Intel® Server Platform SRSH4
Product Guide

Order Number: A76345-003

A Guide for Technically Qualified Assemblers of Intel® Identified Subassemblies and Products

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1 Important Safety Information

Important Safety Information

Only a technically qualified person shall access, integrate, configure, and service this product.

Intended Application Uses

This product was evaluated as Information Technology Equipment (ITE), which may be installed in offices, schools, computer rooms, and similar commercial type locations. The suitability of this product for other Product Categories and Environments (such as medical, industrial, alarm systems, and test equipment), other than an ITE application, may require further evaluation.

Safety Instructions and Information

To avoid personal injury or property damage, before you begin installing the product, read, observe, and adhere to all of the following safety instructions and information. The following safety symbols may be used throughout this product guide, and may be marked on the product and or its packaging.

Table 1.   Safety Symbols

CAUTION	Indicates the presence of a hazard that may cause minor personal injury or property damage if the CAUTION is ignored.
WARNING	Indicates the presence of a hazard that may result in serious injury or death if the WARNING is ignored.
⚠	Indicates potential hazard if hazard symbol is ignored.
⚡	Indicates shock hazards that result in serious injury or death if safety instructions are not followed.
♨	Indicates hot components or surfaces.
⌖	Indicates do not touch fan blades, may result in injury.
⌁	Indicates product has multiple power cords, and all power cords must be unplugged to disconnect AC power or mains.
⌁	Indicates ESD sensitive components. Use of an antistatic wrist strap connected to ground is recommended.

Checking the Power Cords

⚠️⚠️ WARNING

To avoid electrical shock, do not attempt to modify or use the supplied AC power cord(s), if they are not the exact type required. If a power cord(s) supplied is not compatible with the AC wall outlet in your region, get one that meets the following criteria:

- The power cord must be properly rated for the AC voltage in your region.
- The power cord plug cap must have an electrical current rating that is at least 125% of the electrical current rating of the product.
- The power cord plug cap that plugs into the wall socket-outlet must have a grounding-type male plug designed for use in your region.
- The power cord must have safety certifications for your region, and shall be marked with the certification markings.
- The power cord plug cap that plugs into the AC receptacle on the power supply must be an IEC 320, sheet C13, type female connector.
- In Europe, the power cord must be less than 4.5 meters (14.76 feet) long, and it must be flexible <HAR> (harmonized) or VDE certified cordage to comply with the chassis' safety certifications.

The power supply cord(s) is the main disconnect device to AC power. The socket outlet(s) shall be near the equipment and shall be readily accessible for disconnection.

Multiple Power Cords

⚠️⚠️ WARNING

To avoid electrical shock, disconnect all AC power cords before accessing inside the system.

Earth Grounded Socket-Outlets

⚠️⚠️ WARNING

To avoid electrical shock, the system power cord(s) must be plugged into socket-outlet(s) that is provided with a suitable earth ground. The system will be provided with the following marking:

Connect only to properly earthed socket outlet.
Apparaten skall anslutas till jordat uttag när den ansluts till ett nätverk.

Before You Remove the Access Cover

⚠⚠ WARNING

To avoid personal injury or property damage, the following safety
instructions apply whenever accessing inside the product:

- Turn off all peripheral devices connected to this product.
- Turn off the system by pressing the power button on the front of the product.
- Disconnect the AC power by unplugging all AC power cords from the system or wall outlet.
- Disconnect all cables and telecommunication lines that are connected to the system.
- Retain all screws or other fasteners when removing access cover(s). Upon completion of accessing inside the product, refasten access cover with original screws or fasteners.
- Do not access inside power supply. There are no serviceable parts in the power supply. Return to manufacturer for servicing.

Power Supply Modules

⚠⚠ CAUTION

Power supply modules have double-pole/neutral fusing.

Fans

⚠⚠ WARNING

To avoid injury do not contact moving fan blades.

Electrostatic Discharge (ESD)

⚠⚠ CAUTION

Perform the procedures in this chapter only at an electrostatic discharge
(ESD) workstation, because the server components can be extremely
sensitive to ESD. If no such station is available, you can reduce the risk of
electrostatic discharge ESD damage by doing the following:

- Wear an antistatic wrist strap and attach it to a metal part of the server.
- Touch the metal on the server chassis before touching the server components.
- Keep part of your body in contact with the metal server chassis to dissipate the static charge while handling the components.
- Avoid moving around unnecessarily.

- Hold the server components (especially boards) only by the edges.
- Place the server components on a grounded, static-free surface. Use a conductive foam pad if available but not the component wrapper.
- Do not slide the components over any surface.

Cooling and Airflow

⚠ **CAUTION**

For proper cooling and airflow, always install all access covers before turning on the system. Operating the system for longer than five minutes without the covers in place can cause overheating and damage to system components.

Lifting and Moving

⚠ **CAUTION**

Do not attempt to lift or move the server by the handles on the power supplies.

Equipment Rack Precautions

Follow the rack manufacturer's safety and installation instructions for proper rack installation. The following additional rack safety installation measures shall be considered:

⚠ **ANCHOR THE EQUIPMENT RACK**

The equipment rack must be anchored to an unmovable suitable support to prevent the rack from falling over when one or more systems are fully extended out of the rack assembly. You must also consider the weight of any other devices installed in the rack assembly. The equipment rack must be installed according to the manufacturer's instructions.

⚠ **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 system(s).

⚠ **GROUNDING THE RACK INSTALLATION**

To avoid the potential for an electrical shock hazard, the rack assembly itself must be suitably earth grounded, according to your local regional electrical codes. This typically will require the rack to have its own separate earth ground. We recommend you consult your local approved electrician.

⚠ OVER CURRENT PROTECTION

The system is designed to operate on a 20A AC voltage source that is provided with 20A over current protection. If the AC source for the rack exceeds 20A over current protection, each system must be provided with 20A or less over current supplemental protection. The supplementary over current protection must have the appropriate regional safety certifications for the over current application.

⚠ TEMPERATURE LIMITS

The operating temperature of the system, when installed in the rack, must not go below 10 °C (50 °F) or rise above 35 °C (95 °F). Extreme fluctuations in temperature may cause a variety of problems in system, and safety limits may be broken.

⚠ VENTILATION CONSIDERATIONS

The equipment rack must provide sufficient airflow to the front of the system to maintain proper cooling. The rack selected and the ventilation provided must be suitable to the environment in which the system will be used.

Important Set-Up Safety Information

⚠ WARNING: ENGLISH (US)

⚠ AVERTISSEMENT: FRANÇAIS

⚠ WARNUNG: DEUTSCH

⚠ AVVERTENZA: ITALIANO

⚠ ADVERTENCIAS: ESPAÑOL

⚠️ WARNING: English (US)
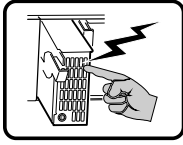
The power supply in this product contains no user-serviceable parts. There may be more than one supply in this product. Refer servicing only to qualified personnel.
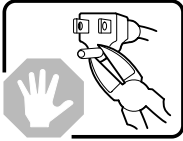
Do not attempt to modify or use the supplied AC power cord if it is not the exact type required. A product with more than one power supply will have a separate AC power cord for each supply.
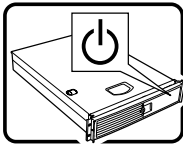
The power button on the system does not turn off system AC power. To remove AC power from the system, you must unplug each AC power cord from the wall outlet or power supply.

The power cord(s) is considered the disconnect device to the mains (AC) power. The socket outlet that the system plugs into shall be installed near the equipment and shall be easily accessible.

SAFETY STEPS: Whenever you remove the chassis covers to access the inside of the system, follow these steps:

1. Turn off all peripheral devices connected to the system.
2. Turn off the system by pressing the power button.
3. Unplug all AC power cords from the system or from wall outlets.
4. Label and disconnect all cables connected to I/O connectors or ports on the back of the system.
5. Provide some electrostatic discharge (ESD) protection by wearing an antistatic wrist strap attached to chassis ground of the system—any unpainted metal surface—when handling components.
6. Do not operate the system with the chassis covers removed.
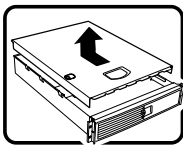
After you have completed the six SAFETY steps above, you can remove the system covers. To do this:

1. Unlock and remove the padlock from the back of the system if a padlock has been installed.
2. Remove and save all screws from the covers.
3. Remove the covers.
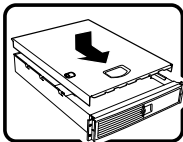
For proper cooling and airflow, always reinstall the chassis covers before turning on the system. Operating the system without the covers in place can damage system parts. To install the covers:

1. Check first to make sure you have not left loose tools or parts inside the system.
2. Check that cables, add-in boards, and other components are properly installed.
3. Attach the covers to the chassis with the screws removed earlier, and tighten them firmly.
4. Insert and lock the padlock to the system to prevent unauthorized access inside the system.
5. Connect all external cables and the AC power cord(s) to the system.

continued

⚠ **WARNING: English (US)** (Continued)
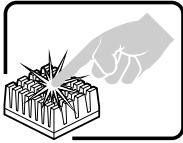
A microprocessor and heat sink may be hot if the system has been running. Also, there may be sharp pins and edges on some board and chassis parts. Contact should be made with care. Consider wearing protective gloves.
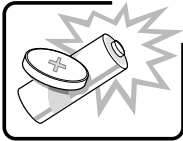
Danger of explosion if the battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the equipment manufacturer. Dispose of used batteries according to manufacturer's instructions.
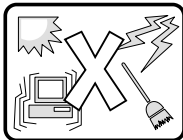
The system is designed to operate in a typical office environment. Choose a site that is:

- Clean and free of airborne particles (other than normal room dust).

- Well ventilated and away from sources of heat including direct sunlight.

- Away from sources of vibration or physical shock.

- Isolated from strong electromagnetic fields produced by electrical devices.

- In regions that are susceptible to electrical storms, we recommend you plug your system into a surge suppresser and disconnect telecommunication lines to your modem during an electrical storm.

- Provided with a properly grounded wall outlet.

- Provided with sufficient space to access the power supply cord(s), because they serve as the product's main power disconnect.

⚠ AVERTISSEMENT: Français
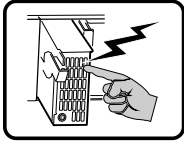
Le bloc d'alimentation de ce produit ne contient aucune pièce pouvant être réparée par l'utilisateur. Ce produit peut contenir plus d'un bloc d'alimentation. Veuillez contacter un technicien qualifié en cas de problème.
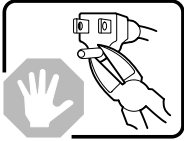
Ne pas essayer d'utiliser ni modifier le câble d'alimentation CA fourni, s'il ne correspond pas exactement au type requis. Le nombre de câbles d'alimentation CA fournis correspond au nombre de blocs d'alimentation du produit.
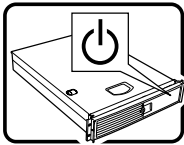
Notez que le commutateur CC de mise sous tension /hors tension du panneau avant n'éteint pas l'alimentation CA du système. Pour mettre le système hors tension, vous devez débrancher chaque câble d'alimentation de sa prise.

CONSIGNES DE SÉCURITÉ -Lorsque vous ouvrez le boîtier pour accéder à l'intérieur du système, suivez les consignes suivantes:

1. Mettez hors tension tous les périphériques connectés au système.

2. Mettez le système hors tension en mettant l'interrupteur général en position OFF (bouton-poussoir).

3. Débranchez tous les cordons d'alimentation c.a. du système et des prises murales.

4. Identifiez et débranchez tous les câbles reliés aux connecteurs d'E-S ou aux accès derrière le système.

5. Pour prévenir les décharges électrostatiques lorsque vous touchez aux composants, portez une bande antistatique pour poignet et reliez-la à la masse du système (toute surface métallique non peinte du boîtier).

6. Ne faites pas fonctionner le système tandis que le boîtier est ouvert.
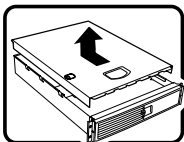
Une fois TOUTES les étapes précédentes accomplies, vous pouvez retirer les panneaux du système. Procédez comme suit:

1. Si un cadenas a été installé sur à l'arrière du système, déverrouillez-le et retirez-le.

2. Retirez toutes les vis des panneaux et mettez-les dans un endroit sûr.

3. Retirez les panneaux.
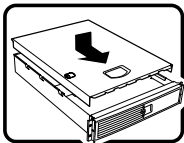
Afin de permettre le refroidissement et l'aération du système, réinstallez toujours les panneaux du boîtier avant de mettre le système sous tension. Le fonctionnement du système en l'absence des panneaux risque d'endommager ses pièces. Pour installer les panneaux, procédez comme suit:

1. Assurez-vous de ne pas avoir oublié d'outils ou de pièces démontées dans le système.

2. Assurez-vous que les câbles, les cartes d'extension et les autres composants sont bien installés.

3. Revissez solidement les panneaux du boîtier avec les vis retirées plus tôt.

4. Remettez le cadenas en place et verrouillez-le afin de prévenir tout accès non autorisé à l'intérieur du système.

5. Rebranchez tous les cordons d'alimentation c. a. et câbles externes au système.
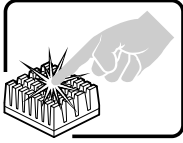
Le microprocesseur et le dissipateur de chaleur peuvent être chauds si le système a été sous tension. Faites également attention aux broches aiguës des cartes et aux bords tranchants du capot. Nous vous recommandons l'usage de gants de protection.
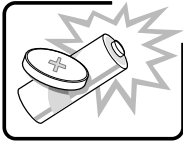
Danger d'explosion si la batterie n'est pas remontée correctement. Remplacer uniquement avec une batterie du même type ou d'un type équivalent recommandé par le fabricant. Disposez des piles usées selon les instructions du fabricant.
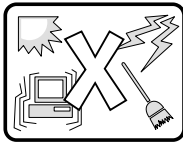
Le système a été conçu pour fonctionner dans un cadre de travail normal. L'emplacement choisi doit être:

- Propre et dépourvu de poussière en suspension (sauf la poussière normale).
- Bien aéré et loin des sources de chaleur, y compris du soleil direct.
- A l'abri des chocs et des sources de vibrations.
- Isolé de forts champs électromagnétiques géenérés par des appareils électriques.
- Dans les régions sujettes aux orages magnétiques il est recomandé de brancher votre système à un supresseur de surtension, et de débrancher toutes les lignes de télécommunications de votre modem durant un orage.
- Muni d'une prise murale correctement mise à la terre.
- Suffisamment spacieux pour vous permettre d'accéder aux câbles d'alimentation (ceux-ci étant le seul moyen de mettre le système hors tension).

⚠ WARNUNG: Deutsch
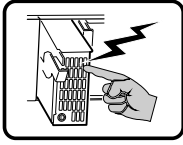
Benutzer können am Netzgerät dieses Produkts keine Reparaturen vornehmen. Das Produkt enthält möglicherweise mehrere Netzgeräte. Wartungsarbeiten müssen von qualifizierten Technikern ausgeführt werden.
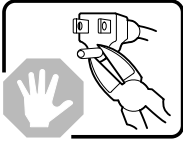
Versuchen Sie nicht, das mitgelieferte Netzkabel zu ändern oder zu verwenden, wenn es sich nicht genau um den erforderlichen Typ handelt. Ein Produkt mit mehreren Netzgeräten hat für jedes Netzgerät ein eigenes Netzkabel.
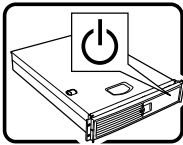
Der Wechselstrom des Systems wird durch den Ein-/Aus-Schalter für Gleichstrom nicht ausgeschaltet. Ziehen Sie jedes Wechselstrom-Netzkabel aus der Steckdose bzw. dem Netzgerät, um den Stromanschluß des Systems zu unterbrechen.

SICHERHEISMASSNAHMEN: Immer wenn Sie die Gehäuseabdeckung abnehmen um an das Systeminnere zu gelangen, sollten Sie folgende Schritte beachten:

1. Schalten Sie alle an Ihr System angeschlossenen Peripheriegeräte aus.

2. Schalten Sie das System mit dem Hauptschalter aus.

3. Ziehen Sie den Stromanschlußstecker Ihres Systems aus der Steckdose.

4. Auf der Rückseite des Systems beschriften und ziehen Sie alle Anschlußkabel von den I/O Anschlüssen oder Ports ab.

5. Tragen Sie ein geerdetes Antistatik Gelenkband, um elektrostatische Ladungen (ESD) über blanke Metallstellen bei der Handhabung der Komponenten zu vermeiden.

6. Schalten Sie das System niemals ohne ordnungsgemäß montiertes Gehäuse ein.
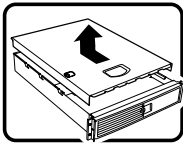
Nachdem Sie die oben erwähnten ersten sechs SICHERHEITSSCHRITTE durchgeführt haben, können Sie die Abdeckung abnehmen, indem Sie:

1. Öffnen und entfernen Sie die Verschlußeinrichtung (Padlock) auf der Rückseite des Systems, falls eine Verschlußeinrichtung installiert ist.

2. Entfernen Sie alle Schrauben der Gehäuseabdeckung.

3. Nehmen Sie die Abdeckung ab.
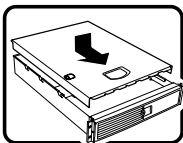
Zur ordnungsgemäßen Kühlung und Lüftung muß die Gehäuseabdeckung immer wieder vor dem Einschalten installiert werden. Ein Betrieb des Systems ohne angebrachte Abdeckung kann Ihrem System oder Teile darin beschädigen. Um die Abdeckung wieder anzubringen:

1. Vergewissern Sie sich, daß Sie keine Werkzeuge oder Teile im Innern des Systems zurückgelassen haben.

2. Überprüfen Sie alle Kabel, Zusatzkarten und andere Komponenten auf ordnungsgemäßen Sitz und Installation.

3. Bringen Sie die Abdeckungen wieder am Gehäuse an, indem Sie die zuvor gelösten Schrauben wieder anbringen. Ziehen Sie diese gut an.

4. Bringen Sie die Verschlußeinrichtung (Padlock) wieder an und schließen Sie diese, um ein unerlaubtes Öffnen des Systems zu verhindern.

5. Schließen Sie alle externen Kabel und den AC Stromanschlußstecker Ihres Systems wieder an.

Fortsetzung
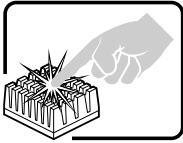
Der Mikroprozessor und der Kühler sind möglicherweise erhitzt, wenn das System in Betrieb ist. Außerdem können einige Platinen und Gehäuseteile scharfe Spitzen und Kanten aufweisen. Arbeiten an Platinen und Gehäuse sollten vorsichtig ausgeführt werden. Sie sollten Schutzhandschuhe tragen.
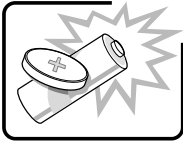
Bei falschem Einsetzen einer neuen Batterie besteht Explosionsgefahr. Die Batterie darf nur durch denselben oder einen entsprechenden, vom Hersteller empfohlenen Batterietyp ersetzt werden. Entsorgen Sie verbrauchte Batterien den Anweisungen des Herstellers entsprechend.
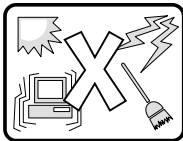
Das System wurde für den Betrieb in einer normalen Büroumgebung entwickelt. Der Standort sollte:

- sauber und staubfrei sein (Hausstaub ausgenommen);

- gut gelüftet und keinen Heizquellen ausgesetzt sein (einschließlich direkter Sonneneinstrahlung);

- keinen Erschütterungen ausgesetzt sein;

- keine starken, von elektrischen Geräten erzeugten elektromagnetischen Felder aufweisen;

- in Regionen, in denen elektrische Stürme auftreten, mit einem Überspannungsschutzgerät verbunden sein; während eines elektrischen Sturms sollte keine Verbindung der Telekommunikationsleitungen mit dem Modem bestehen;

- mit einer geerdeten Wechselstromsteckdose ausgerüstet sein;

- über ausreichend Platz verfügen, um Zugang zu den Netzkabeln zu gewährleisten, da der Stromanschluß des Produkts hauptsächlich über die Kabel unterbrochen wird.

⚠ AVVERTENZA: Italiano
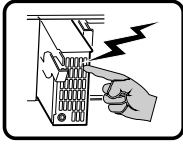
Rivolgersi ad un tecnico specializzato per la riparazione dei componenti dell'alimentazione di questo prodotto. È possibile che il prodotto disponga di più fonti di alimentazione.
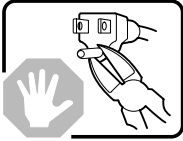
Non modificare o utilizzare il cavo di alimentazione in c.a. fornito dal produttore, se non corrisponde esattamente al tipo richiesto. Ad ogni fonte di alimentazione corrisponde un cavo di alimentazione in c.a. separato.
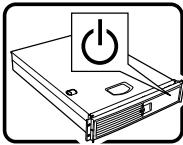
L'interruttore attivato/disattivato nel pannello anteriore non interrompe l'alimentazione in c.a. del sistema. Per interromperla, è necessario scollegare tutti i cavi di alimentazione in c.a. dalle prese a muro o dall'alimentazione di corrente.

PASSI DI SICUREZZA: Qualora si rimuovano le coperture del telaio per accedere all'interno del sistema, seguire i seguenti passi:

1. Spegnere tutti i dispositivi periferici collegati al sistema.
2. Spegnere il sistema, usando il pulsante spento/acceso dell'interruttore del sistema.
3. Togliere tutte le spine dei cavi del sistema dalle prese elettriche.
4. Identificare e sconnettere tutti i cavi attaccati ai collegamenti I/O od alle prese installate sul retro del sistema.
5. Qualora si tocchino i componenti, proteggersi dallo scarico elettrostatico (SES), portando un cinghia anti-statica da polso che è attaccata alla presa a terra del telaio del sistema – qualsiasi superficie non dipinta – .
6. Non far operare il sistema quando il telaio è senza le coperture.
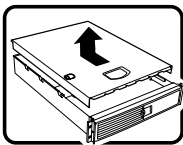
Dopo aver seguito i sei passi di SICUREZZA sopracitati, togliere le coperture del telaio del sistema come seque:

1. Aprire e rimuovere il lucchetto dal retro del sistema qualora ve ne fosse uno installato.
2. Togliere e mettere in un posto sicuro tutte le viti delle coperture.
3. Togliere le coperture.
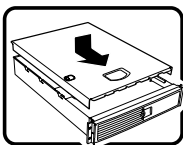
Per il giusto flusso dell'aria e raffreddamento del sistema, rimettere sempre le coperture del telaio prima di riaccendere il sistema. Operare il sistema senza le coperture al loro proprio posto potrebbe danneggiare i componenti del sistema. Per rimettere le coperture del telaio:

1. Controllare prima che non si siano lasciati degli attrezzi o dei componenti dentro il sistema.
2. Controllare che i cavi, dei supporti aggiuntivi ed altri componenti siano stati installati appropriatamente.
3. Attaccare le coperture al telaio con le viti tolte in precedenza e avvitarle strettamente.
4. Inserire e chiudere a chiave il lucchetto sul retro del sistema per impedire l'accesso non autorizzato al sistema.
5. Ricollegare tutti i cavi esterni e le prolunghe AC del sistema.
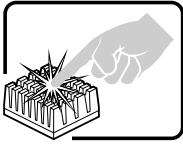
Se il sistema è stato a lungo in funzione, il microprocessore e il dissipatore di calore potrebbero essere surriscaldati. Fare attenzione alla presenza di piedini appuntiti e parti taglienti sulle schede e sul telaio. È consigliabile l'uso di guanti di protezione.
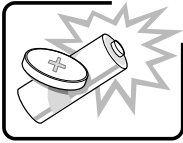
Esiste il pericolo di un esplosione se la pila non viene sostituita in modo corretto. Utilizzare solo pile uguali o di tipo equivalente a quelle consigliate dal produttore. Per disfarsi delle pile usate, seguire le istruzioni del produttore.
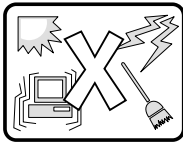
Il sistema è progettato per funzionare in un ambiente di lavoro tipo. Scegliere una postazione che sia:

- Pulita e libera da particelle in sospensione (a parte la normale polvere presente nell'ambiente).
- Ben ventilata e lontana da fonti di calore, compresa la luce solare diretta.
- Al riparo da urti e lontana da fonti di vibrazione.
- Isolata dai forti campi magnetici prodotti da dispositivi elettrici.
- In aree soggette a temporali, è consigliabile collegare il sistema ad un limitatore di corrente. In caso di temporali, scollegare le linee di comunicazione dal modem.
- Dotata di una presa a muro correttamente installata.
- Dotata di spazio sufficiente ad accedere ai cavi di alimentazione, i quali rappresentano il mezzo principale di scollegamento del sistema.

⚠ **ADVERTENCIAS: Español**
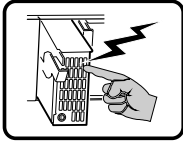
El usuario debe abstenerse de manipular los componentes de la fuente de alimentación de este producto, cuya reparación debe dejarse exclusivamente en manos de personal técnico especializado. Puede que este producto disponga de más de una fuente de alimentación.
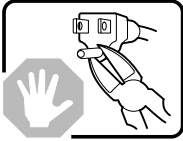
No intente modificar ni usar el cable de alimentación de corriente alterna, si no corresponde exactamente con el tipo requerido.

El número de cables suministrados se corresponden con el número de fuentes de alimentación de corriente alterna que tenga el producto.
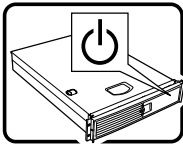
Nótese que el interruptor activado/desactivado en el panel frontal no desconecta la corriente alterna del sistema. Para desconectarla, deberá desenchufar todos los cables de corriente alterna de la pared o desconectar la fuente de alimentación.

INSTRUCCIONES DE SEGURIDAD: Cuando extraiga la tapa del chasis para acceder al interior del sistema, siga las siguientes instrucciones:

1. Apague todos los dispositivos periféricos conectados al sistema.

2. Apague el sistema presionando el interruptor encendido/apagado.

3. Desconecte todos los cables de alimentación CA del sistema o de las tomas de corriente alterna.

4. Identifique y desconecte todos los cables enchufados a los conectores E/S o a los puertos situados en la parte posterior del sistema.

5. Cuando manipule los componentes, es importante protegerse contra la descarga electrostática (ESD). Puede hacerlo si utiliza una muñequera antiestática sujetada a la toma de tierra del chasis — o a cualquier tipo de superficie de metal sin pintar.

6. No ponga en marcha el sistema si se han extraído las tapas del chasis.
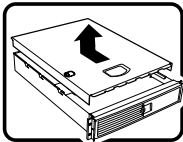
Después de completar las seis instrucciones de SEGURIDAD mencionadas, ya puede extraer las tapas del sistema. Para ello:

1. Desbloquee y extraiga el bloqueo de seguridad de la parte posterior del sistema, si se ha instalado uno.

2. Extraiga y guarde todos los tornillos de las tapas.

3. Extraiga las tapas.
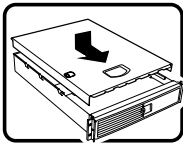
Para obtener un enfriamiento y un flujo de aire adecuados, reinstale siempre las tapas del chasis antes de poner en marcha el sistema. Si pone en funcionamiento el sistema sin las tapas bien colocadas puede dañar los componentes del sistema. Para instalar las tapas:

1. Asegúrese primero de no haber dejado herramientas o componentes sueltos dentro del sistema.

2. Compruebe que los cables, las placas adicionales y otros componentes se hayan instalado correctamente.

3. Incorpore las tapas al chasis mediante los tornillos extraídos anteriormente, tensándolos firmemente.

4. Inserte el bloqueo de seguridad en el sistema y bloquéelo para impedir que pueda accederse al mismo sin autorización.

5. Conecte todos los cables externos y los cables de alimentación CA al sistema.
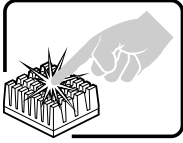
Si el sistema ha estado en funcionamiento, el microprocesador y el disipador de calor pueden estar aún calientes. También conviene tener en cuenta que en el chasis o en el tablero puede haber piezas cortantes o punzantes. Por ello, se recomienda precaución y el uso de guantes protectores.
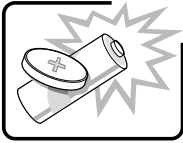
Existe peligro de explosión si la pila no se cambia de forma adecuada. Utilice solamente pilas iguales o del mismo tipo que las recomendadas por el fabricante del equipo. Para deshacerse de las pilas usadas, siga igualmente las instrucciones del fabricante.
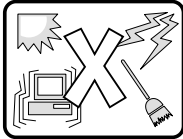
El sistema está diseñado para funcionar en un entorno de trabajo normal. Escoja un lugar:

- Limpio y libre de partículas en suspensión (salvo el polvo normal).
- Bien ventilado y alejado de fuentes de calor, incluida la luz solar directa.
- Alejado de fuentes de vibración.
- Aislado de campos electromagnéticos fuertes producidos por dispositivos eléctricos.
- En regiones con frecuentes tormentas eléctricas, se recomienda conectar su sistema a un eliminador de sobrevoltage y desconectar el módem de las líneas de telecomunicación durante las tormentas.
- Provisto de una toma de tierra correctamente instalada.
- Provisto de espacio suficiente como para acceder a los cables de alimentación, ya que éstos hacen de medio principal de desconexión del sistema.

2 Unpacking and Inspecting

Checking for Damage to the Packaging

Inspect the packaging container for evidence of mishandling during transit. If the packaging container is damaged, photograph it for reference. Save the packaging container and packing materials in the event you need to package the server for reshipment.

Checking the Package Contents

Remove the server from the packaging container and, using the list below, check that all parts and accessories are included. Inspect the server and accessories for damage. If any of the contents appear damaged, file a damage claim with the carrier immediately.

- Intel® Server Platform SRSH4 with the following parts installed:
  — SSH4 baseboard
  — SSH4 processor board
  — SSH4 memory board
  — Fan distribution board
  — Front panel board
  — Hot plug indicator board
  — Power cage
  — Two 430-W power supplies
  — Six electronics bay fans
  — Combination Slimline 3.5-inch floppy drive and Slimline CD-ROM drive
  — 1-inch hard disk drive bay
  — Rack bezel and handles
  — Additional parts or components depending on specific system configuration. See system specific documentation for a list of additional parts.
- Quick Start Guide (fold-out poster)
- System Accessory Kit
  — Two North American power cords
  — Server Platform SRSH4 System Resource CD (contains product documentation, device drivers, and software utilities)
  — Three sets (six rails) 5.25-inch peripheral rails and screws

3 Getting Started

This section discusses the main steps you need to perform to get your server up and running:

1. Select an appropriate site.
2. Install processors, memory, hard disk drives, and other options.
3. Connect the monitor, keyboard, and mouse.
4. Turn on the server and boot to the System Resource CD-ROM.
5. Configure the system with the FRU/SDR load utility.
6. Install the service partition (optional).
7. Install an operating system.
8. Set up system security.
9. Install the server into a rack unit.

