Intel® TSRMT2
Carrier/Industrial Grade Server
Product Guide

Disclaimer

The TSRMT2 server may contain design defects or errors known as errata which may cause the product to deviate from published specifications. Current characterized errata are available on request.

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Contents

Part II: Service Technician's Guide

4 Upgrading the Hardware

5 Upgrading the Chassis

6 Technical Reference

7 Solving Problems

A POST Error Codes and Messages

B Equipment Log and Configuration Worksheet

C Warnings

D CD-ROM and Floppy Disk Drive Installation

Figures

Tables

Intel TSRMT2 Carrier/Industrial Grade Server Product Guide

Part I: User's Guide

1 Chassis Description

2 Regulatory Specifications and Disclaimers

3 Configuration Software and Utilities

This document provides an overview of the TSRMT2 server system. This manual consists of two parts:

- *User's Guide*, beginning on page 9 describes procedures that **DO NOT REQUIRE** removing and replacing boards. You do not need to be a qualified service technician to perform procedures listed in the *User's Guide*.
- *Service Technician's Guide*, beginning on page 65 describes procedures that **REQUIRE** removing and replacing boards. You must be a qualified service technician to perform procedures listed in the *Service Technician's Guide*.

⚠ **WARNING**

> **Only a QUALIFIED SERVICE TECHNICIAN is authorized to remove the server covers and to access any of the components inside the server. Before removing the covers, see "Safety: Before You Remove Server Covers" on page 68 and "Warnings and Cautions" on page 69.**

⚠ **WARNING**

> **Anchor the equipment rack: The equipment rack must be anchored to an unmovable support to prevent it from falling over when one or more servers are extended in front of the rack on slides. You must also consider the weight of any other device installed in the rack. A crush hazard exists should the rack tilt forward which could cause serious injury.**
>
> **Only use a screwdriver tip to push in the lock tabs on the rack slides; a pinch hazard exists if fingers are used for this purpose.**
>
> **If an AC power supply is installed:**
>
> **Mains AC power disconnect: The AC power cord is considered the mains disconnect for the server and must be readily accessible when installed. If the individual server power cord will not be readily accessible for disconnection then you are responsible for installing an AC power disconnect for the entire rack unit. The mains disconnect must be readily accessible, and must be labeled as controlling power to the entire rack, not just to the server(s). To remove all power, remove the AC cord.**

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

Overcurrent protection: The server is designed for an AC line voltage source with up to 20 amperes of overcurrent protection per cord feed. If the power system for the equipment rack is installed on a branch circuit with more than 20 amperes of protection, you must provide supplemental protection for the server. The overall current rating of a configured server is less than 4 amperes.

If a DC power supply is installed:

The DC source must be electrically isolated by double or reinforced insulation from any hazardous AC or DC source. The DC source must be capable of providing up to 300 mW of continuous power. Connection with a DC source should only be performed by trained service personnel.

Mains DC power disconnect: You are responsible for installing a DC power disconnect for the entire rack unit. This mains disconnect must be readily accessible, and it must be labeled as controlling power to the entire unit, not just to the servers(s).

Grounding the rack installation: To avoid the potential for an electrical shock hazard, you must include a third wire safety ground conductor with the rack installation. The safety grounding conductor must be a minimum 14AWG connected to the earth ground stud on the rear of the server. The safety ground conductor should be connected to the chassis stud with a two hole crimp terminal with a maximum width of 0.25 inch. The nuts on the chassis studs should be installed with a 10 in/lbs torque. The safety ground conductor provides proper grounding only for the server. You must provide additional, proper grounding for the rack and other devices installed in it.

Overcurrent protection: Overcurrent protection circuit breakers must be provided as part of each host equipment rack and must be installed between the DC source and the server. The server is designed for a DC line voltage power source with up to 10 amperes of overcurrent protection per feed pair. If the DC power system for the equipment rack is installed with more than 10 amperes of protection, you must provide supplemental protection for the server. The overall current rating of a configured server is less than 7 amperes.

⚠ WARNING

Do not attempt to modify or use an AC power cord that is not the exact type required. You must use a power cord that meets the following criteria:

1. **Rating: For U.S./Canada cords must be UL Listed/CSA Certified type SJT, 18-3 AWG. For outside U.S./Canada cords must be flexible harmonized (<HAR>) or VDE certified cord with 3 x 0.75mm conductors rated 250 VAC.**

2. **Connector, wall outlet end: Cords must be terminated in grounding-type male plug designed for use in your region. The connector must have certification marks showing certification by an agency acceptable in your region and for U.S. must be rated 125% of overall current rating of the server.**

3. **Connector, server end: The connectors that plug into the AC receptacle on the server must be an IEC 320, sheet C19, type female connector.**

4. **Cord length and flexibility: Cords must be less than 4.5 meters (14.76 feet) long.**

⚠ CAUTION

Temperature: The temperature in which the server operates when installed in an equipment rack, must not go below 5 °C (41 °F) or rise above 40 °C (104 °F). Extreme fluctuations in temperature can cause a variety of problems in your server.

Ventilation: The equipment rack must provide sufficient airflow to the front of the server to maintain proper cooling. The rack must also include ventilation sufficient to exhaust a maximum of 1023 BTU's per hour for the server. The rack selected and the ventilation provided must be suitable to the environment in which the server will be used.

Intel TSRMT2 Carrier/Industrial Grade Server Product Guide

1 Chassis Description

The TSRMT2 is a rack-mounted server that supports one to two Intel® Pentium® III processors and up to 6 Gbytes of SDRAM memory. The server supports high availability features such as AC and DC power supply modules, scalable architecture to support symmetric multiprocessing (SMP), and a variety of operating systems.

Physical Specifications

Table 1 lists the server's physical specifications while Figure 1 presents a view of the TSRMT2 server chassis.

Table 1.   Physical Specifications

Specification	Value
Height	1.7 inches (43 mm)
Width	17.12 inches (435 mm)
Depth	19.98 inches (507 mm) (without the front bezel)
Front clearance, minimum	2 inches (50.8 mm)
Side clearance, minimum	1 inches (25.4 mm)
Rear clearance, minimum	3.6 inches (92 mm)

OM13106

Figure 1. TSRMT2 Server Chassis

Environmental Specifications

The TSRMT2 system meets environmental specifications as indicated in Table 2. All testing was performed per procedures defined in *Bellcore GR-63-CORE NEBS Physical Protection*, *Bellcore GR-3580 NEBS Criteria Levels*, *Bellcore GR-1089-CORE EMC and Electrical Safety – Generic Criteria for Network Telecommunications Equipment*, and the *Intel® Environmental Standards Handbook*.

Table 2.   Environmental Specifications

Environment	Specification
Temperature operating	5 °C to 40 °C (41 °F to 104 °F)
Temperature non-operating	-40 °C to 70 °C (-104 °F to 158 °F)
Altitude	0 to 3,962 m (0 to 13,000 ft)
Humidity non-operating	95%, non-condensing at temperatures of 23 °C (73 °F) to 40 °C (104 °F)
Vibration operating	Swept sine survey at an acceleration amplitude of 0.1 g from 5 to 100 Hz and back to 5 Hz at a rate of 0.1 octave/minute, 90 minutes per axis on all three axes as per Bellcore GR-63-CORE standards.
Vibration non-operating	Swept sine survey at an acceleration amplitude of 0.5 g from 5 to 50 Hz at a rate of 0.1 octaves/minute, and an acceleration amplitude of 3.0g from 50 to 500 Hz at a rate of 0.25 octaves/minute, on all three axes as per Bellcore GR-63-CORE standard.
	2.2 Grms, 10 minutes per axis on all three axes as per the Intel Environmental Standards Handbook.
Shock operating	Half-sine 2 G, 11 ms pulse, 100 pulses in each direction, on each of the three axes as per the Intel Environmental Standards Handbook.
Shock non-operating	Trapezoidal, 30 G, 170-inch/sec delta V, three drops in each direction, on each of the three axes as per Intel Environmental Standards Handbook.
Safety	UL 1950, CSA 950, IEC 950, TUV/GS EN60950.
Emissions	Certified to FCC Class A; tested to CISPR 22 Class A, EN 55022 Class A, VCCI Class A ITE, AS/NZS 3548 Class A.
Immunity	Verified to comply with EN 50082-1.
Electrostatic discharge (ESD)	Tested to ESD levels up to 15 kilovolts (kV) air discharge and up to 8 kV contact discharge without physical damage as per Intel Environmental Standards Handbook.
Acoustic	Sound pressure: < 60 dBA at ambient temperatures < 28 °C measured at bystander positions in operating mode.

Chassis Feature Locations

Front Panel

Figure 2 shows the front panel view of the system. The front panel contains system control switches, alarm indicators and relays, and status indicators. You will find the front panel's controls summarized in Table 3.
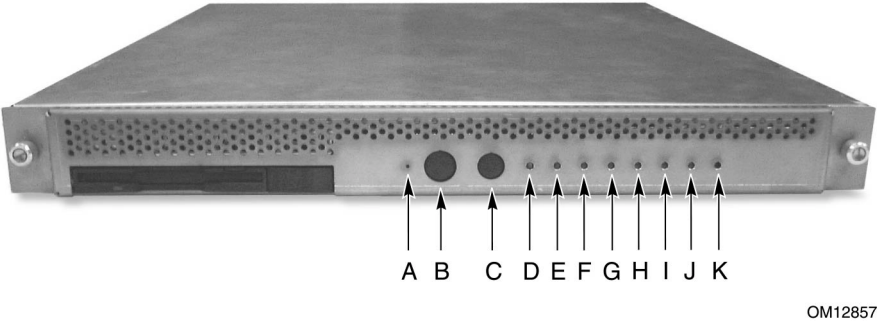
OM12857

A	NMI switch	G	Alarm: PWR (green)
B	System power switch	H	Status: NIC (green)
C	System reset	I	Status: DSK (HDD Activity, green)
D	Alarm: CRT (Critical)	J	Status: Main Power (green)
E	Alarm: MJR (Major)	K	Status: User ID (white)
F	Alarm: MNR (Minor)		

