



@server

xSeries 135

User's Reference



IBM xSeries 135



User's Reference

Note: Before using this information and the product it supports, be sure to read the general information in Appendix B, “Product warranty and notices,” on page 139.

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Safety

Before installing this product, read the Safety Information below.

مج، يجب قراءة دات السلامة

Antes de instalar este produto, leia as Informações de Segurança.

在安装本产品之前，请仔细阅读 **Safety Information** (安全信息)。

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

Ennen kuin asennat tämän tuotteen, lue turvaohjeet kohdasta Safety Information.

Avant d'installer ce produit, lisez les consignes de sécurité.

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

Πριν εγκαταστήσετε το προϊόν αυτό, διαβάστε τις πληροφορίες ασφάλειας (safety information).

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

A termék telepítése előtt olvassa el a Biztonsági előírásokat!

Prima di installare questo prodotto, leggere le Informazioni sulla Sicurezza

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

Пред да се инсталира овој продукт, прочитајте информацијата за безбедност.

Les sikkerhetsinformasjonen (Safety Information) før du installerer dette produktet.

Przed zainstalowaniem tego produktu, należy zapoznać się z książką "Informacje dotyczące bezpieczeństwa" (Safety Information).

Antes de instalar este produto, leia as Informações sobre Segurança.

Перед установкой продукта прочтите инструкции по технике безопасности.

Pred inštaláciou tohto zariadenia si pečítajte Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

Antes de instalar este producto lea la información de seguridad.

Läs säkerhetsinformationen innan du installerar den här produkten.

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.**
- **Connect and disconnect cables as described in the following table when installing, moving, or opening covers on this product or attached devices.**

To Connect:

1. Turn everything OFF.
2. First, attach all cables to devices.
3. Attach signal cables to connectors.
4. Attach power cords to outlet.
5. Turn device ON.

To Disconnect:

1. Turn everything OFF.
2. First, remove power cords from outlet.
3. Remove signal cables from connectors.
4. Remove all cables from devices.

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.

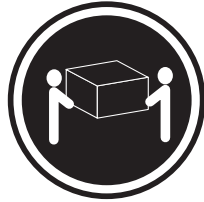


DANGER

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 the beam.

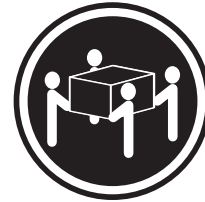
Statement 4



≥ 18 kg (39.7 lb)



≥ 32 kg (70.5 lb)



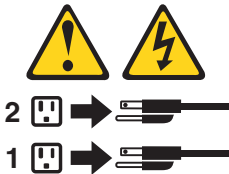
≥ 55 kg (121.2 lb)

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 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.

Chapter 1. Introducing the xSeries 135 appliance server

Your IBM® eServer xSeries 135 appliance server is a one-U-high¹ rack model Web hosting appliance server. This high-performance appliance server is ideally suited for networking environments that require superior performance, efficient memory management, flexibility, and reliable data storage.

Note: See the Documentation CD that is included with your appliance server for the latest version of this document.

Packaged with the IBM xSeries 135 appliance server are the following items:

- *IBM xSeries 135 Installation Guide*
- The xSeries 135 appliance server:
 - Mounting brackets and hardware
 - Cage nuts or clip nuts
 - C2T chaining cable (model 8654 only)
 - C2T device breakout cable (model 8654 only)
 - Power cord
 - Cable straps
- *IBM xSeries 130 and xSeries 135 Documentation CD*
- *Supplementary CD*
- *Recovery CD*
- *Rack Mounting Instructions* and template

Your appliance server serial number and model number are located on the ID label located on the right edge of the appliance server bezel as shown in the following illustration. You will need these numbers when you register your appliance server with IBM.

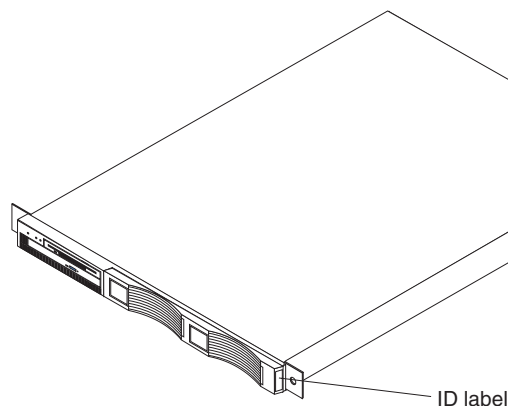


Figure 1. Locating the ID label

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

1. Rack cabinets are marked in vertical increments of 1.75 inches. Each increment is referred to as a unit (U). A one-U-high device is 1.75 inches tall.

Notices and statements used in this book

The Caution statements and the Danger statements also appear in the multilingual safety information book provided on the *Documentation CD*. Each statement is numbered for easy reference to the corresponding statement in the safety book.

The notice and statement 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 statements indicate situations that can be potentially hazardous to you. A caution statement is placed just before the description of a potentially hazardous procedure step or situation.
- **Danger:** These statements indicate situations that can be potentially lethal or extremely hazardous to you. A danger statement is placed just before the description of a potentially lethal or extremely hazardous procedure step or situation.

Reliability, availability, and serviceability features

Three of the features in the appliance server design are reliability, availability, and serviceability (RAS). These factors help to ensure the integrity of the data that is stored on your appliance server; that your server is available when you want to use it; and that should a failure occur, you can easily diagnose and repair the failure with minimal inconvenience.

The following is an abbreviated list of the RAS features that your appliance server supports.

- Menu-driven setup, system configuration, and diagnostic programs
- Power-on self-test (POST)
- Integrated advanced system management processor (model 8654 only)
- Predictive Failure Analysis[®] (PFA)
- Remote system problem-analysis support
- Power and temperature monitoring
- Error codes and messages
- System error logging
- Automatic restart after a power failure
- CRC checking on the SCSI buses (model 8654 only)
- Error checking and correcting (ECC) memory
- Redundant Ethernet capabilities
- Light Path Diagnostics[™] panel feature on the system board (model 8654 only)
- Vital product data (VPD) on the system board and SCSI backplane (model 8654 only)
- Customer support center 24 hours per day, 7 days a week¹

¹.Service availability will vary by country. Response time will vary depending on the number and nature of incoming calls.

System requirements

You must have a supported Web browser installed on your remote workstation to communicate with the appliance server through the Appliance System Manager. The supported browsers are Microsoft® Internet Explorer 5.x, or Netscape Communicator 4.7.

The IBM Advanced Appliance Configuration Utility agent is preinstalled on the appliance server. You can use the Advanced Appliance Configuration Utility to manage one or many appliance servers. You must install the Advanced Appliance Configuration Utility console from the *Supplementary CD* on the remote workstation you are using to manage the appliance server.

Note: The remote workstation running the Advanced Appliance Configuration Utility must be on the same physical subnet as the appliance server.

Software on the xSeries 135 appliance server

The following software is installed on the xSeries 135 appliance server. You might need to install additional components to use all of the software features.

- **RedHat Linux version 6.2**

RedHat Linux version 6.2 is the preinstalled operating system.

- **IBM Advanced Appliance Configuration Utility**

The Advanced Appliance Configuration Utility agent is preinstalled on your appliance server. You must install the Advanced Appliance Configuration Utility console from the *Supplementary CD* on a remote workstation that is on the same physical subnet as your appliance server. The utility detects the presence of xSeries appliance servers on the network, and enables you to set up and manage the network configuration for one or multiple appliance servers. The IBM Advanced Appliance Utility provides the following:

- Automatic discovery of appliance servers
- Point to point management
- Installation and management of multiple appliance servers
- Automatic assignment of static IP addresses from a specified range to newly installed appliance servers
- DHCP compatibility (not available for xSeries 135 appliance servers)
- Reprovisioning, which enables you to do the following on your appliance server:
 - Create an appliance image
 - Apply an appliance image
 - Remotely initiate a factory image restoration

- **Appliance System Manager**

The Appliance System Manager manages the operating system and provides system services. Some of the features of the program include:

- **Administrative E-mail Alerts** - This powerful feature monitors your system and automatically alerts you through e-mail of detected problems, such as high central processing unit utilization, low disk space, and other potential problems.

- **Mailing List Manager** - This feature allows you to setup mailing lists and then simultaneously send e-mails to every person or address defined on the list.
- **PHP Support** - This feature allows you to produce dynamic content, such as adding a date or time box to a Web page.
- **Upgrade Detection** - This feature compares your installed software with the latest available upgrades on the Web. Use the default Web site provided or define your own site.
- **IBM HTTP Server version 1.3.12**

The IBM HTTP Server version 1.3.12 includes:

 - The base Web-serving functions.
 - The IBM HTTP Server administration software and interface, which is a Web-based interface that lets you update the configuration, if needed. The Web server is supplied with a default configuration for quick deployment and use. The Appliance System Manager uses the IBM HTTP Server for its Web-based administrative interfaces. Multiple independent versions of the IBM HTTP Server, each with its own configuration files and processes, run simultaneously.
 - A production Web server listening at the standard HTTP port 80. This server instance responds to (end-user) requests for stored Web pages.
 - The administration server that administers the production Web server. This server instance listens on port 8008 for HTTP, and on port 8009 for HTTP-S.
 - The Appliance System Manager server that provides the administrative interfaces. This server instance listens on port 1959 for HTTP requests and on port 1999 for HTTP-S requests. The administrator does not have to start each server instance individually. Starting the appliance server initiates all three servers.

The IBM xSeries 135 model 8654 appliance server

This section provides general information about the model 8654 appliance server. For information about the model 8672, see “The IBM xSeries 135 model 8672 appliance server” on page 8.

Features and specifications

The following table provides a summary of the features and specifications for the xSeries 135 model 8654 appliance server.

<p>Microprocessor:</p> <ul style="list-style-type: none"> One Intel® Pentium® III, 1 GHZ microprocessor with MMX™ technology and SIMD extensions 256 KB level-2 cache Supports up to two 1 GHZ microprocessors <p>Memory:</p> <ul style="list-style-type: none"> Standard: 256 MB Maximum: 2 GB Type: PC 133 MHz ECC, SDRAM, registered DIMMs Slots: Four dual in-line Supports 128 MB, 256 MB, 512 MB, and 1 GB DIMMs <p>Drives standard:</p> <ul style="list-style-type: none"> Diskette: 1.44 MB CD-ROM: 24-10X IDE One 18.2 GB 10K SCSI hard disk drive Supports two 36 GB 10K SCSI hard disk drives maximum <p>Expansion bays:</p> <p>Two 3.5-inch slim-high bays for SCSI hard disk drives (one available)</p> <p>PCI expansion slots:</p> <p>Two 33 MHz, 64-bit</p> <p>Power supply:</p> <p>One 200 watt (115-230 V ac)</p>	<p>Video:</p> <ul style="list-style-type: none"> S3 video controller on the system board Compatible with SVGA 8 MB SDRAM video memory <p>Size:</p> <ul style="list-style-type: none"> Height: 4.37 cm (1.75 in.) Depth: 63.5 cm (25.72 in.) Width: 43.9 cm (17.32 in.) Weight: approximately 12.7 kg (28 lb) when fully configured <p>Integrated functions:</p> <ul style="list-style-type: none"> One Ultra160 SCSI controller Dual 10BASE-T/100BASE-TX Intel Ethernet controllers on the system board One serial port Two C2T ports (one in, one out) <p>Acoustical noise emissions:</p> <ul style="list-style-type: none"> Sound power, idling: 6.1 bel maximum Sound power, operating: 6.2 bel maximum 	<p>Environment:</p> <ul style="list-style-type: none"> Air temperature: <ul style="list-style-type: none"> Server on: 10° to 35° C (50.0° to 95.0° F). Altitude: 0 to 914 m (2998.7 ft) Server on: 10° to 32° C (50.0° to 89.6° F). Altitude: 914 m (2998.7 ft) to 2133 m (6998.0 ft) Server off: 10° to 43° C (50.0° to 109.4° F). Maximum altitude: 2133 m (6998.0 ft) Humidity: <ul style="list-style-type: none"> Server on: 8% to 80% Server off: 8% to 80% <p>Heat output:</p> <p>Approximate heat output in British thermal units (Btu) per hour:</p> <ul style="list-style-type: none"> Minimum configuration: 273 Btu (80 watts) Maximum configuration: 751 Btu (220 watts) <p>Electrical input:</p> <ul style="list-style-type: none"> Sine-wave input (50-60 Hz) required Input voltage low range: <ul style="list-style-type: none"> Minimum: 100 V ac Maximum: 127 V ac Input voltage high range: <ul style="list-style-type: none"> Minimum: 200 V ac Maximum: 240 V ac Input kilovolt-amperes (kVA) approximately: <ul style="list-style-type: none"> Minimum: 0.08 kVA Maximum: 0.22 kVA
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Table 1. Features and specifications for the xSeries 135 model 8654.

Controls and indicators on the model 8654 appliance server

This section identifies the controls and indicators on the front and the rear of the appliance server.

Front view

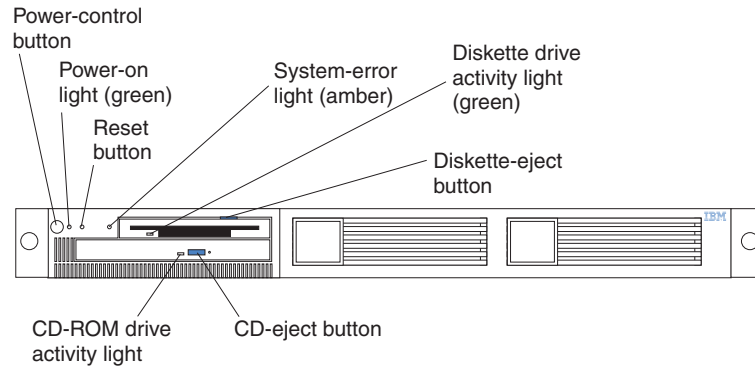


Figure 2. Identifying appliance server controls and indicators on the xSeries 135 model 8654

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

Power-on light: This green LED blinks when the appliance server is off and stays on when you turn on your appliance server.

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

System-error light: This amber LED lights when a system error occurs. An LED on the Light Path Diagnostics™ panel on the system board will also be on to further isolate the error.

Diskette drive activity light: When this LED is on, it indicates that the diskette drive is in use.

Diskette-eject button: Push this button to release a diskette from the drive.

CD-eject button: Push this button to release a CD from the drive.

CD-ROM drive activity light: When this light is on, it indicates that the CD-ROM drive is in use.

Rear view

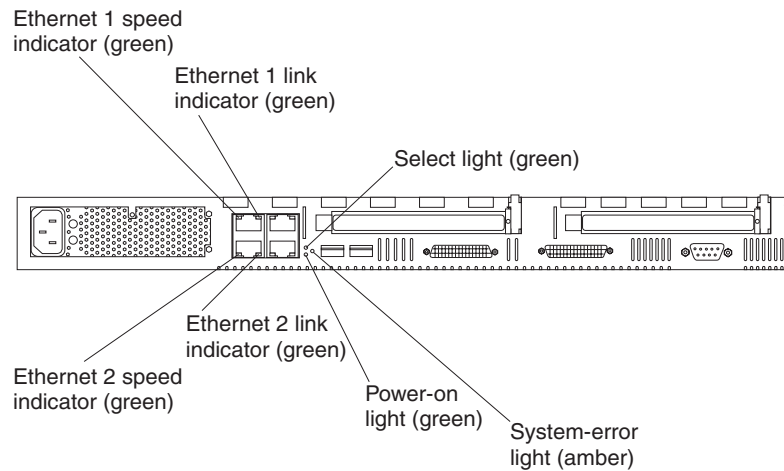


Figure 3. Identifying appliance server controls and indicators on the xSeries 135 model 8654

Ethernet 1 speed indicator: This green LED lights when the speed of the Ethernet LAN that is connected to Ethernet port 1 is 100 Mbps.

Ethernet 1 link indicator: This green LED lights when there is an active link connection on the 10BASE-T or 100BASE-TX interface for Ethernet port 1.

Select light: This green LED lights when the monitor, keyboard, and mouse are logically connected to this appliance server. This light duplicates the LED in the select button/ indicator on the front of the appliance server.

System-error light: This amber LED lights when a system error occurs. An LED on the Light Path Diagnostics panel on the system board will also be on to further isolate the error. This light duplicates the system-error light on the front of the server.

Power-on light: This green LED lights and stays on when you turn on your appliance server. This light duplicates the power-on light on the front of the appliance server.

Ethernet 2 link indicator: This green LED lights when there is an active link connection on the 10BASE-T or 100BASE-TX interface for Ethernet port 2.

Ethernet 2 speed indicator: This green LED lights when the speed of the Ethernet LAN that is connected to Ethernet port 2 is 100 Mbps.

The IBM xSeries 135 model 8672 appliance server

This section provides general information about the model 8672 appliance server.

Features and specifications

The following table provides a summary of the features and specifications for the xSeries 135 model 8672 appliance server.

<p>Microprocessor:</p> <ul style="list-style-type: none"> One Intel Celeron™ 800 MHz microprocessor with MMX™ (MMX2) technology 128 KB Level-2 cache <p>Memory:</p> <ul style="list-style-type: none"> Standard: 256 MB Maximum: 1.5 GB Type: PC133 MHz, ECC SDRAM, unregistered DIMMs only Slots: Three dual inline Supports 128 MB, 256 MB, and 512 MB DIMMs <p>Drives:</p> <ul style="list-style-type: none"> Diskette: 1.44 MB CD-ROM: 24-10X IDE One 20 GB IDE hard disk drive Supports two 40 GB IDE hard disk drives maximum <p>Expansion bays:</p> <p>Two 3.5-inch slim-high bays for IDE hard disk drives (one available)</p> <p>Power supply:</p> <p>One 200 watt (110 or 220 V ac auto-sensing)</p>	<p>Video:</p> <ul style="list-style-type: none"> S3 Savage 4 Pro video controller on the system board Compatible with SVGA and VGA 8 MB SDRAM video memory <p>Size:</p> <ul style="list-style-type: none"> Height: 4.37 cm (1.75 in.) Depth: 63.5 cm (25 in.) Width: 44 cm (17.32 in.) Maximum weight: 19.05 kg (42 lb) depending on your configuration <p>Integrated functions:</p> <ul style="list-style-type: none"> Dual-channel bus mastering IDE controller Dual 10BASE-T/100BASE-TX Ethernet controllers on the system board One serial port Keyboard port Mouse port <p>Acoustical noise emissions:</p> <ul style="list-style-type: none"> Sound power, idling: 6.6 bel maximum Sound power, operating: 6.8 bel maximum 	<p>Environment:</p> <ul style="list-style-type: none"> Air temperature: <ul style="list-style-type: none"> Server on: 10° to 35° C (50.0° to 95.0° F). Altitude: 0 to 914 m (2998.7 ft) Server on: 10° to 32° C (50.0° to 89.6° F). Altitude: 914 m (2998.7 ft) to 2133 m (6998.0 ft.) Server off: -40° to 60° C (-104° to 140° F). Maximum altitude: 2133 m (6998.0 ft) Humidity: <ul style="list-style-type: none"> Server on: 8% to 80% Server off: 5% to 100% <p>Heat output:</p> <p>Approximate heat output in British thermal unit (Btu) per hour:</p> <ul style="list-style-type: none"> Minimum configuration: 171 Btu (50 watts) Maximum configuration: 410 Btu (120 watts) <p>Electrical input:</p> <ul style="list-style-type: none"> Sine-wave input (47-63 Hz) required Input voltage low range: <ul style="list-style-type: none"> Minimum: 90 V ac Maximum: 137 V ac Input voltage high range: <ul style="list-style-type: none"> Minimum: 180 V ac Maximum: 265 V ac Input kilovolt-amperes (kVA) approximately: <ul style="list-style-type: none"> Minimum: 0.095 kVA Maximum: 0.213 kVA
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Table 2. Features and specifications for the xSeries 135 model 8672.

Controls and indicators on the model 8672 appliance server

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

Front view

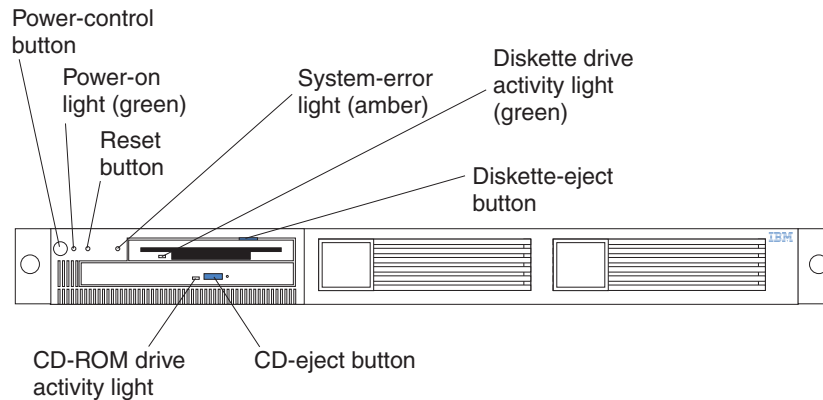


Figure 4. Identifying appliance server controls and indicators on the xSeries 135 model 8672

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

Power-on light: This green LED lights and stays on when you turn on your appliance server, and it blinks when the appliance server is in standby mode.

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

System-error light: This amber LED lights when a system error occurs.

Diskette drive activity light: When this LED is on, it indicates that the diskette drive is in use.

Diskette-eject button: Push this button to release a diskette from the drive.

CD-eject button: Push this button to release a CD from the drive.

CD-ROM drive activity light: When this light is on, it indicates that the CD-ROM drive is in use.

Rear view

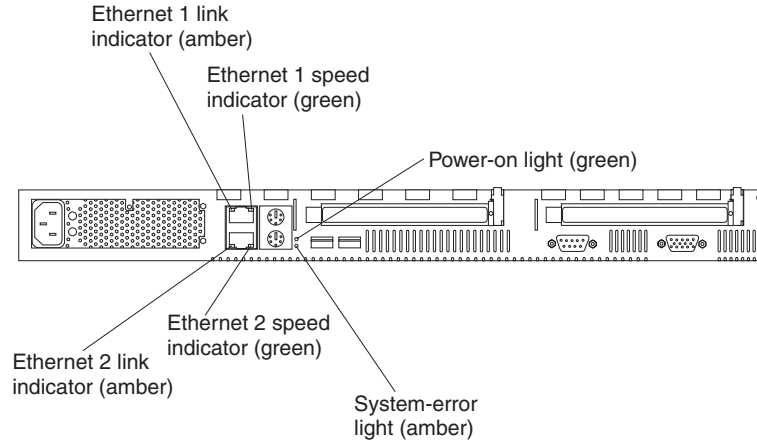


Figure 5. Identifying appliance server controls and indicators on the xSeries 135 model 8672

Ethernet 1 link indicator: This amber LED lights when there is an active link connection on the 10BASE-T or 100BASE-TX interface for Ethernet port 1.

Ethernet 1 speed indicator: This green LED lights when the speed of the Ethernet LAN that is connected to Ethernet port 1 is 100 Mbps.

Power-on light: This green LED lights and stays on when you turn on your appliance server and it will blink when the appliance server is in standby mode. This light duplicates the power-on light on the front of the appliance server.

System-error light: This amber LED lights when a system error occurs. This light duplicates the system-error light on the front of the appliance server.

Ethernet 2 speed indicator: This green LED lights when the speed of the Ethernet LAN connected to Ethernet port 2 is 100 Mbps.

Ethernet 2 link indicator: This amber LED lights when there is an active link connection on the 10BASE-T or 100BASE-TX interface for Ethernet port 2.

Turning on the appliance server

Complete the following steps to turn on the appliance server:

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.**
- **Connect and disconnect cables as described in the following table when installing, moving, or opening covers on this product or attached devices.**

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.	

1. Plug the power cord of your appliance server into the power source.

Note: Plugging the power cord into a power source may cause the appliance server to start automatically. This is an acceptable action.

2. Wait 30 seconds, and then press the power control button on the front of the appliance server.

Turning off the appliance server

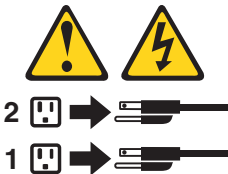
Turning off the appliance server refers to the act of disconnecting the appliance server from the power source.

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 appliance server:

1. From the Appliance System Manager, click **Operations** → **Restart/Stop Appliance**; then, click **Shutdown**.
2. Press the power-control button on the front of the appliance server. This will put the appliance server into standby mode.
3. Disconnect the appliance server from the power source.

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

Standby mode

Standby mode puts the appliance server into a wait state. When in a wait state, the appliance server is not running the operating system, and all core logic is shut down.

Complete the following steps to put the appliance server into the standby mode:

1. From the Appliance System Manager, click **Operations** → **Restart/Stop Appliance**; then, click **Shutdown**.
2. Press the power-control button on the front of the appliance server.

Chapter 2. Arranging your workspace

To get the most from your server, arrange both the equipment you use and your work area to suit your needs and the kind of work you do. Your comfort is of foremost importance, but light sources, air circulation, and the location of electrical outlets also can affect the way you arrange your workspace.

Comfort

Although no single working position is ideal for everyone, here are a few guidelines to help you find a position that suits you best.

Sitting in the same position for a long time can cause fatigue. A good chair can make a big difference. The backrest and seat should adjust independently and provide good support. The seat should have a curved front to relieve pressure on the thighs. Adjust the seat so that your thighs are parallel to the floor and your feet are either flat on the floor or on a footrest.

When using the keyboard, keep your forearms parallel to the floor and your wrists in a neutral, comfortable position. Try to keep a light touch on the keyboard and your hands and fingers relaxed. You can change the angle of the keyboard for maximum comfort by adjusting the position of the keyboard feet.

Adjust the monitor so the top of the screen is at, or slightly below, eye level. Place the monitor at a comfortable viewing distance, usually 51 to 61 cm (20 to 24 in.), and position it so you can view it without having to twist your body. Also position other equipment you use regularly, such as the telephone or a mouse, within easy reach.

Glare and lighting

Position the monitor to minimize glare and reflections from overhead lights, windows, and other light sources. Even reflected light from shiny surfaces can cause annoying reflections on your monitor screen. Place the monitor at right angles to windows and other light sources, when possible. Reduce overhead lighting, if necessary, by turning off lights or using lower wattage bulbs. If you install the monitor near a window, use curtains or blinds to block the sunlight. You might have to adjust the Brightness and Contrast controls on the monitor as the room lighting changes throughout the day.

Where it is impossible to avoid reflections or to adjust the lighting, an antiglare filter placed over the screen might be helpful. However, these filters might affect the clarity of the image on the screen; try them only after you have tried all other methods of reducing glare.

Dust buildup compounds problems that are associated with glare. Remember to clean your monitor screen periodically using a soft cloth that is moistened with a nonabrasive liquid glass cleaner.

Air circulation

Your server and monitor produce heat. Your server has one or more fans that pull in fresh air and force out hot air. The monitor lets hot air escape through vents. Blocking the air vents can cause overheating, which might result in a malfunction or damage. Place the server and monitor so that nothing blocks the air vents; usually, 15 cm (6 inches) of air space is sufficient. Also, make sure that the vented air is not blowing on someone else.

Electrical outlets and cable lengths

The location of electrical outlets and the length of power cords and cables that connect to the monitor, printer, and other devices might determine the final placement of your server.

When arranging your workspace:

- Avoid the use of extension cords. When possible, plug the server power cords directly into electrical outlets.
- Keep power cords and cables neatly routed away from walkways and other areas where they might get kicked accidentally.

For more information about power cords, refer to the power cord information in this on-line publication.

Chapter 3. Configuring your appliance server

This chapter describes how to configure your xSeries 135 appliance server.

You can configure your appliance server remotely by using the Advanced Appliance Configuration Utility, or directly by attaching a monitor, keyboard, and mouse to the appliance server. For more information on cabling directly to your appliance server, see “Cabling the model 8654 appliance server” on page 89 or “Cabling the model 8672 appliance server” on page 92.

Use the following general procedure to help you configure your appliance server:

1. Designate a workstation to use to remotely manage the appliance server.
2. Set the initial Internet protocol (IP) address, see “Setting the initial Internet protocol (IP) address”.

If you are configuring multiple appliance servers, see Chapter 4, “The Advanced Appliance Configuration Utility,” on page 31.

After you configure your appliance server, you can:

- Add web content
- Manage the appliance server

See Chapter 5, “Managing the appliance server,” on page 43 for detailed information about the Appliance System Manager program.

Setting the initial Internet protocol (IP) address

There are four methods you can use to set the initial IP address. Choose a method that best suits the needs for your specific environment.

Note: Before you log on, you need to have a valid IP address, net mask, host name, domain name, gateway, and primary DNS server address for the appliance server to use in your IP network. If you do not have this information, contact your network administrator.

Descriptions of the four methods you can use to set the initial IP address are as follows:

- **Using Appliance System Manager through a browser:** This interactive method enables you to complete the initial configuration for an individual appliance server through a browser; it leaves the appliance server ready to use, with no further network configuration required. See “Setting the initial IP address using Appliance System Manager” on page 16.
- **Using the command line:** If a browser is not available and you plan to connect a keyboard and display to the appliance server, you can use the command-line method. With this interactive method, you can log into the appliance server, run the Setup script, and answers the questions to create the initial network configuration. After you restart the appliance server, it is ready to use with no further network configuration required. See “Setting the initial IP address in a command line” on page 17.

- **Using the IBM Advanced Appliance Configuration Utility:** This interactive method enables you to configure the IP address for multiple appliance servers simultaneously. With this method, you can assign a range of addresses to all of the appliance servers; then, when you turn on the appliance servers, their initial network configurations will run automatically. To use this method, you must install the Advanced Appliance Configuration console tool on a Windows machine that is on the same subnet as the appliance servers. In addition, this method requires manual interaction through a browser to complete the configuration of each appliance server. See “Setting the initial IP address using the Advanced Appliance Configuration Utility” on page 17.
- **Using a diskette:** This is the only non-interactive method that you can use to set the initial IP address for the appliance server. With this method, you can prepare a diskette in advance and place it in the appliance server diskette drive during the hardware installation process; then when you turn on the appliance server, it will configure automatically using the information provided on the diskette. See “Setting the initial IP address using a diskette” on page 18.

Setting the initial IP address using Appliance System Manager

Appliance System Manager is a program that you can use to configure and manage the resources of the IBM xSeries 135 appliance server. You can access Appliance System Manager through a Web browser on a computer that has network access to the appliance server. Appliance System Manager enables the system administrator to change system settings and other configuration settings for the appliance server.

To set the initial IP address for the appliance server, perform the following steps:

1. Open a browser.
2. Disable the proxy settings for the browser.
3. Go to `http://appliance_IP_address:3939` where *appliance_IP_address* is the IP address that you want to assign to the appliance server. If the browser times out, you might have to repeat this step.
4. Type administrator for the user ID and password for the password.

Notes:

- a. The **User Name** and **Password** fields are case sensitive.
 - b. The user name and password are different from the root user.
5. The ASM (Appliance System Manager) Configuration window opens, enabling you to set the language and change the password for the root user.
 6. Select the language that you want to use and click **Next**. The window will change to the language selected.
 7. Change the password for the root user.
 - a. Type a new password.
 - b. Type the password again.
 - c. Click **Next**.
 8. The Configuration-Set Networking Parameters window opens. Type the information for the following required fields; then, click **Next**:
 - Host Name
 - Domain Name
 - Gateway
 - IP Address (the IP address is already displayed, but you can change it to a different address)
 - Netmask

- Primary DNS Server (optional)
9. Click **Next** to make the changes take effect. A Machine rebooting message appears. If the page does not load by itself in five minutes, click **Refresh**.
 10. When prompted, type administrator for the user name and password for the password. In the Appliance System Manager Main Page, you can perform additional configuration tasks. See Chapter 5, “Managing the appliance server,” on page 43 for detailed information about the Appliance System Manager program.

Alternatively, you can start Appliance System Manager by clicking the **Start Web Management** button on the IBM Advanced Appliance Configuration Utility.

Setting the initial IP address in a command line

A command line script is provided if a browser is not accessible. To use this method to assign the initial IP address, do the following:

1. Turn off the appliance server.
2. Attach a keyboard, mouse, and monitor to the appliance server.
Note: If you have a model 8654 appliance server, you must first attach the C2T device breakout cable; then, attach the keyboard, mouse and monitor to the cable. Or, you can attach a serial terminal (VT100) to the serial port.
3. Turn on the appliance server.
4. Log in to the appliance server using password as the password.
5. Type `/opt/CSM/scripts/setup.pl` and press **Enter**.
6. Respond to the questions as prompted.
7. Type **9** to exit the configuration and **1** to restart the appliance server.

Setting the initial IP address using the Advanced Appliance Configuration Utility

Use this method if you want to configure the IP address for multiple appliance servers simultaneously. Complete the following steps:

1. Configure the IBM Advanced Appliance Configuration Utility to include the new appliance server. See Chapter 4, “The Advanced Appliance Configuration Utility,” on page 31 for information on using the Advanced Appliance Configuration Utility.
2. Start the IBM Advanced Appliance Configuration Utility with the configuration and deploy the new appliance server in the same subnet (the IBM Advanced Appliance Configuration Utility does not work outside of the subnet of the appliance server).
3. Select the appliance server in the left pane, and click **Start Web Management**. An initial configuration page opens.
4. Complete the initial configuration of the appliance server using the wizard. The appliance server restarts.

Setting the initial IP address using a diskette

Use this method to automatically configure the appliance server using the information provided on a diskette. To set the initial IP address using a diskette, do the following:

1. Format a diskette using a computer running DOS or Windows, or create a DOS file system on the diskette if you are using a different computer.
2. Create an initial configuration file in the root directory of the diskette called `initsys.ini`. In this file, you will include the new IP address of the appliance server.

The configuration file can contain the following information:

- Initial IP address
- Host name of the appliance server
- IP address of gateway device (default route)
- Network mask
- IP address of primary DNS name server
- System password

The following keywords are available.

Attention: Keywords can appear in any order, and the keyword names are case-sensitive.

Keyword	Purpose	Default value
IPAddress	Initial IP address	
NetworkMask	Network mask	
HostName	Fully-qualified host name	
GatewayAddress	IP address of gateway device	
NameServerAddress	IP address of primary DNS name server	
Password	System password	password
Language	Set appliance server language	en_US

The language field must have valid values as shown in the following table:

Table 3. Language selection table.

Language	Value
Simplified Chinese	zh_CN
Traditional Chinese	zh_TW
English	en_US
German	de_DE
French	fr_FR
Italian	it_IT
Japanese	ja_JP
Spanish	es_ES

The following is an example configuration file:

```
IPAddress=10.1.1.1
NetworkMask=255.255.255.0
GatewayAddress=9.27.67.1
HostName=9.27.67.1
NameServerAddress=9.24.63.1
```

Notes:

- a. The configuration file contains only 7-bit standard ASCII characters.
 - b. Lines beginning with # are treated as comments.
 - c. All blank spaces are ignored.
 - d. The only required parameter in the initial configuration file is the initial IP address. The system password parameter default is password.
 - e. If you only specify the initial IP address, the administrator must use the initial configuration wizard that is provided by the Appliance System Manager to complete the initial configuration of the appliance server. Any values that are supplied in the file are automatically filled in when using the wizard, so that you do not have to type them again.
3. Insert the diskette into the appliance server, and turn on the appliance server.

Note: The diskette must be in the appliance server when the appliance server is started for the contents of the diskette to be read.

