Sun Cobalt™ LX50 Server

User Guide

Sun Cobalt™

Part Number / Numéro de pièce : 816-5359-10 Rev A

Preface

This User Guide provides information on how to install, configure, and validate the operation of the Sun Cobalt™ LX50 server.

Topics in this chapter include:

- Who Should Use This Book
- Conventions Used in this Manual
- Related Documentation
- Ordering Sun Documents
- Accessing Sun Documentation Online
- Shell Prompts in Command Examples
- Notice

Who Should Use This Book

The intended audience for this book are system administrators who are responsible for installing and validating the Sun Cobalt LX50 server.

Conventions Used in this Manual

The following table describes the typographic conventions used in this book.

Table 1 Typographic Conventions

Typeface or Symbol	Meaning	Example
`courier font`	Names of commands; Names of files; On-screen computer output;	Use `ls -a` to list all files. Edit your `.login` file. `machine_name% You have mail.`
italics	Book titles, new words; Terms to be emphasized; Variables that you replace with a real value;	Read Chapter 6 in *User's Guide*; These are called *class* options; You *must* be root to do this; To delete a file, type `rm` *filename*.
`boldface courier font`	What you type	`machine_name%` **`su`**

Related Documentation

These documents contain information related to the tasks described in this book:

Sun Linux 5.0 User Guide

Sun Linux Comparison Guide

Ordering Sun Documents

The SunDocs℠ program provides more than 250 manuals from Sun Microsystems, Inc. If you are in the United States, Canada, Europe or Japan, you can purchase documentation sets or individual manuals by using this program.

For a list of documents and how to order them, see the catalog section of the SunExpress™ Internet site at `http://store.sun.com`.

Accessing Sun Documentation Online

The `http://docs.sun.com` Web site enables you to access the Sun technical documentation online. You can browse the `docs.sun.com` archive or search for a specific book title or subject.

Shell Prompts in Command Examples

Table 2 shows the default system prompt and superuser prompt for the C, Bourne and Korn shells.

Table 2 Shell Prompts

Shell	Prompt
Bourne shell and Korn shell prompt	`machine name$`
Bourne shell and Korn shell superuser prompt	`machine name#`

Notice

To better illustrate the process being discussed, this manual contains examples of data that might be used in daily business operations. The examples might include the names of different individuals, companies, brands and products. Only fictitious names are used and any similarity to the names of individuals, companies, brands and products used by any business enterprise is purely coincidental.

Contents

Figures

Tables

Introducing the Sun Cobalt LX50 server

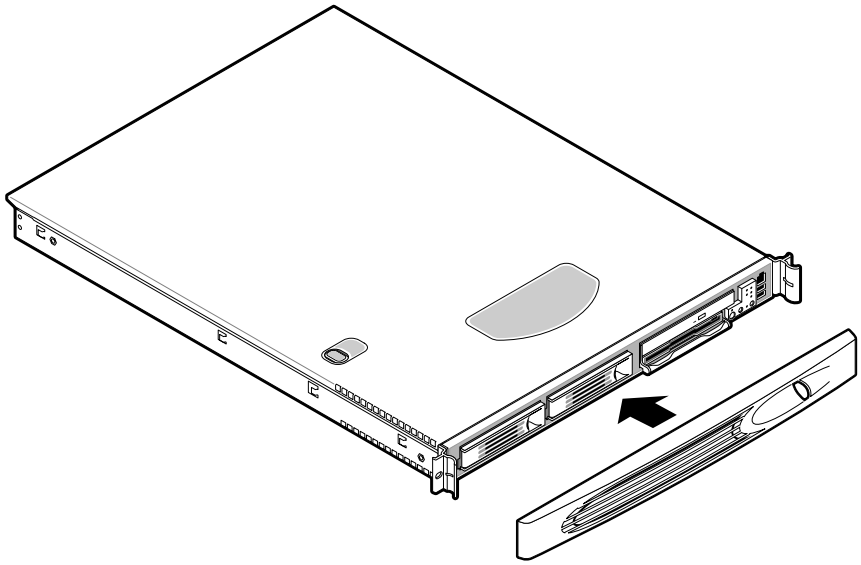
This chapter gives an overview of the Sun Cobalt™ LX50 server. It lists the features of the server, the contents of the ship kit, and summarizes the installation process.

This chapter contains the following sections:

Overview of the Sun Cobalt™ LX50 Server

The Sun Cobalt LX50 server, shown in Figure 1, is a single- or dual-processor server in a 1 rack unit (1RU) chassis (1 RU is 1.75" of vertical rack space). The bezel shown in the figure is installed by the user.

Figure 1. The Sun Cobalt LX50 Server



The Sun Cobalt LX50 server is ideal for:

- Deploying applications at the edge of corporate networks.
- High-density computing environments (scientific research, EDA, financial services, and so on).
- Running custom designed applications for telecommunication carriers and Internet service providers.

The Sun Cobalt LX50 server has the following features (see Chapter 7, “Specifications,” for more details):

- Single or dual processors.
- Six DIMM sockets (maximum of 6 GB of main memory).
- Four USB ports.
- Server Management via RJ-45 sockets at front and rear.
- Support for up to three low-profile, 3.5-inch, Ultra-160 SCSI hard disks (one drive bay is flexible and is configured, by default with a combination floppy drive/CD-ROM module).
- Rear SCSI expansion connector.
- Two PCI slots (one low-profile and one full-height).
- Rack mounting with brackets, (or, optional slide-rail mounting).
- Single power supply with redundant fans.
- Two Ethernet ports (10/100 Mbps RJ-45 NIC ports on rear panel).
- PS/2 keyboard/mouse port with Y adapter.
- VGA output port.
- Front panel controls and indicators.

Contents of the Ship Kit

The Sun Cobalt LX50 server is supplied with the components shown in Table 3

Table 3. Contents of the Ship Kit

Item	Part Number	Quantity	Delivery
Sun Cobalt LX50 Documents on CD: Sun Cobalt *LX50 Server User Guide* *Sun Linux 5.0 User Guide* *Sun Cobalt LX50 Server Product Notes* Warranty Card	705-0266 816-5359 816-5363	1	on CD
Sun Cobalt LX50 Server Diagnostics CD	705-0273	1	on CD
Sun Linux Installer and Rescue CDs	705-0274 705-0275 705-0291	3	on CD
Sun Cobalt LX50 Setup Poster	816-5408	1	printed
Binary Code License Agreement and Regulatory Information Packing List and Safety Information	816-5411 816-5410	1 1	printed printed
PS/2 Keyboard/Mouse Y Cable	none	1	in accessory kit
Bracket Kit	540-5432	1	boxed
Sun Cobalt LX50 Server	540-5436	1	boxed
Sun Cobalt LX50 Front Bezel	540-5431	1	in accessory kit[1]
Power Cord (for USA)	none	1	in accessory kit
Power Cord Clip	none	1	in accessory kit

1. The bezel is stored under a lift-up panel inside the accessory kit box. Be sure to remove the bezel before discarding the box.

Replaceable Components

The replaceable components on the Sun Cobalt LX50 server are shown in Table 4. Some of the components are considered to be customer-replaceable units (CRUs), and some are considered to be field-replaceable units (FRUs), replaceable only by an authorized Sun Microsystems, Inc. field service technician. Also, some components are extra-cost options that can be ordered from Sun Microsystems.

Note: If a FRU needs replacement, contact your local Sun Sales representative, who will put you in contact with the Sun Enterprise Service branch for your area. You can arrange to return the system to Sun for repair under the terms of your warranty. Or, if the server is under a Sun Service agreement, the FRU will be replaced by a Sun Service engineer. If a CRU needs replacement, you can either request a replacement part from Sun or return the entire unit for repair. All parts replaced under the system warranty must be returned to Sun within 30 days of receipt of the replacement part.

Table 4 lists the components and which ones are customer-replaceable, Sun-replaceable, and extra cost options.

Table 4. Replaceable Components

Component	Part Number	Extra Cost Options	CRU/FRU
Memory			
128MB (single)	540-5421		CRU
128MB (pair)	X5022A	X	CRU
256MB (single)	540-5423		CRU
256MB (pair)	X5023A	X	CRU
512MB (single)	540-5425		CRU
512MB (pair)	X5024A	X	CRU
1GB (single)	540-5427		CRU
1GB (pair)	X5025A	X	CRU
Hard disk drives (HDDs)			
36 GB	540-5419		CRU
36 GB	X5020A	X	CRU
72 GB	540-5420		CRU
72 GB	X5021A	X	CRU
CPU/Heatsink Kit[1]			
1.2 GHz	#540-5437		FRU
1.2 GHz	X5028A	X	FRU
1.4 GHz	#540-5438		FRU
1.4 GHz	X5029A	X	FRU
Cable Kit (cables inside the server chassis)	#540-5439		FRU
Optional RJ-45 to DB9 Serial Adapter Kit (three RJ-45 to DB9 cable adapters for the front and rear management ports)	X5026A	X	CRU
Fan module (five unitized fans)	540-5430		CRU
Floppy/CD-ROM combo unit[2]	540-5432		CRU
Power supply	540-5429		CRU
Slide Rail Kit	X5027A	X	CRU
Bracket kit	540-5433		CRU

Table 4. Replaceable Components (Continued)

Component	Part Number	Extra Cost Options	CRU/FRU
Front bezel	540-5431		CRU
Lithium battery	CR2032		CRU
Sun Cobalt LX50 server System FRU[3]	#540-5440		FRU
Main Board[4]	#540-5436		FRU

1. When upgrading from one to two CPUs, the CPUs must be of identical type and speed and the stepping must match within plus or minus one step.
2. A third hard disk drive can be substituted for the floppy/CD-ROM unit, if desired
3. The System FRU is a full server without processors, DIMMs, HDDs, or a floppy/CD-ROM combo unit.
4. The Main Board contains no DIMMs or CPUs, and is packaged in an ESD bag with two foam pads and an ESD wrist strap.

For detailed instructions on how to replace components, see "Customer Replaceable Unit (CRU) Procedures" on page 5-4.

Optional RJ-45 to DB9 Serial Adapter Kit

The optional RJ-45 to DB9 Serial Adapter Kit consists of the following RJ-45 to DB9 adapter cables:

- DSR Peripherals cable (for rear panel Data Set Ready (DSR) peripherals).
- DCD Modem cable (for rear Data Carrier Detect (DCD) modem).
- Front EMP cable (for front Emergency Management Port).

DSR Peripherals Cable

This cable is wired for serial concentrators that use the DSR signal. See "Rear Panel RJ-45 Serial 2 Connector" on page 2-30 for more information on how to use this adapter cable.

DCD Modem Cable

This cable is wired for serial concentrators that use the DCD signal, and for connecting to a modem. See "Rear Panel RJ-45 Serial 2 Connector" on page 2-30 for more information on how to use this adapter cable.

Front EMP Cable

This cable is wired for connection to the COM port of a laptop or computer that connects to the front EMP port of the Sun Cobalt LX50 server. See "Front RJ-45 Serial 2 Connector" on page 2-27 for more information on how to use this adapter cable.

Preinstalled Software

The Sun Cobalt LX50 server comes preinstalled with Sun Linux 5.0, as well as the following applications:

- MySQL server and client
- Apache

In addition, the following applications are `.tar` files or RPMs included under the `/opt/SunApps` directory that need to be installed:

- Sun Grid Engine
- Sun Streaming Server
- Sun One Active Server Pages
- JDK 1.4
- Tomcat
- J2SE Development Kit

In addition to above applications, the server has a dedicated disk partition that contains diagnostic software to verify and troubleshoot server operation. The server also implements the Intelligent Platform Management Interface (IPMI) standard that runs autonomously from the Sun Linux operating system. IPMI performs fault management on the server, logging events and controlling status LEDs on the Main Board as well as the front and rear panels.

For further information on how to use the Sun Linux Installer and Rescue CDs to reinstall Sun Linux and configure the Sun Linux operating environment, see the manual titled *Sun Linux 5.0 User Guide*.

All software is covered by the Sun Microsystems standard software warranty support. Terms can be found at:

`http://www.sun.com/service/support/warranty/terms.html`

Table 5. Software Warranty Information

Product	Warranty Support (see URL above)	Support
Sun Linux	X	SunSpectrum Software-Only Support. Customer may purchase a support contract by referring to: http://www.sun.com/service/support/sw_only/other.html
Sun Grid Engine 5.3	X	No support contract available. For further information, refer to http://wwws.sun.com/software/gridware/support.html
J2SE Dev Kit	X	No support contract available. For further information, refer to http://developer.java.sun.com/developer/support/
Sun One Active Server Pages	X	Customer may purchase a separate support contract by referring to http://www.chilisoft.com/support/stdms.htm
Steaming Server	X	streaming-questions@sun.com
mySQL		http://www.mysql.com/support/index.html
wu-ftpd		http://www.wu-ftp.org/
Apache webserver 1.3.22		http://www.apache.org/

Installation Quickstart

Table 6 is a simplified summary of the steps you need to follow to install and configure the Sun Cobalt LX50 server.

Table 6. Installation Quickstart Procedure

Step	Task	Reference
1 - Install the Hardware	Mount server in the rack Connect the cables	See Chapter 2, “Installing the Server in a Rack.”
2 - Configure the Server	Power on the server Configure BIOS (optional) Run diagnostics (optional) Boot to Sun Linux	See Chapter 4, “Powering On and Configuring the Server

Installing the Server in a Rack

This chapter describes how to intall theSun Cobalt™ LX50 in a rack, using a four-post, two-post, or front-mount rack system. This chapter contains the following sections:

Decide Where to Configure the Sun Cobalt LX50 server

Before installing the Sun Cobalt™ LX50 server, it is best to decide where you want to configure it:

- In the rack
- On the bench

If you are going to configure the server after it is mounted in the rack, proceed to the section titled "Precautions" on page 2-2. To configure the Sun Cobalt LX50 server while it is in the rack, it is best to use a laptop to connect to the server Emergency Management Port (EMP) on the front panel of the server. See "Configuring an External Serial Console" on page 4-7 for details on hooking up the laptop to the EMP.

If you are going to configure the server in a lab environment before it is installed in a rack, proceed to Chapter 3, "Powering On and Configuring the Server," then proceed to the section in this chapter titled "Precautions" on page 2-2.

Note: The preferred method is to configure the server on a lab bench, as all of the server components are much more accessible.

Precautions

Before beginning the rack installation process, read through the following precautions.

Anchor the Equipment Rack

The equipment rack must be anchored to an unmovable support to prevent it from falling over when one or more servers are extended in front of it on slide assemblies. The equipment rack must be installed according to the manufacturer's instructions. You must also consider the weight of any other device installed in the rack.

Main AC Power Disconnect

You are responsible for installing an AC power disconnect for the entire rack unit. This main disconnect must be readily accessible, and it must be labeled as controlling power to the entire unit, not just to the server(s).

Grounding the Rack Installation

To avoid the potential for an electrical shock hazard, you must include a third wire safety grounding conductor with the rack installation. If server power cords are plugged into AC outlets that are part of the rack, you must provide proper grounding for the rack itself. If server power cords are plugged into wall AC outlets, the safety grounding conductor in each power cord provides proper grounding only for the server. You must provide additional, proper grounding for the rack and other devices installed in it.

Temperature

The ambient operating temperature of the server, when installed in an equipment rack, must not go below 5 ˚C (50 ˚F) or rise above 35 ˚C (95 ˚F). Extreme fluctuations in temperature can cause a variety of problems in your server.

Ventilation

The equipment rack must provide sufficient airflow to the front of the server to maintain proper cooling. It must also include ventilation sufficient to exhaust a maximum of 850 BTUs per hour for a fully loaded Sun Cobalt LX50 server.

It is important to note that this is the maximum, and a minimum or typical system could be much less. You may want to calculate the BTU/hr more accurately for your configuration. An extra 500 BTUs per hour over many systems would translate into a large error when calculating air-conditioning capacity.

Introduction

There are two methods for installing the Sun Cobalt LX50 server in a rack:

- Bracket Kit (see "Installing the Server Using the Bracket Kit" on page 2-4)

  This mounting method is quick and easy, but makes it somewhat difficult to service the server.

  There are three mounting methods using the bracket kit:

  - Four Post (see "Mounting in a Four-Post Rack System" on page 2-5)
  - Mid Mount (see "Mid-Mounting in a Two-Post Rack System" on page 2-11)
  - Front Mount (see "Front-Mount-Only in a Two-Post Rack System" on page 2-15)

  Four-post mounting is the recommended method. It the most stable and sturdy method. The mid-mount system requires only two posts, but the posts must be adequately strong and stable to support the weight of multiple servers. The front mount method is highly discouraged, as most racks are unable to safely and reliably support the entire weight of a server through the front rack posts.

- Optional Slide Rail Kit (see "Installing the Server Using the Slide Rail Kit (Optional)" on page 2-21)

  This mounting method is more complicated, but allows the server to be more easily serviced.

Note: At various points during installation, you must either remove or replace the front bezel. The bezel is held in place by the chassis handles. The instructions for removing and replacing the bezel are given here, to avoid repetition in subsequent sections. You will find the bezel in the accessory compartment of the shipping materials.

To remove the bezel:

1. Use the fingerhole to pull the bezel out.
2. Pull out the right side first, allowing the left side to rotate in the chassis handle until it comes loose.

To replace the bezel:

1. Snap the left side of the bezel into the left chassis handle.
2. Swing the right side of the bezel in, allowing the left side to rotate in the chassis handle.
3. Gently push the right side of the bezel into the right hand chassis handle until it snaps into place.

Installing the Server Using the Bracket Kit

The bracket kit allows you to install the server chassis into most two- and four-post rack and cabinet systems.

Required Tools

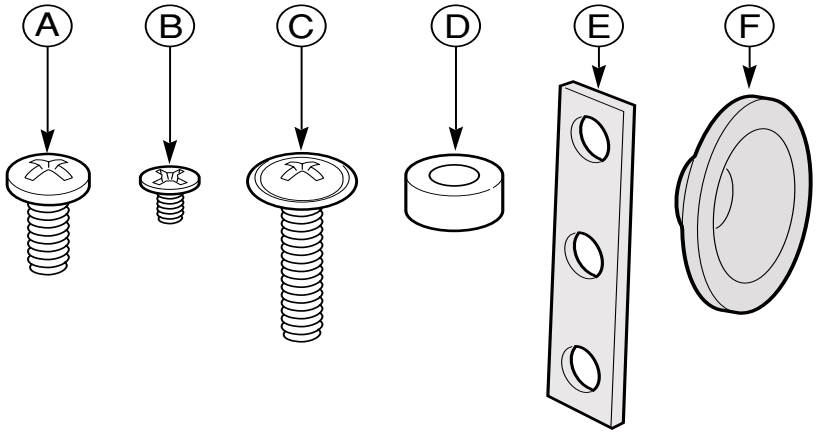
- Phillips screwdriver

Kit Contents

The bracket kit, included as standard equipment with the server, includes the following items:

- Chassis brackets—qty. 2
- Rear brackets—qty. 2
- L brackets—qty. 2
- Fastener pack—qty. 1 (see Figure 2)

Figure 2. Fastener Pack Contents



A. Screw, #10-32 x 1/2-inch—qty. 8

B. Screw, #6-32 x 3/16-inch—qty. 4

C. Screw, #10-32 x 7/8-inch—qty. 2

D. Handle spacers—qty. 2

E. Nut bar—qty. 4

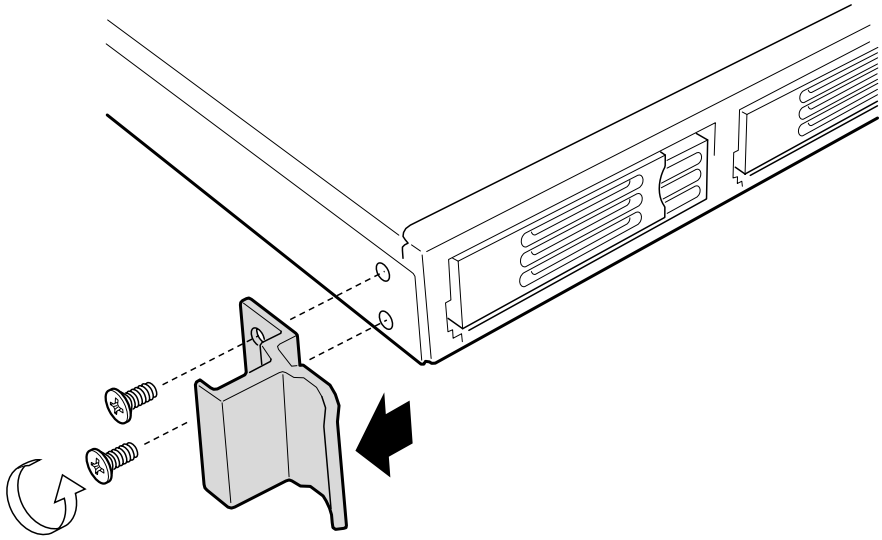
F. Chassis disks—qty. 2

Mounting in a Four-Post Rack System

Remove the Chassis Handles

1. Remove the bezel.
2. Remove two screws (Figure 3) from each handle.
3. Set the handles and screws aside for reattachment later.

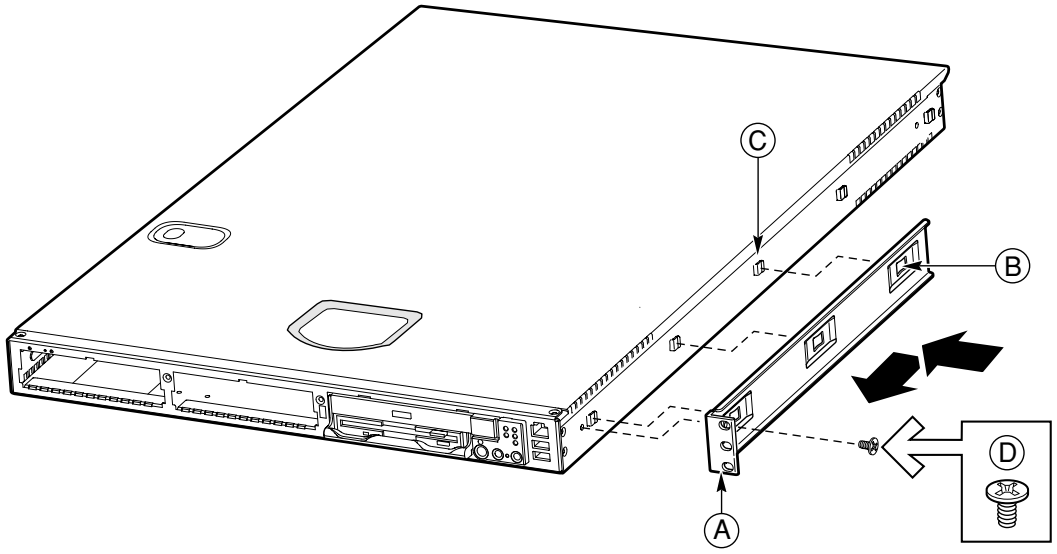
Figure 3. Removing a Handle from the Chassis



Attach Brackets to Chassis

1. Place a chassis bracket along one side of the chassis in the front-mount position (Figure 4, A).
2. Align the holes (B) in the bracket with the tabs (C) on the chassis and place the bracket against the chassis.
3. Slide the bracket as far as it will go toward the front of the chassis.
4. Fasten the bracket to the chassis using screw (D).
5. In the same manner, attach a chassis bracket to the other side of the chassis.

Figure 4. Installing a Chassis Bracket in the Front-mount Position



A. Chassis bracket in front-mount position

B. Bracket holes

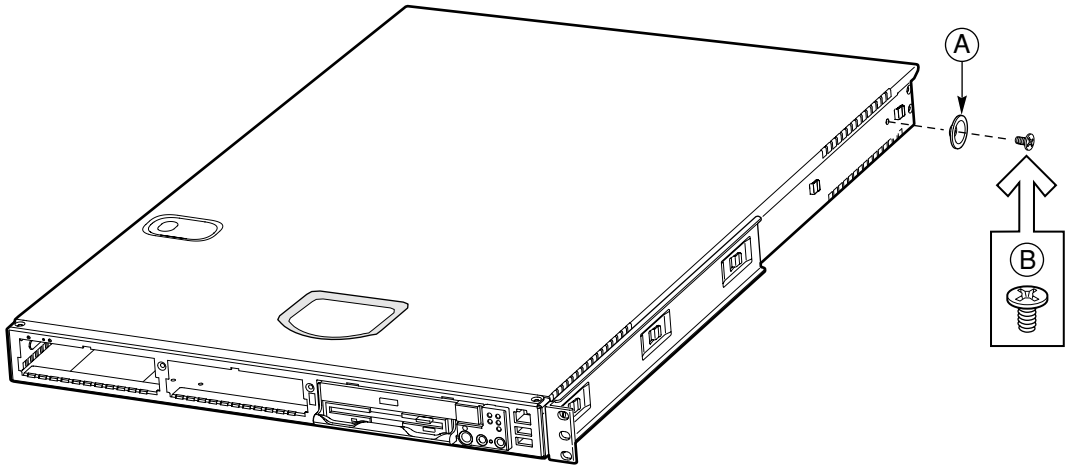
C. Chassis tabs

D. #6-32 x 3/16-inch screw

Attach Disks to Chassis

1. Place a chassis disk at the side of the chassis towards the rear (see Figure 5, A).
2. Install screw (B) and tighten.
3. In the same manner, attach a chassis disk to the opposite side of the chassis.

Figure 5. Attaching a Chassis Disk to the Chassis



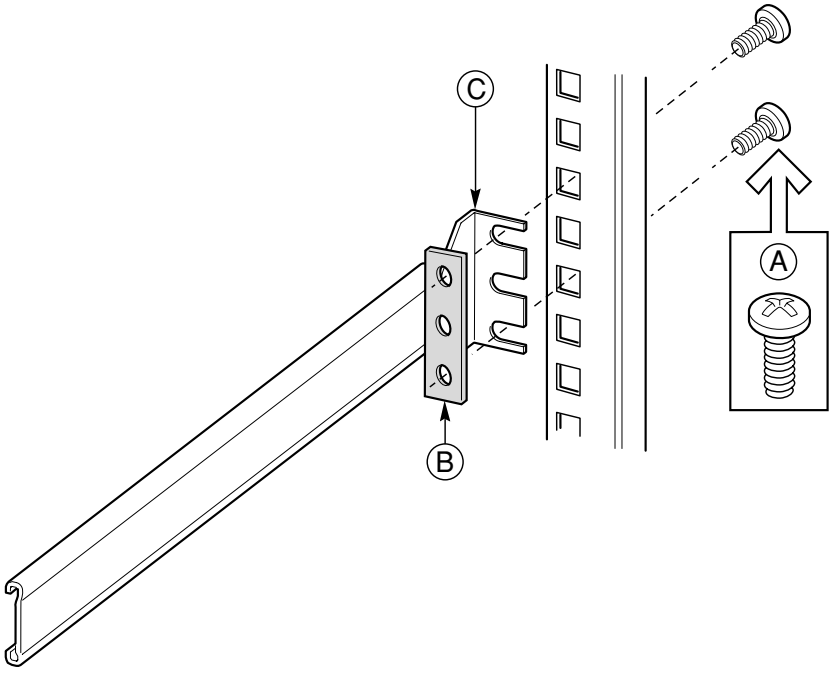
A. Chassis disk

B. #6-32 x 3/16-inch screw

Attach Brackets to Rear Posts

1. Attach a nut bar (Figure 6, B) on the inside of the two rear rack posts using screws (A). Do not completely tighten the screws—leave them loose enough to allow insertion of the brackets in step 2.
2. Insert the slotted foot of a rear bracket (C) between each nut bar and post.
3. Align the face of the bracket foot with the edge of the rack post and firmly tighten the screws.

Figure 6. Attaching a Rear Bracket to a Rear Post



A. #10-32 x 1/2-inch screw with washers

B. Nut bar

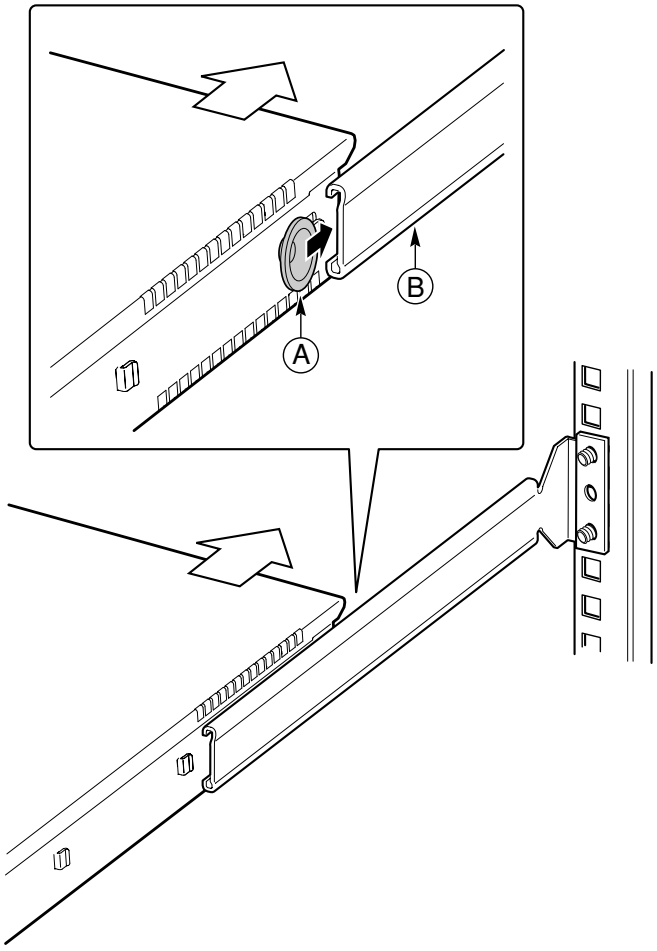
C. Rear bracket

Install Chassis in Rack

Caution: Lifting the chassis and attaching it to the rack is a two-person job. If needed, use an appropriate lifting device. A fully loaded server weighs approximately 11.8 kg (26 lbs).

1. With the chassis front facing you, lift the chassis and position the chassis disks (Figure 7, A) so they fit in the rear brackets (B).

Figure 7. Installing the Chassis in the Rear Brackets

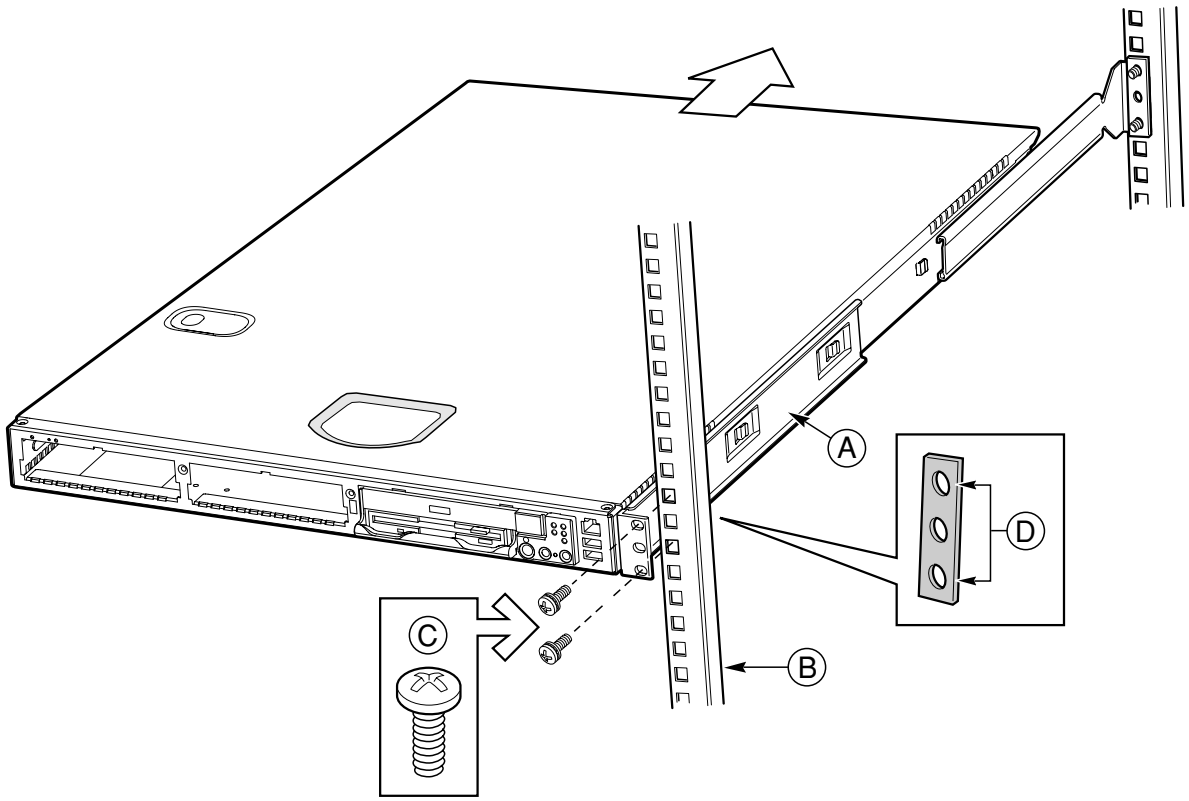


A. Chassis disk

B. Rear bracket

2. Slide the chassis toward the rear of the rack until the front of the chassis brackets contact the front posts.
3. Attach the chassis brackets (Figure 8, A) to the front posts (B) using two screws (C) and one nut bar (D) per side.