Figure 2. Front Panel Control Locations

Table 3.   Front Panel Features

Item	Feature	Description
Front Panel Switches		
A	NMI switch	A momentary switch used to instruct the processor to copy system memory to the hard drive. Pressing the recessed button with a paper clip or pin puts the server in a halt state for diagnostic purposes and allows you to issue a non-maskable interrupt. After issuing the interrupt, a memory dump determine the cause of the problem.
B	Power switch	Toggles the system power.
C	Reset switch	Reboots and initializes the system.
Front Panel Alarm LEDs and Relays		
D	Critical (amber)	When continuously lit, indicates the presence of a Critical System Fault. A critical system fault is an error or event detected by the system with a fatal impact to the system. In this case, the system cannot continue to operate. An example could be the loss of a large section of memory or other corruption that renders the system not operational. Additionally, the front panel's critical alarm relay engages.
E	Major (amber)	When continuously lit, indicates the presence of a Major System Fault. A major system fault is an error or event detected by the system that has discernable impact to system operation. In this case, the system can continue to operate but in a "degraded" fashion (reduced performance or loss of non-fatal feature reduction). An example could be the loss of one of two mirrored disks. Additionally, the front panel's major alarm relay engages.
F	Minor (amber)	When continuously lit, indicates the presence of a Minor System Fault. A minor system fault is an error or event detected by the system but has little impact to actual system operation. An example would be a correctable ECC error. Additionally, the front panel's minor alarm relay engages.
G	Power (amber)	When continuously lit indicates the presence of a Power System Fault. Additionally, the front panel's power alarm relay engages.
Front Panel Status LEDs		
H	NIC activity LED (green)	Indicates NIC activity.
I	HDD activity LED (green)	Indicates any system SCSI hard drive activity.
J	Main power LED (green)	When continuously lit, indicates the presence of DC power in the server. The LED goes out when the power is turned off or the power source is disrupted. When it is blinking green, it indicates that the system is in ACPI sleep mode.
K	User ID (white)	When continuously lit, indicates that the user ID function is active.
Front Panel Connectors (Concealed by the Bezel)		
	RJ45 Serial Connector	Serial Connector (also available on the back panel through a second RJ45 connector).
	2 x USB Connectors	USB Port 2 and USB Port 3.

Back Panel

Figure 3 shows the back panel view of the system.
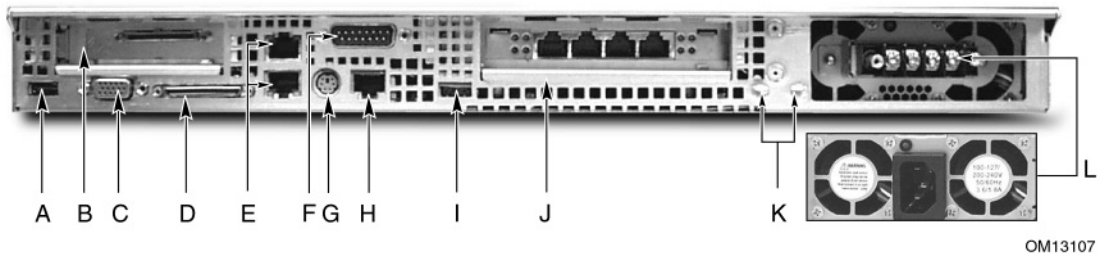
Figure 3. DC Input Back Panel (AC Input Power Supply Shown Below)

You will find the back panel's feature summary in Table 4.

Table 4. Back Panel Features

Item	Description
A	USB port 1
B	One low profile, half-length 64-bit, 66 MHz PCI add-in board slot (3.3 V riser board)
C	Video connector
D	External wide SCSI Ultra160 68-pin connector
E	Dual NIC 10/100 E/N RJ45 connectors NIC 1 (lower) and NIC 2 (upper)
F	DB-15 male connector for front panel alarm relay contacts
G	PS/2†-compatible keyboard port, 6-pin connector
H	Serial port, 8-pin RJ45 connector
I	USB port 0
J	One full height, full length 64-bit, 33 MHz PCI add-in board slot (5 V riser board), or, One full height, full length 64-bit, 66 MHz PCI add-in board slot (3.3 V riser board)
K	Two grounding lugs for attachment of grounding wire to chassis. For use only when configured for DC input power supply
L	250 W power supply (DC version shown above, AC version shown below)

Server Board Connector and Component Locations

Figure 4 shows the location of the server board's connectors and other components.
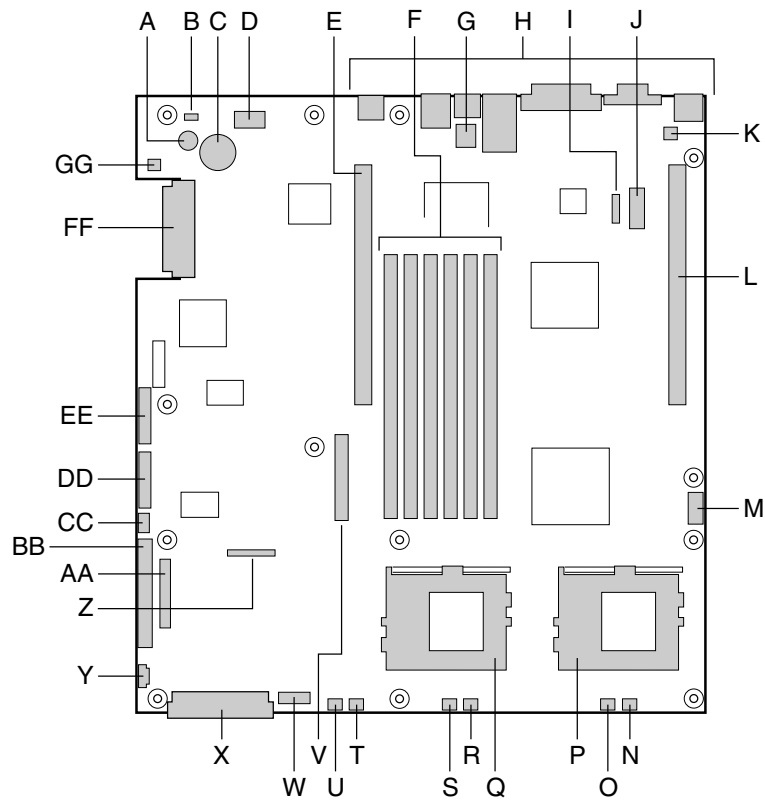
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A	Speaker	R	Sys fan 2 connector
B	ID LED	S	CPU 1 fan connector
C	Battery	T	Sys fan 1 connector
D	Diagnostic LEDs (POST code)	U	Aux fan connector
E	66 MHz/64-bit PCI riser slot (full height)	V	Floppy drive connector
F	DIMM slots	W	Fan module connector
G	DSR/DCD serial jumper	X	Main power connector
H	I/O ports	Y	Auxiliary signal connector
I	ICMB connector	Z	Floppy/FP/IDE connector
J	COM1 serial header	AA	Alternate front panel connector
K	Chassis intrusion connector	BB	ATA/IDE connector
L	66 MHz/64-bit PCI riser slot (low profile)	CC	IPMB connector
M	USB 3 & 4 header	DD	SSI front panel connector
N	Sys fan 3 connector	EE	Configuration jumper block
O	CPU 2 fan connector	FF	SCSI connector (SCSI version only)
P	Secondary processor socket	GG	Hard Disk Drive LED header
Q	Primary processor socket		

Figure 4. Server Board Connector and Component Locations

Processor

The server board accommodates one or two Intel Pentium lll processors up to 1.26 GHz with 512k cache in the FC-PGA2 package.

Memory

The system board contains six 168-pin DIMM slots each supporting 72-bit ECC (64-bit main memory plus ECC) registered SDRAM DIMMs (PC-133 compatible). You may install a minimum of 128 MB (64 MB x 2) and as much as 6 GB.

✏ **NOTE**

> Use DIMMs that have been tested for compatibility with the server board.
> Contact your sales representative or dealer for a current list of approved
> memory modules.

PCI Riser Slots

The server board has two PCI riser slots, each capable of supporting 64-bit/66-MHz PCI riser cards. PCI features:

- Bus speed up to 66 MHz
- 32 bit memory addressing
- 5 V/3.3 V signaling environment
- Burst transfers of up to 512 Mbps
- 8, 16, 32, or 64-bit data transfers
- Plug and Play ready
- Parity enabled

Video

The server board uses an ATI RAGE† XL PCI graphics accelerator with 8 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 server board supports disabling of the onboard video through the BIOS setup menu or when a plug in video card is installed in any of the PCI slots.

SCSI Controller

The server board includes an embedded Adaptec† AIC-7899W controller providing dual Ultra160 Low Voltage Differential (LVD) SCSI channels.

The SCSI bus is terminated on the server board with active terminators that cannot be disabled. The onboard device must always be at one end of the bus. The device at the other end of the cable is terminated with the active terminator on the SCSI cable installed in the system.

Network Controller

✏ NOTE

To ensure EMC product regulation compliance for inta-building lighting surges, the system must only be used with shielded LAN cables that are grounded at both ends.

The server board uses two Intel® 82550PM Fast Ethernet Controllers and supports two 10Base-T/100Base-TX network subsystems.

On the SERVER BOARD, NIC 1 can be used as both a network interface and server management interface.

NIC Connector and Status LEDs

The 82550 controller drives LEDs on the network interface connector that indicate link/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

✏ **NOTE**

> Using both on-board 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 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 2 adapters to increase transmission throughput. Also includes AFT. Works with any 10Base-TX or 100Base-TX switch.
- Fast EtherChannel[†] (FEC) or Intel® Link Aggregation - creates a team of up to 6 adapters to increase transmission and reception throughput. Also includes AFT. Requires a FEC-enabled switch.

To set up an option, read the instructions in the Linux RH7.1 readme files.

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 a PRO/1000 server adapter as the primary adapter and a PRO/100+ 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+ will take over. Then when the PRO/1000 server adapter is replaced, it will automatically revert to being the primary adapter in the team.

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

Mixed Adapter Teaming

AFT supports up to two server adapters per team, in any mix.

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 server adapters installed in your server or workstation 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 8 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 server adapters installed in your server and linked to the same FEC-enabled Cisco switch.

Keyboard and Mouse

The keyboard controller is PS/2 compatible. If specified through the System Setup Utility (SSU), the server may be locked automatically if there is no keyboard or mouse activity for a predefined length of time. Once the inactivity (lockout) timer has expired, the keyboard and mouse do not respond until the previously stored password is entered. If a mouse is required, connect an USB mouse to a USB port.

RJ45 Serial Port

The rear RJ45 serial port is a fully functional COM port that supports any standard serial device and provides support for serial concentrators, which typically support RJ45 serial connectors. For server applications that use a serial concentrator to access the server management features of the baseboard, a standard 8-pin CAT-5 cable from the serial concentrator is plugged directly into the rear RJ45 serial port. The 8 pins of the RJ45 connector can be configured to match either of two pin-out standards used by serial port concentrators. To accommodate either standard, the J6A2 jumper block located directly behind the rear RJ45 serial port must be jumpered appropriately.

