begin" on page 136.
- Read "Safety information" on page 257.
- Read "Handling electrostatic discharge-sensitive devices" on page 260.

Complete the following actions to remove the battery from the Legacy I/O board:

Important: Removing the battery may cause loss of boot records affecting operating system and application availability.

1. Remove the Legacy I/O board as described in "Legacy I/O board removal" on page 203.
2. Insert the tip of a small flat-bladed screwdriver or equivalent under the plastic tab on the snap-on plastic retainer of the Legacy I/O board.
3. Gently push down on the screwdriver to lift the battery.



4. Remove the battery from its socket.
5. Dispose of the battery according to local ordinance.

Battery installation

Complete the following actions to install the battery on the Legacy I/O board:

1. Remove the new lithium battery from its package and, being careful to observe the correct polarity, insert it in the battery socket and close the plastic tab over the battery.
2. Install the Legacy I/O board as described in "Legacy I/O board installation" on page 205.
3. Close the rear portion of the top chassis cover.

Jumper information

The following information concerns jumpers.

General procedure to change jumper setting

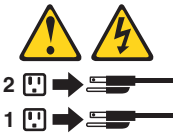
These general instructions describe how to change a jumper setting:

1. Read "Before you begin" on page 136.
2. Observe the safety precautions in "Safety information" on page 257 and "Handling electrostatic discharge-sensitive devices" on page 260.
3. Turn off all connected peripherals.
4. Power down the system by pressing and holding for several seconds the Power button on the front of the chassis. After the server shuts down, unplug both AC power cords to remove standby power from the server.

   Statement 5

CAUTION:

The power control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.

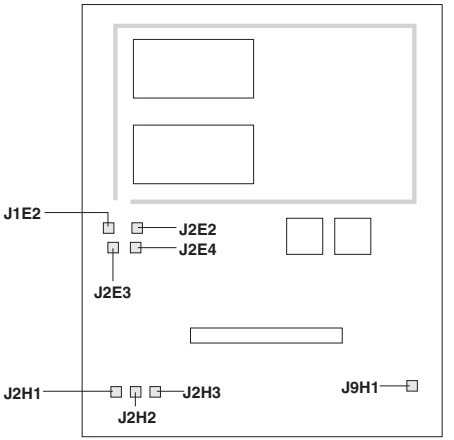


5. Expose the board on which the jumpers reside.
6. Locate the configuration jumper blocks on the board.
7. Move jumper to pins specified for the desired setting.
8. Reinstall any boards or components that you removed in order to access the jumper blocks.

Processor baseboard jumpers

Jumper blocks exist on the processor baseboard that allow you to route Joint Test Action Group (JTAG) Test Data In (TDI) and Test Data Out (TDO) signals through different components on the processor baseboard. Additionally, jumper blocks allow you to configure the host bus frequency, set the processor frequency, and set other miscellaneous functions. To access these jumper blocks you need expose the top half of the processor baseboard by following the procedure in "Processor baseboard" on page 192.

The following illustration shows where the jumper blocks reside on the top half of the Processor Baseboard.

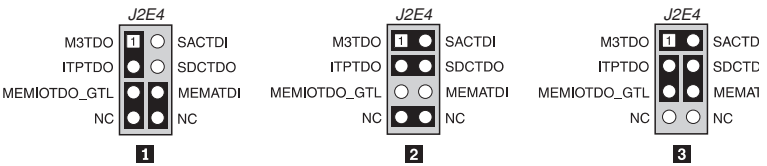


J2E3	JTAG SELECT1
J2E4	JTAG SELECT2
J2H1	Host Bus Frequency
J2H2	Host Bus Frequency
J2H3	Host Bus Frequency
J1E2	Processor Frequency
J2E2	Miscellaneous
J9H1	Miscellaneous

JTAG Select1 settings

Jumper block J2E4 selects combinations of the processor, supporting chip set, memory, and I/O as routes for JTAG TDI and TDO signals. The default jumper setting allows for JTAG TDI and TDO signals to be routed through the processor only.

The following illustration shows the jumper settings.

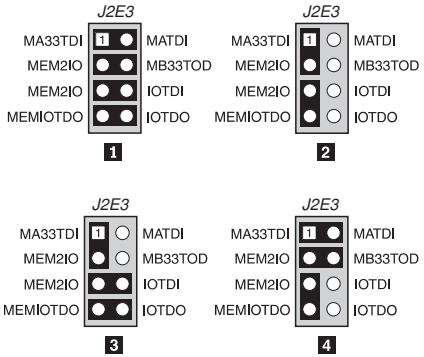


1	Processor Only
2	Processor and Supporting Chip Set
3	Processor, Supporting Chip Set, Memory, and I/O (Default Setting)

JTAG Select2 settings

Jumper block J2E3 adds and skips processor baseboard components to the JTAG TDI and TDO signal path. With this jumper you can choose to add memory and I/O, choose to skip memory and I/O, choose to skip memory and add I/O, or choose to add memory and skip I/O. The default jumper setting skips memory and I/O.

The following illustration shows the jumper settings.



1 Add Memory and I/O (Default Setting)

2 Skip Memory and Skip I/O

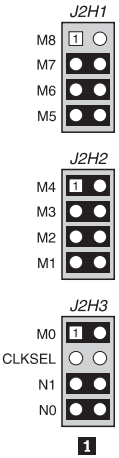
3 Skip Memory and Add I/O

4 Add Memory and Skip I/O

Setting host bus frequencies

Jumper blocks J2H1, J2H2, and J2H3 configure the host bus frequency. The settings for all three jumper blocks combine to yield the single frequency. By default, the frequency is set to 133 MHz.

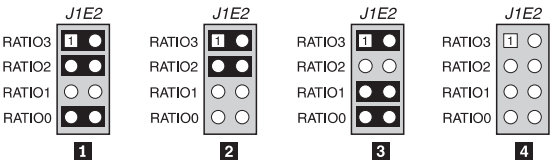
The following illustration shows the jumper settings.



Processor host core bus ratio

Jumper block J1E2 configures the host-core bus ratio. By default, the bus ratio is two to 11 and the core frequency is 733 MHz.

The following illustration shows the jumper settings.

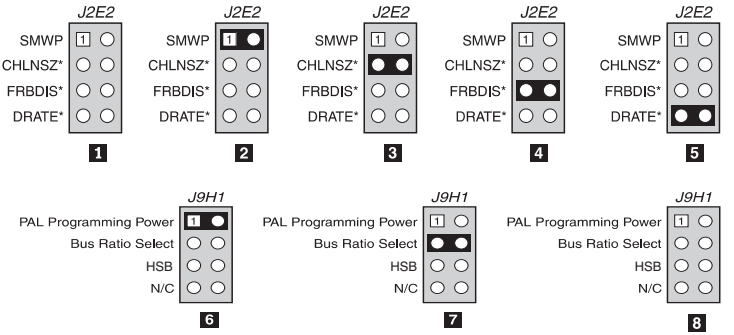


1. Two to 10 Bus Ratio with 667 MHz Core Frequency
2. Two to 11 Bus Ratio with 733 MHz Core Frequency
3. Two to 12 Bus Ratio with 800 MHz Core Frequency
4. Processor Frequency Auto Detect (Default Setting)

Miscellaneous jumper settings

Jumper blocks J2E2 and J9H1 enable server management write-protect, disable the FRB, enable the FSB in common clock mode, and apply power to the pull-ups on the ISP chain for stand-alone programming. Additionally, the jumpers select between using J1E2 or BMC auto detect of processor frequency to set the host core bus ratio. By default, the FSB is enabled in common clock mode, power is not applied to pull-ups, and the J1E2 jumper determines the host core bus ratio.

The following illustration shows the jumper settings.



1 Not Jumpered (Default Setting)

2 Enables Server Management Write Protect

3 Reserved

4 Disables the FRB

5 Enables the FSB in Common Clock Mode (1X)

6 Applies Power to Pull-ups on ISP Chain for Stand-Alone Programming

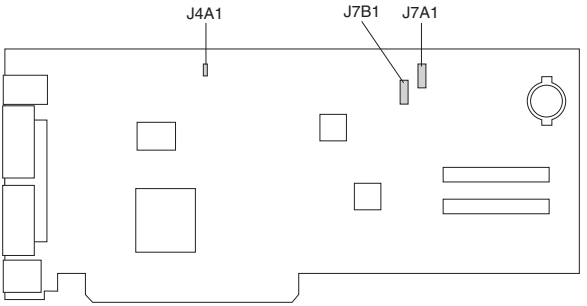
7 Processor Frequency Auto-detect by BMC

8 Applies No Power to Pull-ups and Uses J1E2

Legacy I/O board jumpers

Jumper blocks exist on the Legacy I/O Board that allow you to perform recovery boot operations, clear the CMOS register, clear the password, and configure FWH programming. To access these jumper blocks you need remove the Legacy I/O Board by following the instructions in "Legacy I/O board removal" on page 203.

The following illustration shows where the jumper blocks reside on the Legacy I/O Board.



J4A1 FWH Programming

J7A1 Recover Boot, CMOS Clear, and Password Clear

J7B1 Forced BMC program mode

Configuring FWH programming

Jumper block J4A1 allows you to configure the FWH programming at 12 Volts. By default, FWH programming is configured for 3.3 Volts.

The following illustration shows the jumper settings.

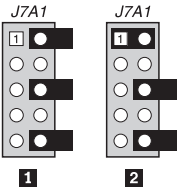
1 FWH Programming at 12 Volts

2 FWH Programming at 3.3 Volts (Default Setting)

Configuring recovery boot

Jumper block J7A1 controls whether the system attempts to boot using BIOS programmed in flash memory. By default, the system does not perform a recovery boot using this BIOS.

The following illustration shows the jumper settings.



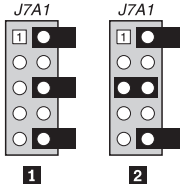
1 Does not use the BIOS Programmed in Flash Memory During a Recovery Boot Procedure (Default Setting)

2 Uses the BIOS Programmed in Flash Memory During a Recovery Boot Procedure

Clearing the CMOS register

Jumper block J7A1 controls whether settings stored in CMOS nonvolatile memory (NVRAM) are retained during a system reset. By default, the system does not keep the default values in this register. You can configure J7A1 to restore the system defaults.

The following illustration shows the jumper settings.



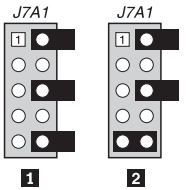
1 Do not keep default values in the CMOS register (Default Setting)

2 Clear the CMOS register and restore the system default values

Clearing system password

Jumper block J7A1 controls whether a stored password is retained or cleared during a system reset. By default, the system retains this password. To clear it you must configure jumper block J7A1.

The following illustration shows the jumper settings.



1 Retains the System Password on Reset (Default Setting)

2 Clears the System Password on Reset

Forced BMC program mode

Jumper block J7B1 controls whether the BMC is in a firmware transfer mode and forces an update to the BMC mode.

1 BMC programming forced

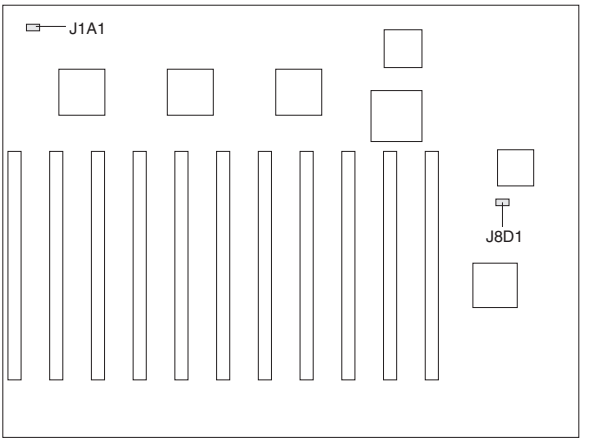
2 BMC programming non-forced (Default Setting)

OEM I/O baseboard jumpers

Jumper blocks exist on the OEM I/O Baseboard that allow you to include the BMC in the JTAG chain and override the hardware PCI hot plug interlock switches. To access

these jumper blocks you need to expose the OEM I/O Baseboard by following the instructions in "I/O baseboard removal" on page 196.

The following illustration shows where the jumper blocks reside on the OEM I/O baseboard.

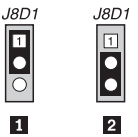


J8D1	Include BMC in the JTAG Chain
J1A1	Override the PCI Hot Plug Interlock Switches

Including the BMC in the JTAG chain

Jumper block J8D1 lets you include or exclude the BMC in the JTAG chain. By default, the BMC is excluded from the JTAG chain.

The following illustration shows the jumper settings.

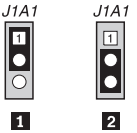


1	Excludes BMC from the JTAG Chain (Default Setting)
2	Includes BMC in the JTAG Chain

Overriding the hardware PCI hot plug interlock

Jumper block J1A1 lets you override the hardware PCI hot plug interlock switches. By default, the jumper setting allows for the slot's interlock switch and/or the PID's GPIO27 to set the interlock value.

The following illustration shows the jumper settings.

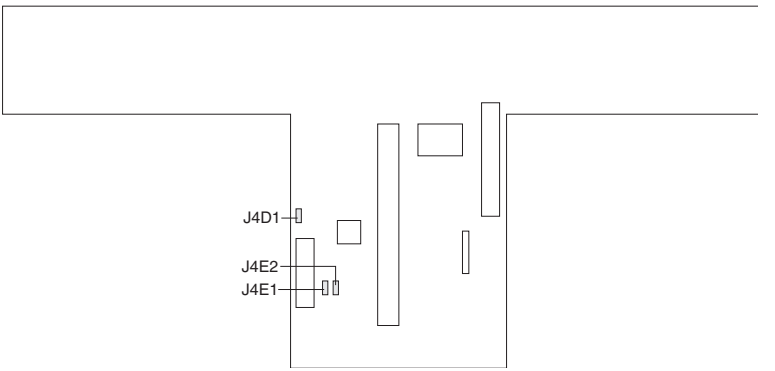


1	Allows the PCI Hot Plug Interlock Switch and/or the PID's GPIO27 to Set the Interlock Value (Default Setting)
2	Overrides the Hardware PCI Hot Plug Interlock Switch

T-Docking board jumpers

Jumper blocks exist on the T-Docking Board that allow you to force a firmware update, flash boot block write enable, and configure for 220 Volt Brownout protection. To access these jumper blocks you need expose the T-Docking Board by following the instructions in "T-Docking board" on page 205.

The following illustration shows where the jumper blocks reside on the T-Docking board.



J4E1	Force Firmware Update
J4E2	Flash Bootblock Enable
J4D1	220V Brownout Protection

Forcing a firmware update and flashing boot block write enable

Jumper blocks J4E1 and J4E2 allow you force a firmware update and flash boot block write enable. By default, both these features are disabled.