Figure 8. Attaching a Front Bracket to a Front Post



A. Chassis bracket

B. Front post

C. #10-32 x 1/2-inch screw with washers

D. Nut bar

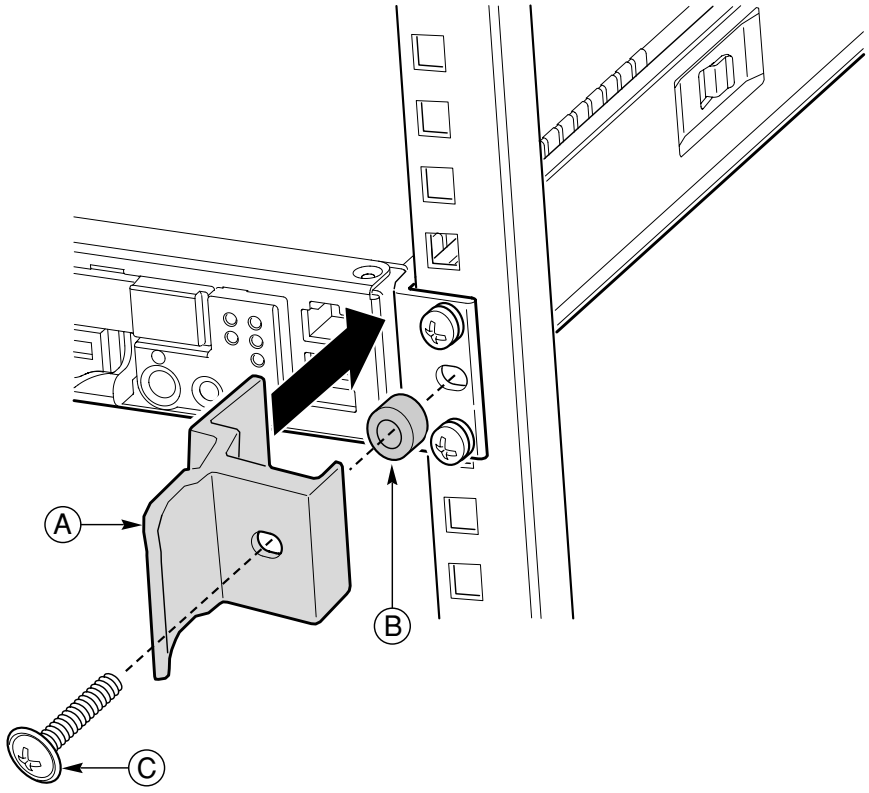
Install Chassis Handles

Note: The handles are required to hold the bezel on. If you will not be installing a bezel, you do not need to install the handles.

1. Slide a handle (Figure 9, A) between the chassis and the chassis bracket.
2. Align the hole in the handle with the unused hole in the chassis bracket.
3. Install a spacer (B) between the handle and the chassis bracket.
4. Install and tighten screw (C) to secure the handle.
5. In the same manner, attach the other handle to the opposite side.
6. Replace the bezel.

You have completed the installation of your chassis in a four-post rack system.

Figure 9. Attaching a Chassis Handle to a Front Post



A. Chassis handle

B. Spacer

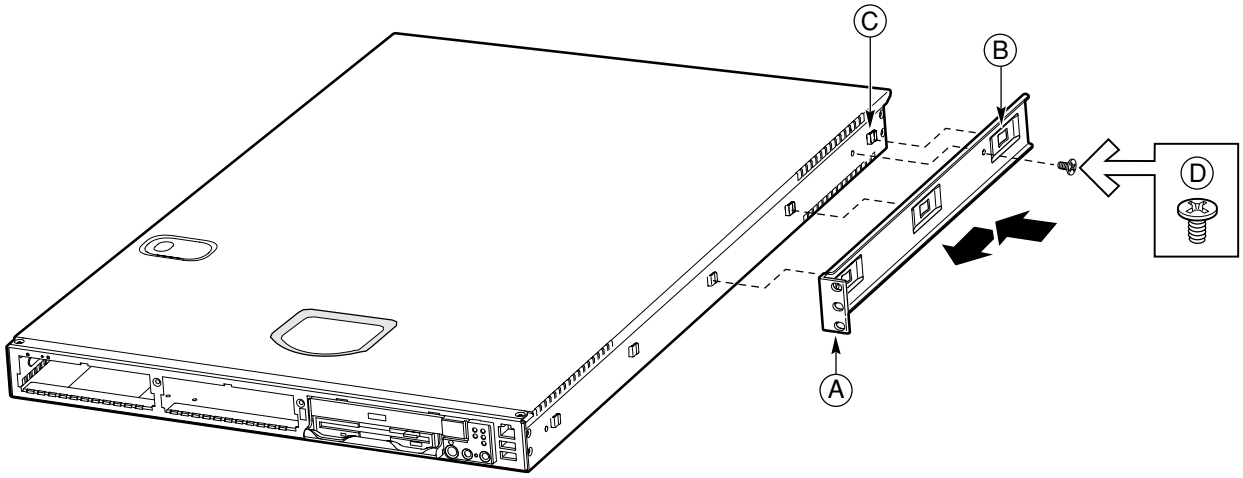
C. #10-32 x 7/8-inch screw with washer

Mid-Mounting in a Two-Post Rack System

Attach Brackets to Chassis

1. Place a mounting bracket (Figure 10, A) along one side of the chassis in the mid-mount position.
2. Align the holes (B) in the bracket with the tabs (C) on the chassis and place the bracket against the chassis.
3. Slide the bracket as far as it will go toward the front of the chassis.
4. Fasten the bracket to the chassis using screw (D).
5. In the same manner, attach a bracket to the other side of the chassis.

Figure 10. Installing a Chassis Bracket in the Mid-mount Position



A. Chassis bracket in mid-mount position

B. Bracket holes

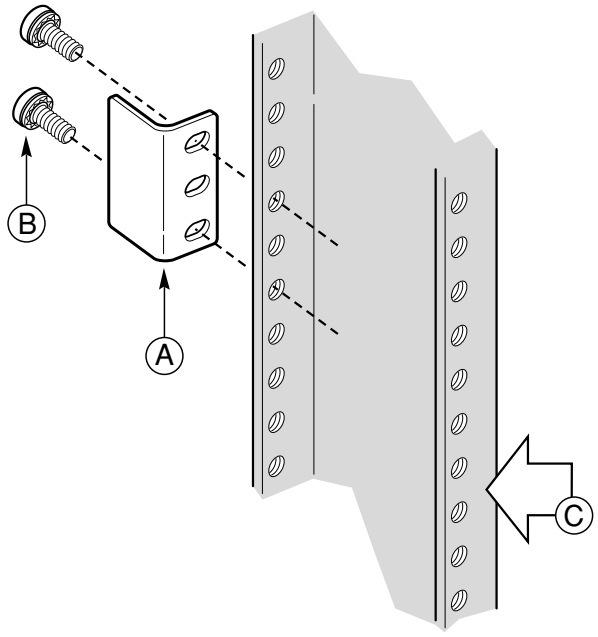
C. Chassis tabs

D. #6-32 x 3/16-inch screw

Attach L Brackets to Center Posts

1. Position a supplied L bracket (Figure 11, A) on the backside of the center post (C).
2. Attach the L bracket to the center post using the screws (B) supplied with your rack. Do not fully tighten at this time.
3. In the same manner, attach an L bracket to the other center post.

Figure 11. Attaching an L Bracket to a Center Post



A. L bracket

B. Screw (supplied by your rack manufacturer)

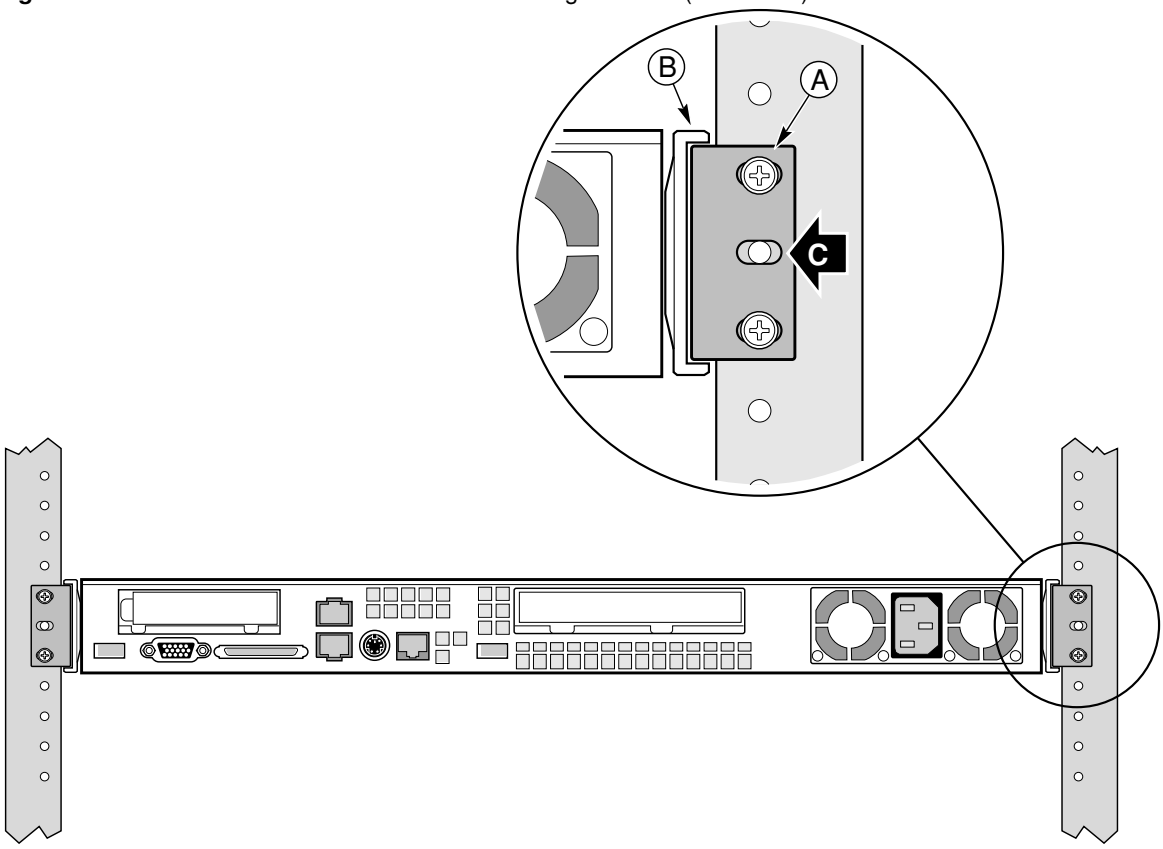
C. Front side of typical right center post

Install Chassis in Rack

Caution: Lifting the chassis and attaching it to the rack is a two-person job. If needed, use an appropriate lifting device. A fully loaded server weighs approximately 11.8 kg (26 lbs).

1. Locate one person at the front of the rack and one at the rear.
2. Position the chassis so that the L brackets (Figure 12, A) are inserted into the chassis mounting brackets (B).
3. While supporting the weight of the chassis, adjust the L brackets to fit tightly into the chassis brackets (C).

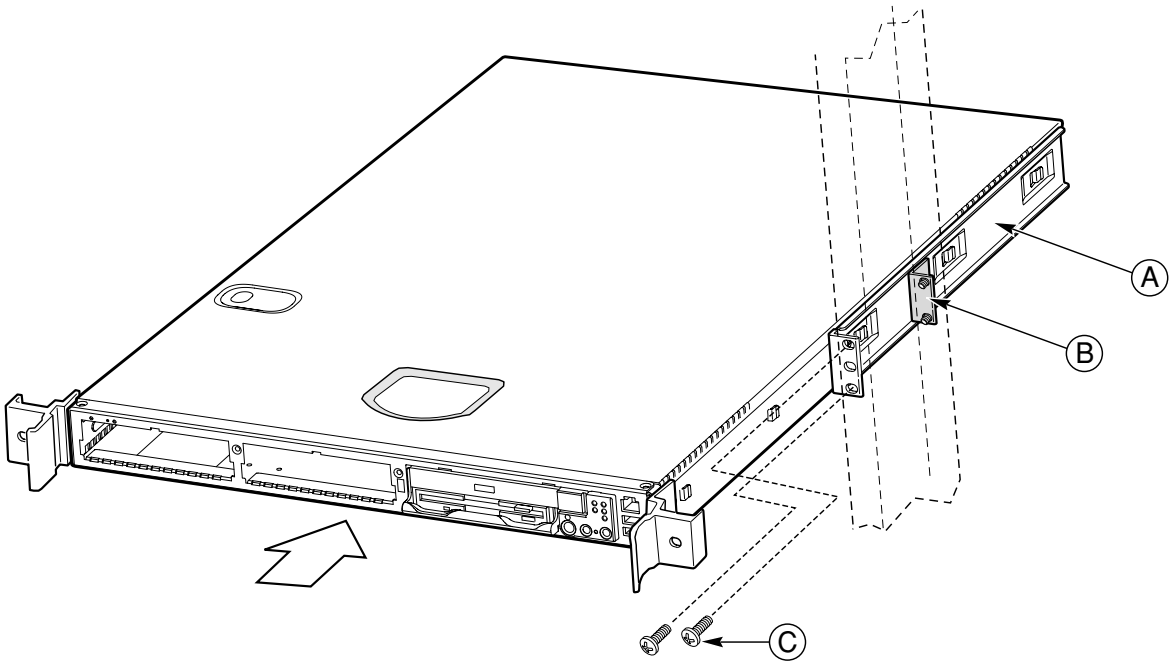
Figure 12. L Brackets Inserted into Chassis Mounting Brackets (Rear View)



4. Slide the chassis toward the rear of the rack until the front of the chassis mounting brackets contact the front of the center posts.
5. Using the screws (Figure 13, C) supplied with your rack, attach the front of the mounting brackets to the front of the center posts.

You have completed the mid-mount installation of your chassis in a two-post rack system.

Figure 13. Installing the Chassis in the Rack



A. Chassis bracket in mid-mount position

B. L bracket

C. Screw (supplied by rack manufacturer)

Front-Mount-Only in a Two-Post Rack System

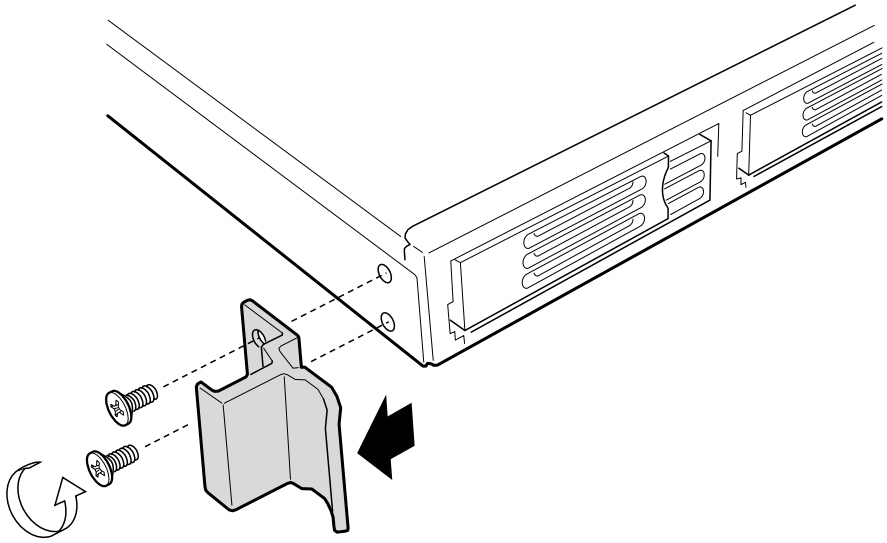
Warning: Your chassis rack-mount kit provides the option for mounting the system in a two-post front-mount-only configuration. However, mounting your chassis using this option is not recommended for use in most rack systems. In fact, the front mount method is highly discouraged, as most racks are unable to safely and reliably support the entire weight of a server through the front rack posts

If a front-mount-only configuration is desired, it is highly recommended that you verify through your rack vendor that your specific rack is designed to support the excessive weight and stresses this type of mounting configuration imposes on the rack. Structural failure of the rack is likely if it is not designed for this type of load. A four-post or a two-post mid-mount configuration should be used when possible.

Remove the Chassis Handles

1. Remove the bezel.
2. Remove two screws from each handle (see Figure 14).
3. Set the handles and screws aside for reattachment later.

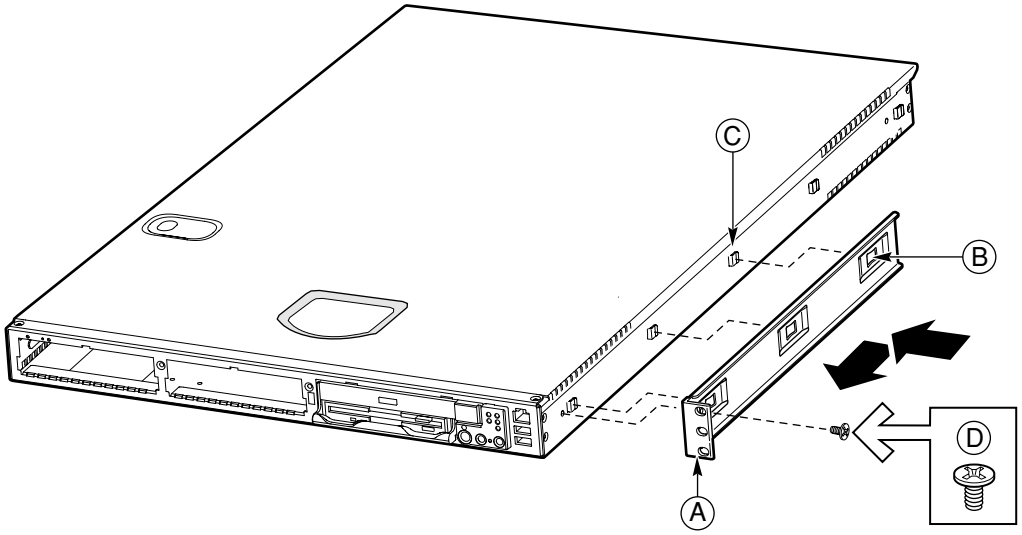
Figure 14. Removing a Handle from the Chassis



Attach Brackets to Chassis

1. Place a mounting bracket (Figure 15, A) along one side of the chassis in the front-mount position.
2. Align the holes (B) in the bracket with the tabs (C) on the chassis and place the bracket against the chassis.
3. Slide the bracket as far as it will go toward the front of the chassis.
4. Attach the bracket to the chassis using screw (D).
5. In the same manner, attach a bracket to the other side of the chassis.

Figure 15. Installing a Chassis Bracket in the Front-mount Position



A. Chassis bracket in front-mount position

B. Bracket holes

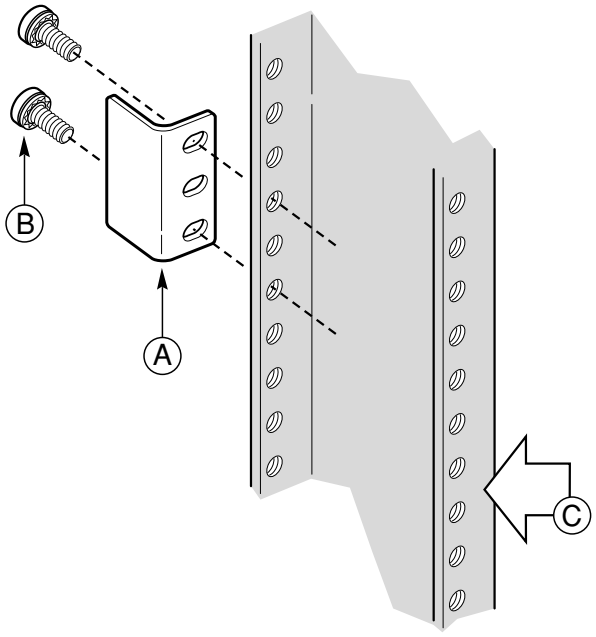
C. Chassis tabs

D. #6-32 x 3/16-inch screw

Attach L Brackets to Center Posts

1. Position an L bracket (Figure 16, A) on the backside of the center post (C).
2. Attach the L bracket to the center post using the screws (B) supplied with your rack. Do not fully tighten at this time.
3. In the same manner, attach an L bracket to the other center post.

Figure 16. Attaching an L Bracket to a Center Post



A. L bracket

B. Screw (supplied by rack manufacturer)

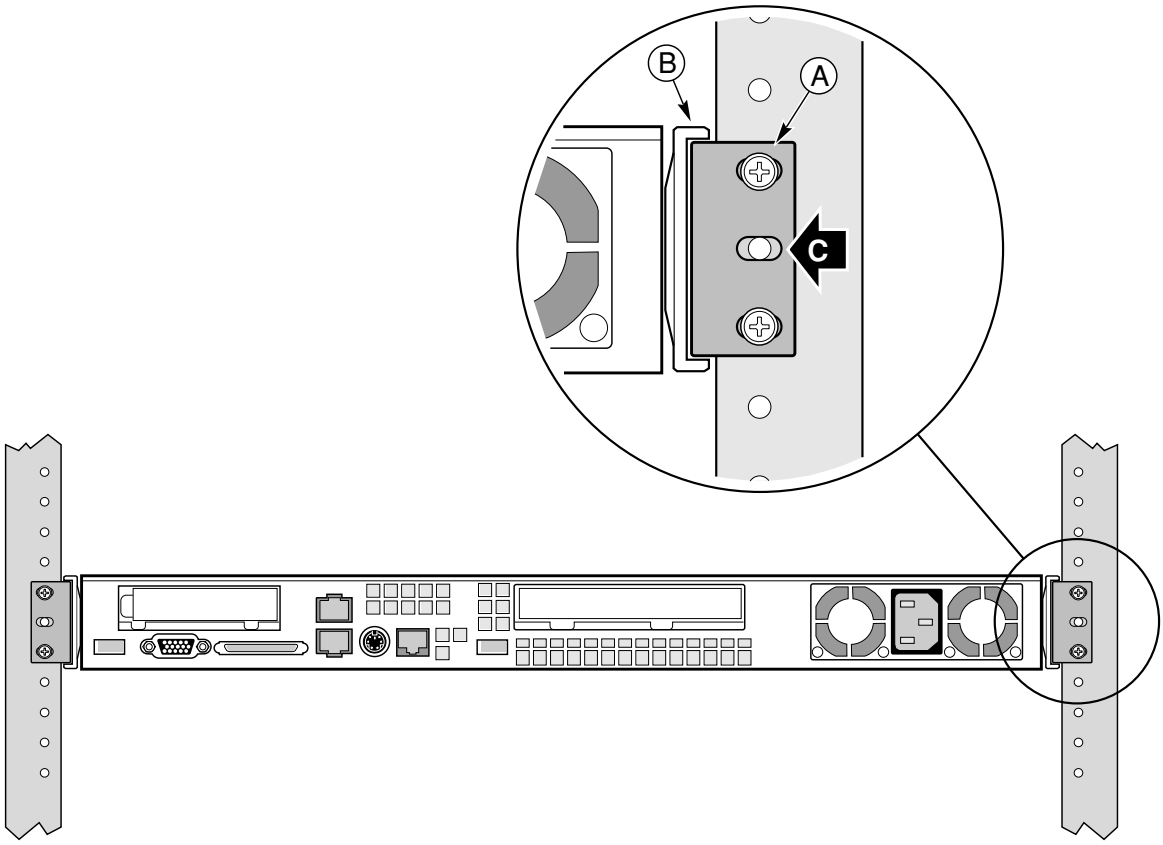
C. Front flange of typical right center post

Install Chassis in Rack

Caution: Lifting the chassis and attaching it to the rack is a two-person job. If needed, use an appropriate lifting device. A fully loaded server weighs about 11.8 kg (26 lbs).

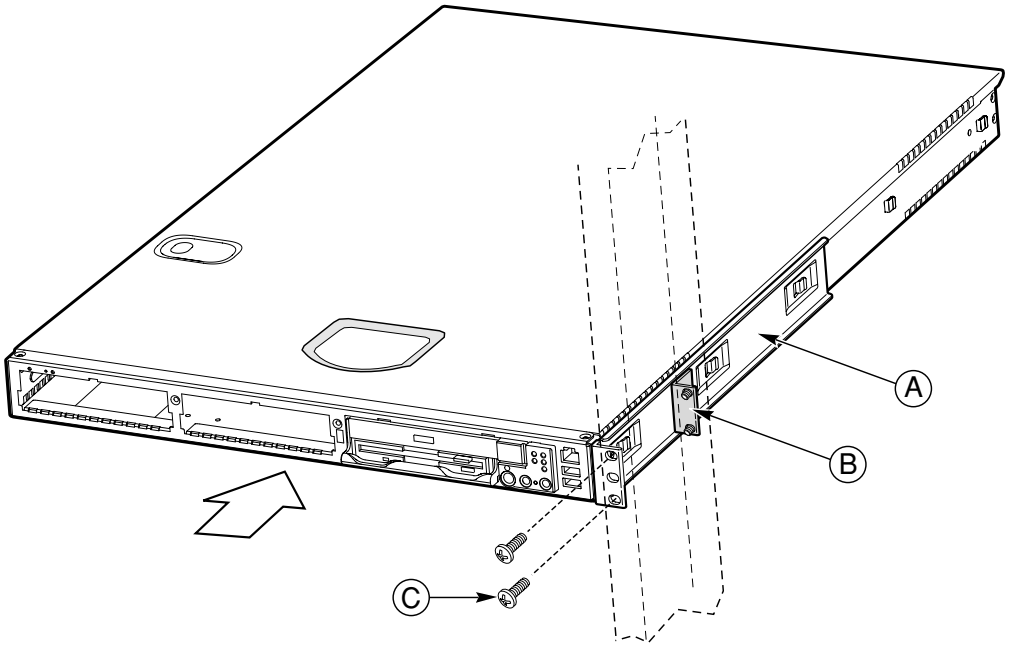
1. Locate one person at the front of the rack and one at the rear.
2. Position the chassis so that the L brackets (Figure 17, A) are inserted into the chassis mounting brackets (B).
3. While supporting the weight of the chassis, adjust the L brackets to fit tightly into the chassis brackets (C).

Figure 17. L Brackets Inserted into Chassis Mounting Brackets (Rear View)



4. Slide the chassis toward the rear of the rack until the front of the chassis brackets contact the front of the center posts.
5. Using the fasteners (Figure 18, C) supplied with your rack, attach the front of the mounting brackets to the front of the center posts.

Figure 18. Installing the Chassis in the Rack



A. Chassis bracket in front-mount position

B. L bracket

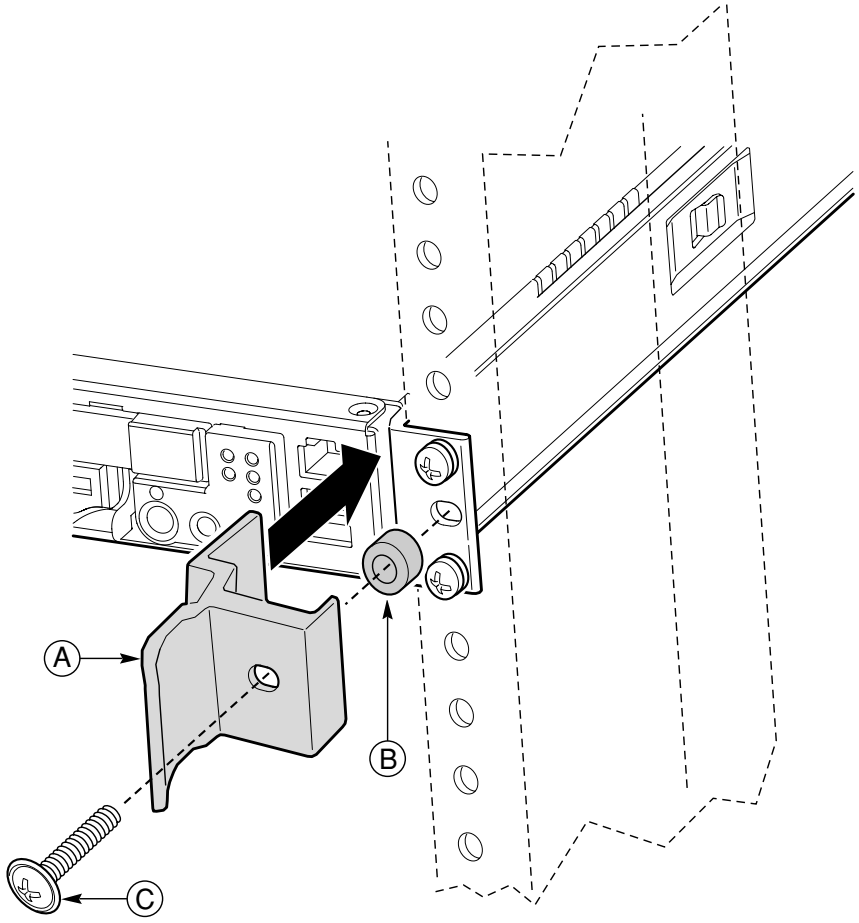
C. Screw (supplied by rack manufacturer)

Install Chassis Handles

Note: The handles are only required to hold the bezel on. If you will not be installing a bezel, you do not need to install the handles.

1. Slide a handle (Figure 19, A) between the chassis and the chassis bracket.
2. Align the hole in the handle with the unused hole in the chassis bracket.
3. Install a spacer (B) between the handle and the bracket.
4. Install and tighten screw (C) to secure the handle.
5. In the same manner, attach the other handle to the opposite side.
6. Replace the bezel.

Figure 19. Attaching a Chassis Handle to a Center Post



A. Chassis handle

B. Spacer

C. #10-32 x 7/8-inch screw with washer

Installing the Server Using the Slide Rail Kit (Optional)

The rail kit is an extra cost option, and allows you to install the Sun Cobalt LX50 server in most four-post rack and cabinet systems.

Required Tools

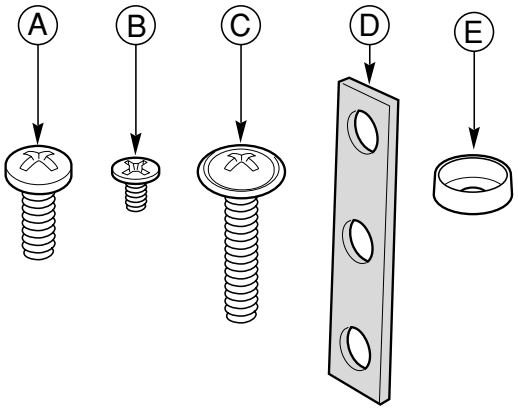
- Phillips screwdriver

Kit Contents

The slide rail kit, available as optional equipment, includes the following items:

- Slide rail assemblies—qty. 2
- Rail brackets—qty. 4
- Fastener pack—qty. 1 (see Figure 20)

Figure 20. Fasteners Provided



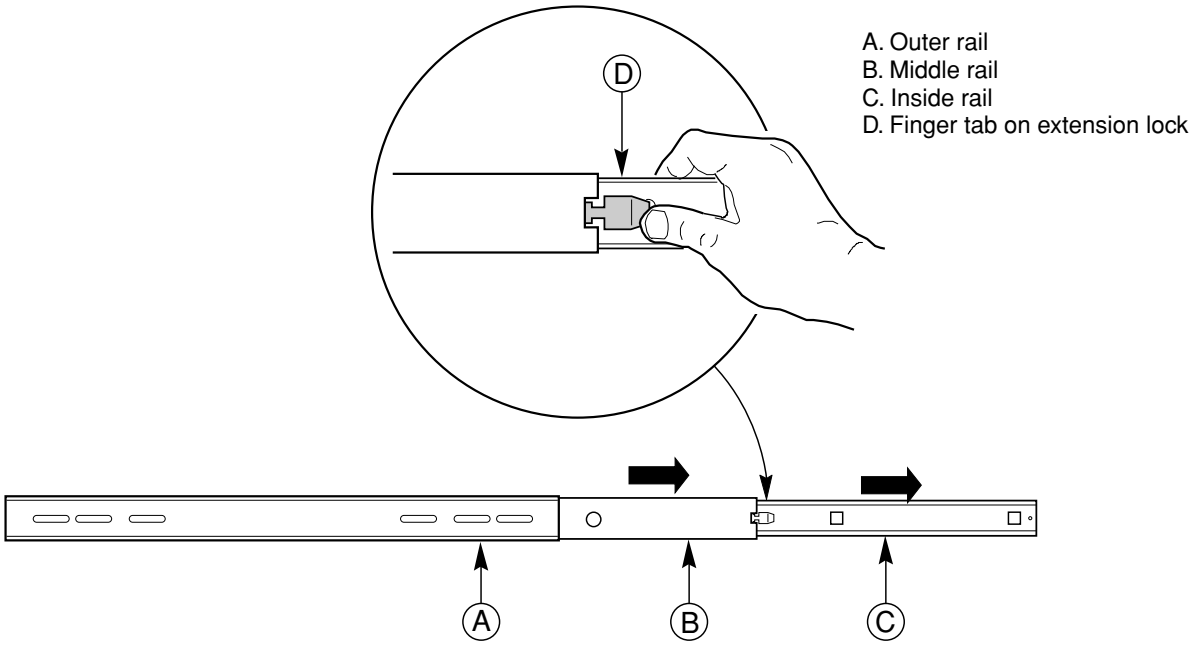
A. Screws, #10-32 x ∫-inch—qty. 8
B. Screws, #6-32 x 3/16-inch—qty. 10
C. Screws, #10-32 x 7/8-inch—qty. 2
D. Nut bars—qty. 4
E. Washers—qty. 10

Remove the Inside Rails

1. Fully extend a rail assembly (Figure 21). The finger tab (D) for the extension lock is revealed.
2. Press the finger tab and slide the inside rail (C) from the middle rail (B) until it completely separates.