Changing default passwords

Passwords on new appliance servers are set to password. To change the passwords, perform the following steps:

Attention: Do not delete the original administrator ID until you have created a new administrator ID that is valid.

- Root password: If you have not changed the root password in the initial configuration page, click **Security/System Password** in Appliance System Manager, and change the password.
- User password: The default user is webroot with a password of password. Click **Security/Manage Users** in Appliance System Manager, and change the default user password.
- Administrator password: The default Appliance System Manager administrator ID is administrator with a password of password. Click **Security/Manage Administrators/Edit Administrator** in Appliance System Manager, and change the administrator user password.

For greater security, create an Appliance System Manager administrator with a different user ID and password. Then, delete the original administrator user ID.

Using the Supplementary CD

The *Supplementary* CD contains documentation and software applications that are approved for your xSeries 135 appliance server. The following table lists the names of the directories on the *Supplementary* CD and a description of the contents of each directory.

Directory name	Contents
IBM Advanced Appliance Configuration	IBM Advanced Appliance Configuration console and agent installation files. To install the Advanced Appliance Configuration console, run setup.exe from the x:\IBM Advanced Appliance Configuration directory, where x is the drive letter assigned to your CD-ROM drive.
License	License information for the preinstalled IBM and non-IBM software
Recovery_Enablement_Disk	DiskCreator.exe creates a recovery-enablement diskette for use when recovering the appliance. To make a diskette, run the DiskCreator.exe and insert a formatted 1.44 MB diskette into drive A when prompted.
Sources	RPM packages of the source code of the open-source software that is preinstalled on the xSeries 135 appliance server.
readme.txt	A text file that describes the contents of the <i>Supplementary</i> CD.

Using the Configuration/Setup Utility program for the xSeries 135

This section provides the instructions needed to start the Configuration/Setup Utility program and descriptions of the available menu choices. You do not need to use this information unless you need to change the BIOS settings of your appliance server.

Note: The Configuration/Setup Utility might vary slightly depending upon if you are using the xSeries 135 model 8654 or the xSeries 135 model 8672.

The Configuration/Setup utility is a menu driven utility that is part of the BIOS code that comes with your appliance server, that you can use to:

- Configure serial connector assignments
- Change the drive startup sequence
- Resolve configuration conflicts
- Set the date and time
- Set passwords

The following sections provide instructions for starting the Configuration/Setup Utility program and descriptions of the menu choices that are available.

Attention: Your appliance comes with preconfigured BIOS settings. Changing these settings could result in difficulty managing your appliance server. Do not change them unless instructed to do so by IBM support personnel. The preconfigured basic input/output system (BIOS) settings are shown in the following table:

Table 4. Preconfigured BIOS settings.

Start options	Settings
Keyboardless operation mode	Enabled
Displayless operation mode	Enabled
Floppy diskette	Removed from boot sequence
Network	Removed from boot sequence
Virus detection	Disabled
Boot failure detect	Disabled

Starting the Configuration/Setup Utility program

To start the Configuration/Setup Utility program:

Note: To use this program you need to have a keyboard, mouse, and monitor connected to the appliance server.

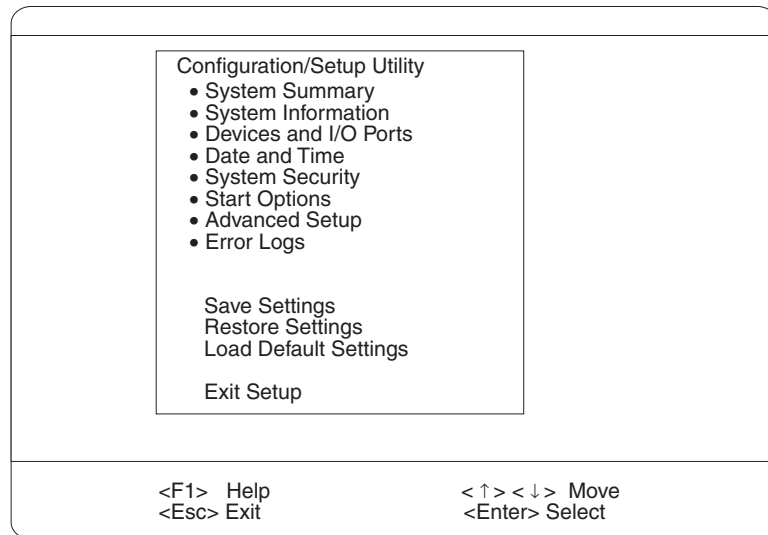
1. Turn on the appliance server and view the monitor screen.
2. When the message Press F1 for Configuration/Setup appears, press F1.

Note: If you have set both levels of passwords (user and administrator), you must type the administrator password to access the full Configuration/Setup menu.

3. Follow the instructions that appear on the monitor screen.

Configuration/Setup main menu choices

From the Configuration/Setup Utility main menu, you can select settings that you want to change. The Configuration/Setup Utility main menu is similar to the following.



Notes:

1. You can press F1 to display help information for a selected menu item.
2. The choices on some menus might differ slightly, depending on the BIOS version in your appliance server.

The following choices available from the main menu:

- **System Summary**

Select this choice to display configuration information. This includes the type and speed of the microprocessors and the amount of memory installed.

Changes that you make to configuration settings appear on this summary screen. You cannot edit the fields.

This choice appears on both the full and limited Configuration/Setup Utility menus.

- **System Information**

Select this choice to display information about your appliance server. Changes that you make on other menus might appear on this summary screen. You cannot edit any fields. The **System Information** choice appears only on the full Configuration/Setup Utility main menu.

- **Product Data**

Select this choice to view system information, such as the machine type and model, the appliance server serial number, and the revision level or issue date of the BIOS stored in the flash electrically erasable programmable ROM (EEPROM).

- **System Card Data**

Select this choice to view vital product data (VPD) for some server components.

- **Devices and I/O Ports**

Select this choice to view or change the assignments for devices and input/output ports. This choice appears only on the full Configuration/Setup Utility main menu.

You can also use this choice to enable or disable the integrated SCSI, and Ethernet controllers.

- The default setting is **Enable** for all the controllers. If you select **Disable**, the system will not configure the disabled device, and the operating system will not detect the device. (This is equivalent to unplugging the device.)
- If the on-board SCSI controller (model 8654 only) is disabled and no other storage-device controller is installed, operating system startup cannot occur.

- **Date and Time**

Select this choice to set the system date and time. This choice appears only on the full Configuration/Setup Utility main menu.

The system time is in a 24-hour format: hour:minute:second.

- **System Security**

Select this choice to set passwords or a system owner's name. This choice appears only on the full Configuration/Setup Utility main menu.

You can implement two levels of password protection:

- **Power-on Password**

Select this choice to set or change a power-on password.

Note: If you set a power-on password, you can no longer remotely manage the appliance.

- **Administrator Password**

Select this choice to set or change an administrator password.

Attention: If an administrator password is set and then forgotten, it cannot be overridden or removed. You must replace the system board.

The administrator password provides access to all choices on the Configuration/Setup Utility main menu. You can set, change, or delete both the administrator and power-on passwords and allow a power-on password to be changed by the user.

- **Start Options**

Select this choice to view or change the start options. This choice appears only on the full Configuration/Setup Utility main menu. Start options take effect when you start your appliance server.

You can select keyboard operating characteristics, such as the keyboard speed. You also can specify whether the keyboard number lock starts on or off. You also can enable the appliance server to run without a diskette drive, monitor, or keyboard.

The appliance server uses a startup sequence to determine the device from which the operating system starts. For example, you can define a startup sequence that checks for a startable diskette in the diskette drive, then checks the hard disk drive in bay 1, and then checks a network adapter.

If the **Boot Fail Count** choice is enabled, you must restart the system three times to restore the system BIOS default settings. If this choice is disabled, the system BIOS defaults can be restored only from the Configuration/Setup Utility main menu.

You can enable a virus-detection test that checks for changes in the master boot record at startup.

- **Advanced Setup**

Select this choice to change values for advanced hardware features, such as cache control and PCI configuration. This choice appears only on the full Configuration/Setup Utility main menu.

A warning message appears above the choices on this menu to alert you that the system might malfunction if these options are configured incorrectly. Follow the instructions on the screen carefully.

- **Processor Serial Number Access**

Select this choice to specify whether the microprocessor serial number in the microprocessor is readable.

- **System Partition Visibility**

Select this choice to specify whether the System Partition is visible. To make the System Partition visible, set this value to **Visible**. To make the System Partition invisible, set this value to **Hidden**.

- **Core Chipset Control**

Select this choice to modify settings that control features of the core chip set on the system board.

Attention: Do not make changes here unless directed to do so by an IBM authorized service representative.

- **Cache Control**

Select this choice to enable or disable the microprocessor cache. In addition, you can define the microprocessor cache mode as write-back (WB) or write-through (WT). Selecting write-back mode provides better system performance.

- **PCI Slot/Device Information**

Select this choice to view and identify system resources that are used by PCI devices. PCI devices automatically communicate with the appliance server configuration information. This usually results in automatic configuration of a PCI device.

Attention: You must use the menu selections to save custom settings for the **PCI Slot/Device Information** choice. The **Save Settings**, **Restore Settings** and **Load Default Settings** choices on the main menu of the Configuration/Setup Utility do not save the PCI Slot/Device Information settings.

Use the **PCI Device Control** choice to enable or disable the PCI slots from this menu.

The default setting is **Enable** for all the PCI slots. If you select **Disable**, the system will not configure the disabled device, and the operating system will not detect the device. (This is equivalent to unplugging the device.)

- **Memory Settings**

Select this choice to manually disable or enable a bank of memory.

If a memory error is detected during POST or memory configuration, the appliance server can automatically disable the failing memory bank and continue operating with reduced memory capacity. If this occurs, you must manually enable the memory bank after the problem is corrected. Select **Memory Settings** from the Advanced Setup menu, use the arrow keys to highlight the bank that you want to enable; then, use the arrow keys to select **Enable**.

- **Error Logs**

Select this choice to view or clear error logs.

- Select **POST Error Log** to view the three most recent error codes and messages that the system generated during POST.

Select **Clear error logs** from the POST Error Log menu to clear the error log.

- Select **System Event/Error Log** to view the System Event/Error log. The system event/error log contains all the system error and warning messages that the system has generated. You can use the arrow keys to move between pages in the System Event/Error log.

Select **Clear error logs** from the System Event/Error log menu to clear the error or event log.

- **Save Settings**

Select this choice to save your customized settings.

- **Restore Settings**

Select this choice to delete your changes and restore the previous settings.

- **Load Default Settings**

Select this choice to discard your changes and restore the factory settings.

- **Exit Setup**

If you have made any changes, the program will prompt you to save the changes or exit without saving the changes.

Using passwords

The **System Security** choice appears only on the full Configuration/Setup Utility menu. After you select this choice, you can implement two levels of password protection: power-on password and administrator password.

Power-on password

After you set a power-on password, you can enable the unattended-start mode. This locks the keyboard and mouse, but enables the system to start the operating system. The keyboard and mouse remain locked until you type the correct password.

You can use any combination of up to seven characters (A–Z, a–z, 0–9, and blanks) for your power-on password. Keep a record of your password in a secure place. If you forget the power-on password, you can regain access to the appliance server through one of the following methods:

- If an administrator password is set, type the administrator password at the power-on prompt. Start the Configuration/Setup Utility program, and change the power-on password.
- Change the position of the password override switch or clear CMOS jumper.
- Remove the battery and then install the battery.

The following illustration shows the location of the password override switch on a model 8654 appliance server, switch 4 of switch block 1, on the system board.

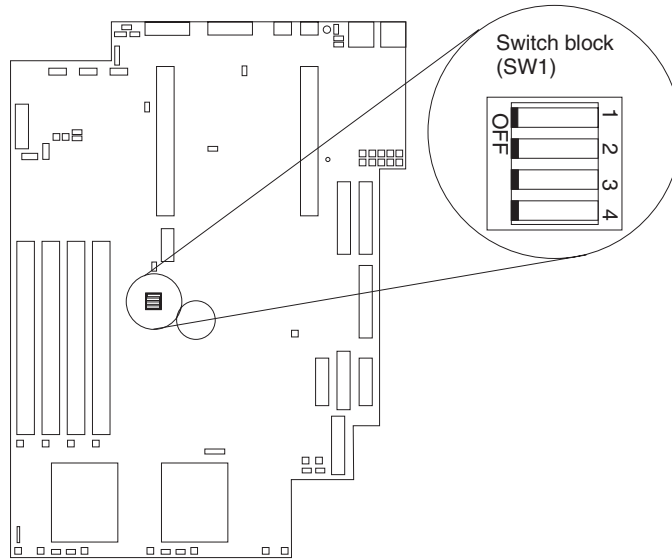


Figure 6. The password override switch on the model 8654

The following illustration shows the location of the CMOS jumper on a model 8672 appliance server system board.

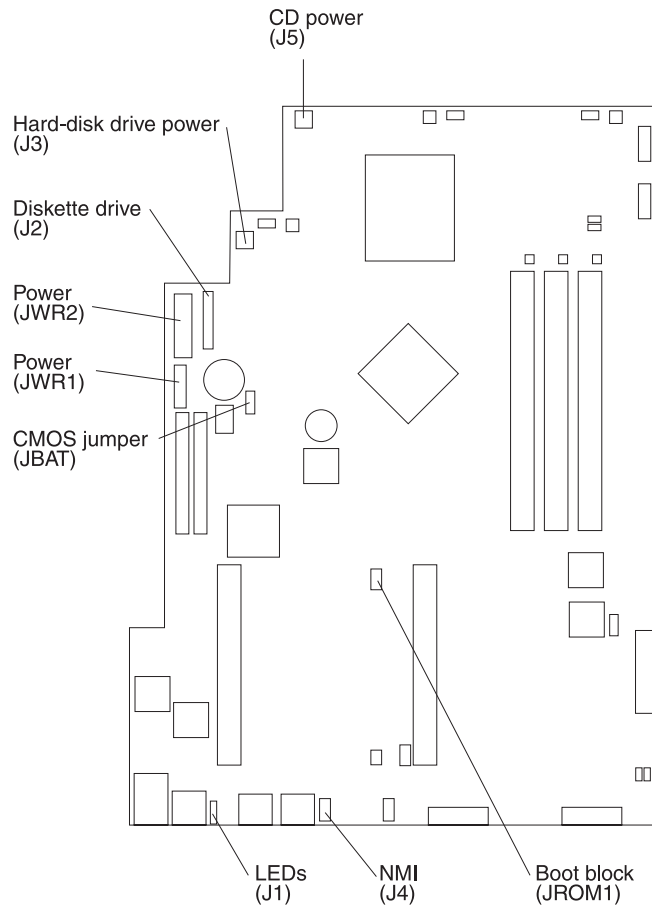


Figure 7. The password override jumper on the model 8672

To set the password override switch or jumper:

1. Review the information in “Safety” on page vii.
2. Turn off the appliance server and peripheral devices and disconnect all external cables and power cords; then, remove the cover. See “Removing the cover” on page 76.
3. To set the override switch or jumper for your model:
 - 8654, Toggle switch 4 on switch block 1 on the system board to the position opposite the current position. This clears the power-on password for one boot cycle.
 - 8672, If the CMOS jumper is installed, remove it to clear the CMOS and reset the power-on password. If the CMOS jumper is not installed, then installing it will clear the CMOS and reset the power-on password.

Note: This means that you can now start or power-on the appliance server one time without having to use the power-on password. But if you do not use the Configuration/Setup Utility program to change or delete the password, the next time you start the appliance server, the original power-on password will be reinstated.

4. Connect the appliance server to a power source, keyboard, monitor, and mouse.
5. Restart the appliance server.

Note: You can now start the Configuration/Setup Utility program and either delete the old password or set a new power-on password.

Administrator password

Select this choice to set an administrator password. The administrator password provides access to all choices on the Configuration/Setup Utility main menu. You can set, change, or delete both the administrator and power-on passwords and enable a power-on password to be changed by the user.

Attention: If an administrator password is set and then forgotten, it cannot be overridden or removed. You must replace the system board.

The following table provides a summary of the password features.

Table 5. Power-on and administrator password features.

Type of password	Results
Power-on password	<ul style="list-style-type: none">Type the password to complete the system startup.All choices are available on the Configuration/Setup Utility main menu.
Administrator password	<ul style="list-style-type: none">No password is required to start the system.Type the password to access the Configuration/Setup Utility program.All choices are available on the Configuration/Setup Utility main menu.
Administrator <i>and</i> power-on password	<ul style="list-style-type: none">You can type either password to complete the system startup.The administrator password provides access to all choices on the Configuration/Setup Utility main menu. You can set, change, or delete both the administrator and power-on passwords and allow a power-on password to be changed by the user.The power-on password provides access to a limited set of choices on the Configuration/Setup Utility main menu. This limited access might include changing or deleting the power-on password.

Using the SCSISelect utility program

SCSISelect is a built-in, menu-driven configuration utility program that you can use to:

Note: The SCSISelect utility program is available for the model 8654 only.

- View the default SCSI IDs
- Locate and correct configuration conflicts
- Perform a low-level format on a SCSI hard disk

The following sections provide the instructions needed to start the SCSISelect Utility and descriptions of the menu choices available.

Starting the SCSISelect utility program

To start the SCSISelect utility program:

Note: To use the SCSISelect utility you need to have a keyboard, mouse, and monitor connected to the appliance server.

1. Turn on the appliance server.
2. When the <<< Press <CTRL><A> for SCSISelect™ Utility! >>> prompt appears, press Ctrl+A.

Note: If an administrator password has been set, a prompt appears asking you to type the password to start the SCSISelect Utility program.

3. Use the arrow keys to select a choice from the menu.
 - Press Esc to return to the previous menu.
 - Press the F5 key to switch between color and monochrome modes (if your monitor permits).
4. Follow the instructions on the screen to change the settings of the selected items; then, press Enter.

SCSISelect menu options

The following choices appear on the SCSISelect Utility menu:

- **Configure/View Host Adapter Settings**

Select this choice to view or change the SCSI controller settings. To reset the SCSI controller to its default values, press F6; then, follow the instructions that appear on the screen.

You can view or change the following controller settings:

- **Host Adapter SCSI ID**

Select this option to be able to view the SCSI controller ID, normally 7.

- **SCSI Parity Checking**

Select this option to be able to view the assigned value of **Enabled**.

- **Host Adapter SCSI Termination**

Select this option to be able to view the assigned value of **Enabled**.

- **Boot Device Options**

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

- **SCSI Device Configuration**

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

Note: The Maximum Sync Transfer Rate is the transfer rate for Ultra SCSI devices.

- The transfer rate for Ultra3 SCSI LVD devices is 160.0 Mbps.
- The transfer rate for Ultra2 SCSI LVD devices is 80.0 Mbps.
- The transfer rate for Fast SCSI devices is 20.0 Mbps.

- **Advanced Configuration Options**

Select this choice to view or change the settings for advanced configuration options.

- **SCSI Disk Utilities**

Select this choice to view the SCSI IDs that are assigned to each device or to format a SCSI device.

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

Note: If you press Ctrl+A before the selected drives are ready, an Unexpected SCSI Command Failure screen might appear. Restart the appliance server and watch the SCSISelect messages as each drive spins up. After the drive that you want to view or format spins up, press Ctrl+A.

Chapter 4. The Advanced Appliance Configuration Utility

The Advanced Appliance Configuration Utility is one way to configure network settings. If you are adding multiple appliance servers to your network, you can use the Advanced Appliance Configuration Utility to configure multiple appliance servers simultaneously.

Use the following general procedure to manage the appliance server:

1. If you have not already done so, designate a mobile computer, workstation, or server to use to manage the network.
2. Install and then start the Advanced Appliance Configuration Utility from the *Supplementary* CD on the workstation (see “Installing and starting the Advanced Appliance Configuration Utility”).
3. Create groups and determine if you want to enable reprovisioning (see “Using the group functions to manage your appliance servers” on page 32 and “Enabling Reprovisioning for an existing group” on page 39.)
4. If necessary, add appliance servers to the groups (see “Moving an appliance server into a group” on page 37). You might not need to perform this step if appliance servers have automatically been moved to another group.
5. Configure your Web site and transfer Web content to the appliance server. See the Chapter 5, “Managing the appliance server,” on page 43 for more information about the Appliance System Manager program.

Installing and starting the Advanced Appliance Configuration Utility

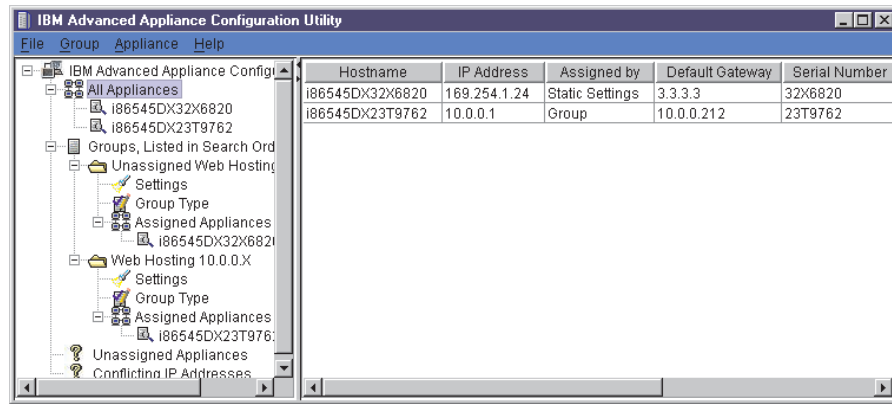
To install and start the Advanced Appliance Configuration Utility, do the following:

1. Insert the *Supplementary* CD into the CD-ROM drive of your remote Windows workstation designated for managing the network.
2. From the IBM Advanced Appliance Configuration directory, run the Setup.exe file.
3. From the remote workstation you are using to manage the network, go to Start and then open the IBM Advanced Appliance Configuration Utility.

Any IBM xSeries appliance server that is running and is connected to the same physical subnet as the system that is running the Advanced Appliance Configuration Utility console is automatically discovered when you start the Advanced Appliance Configuration Utility. Each appliance server appears in the All Appliances list and one of the following lists: the appliance list of the group it belongs to, the Unassigned Appliances list, or the Conflicting IP Address list. A rescan, (see “Rescanning” on page 41) forces an immediate discovery of appliance servers in the subnet.

Notes:

- a. The Advanced Appliance Configuration Utility configures and reports the TCP/IP settings of the first adapter on each appliance server only. The first adapter is the port 1 Ethernet controller. Be sure to connect the built-in Ethernet connector to the same subnet as your system running the Advanced Appliance Configuration Utility.
- b. The Advanced Appliance Configuration Utility console must be running on the same physical subnet as the appliance server. Only one Advanced Appliance Configuration Utility console should be running at a time.



Proceed to “Using the group functions to manage your appliance servers” to continue using the Advanced Appliance Configuration Utility.

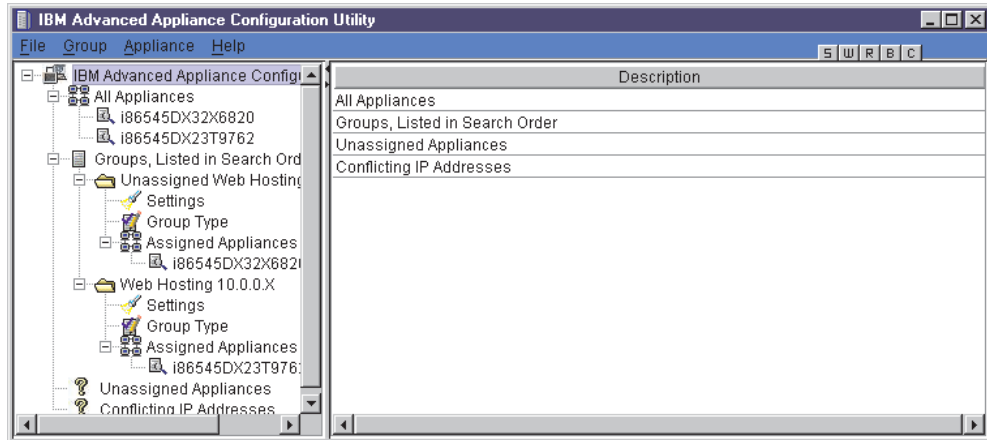
Using the group functions to manage your appliance servers

Groups specify the parameters that the Advanced Appliance Configuration Utility uses to automatically categorize discovered appliance servers and to configure them with the network settings of their group. Group types are defined by appliance type or purpose. Each group can contain only one type of appliance server. The Advanced Appliance Configuration Utility uses groups to logically list appliance servers and to automatically apply predetermined network settings to newly installed and discovered appliance servers. You can drag and drop appliance servers from one group to another as long as the appliance server type matches the group.

Appliance servers can belong only to a group that matches the type of appliance server. If the Advanced Appliance Configuration Utility is configured to not assign settings, it does not configure any of the network settings of the appliance server. Groups provide a collection of appliance servers that:

- Display network settings
- Provide a shortcut to Appliance System Manager
- Provide a common reprovisioning capability

If the appliance network settings are configured by a method other than using the Advanced Appliance Configuration Utility, the appliance server is still discovered, and it joins the first group that matches the appliance server. If no matching group exists, the appliance server is listed in the Unassigned Appliances list. The Advanced Appliance Configuration Utility window lists the following items:



- All appliances

Every discovered appliance server is listed under all appliances, and also in one of the following:
- Groups, Listed in Search Order

This view shows all groups that are defined, with appliance servers that are assigned to each group nested beneath the group name in the Tree view. The purpose of the appliance server is defined by a group so that all appliance servers appearing in a group are of the same type.

The IBM Advanced Appliance Configuration Utility automatically assigns one IP address per appliance server, using available addresses assigned within the group type. When a group IP address range is exhausted, the Advanced Appliance Configuration Utility no longer manages the network settings of subsequently discovered appliance servers.

When an appliance server is discovered on the network, the Advanced Appliance Configuration Utility searches defined groups. Appliances are then automatically added to the first group that matches the purpose of the appliance server. The order in which groups appear is important in the appliance discovery process, because an appliance server is assigned to the first matching group that it discovers. To adjust the search order, right-click on a group and use up or down to adjust its position within the group list.
- Unassigned Appliances list

Any discovered appliance servers that do not match any existing group join the Unassigned Appliances list.
- Conflicting IP Addresses

If the IP Address of the discovered appliance server has the same address of an already discovered appliance server and there is no group defined to automatically assign a different address, the appliance server is placed in the conflicting address list.

Creating a group

When you create a group, appliance servers that match the appliance type of the group and are members of the Unassigned Appliances list automatically move to that group. To create a group, do the following:

1. Start the Advanced Appliance Configuration Utility. From the Group menu, click **Create Group**. The Advanced Appliance Configuration Utility Group Wizard window opens.
2. Specify a group name. In the **Group Name** field, type a unique name that will identify the group.
3. Select the Appliance Group type. The Appliance Group type determines what purpose an appliance server must serve to be included in the group. For example, you can select one of the following values:
 - All xSeries Appliances
 - xSeries Network Attached Storage Appliances (this includes the xSeries 150)
 - xSeries Web Hosting Appliances (this includes the xSeries 130 and xSeries 135)
4. If you want this group to manage the network settings of the assigned appliance servers using the Advanced Appliance Configuration Utility, click **Yes**, and then specify the TCP/IP network settings to be used by members of the group. If you want to use some other tool to configure your IP address, click **No** and proceed to step 5 on page 35.

Start IP Address

The lowest IP address in a range of IP addresses that can be automatically assigned to an appliance server that is a member of the group.

End IP Address

The highest IP address in a range of IP addresses that can be automatically assigned to an appliance server that is a member of the group.

Subnet Mask

The subnet mask value to automatically assign for members of the group.

Default Gateway

The IP address for the default gateway to automatically assign for members of the group (optional).

DNS Address

The IP address of the Domain Name Server (DNS) to automatically assign for members of the group (optional). Up to three entries are available.

Use Current Host Name

This is the host name of the appliance server and it is not automatically assigned.

Use "i"Prefix and Model-Serial number

The host name is set to use an "i" prefix and the model and serial number of the appliance server. This is the default name that is preconfigured on xSeries 135 appliance servers. For example, an appliance server with the model number of 86545DX and serial number of 23T9762 yields a host name of i86545DX23T9762.

Use Prefix-IP Address

A user-specified prefix is combined with the appliance server IP address to generate the host name. Periods (.) are invalid in a host name, and are replaced with hyphens (-). When you supply the prefix, remember that the total length of the host name cannot exceed 15 characters.

Domain Name

Enter the DNS domain name to assign to appliance servers. This field is optional.

5. Click to **enable reprovisioning** and complete the File Transfer Protocol (FTP) setup information. To reprovision your appliance servers from the FTP server, complete the following fields:

Remote Host Name

This is the host name or IP address of the FTP server.

Remote Directory

This is the directory to use on the FTP server for reprovisioning images. This directory cannot be left blank. The image file has to be created in a subdirectory of the FTP server root directory.

FTP User Name

This is the username to use when logging into the FTP server.

FTP Password

This is the password to use when logging into the FTP server.

6. Click **Finish**.

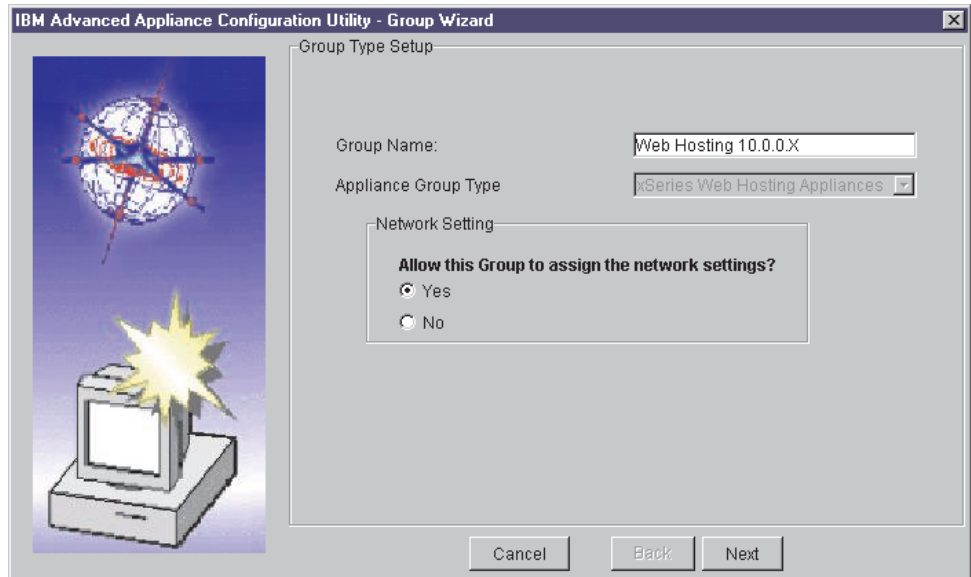
When groups are defined, go to “Using the group functions to manage your appliance servers” on page 32 or “Moving an appliance server into a group” on page 37. When finished, you can then use the Advanced Appliance Configuration Utility to edit groups, move appliances, or you can use other features of the Advanced Appliance Configuration Utility such as reprovisioning.

Editing a group

You can modify a group and enable reprovisioning for a group using the edit group feature. If you edit a group and make changes to the host name or DNS domain name, you need to start the appliance server again for the changes to take effect. To make changes to an existing group, do the following:

1. From the Groups listed in Search order list, highlight the group that you want to change.
2. Open the Group menu, and click **Edit Group**. Make the changes that you want. You can edit any field for the Group except the group type.

Note: Changes you make to a group do not apply to all appliance servers. Changes apply only to appliance servers that have network settings assigned by the group. See also “Editing appliance server settings” on page 38.



3. If you want this group to manage the network settings of the assigned appliance servers using the Advanced Appliance Configuration Utility, click **Yes**, and then specify the TCP/IP network settings to be used by members of the group. If you want to use some other tool to configure your IP address, click **No** and proceed to step 4 on page 37.

Start IP Address

The lowest IP address in a range of IP addresses that can be automatically assigned to an appliance server that is a member of the group.

End IP Address

The highest IP address in a range of IP addresses that can be automatically assigned to an appliance server that is a member of the group.

Subnet Mask

The subnet mask value to automatically assign for members of the group.

Default Gateway

The IP address for the default gateway to automatically assign for members of the group (optional).

DNS Address

The IP address of the DNS Address to automatically assign for members of the group (optional). Up to three entries are available.

Use Current Host Name

The host name of the appliance server is not automatically assigned.

Use "i"Prefix and Model-Serial number

The host name is set to use an "i" prefix and the model and serial number of the appliance server. This is the default name that is preconfigured on xSeries 135 appliance servers. For example, an appliance server with the model number of 86545DX and serial number of 23T9762 yields a host name of i86545DX23T9762.

Use Prefix-IP Address

A user-specified prefix is combined with the appliance server IP address to generate the host name. Periods (.) are invalid in a host name, and are replaced with hyphens (-). When you supply the prefix, remember that the total length of the host name cannot exceed 15 characters.

Domain Name

Enter the DNS domain name to assign to appliance servers. On Windows systems this is known as the DNS Suffix Search. This field is optional.

4. Click to **enable reprovisioning** and complete the File Transfer Protocol (FTP) setup information. You can reprovision your appliances from the FTP server by completing the following fields:

Remote Host Name

This is the host name or IP address of the FTP server.

Remote Directory

This is the directory to use on the FTP server for reprovisioning images.

FTP User Name

This is the username to use when logging into the FTP server.

FTP Password

This is the password to use when logging into the FTP server.

5. Click **Finish**.

Moving an appliance server into a group

To move an appliance server into a group, perform the following steps:

1. Using the mouse, select the appliance server icon. When you drag the icon, it changes and displays where you can drop the appliance server.
2. Drag the appliance server icon into the group that you want. Although the appliance server is listed in the All Appliances list, you can drop the appliance server icon when you are over the group name or the Assigned Appliances list that belongs to the group.

If the group is configured to manage network settings and there is an IP address available from the IP address range of the group, the Advanced Appliance Configuration Utility automatically configures the network settings of the appliance server. Otherwise, the network settings are not configured by the Advanced Appliance Configuration Utility and no changes are made. If you need to make changes to the settings for your appliance server after it is assigned to a group, see “Editing appliance server settings” on page 38.

Removing appliance servers from groups

Use the remove appliance option to delete an appliance server from the Advanced Appliance Configuration Utility console database. Removing an appliance server that is no longer in use enables the IP address that was assigned to the appliance server to be allocated to another appliance server. You can also remove an appliance server from a group and then rescan the network to add it to an appropriate group that appears higher in the group list.

Note: If the appliance server you are trying to remove does not respond when you highlight it and select remove, it is automatically removed. However, if you attempt to remove an active appliance server, a warning message displays.

To remove an appliance server, highlight and right-click the appliance server; then from the menu, click **Remove Appliance**.