Selecting a Site

This section describes the space and power requirements and general site criteria for installing the server.
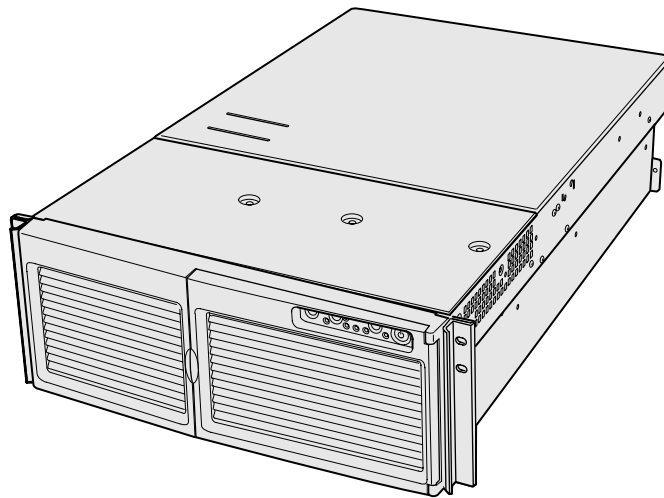
OM13253

Figure 1. SRSH4 Server

Space and Power Requirements

Table 2. SRSH4 Server Physical Specifications

Specification	Rack Mode Only
Height	7 inches (178 mm) (4u)
Width	17.5 inches (445 mm)
Depth	28.0 inches (711 mm)
Weight	57 pounds (25.9 kg), minimum configuration
	88 pounds (39.9 kg), maximum configuration
Required front clearance	3 inches (76 mm), inlet airflow <35 °C (95 °F)
Required rear clearance	4.5 inches (114 mm), no airflow restriction
Required side clearance	1 inch (25 mm)
Power requirements	
Voltage (110)	90 V_{rms} min, 132 V_{rms} max, 8 A_{rms}*
Voltage (220)	180 V_{rms} min, 264 V_{rms} max, 4 A_{rms}*
Frequency	47 Hz min, 63 Hz max
	* Amperage is total system power, with two or three power supply modules installed, with one or two AC cords.

For detailed information on calculating power consumption for specific server configurations,

General Site Criteria

The server operates reliably within normal office environmental limits. Select a site that meets these criteria:

- Near a properly grounded, three-pronged power outlet.
  — In the United States and Canada: a NEMA 6-15R outlet for 100-120 V and for 200-240 V.
  — In other geographic areas: a properly grounded outlet in accordance with the local electrical authorities and electrical code of the region.
- Clean and relatively free of excess dust.
- Well ventilated and away from sources of heat, with the ventilating openings on the server kept free of obstructions.
- Maximum ambient air temperature should not exceed 35 °C (95 °F).
- Away from sources of vibration or physical shock.
- Isolated from strong electromagnetic fields and noise caused by electrical devices such as elevators, copy machines, air conditioners, large fans, large electric motors, radio and TV transmitters, and high-frequency security devices.
- Access space provided so the server power cords can be unplugged from the power supply or the wall outlet; this is the only way to remove AC power from the server.
- Clearance provided for cooling and airflow.

⟹ **NOTES**

> **Surge suppressor recommended:** In geographic regions that are susceptible to electrical storms, Intel strongly recommends that you plug the server into a surge suppressor.
>
> **EMI information:** For information about complying with electromagnetic interference regulations, see "Regional EMC Compliance Information" on page 147.

Installing Processors, Memory, Hard Disk Drives, and Options

The server is shipped without processors, memory, or hard drives. To install the memory, processors, hard drives, and other options, follow the steps shown in the Quick Start User Guide that is included with the server. For more information on any of the steps listed on the guide, see the references below:

1. Removing the covers:
   a. Removing the rear access cover—see page 64.
   b. Removing the access cover to the system boards—see page 67.
2. Removing the memory and processor boards:
   a. Removing the memory board—see page 68.
   b. Removing the air baffle—see page 70.
   c. Removing the processor board—see page 72.
3. Installing memory and processors:
   a. Installing the DIMMs in the memory board—see page 81.
   b. Installing the processors on the processor board—see page 77.
4. Installing an ICMB board—follow the instructions that came with the ICMB board kit.
5. Installing the processor and memory boards:
   a. Installing the processor board on the baseboard—see page 73.
   b. Installing the air baffle—see page 71.
   c. Installing the memory board—see page 69.
6. Installing PCI add-in cards—see page 92. For a description of the PCI slots, see Figure 29 on page 92.
7. Installing hard disk drives—see page 84.
8. Installing an additional power supply or additional peripherals—see page 89, page 103, and any additional documentation that came with the peripherals.
9. Installing covers:
   a. Installing the access cover to the system boards—see page 67.
   b. Installing the rear access cover—see page 64.
10. Configuring your system—complete the remainder of this "Getting Started" section.

Connecting the Monitor, Keyboard, and Mouse

Connect the monitor, keyboard, and mouse to the appropriate connectors on the rear panel of the server. See Figure 51 on page 130.

You have completed the hardware setup. The remainder of this section discusses software setup and configuration.

Turning On the Server and Running the Power-On Self-Test (POST)

Each time you start the server, the Power-On Self-Test (POST) runs automatically. POST is stored in flash memory.

To start the server, do the following:

⇒ **NOTE**

>   To access certain features, such as BIOS Setup, you must press specific keys
>   at specific times during POST. To familiarize yourself with this procedure,
>   read the following instructions through completely before actually
>   performing them. For a summary of hot keys active during POST, see
>   Table 3 on page 31.

1. Make sure all external devices, such as a monitor, keyboard, and mouse, are connected.
2. If a drive protection card or diskette is present in the diskette drive, remove it.
3. Plug the video monitor power cord into the power source or wall outlet. Turn on the video monitor.
4. Plug the AC power cords into the power connectors on the back of the chassis and into the power source or wall outlet.
5. If the server does not turn on when you plug it into the AC outlet, press the on/off power button on the front panel.
6. Verify that the main power LED on the front panel is lit (see Figure 50 on page 128).
7. Insert the Server Platform SRSH4 System Resource CD into the CD-ROM drive.

    After a few seconds, POST begins and a splash screen is displayed (if the splash screen is disabled in BIOS Setup, a diagnostics screen is displayed). POST discovers, configures, and tests the processors, memory, keyboard, and most installed peripheral devices. The length of time needed to complete POST depends on the amount of memory installed and the number of option boards installed.

8. Shortly after the splash screen is displayed, POST displays the message "Press <F2> to enter Setup…" at the bottom of the screen. At this point, you can press any of the keys identified with an asterisk (*) in Table 3 on page 31, or you can do nothing and wait until the server boots from the CD-ROM. If you enter BIOS Setup, the Service Partition, or the Adaptec[†] SCSI*Select*[†] Utility, when you exit those features, the server might reboot.
9. After POST completes, the system beeps once and then searches all boot devices in the order defined by the boot priority settings in the BIOS. The system finds, loads, and runs the limited operating system on the System Resource CD.

If there is no device with a bootable operating system, the boot process continues, the system beeps once, and the following message is displayed:

```
Operating System not found
```

If you have a device with a bootable operating system but see this message anyway, reboot and use BIOS Setup (page 37) to make sure your boot device settings are correct.

Hot Keys for POST

Table 3 lists the hot keys you can use during POST to access setup utilities and alter the normal POST execution.

Table 3.   Hot Keys

To Do This:	Press These Keys:
Abort memory test during POST.	<Space> Press while BIOS is updating memory size on screen.
Resume after a POST error is displayed. (The system pauses after displaying an error.)	<F1>
Enter BIOS Setup during POST.	<F2>*
Boot to the service partition.	<F4>*
Boot from a network using Preboot Execution Environment (PXE).	<F12>*
Remove the splash screen to view the diagnostic messages during POST and display a menu for selecting the boot device.	<ESC>* Note: Using BIOS Setup, you can enable the Boot-Time Diagnostic Screen, in which case POST does not display the splash screen. Note: If you use the displayed menu to change the boot device, the change affects the current boot only.
Enter the Adaptec SCSI*Select* Utility during POST.	<Ctrl+A>*
* Press any of these keys when the prompt "Press <F2> to enter Setup…" is displayed.	

Configuring the System with the FRU/SDR Load Utility

After POST completes and the system has finished booting from the System Resource CD, run the FRU/SDR Load Utility to configure the sensor data record (SDR) and field replaceable unit (FRU) inventory for the server. For instructions, see page 60.

⟹ **NOTE**

> When you first set up your server and any time you change the number of processors, fans, or power supplies, you must run the FRU/SDR load utility. Running FRU/SDR loads the sensor configuration (SDR) that is used to monitor temperature, voltage, and other parameters. If the FRU/SDR configuration does not match the physical configuration of the server, false errors might be generated by sensors that don't actually exist, and sensors that do exist might not be monitored.

Installing the Service Partition (Recommended)

When you are setting up your server system, you can install a service partition on your hard drive. The service partition, in conjunction with Intel® Server Management (ISM) software, provides emergency remote management and remote server setup. The service partition lets you remotely access a local partition on the server and identify and diagnose server health issues by using either a modem or network connection. The service partition uses approximately 30 to 40 MB of hard disk space.

⟹ **NOTE**

> Intel strongly recommends that you install the service partition before installing an operating system. If you skip this step now, and later decide to install a service partition, any operating system or other data on the drive will be lost. For more information, see the "Service Partition" section in the *Installation Guide for Intel Server Management*, which is contained on the System Resource CD.

To create and format the service partition:

1. Boot the server to the System Resource CD.
2. From the menu, select Utilities and press the <Enter> key.
3. Select Run Service Partition Administrator and press the <Enter> key.
4. From the list of available items, select Create Service Partition-first time.
5. Follow the instructions that appear on the screen. These instructions prompt you to reboot the server. It will reboot from the CD-ROM.
6. After the system reboot, select the Utilities menu and press the <Enter> key.
7. Select Run Service Partition Administrator and press the <Enter> key.
8. Select Format Service Partition and Install Software.
9. Remove the System Resource CD from the CD-ROM drive and exit from the menu screen.

You can now install the operating system.

Installing the Operating System

The System Resource CD contains a limited operating system with enough functionality to boot the server and to copy and use the utilities and other files from the CD. This limited operating system is not intended to be used to run applications. To run your server and applications, you must install the operating system of your choice on the server. Follow the installation instructions that came with the operating system.

The System Resource CD-ROM

Earlier sections of this product guide referred to the System Resource CD-ROM. The CD contains documentation, device drivers, utilities, and other useful information and software. Most of the documentation is in Adobe[†] Acrobat[†] format (PDF) and the CD includes the Adobe Acrobat Reader for viewing the files.

You can access the CD in the following ways:

- **Using a Web browser**—Insert the CD in any system that has a Web browser. If the CD-ROM drive in the system is set to autorun, the first screen from the CD user interface will be displayed automatically; if not, open the file on the CD called welcome.htm. From the Web interface, you can browse the contents of the CD, create driver and utility diskettes, and more.
- **Viewing the file system**—You can use a file system viewer, such as Windows[†] Explorer, to view the contents of the CD directly.
- **Booting the server from the CD**—You can boot the server from the CD. The CD contains a basic DOS operating system and DOS-based applications that let you create diskettes and run utilities.

System Security

Table 4 summarizes the security features provided by the BIOS to prevent unauthorized or accidental access to the system. You can enable these features using the Security section of BIOS Setup (page 37). Most of the features can also be enabled using the System Setup Utility (SSU) (page 48). Additional information on passwords is provided following the table.

Table 4.   Software Security Features

Feature	Description
Secure Mode	**To enable secure mode:** Set a user password.
	To enter secure mode, do one of the following:
	• Press the hot-key combination for secure mode. You can specify a hot-key combination, which must consist of Ctrl+Alt plus one alphanumeric character.
	• Let the inactivity timer time out. If you don't touch the keyboard during the time-out period, the system enters secure mode automatically. You can set the time-out period from two minutes to 120 minutes.
	• Power on or reset the system. The system automatically enters secure mode on power up.
	When the system is in secure mode:
	• Onboard video is blanked, if enabled.
	• Diskette drive is write protected, if enabled.
	• Power, Sleep, and Reset buttons on the front panel are disabled.
	• Mouse and keyboard input are ignored, except for entering a password.
	• The keyboard LEDs flash.
Secure Mode Boot	**To enable, do both of the following:**
	• Set a user password.
	• Enable Secure Mode Boot.
	To activate: Power on or reset the server.
	When enabled:
	• If booting from drive A: the user must enter a password. After the user enters the password, the system continues with the boot process. The system doesn't enter secure mode until activated by the hot-key or timer.
	• If the system is not booting from drive A: the system boots normally. No password is required, and the system enters secure mode automatically.
	The system boots according to the boot device priority set in BIOS Setup.
Password on Boot	**To enable, do all of the following:**
	• Set a user password.
	• Enable Password on Boot.
	• Disable Secure Mode Boot.
	To activate: Power on or reset the server.
	When enabled: The user must enter a password to boot the system. The system boots according to the boot device priority set in BIOS Setup.

continued

Intel SRSH4 Server Platform Product Guide

Table 4. Software Security Features (Continued)

Feature	Description
Fixed Disk Boot Sector Write Protect	**To enable, do the following:** • Set Fixed Disk Boot Sector to Write Protect in the Security section of BIOS Setup. **To activate:** Power on or reset the server. **When enabled:** Write protects the master boot record of the IDE hard disk drive when the system boots from drive A:. Prevents viruses from corrupting the boot sector under DOS. Works only with IDE drives.
Power Switch Inhibit	**To enable:** Enable Power Switch Inhibit. **To activate:** Power on or reset the server. **When enabled:** The power switch can't be used to power off the system.

Using Passwords

Passwords are up to seven characters long; may use only the alphanumeric characters a-z, A-Z, and 0-9; and are not case sensitive.

You set administrator and user passwords in BIOS Setup and in the SSU. When you have either password set, you must enter that password to do any of the following:

- Enter BIOS Setup and the SSU.
- Boot the server from drive A: when Secure Boot Mode is enabled.
- Boot the server when Password on Boot is enabled.
- Exit secure mode.

When you have both a user and an administrator password set, you may enter either password. However, if you enter the user password for BIOS Setup or the SSU, you will be able to modify only the time, date, language, user password, secure mode timer, and secure mode hot-key. To modify any other features, you must enter the administrator password.

You can clear a password by setting it to a blank string. If you forget your passwords, you can use the Password Clear jumper to clear the passwords on the next boot (see "Baseboard Jumpers" on page 136).

Installing the Server in a Rack

The server mounts in a rack using a Rack Mount Kit. For information on rack mount kits and the specifications for compatible racks, see:

http://support.intel.com/support/motherboards/server/ssh4/srsh4/compat.htm

Install the Rack Mount Kit following the instructions on the back of the *Quick Start User Guide* and the instructions that came with the kit.

When installing or removing the server from the rack, use an appropriate mechanical assist unit to lift and move the server.

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4 Configuration Software and Utilities

This section describes the following software and utilities:

- **BIOS Setup**—for modifying server board set features, including setting time, date, and system passwords; setting the boot device priority; configuring the diskette drive and serial ports; and enabling the SCSI BIOS and system management features.
- **SCSI***Select*—for configuring the onboard SCSI host adapter, including changing default values, checking and changing SCSI device settings that might conflict with those of other devices in the server, and performing a low-level format on SCSI devices installed in the server.
- **BIOS and firmware updates**—for updating the BIOS on the system board and other system firmware.

Additional utilities for system management are described on page 45.

BIOS Setup

Use BIOS Setup to change the system configuration defaults. You can run BIOS Setup with or without an operating system being present. BIOS Setup stores most of the configuration values in battery-backed CMOS; the remainder are stored in flash memory. The values take effect when the system is booted. POST uses these values to configure the hardware. If the values and the actual hardware do not agree, POST generates an error message. You must run BIOS Setup to change the BIOS settings from the default or current configuration.

Run BIOS Setup to modify server board set features such as:

- Defining the diskette drive
- Defining the serial ports
- Setting time and date
- Configuring hard drives
- Specifying boot device sequence
- Enabling SCSI BIOS
- Setting up system passwords

Using either BIOS Setup or the System Setup Utility (page 48), you can set up system passwords, specify the boot device sequence, and enable some server management features. Both utilities access the same stored configuration data for these items, and the result of making a change to these settings using either utility is identical.

Recording BIOS Setup Settings

Record your BIOS Setup settings. If your custom values ever need restoring (after a CMOS clear, for example), you must run BIOS Setup and enter your custom settings again. A record of any custom settings will make this much easier.

Clearing CMOS Memory

If you need to clear CMOS memory, you can use either of these two methods:

- Use the front panel buttons:
  1. Power down the server.
  2. Press the Reset button and hold it down for four seconds or more; while holding down the reset button, press the power button.
  3. Release both buttons at the same time.
- Use the CMOS Clear jumper (page 136):
  1. Power down the server.
  2. Install a jumper on the CMOS Clear jumper pins.
  3. Boot the system.
  4. Power down the system and remove the jumper from the CMOS Clear pins.

The next time the system is started following the CMOS clear, the boot process halts displaying the message *NVRAM cleared by jumper*.

Using BIOS Setup

To run BIOS Setup, boot the server and press the F2 key when prompted.

Use the keys listed in Table 5 to navigate the BIOS Setup menus.

Table 5.   BIOS Setup Menu Navigation

To:	Press:
Get general help	<F1> or <Alt+H>
Move between menus	← →
Go to the previous item	↑
Go to the next Item	↓
Change the value of an item	+ or -
Select an item or display a submenu	<Enter>
Leave a submenu or exit BIOS Setup	<Esc>
Reset to BIOS Setup defaults	<F9>
Save and exit BIOS Setup	<F10>

When an option is grayed out and not accessible, you cannot change or configure the option in that menu screen for one of the following reasons:

- The option is auto-configured or auto-detected.
- The field is informational only.
- The field is password protected and is accessible only by the User or Administrator.

SCSI*Select*

The SRSH4 server includes an onboard Adaptec SCSI controller with two SCSI channels
(A and B). The host adapter includes an onboard Adaptec SCSI*Select* configuration utility that
allows you to view and configure the settings of the host adapter and devices in the server.

⟹ **NOTE**

> The SCSI*Select* utility is only available if the onboard SCSI controller is
> enabled in BIOS Setup.

When to Run SCSI*Select*

Use the SCSI*Select* utility to:
- Change default values
- Check and change SCSI device settings that might conflict with those of other devices in
  the server
- Do a low-level format on SCSI devices installed in the server

Running SCSI*Select*

To run the SCSI*Select* utility:

1. During POST, press <Ctrl+A> to run the utility when this message appears on the video
   monitor:

   ```
   <<<Press <Ctrl><A> for SCSISelect(TM) Utility!>>>
   ```
2. When the main menu for the host adapter appears, follow the instructions on screen to
   configure the controller settings or format drives on each SCSI channel.

Software Updates

Your system comes with preinstalled firmware for the system BIOS, baseboard management controller (BMC), and hot-swap controller (HSC). A FRU/SDR Load Utility is included on the System Resource CD. When updates for any of these items are available, you can download the updates from the Intel support website:

http://support.intel.com/support/motherboards/server/ssh4/srsh4

Updates are available in two forms:

- A software update package (SUP) containing all updates (BIOS, BMC, HSC, and FRU/SDR)
- Individual files, one for each update

To use either form of update, you must create bootable diskettes. The procedure for creating bootable diskettes is described in the following section. SUPs are discussed beginning on page 41 and individual updates are discussed beginning on page 41.

Creating Bootable Diskettes

To use diskettes for updates, you must format them as system or bootable diskettes with ROM-DOS[†] version 6.22 or later or MS-DOS[†] version 6.22 or later.

➡ **NOTE**

> Intel recommends that you create bootable diskettes by booting the target system from the System Resource CD that accompanied the product. However, the process for making the diskettes is the same for all compatible versions of DOS. ROM-DOS version 6.22 is included on the System Resource CD.

To format a diskette as a bootable diskette:

1. Boot to the System Resource CD.
2. Exit from the menu to a DOS prompt.
3. Insert a diskette into the floppy drive.
4. At the DOS prompt, for an unformatted diskette, type:
   ```
   format a:/s
   ```
   or, for an already formatted diskette, type:
   ```
   sys a:
   ```
5. Press <Enter>.

Software Update Packages

A Software Update Package (SUP) contains all the necessary files to perform BIOS, BMC, HSC, and FRU/SDR, or other software updates.

To install a Software Update Package:

1. Download the software update (page 40) along with any ReadMe, Release Notes, and other files listed on the Web page for the update.
2. Print and read the ReadMe, Release Notes, and any other text or document files that came with the update. The files from the Web page contain the latest information and instructions for the update, which supercedes the information in this product guide.
3. Record the current BIOS settings.
   a. Boot the computer and press <F2> when you are prompted to do so.
   b. Write down the current settings in the BIOS Setup program.
4. Follow the installation instructions that came with the update.

⟹ **NOTE**

> Do not turn off the system during the update process.

5. When the update is complete, use BIOS Setup (page 37) to reconfigure any custom settings.

Individual Updates

This section gives procedures for performing individual updates of the BIOS, BMC or HSC firmware, and FRU/SDR data.

BIOS Updates

The IFLASH utility is a DOS-based utility used to install BIOS updates. IFLASH.EXE is included with the BIOS update file.

Updating the BIOS

To update the BIOS:

1. Download the software update (page 40) along with any ReadMe, Release Notes, and other files listed on the Web page for the update.
2. Print and read the ReadMe, Release Notes, and any other text or document files that came with the update. The files from the Web page contain the latest information and instructions for the update, which supercedes the information in this product guide.
3. Record the current BIOS settings.
   a. Boot the computer and press <F2> when you are prompted to do so.
   b. Write down the current settings in the BIOS Setup program.
4. Follow the installation instructions that came with the update.
5. When the update is complete, use BIOS Setup (page 37) to reconfigure any custom settings.

Recovering the BIOS

In the rare event that the BIOS update fails and the BIOS is corrupted, you will need to recover the BIOS. The Release Notes or other documentation that you downloaded with the BIOS update explain the steps for recovering the BIOS. The procedure requires you to install one or more jumpers temporarily. For the location of the jumpers and help in identifying the correct jumper pins, see pages 135 and 136.

Changing the BIOS Language

You can use the BIOS update utility to change the language used for text in the BIOS Setup user interface:

1. Insert the diskette holding the BIOS update files into drive A and boot the server.
2. Follow the instructions that appear on the screen, choosing to update the language files.
3. When the utility finishes updating the BIOS, remove the diskette from drive A and reboot the system.

Firmware Updates

The Firmware Update Utility is a DOS-based program used to update the BMC and HSC firmware code. You need to run the utility only if new firmware code is necessary. The utility is included with the firmware update file.

To update the firmware:

1. Download the firmware update (page 40) along with any ReadMe, Release Notes, and other files listed on the Web page for the update.
2. Print and read the ReadMe, Release Notes, and any other text or document files that came with the update. The files from the Web page contain the latest information and instructions for the update, which supercedes the information in this product guide.
3. Follow the installation instructions that came with the update.
4. After the update is complete, if you are updating the BMC firmware, disconnect the AC power cord from the system and wait 60 seconds.

⟹ **NOTE**

> To complete the update of the BMC firmware, you must disconnect the AC power cord to remove the standby power from the BMC. Removing the standby power forces the BMC to reset, which is necessary to complete the update.

5. Reconnect the AC power cord and power up the system.
6. If you are updating the BMC firmware, run the FRU/SDR utility (page 60).

FRU/SDR Updates

The Field Replacement Unit (FRU) and Sensor Data Record (SDR) load utility is a DOS-based program used to update the server FRU and SDR configuration. The utility is included with the update file.

To update the FRU/SDR configuration:

1. Download the software update (page 40) along with any ReadMe, Release Notes, and other files listed on the Web page for the update.
2. Print and read the ReadMe, Release Notes, and any other text or document files that came with the update. The files from the Web page contain the latest information and instructions for the update, which supercedes the information in this product guide.
3. Follow the installation instructions that came with the update.

5 System Management

Intel integrates system management features into the hardware and provides additional features through Intel Server Management software. This section describes the integrated hardware features, Intel Server Management software, and the System Setup Utility and FRU/SDR Load Utility used to configure the hardware features.

Integrated Hardware System Management

Figure 2 is a simplified diagram of the system management features integrated into the server.
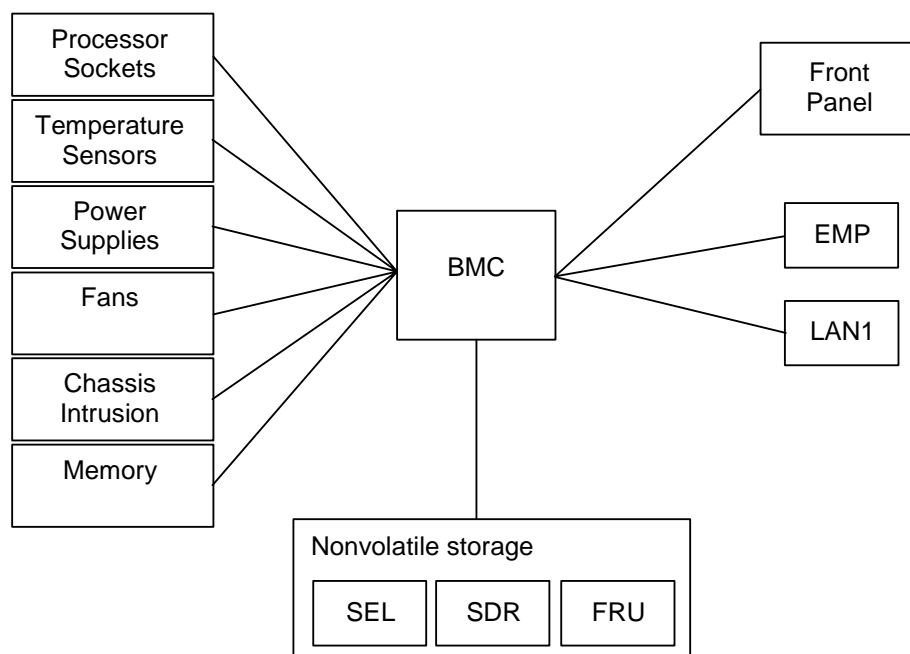
Figure 2. Integrated System Management

Baseboard Management Controller

Intel® server boards incorporate a baseboard management controller (BMC), which is a dedicated microcontroller for system management activities. The BMC performs the following functions:

- Monitors system components and sensors, including processors, memory, fans, power supplies, temperature sensors, and chassis intrusion sensors.
- Manages nonvolatile storage for the system event log (SEL), sensor data records (SDRs), and baseboard field-replaceable unit (FRU) inventory.
- Interfaces with the emergency management port (EMP) and LAN1 port to send alerts and interact with remote management systems.
- Provides the main front panel control functions (power on/off, reset, and so on).

Field Replaceable Units and Sensor Data Records

Field replaceable units (FRUs) are major modules in the chassis that contain active electronic circuitry. FRUs can store information—such as board serial number, part number, name, and asset tag—that can be read using the System Setup Utility (page 48). The BMC stores FRU information for the baseboard in a nonvolatile storage component on the board.

The BMC uses Sensor Data Records (SDRs) to identify the sensors in the system for monitoring. SDRs provide a list of the sensors, their characteristics, location, type, and type-specific information, such as default threshold values, factors for converting a sensor reading into the appropriate units (mV, rpm, degrees Celsius), and information on the types of events that a sensor can generate. The BMC stores SDR information in a nonvolatile storage component on the baseboard.

You can use the FRU/SDR Load Utility (page 60) to initialize or update the FRU and SDR information. Intel server boards are shipped from the factory with some sensors disabled, because the actual configuration of the chassis is only determined when the user completes the system configuration. Chassis-specific information in the FRU, such as chassis part number, is also absent. For these reasons, it is important to run the FRU/SDR Load Utility as part of the system setup process. You should also run the FRU/SDR Load Utility whenever you change the number of fans, processors, or power supplies in the server.

System Event Log

The BMC manages a system event log (SEL), where it records significant or critical system events. Such events include temperatures and voltages out of range, fan failures, and other sensor-related events. The BIOS, software, add-in cards, and other devices can also log events by sending messages to the BMC. The SEL is stored in nonvolatile storage.

You can view the current contents of the SEL by using the System Setup Utility (page 48).

Platform Event Management

Events can trigger alerts and other actions by the BMC. The server is configured with the following set of standard events:

- Temperature sensor out of range
- Voltage sensor out of range
- Fan failure
- Chassis intrusion
- Power supply fault
- BIOS uncorrectable ECC error
- BIOS POST error
- Processor fault resilient booting (FRB) failure
- Fatal nonmaskable interrupt (NMI) from a source other than the front panel switch
- Watchdog timer reset, power down, or power cycle
- System restart (reboot)

Alerts can take either of these forms:

- **Platform event pages**—the BMC dials a paging service and sends a predefined paging string. To use platform event paging (PEP), you must attach an external modem to the emergency management port (COM2).
- **BMC LAN alerts**—the BMC sends an alert to a predefined destination on the LAN.

You can configure PEP and BMC LAN alerts by using the System Setup Utility (page 48).

Emergency Management Port

The emergency management port (EMP) refers to the use of the COM2 port, with either an external modem or direct serial connection, for remote management. The BMC controls the port and interfaces with remote access software, such as the Direct Platform Control application in Intel Server Management.

You can configure the EMP by using the System Setup Utility (page 48).

Intel Server Management

Intel Server Management (ISM) is a system management package that is included on a separate ISM CD. ISM applications interact with the integrated hardware system management features of the server to allow you to monitor and manage a server from a remote workstation:

- Remote connection from a Windows-based client workstation over a LAN, or over a modem or direct serial connection to the emergency management port on the server.
- Real-time monitoring and alerting for server hardware sensors.
- Emergency management when the server is off (but still connected to AC power) lets you verify the state of the server, diagnose hardware problems, and power on/off or reset the server.
- Run the System Setup Utility to change the server configuration.
- Run diagnostics tools similar to those used during factory testing.

Some features of ISM depend on a service partition on the server that you are managing. The service partition is a special disk partition on the system drive that contains a ROM-DOS[†] operating system and DOS-based utilities, including the System Setup Utility, FRU/SDR Load Utility, and Remote Diagnostics. The server can be booted to the service partition, either locally or remotely, to provide access to the utilities.

For more information on Intel Server Management and the individual ISM applications, see the ISM CD.

Using the System Setup Utility

The System Setup Utility (SSU) is located on the System Resource CD-ROM that is shipped with the server.

Run the System Setup Utility to:

- Set boot device priority
- Set passwords and security options
- View system events
- View FRU information
- View sensor data records
- Update system firmware and BIOS
- Save and restore the system configuration
- Set up the server to send alerts for platform events
- Set up the server for remote management

Using either the System Setup Utility or BIOS Setup (page 37), you can specify the boot device sequence and set up system passwords and security options. Both utilities access the same stored configuration data for these items, and the result of making a change to these settings using either utility is identical.

The SSU consists of a collection of task-oriented modules plugged into a common framework called the Application Framework (AF). The Application Framework provides a launching point for individual tasks and a location for setting customization information.

Creating SSU Diskettes

You can run the SSU directly from the Utilities menu of the System Resource CD-ROM, from a set of DOS diskettes, or from the service partition of the hard disk.

If you choose to run the SSU from a set of DOS diskettes, you must create the SSU diskettes from the Resource CD-ROM as follows:

1. Boot to the System Resource CD-ROM.
2. Choose **Create Diskettes > Create Diskettes by Device/Function > System Setup Utility**.
3. Follow the instructions displayed.

Alternatively, if you have a workstation with the Microsoft Windows operating system, you can insert the CD into that system and create the diskettes on that system.

Running the SSU

When the SSU starts in the default local execution mode, the SSU accepts input from the keyboard or mouse. The SSU presents a VGA-based GUI on the primary monitor.

If you run the SSU from read-only media, such as the CD-ROM, you cannot save user preference settings (such as screen colors).