Note: The middle rail (B) and outer rail (A) cannot be separated.

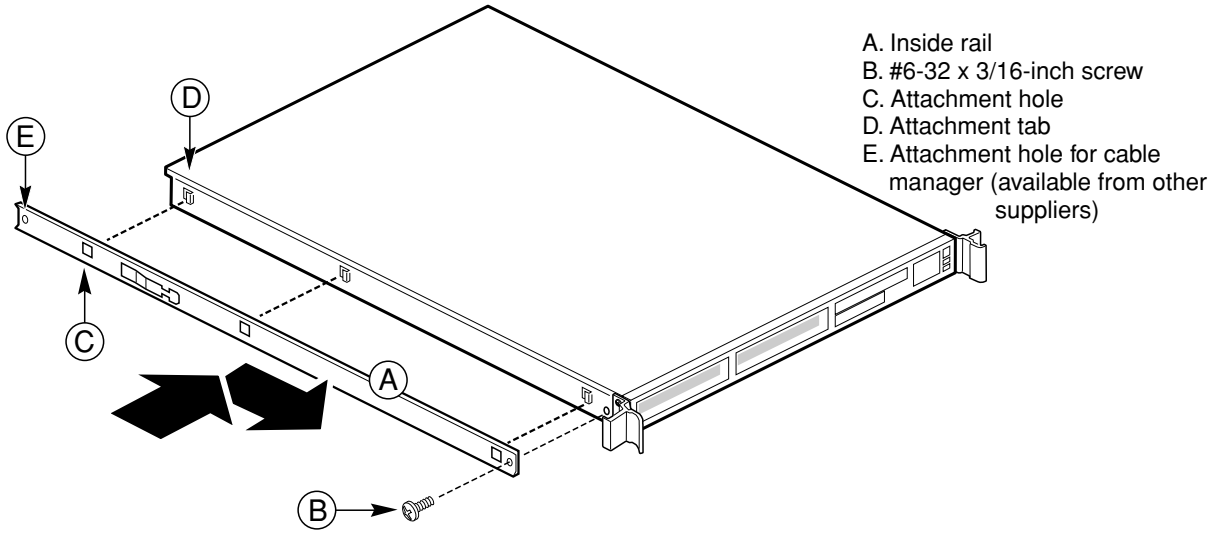
Figure 21. Fully Extended Rail Assembly



Attach Inside Rails to Chassis

1. Position an inside rail (Figure 22, A) along one side of the chassis with the finger tab facing outward and located closer to the rear of the chassis.
2. Align the holes (C) in the rail with the tabs (D) on the chassis and place the rail against the chassis.
3. Slide the rail as far as it will go toward the front of the chassis to engage the tabs.
4. Fasten the rail to the chassis using one screw (B) at the front of the chassis.
5. In the same manner, attach the other inside rail to the other side of the chassis.

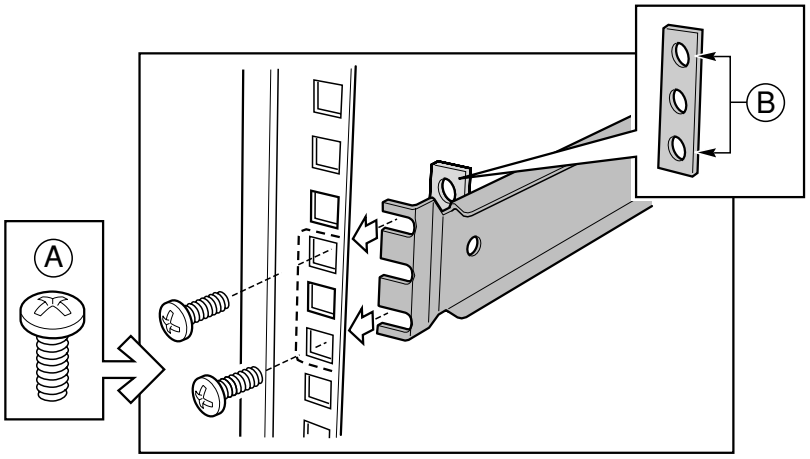
Figure 22. Attaching an Inside Rail to the Chassis



Attach Rail Brackets to Posts

1. Using two screws (Figure 23, A) with washers, attach one nut bar (B) to the inside of the rack post. Do not completely tighten the screws—leave them loose enough to allow insertion of the brackets in the next step.
2. Insert the slotted foot of a rail bracket between each nut bar and post.
3. Align the face of the bracket foot with the inside edge of the rack post and firmly tighten the screws.
4. Repeat steps 1 to 3 above to install the other 3 brackets (2 Front and 2 Back total). Ensure all brackets are at the same height on the rack.

Figure 23. Attaching a Rail Bracket to a Rack Post

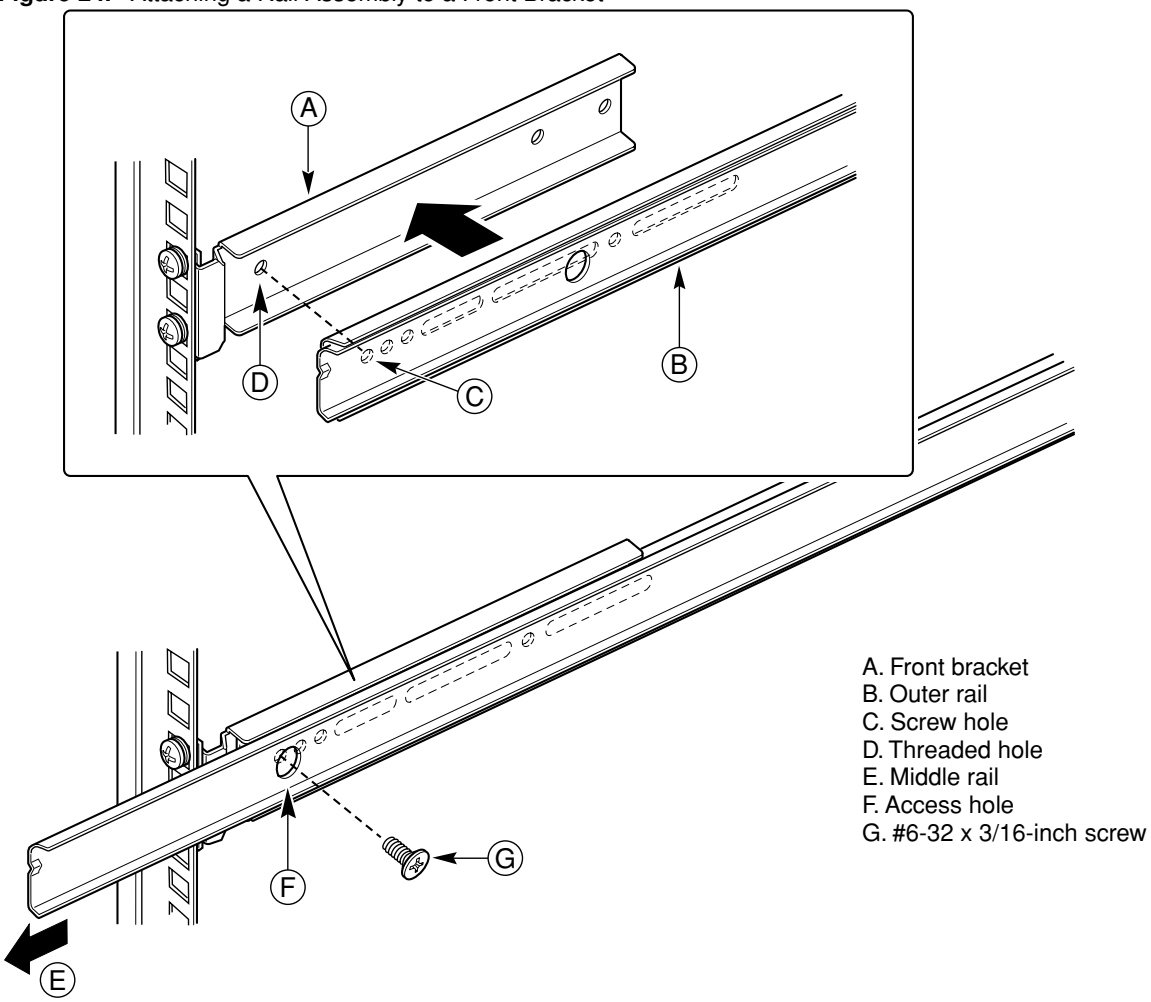


A. #10-32 x ∫-inch screw with washer
B. Nut bar

Attach a Rail Assembly to a Front Bracket

1. Position a rail assembly (middle and outer rails) with its black plastic end caps toward the rear of the rack and its outer rail closest to the brackets.
2. Align the front screw hole (Figure 24, C) in the outer rail (B) with the threaded hole (D) nearest the front of the front bracket (A) and fit the rail assembly into the front and rear brackets.
3. Slide the middle rail toward the front (E) until the access hole (F) in the middle rail is aligned with the front screw hole (C) in the outer rail.
4. Insert screw (G) through the access hole and loosely attach the outer rail to the front bracket.
5. In a similar manner to steps 2 through 4, install a screw through a slot in the outer rail and into the rear-most threaded hole in the front bracket. Firmly tighten this screw.
6. Firmly tighten the front screw (G) installed loosely in step 4.
7. In the same manner, attach the other rail assembly to the other side.

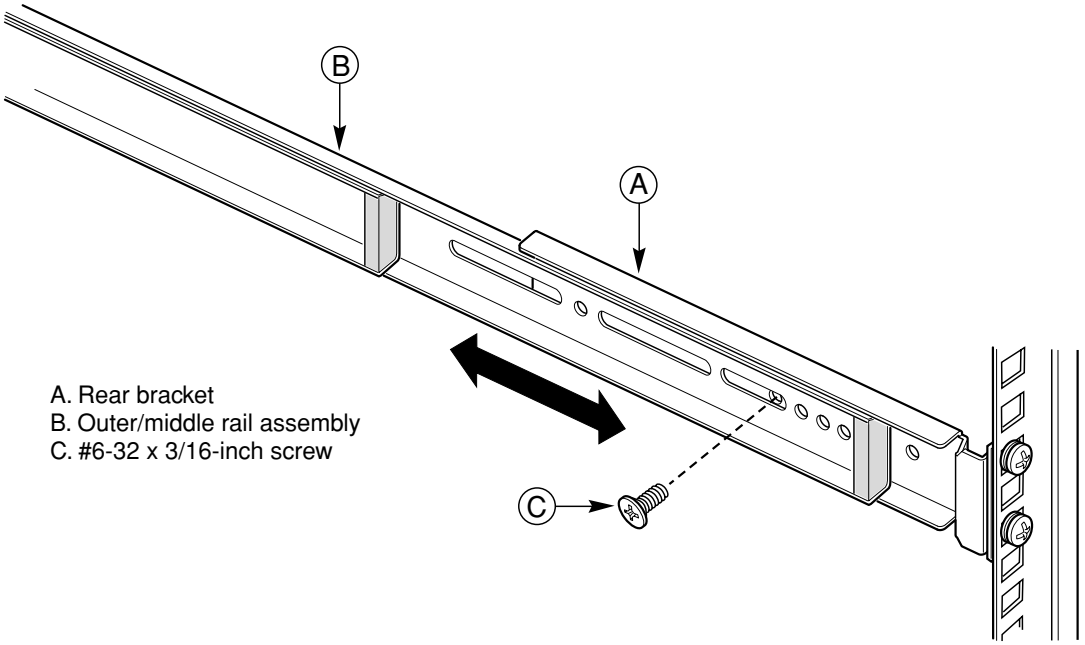
Figure 24. Attaching a Rail Assembly to a Front Bracket



Attach a Rail Assembly to a Rear Bracket

1. Slide the middle rail toward the front (Figure 25) until the rear bracket area is accessible.
2. Attach the rear end of the outer rail (B) to the rear bracket (A) with at least one screw (C). If possible, attach at two places.
3. In the same manner, attach the other rail assembly to the other side.

Figure 25. Attaching a Rail Assembly to a Rear Bracket

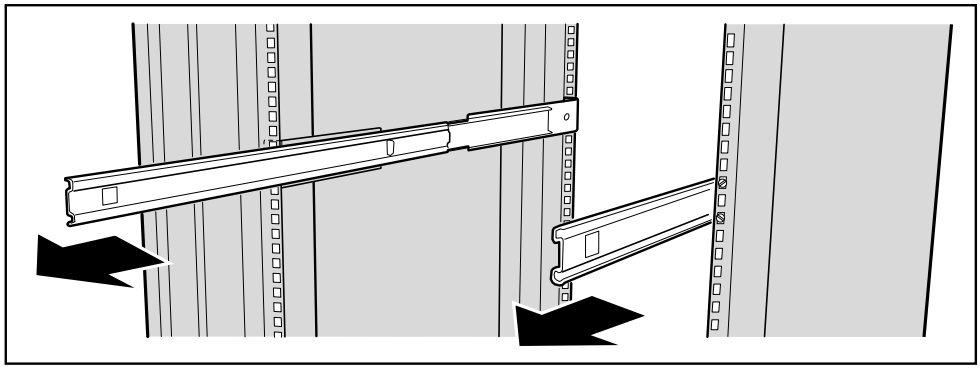


Install the Chassis on the Rails

1. Fully extend the left and right rails (Figure 26) until the extension locks have engaged and the rails will not push back in. The rail system is now ready to receive the chassis.

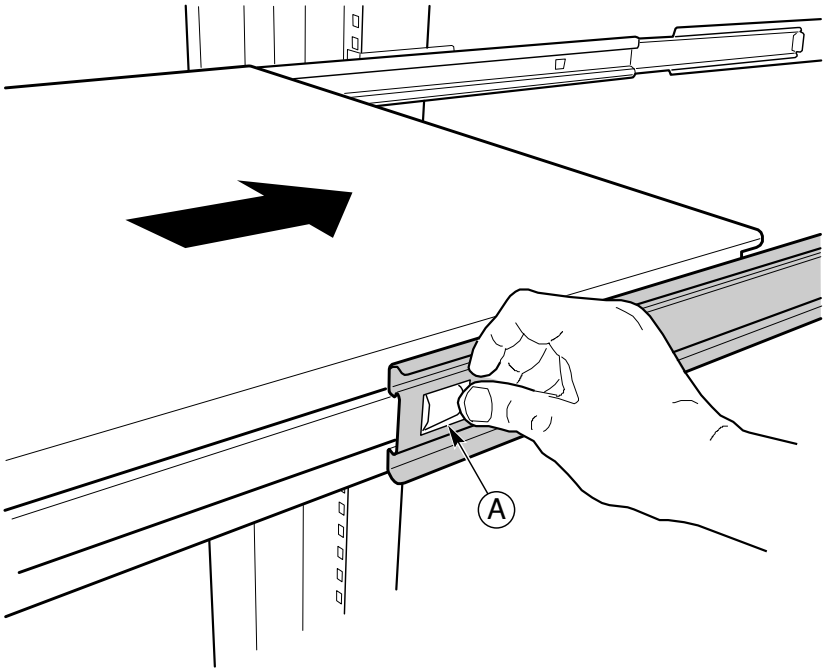
Caution: Lifting and placing the chassis in the rails is a two-person job. If needed, use an appropriate lifting device. A fully loaded server weighs approximately 11.8 kg (26 lbs).

Figure 26. Rails Fully Extended



2. With the chassis front facing you, lift the chassis and carefully insert the rails attached to the chassis in the extended rails.
3. Slide the chassis toward the rear of the cabinet until the rails lock together.
4. Depress and hold down the finger tabs (Figure 27, A) on both extension locks while sliding the chassis toward the rear.

Figure 27. Releasing the Extension Locks



A. Finger tab on extension lock

5. Slide the chassis all the way into the rack until the chassis handles are against the front posts.

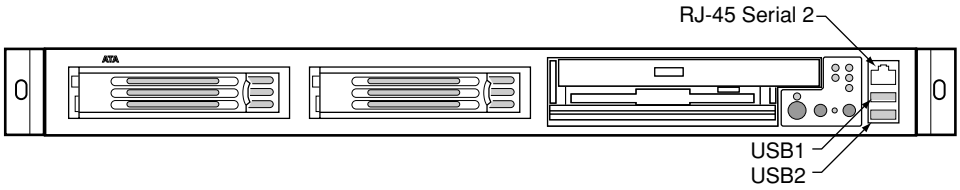
Connecting the Cables

The Sun Cobalt LX50 server has a number of connectors. Some are on the front panel; others are located on the rear panel. This section summarizes the usage of each connector.

Front Panel Connectors

To access the front panel connectors when a front bezel is installed, grasp the bezel on the right side at the finger hole and gently pull it towards you, unhinging it at the left until it unsnaps from the chassis. Figure 28 shows the front of the server with the bezel removed.

Figure 28. Front Panel (bezel removed)



There are three connectors on the right side of the front panel:

- Front RJ-45 Serial 2 connector (top connector, ttyS1)
- USB 1 connector (middle connector)
- USB 2 connector (bottom connector)

The BIOS is set by default to redirect BIOS, bootup, and Linux Loader (LILO) messages to the serial port. The default communications settings for the serial console ports on the server are:

- 9600 bps
- 8 data bits
- 1 stop bit
- No parity
- No flow control

Front RJ-45 Serial 2 Connector

The Sun Cobalt LX50 server provides two common external RJ-45 serial ports, one located on the back of the system and the other located on the front panel.

The use of RJ-45 connectors for the serial interface is widely becoming a standard for use in the high-density server market. The intended usage model for the RJ-45 serial connector on the back of the system is for use as an interface to a serial port concentrator allowing for remote access to the server's Emergency Management Port (EMP). The serial connector on the front panel (ttyS1) can be used as a direct connect to the EMP, allowing for PC-to-PC serial communications to perform diagnostics on a server mounted in a rack environment.

Table 7. RJ-45 Connector Usage

Mode	Front	Back
Modem	No	Yes
Serial Concentrator	No	Yes
PC-to-PC communication	Yes	Yes

Both front and back serial connectors cannot be used at the same time. Logic on the server Main Board determines which connector is in use.

If the front serial port is in use, the rear panel serial port is automatically disabled. When the front-panel serial port connection is removed, the system automatically re-enables the rear panel serial port.

The front RJ-45 usage model is intended for PC-to-PC serial communication only. It shares common serial signals with the RJ-45 serial port, located on the back of the system. However, it does not support a modem, as there is no RI signal. Instead it sets pin 5 to ground, causing logic on the Main Board to disable the rear serial port when a cable or adapter is plugged into it.

For a direct connect or PC-to-PC serial communication, either an 8-pin RJ-45-to-DB9 adapter or a cable supporting both DB-9 and RJ-45 connectors is necessary. Table 8 provides a pinout for the front RJ-45-to-DB9 adapter cable.

Table 8. Front RJ-45 Serial 2 Port Adapter Pinout

Signal Name	RJ-45	DB9
No connect	N/A	1
SIN	6	2
SOUT	3	3
DTR	2	4
GND	4	5 [a]
DSR	7	6
RTS	1	7
CTS	8	8
RI	5	5 [1]
No connect		9

a. The use of a modem on this port cannot be supported due to the lack of the RI signal.

Note: Sun Microsystems provides an optional RJ-45 to DB9 Serial Adapter Kit (order number X5026A) for purchase. It contains three RJ-45-to-DB9 adapters. They can be plugged into the front or rear EMP connectors. The cables are:

- DSR Peripherals cable (for rear panel connector data set ready (DSR) peripherals)
- DCD Modem cable (for rear panel connector data carrier detect (DCD) modem)
- Front EMP cable (for front Emergency Management Port)

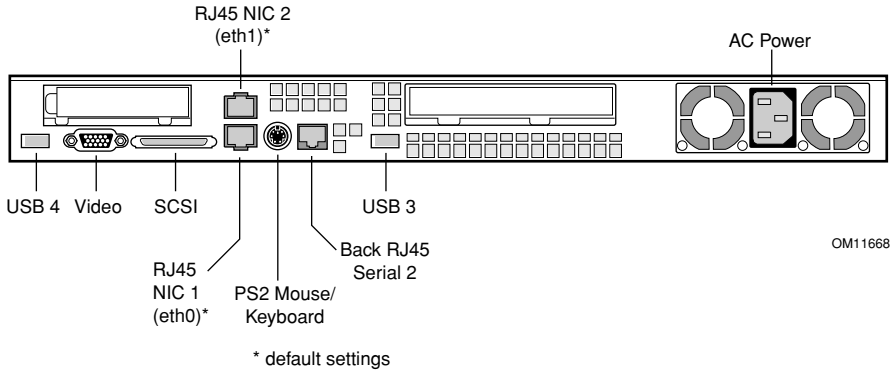
USB Connectors

The USB 1 and USB 2 connectors provide USB functionality. All ports function with identical capabilities and with the same bandwidth. The industry-standard USB v1.1 specification defines the external connectors.

Note: The USB ports are disabled until Linux is booted and the USB drivers are installed. A PS/2 keyboard is required if a keyboard is necessary for initial bootup and configuration.

Rear Panel Connectors

Figure 29. Rear Panel



There are 9 connectors on the rear panel:

- RJ-45 NIC 1 connector
- RJ-45 NIC 2 connector
- AC Power connector
- USB 3 connector
- Back RJ-45 Serial 2 connector (ttyS1)
- P/S2 mouse/keyboard connector
- SCSI connector
- Video connector
- USB 4 connector

RJ-45 NIC 1 and NIC 2 Connectors

The server supports two 10BASE-T/100BASE-TX Network Interface Controllers (NICs). The NIC interfaces support the following features:

- Integrated IEEE 802.3 10BASE-T and 100BASE-TX compatible PHY
- IEEE 820.3u AutoNegotiation support
- Full-duplex support at both 10 Mbps and 100 Mbps operation
- Both ports are PXE Boot capable
- Low power +3.3 V device (Wake-On-LAN support on both rear panel Ethernet ports)

AC Power Connector

This connector is where you plug in the AC power cord (a power cord is supplied appropriate to your geographic region).

Warning: Do not attempt to modify or use the supplied AC power cord if it is not the exact type required.

The power supply cord is the main disconnect to AC power. The socket outlet must be installed near the equipment and readily accessible.

Rear Panel RJ-45 Serial 2 Connector

The intended use for the RJ-45 serial port, located in the back of the system, is for remote EMP communication by connecting the port to a serial terminal concentrator. With the optional RJ-45 to DB9 Serial Adapter Kit, the serial port can also be configured for use with a modem. Table 4, "Replaceable Components," on page 1-4 gives ordering information for the adapter kit. The rear serial port is traditionally referred to as COM2 (DOS, Windows), or ttyS1 (Linux).

Serial terminal concentrators use one of two serial communication standards. Some terminal concentrators require a Data Carrier Detect (DCD) signal, while others require a Data Set Ready (DSR) signal. The server Main Board can be configured to support either of these configurations by setting the appropriate jumper on the jumper block, located directly behind the RJ-45 serial connector on the Main Board.

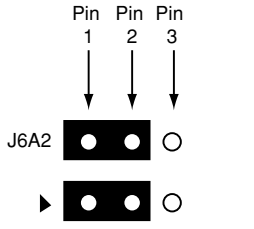
The back RJ-45 Serial 2 port can support any standard serial device. An RJ-45 connector was selected to allow for direct support for serial port concentrators, which typically use RJ-45 connectors and are widely used in the high-density server market to access the server management features of the server.

To give support for either of two serial configuration standards used by serial port concentrators, the J6A2 jumper block, located on the Main Board inside the server directly behind the rear RJ-45 serial port, must be jumpered appropriately according to which standard is desired.

Note: By default, as configured in the factory, the server Main Board has the back RJ-45 serial port configured to support a DSR signal that is compatible with industry-standard serial concentrators. To change the configuration, the J6A2 jumper block must be accessed (the top cover must be removed to access this jumper block).

For serial devices that require a DSR signal (default), the J6A2 jumper block must be configured as follows: both jumpers are in position 1 and 2. Pin 1 is denoted by an arrow directly next to the jumper block.

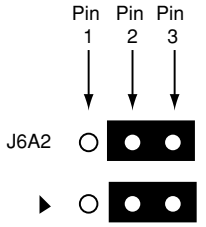
Figure 30. J6A2 Jumper Block Configured for DSR Signal (pin 7 connected to DSR)



J6A2 Jumper Block
(viewed from front of LX50 server)

For serial devices that require a DCD signal, the J6A2 jumper block must be configured as follows: Both jumpers are in positions 2 and 3. Pin 1 is denoted by an arrow directly next to the jumper block. The following diagram provides the J6A2 jumper block pinout for this configuration.

Figure 31. J6A2 Jumper Block Configured for DCD Signal (pin 7 connected to DCD)



J6A2 Jumper Block
(viewed from front of LX50 server)

For those serial devices that require a DB9 type of serial connector, an 8-pin RJ-45-to-DB9 adapter must be used. Table 9 provides the pinout required for the adapter to provide RS232 support.

Table 9. Back Serial 2 Port Adapter Pinout

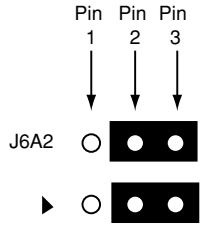
RJ-45	Signal	Abbr.	DB9
1	Request to Send	RTS	7
2	Data Terminal Ready	DTR	4
3	Transmitted Data	TD	3
4	Signal Ground	SGND	5
5	Ring Indicator	RI	9
6	Received Data	RD	2
7	Data Carrier Detect/Data Set Ready	DCD/DSR	1 or 6[a]
8	Clear To Send	CTS	8

a. The RJ-45-to-DB9 adapter used should match both the signal requirements of the serial device and the external RJ-45 serial port. The external RJ-45 serial port provides all standard serial port signals, however having only 8 pins, Pin 7 can be manually configured to support either a DCD or DSR signal by setting the J6A2 jumper block appropriately.

On the Sun Cobalt LX50 server, the adapters used for the back connector cannot be used with the front connector, as the pinout for the RJ-45 ports are different.

As an example, when using an external modem to access the server management features of the server Main Board, you must first set the J6A2 jumper to support a DCD signal and make or choose the appropriate RJ-45-to-DB9 adapter.

Figure 32. J6A2 Jumper Block Configured for DCD Signal (pin 7 connected to DCD)



J6A2 Jumper Block
(viewed from front of LX50 server)

If you choose to develop your own RJ-45-to-DB9 adapter, see Table 9 for the appropriate pinout configuration.

Note:

- Only the back Serial 2 port has modem support
- Sun Microsystems provides an optional RJ-45 to DB9 Serial Adapter Kit (order number X5026A) that can be purchased that contains all three RJ-45-to-DB9 adapters:
  - DSR Peripherals cable (for rear panel data set ready (DSR) peripherals
  - DCD Modem cable (for rear panel data carrier detect (DCD) modem)
  - Front EMP cable (for front panel Emergency Management Port)

USB 3 and USB 4 Connectors

The USB 3 and USB 4 connectors provide USB functionality. All ports function with identical capabilities and with the same bandwidth. The industry-standard USB v1.1 specification defines the external connectors.

Note: The USB ports are disabled until Linux is booted and the USB drivers are installed. A PS/2 keyboard is required if a keyboard is necessary for initial bootup and configuration.

PS/2 Keyboard/Mouse Connector

A single PS/2 port located on the back panel is provided to support a standard keyboard or mouse. A PS/2 Y-cable adapter, included with the Sun Cobalt LX50 server, allows simultaneous use of the PS/2 keyboard and mouse. Such cable adapters are also commonly available at most computer stores.

Note: The USB ports are disabled until Linux is booted and the USB drivers are installed. A PS/2 keyboard is required if a keyboard is necessary for initial bootup and configuration.

SCSI Connector

The Sun Cobalt LX50 server includes an onboard Adaptec dual channel Ultra-160 SCSI controller capable of controlling up to three internally mounted SCSI drives and 15 external SCSI drives at rates up to 160 MB/s. The onboard SCSI controller is connected to a SCSI backplane board inside the server using a 68-pin SCSI cable. The SCSI backplane provides connections for up to three internally mounted SCA LVDS SCSI drives with standard 80-pin SCA connectors. Channel B is used exclusively by internal drives while channel A is used for connecting to external SCSI devices by means of a rear panel high-density SCSI connector. The connector supports a standard high-density 68-pin connector. Use only shielded Ultra-160 LVDS rated cables for connection to external SCSI drives.

Video Connector

The Sun Cobalt LX50 server provides an ATI Rage XL PCI graphics accelerator, along with 8 MB of video SDRAM and support circuitry for an embedded SVGA video subsystem. The SVGA subsystem supports a variety of modes, up to 1600 x 1200 resolution in 8/16/24/32 bpp modes under 2D, and up to 1024 x 768 resolution in 8/16/24/32 bpp modes under 3D. It also supports both CRT and LCD monitors with up to 100 Hz vertical refresh rates. All of these capabilities depend on software support.

The server provides a standard 15-pin VGA connector and supports disabling of the on-board video through the BIOS Setup menu or when a plug-in video card is installed in any of the PCI slots.

Controls and Indicators

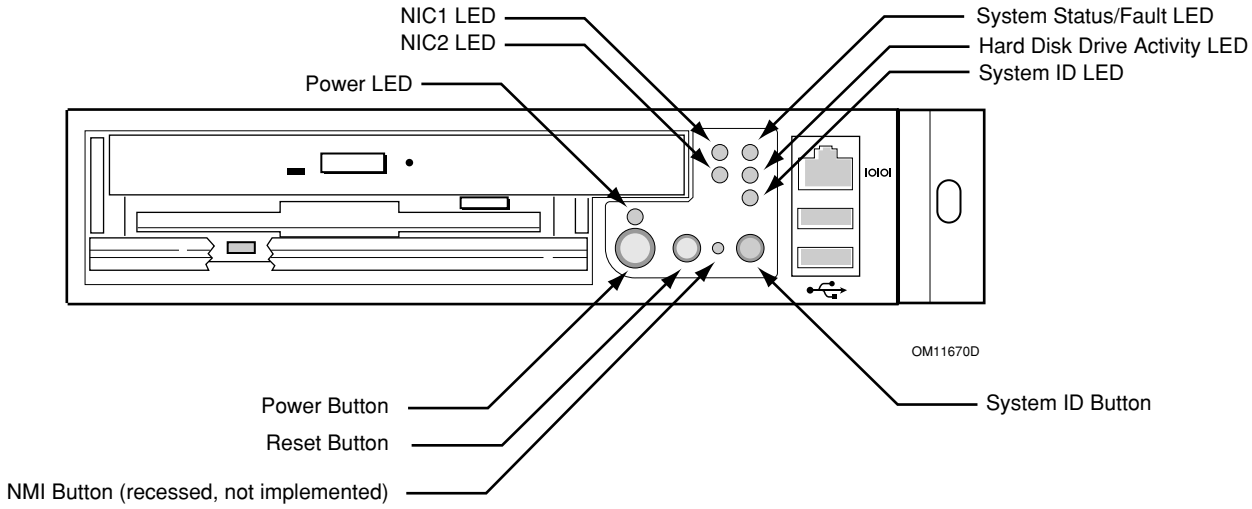
This chapter describes the control pushbuttons and LED indicators on the Sun Cobalt™ LX50 server. All of the descriptions in this chapter pertain to buttons and indicators that are usable and visible from the outside of the chassis. For information about the controls and indicators on the server Main Board, see the additional information contained in Chapter 6, "Troubleshooting the Server."

The pushbuttons and LEDs on the front and rear panels are described in the following sections.

Front Panel LEDs and Pushbuttons

The front panel contains the pushbuttons and LEDs shown in Figure 33. Note that the illustration has the bezel removed.

Figure 33. Front Panel Pushbuttons and LEDs (bezel removed)



LEDs

- Power LED (green). This LED is controlled by software. It flashes when the server is first powered up and changes to steady on when the server firmware has completed the power-up self-test (POST).
- NIC1 and NIC2 LEDs (green). These LEDs blink to reflect network data activity.
- System Status/Fault LED (green/amber). This LED can assume different states (green, amber, steady, blinking) to indicate critical, non-critical, or degraded server operation. See “Front-Panel System Status LED” on page 6-3 for more details regarding this LED.
- Hard Disk Drive Activity LED (green). The Drive Activity LED on the front panel is used to indicate drive activity from the onboard SCSI controller. The server Main Board also provides a header, giving access to this LED for add-in IDE or SCSI controllers.
- System ID LED (blue). The blue System Identification LED is used to help identify a system for servicing when it is installed within a high density rack or cabinet that is populated with several other similar systems. The System ID LED is illuminated when the system ID button, located on the front panel, is pressed. If activated by the front panel pushbutton, the LED remains on until the pushbutton is depressed again. The LED also illuminates when the server receives a remote System Identify command from a remote management console. In this case, the LED turns off after a timeout period. An additional blue System ID LED on the Main Board is visible through the rear panel. It mirrors the operation of the front panel LED.