✏ **NOTE**

> The RJ45 serial port's default configuration is DSR. For serial concentrators requiring a DCD signal, configure the jumper block as shown in Figure 36.

For those server applications requiring a DB9 serial connector, use an 8-pin RJ45-to-DB9 adapter. Table 5 defines the pin-out required for the adapter to provide RS232 support.

Table 5.   Rear Serial Port Adapter Pin-out

RJ45	Signal	Abbreviation	DB9
1	Request to Send	RTS	7
2	Data Terminal Ready	DTR	4
3	Transmitted Data	TD	3
4	Signal Ground	SGND	5
5	Ring Indicator	RI	9
6	Received Data	RD	2
7	DCD or DSR	DCD/DSR	1 or 6
8	Clear To Send	CTS	8

✏ **NOTE**

> The RJ45-to-DB9 adapter should match the configuration of the serial device used. One of two pin-out configurations may be used depending on whether the serial device requires a DSR or DCD signal. The final adapter configuration should also match the desired pin-out of the RJ45 connector, which can support either DSR or DCD.

This system is configured with both front and back RJ45 serial connectors, the adapters used for the rear port cannot be used with the front port, as the pin-out for front and back RJ45 ports are different. For example, modem applications typically use DCD. In this case, the user would use a DCD-configured adapter and set the jumper block to DCD as shown in Figure 36.

ACPI

The server board supports the Advanced Configuration and Power Interface (ACPI) as defined by the ACPI 1.0 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 BOARD 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.

Security

Software Locks

The BIOS Setup and the System Setup Utility (SSU) provide a number of security features to prevent unauthorized or accidental access to the system. Once the security measures are enabled, you can access the system only after you enter the correct password(s). For example:

* Enable the keyboard lockout timer so that the server requires a password to reactivate the keyboard and mouse after a specified time out period—1 to 120 minutes.
* Set and enable a supervisor password.
* Set and enable a user password.
* Set secure mode to prevent keyboard or mouse input and to prevent use of the front panel reset and power switches.
* Activate a hot key combination to enter secure mode quickly.
* Disable writing to the diskette drive when secure mode is set.
* Disable access to the boot sector of the operating system hard disk drive.

Using Passwords

You may set either the user password, the supervisor password, or both passwords. If only the user password is set, you:

- Must enter the user password to enter BIOS Setup or the SSU
- Must enter the user password to boot the server if Password on Boot is enabled in either the BIOS Setup or SSU
- Must enter the user password to exit secure mode

If only the supervisor password is set, you:

- Must enter the supervisor password to enter BIOS Setup or the SSU
- Must enter the supervisor password to boot the server if Password on Boot is enabled in either the BIOS Setup or SSU
- Must enter the supervisor password to exit secure mode

If both passwords are set, you:

- May enter the user password to enter BIOS Setup or the SSU, however, you will not be able to change many of the options
- Must enter the supervisor password if you want to enter BIOS Setup or the SSU and have access to all of the options
- May enter either password to boot the server if Password on Boot is enabled in either the BIOS Setup or SSU
- May enter either password to exit secure mode

Secure Mode

Configure and enable the secure boot mode by using the SSU. When secure mode is in effect:

- You can boot the server and the operating system will run, but you must enter the user password to use the keyboard or mouse.
- You cannot turn off system power or reset the server from the front panel switches.
- Secure mode has no effect on functions enabled via remote server management or power control via the watchdog timer.

Taking the server out of secure mode does not change the state of system power. That is, if you press and release the power switch while secure mode is in effect, the system will not be powered off when secure mode is later removed. However, if the front panel power switch remains depressed when secure mode is removed, the server will be powered off.

Summary of Software Security Features

Table 6 lists the software security features and describes what protection each offers. In general, to enable or set the features listed here, you must run the SSU and go to the Security Subsystem Group, menu. The table also refers to other SSU menus and to the Setup utility.

Table 6.   Software Security Features

Feature	Description
Secure mode	**How to enter secure mode:**
	Setting and enabling passwords automatically places the system in secure mode.
	If you set a hot-key combination (through Setup), you can secure the system simply by pressing the key combination. This means you do not have to wait for the inactivity time-out period.
	When the system is in secure mode:
	The server can boot and run the operating system, but mouse and keyboard input is not accepted until the user password is entered.
	At boot time, if a CD is detected in the CD-ROM drive or a diskette in drive A, the system prompts for a password. When the password is entered, the server boots from CD or diskette and disables the secure mode.
	If there is no CD in the CD-ROM drive or diskette in drive A, the server boots from drive C and automatically goes into secure mode. All enabled secure mode features go into effect at boot time.
	To leave secure mode: Enter the correct password(s).
Disable writing to diskette	In secure mode, the server will not boot from or write to a diskette unless a password is entered.
	To write protect access to diskette whether the server is in secure mode or not, use the Setup main menu, Floppy Options, and specify Floppy Access as read only.
Set a time out period so that keyboard and mouse input are not accepted	Specify and enable an inactivity time out period of from 1 to 120 minutes.
	If no keyboard or mouse action occurs for the specified period, attempted keyboard and mouse input will not be accepted.
Also, screen can be blanked, and writes to diskette can be inhibited	The monitor display will go blank, and the diskette drive will be write protected (if these security features are enabled through Setup).
	To resume activity: Enter the correct password(s).
Control access to using the SSU: set supervisor password	To control access to setting or changing the system configuration, set a supervisor password and enable it through Setup.
	If both the supervisor and user passwords are enabled, either can be used to boot the server or enable the keyboard and/or mouse, but only the supervisor password will allow Setup to be changed.
	To disable a password, change it to a blank entry or press CTRL-D in the Change Password menu of the Supervisor Password Option menu found in the Security Subsystem Group.
	To clear the password if you cannot access Setup, change the Clear Password jumper (see Chapter 5).

Table 6.   Software Security Features (continued)

Feature	Description
Control access to the system other than SSU: set user password	To control access to using the system, set a user password and enable it through Setup. To disable a password, change it to a blank entry or press CTRL-D in the Change Password menu of the User Password Option menu found in the Security Subsystem Group. To clear the password if you cannot access Setup, change the Clear Password jumper (see Chapter 5).
Boot without keyboard	The system can boot with or without a keyboard. During POST, before the system completes the boot sequence, the BIOS automatically detects and tests the keyboard if it is present and displays a message.
Specify the boot sequence	The sequence that you specify in setup will determine the boot order. If secure mode is enabled (a user password is set), then you will be prompted for a password before the server fully boots. If secure mode is enabled and the "Secure Boot Mode" option is also enabled, the server will fully boot but will require a password before accepting any keyboard or mouse input.

Riser Boards

The server board includes one 3.3 V 64-bit at 66 MHz riser board with half-height bracket for PCI add-in cards (see Figure 5). Figure 6 shows the optional configuration; the 3.3 V riser board attached to a full-height bracket. Using both configurations allows both PCI busses to support 3.3 V PCI add-in cards.

Both the 3.3 Volt and optional 5 Volt riser boards support Zero Channel RAID (ZCR) cards. To operate correctly, insert the ZCR card into the riser board then, insert the riser board into the full-height riser board slot on the server board. For the location of the full-height riser slot, see Callout E, Figure 4 on Page 18.
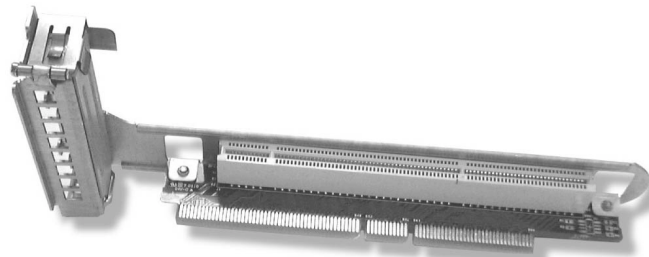
OM12859

Figure 5. 3.3 Volt Riser Board with Half-height Bracket

OM12858

Figure 6. 3.3 Volt Riser Board with Full-height Bracket

Figure 7 shows the 5 V riser board available as an option. The 5 V riser board contains voltage level translation circuitry converting the 5 V PCI add-in card's 5 V signals to the server board's 3.3 V signal levels.

OM13217

Figure 7. 5 Volt Riser Board with Full-height Bracket

The 5 Volt riser board also supports 3.3 V 33 MHz 64-bit PCI add-in cards. The 5 V riser should only be installed in the full height PCI bus (P64-B) which is closest to the power supply.

Power Supplies

The TSRMT2 server system may be configured with either an AC-or DC-input power subsystem. Power from the power subsystem is carried to internal system boards and peripheral devices via discrete cables.

The non-hot-swap 250 Watts power supply module is capable of handling the worst-case power requirements for a fully configured TSRMT2 server system. This includes two Pentium III processors, 6 GB of memory and two hard drives at 18 Watts per drive (typical worst case 3.5-inch by 1.0-inch, 15k RPM drive).

The power supply is accessed from the rear of the chassis.

Only the DC input version is NEBS certified.

DC Power Subsystem

This section defines the features of the DC input switching power subsystem. The DC power supply front panel, visible from the server chassis back panel, is shown in Figure 8.

OM13108

Figure 8. DC-Power Supply Subsystem

Features
- 250 W output capability in full DC input voltage range
- "Power Good" indication LEDs
- Predictive failure warning
- Internal cooling fans with multi-speed capability
- Remote sense of 3.3 Volt, 5 Volt, and 12 Volt DC outputs
- "DC_OK" circuitry for brown out protection and recovery
- Built-in overloading protection capability
- Onboard field replaceable unit (FRU) information
- I^2C interface for server management functions

Introduction

The DC version of the TSRMT2 server system uses a -48 to -60 VDC input switching power subsystem, which provides up to 250 Watts with -48 to -60 VDC input and with current and remote sense regulation.

Interface Requirements

DC Input

The DC power source may produce hazardous voltage levels exceeding -60 VDC and high energy levels above 240VA that may cause electric shock or burns. All DC input connections should be made only by a qualified service person only to prevent injury. All wiring terminals connected to the DC input terminal block must be fully-insulated with no exposed bare metal.

DC Output Connectors

The power subsystem DC power and control signals are interfaced to the server system via wire harnesses when the power supply modules are inserted into the power subsystem enclosure. The safety ground pin of the power supply module is the first pin to connect and the last to disconnect when the module is being inserted or removed from the power subsystem housing. In addition to the 5 V Standby, -12 V, +3.3 V, +5 V and +12 VDC outputs, the following signals and output pins are included:

- +3.3 VDC remote sense
- +5 VDC remote sense
- +12 VDC remote sense
- Remote sense return
- Power Subsystem On (DC PWR enable)
- Power Good
- I^2C^*

* PS Failure, PS Presence, PS Predictive Fail, +12 V Mon, +5 V Mon, and the 5 V Standby rails failure are being monitored via an I^2C interface chip.