The SSU supports ROM-DOS version 6.22. The SSU will not operate from a "DOS box" running under an operating system such as Windows.

To start the SSU:

1. Start the SSU using one of the following methods:

    — **From diskettes:** Insert the first SSU diskette in drive A and boot the server from the diskette. You are prompted to insert the second diskette. After loading completes the SSU starts automatically.

    — **From the System Resource or ISM CD-ROM:** Boot the server to the System Resource CD and start the SSU from the Utilities menu.

    — **From the Service Partition:** Boot the server to the Service Partition (page 30) and execute the following DOS commands:

        ```
        C:\>  cd ssu

        C:\SSU>  ssu.bat
        ```

2. The mouse driver loads if it is available; press <Enter> to continue.
3. When the SSU title appears on the screen, press <Enter> to continue.

Working with the GUI

You can access features of the GUI using the mouse or keyboard:

- **Mouse**—Click once to choose menu items and buttons or to select items in a list, such as the Available Tasks list. To run a list item, such as one of from the Available Tasks list, select the item and click OK or double-click the item.
- **Keyboard**—Use the tab and arrow keys to highlight buttons and press the spacebar or <Enter> to execute. You can also execute a menu or button by using the <Alt> key in combination with the underlined letter in the name of the menu or button.

You can have more than one task open at the same time, although some tasks might require complete control to avoid possible conflicts. The tasks achieve complete control by keeping the task as the center of operation until you close the task window.

The SSU has a build-in help system, which you access by clicking a Help button or choosing the Help menu.

Customizing the SSU Interface

The SSU lets you customize your interface using the Preferences section of the main window. The AF sets these preferences and saves them in the AF.INI file so that they take effect the next time you start the SSU. There are four user customizable settings:

- **Color**—lets you change the default colors associated with different items on the screen using predefined color combinations. The color changes take effect immediately.
- **Mode**—lets you set the desired expertise level: novice, intermediate, or expert.

    The expertise level determines which tasks are visible in the Available Tasks section and which actions each task performs. For a new mode setting to take effect, you must exit the SSU and restart it.

- **Language**—lets you change the text in the SSU to the appropriate language. For a new language setting to take effect, you must exit the SSU and restart it.
- **Other**—lets you show or hide the status bar at the bottom of the SSU main window. The change takes effect immediately.

⇒ **NOTE**

If you run the SSU from read-only media (CD-ROM, for example), these preferences are lost when you exit the SSU.

Exiting the SSU

Exiting the SSU closes all SSU windows.

Setting Boot Device Priority

To change the boot priority of a device:
1. From the SSU Main window, choose Boot Devices.
2. In the Multiboot Options Add-in window, select a device.
3. Click the **Move Up** button to move it up in the list. Click the **Move Down** button to move it down.

Setting Passwords and Security Options

You can set a user password and an admin password. On some systems, you must set an admin password before you can set a user password. On other systems, the passwords are independent. You can set the same passwords and security options by using BIOS Setup (37).

Setting the Admin Password

The Admin Password button lets you set or change the admin password used by both the SSU and the system BIOS. This option is not available if both an admin and a user password are set and you entered only the user password when you started the SSU. All changes to the admin password take effect immediately.

To change or clear the administrator password:
1. From the SSU Main window, choose Security.
2. Click the **Admin Password** button.
3. If you are changing passwords, enter the old password.
4. Enter the new password (or leave blank to clear).
5. Confirm the password by entering it again (or leave blank to clear).
6. Click **OK** to save the password and return to the Security window.

Setting the User Password

The User Password button lets you set or change the user password used by both the SSU and the system BIOS. All changes to the user password take effect immediately.

To change or clear the user password:

1. From the SSU Main window, choose Security.
2. Click the **User Password** button.
3. If you are changing passwords, enter the old password in the first box.
4. Enter the new password (or leave blank to clear).
5. Confirm the password by entering it again (or leave blank to clear).
6. Click **OK** to save the password and return to the Security window.

Setting Security Options

For a description of security features, see page 34.

To set the security options:

1. In the Security window, click the **Options** button.
2. For each option, select the desired setting from the list. The options are:
   - **Security Hot Key:** The key combination that can be used to put the server into secure mode.
   - **Secure Mode Timer:** If no keyboard or mouse activity occurs during the chosen time interval, the server enters secure mode.
   - **Secure Mode Boot:** Enable forces the server to boot directly into secure mode.
   - **Video Blanking:** Enable turns off the video when the server is in secure mode.
   - **Floppy Write:** Enable prevents writing to the diskette drive while the server is in secure mode.
   - **Power Switch Inhibit:** Enable prevents the power and reset buttons from functioning when the server is in secure mode. Disable allows the power and reset buttons to function normally when the server is in secure mode.
3. Click **Save** to save the settings and return to the Security window.

Viewing the System Event Log

To view the System Event Log (SEL):

1. From the SSU Main window, choose SEL Manager.

   When you start the SEL Manager, it automatically loads the current list of events from non-volatile memory.
2. Use the <F4> and <F5> keys to scroll the window contents to the left and right to view all of the columns.
3. Use the File and SEL menu items to work with the SEL information:
   - **Open:** Views data from a previously saved SEL file.
   - **Save As:** Saves the currently loaded SEL data to a file.

- **Properties:** Displays information about the SEL.
- **Clear SEL:** Clears the SEL data from the nonvolatile storage area.
- **Reload:** Refreshes the display by reading the current SEL entries from the server.
- **Sort By:** Sorts the displayed events by event number, time stamp, sensor type and number, event description, or event generator ID.

Viewing FRU Information

To view the Field Replaceable Unit (FRU) information:

1. From the SSU Main window, choose FRU Manager.

    When you start the FRU Manager, it automatically loads the current list of events from non-volatile memory.

    The FRU Manager window has a navigation pane on the left that displays, in a tree format, the inventory of components in the server. The tree has three categories: Chassis, Board, and Product. Clicking on a category expands or collapses a list of components for that category. Clicking on an individual component displays the FRU information for that component in the presentation pane in the upper right. The description pane in the lower right displays a description of the currently selected FRU area.

2. Use the <F4> and <F5> keys to scroll the window contents to the left and right to view all of the columns.

3. Use the File and FRU menu items to work with the FRU information:

- **Open:** Views data from a previously saved FRU file.
- **Save As:** Saves the currently loaded FRU data to a file.
- **Properties:** Displays the number of FRU devices in the system and the number being displayed. Only FRU devices with valid FRU areas are displayed.
- **Reload:** Refreshes the display by reading the current FRU entries from the server.

Viewing Sensor Data Records

To view the Sensor Data Records (SDR):

1. From the SSU Main window, choose SDR Manager.

    When you start the SDR Manager, it automatically loads the SDR entries from non-volatile memory.

    The SDR Manager window has a navigation pane on the left that displays, in a tree format, the sensor data records. The tree has categories for each type of record. Clicking on a category expands or collapses a list of SDRs for that category. Clicking on an individual SDR displays the information for that SDR in the presentation pane in the upper right. The description pane in the lower right displays a description of the currently selected SDR type.

2. Use the <F4> and <F5> keys to scroll the window contents to the left and right to view all of the columns.

3. Use the File and SDR menu items to work with the SDR information:
   - **Open:** Views data from a previously saved SDR file.
   - **Save As:** Saves the currently loaded SDR data to a file.
   - **Properties:** Displays information about the SDR, including IPMI version, number of SDR entries, time stamps for changes to the SDR information, and free space remaining.
   - **Reload:** Refreshes the display by reading the SDR data from the server.

Updating System Firmware and BIOS

Using the SSU, you can update the BIOS, update the firmware, and verify the firmware. Procedures for each are given below. You can also update the BIOS and firmware without using the SSU (page 40). You can download the updates from the Intel support website:

http://support.intel.com/support/motherboards/server/ssh4/srsh4

Updating the BIOS

To update the BIOS:
1. Download the update from the Intel support website.
2. From the SSU Main window, choose System Update. (System Update is available only in Expert mode.)

   When you start System Update, it automatically displays the current revision information for the system firmware and BIOS.
3. From the **File** menu, choose **Load** and choose a .uif or .bio file to use for the update.
4. Click the **Update** button to update the BIOS.

Updating the Firmware

To update the system firmware:
1. Download the update from the Intel support website.
2. From the SSU Main window, choose System Update. (System Update is available only in Expert mode.)
3. When you start System Update, it automatically displays the current revision information for the system firmware and BIOS.
4. From the **File** menu, choose **Load** and choose a .uif or .hex file to use for the update.
5. Click the **Update** button to perform the update.

Verifying the Firmware

To compare the system firmware in nonvolatile memory with a firmware file:
1. Download the update from the Intel support website.
2. From the SSU Main window, choose System Update. (System Update is available only in Expert mode.)

   When you start System Update, it automatically displays the current revision information for the system firmware and BIOS.
3. From the **File** menu, choose **Load** and choose a .hex file to use for the update.
4. Click the **Verify** button to compare the firmware code in nonvolatile storage with the selected file.

Saving and Restoring the System Configuration

Using the SSU, you can save the following configuration information to a file:

- Platform type, BIOS revision, and firmware revision
- CMOS settings
- Extended system configuration data (ESCD)
- Settings for the emergency management port (EMP), platform event paging (PEP), and BMC LAN alerts

Data is saved from all sources. There is no way to choose only certain pieces of configuration data to save. You can also restore the information from a saved configuration file.

⟹ **NOTE**

BIOS passwords are stored in the file. Restoring a configuration can change passwords on a server. EMP and LAN passwords are not stored in the file.

Saving a Configuration

To save the system configuration:

1. From the SSU Main window, choose Config Save/Restore. (Configuration Save/Restore is available only in Expert mode.)
2. Click **Save To File** and specify a filename and location.

Restoring a Configuration

To restore the system configuration from a file:

1. From the SSU Main window, choose Config Save/Restore. (Configuration Save/Restore is available only in Expert mode.)
2. Click **Restore from File** and specify a filename and location.

   The CSR reads the platform type, BIOS revision, and firmware revision from the file and compares that information with the same information retrieved from the server. If the two do not match, an error message is displayed and the restore operation aborts. If they do match, the CSR restores the configuration data to the server. It prompts you to reboot the server for the new settings to take effect.

Alerting for Platform Events

You can set up the server to alert you when various events occur. Alerts can be delivered either as telephone pages or over the LAN. Instructions for setting up both telephone paging alerts and LAN alerts are given below.

Setting Up Paging Alerts

To set up the server to send alerts as telephone pages:

1. Install an external modem on the Emergency Management Port (COM2).
2. From the SSU Main window, choose Platform Event Manager (PEM).
3. In the PEM window, click **Configure EMP**.

4. In the corresponding boxes, enter the following command strings for the modem attached to the EMP port:

- **ESC Sequence:** the escape sequence. This string is sent to the modem before sending command strings. The maximum length for the string is five characters; longer strings are truncated.

- **Hangup String:** hang up or drop the connection. The EMP automatically sends an <ENTER> character following this string. The maximum length for the string is eight characters; longer strings are truncated.

- **Modem Dial Command:** the command to dial a phone number. This string is sent to the modem before sending the paging string.

- **Modem Init String:** the initialization string for the modem. This string is sent every time the EMP initializes. The maximum length for the string is determined at run-time from firmware. You will be notified if the string is truncated. Following a save, the actual string saved is displayed in the edit box.

5. Click **Save** to save the changes.
6. Click **Close** to return to the PEM window.
7. In the PEM window, click **Configure PEP**.
8. Select the **Enable PEP** check box.
9. In the **Blackout Period** box, enter the minimum time, in minutes, between successive pages. The valid range is [0 - 255] where 0 disables the blackout period. Setting a blackout period can save you from being flooded with repeat pages. After you receive a PEP page, no additional pages are sent by PEP for the duration of the blackout period.
10. In the **Paging String** box, enter the phone number to dial for the page and the message you want sent with the page. The maximum length for the paging string is determined at run-time from firmware. You will be notified if the string is truncated. Following a save, the actual string saved is displayed in the edit box.
11. From the **Options** menu, choose **Configure Event Actions**.
12. In the Platform Event Paging Actions window, move the events that you want to generate an alert to the Enabled column and move all other events to the disabled column using the following buttons:

- >>: Moves all events from the enabled list to the disabled list.

- >: Moves the selected event from the enabled list to the disabled list.

- <: Moves the selected event from the disabled list to enabled the list.

- <<: Moves all events from the disabled list to the enabled list.

13. Click **Save** to save the changes.
14. Click **Close** to return to the PEP Configuration window.
15. To send a test page to verify that you have correctly configured PEP, from the **Options** menu, choose **Send Alert**.
16. Click **Save** to save the configuration.
17. Click **Close** to return to the Platform Event Manager window.

Setting Up LAN Alerts

To set up the server to send alerts over the LAN:

1. Configure the remote system to receive alerts. For more information, see the documentation for Intel Server Management software.
2. From the SSU Main window, choose Platform Event Manager (PEM).
3. In the PEM window, click **Configure LAN**.
4. Select the **Enable LAN Alerts** check box.
5. (Optional) In the **SNMP Community String** box, enter a string for the community field in the Header section of the SNMP trap sent for an alert. The string must be from 5 to 16 characters. The default string is *public*.
6. In the **IP Setup** box, choose either:
   - **DHCP**: the IP address for the server is automatically assigned by the DHCP (dynamic host control protocol) server on the network. The Host, Gateway, and Subnet Mask boxes in the dialog are ignored.
   - **Static**: assign the IP address for the server using the Host, Gateway, and Subnet Mask boxes in the dialog.
7. If you chose Static IP Setup in the previous step, fill in the IP addressing boxes:
   - **Host IP Address**: the IP address of this server.
   - **Gateway IP Address**: the IP address of the router for this server.
   - **Subnet Mask**: the IP address for the server's subnet. The server uses this to decide if the alert destination is on the same subnet.
8. In the **Alert IP Address** box, fill in the IP address of the system you want to receive alerts from this server. If you want the alert to be broadcast to an entire subnet, enter the IP address for the subnet.
9. From the **Options** menu, choose **Configure Event Actions**.
10. In the BMC LAN Alerting Actions window, move the events that you want to generate an alert to the Enabled column and move all other events to the disabled column using the following buttons:
    - >>: Moves all events from the enabled list to the disabled list.
    - >: Moves the selected event from the enabled list to the disabled list.
    - <: Moves the selected event from the disabled list to enabled the list.
    - <<: Moves all events from the disabled list to the enabled list.
11. Click **Save** to save the changes.
12. Click **Close** to return to the BMC LAN Configuration window.
13. To send a test alert to verify that you have correctly configured BMC LAN alerts, from the **Options** menu, choose **Send Alert**.
14. Click **Save** to save the changes.
15. Click **Close** to return to the PEM window.

Managing the Server Remotely

You can set up the server so that you can connect to it from a remote client system to perform management tasks. You can make the connection over a LAN or by using a modem or direct serial cable to the Emergency Management Port (EMP). Instructions for setting up the server for remote LAN and serial/modem access are given below.

Setting Up Remote LAN Access

To configure remote LAN access:

1. From the SSU Main window, choose Platform Event Manager (PEM).
2. In the PEM window, click **Configure LAN**.
3. If you want to require a password for remote access, enter the password in the **Enter New Password** box and in the **Verify New Password** box. Passwords can be from 1 to 16 characters long, using any ASCII character in the range [32-126]. To clear the passwords, leave both boxes blank. (You can also clear the password by choose the menu Options > Clear LAN Password.)
4. From the **LAN Access Mode** list, select the remote access mode:

    - **Full Access**: a remote system can initiate a LAN connection regardless of the state or health of the server.

    - **Restricted**: a remote system can initiate a LAN connection, but cannot perform control operations such as power down, reset, or front panel NMI.

    - **Disabled**: remote systems are not allowed to initiate LAN connections.

5. In the **IP Setup** box, choose either:

    - **DHCP**: the IP address for the server is automatically assigned by the DHCP (dynamic host control protocol) server on the network. The Host, Gateway, and Subnet Mask boxes in the dialog are ignored.

    - **Static**: assign the IP address for the server using the Host, Gateway, and Subnet Mask boxes in the dialog.

6. If you chose Static IP Setup in the previous step, fill in the IP addressing boxes:

    - **Host IP Address**: the IP address of this server.

    - **Gateway IP Address**: the IP address of the router for this server.

    - **Subnet Mask**: the IP address for the server's subnet. The server uses this to decide if the alert destination is on the same subnet.

7. Click **Save** to save the changes.
8. Click **Close** to return to the PEM window.

Setting Up Remote Modem or Serial Access

To configure remote modem or serial access:

1. From the SSU Main window, choose Platform Event Manager (PEM).
2. In the PEM window, click **Configure EMP**.
3. If you want to require a password for remote access, enter the password in the **Enter New Password** box and in the **Verify New Password** box. Passwords can be from 1 to 16 characters long, using any ASCII character in the range [32-126]. To clear the passwords, leave both boxes blank. (You can also clear the password by choose the menu Options > Clear LAN Password.)
4. In the **Modem Ring Time** box, enter the number of 500ms intervals that the BMC should wait before taking control of the COM2 port and answering an incoming call. A value greater than zero gives the BIOS time to answer before the BMC takes control. A value of zero causes the BMC to answer immediately. The maximum value, 63, tells the BMC to ignore the call. Modem Ring Time applies only to Preboot access mode and is ignored for other access modes.
5. In the **System Phone Number** box, enter the number for the phone line connected to the modem on the EMP.
6. From the **Access Mode** list, choose the remote access mode:

    - **Always Active**: the EMP is available at any time.

    - **Preboot**: the EMP is available only when the server is powered down or is in the running POST during startup.

    - **Disabled**: remote systems are not allowed to initiate connections.

7. From the **Restricted Mode** list, choose either:

    - **Enabled**: a remote system can initiate a connection, but cannot perform control operations such as power down, reset, or front panel NMI.

    - **Disabled**: the remote system has full control of the server.

8. From the **Connection Mode** list, choose either:

    - **Direct Connect**: the COM2 port on the server is connected by a serial cable to the remote system.

    - **Modem Connect**: the COM2 port on the server is connected to a modem.

9. Click **Save** to save the changes.
10. Click **Close** to return to the PEM window.

FRU/SDR Load Utility

The Field Replacement Unit (FRU) and Sensor Data Record (SDR) load utility is a DOS-based program used to update the server management subsystem's product level FRU and SDR nonvolatile storage. The utility:

- Discovers the product configuration based on instructions in a master configuration file
- Displays the FRU, SDR, and SMB information
- Updates the nonvolatile storage managed by the BMC that holds the SDR and FRU area
- Generically handles FRU devices that might not be associated with the BMC

When to Run the FRU/SDR Load Utility

You'll need to run the FRU/SDR utility in these situations:

- When first setting up your server
- Whenever you change the number of power supplies, processors, or fans in the server
- When installing a FRU/SDR update (page 42)

⟹ **NOTE**

> If the FRU/SDR configuration information in BMC nonvolatile storage does not match the physical configuration of the server, you might see false errors generated by sensors that don't actually exist, and sensors that do exist might not be monitored. So, it's important to keep the configuration up to date.

Running the FRU/SDR Load Utility

You can run the utility directly from the Utilities menu of the System Resource CD. However, if you have downloaded an update, you should run the updated version from the update diskette.

The executable file for the utility is FRUSDR.EXE. The utility requires the following:

- ROM-DOS version 6.22 or MS-DOS version 6.22 (and later versions)
- One or more .fru files describing the system's field replaceable units
- A .cfg file describing the system configuration
- An .sdr file describing the sensors in the system

Command Line Format

The basic command line format is:

```
FRUSDR [-?] [-h] [-d {fru, sdr, smb}] [-cfg filename.cfg] [-fru filename.fru]
```

Table 6.   Command Line Format

Option	Description
-? or –h	Display usage information.
-d {fru, sdr, smb}	Display requested area only.
-cfg filename.cfg	Updates the FRU and SDR configuration using a CFG file.
-fru filename.fru	Updates the FRU configuration using a FRU file.
-p	Pause between blocks of data.

The FRU/SDR load utility allows only one of the command line options ?, h, d, fru, or cfg at a time. You can use the p flag with any of the other options. You can use either a slash (/) or a minus sign (-) to specify command line options.

Displaying a Given Area

When the utility is run with the -d option, information about the specified area is read from memory and displayed. If the given display function fails because of an inability to parse the data present or a hardware failure, the utility displays an error message and exits.

Using a Specified CFG File

In most cases, you'll use the standard configuration file master.cfg that is supplied with the utility on the System Resource CD and with software updates:

```
FRUSDR –cfg master.cfg
```

The utility loads the specified CFG file and uses the information in that file to:

- Verify that the CFG file is the correct one for the hardware model
- Load the data from the FRU files, prompting the user for information as necessary
- Select the proper SDRs and load them into nonvolatile storage

Using a Specified FRU File

If you run FRUSDR using the master.cfg file, and FRUSDR halts prematurely, you can update individual FRU areas by using the -fru switch and a specific FRU file.

⟹ **NOTE**

> FRUSDR, when run using the -fru switch, does not check to make sure it is
> running on the correct hardware for the specified FRU file. The -fru switch
> causes FRUSDR to overwrite all information in the specified FRU area.

Updating Nonvolatile Storage Areas

The .fru and .sdr files are specific to a particular server platform. The files include header information to identify the platform. The utility verifies that a file is being used with the correct server before updating any information in nonvolatile storage. Prior to updating the SDR information, the SDR area in nonvolatile storage is cleared.

6 Installing and Removing Components

Tools and Supplies Needed

- Phillips[†] screwdriver
- Small flat-bladed screwdriver
- Extraction tool for processor heat sink clips:

    Dexter Design
    (503) 648-7000
    dxtrdsgn@aol.com
    Order part number: 650308-003-P6
- Antistatic wrist strap and conductive foam pad (recommended)
- Pen or pencil
- Equipment log (page 160)

As you integrate new parts into the system, record the model and serial number of the server system, all installed options, and any other pertinent information specific to the server system. You will need this information when running the SSU.

Access Covers

This section includes instructions for the following:

- Removing and installing the bezel
- Removing and installing the rear access cover
- Removing and installing the front access cover

Removing and Installing the Bezel

You need to remove the bezel to install and remove hot-swap power supplies and to install and remove devices in the 5.25-inch peripherals bay. The bezel has ball studs (Figure 3, A) on the back that snap-fit into holes on the chassis front.

- To remove the bezel, pull it away from the chassis until the ball studs release from the chassis.
- To install the bezel, align the ball studs with the holes in the chassis and push gently until the ball studs snap into the holes.
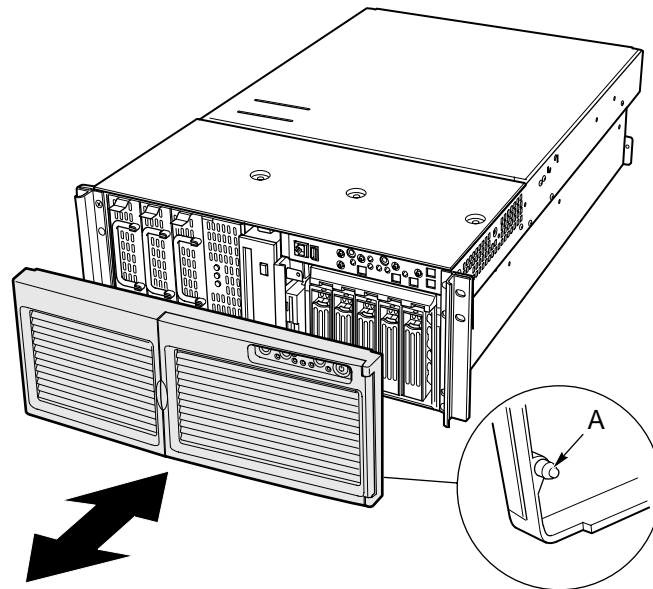
OM13254

Figure 3. Attaching the Bezel to the Chassis

Removing the Rear Access Cover

The rear access cover provides access to the hot-swap fans and to the electronics bay that contains PCI add-in cards and the server board set. To remove the cover:

1. Release the captive screws located on the rear edge of the cover (Figure 4).
2. While lightly pressing down on the cover, slide it toward the rear of the chassis.
3. Lift the cover up and off of the chassis.
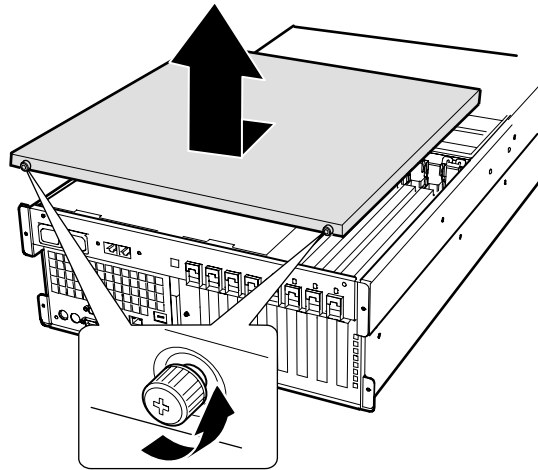
OM13255

Figure 4. Removing the Rear Access Cover

Installing the Rear Access Cover

⇒ **NOTE**

> Before installing the rear access cover, check that you have not left tools or loose parts inside the system.

To install the rear access cover:

1. Position the cover on the chassis so that the cover tabs align with the chassis slots.
2. While lightly pressing down on the cover, slide it toward the front of the chassis until the cover tabs fully engage the chassis slots.
3. Attach the cover to the chassis with the captive screws located on the rear edge of the cover.

Removing the Front Access Cover

To install or remove devices in the peripherals bay and to install or remove the hot-swap drive bay or power supply bay, you need to remove the front access cover. To remove the front access cover:

1. Remove the three cover screws, as shown in Figure 5.
2. While lightly pressing down on the cover, slide it toward the front of the chassis.
3. Lift the cover up and off of the chassis.
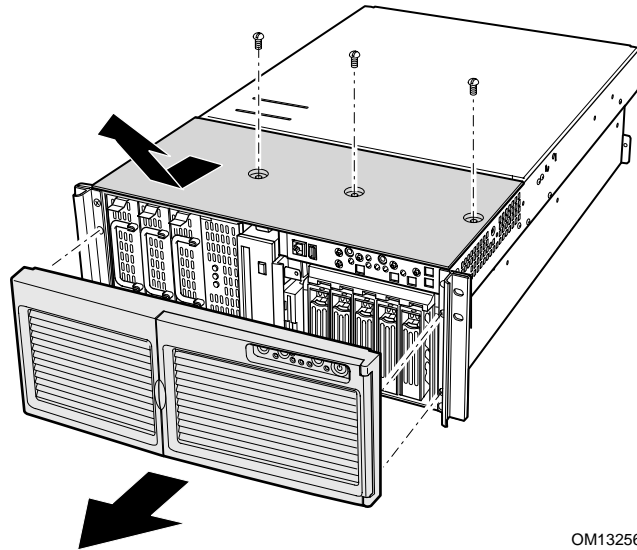
OM13256

Figure 5. Removing the Front Access Cover

Installing the Front Access Cover

⇒ **NOTE**

> Before installing the front access cover, check that you have not left tools or loose parts inside the system.

To install the front access cover:

1. Position the cover on the chassis so that the cover tabs align with the chassis slots.
2. While lightly pressing down on the cover, slide it toward the rear of the chassis until the cover tabs fully engage the chassis slots.
3. Attach the cover to the chassis with the three screws removed earlier.

Accessing the System Boards

This section includes instructions for the following:

- Removing and installing the access cover to the system boards
- Removing and installing the memory board
- Removing and installing the processor board air baffle
- Removing and installing the processor board
- Removing and installing the baseboard

Removing the Access Cover to the System Boards

To remove the access cover to the system boards:

1. Remove the rear access cover (page 64).
2. Loosen the two captive screws located at the front of the access cover to the system boards (Figure 6).
3. Lift the end of the cover where the screws are located and remove the cover.
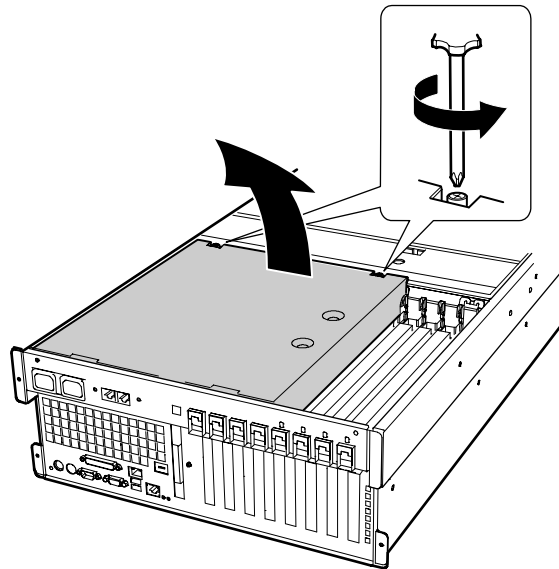
OM13257

Figure 6. Removing the Access Cover to the System Boards

Installing the Access Cover to the System Boards

To install the access cover:

1. Orient the access cover with the captive screws toward the front of the server.
2. Insert the tabs on the rear of the cover into the slots at the rear of the chassis.
3. Press down gently and tighten the captive screws at the front of the cover.

Removing the Memory Board

To remove the memory board:

1. Grasp the bracket on the top edge of the memory board and pull straight up until the board disengages from the connector on the processor board (Figure 7).
2. Lift the memory board out of the chassis.
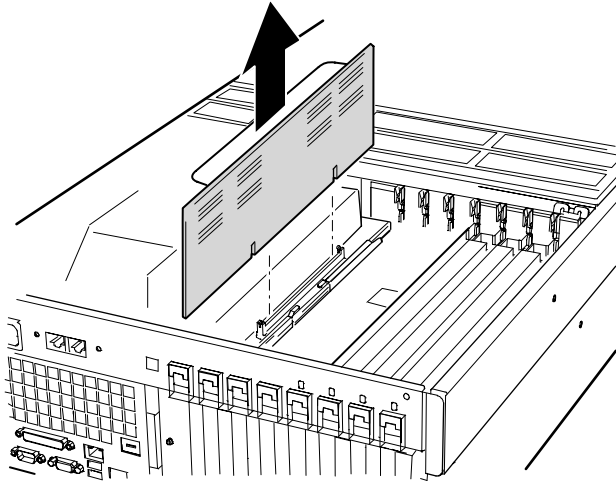
OM13258

Figure 7. Removing the Memory Board

Installing the Memory Board

To install the memory board:

1. Holding the bracket on the top edge of the memory board, insert the board into the guides at both ends of the electronics bay.