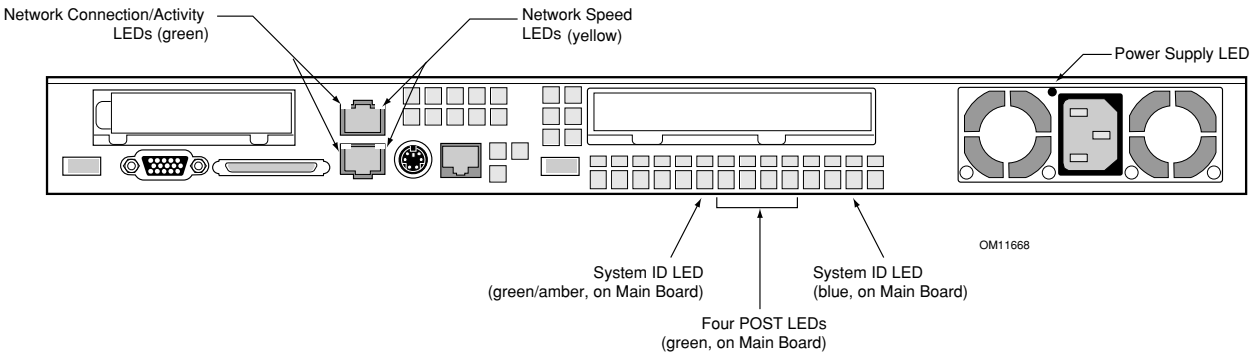
Pushbuttons

- Power/Sleep button. This pushbutton is used to toggle the system power on and off. This button is also used as a sleep button for operating systems that follow the ACPI specification. Sun Linux configures the power button to the instant off mode.
- Reset button. Depressing this pushbutton reboots and initializes the system.
- NMI button. Pushing this recessed pushbutton causes a non-maskable interrupt to occur; however, NMI event trapping is not implemented in Sun Linux 5.0.
- System ID button. This pushbutton toggles the state of the front panel ID LED and the server Main Board ID LED. The Main Board ID LED is visible through the rear of the chassis and allows you to locate a particular server from behind a rack of servers.

Rear Panel LEDs

The rear panel contains the LEDs shown in Figure 34.

Figure 34. Rear Panel LEDs



- Network Connection/Activity LEDs (green). The green LED, when illuminated, indicates a valid network connection. It also indicates, when blinking, that there is transmit or receive activity.
- Network Speed LEDs (yellow). The yellow LED indicates 100 Mbps operation when lit and 10 Mbps operation when off.
- POST LEDs (multi-color). To help diagnose power-on self test (POST) failures, a set of four bi-color diagnostic LEDs is located on the back edge of the server Main Board. These LEDs are visible through holes in the rear panel. Each of the four LEDs can have one of four states: Off, Green, Red, or Amber. For detailed information on these LEDs, see “POST LED Indicators” on page 6-12.
- System ID LED (blue). This LED is located on the Main Board and is visible through holes in the rear panel. It can provide a mechanism for identifying one system out of a group of identical systems. This can be particularly useful if the server is used in a rack-mount chassis in a high-density, multiple-system application. The LED is activated by depressing the front panel System ID pushbutton or if the server receives a remote System Identify command from a remote management console. If activated by the front panel pushbutton, the LED remains on until the pushbutton is depressed again. When the LED illuminates due to a remote System Identify command, the LED turns off after a timeout period. An additional blue System ID LED is located on the front panel that mirrors the operation of the rear Main Board LED.
- Power Supply LED (green/amber). This is a bi-color LED that can be on, off, green, amber, or blinking, or combination thereof. See “Rear Panel Power Supply Status LED” on page 6-4 for more detailed information.

Powering On and Configuring the Server

This chapter explains how to use the Power On switch to apply power to the server, boot to the Sun Linux 5.0 operating system, use the serial console, update system software, and validate the operation of the Sun Cobalt™ LX50 server. The chapter contains these sections:

Setting the Jumper Positions

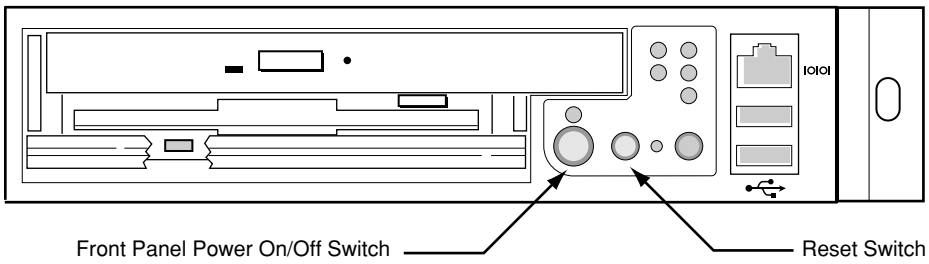
Two jumpers on the Main Board are preset by default to the positions that satisfy most serial port configurations. They are located at the rear of the server, on the Main Board, next to the rear RJ-45 serial 2 connector. The two jumpers are on the jumper block labeled J6A2. The top cover of the server must be removed to access these jumpers. If you need to change these jumpers from their factory default positions, see "Rear Panel RJ-45 Serial 2 Connector" on page 2-30.

Powering On

Caution: The power switch on the front of the server is an On/Off switch, but it does not isolate the equipment from the AC power being supplied through the AC power cord.

The location of the switch is shown in Figure 35.

Figure 35. Power and Reset Switches on the Front Panel



Pushing the switch sends a signal to monitoring circuitry inside the server. The switch does not directly control high-voltage AC; it controls only low-voltage signals. When the monitoring circuitry detects that the button has been depressed, it activates the power supply and powers up the server. Likewise, when the server is powered up, pushing the switch powers the server down.

The main method for isolating the server from all high voltage is to physically remove the AC power cord. If the power cord is not removed, the only other way to isolate the server from high voltage is to open all external circuit breakers that supply AC voltage to the equipment.

Caution: As shipped, the Sun Cobalt LX50 server does not have Advanced Configuration and Power (ACPI) enabled in the Sun Linux™ 5.0 kernel and, as a result, the front panel power switch operates as a normal power switch. In this configuration, press the switch once and power comes on, press again and the power goes off. It is recommended that you use the standard Sun Linux 5.0 shutdown command before you power down the system using the switch. Activate the front panel switch to remove power only when Linux has completed the shutdown process and has halted.

Should you elect to use an ACPI-enabled Linux kernel and run the ACPI daemon (acpid), the behavior of the front panel switch will change to support the standard "soft-off" capability. That is, when the server is on and the power switch is pressed, the OS is notified and begins a graceful shutdown. Additionally, with ACPI enabled and the server on, pressing the power button for longer than four seconds forces an immediate (non-graceful) shutdown.

Clearing CMOS

It may be necessary to clear CMOS memory in order to restore the default BIOS passwords required to boot the server (user) or access setup functions (supervisor), as well as the default BIOS settings. To clear CMOS, follow these steps:

1. Power down the server
2. Push and hold the reset button for at least four seconds
3. While continuing to depress the reset button, push the server power button to power up the server
4. After power has been applied, release the reset button

Booting Up

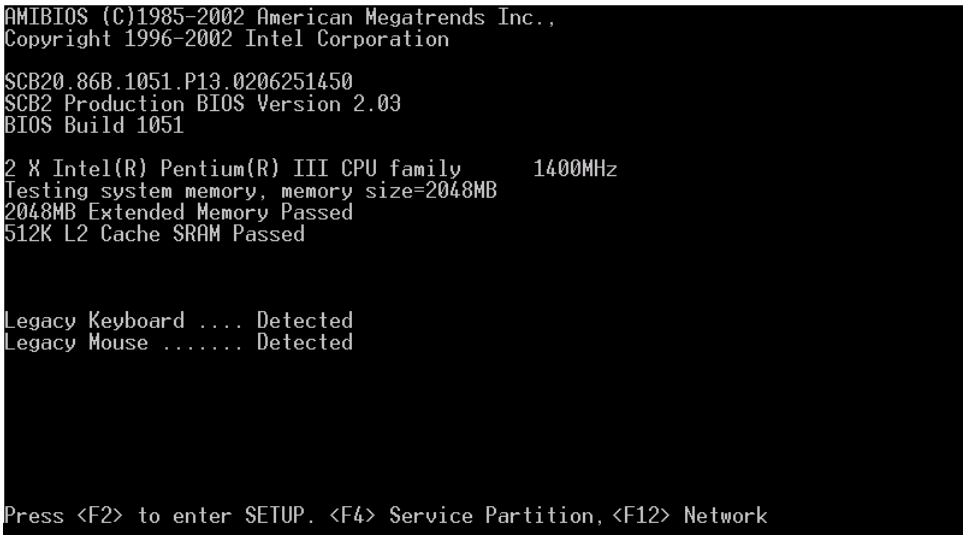
As soon as power is applied to the server, the bootup process begins. Boot messages are sent to either a monitor attached to the video port, or to a serial console attached to the front or rear RJ-45 serial console ports.

The server is configured by default to initially send BIOS and kernel messages to both the serial console and the video port. However, when the boot process reaches the Linux Loader (LILO) point, the messages and screens are sent only to the video port. After bootup is finished, the configuration can be changed to send all messages to the serial console (see "Configuring an External Serial Console" on page 4-7).

Boot Options

The first bootup screen is shown in Figure 36.

Figure 36. First BIOS Bootup Screen



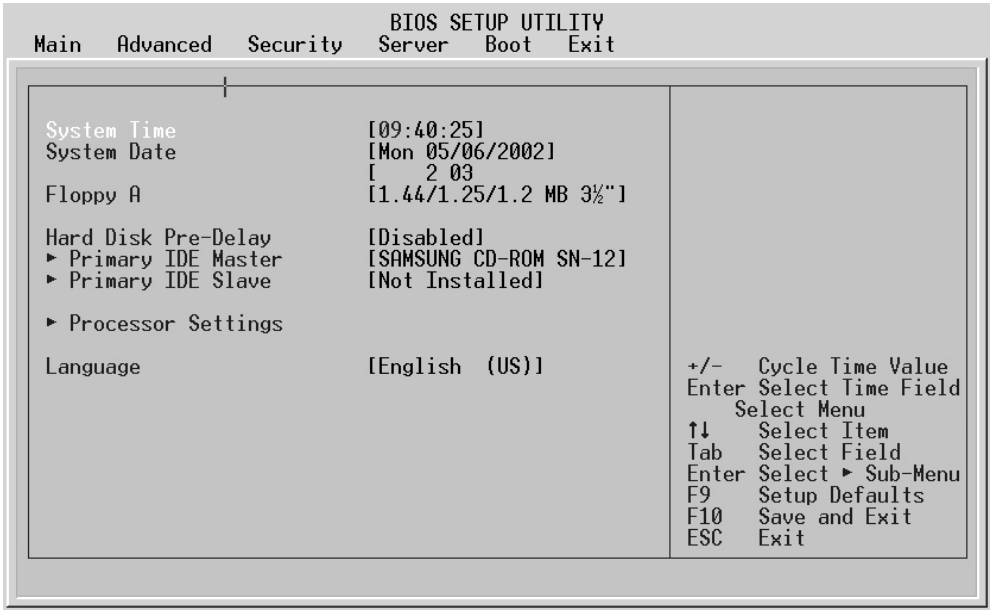
At the bottom of the screen, you are given the option to press the following function keys:

- F2 to enter the BIOS Setup Utility
- F4 for the Service Partition (a DOS partition allowing setup configuration and server testing)
- F12 to boot from the Network

BIOS Setup Utility <F2>

Press F2 to enter the BIOS Setup Utility. The main BIOS Setup Utility screen shown in Figure 37 appears.

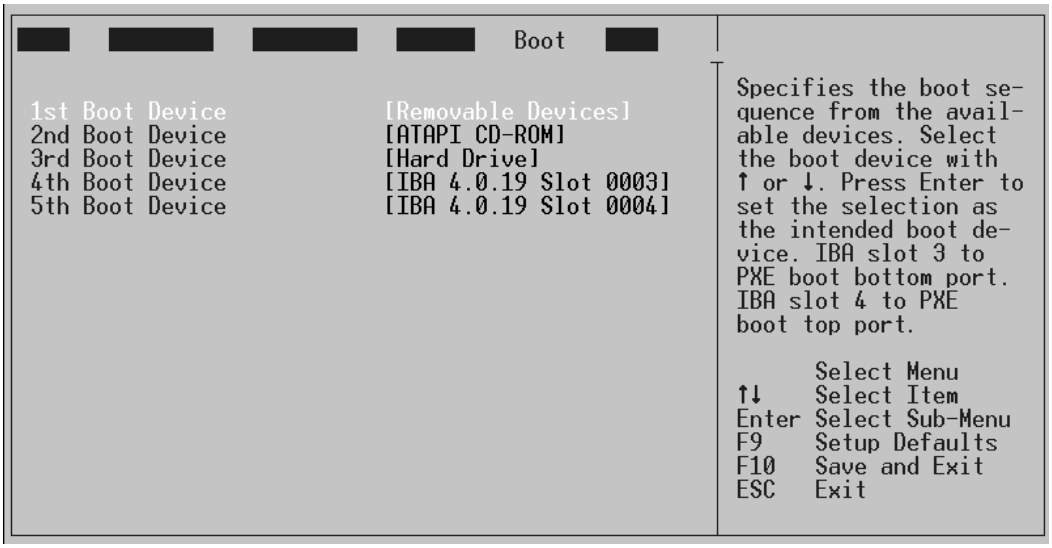
Figure 37. BIOS Setup Utility Main Screen



Caution: Changing the BIOS settings may cause undesirable effects, and in some cases may disable the server. Be very careful before changing the BIOS configuration.

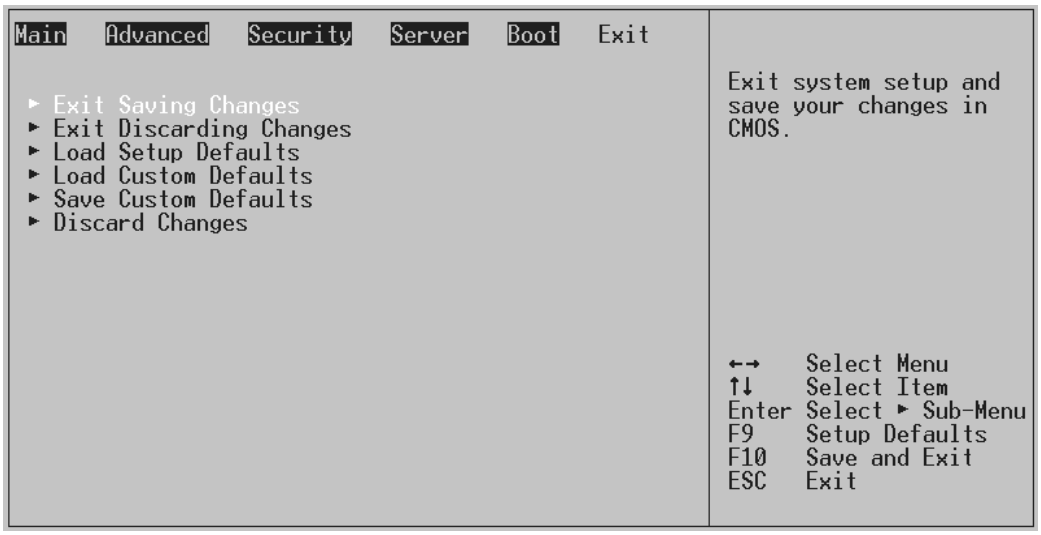
It is important to note the default boot sequence. The boot sequence is accessed by using the right arrow key to select the Boot menu item on the top of the BIOS screen, then pressing Enter. The boot sequence is then displayed. The default boot sequence is as shown in Figure 38. Use this screen to restore the boot sequence, if necessary.

Figure 38. Default Boot Sequence



You can always restore all of the default BIOS settings by scrolling to the Exit menu item along the top of the screen. The BIOS Setup screen then appears as shown in Figure 39.

Figure 39. BIOS Setup Utility Exit Screen



To restore all of the default settings, scroll to “Load Setup Defaults” and press Enter, then select Yes at the prompt and press Enter again. Now press F10 to save the settings and exit.

When you exit the BIOS setup utility, the bootup process continues.

Service Partition <F4>

Press F4 to boot to the service partition. This partition allows you to set configuration parameters and run diagnostics. See “Using the Service Partition Menu” on page 4-9 for more details.

When you are finished using the service partition, you must depress the Ctrl-Alt-Delete keys simultaneously to reboot.

Network <F12>

Press F12 to boot from the network. The server software then looks for a valid boot file name on the network. If it finds such a file name, it boots from the network. If it cannot find a valid file name, it gives up and continues to boot from the hard disk. Figure 40 is an example of how the screen appears when booting from the network fails.

Figure 40. Network Boot Failed Screen

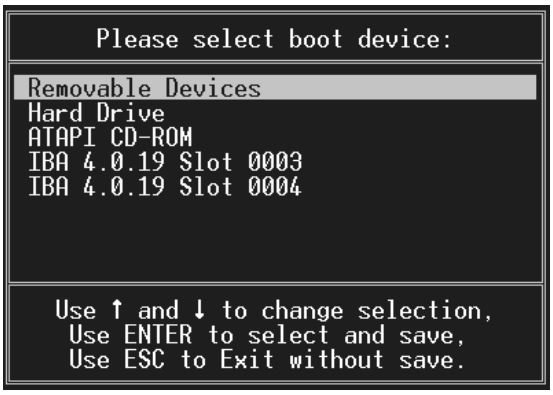
PXE (Pre-boot Execution Environment) is a method by which the server can booted from a remote server. This allows the system to boot without any knowledge of the Operating System on the server. The PXE environment uses DHCP to obtain network addresses. PXE is primarily used for loading operating systems, configuring the system, or burn-in type testing. PXE booting will only work if a properly configured PXE server is available.

Choose Boot Device <ESC>

Press the Esc key to go to the boot device selection menu. This menu, shown in Figure 41, allows you to select the device from which the system will boot. To select a boot device, scroll to the desired device and press Enter; otherwise, press Esc to exit without changing the boot device.

Note: When you select a boot device with the menu shown in Figure 41, it only affects the current boot. Subsequent boots revert to the device stored in the BIOS default settings.

Figure 41. Boot Device Selection Menu.



Linux Loader (LILO) Menu Options

The bootup process eventually takes you to the Sun Linux loader screen. The Sun Cobalt LX50 server uses the standard LILO boot loader. You initially have four options:

- linux
- linux-serial
- linux-up [1]
- linux-up-serial[1]

In all cases, the serial ports on the front and rear panels are operational but their modes change. When you choose any of the serial boot options (linux-serial or linux-up serial), the serial port (ttyS1) becomes the default console device. The standard keyboard/mouse/VGA port becomes just a standard tty device. Conversely, when you choose any of the non-serial options (linux or linux-up), the standard Linux console is the keyboard/mouse/VGA port and the serial port becomes a standard Linux login terminal.

If you do nothing, the default option (linux) is automatically selected after about five seconds. This option is also selected if you press Enter before the five seconds is up. You may also manually select one of the options. To do this, press the Tab key. Pressing Tab brings up the following prompt:

```
boot:
```

You may now type any of the options after the prompt, for example:

`boot: linux`, or

`boot: linux-serial`, or

`boot: linux-up`, or

`boot: linux-up-serial`

After you make your selection, Linux continues to boot.

Initialization Sequence

At this point, you can do the following:

- Set Up Hardware Devices
- Log On and Create a Password (the default login is `root` and the default password is `admin`)
- Reconfigure the Console
- Configure X
- Configure Serial
- Configure Video
- Configure Default Services
- Configure New Services
- Set Up Linux Applications
- Set Up Sun Linux Applications

Please refer to the *Sun Linux 5.0 User Guide* for more details.

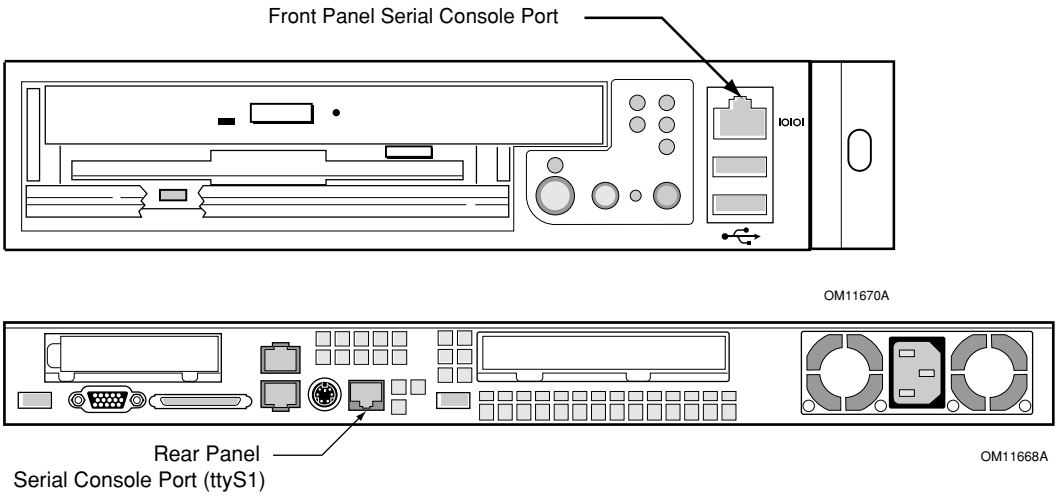
---

1. linux-up is Linux uniprocessor, and can be run on a dual-processor server. Linux runs faster if you have a single CPU and you choose one of the “up” options.

Configuring an External Serial Console

There are two RJ-45 serial console ports on the Sun Cobalt LX50 server, one on the front panel and one on the rear panel, as shown in Figure 42. You can direct boot messages to a serial console (for example, a laptop running HyperTerminal).

Figure 42. Front- and Rear-Panel Serial Console Ports



The default communications settings for the serial console ports on the server are:

- 9600 bps
- 8 data bits
- 1 stop bit
- No parity
- No flow control

Note: When Linux starts communicating over the serial port, it requires hardware flow control to be enabled.

You can connect to the port if you have an adapter cable that has an RJ-45 connector at one end and a DB9 connector at the other, wired in accordance with Table 8, "Front RJ-45 Serial 2 Port Adapter Pinout," on page 2-28 of Chapter 2, "Installing the Server in a Rack." You can then connect the COM1 port of a PC or laptop to the serial console using the adapter cable and use HyperTerminal (or a similar application) to communicate with the server.

An ANSI 500 terminal emulator is needed to have the display appear properly during BIOS setup and when using the diagnostic CD or Service Partition tools.

Only one of the serial console ports can be used at a time. In Chapter 2, "Installing the Server in a Rack," see "Front RJ-45 Serial 2 Connector" on page 2-27, and "Rear Panel RJ-45 Serial 2 Connector" on page 2-30 for details on how their ports are configured.

The intended usage model for the RJ-45 serial connector on the back of the server is for use as an interface to a serial port concentrator, allowing for remote access to the server's Emergency Management Port (EMP). The serial connector on the front panel can be used as a direct connect to the EMP, allowing for PC-to-PC serial communications to diagnostics on a server mounted in a rack environment.

The server is initially configured to send all the initial BIOS and kernel bootup messages to both the serial console and the VGA port.

When the boot process gets to the Linux loader, the boot screen information is sent both to the VGA and serial ports, and you are presented with the following choices:

- linux
- linux-up
- linux-serial
- linux-up-serial

To direct all of the messages to the serial console, use the Tab key and choose one of the serial options.

Note: The serial port is enabled for all boot options, but the standard Linux console device changes, depending on which boot option is selected (see "Linux Loader (LILO) Menu Options" on page 4-6 for more details).

Using the Service Partition Menu

When you press F4 at the initial bootup screen, the Service Partition Menu appears (see Figure 43).

Figure 43. Service Partition Menu

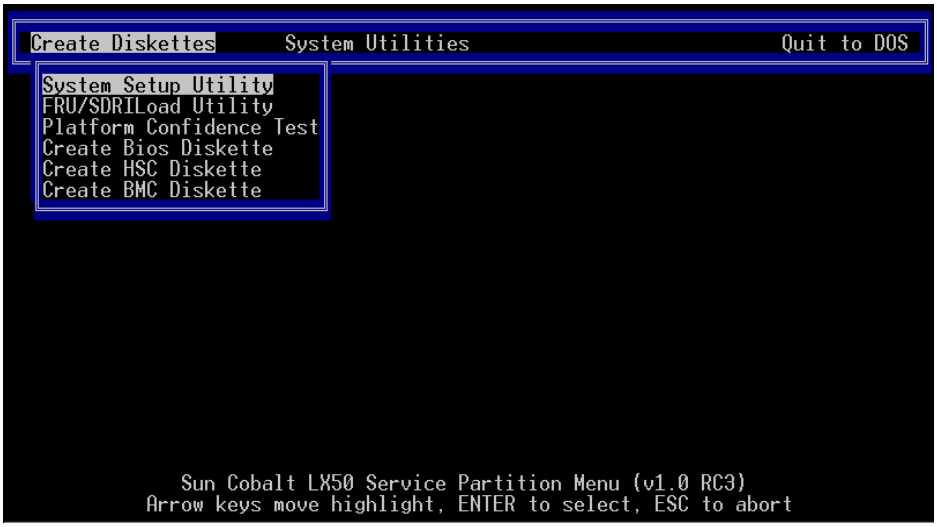
There are three main menu items across the top of this screen:

- Create Diskettes
- System Utilities
- Quit to DOS

Create Diskettes

Pressing Enter with the Create Diskettes menu item highlighted brings up the submenu shown in Figure 44.

Figure 44. Create Diskettes Submenu



You can use this submenu to create various types of standalone diskettes that you can use to boot servers and run particular tests, utilities, or Flash the BIOS instead of using the service partition menu.

The following disks can be created:

- System Setup Utility: choosing this option creates two diskettes that allow you to run the System Setup Utility (SSU) in the same way that you run it from the service partition or from the diagnostic CD. With the two diskette set, you can perform the functions described in “Run System Setup Utility” on page 4-12.
- FRU/SDR Load Utility: choosing this option creates one diskette that allows you to run the FRU/SDR Load Utility in the same way that you run it from the service partition or from the diagnostic CD. With the diskette, you can perform the functions described in “Run Field Replaceable Unit/System Data Record (FRU/SDR) Update2” on page 4-25
- Platform Confidence Test: choosing this option creates one diskette that allows you to run the Platform Confidence Test in the same way that you run it from the service partition or from the diagnostic CD. With the diskette, you can perform the functions described in “Run System Diagnostic Test” on page 4-15
- Create BIOS Diskette: choosing this option creates one diskette. You may use this diskette to update the BIOS of any server.
- Create HSC Diskette: choosing this option creates one diskette that allows you to update the HSC firmware.
- Create BMC Diskette: choosing this option creates one diskette that allows you to update the BMC firmware

System Utilities

Pressing Enter with the System Utilities menu item highlighted brings up the submenu shown in Figure 45.

Figure 45. System Utilities Submenu

The following submenus are available:

- Run System Setup Utility
- Run System Diagnostic Test
- Run BMC Firmware Update
- Run HSC Firmware Update
- Run FRU/SDR Update
- Run BIOS Boot Block Update (reboot required)
- Run BIOS Update (reboot required)
- Reboot to Service Partition
- Reboot System

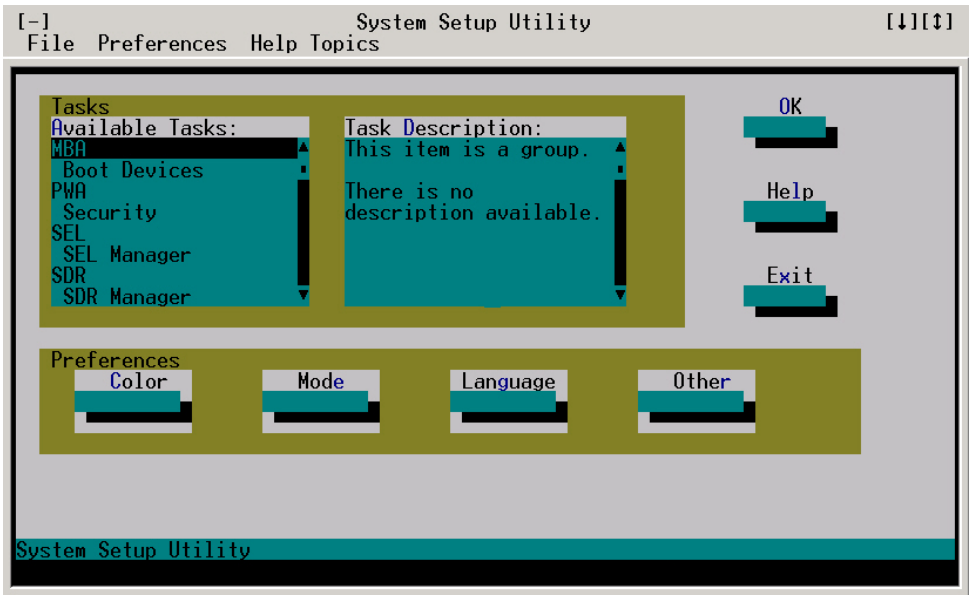
Run System Setup Utility

The built-in service partition on the hard disk of the Sun Cobalt LX50 server allows you to perform server management, configuration and validation testing. To bring up the service partition, reboot and press the <F4> function key when the first BIOS screen appears.

Note: Any configuration changes (CPU, memory, hard disk, add-in PCI cards and so forth) causes the server to revert to its factory-default state, regardless of how the server boot options have been set up using SSU or the BIOS setup.

Select Run System Setup Utility to run system setup. The System Setup Utility main window appears (see Figure 46).

Figure 46. SSU Main Window



The System Setup Utility (SSU) allows you to configure the following:

- User Preferences
- Boot devices
- Security

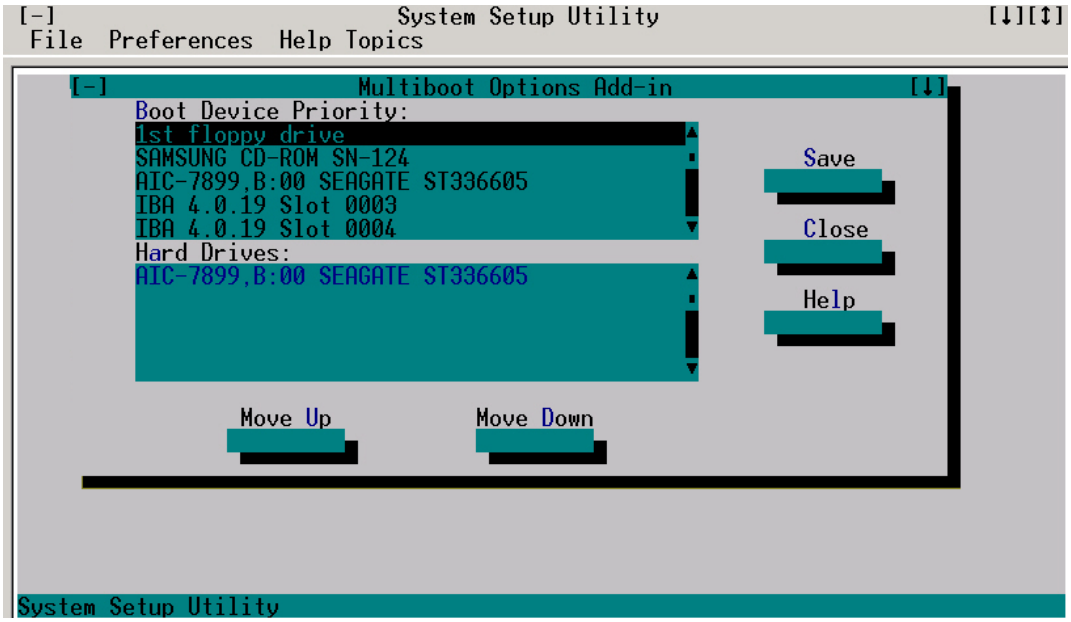
Setting User Preferences

Because the server supports running the SSU over a serial console, all of the menus work in text mode only.

Configuring Boot Devices

The Multiboot Add-in (MBA) feature of the SSU allows you to select the boot order for all bootable peripheral devices. To select the boot device priority, double-click the MBA Boot Devices menu item in the Available Tasks pane of the SSU main window. The Multiboot Options Add-in window appears (see Figure 47).

Figure 47. Multiboot Add-in Window



To change boot priorities, select a boot device and use the Move Down and Move Up buttons to move the device boot priority.