Using the Assigned by First Matching Group function

The Assigned by First Matching Group function enables you to set appliance servers to join the first matching group. You can move appliance servers to the group that you want by using a drag-and-drop method or by right-clicking the unassigned appliance server and then clicking **Assign by First Matching Group**. To assign an appliance server to the first matching group, do the following:

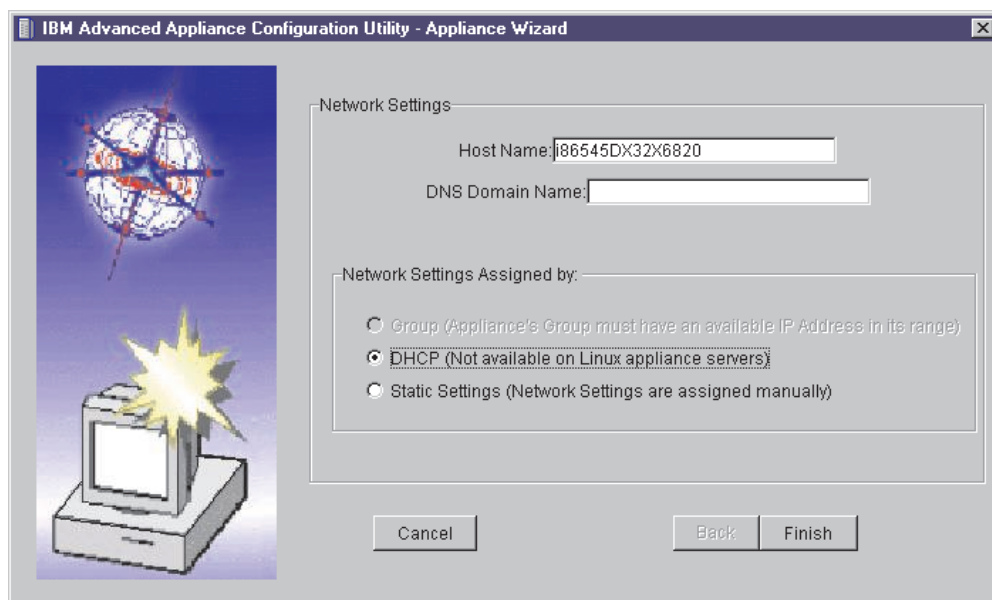
1. Right-click the group to which you want to move the appliance server.
2. Click **Move Up in List** to move the selected group up in the list of groups.
3. Repeat steps 1 and 2 until the group that you want to add the appliance server to appears above the group that currently contains the appliance server.
4. Right-click the appliance server that you want to move to another group, and then click **Assign by First Matching Group**. The appliance server moves to the group that it matches.

Editing appliance server settings

You can make changes to your appliance server network settings. To change network settings, do the following:

1. Highlight the appliance server you want to change and click **Edit Appliance**.

Note: This utility can be used to manage both xSeries 130 and xSeries 135 appliance servers. The following screen shows an xSeries 130. The DHCP option will not be available on the xSeries 135.



2. Select if you want the network settings assigned by **Group** or **Static Settings**. If you select **Static Settings**, proceed to step 3 on page 39. If you select **Group**, proceed to step 4 on page 39.

Notes:

- a. The appliance server remains in the group but any changes made to the group are not made to the appliance server that is now assigned for static settings.
- b. You can also change the host name and DNS domain name when **Static Settings** has been selected.

3. Enter the TCP/IP settings for the appliance server.

IP Address

The IP address assigned to the appliance server.

Subnet Mask

The subnet mask value assigned to the appliance server.

Default Gateway

The IP address for the default gateway assigned to the appliance server (optional).

DNS Address

The IP address of the Domain Name Server (DNS) assigned to the appliance server (optional). Up to three entries are available.

4. Click **Finish**.

Note: If you edit the host name or DNS domain name for the appliance server, you need to restart the appliance server for the changes to take effect.

Reprovisioning your appliance server

Reprovisioning enables you to easily change the operating system on an appliance server. This is done by creating an image of a configured appliance server and then storing it on an FTP server, using the **Create Appliance Image** function. You can then store this image on one or several appliance servers using the **Apply Appliance Image** function. Using reprovisioning, you can do the following to your appliance server:

- Create an appliance image
- Apply an appliance image
- Restore factory settings

Note: Reprovisioning does not affect the data on your appliance server; only the operating system on the appliance server.

Enabling Reprovisioning for an existing group

If you enable a group to support reprovisioning, you can create and apply appliance server images.

Notes:

1. When you are in the process of reprovisioning an appliance server, the icon next to the appliance server changes in appearance.
2. The history tab of the appliance server records the results of a reprovision action. Check this tab to ensure that the operation completed successfully.

To enable reprovisioning for an existing group, do the following:

1. Select the group for which you want to enable reprovisioning.
2. Highlight and right-click on the group for which you want to enable reprovisioning; then, click **Edit Group**.
3. Navigate to the reprovisioning window and select **Enable Reprovisioning**.
4. Set the FTP settings.

Remote Host Name

This is the host name or IP address of the FTP server.

Remote Directory

This is the directory to use on the FTP server for reprovisioning images.

FTP User Name

This is the username to use when logging into the FTP server.

FTP Password

This is the password to use when logging into the FTP server.

5. Click **Finish** to return to the main window.

Note: When you create an image for reprovisioning, it is saved as the group name and model number. Although multiple models of appliance servers may belong to a group, only images created from the same model can be applied. This prevents you from applying the image to the wrong appliance server.

Creating an appliance server image

The Create Appliance Image function makes an image of the operating system on your appliance server, and saves this image on the FTP server designated for the group.

Note: If the history tab of the appliance server shows that the reprovision action failed due to an FTP failure, retry the action. If you continue to have FTP problems, try manually connecting to your FTP server to verify connectivity.

To create an appliance server image, perform the following steps:

1. Select the appliance server from which you want to create the image.
2. From the Appliance menu, click **Create Appliance Image**.
3. Click **Yes**.

Applying an appliance server image

The Apply Appliance Image function replaces an image of the operating system on your appliance server with an image from the FTP server designated for the group.

Note: If the history tab of the appliance server shows that the reprovision action failed due to an FTP failure, retry the action. If you continue to have FTP problems, try manually connecting to your FTP server to verify connectivity.

To apply an appliance image, perform the following steps:

1. Select the appliance server to which you want to apply the image.
2. From the Appliance menu, click **Apply Appliance Image**.
3. Click **Yes**.

Restoring a factory image

Reprovisioning also enables remote restoration of the original factory image to the appliance server by reapplying the factory image from the local image on the appliance server. Because an FTP server is not involved, this ability is available regardless of whether or not the appliance servers belong to a group.

To restore the factory image, do the following:

1. Select the appliance server to which you want to restore the image.
2. From the Appliance menu, click **Restore Factory Image**.
3. Click **Yes**.

Rescanning

The Advanced Appliance Configuration Utility detects appliance servers that are on the same physical subnet as the Advanced Appliance Configuration Utility console. Appliance servers that can communicate with the console have a file/magnifying glass icon; those that are not responding have an X on a red circle icon.

The Advanced Appliance Configuration Utility does not automatically detect if an appliance server has failed. If you suspect that an appliance server has failed, rescan the network to update the icons. To rescan the network, from the File menu, click **Rescan Network**

Exporting and importing the database

The server database of the Advanced Appliance Configuration Utility Console contains group definitions and discovered appliance server information. When the appliance server starts, it reads the database file and updates the file automatically. To import or export a configuration database, do the following:

1. From the File menu, click **Import configuration** or **Export configuration**.
2. Type the file name (the exported file is an ASCII based text file). If a file name is specified, all file names are relative to the directory where the Advanced Appliance Configuration Utility is installed.

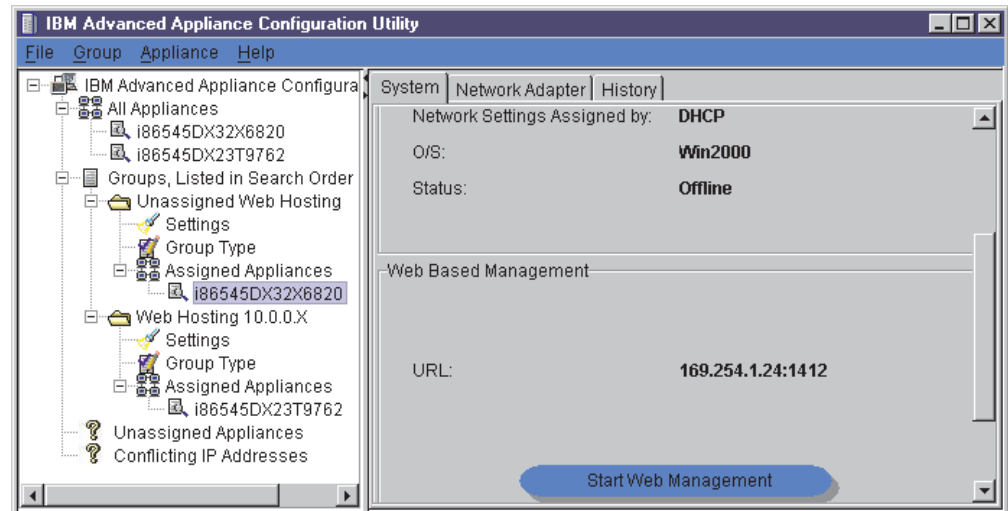
Notes:

- a. The remote workstation that is running the Advanced Appliance Configuration Utility console automatically maintains a copy of the database (ServerConfiguration.properties) in the Advanced Appliance Configuration Utilities installed directory. To remove previous configuration data, close the Advanced Appliance Configuration Utility, delete this file, and then start the utility again. When you start again, all previously configured groups are deleted. The Advanced Appliance Configuration Utility discovers connected appliance servers and their network settings.
- b. As a precaution, you cannot export to an already existing file.

Starting Appliance System Manager using Advanced Appliance Configuration Utility

To use the Advanced Appliance Configuration Utility console to start the Appliance System Manager, do the following:

1. Click the appliance that you want.
2. Click **Start Web-Based Management**.



Your default Web browser starts, and starts the Appliance System Manager console automatically.

3. Log in to the Appliance System Manager Web page.

Chapter 5. Managing the appliance server

The appliance server provides easy-to-use Web hosting on a preinstalled server platform with unattended operation. Installation is simple and configuration is minimal.

An Internet Service Provider (ISP) or e-business customer can deploy as many appliances as the enterprise needs. Most of the operation of the xSeries 135 is hidden. All administration is done remotely through Web-based interfaces.

Most operations start from the Appliance System Manager main Web page. To enter Appliance System Manager:

1. Go to the URL `https://ip_address_of_appliance:1999`
2. Click **Administration** → **Appliance System Administration**.
3. Enter an Appliance System Manager administrator userid and password. (The default userid is "administrator" and the default password is "password".)

Putting Web pages on the appliance server

You can use any Web publishing tools to create page content. You cannot create pages on the appliance server, or on your administrative network.

Supported Web page formats

The Web pages must have static content, with the exception of PHP. Any static file is allowed, including:

- HTML files with .htm or .html filetypes
- Images with .jpg or .gif filetypes
- Audio files with filetypes such as .wav
- Movie files with filetypes such as .mpg
- Animated files created with tools such as Macromedia

Unsupported Web page formats

Users cannot store certain Web pages that change according to end-user actions. Such Web pages include Java servlets or other server-side programming, although some formats (PHP pages, for example) are supported.

Sending customer pages to the appliance server

Users can use File Transfer Protocol (FTP) to copy Web content pages to their home directories on the appliance. They also can use FTP to delete files and to move files. Customer FTP use is limited as described below.

A customer connecting to the appliance using FTP and the correct user ID is placed directly into their home directory, which appears as /. The user can create subdirectories below that home directory, but cannot access directories of any other users on the appliance server.

Users should place Web userid files into the public_html subdirectory of their home directories. A Web page with a URL starting with http://appliance/ belongs to the appliance. To change Web pages with URLs starting with http://appliance/, change the files owned by the user webroot. For example, changing the file index.html in the Webroot public_html directory changes the home Web page of the appliance.

Note: You could configure the IBM HTTP Server to look for Web pages in other directories, but all Web files should be somewhere on the /home, /home2, or one of the /net/homeX partitions. Files in any other partition are not backed up and would be overwritten if the appliance were reloaded.

Accessing customer Web pages

Web pages owned by users are accessed as http://appliance/~userID . For example, assume user userid creates Web pages in userid's public_html directory on an appliance with the host name www.example.com . Now userid's pages can be accessed by the URL http://www.example.com/~userid.

User Web space security

The customer Web pages are protected by FTP and Linux security. FTP users have no administrative access and cannot access directories or files of other users. Customers are allowed access only to their own home directories. Non-customers are not allowed FTP access at all. Customers do not have access to the Appliance System Manager Web pages or to any other administrative function. Customers can, however, update their own passwords. To change the password, perform the following steps:

1. Visit the URL http://appliance_IP_address:1959.
2. Click **Change User Password**.
3. Enter the existing password and the new password.

User Web content backup

Customers are responsible for backing up their own pages. An administrator can periodically backup all user data, see "Backing up and restoring customer data" on page 49, but those backups do not happen automatically.

Checking status

The system status checks are to check the status of the appliance itself, and to check the status of the network.

Note: The time returned on status requests is for the time zone set at the appliance. If you are accessing the appliance from another time zone, the times might differ.

System processes

Click **Status** → **System Processes** to display a list of the active processes on the appliance. Clicking System Processes is similar to issuing the `ps` command. The process status page is displayed for each process. These processes are described as follows:

- **USER** - the user ID of the process owner
- **PID** - the processID
- **%CPU** - the percentage of total CPU being used by the process
- **%MEM** - the percentage of total memory being used by the process
- **VSZ** - the total virtual memory size of the process
- **RSS** - the resident virtual memory size of the process
- **TTY** - the terminal name
- **STAT** - the process codes
- **START** - when the process was started
- **TIME** - the total CPU time used by the process so far
- **COMMAND** - the name of the processed command

Click **Refresh** to refresh the status report. Click **History** to select from the most recent 10 status reports. When clicked, the **History** button changes to **Current**.

Disk usage

Click **Status** → **Disk Usage** to display the disk usage on the appliance. Use this command to make sure you are allocating enough space to users. Return values are described as follows:

- **Filesystem** indicates the current location on the drive for which the statistics are compiled, for example, `/dev/sda7`.
- **Used** indicates the amount of disk space (in bytes) currently in use on this filesystem.
- **Available** indicates the amount of unused disk space on this filesystem.
- **Use%** indicates the percent of used disk space on this filesystem.
- **Mount** displays the directory where this filesystem is mounted, for example, `/`.

Click **Refresh** to refresh the status report. Click **History** to select from the most recent 10 status reports. When clicked, the **History** button changes to **Current**.

System usage

Click **Status** → **System Usage** to display the statistics for the system times of the CPU and disk read and write. All the times displayed are in jiffies (1/100th of a second). The following times are displayed for User mode, user mode-low priority, System mode, and Idle task:

- CPU
- Disk
- Disk read I/O
- Disk write I/O
- Disk write block
- Disk read block

Click **Refresh** to refresh the status report.

Click **History** to select from the most recent 10 status reports. When clicked, the History button changes to Current.

System load

Click **Status** → **System Load** to display the number of jobs in the run queue in 1, 5, and 15 minute load averages. Click **Refresh** to refresh the status report. Click **History** to select from the most recent 10 status reports. When clicked, the History button changes to Current.

Memory usage

Click **Status** → **Memory Usage** to display the amount of current free memory and swap memory. All units are in KB. The page displays the following:

- Total memory in the system
- Free unallocated memory available for applications use
- Shared memory
- Buffers
- Cached memory
- Swap memory
 - Total memory allocated for swap
 - Free memory available for swap

Click **Refresh** to refresh the status report.

Click **History** to select from the most recent 10 status reports. When clicked, the History button changes to Current.

Kernel interrupts

Click **Status** → **Kernel Interrupts** to check the status kernel interrupts. This page displays the statistics for interrupts for each IRQ disk and swap pages. Interrupts received are the number of interrupts for each IRQ. The IRQs shown are typical assignments and might not correspond to your system's configuration. System statistics indicate the number of pages the system paged in and out from the disk. It also shows the number of swap pages that have been brought in and out. Click **Refresh** to refresh the status report. Click **History** to select from the most recent 10 status reports. When clicked, the History button changes to Current.

Adapters

You can check the status of the appliance's network adapters:

1. Click **Status** → **Adapters**.
2. Click **View** for the adapter you want to check.

For the selected adapter the page displays the following:

- The current time and date
- Transmit and receive information

RPMs

The Installed RPM Status window displays information about the software currently installed on the system. Click **Status** → **RPM Status**. The following information is displayed for each installed RPM package:

- Name of the installed package
- Version of the installed package
- Vendor name
- Build date
- Install date
- Name of the host machine
- Size of the package (KB)
- Type of software license
- Other details

Note: You can use the browser Find function to look for specific text in the returned information, such as specific RPM package names.

Operating the appliance

This section explains how to use the appliance server.

Stopping the appliance

To stop the appliance, perform the following steps:

1. Click **Operations** → **Restart/Stop Appliance**.
2. Click **Shutdown**.

The appliance software stops, but the appliance is not powered off. Wait five minutes for the software to stop properly, then use the appliance power switch to power off the appliance.

Restarting the appliance

To restart the appliance, perform the following steps:

1. Click **Operations** → **Restart/Stop Appliance**.
2. Click **Reboot**.

Managing the Web server

This section describes how to manage the Web Server. Any Appliance System Manager administrator can administer the production Web server. When you visit the IBM HTTP Server ServerAdmin page, you are prompted for a user ID and password. You can use any Appliance System Manager administrator user ID and password. You can use the default administrator ID and password if you have not changed them.

To manage the Web Server:

1. Go to the URL `https://ip_address_of_appliance:1999`
2. If prompted, accept the new site certificate.
3. Click **Administration** → **IBM HTTP Server Administration**. A new browser window will appear.

Enter any Appliance System Manager administrator user ID and password to log in. The IBM HTTP Server administration program will appear. To read the IBM HTTP Server documentation, go to `http://your_appliance_IP_address:1959` and click **Documentation** → **IBM HTTP Server**.

Starting and stopping Web servers

The Web Server starts automatically when the appliance is started, and shuts down when the system is shutdown. You can start and stop the HTTP Server from the Appliance System Manager by selecting Operations **Stop/Start Web Server** in the Appliance System Manager navigator.

Backing up and restoring the appliance configuration

You can backup or restore system and Web Server configuration.

Backing up: Click **Operations** → **Backup/Restore** → **Backup Configuration** to start the process. The backup page lets you create backup files containing current appliance configuration data for the operating system, Web server, and administration data. The files backed up include:

- The main configuration file
- Key rings and key databases used for HTTP-S connections
- The security files holding administrator information

Note: The key rings and key databases are stored in a centralized set of locations. You do not need to know which are currently used. The key database used by Appliance System Manager to secure its HTTP-S session is in a separate location, and is also backed up. Customer Web pages are not backed up in this process. See Backing up and restoring customer data for information about backing up customer Web pages. You should also tell customers to keep a copy of files they FTP to the appliance.

Copying configuration backup to another system: A configuration backup is useful only if it is accessible after something happens to the backed up appliance. After you back up the configuration information, copy it to another system. Perform the following steps to copy the configuration information to another system:

1. Click **Operations** → **Backup/Restore** → **Backup Configuration**.
2. Click **Copy to server**.
3. Provide the requested information to use FTP to transfer the configuration information to another system.

Copying configuration backup from another system: If restoring a configuration is necessary, you first must copy it onto the appliance. Perform the following steps to copy the configuration information from another system:

1. **Operations** → **Backup/Restore** → **Restore Configuration**.
2. Click Copy from server.
3. Provide the requested information to transfer the configuration information from another system.

Restoring: To restore a backed up configuration, perform the following steps:

1. Copy the backed up configuration onto the appliance, if necessary.
2. Click **Operations** → **Backup/Restore** → **Restore Backup**.

Attention: Restoring a backup configuration overwrites the current appliance configuration such as network settings, definitions of user accounts, passwords, SSL certificates. Customer Web pages are not overwritten.

Backing up and restoring customer data

You can backup and restore customer data, and also backup user directories by FTP.

Backing up customer data: To back up customer data, perform the following steps:

1. Click **Operations**, then click **Backup User Directories**.
2. Select **Full** or **Incremental** backup:
 - Click **Full** to backup all user files.
Attention: All files found in the specified server directory are first deleted.
 - Click **Incremental** to backup only user files that have changed since the previous backup to the same server directory. If no previous backup is found in the server directory, an error is reported.
3. Fill in the host name, directory, user and password. For FTP, if you do not specify an absolute directory, the directory given is used relative to the default directory of the user. You must use a different server directory for backing up each appliance. You should use the appliance host name or other unique identifier for each backup directory name.
4. Click **Submit**. The appliance creates the backup directory if necessary, and then performs the Full or Incremental backup.
5. After doing the backup, click **Operations** → **Backup/Restore** → **View Backup/Restore Results** to determine when the backup is completed and whether it was successful.

Restoring customer data: To restore customer data, perform the following steps:

1. Click **Operations** → **Backup/Restore** → **Restore User Directories**
2. Enter the location of a previous backup.
3. Click **Submit**. The backed up files will be restored to the appliance. If both full and incremental backups had been performed, first the full backup is restored, then the incremental backups are restored in order.
4. After doing the restore, click **Operations** → **Backup/Restore** → **View Backup/Restore Results** to determine when the restore has completed and whether it is successful.

Note: Unexpected results might occur if more than one administrator attempts to change the appliance configuration at the same time.

Recovering from a failed hard drive

If one of your hard drives fails, and you have recent backups of your configuration and user data, you can recover this information.

First hard drive failed

If your appliance's first or only hard drive has failed:

1. Install the replacement hard drive. For information about installing hard drives, see "Installing hard disk drives" on page 77.
2. Install the appliance software using the *Recovery* CD. For more information, see "Using the Recovery CD" on page 128. Select the Reformat option to completely initialize the hard drive.
3. Perform the initial appliance configuration. See Chapter 3, "Configuring your appliance server," on page 15, for more information.
4. Install any appliance upgrades you had previously installed, for more information, see "Upgrading the appliance server".
5. Restore your most recent backup of the appliance configuration.
6. If your appliance has only one hard drive, restore your most recent backup of the user data. If your appliance server has additional hard drives, before restoring the user data, make a separate backup of user data already on the appliance. (Do not overwrite your previous user data backup!). This will preserve any changes made to user data on the other hard drives since you last made a user data backup.
 - a. Restore the previous user data backup.
 - b. Restore the user data backup you just made.

Additional hard drive failed

If your appliance has multiple hard drives and a hard drive other than the first has failed:

1. Install the replacement hard drive (see "Installing hard disk drives" on page 77).
2. Activate the additional hard drive in Appliance System Manager (see "Activating an additional hard disk" on page 60).
3. Make a new backup of the existing user data (do not overwrite your previous user data backup). This preserves any changes made to user data on the other hard drives since you last made a user data backup.
4. Restore the previous user data backup.
5. Restore the user data backup you just made.

Upgrading the appliance server

You can view, download and install current and previous fixes to the appliance. By applying the latest upgrade, you upgrade your appliance to the latest level; you do not need to install any earlier upgrades first. Before applying an upgrade, you should backup your configuration and user data. This information is described as follows:

Viewing upgrades

To check the status of updates, perform the following steps:

1. Click **Operations**.
2. Click **Install Maintenance**.

On the Install Maintenance page, you can now view the last upgrade installed and any upgrade that is pending installation, as indicated by its status: The status values are described as follows.

Table 6. Status messages.

Status Message	Meaning
Current level of the Appliance	The last upgrade that has been installed on the appliance
Downloading to the Appliance	The designated upgrade is either being downloaded or copied to the appliance
Ready to install on the Appliance	The designated download or copy of upgrade to appliance is complete and therefore is ready to be installed.
To be installed on the Appliance	The upgrade will be installed during the next system reboot

Checking for upgrades

To check for upgrades to the appliance, perform the following:

1. From the Install Maintenance page, click **Check for Upgrades**. The Software Upgrade Detection page appears.
2. Select location (meaning CD, FTP, or Local File system).
3. Click **Select Upgrades**. A list of upgrades that can be downloaded appears on the Software Upgrade Selection page.

Installing upgrades

To install an upgrade, perform the following steps:

1. From the Software Upgrade Selection page, select an upgrade.
2. Click **Retrieve Upgrade**.
3. A request for the selected upgrade will then be sent out and you will be returned to the Install Maintenance page. At the Install Maintenance page, the status of your requested download displays. Click **Refresh** to update the status.
4. When the download is complete, click **Install** to install the downloaded upgrade.
5. Restart the appliance to apply the installed upgrade.

Canceling upgrades

To cancel an upgrade, from the Install maintenance page, click **Cancel Upgrade**. The selected upgrade will not be installed. It will be removed from the appliance. All downloads in progress are stopped.

Configuring the appliance server

This section describes how to configure the appliance.

Selecting a language for the appliance server

To select the language that appears on the Appliance System Manager and IBM HTTP Server administration Web pages, perform the following steps.

1. Click **Configuration**.
2. Click **Language**.
3. Select the desired language.
4. Click **Submit**. The Appliance System Manager and IBM HTTP Server will then restart, and all Appliance System Manager and IBM HTTP Server administration pages appear in the selected language.

Setting the appliance date, time, and time zone

To set the appliance server date, time, and time zone, perform the following steps:

1. Click **Configuration** → **Date/Time**.
2. Fill in the desired date, time, and time zone.
3. Click **Submit**.

Configuring telnet

To enable or disable Telnet access, perform the following steps:

1. Click **Configuration**.
2. Click **System Services**.
3. Set Telnet services to **On** or **Off**.
4. Click **Submit**.

You can also specify which hosts are allowed Telnet access. To do this, perform the following steps:

1. Click **Security**.
2. Click **System Access**.
3. Click **Telnet Access**.
4. A list of rules is displayed. Access is granted to any host that matches any rule setting. Read the Web page help (click "**Help**" in the upper right corner), to find out more about access rules.

Configuring FTP

To enable or disable FTP access, perform the following steps:

1. Click **Configuration**.
2. Click **System Services**.
3. Set FTP services to **On** or **Off**.
4. Click **Submit**.

You can also specify which hosts are allowed FTP access. Perform the following steps:

1. Click **Security**.
2. Click **System Access**.
3. Click **FTP Access**.
4. A list of rules is displayed. Access is granted to any host that matches any rule setting. To view more information about access rules, click "?" in the upper right corner to view the Web page help for this subject.

Changing the system console

To change which attached terminal can be used to log in to the appliance, perform the following steps:

1. Click **Configuration** → **System Services**.
2. Select one of the following:
 - **Video** - you can log in using the attached display and keyboard, or serial port 1
 - **Serial Port 1** - you can log in using the attached display and keyboard, or serial port 1
 - **Serial Port 2** - you can log in using the attached display and keyboard, or serial port 2. Your appliance hardware might not have a second serial port.

Configuring e-mail

To configure e-mail, perform the following steps:

1. Click **Configuration**.
2. Click **E-mail**.
3. Click **E-mail configuration**.
4. In the **Postmaster** field, type the e-mail address for your Postmaster (optional). This is an external e-mail address (for example, user@example.com) to which the appliance sends any e-mail addressed to a user on the appliance. For example, any e-mail addressed to root@yourappliance will be forwarded to the postmaster e-mail address. If no postmaster e-mail address is configured, any e-mail that would have been forwarded to the postmaster address is instead discarded.
5. In the **SMTP Server** field, type the fully qualified host name (for example mailserver.example.com) through which the appliance will relay all outgoing e-mail (optional). If you do not use this option, the appliance attempts to deliver all e-mail directly. This feature might not work if the appliance is behind a firewall, hence the need to instead forward all e-mail to another server that might know how to get the e-mail out.
6. Click **Submit**.

Configuring e-mail alerts

You can configure the appliance to send e-mail alerts when certain events occur. This feature helps warn administrators of possible trouble. With e-mail alerts, administrators can specify which e-mail addresses receive alert messages and which events are checked for. The appliance checks every five minutes for certain events that, if selected, generate alerts. These alerts are sent out only every twenty-four hours. You will get a second alert for a specific event only if the event occurs again twenty-four hours later. If you wish to reset the alert so that the event will send e-mail, disable that alert event and then re-enable it.

Selecting events that produce alerts

To define an event that produces an e-mail alert, perform the following steps:

1. Click **Configuration**.
2. Click **E-mail**.
3. Click **E-mail Alerts**.
4. Click **Event List**.
5. Select the events you want to produce alerts.
6. Click **Submit**.

Table 7. Events that produce alerts.

Event	Explanation
Any file system is >= XX % full.	Use this alert to monitor disk space. Type the percentage above which an alert should be generated. This pertains to local file systems only. Valid values range from 0 to 100.
Processor load X	Use this alert to monitor the workload on the computer. Type the average number of processes in a runnable state over the last five minutes above which an alert should be generated. Valid values range from 0 to 1000.
Web server is not responding	Use this alert to make sure your Web server is running.
Host X not responding to ping	Use this alert to monitor an important path in your network. Type the host name or IP address of the host you want to make sure there is a path to. This is a good indicator that your network is working properly.
Memory usage X%	Use this path to monitor the amount of memory used. Valid values range from 0 to 100.
Unexpected restart	An alert will be sent when the appliance is started if it does not appear to have been shut down normally. For example, if the machine suffers a power failure, it will send this alert when it restarts.

Adding e-mail addresses

To add an e-mail address to the notification list, perform the following steps:

1. Click **Configuration**.
2. Click **E-mail**.
3. Click **E-mail Alerts**.
4. Click **Address List**.
5. Click **Add**.
6. Type the fully qualified address you want to add.
7. Click **Submit**.

Editing e-mail addresses

To edit an e-mail address that receives alerts, perform the following steps:

1. Click **Configuration**.
2. Click **E-mail**.
3. Click **Email Alerts**.
4. Click **Address List**.
5. Select an e-mail address from the list.
6. Click **Edit**.
7. Change the address.
8. Click **Submit**.

Deleting e-mail addresses

To delete an e-mail address from the address list, perform the following steps:

1. Click **Configuration**.
2. Click **E-mail**.
3. Click **E-mail Alerts**.
4. Click **Address List**.
5. Select the address you want to delete.
6. Click **Delete**.

Configuring E-Mail List Manager

A mailing list allows you to automatically forward mail from one mail address to one or more addresses. The Mail List Manager allows you to view, add, edit, and delete mail lists. The appliance uses the MajorDomo mailing list program. For more information about MajorDomo, see <http://www.greatcircle.com/majordomo>.

Enabling or disabling the Mail List Manager

To enable or disable the Mail List Manager, perform the following steps:

1. Click **Configuration**.
2. Click **E-Mail**.
3. Click **E-Mail Lists**.
4. Click **E-Mail List Manager**.
5. If you want to use E-Mail List, click **Enable E-Mail Lists**.
6. If you do not want to use E-Mail List, click **Disable E-Mail Lists**.
7. Type the fully qualified e-mail address of the person you want to administer the E-Mail List Manager.
8. Click **Submit**.
9. If you have not already configured your e-mail, click **Config Sendmail** and type the e-mail address for your Postmaster address and the host name for the SMTP server (optional).

Listing mailing lists

To view current e-mailing lists, click **Configuration**, and then click **E-Mail Lists**. When prompted, select **List E-Mail Lists**. This page allows you to view the current names of the mailing lists and the addresses of their recipients.

Note: From this page you can add, edit, or delete mailing lists.

Adding mailing lists

To add a new mailing list, perform the following steps:

1. From the List Mail List page, click **Add**.
2. In List Name, type a unique name for this mailing list.
3. In Password, type a password for this list.
4. In Confirm Password, retype the password.
5. If you want to allow users to join this e-mail list without any administrator intervention, click **Allow User Subscriptions**. If you do not, clear this box.
6. If you want to allow people who are not on the e-mail list to be able to send e-mail to all those on the e-mail list, click **Allow Unsubscribed Postings**. If you do not, clear this box.
7. In E-mail Addresses, type the e-mail addresses of the people you want to be initially included in this e-mail list.
8. Click **Submit**.

Editing mailing lists

To edit an existing mailing list, perform the following steps:

1. If you have not already done so, open the List E-Mail List window by clicking **Configuration → E-mail → E-mail list → List E-mail Lists**.
2. From the List E-Mail List page, click the mailing list you want to edit.
3. Click **Edit**.
4. In Password, type a new password for this list.
5. In Confirm Password, retype the new password.
6. If you want to allow users to join this e-mail list without any administrator intervention, click **Allow User Subscriptions**. If you do not, clear this box.
7. If you want to allow people who are not on the e-mail list to be able to send e-mail to all those on the e-mail list, click **Allow Unsubscribed Postings**. If you do not, clear this box.
8. In Email Addresses, type the e-mail addresses of the people you want to be included in this e-mail list.
9. Click **Submit**.

Deleting mailing lists

To delete a mailing list, perform the following steps:

1. If you have not already done so, open the List E-Mail List window by clicking **Configuration → E-mail → E-Mail List → List E-Mail Lists**.
2. From the List E-Mail List page, click the mailing list you want to delete.
3. Click **Submit**.

Changing the host name or default gateway

To change the host name or default gateway (router) perform the following steps.

1. Click **Configuration**.
2. Click **Network**.
3. Click **System**.
4. Enter the base host name, the part to the left of the first period (.) in the host name field.
5. Enter the domain name, the part to the right of the first period (.) in the Domain field. For example, if the appliance is www.example.com, enter www in the host name field and example.com in the Domain field.
6. Optionally, enter the IP address of the default router in the Gateway field.
7. Click **Submit**.

After changing the appliance host name, Appliance System Manager generates a new self-signed SSL certificate which might cause your browser to issue a warning.

Changing the IP address

To change the IP address or to configure IP aliases, perform the following steps:

1. Click **Configuration**.
2. Click **Network**.
3. Click **Adapters**.
4. Select the interface to add an alias or edit settings.
5. Click **Add alias** or **Edit**.

After changing the IP address, Appliance System Manager generates a new self-signed SSL certificate which might cause your browser to issue a warning.

Changing the routing

To change the appliance's IP routing, except the default route, perform the following steps:

1. Click **Configuration**.
2. Click **Network**.
3. Click **Static Routes**.
4. Make the desired change.

Changing the Domain Name Services (DNS)

To configure the DNS servers used by the appliance, perform the following steps:

1. Click **Configuration**.
2. Click **Network**.
3. Click **DNS**.
4. Make the desired change.

Changing the local host name table

Use this option to configure IP addresses for host names that are not in DNS. To change the appliances local host name table, perform the following steps:

1. Click **Configuration**.
2. Click **Network**.
3. Click **Local Host Names**.
4. Make the desired change.

Configuring IBM HTTP server

The HTTP Server starts automatically when the appliance is started. You can start and stop the HTTP Server from the Appliance System Manager by selecting **Operations Stop/Start Web Server** in the Appliance System Manager navigator. Any Appliance System Manager administrator can administer the production Web server. When you visit the HTTP Server ServerAdmin page you are prompted for a user ID and password. You can use any Appliance System Manager administrator user ID and password. You can use the default administrator ID administrator and password if you have not changed them. To manage the HTTP Server:

1. Go to the URL
`https://ip_address_of_appliance:1999`
2. If prompted, accept the new site certificate.
3. Click **Administration**.
4. Click **IBM HTTP Server Administration**.
5. Make desired changes.

Configuring PHP

PHP is a programming language that can be embedded in a page that allows you to produce dynamic content such as adding dates or a time box, accessing files, or running commands. To enable or disable PHP support:

1. Click **Configuration** → **PHP Configuration** → **PHP Enable**.
2. Click the desired button (**Enable** or **Disable**).

Note: Do not click Enable or Disable if you have configured your Web server for PHP yourself; you will lose your Web server's PHP configuration.

To configure PHP:

1. **Configuration** → **PHP Configuration** → **PHP Configure**.
2. The PHP configuration file (php.ini) will be shown in the Web page. Make the desired changes, then click **Submit**.
3. The Web server will restart and the changes will take effect immediately.