2. Align the memory board with the connector on the processor board and press down on the bracket until the board is fully inserted into the connector.
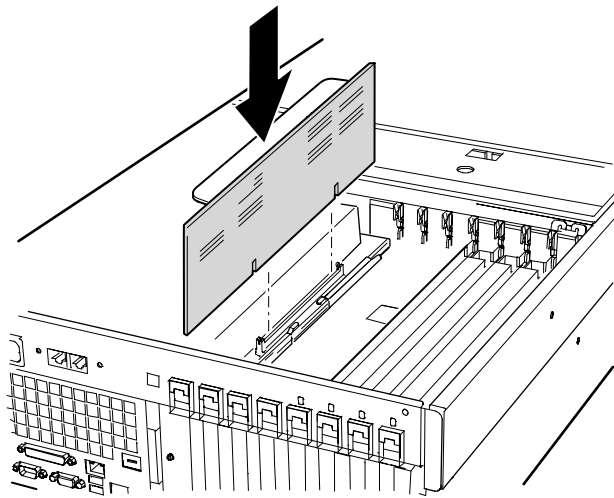
OM13259

Figure 8. Installing the Memory Board

Removing the Processor Board Air Baffle

To remove the processor board air baffle:

1. Remove the screw holding the dual power receptacle (located at the top left rear of the chassis) and pull it clear of the chassis as far as the attached cords will allow (Figure 9, A and B).
2. At the end of the air baffle closest to the rear of the chassis, press the two tabs toward each other (Figure 9, D) and raise the end, rotating the baffle about 30°.
3. Disengage the air baffle at the front of the electronics bay and remove the baffle from the chassis.
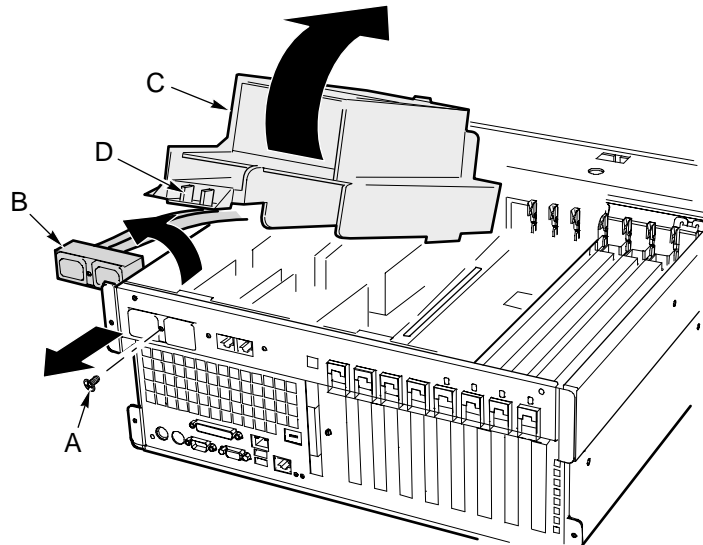
OM13260

A	Power receptacle screw	C	Air baffle
B	Dual power receptacle	D	Release tabs on air baffle

Figure 9. Removing the Processor Board Air Baffle

Installing the Processor Board Air Baffle

To install the processor board air baffle:

1. Orient the baffle so that the two release tabs are toward the rear of the chassis (Figure 10).
2. With the rear of the air baffle raised, insert the tab on the front of the air baffle into the slot in the chassis. Holding the baffle at an angle of about 30° will allow the tab to engage correctly.
3. Holding the power receptacle and attached cords clear, rotate the rear end of the baffle down. Adjust the position of the baffle until it moves into place and the two tabs are engaged. Do not force it down.
4. Move the power receptacle into place and attach the receptacle using the screw.
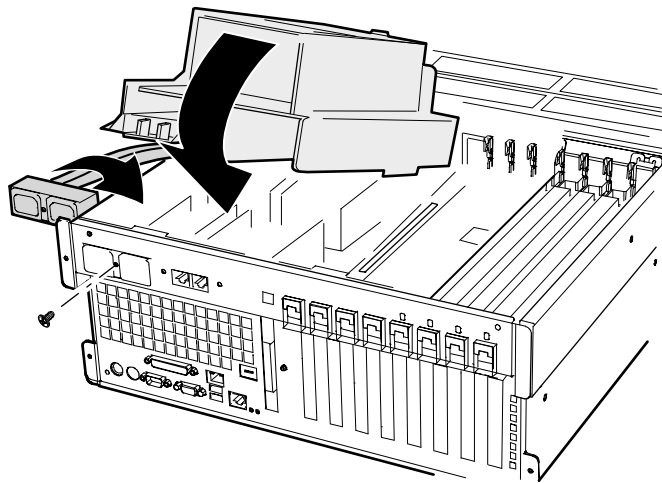
OM13261

Figure 10. Installing the Processor Board Air Baffle

Removing the Processor Board

To remove the processor board:

1. Rotate the handles on the processor board until they are fully open (Figure 11).
2. Using the handles, tilt the processor board up and remove it from the chassis.
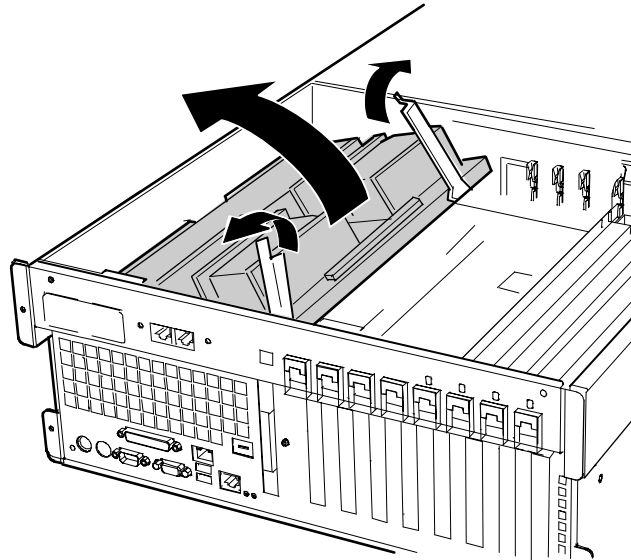
OM13262

Figure 11. Removing the Processor Board

Installing the Processor Board

To install the processor board:

1. Insert the tabs on the processor board into the slots on the baseboard bracket (Figure 12, A).
2. With the handles in the open position, lower the processor board until it rests on the baseboard bracket.
3. Close and press down on the handles until the processor board is fully engaged with the sockets on the baseboard.
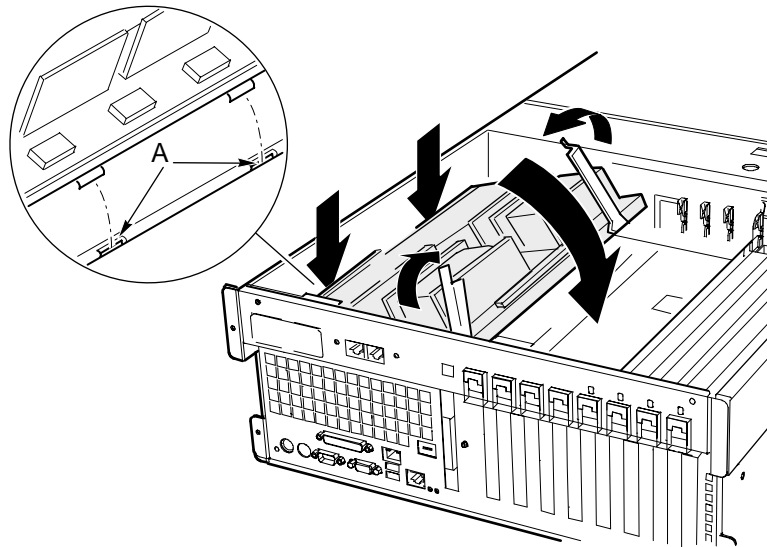
OM13263

Figure 12. Installing the Processor Board

Removing the Baseboard

To remove the baseboard:

1. Remove all external cables from the baseboard I/O ports at the back of the chassis.
2. Remove the fan assembly (page 109).
3. Label and disconnect all internal cables connected to the PCI add-in boards.
4. Remove all PCI add-in boards (pages 95 and 97).
5. Plastic curtains run the length of the electronics bay separating the PCI add-in cards. Remove the curtains as follows:
   a. Release one end of the curtain from the front retention mechanism. Lift the free end high enough to clear the chassis.
   b. From outside of the rear of the chassis, push down on the other end of the curtain and pull the free end out of the chassis.
6. Label and remove all internal cables attached to connectors on the board. For a diagram showing labeled connectors, see Figure 53 on page 136. Remove all cables from the cable retention clip on the front of the electronics bay.
7. A plastic retention mechanism for the PCI add-in cards is fastened to the front of the electronics bay by three clips (Figure 13, A). Release each clip by pressing down on the tab and remove the retention mechanism.

OM13264
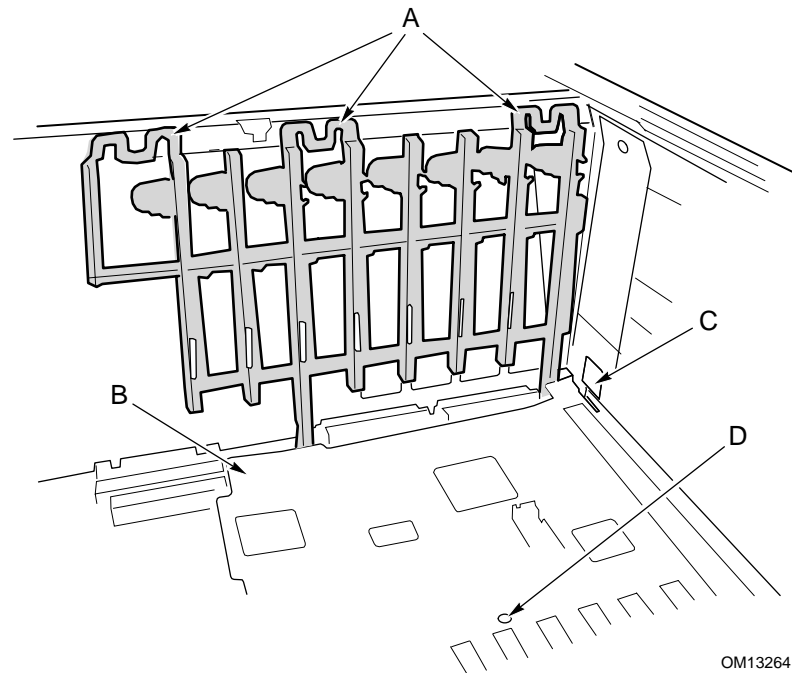
A	Tabs (3) on retention mechanism	C	Overlay tab (1 of 2)
B	Protective overlay	D	Overlay screw

Figure 13. Removing the Front Retention Mechanism

8. Remove the plastic protective overlay covering the PCI area of the board as follows:
   a. Unscrew the captive screw holding the overlay in place (Figure 13, D).
   b. Near the middle of the baseboard, lift the edge of the overlay until it is clear of the connectors on the board (Figure 13, B).
   c. Slide the overlay toward the front of the electronics bay and unhook it from the two tabs (Figure 13, C).
   d. Remove the overlay.
9. Remove the six screws, the plastic overlay, and the two processor board mounting brackets that attach the baseboard to the electronics bay (Figure 14, A).
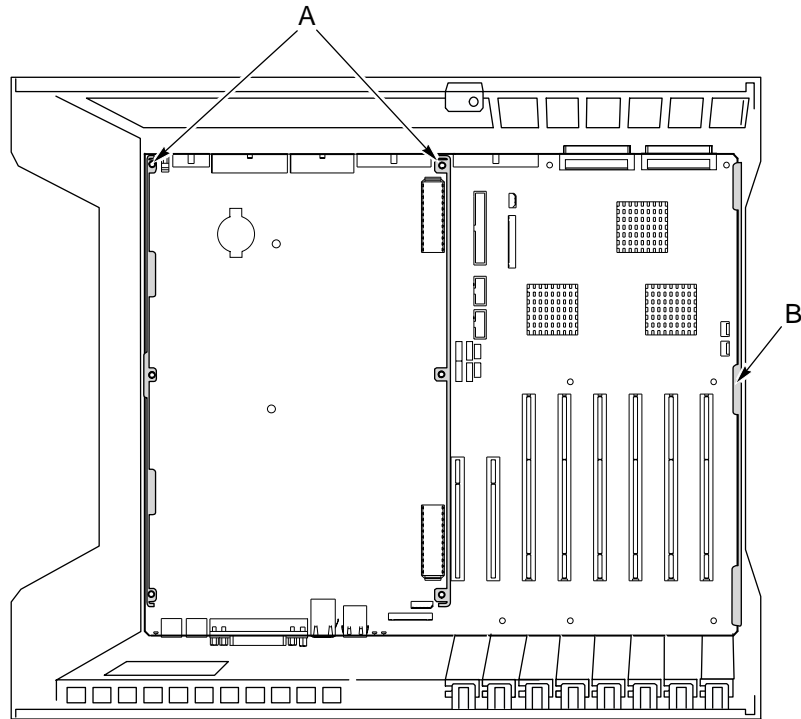
OM13265

Figure 14. Baseboard Mounting

10. Lifting the board slightly, slide the baseboard toward the front of the chassis until the I/O ports clear the chassis.
11. At one side of the chassis, the board is inserted into slots in a foam panel (Figure 14, B). Lift up on the opposite end of the board and pull the edge of the board out of the slots in the foam panel.
12. Lift the baseboard out of the electronics bay and place it component-side up on a nonconductive, static-free surface (or in an antistatic bag).

Installing the Baseboard

To install the baseboard:

1. With the rear of the electronics bay closest to you and the baseboard oriented so that the I/O connectors line up with the cutout in the back left of the chassis (Figure 14, above), lower the right end of the baseboard into the electronics bay and slip the board edge into the slots of the foam panel (Figure 14, B, above).
2. Lower the other end of the baseboard to the floor of the electronics bay and slide it toward the back of the chassis until:
   a. The I/O connectors fit all of the way into the I/O connector openings.
   b. The six mounting holes (Figure 14, A, above) on the baseboard are aligned with their corresponding threaded standoffs in the floor of the electronics bay.
3. Install the processor board mounting brackets and processor-side plastic overlay as follows:
   a. Align the processor board mounting bracket for the center of the baseboard with the three mounting holes. Insert a screw through each of the holes and partially thread the screws into the standoffs.
   b. Align the other mounting bracket along the edge of the board. Align the plastic overlay with the bracket and the two plastic studs. Insert a screw through each of the holes in the overlay and mounting bracket and partially thread the screws into the standoffs.
   c. Adjust the board position as needed and tighten the six screws.
4. Install the plastic protective overlay covering the PCI area of the board as follows:
   a. At the side of the electronics bay where the edge of the baseboard is inserted into the foam, place the two slots in the overlay over the hooked tabs (Figure 13, C, on page 74).
   b. Slide the overlay toward the rear of the chassis to hook the tabs in the slots.
   c. Carefully fit the overlay around the baseboard connectors and down against the board.
   d. Tighten the captive screw that holds the overlay in place.
5. Install the front retention mechanism for the PCI add-in cards on the front wall of the electronics bay (Figure 13 on page 74).
6. Connect all internal cables to the baseboard.
7. Install the PCI add-in board curtains as follows:
   a. At the back of the electronics bay, slide the end of a curtain with the locking tab into the topmost square hole adjacent to any add-in board expansion slot.
   b. At the front of the electronics bay, slide the tab at the other end of the curtain into the clip on the corresponding retention mechanism.
8. Install all PCI add-in boards and attach any internal cables to the boards.
9. Install the fan assembly in the main server chassis.
10. Attach the external cables to the baseboard I/O ports.

Processors

This section includes instructions for installing and removing processors and heat sinks. For a list of supported processors, call your service representative or visit the Intel Support website:

http://support.intel.com/support/motherboards/server/ssh4/srsh4/

Installing Processors

To install processors:

1. Observe the safety and ESD precautions at the beginning of this document.

⟹ **NOTE**

> You must install a processor in processor socket 1. When installing multiple processors, populate the processor sockets in the order shown in Figure 15.

OM13266
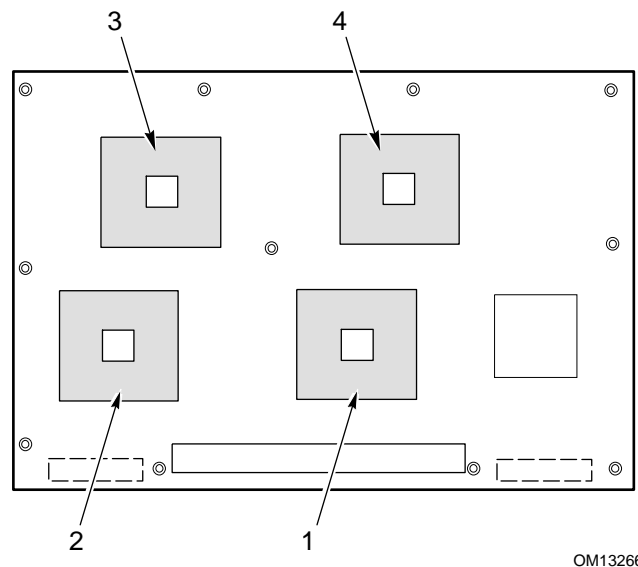
Figure 15. Correct Order for Populating Processor Sockets

⚠ **CAUTION**

> If you are not using processor sockets 3 and 4, leave the foam block in place.
> The block is required for proper airflow for cooling the processors.

2. Raise the locking bar on the socket.
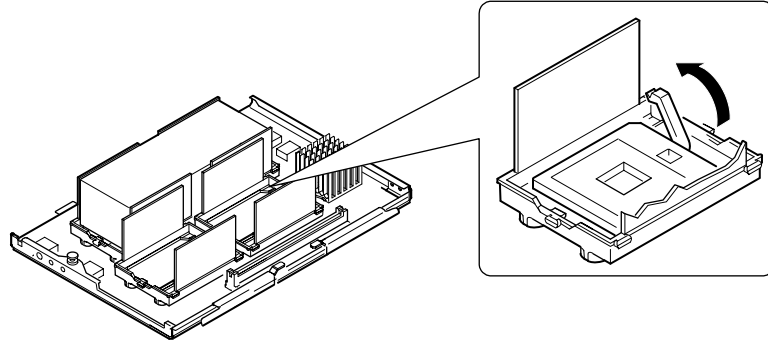
OM13267

Figure 16. Raising the Locking Bar

3. Orient the processor so that the triangle on the corner of the processor aligns with the triangle on the corner of the socket (Figure 17).
4. Aligning the pins of the processor with the socket, insert the processor into the socket. The processor should drop into the socket without requiring any force.
5. Lower the locking bar completely.
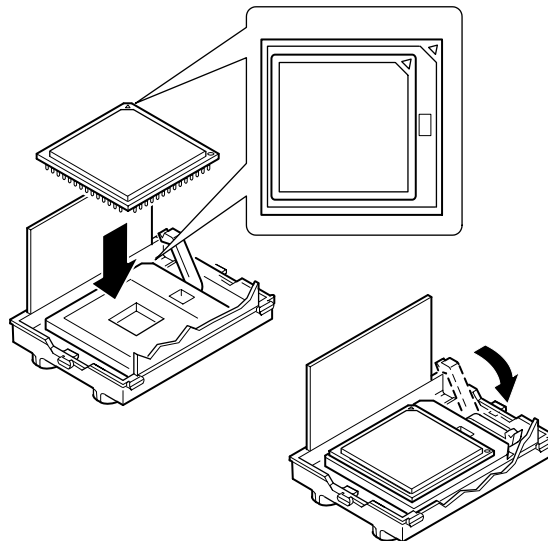
OM13268

Figure 17. Installing Processors

6. Following the instructions packaged with the applicator, apply thermal grease to the processor.
7. Insert the heat sink into the air baffle and place it on top of the processor (Figure 18, A).
8. Install both heat sink clips as follows:
   a. Place the heat sink clip on the center tab of the retention module and slide the clip to the right to engage the center tab.
   b. Snap one end of the clip down over the corresponding tab on the retention module.
   c. Snap the remaining end of the clip down over the corresponding tab.
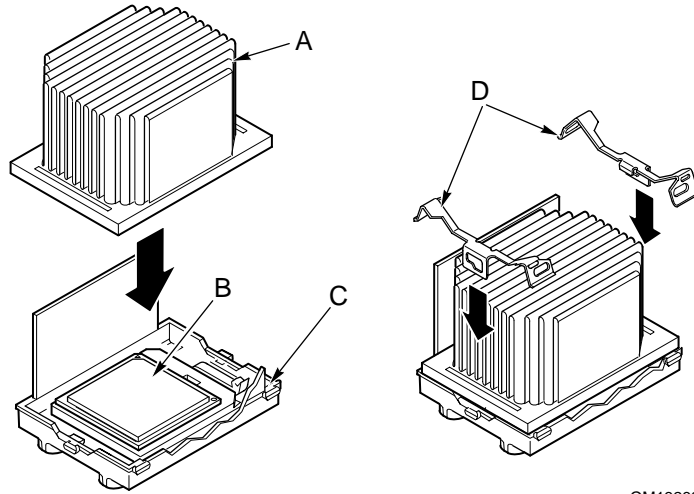
OM13269

A	Heat sink	C	Retention module
B	Socket and processor	D	Heat sink retention clips

Figure 18. Installing the Heat Sink

Removing Processors

To remove processors:

1. Observe the safety and ESD precautions at the beginning of this document.
2. Remove both heat sink clips as follows:
   a. Insert the heat sink clip extraction tool (see "Tools and Supplies Needed" on page 62) into the slot at one end of the clip (Figure 19).
   b. Press down on the tool until the clip clears the bottom edge of the tab on the retention module and rotate the tool until the end of the clip is free of the tab.
   c. Using the clip extraction tool, release the other end of the clip.
   d. Slide the clip to the left to disengage it from the center tab on the retention module and remove the clip.
3. Lift the heat sink straight out of the retention module.
4. Raise the locking bar on the socket.
5. Remove the processor from the socket.

OM13270
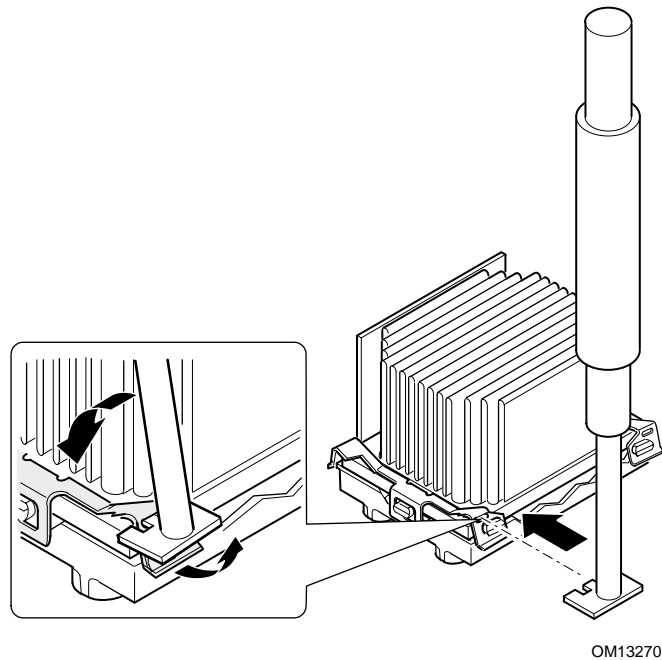
Figure 19. Removing a Processor

Memory

This section includes instructions for removing and installing DIMMs on the memory board. For a list of supported memory, call your service representative or visit the Intel Support website:

http://support.intel.com/support/motherboards/server/ssh4/srsh4/compat.htm

Installing DIMMs

⚠ **CAUTION**

Use extreme care when installing a DIMM. Applying too much pressure can damage the socket. Keyed DIMMs insert only one way.

⇒ **NOTE**

Load the DIMMs in the following order (Figure 20).
1. Bank 1: DIMMs #1, 2, 3, and 4
2. Bank 2: DIMMs #5, 6, 7, and 8
3. Bank 3: DIMMs #9, 10, 11, and 12

Always fill banks completely. Partially filled banks are ignored by the system.

Use only approved DIMMs listed on the Intel customer support Web site:

http://support.intel.com/support/motherboards/server/ssh4/srsh4/compat.htm

To install DIMMs:

1. Remove the memory board (page 68), and place the board component-side up on a nonconductive, static-free surface.
2. Holding the DIMM only by its edges, remove it from its antistatic package.
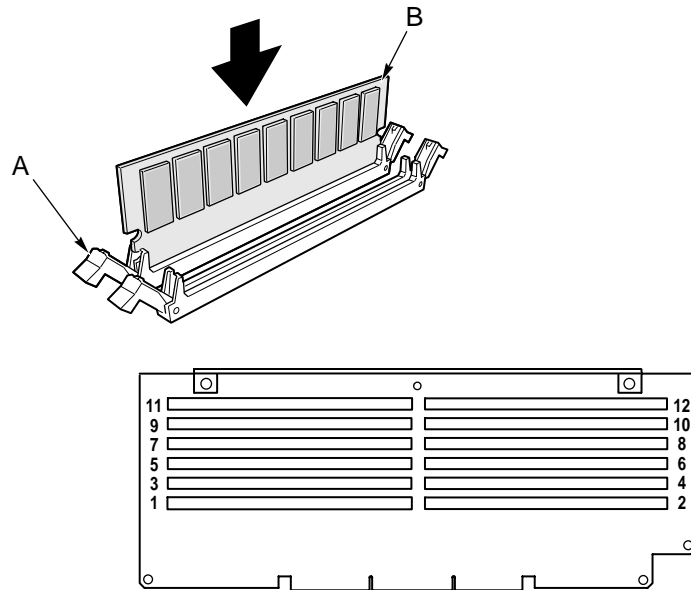
OM13272

Figure 20. Installing Memory

3. Open the plastic ejector levers at each end of the DIMM socket on the memory board (Figure 20, A).
4. Orient the DIMM so that the notch in the bottom edge of the DIMM aligns with the keyed socket on the memory board.
5. Insert the bottom edge of the DIMM into the socket and press down firmly on the DIMM until it seats correctly. The plastic ejector levers should snap into place when the DIMM is seated.
6. Make sure that the plastic ejector levers on the socket ends are fully closed.
7. Reinstall the memory board (page 69).

Removing DIMMs

1. Remove the memory board (page 68). Place the board component-side up on a nonconductive, static-free surface.
2. Locate the DIMM you want to remove and gently push down on the plastic ejector levers (Figure 21, A) to eject the DIMM from its socket.
3. Hold the DIMM only by its edges, being careful not to touch its components or gold edge connectors. Carefully lift it away from the socket and store it in an antistatic package.
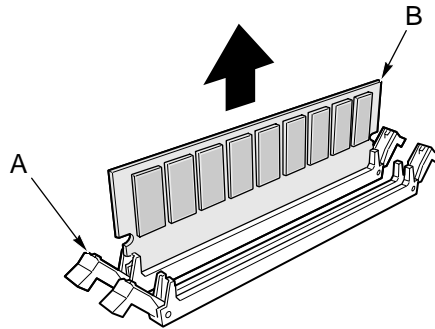
OM13271

Figure 21. Removing DIMMs

Hot-Swap SCSI Drives

Hot-swap drives are installed in carriers that fit into the hot-swap drive bay. This section describes the LED status indicators for the drive bays and gives instructions for using the drive carriers to install and remove drives.

Checking a Hot-Swap SCSI Drive Status Indicator

Each hot-swap SCSI drive slot has an LED that indicates drive status (Figure 22). To view the LEDs, open the access door on the right side of the bezel.

OM13273
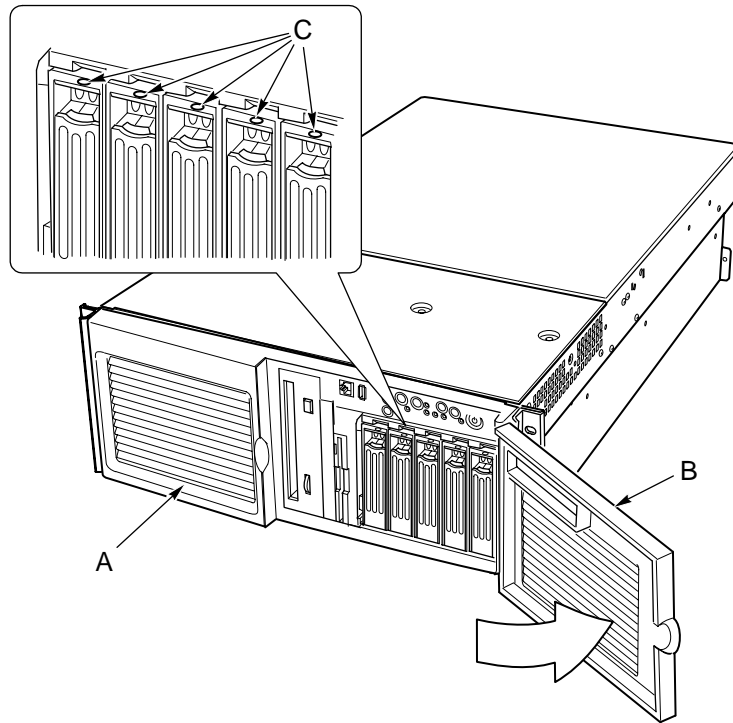
A	Bezel	C	LED status indicators
B	Access door, hot-swap drive bay		

Figure 22. Hot-Swap SCSI Drive Bay and Status Indicators

Table 7 lists the LED states and the drive status indicated by each state.

Table 7.   LED States for Hot-Swap SCSI Drive Status

LED State	Status
Solid green	The hard drive is present and powered on.
Flashing green	The hard drive is active.
Solid yellow	There is an asserted fault status on the hard drive.
Flashing yellow	A rebuild of the hard drive is in progress.
Off	The hard drive is not powered on.

Installing a Hot-Swap Drive in a Carrier

Before you can install a drive in the hot-swap drive bay, you must install the drive into a drive carrier. To install a hot-swap drive in a carrier:

1. If the plastic air baffle is installed in the carrier, remove the four screws that attach the air baffle to the carrier. Save the air baffle in case you later remove a drive.
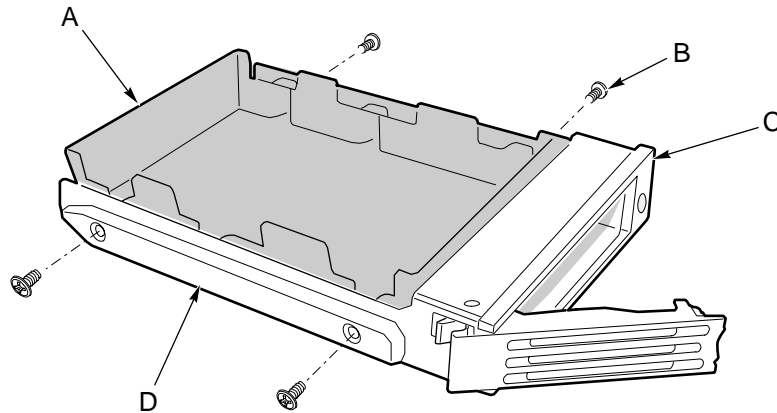
OM13274

A	Air Baffle	C	Carrier
B	Screw	D	Plastic rail

Figure 23. Removing a Plastic Air Baffle from a Carrier

2. Remove the hard drive from its wrapper and place it on an antistatic surface.
3. Record the new drive model and serial number in your equipment log.