The following illustration shows the jumper settings.

1 No Firmware Update or Flash Bootblock Enable (Default Setting)

2 Flash Bootblock Enable

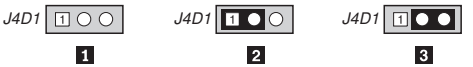
3 Force a Firmware Update

4 Force a Firmware Update and Flash Bootblock Enable

Configuring brownout protection

Jumper block J4D1 allows you set the brownout protection for either 110 or 220 volts. By default, 110 volt protection is enabled.

The following illustration shows the jumper settings.



1 Low Line for 110 Volt Brownout Protection (Default Setting)

2 Low Line for 110 Volt Brownout Protection (Default Setting)

3 High Line for 220 Volt Brownout Protection

Video modes

The ATI RAGE XL integrated video controller provides VGA modes for resolutions of 1280 x 1024 and below. The following table shows what is supported and what is unsupported. Areas of the table with dashes are unsupported.

Table 25. 2D modes for 64-bit SDR SD/SGRAM (100 MHz).

Display mode	Refresh rate MHz	Buffer Memory (MB)															
		4				8				16				32			
		Color Depth (bpp)															
		8	16	24	32	8	16	24	32	8	16	24	32	8	16	24	32
640 x 480	60 - 200																
800 x 600	48 - 180																
1024 x 768	43 - 140																
1152 x 864	43 - 100																
1280 x 1024	43				—												
	47				—												

Table 25. 2D modes for 64-bit SDR SD/SGRAM (100 MHz).

Display mode	Refresh rate MHz	Buffer Memory (MB)															
		4				8				16				32			
		Color Depth (bpp)															
		8	16	24	32	8	16	24	32	8	16	24	32	8	16	24	32
	60				—												
	70				—												
	74				—												
	75				—												
	85				—												
	90				—												
	100				—				—				—				—

Determining DC-to-DC status

Each DC-to-DC has an LED that indicates whether power is supplied to the DC-to-DC and the health of the DC-to-DC. The following table provides more detail on the LEDs. The LEDs are located on the Sideplane board above the 5-Volt DC-to-DC connector (J6B1).

Table 26. DC-to-DC LED.

AC power not present (amber LED)	AC power present system powered off (amber LED)	AC power present system powered on (amber LED)	Description
Off			No AC power to any power supply or DC-to-DC
	On		AC present/ standby output on
		Off	AC present / standby output on; DC-to-DC outputs on and okay
		On	AC present / standby output on; DC-to-DC failure; DC-to-DC not installed

Symptom-to-FRU index

This index supports xSeries 380 servers.

Notes:

1. Check the configuration before you replace a FRU. Configuration problems can cause false errors and symptoms.
2. The default configuration can be loaded by starting the system and then pressing the reset button four times, waiting 15 seconds between each press. Once the configuration has reset to the default, it must be saved in Setup to be stored in CMOS.
3. For IBM devices not supported by index, refer to the manual for that device.
4. Always start with "General checkout" on page 1.

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 displays POST error codes and messages on the screen.

Beep symptoms

Beep symptoms are short tones or a series of short tones separated by pauses (intervals without sound). See the following examples.

Note: There is a single beep when the first AC cord is plugged in.

Beeps	Description
1-2-3	• One beep • A pause (or break) • Two beeps • A pause (or break) • Three Beeps
4	Four continuous beeps

Beep/Symptom	FRU/Action
1-5-1-1 (processor failure)	1. **Reseat processor(s)** 2. Processor
1-5-2-1 (no processor installed/detected)	1. **Reseat processor** 2. Processor

Beep/Symptom	FRU/Action
1-5-4-2 (power control fault; power-good dropped out)	1. **Reseat power supplies** 2. Check DC to DC converter configuration 3. Reseat D2D converters 4. Reseat processors 5. Reseat power pods 6. Check Legacy cable connection
1-5-4-4 (PWRGD-BUF failure; no power-good on power-up)	1. **Check DC to DC converter configuration** 2. Reseat D2D converters 3. Reseat processors 4. Reseat power pods 5. Check Legacy cable connection 6. I/O board
1-5-5-1 (CPU board interlock failure)	1. **Verify CPU board inserted fully**
The following beep codes may be preceded by 1-5-4-2 or 1-5-4-4:	
1 (General power supply redundancy failure)	1. **Verify that all power cords are connected.** 2. Reseat power supply indicated by power supply LED 3. Replace power supply indicated by power supply LED
2-1 (Power pod 1)	1. **Reseat power pod 1.** 2. Power pod 1.
2-2 (Power pod 2)	1. **Reseat power pod 2.** 2. Power pod 2.
2-3 (Power pod 3)	1. **Reseat power pod 3.** 2. Power pod 3.
2-4 (Power pod 4)	1. **Reseat power pod 4.** 2. Power pod 4.
3-1 (Memory board A)	1. **Reseat memory board A (upper board).** 2. Memory board A.
3-1-1 (Memory board D2D)	1. **Reseat D2D marked "D2D0" on memory board A.** 2. D2D marked "D2D0" on memory board A.
3-1-2 (Memory board D2D)	1. **Reseat D2D marked "D2D1" on memory board A.** 2. D2D marked "D2D1" on memory board A.
3-2 (Memory board B)	1. **Reseat memory board B (lower board).** 2. Memory board B.
3-2-1 (Memory board D2D)	1. **Reseat D2D marked "D2D0" on memory board A.** 2. D2D marked "D2D0" on memory board B.
3-2-2 (Memory board D2D)	1. **Reseat D2D marked "D2D1" on memory board A.** 2. D2D marked "D2D1" on memory board B.
4 (T-docking board D2D)	1. **Reseat 12V D2D on T-docking board.** 2. 12V D2D on T-docking board.

Beep/Symptom	FRU/Action
5-1 (Sideplane 5V D2D)	1. **Reseat 5V D2D-A (#1) on sideplane board** 2. 5V D2D-A on sideplane board
5-2 (Sideplane 5V D2D)	1. **Reseat 5V D2D-B (#2) on sideplane board** 2. 5V D2D-B on sideplane board
6 (Sideplane 3.3V processor D2D)	1. **Reseat 3.3V processor D2D on sideplane board (bottom left)** 2. 3.3V processor D2D on sideplane board (bottom left)
7-1 (Sideplane 3.3V I/O D2D)	1. **Reseat 3.3V I/O D2D-A on sideplane board (bottom right)** 2. 3.3V I/O D2D-A on sideplane board (bottom right)
7-2 (Sideplane 3.3V I/O D2D)	1. **Reseat 3.3V I/O D2D-B on sideplane board (top right)** 2. 3.3V I/O D2D-B on sideplane board (top right)
8-1 (Processor board D2D)	1. **Reseat processor baseboard** 2. Processor baseboard
8-2 (Processor board D2D)	1. **Reseat processor baseboard** 2. Processor baseboard
1-5-5-2 (Fan fuse)	1. **Check T-docking board connections** 2. T-docking board

Error symptoms

Error Symptom	FRU/Action
System does not power up once back together (loose connection(s) and/or bent pins)	1. **Reseat boards and D2Ds** 2. Check front panel cable connections
System powers on but then turns back off often with fault light (bent pin(s); short on board)	1. **Reseat processor** 2. Processor
System powers up but does not POST (loose connection(s); incorrect processor stepping; system speed too high for processors; memory not stuffed in documented order; unsupported or unvalidated DIMMS)	1. **Check that screw or other conductive item has not been dropped into system** 2. Reseat boards and D2D 3. Check for bent pins on cables 4. Check for bent pins on processors
System does not recognize all installed processors (loose connection; bent pin(s) on processor(s))	1. **Reseat processors and power pods** 2. Check for bent pins on processors 3. Check cable connections from processor board to power pod

Error Symptom	FRU/Action
No video (loose connection)	1. **Reseat boards, D2Ds and processors** 2. Check for bent pins on all connectors 3. Reseat memory boards and DIMMs 4. Ensure proper population of DIMM banks 5. DIMMs 6. Power pod 7. D2Ds
SCSI drives not recognized during POST (loose connection)	1. **Reseat SCSI cable between I/O and T-docking boards** 2. Reseat hard disk drive
LS120 or CD-ROM drives not recognized by BIOS/EFI (loose connection)	1. **Reseat IDE cable and power cable** 2. Ensure that BIOS setup has these devices enabled
Not all drives are recognized by fixed disk diagnostic.	1. **Remove first drive that does not show up and rerun diagnostic.** If remaining drives show up, replace the one that was removed. 2. If remaining drives do not show up, remove successive drives one at a time and rerun diagnostic.
System hangs during fixed disk diagnostic.	1. **Remove hard drive being tested at the time of the hang and rerun the diagnostic.** If successful, replace drive that was removed.

Diagnostic error codes

For information on running the diagnostic programs, see "Running diagnostic programs" on page 15.

System error codes

Error Code/Symptom	FRU/Action
3000h Register Bank Switch Failed	1. Reseat all Processors and Power Pods 2. Individually replace Processors and Power Pods 3. Processor Board
3001h Register Read/Write Failed	1. Reseat all Processors and Power Pods 2. Individually replace Processors and Power Pods 3. Processor Board
3002h CPU Basic Instruction Operation Failed	1. Reseat all Processors and Power Pods 2. Individually replace Processors and Power Pods 3. Processor Board

Error Code/Symptom	FRU/Action
3003h CPU Parallel Data Manipulation Failed	1. Reseat all Processors and Power Pods 2. Individually replace Processors and Power Pods 3. Processor Board
3005h FPU Arithmetic Error	1. Reseat all Processors and Power Pods 2. Individually replace Processors and Power Pods 3. Processor Board
3006h FPU Comparison Error	1. Reseat all Processors and Power Pods 2. Individually replace Processors and Power Pods 3. Processor Board
3007h FPU Load /Store Error	1. Reseat all Processors and Power Pods 2. Individually replace Processors and Power Pods 3. Processor Board
3008h FPU Conversion Error	1. Reseat all Processors and Power Pods 2. Individually replace Processors and Power Pods 3. Processor Board
3010h CPU Speed does not match expected value	1. Check that the expected value entered is correct. 2. Reseat all Processors and Power Pods 3. Individually replace Processors and Power Pods 4. Processor Board
3011h CPU Mode Switching Failed	1. Reseat all Processors and Power Pods 2. Individually replace Processors and Power Pods 3. Processor Board
3020h CPU Basic Compatibility Test Failed	1. Reseat all Processors and Power Pods 2. Individually replace Processors and Power Pods 3. Processor Board
3021h FPU Basic Compatibility Test Failed	1. Reseat all Processors and Power Pods 2. Individually replace Processors and Power Pods 3. Processor Board
3022h CPU Protected Mode Compatibility Test Failed	1. Reseat all Processors and Power Pods 2. Individually replace Processors and Power Pods 3. Processor Board
3100h Read /Write test on DMA controller 1 failed.	1. Legacy I/O Board
3101h Read /Write test on DMA controller 2 failed.	1. Legacy I/O Board
3102h Read /Write test on page registers failed.	1. Legacy I/O Board
3111h Enable/Disable of the interrupt controller failed	1. Legacy I/O Board
3112h Stray interrupts detected	1. Legacy I/O Board

Error Code/Symptom	FRU/Action
3120h Timer Periodic Interrupt is not being generated.	1. Legacy I/O Board
3121h Timer is counting at a slower rate.	1. Legacy I/O Board
3122h Timer is counting at a faster rate.	1. Legacy I/O Board
3130h Real Time Clock is running at a slower rate.	1. Legacy I/O Board
3131h Real Time Clock is running at a faster rate.	1. Legacy I/O Board
3140h battery backup unit that powers CMOS RAM has no power.	1. Battery or CMOS unit
3141h Configuration mismatch in CMOS RAM.	1. Run BIOS Setup 2. Replace battery or CMOS unit
3142h CMOS RAM memory size	1. 1. Run BIOS Setup 2. 2. Replace battery or CMOS unit
3143h CMOS RAM time is invalid.	1. Run BIOS Setup 2. Battery or CMOS unit
3144h Bad CMOS RAM checksum detected.	1. Run BIOS Setup 2. Battery or CMOS unit
3145h Periodic time update cycle not occurring.	1. Legacy I/O Board
3146h CMOS RAM fails to hold data.	1. Legacy I/O Board
00A0h PCI Device Enumeration Failed	1. Reseat all PCI Devices 2. Check for IRQ sharing issues 3. System I/O Board
00A1h PCI Device Access Failed	1. Reseat all PCI Devices 2. Check for IRQ sharing issues 3. System I/O Board
00A2h PCI Configuration Space could not be verified	1. Reseat all PCI Devices 2. Check for IRQ sharing issues 3. System I/O Board
1000h MP table failed or Load MP driver failed	1. Replace System BIOS 2. Legacy I/O Board
1009h Cache coherency test failed.	1. Reseat all Processors and Power Pods 2. Individually replace Processors and Power Pods 3. Processor Board

Error Code/Symptom	FRU/Action
100Ah Memory consistency test failed.	1. Reseat all Processors and Power Pods 2. Individually replace Processors and Power Pods 3. Processor Board
100Bh I/O access test failed on processor X at port XXXXh.	1. Reseat all Processors and Power Pods 2. Individually replace Processors and Power Pods 3. Processor Board
100Eh CPU speed error.	1. Check that the expected value entered is correct. 2. Reseat all Processors and Power Pods 3. Individually replace Processors and Power Pods 4. Processor Board
1020h CPU functionality test failed.	1. Reseat all Processors and Power Pods 2. Individually replace Processors and Power Pods 3. Processor Board
1021h FPU functionality test failed.	1. Reseat all Processors and Power Pods 2. Individually replace Processors and Power Pods 3. Processor Board
1022h CPU mode switch test failed.	1. Reseat all Processors and Power Pods 2. Individually replace Processors and Power Pods 3. Processor Board
1023h CPU compatibility test failed.	1. Reseat all Processors and Power Pods 2. Individually replace Processors and Power Pods 3. Processor Board
1024h MP test time out	1. Reseat all Processors and Power Pods 2. Individually replace Processors and Power Pods 3. Processor Board
00B2h SMBIOS Table Checksum Invalid	1. Replace System BIOS 2. Legacy I/O Board

Memory test error codes

The addresses below are absolute addresses.