Configuring NFS file systems

To configure NFS file systems, select an option below.

Adding a file system

1. Click **Configuration**.
2. Click **NFS Filesystems**.
3. Click **Add**.
4. Type the host name.
5. Type the export path (the path of the exported filesystem on the NFS server).
6. Type the mount options. Leave blank or specify "defaults" for the default mount options. Multiple options can be specified, separated by commas. For example, "ro,rsiz=8192" means mount read-only and use a read buffer size of 8192. See the Linux documentation for the "mount" command for all the valid options.
7. Click **Submit**.

Editing a file system

1. Click **Configuration**.
2. Click **NFS Filesystems**.
3. Select the file system you want to edit.
4. Click **Edit**.
5. Modify the fields as desired.
6. Click **Submit**.

Deleting a file system

1. Click **Configuration**.
2. Click **NFS Filesystems**.
3. Select the file system you want to delete.
4. Click **Delete**.

Activating a file system

Use "Activate" to mount an NFS file system that is currently not mounted, either because the NFS server was not available when the appliance was started, or because you have unmounted it.

1. Click **Configuration**.
2. Click **NFS Filesystems**.
3. Select the file system you want to activate.
4. Click **Activate**.

Deactivating a file system

Use "Deactivate" to unmount an NFS file system. The file system will be mounted again if you restart the appliance or use the "Activate" feature.

1. Click **Configuration**.
2. Click **NFS Filesystems**.
3. Select the file system you want to deactivate.
4. Click **Deactivate**.

Activating an additional hard disk

To initialize and use an additional hard disk drive, perform the following steps:

1. Turn off the appliance server; then, refer to “Installing hard disk drives” on page 77 for instructions on how to install a hard disk drive in your appliance server.
2. Turn on the appliance server.
3. Click **Configuration**.
4. Click **Hardware**.
5. Click the arrow next to the drive to be activated.

Using security

The following information describes how to set the system password, manage administrators and users, and manage SSL certificates.

Setting the system password

After the initial configuration, you should change the default passwords. On a new appliance, all the passwords are set to *password*.

The system password (the password for the root account) should have been changed when you entered information in the initial configuration page, but if not, click **Security** → **System Password** in the Appliance System Manager and change it there.

Managing SSL certificates

If you want your users to have the protection of a Secure Sockets Layer protocol (SSL) when connecting to your site, you'll need an SSL certificate, and you'll need to configure your Web server to use SSL. See “Managing the Web server” on page 48.

Appliance System Manager allows you to manage SSL certificates by completing the following tasks:

- Creating an SSL database
- Deleting an SSL database
- Creating a self-signed certificate (usually for testing)
- Creating a signed certificate request
- Adding a signed certificate
- Adding a CA certificate
- Listing certificates

Understanding SSL

Anytime you visit a URL that starts with "https" or see the "secure connection" icon in your browser, you are connecting using Secure Sockets Layer protocol (SSL). Using SSL with your Web server provides two main benefits:

- **Authentication** - If your Web server uses an SSL Certificate that is signed by a recognized Certificate Authority (CA), your users can feel more confident of your identity.

For example: A Certificate Authority will not issue signed certificates for example.com without first checking that the people requesting the certificates are who they say they are and that they actually represent example.com. Therefore, when users visit a Web site claiming to be hosted by example.com and see that this site has a signed certificate for example.com, they can feel fairly confident that they are really connected to the example.com Web site.

- **Encryption** - SSL also encrypts the network connection between the browser and the Web server, preventing eavesdropping — even by someone who might be able to "sniff" the network traffic. This is desirable, for example, when providing a password to log into a site or when viewing sensitive personal information. Certificates contain information, such as the name of the authority and organization, that identifies the entity (authority) that issued and owns the certificate.

Creating an SSL database

Before you can work with SSL certificates, you must create a database to store them in. You can then add one or more certificates to the newly added SSL database, which the IBM HTTP Server can then use for its HTTP-S support. The IBM HTTP Server configuration must be modified to refer to this database before the database and its contents can be used by the Web server. To create an SSL database, perform the following steps:

1. Click **Security**.
2. Click **Manage SSL Certificates**.
3. Click **Create**.
4. Type a file name for the new database. This value may contain only alphanumeric characters and spaces, up to a maximum of 64 characters. Do not include any directory information. The key database file extension (.kdb) will be added automatically to the supplied name to form the complete file name of the database.
5. Type the password you want to use to authenticate access to the new database. You must provide this password whenever you wish to update the database contents or delete the database. Passwords are case-sensitive. This value can be any text string up to 255 characters, excluding blanks and special characters.

Note: If you forget this password, you will not be able to modify the contents or delete the database.

6. Retype the database password to confirm the correct value is entered.
7. Click **Submit**.
8. The new database is created in the directory /opt/IBMHTTPServer/keys, with the extension .kdb added. For example, if you supply the file name xyz, Appliance System Manager will create a database /opt/IBMHTTPServer/keys/xyz.kdb. This is the filename you should use in the Keyfile directive for the IBM HTTP Server configuration.

Deleting an SSL database

To delete an SSL database, perform the following:

1. Click **Security**.
2. Click **Manage SSL Certificates**.
3. Select the database you want to delete.
4. Type the password for the database.
5. Click **Delete**.
6. Click **Delete** again to confirm your choice.

Creating a self-signed certificate

For testing, you can generate certificates that are signed only by you. Because these are not signed by a recognized Certificate Authority, they will usually cause browsers to warn users that the site might not be secure. To create a self-signed certificate, perform the following:

1. Click **Security**.
2. Click **Manage SSL Certificates**.
3. Select the database that you want to create the certificate in, and enter its password.
4. Click **Edit**.
5. Select **Create new Self-signed Certificate**.
6. Click **Submit**.
7. Type the Key Label, the name that identifies the key and certificate in the database (for example, my public certificate). This value can be any text string up to 64 characters. The Label is the text you will supply in the SSLServerCert directive in IBM HTTP Server to select this certificate as the one that your Web server will use. If you will use it this way, do not include spaces in the name. Alternatively, you can designate one certificate in your database as the default; see Viewing certificates.
8. Select the Key Size.
9. Type the Common Name, the name used to identify the system that owns the certificate. For example, the full host name of the system (www.myserver.com). This value can be any text string up to 64 characters. If the common name in a certificate does not match the host name in the URL, most browsers will display a warning message to the user, so it's best to use the host name here.
10. Type the Organization, the name used to identify the organization that owns the certificate. You can use any name to identify your organization, such as your company name (My Company Name). This value can be any text string up to 64 characters.
11. (Optional) Type the Organizational Unit, the name used to further identify the organization that owns the certificate, such as the department. You can use any name to identify your organizational unit, such as your department or division name. This value can be any text string up to 64 characters.
12. (Optional) Type the Locality, the name used to identify the location of the organization that owns the certificate. You can use any name, such as the name of your city or division. This value can be any text string up to 64 characters.
13. (Optional) Type the State/Province, the name of the state, province, or region of the organization that owns the certificate. This value can be any text string up to 64 characters.

Note: Some Certificate Authorities require this field.

14. (Optional) Type the Zip Code, the zip code or postal code of the organization that owns the certificate. This value can be any text string up to 16 characters.
15. (Optional) Type the Country, the name of the country of the organization that owns the certificate. This value is the two character country code (ISO format) of your country (for example, US for the United States).
16. Click **Submit**.

Creating a signed certificate request

When you are ready to request a signed certificate from a Certificate Authority, you need to generate a request in a special format. To generate such a request, perform the following steps:

1. Click **Security**.
2. Click **Manage SSL Certificates**.
3. Select the database that you want to put the certificate into, and enter its password.
4. Click **Edit**.
5. Select **Create new Certificate Signing Request**.
6. Click **Submit**.
7. Type the Key Label, the name that identifies the key and certificate in the database (for example, my public certificate). This value can be any text string up to 64 characters. The Label is the text you will supply in the SSLServerCert directive in IBM HTTP Server to select this certificate as the one that your Web server will use. If you will use it this way, do not include spaces in the name. Alternatively, you can designate one certificate in your database as the default (see "Listing certificates" on page 65).
8. Select the Key Size.
9. Type the Common Name, the name used to identify the system that owns the certificate. For example, the full host name of the system (www.myserver.com). This value can be any text string up to 64 characters. If the common name in a certificate does not match the host name in the URL, most browsers will display a warning message to the user, so it's best to use the host name here.
10. Type the Organization, the name used to identify the organization that owns the certificate. You can use any name to identify your organization, such as your company name (My Company Name). This value can be any text string up to 64 characters.
11. (Optional) Type the Organizational Unit, the name used to further identify the organization that owns the certificate, such as the department. You can use any name to identify your organizational unit, such as your department or division name. This value can be any text string up to 64 characters.
12. (Optional) Type the Locality, the name used to identify the location of the organization that owns the certificate. You can use any name, such as the name of your city or division. This value can be any text string up to 64 characters.
13. (Optional) Type the State/Province, the name of the state, province, or region of the organization that owns the certificate. This value can be any text string up to 64 characters.
Note: Some Certificate Authorities require this field.
14. (Optional) Type the Zip Code, the zip code or postal code of the organization that owns the certificate. This value can be any text string up to 16 characters.

15. (Optional) Type the Country, the name of the country of the organization that owns the certificate. This value is the two character country code (ISO format) of your country (for example, US for the United States).
16. Click **Submit**.
17. The request will be shown in a format that should allow you to cut and paste it. Consult your Certificate Authority for instructions on what to do with it.

Adding a signed certificate

When you have received a signed certificate from a Certificate Authority, do the following to add it to your SSL database.

Note: You must add the certificate to the same database in which you originally created the request. If the database is lost, you will have to create a new request and get a new certificate. Contact your Certificate Authority for help.

1. Click **Security**.
2. Click **Manage SSL Certificates**.
3. Select the database that you used to create the certificate request, enter its password.
4. Click **Edit**.
5. Select **Add A Signed Certificate to the Database**.
6. Click **Submit**.
7. Paste the certificate information into the **Paste Signed Certificate Below** field.
8. Click **Submit**.

Adding a CA certificate

A Certificate Authority (CA) certificate (sometimes referred to as a root certificate or root key) allows you to receive and add any publicly signed certificates from the CA. The SSL database was initialized with the default set of Certificate Authority (CA) certificates when the database was created.

To add a Certificate Authority certificate (received from a Certificate Authority) to the SSL database, perform the following steps:

1. Click **Security**.
2. Click **Manage SSL Certificates**.
3. Select the database that you want to put the CA certificate into, and enter its password.
4. Click **Edit**.
5. Select **Add a CA Certificate to the Database**.
6. Click **Submit**.
7. Paste the received certificate information into the **Paste Signed Certificate Below** field.
8. Click **Submit**.

Listing certificates

To list or view a self-signed certificate, publicly signed certificate, or Certificate Authority certificate, perform the following steps:

1. Click **Security**.
2. Select the database that you want to work with, and enter its password.
3. Click **Edit**.
4. Select **List Certificates**.
5. Click **Submit**.
6. Select the type of certificates you wish to list: Signed, Requested, or CA.
7. Click **Refresh**.
8. If you wish to work with a certificate in the list, select it and click View (to see more information on a certificate), Delete, Make default, or Extract. Extracting a certificate puts it in a form that can be cut and pasted into an e-mail.
9. When done, click **Finished**.

Controlling access

This section describes how to specify the hosts that are allowed control center access for Appliance System Manager, FTP, and Telnet. Specific information is presented as follows:

Managing administrators

Administrators have the authority to manage Appliance System Manager and IBM HTTP Server. To manage administrators, click **Security** → **Manage Administrators**. A list of administrators is displayed. Click the appropriate button to:

- Add Administrators
- Edit Administrators (change passwords)
- Delete Administrators

Managing users

A user is a customer of your service, someone who plans to store Web pages on the appliance. You manage them by assigning each user a user ID, a password, and an amount of disk space in their home directory. You are responsible for letting the user know this information.

The user, then, uses FTP to transmit Web pages to the specified home directory on the appliance. After you select Manage Users, a list of users is displayed. You can select a user to edit, activate, deactivate, or delete. You can also add a new user. These steps are described as follows:

1. Click **Security** → **Manage Users**.
2. A list of users is displayed. Click the appropriate button to:

Add - Add a new user. Specify a user ID, password, and an optional disk space quota for the new user. You can also specify where their home directory should be, and optionally specify the numeric user id that the appliance will try to assign to the new user.

Edit - Change a user password or disk quota.

Deactivate - Disable FTP access for a user. The user Web pages are still accessible. The user ID is displayed within square brackets, ([]), when deactivated.

Activate - Activate a previously deactivated user.

Delete - Delete the user and all the user Web pages.

Appliance System Manager access

To specify the hosts that are allowed access to Appliance System Manager, perform the following steps:

1. Click **Security**.
2. Click **System Access**.
3. Click **ASM Access** to configure access to the Appliance System Manager. By default, all hosts are allowed. If you add any specific hosts, only those hosts are allowed. You can add or delete hosts from the list on the page by clicking the **Add** and **Delete** buttons. Delete all hosts from the list to allow all hosts.
4. When the list is correct, click **Submit** to make it take effect. (Before submitting the list, be sure the host you are accessing Appliance System Manager from is on the list; otherwise you will be unable to continue using Appliance System Manager from that host.)

FTP access

You can specify which hosts are allowed FTP access by performing the following steps:

1. Click **Security**.
2. Click **System Access**.
3. Click **FTP Access**.
4. A list of rules is displayed. Access is granted to any host that matches any rule setting. Access is denied to hosts that do not match any rule.

Note: The FTP service can also be completely disabled, see “Configuring FTP” on page 53. If you want to enable FTP access for some hosts here, also check there to be sure the service itself is enabled.

Telnet access

You can also specify which hosts are allowed Telnet access by performing the following steps:

1. Click **Security**.
2. Click **System Access**.
3. Click **Telnet Access**.
4. A list of rules is displayed. Access is granted to any host that matches any rule setting. Access is denied to hosts that do not match any rule.

Note: The telnet service can also be completely disabled, see “Configuring telnet” on page 52. If you want to enable telnet access for some hosts here, also check there to be sure the service itself is enabled.

Table 8. FTP/Telnet Settings/Result.

FTP/Telnet settings	Results
Default	All hosts are allowed.
all	Matches any host. To restrict access, delete this rule and add more specific ones the allow the access you want.
IP address or host name	Matches the IP address or host name is allowed. For example, to allow abc.example.com , add the rule abc.example.com
.host name	Matches any host whose host name ends in host name. For example, .example.com matches any host name that ends in .example.com
number.	Matches any host whose IP address starts with that number. For example, 192.168. matches any host whose IP address starts with 192.168.
variable1 EXCEPT variable2	Each variable can be one of the previous four kinds of rules. This rule matches any host that matches variable1 but not variable2. For example: 1. all EXCEPT .example.com matches any host whose host name does not end in .example.com. 2. 192.168. EXCEPT this.example.com matches any hosts with IP addresses starting with 192.168., unless the host name is this.example.com.

Using logs

There are two kinds of logs, system logs and Appliance System Manager logs. The HTTP Server keeps several logs for both the Web server and for the administration server.

The Appliance System Manager automatically prunes the logs so that they do not consume too much system resource. The log files are pruned daily if the size of a log file exceeds a pre-determined limit. There is no administrative interface to the pruning function. The log files to be pruned include all log files with the .log filetype. They are in the directory structure /opt/IBMHTTPServer/logs/*log .

Examples of logs are listed as follows:

- Logs for the production instance of the HTTP Server:
 - Error logs
 - Transfer logs
 - Custom logs, including the access log
 - Cookie logs
- Logs for the administration instance of the server:
 - Error logs
 - Access logs

Using system logs

You can check many logs showing system activity. These logs are described as follows:

- **Cron Job log:** Click **Disk Log** to display the contents of `/var/log/cron`. This log has an entry for each cron job that starts successfully. You can scroll through the log or go to a specified line in the log.
- **Boot log:** Click **Boot Log** to display the contents of `/var/log/dmesg`. You can scroll through the log or go to a specified line in the log. This log contains messages issued by the kernel during startup.
- **System message log:** Click **System Message Log** to display the contents of `/var/log/messages`. You can scroll through the log or go to a specified line in the log.
- **System security log:** Click **System Security Log** to display the contents of `/var/log/secure`. You can scroll through the log or go to a specified line in the log.
- **File transfer log:** Click **File Transfer Log** to display the contents of `/var/log/xferlog` which lists the files transferred to the appliance's user accounts.

Using Appliance System Manager logs

This section discusses Appliance System Manager logs. These functions are described as follows:

- **Audit log:** Click **Logs** → **Appliance System Manager** → **Audit** to display an audit log from `/var/log/asm_audit.log`. You can scroll through the list or go to a specified line in the list.
- **Error log:** Click **Logs** → **Appliance System Manager** → **Error** to display an error log from `/var/log/asm_error.log`. You can scroll through the list or go to a specified line in the list.
- **Web access log:** Click **Logs** → **Appliance System Manager** → **Web Access Log** to display the list of Appliance System Manager Web accesses, both successful and unsuccessful, in `/opt/CSM/WebServer/logs/access_log`. You can scroll through the list or go to a specified line in the list.
- **Web error log:** Click **Logs** → **Appliance System Manager** → **Web Error Log** to display a list of Web errors as stored in `/opt/CSM/WebServer/logs/error_log`. You can scroll through the list or go to a specified line in the list.

Chapter 6. Installing options

This chapter provides instructions for adding options to your appliance server. Some option-removal instructions are provided in case you need to remove one option to install another. For a list of supported options for your appliance server, see the ServerProven[®] list at <http://www.ibm.com/pc/compat> on the World Wide Web.

Before you begin

To install options in your appliance server, begin by reading the following information.

- Become familiar with the safety and handling guidelines specified under “Handling static-sensitive devices” on page 70, and read the safety statements in “Safety” on page vii. These guidelines will help you work safely while working with your appliance server or options.
- Have a keyboard, monitor, and mouse available.
- Make sure that you have an adequate number of properly grounded electrical outlets for your appliance server, monitor, and any other options that you intend to install.
- Back up all important data before you make changes to disk drives.
- Have a small, flat-blade screwdriver available.
- Before you install an optional device in your appliance server, verify that IBM supports that device on your model. You can view the list of supported devices for your model at: <http://www.ibm.com/pc/us/compat>.

System reliability considerations

To help ensure proper cooling and system reliability, make sure that:

- Each of the drive bays has either a drive or a filler panel installed.
- The cover is in place during operation, or is removed for no longer than 30 minutes while the appliance server is operating.
- There is space around the appliance server to allow the appliance server cooling system to work properly. Leave approximately 127 mm (5 in.) of space around the front and rear of the appliance server.
- A failed fan is replaced within 48 hours.

Handling static-sensitive devices

Attention: Static electricity can damage electronic devices and your system. To avoid damage, keep static-sensitive devices in their static-protective packages until you are ready to install them. To reduce the possibility of electrostatic discharge, observe the following precautions:

- Limit your movement. Movement can cause static electricity to build up around you.
- Handle the device carefully, holding it by its edges or its frame.
- Do not touch solder joints, pins, or exposed printed circuitry.
- Do not leave the device where others can handle and possibly damage the device.
- While the device is still in its static-protective package, touch it to an unpainted metal part of the unit for at least two seconds. (This drains static electricity from the package and from your body.)
- Remove the device from its package and install it directly into your system unit without setting it down. If it is necessary to set the device down, place it on its static-protective packaging. (If your device is an adapter, place it component side up.) Do not place the device on your system unit cover or on a metal table.
- Take additional care when handling devices during cold weather, because heating reduces indoor humidity and increases static electricity.

Major components of the model 8654 appliance server

The following illustration shows the locations of major components in your model 8654 appliance server.

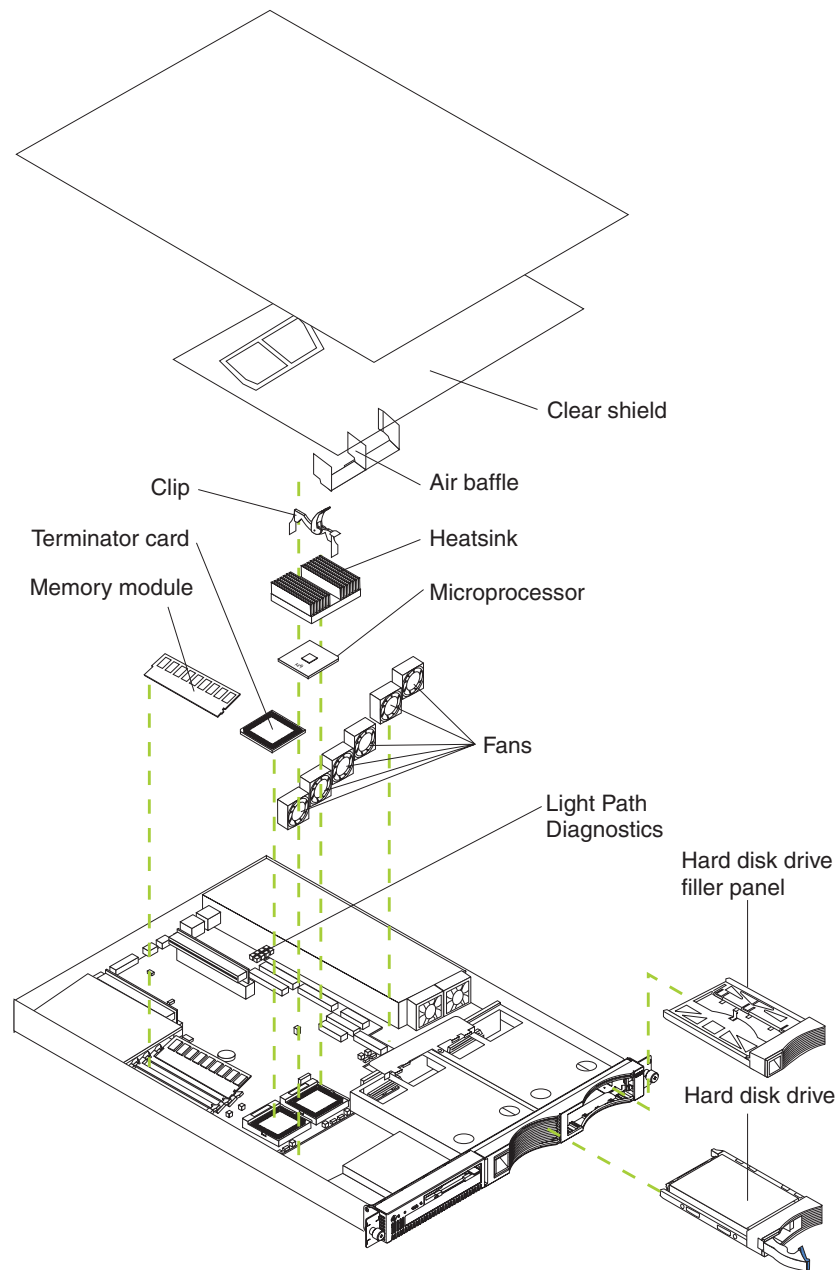


Figure 8. Viewing the major components of the xSeries 135 model 8654

System board option connectors

The following illustration identifies the connectors on the system board.

System board jumper blocks

Any jumper blocks on the system board that are not shown in the illustration are reserved. For normal operation of the system, no jumpers should be installed on any of the jumper blocks.

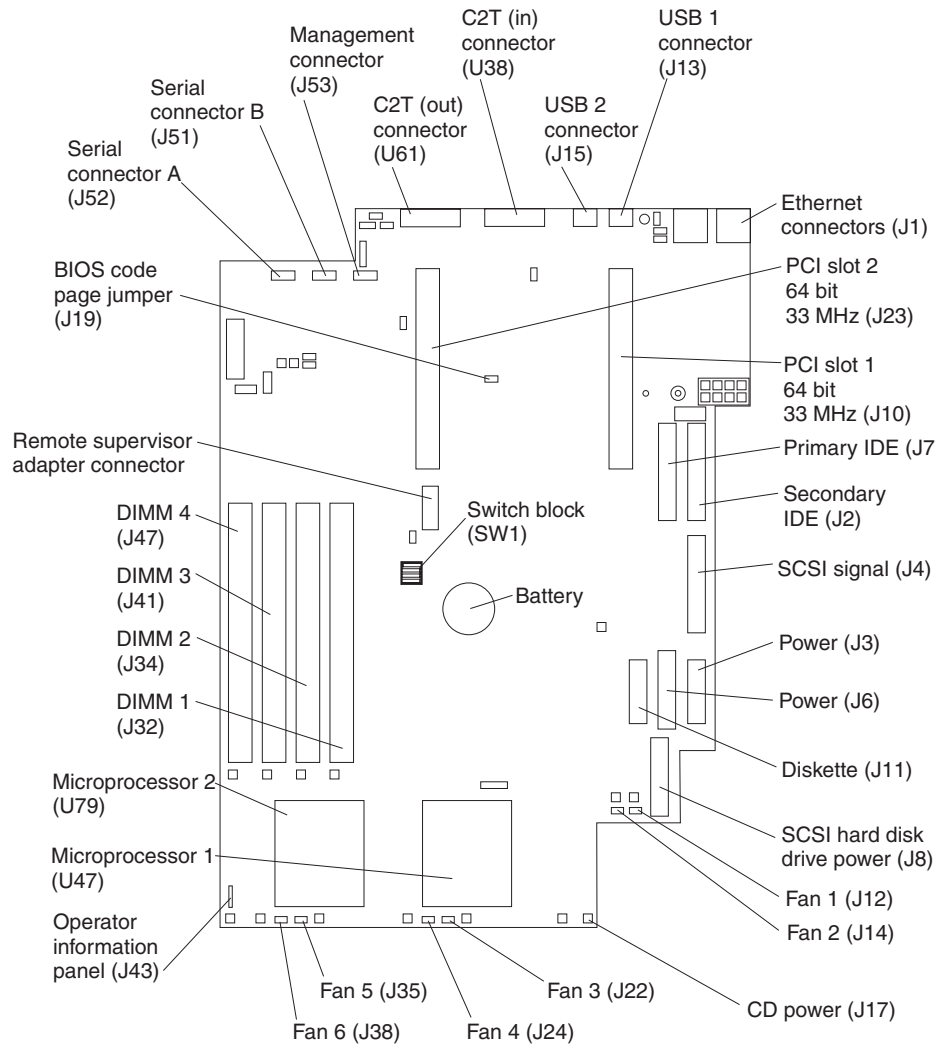


Figure 9. Viewing the system board connectors

System board switch block

The switch block contains microswitches 1 through 4. Switch 1 is at the top of the switch block and switch 4 is at the bottom. For more information about this switch block see “Power-on password” on page 25.

The following table describes the function for each switch.

Table 9. Switches 1 through 4.

Switch number	Switch description
1	Reserved. The default setting is Off (disabled).
2	Reserved. The default setting is Off.
3	Reserved. The default setting is Off.
4	Bypass power-on password. When this switch is toggled to the opposite position, the system bypasses the power on password, if one is set. See “Power-on password” on page 25.

System board LEDs

The following illustration identifies the LEDs on the system board.

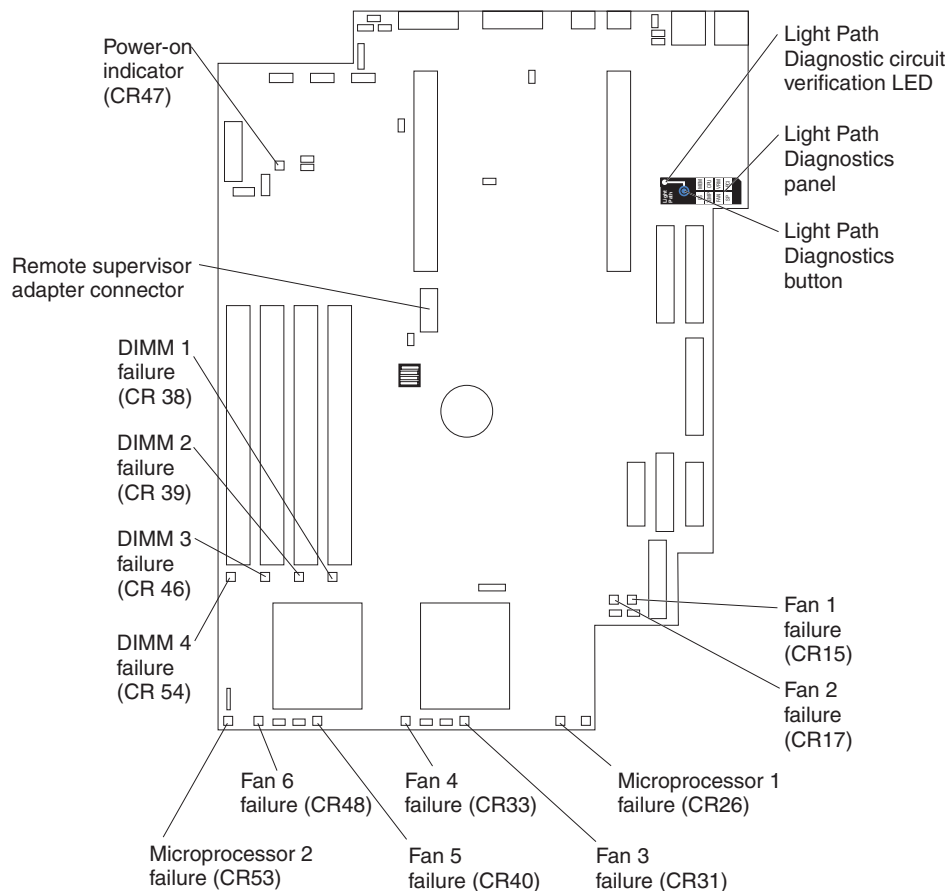


Figure 10. Viewing the system board connectors

Major components of the model 8672 appliance server

The following illustration shows the locations of major components in your model 8672 appliance server.

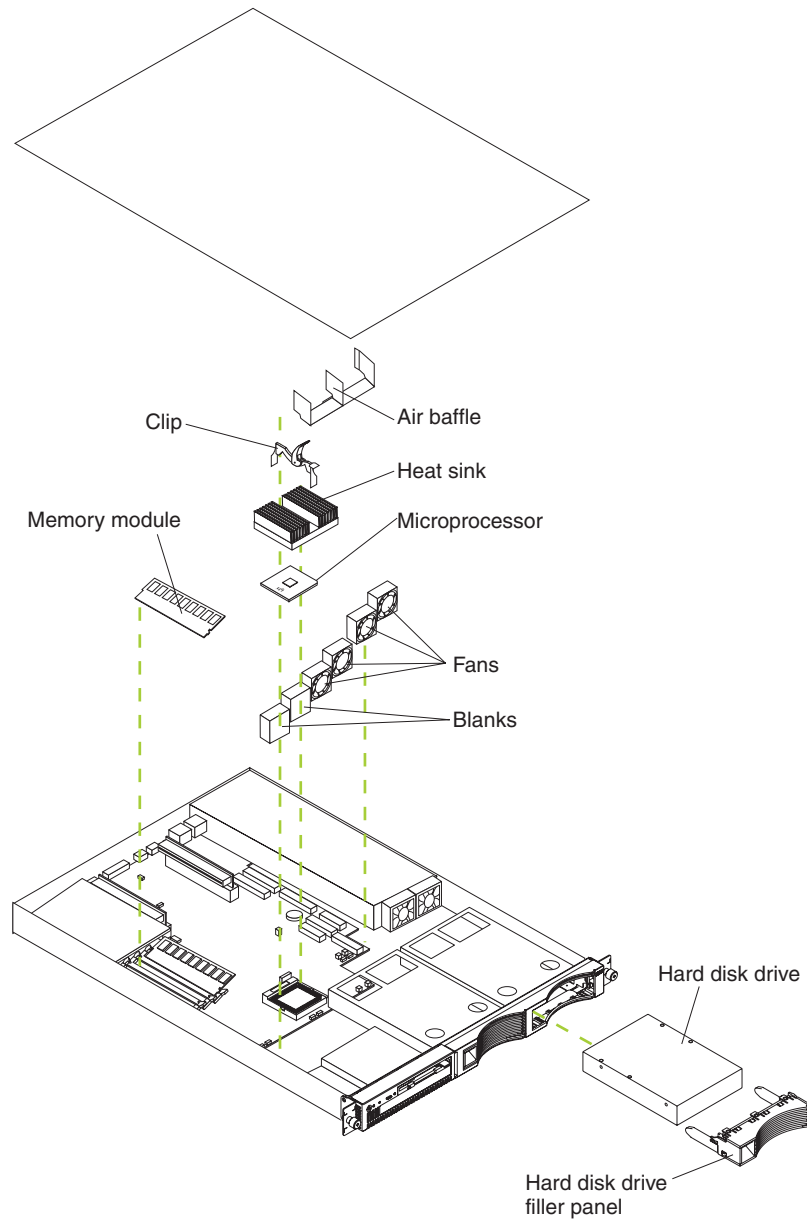


Figure 11. Viewing the major components of the xSeries 135 model 8672

System board internal cable connectors

The following illustration identifies the internal connectors on the system board.

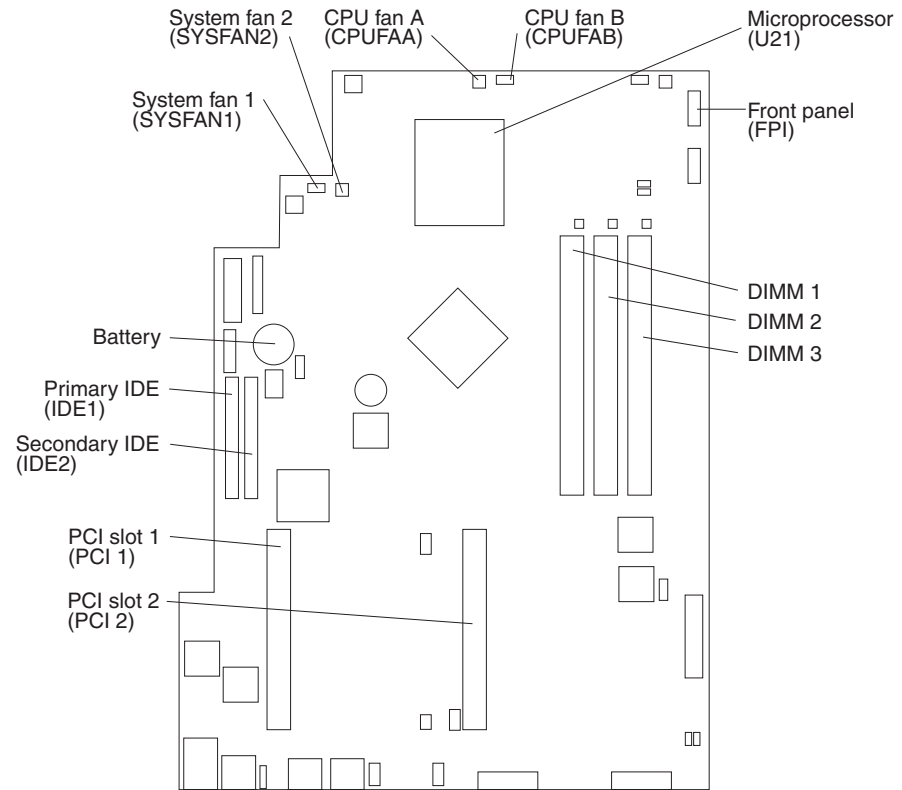


Figure 12. Viewing the system board connectors

System board jumpers

The following illustration identifies the jumpers on the system board.