Power Supply Module LED Indicators

There is a single bi-color LED to indicate power supply status. When DC is applied to the PSU and standby voltages are available the LED blinks GREEN. The LED turns on GREEN to indicate that all the power outputs are available. The LED turns on AMBER to indicate that the power supply has failed, shutdown due to over current, shutdown due to over temperature, or is indicating a predictive failure. Refer to LED Indicators for conditions of the LEDs. The Alert signal from the Heceta-P will trigger an AMBER blinking LED condition. If the module condition is Alert and Fail at the same time, the LED will be AMBER with no blinking. The LED is visible on the power supply module's exterior surface at the back of the system.

Table 7.   LED Indicators

Power Supply Condition	Power Supply LED
No DC power to all PSU	OFF
No DC power to this PSU only	AMBER
DC present / Only Standby Outputs On	BLINK GREEN
Power supply DC outputs ON and OK	GREEN
Power Supply in Alert Condition	BLINK AMBER
Power supply failure (OTP, OCP, OVP, UV)	AMBER

DC Input Voltage Specification

The power supply will operate within all specified limits over the input voltage range outlined in Table 8. The power supply will power-off if the DC input is less than 34 VDC.

Table 8.   DC Input Rating

Parameter	Minimum Tolerance	Nominal Rating	Maximum Tolerance[1]	Maximum Input Current
Voltage	-38 VDC	-48 to –60 VDC	-75 V DC	13.5 Amps

[1] Maximum input current is measured at the lowest input voltage that the power supply continues to operate. This is not to be used for determining agency input current markings.

DC Output Current Specifications

The combined output power of all outputs will not exceed 250 W. Each output has a maximum and minimum current rating shown in Table 9. The power supply meets both static and dynamic voltage regulation requirements for the minimum dynamic loading conditions. The power supply meets only the static load voltage regulation requirements for the minimum static load conditions.

Table 9.   250 W Load Ratings

	+3.3 V	+5 V	+12 V	-12 V	5 VSB
PEAK (10sec)			30A		
MAX	20A	20A	25A	0.5A	1.5A
MIN DYNAMIC	2.0A	2.0A	1.5A	0A	0A
MIN STATIC	1A	1A	0A	0A	0A

Note: The maximum combined power of the 3.3 V and 5 V outputs is 150 W.

AC Power Subsystem

This section defines the AC-input switching power subsystem.
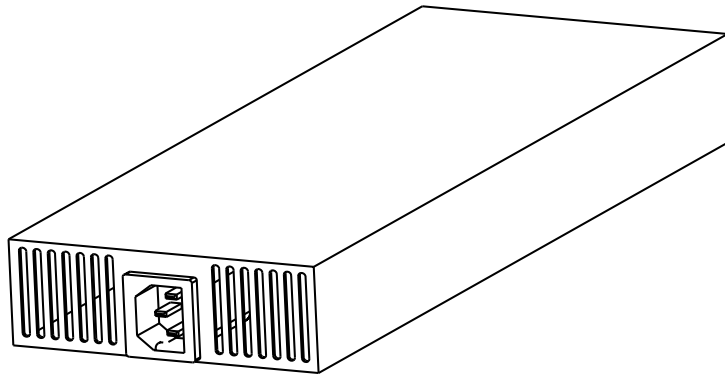
OM12864

Figure 9. AC-Power Supply Subsystem

Features

- 250 W output capability in full AC input voltage range
- "Power Good" indication LEDs
- Predictive failure warning
- Internal cooling fans with multi-speed capability
- Remote sense of 3.3 V, 5 V, and 12 VDC outputs
- AC_OK circuitry for brown out protection and recovery
- Built-in load sharing capability
- Built-in overloading protection capability
- Onboard field replaceable unit (FRU) information
- I^2C interface for server management functions
- Integral handle for insertion/extraction

Introduction

The AC version of the TSRMT2 server system uses an AC input switching power subsystem which provides up to 250 W DC with 110 - 220 VAC input and with current and remote sense regulation. Refer to Table 10 for conditions of the power supply LEDs.

Table 10.   LED Indicators

Power Supply Condition	Power Supply LED
No AC power to all PSU	OFF
No AC power to this PSU only	AMBER
DC present / Only Standby Outputs On	BLINK GREEN
Power supply DC outputs ON and OK	GREEN
Power Supply in Alert Condition	BLINK AMBER
Power supply failure (OTP, OCP, OVP, UV)	AMBER

AC Input Voltage Specification

The power supply will operate within all specified limits over the input voltage ranges outlined in Table 11. Harmonic distortion of up to 10% THD will not cause the power supply to go out of specified limits.

Table 11.   AC Input Rating

Parameter	MIN	RATED	MAX	Max Input Current (250 W Version)
Voltage (110)	90 V_{rms}	100-127 V_{rms}	140 V_{rms}	6.7 A_{rms}
Voltage (220)	180 V_{rms}	200-240 V_{rms}	264 V_{rms}	
Frequency	47 Hz		63 Hz	

DC Output Current Specifications

The combined output power of all outputs should not exceed 250 W. Each output has a maximum and minimum current rating shown in Table 12. The power supply meets both static and dynamic voltage regulation requirements for the minimum dynamic loading conditions. The power supply meets only the static load voltage regulation requirements for the minimum static load conditions.

Table 12.   250 W Load Ratings

	+3.3 V	+5 V	+12 V	-12 V	5 VSB
PEAK (10sec)			30A		
MAX	20A	20A	25A	0.5A	1.5A
MIN DYNAMIC	2.0A	2.0A	1.5A	0A	0A
MIN STATIC	1A	1A	0A	0A	0A

✏ **NOTE**

The maximum combined power of the 3.3 V and 5 V outputs is 150 W.

Peripheral Bay

The peripheral bay provides support for one removable media device, which can be one of the following devices.

- ½-inch (slimline) CD-ROM drive, or
- ½-inch (slimline) floppy drive (optional)

SCSI Hard Drive Bay 1 and 2

The hard drive tray supports two 3.5-inch x 1.0-inch Ultra160 SCSI technology hard disk drives (non-SCA). The hard drive tray accepts 15K RPM (and below) hard drives that consume up to 18 Watts of power.

Cooling Subsystem

The cooling subsystem contains a fan module consisting of five 40 mm fans to cool the server board and other components. The fans are installed directly behind the drive tray and are located in front of the server board. The fan connector is located on the server board. Each fan provides tachometer signal output to the server board to indicate a fan failure. A fan failure is indicated by the fan fault LED located on the front panel. The fan module is shown in Figure 10.

OM13109

Figure 10. Fan Module

Ambient Temperature Control

The system baseboard contains a pulse-width-modulation (PWM) circuit, which cycles the 12 VDC fan voltage to provide quiet operation when system baseboard temperature is low and there are no fan failures. Under normal baseboard temperature conditions (less than 45 °C), the fan power circuit supplies an effective fan voltage of 7.0 VDC. When the baseboard temperature exceeds 45 °C, the fan control circuit ceases cycling and delivers 12 VDC. Following a baseboard temperature excursion above 45 °C the fan voltage does not reenter PWM mode until the baseboard temperature drops below 45 °C and all fans are operational.

Server Management Summary

The server management system features a Board Management Controller (BMC), which autonomously monitors server status and provides the interface to server management control functions. This controller is responsible for controlling system power, resets, monitoring voltages, temperatures, fans, and communicating with secondary controllers on its Intelligent Platform Management Bus (IPMB).

The functions of each controller are summarized in the following sections.

Board Management Controller (BMC)

The BMC on the server board provides server management monitoring capabilities. Associated with the BMC is a flash memory that holds the operational code, sensor data records (SDR), and system event log (SEL). A serial EEPROM holds the BMC configuration defaults and field replaceable unit (FRU) information. The BMC supports the following:

- Server board voltage monitoring
- Fan failure detection
- Fan speed control
- Processor voltage monitoring
- Processor presence detection
- Processor internal error (IERR) monitoring
- Fault resilient booting (FRB)
- Processor disable control
- Watchdog timer
- Periodic system management interrupt (SMI) timer
- I^2C master controller for the Intelligent Platform Management Bus (IPMB)
- Three private I^2C management bus interfaces
- Server management software (SMS) and server management mode (SMM) IPMB message receiver
- Event message receiver
- System event log (SEL) management and access
- Sensor data record (SDR) repository management and access
- Processor nonmaskable interrupt (NMI) monitoring
- Processor SMI monitoring
- Time-stamp clock
- Secure mode
- Software front panel NMI generation

2 Regulatory Specifications and Disclaimers

Declaration of the Manufacturer or Importer

We hereby certify that this product is in compliance with European Union EMC Directive 89/336/EEC, using standards EN55022 (Class A) and EN55024 and Low Voltage Directive 73/23/EEC, Standard EN60950.

Safety Compliance

USA:	UL 1950 – 3rd Edition/CSA 22.2. No. 950-M93
Canada:	UL Certified – 3rd Edition/CSA 22.2. No. 950-M93 for Canada (product bears the single UL mark for U.S. and Canada)
Europe:	Low Voltage Directive, 73/23/EECTUV/GS to EN60950 2nd Edition with Amendments, A1 = A2 + A3 + A4
International:	TUV/CB to IEC 60950 3rd Edition, EN60 950 2nd Edition + Amd 1-4, EMKO-TSE (74-SEC) 207/94 plus international deviations
Australian / New Zealand:	CB Report to IEC 60950, 3rd Edition plus Australian deviations

Electromagnetic Compatibility (EMC)

USA:	FCC CFR 47 Part 2 and 15, Verified Class A Limit
Canada:	IC ICES-003 Class A Limit
Europe:	EMC Directive, 89/336/EEC • EN55022, Class A Limit, Radiated & Conducted Emissions • EN55024, ITE Specific Immunity Standard • EN61000-4-2, ESD Immunity (Level 2 Contact Discharge, Level 3 Air Discharge) • EN61000-4-3, Radiated Immunity (Level 2) • EN61000-4-4, Electrical Fast Transient (Level 2) • EN61000-4-5, AC Surge • EN61000-4-6, Conducted RF • EN61000-4-8, Power Frequency Magnetic Fields • EN61000-4-11, Voltage Dips and Interrupts • EN61000-3-2, Limit for Harmonic Current Emissions • EN61000-3-3, Voltage Flicker
Japan:	VCCI Class A ITE (CISPR 22, Class A Limit) IEC 1000-3-2 Limit for Harmonic Current Emissions
Australia/New Zealand:	AS/NZS 3548, Class A
Taiwan:	BSMI Approval, Class A
Korea:	RRL Approval, Class A
Russia:	GOST Approved
International:	CISPR 22, Class A Limit

FCC Electromagnetic Compatibility Notice (USA)

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 designed to provide reasonable protection against harmful interference when the equipment is operating in a commercial environment. 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. Operation of this equipment in a residential area is likely to cause harmful interference. In this case, the user is required to correct the interference at their own expense. 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 into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Any changes or modifications not expressly approved by the grantee of this device could void the user's authority to operate the equipment. The customer is responsible for ensuring compliance of the modified product.