Error Code/Explanation	FRU/Action
0100h ROM read error. AMIDiag could not read from a ROM location.	1. Replace System BIOS 2. Legacy I/O Board
0101h ROM not write-protected. AMIDiag was able to write over data in a ROM location. ROM locations should be write-protected.	1. Replace System BIOS 2. Legacy I/O Board

Error Code/Explanation	FRU/Action
0102h System BIOS cannot set the year to 2000 after 12/31/99.	1. Replace System BIOS
0120h Parity error at absolute memory location XXXXXXXXh. AMIDiag found a parity error at xxxxxxxxh.	1. Reseat Memory DIMMs 2. Memory Board
0130h The pattern written at XXXXXXXXh was qqqqh. The pattern read back from that address was pppph. AMIDiag wrote a pattern to address xxxxxxxxh. A different value was read back.	1. Reseat Memory DIMMs 2. Memory Board
0131h Parity failure at XXXXXXXXh during pattern test. While performing the pattern test to the specified address, AMIDiag received a parity error.	1. Reseat Memory DIMMs 2. Memory Board
0132h Faulty memory chip on SIMMM xxxx	1. Reseat Memory DIMMs 2. Memory Board
0135h ECC correctable error in SIMM sockets xxxx/yyyy	1. Reseat Memory DIMMs 2. Memory Board
0136h ECC uncorrectable error in SIMM sockets xxxx/yyyy	1. Reseat Memory DIMMs 2. Memory Board
0137h Error occurred on bank XXXX interleave YYYY	1. Reseat Memory DIMMs 2. Memory Board
0140h Failure at address XXXXXXXXh, bit position bbh. A failure occurred at the specified address.	1. Reseat Memory DIMMs 2. Memory Board
0150h Failure at XXXXXXXXh, bit position bbh. A failure occurred at the specified address.	1. Reseat Memory DIMMs 2. Memory Board
0160h There is an address short between bit xxh and yyh. AMIDiag detected a short in the address lines between the bits specified above. For example, if `Address short found between bit 01h and 02h` appeared, address lines A0 and A1 have a short between them.	1. Reseat Memory DIMMs 2. Memory Board
0170h RAM Refresh is not working. The system RAM refresh signal is either not being generated or the signal is being generated sporadically.	1. Legacy I/O Board

Error Code/Explanation	FRU/Action
0171h - 0172h RAM Refresh is slower or faster than expected. Normally, the system should generate a refresh signal about once every 15 ms. This error occurs if the refresh signal is occurring at a slower or faster rate.	1. Legacy I/O Board
0180h The pattern written at address XXXXXXXXh was qqqqh. The pattern read back from that address was pppph. AMIDiag wrote a pattern to address xxxxxxxh. When reading it back, AMIDiag read a different value from that same address.	1. Reseat Memory DIMMs 2. Memory Board
0181h No active external cache memory.	1. Reseat all Processors and Power Pods 2. Individually replace Processors and Power Pods 3. Processor Board
0184h Data bus short found.	1. Legacy I/O Board
0190h Test failed at address xxxxxxxh. An unknown memory error occurred at xxxxxxxh.	1. Reseat Memory DIMMs 2. Memory Board
01A0h The same as code 0130h (Pattern written at address XXXXXXXXh was qqqqh, read back was pppph).	1. Reseat Memory DIMMs 2. Memory Board

IDE CD test error codes

Error Code/Explanation	FRU/Action
0A01h Eject fails on drive x.	1. Manually eject media 2. Retry tray function 3. Check drive cables and connections 4. Drive 5. Legacy I/O board
0A02h Close failed on drive x.	1. Manually close drive 2. Retry tray function 3. Check drive cables and connections 4. Drive 5. Legacy I/O board

Error Code/Explanation	FRU/Action
0A03h Sequential data test failed, Drive x, Sector Y.	1. Replace media 2. Check drive cables and connections 3. Connect drive to other IDE channel 4. Drive 5. Legacy I/O board
0A04h Sequential data test failed, No data CD in Drive x.	1. Replace media 2. Check drive cables and connections 3. Connect drive to other IDE channel 4. Drive 5. Legacy I/O board
0A05h Random data test failed, Drive x, Sector Y.	1. Replace media 2. Check drive cables and connections 3. Connect drive to other IDE channel 4. Drive 5. Legacy I/O board
0A06h Random data test failed, No data CD in Drive x.	1. Replace media 2. Check drive cables and connections 3. Connect drive to other IDE channel 4. Drive 5. Legacy I/O board
0A07h Sequential Play test failed, Drive x, Sector y.	1. Replace media 2. Check drive cables and connections 3. Connect drive to other IDE channel 4. Drive 5. Legacy I/O board
0A08h Sequential Play test failed, no Audio CD in Drive x.	1. Replace media 2. Check drive cables and connections 3. Connect drive to other IDE channel 4. Drive 5. Legacy I/O board
0A09h Random Play test failed, Drive x, Sector y.	1. Replace media 2. Check drive cables and connections 3. Connect drive to other IDE channel 4. Drive 5. Legacy I/O board
0A10h Random Play test failed, no Audio CD in Drive x.	1. Replace media 2. Check drive cables and connections 3. Connect drive to other IDE channel 4. Drive 5. Legacy I/O board

Error Code/Explanation	FRU/Action
0A11h No Audio tracks in the multisession CD in the Drive x.	1. Replace media 2. Check drive cables and connections 3. Connect drive to other IDE channel 4. Drive 5. Legacy I/O board
0A12h Number of Audio tracks inadequate for the test.	1. Replace media 2. Check drive cables and connections 3. Connect drive to other IDE channel 4. Drive 5. Legacy I/O board

ATAPI removables test error codes

Error Code/Explanation	FRU/Action
0F01h No ATAPI Removable drives present.	1. Check drive cables and connections 2. Connect drive to other IDE channel 3. Drive 4. Legacy I/O board
0F02h Write failed.	1. Replace media 2. Check drive cables and connections 3. Connect drive to other IDE channel 4. Drive 5. Legacy I/O board
0F03h Read failed.	1. Replace media 2. Check drive cables and connections 3. Connect drive to other IDE channel 4. Drive 5. Legacy I/O board
0F04h Seek operation failed.	1. Replace media 2. Check drive cables and connections 3. Connect drive to other IDE channel 4. Drive 5. Legacy I/O board
0F05h Eject fails on drive x.	1. Replace media 2. Check drive cables and connections 3. Connect drive to other IDE channel 4. Drive 5. Legacy I/O board

Error Code/Explanation	FRU/Action
0F06h Sequential Read Verify failed.	1. Replace media 2. Check drive cables and connections 3. Connect drive to other IDE channel 4. Drive 5. Legacy I/O board
0F07h Random Read Operation failed.	1. Replace media 2. Check drive cables and connections 3. Connect drive to other IDE channel 4. Drive 5. Legacy I/O board
0F08h Random Read Verify failed.	1. Replace media 2. Check drive cables and connections 3. Connect drive to other IDE channel 4. Drive 5. Legacy I/O board
0F09h Random Seek Operation failed.	1. Replace media 2. Check drive cables and connections 3. Connect drive to other IDE channel 4. Drive 5. Legacy I/O board

IDE DVD drive test error codes

Error Code/Explanation	FRU/Action
1900h Critical/Command Error.	1. Replace media 2. Check drive cables and connections 3. Connect drive to other IDE channel 4. Drive 5. Legacy I/O board
1901h DVD Seek Test failed.	1. Replace media 2. Check drive cables and connections 3. Connect drive to other IDE channel 4. Drive 5. Legacy I/O board
1902h DVD Read Test failed.	1. Replace media 2. Check drive cables and connections 3. Connect drive to other IDE channel 4. Drive 5. Legacy I/O board

SCSI test error codes

Code/Explanation	FRU/Action
0500h SCSI device not ready	1. Confirm that drive is configured 2. Check drive cables and connections 3. Drive 4. System I/O Board or SCSI add-on controller
0502h SCSI device read error	1. Confirm that drive is configured 2. Check drive cables and connections 3. Drive 4. System I/O Board or SCSI add-on controller
0504h SCSI device write error	1. Confirm that drive is configured 2. Check drive cables and connections 3. Drive 4. System I/O Board or SCSI add-on controller
0505h SCSI disk format failed	1. Confirm that drive is configured 2. Check drive cables and connections 3. Drive 4. System I/O Board or SCSI add-on controller
0506h SCSI disk self test failed	1. Confirm that drive is configured 2. Check drive cables and connections 3. Drive 4. System I/O Board or SCSI add-on controller
0507h SCSI disk buffer error	1. Confirm that drive is configured 2. Check drive cables and connections 3. Drive 4. System I/O Board or SCSI add-on controller
0508h SCSI disk random read error	1. Confirm that drive is configured 2. Check drive cables and connections 3. Drive 4. System I/O Board or SCSI add-on controller
0509h SCSI disk random write error	1. Confirm that drive is configured 2. Check drive cables and connections 3. Drive 4. System I/O Board or SCSI add-on controller
050Ah SCSI disk block repair failed	1. Confirm that drive is configured 2. Check drive cables and connections 3. Drive 4. System I/O Board or SCSI add-on controller

Code/Explanation	FRU/Action
050Bh SCSI spin down test failed	1. Confirm that drive is configured 2. Check drive cables and connections 3. Drive 4. System I/O Board or SCSI add-on controller
050Ch Error in disk partition table	1. Confirm that drive is formatted and configured 2. Check drive cables and connections 3. Drive 4. System I/O Board or SCSI add-on controller
050Dh Boot sector error. The boot partition has an incorrect definition	1. Confirm that drive is formatted and configured 2. Check drive cables and connections 3. Drive 4. System I/O Board or SCSI add-on controller
050Eh Media error. The media description for the partition is bad. The unit is not properly OS formatted	1. Confirm that drive is formatted and configured 2. Check drive cables and connections 3. Drive 4. System I/O Board or SCSI add-on controller
050Fh The sector number information in the partition table is wrong. The unit is not properly OS formatted	1. Confirm that drive is formatted and configured 2. Check drive cables and connections 3. Drive 4. System I/O Board or SCSI add-on controller
0510h No Tape in the drive	1. Check if a tape is in drive 2. Confirm that drive is configured 3. Check drive cables and connections 4. Drive 5. System I/O Board or SCSI add-on controller
0511h Positioning failed on tape drive	1. Confirm that drive is configured 2. Check drive cables and connections 3. Drive 4. System I/O Board or SCSI add-on controller
0512h Tape read error	1. Check if write test has been executed 2. Confirm that drive is configured 3. Check drive cables and connections 4. Drive 5. System I/O Board or SCSI add-on controller
0513h Tape write error	1. Confirm that drive is configured 2. Check drive cables and connections 3. Drive 4. System I/O Board or SCSI add-on controller

Code/Explanation	FRU/Action
0515h Tape Self-test error	1. Confirm that drive is configured 2. Check drive cables and connections 3. Drive 4. System I/O Board or SCSI add-on controller
0516h Tape buffer error	1. Confirm that drive is configured 2. Check drive cables and connections 3. Drive 4. System I/O Board or SCSI add-on controller
0520h No CD in the drive	1. Check if a CD is in drive. 2. Confirm that drive is configured 3. Check drive cables and connections 4. Drive 5. System I/O Board or SCSI add-on controller
0521h CD-ROM read error	1. Confirm that drive is configured 2. Check drive cables and connections 3. Drive 4. System I/O Board or SCSI add-on controller
0523h CD-ROM play error	1. Confirm that drive is configured 2. Check drive cables and connections 3. Drive 4. System I/O Board or SCSI add-on controller
0524h CD Self-test error	1. Confirm that drive is configured 2. Check drive cables and connections 3. Drive 4. System I/O Board or SCSI add-on controller
0525h CD Open error	1. Manually eject media and close drive 2. Retry tray function 3. Confirm that drive is configured 4. Check drive cables and connections 5. Drive 6. System I/O Board or SCSI add-on controller
0526hCD Close error	1. Manually eject media and close drive 2. Retry tray function 3. Confirm that drive is configured 4. Check drive cables and connections 5. Drive 6. System I/O Board or SCSI add-on controller

Code/Explanation	FRU/Action
0527h CD Buffer error	1. Confirm that drive is configured 2. Check drive cables and connections 3. Drive 4. System I/O Board or SCSI add-on controller
0528h Pattern compare failed. Check pattern did not match	1. Check if AMIDiag CD is present in drive 2. Confirm that drive is configured 3. Check drive cables and connections 4. Drive 5. System I/O Board or SCSI add-on controller
0529h CD-ROM random read error	1. Confirm that drive is configured 2. Check drive cables and connections 3. Drive 4. System I/O Board or SCSI add-on controller
0550h Read timeout	1. Confirm that drive is configured 2. Check drive cables and connections 3. Drive 4. System I/O Board or SCSI add-on controller
0560h File not found	1. Check if AMIDiag CD is present in drive 2. Confirm that drive is configured 3. Check drive cables and connections 4. Drive 5. System I/O Board or SCSI add-on controller
0580h Cannot allocate memory	1. Restart the system and retry
0590h Command not supported. Unable to run the test on the device.	1. Confirm that drive is configured 2. Check drive cables and connections 3. Drive 4. System I/O Board or SCSI add-on controller

Keyboard test error codes

Code/Explanation	FRU/Action
0400h AMIDiag found a keyboard controller interface error.	1. Keyboard 2. Legacy I/O Board
0401h AMIDiag issued commands to the keyboard controller and received improper responses.	1. Keyboard 2. Legacy I/O Board
0410h - 0411h Keyboard clock line is stuck low/high. The clock line to the keyboard is stuck either low or high.	1. Keyboard 2. Legacy I/O Board

Code/Explanation	FRU/Action
0412h - 0413h Keyboard data line is stuck low/high. The data line to the keyboard is stuck either low or high.	1. Keyboard 2. Legacy I/O Board
0415h Keyboard LED could not be turned on.	1. Keyboard 2. Legacy I/O Board
0416h Keyboard diagnostic echo failed.	1. Keyboard 2. Legacy I/O Board

Video test error codes

Code/Explanation	FRU/Action
0900h Vertical Synchronization Test failed	1. Video Adapter 2. System I/O Board
0901h Horizontal Synchronization Test failed	1. Video Adapter 2. System I/O Board
0902h Graphics controller test failed	1. Video Adapter 2. System I/O Board
0903h Attribute controller test failed	1. Video Adapter 2. System I/O Board
0904h DAC register test failed	1. Video Adapter 2. System I/O Board
0905h Video adapter memory R/W test failed.	1. Video Adapter 2. System I/O Board
0921h AGP test failed.	1. Video Adapter 2. System I/O Board
2100h Video adapter attribute test failed.	1. Replace the Video Monitor 2. Video Adapter 3. System I/O Board
2102h Video adapter color test failed.	1. Replace the Video Monitor 2. Video Adapter 3. System I/O Board
2110h - 2120h Param1 x Param2 mode test failed.	1. Replace the Video Monitor 2. Video Adapter 3. System I/O Board