4. Place the drive in the carrier with the component side down.
5. Using the four screws removed earlier, attach the drive to the carrier.
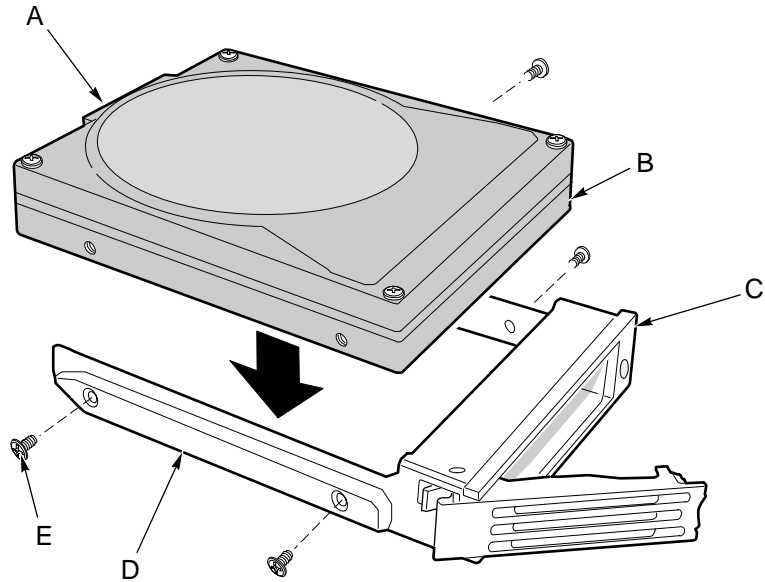
OM13275

A	SCA Connector	D	Plastic Rail
B	Drive	E	Screw
C	Carrier		

Figure 24. Installing a SCSI Hard Disk Drive in a Carrier

Removing a Hot-swap Drive from a Carrier

To remove a hot-swap drive from a carrier:
1. Remove the carrier and drive from the drive bay.
2. Remove the four screws that secure the drive to the carrier.
3. Place the drive on an antistatic surface.
4. If you are going to reinstall the carrier without a drive, you must first replace the air baffle in the carrier (Figure 23).

Removing and Installing Hot-Swap Disk Drives

⚠ CAUTION

Do not leave any drive slots without a drive or air baffle installed in the carrier. An empty carrier installed in a drive slot reduces cooling efficiency and can affect performance or cause damage due to overheating.

To replace a hot-swap disk drive:

1. Depress the green clip at the end of the plastic carrier handle. Pull the handle out to disengage the carrier handle latch from the locking slot at the top of the drive bay (Figure 25, B and C).
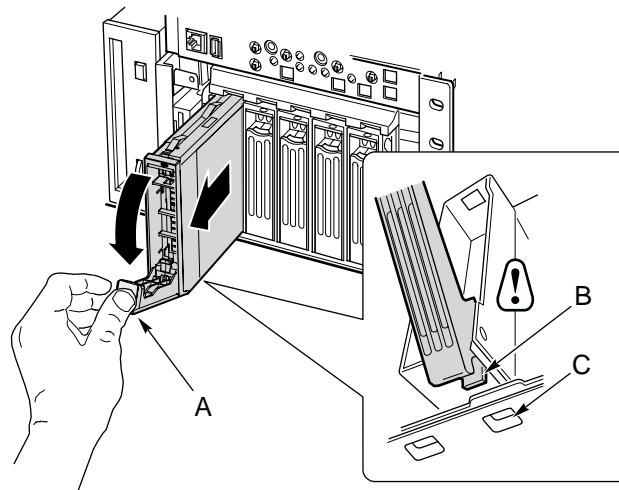
OM13276

A	Handle	C	Locking slot
B	Latch		

Figure 25. Removing a Drive Carrier

2. Carefully pull on the carrier handle and slide the carrier out of the bay.

3. Install a new drive into the carrier (page 85).
4. Hold the carrier handle in the fully open position and slide the carrier into the desired bay.
5. Push the carrier into the drive bay until the carrier handle latch engages the locking slot in the edge of the drive bay (Figure 26, C).
6. Push the handle closed until it clicks into position.
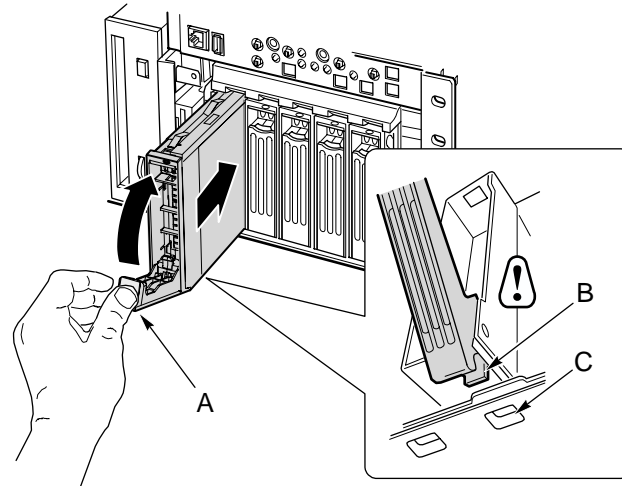
OM13277

A   Handle   C   Locking slot
B   Latch

Figure 26. Installing a Drive Carrier

DC Power Supplies

The power supply bay accommodates up to three power supply modules. The bay contains a power distribution board (PDB) that manages the delivery of power from the power supply modules.

Checking the Power Status LEDs

To view the power supply status LEDs (Figure 27), remove the bezel, as described on page 63.
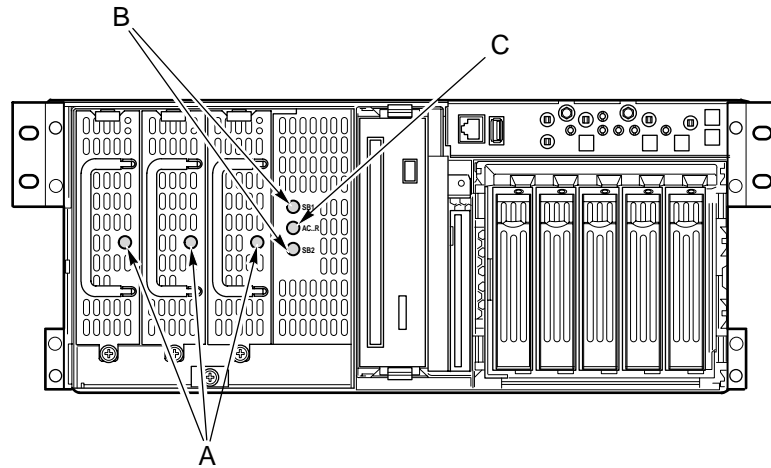
OM13278

A	Power LEDs (PWR)	C	Redundant AC LED (AC_R)
B	Standby LEDs (SB1 and SB2)		

Figure 27. Power and Standby LEDs

Table 8 lists the LED states and the power supply status indicated by each state.

Table 8.   LED Power Supply Status Indicators

Power LED State	Status
On	AC power is applied and the power module is functioning properly.
Off	Module is disabled.
	Module is overstressed.
	Module replacement required.
Standby LEDs State	**Status**
On	AC power is applied to corresponding power module, SB1 (left) or SB2 (right).
Redundant AC LED State	**Status**
On	Redundant (center) module is installed and power subsystem is operating in redundant AC mode.
Off	Power subsystem is not operating in redundant AC mode.

> If all power supply modules are functioning and all power cables from the power distribution board are properly connected to the baseboard and other components, but the server still won't power on, replace the power supply bay (page 107).

Removing a Power Supply Module

To remove a power supply module:

1. Remove the bezel (page 63).

OM13279
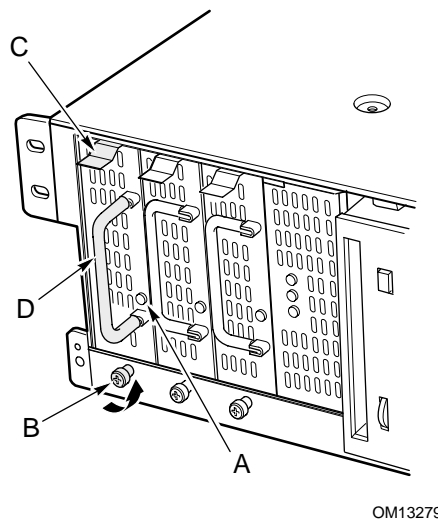
A	Power supply module	C	Locking tab
B	Captive screw	D	Handle

Figure 28. Removing a Power Supply Module

2. Loosen the captive screw that retains the power supply module.

⚠ **CAUTION**

> To avoid damaging the module, do not tilt or twist the power supply module as you pull it from the power supply bay. The module disengaging from its connector causes the initial resistance you will feel. Use even, steady force to remove the supply.

3. While pressing down on the locking tab, grasp the handle and carefully pull the module out of the power supply bay.
4. If you are not going to install a replacement module, you must install a filler panel in the vacant slot.
5. Install the bezel.

Installing a Power Supply Module

To install a power supply module:

1. Remove the bezel (page 63).
2. If present, remove the filler panel from the vacant slot.
3. Slide the power supply module into the vacant slot until you feel resistance.

⚠ CAUTION

The module engaging its connector causes the resistance. To avoid damaging the module, do not tilt or twist the power supply module as you push it into the connector.

4. Push the module into the bay until the locking tab snaps into place.

   The green LED on the power supply module should be illuminated.
5. Tighten the captive screw that retains the power supply module.
6. Install the bezel.

PCI Add-In Boards

The SRSH4 server supports four hot-plug PCI add-in boards and four non-hot-plug PCI add-in boards.
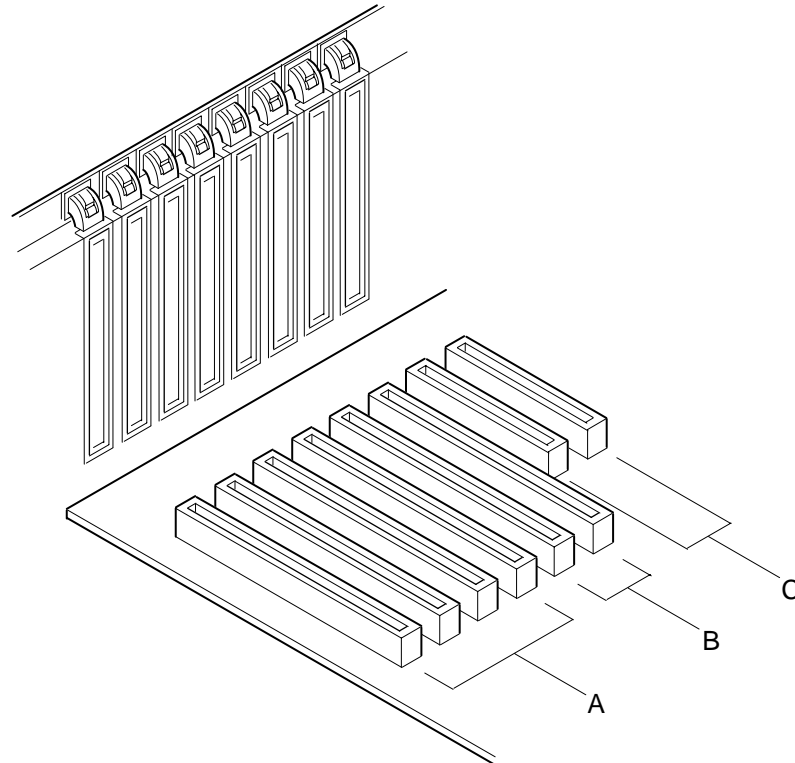
OM13280

A	Four hot-plug 64-Bit, 100-MHz PCI-X add-in board slots	C	Two non-hot-plug 32-Bit, 33-MHz PCI add-in board slots
B	Two non-hot-plug 64-Bit, 100-MHz PCI-X add-in board slots		

Figure 29. PCI Add-In Board Locations

⚠ **CAUTION**

Be sure any empty expansion slots have a slot cover installed. An open expansion slot reduces the cooling and EMI integrity of the server and can affect performance and cause damage due to overheating.

Operating System Support for Hot-Plug Add-In Boards

Some operating systems support hot-plugging PCI add-in boards and some do not. Operating system support is provided by a driver that you must install when setting up your server. Hot-plug drivers are available on the System Resource CD in the Drivers directory. The driver files on the CD include information on installing and using the hot-plug software.

If you don't find a driver for your operating system on the System Resource CD, you can check the Intel Customer Support website for the latest drivers:

http://support.intel.com/support/motherboards/server/ssh4/spsh4/

Without a driver, the operating system does not support hot-plug installation and removal of PCI add-in boards. In that case, you must treat all eight PCI slots as non-hot-plug slots and follow the instructions on pages 96 and 97 for installing and removing all PCI add-in boards.

Checking the Status Indicators for a Hot-Plug Add-In Board

A bank of LED indicators on the back panel of the electronics bay indicates the status of the hot-plug PCI add-in boards (Figure 30).
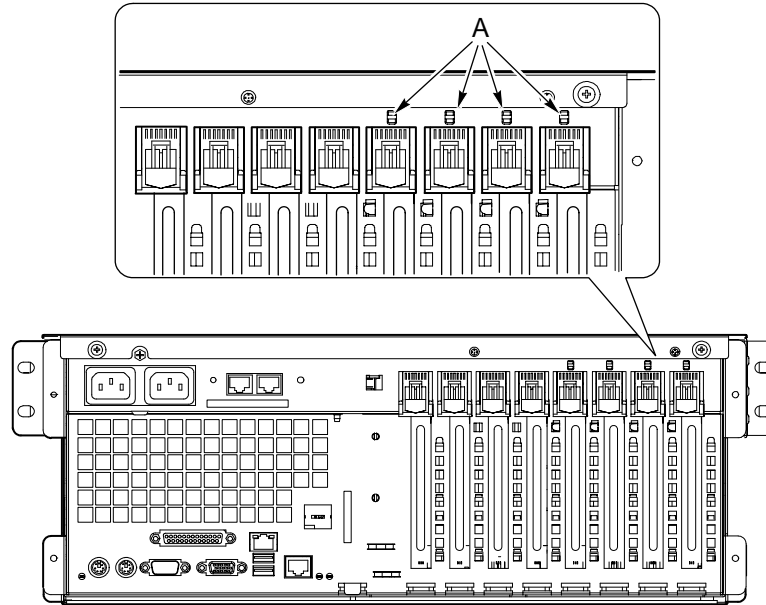
OM13281

A   Status LED indicators

Figure 30. Status Indicators for Hot-Plug PCI Add-In Boards

Table 9 lists the LED states and the hot-plug PCI status indicated by each state.

Table 9.   LED Hot-Plug PCI Status Indicators

Power LED State	Status
Green	Power to slot
Amber	Fault on slot
Not lit	No power to slot

Installing a Hot-Plug PCI Add-In Board

To install a hot-plug PCI add-in board:

1. Remove the rear access cover (page 64).
2. If the LED for the slot indicates that power to the slot is on, turn it off by using the PCI hot-plug application software on your system (see "Operating System Support for Hot-Plug Add-In Boards" on page 92).

   The LED adjacent to the slot should now be off.
3. Open the latches on the front and rear retention mechanisms (Figure 31, A and B).
4. If necessary, remove and save the expansion slot cover.
5. Prepare the new PCI board for installation:
   a. Remove the add-in board from its protective wrapper. Be careful not to touch the components or gold edge connectors. Place the add-in board with the component side up on an antistatic surface.
   b. Record the serial number of the add-in board in your equipment log.
   c. Set jumpers or switches according to the manufacturer's instructions.
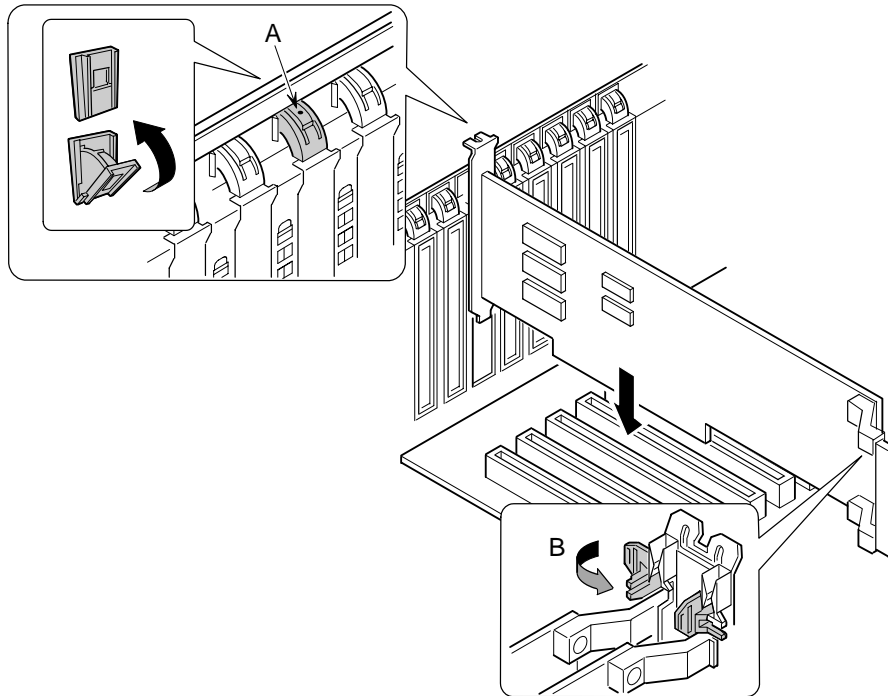
OM13282

A   Latch, rear retention mechanism
B   Latch, front retention mechanism

Figure 31. Installing a Hot-Plug PCI Add-In Board

6. On the edge opposite the connectors, grasp the board by both corners. Orient the board to the vacant hot-plug slot so that the metal retention bracket is toward the rear of the chassis.
7. Insert the board into the front and rear retention mechanisms. Carefully push down on the board until it engages and fully seats in the slot connector.

8. Close the front and rear latches.
9. Install the rear access cover.
10. Turn on power to the add-in board using the PCI hot-plug application software on your system.

Removing a Hot-Plug PCI Add-In Board

To remove a hot-plug PCI add-in board:

1. Remove the rear access cover (page 64).
2. If the LED for the slot indicates that power to the slot is on, turn it off by using the PCI hot-plug application software on your system (see "Operating System Support for Hot-Plug Add-In Boards" on page 92).

   The LED adjacent to the slot should now be off.
3. Disconnect any cables attached to the board you are removing.
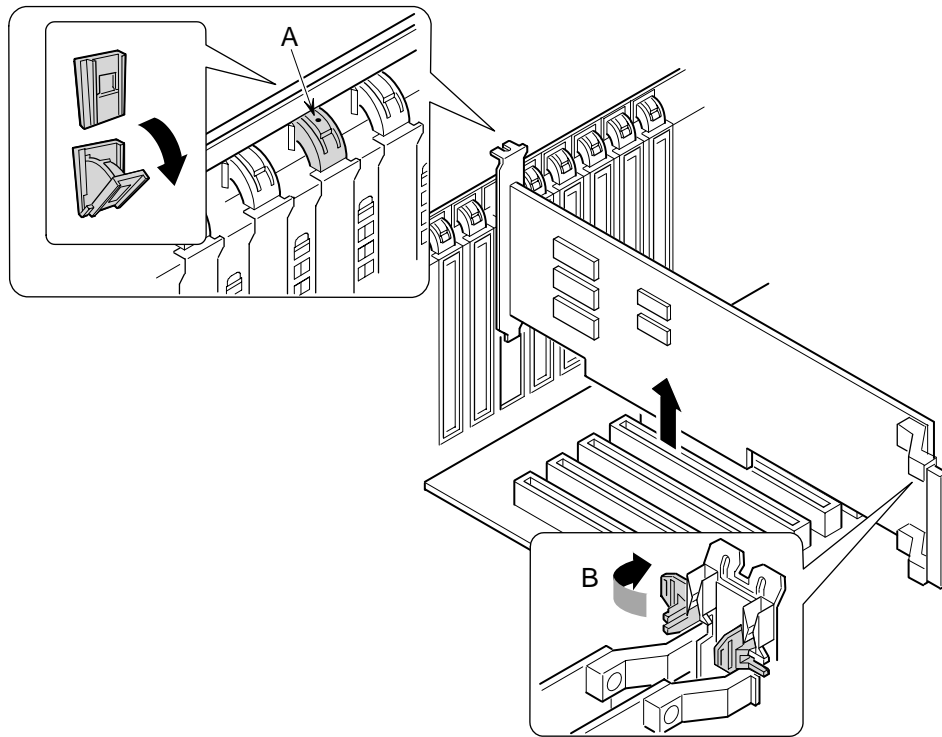
OM13283

A   Latch, rear retention mechanism
B   Latch, front retention mechanism

Figure 32. Removing a Hot-Plug PCI Add-In Board

4. Release the latches on the front and rear retention mechanisms (Figure 32, A and B).
5. Grasp the board at both corners, pull it out of the slot connector, and carefully slide it out of the retention mechanisms. Store the board in an antistatic protective wrapper.
6. If you are not reinstalling a board in the same slot, install an expansion slot cover and install the rear access cover. If you are installing a new board, follow the instructions on page 94.

Installing a PCI Add-In Board in a Non-Hot-Plug Slot

⚠ CAUTION

> The PCI add-in board slots located under the system board access cover are not hot-plug slots.

To install a PCI add-in board in a non-hot-plug slot:

1. Disconnect the AC power cords from the power source or wall outlets.
2. Turn off all peripheral devices connected to the server system.
3. Remove the rear access cover (page 64) and the system board access cover (page 67).
4. If necessary, remove and save the expansion slot cover.
5. Prepare the new PCI board for installation:
   a. Remove the add-in board from its protective wrapper. Be careful to not touch the components or gold edge connectors. Place the board with the component side up on an antistatic surface.
   b. Record the serial number of the new add-in board in your equipment log.
   c. Set jumpers or switches according to the manufacturer instructions.
6. Open the latches on the front and rear retention mechanisms (Figure 33, A and B).
7. On the edge opposite the connectors, grasp the board by both corners. Orient the board to the vacant slot so that the metal retention bracket is toward the rear of the chassis.
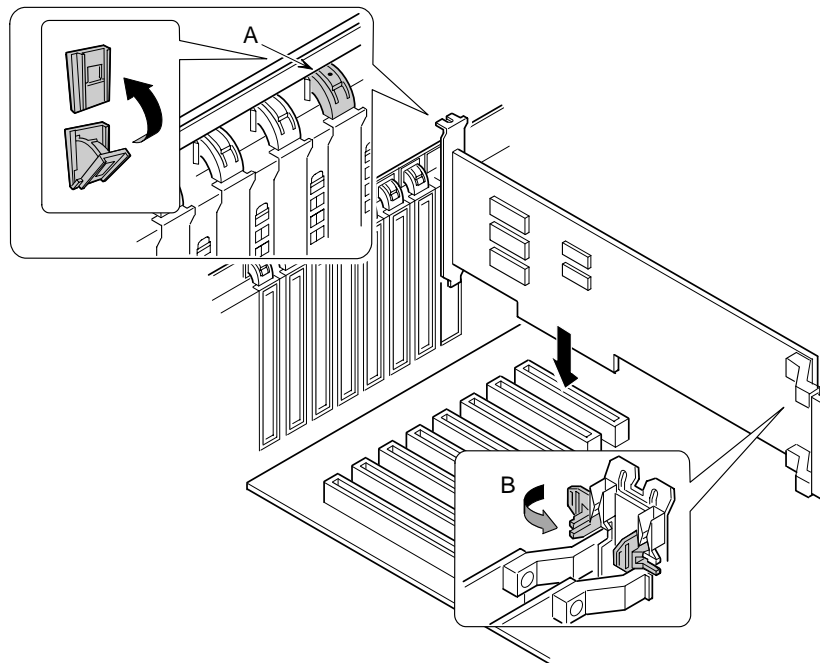
OM13284

A   Latch, rear retention mechanism
B   Latch, front retention mechanism

Figure 33. Installing and Removing a Non-Hot-Plug PCI Add-In Board

8. Insert the board into the front and rear retention mechanisms. Carefully push down on the board until it engages and fully seats in the slot connector.
9. Close the front and rear latches.
10. Install the system board access cover and the rear access cover.
11. Turn on any peripheral devices connected to the system.
12. Connect the power cord and turn on power to the server.

Removing a PCI Add-In Board from a Non-Hot-Plug Slot

⚠️ **CAUTION**

> The PCI add-in board slots located under the system board access cover are not hot-plug slots.

To remove a PCI add-in board from a non-hot-plug slot:

1. Disconnect the AC power cords from the power source or wall outlets.
2. Turn off all peripheral devices connected to the server system.
3. Remove the rear access cover (page 64) and the system board access cover (page 67).
4. Release the latches on the front and rear retention mechanisms.
5. Grasp the board by the top edge or corners, carefully pull it out of the connector, and slide it free of the retention bracket.
6. If you are installing a new board, follow the instructions on page 96. If you are not installing another PCI add-in board, continue with the next step below.
7. Install a slot cover over the vacant slot in the back panel.
8. Install the system board access cover and the rear access cover.
9. Turn on any peripheral devices connected to the system.
10. Connect the power cord and turn on power to the server.

Cooling System Fans

The server accommodates six hot-swap fans.

⚠ CAUTION

Don't remove a fan while the server is powered on unless you have a replacement unit available. Once you remove an individual fan from the system, replace it within five minutes. Vacant spaces alter airflow patterns in the server system and can cause overheating and damage to system components.

Checking a Fan Status Indicator

A fan status indicator is adjacent to each fan module (Figure 34). The indicators are triangular in shape and point to their respective modules. When a fan is not functioning normally, the indicator is illuminated; otherwise, the indicator is not illuminated. A fan failure is also indicated by the general system fault LED located on the front panel.
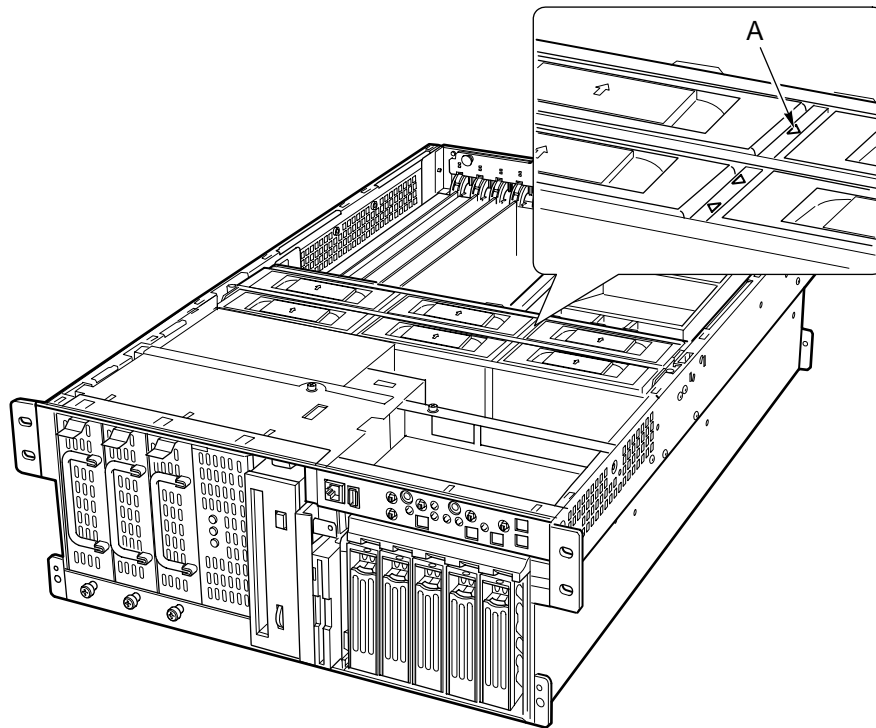
OM13285

A   Fan status indicator

Figure 34. Fan Status Indicator

Removing a Fan Module

To remove a fan:

1. Remove the rear access cover (page 64).
2. Grasp the fan module and pull it straight out of the fan assembly.
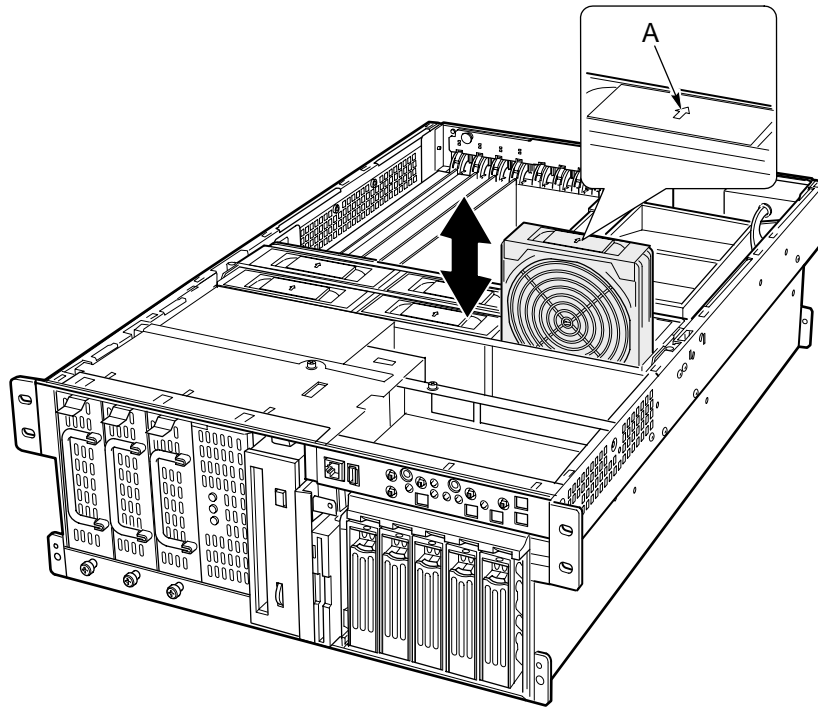
OM13286

A   Airflow direction indicator

Figure 35. Removing and Installing a Fan Module

Installing a Fan Module

➦ **NOTE**

> If you are replacing a failed fan, wait for the fan status indicator to turn off.
> Generally, this will take less than ten seconds.

To install a fan, follow these instructions:
1. Remove the rear access cover (page 64).
2. Place the fan module into the empty slot of the fan assembly. Be sure that the airflow direction arrow is pointing toward the rear of the chassis (Figure 35, A).
3. Check the fan status indicator for the replacement fan. If the installation was successful, the indicator will not be lit.
4. Install the rear access cover.

Backup Battery

The lithium battery on the baseboard powers the real-time clock (RTC) for up to 10 years in the absence of power. 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) might be incorrect.

For a list of approved replacement batteries, contact your customer service representative or dealer.

⚠ 🖎 **WARNING!**

> Danger of explosion if battery is incorrectly replaced. Replace with only the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

⚠ 🖎 **ADVARSEL!**

> Lithiumbatteri - Eksplosionsfare ved fejlagtig håndtering. Udskiftning må kun ske med batteri af samme fabrikat og type. Levér det brugte batteri tilbage til leverandøren.

⚠ 🖎 **ADVARSEL!**

> Lithiumbatteri - Eksplosjonsfare. Ved utskifting benyttes kun batteri som anbefalt av apparatfabrikanten. Brukt batteri returneres apparatleverandøren.

⚠ 🖎 **VARNING!**

> Explosionsfara vid felaktigt batteribyte. Använd samma batterityp eller en ekvivalent typ som rekommenderas av apparattillverkaren. Kassera använt batteri enligt fabrikantens instruktion.

⚠ ✉ VAROITUS!

> Paristo voi räjähtää, jos se on virheellisesti asennettu. Vaihda paristo ainoastaan laitevalmistajan suosittelemaan tyyppiin. Hävitä käytetty paristo valmistajan ohjeiden mukaisesti.