FCC Declaration of Conformity

Product Type: TSRMT2

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
250 Berry Hill Rd., Suite 100
Columbia, SC 29210

Electromagnetic Compatibility Notices (International)

Europe (CE Declaration of Conformity)

This product has been tested in accordance too, and complies with the Low Voltage Directive (73/23/EEC) and EMC Directive (89/336/EEC). The product has been marked with the CE Mark to illustrate its compliance.

Japan EMC Compatibility

この装置は、情報処理装置等電波障害白主規制協議会（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:

This is a Class A product based on the standard of the Voluntary Control Council for Interference by Information Technology Equipment (VCCI). If this equipment is used in a domestic environment, radio disturbance may arise. When such trouble occurs, the user may be required to take corrective actions.

ICES-003 (Canada)

Cet appareil numérique respecte les limites bruits radioélectriques applicables aux appareils numériques de Classe A prescrites dans la norme sur le matériel brouilleur: "Appareils Numériques", NMB-003 édictée par le Ministre Canadian des Communications.

English translation of the notice above:

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the interference-causing equipment standard entitled "Digital Apparatus," ICES-003 of the Canadian Department of Communications.

BSMI (Taiwan)

The BSMI Certification number and the following warning is located on the product safety label which is located visibly on the external chassis.

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。

3 Configuration Software and Utilities

This chapter describes the Power-On Self-Test (POST) and server configuration utilities. The table below briefly describes the utilities.

Table 13. Configuration Utilities

Utility	Description and brief procedure	Page
BIOS Setup	If the system does not have a diskette drive, or the drive is disabled or incorrectly configured, use Setup to enable it. Or, you can move the CMOS jumper on the server board from the default setting (Protect CMOS memory) to the Clear setting; this will allow most server configurations to boot. Then run the SSU to configure the server.	41
BIOS Upgrade Utility	Use to upgrade the BIOS.	51
System Setup Utility (SSU)	Use for viewing and clearing the system event log, viewing the system management FRU information, or viewing the system management SDR repository.	53
FRUSDR Load Utility	Use to update the Field Replacement Unit (FRU), Sensor Data Record (SDR), and SM BIOS (SMB) flash components.	58
Firmware Update Utility	Use to update the Firmware.	62
Using the Adaptec SCSI Utility	Use to configure or view the settings of the SCSI host adapter and onboard SCSI devices in the server.	64

Using BIOS Setup

This section describes the BIOS Setup options. Use Setup to change the server configuration defaults. You can run Setup with or without an operating system being present. Setup stores most of the configuration values in battery backed CMOS; the rest of the values are stored in flash memory. The values take effect when you boot the server. POST uses these values to configure the hardware; if the values and the actual hardware do not agree, POST generates an error message. You must then run Setup to specify the correct configuration.

Recording Your Setup Settings

If the default values ever need to be restored (after a CMOS clear, for example), you must run Setup again. Referring to the worksheets could make your task easier.

If You Cannot Access Setup

If the diskette drive is incorrectly configured so that you cannot access it to run a utility from a diskette, you may need to clear CMOS memory. You will need to open the server, change a jumper setting, use Setup to check and set diskette drive options, and change the jumper back.

Starting Setup

After rebooting, you will see this prompt:

```
Press <F2> to enter SETUP
```

✏ **NOTE**

> If the BIOS setup option "POST Diagnostic Screen" is enabled (Default),
> you will not see the message "Press <F2> to enter SETUP". This message is
> hidden by the Manufacturer's Splash screen. To see the message, press the
> <ESC> key while the splash screen is displayed. This will temporarily
> disable the splash screen allowing you to see the message.

If CMOS/NVRAM is corrupted, you will see other prompts but not the <F2> prompt:

```
Warning:  cmos checksum invalid

Warning:  cmos time and date not set
```

In this condition, the BIOS will load default values for CMOS and attempt to boot.

Setup Menus

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 Setup	<Esc>
Reset to Setup defaults	<F9>
Save and exit Setup	<F10>

When you see this:	It means:
On screen, an option is shown but you cannot select it or move to that field.	You cannot change or configure the option in that menu screen. Either the option is auto-configured or auto-detected, or you must use a different Setup screen.
On screen, the phrase Press Enter appears next to the option.	Press <Enter> to display a submenu that is either a separate full screen menu or a popup menu with one or more choices.

The rest of this section lists the features that display onscreen after you press <F2> to enter Setup. Not all of the option choices are described, because (1) a few are not user selectable but are displayed for your information, and (2) many of the choices are relatively self-explanatory.

The BIOS Setup program menu bar is shown below.

Main	Advanced	Security	Server	Boot	Exit
Allocates resources for hardware components.	Configures advanced features available through the chipset.	Sets passwords and security features.	Selects serial port, LAN, and event log features. Also permits service boot.	Selects boot options and power supply controls.	Saves or discards changes to set program options.

Main Menu

You can make the following selections on the Main Menu. Use the submenus indicated by "▶" for other selections.

Feature	Option	Description
System Time	HH:MM:SS	Sets the system time.
System Date	MM/DD/YYYY	Sets the system date.
Floppy A	Not installed **[1.44/1.25 MB 3 ½-inch]** 2.88 MB 3 ½-inch	Selects the diskette type. Note: The 1.25 MB 3 ½-inch references a 1024 Byte sector Japanese media format. Support for the 1.25, 3 ½-inch format requires a 3 ½-inch 3-mode" diskette drive.
Hard Disk Pre-Delay	**[Disabled]** 3 Seconds 6 Seconds 9 Seconds 12 Seconds 15 Seconds 21 Seconds 30 Seconds	Adds a delay before first access of the hard drive to accommodate slow spin-up hard disk drives.
▶ Primary IDE Master	<Enter>	Enters submenu.
▶ Primary IDE Slave	<Enter>	Enters submenu.
▶ Processor Settings	<Enter>	Enters submenu.
Language	**[English (US)]** Español (SP) Deutsch (DE) Italiano (IT) Français (FR)	Selects which language BIOS displays.

Primary IDE Master and Primary IDE Slave Submenus

Feature	Option	Description
Type	None **[Auto]**	Select the type of device that is attached to the IDE channel. If you select User, you will need to enter the parameters of the IDE device (cylinders, heads and sectors).
LBA Mode Control	N/A	This field informational only.
Multi-Sector Transfers	N/A	This field informational only.
PIO Mode	N/A	This field informational only.
Ultra DMA	N/A	This field informational only.

Processor Settings Submenu

Feature	Option	Description
Processor Type	N/A	This field is informational only.
Processor POST Speed	N/A	This field is informational only.
Processor Retest	**[Disabled]** Enabled	If enabled, BIOS will activate and retest all processors on the next system boot. Option automatically resets to Disabled on next system boot.
Processor 1 CPUID	N/A	This field is informational only.
Processor 1 L2 Cache	N/A	This field is informational only.
Processor 2 CPUID	N/A	This field is informational only.
Processor 2 L2 Cache	N/A	This field is informational only.

Advanced Menu

You can make the following selections on the Advanced Menu itself. Use the submenus for the three other selections that appear on the Advanced Menu.

Feature	Option	Description
▶ PCI Configuration	<Enter>	Enters submenu.
▶ Peripheral Configuration	<Enter>	Enters submenu.
▶ Memory Configuration	<Enter>	Enters submenu.
▶ Advanced Chipset Control	<Enter>	Enters submenu.
Reset Configuration Data	Yes **[No]**	Select Yes if you want to clear the server configuration data during the next boot. The system automatically resets this field to No during the next boot.
Plug & Play O/S	Yes **[No]**	No, lets the BIOS configure all the devices in the system. Yes, lets the operating system configure Plug and Play (PnP) devices not required for boot if your system has a Plug and Play operating system.
Numlock	Off **[On]**	Switches Numlock on and off.

PCI Configuration Submenu

Feature	Option	Description
USB Function	<Enter>	Enters submenu.
Onboard NIC 1	<Enter>	Enters submenu.
Onboard NIC 2	<Enter>	Enters submenu.
Onboard SCSI	<Enter>	Enters submenu.
Onboard Video	<Enter>	Enters submenu.
PCI Slot 1B ROM	**[Disabled]** Enabled	Full-Height PCI Riser Slot. Select whether or not to load the Device's Option ROM. If the BIOS is reporting POST error 146, use this option to disable option ROMs that are not required to boot the system.
PCI Slot 1C ROM	**[Disabled]** Enabled	Low Profile PCI Riser Slot. Select whether or not to load the Device's Option ROM. If the BIOS is reporting POST error 146, use this option to disable option ROMs that are not required to boot the system.

USB Function Submenu

Feature	Option	Description
USB Function	**[Enabled]** Disable	Allows disabling the onboard USB ports

Onboard NIC 1 Function Submenu

Feature	Option	Description
Onboard NIC 1	**[Enabled]** Disable	Allows disabling onboard NIC 1 port
Onboard NIC 1 ROM	**[Enabled]** Disable	Allows disabling onboard NIC 1 ROM

Onboard NIC 2 Function Submenu

Feature	Option	Description
Onboard NIC 2	**[Enabled]** Disable	Allows disabling onboard NIC 2 port
Onboard NIC 2 ROM	**[Enabled]** Disable	Allows disabling onboard NIC 2 ROM

Onboard SCSI Function Submenu

Feature	Option	Description
Onboard SCSI	**[Enabled]** Disable	Allows disabling onboard SCSI port
Onboard SCSI ROM	**[Enabled]** Disable	Allows disabling onboard SCSI ROM

Onboard Video Function Submenu

Feature	Option	Description
Onboard SCSI	**[Enabled]** Disable	Allows disabling onboard Video port

Security Menu

You can make the following selections on the Security Menu itself. Enabling the Supervisor Password field requires a password for entering Setup. The passwords are not case-sensitive.