USB test error codes

Code/Explanation	FRU/Action
0B00h USB mouse set protocol failed.	1. Check USB mouse connection 2. USB mouse 3. Legacy I/O board
0B01h USB mouse remove and attach tests failed.	1. Check USB mouse connection 2. USB mouse 3. Legacy I/O board
0B02h USB mouse not present.	1. Check USB mouse connection 2. USB mouse 3. Legacy I/O board
0B30h USB keyboard control test failed.	1. Check USB keyboard connection 2. USB keyboard 3. Legacy I/O board
0B40h USB keyboard LED test failed.	1. Check USB keyboard connection 2. USB keyboard 3. Legacy I/O board
0B50h USB keyboard remove and attach test failed.	1. Check USB keyboard connection 2. USB keyboard 3. Legacy I/O board
0B60h USB keyboard not present.	1. Check USB keyboard connection 2. USB keyboard 3. Legacy I/O board
0B70h USB Hub communication test failed	1. Check USB Hub connection 2. USB Hub 3. Legacy I/O board
0B80h USB Hub port status test failed	1. Check USB Hub connection 2. USB Hub 3. Legacy I/O board
0B90h USB Hub not present	1. Check USB Hub connection 2. USB Hub 3. Legacy I/O board
1A00h Drive not present.	1. Check USB Floppy connection 2. USB Floppy 3. Legacy I/O board
1A01h Drive not ready	1. Check for a disk inside the USB Floppy drive 2. Check USB Floppy connection 3. USB Floppy 4. Legacy I/O board

Code/Explanation	FRU/Action
1A02h Get device information failed.	1. Check USB Floppy connection 2. USB Floppy 3. Legacy I/O board
1A03h Medium type failed.	1. Replace the floppy diskette 2. Check USB Floppy connection 3. USB Floppy 4. Legacy I/O board
1A04h Medium not found.	1. Check for a disk inside the USB Floppy drive 2. Check USB Floppy connection 3. USB Floppy 4. Legacy I/O board
1A10h Control test failed.	1. Check USB Floppy connection 2. USB Floppy 3. Legacy I/O board
1A11h Format operation failed.	1. Check for a disk inside the USB Floppy drive 2. Check USB Floppy connection 3. USB Floppy 4. Legacy I/O board
1A12h Speed test failed.	1. Check for a disk inside the USB Floppy drive 2. Check USB Floppy connection 3. USB Floppy 4. Legacy I/O board
1A13h Random R/W sector test failed.	1. Replace the floppy diskette 2. Check USB Floppy connection 3. USB Floppy 4. Legacy I/O board
1A14h Sequential R/W sector test failed.	1. 1. Replace the floppy diskette 2. Check USB Floppy connection 3. USB Floppy 4. Legacy I/O board
1A15h Elevator seek was failed.	1. Replace the floppy diskette 2. Check USB Floppy connection 3. USB Floppy 4. Legacy I/O board
1A16h Change line test failed.	1. Check USB Floppy connection 2. USB Floppy 3. Legacy I/O board
1A20h Drive not present	1. Check USB CDROM connection 2. USB CDROM 3. Legacy I/O board

Code/Explanation	FRU/Action
1A21h Device not ready.	1. Check for a CD inside the USB CDROM drive 2. Check USB CDROM connection 3. USB CDROM 4. Legacy I/O board
1A22h Get device information failed.	1. Check USB CDROM connection 2. USB CDROM 3. Legacy I/O board
1A23h Medium type failed.	1. Check USB CDROM connection 2. USB CDROM 3. Legacy I/O board
1A28h Request sense failed.	1. Check USB CDROM connection 2. USB CDROM 3. Legacy I/O board
1A29h Mode sense failed.	1. Check USB CDROM connection 2. USB CDROM 3. Legacy I/O board
1A30h Control test failed.	1. Check USB CDROM connection 2. USB CDROM 3. Legacy I/O board
1A31h Read data failed.	1. Check USB CDROM connection 2. USB CDROM 3. Legacy I/O board
1A32h Play audio track failed.	1. Check USB CDROM connection 2. USB CDROM 3. Legacy I/O board
1A33h Tray test failed	1. Check USB CDROM connection 2. USB CDROM 3. Legacy I/O board
1302h UHCI Register Test failed.	1. Legacy I/O board
1303h UHCI Status Test failed.	1. Legacy I/O board
1304h UHCI Interrupt Test failed.	1. Legacy I/O board
1305h UHCI Frame Tests failed.	1. Legacy I/O board
1306h UHCI Transfer Descriptor failed.	1. Legacy I/O board
1312h OHCI Register Test failed.	1. Legacy I/O board
1313h OHCI Status Test failed.	1. Legacy I/O board
1314h OHCI Interrupt Test failed.	1. Legacy I/O board
1315h OHCI Frame Tests failed.	1. Legacy I/O board
1316h OHCI Transfer Descriptor failed.	1. Legacy I/O board

Serial port test error codes

Code/Explanation	FRU/Action
0601h Data written to port XXXXh was yyyyh. Data read back from the port was zzzzh.	1. Check connection of loopback if used during test 2. Legacy I/O Board
0602h Interrupt identification register test failed.	1. Legacy I/O Board
0603h Data written to port XXXXh was yyyyh. Data read back from the port was zzzzh.	1. Check connection of loopback if used during test 2. Legacy I/O Board
0604h Line status register test failed at port XXXXh.	1. Legacy I/O Board
0605h Interrupt activation test failed at port XXXXh.	
0606h Data transfer test failed at port XXXXh1.	1. Check connection of loopback if used during test 2. Legacy I/O Board
0607h Loop back test failed at port XXXXh.	1. Check connection of loopback if used during test 2. Legacy I/O Board
0608h FIFO register test failed at port XXXXh.	1. Legacy I/O Board
0609h FIFO trigger level test failed at port XXXXh.	1. Legacy I/O Board
0610h FIFO character timeout indication test failed at port XXXXh.	1. Legacy I/O Board
0611h FIFO data transfer test failed at port XXXXh.	1. Legacy I/O Board
0612h Baud rate speed test failed at port XXXXh.	1. Legacy I/O Board

Parallel port test error codes

Code/Explanation	FRU/Action
0701h Data written to port xxxxh was yyh. Data read back was zzh.	1. Check connection of loopback if used during test 2. Legacy I/O Board
0702h The IRQ activation test failed at xxxxh.	1. Legacy I/O Board
0703h No response from printer.	1. Check connection and condition of printer cable 2. Printer 3. Legacy I/O Board

Code/Explanation	FRU/Action
0704h ECP register W/R failed at port xxxxh	1. Legacy I/O Board
0705h ECP FIFO test failed at port xxxxh	1. Legacy I/O Board
0706h Loopback test failed at port xxxxh	1. Check connection of loopback if used during test 2. Legacy I/O Board
0709h EPP register R/W test failed at port XXXXh.	1. Legacy I/O Board

PS/2 mouse test error codes

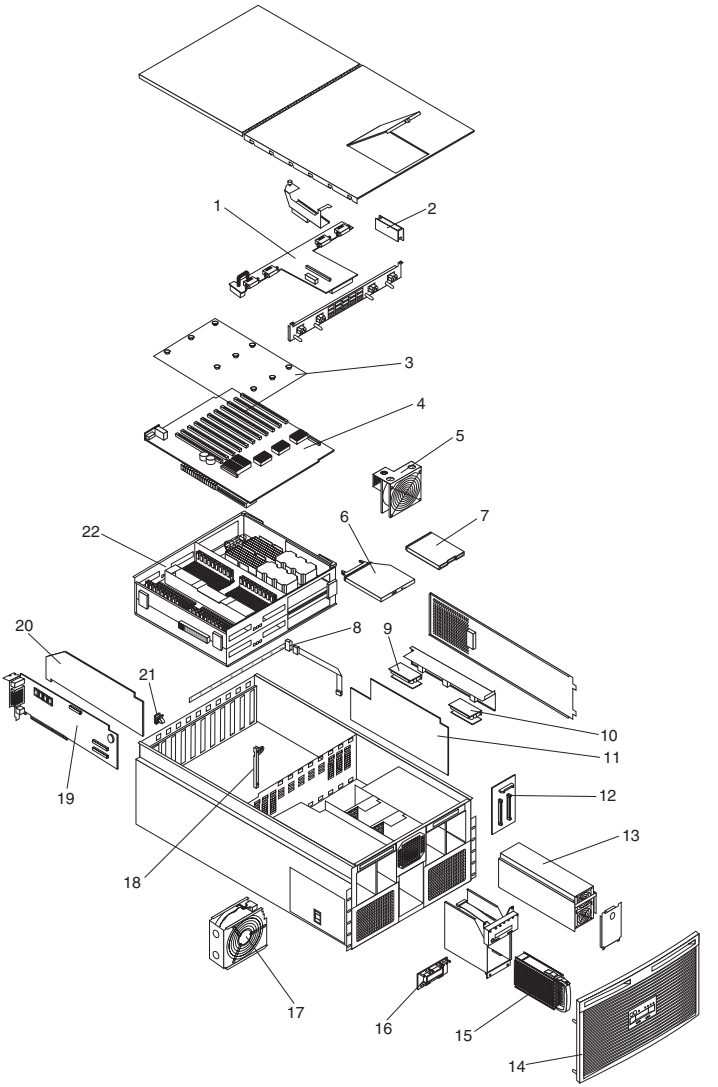
Code/Explanation	FRU/Action
1B00h PS/2 Mouse Self Test Failed	1. Check PS/2 mouse connection 2. Mouse 3. Legacy I/O Board
1B01h PS/2 Mouse Echo Test Failed	1. Check PS/2 mouse connection 2. Mouse 3. Legacy I/O Board
1B02h PS/2 Mouse Remote mode Test Failed	1. Check PS/2 mouse connection 2. Mouse 3. Legacy I/O Board
1B03h PS/2 Mouse failed to respond to the self test	1. Check PS/2 mouse connection 2. Mouse 3. Legacy I/O Board

ACPI test error codes

Code/Explanation	FRU/Action
1702h Invalid ACPI tables	1. Reflash the System BIOS 2. Legacy I/O Board

Parts

This parts listing supports Models 1RX and 2RX of the xSeries 380 server, Type 8683.

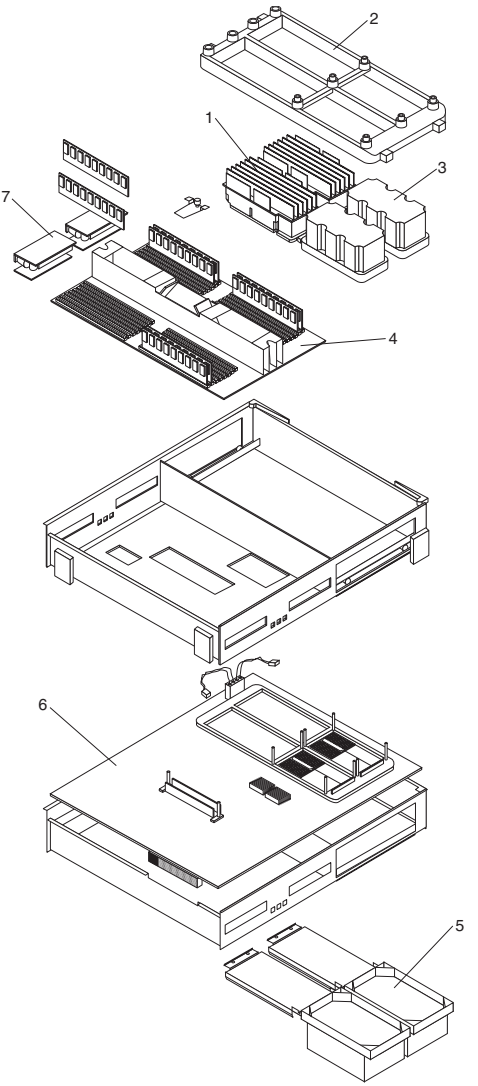


Note: The Intel number may appear on some installed parts and is provided for reference. Use the FRU number when requesting replacement components.

Index	xSeries 380 Type 8683 (Models 1RX, 2RX)	Intel No.	FRU No.
1	T-Docking board	A01949	06P5518
2	12V DC to DC converter	740792-001 715883-001	06P5493
3	I/O base, clear plastic	752607-005	06P5502
4	I/O board	A05938	06P5528
5	120mm fan assembly	716475-004	06P5509
6	CD-ROM drive	A04521-003	06P6370
7	LS-120 diskette drive	A27986-001	06P5546
8	LED board	A20762-211	06P5534
9	3.3V DC to DC converter	740797-001	06P5491
10	5V DC to DC converter	740795-001	06P5492
11	Sideplane board	738275	06P5524
12	SCSI backplane board	737750	06P5530
13	Power supply, 750/800 watt	721568-005 721568-006	06P5494
14	Front bezel	A28813-001	06P5498
15	Hard disk drive	A18534-005	06P5548
16	Front panel board	745764-300	06P5532
17	172mm fan assembly	716473-003	06P5510
18	Card guide	731021-002	06P5542
19	Legacy board	737314	06P5526
20	Card divider	A21985-002	06P5536
21	Rocker switch	A39927-001	06P5554
22	Processor/Memory Complex -- see “Processor/memory complex” on page 252		
	T-Docking cover	A26613-001	24P6715
	Rail Kit	—	31P6030
	Sheet metal kit (sideplane D2D cover; baffle in front of processors; processor/power pod baffle; power supply bay filler panel; top cover; PMC access door; LS120 carrier assembly; CD-ROM carrier assembly; A/C rail; AC connector retainer; hard drive bay; non-hot plug PCI cover; sideplane carrier; memory board D2D retainer; I/O carrier; PMC frames; 12V DVD retention bracket; SCSI connector part - I/O; I/O board handle; and sheetmetal kit bar code)	—	06P5550
	Thermal Sheet Metal Kit (sideplane D2D cover; baffle in front of processors; processor/power pod baffle; power supply bay filler panel; PMC bay access door; and packaging label for kit)	—	06P5552
	Handle	—	06P6368
	Y-Cable	725800-003	06P5460
	CD-ROM Cable	741936-002	06P5461
	LS-120 Cable	741935-00	06P5462

Index	xSeries 380 Type 8683 (Models 1RX, 2RX)	Intel No.	FRU No.
	Internal SCSI Cable	741937-003	06P5463
	Server Management Cable	743186-003	06P5464
	172mm Fan Cable	742226-005	06P5465
	120mm Fan Cable	742227-005	06P5466
	Internal Power Cable	741941-004	06P5467
	Front Panel Cable	743187-001	06P5468
	External SCSI Cable	A30090-001	06P5469
	HPI Cable	743182-006	06P5470
	LH AC Inlet Cable	A38716-003	06P5471
	RH AC Inlet Cable	A38714-002	06P5472

Processor/memory complex



Note: The Intel number may appear on some installed parts and is provided for reference. Use the FRU number when requesting replacement components.