To replace the battery:

1. Before proceeding, record your custom BIOS settings.
2. Disconnect the AC power cords from the power source or wall outlets.
3. Turn off all peripheral devices connected to the server system.
4. Remove the rear access cover (page 64), the system board access cover (page 67), the memory board (page 68), the air baffle (page 70), and the processor board (page 72).
5. Slide the battery in the direction shown in Figure 36, allowing the battery to pop up.
6. Remove the battery from its socket.
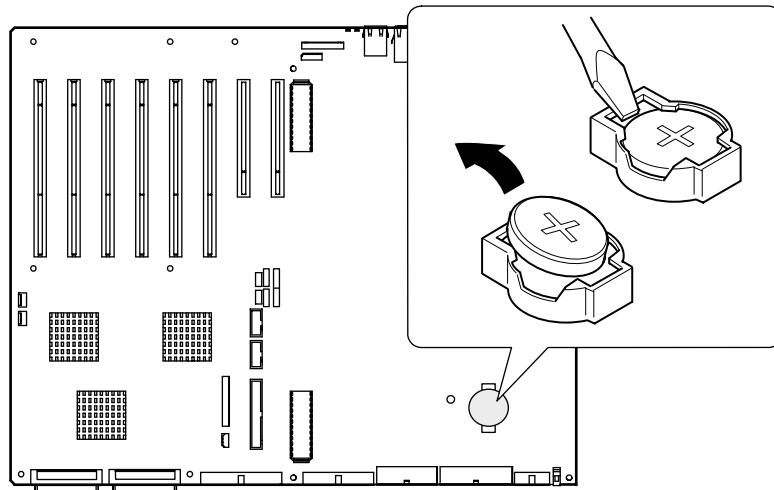
OM13287

Figure 36. Replacing the Backup Battery

7. Dispose of the battery according to local ordinance.
8. Remove the new lithium battery from its package.
9. Being careful to observe the correct polarity, lay the battery in the socket, inserting one edge of the battery under the large corner tabs.
10. Push the battery down until it locks into the socket.
11. Install the processor board, air baffle, memory board, system board access cover, and the rear access cover.
12. Run BIOS Setup to restore the configuration settings to the RTC.
13. Restore your custom BIOS settings.

Front Panel Board

For a description of the features on the front panel board, see page 128.

To replace the front panel board:

1. Turn off power to the server and unplug the AC power cords from the power source.
2. Remove the bezel and the front access cover (pages 63 and 65).
3. Disconnect the cables from front panel board: the front panel board ribbon cable, the USB port cable, and the serial port cable.

   One end of the front panel board is inserted into a slot in the chassis and the other end is secured with a screw and a snap-top standoff.
4. Remove the screw that secures the front panel board to the chassis.
5. Grasp the end of the board closest to the side of the chassis and pull to disengage the board from the standoff.
6. Rotate the free end of the board out until the USB and serial ports clear the chassis, disengage the other end of the board from the slot in the chassis, and lift the board clear of the chassis.
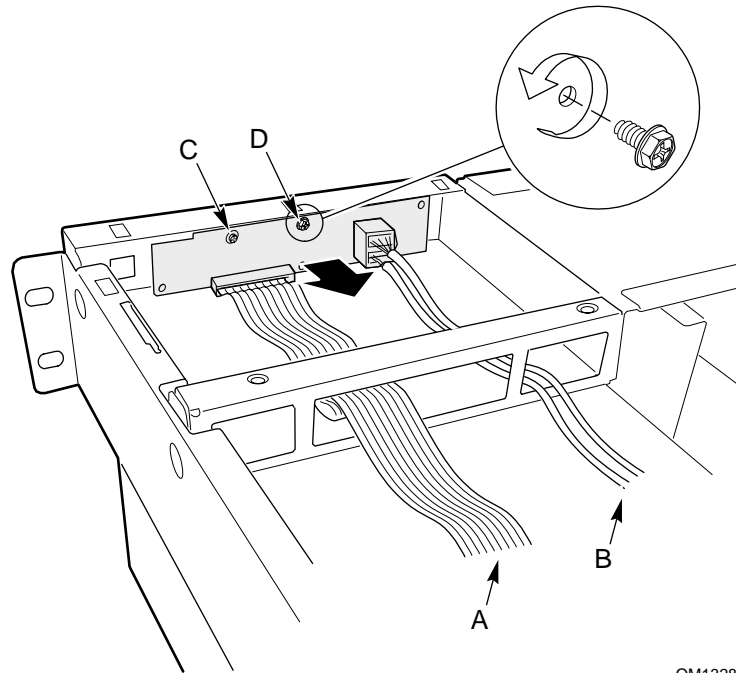
OM13288

A	Front panel board cable	C	Snap-top standoff
B	USB and serial port cables	D	Retaining screw

Figure 37. Replacing the Front Panel Board

7. Position the end of the replacement board in the slot in the chassis and rotate the free end of the board into position, snapping it down over the standoff.
8. Install the retaining screw.
9. Connect the front panel board ribbon cable to the front panel board.
10. Connect the USB and serial port cables to the front panel board.
11. Install the front access cover and the bezel.

Peripheral Drives

This section provides information and instructions for installing and removing devices from the 5.25-inch peripheral bay and the media bay.

Preliminary Considerations

⚠ **CAUTION**

You should not install hard drives in the 5.25-inch peripheral drive bay for two reasons:

- The drives cannot be properly cooled in this location.
- The total EMI from the server might exceed allowable limits, because the hard drive generates additional EMI.

To avoid damage to a 5.25-inch peripheral device, ensure the EMI gasket provided in the device bay does not bridge any open circuits on the exposed peripheral device.

Drive Cables

This section summarizes drive cable requirements and constraints. The number of peripheral drives you can install depends on:

- The number supported by the bus
- The number of drive bays available
- The height of drives in the bays (1-inch or 1.6-inch high)
- The combination of SCSI and IDE devices

IDE Requirements

The server includes an IDE controller and a cable that supports two devices. One of the two connectors on the cable is already used for the CD-ROM drive. The CD-ROM device is configured for Cable Select (CS) and is at the end of the cable; this defines the CD-ROM as the IDE master. If you install a second IDE device, and it is jumpered for Cable Select, connect the device on the middle IDE connector to configure the device as IDE slave, or at the end of the cable to configure the device for IDE master.

SCSI Requirements

The server includes a two-channel SCSI controller. One channel is used for the hot-swap drive bay. You may use the second channel for SCSI devices in the peripheral bay. SCSI cabling and connections must meet the SCSI bus specification. Otherwise, the bus might be unreliable and data might become corrupted or devices might not work properly.

EMC Compliance of 5.25-inch Removable Media Device Bays

Integration of the 5.25-inch peripheral drive bay can affect EMC compliance and is a regulated activity. Except as noted here, any changes to the bay configuration could result in non-compliance with EMC regulations in your area.

Installing a 5.25-inch Peripheral Drive

To install a peripheral drive:

1. Turn off power to the server and unplug the AC power cords from the power source.
2. Remove the bezel and the front access cover (pages 63 and 65).
3. Remove the fan assembly (page 109).
4. If the drive bay is covered by a metal EMI shield, insert your finger in the large hole in one end of the shield and pull the shield from the chassis. Save the shield.
5. If the drive bay has an existing drive installed, remove the drive (page 105) and remove the slide rails attached to the sides of the drive. Save the rails and screws.
6. Remove the new drive from its protective wrapper and place it on an antistatic surface.
7. Record the new drive model and serial numbers in your equipment log.
8. Set any jumpers or switches on the new drive according to the drive manufacturer's instructions.
9. Attach a slide rail to each side of the drive using two mounting screws.
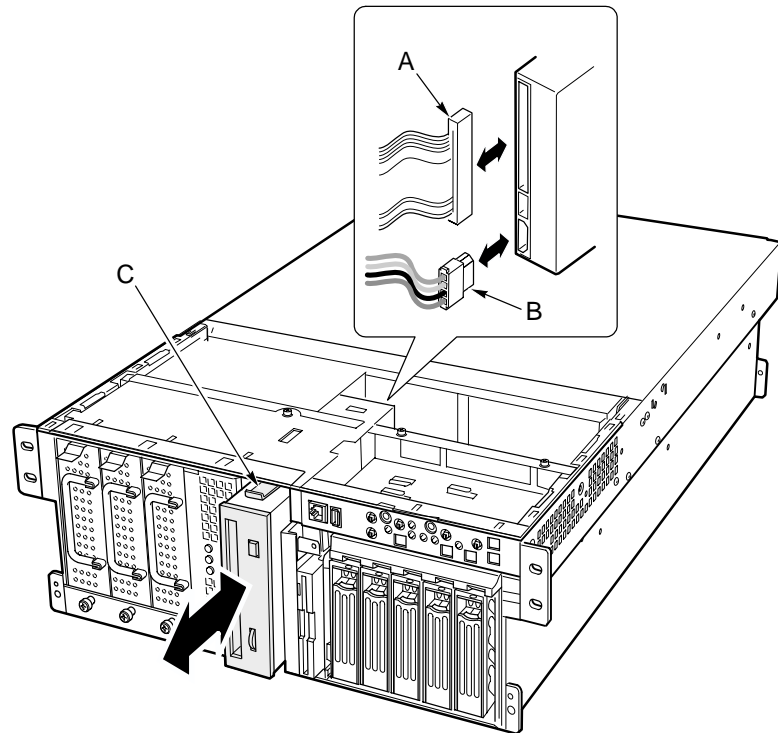
OM13289

A   Data cable   C   Slide rails
B   Power cable

Figure 38. Removing and Installing a 5.25-inch Peripheral Drive

10. Position the drive so the plastic slide rails engage the guide rails in the peripheral bay. Push the drive into the bay until the slide rails lock in place.
11. Connect the signal and power cables to the drive. You can insert the keyed connectors only one way.
12. Install the fan assembly, the front access cover, and the bezel.

Removing a 5.25-inch Peripheral Drive

To remove a peripheral drive:

1. Turn off power to the server and unplug the AC power cords from the power source.
2. Remove the bezel and the front access cover (pages 63 and 65).
3. Remove the fan assembly (page 109).
4. Disconnect the power and data cables from the back of the drive.
5. Facing the front of the drive, press in on the two black plastic tabs (Figure 38, C), one at each side of the drive, to release the drive from the drive bay.
6. Carefully slide the drive out of the bay and place it on an antistatic surface.
7. Remove the four screws that secure the two slide rails to the drive. Save the screws and slide rails.
8. If you are installing a replacement device, skip to "Installing a 5.25-inch Peripheral Drive," step 6, on page 104 to install that device.
9. Install the fan assembly, front access cover, and bezel.

⟹ **NOTE**

> If you leave the drive bay empty, install a metal EMI shield on the bay for proper cooling and airflow. Installing a drive in the bay or covering the bay with a filler panel or EMI shield protects the System EMI integrity and cooling. When you install a drive, save the filler panel and EMI shield to reinstall if you should later remove the drive and not reinstall one in the same bay.

Removing a Device from the Media Bay

To remove a device from the media bay:

1. Turn off power to the server and unplug the AC power cords from the power source.
2. Remove the bezel and the front access cover from the chassis (pages 63 and 65).
3. Remove the fan assembly (page 109).
4. Disconnect the power and data cables from the back of the device (Figure 39).
5. Remove and save the screw that attaches the device to the bay.
6. Slide the device out. If the device will be used again, place it in an antistatic protective wrapper.
7. Install the fan assembly, front access cover, and bezel.
8. Plug the AC power cords into the power source and turn on power to the server.

⟹ **NOTE**

> If you leave the device bay empty, install a metal EMI shield on the bay for proper cooling and airflow. Installing devices in the bays or covering the bays with filler panels or EMI shields protects the System EMI integrity and cooling. When you install a device, save the filler panel or EMI shield to reinstall if you should later remove the device and not reinstall one in the same bay.

OM13290

A	Power cables	C	Screw
B	Data cables		

Figure 39. Removing a Device from the Media Bay

Installing a Device in the Media Bay

To install a device in the media bay:

1. Turn off power to the server and unplug the AC power cords from the power source.
2. Remove the bezel and the front access cover (pages 63 and 65).
3. Remove the fan assembly (page 109).
4. Slide the drive into the bay. Install the screw that attaches the drive to the bay (Figure 39, C, above).
5. Connect the power and signal cables to the drive (Figure 39, A and B, above).
6. Install the fan assembly, front access cover, and bezel.
7. Run BIOS Setup to specify that the device is installed in the system.

Power Supply Bay

Replacing the Power Supply Bay

To replace the power supply bay:

1. Turn off power to the server and unplug the AC power cords from the power source.
2. Remove the bezel, the front access cover, and the rear access cover (pages 63, 64, and 65).
3. Remove all power supply modules (optional).
4. Remove the fan assembly (page 109).
5. Label and disconnect all power and data cables attached to the hot-swap drive bay and the peripheral bay devices. Lift the cables out of the bottom of the fan bay.
6. At the baseboard, label and disconnect the power cables that go to the power supply bay.
7. Remove the front chassis bracket:
    a. Disconnect the cables from the front panel board.
    b. Remove the four screws attaching the bracket to the chassis (Figure 40, G).
    c. Slide the bracket toward the front of the chassis.
    d. Lift the bracket up and clear of the chassis.
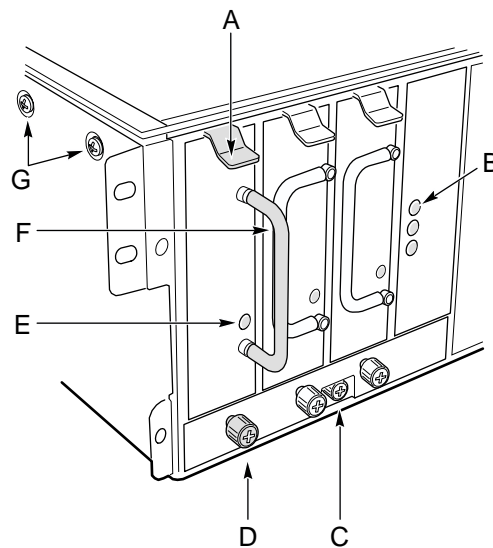
OM13291

A	Locking tab	E	Power LED, power supply module
B	Standby LEDs	F	Handle, power supply module
C	Retaining screw, power supply bay	G	Screw, front chassis bracket (two each side of chassis)
D	Captive screw, power supply module		

Figure 40. Power Supply Bay

8. Remove the electronics bay from the main chassis.
9. Remove the AC power cable from the chassis retention clips.

10. Loosen the captive screw retaining the power supply bay, slide the bay forward to free the tabs at the rear of the bay, and lift the power supply bay out of the chassis.
11. Position the replacement power supply bay in the chassis so that the chassis tab slips into the slot in the bottom of the bay to the rear of the captive screw.
12. Slide the bay to the rear and engage the two tabs on the bottom rear of the bay with the slots in the chassis floor.
13. Tighten the captive screw that retains the bay.
14. Route the AC power cable, being sure to place it in all the chassis retention clips.
15. Install the electronics bay into the main chassis.
16. Install the front chassis bracket:
    a. Align the tabs in the center of the underside of the bracket with slots in the top of the peripheral bay and lower the bracket onto the chassis.
    b. Slide the bracket toward the rear of the chassis until its front is flush with the chassis front.
    c. Connect the cables to the front panel board.
    d. Install the four screws attaching the bracket to the chassis.
17. At the baseboard, connect the power cables that go to the power supply bay.
18. Place all power and data cables back in the fan bay, being careful to route them as they were originally.
19. Connect all power and data cables to the hot-swap drive bay and the peripheral bay devices.
20. Install the fan assembly.
21. Install all power supply modules.
22. Install the front access cover, the rear access cover, and the bezel.
23. Plug in the AC power and turn on power to the server.
24. Observe the power and standby LEDs and confirm that the power supply system is functioning properly.

Cooling System

Removing the Fan Assembly
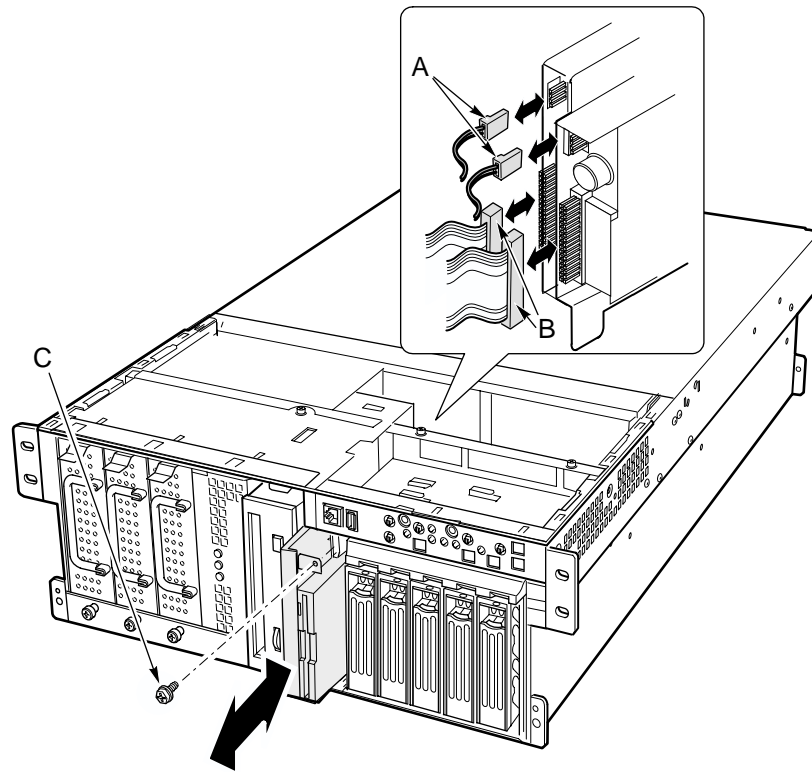
To remove the fan assembly:

1. Turn off power to the server and unplug the AC power cord from the power source.
2. Remove the rear access cover (page 64).
3. Remove all fan modules from the fan assembly.
4. Remove the two screws that attach the fan assembly to the chassis.
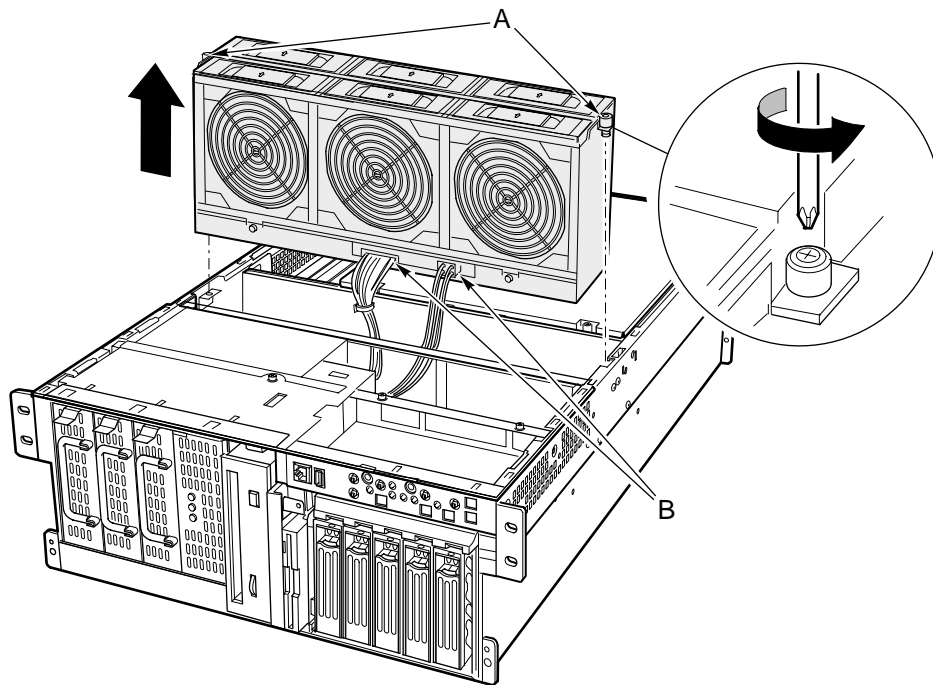
OM13292

A   Screw
B   Power and data connectors

Figure 41. Removing the Fan Assembly

5. Lift the fan assembly straight up until the cable connectors at the bottom are accessible.
6. Remove the cables and lift the fan assembly clear of the chassis.

Installing the Fan Assembly

To install the fan assembly:

1. Position the fan assembly over the fan bay.
2. Attach the cables to the fan board at the bottom of the assembly.
3. Lower the fan assembly into the fan bay.
4. Install the two screws that attach the fan assembly to the chassis.
5. Install the fan modules into the fan assembly.
6. Install the rear access cover.

Replacing the Fan Board

To replace the fan board:

1. Remove the fan assembly (page 109).
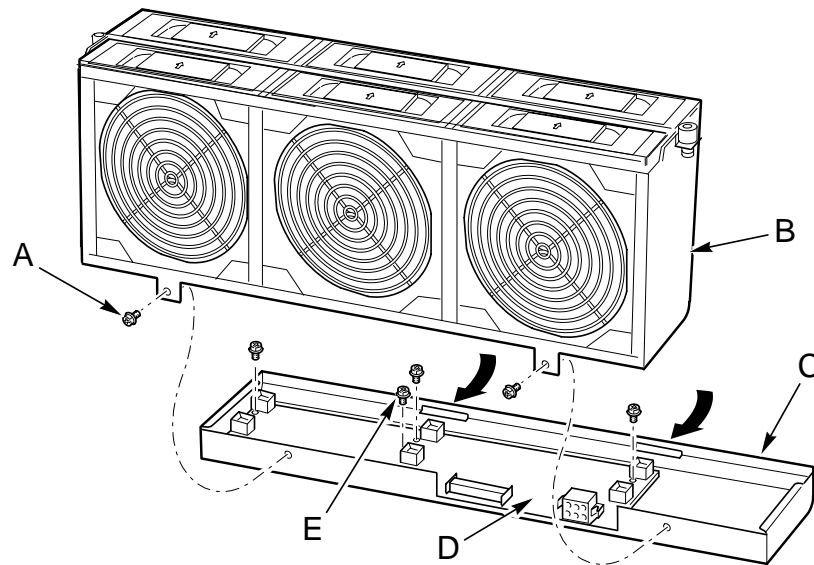
OM13293

A	Screws (2) attaching fan base	D	Fan carrier board
B	Upper fan assembly	E	Screws (4) attaching fan carrier board
C	Fan assembly base		

Figure 42. Replacing the Fan Board

2. Remove the two screws attaching the base to the fan assembly (Figure 42, A).
3. Rotate the base down and remove it from the fan assembly.
4. Remove the four screws securing the fan board to the base.
5. Lift up on the board to free it from the snap-top standoffs and remove the board.
6. Replace the board, snapping it over the two snap-top standoffs, and reinstall the four screws.
7. Reattach the base to the fan assembly and secure it with two screws.
8. Install the fan assembly in the fan bay.

Hot-Swap Drive Bay

Removing the Hot-Swap Drive Bay

To remove the hot-swap drive bay:

1. Turn off power to the server and unplug the AC power cords from the power source.
2. Remove the bezel, the front access cover, and the rear access cover (pages 63, 64, and 65).
3. Remove all of the hot-swap drives (page 87).
4. Remove any devices in the media bay (page 105).
5. Disconnect the cables from the back of the drive bay.
6. While exerting forward pressure on the bay lip, use a flat-head screwdriver to unlock the right hand black tab by pushing it toward the center of the bay. Maintaining forward pressure on the bay helps keep the tab from returning to its locked position.
7. Repeat step 6 for the left hand locking tab.
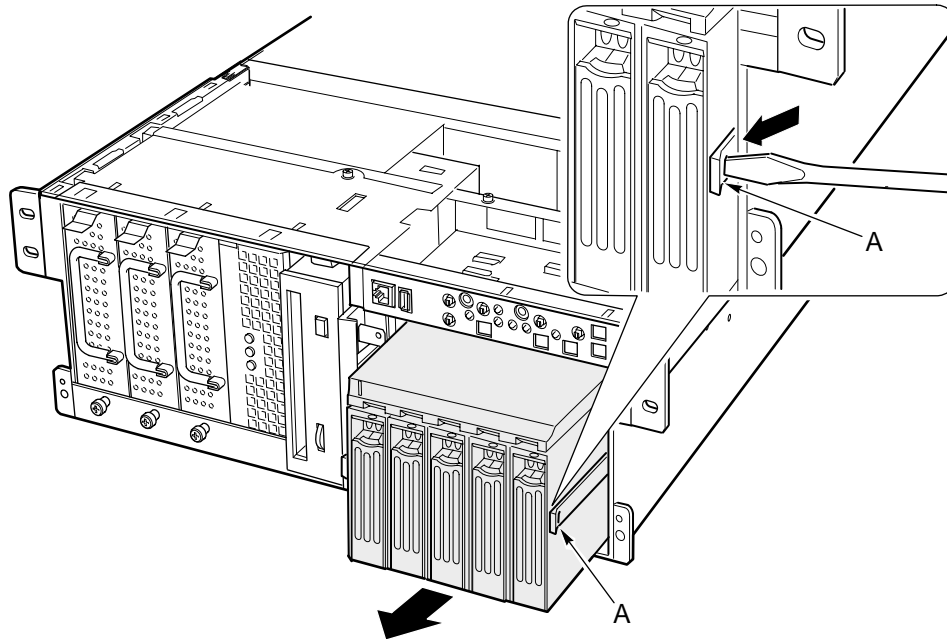
om13294

A   Black locking tab (left hand side of
     bay is a mirror image of right)

Figure 43. Removing a Hot-Swap Drive Bay

8. With both tabs unlocked, pull the drive bay out of the chassis.

Installing a Hot-Swap Drive Bay

To install a hot-swap drive bay:

1. Slide the drive bay into the chassis, pushing it firmly to the rear to fully engage the locking tabs in the chassis slots.
2. Connect the cables to the back of the drive bay.
3. Install any devices in the media bay.
4. Install the hot-swap drives.
5. Install the front access cover, the rear access cover, and the bezel.
6. Plug the AC power cords into the power source and turn on power to the server.

Hot-Plug Indicator Board

To replace the hot-plug indicator board:

1. Remove the rear access cover.
2. Disconnect the ribbon cable from the end of the hot-plug indicator board.
3. Remove the two plastic rivets that secure the board to the electronics bay (Figure 44, C).
4. The end of the board where the cable attaches is inserted into a notch in the chassis. Tilt out the free end of the board and lift the board out of the notched bracket in the back of the electronics bay. Two plastic rivet inserts remain in the mounting holes in the chassis.

OM13420
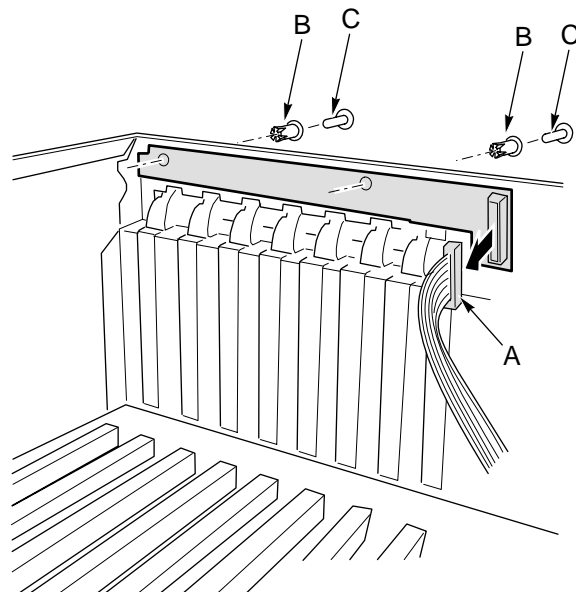
A   Ribbon cable   C   Rivet
B   Rivet sleeve

Figure 44. Removing a Hot-plug Indicator Board

5. Place the end of the new hot-plug indicator board into the notched bracket in the back of the electronics bay.
6. Align the plastic rivet sleeves in the chassis back panel with the two mounting holes in the board and press the sleeves into the holes.
7. Insert the two plastic rivets into the mating sleeves and snap the rivets down to secure the board to the electronics bay.
8. Connect the ribbon cable to the mating connector on the hot-plug indicator board.

Electronics Bay

Removing the Electronics Bay

To remove the electronics bay:
1. Turn off power to the server and unplug the AC power cords from the power source.
2. Remove the bezel, the front access cover, and the rear access cover (pages 63, 64, and 65).
3. Remove the system board access cover, the memory board, and the air baffle (pages 67-70).
4. Remove the fan assembly (page 109).
5. Label and disconnect all power and data cables connected to the hot-swap drive bay and the peripheral bay devices. Lift the cables up and out of the bottom of the fan bay.
6. At the baseboard, label and disconnect the power cables that go to the power supply bay.
7. Remove the four screws that attach the electronics bay to the server chassis (Figure 45, B).
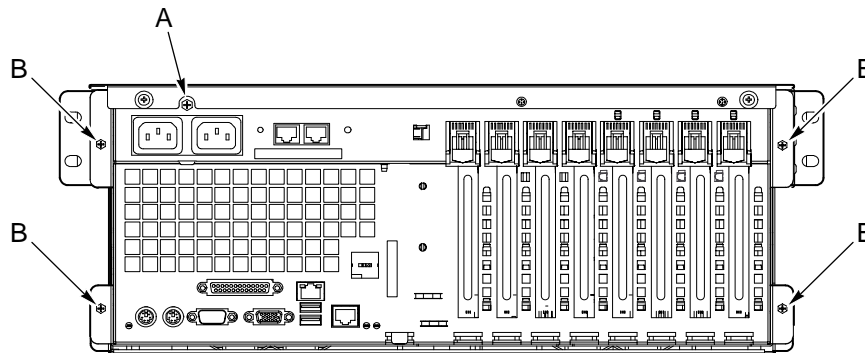
OM13295

A   Power receptacle screw
B   Electronics bay screws

Figure 45. Screw Locations for the Electronics Bay

8. Slide the electronics bay toward the rear of the server about six inches (Figure 46, A).
9. Insert the AC power bracket through the opening in the side of the electronics bay and let it hang down (Figure 46, B).
10. Position the power cable along the chassis ledge, out of the way of electronics bay movement (Figure 46, C).
11. Slide the electronics bay out of the main chassis.
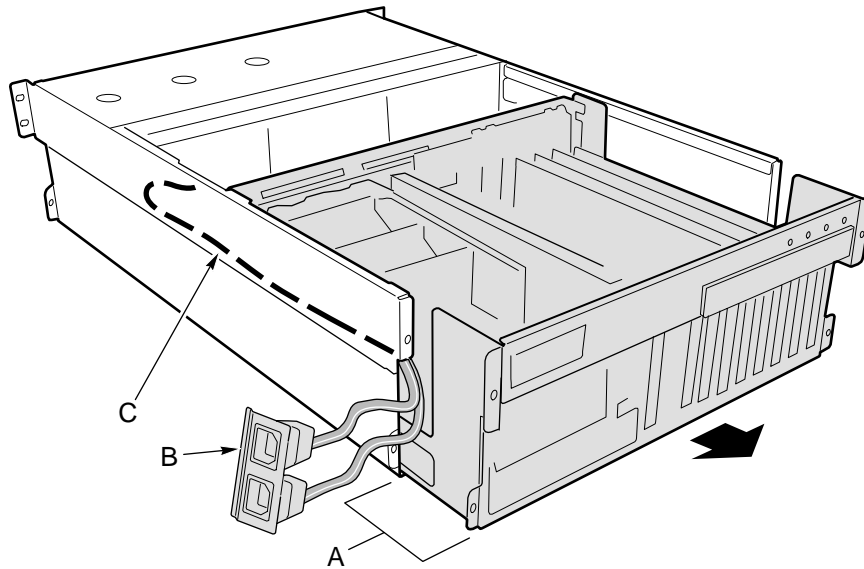
OM13296

A   Electronics bay slid back about six inches   B   AC power bracket
                                                   C   Power cable

Figure 46. Removing the Electronics Bay from the Server Chassis

Installing the Electronics Bay

To install the electronics bay in the server chassis.
1. Position the power cable along the chassis ledge with the AC power bracket hanging down and out of the way.
2. Insert the electronics bay into the rear of the server and slide it about six inches into the server chassis.
3. Position the AC power bracket inside the electronics bay.
4. Slide the electronics bay all of the way into the main chassis. The server chassis tabs should now be engaged with the corresponding slots in the bottom of the electronics bay.
5. Install the four screws that attach the electronics bay to the server chassis.
6. At the baseboard, connect the power cables that go to the power supply bay.
7. Connect all power and data cables to the hot-swap drive bay and the peripheral bay devices. Carefully route all power and data cables, placing them on the floor of the fan bay.
8. Install the fan assembly.