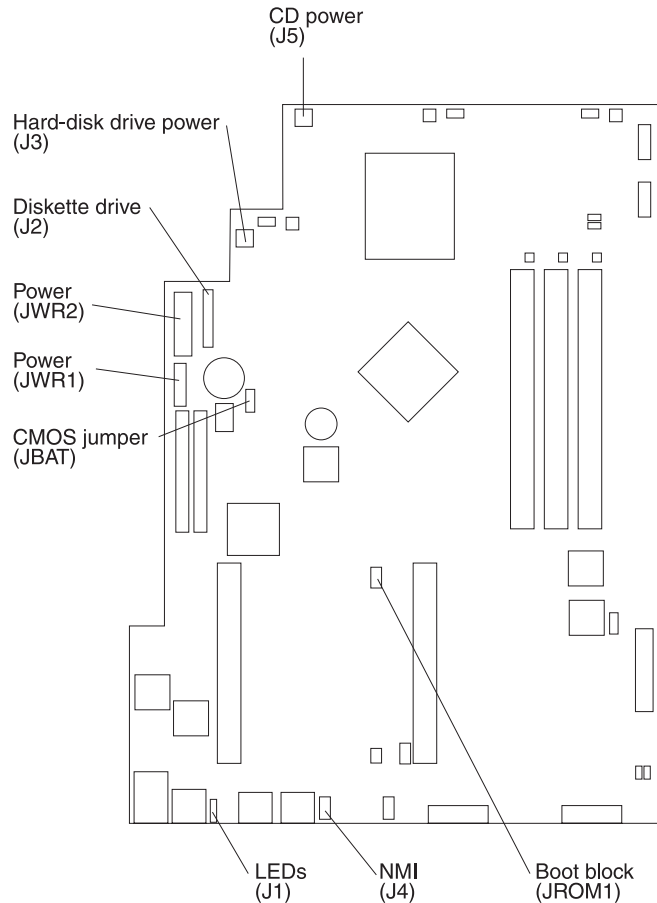


Figure 13. Viewing the system board connectors

Removing the cover

Complete the following steps to remove the appliance server cover:

Note: If you are installing only a SCSI hard disk drive in a model 8654, you do not need to remove the cover.

1. Review the information in “Safety” on page vii.
2. Turn off the appliance server and all attached devices and disconnect all external cables and power cords.
3. If your appliance server is installed in a rack cabinet, remove the appliance server from the rack cabinet.
4. Remove the two screws from the rear of the appliance server.
5. Pull out on the cover-release lever at the back of the appliance server to release the cover.
6. Slide the cover back, then up and off the appliance server.

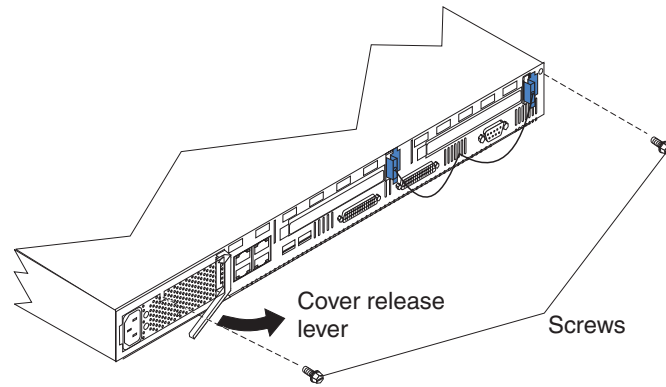


Figure 14. Removing the cover

Note: You might need to remove the clear plastic shield to reach some parts in the appliance server. For proper cooling and airflow, replace the clear plastic shield before replacing the cover.

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

7. Install all options before reinstalling the cover on the appliance server.

Installing hard disk drives

Your appliance server supports two 26 mm (1-in.), slim, 3.5-inch hard disk drives. Model 8654 appliance servers support SCSI hard disk drives, while model 8672 appliance servers support IDE hard disk drives. Before you install a hard disk drive, review the following:

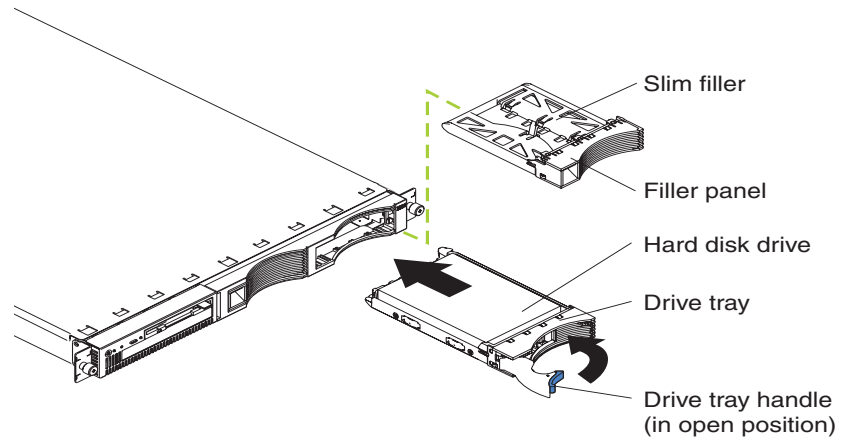
- Inspect the drive or drive tray for any signs of damage.
- To maintain proper system cooling, do not operate the appliance server for more than 2 minutes without either a drive or a filler panel installed in each bay.
- Review the information in “Handling static-sensitive devices” on page 70.
- Check the instructions that come with the drive for more information about installing your drive.

Installing a SCSI hard disk drive in the model 8654

Complete the following steps to install a SCSI hard disk drive in the model 8654:

1. Review the information in “Safety” on page vii.
2. Turn off the appliance server and disconnect all external cables and power cords.
3. Remove the filler panel from the available hard disk drive bay.

4. Install the new hard disk drive in the drive bay:
 - a. Ensure that the tray handle is open (that is, perpendicular to the drive).
 - b. Align the rails on the drive assembly with the guide rails in the drive bay.
 - c. Gently push the drive assembly into the bay until the drive connects to the backplane.
 - d. Push the tray handle toward the closed position until it locks the drive in place.



Note: When you turn on the appliance server, check the hard disk drive status light and activity light to verify that the hard disk drives operate properly.

If the green light flashes rapidly (three flashes per second), the controller is identifying the drive.

5. If you have other options to install, install them now. Otherwise, go to “Installing the cover” on page 88.

Installing an IDE hard disk drive in the model 8672

Complete the following steps to install an IDE hard disk drive on the model 8672:

1. Review the information in “Safety” on page vii.
2. Turn off the appliance server and disconnect all external cables and power cords.
3. Remove the cover according to “Removing the cover” on page 76.
4. Set the drive to primary (master) or secondary (subordinate), depending on the configuration of your appliance server. See the documentation that comes with the drive for instructions.
5. Remove the filler panel from the hard disk drive bay.
6. Install the new hard disk drive in the drive bay:
 - a. Slide the drive into the bay, with the screw holes in the drive facing up, and align the screw holes in the drive with the screw holes in the appliance server chassis.
 - b. Use a screwdriver to drive the screws into the drive and secure it to the appliance server chassis.

Note: You might have to hold the drive up and in place to carefully align the drive with the screw holes in the chassis.

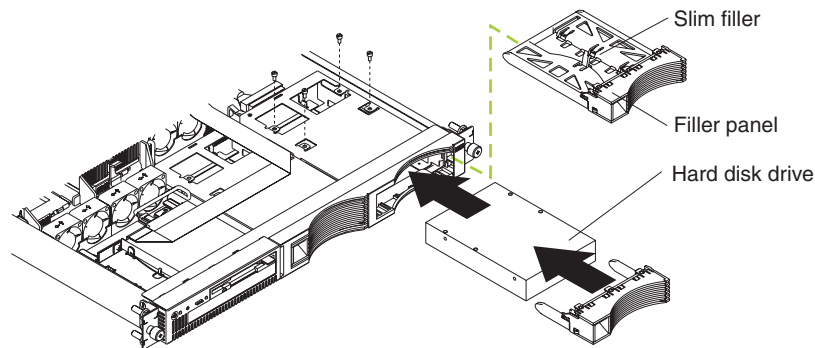


Figure 15. Installing or replacing the hard drive

- c. Connect signal and power cables to the rear of the drive. Be sure to keep the signal cable and power cable clear of the path of the fan behind the drive bay.
7. If you have other options to install, install them now. Otherwise, go to “Installing the cover” on page 88.

Installing memory

Adding memory to your appliance server is an easy way to improve system performance. You can increase the amount of memory in your appliance server by installing dual inline memory modules (DIMMs). Your appliance server uses a noninterleaved memory configuration, which enables you to add, remove, or replace one DIMM at a time. In an interleaved system you would have to add, remove, or replace memory in sets.

Your appliance server comes with a dual inline memory module (DIMM) installed on the system board in DIMM slot 1.

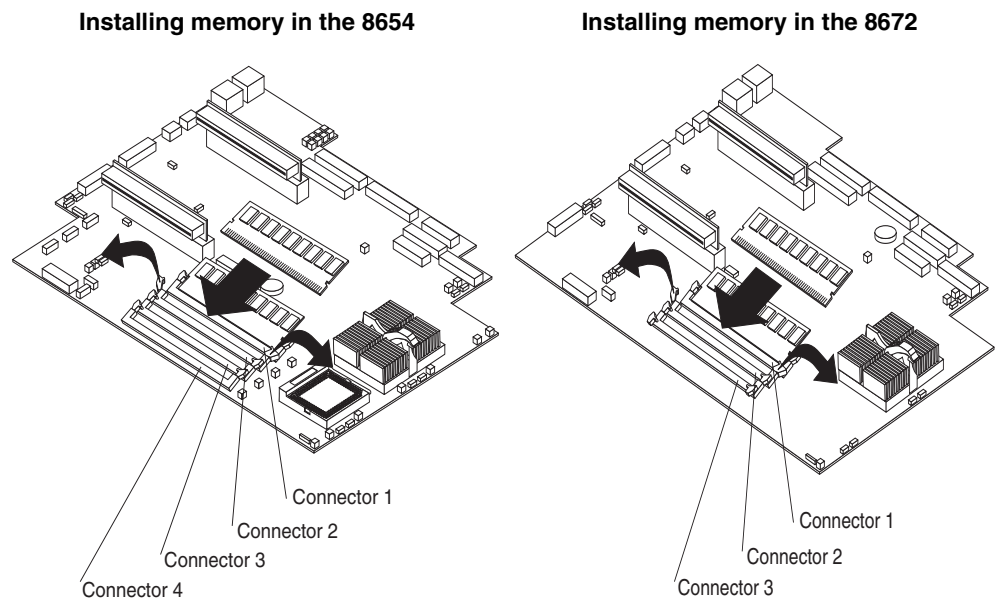


Figure 16. Installing memory

Note: Install additional DIMMs in the following order:

- On the model 8672, DIMM connector 2, and then connector 3
- On the model 8654, DIMM connector 2, connector 3, and then connector 4

Complete the following steps to install a DIMM:

Attention: When you handle static-sensitive devices, take precautions to avoid damage from static electricity. For details on handling these devices, see “Handling static-sensitive devices” on page 70.

1. Review the information in “Safety” on page vii.
2. Turn off the appliance server and disconnect all external cables and power cords.
3. Remove the cover according to “Removing the cover” on page 76.
4. If necessary, remove the PCI adapter in slot 2 for easier access to the DIMM connectors.
5. Touch the static-protective package containing the DIMM to any unpainted metal surface on the appliance server. Then, remove the DIMM from the package.

6. Install the DIMM in the connector.

Attention: To prevent damage to the DIMM connectors, do not force the memory module into the connector.

- a. Turn the DIMM so that the index slots align correctly with the connector.

Note: The DIMM has two index slots, one in the center and the other on the left half of the DIMM connector edge.

- b. Insert the DIMM into the connector by pressing on both corners of the DIMM at the same time. Be sure to press straight into the connector.

Note: When installing a memory module, be sure that no gap exists between the DIMM and the retaining clips. If a gap does exist between the memory module and the retaining clips, remove the DIMM; then, reinsert the DIMM properly.

Attention: To avoid breaking the retaining clips or damaging the DIMM connectors, handle the clips gently.

7. If you removed the adapter from PCI slot 2, reinstall it.

Note: When you start the appliance server for the first time after adding memory, you must have a keyboard, monitor, and mouse connected to the appliance server. The system displays a message indicating that the memory configuration has changed.

- If you installed additional memory, start the Configuration/Setup Utility program, and select **Save Settings**. For more information see “Using the Configuration/Setup Utility program for the xSeries 135” on page 21.
- If you just replaced a failed DIMM, you must start the Configuration/Setup Utility program, select **Advanced Setup**, select **Memory Settings**, highlight the connector or bank of connectors that you want to enable, and then select **Enable**.

8. If you have other options to install, install them now. Otherwise, go to “Installing the cover” on page 88.

Installing adapters in the model 8654

The model 8654 appliance server supports the installation of ServerProven adapters. Your appliance server comes with two peripheral component interconnect (PCI) adapter slots on the system board with riser cards installed in them.

Note: Your appliance server also comes with an integrated video controller on the system board. When you install a video adapter in a PCI slot, the appliance server BIOS automatically disables the integrated video controller. This enables the video adapter in the PCI slot to control the video functions for your monitor.

The following illustration shows the location of the PCI expansion slots on the model 8654 system board.

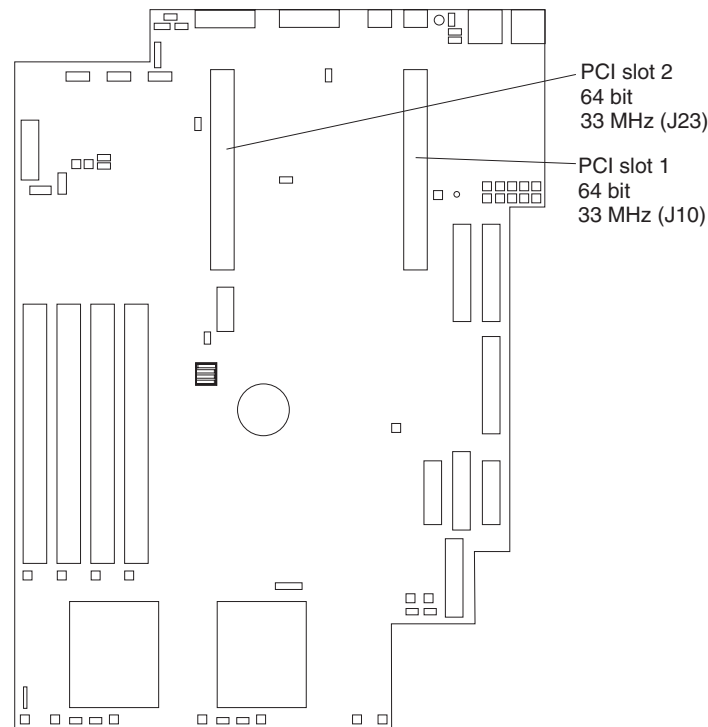


Figure 17. Identifying adapter placement

Adapter considerations

Before you install adapters in the model 8654, review the following:

- Locate the documentation that comes with the adapter and follow those instructions in addition to the instructions in this chapter. If you need to change the switch settings or jumper settings on your adapter, follow the instructions that come with the adapter.
- You can install 32-bit or 64-bit full-length or half-length adapters in the expansion slots. Full-length adapters are installed in slot 1; half-length adapters are installed in either slot 1 or 2.
- Your appliance server supports 5.0 V and universal PCI adapters; it does not support 3.3 V only adapters.
- Your appliance server uses a rotational interrupt technique to configure PCI adapters. You can use this technique to install PCI adapters that currently do not support sharing of PCI interrupts.

- PCI slots 1 and 2 and the integrated SCSI controller are on PCI bus B; the system board and all other integrated devices are on PCI bus A.
Note: PCI bus A is bus 0; PCI bus B is bus 1.
- The system scans PCI slots 1 and 2 to assign system resources. By default, the system starts (boots) devices in the following order: system SCSI devices, then PCI devices.
Note: To change the boot precedence, start the Configuration/Setup Utility, select **Start Options** from the main menu; then, select the **PCI SCSI adapter boot option**.

Installing an adapter in the model 8654

Complete the following steps to install an adapter:

Attention: When you handle static-sensitive devices, take precautions to avoid damage from static electricity. For details on handling these devices, refer to “Handling static-sensitive devices” on page 70.

1. Review the information in “Safety” on page vii.
2. Turn off the appliance server and disconnect all external cables and power cords.
3. Remove the cover according to “Removing the cover” on page 76.
4. Remove the expansion-slot clip that holds the expansion-slot cover in place by sliding it upward and off the frame of the appliance server.
5. Remove the expansion-slot cover.
6. See the documentation that comes with your adapter for any cabling instructions.
Note: Route internal adapter cables before you install the adapter.
7. Set any jumpers or switches as described by the adapter manufacturer.

8. Install the adapter:

Note: When installing an adapter into slot 2, skip steps a and d.

- a. Open the adapter-retention latch by pushing the blue tab to release it. Then push the latch up to the full open position.
- b. Carefully grasp the adapter by its top edge or upper corners, and align it with the connector on the PCI riser card.
- c. Press the adapter *firmly* into the riser-card connector.

Attention: When you install an adapter, be sure that the adapter is correctly seated in the riser-card connector before you turn on the appliance server. Improperly seated adapters might cause damage to the system board, the riser card, or the adapter.

- d. Push down on the blue adapter-retention latch until it clicks into place, securing the adapter.
- e. Replace the expansion-slot clip by sliding it down until it latches into place and holds the adapter securely.

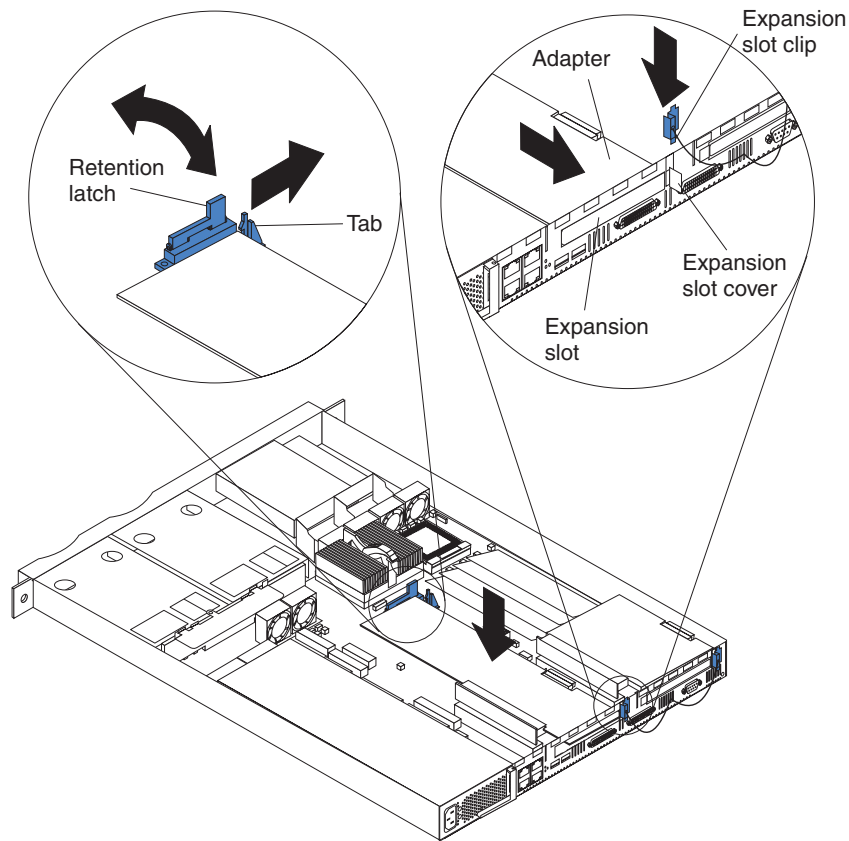


Figure 18. Installing the adapter

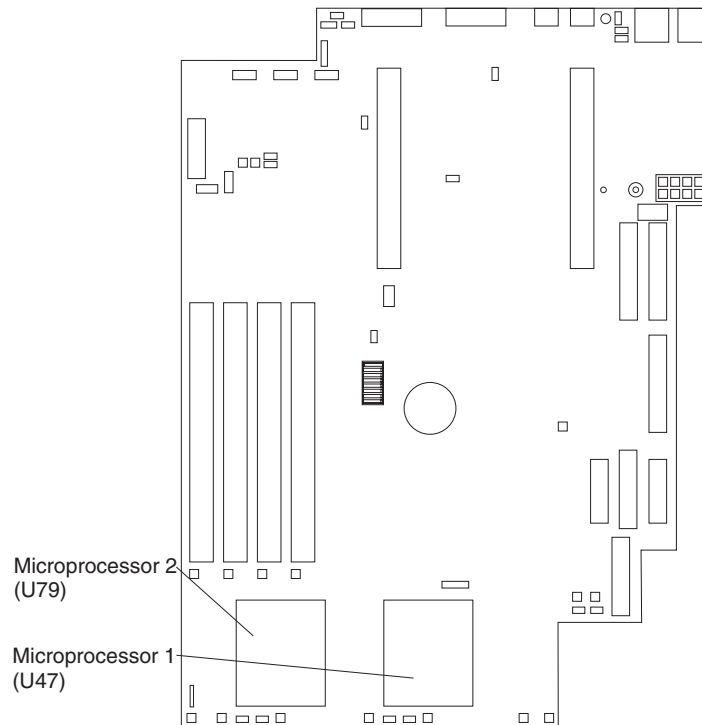
9. Connect the internal cables to the adapter, if necessary.

Attention: Route cables so that they do not block the flow of air from the fans.

10. If you have other options to install, install them now. Otherwise, go to “Installing the cover” on page 88.

Installing a microprocessor on the model 8654

The model 8654 appliance server comes with one 1 GHZ microprocessor installed. The following illustration will help you locate the second microprocessor connector on the system board.



Servers with one microprocessor installed:

- Microprocessor is installed in microprocessor socket 1 (U47).
- Microprocessor supports both the startup and application processes.
- A terminator card is installed in microprocessor socket 2 (U79).

Servers with two microprocessors installed:

- One microprocessor is installed in microprocessor socket 1 (U47), and the second microprocessor is installed in socket 2 (U79).
- Both microprocessors share the system load.

Complete the following steps to install a second microprocessor:

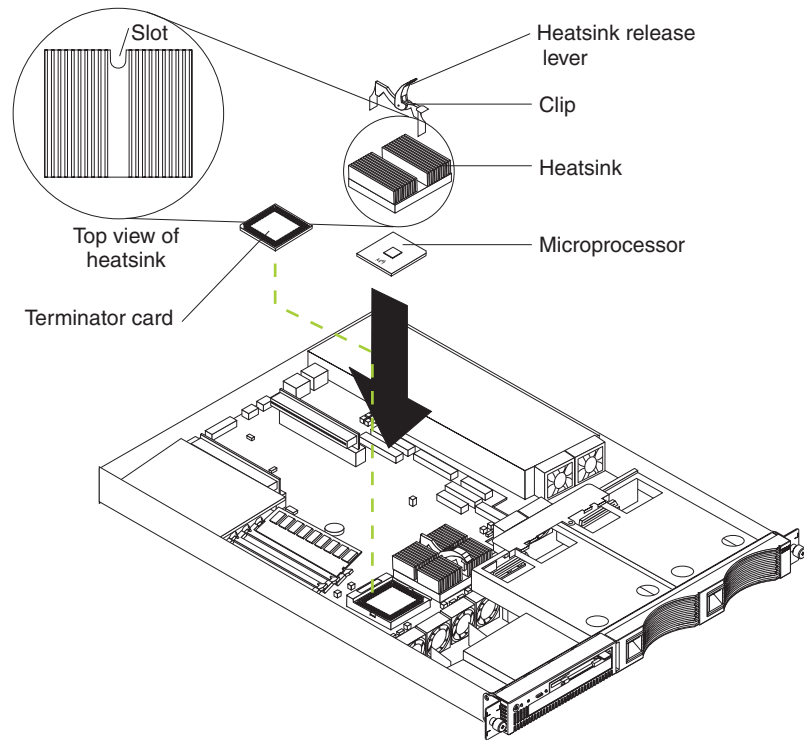
Attention: To avoid damage and to ensure proper server operation, review the following before you install a microprocessor:

- Ensure that the microprocessors are the same type, have the same cache size, and have the same clock speed.
- Ensure that the microprocessor internal and external clock frequencies are identical.
- See the ServerProven list at <http://www.ibm.com/pc/compat> for a list of microprocessors for use with your server.

Attention: When you handle static-sensitive devices, take precautions to avoid damage from static electricity. For details on handling these devices, see “Handling static-sensitive devices” on page 70.

1. Review the information in “Safety” on page vii.
2. Turn off the appliance server and disconnect all external cables and power cords.
3. Remove the cover according to “Removing the cover” on page 76.
4. Remove the plastic shield from the server.
5. Lift up the microprocessor release lever and remove the terminator card from the microprocessor connector.
6. Install the microprocessor in the microprocessor connector.

Attention: To avoid bending the pins, do not use excessive force.
7. Push the release lever down to lock the microprocessor into place.
8. Install the heat sink onto the microprocessor.



9. Replace the clear shield.

Note: The clear shield must be installed to maintain proper air flow and cooling inside the server.
10. If you have other options to install, install them now. Otherwise, go to “Installing the cover” on page 88.

Replacing a fan assembly

The model 8654 appliance server comes with six replaceable fans. The model 8672 appliance server comes with four replaceable fans.

Attention: If a fan fails, replace it within 48 hours to help ensure proper cooling.

Complete the following steps to replace the fan assembly:

1. Review the information in “Safety” on page vii.
2. Turn off the appliance server and disconnect all external cables and power cords.
3. Remove the cover according to “Removing the cover” on page 76.
4. Determine which fan to replace by checking the LED at each fan; a lit LED indicates the fan to replace.

Note: The fan LEDs are illuminated by the Light Path Diagnostics circuit (available on the xSeries 135 model 8654 only). For more information about the LEDs and the Light Path Diagnostics circuit, see “Identifying problems on the model 8654 using status LEDs” on page 120.

5. Remove the fan from the appliance server:
 - a. Disconnect the fan cable from the system board.
 - b. Lift the fan away from the appliance server.
6. Orient the fan so that the air flow arrow on the side of the fan is facing or pointing toward the rear of the appliance server.

Note: Proper air flow is from the front to the rear of the appliance server.

7. Push the replacement fan assembly into the appliance server until it clicks into place.

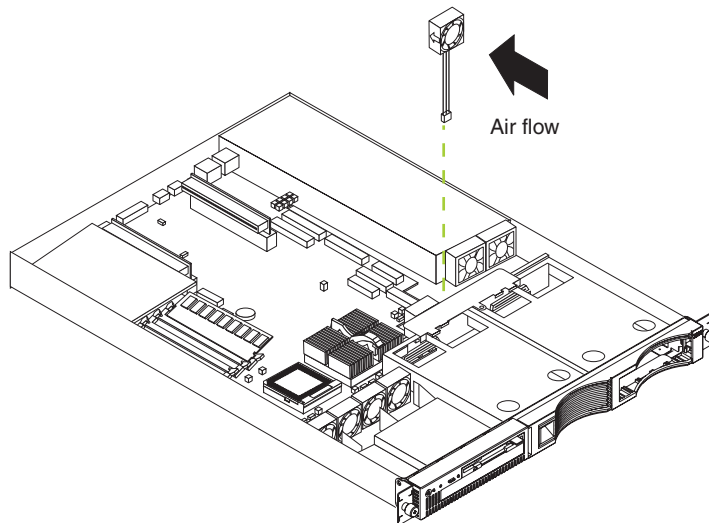


Figure 19. Replacing the fan

8. Connect the fan cable to the system board.

Note: When you start your appliance server after replacing a fan assembly, the system-error light will either remain on or turn off. If the system-error light remains on, you will have to turn off the appliance server to perform further troubleshooting.

9. If you have other options to install, install them now. Otherwise, go to “Installing the cover” on page 88.

Installing the cover

Complete the following steps to install the appliance server cover:

1. Clear any cables that might impede the replacement of the clear shield or the cover.
2. Install the clear shield, if it was removed.

Attention: Before sliding the cover forward, make sure that all of the tabs on the cover will engage the ledge at the front of the appliance server properly. If all the tabs do not engage the ledge properly, it will be extremely difficult to remove the cover later.

3. Install the cover by placing it into position and sliding it forward. Make sure that the cover engages the tabs at the front and rear of the appliance server.
4. Install the screws, and secure the cover as shown.

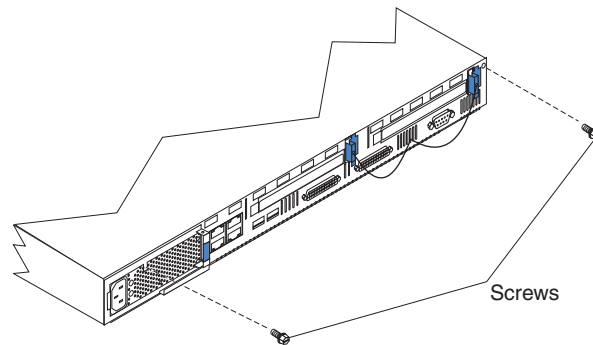


Figure 20. Installing the cover

5. If required for your configuration, install the appliance server in a rack cabinet.
6. Go to “Cabling the appliance server” for information on how to connect cables to your appliance server.

Cabling the appliance server

This section contains the information you need to cable your appliance server. To cable the model:

- 8654, see “Cabling the model 8654 appliance server” on page 89.
- 8672, see “Cabling the model 8672 appliance server” on page 92.

Cabling the model 8654 appliance server

Use the following illustration and the instructions in this section to attach the external cables to your server.

1. Connect the power cord and all external cables to the appliance server, and then plug the power cords into electrical outlets.

Note: Ethernet port 1 is for managing the appliance server. Ethernet port 2 is for hosting Internet content.

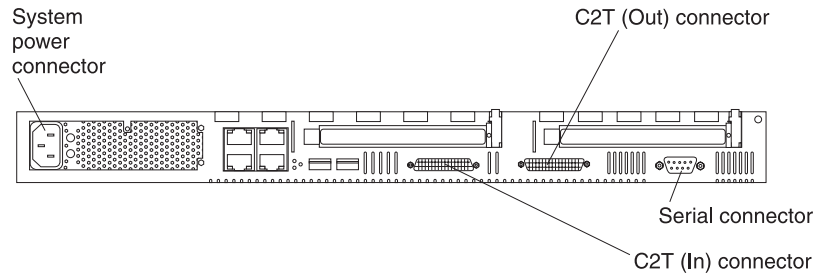


Figure 21. Identifying the xSeries 135 model 8654 connectors

To effectively manage the cables on your appliance server, keep groups of cables secured together, and do not run cables across the back of the appliance server.

Notes:

- a. Use cable straps to bundle like cables together.
 - b. Use cable straps to secure the cable bundles to the vertical rails of the rack cabinet.
 - c. When possible, separate data and power cables. For more information on cable routing, see the cabling instructions for your xSeries 135 server on the World Wide Web at <http://www.pc.ibm.com/support>.
 - d. Do not secure cables too tightly. Overtightening can cause internal damage to cables.
2. Continue with “Connecting appliance servers with a C2T chain”.

Connecting appliance servers with a C2T chain

To share the same monitor, keyboard, and pointing device with several appliance servers, you must connect the appliance servers together with Cable Chain Technology (C2T) interconnect cables through the C2T (In) and C2T (Out) connectors.

The C2T chaining cable uses physically different shells and different-colored connector covers (a black cover for out and a white cover for in) to prevent the accidental connection of two C2T (Out) connectors.

Before you begin, review the following:

- You can connect a maximum of 42 appliance servers with the C2T chaining cables.
- When connecting appliance servers across a space larger than 3 U or on two separate racks, you must use a C2T interconnect cable that is 2 m (6.5 ft) long, which is available in the C2T option cable kit.

Note: Only one 2-m (6.5 ft) cable can be used in the C2T chain.

- The C2T chaining cables are hot-swappable.

Attention: Do not let the pins of the C2T cable connectors touch the appliance server chassis when adding or removing systems to or from the C2T chain.

- Servers are numbered by their position in the chain (1 through n). If one appliance server is removed from the chain, all successive appliance servers are renumbered. For example, if the twelfth appliance server is removed from a chain of 15 appliance servers, appliance servers 13 through 15 will then be renumbered to 12 through 14.
- The C2T numbering is independent of any other appliance server reference. Changing the position of the appliance server in the C2T chain does not affect its IP addresses.

Complete the following steps to connect the appliance servers:

Note: If you are not connecting multiple servers, begin with step 1d.

1. Using the C2T cables, connect the appliance servers together:

Note: Your appliance server comes with a short C2T chaining cable that can span approximately 3 U if needed. A longer C2T cable is available in the C2T cable option kit.

- Connect one end of the C2T chaining cable to the C2T (Out) port of the top appliance server.
- Connect the opposite end of the C2T chaining cable to the C2T (In) port of the appliance server below it.
- Repeat these steps until all of the appliance servers are connected together.
- Connect the C2T breakout cable to the C2T (Out) port of appliance server 1.

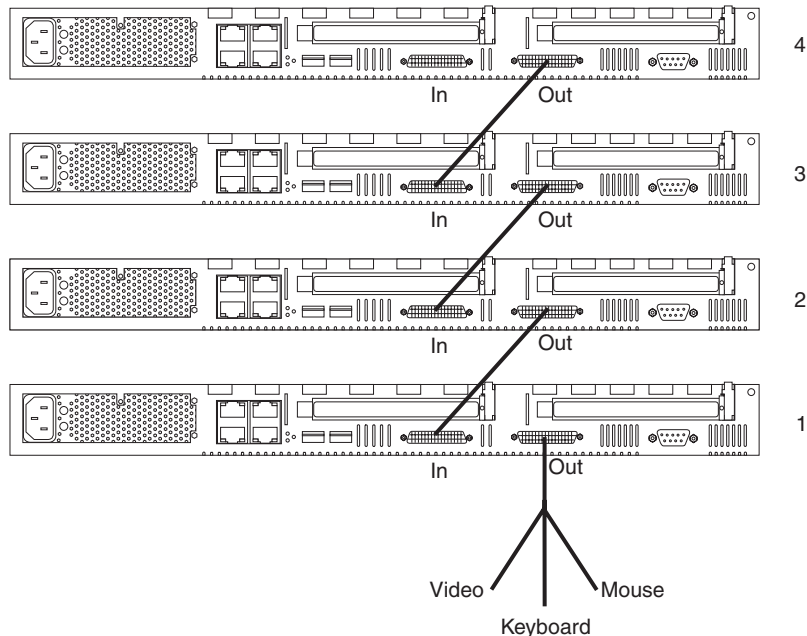


Figure 22. Viewing a C2T interconnect

Note: Server 1 (usually the appliance server at the bottom of the rack) is the appliance server to which you connect the device breakout cable.

- Connect a keyboard, monitor, and mouse to the C2T breakout cable.
- Check the operation of the monitor, pointing device, and keyboard with each appliance server. For testing instructions, see “Testing the C2T chain”.

Testing the C2T chain

After connecting the C2T chain, you will need to test the monitor, keyboard, and pointing device to be sure that they work with each of the appliance servers.