Index	xSeries 380 Type 8683 (Models 1RX, 2RX)	Intel No.	FRU No.
1	Processor, Itanium, 266/733MHz, 2M (Model 1RX)	—	06P5559
1	Processor, Itanium 266/800MHz, 2M (Model 2RX)	—	06P5562
2	Triple beam	738644-006	06P5500
3	Power pod	741455-003	06P5496
4	Memory board	740713	06P5514
5	Thermal blanks	A22015-002	06P5538
6	CPU board	740900	06P5516
7	3.3V DC to DC converter	740797-001	06P5491
	256 MB DIMM		33L3259
	512 MB DIMM		33L3261
	1 GB DIMM		33L3263

Power cords

Power cords for the xSeries 380 are available in three lengths: 1.8 meters, 2.5 meters, and 4.3 meters.

Country/Region	Cord rating	FRU No. 1.8M	2.5M	4.3M
Antigua, Aruba, Bahamas, Barbados, Belize, Bermuda, Bolivia, Brazil, Caicos Island, Canada, Cayman Islands, Costa Rica, Columbia, Dominican Republic, Guam, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Jamaica, Japan, Mexico, Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Saudi Arabia, Thailand, Taiwan, United States, Venezuela	18A/125 Vac	24P6886	24P6887	24P6888
Antigua, Aruba, Bahamas, Barbados, Belize, Bermuda, Bolivia, Brazil, Caicos Island, Canada, Cayman Islands, Costa Rica, Columbia, Dominican Republic, Guam, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Jamaica, Japan, Mexico, Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Taiwan, United States, Venezuela	15A/250 Vac	14F1547	12J5120	14F1548
Afghanistan, Albania, Algeria, Andorra, Angola, Armenia, Austria, Azerbaijan, Belarus, Benin, Belgium, Bosnia, Burkina Faso, Burundi, Cameroon, Cambodia, Cape Verde, Central African Republic, Chad, Congo (Republic of), Comoros, Congo (Democratic Republic of), Cote D'Ivoire (Ivory Coast), Croatia, Czech Rep, Dahomey, Djibouti, Equatorial Guinea, Egypt, Eritrea, Estonia, Ethiopia, Finland, France, French Guyana, French Polynesia, Gabon, Georgia, Germany, Greece, Guadeloupe, Guinea, Guinea Bissau, Hungary, Iceland, Indonesia, Iran, Kazakhstan, Korea (South), Kyrgyzstan, Laos, Latvia, Lebanon, Lithuania, Luxemburg, Macedonia, Madagascar, Mali, Martinique, Mauritania, Mauritius, Mayotte, Moldavia, Monaco, Mongolia, Morocco, Mozambique, Netherlands, New Caledonia, Niger, Nigeria, Norway, Poland, Portugal, Reunion, Romania, Russia, Rwanda, Sao Tome, Saudi Arabia, Senegal, Serbia, Slovakia, Slovenia, Somalia, Spain, Suriname, Sweden, Syria, Tajikistan, Togo, Tunisia, Turkey, Turkmenistan, Ukraine, Upper Volta, USSR (C.I.S.), Uzbekistan, Vanuatu, Vietnam, Wallia and Futuna, Yugoslavia, Zaire	16A/250 Vac	12J5129	55H6643	14F1554
Denmark, Liechtenstein, Switzerland	16A/250 Vac	36L8821	36L8822	36L8823
Israel	16A/250 Vac	12J5121	12J5122	14F1561
Chile, Italy, Libya	16A/250 Vac	12J5125	12J5126	14F1560
Bangladesh, India, Lesotho, Maldives, Namibia, Nepal, Pakistan, Samoa, South Africa, Sri Lanka, Swaziland, Uganda	16A/250 Vac	12J5123	12J5124	14F1557

Country/Region	Cord rating	FRU No. 1.8M	2.5M	4.3M
Bahrain, Brunei, Botswana, Channel Islands, China (Hong Kong S.A.R.), Cyprus, Dominica, Gambia, Ghana, Grenada, Guyana, Iraq, Ireland, Jordan, Kenya, Kuwait, Liberia, Malawi, Malaysia, Malta, Myanmar (Burma), Nigeria, Oman, Qatar, Seychelles, Saint Kitts & Nevis, Saint Lucia, Saint Vincent and the Grenadines, Sierra Leone, Singapore, Sudan, Tanzania, Trinidad & Tobago, United Arab Emirate (Dubai), United Kingdom, Yemen, Zambia, Zimbabwe	13A/250 Vac	12J5986	12J5987	12J5988
Australia, Fiji, New Zealand, Papua New Guinea	15A/250 Vac	12J5127	12J5128	14F1559
China	15A/250 Vac	01K9844	01K9851	01K9852
Argentina, Paraguay, Uruguay	15A/250 Vac	36L8883	36L8884	36L8885

Keyboards (101/102 Key)

Keyboard	FRU No.
US English	37L2551
French Canadian	37L2552
LA Spanish	37L2553
Brazil/Portuguese	37L2554
Arabic	37L2555
Belgium/French	37L2556
Belgium/UK	37L2557
Bulgarian	37L2558
Czech	37L2559
Danish	37L2560
Dutch	37L2561
French	37L2562
German	37L2563
Greek	37L2564
Hebrew	37L2565
Hungarian	37L2566
Iceland	37L2567
Italy	37L2568
Norwegian	37L2569
Polish	37L2570
Portuguese	37L2571
Romanian	37L2572
Russian	37L2573
Serbian/Cyrillic	37L2574
Slavic	37L2575
Spanish	37L2576
Swedish/Finn	37L2577
Swiss, F/G	37L2578
Turkish	37L2579
Turkish	37L2580
UK English	37L2581
Yugosl/Lat	37L2582
US English-EMEA	37L2583
Japanese	37L2584
Chinese/US	37L2585
Thailand	37L2587
French Canadian	37L0913

Related service information

Note: 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 manual.

Safety information

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

Safety notices (multi-lingual translations)

The caution and danger safety notices in this section are provided in the following languages:

- English
- Brazilian/Portuguese
- Chinese
- French
- German
- Italian
- Korean
- Spanish

Important: All caution and danger statements in this IBM documentation begin with a number. This number is used to cross reference an English caution or danger statement with translated versions of the caution or danger statement in this section.

For example, if a caution statement begins with a number 1, translations for that caution statement appear in this section under statement 1.

Be sure to read all caution and danger statements before performing any of the instructions.

Statement 1

DANGER

Electrical current from power, telephone, and communication cables is hazardous. To avoid a shock hazard:

- **Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.**
- **Connect all power cords to a properly wired and grounded electrical outlet.**
- **Connect to properly wired outlets any equipment that will be attached to this product.**
- **When possible, use one hand only to connect or disconnect signal cables.**
- **Never turn on any equipment when there is evidence of fire, water, or structural damage.**
- **Disconnect the attached power cords, telecommunications systems, networks, and modems before you open the device covers, unless instructed otherwise in the installation and configuration procedures.**

To connect:	To disconnect:
1. Turn everything OFF.	1. Turn everything OFF.
2. First, attach all cables to devices.	2. First, remove power cords from outlet.
3. Attach signal cables to connectors.	3. Remove signal cables from connectors.
4. Attach power cords to outlet.	4. Remove all cables from devices.
5. Turn device ON.	

Statement 2

CAUTION:

When replacing the lithium battery, use only IBM Part Number 33F8354 or an equivalent type battery recommended by the manufacturer. If your system has a module containing a lithium battery, replace it only with the same module type made by the same manufacturer. The battery contains lithium and can explode if not properly used, handled, or disposed of.

Do not:

- **Throw or immerse into water.**
- **Heat to more than 100°C (212°F)**
- **Repair or disassemble**

Dispose of the battery as required by local ordinances or regulations.

Statement 3

CAUTION:

When laser products (such as CD-ROMs, DVD drives, fiber optic devices, or transmitters) are installed, note the following:

- **Do not remove the covers. Removing the covers of the laser product could result in exposure to hazardous laser radiation. There are no serviceable parts inside the device.**
- **Use of controls or adjustments or performance of procedures other than those specified herein might result in hazardous radiation exposure.**

DANGER

Some laser products contain an embedded Class 3A or Class 3B laser diode. Note the following. Laser radiation when open. Do not stare into the beam, do not view directly with optical instruments, and avoid direct exposure to

Class 1 Laser Product
Laser Klasse 1
Laser Klass 1
Luokan 1 Laserlaite
Appareil À Laser de Classe 1

Statement 4

≥18 kg (37 lbs)

≥32 kg (70.5 lbs)

≥55 kg (121.2 lbs)

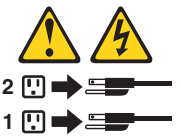
CAUTION:

Use safe practices when lifting.

Statement 5

CAUTION:

The power control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.



Statement 6

CAUTION:
If you install a strain-relief bracket option over the end of the power cord that is connected to the device, you must connect the other end of the power cord to an easily accessible power source.

Statement 8

CAUTION:

Never remove the cover on a power supply or any part that has the following label attached.

Hazardous voltage, current, and energy levels are present inside any component that has this label attached. There are no serviceable parts inside these components. If you suspect a problem with one of these parts, contact a service technician.

Statement 10

CAUTION:
Do not place any object weighing more than 82 kg (180 lbs.) on top of rack-mounted devices.

Statement 13

DANGER

Overloading a branch circuit is potentially a fire hazard and a shock hazard under certain conditions. To avoid these hazards, ensure that your system electrical requirements do not exceed branch circuit protection requirements. Refer to the information that is provided with your IBM device for electrical

Statement 14

CAUTION:
Hazardous voltage, current, and energy levels might be present. Only a qualified service technician is authorized to remove the covers where the following label is attached.

Statement 15

CAUTION:
Make sure that the rack is secured properly to avoid tipping when the server unit is extended.

Statement 16

CAUTION:
Some accessory or option board outputs exceed Class 2 or limited power source limits and must be installed with appropriate interconnecting cabling in accordance with the national electric code.

Statement 17

The following label indicates moving parts nearby:

Importante:

Todas as instruções de cuidado e perigo da *Server Library* começam com um número. Este número é utilizado para fazer referência cruzada de uma instrução de cuidado ou perigo no idioma inglês com as versões traduzidas das instruções de cuidado ou perigo encontradas nesta seção.

Por exemplo, se uma instrução de cuidado é iniciada com o número 1, as traduções para aquela instrução de cuidado aparecem nesta seção sob a instrução 1.

Certifique-se de ler todas as instruções de cuidado e perigo antes de executar qualquer operação.

Instrução 1


PERIGO

A corrente elétrica proveniente de cabos de alimentação, de telefone e de comunicações é perigosa.

Para evitar risco de choque:

- Não conecte ou desconecte cabos e não realize instalação, manutenção ou reconfiguração deste produto durante uma tempestade com raios.
- Conecte todos os cabos de alimentação a tomadas elétricas corretamente instaladas e aterradas.
- Conecte todos os equipamentos ao qual esse produto será conectado a tomadas corretamente instaladas.
- Sempre que possível, utilize apenas uma das mãos para conectar ou desconectar cabos de sinal.
- Nunca ligue qualquer equipamento quando existir evidência de danos por fogo, água ou na estrutura.
- Desconecte cabos de alimentação, sistemas de telecomunicação, redes e modems antes de abrir as tampas dos dispositivos, a menos que especificado de maneira diferente nos procedimentos de instalação e configuração.
- Conecte e desconecte cabos conforme descrito na seguinte tabela, ao instalar ou movimentar este produto ou os dispositivos conectados, ou ao abrir suas tampas.

Para Conectar:	Para Desconectar:
1. DESLIGUE Tudo. 2. Primeiramente, conecte todos os cabos aos dispositivos. 3. Conecte os cabos de sinal aos conectores. 4. Conecte os cabos de alimentação às tomadas. 5. LIGUE os dispositivos.	1. DESLIGUE Tudo. 2. Primeiramente, remova os cabos de alimentação das tomadas. 3. Remova os cabos de sinal dos conectores. 4. Remova todos os cabos dos dispositivos.

Instrução 2

CUIDADO:

Ao substituir a bateria de lítio, utilize apenas uma bateria IBM, Número de Peça 33F8354 ou uma bateria de tipo equivalente, recomendada pelo fabricante. Se o seu sistema possui um móídulo com uma bateria de lítio, substitua-o apenas pelo mesmo tipo de módulo, do mesmo fabricante. A bateria contém lítio e pode explodir se não for utilizada, manuseada e descartada de maneira correta.

Não:

- Jogue ou coloque na água
- Aqueça a mais de 100°C (212°F)
- Conserte nem desmonte

Para descartar a bateria, entre em contato com a área de atendimento a clientes IBM, pelo telefone (011) 889-8986, para obter informações sobre como enviar a bateria pelo correio para a IBM.

Instrução 3

PRECAUCIÓN:

Quando produtos a laser (unidades de CD-ROM, unidades de DVD, dispositivos de fibra ítica, transmissores, etc.) estiverem instalados, observe o seguinte:

- Não remova as tampas. A remoção das tampas de um produto a laser pode resultar em exposição prejudicial à radiação de laser. Nenhuma peça localizada no interior do dispositivo pode ser consertada.
- A utilização de controles ou ajustes ou a execução de procedimentos diferentes dos especificados aqui pode resultar em exposição prejudicial à radiação.

PERIGO

Alguns produtos a laser contêm um diodo laser da Classe 3A ou Classe 3B embutido. Observe o seguinte:

Radiação de laser quando aberto. Não olhe diretamente para o raio a olho nu ou com instrumentos íticos, e evite exposição direta ao raio.

Instrução 4

≥18 kg (37 lbs)

≥32 kg (70.5 lbs)

≥55 kg (121.2 lbs)

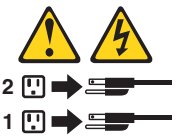
CUIDADO:

Ao levantar a máquina, faça-o com segurança.

Instrução 5

CUIDADO:

Os botões Liga/Desliga localizados no dispositivo e na fonte de alimentação não desligam a corrente elétrica fornecida ao dispositivo. O dispositivo também pode ter mais de um cabo de alimentação. Para remover toda a corrente elétrica do dispositivo, assegure que todos os cabos de alimentação estejam desconectados da fonte de energia elétrica.



Instrução 6

CUIDADO:

Se um opcional de suporte eliminador de tensão estiver instalado na extremidade do cabo de alimentação conectada ao dispositivo, conect a outra extremidade do cabo a uma fonte de energia de fácil acesso.

Instrução 8

CUIDADO:

Nunca remova a tampa de uma fonte de alimentação ou de qualquer peça que tenha esta etiqueta afixada.