Feature	Option	Description
User Password is	**[Not Installed]** Installed	This field is informational only.
Administrator Password is	**[Not Installed]** Installed	This field is informational only.
Set Administrator Password	<Enter>	Controls access to the setup utility. When the <Enter> key is pressed, you are prompted for a password, press the ESC key to abort. Once set, this can be cleared by setting it to a null string, or by using the clear-password jumper on server board.
Set User Password	<Enter>	Controls access to system boot. When the <Enter> key is pressed, you are prompted for a password, press the ESC key to abort. Also used to unlock the system when in the secure mode (secure mode is indicated by blinking keyboard lights). Once set, this can be cleared by setting it to a null string, or by using the clear-password jumper on server board.
User Access Level	**[Limited]** No access View Only Full	Limited: Allows access to certain fields only. No Access: Allows no access to change or view fields. View Only: Allows user to view fields but not change them. Full: Allows user to view and change most fields.

Server Menu

Feature	Option	Description
▶ System Management	<Enter>	Enters the System Management submenu.
▶ Console Redirection	<Enter>	Enters the Console Redirection submenu.
▶ Event Log Configuration	<Enter>	Enters the Event Log Configuration submenu.
Service Boot	**[Disabled]** Enabled	Enables the Service Boot option. Option automatically resets to disabled on next system boot.
Assert NMI on PERR	**[Disabled]** Enabled	If enabled, NMI is generated. SERR option needs to be enabled to activate this option.
Assert NMI on SERR	**[Enabled]** Disabled	If enabled, NMI is generated on SERR and logged.
BMC IRQ	**[Disabled]** IRQ5 IRQ11	Sets the BMC IRQ.
After Power Failure	**[Last State]** Stays Off Power On	Determines the mode of operation if a power loss occurs.

continued

Server Menu (continued)

Feature	Option	Description
Temperature Sensor	**[Disabled]** Enabled	If enabled, the system will not boot if the ambient temperature is outside the range specified in the SDR.
POST Error Pause	**[Enabled]** Disabled	If enabled, the system will wait for user intervention on critical POST errors. If disabled, the system will boot with no intervention, if possible.
Platform Event Filtering	**[Enabled]** Disabled	Enable/Disable trigger for system sensor events inside the BMC.

System Management Submenu

Feature	Option	Description
Board Part Number	**[A46044-405]**	Field is informational only.
Board Serial Number	**[KKC212600176]**	Field is informational only.
System Part Number		Field is informational only.
System Serial Number		Field is informational only.
Chassis Part Number		Field is informational only.
Chassis Serial Number		Field is informational only.
BIOS Version		Field is informational only.
BMC Revision		Field is informational only.
HSBP Revision	**[N/A]**	Field is informational only.

Console Redirection Submenu

Feature	Option	Description
Serial Console Redirection	**[Disabled]** Enabled	
Serial Port	**[COM1 3F8 IRQ4]** COM2 2F8 IRQ3 COM3 3E8 IRQ4	
Baud Rate	9600 **[19.2K]** 38.4K 115.2K	Selects the serial port's baud rate
Flow Control	No Flow Control **[CTS/RTS]** XON / XOFF CTS / RTS + CD	Hardware control Software control Hardware + Carrier Detect (for Modem use)

Event Log Configuration Submenu

Feature	Option	Description
Clear All Event Logs	**[No]** Yes	Allows user to clear all event logs. Setting to Yes will clear the DMI event log after system boot.
Event Logging	Disabled **[Enabled]**	Allows user to log DMI events.
Critical Event Logging	Disabled **[Enabled]**	Allows user to enable critical error event logging. Critical errors are fatal to system operation. They include PERR, SERR, ECC memory errors, and NMI.

Boot Menu

Feature	Option	Description
Quite Boot	Disabled **[Enabled]**	Disabled displayed normal POST messages. Enabled displays OEM logo and disables serial redirection.
► Boot Device Priority	<Enter>	Enters submenu.
► Hard Disk Drives	<Enter>	Enters submenu.
► Removable Devices	<Enter>	Enters submenu.
► ATAPI CDROM Drives	<Enter>	Enters submenu.

Boot Device Priority Submenu

Use the up or down arrow keys to select a device; then press the <+> or <-> keys to move the device higher or lower in the boot priority list.

Boot Priority	Device Option	Description
1st Boot Device	**[Removable Device]** Hard Drive ATAPI CDROM Intel (R) Boot Agent Ve Intel (R) Boot Agent Ve Disabled	Attempts to boot from the diskette drive.
2nd Boot Device	Removable Device **[Hard Drive]** ATAPI CDROM Intel (R) Boot Agent Ve Intel (R) Boot Agent Ve Disabled	Attempts to boot from a hard disk drive.
3rd Boot Device	Removable Device Hard Drive **[ATAPI CDROM]** Intel (R) Boot Agent Ve Intel (R) Boot Agent Ve Disabled	Attempts to boot from the CD-ROM drive.

continued

Boot Device Priority Submenu (continued)

Boot Priority	Device Option	Description
4th Boot Device	Removable Device Hard Drive ATAPI CDROM **[Intel (R) Boot Agent Ve]** Intel (R) Boot Agent Ve Disabled	Attempts to boot from a network connection. Requires the presence of a PXE server.
5th Boot Device	Removable Device Hard Drive ATAPI CDROM Intel (R) Boot Agent Ve **[Intel (R) Boot Agent Ve]** Disabled	Attempts to boot from a network connection. Requires the presence of a PXE server.

Hard Disk Drives Submenu

Choices	Description
1st Hard Drive	**[AIC 7899,B:06 IBM DPSS]**

Removable Devices Submenu

Choices	Description
1st Removable Device	**[1st Floppy Drive]**

ATAPI CD-ROM Drives Submenu

Choices	Description
1st ATAPI CDROM	**[SR243T]**

Exit Menu

You can make the following selections on the Exit Menu. Select an option using the up or down arrow keys; then press <Enter> to execute the option. Pressing <Esc> does not exit this menu. You must select one of the items from the menu or menu bar to exit.

Feature	Option	Description
► Exit Saving Changes	Yes No	Exits after writing all modified Setup item values to NVRAM.
► Exit Discarding Change	Yes No	Exits leaving NVRAM unmodified.
► Load Setup Defaults	Yes No	Loads default values for all Setup items.
► Load Custom Defaults	Yes No	Loads values of all Setup items from previously saved custom defaults.
► Save Custom Defaults	Yes No	Writes all Setup item values to NVRAM.
► Discard Changes	Yes No	Exits discarding changes.

Upgrading the BIOS

Preparing for the Upgrade

Before you upgrade the BIOS, prepare for the upgrade by recording the current BIOS settings, obtaining the upgrade utility, and making a copy of the current BIOS (SERVER BOARD0.86B).

Recording the Current BIOS Settings

1. Boot the computer and press <F2> when you see the message:

   ```
   Press <F2> Key if you want to run SETUP
   ```

2. Write down the current settings in the BIOS Setup program.

✏ **NOTE**

> Do not skip step 2. You will need these settings to configure your computer at the end of the procedure.

Obtaining the Upgrade Utility

You can upgrade to a new version of the BIOS using the new BIOS files and the BIOS upgrade utility, IFLASH.EXE. You can obtain the BIOS upgrade file and the IFLASH.EXE utility through your computer supplier or from the Intel Customer Support website.

✏ **NOTE**

> Please review the instructions distributed with the upgrade utility before attempting a BIOS upgrade.

This upgrade utility allows you to:
- Upgrade the BIOS in flash memory.
- Update the language section of the BIOS.

The following steps explain how to upgrade the BIOS.

Creating a Bootable Diskette

1. Use a DOS or Windows† 95 system to create the diskette.
2. Insert a diskette in diskette drive A.
3. At the C:\prompt, for an unformatted diskette, type:

   ```
   format a:/s
   ```

   Or, for a formatted diskette, type:

   ```
   sys a:
   ```

4. Press <Enter>

Creating the BIOS Upgrade Diskette

The BIOS upgrade file is a compressed self-extracting archive that contains the files you need to upgrade the BIOS.

1. Insert the bootable diskette into the diskette drive.
2. Extract the contents of the BIOS.EXE file onto the bootable diskette. To do this, simply type the filename (with or without the extension) at the a:\prompt, for example "BIOS.EXE".
3. You will be prompted to confirm a folder in which to store the extracted files. The BIOS upgrade image is extracted in the specified folder.

Upgrading the BIOS

1. Place the bootable diskette containing the BIOS update files into the diskette drive of your system. Boot the system with the diskette in the drive.
2. At this point you have a choice of two options. Press 1 and <ENTER> to automatically update the system BIOS. This will update the system BIOS and reset the system. Press 2 and <ENTER> to update the User Binary and reset the system.
3. Wait while the BIOS files are updated. Do not power down the system during the BIOS update process! The system will reset automatically when the BIOS update process is completed. Remove the diskette from the diskette drive.
4. Check to make sure the BIOS version displayed during POST is the new version as the system reboots.
5. Enter Setup by pressing the F2 key during boot. Once in Setup, press the F9 and <ENTER> to set the parameters back to default values.
6. Re-enter the values you wrote down at the beginning of this process. Press F10 and <ENTER> to exit BIOS Setup and Save Changes.
7. If you do not set the CMOS values back to defaults using the F9 key, the system may function erratically.

✏ **NOTE**

You may encounter a CMOS Checksum error or other problem after reboot. Try shutting down the system and booting up again. CMOS checksum errors require that you enter Setup, check your settings, save your settings, and exit Setup.

Recovering the BIOS

It is unlikely that anything will interrupt the BIOS upgrade; however, if an interruption occurs, the BIOS could be damaged. The following steps explain how to recover the BIOS if an upgrade fails.

✐ **NOTE**

> Because of the small amount of code available in the non-erasable boot block area, there is no video support. You will not see anything on the screen during the procedure. Monitor the procedure by listening to the speaker.
>
> You **must** boot to DOS. The BIOS recovery diskette will not be created correctly under the DOS window of a Windows operating system.

1. Get the BIOS update file package from Intel's iBL or *http://support.intel.com web site.*
2. A file called "crisis.zip" is one of the files included with each TSRMT2 BIOS release file package. Unzip the "crisis.zip" file to a directory on your hard drive.
3. Format a blank diskette (the diskette should not be a bootable DOS diskette). Insert the diskette into the diskette drive.
4. From the DOS, run the "crisdisk.bat" file from the directory you created on your hard drive. Follow the instructions on the screen to create the BIOS recovery diskette.

✐ **NOTE**

> The BIOS recovery diskette will not be created correctly under the DOS window of a Windows operating system. You must boot to a DOS system to create the BIOS recovery diskette.