Follow these steps to test the C2T cabling:

1. Turn on the appliance servers and the monitor.
2. Verify that the light in the Select button on appliance server 1 in the C2T chain is lit, indicating that it is selected. If it is not, press the Select button.
3. Verify that the monitor is working.
4. Start up an operating system that has a mouse or pointing device driver and verify that the mouse or pointing device buttons function.
5. Test your keyboard by typing a few words within an application.
6. Press NumLock on the keyboard twice, and then press the number of the appliance server to test next, and then press Enter. Repeat steps 1 through 4 for each of the appliance servers in the chain.
7. If necessary, review “Using the C2T feature”.

Note: If you cannot use the devices, check your cable connections and retry the test. If the problem persists, turn off the appliance servers and connect the C2T breakout cable directly to the C2T (Out) port of the appliance server. Power-on the appliance server and retry the devices. If the devices work, you probably have a bad C2T interconnect cable. Replace the cable and retry the devices in the C2T chain configuration.

Refer to “Input/output connector locations and ports” on page 93 for more details about the input/output connectors on your appliance server.

Using the C2T feature

Placing several appliance servers in a C2T chain enables you to share the same monitor, keyboard, and mouse on all appliance servers in the chain. To select an appliance server, you can either use the Console Select button on the front of the appliance server that you want to select, or you can use the keyboard. If you turn off a selected appliance server, you must select another appliance server that is powered up. For the location of the Select button, see “The IBM xSeries 135 model 8654 appliance server” on page 5.

To use the keyboard, do the following:

1. Press NumLock on the keyboard twice. The screen goes blank.
2. Type the number that corresponds to the appliance server ID in the C2T chain. The screen returns for the appliance server that you selected, and the Console Select LED for that appliance server illuminates.

Server 1 (usually the appliance server at the bottom of the rack) is the appliance server to which you connect the C2T breakout cable. Server 1 must not be turned off (powered down) for the chain to work properly. If appliance server 1 is turned off (powered down), it must be removed from the chain and replaced by the next appliance server in the chain.

Servers are numbered by their position in the chain (1 through n). If one appliance server is removed from the chain, all successive appliance servers are renumbered. For example, if the twelfth appliance server is removed from a chain of 15 appliance servers, appliance servers 13 through 15 will then be renumbered to 12 through 14.

When removing or replacing appliance servers, or changing cables in the chain, it is possible for more than one Select LED to be illuminated on the appliance servers in the chain. To clear all but the selected appliance server LED, press the Select button on any one of the appliance servers in the chain.

If you are using a flat-panel monitor, you might need to adjust the image lock on your monitor when multiple appliance servers are connected using C2T interconnect cables. To adjust this image, select one of the middle appliance servers in the chain by pressing the Select button on the front of the appliance server; then, adjust the image lock accordingly. For more information on how to adjust the image lock, see the documentation that comes with your flat-panel monitor.

Note: For the chain to operate properly, no more than two adjacent appliance servers can be unplugged from the electrical outlet at the same time.

Cabling the model 8672 appliance server

Use the following illustration to cable the model 8672 appliance server.

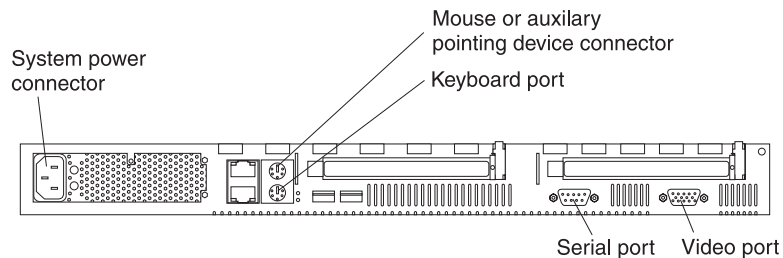


Figure 23. Locating the connectors

To effectively manage the cables on your appliance server, keep groups of cables secured together, and do not run cables across the back of the appliance server.

Notes:

1. Use cable straps to bundle like cables together.
2. Use cable straps to secure the cable bundles to the vertical rails of the rack cabinet.
3. When possible, separate data and power cables. For more information on cable routing, see the cabling instructions for your xSeries 135 server on the World Wide Web at <http://www.pc.ibm.com/support>.
4. Do not secure cables too tightly. Overtightening can cause internal damage to your cables.

Refer to “Input/output connector locations and ports” on page 93 for more details about the input/output connectors on your appliance server.

Input/output connector locations and ports

The following illustrations show the input/output connectors and the expansion slots on the rear of the appliance server. Your appliance server has the following input/output (I/O) connectors:

- Serial connector
- Ethernet connectors
- Cable Chaining Technology (C2T) connectors (model 8654 only)
- Keyboard connector (model 8672 only)
- Video connector (model 8672 only)
- Auxiliary-device (pointing device) connector (model 8672 only)

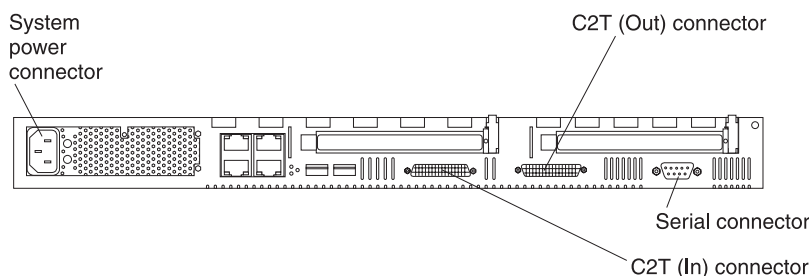


Figure 24. Identifying the connectors on the model 8654

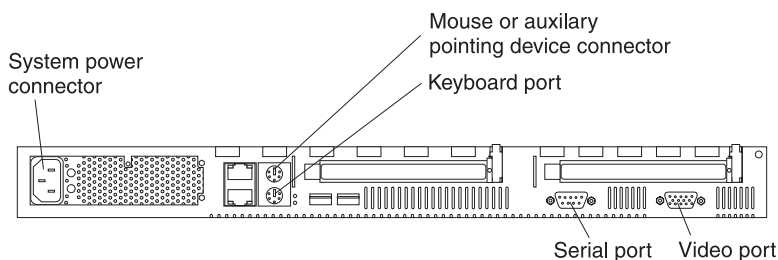


Figure 25. Identifying the connectors on the model 8672

Serial port

Your appliance server has one standard serial port. Some application programs require specific ports, and some modems function properly only at certain serial port addresses. Use the Configuration/Setup Utility program to change the port address assignments and prevent conflicts.

Table 10. Serial port connector on the system board.

Connector	Port	Description
COM1	Serial port connector(external)	Default connection. Used by the operating system. The modem can be connected so that the system can dial out during problems.

Viewing or changing the serial-port assignments

To view or change the serial-port assignments:

1. Restart the appliance server and watch the monitor screen.
2. When the message Press F1 for Configuration/Setup appears, press F1.
3. From the main menu, select **Devices and I/O Ports**; then, press Enter.

Note: The Devices and I/O Ports choice appears only on the full configuration menu. If you set two levels of passwords, you must enter the administrator password to access the full configuration menu.
4. Select the serial port; then, use the arrow keys to advance through the settings available.
5. Select **Save Settings**; then, select **Exit Setup** to exit from the Configuration/Setup Utility main menu.

Serial-port connector

Your appliance server has one serial-port connector located on the rear of the appliance server.

The following table and illustration shows the pin-number assignments for the 9-pin, male D-shell serial-port connector on the rear of your appliance server. These pin-number assignments conform to the industry standard.

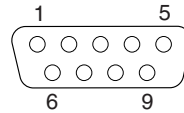


Table 11. Serial-port connector pin-number assignments.

Pin	Signal	Pin	Signal
1	Data carrier detect	6	Data set ready
2	Receive data	7	Request to send
3	Transmit data	8	Clear to send
4	Data terminal ready	9	Ring indicator
5	Signal ground		

Ethernet ports

Your appliance server comes with two integrated Ethernet controllers. These controllers provide an interface for connecting to 10-Mbps or 100-Mbps networks and provide full-duplex (FDX) capability, which enables simultaneous transmission and reception of data on the Ethernet local area network (LAN).

To access the Ethernet ports, connect a Category 3, 4, or 5 unshielded twisted-pair (UTP) cable to the RJ-45 connector on the rear of your appliance server.

Note: The 100BASE-TX Fast Ethernet standard requires that the cabling in the network be Category 5 or higher.

Ethernet port connector

The following table shows the pin-number assignments for the RJ-45 connector. These assignments apply to both 10BASE-T and 100BASE-TX devices.

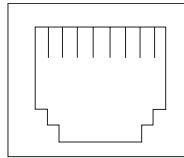


Table 12. Ethernet RJ-45 connector pin-number assignments..

Pin	Signal	Pin	Signal
1	Transmit data+	5	Not connected
2	Transmit data-	6	Receive data -
3	Receive data+	7	Not connected
4	Not connected	8	Not connected

Configuring the Ethernet controllers

When you connect your appliance server to the network, the Ethernet controllers automatically detect the data-transfer rate (10Mbps or 100Mbps) on the network and then set the controllers to operate at the appropriate rate. In addition, if the Ethernet ports that your appliance server is connected to support auto-negotiation, the Ethernet controllers will set the appropriate duplex state. That is, the Ethernet controllers will adjust to the network data rate, whether the data rate is standard Ethernet (10BASE-T), Fast Ethernet (100BASE-TX), half duplex (HDX), or full duplex (FDX). The controllers support half-duplex (HDX) and full-duplex (FDX) modes at both speeds.

C2T ports on the model 8654

There are two Cable Chain Technology (C2T) connectors on the rear of your model 8654 appliance server labeled "IN" and "OUT." These connectors operate with the C2T ports to create a communications chain between appliance servers and a console (monitor, mouse, and keyboard). To share the same monitor, keyboard, and pointing device with several appliance servers, you must connect the appliance servers together with C2T interconnect cables through the C2T (In) and C2T (Out) connectors.

Note: The highest video mode supported in the C2T chain is 1024 x 768.

C2T breakout cable

A keyboard, monitor, and mouse or pointing device are connected to your model 8654 appliance server through the C2T breakout cable. The keyboard and mouse cables have icons of a keyboard and a mouse on their respective cable connectors for easy identification.

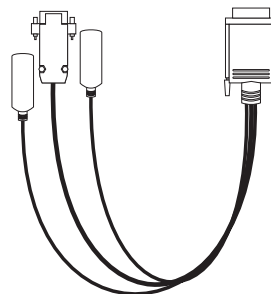


Figure 26. Using the C2T cable

Keyboard connector on the model 8672

There is one keyboard connector on the rear of the model 8672 appliance server. The following table and illustration shows the pin-number assignments for the keyboard connector on the end of the cable.

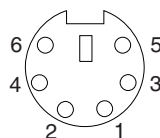


Table 13. Keyboard-connector (6-pin female) pin-number assignments .

Pin	I/O	Signal
1	I/O	Data
2	N/A	Reserved
3	N/A	Ground
4	N/A	+5 V dc
5	I/O	Keyboard clock
6	N/A	Reserved

Video connector on the model 8672

The following table shows the pin-number assignments for the 15-pin analog video connector on the rear of the model 8672 appliance server.

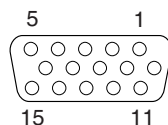


Table 14. Video-connector (15-pin female) pin-number assignments.

Pin	Signal	Pin	Signal	Pin	Signal
1	Red	6	Ground	11	Not connected
2	Green or monochrome	7	Ground	12	DDC SDA
3	Blue	8	Ground	13	Horizontal synchronization (Hsync)
4	Not connected	9	+5 V dc DDC	14	Vertical synchronization (Vsync)
5	Ground	10	Ground	15	DDC SCL

Auxiliary-device (pointing device) connector on the model 8672

There is one auxiliary-device connector that supports a mouse or other pointing device located on the rear of the model 8672 appliance server just under the keyboard connector. The following table shows the pin-number assignments for the auxiliary-device connector on the end of the cable.

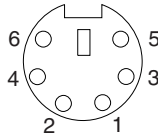


Table 15. Auxiliary or pointing-device-connector (6-pin female) pin-number assignments .

Pin	Signal
1	Data
2	Not connected
3	Ground
4	+5 V dc
5	Clock
6	Not connected

Chapter 7. Solving problems

This section provides basic troubleshooting information to help you resolve some common problems that might occur with your appliance server. You might need to connect a monitor, mouse, and keyboard to aid in your troubleshooting.

If you cannot locate and correct the problem using the information in this section, see “Using the Recovery CD” on page 128 for information on how to use the *Recovery CD* that comes with your appliance server to restore the original preinstalled software. The “Getting information, help, and service” on page 129 has information on how to obtain help from IBM for your appliance server.

Diagnostic tools overview

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

- **POST beep codes, error messages, and error logs**

The power-on self-test (POST) generates beep codes and messages to indicate successful test completion or the detection of a problem. See “POST” on page 101 for more information.

- **Diagnostic programs and error messages**

The appliance server diagnostic programs are stored in upgradable read-only memory (ROM) on the system board for the model 8654 or provided on the *IBM Enhanced Diagnostics CD* for the model 8672. These programs are the primary method of testing the major components of your appliance server. See “Diagnostic programs and error messages” on page 111 for more information.

- **Light Path Diagnostics**

The Light Path Diagnostics feature is for identifying system errors on the xSeries 135 model 8654.

- **Troubleshooting charts**

These charts list problem symptoms, along with suggested steps to correct the problems. See the “Troubleshooting charts” on page 123 for more information.

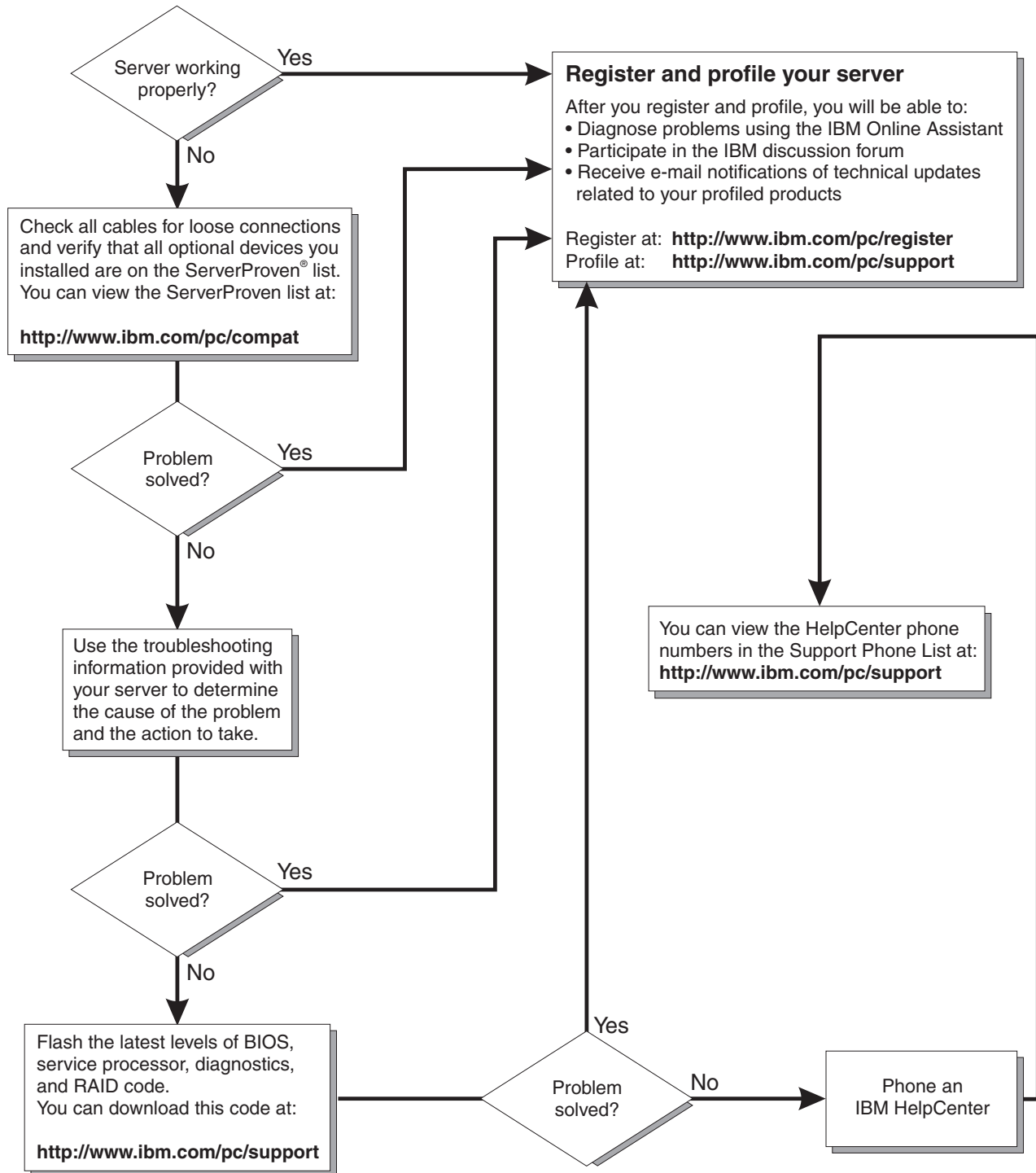
- **Customized support page**

You can create a customized support page that is specific to your hardware, complete with Frequently Asked Questions, parts information, technical hints and tips, and downloadable files. In addition, you can choose to receive electronic mail (e-mail) notifications whenever new information becomes available about your registered products.

After you register and create a profile for your xSeries products, you can diagnose problems using the IBM Online Assistant, and you can participate in the IBM discussion forum. For more detailed information about registering and creating a customized profile for your IBM products, visit the following addresses on the Web:

- <http://www.ibm.com/pc/register>
- <http://www.ibm.com/pc/support>

Server Support



POST

When you turn on the appliance server, it performs a series of tests to check the operation of appliance server components and some of the options that are installed in the appliance server. This series of tests is called the power-on self-test, or POST.

If POST finishes without detecting any problems, a single beep sounds, and the first screen of your operating system or application program appears.

If POST detects a problem, more than one beep sounds, and an error message appears on your screen. See “POST beep code descriptions” and “POST error messages” on page 104 for more information.

Notes:

1. If you have a power-on password set, you must type the password and press Enter, when prompted, before POST will continue.
2. A single problem might cause several error messages. When this occurs, work to correct the cause of the first error message. After you correct the cause of the first error message, the other error messages usually will not occur the next time you run the test.

POST beep code descriptions

Beep codes are sounded in a series of long and short beeps. The possible types of beep codes that your appliance server might emit include the following:

No beeps

If no beep occurs after your appliance server completes POST, call for service.

Continuous beep

Your startup (boot) microprocessor has failed, or your system board or speaker subsystem might contain a failing component. If the system continues through POST with no errors, call for service. If no video appears, the startup processor has failed; replace the startup processor.

One short beep

One beep indicates that your appliance server successfully completed POST. POST detected no configuration or functional errors. One beep also occurs after your appliance server completes POST if you type an incorrect power-on password.

Two short beeps

POST encountered an error. The Configuration/Setup Utility program will display additional information; follow the instructions that appear on the screen. See “POST error messages” on page 104 for descriptions of the text messages that might appear.

Three short beeps

A system memory error has occurred. This combination occurs only if the video basic input/output system (BIOS) cannot display the error message. Replace the failing memory module.

Repeating short beeps

The system board might contain a failing component, your keyboard might be defective, or a key on the keyboard might be stuck. Running the diagnostic tests can isolate the appliance server component that failed, but you must have your system serviced. If the error message remains, call for service. Ensure that:

- Nothing is resting on the keyboard and pressing the key.
- No key is struck.
- The keyboard cable is connected correctly to the keyboard and to the correct connector on the serve.

Note: If you just connected a new mouse or other pointing device, turn off the appliance server and disconnect that device. Wait at least 5 seconds; then, turn on the appliance server. If the error message goes away, replace the device.

Running the diagnostic tests can isolate the appliance server component that failed, but you must have your system serviced. If the error message remains, call for service.

One long and one short beep

POST encountered an error on a video adapter. If you are using the integrated video controller, call for service. If you are using an optional video adapter, replace the failing video adapter.

One long and two short beeps

A video I/O adapter ROM is not readable, or the video subsystem is defective. If you hear this beep combination twice, both the system board and an optional video adapter have failed the test. This beep combination might also indicate that the system board contains a failing component.

One long and three short beeps

The system-board video subsystem has not detected a monitor connection to the appliance server. Ensure that the monitor is connected to the appliance server. If the problem persists, replace the monitor.

Two long and two short beeps

POST does not support the optional video adapter. This beep combination occurs when you install a video adapter that is incompatible with your appliance server. Replace the optional video adapter with one that the appliance server supports, or use the integrated video controller.

POST beep codes

This section contains the POST beep codes for your appliance server. Your server might omit beep codes that are described in the following table. For example, a 1-2-3 beep code is one beep, a pause, two consecutive beeps, another pause, and then three more consecutive beeps.

Table 16. POST beep codes.

Beep code	Description	Action
1-1-2	Microprocessor register test has failed.	Call for service.
1-1-3	CMOS write/read test has failed.	
1-1-4	BIOS ROM checksum has failed.	
1-2-1	Programmable Interval Timer test has failed.	
1-2-2	DMA initialization has failed.	
1-2-3	DMA page register write/read test has failed.	
1-2-4	RAM refresh verification has failed. Turn off the appliance server and then restart the appliance server. If the problem persists, call for service.	
1-3-1	First 64 KB RAM test has failed. Turn off the appliance server and then restart the appliance server. If the problem persists, call for service.	
1-3-2	First 64 KB RAM parity test has failed. Turn off the appliance server and then restart the appliance server. If the problem persists, call for service.	
1-4-3	Interrupt vector loading test has failed.	
2-1-1	Secondary DMA register test has failed.	
2-1-2	Primary DMA register test has failed.	
2-1-3	Primary interrupt mask register test has failed.	
2-1-4	Secondary interrupt mask register test has failed.	
2-2-1	Interrupt vector loading has failed.	
2-2-2	Keyboard controller test has failed.	
2-2-3	CMOS power failure and checksum checks have failed.	
2-2-4	CMOS configuration information validation has failed.	
2-3-2	Screen memory test has failed.	
2-3-3	Screen retrace tests have failed.	
2-3-4	Search for video ROM has failed.	
2-4-1	Screen test indicates the screen is operable.	
3-1-1	Timer tick interrupt test has failed.	
3-1-2	Interval timer channel 2 test has failed.	
3-1-3	RAM test has failed above address hex 0FFFF.	
3-1-4	Time-of-Day clock test has failed.	
3-2-1	Serial port test has failed.	
3-2-2	Parallel port test has failed.	
3-2-4	Comparison of CMOS memory size against actual has failed.	
3-3-1	A memory size mismatch has occurred. Turn off the appliance server and then restart the appliance server. If the problem persists, call for service.	
3-3-2	I2C bus has failed.	

POST error messages

The following tables provide information about the POST error messages that can appear during startup. You need to attach a mouse, monitor, and keyboard to view the post error messages.

Table 17. POST error messages.

POST message	Description
062	<p>The appliance server failed to start on three consecutive attempts.</p> <p>All caches are disabled. Repeatedly turning the appliance server on and then off or resetting the appliance server might cause this problem.</p> <p>Action: Start the Configuration/Setup Utility program and verify that all settings are correct. Use the Cache Control selection in the Advanced Setup menu of the Configuration/Setup Utility program to enable the caches.</p> <p>If the problem persists, call for service. When the problem is corrected, be sure to enable the caches.</p>
101 102 106	<p>An error occurred during the system board and microprocessor test.</p> <p>Action: Call for service.</p>
114	<p>An adapter read-only memory (ROM) error occurred.</p> <p>Action: Remove the options. If you can start the appliance server without the options installed, reinstall each option one at a time and retest after each is reinstalled. When an option fails, replace it.</p> <p>If you cannot isolate and correct the problem, call for service.</p>
129	<p>An error was detected in the L1 cache of one of the microprocessors.</p> <p>Action:</p> <ol style="list-style-type: none"> 1. If you just installed a microprocessor, verify that the microprocessor is installed and seated correctly. 2. If the problem persists, call for service.
151	<p>A real-time clock (RTC) error occurred.</p> <p>Action: Call for service.</p>
161	<p>The real-time clock battery has failed.</p> <p>Action: Replace the battery yourself or call for service.</p> <p>You can use the appliance server until you replace the battery. However, you must run the Configuration/Setup Utility program and set the time and date and other custom settings each time you turn on the appliance server.</p>
162	<p>A change in device configuration occurred. This error occurs under one or more of the following conditions:</p> <ul style="list-style-type: none"> • A new device has been installed. • A device has been moved to a different location or cable connection. • A device has been removed or disconnected from a cable. • A device is failing and is no longer recognized by the appliance server as being installed. • An external device is not turned on. • An invalid checksum is detected in the battery-backed memory. <p>Action: Verify that all external devices are turned on. You must turn on external devices before turning on the appliance server.</p> <p>If you did not add, remove, or change the location of a device, a device is probably failing. Running the diagnostic program might isolate the failing device.</p> <p>If you cannot isolate and correct the problem, call for service.</p>

Table 17. POST error messages.

POST message	Description
163	<p>The time of day has not been set.</p> <p>Action: Set the correct date and time. If the date and time are set correctly and saved, but the 163 error message reappears, call for service.</p> <p>You can use the appliance server until the system is serviced, but any application programs that use the date and time will be affected.</p>
164	<p>A change in the memory configuration occurred. This message might appear after you add or remove memory.</p> <p>Note: The appliance server can be used with decreased memory capacity.</p> <p>Action: 1. If POST error message 289 also occurred, follow the instructions for that error message first.</p> <p>2. If you just installed or removed memory, run the Configuration/Setup Utility program; then, exit, saving the new configuration settings.</p> <p>If the message appears again, shut down the appliance server, reset the memory modules, and restart the appliance server.</p> <p>If the problem persists, call for service.</p>
175	<p>A vital product data (VPD) error occurred.</p> <p>Action: Call for service.</p>
176 177 178	<p>A security hardware error occurred.</p> <p>Action: Check for indications that someone has tampered with the appliance server. If no one has tampered with the appliance server, call for service.</p>
184	<p>The power-on password information stored in your appliance server has been removed.</p> <p>Action: From the Configuration/Setup Utility program main menu, select System Security. Then, follow the instructions on the screen.</p> <p>If this information cannot be restored, call for service.</p>
185	<p>A power failure damaged the stored information about the drive-startup sequence.</p> <p>Action: From the Configuration/Setup Utility program main menu, select Start Options; then, follow the instructions on the screen.</p> <p>If this information cannot be restored, call for service.</p>
186	<p>A system board or hardware error occurred.</p> <p>Action: Call for service.</p>
187	<p>The VPD serial number is not set.</p> <p>Action: The system serial number is set in the VPD EEPROM at the time of manufacturing. If the system board has been replaced, the system serial number will be invalid and should be set. From the main menu of the Configuration/Setup Utility program, select System Information, and then select Product Data. If the problem persists, call for service.</p>
188	<p>A vital product data (VPD) error occurred.</p> <p>Action: Call for service.</p>
189	<p>An attempt has been made to access the appliance server with invalid passwords. After three incorrect attempts, the appliance server locks up; that is, the logon data fields are no longer available to the user.</p>

Table 17. POST error messages.

POST message	Description
201	<p>An error occurred during the memory controller test. This error can be caused by:</p> <ul style="list-style-type: none"> • Incorrectly installed memory • A failing memory module • A system board problem <p>Action: 1. If you just installed memory, verify that the new memory is correct for your appliance server. Also verify that the memory is installed and seated correctly.</p> <p>2. If the problem persists, call for service.</p>
229	<p>An error was detected in the L2 cache of one of the microprocessors.</p> <p>Action: 1. If you just installed a microprocessor, verify that the microprocessor is installed and seated correctly.</p> <p>2. If the problem persists, call for service.</p>
289	<p>An error occurred during POST memory tests, and a failing DIMM was disabled.</p> <p>Note: You can use the appliance server with decreased memory.</p> <p>Action: 1. If you just installed memory, verify that the new memory is correct for your appliance server. Also verify that the memory is installed and seated correctly. Start the Configuration/Setup Utility program and select Memory Settings from the Advanced Setup menu to enable the DIMM.</p> <p>2. If the problem remains, replace the failing DIMM.</p> <p>If the problem persists, call for service.</p>
301 303	<p>An error occurred during the keyboard and keyboard controller test. These error messages also might be accompanied by continuous beeping.</p> <p>Action: Ensure that:</p> <ul style="list-style-type: none"> • Nothing is resting on the keyboard and pressing a key. • No key is stuck. • The keyboard cable is connected correctly to the keyboard and to the correct connector on the appliance server. <p>Running the diagnostic tests can isolate the appliance server component that failed, but you must have your system serviced. If the error message remains, call for service.</p> <p>Note: If you just connected a new mouse or other pointing device, turn off the appliance server and disconnect that device. Wait at least 5 seconds; then, turn on the appliance server. If the error message goes away, replace the device.</p>
602	<p>Invalid diskette boot record</p> <p>Action: 1. Replace the diskette.</p> <p>2. If the problem persists, make sure that the diskette drive cables are correctly and securely connected.</p> <p>3. If the problem remains, replace the diskette drive.</p> <p>If the problem persists, call for service.</p>
604	<p>An error occurred during a diskette drive test.</p> <p>Action: 1. Verify that the Configuration/Setup Utility program correctly reflects the type of diskette drive that you have installed.</p> <p>2. Run the diagnostic tests. If the diagnostic tests fail, call for service.</p>
662	<p>A diskette drive configuration error occurred.</p> <p>Action: If you removed a diskette drive, make sure that the diskette drive setting is correct in the Configuration/Setup Utility program. If the setting is not correct, change it.</p> <p>If the problem persists, call for service.</p>

Table 17. POST error messages.

POST message	Description
962	<p>A parallel port configuration error occurred.</p> <p>Action: If you changed a hardware option, make sure that the parallel port setting is correct in the Configuration/Setup Utility program. If the setting is not correct, change it.</p> <p>If the problem persists, call for service.</p>
11xx	<p>An error occurred during the system-board serial port test.</p> <p>Action: If you have a modem, serial printer, or other serial device attached to your appliance server, verify that the serial cable is connected correctly. If it is, use the following procedure:</p> <ol style="list-style-type: none"> 1. Turn off the appliance server. 2. Disconnect the serial cable from the serial port. 3. Wait five seconds; then, turn on the appliance server. <p>If the POST error message does not reappear, either the serial cable or the device is probably failing. See the documentation that comes with the serial device for additional testing information.</p> <p>If the POST error message reappears, call for service.</p>
1162	<p>The serial port configuration conflicts with another device in the system.</p> <p>Action:</p> <ol style="list-style-type: none"> 1. Make sure the IRQ and I/O port assignments needed by the serial port are available. 2. If all interrupts are being used by adapters, you might need to remove an adapter to make an interrupt available to the serial port, or force other adapters to share an interrupt.
1601	<p>An Advanced Systems Management update is needed.</p> <p>Action: Download and install the latest Advanced Systems Management flash update.</p>
1800	<p>A PCI adapter has requested a hardware interrupt that is not available.</p> <p>Action:</p> <ol style="list-style-type: none"> 1. Make sure that the PCI adapter and all other adapters are set correctly in the Configuration/Setup Utility program. If the interrupt resource settings are not correct, change the settings. 2. If all interrupts are being used by other adapters, you might need to remove an adapter to make an interrupt available to the PCI adapter, or force other adapters to share an interrupt.

Table 17. POST error messages.

POST message	Description
1962	<p>No valid startup devices were found. The system cannot find the startup drive or operating system.</p> <p>Action: Be sure that the drive that you want to start from is in the startup sequence.</p> <ol style="list-style-type: none"> 1. Select Start Options from the Configuration/Setup Utility program main menu. If you are unable to set the startup sequence, call for service. 2. Check the list of startup devices in the Startup device data fields. Is the drive you want to start from in the startup sequence? <ul style="list-style-type: none"> Yes Exit from this screen; then, select Exit Setup to exit from the Configuration/Setup menu. Go to step 3. No Follow the instructions on the screen to add the drive; then, save the changes and exit from the Configuration/Setup menu. Restart the appliance server. 3. Is an operating system installed? <ul style="list-style-type: none"> Yes Turn off the appliance server. Go to step 4. No Install the operating system in your appliance server; then, follow your operating system instructions to shut down and restart the appliance server. 4. During appliance server startup, watch for messages indicating a hardware problem. <p>If the same error message appears, call for service.</p>
2400	<p>An error occurred during the testing of the video controller on the system board. This error can be caused by a failing monitor, a failing system board, or a failing video adapter (if one is installed).</p> <p>Action: Verify that the monitor is connected correctly to the video connector. If the monitor is connected correctly, call for service.</p>
2462	<p>A video memory configuration error occurred.</p> <p>Action: Make sure that the monitor cables are correctly and securely connected to the appliance server.</p> <p>If the problem persists, call for service.</p>
5962	<p>An IDE CD-ROM configuration error occurred.</p> <p>Action: Check the signal and power cable connections to the CD-ROM drive.</p> <p>If the problem persists, call for service.</p>
8603	<p>An error occurred during the mouse (pointing device) controller test. The addition or removal of a mouse, or a failing system board can cause this error.</p> <p>Note: This error also can occur if electrical power was lost for a very brief period and then restored. In this case, turn off the appliance server for at least 5 seconds; then, turn it back on.</p> <p>Action: Ensure that the keyboard and mouse (pointing device) are attached to the correct connectors. If they are connected correctly, use the following procedure:</p> <ol style="list-style-type: none"> 1. Turn off the appliance server. 2. Disconnect the mouse from the appliance server. 3. Turn on the appliance server. <p>If the POST error message does not reappear, the mouse is probably failing. See the documentation that comes with the mouse for additional testing information. If the problem remains, replace the mouse or pointing device.</p> <p>If the POST error message reappears, run the diagnostic tests to isolate the problem. If the diagnostic tests do not find a problem and the POST error message remains, call for service.</p>

Table 17. POST error messages.

POST message	Description
00012000	<p>Processor machine check.</p> <p>Action: 1. Update the system BIOS. 2. If the problem persists, replace the microprocessor.</p>
00019501	<p>Processor 1 is not functioning.</p> <p>Action: Replace microprocessor 1.</p> <p>If the problem persists, call for service.</p>
00019502	<p>Processor 2 is not functioning.</p> <p>Action: Replace microprocessor 2.</p> <p>If the problem persists, call for service.</p>
00019701	<p>Processor 1 failed the built-in self-test.</p> <p>Action: Replace microprocessor 1.</p> <p>If the problem persists, call for service.</p>
00019702	<p>Processor 2 failed the built-in self-test.</p> <p>Action: Replace microprocessor 2.</p> <p>If the problem persists, call for service.</p>
00180100	<p>A PCI adapter has requested memory resources that are not available</p> <p>Action: 1. Make sure that the PCI adapter and all other adapters are set correctly in the Configuration/Setup Utility program. If the memory resource settings are not correct, change the settings. 2. If all memory resources are being used, you might need to remove an adapter to make memory available to the PCI adapter. Disabling the adapter BIOS on the adapter might correct the error. See the documentation that is provided with the adapter.</p>
00180200	<p>A PCI adapter has requested an I/O address that is not available, or the PCI adapter might be defective.</p> <p>Action: 1. Make sure that the I/O address for the PCI adapter and all other adapters are set correctly in the Configuration/Setup Utility program. 2. If the I/O port resource settings are correct, the PCI adapter might be defective. Call for service.</p>
00180300	<p>A PCI adapter has requested a memory address that is not available, or the PCI adapter might be defective.</p> <p>Action: 1. Make sure that the memory addresses for all other adapters are set correctly in the Configuration/Setup Utility program. If the memory resource settings are not correct, change the settings. 2. If the memory resource settings are correct, the PCI adapter might be defective. Call for service.</p>
00180400	<p>A PCI adapter has requested a memory address that is not available.</p> <p>Action: If all memory addresses are being used, you might need to remove an adapter to make memory address space available to the PCI adapter. Disabling the adapter BIOS on the adapter might correct the error. Refer to the documentation that is provided with the adapter.</p>
00180500	<p>A PCI adapter ROM error occurred.</p> <p>Action: Remove the PCI adapters. If you can start the appliance server without the adapters, reinstall each adapter one at a time and retest after each is reinstalled. When an adapter fails, replace it.</p> <p>If you cannot isolate and correct the problem, call for service.</p>

Table 17. POST error messages.