Níveis perigosos de voltagem, corrente e energia estão presentes em qualquer componente que tenha esta etiqueta afixada. Nenhuma peça localizada no interior desses componentes pode ser consertada. Se você suspeitar de algum problema em alguma dessas peças, entre em contato com um técnico IBM.

Instrução 10

CUIDADO:

Não coloque nenhum objeto com peso superior a 82 kg (180 lbs.) sobre dispositivos montados em rack.

Instrução 13

PRECAUCIÓN:

A sobrecarga em um circuito derivado apresenta um risco potencial de incêndio e de choque sob determinadas condi ções. Para evitar estes riscos, assegure que os requisitos elétricos de seu sistema não excedam os requisitos de prote ção do circuito derivado. Para conhecer as especifica ções elétricas, consulte as informa ções fornecidas com seu dispositivo IBM.

Instrução 14

CUIDADO:

Níveis perigosos de voltagem, corrente e energia podem estar presentes. Apenas um técnico qualificado de manutenção está autorizado a remover as tampas em que esta etiqueta esteja afixada.

Instrução 15

CUIDADO:

Assegure que o rack esteja preso adequadamente, para evitar que ele se incline quando a unidade do servidor for estendida.

Instrução 16

CUIDADO:

Algumas saídas de acessórios ou de placas opcionais excedem os limites da Classe 2 ou da fonte de alimentação e devem ser instalados com os cabos de interconexão apropriados, em conformidade com as normas elétricas nacionais.

Instrução 17

CUIDADO:

O seguinte rótulo indica movimento de partes próximas.

重要：

Server Library 中的所有提醒和危险条款前都有一个数字标识。该数字是用来交叉引用一个英文的提醒和危险条款及本部分中的与之对应的已翻译成其它文字的提醒和危险条款。

例如，如果一个提醒条款前的数字为 1，则本部分中相应的译文也带有标号 1。

在执行任何指示的操作之前，请确保您已经阅读了全部提醒和危险条款。

声明 1

危险

电源、电话和通信电缆中带有危险电流。

为避免电击：

雷电期间不要拆接电缆或安装、维修及重新配置本产品。

将所有电源线连接至正确布线并已安全接地的电源插座上。

将应与本产品连接的所有设备连接至正确布线的插座上。

尽量只使用单手拆接信号电缆。

有水、火及结构损坏迹象时，请勿打开任何设备。

除非在安装配置过程中有明确指示，否则，打开设备机盖前应先断开与电源线、远程通信系统、网络和调制解调器的所有连接。

安装、移动或打开本产品及其附带设备的机盖时，应按下表所述连接和断开电缆。

连接时：	断开连接时：
1. 关闭所有设备。	1. 关闭所有设备。
2. 首先将所有电缆连接至设备。	2. 首先从插座中拔出电源线。
3. 将信号电缆连接至接口。	3. 从接口上拔下信号电缆。
4. 将电源线连接至插座。	

声明 2

警告：

更换锂电池时，只能使用 IBM 产品号 33F8354 或者是厂商推荐的等同类型的电池。

如果系统模块中含有锂电池，则只能使用同一厂商制造的同一类型的模块进行更换。电池中含有锂，如果使用、掌放或处理不当，可能会发生爆炸。

请勿对电池进行下列操作：
扔入或浸入水电
加热超过 100 （212 F）
进行修理或分解
请按本地法规要求处理电池。

声明 3

警告：

安装激光产品（如 CD-ROM、DVD 驱动器、光纤设备或送话器）时，应注意以下事项：

不要拆除外盖，拆除激光产品的外盖可能会导致激光辐射的危险，本设备中没有用户可维修的部件。

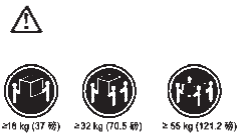
非此处指定的其它控制、调整或与性能有关的操作都有可能导致激光辐射的危险。

危险

某些激光产品中包含内嵌的 3A 级或 3B 级激光二极管，请注意以下事项。

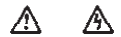
打开时会产生激光辐射。不要直视光束，不要使用光学仪器直接观看光束，避免直接暴露于光束之下。

声明 4



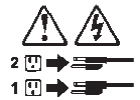
警告：
抬起时请采用安全操作方法。

声明 5



警告：

使用设备上的电源控制按钮和电源上的开关都不能断开本设备上的电流。另外，本设备可能带有多条电源线。如要断开设备上的所有电流，请确保所有电源线均已与电源断开连接。



声明 6

警告：

如果在电源线连接设备的一端安装了固定松紧夹，则必须将电源线的另一端连接至使用方便的电源。

声明 7

警告：

如果设备带有外门，则在移动或抬起设备前应将其拆除或固定以避免造成人员伤害。外门支撑不了设备的重量。

声明 8

警告：
不要拆除电源外盖或贴有下列标签的任何部件。

贴有此标签的组件内部存在高电压、高电流的危险。这些组件中没有用户可维修的部件。如果怀疑其中的部件存在问题，应与服务技术人员联系。

声明 9

警告：

为避免人员伤害，拆除设备上的风扇前应拔下热插拔风扇电缆。

声明 10

警告：

机柜安装的设备上面不能放置重于 82kg（180 磅）的物品。

>82 kg (180 磅)

声明 11

警告：

下面的标签表明附近有锋利的边、角或接头。

声明 12

警告：
下面的标签表明附近有高热表面。

声明 13

危险

分支电路过载在某些情况下可能导致火灾和电击。 为避免这些危险，请确保您系统的电力需求不超出分支电路保护需求。请参阅随 **IBM** 设备提供的信息以了解电气规范。

声明 14

注意：
可能存在危险的电压、电流和能级。
只有合格的维修技术人员才可打开贴有以下标签的舱盖。

声明 15

注意：
请确保机架安装牢靠，以防扩展服务器机组时翻倾。

声明 16

注意：
某些附件或选件电路板的输出超出 **2** 级或有限电源限制，因此务必依据国家电气法规安装相应的中继电缆。

- 声明 17

小心：
下列标签表示附近有移动部件。

重要資訊：

Server Library 中所有「注意」及「危險」的聲明均以數字開始。此一數字是用來作為交互參考之用，英文「注意」或「危險」聲明可在本節中找到相同內容的「注意」或「危險」聲明的譯文。

例如，有一「危險」聲明以數字 1 開始，則該「危險」聲明的譯文將出現在本節的「聲明」1 中。

執行任何指示之前，請詳讀所有「注意」及「危險」的聲明。

聲明 1

危險

電源、電話及通信電纜上所產生的電流均有危險性。

欲避免電擊危險：

- 在雷雨期間，請勿連接或切斷本產品上的任何電纜線，或安裝、維修及重新架構本產品。
- 請將電源線接至接線及接地正確的電源插座。
- 請將本產品隨附的設備連接至接線正確的插座。
- 儘可能使用單手來連接或切斷信號電纜線。
- 當設備有火燒或泡水的痕跡，或有結構性損害時，請勿開啓該設備的電源。
- 在安裝及架構之時，若非非常熟悉，在開啓裝置蓋子之前，請切斷電源線、電信系統、網路及數據機。
- 在安裝、移動本產品或附加裝置，或開啓其蓋子時，請依照下表中「連接」及「切斷」電纜線的步驟執行。

連接：	切斷：
1. 關閉所有開關。	1. 關閉所有開關。
2. 先將所有電纜線接上裝置。	2. 先自電源插座拔掉電源線。
3. 將信號電纜接上接頭。	3. 拔掉接頭上的所有信號電纜。
4. 再將電源線接上電源插座。	4. 再拔掉裝置上的所有電纜線。
5. 開啓裝置的電源。	

聲明 2

注意：

更換鋰電池時，只可使用 IBM 零件編號 33F8354 的電池，或製造商建議之相當類型的電池。若系統中具有包含鋰電池的模組，在更換此模組時，請使用相同廠商製造的相同模組類型。如未正確使用、處理或丟棄含有鋰的電池時，可能會引發爆炸。

請勿將電池：

- 丟入或浸入水中
- 加熱超過 100 ℃ (212 ℉)
- 修理或拆開

請遵照當地法令規章處理廢棄電池。

聲明 3

注意：

安裝雷射產品 (如 CD-ROM、DVD 光碟機、光纖裝置或發射器) 時，請注意下列事項：

- 請勿移開蓋子。移開雷射產品的蓋子，您可能會暴露於危險的雷射輻射之下。裝置中沒有需要維修的組件。
- 不依此處所指示的控制、調整或處理步驟，您可能會暴露於危險的輻射之下。

危險

有些雷射產品含有內嵌式 Class 3A 或 Class 3B 雷射二極體。請注意下列事項：

開啓時會產生雷射輻射。請勿凝視光束，不要使用光學儀器直接觀察，且應避免直接暴露在光束下。

聲明 4

≥ 18 公斤 (37 磅)

≥ 32 公斤 (70.5 磅)

≥ 55 公斤 (121.2 磅)

注意：

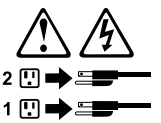
抬起裝置時，請注意安全措施。

聲明 5

注意：

裝置上的電源控制按鈕及電源供應器上的電源開關均無法關閉裝置上的電流。

本裝置可能有一條以上的電源線。如要移除裝置上的所有電流，請確認所有電源線已與電源分離。



聲明 6

注意：
若您在電源線與裝置連接的一端安裝了鬆緊托架選用配備，您便必須將電源線的另一端接至容易插上或拔掉的電源上。

聲明 8

注意：
嚴禁移除電源供應器的蓋子，或任何貼有下列標籤的組件。

貼有此標籤的元件內均有危險的電壓、電流及能源。這些元件中沒有需要維修的組件。若察覺問題發生在上述組件時，請與服務人員聯絡。

聲明 10

注意：
請勿將任何重量超過 82 公斤 (180 磅) 的物品置於已安裝機架的裝置上方。

>82 公斤 (180 磅)

聲明 13

危險

分支電路超載可能會引發火災，在特定情況下會有電擊之虞。為避免這些危險發生，請確定您的系統電力需求不超過分支電路的保護需求。請參閱 IBM 電力規格裝置所附的資訊。

聲明 14

注意：
可能會有危險的電壓、電流或能源量。僅授權合格的維修技師在貼上以下標籤之處移除外殼。

聲明 15

注意：
請確定已固定好機架，以免拉出伺服器裝置時造成傾斜。

聲明 16

注意：
部份配件或選購機板的輸出超過 Class 2 或電源限制，
必須安裝符合全國電工法規的適當互相連接電纜。

聲明 17

注意：

下面標誌表示請注意周圍可能會鬆落的零件。

Important:

Toutes les consignes Attention et Danger indiquées dans la bibliothèque *Server* sont précédées d'un numéro. Ce dernier permet de mettre en correspondance la consigne en anglais avec ses versions traduites dans la présente section.

Par exemple, si une consigne de type Attention est précédée du chiffre 1, ses traductions sont également précédées du chiffre 1 dans la présente section.

Prenez connaissance de toutes les consignes de type Attention et Danger avant de procéder aux opérations décrites par les instructions.

Notice n° 1

DANGER

Le courant électrique passant dans les câbles de communication, ou les cordons téléphoniques et d'alimentation peut être dangereux.

Pour éviter tout risque de choc électrique:

- Ne manipulez aucun câble et n'effectuez aucune opération d'installation, d'entretien ou de reconfiguration de ce produit au cours d'un orage.
- Branchez tous les cordons d'alimentation sur un socle de prise de courant correctement câblé et mis à la terre.
- Branchez sur des socles de prise de courant correctement câblés tout équipement connecté à ce produit.
- Lorsque cela est possible, n'utilisez qu'une seule main pour connecter ou déconnecter les câbles d'interface.
- Ne mettez jamais un équipement sous tension en cas d'incendie ou d'inondation, ou en présence de dommages matériels.
- Avant de retirer les carters de l'unité, mettez celle-ci hors tension et déconnectez ses cordons d'alimentation, ainsi que les câbles qui la relient aux réseaux, aux systèmes de télécommunication et aux modems (sauf instruction contraire mentionnée dans les procédures d'installation et de configuration).
- Lorsque vous installez ou que vous déplacez le présent produit ou des périphériques qui lui sont raccordés, reportez-vous aux instructions ci-dessous pour connecter et déconnecter les différents cordons.

Connexion	Déconnexion
1. Mettez les unités hors tension. 2. Commencez par brancher tous les cordons sur les unités. 3. Branchez les câbles d'interface sur des connecteurs. 4. Branchez les cordons d'alimentation sur des prises. 5. Mettez les unités sous tension.	1. Mettez les unités hors tension. 2. Débranchez les cordons d'alimentation des prises. 3. Débranchez les câbles d'interface des connecteurs. 4. Débranchez tous les câbles des unités.

Notice n° 2

ATTENTION:

Remplacez la pile au lithium usagée par une pile de référence identique exclusivement - voir la référence IBM - ou par une pile équivalente recommandée par le fabricant. Si votre système est doté d'un module contenant une pile au lithium, vous devez le remplacer uniquement par un module identique, produit par le même fabricant. La pile contient du lithium et présente donc un risque d'explosion en cas de mauvaise manipulation ou utilisation.

- **Ne la jetez pas à l'eau.**
- **Ne l'exposez pas à une température supérieure à 100 °C.**
- **Ne cherchez pas à la réparer ou à la démonter.**

Pour la mise au rebut, reportez-vous à la réglementation en vigueur.

Notice n° 3

ATTENTION:

Si des produits laser sont installés (tels que des unités de CD-ROM ou de DVD, des périphériques contenant des fibres optiques ou des émetteurs-récepteurs), prenez connaissance des informations suivantes:

- **N'ouvrez pas ces produits pour éviter une exposition directe au rayon laser. Vous ne pouvez effectuer aucune opération de maintenance à l'intérieur.**
- **Pour éviter tout risque d'exposition au rayon laser, respectez les consignes de réglage et d'utilisation des commandes, ainsi que les procédures décrites dans le présent document.**

DANGER

Certains produits laser contiennent une diode laser de classe 3A ou 3B. Prenez connaissance des informations suivantes:

Rayonnement laser lorsque le carter est ouvert. évitez de regarder fixement le faisceau ou de l'observer à l'aide d'instruments optiques. évitez une exposition directe au rayon.

Notice n° 4

≥18 kg (37 lbs)

≥32 kg (70.5 lbs)

≥55 kg (121.2 lbs)

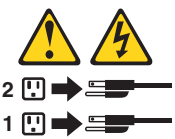
ATTENTION:

Faites-vous aider pour soulever ce produit.

Notice n° 5

ATTENTION:

Le bouton de mise sous tension/hors tension de l'unité et l'interrupteur d'alimentation du bloc d'alimentation ne coupent pas l'arrivée de courant électrique à l'intérieur de la machine. Il se peut que votre unité dispose de plusieurs cordons d'alimentation. Pour isoler totalement l'unité du réseau électrique, débranchez tous les cordons d'alimentation des socles de prise de courant.