9. Install the air baffle, memory board, and system board access cover.
10. Install the rear access cover, the front access cover, and the bezel.
11. Plug in the AC power cord and turn on power to the server.

7 Solving Problems

This chapter helps you identify and solve problems that might occur while you are using the system.

Resetting the System

To do this:	Press:
Clear system memory, restart POST, and reload the operating system.	Reset button
Cold boot reset, which clears system memory, restarts POST, reloads the operating system, and halts power to all peripherals.	Power off/on

Initial System Startup

Incorrect installation or configuration usually causes problems that occur at initial system startup. Hardware failure is a less frequent cause. Check the following:

❑ Are all cables correctly connected and secured?

❑ Are the processors fully seated in their sockets on the processor board?

❑ Are all PCI add-in boards fully seated in their slots on the baseboard?

❑ Are all jumper and switch settings on add-in boards and peripheral devices correct? To check these settings, refer to the manufacturer's documentation. If applicable, ensure that there are no conflicts—for example, two add-in boards sharing the same interrupt.

❑ Are all DIMMs installed correctly?

❑ Are all peripheral devices installed correctly?

❑ Are hard disk drives properly formatted or configured?

❑ Are all device drivers properly installed?

❑ Are the configuration settings made with the SSU correct?

❑ Is the operating system properly loaded? Refer to the operating system documentation.

❑ Did you press the system power on/off switch on the front panel to turn the server on (the power-on light should be lit)?

❑ Are the system power cords properly connected to the system and plugged into a NEMA 6-15R outlet for 100-120 V~ or for 200-240 V~?

❑ Is AC power available at the wall outlet?

If all items are correct and problems persist, contact your service representative or authorized dealer for assistance.

Running New Application Software

Problems that occur when you run new application software are usually related to the software. Faulty equipment is much less likely, especially if other software runs correctly.

Application Software Checklist

❑ Does the system meet the minimum hardware requirements for the software? See the software documentation.
❑ If you are running the software from a diskette, were the files copied to the diskette correctly?
❑ If you are running the software from a CD-ROM disk, is the disk scratched or dirty?
❑ If you are running the software from a hard drive, is the software correctly installed? Were all necessary procedures followed and files installed?
❑ Are the correct device drivers installed?
❑ Is the software correctly configured for the system?
❑ Are you using the software correctly?
❑ If problems persist, contact the software vendor's customer service representative.

After the System Has Been Running Correctly

Problems that occur after the system has been running correctly with no hardware or software changes often indicate equipment failure. However, recent changes made to the system, such as hardware or software that has been added or removed, might also be the source of the problems. Check the following:

❑ If you are running the software from a diskette, try a new copy of the software.
❑ If you are running the software from a CD-ROM disk, try a different disk to see if the problem occurs on all disks.
❑ If you are running the software from a hard drive, try running it from a diskette. If the software runs correctly, there might be a problem with the copy on the hard drive. Reinstall the software on the hard disk, and try running it again. Make sure all necessary files are installed.
❑ If the problems are intermittent, there might be a loose cable, dirt in the keyboard (if keyboard input is incorrect), a marginal power supply, or other intermittent component failures.
❑ If you suspect that a transient voltage spike, power outage, or brownout might have occurred, reload the software and try running it again. Symptoms of voltage spikes include a flickering video display, unexpected system reboots, and the system not responding to user commands.

If all items are correct and problems persist, contact your service representative or authorized dealer for assistance.

Monitoring POST

When you turn on the system, POST displays messages that provide information about the system. If a failure occurs, POST emits beep codes that indicate errors in hardware, software, and firmware. If POST can display a message on the video display, the speaker beeps twice as the message appears. For a complete list of errors and codes, see page 145.

Verifying Proper Operation of Key System Lights

As POST determines the system configuration, it tests for the presence of each mass storage device installed in the system. As POST checks each device, the activity light for that device should turn on briefly. Check for the following:

❑ Does the diskette drive activity light turn on briefly? If not, see "Diskette Drive Activity Light Does Not Light" on page 120.

❑ Does the hard disk drive activity light on the control panel turn on briefly? If not, see "Hard Drive Activity Light Does Not Light" on page 120.

Confirming Loading of an Operating System

Once the system boots up, the operating system prompt appears on the screen. The prompt varies according to the operating system. If the operating system prompt does not appear, see "Initial System Startup" on page 116.

Specific Problems and Corrective Actions

This section provides possible solutions for these specific problems:

- Power light does not light
- No beep or incorrect beep pattern
- No characters appear on the screen
- Characters on the screen appear distorted or incorrect
- System cooling fans do not rotate
- Diskette drive activity light does not light
- Hard drive activity light does not light
- CD-ROM drive activity light does not light
- Problems with applications software
- The startup prompt "Press <F2> key if you want to run Setup" does not appear on the screen
- The bootable CD-ROM is not detected

Try the solutions in the order given. If you cannot correct the problem, contact your service representative or authorized dealer for assistance.

Power Light Does Not Light

Check the following:

❑ Are all the power supplies plugged in? Is the power turned on to the power strip or outlet? Do you have a blown fuse or breaker?

❑ Is the system functioning normally? If so, the power LED might be defective, the cable from the front panel to the fan carrier board might be loose, or the cable from the fan carrier board to the baseboard might be loose.

❑ Are there other problems with the system? If so, check the items listed under "System Cooling Fans Do Not Rotate Properly" on page 120.

If all items are correct and problems persist, contact your service representative or authorized dealer for assistance.

No Beep Codes

If the system operates normally, but there was no beep, the speaker might be defective. If the speaker is enabled, but the speaker does not function, contact your service representative or authorized dealer for assistance.

No Characters Appear on Screen

Check the following:

❑ Is the keyboard working? Check to see that the "Num Lock" light is functioning.
❑ Is the video monitor plugged in and turned on? Many modern video monitors shut down when inactive and might require a moment to warm up when activated.
❑ Are the brightness and contrast controls on the video monitor properly adjusted?
❑ Are the video monitor switch settings correct?
❑ Is the video monitor signal cable properly installed?
❑ Is the onboard video controller enabled?

If you are using an add-in video controller board, do the following:

1. Verify that the video controller board is fully seated in the PCI add-in board connector (and verify that the video monitor is plugged in to the active video controller).
2. Reboot the system for changes to take effect.
3. If there are still no characters on the screen after you reboot the system and POST emits a beep code, write down the beep code you hear. This information is useful for your service representative.
4. If you do not receive a beep code and characters do not appear:
    a. The video display monitor or video controller might have failed. You can verify this by trying the monitor on another system or trying a different monitor on this system.
    b. The system did not find any valid memory installed. Verify that you are using the correct type of memory for the system and that you have installed it correctly (page 81).

Characters Are Distorted or Incorrect

Check the following:

❑ Are the brightness and contrast controls properly adjusted on the video monitor? See the manufacturer's documentation.
❑ Are the video monitor signal and power cables properly installed?
❑ Is the correct monitor/video board installed for your operating system?

If the problem persists, the video monitor might be faulty or it might be the incorrect type. Contact your service representative or authorized dealer for assistance.

System Cooling Fans Do Not Rotate Properly

If the system cooling fans are not operating properly, system components could be damaged.

If the system power LED is on, but the fans are not rotating properly, check the following:

❑ Are any of the fan fault indicators lit? Is so, try replacing the corresponding fan module.
❑ Is the cable from the fan carrier board connected to the baseboard?
❑ Are the power supply cables properly connected to the baseboard and the fan carrier board assembly?
❑ Are there any shorted wires caused by pinched cables or power connector plugs forced into power connector sockets the wrong way?

If the connections are correct, contact your service representative or authorized dealer for assistance.

Diskette Drive Activity Light Does Not Light

Check the following:

❑ Are the diskette drive power and signal cables properly installed?
❑ Are all relevant switches and jumpers on the diskette drive set correctly?
❑ Is the diskette drive properly configured?
❑ Is the diskette drive activity light always on? If so, the signal cable might be plugged in incorrectly.

If you are using the onboard diskette controller, use BIOS Setup (page 38) to make sure that "Onboard Floppy" is set to "Enabled." If you are using an add-in diskette controller, make sure that "Onboard Floppy" is set to "Disabled."

If the problem persists, there might be a problem with the diskette drive, baseboard, or drive signal cable. Contact your service representative or authorized dealer for assistance.

Hard Drive Activity Light Does Not Light

If you have installed one or more hard drives in your system, check the following:

❑ Are the power and signal cables to the drive properly installed?
❑ Are all relevant switches and jumpers on the hard drive and adapter board set correctly?
❑ Is the hard drive properly configured?

⇒ **NOTE**

Front panel hard disk LED indicates SCSI devices: The hard drive activity light on the front panel lights when a SCSI device controlled by the onboard SCSI host controller is in use. This LED does not display CD-ROM activity.

CD-ROM Drive Activity Light Does Not Light

Check the following:

❑ Are the power and signal cables to the CD-ROM drive properly installed?
❑ Are all relevant switches and jumpers on the drive set correctly?
❑ Is the drive properly configured?
❑ Is the onboard IDE controller enabled in the BIOS?

Network Problems

The server hangs when the drivers are loaded.

❑ Change the PCI interrupt settings. Try the "PCI Installation Tips" below.

Diagnostics pass, but the connection fails.

❑ Make sure the network cable is securely attached.
❑ Make sure you specify the correct frame type in your NET.CFG file.

The Link LED does not light.

❑ Make sure you have loaded the network drivers.
❑ Check all cable connections.
❑ Try another port on the hub or switch.
❑ Make sure you have the correct type of cable between the adapter and the hub or switch. Some hubs and switches require a crossover cable while others require a straight through cable. For more information on crossover cabling, see your hub or switch documentation.

The Activity LED doesn't light.

❑ Make sure you've loaded the correct network drivers.
❑ The network might be idle. Try accessing a server.

The onboard network interface controller (NIC) stopped working when an add-in adapter was installed.

❑ Make sure the cable is connected to the port from the onboard NIC.
❑ Make sure your PCI BIOS is current. Try the "PCI Installation Tips" below.
❑ Make sure the other adapter supports shared interrupts. Also, make sure your operating system supports shared interrupts; OS/2[†] does not.
❑ Try reseating the add-in adapter.

The add-in adapter stopped working without apparent cause.

❑ Try reseating the adapter first; then try a different slot if necessary.
❑ The network driver files might be corrupt or deleted. Delete and then reinstall the drivers.
❑ Run the diagnostics.

PCI Installation Tips

Check the following:

❑ Some drivers might require interrupts that are not shared with other PCI drivers. The SSU can be used to adjust the interrupt numbers for PCI devices. For certain drivers, it might be necessary to alter settings so that interrupts are not shared.

❑ Check PCI interrupt interdependencies among slots and onboard devices.

Problems with Application Software

If you have problems with application software, do the following:

❑ Verify that the software is properly configured for the system. See the software installation and operation documentation for instructions on setting up and using the software.

❑ Try a different copy of the software to see if the problem is with the copy you are using.

❑ Make sure all cables are installed correctly.

❑ If other software runs correctly on the system, contact your vendor about the failing software.

If the problem persists, contact the software vendor's customer service representative for assistance.

Bootable CD-ROM Is Not Detected

Check the following:

❑ Is the BIOS set to allow the CD-ROM to be the first bootable device?

❑ Are the jumpers on the CD-ROM drive set correctly?

❑ Are the power and data cables connected properly?

A Server Description

This chapter provides a general description of the SRSH4 server.

Feature Summary

Table 10 summarizes the features of the Server Platform SRSH4. Table 2 on page 28 lists the physical specifications of the server.

Table 10.   Feature Summary

Feature	Description
Rack mount design	Compact 4U design (7 inches high and 28 inches deep).
Configuration flexibility	Up to four processors from the Intel® Xeon™ processor family Eight full length PCI slots (4 PCI-X hot plug, 2 PCI-X non hot plug, 2 PCI non hot plug). Two or Three power supplies. Two Ultra320 SCSI channels. Up to five 1-inch hot-swap Ultra320 SCSI hard drives. Slimline 3.5-inch floppy/CD-ROM drive plus one 5.25-inch peripheral bay. 24 GB DDR DRAM memory support. External I/O and disk expansion. Built-in 10/100 and Gbit LAN controllers. Customizable bezel.
Serviceability	Front access to hot-swap power supplies and hard disk bays. Top access to hot-plug PCI boards and hot-swap fans. Color coded throughout for serviceable items. Detailed configuration labels on the system. Fault indicators and system UID (Unit ID) light.
Availability	Four 64-bit, 100-MHz PCI-X hot plug slots. Up to five 1.0-inch hot-swap Ultra320 disk drives. Three hot-swap power supply modules in a 2+1 redundant configuration (third module optional). Two AC power input cords in a 1+1 redundant configuration. Six hot-swap system fans in a 5+1 redundant configuration.
Manageability	IPMI 1.5 compliant. WfM 2.0 compliant. Extensive system sensors and monitoring. Remote management and diagnostics via Serial or LAN port. External chassis management via ICMB.
Front panel interface	Switches: Power, Reset, NMI, Sleep, Unit ID. Ports: USB port 3, RJ45 Serial port B. LEDs: Main power, Standby power, HDD activity, LAN1 activity, LAN2 activity, General system fault, Unit ID.

Chassis Access

The SRSH4 server provides easy access for changing hot-swap devices:

- A door in the bezel provides access to hot-swap disk drives.
- Removing the bezel, which simply pulls off, provides access to hot-swap power supplies.
- The rear access cover provides access to the hot-swap fans and hot-plug PCI boards.
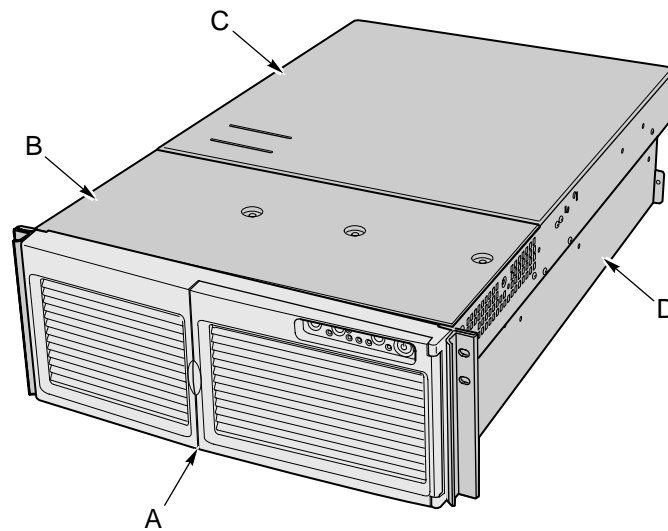
OM13297

A	Bezel	C	Rear access cover
B	Front access cover	D	Chassis

Figure 47. SRSH4 Server Hot-Swap Access

Main Chassis Components

Figure 48 shows the chassis with the access covers removed.
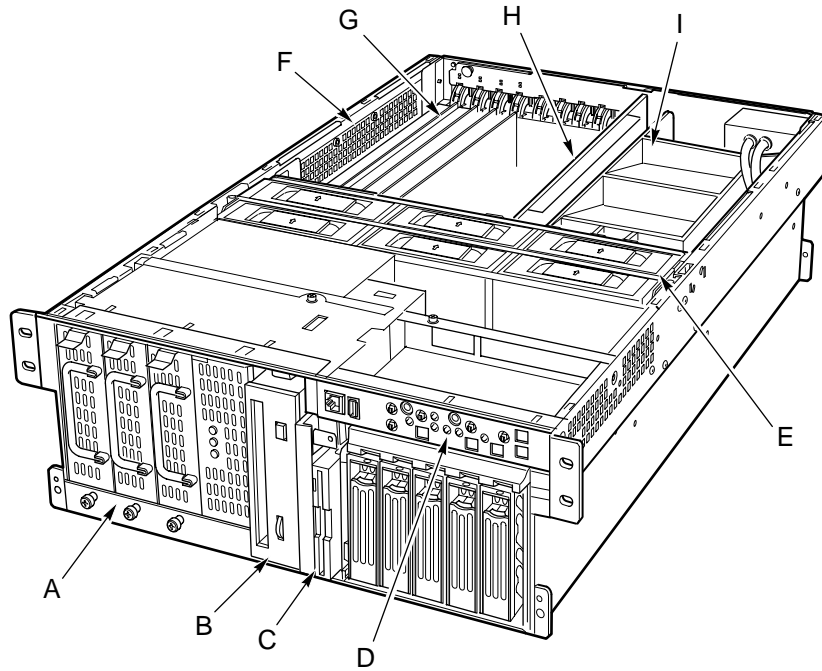
OM13298

A	Power supply bay	E	Fan bay
B	5.25-inch peripheral bay	F	Electronics bay
C	Media bay with 3.5-inch diskette and CD-ROM	G	Hot-plug PCI add-in cards
		H	Memory board
D	Front control panel	I	Processor board air baffle

Figure 48. Chassis with Bezel and Access Covers Removed

Electronics Bay Components

Figure 49 shows the electronics bay with the access cover, memory board, and air baffle removed.
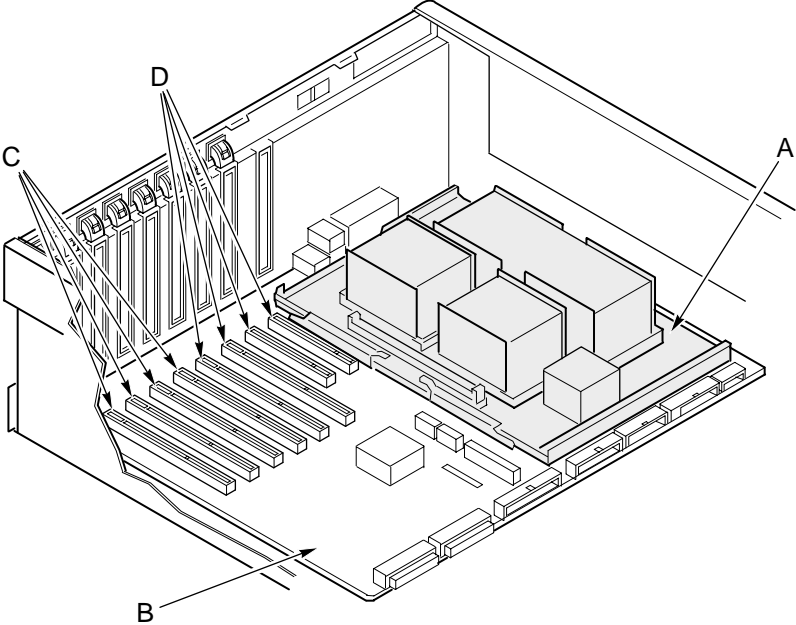
OM13299

A	Processor board	C	Hot-plug PCI slots
B	Baseboard	D	Non-hot-plug PCI slots

Figure 49. Electronics Bay Internal Components

Front Control Panel

Figure 50 and Table 11 describe the features of the front control panel of the Server Platform SRSH4.

OM13300
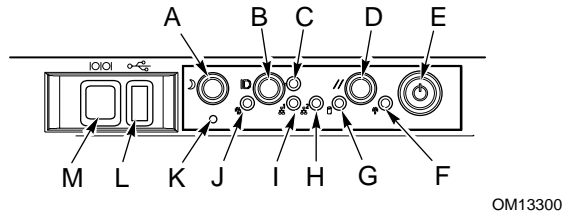
Figure 50. SRSH4 Front Control Panel

Table 11.   Front Control Panel Features

	Device	Operation
A	Sleep button	To put a system supporting ACPI into sleep mode (S1), press the sleep button momentarily.
		To wake a system from sleep mode, press the sleep button momentarily.
B	Chassis ID button	Illuminates LEDs on both the front and rear of the chassis, simplifying identification of the chassis in a rack from the rear.
C	Chassis ID LED	Blue indicates chassis ID is active.
D	Reset button	To reset the system, press the reset button momentarily.
		To clear CMOS, press and hold the reset button for at least four seconds, and then press the power button. Release both the reset and power buttons at the same time. The system will power on and the CMOS will be reset.
E	Power button	To turn power on, press the power button momentarily. If the system is in sleep state, pressing the power button momentarily brings the system out of the sleep state.
		To turn power off, press and hold the power button for more than four seconds. This overrides ACPI mode.
F	Main power LED	Solid green indicates the presence of DC power in the server.
		Flashing green indicates that the system is in ACPI sleep mode.
G	Hard drive activity LED	Green indicates system hard drive activity.
H	LAN2 LED	Green indicates LAN2 activity.
I	LAN1 LED	Green indicates LAN1 activity.
J	Fault LED	Red indicates any system fault condition.
K	NMI switch	Causes a non-maskable interrupt. Located behind the bezel door.
L	USB connector	USB port 3. Located behind the bezel door.
M	Serial port connector	Serial port B. Located behind the bezel door.

Rear Panel

Figure 51 describes the features of the rear panel of the Server Platform SRSH4.
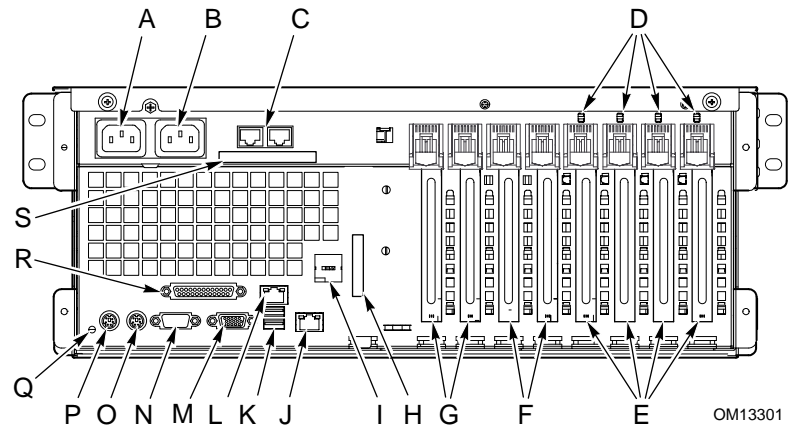
A	Power supply AC inlet 1	J	LAN2 Gbit port
B	Power supply AC inlet 2	K	USB ports 0 (upper) and 1 (lower)
C	Optional ICMB ports 1 (left) and 2 (right)	L	LAN1 100/10 RJ45 connector
D	Hot-plug PCI LEDs	M	Video connector
E	Hot-plug 64-bit, 100-MHz PCI-X add-in card slots	N	Serial port A
F	Non-hot-plug 64-bit, 100-MHz PCI-X add-in card slots	O	PS/2†-compatible mouse port
		P	PS/2-compatible keyboard port
G	Non-hot-plug 32-bit, 33-MHz PCI add-in card slots	Q	Chassis ID LED
H	Knockout for optional VHDCI SCSI connector	R	IEEE-1284 Enhanced Parallel Port
I	Knockout for optional serial port B	S	Knockout for optional SCSI connector

Figure 51. SRSH4 Rear Panel View

Peripheral Device Bay

Opening the right bezel door provides access to the peripheral bay. The peripheral bay consists of two bays for removable media:

- The configurable media bay comes with a combination slimline 3.5-inch diskette drive and slimline CD-ROM drive installed.
- The half-height media bay accommodates a 5.25-inch drive, such as a DAT drive.

⚠ **CAUTION**

> Intel does not recommend installing a hard disk drive in the 5.25-inch bay, because of potential cooling and electromagnetic interference (EMI) constraints.

Hot-Swap Hard Drive Bay

The hard drive bay supports up to five 3.5-inch by 1.0-inch Ultra320 SCSI hard drives. The hard drive bay also supports SCSI hard drive technologies, such as U160 and Ultra2, that are slower than the Ultra320 SCSI technology.

Each hard drive is connected to an Adaptec Ultra320 SCSI hot-swap backplane. The backplane provides 80-pin SCA-2 connectors for each hard drive and accepts 15,000 RPM and slower SCSI hard drives that consume up to 20 watts of power.

Opening the bezel door provides access to the hard drives. To allow hot swapping, each hard drive mounts in a hard drive carrier. When a hard drive is removed from the system, both the carrier and the hard drive are removed.
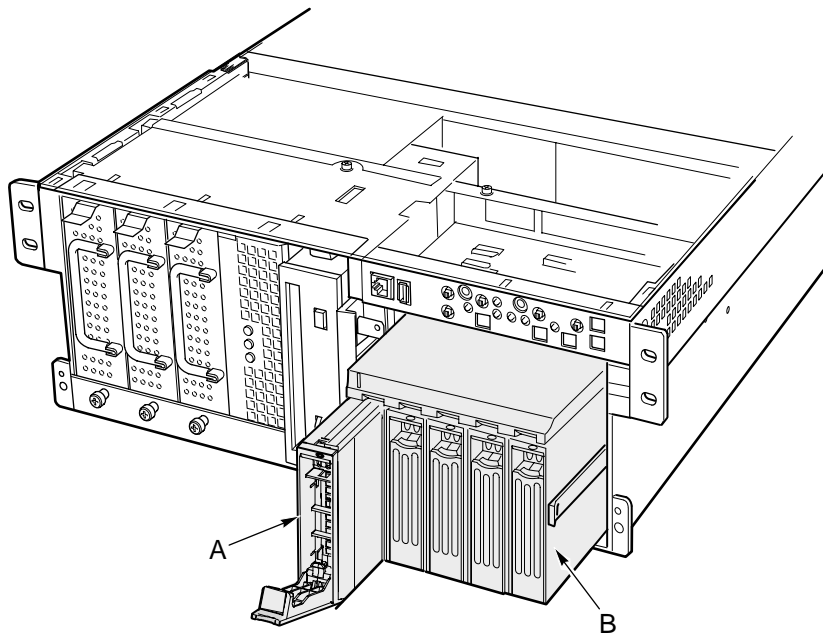
OM13302

A   Hard drive and carrier (partially pulled out)
B   Hard drive bay (partially pulled out)

Figure 52. Hard Drive Bay (Bezel Removed)

⚠ CAUTION

Because all hard drives have different cooling, power, and vibration characteristics, Intel has validated specific hard drive types in the SRSH4 server. To see a list of validated manufacturers and hard drive types, go to:

http://support.intel.com/support/motherboards/server/ssh4/srsh4/compat.htm

Power Supplies

The power supply bay comes with two 430-W power supply modules and can accommodate a third module for redundancy. The modules connect through the power distribution board (PDB) and auto-sense input voltage. The power redundant (2+1) configuration allows you to hot-swap a failed power supply without interrupting normal system operation.

System Cooling

⚠ **CAUTION**

All access covers must be on the system for proper cooling.

To ensure that all components remain within specification under all system environmental conditions, do not exceed five minutes for hot swapping of fans or power supplies.

The server comes with six fans in a redundant (5+1) configuration. This redundant configuration allows you to hot-swap a failed fan module without interrupting normal system operation. Air enters through the bezel, passes through the system components, and exhausts through the rear and left side of the chassis.

Under normal system conditions, the fans run at a slower, quieter speed. If a fan failure is sensed, a fan is not detected, or ambient temperature exceeds a certain limit, the fan speed is set to high.

LEDs indicate if individual fans are inoperative. Under the same fan failure conditions, the general system fault LED on the front panel is lit.

Server Board Set Features

The server board set for the SRSH4 consists of a baseboard, memory board, and processor board. Table 12 lists the major features of the server board set.

Table 12.   Server Board Set Features

Feature	Description
Processors	Up to four processors from the Intel Xeon processor MP family.
Memory	12 dual inline memory module (DIMM) slots support PC-200-compliant registered ECC DDR DRAM DIMMs. • Minimum configuration: Four 128-MB DIMMs, for a total of 512 MB • Maximum configuration: Twelve 2-GB stacked DIMMs for a total of 24 GB
Video	Integrated onboard ATI RAGE[†] XL PCI 64-bit SVGA controller with 4 MB video RAM.
PCI bus	Eight full length PCI slots: • Four 64-bit, 100-MHz hot-plug PCI-X slots • Two 64-bit, 100-MHz non-hot-plug PCI-X slots • Two 32-bit, 33-MHz non-hot-plug PCI slots
Network	• 10/100 network interface controller • Gbit network interface controller
System I/O	• PS/2 keyboard and mouse ports • One VGA video port • Two external USB ports, internal header providing two additional USB ports • One external serial port, one internal serial port header • One external Ultra320 SCSI port, one internal • Two NIC ports (RJ-45) • IEEE-1284 Enhanced Parallel Port (EPP) • IDE peripheral port
Form Factor	Server ATX form factor for the baseboard.

Baseboard Connector and Component Locations

Figure 53 identifies the connectors and major components on the SRSH4 baseboard.
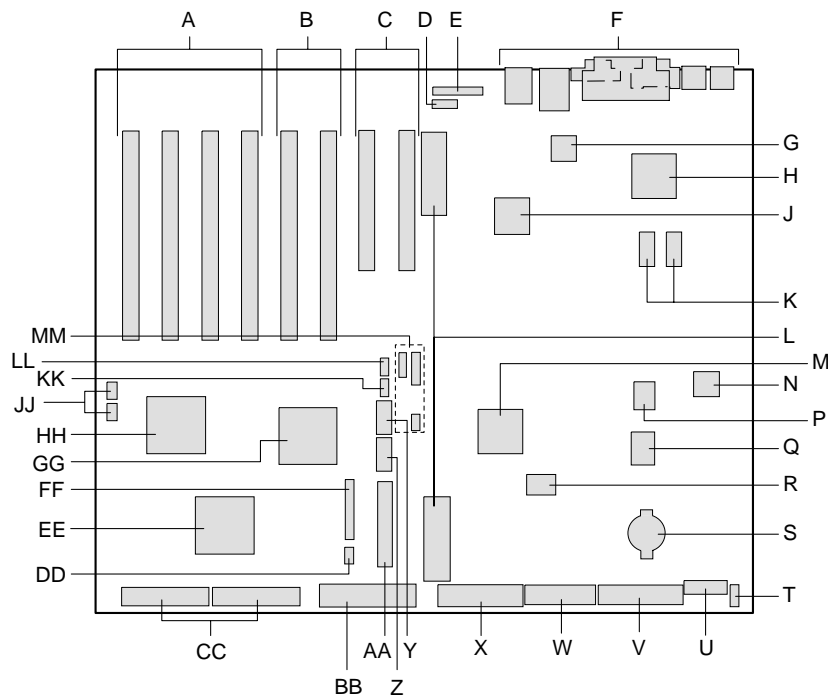
OM14382

A	64-bit, 100-MHz, hot-plug PCI-X slots	U	14-pin Power Control connector (P35)
B	64-bit, 100-MHz, non-hot-plug PCI-X slots	V	24-pin Power connector (P32)
C	32 bit, 33-MHz, non-hot-plug PCI slots	W	20-pin Power connector (P28)
D	Intelligent Chassis Management Bus (ICMB) connector (P24)	X	Floppy disk drive connector (P25)
		Y	Serial port B connector (P17)
E	Hot-Plug Indicator Board (HPIB) connector (P23)	Z	USB #3 Header (P18)
		AA	Front Panel Header (P19)
F	Back Panel I/O connectors (see page 130)	BB	IDE Connector (P13)
G	Intel® 82550 Ethernet controller	CC	SCSI LVD connectors (P4 and P7)
H	ATI Rage XL 2D/3D graphics accelerator	DD	Intelligent Platform Management Bus (IPMB) connector (P12)
J	Intel® 82544 Ethernet controller		
K	Video RAM (VRAM) (4 MB total)	EE	Adaptec 7902 SCSI controller
L	Processor board connectors (P21 and P22)	FF	Fan connector (P11)
M	ServerWorks South Bridge Controller (CSB5)	GG	ServerWorks PCI-X Bus Bridge Controller (CIOB30)
N	BMC component	HH	ServerWorks PCI-X Bus Bridge Controller (CIOB30)
P	BIOS Flash component	JJ	RAID LED connectors (P1 and P2)
Q	PC87417 Super I/O controller	KK	Hot-swap backplane (HSBP) connector (P16)
R	BMC Flash component	LL	Secondary HSBP connector (P15)
S	Battery	MM	Jumpers
T	Chassis Intrusion Detect connector (P36)		

Figure 53. Baseboard Connector and Component Locations

Baseboard Jumpers

Jumpers on the baseboard are organized into three groups: boot block jumpers (JP3), main jumpers (JP4, JP5, and JP6), and serial port B jumpers (JP25). Figure 54 identifies the jumper blocks and pin numbers. The function of each pair of pins is described in the sections that follow.
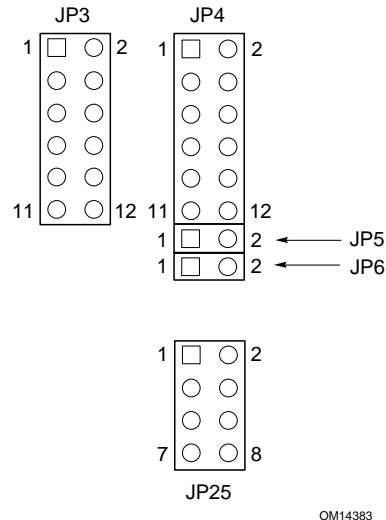
Figure 54. Baseboard Jumpers

Boot Block Jumpers

The boot block jumpers are used when updating the BIOS or BMC firmware in the unusual event that the boot block area needs to be updated. These jumpers are not used for routine firmware updates. Use the boot block jumpers only when the instructions with a firmware update specifically say to do so. When you do need to enable either of these features, use one of the spares from JP4 pins 1 and 2 or JP25 pins 7 and 8. Table 13 identifies the function of each pin pair on JP3.