POST message	Description
00180600	<p>A PCI-to-PCI bridge error occurred. More than one PCI bus tried to access memory below 1 MB.</p> <p>Action: Remove the PCI adapter that has the PCI bridge. If you can start the appliance server without the adapter, reinstall and retest the adapter. If the adapter fails, replace it.</p> <p>If you cannot isolate and correct the problem, call for service.</p>
00180700	<p>xxxxyyyy system board PCI device does not respond or was disabled by the user (where xxxx is the PCI vendor ID and yyyy is the PCI device ID).</p> <p>Action: Start the Configuration/Setup Utility program, select Devices and I/O Ports, and make sure that the device is enabled. If the problem persists, call for service.</p>
00180800	<p>An unsupported PCI device is installed.</p> <p>Action: Remove the PCI adapters. If you can start the appliance server without the adapters, reinstall each adapter one at a time and retest after each is reinstalled. When an adapter fails, replace it.</p> <p>If the problem persists, call for service.</p>
00181000	<p>PCI error.</p> <p>Action: Remove the PCI adapters. If you can start the appliance server without the adapters, reinstall each adapter one at a time and retest after each is reinstalled. When an adapter fails, replace it.</p> <p>If the problem persists, call for service.</p>
01295085	<p>The ECC checking hardware test failed.</p> <p>Action: Call for service.</p>
01298001	<p>No update data is available for processor 1.</p> <p>Action: Update the system BIOS to a level that supports the microprocessors that are installed in the appliance server.</p>
01298002	<p>No update data is available for processor 2.</p> <p>Action: Update the system BIOS to a level that supports the microprocessors that are installed in the appliance server.</p>
01298101	<p>The update data for processor 1 is incorrect.</p> <p>Action: Update the system BIOS to a level that supports the microprocessors that are installed in the appliance server.</p>
01298102	<p>The update data for processor 2 is incorrect.</p> <p>Action: Update the system BIOS to a level that supports the microprocessors that are installed in the appliance server.</p>
01298200	<p>Microprocessor speed mismatch</p> <p>Action: The microprocessors that are installed do not run at the same speed; install microprocessors with identical speeds.</p>
I9990301	<p>A hard disk drive error occurred.</p> <p>Action: Call for service.</p>
I9990305	<p>POST could not find an operating system.</p> <p>Action: Install an operating system. If you have already installed the operating system, check the drive startup sequence. If the drive sequence is correct, run the diagnostic tests to verify that the hard disk drive is functioning correctly. If there is a problem with the hard disk drive (such as a bad sector), you might need to reinstall the operating system.</p> <p>If you cannot reinstall the operating system, call for service.</p>

Table 17. POST error messages.

POST message	Description
I9990650	Power is restored. Action: No action is required. This message appears each time power is restored to the appliance server after a power loss.
Other Numbers	POST found an error. Action: Follow the instructions on the screen.

Event/error logs

The POST error log contains the three most recent error codes and messages that the system generated during POST. The System Event/Error log contains all messages that were issued during POST and all system status messages from the Advanced Systems Management processor.

To view the contents of the System Event/Error log, start the Configuration/Setup Utility program; then, select **Event/Error Logs** from the main menu.

Diagnostic programs and error messages

The appliance server diagnostic programs are stored in upgradable read-only memory (ROM) on the system board or on the *IBM Enhanced Diagnostics* CD that comes with the appliance server. These programs are the primary method of testing the major components of your appliance server.

Diagnostic error messages indicate that a problem exists; they are not intended to be used to identify a failing part. Troubleshooting and servicing of complex problems that are indicated by error messages should be performed by trained service personnel.

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

The following sections contain the error codes that might appear in the detailed test log and summary log when running the diagnostic programs.

The error code format is as follows:

fff-ttt-iii-date-cc-text message

where:

fff is the three-digit function code that indicates the function being tested when the error occurred. For example, function code 089 is for the microprocessor.

ttt is the three-digit failure code that indicates the exact test failure that was encountered. (These codes are for trained service personnel and are described in the *Hardware Maintenance Manual*.)

iii is the three-digit device ID. (These codes are for trained service personnel and are described in the *Hardware Maintenance Manual*.)

date is the date that the diagnostic test was run and the error recorded.

cc is the check value that is used to verify the validity of the information.

text message is the diagnostic message that indicates the reason for the problem.

Text messages

The diagnostic text message format is as follows:

Function Name: Result (test specific string)

where:

Function Name	is the name of the function being tested when the error occurred. This corresponds to the function code (fff) given in the previous list.
Result	can be one of the following: <ul style="list-style-type: none">Passed This result occurs when the diagnostic test completes without any errors.Failed This result occurs when the diagnostic test discovers an error.User Aborted This result occurs when you stop the diagnostic test before it is complete.Not Applicable This result occurs when you specify a diagnostic test for a device that is not present.Aborted This result occurs when the test could not proceed because of the system configuration.Warning This result occurs when a possible problem is reported during the diagnostic test, such as when a device that is to be tested is not installed.
Test Specific String	This is additional information that you can use to analyze the problem.

Starting the diagnostic programs

You can press F1 while running the diagnostic programs to obtain Help information. You also can press F1 from within a Help screen to obtain online documentation from which you can select different categories. To exit from Help, press Esc. You need to attach a mouse, monitor, and keyboard to use the diagnostic programs.

To start the diagnostic programs:

1. If you have a model 8672 appliance server, insert the *IBM Enhanced Diagnostics* CD in the CD-ROM drive on the appliance server.
2. Turn on the appliance server and watch the screen.
3. When the message F2 for Diagnostics appears, press F2.
4. Type the appropriate password; then, press Enter.
5. Select either **Extended** or **Basic** from the top of the screen.
6. When the Diagnostic Programs screen appears, select the test you want to run from the list that appears; then, follow the instructions on the screen.

Notes:

- a. If the appliance server stops during testing and you cannot continue, restart the appliance server and try running the diagnostic programs again. If the problem persists, call for service.
- b. The keyboard and mouse (pointing device) tests assume that a keyboard and mouse are attached to the appliance server.

- c. If you run the diagnostic programs with no mouse attached to your appliance server, you will not be able to navigate between test categories using the **Next Cat** and **Prev Cat**. All other functions that are provided by mouse-selectable buttons are also available using the function keys.
- d. You can view appliance server configuration information (such as system configuration, memory contents, interrupt request (IRQ) use, direct memory access (DMA) use, device drivers, and so on) by selecting **Hardware Info** from the top of the screen.

When the tests have completed, you can view the test log by selecting **Utility** from the top of the screen.

If the diagnostic programs do not detect an error but the problem persists during typical appliance server operations, a software error might be the cause. If you suspect a software problem, refer to the information that comes with the software package.

Viewing the test log

The test log will not contain any information until after the diagnostic program has run.

Note: If you already are running the diagnostic programs, begin with step 3.

To view the test log:

1. Turn on the appliance server and watch the screen.
If the appliance server is on, shut down your operating system and restart the appliance server.
2. When the message **F2 for Diagnostics** appears, press F2.
If a power-on password is set, the appliance server prompts you for it. Type the appropriate password; then, press Enter.
3. When the Diagnostic Programs screen appears, select **Utility** from the top of the screen.
4. Select **View Test Log** from the list that appears; then, follow the instructions on the screen.

The system maintains the test-log data while the appliance server is powered on. When you turn off the power to the appliance server, the test log is cleared.

Diagnostic error message tables

The following tables provide descriptions of the error messages that might appear when you run the diagnostic programs.

Important:

If diagnostic error messages appear that are not listed in the following tables, make sure that your appliance server has the latest levels of BIOS and diagnostics microcode installed.

Table 18. Diagnostic error messages.

Code	Function	Result	Text message	Action
001	Core system	Failed	Processor board, ECC Test	Call for service.
			System board	
005	Video port		Processor and system boards	
011	Serial port		Integrated serial port	
014	Parallel port		Integrated parallel port	
015	USB interface	Aborted	Can NOT test USB interface while it is in use. Note: If you have a USB keyboard or mouse attached, you cannot run the diagnostic program for the USB interface.	<ol style="list-style-type: none"> 1. Turn off the appliance server. 2. Replace the USB keyboard and mouse with a standard keyboard and mouse. 3. Turn on the appliance server. 4. Run the diagnostic test again.
		Failed	System board	Call for service.
020	PCI interface	Failed	System board	Call for service.
030	SCSI interface	Failed	SCSI adapter in slot <i>n</i> failed register/counter/ power test (where <i>n</i> is the slot number of the failing adapter)	Refer to the information provided with the adapter for instructions. If the problem persists, call for service.
			SCSI controller on system board failed register/counter/power test	Call for service.
075	Power supply	Failed	Voltage sensed by the system is out of range	Call for service.

Table 18. Diagnostic error messages.

Code	Function	Result	Text message	Action
089	Microprocessor	Failed	Invalid microprocessor in slot xyz or BIOS setup problem (where xyz identifies the microprocessor that is causing the error message)	<ol style="list-style-type: none"> 1. Check the system error log for the related error messages. 2. If your appliance server does not have the latest level BIOS installed, update the BIOS. 3. If the problem remains, replace the xyz microprocessor and run the test again. <p>If the problem persists, call for service.</p>
			Processor in socket ID xyz is installed but not functioning (where xyz identifies the microprocessor that is causing the error message)	
			Microprocessor in socket ID xyz (where xyz identifies the microprocessor that is causing the error message)	<ol style="list-style-type: none"> 1. Reseat the microprocessor. 2. If the problem remains, replace the microprocessor. <p>If the problem persists, call for service.</p>
			Processor in socket id xyz is defective (where xyz identifies the microprocessor that is causing the error message)	<p>Replace the microprocessor.</p> <p>If the problem persists, call for service.</p>
			Test setup error: Application microprocessor not installed or BIOS setup problem	<ol style="list-style-type: none"> 1. Verify that the Application microprocessor is installed and seated correctly. 2. If your appliance server does not have the latest level BIOS installed, update the BIOS. 3. If the problem remains, replace the application microprocessor and run the test again. <p>If the problem persists, call for service.</p>

Table 18. Diagnostic error messages.

Code	Function	Result	Text message	Action
075	Microprocessor	Failed	VRM corresponding to Microprocessor in socket xyz is defective (where xyz identifies the microprocessor whose VRM is causing the error message)	Replace the VRM. If the problem remains, call for service.
			VRM corresponding to Microprocessor in socket ID xyz is not installed (where xyz identifies the microprocessor whose VRM is causing the error message)	Install a VRM. If the problem persists, call for service.
175	System thermal	Failed	Fan # <i>n</i> (where <i>n</i> is the number of the failing fan)	Replace the indicated fan.
			Temperature sensed on processor board is out of range	Call for service.
180	Status display	Failed	Any failure message	Call for service.
201	System memory	Failed	DIMMs in location DIMM <i>n</i> (where <i>n</i> is the number of the socket that contains the failing DIMM)	<ol style="list-style-type: none"> 1. Reseat the failing DIMM. 2. If the problem remains, replace the DIMM. <p>If the problem persists, call for service.</p>
			Test setup error: Corrupt BIOS in ROM	<p>If your appliance server does not have the latest level BIOS installed, update the BIOS to the latest level.</p> <p>If the problem persists, call for service.</p>
			Test setup error: Corrupt DMI BIOS, information in BIOS is not as expected	

Table 18. Diagnostic error messages.

Code	Function	Result	Text message	Action
202	System cache	Aborted	Test setup error: BIOS cannot access VPD information	<p>If your appliance server does not have the latest level BIOS code installed, update the BIOS code to the latest level and run the diagnostic program again.</p> <p>If the problem persists, call for service.</p>
			Test setup error: Corrupt DMI BIOS. Information in BIOS is not as expected	
			Test setup error: No L2 cache detected on microprocessor socket ID xyz or BIOS setup problem (where xyz identifies the microprocessor that is causing the error message)	
		Test setup error: Unknown hardware problem associated with microprocessor in socket ID xyz. (where xyz identifies the microprocessor that is causing the error message)		
Failed	Microprocessor in socket ID xyz (where xyz identifies the microprocessor that is causing the error message)	<ol style="list-style-type: none"> Reseat the identified microprocessor. If the problem remains, replace the microprocessor. <p>If the problem persists, call for service.</p>		
Warning	Test setup error: Cache is disabled. Use system setup to enable before retrying the test	<p>Use the Cache Control choice from the Advanced Setup menu to enable the cache.</p> <p>If the problem persists, call for service.</p>		
206	Diskette drive	Failed	Internal diskette drive bay	Call for service.
215	CD-ROM	Failed	On system board.	Call for service.
		Aborted	The CD-ROM drive is not present.	Verify that the cables are properly connected to the CD-ROM. If the problem persists, call for service.
217	Hard disk drive	Failed	BIOS drive # <i>n</i> (where <i>n</i> is the drive bay number)	Call for service.

Table 18. Diagnostic error messages.

Code	Function	Result	Text message	Action
264	Magnetic tape drive	Aborted	Test setup error: No tape drive found	<p>Check the cable and power connections to the drive.</p> <p>Refer to the information that is provided with the tape drive.</p> <p>If the problem persists, call for service.</p>
		Failed	The load/mount test failed for device <i>n</i> on adapter <i>m</i> (where <i>n</i> is the number of the device and <i>m</i> is the adapter number)	<p>Refer to the information provided with the tape drive.</p> <p>If the problem persists, call for service.</p>
			The self-diagnostic failed for device <i>n</i> on adapter <i>m</i> (where <i>n</i> is the number of the device and <i>m</i> is the adapter number)	
			The unload/eject test failed for device <i>n</i> on adapter <i>m</i> (where <i>n</i> is the number of the device and <i>m</i> is the adapter number)	
			The unload/eject push button test failed for device <i>n</i> on adapter <i>m</i> (where <i>n</i> is the number of the device and <i>m</i> is the adapter number)	
The read/write self-diagnostic failed for device <i>n</i> on adapter <i>m</i> (where <i>n</i> is the number of the device and <i>m</i> is the adapter number)	<p>Insert a new tape cartridge; then, run the diagnostic test again.</p> <p>Refer to the information that is provided with the tape drive.</p> <p>If the problem persists, call for service.</p>			
301	Keyboard	Failed	On system board keyboard test failed	<ol style="list-style-type: none"> 1. Verify that the keyboard cable is connected. 2. If the problem remains, replace the keyboard cable. <p>If the problem persists, call for service.</p>
302	Mouse	Failed	On system board pointing device test failed.	Replace the pointing device. If the problem persists, call for service.
305	Video monitor		Any message	Refer to the information that comes with the monitor.

Table 18. Diagnostic error messages.

Code	Function	Result	Text message	Action
405	Ethernet	Failed	In PCI slot <i>n</i> (where <i>n</i> is the PCI slot number in which the failing Ethernet adapter is installed)	Replace the Ethernet adapter in slot <i>n</i> . If the problem persists, call for service.
			On system board	Call for service.
415	Analog/digital modem	Not applicable	No modem was detected	<ol style="list-style-type: none"> 1. Verify that the modem is properly attached to the appliance server. 2. If the problem remains, replace the modem. <p>If the problem persists, call for service.</p>
			PCI modem detected but not enabled	<ol style="list-style-type: none"> 1. Change the configuration to enable the modem. 2. If the problem remains, replace the modem. <p>If the problem persists, call for service.</p>
		Failed	Modem reset failed	<p>Replace the modem.</p> <p>If the problem persists, call for service.</p>
			No dial tone detected	<ol style="list-style-type: none"> 1. Make sure that the phone line attached to the modem has a dial tone. (Connect a phone to the line and listen, if necessary.) If there is no tone, have the phone line serviced. 2. If the problem remains, replace the modem. <p>If the problem persists, call for service.</p>

Identifying problems on the model 8654 using status LEDs

If the system-error light in the operator information panel on the front of the appliance server is on, one or more LEDs inside the appliance server might be on. Use the Light Path Diagnostics panel to identify the type of error that occurred.

Note: Light Path Diagnostics is available on the xSeries 135 model 8654 only.

For LED locations see the “Light Path Diagnostics panel on the model 8654” on page 121.

The Light Path Diagnostics panel in your appliance server enables you to quickly identify the type of system error that occurred. The Light Path Diagnostics panel is located on the system board, just behind PCI adapter slot 1. When you press the Light Path Diagnostics button, the LED on the top-right corner of the panel illuminates. This shows that the diagnostic circuitry is working correctly.

Your appliance server is designed so that any LEDs that are illuminated can be illuminated again without power after you remove the cover. This feature helps you isolate the problem if an error causes the appliance server to shut down. See “Model 8654 Light Path Diagnostics table” on page 121.

Important: You have up to 12 hours to use the Light Path Diagnostic LEDs after the power is removed from the appliance server. After 12 hours, you must turn on the appliance server again to be able to use the Light Path Diagnostic LEDs to help locate system errors.

To view the LEDs on the system board:

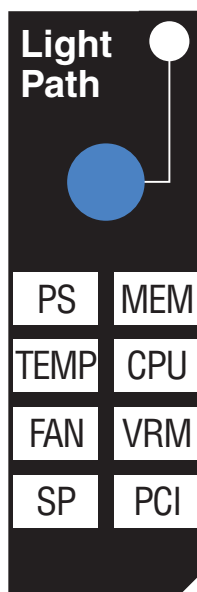
1. Turn off the appliance server and peripheral devices.
2. Remove all external cables from the appliance server; then, remove the appliance server from the rack and remove the cover. For more information see “Removing the cover” on page 76 for instructions.
3. Press and hold the Light Path Diagnostics (blue) button on the diagnostics panel. The LEDs will be illuminated while the switch is pressed.

Note: You can illuminate the LEDs for a maximum of 2 minutes. After that time, the circuit that powers the LEDs is exhausted.

4. Replace the cover on the appliance server; then, reinstall the appliance server in the rack and connect all external cables. For more information see “Installing the cover” on page 88 for instructions.

Light Path Diagnostics panel on the model 8654

The following illustration shows the LEDs on the diagnostics panel on the system board. See “Model 8654 Light Path Diagnostics table” for information on identifying problems using these LEDs.



Model 8654 Light Path Diagnostics table

The system-error light on the operator information panel is lit when certain system errors occur. If the system-error light on your appliance server is lit, use the following table to help determine the cause of the error and the action you should take.

Table 19. Light Path Diagnostics.

Lit LED on diagnostics panel	Cause	Action
None	An error has occurred and cannot be isolated, or the Advanced Systems Management processor has failed.	An error has occurred that is not represented by a Light Path Diagnostics LED. Check the system error log for more information about the error.
PS	Power supply has failed.	Have the system serviced.
TEMP	The system temperature has exceeded a threshold level.	<ol style="list-style-type: none"> 1. Check to see if a fan has failed. If it has, replace the fan. 2. Make sure that the room temperature is not too hot. (See “The IBM xSeries 135 model 8654 appliance server” on page 5 or “The IBM xSeries 135 model 8672 appliance server” on page 8.) <p>If the problem persists, have the system serviced.</p>
FAN	A fan has failed or is operating too slowly. Note: A failing fan can also cause the TEMP LED to be on.	Check the LEDs on the fans and replace the indicated fan.

Table 19. Light Path Diagnostics.

Lit LED on diagnostics panel	Cause	Action
SP	The service processor has failed.	Remove power from the appliance server, and then restart the appliance server. If the problem persists have the system serviced.
MEM	A memory error occurred.	<ol style="list-style-type: none"> 1. Check the DIMM failure LEDs on the system board. 2. Replace the DIMM that is indicated by the lit DIMM failure LED.
CPU	One of the microprocessors has failed.	<ol style="list-style-type: none"> 1. Check the microprocessor failure LEDs on the system board. 2. If a microprocessor failure LED is on, make sure that the microprocessor is installed correctly (see “Identifying problems on the model 8654 using status LEDs” on page 120). 3. If the problem persists, replace the microprocessor. <p>If the problem persists, have the system serviced.</p>
VRM	One of the VRMs on the system board has failed.	Remove power from the appliance server, and then restart the appliance server. If the problem persists have the system serviced.
PCI	An error occurred on a PCI bus. The system board caused the error.	<ol style="list-style-type: none"> 1. Check the error log for additional information. 2. If you cannot isolate the failing adapter from the information in the error log, try to determine the failing adapter by removing one adapter at a time from PCI bus B (PCI slots 1 and 2) and restarting the appliance server after each adapter is removed. <p>If the problem persists, have the system serviced.</p>

Troubleshooting charts

You can use the troubleshooting charts in this section to find solutions to problems that have definite symptoms.

Look for the symptom in the left column of the chart. Instructions and probable solutions to the problem are in the right column. If you have just added new software or a new option and your appliance server is not working, do the following before using the troubleshooting charts:

- Remove the software or device that you just added.
- Restart to determine if it is running correctly.
- Reinstall the new software or new device.

Table 20. Troubleshooting charts.

Device	Suggested action
CD-ROM drive	Verify that:
CD-ROM drive is not recognized.	<ul style="list-style-type: none"> • The primary IDE channel is enabled in the Configuration/Setup Utility program. • All cables and jumpers are installed correctly. • The correct device driver is installed for the CD-ROM drive.
Diskette drive	If there is a diskette in the drive, verify that:
Diskette drive activity light stays on.	<ul style="list-style-type: none"> • The diskette drive is enabled in the Configuration/Setup Utility program. • The diskette is good and not damaged. (Try another diskette if you have one.) • Your software program is OK. <p>If the diskette drive activity light stays on, call for service.</p>
Intermittent problems	Verify that:
A problem occurs only occasionally and is difficult to detect.	<ul style="list-style-type: none"> • All cables and cords are connected securely to the rear of the server and attached options. • When the server is turned on, air is flowing from the rear of the server at the fan grill. If there is no airflow, the fan is not working. This causes the server to overheat and shut down. • Ensure that the SCSI bus and devices are configured correctly and that the last external device in each SCSI chain is terminated correctly. <p>If the problem continues, call for service.</p>
Keyboard, mouse, or pointing-device problems.	<ul style="list-style-type: none"> • Make sure that the appliance server and the monitor are turned on. • Try using another keyboard.
All or some keys on the keyboard do not work.	<ul style="list-style-type: none"> • Make sure that the C2T device breakout cable is properly connected to a model 8654 appliance server. • Make sure that the keyboard cable is properly connected to the C2T breakout cable. <p>If the items above are correct but the problem continues, call for service.</p>
The mouse or pointing device does not work.	<ul style="list-style-type: none"> • Verify that the mouse or pointing-device cable is securely connected and the device drivers are installed correctly. • Try using another mouse or pointing device. <p>If the problem continues, call for service.</p>

Table 20. Troubleshooting charts.

Device	Suggested action
Memory problems	<p>Verify that:</p> <ul style="list-style-type: none"> • The memory modules are seated properly. • You have installed the correct type of memory. • If you changed the memory, you updated the memory configuration with the Configuration/Setup Utility program. • All banks of memory on the DIMMs are enabled. The server might have automatically disabled a DIMM bank when it detected a problem, or a DIMM bank could have been manually disabled. <p>Look in the POST error log for error message 289:</p> <ul style="list-style-type: none"> • If the DIMM was disabled by a systems-management interrupt (SMI), replace the DIMM. • If the DIMM was disabled by the user or by POST: <ol style="list-style-type: none"> 1. Start the Configuration/Setup Utility program. 2. Enable the DIMM. 3. Save the configuration and restart the server. • If you continue to get this error, replace the DIMM. <p>If the problem continues, call for service.</p>
Microprocessor problems	The startup (boot) microprocessor is not working properly.
The server emits a continuous tone during POST.	<p>Verify that the startup microprocessor is seated properly.</p> <p>If it is, call for service.</p>
Monitor problems	<p>Some IBM monitors have their own self-tests. If you suspect a problem with your monitor, refer to the information that comes with the monitor for adjusting and testing instructions.</p> <p>If you still cannot find the problem, call for service.</p>
The screen is blank.	<p>Verify that:</p> <ul style="list-style-type: none"> • The appliance server power cord is plugged into the appliance server and a working electrical outlet. • The monitor cables are connected properly. • The monitor is turned on and the brightness and contrast controls are adjusted correctly. <p>If the screen remains blank, call for service.</p>
Only the cursor appears.	Call for service.
The monitor works when you turn on the server, but goes blank when you start some application programs.	<p>Verify that you installed the necessary device drivers for the applications.</p> <p>If the screen remains blank, call for service.</p>

Table 20. Troubleshooting charts.

Device	Suggested action
<p>Wavy, unreadable, rolling, distorted screen, or screen jitter.</p>	<p>If the monitor self-tests show the monitor is working correctly, consider the location of the monitor. Magnetic fields around other devices (such as transformers, appliances, fluorescent lights, and other monitors) can cause screen jitter or wavy, unreadable, rolling, or distorted screen images. If this happens, turn off the monitor. (Moving a color monitor while it is turned on might cause screen discoloration.) Then move the device and the monitor at least 305 mm (12 in.) apart. Turn on the monitor.</p> <p>Notes:</p> <ul style="list-style-type: none"> • To prevent diskette drive read/ write errors, be sure that the distance between monitors and diskette drives is at least 76 mm (3 in.). • Non-IBM monitor cables might cause unpredictable problems. • An enhanced monitor cable with additional shielding is available for the IBM model 9521 and 9527 monitors. For information about the enhanced monitor cable, see your IBM reseller or IBM marketing representative. <p>If the problem continues, call for service.</p>
<p>Wrong characters appear on the screen.</p>	<p>If the wrong language is displayed, update the BIOS code with the correct language.</p> <p>If the problem continues, call for service.</p>
<p>Option problems</p>	<p>Verify that:</p>
<p>An IBM option that was just installed does not work.</p>	<ul style="list-style-type: none"> • The option is designed for the appliance server. Refer to the "Server Support" flowchart for information about obtaining ServerProven™ compatibility information from the World Wide Web. • You followed the installation instructions that came with the option. • The option is installed correctly. • You have not loosened any other installed options or cables. • You updated the configuration information in the Configuration/Setup Utility program. Whenever memory or an option is changed, you must update the configuration. <p>If the problem continues, call for service.</p>
<p>Power problems</p>	<p>Verify that:</p>
<p>The appliance server does not power on.</p>	<ul style="list-style-type: none"> • The power cables are properly connected to the appliance server. • The electrical outlet functions properly. • The type of memory installed is correct. • If you just installed an option, remove it, and restart the server. If the server now powers on, you might have installed more options than the power supply supports. <p>If the problem continues, call for service.</p>
<p>Serial port problems</p>	<p>Verify that:</p>
<p>The number of serial ports identified by the operating system is less than the number of serial ports installed.</p>	<p>Each port is assigned a unique address by the Configuration/Setup Utility program and none of the serial ports are disabled.</p> <p>Note: Management port is the same as a serial port connector, and is not available for use by the operating system. This port does not appear in the Configuration/Setup Utility program menus; it can be configured.</p> <p>If the problem continues, call for service.</p>

Table 20. Troubleshooting charts.

Device	Suggested action
A serial device does not work.	<p>Verify that:</p> <ol style="list-style-type: none"> 1. The device is compatible with the appliance server. 2. The serial port is enabled and is assigned a unique address. <p>If the problem continues, call for service.</p>
Software problem	To determine if problems are caused by the software, verify that:
Suspected software problem.	<ul style="list-style-type: none"> • Your appliance server has the minimum memory requirements to use the software. For memory requirements, see the information that comes with the software. <p>Note:</p> <p>If you have just installed an adapter or memory, you might have a memory address conflict.</p> <ul style="list-style-type: none"> • The software is designed to operate on your appliance server. • Other software works on your appliance server. • The software that you are using works on another system. <p>If you received any error messages when using the software program, see the information that comes with the software for a description of the messages and solutions to the problem.</p> <p>If the problem continues, contact your place of purchase.</p>

Replacing the battery

When replacing the battery you must replace it with a lithium battery of the same type, from the same manufacturer. To avoid possible danger, read and follow the safety statement below.

To order replacement batteries, call 1-800-772-2227 within the United States, and 1-800-465-7999 or 1-800-465-6666 within Canada. Outside the U.S. and Canada, call your IBM reseller or IBM marketing representative.

Note: After you replace the battery, you must reconfigure your appliance server and reset the system date and time.

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.

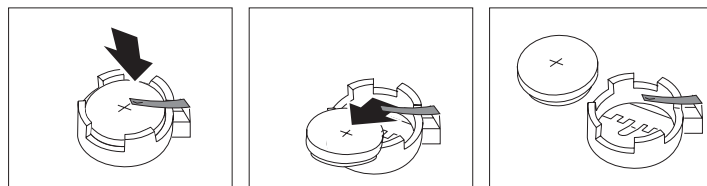
Do not:

- **Throw or immerse into water**
- **Heat to more than 100°C (212°F)**
- **Repair or disassemble**

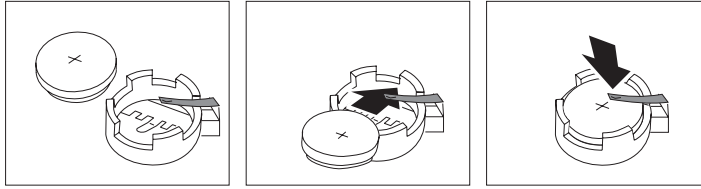
Dispose of the battery as required by local ordinances or regulations.

Complete the following steps to replace the battery:

1. Read “Safety” on page vii, and follow any special handling and installation instructions supplied with the replacement battery.
2. Turn off the appliance server and peripheral devices, and disconnect all external cables and power cords; then, remove the appliance server cover.
3. Remove the battery:
 - a. Use one finger to lift the battery clip over the battery.
 - b. Use one finger to slightly slide the battery out from its socket. The spring mechanism will push the battery out toward you as you slide it from the socket.
 - c. Use your thumb and index finger to pull the battery from under the battery clip.
 - d. Ensure that the battery clip is touching the base of the battery socket by pressing gently on the clip.



4. Insert the new battery:
 - a. Tilt the battery so that you can insert it into the socket, under the battery clip.
 - b. As you slide it under the battery clip, press the battery down into the socket.



5. Reinstall the appliance server cover, and connect the cables.
6. Turn on the appliance server.
7. Start the Configuration/Setup Utility program and set configuration parameters.
 - Set the system date and time.
 - Set the power-on password.
 - Reconfigure your appliance server.

Using the Recovery CD

The *Recovery CD* for your xSeries 135 is used to recover the preinstalled software on your appliance server. You must start your appliance server with the recovery-enablement diskette, which is created using the *Supplementary CD*, before you can use the *Recovery CD*. Using the *Recovery CD* does not reset your BIOS.

Attention: Installing unauthorized service packs, or applications not included on the *Supplementary CD*, on your appliance server is not supported. You can obtain authorized updates to the installed software using the update function.

Recovering your appliance server using DiskCreator

To create a recovery-enablement diskette and recover the preinstalled software on your appliance server, do the following:

1. Using any workstation other than your appliance server, insert the *Supplementary CD* into the CD-ROM drive.

Note: The workstation that you use to create the recovery-enablement diskette must have one of the following operating systems installed:

- Microsoft Windows NT[®] Workstation
 - Microsoft Windows NT Server
 - Microsoft Windows 2000 Professional
 - Microsoft Windows 2000 Server
 - Microsoft Windows 2000 Advanced Server
 - Microsoft Windows 95
 - Microsoft Windows 98
2. Insert a formatted diskette into the diskette drive of the workstation, and run the `\Recovery_Enablement_Disk\DiskCreator.exe` file that is located on the *Supplementary CD*.
 3. Follow the instructions to create a recovery-enablement diskette.
 4. Remove the recovery-enablement diskette from the diskette drive.
 5. Go to the appliance server and insert the *Recovery CD* into the CD-ROM drive; then, insert the recovery-enablement diskette into the diskette drive of the appliance server.

- Restart the appliance server. The recovery process begins automatically, and the preinstalled software is restored. After the preinstalled software is restored, the system restarts automatically, and all final operating-system configuration changes are performed.

Note: The recovery-enablement diskette is a one-use-only diskette. To use the *Recovery CD* again, you need to run the `DiskCreator.exe` file from the *Supplementary CD*.

Recovering your appliance server without DiskCreator

If you do not have one of the supported operating systems, you can use the following procedure to create a recovery-enablement diskette and recover the preinstalled software on your appliance server:

- Insert a blank diskette into the diskette drive on a workstation other than the appliance server; then, format the diskette as a DOS diskette.
- Insert the *Supplementary CD* into the CD-ROM drive in the workstation, and copy either the `reLoad.on` file or the `manufact.ure` file from the `\Recovery Enablement` directory on the CD to the diskette.

Attention: When you start the appliance server with the *Recovery CD* in the CD-ROM drive and the recovery-enablement diskette in the diskette drive, the recovery process starts. If you copy the `reLoad.on` file to the diskette, the recovery process installs the operating system, but does not delete the data partition D:. If you copy the `manufact.ure` file to the diskette, the recovery process deletes all partitions on the first hard disk in the appliance server and installs the operating system.

- Go to the appliance server and insert the *Recovery CD* into the CD-ROM drive; then, insert the recovery-enablement diskette into the diskette drive of the appliance server.
- Restart the appliance server. The recovery process begins automatically, and the preinstalled software is restored. After the preinstalled software is restored, the system restarts automatically, and all final operating-system configuration changes are performed.

Note: The recovery-enablement diskette is a one-use-only diskette. To use the *Recovery CD* again, you need to run the `DiskCreator.exe` file from the *Supplementary CD*.

Getting information, help, and service

If you need help, service, or technical assistance or just want more information about IBM products, you will find a wide variety of sources available from IBM to assist you. This section contains information about where to go for additional information about IBM and IBM products, what to do if you experience a problem with your computer, and whom to call for service should it be necessary.

Getting information

Information about your IBM server product and preinstalled software, if any, is available in the documentation that comes with your server. That documentation includes printed books, online books, README files, and help files. In addition, information about IBM products is available on the World Wide Web and through the IBM Automated Fax System.

Using the World Wide Web

On the World Wide Web, the IBM Web site has up-to-date information about IBM products and support. The address for the IBM Personal Computing home page is <http://www.ibm.com/pc/>.

You can find support information for your IBM products at <http://www.ibm.com/pc/support/>.

If you click **Profile** from the support page, you can create a customized support page that is specific to your hardware, complete with Frequently Asked Questions, Parts Information, Technical Hints and Tips, and Downloadable Files. In addition, you can choose to receive e-mail notifications whenever new information becomes available about your registered products.

You also can order publications through the IBM Publications Ordering System at <http://www.elink.ibm.com/public/applications/publications/cgibin/pbi.cgi>.