Notice n° 6

ATTENTION:

Si vous installez un guide-câble sur l'extrémité du cordon d'alimentation qui est branchée sur l'unité, vous devez brancher l'autre extrémité de ce cordon sur une prise de courant électriq facile d'accès.

Notice n° 8

ATTENTION:

N'ouvrez jamais le bloc d'alimentation ou tout élément sur lequel e apposée l'étiquette ci-dessous.

Des tensions et des courants dangereux sont présents à l'intérie de tout composant sur lequel est apposée cette étiquette. Ces éléments ne peuvent pas être réparés. Si vous pensez qu'ils peuvent être à l'origine d'un incident, prene contact avec un technicien de maintenance.

Notice n° 10

ATTENTION:

Ne posez pas d'objet dont le poids dépasse 82 kg sur les unités montées en armoire.

Notice n° 13

DANGER

La surcharge d'un circuit de dérivation peut entraîner un risque d'incendie ou de choc électrique sous certaines conditions. Pour éviter ces risques, assurez-vous que les besoins électriques de votre système ne sont pas supérieurs aux capacités de votre circuit de dérivation. Pour les spécifications électriques, reportez-vous aux informations fournies avec votre unité IBM.

Notice n° 14

ATTENTION:

Des tensions et des courants dangereux peuvent être présents. Seul un technicien de maintenance qualifié est autorisé à retirer les carters signalés par l'étiquette ci-dessous.

Notice n° 15

ATTENTION:

Assurez-vous que l'armoire est solidement fixée pour éviter qu'elle ne bascule lorsque le serveur est sorti.

Notice n° 16

ATTENTION:

Certaines sorties d'accessoires ou de cartes d'options dépassent la classe 2 ou les limites de source d'alimentation restreinte et doivent être installées avec des câbles d'interconnexion adéquats conformes aux normes électriques nationales.

Notice n° 17

ATTENTION:

L'étiquette suivante indique la présence de pièces en mouvement.

Wichtig:

Alle Sicherheitshinweise in dieser *Server-Bibliothek* beginnen mit einer Nummer. Diese Nummer verweist auf einen englischen Sicherheitshinweis mit den übersetzten Versionen dieses Hinweises in diesem Abschnitt.

Wenn z. B. ein Sicherheitshinweis mit der Nummer 1 beginnt, so erscheint die übersetzung für diesen Sicherheitshinweis in diesem Abschnitt unter dem Hinweis 1.

Lesen Sie alle Sicherheitshinweise, bevor Sie eine Anweisung ausführen.

Hinweis 1


VORSICHT

Elektrische Spannungen von Netz-, Telefon- und Datenübertragungsleitungen sind gefährlich.

Aus Sicherheitsgründen:

- Bei Gewitter an diesem Gerät keine Kabel anschließen oder lösen. Ferner keine Installations-, Wartungs- oder Rekonfigurationsarbeiten durchführen.
- Gerät nur an eine Schutzkontaktsteckdose mit ordnungsgemäß geerdetem Schutzkontakt anschließen.
- Alle angeschlossenen Geräte ebenfalls an Schutzkontaktsteckdosen mit ordnungsgemäß geerdetem Schutzkontakt anschließen.
- Signalkabel möglichst einhändig anschließen oder lösen.
- Keine Geräte einschalten, wenn die Gefahr einer Beschädigung durch Feuer, Wasser oder andere Einflüsse besteht.
- Die Verbindung zu den angeschlossenen Netzkabeln, Telekommunikationssystemen, Netzwerken und Modems ist vor dem öffnen des Gehäuses zu unterbrechen. Es sei denn, dies ist in den zugehörigen Installations- und Konfigurationsprozeduren anders angegeben.
- Nur nach den nachfolgend aufgeführten Anweisungen arbeiten, die für Installation, Transport oder öffnen von Gehäusen von Personal Computern oder angeschlossenen Einheiten gelten.

Kabel anschließen:	Kabel lösen:
1. Alle Geräte ausschalten und Netzstecker ziehen. 2. Zuerst alle Kabel an Einheiten anschließen. 3. Signalkabel an Anschlußbuchsen anschließen. 4. Netzstecker an Steckdose anschließen. 5. Gerät einschalten.	1. Alle Geräte ausschalten. 2. Zuerst Netzstecker von Steckdose lösen. 3. Signalkabel von Anschlußbuchsen lösen. 4. Alle Kabel von Einheiten lösen.

Hinweis 2

ACHTUNG:

Eine verbrauchte Batterie nur durch eine Batterie mit der IBM Teilenummer 33F8354 oder durch eine vom Hersteller empfohlene Batterie ersetzen. Wenn Ihr System ein Modul mit einer Lithium-Batterie enthält, ersetzen Sie es immer mit dem selben Modultyp vom selben Hersteller. Die Batterie enthält Lithium und kann bei unsachgemäßer Verwendung, Handhabung oder Entsorgung explodieren.

Die Batterie nicht:

- mit Wasser in Berührung bringen.
- über 100 C erhitzen.
- reparieren oder zerlegen.

Die örtlichen Bestimmungen für die Entsorgung von Sondermüll beachten.

Hinweis 3

ACHTUNG:

Wenn ein Laserprodukt (z. B. CD-ROM-Laufwerke, DVD-Laufwerke, Einheiten mit Glasfaserkabeln oder Transmitter) installiert ist, beachten Sie folgendes.

- Das Entfernen der Abdeckungen des CD-ROM-Laufwerks kann zu gefährlicher Laserstrahlung führen. Es befinden sich keine Teile innerhalb des CD-ROM-Laufwerks, die vom Benutzer gewartet werden müssen. Die Verkleidung des CD-ROM-Laufwerks nicht öffnen.
- Steuer- und Einstellelemente sowie Verfahren nur entsprechend den Anweisungen im vorliegenden Handbuch einsetzen. Andernfalls kann gefährliche Laserstrahlung auftreten.

VORSICHT

Manche CD-ROM-Laufwerke enthalten eine eingebaute Laserdiode der Klasse 3A oder 3B. Die nachfolgend aufgeführten Punkte beachten.

Laserstrahlung bei geöffneter Tür. Niemals direkt in den Laserstrahl sehen, nicht direkt mit optischen Instrumenten betrachten und den Strahlungsbereich meiden.

Hinweis 4

≥18 kg (37 lbs)

≥32 kg (70.5 lbs)

≥55 kg (121.2 lbs)

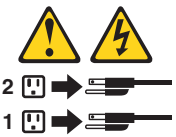
ACHTUNG:

Beim Anheben der Maschine die vorgeschriebenen Sicherheitsbestimmungen beachten.

Hinweis 5

ACHTUNG:

Mit dem Betriebsspannungsschalter an der Vorderseite des Servers und dem Betriebsspannungsschalter am Netzteil wird die Stromversorgung für den Server nicht unterbrochen. Der Server könnte auch mehr als ein Netzkabel aufweisen. Um die gesamte Stromversorgung des Servers auszuschalten, muß sichergestellt werden, daß alle Netzkabel aus den Netzsteckdosen herausgezogen wurden.



Hinweis 6

ACHTUNG:

Wenn am Netzkabel, das an die Einheit angeschlossen ist, eine Kabelhalterung angebracht wird, muss der Server an eine leicht zugängliche Netzsteckdose angeschloss werden.

Hinweis 8

ACHTUNG:

Die Abdeckung oder eine Komponente eines Netzteils, die wie nachfolgend aufgeführt gekennzeichnet ist, darf keinesfalls entfernt werden.

In Komponenten, die so gekennzeichnet sind, können gefährliche Spannungen anliegen. In diesen Komponenten sind keine Teile vorhanden, die vom Benutzer gewartet werden müssen. Besteht der Verdacht, dass an einem dieser Teile ein Fehler aufgetreten ist, ist ein IBM Kundendiensttechniker zu verständigen.

Hinweis 10

ACHTUNG:

Keine Gegenstände, die mehr als 82 kg wiegen, auf Rack-Einheiten ablegen.

Hinweis 13

VORSICHT

Durch überlastung des Netzstromkreises besteht unter bestimmten Bedingungen die Gefahr eines Brandes und eines elektrischen Schlages. Um solche Gefahrenquellen zu vermeiden, sollten Sie daher sicherstellen, dass die Spannungswerte Ihres Systems nicht über den aus Sicherheitsgründen festgelegten Werten des Netzstromkreises liegen. Weitere Informationen hierzu finden Sie in der Dokumentation, die Sie zusammen mit der IBM Einheit erhalten haben.

Hinweis 14

ACHTUNG:

Es können gefährliche Spannungen und Ströme auftreten. Die Abdeckungen, die durch folgendes Etikett gekennzeichnet sind, dürfen nur von einem qualifizierten Mitarbeiter des technischen Kundendienstes entfernt werden.

Hinweis 15

ACHTUNG:

Stellen Sie sicher, dass das Rack ordnungsgemäss befestigt ist, damit es nicht kippt, wenn die Server-Einheit herausgezogen wird.

Hinweis 16

ACHTUNG:

Einige Ausgaben einer Zusatzplatine überschreiten die eingeschränkten Spannungswerte bzw. die Werte der Klasse 2. Diese müssen daher mit geeigneten Kabeln gemäss den nationalen Spannungswerten angeschlossen werden.

Hinweis 17

ACHTUNG:

Der folgende Aufkleber weist auf nahegelegene bewegliche Teile hin.

Importante:

Tutti gli avvisi di attenzione e di pericolo riportati nella pubblicazione *Server Library* iniziano con un numero. Questo numero viene utilizzato per confrontare avvisi di attenzione o di pericolo in inglese con le versioni tradotte riportate in questa sezione.

Ad esempio, se un avviso di attenzione inizia con il numero 1, la relativa versione tradotta è presente in questa sezione con la stessa numerazione.

Prima di eseguire una qualsiasi istruzione, accertarsi di leggere tutti gli avvisi di attenzione e di pericolo.

Avviso 1


PERICOLO

La corrente elettrica circolante nei cavi di alimentazione, del telefono e di segnale è pericolosa.

Per evitare il pericolo di scosse elettriche:

- Non collegare o scollegare i cavi, non effettuare l'installazione, la manutenzione o la riconfigurazione di questo prodotto durante i temporali.
- Collegare tutti i cavi di alimentazione ad una presa elettrica correttamente cablata e munita di terra di sicurezza.
- Collegare qualsiasi apparecchiatura collegata a questo prodotto ad una presa elettrica correttamente cablata e munita di terra di sicurezza.
- Quando possibile, collegare o scollegare i cavi di segnale con una sola mano.
- Non accendere qualsiasi apparecchiatura in presenza di fuoco, acqua o se sono presenti danni all'apparecchiatura stessa.
- Scollegare i cavi di alimentazione, i sistemi di telecomunicazioni, le reti e i modem prima di aprire i coperchi delle unità, se non diversamente indicato nelle procedure di installazione e configurazione.
- Collegare e scollegare i cavi come descritto nella seguente tabella quando si effettuano l'installazione, la rimozione o l'apertura dei coperchi di questo prodotto o

  delle unità collegate.

Per collegare:	Per scollegare:
1. SPEGNERE tutti i dispositivi.	1. SPEGNERE tutti i dispositivi.
2. Collegare prima tutti i cavi alle unità.	2. Rimuovere prima i cavi di alimentazione dalle prese elettriche.
3. Collegare i cavi di segnale ai connettori.	3. Rimuovere i cavi di segnale dai connettori.
4. Collegare i cavi di alimentazione alle prese elettriche.	4. Rimuovere tutti i cavi dalle unità.
5. ACCENDERE le unità.	

Avviso 2

ATTENZIONE:

Quando si sostituisce la batteria al litio, utilizzare solo una batteria IBM con numero parte 33F8354 o batterie dello stesso tipo o di tipo equivalente consigliate dal produttore. Se il sistema di cui si dispone è provvisto di un modulo contenente una batteria al litio, sostituire tale batteria solo con un tipo di modulo uguale a quello fornito dal produttore. La batteria contiene litio e può esplodere se utilizzata, maneggiata o smaltita impropriamente.

Evitare di:

- Gettarla o immergerla in acqua
- Riscaldarla ad una temperatura superiore ai 100°C
- Cercare di ripararla o smontarla

Smaltire secondo la normativa in vigore (D.Lgs 22 del 5/2/9) e successive disposizioni nazionali e locali.

Avviso 3

ATTENZIONE:

Quando si installano prodotti laser come, ad esempio, le unità DVD, CD-ROM, a fibre ottiche o trasmettitori, prestare attenzione a quanto segue:

- Non rimuovere i coperchi. L'apertura dei coperchi di prodotti laser può determinare l'esposizione a radiazioni laser pericolose. All'interno delle unità non vi sono parti su cui effettuare l'assistenza tecnica.
- L'utilizzo di controlli, regolazioni o l'esecuzione di procedure non descritti nel presente manuale possono provocare l'esposizione a radiazioni pericolose.

PERICOLO

Alcuni prodotti laser contengono all'interno un diodo laser di Classe 3A o Classe 3B. Prestare attenzione a quanto segue:

Aprendo l'unità vengono emesse radiazioni laser. Non fissare il fascio, non guardarlo direttamente con strumenti ottici ed evitare l'esposizione diretta al fascio.

Avviso 4

≥18 kg (37 lbs)

≥32 kg (70.5 lbs)

≥55 kg (121.2 lbs)

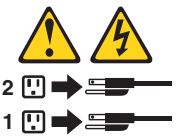
ATTENZIONE:

Durante il sollevamento della macchina seguire delle norme di sicurezza.

Avviso 5

ATTENZIONE:

Il pulsante del controllo dell'alimentazione situato sull'unità e l'interruttore di alimentazione posto sull'alimentatore non disattiva la corrente elettrica fornita all'unità. L'unità potrebbe disporre di più di un cavo di alimentazione. Per disattivare la corrente elettrica dall'unità, accertarsi che tutti i cavi di alimentazione siano scollegati dalla sorgente di alimentazione.



Avviso 6

ATTENZIONE:

Se sull'estremità del cavo di alimentazione è Installata l'opzione di sostegno del cavo, è necessario collegare l'altra estremità del cavo di alimentazione ad una fonte di alimentazione faci accessibile.

Avviso 8

ATTENZIONE:

Non togliere mai il coperchio di un alimentatore o qualsiasi parte su cui è posta la seguente etichetta.

Tensioni pericolose, corrente e livelli di energia sono presenti all'interno del componente su cui è posta questa etichetta. All'interno di questi componenti non vi sono parti su cui effettuare l'assistenza tecnica. Se si sospetta un problema in una di queste parti, rivolgersi ad un tecnico di manutenzione.