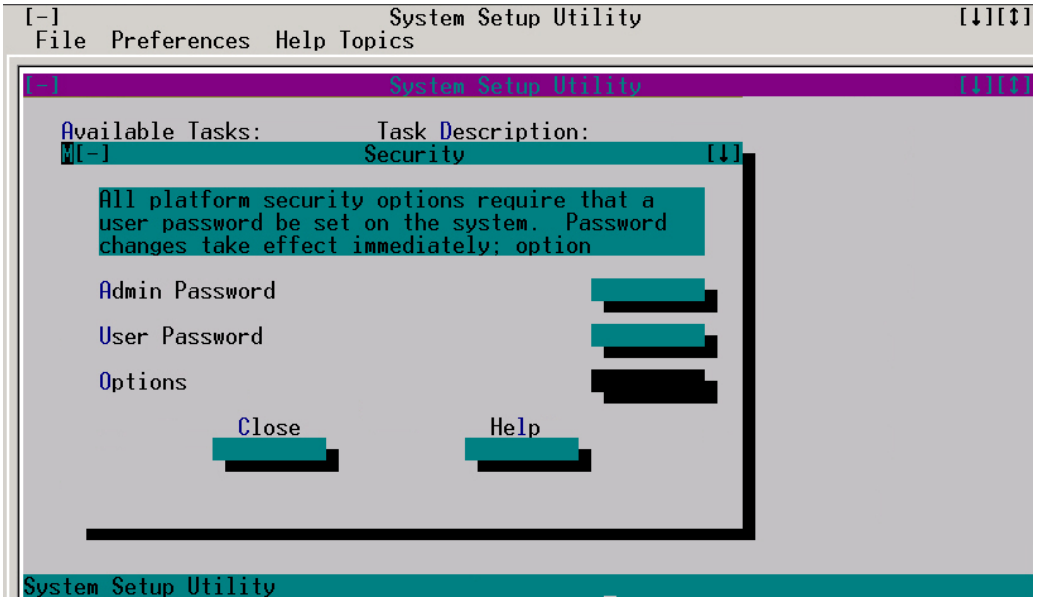
Note: This menu allows you to change the boot order without going into the BIOS setup.

Configuring Security

The Password Authorization feature of the SSU allow you to set BIOS passwords and other security options. To configure server security, double-click the PWA Security menu item in the Available Tasks pane of the SSU main window. The main Security window appears (see Figure 48).

Note: This menu allows you to change the security settings without going into the BIOS setup.

Figure 48. Security Main Window



Use the Admin Password, User Password, and Options buttons to configure the security options.

The System Setup Utility (SSU) allows you to manage the following:

- System Event Log (SEL)
- System Data Records (SDR)
- Field Replaceable Units (FRU)
- Platform Events

Managing the System Event Log

The server maintains a system event log in non-volatile memory. The log can be viewed and cleared using the SSU. To manage the log, double-click the SEL Manager menu item on the Available Tasks pane of the main SSU window. The System Event Log appears, and you can use the menu bar at the top of the log window to save the log, open a log, clear the log, or reload the log.

Managing the Sensor Data Records

The Sensor Data Record (SDR) Manager allows you to view the current sensor data for the system, save the SDR data to a file, and view SDR information previously saved to a file. The SDR data is saved in standard SDR format. To manage the SDR data, double-click the SDR Manager menu item on the Available Tasks pane of the main SSU window. The SDR Manager main window appears, and you can use the menu bar at the top of the window to manage SDR data.

Managing the Field Replaceable Units

The Field Replaceable Unit (FRU) Manager allows you to view the FRU information stored in the managed server. The FRU records contain information about the system components, such as manufacturer's name, product name, part number, version number and asset tags. This information may prove useful when troubleshooting faults in the server.

To manage the FRUs, double-click the FRU Manager menu item on the Available Tasks pane of the main SSU window. The FRU Manager main window appears, and you can use the menu bar at the top of the log window to manage FRU information.

Managing Platform Events

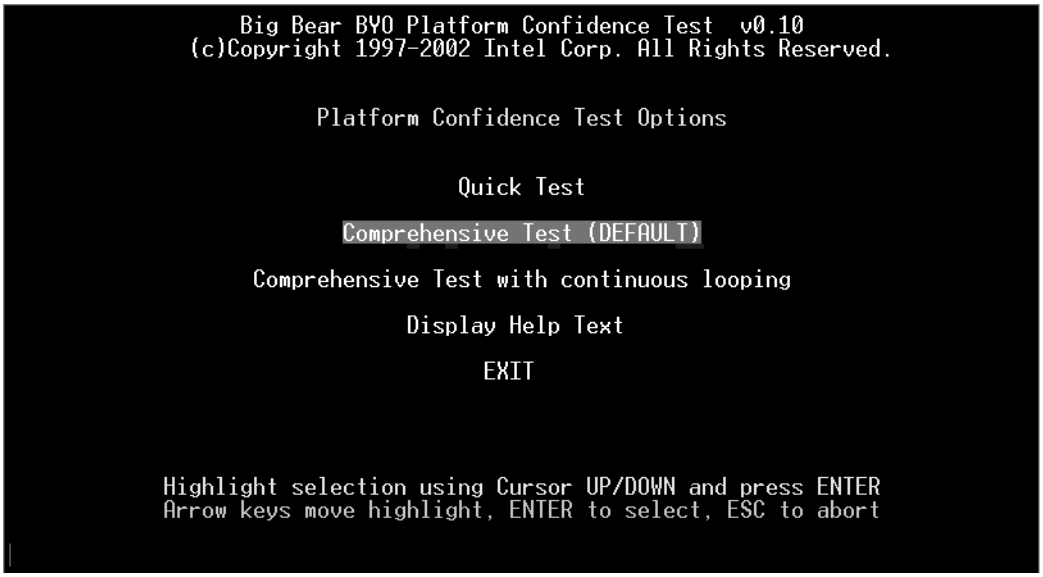
The Platform Event Manager (PEM) allows you to configure and manage Platform Event Paging (PEP), Baseboard[1] Management Controller Local Area Network (BMC-LAN) Configuration, and the Emergency Management Port (EMP).

To use PEM, double-click the Platform Event Manager menu item on the Available Tasks pane of the main SSU window. The Platform Event Manager main window appears. You can click on the buttons in this window to perform platform management.

Run System Diagnostic Test

Select Run System Diagnostic test to bring up the Platform Confidence Test menu (see Figure 49).

Figure 49. Platform Confidence Test Menu



You can use this menu to perform the following tests:

- Quick Test
- Comprehensive Test (DEFAULT)
- Comprehensive Test With Continuous Looping

All test results are saved in the `RESULT.LOG` file of the current directory, which is normally `C:\PCT`. This file is overwritten for each test.

1. Baseboard refers to the Main Board in the server.

Quick Test

This test performs a quick test of the CPU(s), DIMM memory, CPU cache memory, and hard disk drives. It is not a complete test of these units.

Quick Test takes from 2 to 5 minutes, depending on the amount of DIMM memory installed. The following test modules are run during Quick Test:

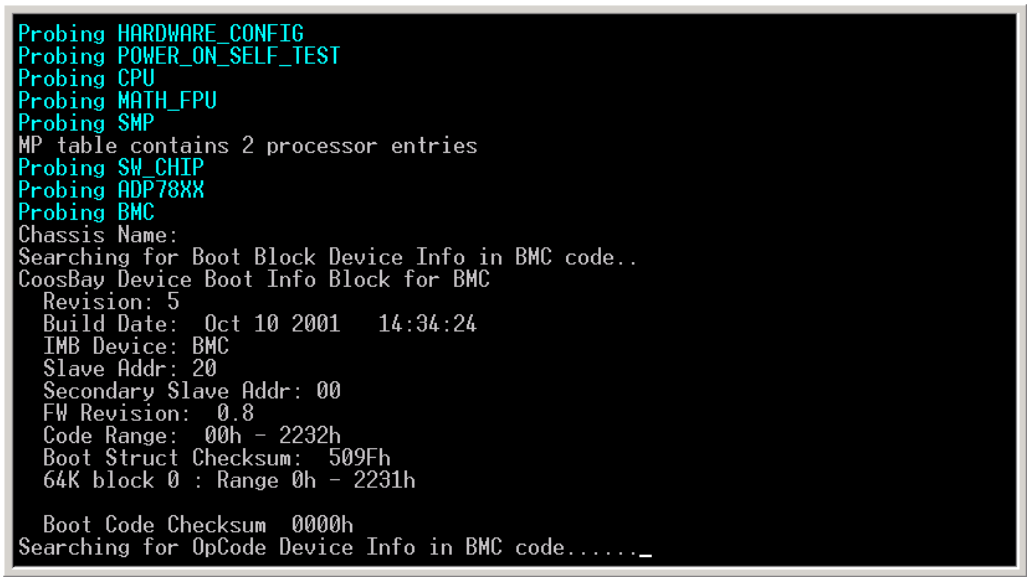
- Power On Self Test (POST)
- CPU Test(s)
- Symmetric Multiprocessing (SMP) Processor 0 Test
- Symmetric Multiprocessing (SMP) Processor 1 Test
- Hard Disk Drive Test(s)
- Cache Memory Test(s)
- DIMM Memory Test

To run the Quick Test, follow this procedure:

1. Select Quick Test using the arrow keys and press Enter.

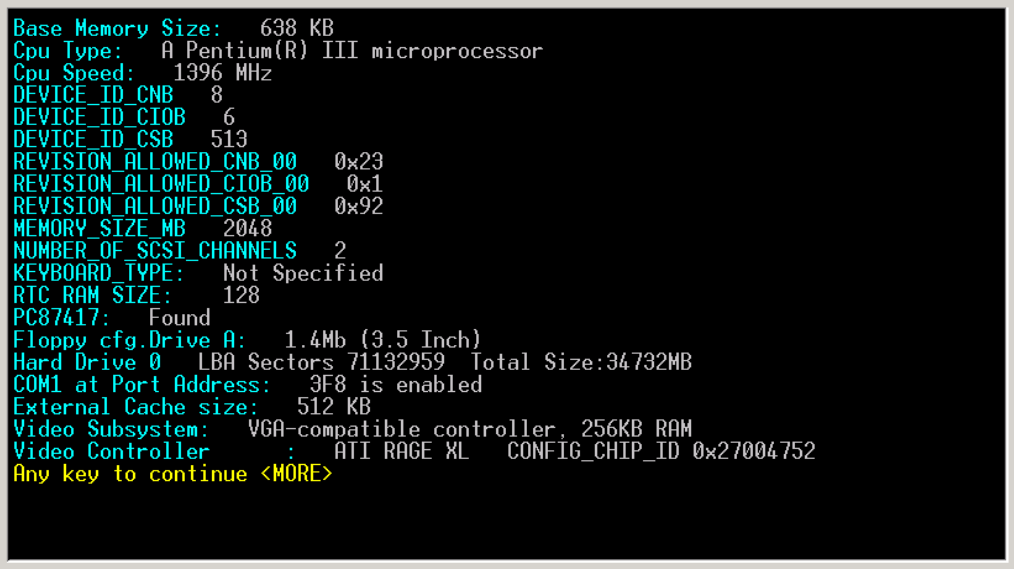
   The initial testing produces a screen similar to the one shown in Figure 50. This phase of the testing determines your server configuration.

Figure 50. Platform Confidence Quick Test (first screen)



More screen entries appear as the test progresses. Eventually the screen shown in Figure 51 appears.

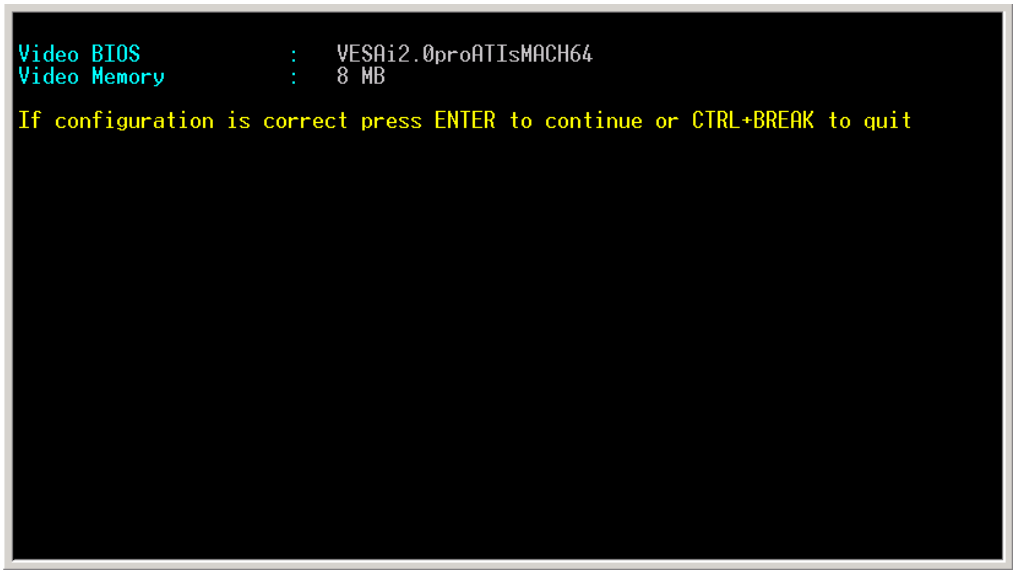
Figure 51. Platform Confidence Quick Test Hardware Test Configuration (first screen)



This screen indicates the hardware configuration that has been determined from the initial tests.

2. Press any key to display the remaining results of the configuration testing (see Figure 52).

Figure 52. Platform Confidence Quick Test Hardware Test Configuration (second screen)



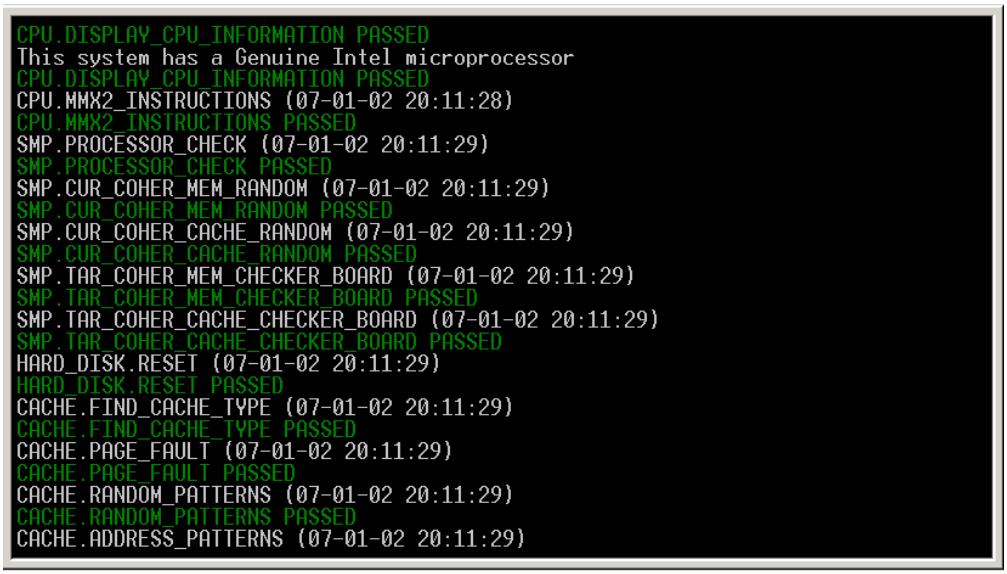
3. If the hardware configuration does not match the configuration of your server, press the Ctrl and Break keys simultaneously.

   You are prompted to check all the cables and your server configuration, then you are exited to the Platform Confidence Test main menu.

4. If the configuration is correct, press Enter to continue.

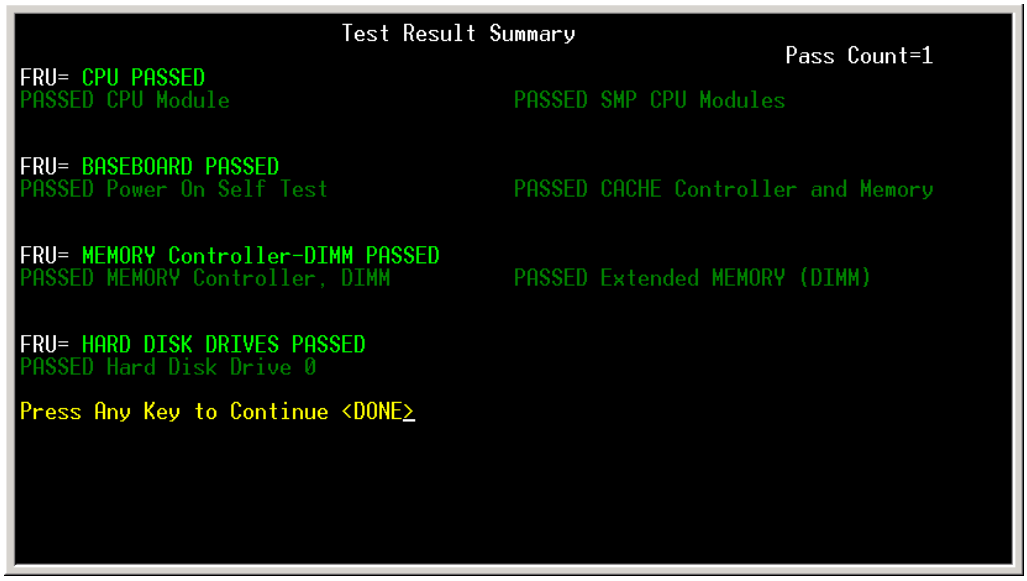
Several entries are displayed and scroll past on the screen, showing the test progress (see Figure 53).

Figure 53. Platform Confidence Quick Test Progress



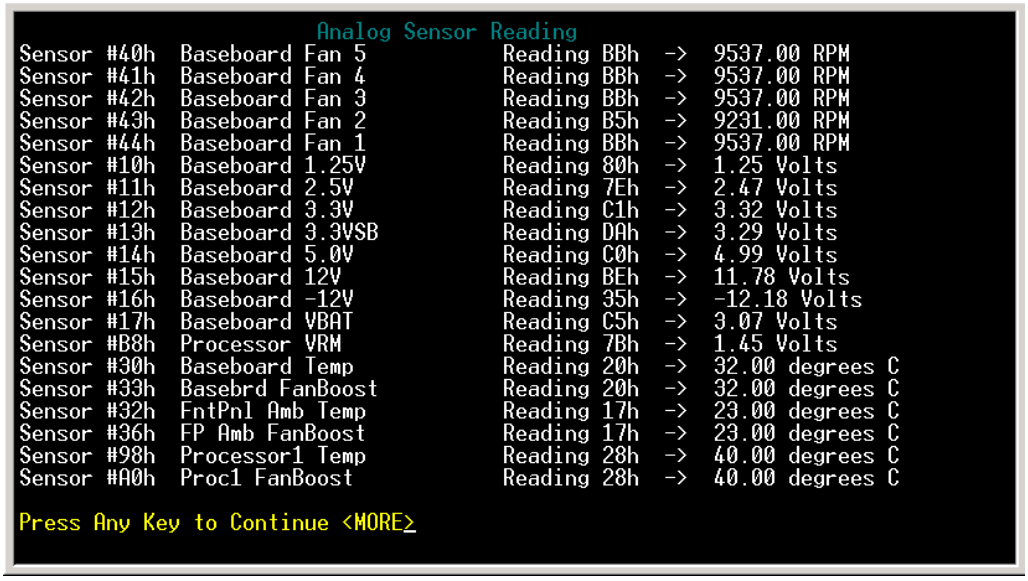
When the testing is done, the results are summarized (see Figure 54).

Figure 54. Platform Confidence Quick Test Results



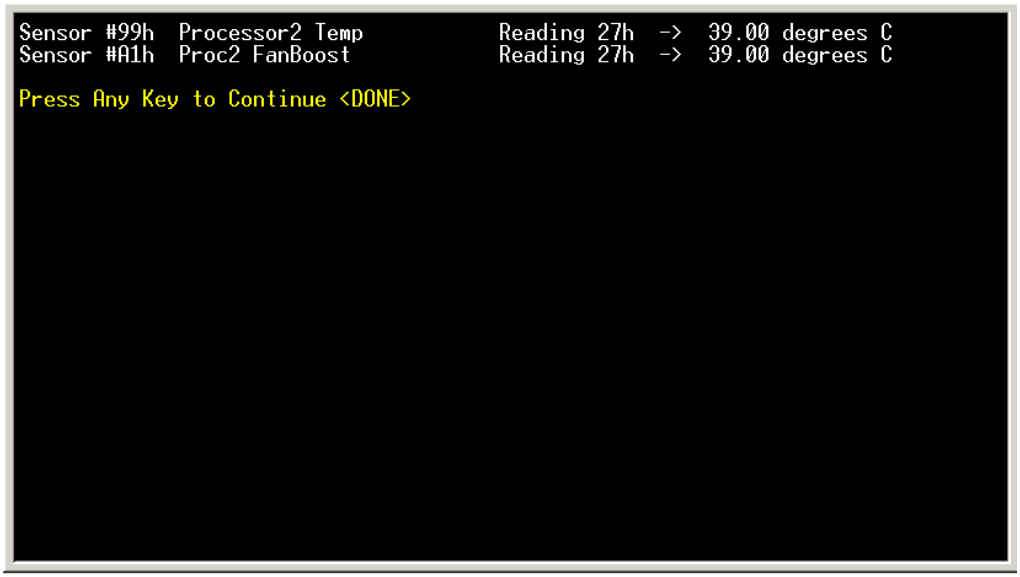
5. Press any key to see the analog sensor readings (see Figure 55).

Figure 55. Platform Confidence Quick Test Sensor Readings (first screen)



6. Press any key to see the remaining sensor readings (see Figure 56).

Figure 56. Platform Confidence Quick Test Sensor Readings (second screen)



7. Press any key to return to the main Platform Confidence Test menu.

To view the test results, follow this procedure:

1. Return to the System Utilities submenu (see Figure 45 on page 4-11) and exit to DOS.
2. Change directories to:

   `C:\PCT`

3. Type the following command:

   `Type RESULT.LOG | more`

   A portion of the `RESULT.LOG` file is displayed each time you press a key. In this way, you can see the results, which are divided into the following sections:

   - BIOS ID
   - Hardware Configuration
   - Test Summary
   - Analog Sensor Readings

   The `RESULT.LOG` file is overwritten each time you run a test. A sample of the `RESULT.LOG` file is shown in Figure 57.

Figure 57. Sample RESULT.LOG

```
Big Bear BYO Platform Confidence Test  v0.20


***** BIOS ID *****

SCB20.86B
SCB20
SCB20.86B.0042.D42.0204261619
SCB20
SCB20.86B-SCB20
SCB20-SCB20


***** HARDWARE CONFIGURATION *****

POWER_ON_SELF_TEST.Base Memory Size: = 638 KB
CPU.Cpu Type: = A Pentium(R) III microprocessor
CPU.Cpu Speed: = 1396 MHz
SW_CHIP.DEVICE_ID_CNB = 8
SW_CHIP.DEVICE_ID_CIOB = 6
SW_CHIP.DEVICE_ID_CSB = 513
SW_CHIP.REVISION_ALLOWED_CNB_00 = 0x23
SW_CHIP.REVISION_ALLOWED_CIOB_00 = 0x1
--More--REVISION_ALLOWED_CSB_00 = 0x92
SW_CHIP.MEMORY_SIZE_MB = 2048
ADP78XX.NUMBER_OF_SCSI_CHANNELS = 2
KEYBOARD.NUMBER_OF_RANDOM_KEYS: = 5
KEYBOARD.KEYBOARD_TYPE: = Not Specified
RTC.RTC RAM SIZE:  = 128
SIO308.PC87417: = Found
FLOPPY_A.Floppy cfg.Drive A: = 1.4Mb (3.5 Inch)
HARD_DISK.Hard Drive 0 = LBA Sectors 71132959  Total Size:34732MB
CDROM.MSCDEX: = Not Installed; CDROM tests disabled.
COM_PORT_1.COM1 at Port Address: = 3F8 is enabled
CACHE.External Cache size: = 512 KB
GENERIC_VGA_VIDEO.Video Subsystem: = VGA-compatible controller, 256KB RAM
GRAPHICS.Video Controller      : = ATI RAGE XL   CONFIG_CHIP_ID 0x27004752
GRAPHICS.Video BIOS            : = VESA 2.0   ATI MACH64
GRAPHICS.Video Memory          : = 8 MB
GRAPHICS.Video Controller      : = ATI RAGE XL   CONFIG_CHIP_ID 0x27004752
GRAPHICS.Video BIOS            : = VESA 2.0   ATI MACH64
GRAPHICS.Video Memory          : = 8 MB


***** TEST SUMMARY FILE *****

--- test.sum file --------------    Pass   Fail  Errors   Last run on/at
HARDWARE_CONFIG.SYSTEM_CONFIGURATI  1      0      0       07-02-02 09:06:48
```

Figure 58. Sample RESULT.LOG (continued)

```
POWER_ON_SELF_TEST.VALIDITY_CHECK   1      0      0       07-02-02 09:06:48
POWER_ON_SELF_TEST.MEMORY_CHECK     1      0      0       07-02-02 09:06:48
CPU.CPU_TYPE                        1      0      0       07-02-02 09:06:48
CPU.FLOATING_POINT_UNIT             1      0      0       07-02-02 09:06:48
CPU.CLOCK_SPEED                     1      0      0       07-02-02 09:06:49
CPU.FEATURES                        1      0      0       07-02-02 09:06:49
CPU.MMX_INSTRUCTIONS                1      0      0       07-02-02 09:06:49
CPU.DISPLAY_CPU_INFORMATION         1      0      0       07-02-02 09:06:49
CPU.MMX2_INSTRUCTIONS               1      0      0       07-02-02 09:06:49
MATH_FPU.PRESENCE                   1      0      0       07-02-02 09:06:49
MATH_FPU.FADD                       1      0      0       07-02-02 09:06:49
MATH_FPU.FSUB                       1      0      0       07-02-02 09:06:49
MATH_FPU.FMULT                      1      0      0       07-02-02 09:06:49
MATH_FPU.FDIV                       1      0      0       07-02-02 09:06:49
MATH_FPU.FLOG10                     1      0      0       07-02-02 09:06:49
MATH_FPU.FDIV_BUGCHECK              1      0      0       07-02-02 09:06:49
MATH_FPU.FDIV_NORMAL                1      0      0       07-02-02 09:06:49
MATH_FPU.TANGENT                    1      0      0       07-02-02 09:06:49
SMP.PROCESSOR_CHECK                 1      0      0       07-02-02 09:06:49
SMP.CUR_COHER_MEM_RANDOM            1      0      0       07-02-02 09:06:49
SMP.CUR_COHER_CACHE_RANDOM          1      0      0       07-02-02 09:06:49
SMP.TAR_COHER_MEM_CHECKER_BOARD     1      0      0       07-02-02 09:06:50
SMP.TAR_COHER_CACHE_CHECKER_BOARD   1      0      0       07-02-02 09:06:50
SW_CHIP.REGISTER_TEST               1      0      0       07-02-02 09:06:50
SW_CHIP.REVISION_CHECK              1      0      0       07-02-02 09:06:50
SW_CHIP.MEMORY_SIZE_CHECK           1      0      0       07-02-02 09:06:50
SW_CHIP.DISPLAY_COMPONENTS          1      0      0       07-02-02 09:06:50
ADP78XX.SCRATCH_RAM                 1      0      0       07-02-02 09:06:50
ADP78XX.ACC_TEST                    1      0      0       07-02-02 09:06:50
ADP78XX.DATA_FIFO                   1      0      0       07-02-02 09:06:50
ADP78XX.SCB_FIFO                    1      0      0       07-02-02 09:06:50
BMC.CHECKDEVICEID                   1      0      0       07-02-02 09:06:50
BMC.CHECKSELFTEST                   1      0      0       07-02-02 09:06:50
BMC.CHECKCHASSISCAP                 1      0      0       07-02-02 09:06:50
BMC.CHECKCHASSISSTATUS              1      0      0       07-02-02 09:06:50
BMC.CHECKCHASSISNAME                1      0      0       07-02-02 09:06:50
BMC.NMIPULSE                        1      0      0       07-02-02 09:06:51
BMC.PROCESSORCFG                    1      0      0       07-02-02 09:06:51
BMC.WATCHDOGTIMER                   1      0      0       07-02-02 09:06:54
BMC.SELTIMESTAMP                    1      0      0       07-02-02 09:06:54
BMC.CHECKANALOGSENSORS              1      0      0       07-02-02 09:07:40
BMC.CHECKANALOGHYST                 1      0      0       07-02-02 09:07:41
BMC.CHECKDISCRETESENSORS            1      0      0       07-02-02 09:07:41
BMC.DISPLAYANALOGREADINGS           1      0      0       07-02-02 09:07:55
BMC.CLEARSEL                        1      0      0       07-02-02 09:07:56
HSC.CHECKDEVICEID                   1      0      0       07-02-02 09:07:56
HSC.SELF_TEST                       1      0      0       07-02-02 09:07:56
HSC.CHECKSENSORHYST                 1      0      0       07-02-02 09:08:00
ICMB.SELFTEST                       1      0      0       07-02-02 09:08:00
ICMB.DEVICEID                       1      0      0       07-02-02 09:08:00
ICMB.BRIDGESTATE                    1      0      0       07-02-02 09:08:00
ICMB.ICMBADDRESS                    1      0      0       07-02-02 09:08:00
PRI_INTERRUPT_CONTROLLER.MASTER_IN  1      0      0       07-02-02 09:08:00
PRI_INTERRUPT_CONTROLLER.SLAVE_INT  1      0      0       07-02-02 09:08:00
PRI_INTERRUPT_CONTROLLER.REAL_TIME  1      0      0       07-02-02 09:08:01
PROGRAMMABLE_INTERVAL_TIMER.MODE_T  1      0      0       07-02-02 09:08:01
PROGRAMMABLE_INTERVAL_TIMER.TIMER_  1      0      0       07-02-02 09:08:01
PROGRAMMABLE_INTERVAL_TIMER.MODE_S  2      0      0       07-02-02 09:08:01
PROGRAMMABLE_INTERVAL_TIMER.COUNTE  3      0      0       07-02-02 09:08:01
KEYBOARD.SELF_TEST                  1      0      0       07-02-02 09:08:01
KEYBOARD.INTERFACE                  1      0      0       07-02-02 09:08:02
RTC.RAM                             1      0      0       07-02-02 09:08:02
RTC.CLOCK                           1      0      0       07-02-02 09:08:05
RTC.ACCURACY                        1      0      0       07-02-02 09:08:11
RTC.INTERRUPT                       1      0      0       07-02-02 09:08:11
RTC.ABS_TIMECHECK                   1      0      0       07-02-02 09:08:11
PCI_BUS.PCI_BIOS_PRESENCE           1      0      0       07-02-02 09:08:11
PCI_BUS.FIND_PCI_DEVICES            1      0      0       07-02-02 09:08:11
SIO308.REVISION_CHECK               1      0      0       07-02-02 09:08:11
SIO308.PLUG_AND_PLAY                1      0      0       07-02-02 09:08:11
SIO308.REGISTER                     1      0      0       07-02-02 09:08:11
SIO308.VERIFY_ESCD                  1      0      0       07-02-02 09:08:11
```

Figure 59. Sample RESULT.LOG (continued)

```
CACHE.MULTIPLE_LINE_ACCESS          1      0      0       07-02-02 09:08:46
CACHE.OPPOSING_PATTERNS             1      0      0       07-02-02 09:08:47
MEMORY.ADDRESS_PATTERNS             1      0      0       07-02-02 09:09:11
MEMORY.RANDOM_PATTERNS              1      0      0       07-02-02 09:09:47
MEMORY.CACHE_RANDOM_PATTERNS        1      0      0       07-02-02 09:09:48
MEMORY.CACHE_PSEUDO_RANDOM_PATTERN  1      0      0       07-02-02 09:09:51
MEMORY.CACHE_CHECKERBOARD_PATTERNS  1      0      0       07-02-02 09:09:53
MEMORY.CACHE_ADDRESS_PATTERNS       1      0      0       07-02-02 09:09:54
MEMORY.CACHE_32KB_ACCESS            1      0      0       07-02-02 09:09:54
MSDRAM64.RAND_DWORD                 1      0      0       07-02-02 09:10:41
MSDRAM64.ADDRESS_LINES              1      0      0       07-02-02 09:10:41
MEMORY_STRESS.CACHE_WINDOWS         1      0      0       07-02-02 09:11:04
MEMORY_STRESS.CACHE_EVICT           1      0      0       07-02-02 09:11:25
GENERIC_VGA_VIDEO.REGS              1      0      0       07-02-02 09:11:25
GENERIC_VGA_VIDEO.DAC_REGS          1      0      0       07-02-02 09:11:26
GENERIC_VGA_VIDEO.RAM               1      0      0       07-02-02 09:11:26
GENERIC_VGA_VIDEO.RW_MODES          1      0      0       07-02-02 09:11:26
GRAPHICS.VIDEO_MEMORY               1      0      0       07-02-02 09:11:44


***** ANALOG SENSOR READINGS *****

Sensor #40h  Baseboard Fan 5          Reading A1h  ->  8211.00 RPM
Sensor #41h  Baseboard Fan 4          Reading 9Ch  ->  7956.00 RPM

Sensor #40h  Baseboard Fan 5          Reading A1h  ->  8211.00 RPM
Sensor #41h  Baseboard Fan 4          Reading 9Ch  ->  7956.00 RPM
Sensor #42h  Baseboard Fan 3          Reading A1h  ->  8211.00 RPM
Sensor #43h  Baseboard Fan 2          Reading 98h  ->  7752.00 RPM
Sensor #44h  Baseboard Fan 1          Reading 98h  ->  7752.00 RPM
Sensor #10h  Baseboard 1.25V          Reading 80h  ->  1.25 Volts
Sensor #11h  Baseboard 2.5V           Reading 7Eh  ->  2.47 Volts
Sensor #12h  Baseboard 3.3V           Reading C1h  ->  3.32 Volts
Sensor #13h  Baseboard 3.3VSB         Reading D9h  ->  3.28 Volts
Sensor #14h  Baseboard 5.0V           Reading C0h  ->  4.99 Volts
Sensor #15h  Baseboard 12V            Reading C0h  ->  11.90 Volts
Sensor #16h  Baseboard -12V           Reading 36h  ->  -12.11 Volts
Sensor #17h  Baseboard VBAT           Reading C6h  ->  3.09 Volts
Sensor #B8h  Processor VRM            Reading 7Bh  ->  1.45 Volts
Sensor #30h  Baseboard Temp           Reading 21h  ->  33.00 degrees C
Sensor #33h  Basebrd FanBoost         Reading 21h  ->  33.00 degrees C
Sensor #32h  FntPnl Amb Temp          Reading 17h  ->  23.00 degrees C
Sensor #36h  FP Amb FanBoost          Reading 17h  ->  23.00 degrees C
Sensor #98h  Processor1 Temp          Reading 28h  ->  40.00 degrees C
Sensor #A0h  Proc1 FanBoost           Reading 28h  ->  40.00 degrees C
Sensor #99h  Processor2 Temp          Reading 27h  ->  39.00 degrees C
Sensor #A1h  Proc2 FanBoost           Reading 27h  ->  39.00 degrees C
C:\PCT>
```

Comprehensive Test

This test fully exercises and tests the server system. The test takes approximately 15 to 20 minutes to execute, depending on the amount of memory installed. The following test modules are run during the Comprehensive Test:

- Power On Self Test
- CPU Test(s)
- Cache Memory Test(s)
- Math Coprocessor Test(s)
- Symmetric Multiprocessing (SMP) Processor 0
- Symmetric Multiprocessing (SMP) Processor 1
- DIMM Memory Test
- Serverworks HE-SL Chipset Test
- Primary Interrupt Controller Test
- Programmable Interrupt Timer Test
- Keyboard Test
- Hot Swap Controller Test
- Real Time Clock Test
- PCI Bus Controller Test
- Universal Serial Bus Controller Test
- Super I/O Controller Test
- DMA Controller Test
- Baseboard Management Controller Test
- Comm Port 1 Controller Test
- Comm Port 2 Controller Test
- Adaptec SCSI Controller Test
- Parallel Port Controller Test
- Floppy A Controller Test
- ATI Video Adapter Test
- CD-ROM Controller Test
- Hard Disk Drive Controller and Drives Test

To run the Comprehensive Test, follow this procedure:

1. Select Comprehensive Test using the arrow keys and press Enter.

   The initial testing determines your server configuration, and produces screens similar to those shown in Figure 50, Figure 51, and Figure 52.