5. Power off the TSRMT2 system, unplug/disconnect the power cord, and remove the chassis panel.
6. Remove the spare jumper from pins 11-12 on jumper block 1J15 and install it on pins 9-10 (BIOS Recovery) of jumper block 1J15.
7. Insert the BIOS recovery diskette into the diskette drive.
8. Reinstall the chassis panel, plug-in/reconnect the power connection, and power-on the system.
9. The screen will remain blank while the BIOS Recovery is performed. A number of beeps will occur during the BIOS update. The diskette drive access light will not turn off when the BIOS recovery is completed. Allow four minutes for the BIOS recovery to complete. If a POST card is installed in a PCI slot during the BIOS recovery, you can tell that the BIOS recovery is complete when code "EC" is displayed. When the BIOS Recovery is complete, it is safe to power off the system.
10. Power off the system, unplug/disconnect the power cord, and remove the chassis panel.
11. Remove the BIOS Recovery jumper from pins 9-10 and store the jumper on pins 11-12.
12. Replace the chassis panel; plug in the power cord(s), and power on the system.
13. Perform a CMOS clear following the BIOS recovery.

Changing the BIOS Language

You can use the BIOS upgrade utility to change the language the BIOS uses for messages and the Setup program. Use a bootable diskette containing the Intel® Flash Utility and language files.

1. Boot the computer with the bootable diskette in drive A. The BIOS upgrade utility screen appears.
2. Select Update Flash Memory From a File.
3. Select Update Language Set. Press <Enter>.
4. Select drive A and use the arrow keys to select the correct .lng file. Press <Enter>.
5. When the utility asks for confirmation that you want to flash the new language into memory, select Continue with Programming. Press <Enter>.
6. When the utility displays the message upgrade is complete, remove the diskette. Press <Enter>.

The computer will reboot and the changes will take effect.

Using the System Setup Utility

The System Setup Utility (SSU) is on the Server Board Resource software CD shipped with the server board. The SSU provides a graphical user interface (GUI) over an extensible framework for server configuration. The SSU framework supports the following functions and capabilities:

- Allows viewing and clearing of the system's critical event log
- Allows the viewing of the system management FRU information
- Allows the viewing of the system management SDR repository

What You Need to Do

The SSU may be run directly from the Server Resource CD (by booting the server system to the CD and selecting "Utilities") or from a set of DOS diskettes.

If you choose to run the SSU from a set of DOS diskettes, you must create the SSU diskettes from the Server Resource CD by booting to the CD and selecting "Create Diskettes." Alternatively, if you have a Windows 95 or Windows NT† workstation, you can insert the CD into that system and create diskettes from the "Utilities" menu of the graphical user interface.

If your diskette drive is disabled, or improperly configured, you must use the flash resident Setup utility to enable it so that you can use the SSU. If necessary, you can disable the drive after you exit the SSU. Information entered using the SSU overrides any entered using Setup.

Running the SSU from the CD

Running the ssu.bat file provided on the SSU media starts the SSU. If the server boots directly from the SSU media, the ssu.bat file is automatically run. If it boots from a different media, the SSU can be started manually or by another application. When the SSU starts in the local execution mode (the default mode), the SSU accepts input from the keyboard and/or mouse. The SSU presents a VGA based Graphical User Interface (GUI) on the primary monitor.

The SSU runs from writable, non-writable, removable, and non-removable media. If the SSU is run from non-writable media, user preference settings (such as screen colors) cannot be saved.

The SSU supports the ROM-DOS V6.22 operating system. It may run on other ROM-DOS-compatible operating systems but they are not supported. The SSU will not operate from a "DOS box" running under an operating system such as Windows.

Starting the SSU

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. The SSU requires the availability of the AF.INI, AF.HLP, plus any .ADN files and their associated .HLP and .INI files.

1. **After creating set of three SSU diskettes from the CD:** Insert the first SSU diskette in drive A, and press the reset button or <Ctrl+Alt+Del> to reboot your server from the diskette. Insert the second diskette when prompted.
2. **Directly from the Server Resource CD:** Insert the Server Resource CD into your CD ROM drive and press the reset button or <Ctrl-Alt-Del> to reboot. When prompted to do so, press <F2> to enter BIOS Setup. From the Boot Menu, select the Boot Device Priority option and then select CD-ROM as your primary boot device. Save those settings and exit BIOS Setup. The server will boot from the CD-ROM and display a menu of options. Follow the instructions in the menu to start the SSU.
3. When the SSU title appears on the screen, press <Enter> to continue.
4. The mouse driver loads if it is available; press <Enter> to continue.
5. This message appears:
   ```
   Please wait while the Application Framework loads....
   ```
6. When the main window of the SSU appears, you can customize the user interface before continuing.

Customizing the SSU

The SSU lets you customize the user interface according to your preferences. 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:** This button lets you change the default colors associated with different items on the screen with predefined color combinations. The color changes are instantaneous.
- **Mode:** This button lets you set the desired expertise level.
  — Novice
  — Intermediate
  — Expert

  The expertise level determines which tasks are visible in the Available Tasks section and what action each task performs. For a new mode setting to take effect, you must exit the SSU and restart it.
- **Language:** This button lets you change the strings in the SSU to strings of the appropriate language. For a new language setting to take effect, you must exit the SSU and restart it.
- **Other:** This button lets you change other miscellaneous options in the SSU. The changes take effect immediately.

To change the interface default values:

Use the mouse to click on the proper button in the Preferences section of the SSU Main window,

Or,

Use the tab and arrow keys to highlight the desired button, and press the spacebar or <Enter>,

Or,

Access the menu bar with the mouse or hot keys (Alt + underlined letter).

✏ **NOTE**

> If you run the SSU from non-writable media (like a CD-ROM), these preferences will be lost when you exit the SSU.

Launching a Task

It is possible to have many tasks open at the same time, although some tasks may 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.

To launch a task:

In the SSU Main window, double-click on the task name under Available Tasks to display the main window for the selected task.

Or,

Highlight the task name, and click on OK.

Or,

Use the tab and arrow keys to highlight the desired button, and press the spacebar or <Enter>.

SEL Manager Add-in

Clicking on the SEL Manager Add-in task brings up the Server Event Log (SEL) viewer. You can load and view the current SEL data stored in the BMC, save the currently loaded SEL data to a file, view previously saved SEL data, or clear the SEL.

When the SEL Manager is first invoked, it loads the System Event Log entries from the server. If there are no SEL entries, a message box is displayed.

The SEL Manager main window is based on a multi-column format. All SEL entries are displayed in this window, one system event per row. Each column can be sorted by clicking on the column heading. The event number is tied to the particular event even if any other column sorts the list. The following keyboard keys are used to scroll the event columns. The F4 key shifts the event columns left, while the F5 key shifts the event columns right.

The SEL Manager has the following menus:

File Menu

The File menu has the following options:

- **Open:** Opens an SEL data file for viewing.
- **Save As:…** Saves the currently loaded SEL data to a file.
- **Exit:** Quits the SEL Viewer.

SEL Menu

The SEL menu has the following options:

- **Properties:** Displays information about the SEL. These fields are display only.
- **Clear SEL:** Clears the SEL entries from the NV storage area and from the SEL Manager main window.
- **Reload:** Reloads the SEL entries from the NV storage area.

Help

The Help menu has the following option:

- **Help Topics:** Displays the help information for the SEL Manager Add-in.

SDR Manager Add-in

Clicking on the SDR Manager Add-in task brings up the Sensor Data Record (SDR) viewer. You can load and view the current SDR data stored in the NV storage area, save the currently loaded SDR data to a file, or view previously saved SDR data. The SDR Manager main window provides access to all the features of the add-in through menus. The F4 key shifts the SDR columns left, while the F5 key shifts the SDR columns right.

The SDR Viewer has the following menus:

File Menu

The File menu has the following options:
- **Open:** Opens an SDR data file for viewing.
- **Save As:** Saves the currently loaded SDR data to a file.
- **Exit:** Quits the SDR Viewer.

SDR Menu

The SDR menu has the following options:
- **Properties:** Displays SDR information from the BMC. These fields are display only.
- **Reload:** Reloads the SDR entries from the server.

Help

The Help menu has the following option:
- **Help Topics:** Displays the help information for the SDR Manager Add-in.

FRU Manager Add-in

Clicking on the FRU Manager Add-in task brings up the Field Replacement Unit (FRU) viewer. You can load and view the current FRU data stored in the NV storage area, save the currently loaded FRU data to a file, or view previously saved FRU data. The FRU Manager main window provides access to all the features of the add-in through menus. The F4 key shifts the FRU columns left, while the F5 key shifts the FRU columns right.

The FRU Viewer has the following menus:

File Menu

The File menu has the following options:
- **Open:** Opens an FRU data file for viewing.
- **Save As:** Saves the currently loaded FRU data to a file.
- **Exit:** Quits the FRU Viewer.

FRU Menu

The FRU menu has the following options:

- **Properties:** Displays FRU information from the BMC. These fields are display only.
- **Reload:** Reloads the FRU entries from the server.

Help

The Help menu has the following option:

- **Help Topics:** Displays the help information for the FRU Manager Add-in.

Exiting the SSU

Exiting the SSU causes all windows to close.

- Exit the SSU by opening the menu bar item File in the SSU Main window.
- Click on Exit,

    Or,
- Highlight Exit, and press <Enter>.

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, SDR, and the SM BIOS (SMB) nonvolatile storage components (EEPROMs). The load utility

- Discovers the product configuration based on instructions in a master configuration file
- Displays the FRU information
- Updates the nonvolatile storage device (EEPROM) associated with the Baseboard Management Controller (BMC) that holds the SDR and FRU area
- Updates the SMB area located in the BIOS nonvolatile storage device
- Generically handles FRU devices that may not be associated with the BMC

When to Run the FRU/SDR Load Utility

You should run the FRU/SDR Load Utility each time you upgrade or replace the hardware in your server, excluding add-in boards, hard drives, and RAM. For example: when you upgrade hardware like adding another processor.

Because the firmware must reload to properly initialize the sensors after programming, turn the server off and unplug/disconnect the power cords from the server. Wait approximately 30 seconds, and plug-in/reconnect the power cords.

What You Need to Do

The FRU/SDR Load Utility may be run directly from the Configuration Software CD or from a diskette you create from the CD. It can be extracted from the CD by booting to the CD and selecting "Make Diskettes" or by inserting the CD into a PC running Windows 95 or NT and selecting the "Utilities" section.

✏ **NOTE**

> If your diskette drive is disabled, or improperly configured, you must use BIOS Setup to enable it. If necessary, you can disable the drive after you are done with the FRUSDR utility.