Table 13. Boot Block Jumper Descriptions

Jumper Block	Pins	Jumper Name—Effect when shorted.
JP3	1-8	Reserved.
	9-10	BMC Boot Block Write Enable—Allows the BMC boot block to be overwritten when updating the BMC firmware.
	11-12	BIOS Boot Block Write Enable—Allows the BIOS boot block to be overwritten when updating the BIOS.

Main Jumpers

Table 14 identifies the function of each pin pair on the main jumper blocks (JP4, JP5, and JP6). The BIOS Recover, Password Clear, and CMOS Clear jumpers are described in more detail elsewhere in this product guide (see the references in Table 14). The FRB3 Timer Disable jumper and the BMC Force Update jumper are special purpose jumpers that you should use only when instructed to do so by an Intel support document. When you do need to enable any of these features, use one of the spares from JP4 pins 1 and 2 or JP25 pins 7 and 8.

Table 14.   Main Jumper Descriptions

JP4	1-2	Spare.
	3-4	BIOS Recovery—System will attempt to recover the BIOS at the next boot. For more information, see page 42.
	5-6	Reserved.
	7-8	Reserved.
	9-10	Password Clear—User and administrator passwords are cleared at the next boot. For more information, see page 35.
	11-12	CMOS Clear—CMOS settings are cleared at the next boot. For more information, see page 38.
JP5	1-2	FRB3 Timer Disable—Disables fault resilient boot timer 3.
JP6	1-2	BMC Force Update—Lets a system with corrupted BMC firmware boot for an update.

Serial Port B Jumpers

Table 15 identifies the function of each pin pair on the serial port B jumper block (JP25). By default, the serial port B connector is an RJ45, which has only eight pins and doesn't provide separate DCD and DSR signals. The serial port B jumpers let you configure the DSR and DCD signals passed from the port connector to the inputs of the UART. The default configuration has jumpers installed on pins 1 and 2 and on pins 3 and 4.

⟹ **NOTE**

Never install jumpers on pins 3 and 4 and on pins 5 and 6 at the same time.
This would cause both the DCD and DSR signals from the connector to drive
the DCD input on the UART, resulting in signal contention.

Table 15.   Serial Port B Jumper Descriptions

JP25	1-2	DSR to DSR—DSR from connector is passed to DSR input on UART (RJ45 & DB9).
	3-4	DSR to DCD—DSR from connector is passed to DCD input on UART (RJ45 only).
	5-6	DCD to DCD—DCD from connector is passed to DCD input on UART (DB9 only).
	7-8	Spare.

Processors

The SRSH4 accommodates one to four processors from the Intel Xeon processor MP family. For a complete list of supported processors see:

http://support.intel.com/support/motherboards/server/ssh4/srsh4

DIMM Memory

The memory board contains twelve 168-pin DIMM slots each supporting 72-bit ECC (64-bit main memory plus ECC) registered PC-200 Double Data Rate (DDR) DIMMs. Memory is partitioned in three banks. You may install a minimum of 512 MB (128 MB x 4) or as much as 24 GB.

The controller automatically detects, sizes, and initializes the memory array, depending on the type, size, and speed of the installed DIMMs, and reports memory size and allocation to the server via configuration registers.

⟹ **NOTE**

Use DIMMs that have been tested for compatibility with the SRSH4 server. Contact your sales representative or dealer for a current list of approved memory modules, or check the Intel Customer Support website for the latest tested memory list:

http://support.intel.com/support/motherboards/server/ssh4/srsh4/compat.htm

Onboard Video

The baseboard incorporates an ATI RAGE XL PCI graphics accelerator with 4 MB of video SDRAM that supports all standard IBM VGA modes. The embedded SVGA video subsystem supports:

- Pixel resolutions up to 1600 x 1200 under 2D and 1024 x 768 under 3D
- CRT and LCD monitors up to 100 Hz vertical refresh rate

The baseboard supports disabling of the onboard video through BIOS Setup or when a plug-in video card is installed in any of the PCI slots.

SCSI Controller

The baseboard includes an embedded Adaptec 7902 SCSI controller, which contains two independent SCSI channels. You can disable the SCSI controller in BIOS Setup. Both channels support 16-bit SE or LVD SCSI operations at the following speeds:

- Ultra320 (320 MB/sec)
- Ultra160 (160 MB/sec)
- Ultra2 (80 MB/sec)
- Ultra Wide SE (40 MB/sec)

The baseboard provides active terminators, termination voltage, resettable fuses, and protection diodes for both SCSI channels. You can disable the onboard terminators in BIOS Setup.

Network Interface Controllers

⟹ **NOTE**

> To ensure EMC product regulation compliance, the system must be used
> with shielded LAN cables.

The baseboard includes two network interface controllers (NICs):

- Intel 82550 NIC that supports 10Base-T and 100Base-TX networks
- Intel 82544 NIC that supports 10Base-T, 100Base-TX networks, and 1000BASE-T networks

The 82550 controller supports the following features:

- 32-bit PCI, CardBus master interface
- Integrated IEEE 802.3 10Base-T and 100Base-TX compatible PHY†
- IEEE 820.3u auto-negotiation support
- Chained memory structure similar to the 82559, 82558, 82557 and 82596
- Full duplex support at both 10 Mbps and 100 Mbps operation
- Low power +3.3 V device
- IP checksum off-loading

NIC 1 can be used as both a network interface and server management interface.

The 82544 controller supports the following features:

- Direct 32/64-bit, 33/66-MHz interface to the PCI bus
- Integrated IEEE 802.3 1000BASE-T, 100BASE-TX, and 10BASE-T
- Integrated third-generation MAC and proven IEEE 803.3ab compatible PHY
- Full duplex support for 10-Mbps, 100-Mbps, and 1000 Mpbs operation
- Descriptor ring management architecture optimized to deliver both high performance and PCI/PCI-X bus efficiency
- Low power +3.3 V device
- IP and TCP/UDP checksum off-loading

NIC Connector and Status LEDs

The NICs drive LEDs on the network interface connectors that indicate link connection and activity on the LAN and 10- or 100-Mbps operation. The green LED indicates network connection when on and TX/RX activity when blinking. The yellow LED indicates 100-Mbps operation when lit.

Network Teaming Features

> Using both onboard NICs in a team does not allow the use of NIC 1 for server management access. To support both network teaming features and server management features, a third NIC must be added and teamed to NIC 2.

The network controller provides several options for increasing throughput and fault tolerance when running Windows NT[†] 4.0, Windows 2000, NetWare[†] 4.1x or newer, or Linux[†]:

- Adapter Fault Tolerance (AFT)—provides automatic redundancy for your adapter. If the primary adapter fails, the secondary takes over. AFT works with any hub or switch.
- Adaptive Load Balancing (ALB)—creates a team of two to eight adapters to increase transmission throughput and includes AFT. Works with any 10Base-TX or 100Base-TX switch.
- Fast EtherChannel[†] (FEC) or Intel® Link Aggregation—creates a team of up to eight adapters to increase transmission and reception throughput and includes AFT. Requires a FEC-enabled switch.

To set up an option, read the instructions in the Windows NT 4.0 or NetWare 4.1x readme files.

> Windows NT versions prior to 4.0 do not support Adapter Teaming options.
>
> Adapter Teaming options require NT 4.0 with Service Pack 4.0 or later (or Service Pack 3.0 and the Windows Hot Fix[†]).
>
> In Windows NT, teaming options cannot be implemented on adapters that have been configured for VLANs. NetWare can support teaming options and VLANs on the same adapters.

Adapter Fault Tolerance

Adapter Fault Tolerance (AFT) is a simple, effective, and fail-safe approach to increase the reliability of server connections. AFT gives you the ability to set up link recovery to the server adapter in case of a cable, port, or network interface card failure. By assigning two server adapters as a team, AFT enables you to maintain uninterrupted network performance.

AFT is implemented with two server adapters: a primary adapter and a backup, or secondary, adapter. During normal operation, the backup will have transmit disabled. If the link to the primary adapter fails, the link to the backup adapter automatically takes over.

Preferred Primary Adapter

With multiple adapters installed, you can specify one as the Preferred Primary adapter. For example if you have a server with an Intel® PRO/1000 Server Adapter as the primary adapter and an Intel® PRO/100+ Server Adapter as the secondary, you could configure the PRO/1000 Server Adapter to be the preferred primary. In this scenario, if the PRO/1000 Server Adapter fails, the PRO/100+ Server Adapter takes over. Then when the PRO/1000 Server Adapter is replaced, it automatically reverts to being the primary adapter in the team.

If a Preferred Primary is not selected, Intel PROset will attempt to select the best adapter, based on adapter model and speed.

Adaptive Load Balancing

Adaptive Load Balancing (ALB) is a simple and efficient way to increase your server's transmit throughput. With ALB you group server adapters in teams to provide an increased transmit rate (up to 8 Gbps) using a maximum of eight adapters. The ALB software continuously analyzes transmit loading on each adapter and balances the rate across the adapters as needed. Adapter teams configured for ALB also provide the benefits of AFT. Receive rates remain at 100 Mbps or 1 Gbps depending on the primary adapter's capability.

To use ALB, you must have two to eight server adapters installed in your server and linked to the same network switch.

Cisco† Fast EtherChannel

Fast EtherChannel (FEC) is a performance technology developed by Cisco to increase your server's throughput. Unlike ALB, FEC can be configured to increase both transmission and reception channels between your server and switch. FEC works only with FEC-enabled switches, such as the Catalyst 5000 series. With FEC, as you add adapters to your server, you can group them in teams to provide up to 18 Gbps at full duplex, with a maximum of eight server adapters. The FEC software continuously analyzes loading on each adapter and balances network traffic across the adapters as needed. Adapter teams configured for FEC also provide the benefits of AFT.

To use FEC, you must have two, four, or eight server adapters installed in your server and linked to the same FEC-enabled Cisco switch.

ACPI

The server supports the Advanced Configuration and Power Interface (ACPI) as defined by the ACPI 1.0b and PC97 specifications. An ACPI-aware operating system can put the system into a state where the hard drives spin down, the system fans stop, and all processing is halted. However, the power supply will still be on and the processors will still be dissipating some power, so the power supply fans will still run.

The server supports sleep states s0, s1, s4, and s5:

- s0: Normal running state.
- s1: Processor sleep state. No context will be lost in this state and the processor caches will maintain coherency.
- s4: Hibernate or Save to Disk: The memory and machine state are saved to disk. Pressing the power button or other wakeup event will restore the system state from the disk and resume normal operation. This assumes that no hardware changes have been made to the system while it was off.
- s5: Soft off: Only the RTC section of the CSB and the BMC are running in this state. No context is saved by the OS or hardware.

⚠ **CAUTION**

The system is off only when the AC power cord is disconnected.

B Regulatory Information

Product Regulation Compliance Information

This product has been verified to comply with the following safety standards / requirements:

Product Safety

Argentina	Resolution S.I.C.M No. 92/98
Australia / New Zealand	AS/NZS 3562
Canada / USA	UL60 950 – CSA60 950
European Union	EN60 950 & 73/23/EEC
Germany	EN60 950
International	IEC 60 950
Nordics	EMKO-TSE (74-SEC) 207/94

Electromagnetic Compatibility (EMC) - Emissions

Australia / New Zealand	AS/NZS 3548 (Class A)
Canada	ICES-003 (Class A)
European Union	EN55022: 1994 (Class A) & 89/336/EEC
International	CISPR 22, 3rd Edition (Class A)
Japan	VCCI (Class A)
Korea	MIC Notice 1997-42 (Class A)
Russia	GOST-R 29216-91 (Class A)
Taiwan	BSMI CNS13438
USA	Title 47 CFR, Part 15 (Class A)
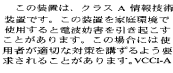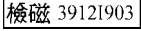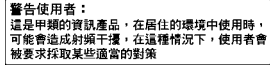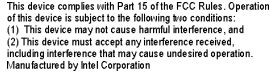
Electromagnetic Compatibility - Immunity

European Union	EN55024: 1998
International	CISPR 24: 1st Edition
Korea	MIC Notice 1997-41
Russia	GOST-R 50628-95

Power Line Harmonics / Voltage Flicker

European Union	EN61000-3-2 / EN61000-3-3
International	IEC61000-3-2
Japan	JEIDA

Table 16.   Product Regulatory Compliance Markings

Country	Markings on Product or Packaging	Marking Description
Argentina		IRAM Safety Compliance Mark
Australia / New Zealand	N232	EMC Compliance Mark. Note : As shown indicates that the compliance folder is held in Australia
Canada		System Compliance Safety Mark (same for USA)
	CANADA ICES-003 CLASS A	EMC Compliance Mark
European Union / Nordics	CE	Declaration of Conformity Mark
Germany	GS	System Safety Compliance Mark
Japan	この装置は，クラス A 情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。VCCI-A	EMC Compliance Mark – Class A
Korea	MIC	EMC Compliance Mark
Russia		Safety & EMC Compliance Mark
Taiwan	檢磁 3912I903	BSMI Certification Number
	警告使用者： 這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策	BSMI EMC Warning for Class A Devices
USA		System Compliance Safety Mark (same for Canada)
	This device complies with Part 15 of the FCC Rules. Operation of this device is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation. Manufactured by Intel Corporation	EMC Compliance Marking Statement – Class A Products

Regional EMC Compliance Information

Table 17.   Regional EMC Compliance Information

Country	Compliance Information
USA	**FCC Verification Notice (Class A)** This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. For questions related to the EMC performance of this product, contact: Intel Corporation 5200 N.E. Elam Young Parkway Hillsboro, OR 97124 1-800-628-8686 This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are NOT designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures: Reorient or relocate the receiving antenna. Increase the separation between the equipment and the receiver. Connect the equipment to an outlet on a circuit other than the one to which the receiver is connected. Consult the dealer or an experienced radio/TV technician for help.
CANADA	**INDUSTRY CANADA (Class A)** This Class A digital apparatus complies with Canadian ICES-003. Cet appereil numérique de la classe A est conforme à la norme NMB-003 du Canada.
EUROPE	**CE Declaration of Conformity** This product has been tested in accordance to, and complies with the European Low Voltage Directive (73/23/EEC) and European EMC Directive (89/336/EEC). The product has been marked with the CE Mark to illustrate its compliance

Table 17. Regional EMC Compliance Information (Continued)

Country	Compliance Information
JAPAN	**VCCI (Class A)** この装置は、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に基づくクラスＡ情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。 English translation of the notice above is as follow: This is a Class A product based on the standard of the Voluntary Control Council For Interference (VCCI) from Information Technology Equipment. If this is used near a radio or television receiver in a domestic environment, it may cause radio interference. Install and use the equipment according to the instruction manual.
TAIWAN	**BSMI Certification Information** The following BSMI Certification Number is marked on the product: 檢磁 39121903 The following BSMI EMC Warning is marked on the product: BSMI Cert No and EMC Warning are required for Class A products 警告使用者： 這是甲類的資訊產品，在居住的環境中使用時， 可能會造成射頻干擾，在這種情況下，使用者會 被要求採取某些適當的對策
KOREA	**RRL Certification Information** MIC 1. 기기의 명칭(모델명) : 2. 인증번호 : 3. 인증받은 자의 상호 : 4. 제조년월일: 5. 제조자/제조국가 : The English translation for the above is as follows: 1. Type of Equipment (Model Name): Server Platform SRSH4 2. Certification No.: Contact Intel representative 3. Name of Certification Recipient: Intel Corporation 4. Date of Manufacturer: Refer to date code on product 5. Manufacturer / Nation: Intel / Refer to manufacturing label on product:

Product Ecology Documentation

Energy Saving Features

Refer to page 143.

Disposal Considerations

This product contains the following materials that may be regulated upon disposal:

Battery: see page 100.

Lead solder: electronic circuit boards in the system might contain lead solder.

Intel encourages its customers to recycle its products and their components (such as batteries and boards) whenever possible. In the US, a list of recyclers in your area can be found at: *http://www.eiae.org*

In the absence of a viable recycling option, products and their components must be disposed of in accordance with all applicable local environmental regulations.

Disassembly Instructions

This section is intended to aid electronic recyclers in disassembly of Intel products.

⚠ ⚠ WARNING

Only a technically qualified person shall access, integrate, configure, service, or disassemble this product.

Tools needed: see page 62.

Disassembly Steps: see page 62.

C Error Messages and Error Codes

Table 18 lists the port-80 codes displayed during the boot process. A beep code is a series of individual beeps on the PC speaker, each of equal length. Table 18 describes the error conditions associated with each beep code and the corresponding POST check point code as seen by a port 80h card. For example, if an error occurs at checkpoint 22h, the BIOS issues the beep code 1-3-1-1.

Table 18.   Standard BIOS POST Codes

CP	Beeps	Reason
02		Verify Real Mode
04		Get Processor type
06		Initialize system hardware
08		Initialize chipset registers with initial POST values
09		Set in POST flag
0A		Initialize Processor registers
0B		Enable Processor cache
0C		Initialize caches to initial POST values
0E		Initialize I/O
0F		Initialize the local bus IDE
10		Initialize Power Management
11		Load alternate registers with initial POST values
12		Restore Processor control word during warm boot
14		Initialize keyboard controller
16	1-2-2-3	BIOS ROM checksum
18		8254 timer initialization
1A		8237 DMA controller initialization
1C		Reset Programmable Interrupt Controller
20	1-3-1-1	Test DRAM refresh
22	1-3-1-3	Test 8742 Keyboard Controller
24		Set ES segment register to 4GB
28	1-3-3-1	Autosize DRAM, system BIOS stops execution here if the BIOS does not detect any usable memory DIMMs
2A		Clear 8 MB base RAM
2C	1-3-4-1	Base RAM failure, BIOS stops execution here if entire memory is bad
32		Test Processor bus-clock frequency
34		Test CMOS
35		RAM Initialize alternate chipset registers
36		Warm start shut down
37		Reinitialize the chipset

Table 18. Standard BIOS POST Codes (Continued)

CP	Beeps	Reason
38		Shadow system BIOS ROM
39		Reinitialize the cache
3A		Autosize cache
3C		Configure advanced chipset registers
3D		Load alternate registers with CMOS values
40		Set Initial Processor speed new
42		Initialize interrupt vectors
44		Initialize BIOS interrupts
46	2-1-2-3	Check ROM copyright notice
47		Initialize manager for PCI Option ROMs
48		Check video configuration against CMOS
49		Initialize PCI bus and devices
4A		Initialize all video adapters in system
4B		Display QuietBoot screen
4C		Shadow video BIOS ROM
4E		Display copyright notice
50		Display Processor type and speed
52		Test keyboard
54		Set key click if enabled
55		USB initialization
56		Enable keyboard
58	2-2-3-1	Test for unexpected interrupts
5A		Display prompt "Press F2 to enter SETUP"
5C		Test RAM between 512 and 640k
60		Test extended memory
62		Test extended memory address lines
64		Jump to UserPatch1
66		Configure advanced cache registers
68		Enable external and processor caches
6A		Display external cache size
6B		Load custom defaults if required
6C		Display shadow message
6E		Display non-disposable segments
70		Display error messages
72		Check for configuration errors
74		Test real-time clock
76		Check for keyboard errors

Table 18. Standard BIOS POST Codes (Continued)

CP	Beeps	Reason
7A		Test for key lock on
7C		Set up hardware interrupt vectors
7D		Intelligent system monitoring
7E		Test coprocessor if present
82		Detect and install external RS232 ports
85		Initialize PC-compatible PnP ISA devices
86		Re-initialize on board I/O ports
88		Initialize BIOS Data Area
8A		Initialize Extended BIOS Data Area
8C		Initialize floppy controller
90		Initialize hard disk controller
91		Initialize local bus hard disk controller
92		Jump to UserPatch2
93		Build MPTABLE for multi-processor boards
94		Disable A20 address line
95		Install CD-ROM for boot
96		Clear huge ES segment register
98	1-2	Search for option ROMs. One long, two short beeps on checksum failure
9A		Shadow option ROMs
9C		Set up Power Management
9E		Enable hardware interrupts
A0		Set time of day
A2		Check key lock
A4		Initialize typematic rate
A8		Erase F2 prompt
AA		Scan for F2 key stroke
AC		Enter SETUP
AE		Clear in-POST flag
B0		Check for errors
B2		POST done – prepare to boot Operating System
B4	1	One short beep before boot
B5		Display MultiBoot menu
B6		Check password, password is checked before option ROM scan
B7		ACPI initialization
B8		Clear global descriptor table
BC		Clear parity checkers
BE		Clear screen (optional)

Table 18. Standard BIOS POST Codes (Continued)

CP	Beeps	Reason
BF		Check virus and backup reminders
C0		Try to boot with INT 19
C8		Forced shutdown
C9		Flash recovery
DO		Interrupt handler error
D2		Unknown interrupt error
D4		Pending interrupt error
D6		Initialize option ROM error
D8		Shutdown error
DA		Extended Block Move
DC		Shutdown 10 error

Table 19 lists the port-80 codes displayed during a recovery boot process.

Table 19.   Recovery BIOS POST Codes

CP	Beeps	Reason
E0		Initialize chip set
E1		Initialize bridge
E2		Initialize processor
E3		Initialize timer
E4		Initialize system I/O
E5		Check forced recovery boot
E6		Validate checksum
E7		Go to BIOS
E8		Initialize processors
E9		Set 4 GB segment limits
EA		Perform platform initialization
EB		Initialize PIC and DMA
EC		Initialize memory type
ED		Initialize memory size
EE		Shadow boot block
EF		Test system memory
F0		Initialize interrupt services
F1		Initialize real time clock
F2		Initialize video
F3		Initialize beeper
F4		Initialize boot
F5		Restore segment limits to 64 KB
F6		Boot mini DOS
F7		Boot full DOS

Table 20 lists the beep codes generated by the BMC.

Table 20.   BMC Beep Codes

Beeps	Reason
1-5-1-1	FRB3 failure (processor failure)
1-5-2-1	CPU: empty slot
1-5-2-2	CPU: no processors
1-5-2-3	CPU: configuration error (such as VID mismatch)
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 fault

Table 21 lists 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 these indicate a system that might be malfunctioning. All POST errors and warnings are logged in the system event log.

Table 21.   Error Messages and Codes

Code	Error Message	Failure Description
0200:	Failure Fixed Disk	Hard disk error
0210:	Stuck Key	Keyboard connection error
0211:	Keyboard error	Keyboard failure
0212:	Keyboard Controller Failed	Keyboard Controller Failed
0213:	Keyboard locked – Unlock key switch	Keyboard locked
0220:	Monitor type does not match CMOS – Run SETUP	Monitor type does not match CMOS
0230:	System RAM Failed at offset	System RAM error Offset address
0231:	Shadow RAM Failed at offset	Shadow RAM Failed Offset address
0232:	Extend RAM Failed at address line	Extended RAM failed Offset address
0233:	Memory type mixing detected	Memory type mixing detected
0234:	Single – bit ECC error	Memory 1 bit error detected
0235:	Multiple-bit ECC error	Memory multiple-bit error detected
0250:	System battery is dead – Replace and run SETUP	NVRAM battery dead
0251:	System CMOS checksum bad – Default configuration used	CMOS checksum error
0252:	Password checksum bad - Passwords cleared	
0260:	System timer error	System timer error
0270:	Real time clock error	RTC error
0271:	Check date and time setting	RTC time setting error

continued

Table 21. Error Messages and Codes (Continued)

Code	Error Message	Failure Description
02B0:	Diskette drive A error	
02B2:	Incorrect Drive A type – run SETUP	Incorrect Drive A type
02D0:	System cache error – Cache disabled	CPU cache error
0B00:	Rebooted during BIOS boot at Post Code	
0B1B:	PCI System Error on Bus/Device/Function	PCI system error in Bus/device/Function
0B1C:	PCI Parity Error in Bus/Device/Function	PCI system error in Bus/device/Function
0B50:	Processor 1 with error taken offline	Failed Processor 1, error detected
0B51:	Processor 2 with error taken offline	Failed Processor 2, error detected
0B52:	Processor 3 with error taken offline	Failed Processor 3, error detected
0B53:	Processor 4 with error taken offline	Failed Processor 4,n error detected
0B5F:	Forced to use CPU with error	An error detected in the entire CPU
0B60:	DIMM bank 1 has been disabled	Memory error, memory bank 1 failed
0B61:	DIMM bank 2 has been disabled	Memory error, memory bank 2 failed
0B62:	DIMM bank 3 has been disabled	Memory error, memory bank 3 failed
0B6F:	DIMM bank with error is enabled	An error detected in all the memory
0B70:	The error occurred during temperature sensor reading	Error while detecting a temperature failure
0B71:	System temperature out of the range	Temperature error detected
0B74:	The error occurred during voltage sensor reading	Error while detecting voltage
0B75:	System voltage out of the range	System voltage error
0B7C:	The error occurred during redundant power module confirmation	The error occurred while retrieving the power information
0B80:	BMC Memory Test Failed	BMC device (chip) failed
0B81:	BMC Firmware Code Area CRC check failed	BMC device(chip) failed
0B82:	BMC core Hardware failure	BMC device(chip) failed
0B83:	BMC IBF or OBF check failed	Access to BMC address failed
0B90:	BMC Platform Information Area corrupted	BMC device(chip) failed
0B91:	BMC update firmware corrupted	BMC device(chip) failed
0B92:	Internal Use Area of BMC FRU corrupted	SROM storing chassis information failed (Available for use except for FRU command and emergency management port function)
0B93:	BMC SDR Repository empty	BMC device (chip) failed
0B94:	IPMB signal lines do not respond	SMC (Satellite Management Controller) failed (Available for use except for the access function to SMC via IPMB)
0B95	BMC FRU device failure	SROM storing chassis information failed (Available for use except for FRU command and emergency management port function)
0B96	BMC SDR Repository failure	BMC device (chip) failed

Table 21. Error Messages and Codes (Continued)

Code	Error Message	Failure Description
0B97	BMC SEL device failure	BMC device (chip) failed
0BB0:	SMBIOS – SROM data read error	SROM data read error
0BB1:	SMBIOS – SROM data checksum bad	Bad checksum of SROM data
0BD0:	1st SMBus device address not acknowledged	Some SMBus device (chip) failed
0BD1:	1st SMBus device Error detected	Some SMBus device (chip) failed
0BD2:	1st SMBus timeout	Some SMBus device (chip) failed
	Expansion ROM not initialized	PCI Expansion ROM card not initialized
	Invalid System Configuration Data	System configuration data destroyed
	System Configuration Data Read Error	System configuration data read error
	Resource Conflict	PCI card resource is not mapped correctly
	System Configuration Data Write error	System configuration data write error
	Warning: IRQ not configured	PCI interrupt is not configured correctly
8503:	Incorrect memory speed in location: XX, XX, …	Non-PC200 DIMMs have been installed in slots XX, XX, …

D Equipment Log and Configuration Worksheets

Equipment Log

Use the blank equipment log provided here to record information about the system. Some of this information might be required when running the System Setup Utility (SSU).

Item	Manufacturer Name and Model Number	Serial Number	Date Installed
System			
Server Board Set			
Processor Speed and Cache			
Video Display			
Keyboard			
Mouse			
Diskette Drive A			
CD-ROM Drive			
5.25-inch Peripheral Drive			
Hard Drive 1			
Hard Drive 2			
Hard Drive 3			
Hard Drive 4			
Hard Drive 5			

continued

Equipment Log (Continued)

Item	Manufacturer Name and Model Number	Serial Number	Date Installed

Calculating Power Consumption

The total combined wattage for the system configuration must be less than the output of your power supplies. Use the two worksheets in this section to calculate the power used by your system. For current and voltage requirements of add-in boards and peripherals, see your vendor documents.

Calculating DC Power Usage

1. List the current for each board and device in the appropriate voltage level column.
2. Add the currents in each column. Then go to the next worksheet.

Table 22. Power Usage Worksheet 1

Device	Current (maximum) at voltage level:				
	+3.3 V	+5 V	5 V Standby	+12 V	-12 V
Server Board Set					
Primary Processor					
Second Processor					
Third Processor					
Fourth Processor					
Memory					
PCI slot 1					
PCI slot 2					
PCI slot 3					
PCI slot 4					
PCI slot 5					
PCI slot 6					
PCI slot 7					
PCI slot 8					
1st 3.5-inch Hard Disk Drive					
2nd 3.5-inch Hard Disk Drive					
3rd 3.5-inch Hard Disk Drive					
4th 3.5-inch Hard Disk Drive					
5th 3.5-inch Hard Disk Drive					
Combo 3.5-inch Diskette/CD Drive					
5.25-inch Peripheral Drive					
Fans					
Total Current					

Total Combined Power Used by the System

1. From the previous worksheet, enter the total current for each column.
2. Multiply the voltage by the total current to get the total wattage for each voltage level.
3. Add the total wattage for each voltage level to arrive at a total combined power usage on the power supply.

Table 23.   Power Usage Worksheet 2

Voltage level and total current (V x A = W)	Total Watts for each voltage level
(+3.3 V) X (_____ A)	_____ W
(+5 V) X (_____ A)	_____ W
(-5 V) X (_____ A)	_____ W
(+12 V) X (_____ A)	_____ W
(-12 V) X (_____ A)	_____ W
Total Combined Wattage	_____ W

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