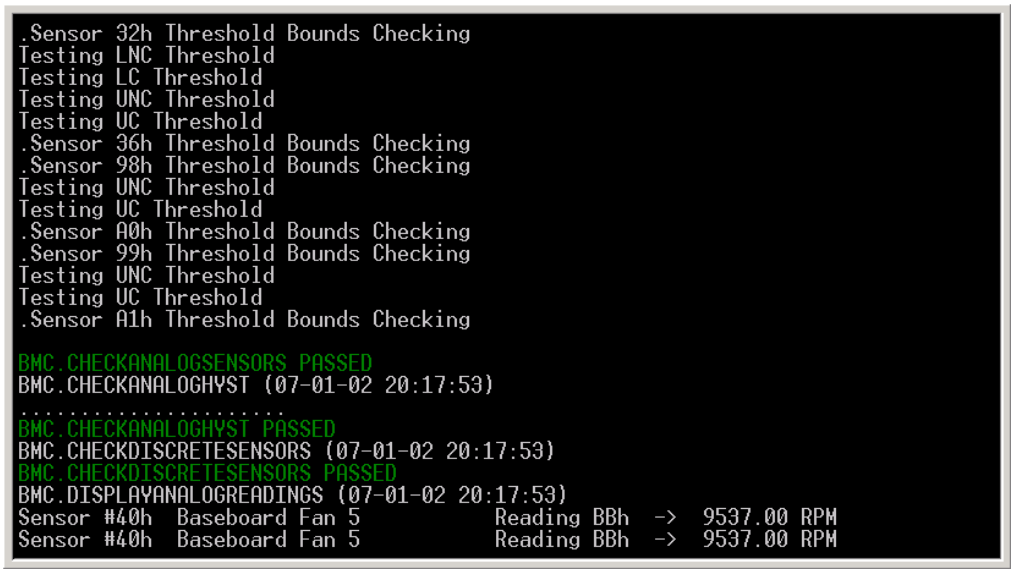
2. When you are prompted about the configuration of the server, if the hardware configuration does not match the configuration of your server, press the Ctrl and Break keys simultaneously.

   You are prompted to check all the cables and your server configuration, then you are exited to the Platform Confidence Test main menu.

3. If the configuration is correct, press Enter to continue.

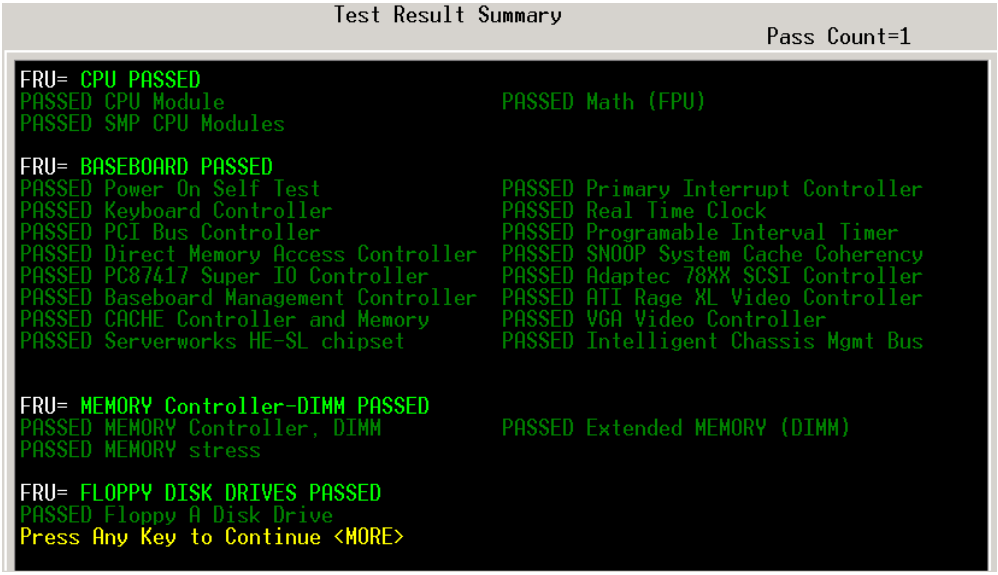
   Several entries are displayed and scroll past on the screen, showing the test progress (see Figure 60). The information is much more detailed than that displayed for the Quick Test.

Figure 60. Platform Confidence Comprehensive Test Progress



When the testing is done, the results are summarized (see Figure 61).

Figure 61. Platform Confidence Comprehensive Test Results



4. Press any key to see the remaining test results.
5. Press any key to see the analog sensor readings (similar to the screens shown in Figure 55 and Figure 56).
6. Press any key to return to the main Platform Confidence Test menu.
7. You can view the `RESULT.LOG` file in a similar fashion to that previously explained.

Comprehensive Test With Continuous Looping

This test performs the same test as the Comprehensive Test, but runs continuously until stopped. To stop the testing and display the test pass count, press Ctrl + Break. The number of test loops executed is shown as "Pass Count = n" at the upper right side of the screen.

The run time for this test is approximately 15 to 20 minutes per pass, depending on the amount of memory installed.

Note: The Comprehensive Test should be run after changing any FRU, CRU, or adding an optional component.

Run Baseboard[1] Management Controller (BMC) Firmware Update[2]

Use this menu selection to update the Baseboard Management Controller (BMC) firmware. The BMC code resides both on the Diagnostics CD and on the Service Partition in the `C: /BMC` directory.

Run HSC Firmware Update

Use this menu selection to update the hard disk controller firmware. The HSC code resides both on the Diagnostics CD and on the Service Partition in the `C: /HSC` directory.

Run Field Replaceable Unit/System Data Record (FRU/SDR) Update[2]

Use this menu item to re-inventory the FRUs and System Data Records (SDR) on the Sun Cobalt LX50 server. You can also use this selection to modify the asset tag and the chassis serial number. These are both customer optional fields that are left blank when the system is shipped from the factory.

When you run the update, make sure you choose the following at the appropriate prompt:

- Main Board supports SCSI drives
- SR1200 chassis

The FRU/SDR code resides both on the Diagnostics CD and on the Service Partition in the `C: /FRUSDR` directory.

Run BIOS Update (reboot required)[2]

Use this menu item to update the BIOS Boot block in the event that the boot block becomes corrupted. Use this menu item to also update the BIOS in the event that the BIOS becomes corrupted or if you want to set the BIOS settings back to their defaults. A reboot occurs automatically after the update is complete. The BIOS code resides both on the Diagnostics CD and on the Service Partition in the `C: /BIOS` directory.

Reboot to Service Partition

Selecting this menu item causes a reboot to the service partition.

Reboot System

Choosing this menu item causes a reboot, maintaining normal boot ordering.

---

1. The baseboard refers to the server Main Board
2. The update files are on the hard drive service partition. This allows accessibility to the partition from within Linux, since it is mounted as `/diag` at the root. The latest firmware updates can be downloaded by means of FTP onto the `/diag` partition so that you can simply reboot and update the system

Restarting and Shutting Down

You may restart or shut down the Sun Cobalt LX50 server using software or hardware.

Software Mechanisms

The following software mechanisms are available:

- Ctrl-Alt-Del key combination: use this to shut down the operating system and restart the server at any time. This works regardless of whether you are logged in or not when in text mode. When running Gnome or XWindows desktops, you must log in as root first. The Ctrl-Alt-Del key combination works for both PS/2 and USB keyboards.
- `shutdown -h now`: type this to initiate an orderly shutdown and halt the server. You may then press the Power button to safely power off the server.
- `shutdown -r now`: type this to initiate an orderly shutdown and reboot of the server.

Hardware Mechanisms

The following hardware mechanisms are available:

- Press the Reset button: the server is immediately forced to restart. However, you may lose data.
- Press the Power button: the server is immediately forced to power down. However, you may lose data.

Important: These hardware mechanisms are not recommended and should be used only as a last resort.

Maintaining the Server

This chapter describes how to replace components in the Sun Cobalt™ LX50 server after it has been set up. It contains the following sections:

Note: The procedures in this chapter for servicing field replaceable faulty components are for the attention of qualified service engineers only. If a Field Replaceable Unit (FRU) needs replacement, contact your local Sun Sales representative who will put you in contact with the Sun Enterprise Service branch for your area. You can arrange to return the system to Sun for repair under the terms of your warranty. Or, if under a Sun Service agreement, the FRU will be replaced by a Sun Service engineer. If a Customer Replaceable Unit (CRU) needs replacement, you can either request a replacement part from Sun or return the entire unit for repair. All parts replaced under the system warranty must be returned to Sun within 30 days of receipt of the replacement part.

Note: When working on a server, you may want to turn on the blue System ID LED to identify the server that is being worked on. See "LEDs" on page 3-2 for instructions on how to turn on this LED.

Tools and Supplies Needed

All that is needed is an antistatic wrist strap (recommended).

Determining a Faulty Component

To determine and isolate a faulty component, refer to Chapter 6, "Troubleshooting the Server." This chapter can help you isolate a faulty component using the following methods:

- Status LEDs (see "Status LEDs" on page 6-3)
- Fault LEDs (see "Server Main Board Fault LEDs" on page 6-5)
- POST LEDs, beep codes, and displayed error messages (see "Diagnosing System Errors" on page 6-2)
- Platform Confidence Test (see "Platform Confidence Test (PCT)" on page 6-2)
- System Setup Utility (see "System Setup Utility (SSU)" on page 6-2)

Safety: Before You Remove the Cover

Before removing the system cover to work inside the server, observe these safety guidelines:

1. Turn off all peripheral devices connected to the system.
2. Turn off the system by pressing the power button on the front of the system. Then unplug the AC power cord from the system or wall outlet.
3. Label and disconnect all peripheral cables and all telecommunication lines connected to I/O connectors or ports on the back of the system.
4. Before handling components, attach a wrist strap to a chassis ground of the system (any unpainted metal surface).

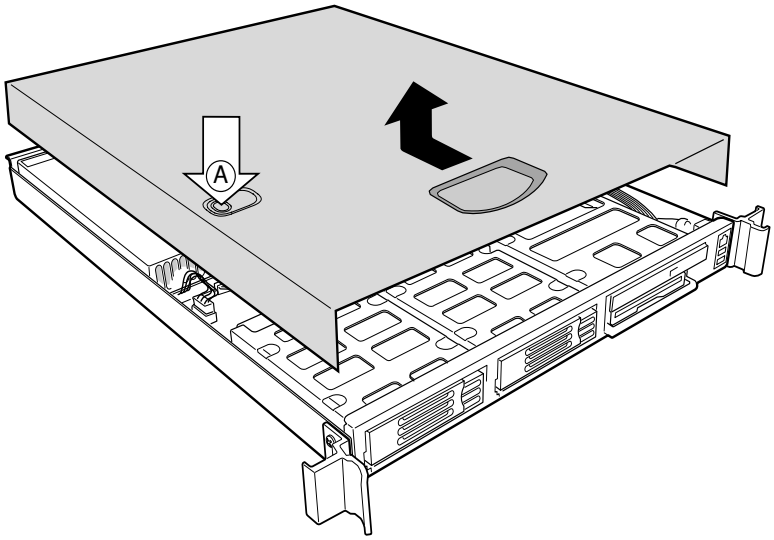
Removing and Replacing the Cover

Many of the equipment replacement procedures require that you remove the chassis cover. Before you remove the cover, observe the safety instructions in the section titled “Safety: Before You Remove the Cover” on page 5-2

To remove the cover, follow these steps:

1. While pressing the blue latch button (A) with your left thumb, push down on the top cover and slide it back using the heel of your right hand on the black pad (see Figure 62).

Figure 62. Removing the Cover



2. Set the cover aside and away from the immediate work area.

Note: A non-skid surface or a stop behind the chassis may be needed if attempting to remove the top cover on a flat surface. Sliding the server chassis on a wooden surface may mar the surface (there are no rubber feet on the bottom of the chassis).

Customer Replaceable Unit (CRU) Procedures

The following equipment is customer replaceable:

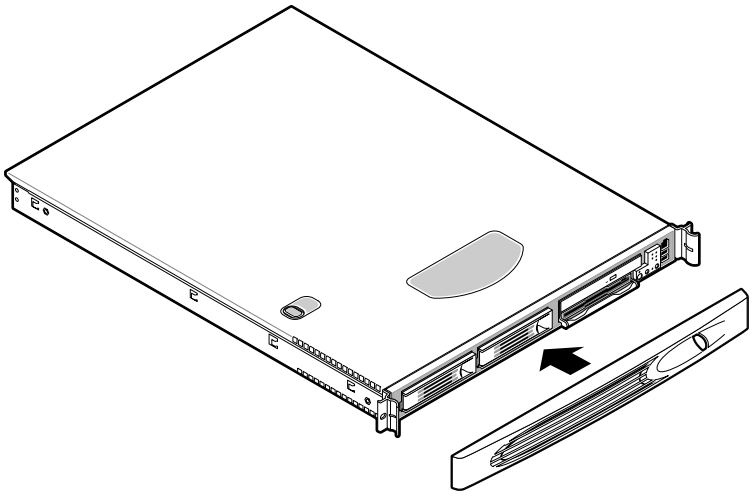
- Front Bezel
- Floppy/CD-ROM Combo Module
- Memory
- Power Supply Unit
- Hard Disk Drives
- Fan Module
- PCI Cards
- Battery

Note: Any configuration changes (CPU, memory, hard disk, add-in PCI cards and so forth) causes the server to revert to the factory default BIOS settings, regardless of how the server boot options have been set up using the System Setup Utility or the BIOS setup.

Front Bezel

To access the system controls and peripherals when a front bezel is installed, grasp the bezel at the finger hole on the right side and gently pull it towards you, unhinging it at the left, until it unsnaps from the chassis. Replace the bezel using the reverse process (see Figure 63).

Figure 63. Bezel Replacement



Floppy/CD-ROM Combo Module

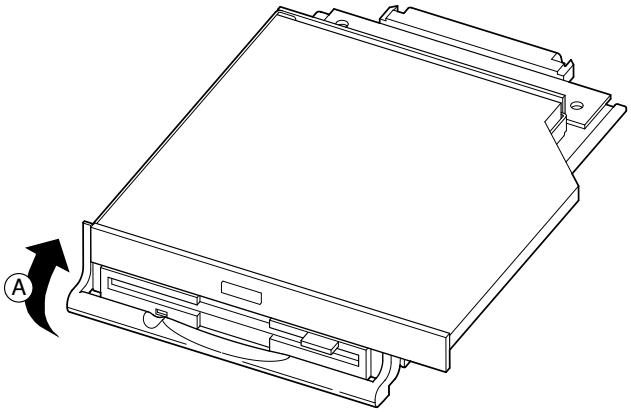
Caution: A CD-ROM drive/FDD module is NOT hot swappable. Before replacing it, you must first take the server out of service, turn off all peripheral devices connected to the system, turn off the system by pressing the power button, and unplug the AC power cord from the system or wall outlet.

Note: The floppy/CD-ROM module may be replaced with a hard disk drive. If you do this, you need to install a small plastic cover to cover the gap at the right side of the drive that is left by removal of the (larger size) floppy/CD-ROM module. The plastic cover is included in the accessory kit.

To replace the Floppy/CD-ROM module, follow these steps:

1. Before removing the cover to work inside the system, observe the safety guidelines previously stated.
2. Remove the bezel from the front of the chassis.
3. As shown in Figure 64, rotate the module's handle bar up (A) and pull on the handlebar to remove the module from the flex bay.

Figure 64. Floppy/CD-ROM Module Replacement



4. Slide a new module into the flex bay until you feel the connectors touch.
5. Push the module in (using the handlebar) about 3/16 of an inch (5mm) more to fully engage the connectors.
6. Rotate the handle bar down.
7. Reinstall the bezel.

Note: The Comprehensive Test should be run after changing any FRU, CRU, or adding an optional component. See "Run System Diagnostic Test" on page 4-15.

Memory

Caution: Before touching or replacing any component inside the LX50 server, disconnect all external cables and follow the instructions in "Safety: Before You Remove the Cover" on page 5-2 and "Removing and Replacing the Cover" on page 5-3. Always place the server on a grounded ESD pad and wear a properly grounded antistatic wrist strap.

Only PC133-compliant SDRAM is supported by the server board. Install from 128 MB to 6 GB of registered ECC memory using up to six DIMMs. The Sun Cobalt LX50 server chassis requires low-profile (LP) 1.2-inch DIMMs.

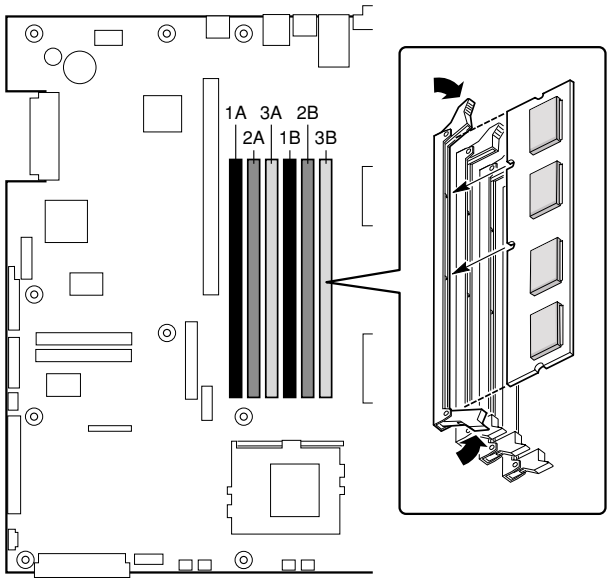
DIMMs must be installed in pairs (not side-by-side) and in the following order: 1A and 1B, 2A and 2B, 3A and 3B (see Figure 65). Each DIMM in a pair must be the same memory size and type. The server uses DIMMS with CL3 timing.

Installed DIMMs must be the same speed and must all be registered[1]. For part numbers of optional DIMMs, see Table 4 on page 1-4.

Caution: Use of unauthorized DIMM modules may damage the server and may void the warranty.

Note: The Comprehensive Test should be run after changing any FRU, CRU, or adding an optional component. See "Run System Diagnostic Test" on page 4-15.

Figure 65. DIMM Pair Locations



1. Registered DIMMS are those with an onboard latch that resynchronizes the address/control lines to the DIMM. These latches are also buffers to allow the Main Board electronics to drive multiple-row devices. It is most common for ECC SDRAM modules to be registered.

Power Supply Unit

Caution: Your Sun Cobalt LX50 server does not have a redundant power supply. Before replacing the power supply, you must take the server out of service.

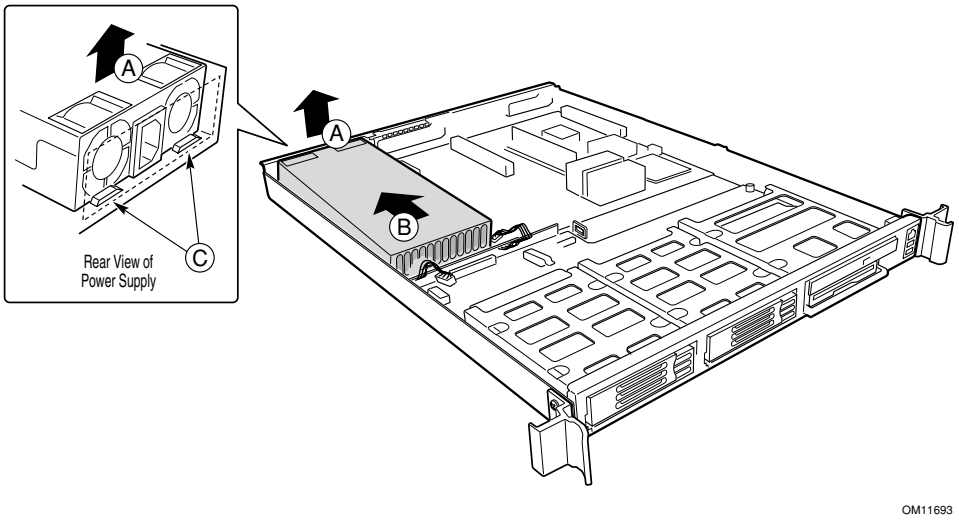
Caution: Before touching or replacing any component inside the LX50 server, disconnect all external cables and follow the instructions in "Safety: Before You Remove the Cover" on page 5-2 and "Removing and Replacing the Cover" on page 5-3. Always place the server on a grounded ESD pad and wear a properly grounded antistatic wrist strap.

Follow these steps to replace the power supply:

1. Before removing the cover to work inside the system, observe the safety guidelines previously mentioned.
2. Unplug the power cord from the power source and the power supply module.
3. Remove the chassis cover.

Caution: As shown in Figure 66, lift the rear of the power supply module up only enough to clear the raised guides. Lifting higher may damage the edge connector and power distribution board.

Figure 66. Removing the Power Supply



4. Lift the rear of the module up (A) only enough to clear the raised guides (C) on the chassis floor.
5. Push the module to the rear of the chassis (B) until it disengages from the power distribution board.
6. Lift the module out of the chassis.
7. Place the edge connector end of the replacement module onto the chassis floor and slide it toward the front of the chassis until the edge connector is fully inserted in the power distribution board connector.

8. Make sure that the rear of the power supply is fully seated on the chassis floor and in front of the raised guides (C).
9. Replace the chassis cover.

Note: The Comprehensive Test should be run after changing any FRU, CRU, or adding an optional component. See "Run System Diagnostic Test" on page 4-15.

Hard Disk Drives

Caution: Not all SCSI hard disk drives (HDD) are supported by the server. Unsupported drives will not mate mechanically with the connector on the inside of the drive bay. All drives must be LVDS SCA type (80-pin connector). The server does not support internal single-ended (SE) drives.

Unless a RAID card is installed in the server, the hard drives cannot be hot swapped.

The use of unauthorized HDDs may damage the system and void the warranty. Only Sun-certified drives should be used. See Table 4 on page 1-4 for a list of approved hard disk drives.

Caution: To allow proper airflow and cooling during operation, all drive bays must contain a HDD assembly (drive mounted on a carrier) or a carrier with an air baffle installed.

Caution: You must remove power from the Sun Cobalt LX50 server before attempting to remove or insert a HDD. Be sure to wait 30 seconds for the drive motor to come to a complete stop before removing a drive.

Neither hot swap nor hot plug are supported on the server. Before replacing the HDD, you must first take the server out of service, turn off all peripheral devices connected to the system, turn off the system by pressing the power button, and unplug the AC power cord from the system or wall outlet.

Also be sure to back up any current data on your disk drive(s) before installing or reconfiguring your disk environment.

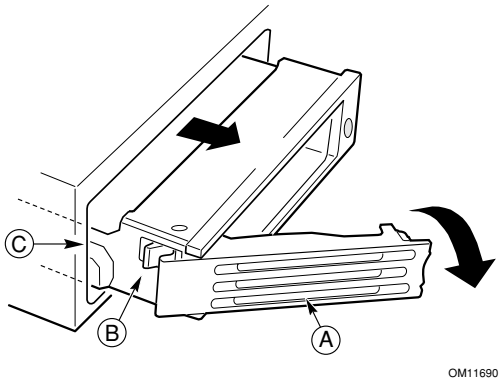
Caution: Put on the disposable ESD wrist strap supplied with each hard disk drive before removing or installing a HDD.

Caution: Special conditions apply when replacing a RAID drive**.** Make sure you are familiar with Linux disk administration. Also be sure to back up any current data on your disk drive(s) before installing or reconfiguring your disk environment.

Note: A third HDD can be inserted in place of the Floppy/CD-ROM combo unit under the same restrictions of removing power as previously mentioned above.

1. Before removing the cover to work inside the system, observe the safety guidelines mentioned earlier.
2. Remove the bezel from the front of the chassis.
3. As shown in Figure 67, pull the retention lever (A) toward you until the tab end (B) of the lever is free of the housing slot (C).
4. Pull the HDD assembly forward and out of the drive bay.

Figure 67. Removing a HDD Assembly From a Bay



6. Remove the new HDD assembly (hard disk drive mounted on a carrier) from its wrapper and place it on an anti-static surface.
7. Install the new HDD assembly into the drive bay by inserting the tab end (B) of the retention lever (A) into the housing slot (C) and gently closing the lever.

Note: Closing the lever should seat the HDD into the backplane connector. If the drive does not insert or seat properly, do not force the lever. Instead, check again to make sure the tab of the retention lever is properly inserted into the housing before closing the lever.

8. Reinstall a carrier and air baffle in any bays where you are not reinstalling a HDD assembly.

Note: The Comprehensive Test should be run after changing any FRU, CRU, or adding an optional component. See “Run System Diagnostic Test” on page 4-15.

Air Baffle

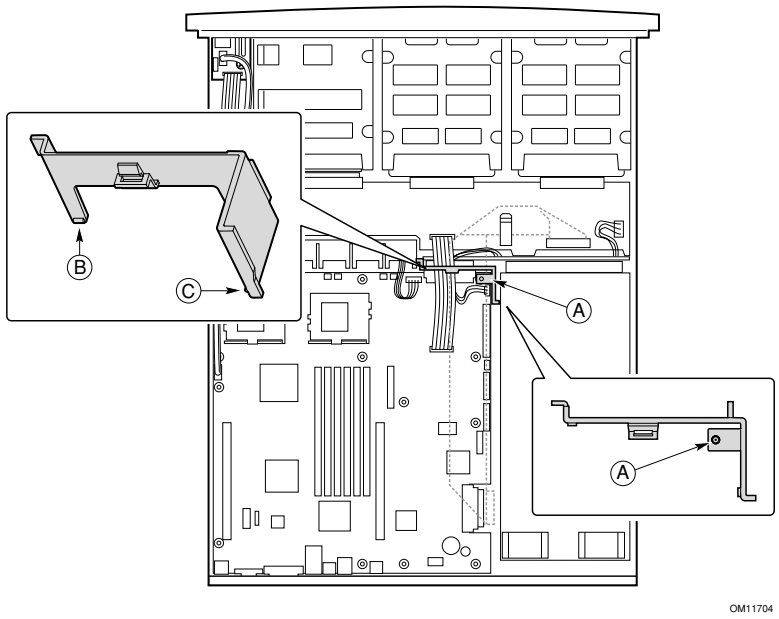
The air baffle must be removed before you can replace the fan module.

Removal

Caution: Before touching or replacing any component inside the LX50 server, disconnect all external cables and follow the instructions in "Safety: Before You Remove the Cover" on page 5-2 and "Removing and Replacing the Cover" on page 5-3. Always place the server on a grounded ESD pad and wear a properly grounded antistatic wrist strap.

1. Before removing the cover to work inside the system, observe the safety guidelines mentioned earlier.
2. Remove the chassis cover.
3. As shown in Figure 68, gently spread the air baffle walls at (B) and (C) and lift up until pin (A) is free of the board mounting hole.
4. Remove the baffle from the chassis.

Figure 68. Removing the Air Baffle



Installation

1. Ensure the flex cable, auxiliary power cable, and SCSI cables are routed under where you will be installing the air baffle.
2. Aligning pin (A) with the board mounting hole, position the air baffle over the white server board power connector.
3. Lower the baffle into position and press it down against the chassis floor.
4. Ensure tabs (B) and (C) are under the edge of the server board.

Fan Module

Caution: Before touching or replacing any component inside the LX50 server, disconnect all external cables and follow the instructions in "Safety: Before You Remove the Cover" on page 5-2 and "Removing and Replacing the Cover" on page 5-3. Always place the server on a grounded ESD pad and wear a properly grounded antistatic wrist strap.

The fan module is a single component. The individual fans that make up the module are not swappable. Should a fan fail, the entire module will need to be replaced. A tab on the side of the fan module makes replacement of the module tool-less and very simple. The fan module is not hot swappable. The server must be turned off before the fan module can be replaced.

To replace the fan module, refer to Figure 69 and follow these steps:

1. Before removing the cover to work inside the system, observe the safety guidelines previously given.
2. Remove the cover from the chassis.
3. Remove the air baffle.
4. Unplug the fan cable from the server board (D).
5. At the left end of the module, press on tab (B) to release it from the chassis slot (C).
6. Lift the module from the chassis. When the right end is free, detach the USB cable.
7. Attach the USB cable to the replacement module.

Caution: Failure to properly route the USB cable can cause it to interfere with the top cover. If the cable is removed and then not placed properly under the cable clamp at the front, it may result in the cover crushing the USB cable and destroying the intrusion sensor on the front panel board.

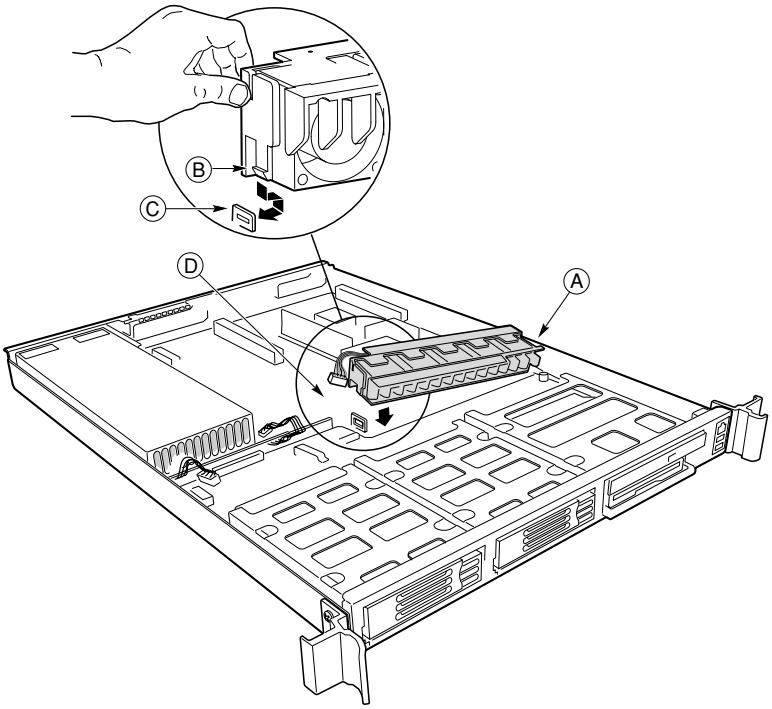
8. Slide the "L" shaped foot on the right end of the module under the chassis tab near the chassis sidewall.
9. Lower the module to the chassis floor. Ensure it is situated between the raised guides, not on top of them.
10. Press down on the left end of the module until tab (B) fits into the chassis slot (C).
11. Plug the power cable into the system fan connector on the server board.
12. Install the air baffle.

Note: Check to ensure that all cables are firmly seated and properly routed. Pay special care to the flexible cable between the Main Board and backplane.

13. Replace the chassis cover.

Note: The Comprehensive Test should be run after changing any FRU, CRU, or adding an optional component. See "Run System Diagnostic Test" on page 4-15.