Avviso 10

ATTENZIONE:

Non poggiare oggetti che pesano più di 82 kg sulla parte superiore delle unità montate in rack.

Avviso 13

PERICOLO

Il sovraccarico di un impianto elettrico può generare un pericolo di incendio o di scosse elettriche in determinate situazioni. Per evitare questi pericoli, verificare che i requisiti elettrici del sistema non superino i requisiti di protezione dell'impianto elettrico. Per le specifiche elettriche, consultare le informazioni fornite con il dispositivo IBM.

Avviso 14

ATTENZIONE:

E' possibile che siano presenti livelli pericolosi di tensione, corrente ed energia. Solo i tecnici qualificati sono autorizzati a rimuovere i coperchi sui quali è posta la seguente etichetta.

Avviso 15

ATTENZIONE:

Per evitare che il rack si capovolga quando l'unità del server viene estratta, verificare che esso sia fissato correttamente.

Avviso 16

ATTENZIONE:

Le uscite di alcuni accessori e schede superano i limiti di Classe 2 o di alimentazione elettrica e devono essere installate con un cablaggio di interconnessione appropriato in base alle norme elettriche nazionali.

Instrução 17

ATTENZIONE:

La seguente etichetta indica che nelle vicinanze vi sono parti in movimento.

중요:

본 *Server Library*에 있는 모든 주의 및 위험 경고문은 번호로 시작합니다. 이 번호는 영문 주의 혹은 위험 경고문과 이 절에 나오는 번역된 버전의 주의 혹은 위험 경고문을 상호 참조하는 데 사용됩니다.

예를 들어, 주의 경고문이 번호 1로 시작하면, 번역된 해당 주의 경고문을 본 절의 경고문 1에서 찾아볼 수 있습니다.

모든 지시사항을 수행하기 전에 반드시 모든 주의 및 위험 경고문을 읽으십시오.

경고문 1

위험

전원, 전화 및 통신 케이블로부터 흘러 나오는 전류는 위험합니다.

전기 충격을 피하려면:

- 뇌우를 동반할 때는 케이블의 연결이나 철수, 이 제품의 설치, 유지보수 또는 재구성을 하지 마십시오.
- 모든 전원 코드를 적절히 배선 및 접지해야 합니다.
- 이 제품에 연결될 모든 장비를 적절하게 배선된 콘센트에 연결하십시오.
- 가능한한 신호 케이블을 한 손으로 연결하거나 끊으십시오.
- 화재, 수해 또는 구조상의 손상이 있을 경우 장비를 켜지 마십시오.
- 설치 및 구성 프로시저에 다른 설명이 없는 한, 장치 덮개를 열기 전에 연결된 전원 코드, 원거리 통신 시스템, 네트워크 및 모뎀을 끊어 주십시오.
- 제품 또는 접속된 장치를 설치, 이동 및 덮개를 열 때 다음 설명에 따라 케이블을 연결하거나 끊도록 하십시오.

연결하려면:	연결을 끊으려면:
1. 모든 스위치를 끕니다.	1. 모든 스위치를 끕니다.
2. 먼저 모든 케이블을 장치에 연결합니다.	2. 먼저 콘센트에서 전원 코드를 뽑습니다.
3. 신호 케이블을 커넥터에 연결합니다.	3. 신호 케이블을 커넥터에서 제거합니다.
4. 콘센트에 전원 코드를 연결합니다.	4. 장치에서 모든 케이블을 제거합니다.
5. 장치 스위치를 켭니다.	

경고문 2

주의:

리튬 배터리를 교체할 때는 IBM 부품 번호 33F8354 또는 제조업체에서 권장하는 동등한 유형의 배터리를 사용하십시오. 시스템에 리튬 배터리를 갖고 있는 모듈이 있으면 동일한 제조업체에서 생산된 동일한 모듈 유형으로 교체하십시오. 배터리에 리튬이 있을 경우 제대로 사용, 처리 또는 처분하지 않으면 폭발할 수 있습니다.

다음을 주의하십시오.

- 던지거나 물에 담그지 않도록 하십시오.
- 100°C(212°F) 이상으로 가열하지 마십시오.
- 수리하거나 분해하지 마십시오.

지역 법령이나 규정의 요구에 따라 배터리를 처분하십시오.

경고문 3

주의:
레이저 제품(CD-ROMs, DVD 드라이브, 광 장치 또는 트랜스미터 등과 같은)이 설치되어 있을 경우 다음을 유의하십시오.

- 덮개를 제거하지 마십시오. 레이저 제품의 덮개를 제거했을 경우 위험한 레이저 광선에 노출될 수 있습니다. 이 장치 안에는 서비스를 받을 수 있는 부품이 없습니다.

- 여기에서 지정하지 않은 방식의 제어, 조절 또는 실행으로 인해 위험한 레이저 광선에 노출될 수 있습니다.

위험

일부 레이저 제품에는 클래서 3A 또는 클래스 3B 레이저 다이오드가 들어 있습니다. 다음을 주의하십시오.

열면 레이저 광선에 노출됩니다. 광선을 주시하거나 광학 기계를 직접 쳐다보지 않도록 하고 광선에 노출되지 않도록 하십시오.

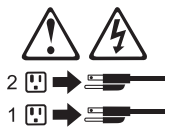
경고문 4

≥18 kg (37 lbs) ≥ 32 kg (70.5 lbs) ≥ 55 kg (121.2 lbs)

주의:
기계를 들 때는 안전하게 들어 올리십시오.

경고문 5

주의:
장치의 전원 제어 버튼 및 전원 공급기의 전원 스위치는 장치에 공급되는 전류를 차단하지 않습니다. 장치에 둘 이상의 전원 코드가 연결되어 있을 수도 있습니다. 장치에서 모든 전류를 차단하려면 모든 전원 코드가 전원으로부터 차단되어 있는 지 확인하십시오.



경고문 6

주의:
장치에 연결되어 있는 전원 코드에 strain-relief 브래킷 옵션이 설치되어 있는 경우 쉽게 액세스할 수 있는 전원에 전원 코드의 다른 한쪽 끝을 연결해야만 합니다.

경고문 8

주의:
다음 레이블이 붙어 있는 전원 공급기나 부품의 덮개를 제거하지 마십시오.

이 레이블이 부착되어 있는 컴포넌트 안에는 위험한 전압, 전류 및 에너지 레벨이 있습니다. 이 컴포넌트 안에는 서비스 받을 수 있는 부품이 없습니다. 이들 부품에 문제가 있을 경우 서비스 기술자에게 문의하십시오.

경고문 10

주의:
서랍형 모델의 장치 상단에 82 kg(180 lbs.)이 넘는 물체를 올려 놓지 마십시오.

경고문 **13**

위험

분기 회로가 과부화되면 특정 상황에서 화재와 전기 충격이 발생할 수 있습니다. 이러한 충격을 방지하려면 귀하의 시스템 전기 요구량이 분기 회로 보호 요구량을 초과하지 않도록 하십시오. 전기 사양에 대해서는 **IBM** 디바이스와 함께 제공되는 정보를 참조하십시오.

경고문 **14**

주의**:**
위험한 전압, 전류 및 에너지 레벨이 있을 수 있습니다. 다음 레이블이 붙어있는 커버는 공인된 서비스 기술자만이 제거할 수 있습니다.

경고문 **15**

주의**:**
랙을 안전하게 설치하여 서버 장치를 추가할 때 쓰러지지 않도록 하십시오.

경고문 **16**

주의**:**
일부 부속품이나 옵션 보드 출력 장치는 클래스 **2** 또는 제한된 전원 한계를 초과하므로 반드시 국가별 전기 코드에 적합한 연결 케이블로 설치해야 합니다.

경고문 17

주의:
다음의 레이블은 동작하는 부품이 가까이에 있음을 나타냅니다.

Importante:

Todas las declaraciones de precaución de esta *Biblioteca del servidor* empiezan con un número. Dicho número se emplea para establecer una referencia cruzada de una declaración de precaución o peligro en inglés con las versiones traducidas que de dichas declaraciones pueden encontrarse en esta sección.

Por ejemplo, si una declaración de peligro empieza con el número 1, las traducciones de esta declaración de precaución aparecen en esta sección bajo Declaración 1.

Lea atentamente todas las declaraciones de precaución y peligro antes de llevar a cabo cualquier operación.

Declaración 1

PELIGRO

La corriente eléctrica de los cables telefónicos, de alimentación y de comunicaciones es perjudicial.

Para evitar una descarga eléctrica:

- No conecte ni desconecte ningún cable ni realice las operaciones de instalación, mantenimiento o reconfiguración de este producto durante una tormenta.
- Conecte cada cable de alimentación a una toma de alimentación eléctrica con conexión a tierra y cableado correctos.
- Conecte a tomas de alimentación con un cableado correcto cualquier equipo que vaya a estar conectado a este producto.
- Si es posible, utilice una sola mano cuando conecte o desconecte los cables de sent.al.
- No encienda nunca un equipo cuando haya riesgos de incendio, de inundación o de daños estructurales.
- Desconecte los cables de alimentación, sistemas de telecomunicaciones, redes y módems conectados antes de abrir las cubiertas del dispositivo a menos que se indique lo contrario en los procedimientos de instalación y configuración.
- Conecte y desconecte los cables tal como se describe en la tabla siguiente cuando desee realizar una operación de instalación, de traslado o de apertura de las cubiertas para este producto o para los dispositivos conectados.

Para la conexin	Para la desconexiín
1. APÁGUELO todo. 2. En primer lugar, conecte los cables a los dispositivos. 3. Conecte los cables de señal a los conectores. 4. Conecte cada cable de alimentaciín a la toma de alimentaciín. 5. ENCIENDA el dispositivo.	1. APÁGUELO todo. 2. En primer lugar, retire cada cable de alimentaciín de la toma de alimentaciín. 3. Retire los cables de señal de los conectores. 4. Retire los cables de los dispositivos.

Declaración 2

PRECAUCIÓN:

Cuando desee sustituir la batería de litio, utilice únicamente el número de pieza 33F8354 de IBM o cualquier tipo de batería equivalente que recomiende el fabricante. Si el sistema tiene un módulo que contiene una batería de litio, sustitúyalo únicamente por el mismo tipo de módulo, que ha de estar creado por el mismo fabricante. La batería contiene litio y puede explotar si el usuario no la utiliza ni la maneja de forma adecuada o si no se desprende de la misma como corresponde.

No realice las acciones siguientes:

- Arrojarla al agua o sumergirla
- Calentarla a una temperatura que supere los 100°C (212°F)
- Repararla o desmontarla

Despréndase de la batería siguiendo los requisitos que exija el reglamento o la legislaciín local.

Declaración 3

PRECAUCIÓN:

Cuando instale productos láser (como, por ejemplo, CD-ROM, unidades DVD, dispositivos de fibra íptica o transmisores), tenga en cuenta las advertencias siguientes:

- No retire las cubiertas. Si retira las cubiertas del producto láser, puede quedar expuesto a radiaciín láser perjudicial. Dentro del dispositivo no existe ninguna pieza que requiera mantenimiento.
- El uso de controles o ajustes o la realizaciín de procedimientos que no sean los que se han especificado aquí pueden dar como resultado una exposiciín perjudicial a las radiaciones.

PELIGRO

Algunos productos láser contienen un diodo de láser incorporado de Clase 3A o de Clase 3B. Tenga en cuenta la advertencia siguiente.

Cuando se abre, hay radiaciín láser. No mire fijamente el rayo ni lleve a cabo ningún examen directamente con instrumentos ípticos; evite la exposiciín directa al rayo.

Declaración 4

≥18 kg (37 lbs)

≥32 kg (70.5 lbs)

≥55 kg (121.2 lbs)

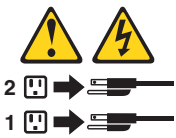
PRECAUCIÓN:

Tome medidas de seguridad al levantar el producto.

Declaración 5

PRECAUCIÓN:

El botín de control de alimentaciín del dispositivo y el interruptor de alimentaciín de la fuente de alimentaciín no apagan la corriente eléctrica suministrada al dispositivo. Es posible también que el dispositivo tenga más de un cable de alimentaciín. Para eliminar la corriente eléctrica del dispositivo, asegúrese de desconectar todos los cables de alimentaciín de la fuente de alimentaciín.



Declaración 6

PRECAUCIÓN:

Si instala la opción de una pieza de sujeción amortiguadora de tens en el extremo del cable de alimentación que está conectado al disposit be conectar el otro extremo del cable de alimentación a una fuente de alimentación de fácil acceso.

Declaración 8

PRECAUCIÓN:

No retire nunca la cubierta de una fuente de alimentación ni ninguna pieza que tenga adherida la etiqueta siguiente.

Existen niveles perjudiciales de energía, corriente y voltaje en los componentes que tienen adherida esta etiqueta. Dentro de estos componentes no existe ninguna pieza que requiera mantenimiento. Si sospecha que alguna de estas piezas tiene un problema, póngase en contacto con un técnico de servicio.

Declaración 10

PRECAUCIÓN:

No coloque ningún objeto que pese más de 82 kg (180 libras) encima de los dispositivos montados en bastidor.

Declaración 13

PELIGRO

La sobrecarga de una conexión puede resultar potencialmente en peligro de fuego y peligro de descarga bajo ciertas condiciones. Para evitar estos peligros, compruebe que los requisitos eléctricos de su sistema no excedan los requisitos de seguridad de la conexión. Consulte la información que viene con el dispositivo de IBM para obtener las especificaciones eléctricas.

Declaración 14

PRECAUCIÓN:

Es posible que haya niveles peligrosos de energía, voltaje o corriente. Sólo está autorizado a extraer las cubiertas que llevan la siguiente etiqueta un técnico de servicio cualificado.

Declaración 15

PRECAUCIÓN:

Asegúrese de que el bastidor esté sujetado correctamente para evitar golpes cuando se extienda la unidad del servidor.

Declaración 16

PRECAUCIÓN:

Algunos accesorios o potencias de placas opcionales exceden los valores de fuente de energía limitados o de la Clase 2 y deben instalarse con el cableado de interconexión apropiado de acuerdo con el código de electricidad nacional.

Declaración 17

PRECAUCIÓN:

La etiqueta siguiente indica que hay partes móviles cerca.

Send us your comments!

We want to know your opinion about this manual (part number 24P2903). 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 to you service most?

   _____

   _____

   _____

   _____

Thank you 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 version
  - Type and version level
- Hardware configuration
  - Print (print screen) configuration currently in use
  - BIOS level
- Operating system software
  - Type and version level

Note: 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.

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GHz, MHz only measures microprocessor internal clock speed, not application performance. Many factors affect application performance.

When referring to hard disk drive capacity, GB equals one billion bytes. Total user-accessible capacity may vary depending on operating environments.

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