Getting information by fax

If you have a touch-tone telephone and access to a fax machine, in the U.S. and Canada, you can receive, by fax, marketing and technical information on many topics, including hardware, operating systems, and local area networks (LANs).

You can call the IBM Automated Fax System 24 hours a day, 7 days a week. Follow the recorded instructions, and the requested information will be sent to your fax machine. In the U.S. and Canada, to access the IBM Automated Fax System, call 1-800-426-3395.

Getting help and service

If you have a problem with your server product you will find a wide variety of sources available to help you.

Using the documentation and diagnostic programs

Many problems can be solved without outside assistance. If you experience a problem with your server product, the first place to start is the troubleshooting information in your IBM documentation. If you suspect a software problem, see the documentation, including README files and online help, that comes with the operating system or application program.

Most IBM server products come with a set of diagnostic programs that you can use to help you identify hardware problems. See the troubleshooting information in your IBM documentation for instructions on using the diagnostic programs.

The troubleshooting information or the diagnostic programs might tell you that you need additional or updated device drivers or other software. IBM maintains pages on the World Wide Web where you can get the latest technical information and download device drivers and updates. To access these pages, go to <http://www.ibm.com/pc/support/> and follow the instructions.

Calling for service

If you have tried to correct the problem yourself and still need help, during the warranty period, you can get help and information by telephone through the IBM HelpCenter®. The following services are available during the warranty period:

- **Problem determination** - Trained personnel are available to assist you with determining if you have a hardware problem and deciding what action is necessary to fix the problem.

- **IBM hardware repair** - If the problem is determined to be caused by IBM hardware under warranty, trained service personnel are available to provide the applicable level of service.
- **Engineering Change management** - Occasionally, there might be changes that are required after a product has been sold. IBM or your reseller, if authorized by IBM, will make selected Engineering Changes (ECs) available that apply to your hardware.

The following items are not covered:

- Replacement or use of non-IBM parts or nonwarranted IBM parts. All warranted parts contain a 7-character identification in the format IBM FRU XXXXXXXX.
- Identification of software problem sources.
- Configuration of BIOS as part of an installation or upgrade.
- Changes, modifications, or upgrades to device drivers.
- Installation and maintenance of network operating systems (NOS).
- Installation and maintenance of application programs.

Refer to your IBM hardware warranty for a full explanation of IBM warranty terms. Be sure to retain your proof of purchase to obtain warranty service.

In the U.S. and Canada, these services are available 24 hours a day, 7 days a week. In the U.K., these services are available Monday through Friday, from 9:00 a.m. to 6:00 p.m.

Note: Response time will vary depending on the number and complexity of incoming calls.

In addition, you are eligible for IBM Start Up Support for 90 days after installation. This service provides assistance for:

- Setting up your network operating system
- Installing and configuring interface adapters
- Installing and configuring network adapters

Please have the following information ready when you call:

- Machine type and model
- Serial numbers of your IBM hardware products
- Description of the problem
- Exact wording of any error messages
- Hardware and software configuration information

Phone numbers are subject to change without notice. For the most up-to-date phone numbers, go to <http://www.ibm.com/pc/support/> and click **Support Phone List**.

Country		Telephone number
Austria	Österreich	01-24 592 5901
Belgium - Dutch	Belgie	02-210 9820
Belgium - French	Belgique	02-210 9800
Canada	Toronto only	416-383-3344
Canada	Canada - all other	1-800-565-3344
Denmark	Danmark	45 20 82 00
Finland	Suomi	09-22 931 840
France	France	02 38 55 74 50
Germany	Deutschland	07032-1549 201

Country		Telephone number
Ireland	Ireland	01-815 9202
Italy	Italia	02-482 9202
Luxembourg	Luxembourg	298-977 5063
Netherlands	Nederland	020-514 5770
Norway	Norge	23 05 32 40
Portugal	Portugal	21-791 51 47
Spain	España	91-662 49 16
Sweden	Sverige	08-477 4420
Switzerland	Schweiz/Suisse/Svizzera	058-333 0900
United Kingdom	United Kingdom	01475-555 055
U.S.A. and Puerto Rico	U.S.A. and Puerto Rico	1-800-772-2227

In all other countries, contact your IBM reseller or IBM marketing representative.

Purchasing additional services

During and after the warranty period, you can purchase additional services, such as support for IBM and non-IBM hardware, operating systems, and application programs; network setup and configuration; upgraded or extended hardware repair services; and custom installations. Service availability and service name might vary by country.

For more information about these services, contact your IBM marketing representative.

Appendix A. Installing the xSeries 135 appliance server

The IBM xSeries 135 appliance server is designed to be installed in a rack cabinet. Use the *Rack Mounting Instructions* and template that come with the appliance server to install your appliance server in a rack cabinet. This section contains information found in the *Rack Mounting Instructions* and the *Installation Guide*.

Review the documentation that comes with your rack cabinet for safety and cabling information. When installing your appliance server in a rack cabinet, consider the following:

- Ensure that the room air temperature is below 35°C (95°F).
- Do not block any air vents; typically, 15 cm (6 in.) of space provides proper airflow.
- Install your server in a rack cabinet with perforated doors.
- Plan the device installation starting from the bottom of the rack.
- Install the heaviest device in the bottom of the rack.
- Remove the rack doors and side panels to provide easier access during installation.
- Connect all power cords to properly wired and grounded electrical outlets.
- Take precautions to prevent overloading the power outlets when you install multiple devices in a rack.

Statement 4



≥ 18 kg (39.7 lb)



≥ 32 kg (70.5 lb)



≥ 55 kg (121.2 lb)

CAUTION:

Use safe practices when lifting.

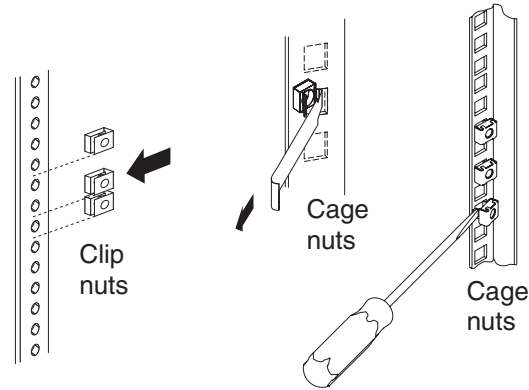
- Do not place any object weighing more than 50 kg (110 lb) on top of rack-mounted devices that weigh more than 50 kg (110 lb)

Installing your IBM xSeries 135 appliance server in the rack cabinet

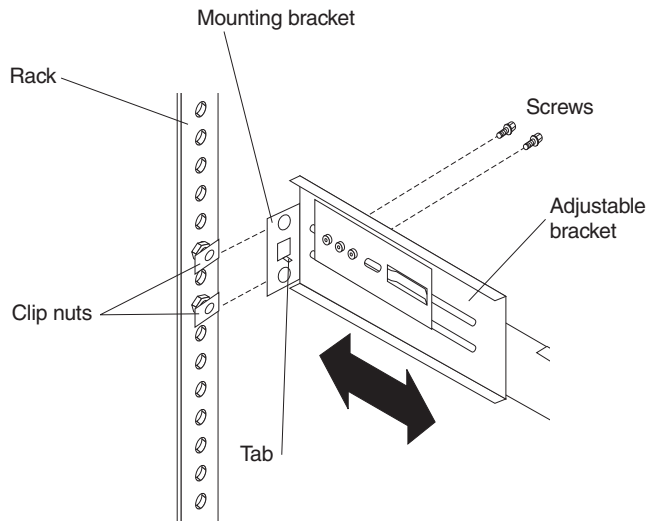
You will need the following items to complete the appliance server installation:

- Flat-blade screwdriver
- Phillips screwdriver
- Mounting brackets and hardware
- Cage nuts or clip nuts

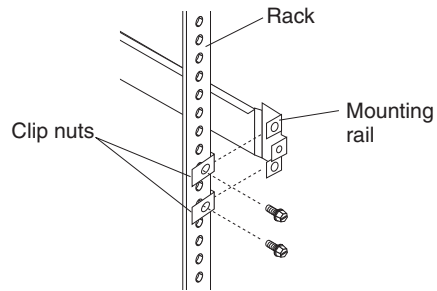
1. Write down the model number and serial number of your appliance server. This information is found on the right side of the bezel on the front corner. You need this information for connecting the appliance server to the network.
2. Select a one-U size location in the rack cabinet. Install a cage nut or clip nut in the top and bottom position of the one-U location that you selected (both sides, front and rear of the rack cabinet).



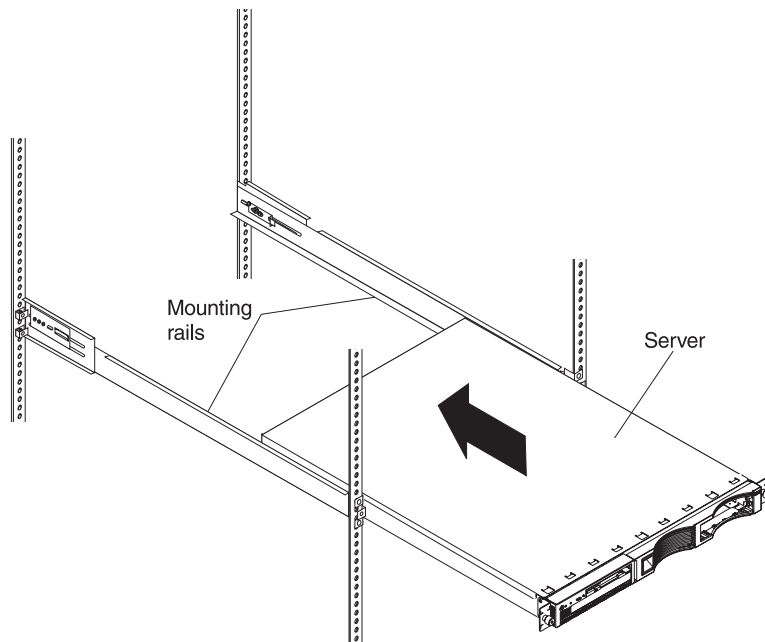
3. Adjust each rear mounting bracket (by loosening the screws) so that the inside distance between the two ends is equal to the outside dimension of the rack mounting flanges. Insert the bracket tab through the center hole between the two clip nuts on the rear mounting flanges. (The right and left rails are labeled.)



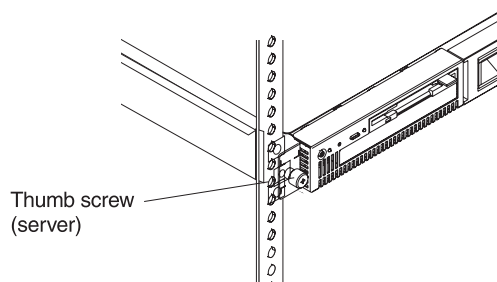
4. Loosely install two mounting screws through the back end of the bracket. Position the mounting bracket so that it lines up with the clip nuts. Install the remaining mounting screws; then, tighten all the screws with a screwdriver. Repeat these steps for each mounting bracket.



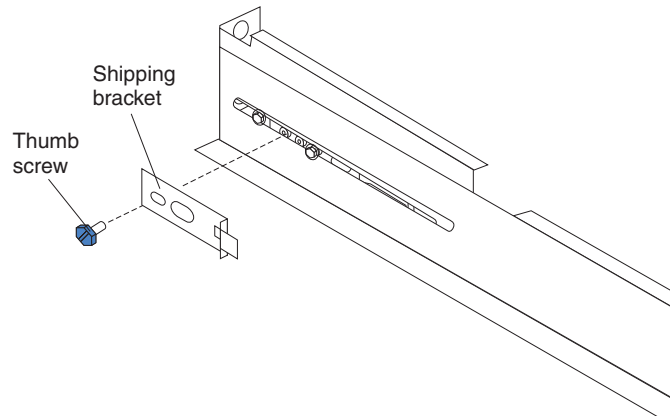
5. Place the server on the mounting brackets; then, slide it in as far as it will go.



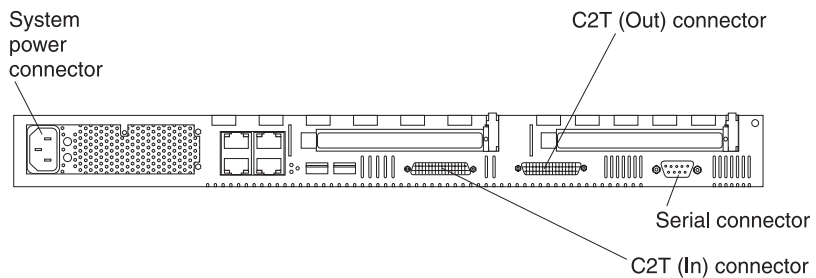
6. Tighten the thumb screws on the front of the server to secure it to the rack cabinet.



7. If you want to move your rack cabinet with the server installed, install the shipping brackets on each side of the server. Insert the shipping bracket tab into the slot on the back of the server. Then, use the blue thumb screw to secure the back of the server and the shipping bracket to the mounting bracket.

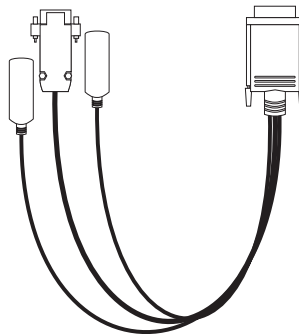


8. Connect the power cord and Ethernet cable. If you are cabling to the xSeries 135 model 8654 go to step 9. If you are cabling to the xSeries 135 model 8672 continue with step 11 on page 137.



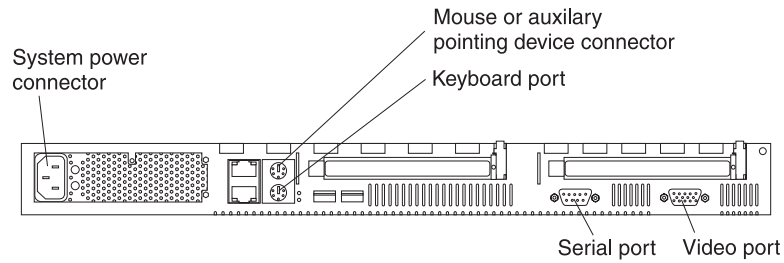
9. You can manage your server remotely from another computer on the network or locally with a keyboard, monitor, and mouse or other pointing device connected to your server. If you manage your server locally, you must use the C2T device breakout cable. Attach the large connector on the C2T cable to the C2T (Out) connector on the rear of your server; then, connect your keyboard, mouse, and monitor to the connectors on the end of the C2T cable.

Note: The keyboard and mouse connectors on the C2T cable have keyboard and mouse icons to differentiate them from each other. The monitor connector is dark blue.



10. Go to Step 12 on page 137.

11. You can manage your server remotely from another computer on the network or locally with a keyboard, monitor, and mouse or other pointing device connected to your server. If you manage your server locally, you must connect the keyboard, monitor, and mouse directly to the back of the xSeries 135 model 8672.



12. Repeat step 1 through step 11. for each server that you install in the rack.
13. Turn on your IBM xSeries 135 and wait 5 to 10 minutes. See “Turning on the appliance server” on page 11.

For information about using your appliance server configuration program, see Chapter 3, “Configuring your appliance server,” on page 15.

Appendix B. Product warranty and notices

This appendix contains warranty and emission notices. It also contains trademarks and general-information notices.

Warranty information

This section contains the warranty period for your product and the IBM Statement of Limited Warranty.

Warranty period

Contact your place of purchase for warranty service information. Some IBM Machines are eligible for on-site warranty service depending on the country or region where service is performed.

Machine - IBM @server xSeries 135

Warranty period - Three years

IBM Statement of Limited Warranty

Z125-4753-06 8/2000

Part 1 - General Terms

This Statement of Limited Warranty includes Part 1 - General Terms and Part 2 - Country-unique Terms. The terms of Part 2 replace or modify those of Part 1. The warranties provided by IBM in this Statement of Limited Warranty apply only to Machines you purchase for your use, and not for resale, from IBM or your reseller. The term "Machine" means an IBM machine, its features, conversions, upgrades, elements, or accessories, or any combination of them. The term "Machine" does not include any software programs, whether pre-loaded with the Machine, installed subsequently or otherwise. Unless IBM specifies otherwise, the following warranties apply only in the country where you acquire the Machine. Nothing in this Statement of Limited Warranty affects any statutory rights of consumers that cannot be waived or limited by contract. If you have any questions, contact IBM or your reseller.

The IBM Warranty for Machines

IBM warrants that each Machine 1) is free from defects in materials and workmanship and 2) conforms to IBM's Official Published Specifications ("Specifications"). The warranty period for a Machine is a specified, fixed period commencing on its Date of Installation. The date on your sales receipt is the Date of Installation unless IBM or your reseller informs you otherwise.

If a Machine does not function as warranted during the warranty period, and IBM or your reseller are unable to either 1) make it do so or 2) replace it with one that is at least functionally equivalent, you may return it to your place of purchase and your money will be refunded.

Extent of Warranty

The warranty does not cover the repair or exchange of a Machine resulting from misuse, accident, modification, unsuitable physical or operating environment, improper maintenance by you, or failure caused by a product for which IBM is not

responsible. The warranty is voided by removal or alteration of Machine or parts identification labels.

THESE WARRANTIES ARE YOUR EXCLUSIVE WARRANTIES AND REPLACE ALL OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OR CONDITIONS OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THESE WARRANTIES GIVE YOU SPECIFIC LEGAL RIGHTS AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM JURISDICTION TO JURISDICTION. SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF EXPRESS OR IMPLIED WARRANTIES, SO THE ABOVE EXCLUSION OR LIMITATION MAY NOT APPLY TO YOU. IN THAT EVENT, SUCH WARRANTIES ARE LIMITED IN DURATION TO THE WARRANTY PERIOD. NO WARRANTIES APPLY AFTER THAT PERIOD.

Items Not Covered by Warranty

IBM does not warrant uninterrupted or error-free operation of a Machine.

Any technical or other support provided for a Machine under warranty, such as assistance via telephone with "how-to" questions and those regarding Machine set-up and installation, will be provided **WITHOUT WARRANTIES OF ANY KIND.**

Warranty Service

To obtain warranty service for a Machine, contact IBM or your reseller. If you do not register your Machine with IBM, you may be required to present proof of purchase.

During the warranty period, IBM or your reseller, if approved by IBM to provide warranty service, provides without charge certain types of repair and exchange service to keep Machines in, or restore them to, conformance with their Specifications. IBM or your reseller will inform you of the available types of service for a Machine based on its country of installation. At its discretion, IBM or your reseller will 1) either repair or exchange the failing Machine and 2) provide the service either at your location or a service center. IBM or your reseller will also manage and install selected engineering changes that apply to the Machine.

Some parts of IBM Machines are designated as Customer Replaceable Units (called "CRUs"), e.g., keyboards, memory, or hard disk drives. IBM ships CRUs to you for replacement by you. You must return all defective CRUs to IBM within 30 days of your receipt of the replacement CRU. You are responsible for downloading designated Machine Code and Licensed Internal Code updates from an IBM Internet Web site or from other electronic media, and following the instructions that IBM provides.

When warranty service involves the exchange of a Machine or part, the item IBM or your reseller replaces becomes its property and the replacement becomes yours. You represent that all removed items are genuine and unaltered. The replacement may not be new, but will be in good working order and at least functionally equivalent to the item replaced. The replacement assumes the warranty service status of the replaced item. Many features, conversions, or upgrades involve the removal of parts and their return to IBM. A part that replaces a removed part will assume the warranty service status of the removed part.

Before IBM or your reseller exchanges a Machine or part, you agree to remove all features, parts, options, alterations, and attachments not under warranty service.

You also agree to

1. ensure that the Machine is free of any legal obligations or restrictions that prevent its exchange;
2. obtain authorization from the owner to have IBM or your reseller service a Machine that you do not own; and
3. where applicable, before service is provided:
 - a. follow the problem determination, problem analysis, and service request procedures that IBM or your reseller provides;
 - b. secure all programs, data, and funds contained in a Machine;
 - c. provide IBM or your reseller with sufficient, free, and safe access to your facilities to permit them to fulfill their obligations; and
 - d. inform IBM or your reseller of changes in a Machine's location.

IBM is responsible for loss of, or damage to, your Machine while it is 1) in IBM's possession or 2) in transit in those cases where IBM is responsible for the transportation charges.

Neither IBM nor your reseller is responsible for any of your confidential, proprietary or personal information contained in a Machine which you return to IBM or your reseller for any reason. You should remove all such information from the Machine prior to its return.

Limitation of Liability

Circumstances may arise where, because of a default on IBM's part or other liability, you are entitled to recover damages from IBM. In each such instance, regardless of the basis on which you are entitled to claim damages from IBM (including fundamental breach, negligence, misrepresentation, or other contract or tort claim), except for any liability that cannot be waived or limited by applicable laws, IBM is liable for no more than

1. damages for bodily injury (including death) and damage to real property and tangible personal property; and
2. the amount of any other actual direct damages, up to the charges (if recurring, 12 months' charges apply) for the Machine that is subject of the claim. For purposes of this item, the term "Machine" includes Machine Code and Licensed Internal Code.

This limit also applies to IBM's suppliers and your reseller. It is the maximum for which IBM, its suppliers, and your reseller are collectively responsible.

UNDER NO CIRCUMSTANCES IS IBM LIABLE FOR ANY OF THE FOLLOWING: 1) THIRD-PARTY CLAIMS AGAINST YOU FOR DAMAGES (OTHER THAN THOSE UNDER THE FIRST ITEM LISTED ABOVE); 2) LOSS OF, OR DAMAGE TO, YOUR RECORDS OR DATA; OR 3) SPECIAL, INCIDENTAL, OR INDIRECT DAMAGES OR FOR ANY ECONOMIC CONSEQUENTIAL DAMAGES, LOST PROFITS OR LOST SAVINGS, EVEN IF IBM, ITS SUPPLIERS OR YOUR RESELLER IS INFORMED OF THEIR POSSIBILITY. SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU.

Governing Law

Both you and IBM consent to the application of the laws of the country in which you acquired the Machine to govern, interpret, and enforce all of your and IBM's rights, duties, and obligations arising from, or relating in any manner to, the subject matter of this Agreement, without regard to conflict of law principles.

Part 2 - Country-unique Terms

AMERICAS

BRAZIL

Governing Law: *The following is added after the first sentence:*

Any litigation arising from this Agreement will be settled exclusively by the court of Rio de Janeiro.

NORTH AMERICA

Warranty Service: *The following is added to this Section:*

To obtain warranty service from IBM in Canada or the United States, call 1-800-IBM-SERV (426-7378).

CANADA

Governing Law: *The following replaces "laws of the country in which you acquired the Machine" in the first sentence:*

laws in the Province of Ontario.

UNITED STATES

Governing Law: *The following replaces "laws of the country in which you acquired the Machine" in the first sentence:*

laws of the State of New York.

ASIA PACIFIC

AUSTRALIA

The IBM Warranty for Machines: *The following paragraph is added to this Section:*

The warranties specified in this Section are in addition to any rights you may have under the Trade Practices Act 1974 or other similar legislation and are only limited to the extent permitted by the applicable legislation.

Limitation of Liability: *The following is added to this Section:*

Where IBM is in breach of a condition or warranty implied by the Trade Practices Act 1974 or other similar legislation, IBM's liability is limited to the repair or replacement of the goods or the supply of equivalent goods. Where that condition or warranty relates to right to sell, quiet possession or clear title, or the goods are of a kind ordinarily acquired for personal, domestic or household use or consumption, then none of the limitations in this paragraph apply.

Governing Law: *The following replaces "laws of the country in which you acquired the Machine" in the first sentence:*

laws of the State or Territory.

CAMBODIA, LAOS, AND VIETNAM

Governing Law: *The following replaces "laws of the country in which you acquired the Machine" in the first sentence:*

laws of the State of New York.

The following is added to this Section:

Disputes and differences arising out of or in connection with this Agreement shall be finally settled by arbitration which shall be held in Singapore in accordance with the rules of the International Chamber of Commerce (ICC). The arbitrator or arbitrators designated in conformity with those rules shall have the power to rule on their own

competence and on the validity of the Agreement to submit to arbitration. The arbitration award shall be final and binding for the parties without appeal and the arbitral award shall be in writing and set forth the findings of fact and the conclusions of law.

All proceedings shall be conducted, including all documents presented in such proceedings, in the English language. The number of arbitrators shall be three, with each side to the dispute being entitled to appoint one arbitrator.

The two arbitrators appointed by the parties shall appoint a third arbitrator before proceeding upon the reference. The third arbitrator shall act as chairman of the proceedings. Vacancies in the post of chairman shall be filled by the president of the ICC. Other vacancies shall be filled by the respective nominating party. Proceedings shall continue from the stage they were at when the vacancy occurred.

If one of the parties refuses or otherwise fails to appoint an arbitrator within 30 days of the date the other party appoints its, the first appointed arbitrator shall be the sole arbitrator, provided that the arbitrator was validly and properly appointed.

The English language version of this Agreement prevails over any other language version.

HONG KONG AND MACAU

Governing Law: *The following replaces "laws of the country in which you acquired the Machine" in the first sentence:*

laws of Hong Kong Special Administrative Region.

INDIA

Limitation of Liability: *The following replaces items 1 and 2 of this Section:*

1. liability for bodily injury (including death) or damage to real property and tangible personal property will be limited to that caused by IBM's negligence;
2. as to any other actual damage arising in any situation involving nonperformance by IBM pursuant to, or in any way related to the subject of this Statement of Limited Warranty, IBM's liability will be limited to the charge paid by you for the individual Machine that is the subject of the claim.

JAPAN

Governing Law: *The following sentence is added to this Section:*

Any doubts concerning this Agreement will be initially resolved between us in good faith and in accordance with the principle of mutual trust.

NEW ZEALAND

The IBM Warranty for Machines: *The following paragraph is added to this Section:*

The warranties specified in this Section are in addition to any rights you may have under the Consumer Guarantees Act 1993 or other legislation which cannot be excluded or limited. The Consumer Guarantees Act 1993 will not apply in respect of any goods which IBM provides, if you require the goods for the purposes of a business as defined in that Act.

Limitation of Liability: *The following is added to this Section:*

Where Machines are not acquired for the purposes of a business as defined in the Consumer Guarantees Act 1993, the limitations in this Section are subject to the limitations in that Act.

PEOPLE'S REPUBLIC OF CHINA (PRC)

Governing Law: *The following replaces this Section:*

Both you and IBM consent to the application of the laws of the State of New York (except when local law requires otherwise) to govern, interpret, and enforce all your and IBM's rights, duties, and obligations arising from, or relating in any manner to, the subject matter of this Agreement, without regard to conflict of law principles.

Any disputes arising from or in connection with this Agreement will first be resolved by friendly negotiations, failing which either of us has the right to submit the dispute to the China International Economic and Trade Arbitration Commission in Beijing, the PRC, for arbitration in accordance with its arbitration rules in force at the time. The arbitration tribunal will consist of three arbitrators. The language to be used therein will be English and Chinese. An arbitral award will be final and binding on all the parties, and will be enforceable under the Convention on the Recognition and Enforcement of Foreign Arbitral Awards (1958).

The arbitration fee will be borne by the losing party unless otherwise determined by the arbitral award.

During the course of arbitration, this Agreement will continue to be performed except for the part which the parties are disputing and which is undergoing arbitration.

EUROPE, MIDDLE EAST, AFRICA (EMEA)

THE FOLLOWING TERMS APPLY TO ALL EMEA COUNTRIES:

The terms of this Statement of Limited Warranty apply to Machines purchased from IBM or an IBM reseller.

Warranty Service:

If you purchase an IBM Machine in Austria, Belgium, Denmark, Estonia, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland or United Kingdom, you may obtain warranty service for that Machine in any of those countries from either (1) an IBM reseller approved to perform warranty service or (2) from IBM. If you purchase an IBM Personal Computer Machine in Albania, Armenia, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Georgia, Hungary, Kazakhstan, Kirghizia, Federal Republic of Yugoslavia, Former Yugoslav Republic of Macedonia (FYROM), Moldova, Poland, Romania, Russia, Slovak Republic, Slovenia, or Ukraine, you may obtain warranty service for that Machine in any of those countries from either (1) an IBM reseller approved to perform warranty service or (2) from IBM.

If you purchase an IBM Machine in a Middle Eastern or African country, you may obtain warranty service for that Machine from the IBM entity within the country of purchase, if that IBM entity provides warranty service in that country, or from an IBM reseller, approved by IBM to perform warranty service on that Machine in that country. Warranty service in Africa is available within 50 kilometers of an IBM authorized service provider. You are responsible for transportation costs for Machines located outside 50 kilometers of an IBM authorized service provider.

Governing Law:

The applicable laws that govern, interpret and enforce rights, duties, and obligations of each of us arising from, or relating in any manner to, the subject matter of this Statement, without regard to conflict of laws principles, as well as Country-unique terms and competent court for this Statement are those of the country in which the warranty service is being provided, except that in 1) Albania, Bosnia-Herzegovina, Bulgaria, Croatia, Hungary, Former Yugoslav Republic of Macedonia, Romania,

Slovakia, Slovenia, Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine, and Uzbekistan, the laws of Austria apply; 2) Estonia, Latvia, and Lithuania, the laws of Finland apply; 3) Algeria, Benin, Burkina Faso, Cameroon, Cape Verde, Central African Republic, Chad, Congo, Djibouti, Democratic Republic of Congo, Equatorial Guinea, France, Gabon, Gambia, Guinea, Guinea-Bissau, Ivory Coast, Lebanon, Mali, Mauritania, Morocco, Niger, Senegal, Togo, and Tunisia, this Agreement will be construed and the legal relations between the parties will be determined in accordance with the French laws and all disputes arising out of this Agreement or related to its violation or execution, including summary proceedings, will be settled exclusively by the Commercial Court of Paris; 4) Angola, Bahrain, Botswana, Burundi, Egypt, Eritrea, Ethiopia, Ghana, Jordan, Kenya, Kuwait, Liberia, Malawi, Malta, Mozambique, Nigeria, Oman, Pakistan, Qatar, Rwanda, Sao Tome, Saudi Arabia, Sierra Leone, Somalia, Tanzania, Uganda, United Arab Emirates, United Kingdom, West Bank/Gaza, Yemen, Zambia, and Zimbabwe, this Agreement will be governed by English Law and disputes relating to it will be submitted to the exclusive jurisdiction of the English courts; and 5) in Greece, Israel, Italy, Portugal, and Spain any legal claim arising out of this Statement will be brought before, and finally settled by, the competent court of Athens, Tel Aviv, Milan, Lisbon, and Madrid, respectively.

THE FOLLOWING TERMS APPLY TO THE COUNTRY SPECIFIED:

AUSTRIA AND GERMANY

The IBM Warranty for Machines: *The following replaces the first sentence of the first paragraph of this Section:*

The warranty for an IBM Machine covers the functionality of the Machine for its normal use and the Machine's conformity to its Specifications.

The following paragraphs are added to this Section:

The minimum warranty period for Machines is six months. In case IBM or your reseller is unable to repair an IBM Machine, you can alternatively ask for a partial refund as far as justified by the reduced value of the unrepaired Machine or ask for a cancellation of the respective agreement for such Machine and get your money refunded.

Extent of Warranty: *The second paragraph does not apply.*

Warranty Service: *The following is added to this Section:*

During the warranty period, transportation for delivery of the failing Machine to IBM will be at IBM's expense.

Limitation of Liability: *The following paragraph is added to this Section:*

The limitations and exclusions specified in the Statement of Limited Warranty will not apply to damages caused by IBM with fraud or gross negligence and for express warranty.

The following sentence is added to the end of item 2:

IBM's liability under this item is limited to the violation of essential contractual terms in cases of ordinary negligence.

EGYPT

Limitation of Liability: *The following replaces item 2 in this Section:*

as to any other actual direct damages, IBM's liability will be limited to the total amount you paid for the Machine that is the subject of the claim. For purposes of this item, the term "Machine" includes Machine Code and Licensed Internal Code.

Applicability of suppliers and resellers (unchanged).

FRANCE

Limitation of Liability: *The following replaces the second sentence of the first paragraph of this Section:*

In such instances, regardless of the basis on which you are entitled to claim damages from IBM, IBM is liable for no more than: *(items 1 and 2 unchanged)*.

IRELAND

Extent of Warranty: *The following is added to this Section:*

Except as expressly provided in these terms and conditions, all statutory conditions, including all warranties implied, but without prejudice to the generality of the foregoing all warranties implied by the Sale of Goods Act 1893 or the Sale of Goods and Supply of Services Act 1980 are hereby excluded.

Limitation of Liability: *The following replaces items one and two of the first paragraph of this Section:*

1. death or personal injury or physical damage to your real property solely caused by IBM's negligence; and
2. the amount of any other actual direct damages, up to 125 percent of the charges (if recurring, the 12 months' charges apply) for the Machine that is the subject of the claim or which otherwise gives rise to the claim.

Applicability of suppliers and resellers (unchanged).

The following paragraph is added at the end of this Section:

IBM's entire liability and your sole remedy, whether in contract or in tort, in respect of any default shall be limited to damages.

ITALY

Limitation of Liability: *The following replaces the second sentence in the first paragraph:*

In each such instance unless otherwise provided by mandatory law, IBM is liable for no more than:

1. *(unchanged)*
2. as to any other actual damage arising in all situations involving nonperformance by IBM pursuant to, or in any way related to the subject matter of this Statement of Warranty, IBM's liability, will be limited to the total amount you paid for the Machine that is the subject of the claim.

Applicability of suppliers and resellers (unchanged).

The following replaces the third paragraph of this Section:

Unless otherwise provided by mandatory law, IBM and your reseller are not liable for any of the following: *(items 1 and 2 unchanged)* 3) indirect damages, even if IBM or your reseller is informed of their possibility.

SOUTH AFRICA, NAMIBIA, BOTSWANA, LESOTHO AND SWAZILAND

Limitation of Liability: *The following is added to this Section:*

IBM's entire liability to you for actual damages arising in all situations involving nonperformance by IBM in respect of the subject matter of this Statement of Warranty will be limited to the charge paid by you for the individual Machine that is the subject of your claim from IBM.

UNITED KINGDOM

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Avis de conformité à la réglementation d'Industrie Canada

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Notice to Customers

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13F9979	Afghanistan, Algeria, Andorra, Angola, Austria, Belgium, Benin, Bulgaria, Burkina Faso, Burundi, Cameroon, Central African Rep., Chad, China (Macau S.A.R.), Czech Republic, Egypt, Finland, France, French Guiana, Germany, Greece, Guinea, Hungary, Iceland, Indonesia, Iran, Ivory Coast, Jordan, Lebanon, Luxembourg, Malagasy, Mali, Martinique, Mauritania, Mauritius, Monaco, Morocco, Mozambique, Netherlands, New Caledonia, Niger, Norway, Poland, Portugal, Romania, Senegal, Slovakia, Spain, Sudan, Sweden, Syria, Togo, Tunisia, Turkey, former USSR, Vietnam, former Yugoslavia, Zaire, Zimbabwe
13F9997	Denmark
14F0015	Bangladesh, Burma, Pakistan, South Africa, Sri Lanka

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14F0051	Liechtenstein, Switzerland
14F0069	Chile, Ethiopia, Italy, Libya, Somalia
14F0087	Israel
1838574	Thailand
6952301	Bahamas, Barbados, Bermuda, Bolivia, Brazil, Canada, Cayman Islands, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Japan, Korea (South), Liberia, Mexico, Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Saudi Arabia, Suriname, Taiwan, Trinidad (West Indies), United States of America, Venezuela

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