Figure 69. Fan Module Replacement



PCI Cards

Caution: Before touching or replacing any component inside the LX50 server, disconnect all external cables and follow the instructions in "Safety: Before You Remove the Cover" on page 5-2 and "Removing and Replacing the Cover" on page 5-3. Always place the server on a grounded ESD pad and wear a properly grounded antistatic wrist strap.

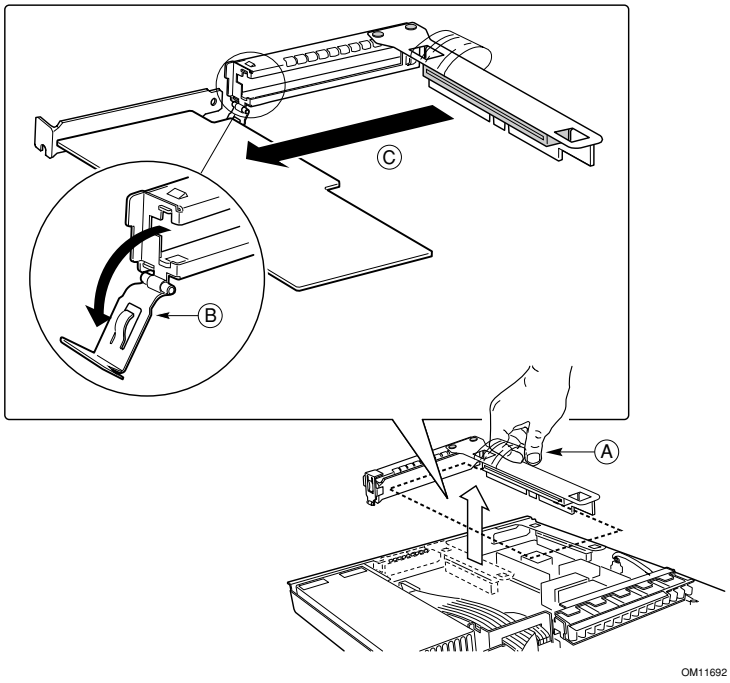
Note: Add-in cards must be replaced while the riser card is removed from the chassis.

The server supports 3 V only and Universal PCI cards. It does not support 5 V only cards.

To replace a PCI card, follow these steps:

1. Before removing the cover to work inside the system, observe the previously stated safety guidelines.
2. Remove the chassis cover.
3. As shown in Figure 70, insert your finger in the plastic loop (A).

Figure 70. Removing a Riser Card



4. Pull straight up and remove the riser card assembly from the chassis.
5. Open the retainer clip (B) on the riser card retention bracket.
6. Pull the PCI card out of the riser card slot (C).
7. Install the new PCI add-in card on the riser.

8. Insert the riser card connector in the server board slot while aligning the tabs on the rear retention bracket with the holes in the chassis.

Caution: Press the riser card straight down into the slot. Tipping it in the slot while installing it may damage the riser card or board slot.

9. Firmly press the riser card straight down until it is seated in the server board slot.
10. Replace the chassis cover if you have no additional work to do inside the chassis.

Note: The Comprehensive Test should be run after changing any FRU, CRU, or adding an optional component. See "Run System Diagnostic Test" on page 4-15.

Battery

Caution: Before touching or replacing any component inside the LX50 server, disconnect all external cables and follow the instructions in "Safety: Before You Remove the Cover" on page 5-2 and "Removing and Replacing the Cover" on page 5-3. Always place the server on a grounded ESD pad and wear a properly grounded antistatic wrist strap.

The lithium battery on the server board powers the real time clock (RTC) for up to 10 years in the absence of power. A low battery condition is stored in the System Event Log (SEL).

When the battery starts to weaken, it loses voltage, and the server settings stored in CMOS RAM in the RTC (for example, the date and time) may be wrong. Contact your customer service representative or dealer for a list of approved replacement batteries.

Warning: There is a danger of explosion if the battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the equipment manufacturer. Discard used batteries according to the manufacturer's instructions.

Note: The Comprehensive Test should be run after changing any FRU, CRU, or adding an optional component. See "Run System Diagnostic Test" on page 4-15.

Field Replaceable Unit (FRU) Procedures

Replacing a CPU and Heatsink

Caution: The procedure below is for the attention of qualified service engineers only. Before touching or replacing any component inside the LX50 server, disconnect all external cables and follow the instructions in "Safety: Before You Remove the Cover" on page 5-2 and "Removing and Replacing the Cover" on page 5-3. Always place the server on a grounded ESD pad and wear a properly grounded antistatic wrist strap.

The server is certified to function properly only with Sun CPUs. Do not mix CPU steppings and speeds or processor family types.

Safety Cautions

Caution: Pressing the power button does not turn off power to this board. Disconnect the server board from its power source and from any telecommunications links, networks, or modems before doing any of the procedures described in this guide. Failure to do this can result in personal injury or equipment damage. Some circuitry on the server board may continue to operate even though the front panel power button is off.

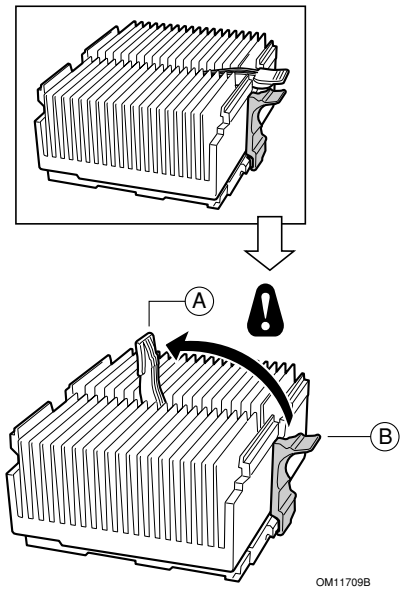
Electrostatic discharge (ESD) can damage server board components. Perform CPU replacement procedures only at an ESD workstation. If no such station is available, you can provide some ESD protection by wearing an antistatic wrist strap and attaching it to a metal part of the computer chassis.

Caution: CPU replacement must be performed by trained service personnel only! An ESD wrist strap must be used for this procedure

To replace a processor, follow these steps:

1. As shown in Figure 71, raise the green heatsink clamping locking lever (A) to the upper position.

Figure 71. Raising the Locking Lever



2. While depressing the black lift tab (B), press the side of the clamp opposite the lift tab towards the heatsink, then carefully lift the clamp upwards at the lift point. Once one side is unclamped, the other side can be freed by rotating the clamp bracket upwards.

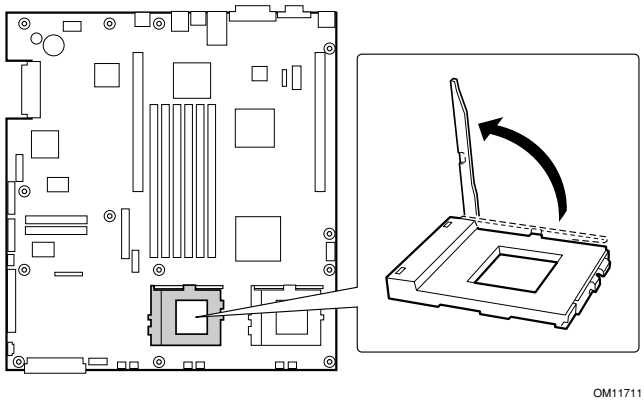
Caution: Do not force the clamps free using any type of tool, as this is highly likely to cause irreparable damage to the processor socket. The clamps will easily disengage once the correct procedure is followed.

3. Gently lift the heatsink and the clamp.

Note: Do not separate the heatsink from the clamp and do not set the heatsink down on its bottom side, as this may contaminate the thermal insulating material.

4. Grasp the end of the zero insertion force arm and bend it out slightly until it disengages from the socket tab.
5. Raise the zero insertion force arm on the processor socket (see Figure 72), making sure the arm is in the full upright position.

Figure 72. Raising the Locking Bar

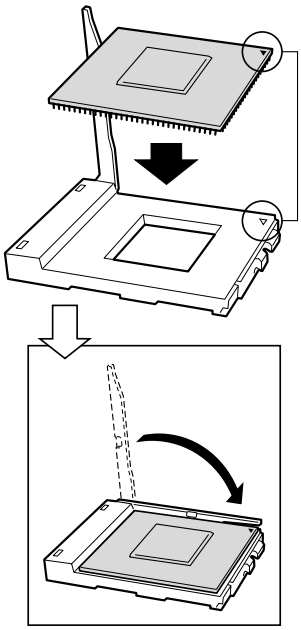


Caution: If you are installing a processor removed from a different server, you must prepare the processor and heatsink so that the heatsink properly conducts the heat away from the processor. If the processor and heatsink are not properly prepared, damage to the processor or socket can result. You should not allow any surface that has thermal interface material to come in contact with any other surface, as surface contamination may occur.

6. Carefully remove the old processor and place it on an antistatic pad (or, if you are moving the processor from one main board to another, insert the processor directly into the new board as indicated in the next step).
7. Aligning the pins and notches of the new processor with the socket, insert the processor into the socket (see Figure 73).
8. Verify that the processor sits flush and level on the socket.
9. Lower the locking bar completely until it locks (see Figure 73)

Caution: Lower the locking bar slowly and make sure that the socket handle is engaged on the locking tab on the side of the socket.

Figure 73. Inserting the Processor and Lowering the Locking Bar



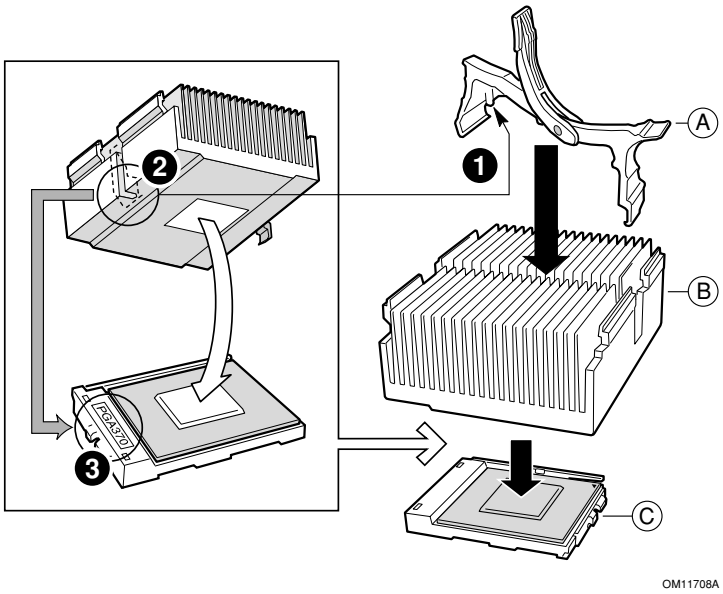
10. Orient the heatsink such that the bottom recessed ledge (also indicated by a slot in the heatsink) is over the PGA-370 marking on the socket (see Figure 74).
11. Gently lower the heatsink in place being careful not to damage the thermal interface material (TIM).

> ***Caution:*** Misorientation of the heatsink will result in poor contact between heatsink and processor. Not only will the processor overheat, but both processor and socket may be damaged when clamping the heatsink down.

12. Align the plastic heatsink latching clamp so that the side clip with a pin (1) is over the heatsink slot (2), as shown in Figure 74.

> ***Caution:*** Incorrect orientation of this clamp will result in damage to the processor socket, requiring a main board replacement! User-inflicted damage is not covered under the processor or system warranty.

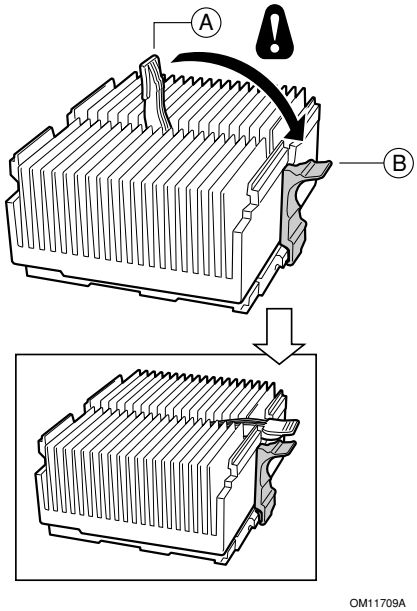
Figure 74. Installing the Heat Sink and Clip



13. With the green heatsink clip lever in the upward position, center and push each black clip under the adjacent processor socket anchor feature.

14. Slowly close the green clip lever as shown in Figure 75 until the clip lever (A) contacts tab (B).

Figure 75. Closing the Locking Lever



15. Verify the heatsink clamp has latched correctly on each side

Note: The Comprehensive Test should be run after changing any FRU, CRU, or adding an optional component. See “Run System Diagnostic Test” on page 4-15.

Installing a New CPU and Heatsink

Installing a new processor and heatsink is an extra-cost option.

Caution: The procedure below is for the attention of qualified service engineers only. Before touching or replacing any component inside the LX50 server, disconnect all external cables and follow the instructions in "Safety: Before You Remove the Cover" on page 5-2 and "Removing and Replacing the Cover" on page 5-3. Always place the server on a grounded ESD pad and wear a properly grounded antistatic wrist strap.

Safety Cautions

Caution: Pressing the power button does not turn off power to this board. Disconnect the server board from its power source and from any telecommunications links, networks, or modems before doing any of the procedures described in this guide. Failure to do this can result in personal injury or equipment damage. Some circuitry on the server board may continue to operate even though front panel power button is off.

Electrostatic discharge (ESD) can damage server board components. Perform CPU replacement procedures only at an ESD workstation. If no such station is available, you can provide some ESD protection by wearing an antistatic wrist strap and attaching it to a metal part of the computer chassis.

To install a new processor, follow these steps:

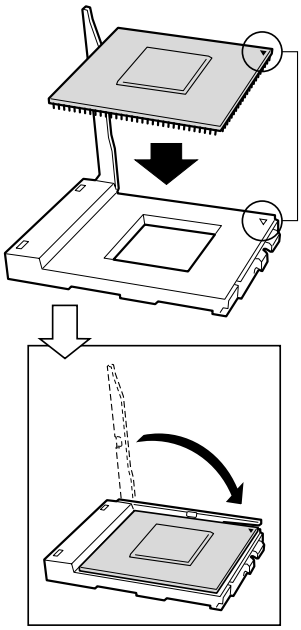
1. Following the instructions packaged with your boxed processor, prepare the new processor for installation.

Caution: You should not allow any surface that has thermal interface material to come in contact with any other surface, as surface contamination may occur.

2. Open the socket handle (make sure it is in the full upright position) and remove the terminator (if adding a processor to an existing one processor system).
3. Aligning the pins and notches of the new processor with the socket, insert the processor into the socket.
4. Verify the processor sits flush and level on the socket.
5. Lower the locking bar completely until it locks (see Figure 76).

Caution: Lower the locking bar slowly and make sure that the socket handle is engaged on the locking tab on the side of the socket.

Figure 76. Inserting the Processor and Lowering the Locking Bar



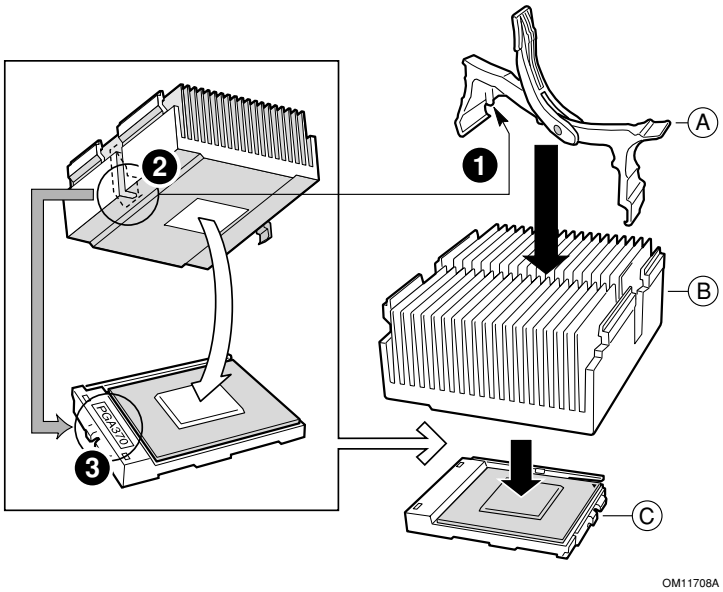
6. Orient the heatsink such that the bottom recessed ledge (also indicated by a slot in the heatsink) is over the PGA-370 marking on the socket.
7. Gently lower the heatsink in place being careful not to damage the thermal interface material (TIM).

Caution: Misorientation of the heatsink will result in poor contact between heatsink and processor. Not only will the processor overheat, but both processor and socket may be damaged when clamping the heatsink down.

8. Align the plastic heatsink latching clamp so that the side clip with a pin (1) is over the heatsink slot (2), as shown in Figure 77.

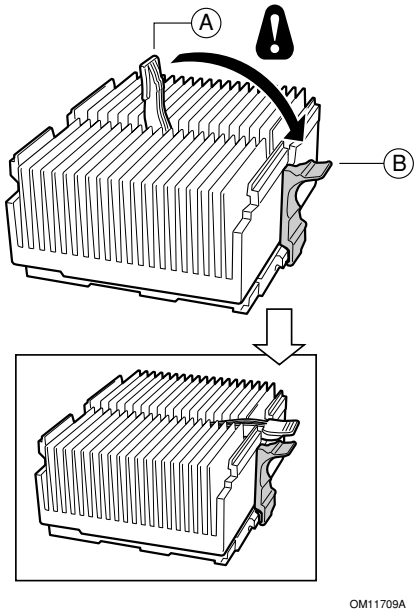
Caution: Incorrect orientation of this clamp will result in damage to the processor socket, requiring a main board replacement! User-inflicted damage is not covered under the processor or system warranty.

Figure 77. Installing the Heat Sink and Clip



9. With the green heatsink clip lever in the upward position, center and push each black clip under the adjacent processor socket anchor feature.
10. Slowly close the green clip lever as shown in Figure 78 until the clip lever (A) contacts tab (B).

Figure 78. Closing the Locking Lever



11. Verify the heatsink clamp has latched correctly on each side.

Note: The Comprehensive Test should be run after changing any FRU, CRU, or adding an optional component. See “Run System Diagnostic Test” on page 4-15.

Server Main Board

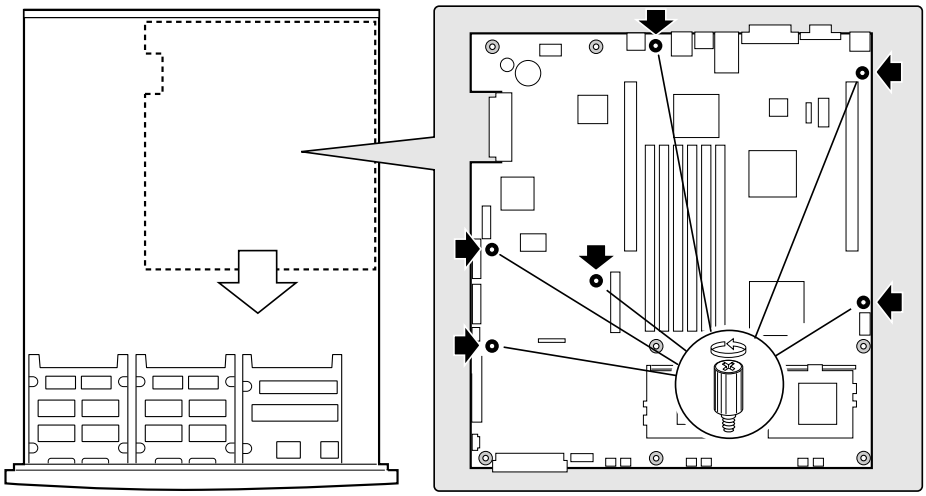
Note: The Main Board contains no DIMMs or CPUs, and is packaged in an ESD bag with two foam pieces and an ESD wrist strap. Be sure to observe all ESD safety guidelines when handling the board.

Caution: The procedure below is for the attention of qualified service engineers only. Before touching or replacing any component inside the LX50 server, disconnect all cables and follow the instructions in "Safety: Before You Remove the Cover" on page 5-2 and "Removing and Replacing the Cover" on page 5-3. Always place the server on a grounded ESD pad and wear a properly grounded antistatic wrist strap.

To replace the server Main Board, follow these steps:

1. Open the box containing the replacement board and remove one of the two antistatic pads. You will need this pad in step 16 as an ESD-safe place to place the old server board.
2. Before removing the cover to work inside the system, observe the previously mentioned safety guidelines.
3. Remove the cover from the chassis.
4. Remove both riser card/PCI card assemblies (see "PCI Cards" on page 5-13).
5. Remove the power supply unit (see "Power Supply Unit" on page 5-7).
6. Remove the air baffle (see "Air Baffle" on page 5-10).
7. Disconnect the USB cable from the server board.
8. At the SCSI backplane board, disconnect the ribbon cable that comes from the front panel board.
9. Remove the fan module (see "Fan Module" on page 5-11).
10. Disconnect both ends of all remaining cables.
11. Remove the SCSI backplane board.
12. Remove the power distribution board (the board the power supply module connector plugs into).
13. Remove any processors, terminators, and memory cards that you wish to use with the new board.
14. Remove the mounting screws that secure the server board to the chassis (see Figure 79).

Figure 79. Removing the Server Board



15. Slide the board toward the front of the chassis until the I/O connectors are clear of the chassis I/O openings.
16. Place the server board on an anti-static pad. You may use one of the two pads that are shipped with the new server board.
17. Ensure that the Mylar insulator sheet is seated securely over the standoffs, is laying flat on the chassis floor, and that the edge of the sheet is seated below the studs in the rear chassis wall.
18. Remove the replacement server board from its packaging and antistatic bag.
19. While placing the board on the chassis standoffs, carefully position the board I/O connectors in the rear chassis I/O openings.

Note: The server Main Board uses three holes to mount the board to the chassis stand-offs. Each hole is designated with a white circle around it.

20. Adjust board position so that the two mounting holes near the board edges rest securely on the two-shouldered standoffs.
21. Install the screws that you removed in step 14.
22. Install the power distribution board.
23. Install the SCSI backplane board.
24. Install the fan module.
25. Cable the new server board to the other system components.
26. Install the air baffle.
27. Install the power supply module.

28. Install the processor(s), terminator, and memory cards that you wish to use with the new board.
29. Install both riser card/PCI card assemblies.
30. Replace the chassis cover if you have no additional work to do inside the chassis.
31. Insert the removed board into the antistatic bag from the new board and insert it into the box for return to Sun Microsystems. A return shipping label is included with the new board. The failed board must be returned to Sun within 30 days.

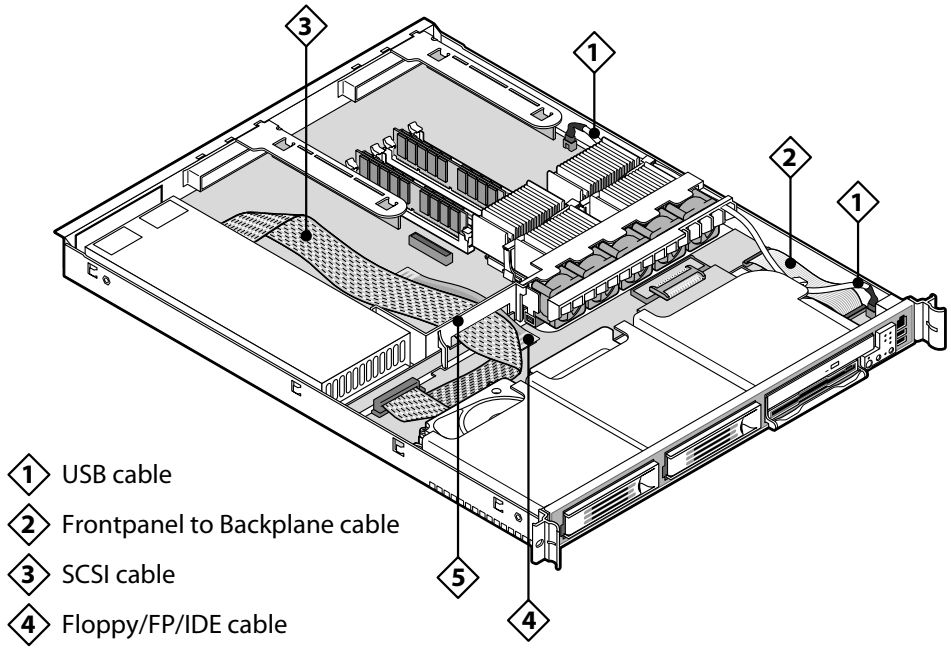
Note: The Comprehensive Test should be run after changing any FRU, CRU, or adding an optional component. See "Run System Diagnostic Test" on page 4-15.

Cable Kit

Caution: The procedure below is for the attention of qualified service engineers only. Before touching or replacing any component inside the LX50 server, disconnect all external cables and follow the instructions in "Safety: Before You Remove the Cover" on page 5-2 and "Removing and Replacing the Cover" on page 5-3. Always place the server on a grounded ESD pad and wear a properly grounded antistatic wrist strap.

You can use the cable kit to remove one or more internal server cables. The procedures given below assume that you are removing and replacing all of the cables.

Figure 80. Cable Kit



1. USB cable
2. Frontpanel to Backplane cable
3. SCSI cable
4. Floppy/FP/IDE cable
5. Air Baffle

Removal

1. Disconnect the power cable from the power supply to the SCSI backplane.
2. Disconnect the SCSI cable from the SCSI backplane.
3. Remove the SCSI cable from the clip on the SCSI backplane.
4. Disconnect the SCSI cable from the server board and remove it.
5. Disconnect the Floppy/FP/IDE flex circuit cable from the SCSI backplane.
6. Disconnect the Floppy/FP/IDE flex circuit cable to the server board and remove.

7. Remove the USB cable
   - Remove the USB cable from the chassis clip.
   - Disconnect the USB cable from the front panel board.
   - Disconnect the USB cable from the main board.
   - Unfasten the USB cable from the fan module clips.
8. Disconnect the front panel board cable from the SCSI backplane.
9. Remove the front board panel cable from the chassis clip.
10. Move all cables out of the way.

Installation

1. Install the front panel board cable into the chassis clip.
2. Connect the front panel board cable to the SCSI backplane.
3. Insert the USB cable.
   - Fasten the USB cable to the fan module clips, making sure the cable is not strained in any way.
   - Connect the USB cable to the main board.
   - Connect the USB cable to the front panel board.
   - Fasten the USB cable to the chassis clip.

Caution: Failure to properly route the USB cable can cause it to interfere with the top cover. If the cable is removed and then not placed properly under the cable clamp at the front, it may result in the cover crushing the USB cable and destroying the intrusion sensor on the front panel board.

4. Connect the Floppy/FP/IDE flex circuit cable to the server board.
5. Connect the Floppy/FP/IDE flex circuit cable to the SCSI backplane.
6. Connect the SCSI cable to the server board.
7. Insert the SCSI cable into the clip on the SCSI backplane.
8. Connect the SCSI cable to the SCSI backplane.
9. Connect the power cable from the power supply to the SCSI backplane.

Note: The Comprehensive Test should be run after changing any FRU, CRU, or adding an optional component. See “Run System Diagnostic Test” on page 4-15.

System FRU

Caution: The procedure below is for the attention of qualified service engineers only. Before touching or replacing any component inside the LX50 server, disconnect all external cables and follow the instructions in "Safety: Before You Remove the Cover" on page 5-2 and "Removing and Replacing the Cover" on page 5-3. Always place the server on a grounded ESD pad and wear a properly grounded antistatic wrist strap.

A System FRU is the Sun Cobalt LX50 server Main Board with SCSI backplane, PSU, power supply adapter board, front-panel board, fan module and all cables, in a chassis. The System FRU contains no CPU(s), HDDs, Floppy/CD-ROM combo or DIMMs. The field engineer transfers the customer's CPU(s), HDDs, Floppy/CD-ROM combo and DIMMs to the new assembly. There are special CPU/heatsink procedures that must be followed when disassembling heatsinks from processors (see "Replacing a CPU and Heatsink" on page 5-15).

Note: The Comprehensive Test should be run after changing any FRU, CRU, or adding an optional component. See "Run System Diagnostic Test" on page 4-15.

Troubleshooting the Server

This chapter explains how to detect and isolate faulty components within the Sun Cobalt™ LX50 server. The chapter contains these sections:

Diagnosing System Errors

Use the following tools to help you isolate server problems:

LEDs

You can use the diagnostic LED indications to isolate faults. See "Status LEDs" on page 6-3, "Server Main Board Fault LEDs" on page 6-5, "System ID LEDs" on page 6-6, and "POST LED Indicators" on page 6-12.

Beep Codes

A built-in server speaker indicates failures with audible beeps. See "POST Beep Codes" on page 6-10.

POST Screen Messages

For many failures, the BIOS sends error codes and message to the screen. See "POST Screen Messages" on page 6-7

System Utilities

The following utilities are available to help troubleshoot system errors:

- Platform Confidence Test (PCT). The PCT is used to test major subsystems of the system board.
- System Setup Utility (SSU). The SSU is used to read the System Event Log (SEL).

Platform Confidence Test (PCT)

The PCT consists of up to 31 tests that test the following:

- Processor subsystem
- Memory subsystem
- Input/output subsystem
- Management subsystem

The PCT supplies three testing levels:

- Quick Test. This runs a subset of available tests and identifies processor, memory, cache and hard drives.
- Comprehensive Tests. This runs Quick Tests and identifies keyboard, mouse, ports and controllers.
- Comprehensive Tests with Looping. This runs Comprehensive Tests, continually loops through tests until stopped, and enables identification of intermittently failing FRUs.

For information on how to run the PCT, see "Run System Diagnostic Test" on page 4-15.

System Setup Utility (SSU)

The SSU is intended to help with troubleshooting system errors, and can be used to read the System Event log (SEL).

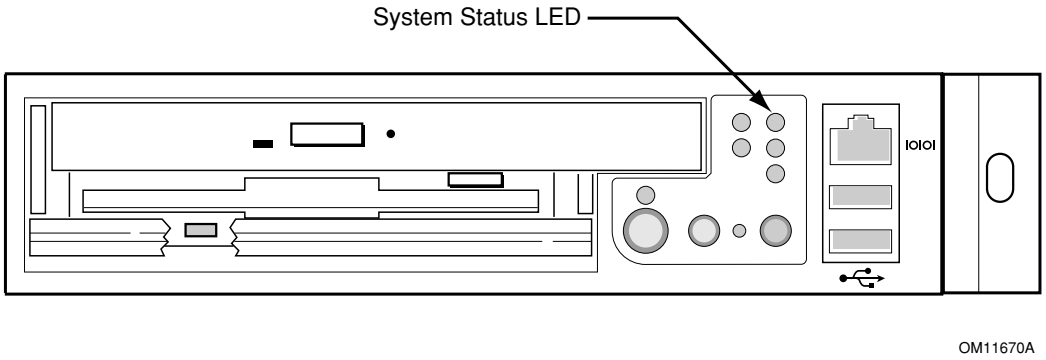
For information on how to run the SSU, see "Using the Service Partition Menu" on page 4-9.

Status LEDs

Front-Panel System Status LED

The front-panel system status LED is located as shown in Figure 81.

Figure 81. Location of Front-Panel System Status LED



The front-panel system status LED has the states indicated in Table 10.

Table 10. System Status LED States

System Status LED State	System Condition
CONTINUOUS GREEN	Indicates the system is operating normally.
BLINKING GREEN	Indicates the system is operating in a degraded condition.
BLINKING AMBER	Indicates the system is in a non-critical condition.
CONTINUOUS AMBER	Indicates the system is in a critical or non-recoverable condition.
NO LIGHT	Indicates POST/system stop.

Critical Condition

A critical condition or non-recoverable threshold crossing is associated with the following events:

- Temperature, voltage, or fan critical threshold crossing.
- Power subsystem failure. The Baseboard[1] Management Controller (BMC) asserts this failure whenever it detects a power control fault (for example, the BMC detects that the system power is remaining on even though the BMC has deasserted the signal to turn off power to the system).
- The system is unable to power up due to incorrectly installed processor(s), or processor incompatibility.
- A satellite controller such as the HSC, or another IMPI-capable device, such as an add-in server management PCI card, sends a critical or non-recoverable state, via the Set Fault Indication command to the BMC.
- Critical Event Logging errors, including System Memory Uncorrectable ECC error and Fatal/Uncorrectable Bus errors, such as PCI SERR and PERR.

1. Baseboard refers to the server Main Board.

Non-Critical Condition

A non-critical condition indicates that at least one of the following conditions is present:

- Temperature, voltage, or fan non-critical threshold crossing.
- Chassis intrusion.
- Satellite controller sends a non-critical state, via the Set Fault Indication command, to the BMC.
- A Set Fault Indication command from the system BIOS. The BIOS may use the Set Fault Indication command to indicate additional, non-critical status such as system memory or CPU configuration changes.

Degraded Condition

A degraded condition indicates that at least one of the following conditions is present:

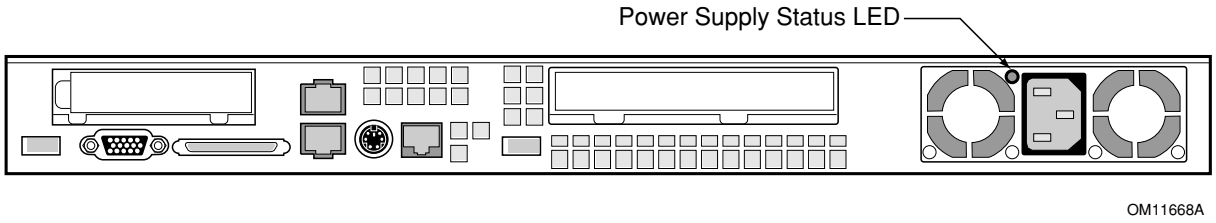
- A processor is disabled by FRB or BIOS.
- BIOS has disabled or mapped out some of the system memory.

Refer to the Sun Cobalt LX50 server Troubleshooting Guide for information on how to isolate the server component responsible for any of the critical, non-critical or degraded conditions listed above.

Rear Panel Power Supply Status LED

The rear-panel power supply status LED is located as shown in Figure 82.

Figure 82. Location of Rear-Panel Power Supply Status LED



The rear-panel power supply status LED has the states indicated in Table 11.

Table 11. Power Supply Status LED States

Power Supply LED State	Power Supply Condition
OFF	No AC power present to power supply
BLINKING GREEN	AC power present, but only the standby outputs are on
GREEN	Power supply DC outputs on and OK
BLINKING AMBER	PSAlert# signal asserted, power supply on
AMBER	Power supply shutdown due to over current, over temperature, over voltage, or undervoltage
AMBER or OFF	Power supply failed and AC fuse open or other critical failure

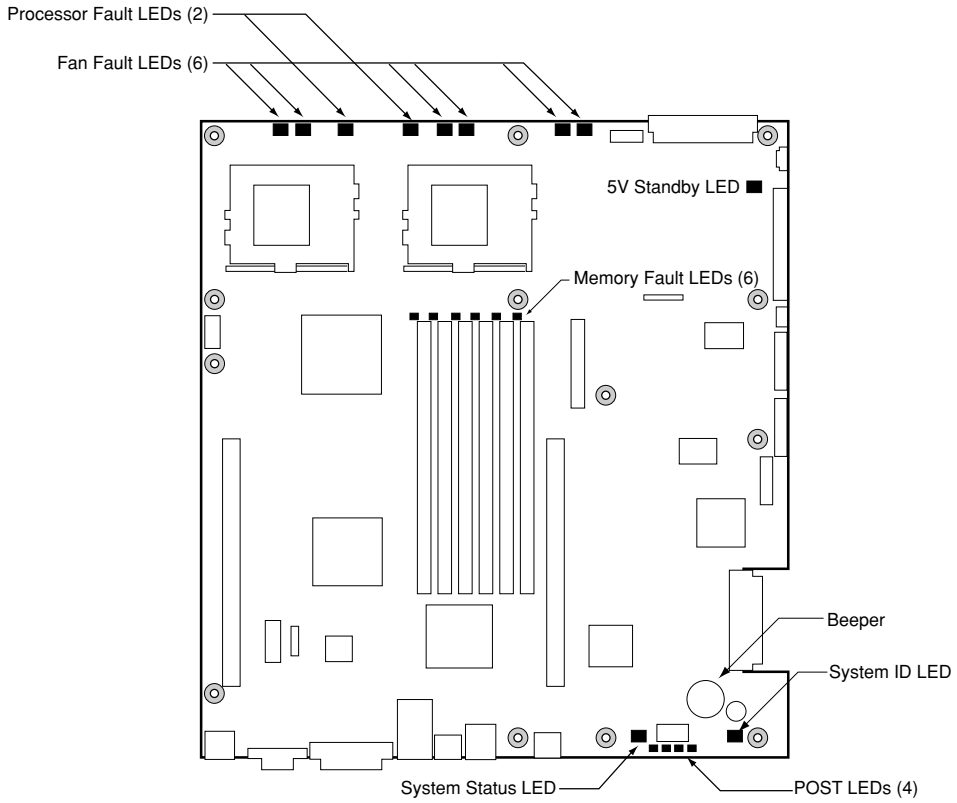
Other LEDs

There are several additional LEDs on the front and rear panels that indicate status and activity. See Chapter 3, “Controls and Indicators,” for more details on these LEDs.

Server Main Board Fault LEDs

There are several fault LEDs built into the server board (see Figure 83). Some of these LEDs are visible only when the chassis cover is removed. The LEDs are explained in this section.

Figure 83. Fault LEDs on the Server Board



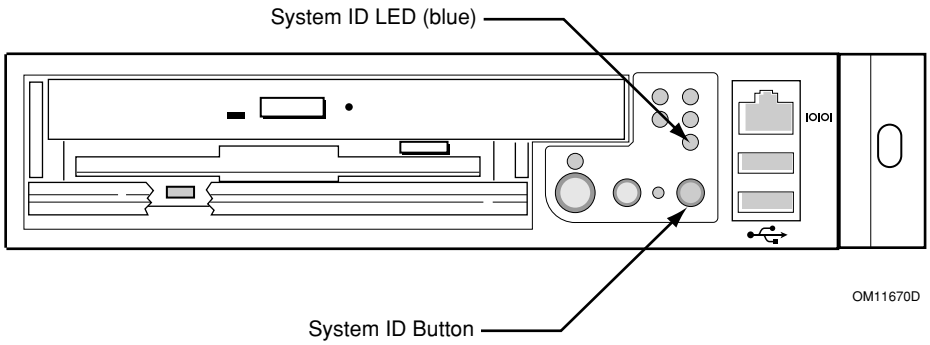
The fault LEDs are summarized below. See the Sun Cobalt LX50 server Troubleshooting Guide for a complete description.

- **POST Code LEDs:** The server board includes an enhanced diagnostic feature that consists of a hardware decoder and four LEDs located at the back of the server board. As the BIOS tests specific areas, the code is displayed at the onset of the BIOS routine. If the BIOS hangs, the display shows which operation was in process.
- **Processor Fault LEDs:** A fault indicator LED is located next to each of the processor sockets. If the server Baseboard Management Controller (BMC) detects a fault in any processor, the corresponding LED illuminates.
- **Memory Fault LEDs:** A fault indicator LED is located next to each of the DIMM sockets. If the BMC detects a fault in a given DIMM, the corresponding LED illuminates.
- **Fan Fault LEDs:** A fault indicator LED is located next to each fan header. When the BMC detects a fan fault, the corresponding LED illuminates. If any fan fault LED is lit, the entire fan module must be replaced.
- **System Status LED:** Indicates functional status of the server board. Glows green when all systems are operating normally. Glows amber when one or more systems are in a fault status. This LED mirrors the function of the system status LED on the front panel.
- **+5 V Standby LED**. This LED is on when the server is plugged into AC power, whether or not the server is actually powered on.

System ID LEDs

A pair of blue LEDs, one at the rear of the server, and one on the front panel, can be used to easily identify the server when it is part of a large stack of servers. A single blue LED located at the back edge of the server board next to the backup battery is visible through the rear panel. The two LEDs mirror each other and can be illuminated by the Baseboard Management Controller (BMC) either by pressing a button on the chassis front panel or through server-management software. When the button is pressed on the front panel, both LEDs illuminate and stay illuminated until the button is pushed again. If the LED is illuminated through a remote System Identify command, the LED turns off after a timeout period. See Figure 83 on page 6-5 for the location of the rear Main Board LED. The front panel ID LED and the ID activation button are shown in Figure 84.

Figure 84. Location of Front-Panel ID LED



Power-On Self Test (POST)

During the power-on self test (POST), the server may indicate a system fault by:

- Displaying error codes and messages at the display screen
- Beeping the speaker in a coded sequence
- Illuminating the POST LEDs, visible from the rear panel, in a coded fashion

POST Screen Messages

During POST, if an error is detected, the BIOS displays an error code and message to the screen. The following tables define POST error codes and their associated messages. The BIOS prompts the user to press a key in case of serious errors. Some of the error messages are preceded by the string “Error” to highlight the fact that the system may be malfunctioning. All POST errors and warnings are logged in the System Event Log (SEL). See “Managing the System Event Log” on page 4-14 for more details on the SEL

Note: All POST errors are logged to the SEL, which is capable of holding over 400 entries. After the SEL is full, no further errors are logged.

Table 12. Standard POST Error Messages and Codes

Error Code	Error Message	Pause On Boot
100	Timer Channel 2 Error	Yes
101	Master Interrupt Controller	Yes
102	Slave Interrupt Controller	Yes
103	CMOS Battery Failure	Yes
104	CMOS Options not Set	Yes
105	CMOS Checksum Failure	Yes
106	CMOS Display Error	Yes
107	Insert Key Pressed	Yes
108	Keyboard Locked Message	Yes
109	Keyboard Stuck Key	Yes
10A	Keyboard Interface Error	Yes
10B	System Memory Size Error	Yes
10E	External Cache Failure	Yes
110	Floppy Controller Error	Yes
111	Floppy A: Error	Yes
112	Floppy B: Error	Yes
113	Hard disk 0 Error	Yes

Table 12. Standard POST Error Messages and Codes (Continued)

Error Code	Error Message	Pause On Boot
114	Hard disk 1 Error	Yes
115	Hard disk 2 Error	Yes
116	Hard disk 3 Error	Yes
117	CD-ROM disk 0 Error	Yes
118	CD-ROM disk 1 Error	Yes
119	CD-ROM disk 2 Error	Yes
11A	CD-ROM disk 3 error	Yes
11B	Date/Time not set	Yes
11E	Cache memory bad	Yes
120	CMOS clear	Yes
121	Password clear	Yes
140	PCI Error	Yes
141	PCI Memory Allocation Error	Yes
142	PCI IO Allocation Error	Yes
143	PCI IRQ Allocation Error	Yes
144	Shadow of PCI ROM Failed	Yes
145	PCI ROM not found	Yes
146	Insufficient Memory to Shadow PCI ROM	Yes

Table 13. Extended POST Error Messages and Codes

Error Code	Error Message	Pause On Boot
8100	Processor 1 failed BIST	No
8101	Processor 2 failed BIST	No
8110	Processor 1 Internal error (IERR)	No
8111	Processor 2 Internal error (IERR)	No
8120	Processor 1 Thermal Trip error	No
8121	Processor 2 Thermal Trip error	No
8130	Processor 1 disabled	No
8131	Processor 2 disabled	No
8140	Processor 1 failed FRB-3 timer	No

Table 13. Extended POST Error Messages and Codes (Continued)

Error Code	Error Message	Pause On Boot
8141	Processor 2 failed FRB-3 timer	No
8150	Processor 1 failed initialization on last boot.	No
8151	Processor 2 failed initialization on last boot.	No
8160	Processor 01: unable to apply BIOS update	Yes
8161	Processor 02: unable to apply BIOS update	Yes
8170	Processor P1:L2 cache Failed	Yes
8171	Processor P2:L2 cache Failed	Yes
8180	BIOS does not support current stepping for Processor P1	Yes
8181	BIOS does not support current stepping for Processor P2	Yes
8190	Watchdog Timer failed on last boot	No
8191	4:1 Core to bus ratio: Processor Cache disabled	Yes
8192	L2 Cache size mismatch	Yes
8193	CPUID, Processor Stepping are different	Yes
8194	CPUID, Processor Family are different	Yes
8195	Front Side Bus Speed mismatch. System Halted	Yes, Halt
8196	Processor Model are different	Yes
8197	CPU Speed mismatch	Yes
8300	Baseboard Management Controller failed to function	Yes
8301	Front Panel Controller failed to Function	Yes
8305	HSC failed to Function	Yes
8420	Intelligent System Monitoring Chassis Opened	Yes
84F1	Intelligent System Monitoring Forced Shutdown	Yes
84F2	Server Management Interface Failed	Yes
84F3	BMC in Update Mode	Yes
84F4	Sensor Data Record Empty	Yes
84FF	System Event Log Full	Yes

POST Beep Codes

The following tables list POST error beep codes. Prior to system video initialization, the BIOS and BMC use these beep codes to notify users of error conditions.

Table 14. BMC-Generated POST Beep Codes

Beep Code[a]	Description
1-5-1-1	FRB failure (processor failure)
1-5-2-1	Empty Processor
1-5-2-2	No Processor
1-5-4-2	Power fault: DC power unexpectedly lost (power control failures)
1-5-4-3	Chipset control failure
1-5-4-4	Power control failure

a. The code indicates the beep sequence; for example, 1-5-1-1 means a single beep, then a pause, then 5 beeps in a row, then a pause, then a single beep, then a pause, and then finally a single beep.

Table 15. BIOS-Generated POST Beep Codes

Beep Code	Error Message	Description
1	Refresh timer failure	The memory refresh circuitry on the Main Board is faulty.
2	Parity error	Parity can not be reset.
3	Base memory failure	Base memory test failure. See Table 16 on page 6-11 for additional error details.
4	System timer	System timer is not operational.
5	Processor failure	Processor failure detected.
6	Keyboard controller Gate A20 failure	The keyboard controller may be bad. The BIOS cannot switch to protected mode.
7	Processor exception interrupt error	The CPU generated an exception interrupt.
8	Display memory read/ write error	The system video adapter is either missing or its memory is faulty. This is not a fatal error.
9	ROM checksum error	System BIOS ROM checksum error.
10	Shutdown register error	Shutdown CMOS register read/write error detected.
11	Invalid BIOS	General BIOS ROM error.

Table 16. POST Memory 3-Beep and LED Error Codes

Beep Code	Debug Port 80h Error Indicator	Diagnostic LED Decoder (G = green, R = red, A = amber)				Meaning
		MSB			LSB	
3	00h	Off	Off	Off	Off	No memory was found in the system
3	01h	Off	Off	Off	G	Memory mixed type detected
3	02h	Off	Off	G	Off	EDO is not supported
3	03h	Off	Off	G	G	First row memory test failure
3	04h	Off	G	Off	Off	Mismatched DIMMs in a row
3	05h	Off	G	Off	G	Base memory test failure
3	06h	Off	G	G	Off	Failure on decompressing post module
3	07h - 0Dh	Off	G	G	Off	Generic Memory Error
		G	Off	Off	Off	
		G	Off	Off	G	
		G	Off	G	Off	
		G	Off	G	G	
		G	G	Off	Off	
		G	G	Off	G	
3	0Eh	G	G	G	Off	SMBUS protocol error
3	0Fh - 0FFh	All other combinations				Generic memory error.

BIOS Recovery Beep Codes

In rare cases, when the system BIOS has been corrupted, a BIOS recovery process must be followed to restore system operability. During recovery mode, the video controller will not be initialized. One high-pitched beep announces the start of the recovery process. The entire process takes two to four minutes. A successful update ends with two high pitched beeps. In the event of a failure, two short beeps are generated and a flash code sequence of 0E9h, 0EAh, 0EBh, 0ECh, and 0EFh appears at the Port 80 diagnostic LEDs.

Table 17. BIOS Recovery Beep Codes

Beep Code	Error Message	Port 80h LED Indicators	Description
1	Recovery started		Start recovery process.
2	Recovery boot error	Flashing series of post codes: E9h, EAh, EBh, ECh, EFh	Unable to boot to floppy, ATAPI, or ATAPI CDROM. Recovery process will retry.
Series of long low-pitched single beeps	Recovery failed	EEh	Unable to process valid BIOS recovery images. BIOS already passed control to OS and flash utility.
Two long high pitched beeps	Recovery complete	EEh	BIOS recovery succeeded, ready for powerdown, reboot.

POST LED Indicators

To help diagnose POST failures, a set of four bi-color diagnostic LEDs is located on the back edge of the server Main Board. Each of the four LEDs can have one of four states: Off, Green, Red, or Amber.

The LED diagnostics feature consists of a hardware decoder and four dual color LEDs. During POST, the LEDs display all normal Port80 codes representing the progress of the BIOS POST. Each postcode is represented by a combination of colors from the four LEDs. The LEDs are in pairs of green and red. The post codes are broken into two nibbles, an upper and a lower nibble. Each bit in the upper nibble is represented by a red LED and each bit in the lower nibble is represented by a green LED. If both bits are set in the upper and lower nibble then both red and green LEDs are lit, resulting in an amber color. Likewise, if both bits are clear then the red and green LEDs are off.

During the POST process, each light sequence represents a specific Port-80 POST code. If a system should hang during POST, the Diagnostic LEDs present the last test executed before the hang. When reading the LEDs, the LEDs should be observed from the back of the system. The most significant bit (MSB) is the first LED on the left, and the least significant bit (LSB) is the last LED on the right.

Note: When comparing a diagnostic LED color string from the server Main Board to those listed in the diagnostic LED decoder in the following tables, the LEDs on the Main Board should be referenced when viewed by looking into the system from the back. Reading the LEDs from left to right, the most-significant bit is located on the left.

Table 18. POST LEDs Code Table (Port 80h Codes)

POST Code	Diagnostic LED Decoder (G = green, R = red, A = amber)				Description
	MSB			LSB	
07h	Off	G	G	G	Uncompress various BIOS modules.
08h	G	Off	Off	Off	Verify password checksum.

Table 18. POST LEDs Code Table (Port 80h Codes) (Continued)

POST Code	Diagnostic LED Decoder (G = green, R = red, A = amber)				Description
08h	G	Off	Off	Off	Verify CMOS checksum.
07h	Off	G	G	G	Read microcode updates from BIOS ROM.
07h	Off	G	G	G	Initializing the processors. Set up processor registers. Select least featured processor as the BSP.
0Bh	G	Off	G	G	Hook before the keyboard BAT command is issued.
0Ch	G	G	Off	Off	Keyboard Controller Test: the keyboard controller input buffer is free. Next, issuing the BAT command to the keyboard controller
0Eh	G	G	G	Off	Init after keyboard test: the keyboard controller BAT command result has been verified. Next, performing any necessary initialization after the keyboard controller BAT command test.
0Fh	G	G	G	G	Write Command Byte 8042: the initialization after the keyboard controller BAT command test is done. The keyboard command byte will be written next.
10h	Off	Off	Off	R	Keyboard Init: the keyboard controller command byte is written. Next, issuing the pin 23 and 24 blocking and unblocking commands
10h	Off	Off	Off	R	Disable and initialize 8259.
11h	Off	Off	Off	A	Detect configuration mode, such as CMOS clear.
13h	Off	Off	G	A	Chipset initialization before CMOS initialization.
19h	G	Off	Off	A	Init System Timer: the 8254 timer test is over. Starting the memory refresh test next
1Ah	G	Off	G	R	Check Refresh Toggle: the memory refresh line is toggling. Checking the 15 second on/off time next.
23h	Off	Off	A	G	Setup Interrupt Vectors: reading the 8042 input port and disabling the MEGAKEY Green PC feature next. Making the BIOS code segment writable and performing any necessary configuration before initializing the interrupt vectors.
24h	Off	G	R	Off	Before Vector: configuration is required before interrupt vector initialization has completed. Interrupt vector initialization is about to begin.
25h	Off	G	R	G	Init interrupt Vectors: interrupt vector initialization is done.
F2h	R	R	A	R	Initialize SMM handler. Initialize USB emulation.
F5h	R	A	R	A	Validate NVRAM areas. Restore from backup if corrupted.
12h	Off	Off	G	R	Load defaults in CMOS RAM if bad checksum or CMOS clear jumper is detected.
12h	Off	Off	G	R	Initializing APP CMOS RAM for appliance servers only.
12h	Off	Off	G	R	Check point after CMOS initialized.
27h	Off	G	A	G	Validate date and time in RTC.
F4h	R	A	R	R	Load micro code to all CPUs.
F6h	R	A	A	R	Scan SMBIOS GPNV areas.

Table 18. POST LEDs Code Table (Port 80h Codes) (Continued)

POST Code	Diagnostic LED Decoder (G = green, R = red, A = amber)				Description
15h	Off	G	Off	A	8254 timer test on channel 2.
15h	Off	G	Off	A	Enable 8042.ve
15h	Off	G	Off	A	Keyboard reset.
26h	Off	G	A	Off	Initialize LCD, if supported.
28h	G	Off	R	Off	Set Video Mode: initialization before setting the video mode is complete. Configuring the monochrome mode and color mode settings next.
29h	G	Off	R	G	Debugger hook.
2Ah	G	Off	A	Off	Init PCI devices and Main Board devices. Pass control to video BIOS. Start serial console redirection.
2Bh	G	Off	A	G	Platform hook.
2Dh	G	G	R	G	Initialize AMI display manager module. Initialize support code for headless system if no video controller is detected.
2Dh	G	G	R	G	Scan flash for logos and Initialize logo data areas.
30h	Off	Off	R	R	Detect PS/2 mouse.
30h	Off	Off	R	R	Hook after c000 ROM control.
2Eh	R	R	A	Off	Set up video parameters in BIOS data area.
37h	Off	G	A	A	Activate ADM: the display mode is set. Displaying the power-on message next.
37h	Off	G	A	A	Initialize language module. Display splash logo.
37h	Off	G	A	A	Display Sign-On Message, BIOS ID and processor information.
38h	G	Off	R	R	Detect USB mouse: initializing the bus input, and general devices next, if present.
34h	Off	G	R	R	Reset IDE controllers.
39h	G	Off	R	A	Displaying bus initialization error messages.
3Ah	G	Off	A	R	Display Setup Message: the new cursor position has been read and saved. Displaying the hit setup message next.
40h	Off	R	Off	Off	Ensure timer keyboard interrupts are on.
4Bh	G	R	G	G	Memory Test: the amount of memory above 8 MB has been found and verified. Checking for a soft reset and clearing the memory below 8 MB for the soft reset next. If this is a power-on situation, going to checkpoint 4Eh next.
57h	Off	A	G	A	Chipset hook after memory size.
53h	Off	R	A	A	Display processor cache size.
54h	Off	A	Off	R	Disable parity and NMI reporting.
60h	Off	R	R	Off	Test 8237 DMA Controller: the DMA page register test passed. Performing the DMA Controller 1 base register test next.

Table 18. POST LEDs Code Table (Port 80h Codes) (Continued)

POST Code	Diagnostic LED Decoder (G = green, R = red, A = amber)				Description
65h	Off	A	R	G	Init 8237 DMA Controller: the DMA controller 2 base register test passed. Programming DMA controllers 1 and 2 next.
7Fh	G	A	A	A	Extended NMI Enable: extended NMI source enabling is in progress.
80h	R	Off	Off	Off	Enable Mouse and Keyboard: the keyboard test has started. Clearing the output buffer and checking for stuck keys. Issuing the keyboard reset command next.
81h	R	Off	Off	G	Keyboard Interface Test: a keyboard reset error or stuck key was found. Issuing the keyboard controller interface test command next.
82h	R	Off	G	Off	Check Stuck Key Enable Keyboard: the keyboard controller interface test completed. Writing the command byte and initializing the circular buffer next.
83h	R	Off	G	G	Disable Parity NMI: the command byte was written and global data initialization has completed. Checking for a locked key next
84h	R	G	Off	Off	Verify RAM Size: checking for a memory size mismatch with CMOS RAM data next
84h	R	G	Off	Off	Check ATA cable type presence of ATAPI devices.
84h	R	G	Off	Off	Display keyboard message.
16h	Off	G	G	R	Display IDE mass storage devices.
17h	Off	G	G	A	Display USB mass storage devices.
85h	R	G	Off	G	Report the first set of POST errors to error manager.
86h	R	G	G	Off	Boot Password Check: the password was checked. Performing any required programming before Setup next.
8Dh	A	G	Off	G	OEM Patch 9.
8Dh	A	G	Off	G	Set Printer RS-232 timeout
8Dh	A	G	Off	G	Init FDD Devices: resetting the hard disk controller next.
95h	R	G	Off	A	Lock out PS/2 keyboard/mouse if unattended start is enabled.
92h	R	Off	G	R	Option ROM scan.
98h	A	Off	Off	R	Init Boot Devices: the adapter ROM had control and has now returned control to BIOS POST. Performing any required processing after the option ROM returned control.
9Bh	A	Off	G	A	Float Processor Initialize: performing any required initialization before the coprocessor test next.
9Eh	A	G	G	R	Enable Interrupts 0,1,2: checking the extended keyboard, keyboard ID, and NUM Lock key next. Issuing the keyboard ID command next.
A2h	R	Off	A	Off	Report second set of POST errors to error messenger.
86h	R	G	G	Off	Prepare And Run Setup: error manager displays and logs POST errors. Waits for user input for certain errors. Execute setup.
8Bh	A	Off	G	G	Set base expansion memory size.

Table 18. POST LEDs Code Table (Port 80h Codes) (Continued)

POST Code	Diagnostic LED Decoder (G = green, R = red, A = amber)				Description
8Ch	A	G	Off	Off	Adjust Setup: programming the Setup options next.
A5h	R	G	R	G	Set display mode.
A7h	R	G	A	G	OEM Patch 12.
A7h	R	G	A	G	Build SMBIOS table and MP tables.
A7h	R	G	A	G	Program hot key and timeout settings in keyboard controller.
A7h	R	G	A	G	Processor initialization before boot.
A7h	R	G	A	G	Copy required language strings to shadow RAM.
AAh	A	Off	A	Off	Clear video screen.
00h	Off	Off	Off	Off	One beep to indicate end of POST. No beep if silent boot is enabled.
00h	Off	Off	Off	Off	POST completed. Passing control to INT 19h boot loader next.

Contacting Technical Support

For technical support, call the phone numbers listed below, according to your location.

United States	(800) 526-0484
UK	Tel: +44 8760 600 3222
France	Tel: +33 1 34 03 50 80
Germany	Tel: +49 1805 20 22 41
Italy	Tel: +39 02 92595228 Free # 800605228
Spain	Tel: 011 34 91 767 60 00

In Europe, the Middle East, and Africa, see the following link for local country telephone numbers:

`http://www.sun.com/service/contacting/solution.html`

Specifications

This chapter summarizes the specifications and capabilities of the Sun Cobalt™ LX50 server. The capabilities require software to enable them.

CPU
Dual Intel Pentium III processors

- 32KB L1 Cache (ECC)
- 512KB L2 Advanced Transfer Cache (ECC)
- 133 MHz Front Side Bus
- Supports CPU Speeds to 1.4 GHz

Chipset
ServerWorks ServerSet* III HE-SL Chipset

- HE-SL North Bridge
- CIOB20 I/O Bridge
- CSB5 South Bridge
- Supports up to six PC-133 compliant registered ECC SDRAM DIMMs
- Up to 6 GB main memory with 128-bit data path to North Bridge
- Two rear mounted and two front mounted Universal Serial Bus (USB 1.1) ports
- X-Bus segment with one embedded device:
- 4MB Flash ROM device for system BIOS (Intel 32 megabit 28F320C3 Flash ROM)
- One IDE connector, supporting one ATA-33 compatible devices

I/O Subsystems
Three separate and independent PCI buses

Segment A: 32 bit, 33 MHz, 5 V (P32-A) with four embedded devices

- ATI Rage* XL 2D/3D video controller with 8 MB of SDRAM
- Two Intel 10/100 82550PM Fast Ethernet Controllers
- ServerWorks CSB5 South Bridge

Segment B: 64 bit, 66 MHz, 3.3 V, (P64-B) supporting the following configuration

- One full size PCI 2.2 Slot capable of supporting full length PCI add-in cards
- Dual-channel Adaptec AIC-7899W wide Ultra-160 SCSI Controller
- Zero Channel RAID (ZCR) adapter support

Segment C: 64 bit, 66/33 MHz, 3.3 V (P64-C) supporting the following device

- One Low Profile PCI 2.2 expansion slot

LPC: (Low Pin Count) bus segment with two embedded devices

- Baseboard[1] Management Controller (BMC)
- Super I/O controller chip providing legacy PC I/O functions

System I/O Port Summary

- Front and rear RJ-45 serial ports (shared COM2 interface)
- Internal serial port header (COM1 interface)
- Four USB ports: two front mount and two rear mount
- Rear mount VGA connector
- Rear mount PS/2 keyboard and mouse combo connector
- Rear mount access to dual RJ-45 10/100 Ethernet ports
- Rear mount high density SCSI Bus A connector (Bus B is internal access only)

1. Baseboard refers to the server Main Board.

Video Capabilities

The server supports all standard IBM VGA modes. The following table shows the 2D/3D modes supported for both CRT and LCD. Table 19 below specifies the minimum memory requirement for various display resolution, refresh rates, and color depths.

Table 19. Video Modes

2D Mode	**Refresh Rate (Hz)**	**2D Video Mode Support**			
		8 bpp	**16 bpp**	**24 bpp**	**32 bpp**
640x480	60, 72, 75, 90, 100	Supported	Supported	Supported	Supported
800x600	60, 70, 75, 90, 100	Supported	Supported	Supported	Supported
1024x768	60, 72, 75, 90, 100	Supported	Supported	Supported	Supported
1280x1024	43, 60	Supported	Supported	Supported	Supported
1280x1024	70, 72	Supported	–	Supported	Supported
1600x1200	60, 66	Supported	Supported	Supported	Supported
1600x1200	76, 85	Supported	Supported	Supported	–
1600x1200	60, 66, 76, 85	Supported	–	–	–
3D Mode	**Refresh Rate (Hz)**	**2D Video Mode Support With Z Buffer Enabled**			
		8 bpp	**16 bpp**	**24 bpp**	**32 bpp**
640x480	60, 72, 75, 90, 100	Supported	Supported	Supported	Supported
800x600	60, 70, 75, 90, 100	Supported	Supported	Supported	Supported
1024x768	60, 72, 75, 90, 100	Supported	Supported	Supported	Supported
1280x1024	43, 60, 70, 72	Supported	Supported	–	–
3D Mode	**Refresh Rate (Hz)**	**2D Video Mode Support With Z Buffer Disabled**			
		8 bpp	**16 bpp**	**24 bpp**	**32 bpp**
640x480	60,72,75,90,100	Supported	Supported	Supported	Supported
800x600	60,70,75,90,100	Supported	Supported	Supported	Supported
1024x768	60,72,75,90,100	Supported	Supported	Supported	Supported
1280x1024	43,60,70,72	Supported	Supported	Supported	–

SCSI Capabilities

Note: Sun Linux 5.0 supports neither hot-swapping nor hot-plugging.

- Supports up to three internal Ultra160 (160MB/s) LVDS hard drives
  - Requires SCA (80-pin) drive connector
  - LVDS signal interface
- Supports connection of external storage chassis through rear panel LVDS connector
- Supports optional zero channel RAID adapter in full size PCI slot

The server provides an embedded dual-channel SCSI bus through the use of the Adaptec AIC-7899W SCSI controller, which is capable of supporting up to 160 MB/sec SCSI transfers. The AIC-7899W controller contains two independent SCSI controllers that share a single 64-bit, 66-MHz PCI bus master interface as a multifunction device, packaged in a 456-pin BGA.

Internally, each controller is identical and is capable of operation using either 16-bit SE or Low-Voltage Differential (LVD) SCSI providing 40 MBps (Ultra-wide SE), 80 MBps (Ultra 2), or 160 MBps (Ultra 160/m). Each controller has its own set of PCI configuration registers and SCI I/O registers. The server board supports disabling of the on-board SCSI controller through the BIOS Setup menu. The internal SCSI slots are intended for use with Sun Ultra160 LVDS SCSI hard disk drives.

The server provides active terminators, termination voltage, a resettable fuse, and a protection diode for both SCSI channels. By design, the on-board termination is always enabled. No ability is provided to disable termination. Each of the two SCSI channels has a connector interface. Channel A is an external high-density connector located on the back edge of the server Main Board, and Channel B is a standard 68-pin internal connector.

Server Management Features

- Baseboard Management Controller (BMC), which provides monitoring, alerting, and logging of critical system information obtained from embedded sensors on the server board. Also provides in band and out-of-band Lights-out and remote-management capability.
- One rear-mount and one front-mount low-profile RJ-45 serial 2 port connection (compatible common serial line concentrators (for example, Cisco and Lantronix).
- Five variable speed tachometer fans (in a single fan module) and thermal sensors throughout the server.
- Fault/Status LEDs located throughout the server board for simple fault isolation.
- Multiple server management headers providing on-board interconnects to server management features.
- SSI-compliant connectors for SSI interface support: front panel, floppy, and ATA-33.
- IPMI 1.5 and DMI 2.0 standard interfaces to management functions.
- Dedicated service partition on hard disk.

Power Supply

- 250W ATX supply
- Dual (redundant) fans
- Status LED

Dimensions

- Height: 1.693 in. (43 mm)
- Width 16.93 in. (430 mm)
- Depth: 23.89 in. (609.2 mm)

Weight

- Approximately 11.8 kg (26 lbs) (unpacked 2-drive server)
- Approximately 40 lbs. (packaged)

Mounting Options

- Mid mount
- Four point mount
- Front mount (with limitations)

Environmental

Ambient Temperature

- Operating Temperature: +5° C to +35° C
- Non-Operating Temperature: -40° C to +65° C

Relative Humidity

- Operating Humidity: 10% to 90% at 27˚ C non-condensing
- Non-Operating Humidity: 93% at 38˚ C non-condensing

Vibration

- Operating Vibration: 0.15 G z-axis; 0.10 G x- and y-axis, 5 to 500 Hz sine
- Non-Operating Vibration: 0.50 G z-axis; 0.25 G x- and y-axis, 5 to 500 Hz sine

Shock

Operating Shock: 3 G, 11 ms, half-sine

Acoustics

< 45 dBA in an idle state in a normal office environment (65˚ F to 75˚ F)