How You Use the FRU/SDR Load Utility

This utility is compatible with ROM-DOS Version 6.22, MS-DOS† Version 6.22, and later versions. The utility accepts CFG, SDR and FRU load files. The executable file for the utility is frusdr.exe. The utility requires the following supporting files:

- One or more .fru files describing the system's field replaceable units
- A .cfg file describing the system configuration
- A .sdr file describing the sensors in the system

Command Line Format

The basic command line format is

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

Command	Description
frusdr	Is the name of the utility
/? Or /h	Displays usage information
/d {smb, fru, sdr}	Only displays requested area
/cfg filename.cfg	Uses custom CFG file
/p	Pause between blocks of data

Parsing the Command Line

The FRU/SDR Load Utility allows only one command line function at a time. A command line function may consist of two parameters; for example: cfg filename.cfg. Any invalid parameters result in displaying an error message and exiting the program. You can use either a slash (/) or a minus sign (-) to specify command line options. The /p flag may be used in conjunction with any of the other options.

Displaying Usage Information

When the utility is run with the **/?** or **/h** command line flags, the following message is displayed:

```
FRU & SDR Load Utility Version X.XX

Usage:  Frusdr              Is the name of the utility.

        /? Or /h            Displays usage information.

        /d {smb,fru,sdr}    Only displays requested area.

        /cfg filename.cfg   Uses custom CFG file.

        /p                  Pause between blocks of data.
```

Displaying a Given Area

When the utility is run with the **/d** SMB, **/d** FRU, or **/d** SDR command line flag, the indicated area is displayed. Each area represents a sensor; one sensor for each instrumented device in the server. 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.

Displaying SM BIOS Area

The SM BIOS area is displayed in ASCII format when the field is ASCII or as a number when the field is a number. Each SM BIOS area displayed is headed with the SM BIOS area designated name. Each field has a field name header followed by the field in ASCII or as a number.

Displaying FRU Area

The FRU area is displayed in ASCII format when the field is ASCII or as a number when the field is a number. Each FRU area displayed is headed with the FRU area designated name. Each field has a field name header followed by the field in ASCII or as a number. The Board, Chassis, and Product FRU areas end with an END OF FIELDS CODE that indicates there is no more data in this area. The Internal Use area is displayed in hex format, 16 bytes per line.

Displaying SDR Area

The SDR nonvolatile storage area is displayed in the following hex format. A Sensor Record Number X header separates the data; where X is the number of that sensor record in the SDR area. The next line after the header is the sensor record data in hex format delineated by spaces. Each line holds up to 16 bytes. The data on each line is followed by the same data in ASCII format; nonprintable characters are substituted by a period (.).

Using Specified CFG File

The utility can be run with the command line parameter of **-**cfg filename.cfg. The filename can be any DOS accepted, eight-character filename string. The utility loads the specified CFG file and uses the entries in the configuration file to probe the hardware and to select the proper SDRs to load into nonvolatile storage.

Displaying Utility Title and Version

The utility displays its title :

```
FRU & SDR Load Utility, Version X.XX
```

Where X.XX is the revision number for the utility.

Configuration File

The configuration file is in ASCII text. The utility executes commands formed by the strings present in the configuration file. These commands cause the utility to perform various tasks needed to ultimately load the proper SDRs into the nonvolatile storage of the BMC and possibly generic FRU devices. Some of the commands may be interactive and require you to make a choice.

Prompting for Product Level FRU Information

Through the use of a Configuration File, the utility may prompt you for FRU information.

Filtering Sensor Data Record From the SDR File

The MASTER.SDR file has all the possible SDRs for the system. These records may need to be filtered based on the current product configuration. The configuration file directs the filtering of the SDRs.

Updating the SDR Nonvolatile Storage Area

After the utility validates the header area of the supplied SDR file, it updates the SDR repository area. Before programming, the utility clears the SDR repository area. The SDR file is loaded via the .cfg File. Then the utility filters all tagged SDRs depending on the product configuration set in the Configuration File. Non-tagged SDRs are automatically programmed. The utility also copies all written SDRs to the SDR.TMP file. It contains an image of what was loaded, and the TMP file is also useful for debugging the server.

Updating FRU Nonvolatile Storage Area

After the configuration is determined, the utility updates the FRU nonvolatile storage area. First it verifies the Common Header area and checksum from the specified FRU file. The Internal Use Area is read out of the specified .FRU file and is programmed into the nonvolatile storage. The Chassis, Board, Product and MultiRecord areas are read out of the specified .FRU file, if they exist, then those areas are programmed into the FRU nonvolatile storage. All the areas are also written to the FRU.TMP file, which is useful for debugging the server.

Updating SMB FRU Nonvolatile Storage Area

After programming the BMC FRU area, the corresponding SMB fields are automatically updated when the server is re-booted.

Cleaning Up and Exiting

If an update was successfully performed, the utility displays an appropriate message and then exits with a DOS exit code of zero.

If the utility fails, it immediately exits with an error message and a non-zero DOS exit code.

Using the Firmware Update Utility

The Firmware Update Utility is a DOS-based program used to update the Baseboard Management Controller's firmware code. You only need to run the Firmware Update Utility if new firmware code becomes necessary.

Making a BMC Firmware Update Diskette

1. Place a formatted diskette into the diskette drive.
2. Extract the contents of the TSRMT2_BMC_FW.EXE file onto the diskette. There is no need to make the diskette bootable; this is done automatically when the files are extracted to the diskette.

Updating the BMC Firmware

1. Place the diskette containing the BMC Firmware update files into the diskette drive of your system. Boot the system while the diskette is in the drive.
2. The following prompt will appear:

   ```
   1.  Single Fault LED (v11.17) Update

   2.  Dual Fault LED (v01.17) Update

   3.  Exit

   Please choose from the above selections [1, 2, or 3].


   Select the BMC Firmware version depending on which chassis you are using with
   the TSRMT2 server board:

   BMC Firmware v.11.17 is for use with chassis that have a single front panel
   fault LED that is the logical combination of the power fault LED and the fan
   fault LED.  BMC Firmware v.11.17 should be used with the SC5000 and SR2050
   server chassis.

   BMC Firmware v.1.17 is for use with chassis that have a two discrete front
   panel fault LEDs, in other words, a separate fault LED for power fault and a
   separate fault LED for fan fault.
   ```

3. Press "1" or "2" depending on the chassis you are using with the TSRMT2 server board.
4. The BMC Firmware update will start automatically. Do not power down the system during the BMC Firmware Update process! When the BMC Firmware update is successfully completed, the system is powered OFF automatically. This is normal operation. Remove the diskette from the diskette drive.
5. Power on the system. During boot, confirm that the BMC Firmware update was completed successfully by checking that the new BMC Firmware version is displayed. For example:

   ```
   Base Board Management Controller

   IPMI Version:1.0     Firmware version:01.17
   ```

Making a FRU/SDR File Update Diskette

1. Place a formatted diskette in the diskette drive.
2. Extract the contents of the FRU/SDR file onto the diskette. There is no need to make the diskette bootable; this is done automatically when the files are extracted to the diskette.

Updating the FRU/SDR Files

1. Place the diskette containing the BMC FW update files into the diskette drive of your system. Boot the system while the diskette is in the drive.
2. The following prompt will appear:

   ```
   Select the Chassis that you have:

   TSRMT2

   TSRMT2

   Exit
   ```
3. Select the option for your chassis.
4. The following prompt will appear:

   ```
   Select the function you wish to perform:

   Update FRUs and the SDR repository

   Update just the SDR repository

   Modify the Asset Tag

   Exit

   For a standard update, select option 1 to update the FRUs and the SDR
   repository.
   ```
5. Answer the questions on the screen to update the SDR repository appropriately for your chassis configuration.
6. When the update is complete, you will be returned to the DOS prompt. Remove the diskette from the diskette drive.
7. Reboot the system to complete the update process.

Using the Adaptec SCSI Utility

The Adaptec SCSI utility detects the SCSI host adapters on the server board. The utility runs out of the BIOS and is used to

- Change default values
- Check and/or change SCSI device settings that may conflict with those of other devices in the server

Running the SCSI Utility

1. When this message appears on the video monitor:

   ```
   Press Ctrl-A to run SCSI Utility...
   ```

2. Press <Ctrl+A> to run this utility. When it appears, choose the host adapter that you want to configure.

Another Adaptec utility that is available on the TSRMT2 Resource CD is the Adaptec EZ SCSI utility. It is to be installed from diskettes onto a DOS or Windows operating system.

Part II: Service Technician's Guide

4   Upgrading the Hardware

5   Upgrading the Chassis

6   Technical Reference

This section describes procedures that **REQUIRE** internal server access. You must be a qualified service technician to perform procedures listed in the *Service Technician's Guide*.

⚠ **WARNING**

> **Only a QUALIFIED SERVICE TECHNICIAN is authorized to remove the server covers and to access any of the components inside the server. Before removing the covers, see "Safety: Before You Remove Server Covers" on page 68 and "Warnings and Cautions" on page 69.**

⚠ **WARNING**

> **Do not attempt to modify or use an AC power cord that is not the exact type required. You must use a power cord that meets the following criteria:**
>
> 1. **Rating: For U.S./Canada cords must be UL Listed/CSA Certified type SJT, 18-3 AWG. For outside U.S./Canada cords must be flexible harmonized (<HAR>) or VDE certified cord with 3 x 0.75 mm conductors rated 250 VAC.**
> 2. **Connector, wall outlet end: Cords must be terminated in grounding-type male plug designed for use in your region. It must have certification marks showing certification by an agency acceptable in your region and for U.S. must be rated 125% of overall current rating of the server.**
> 3. **Connector, server end: The connector that plugs into the AC receptacle on the server must be an IEC 320, sheet C19, type female connector.**
> 4. **Cord length and flexibility: Cords must be less than 4.5 meters (14.76 feet) long.**
> 5. **Only use a screwdriver tip to push in the lock tabs on the rack slides. A pinch hazard exists if fingers are used for this purpose.**

⚠ **WARNING**

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

Overcurrent protection: The server is designed for an AC line voltage source with up to 20 amperes of overcurrent protection. If the power system for the equipment rack is installed on a branch circuit with more than 20 amperes of protection, you must provide supplemental protection for the server. If more than one server is installed in the rack, the power source for each server must be from a separate branch circuit. The overall current rating of a server configured with two power supplies is less than 3 amperes.

⚠ **CAUTION**

Temperature: The operating temperature of the server, when installed in an equipment rack, must not go below 5 °C (41 °F) or rise above 40 °C (104 °F). Extreme fluctuations in temperature can cause a variety of problems in your server.

Ventilation: The equipment rack must provide sufficient airflow to the front of the server to maintain proper cooling. The rack must also include ventilation sufficient to exhaust a maximum of 1023 BTU's per hour for the server. The rack selected and the ventilation provided must be suitable to the environment in which the server will be used.

⚠ **WARNING**

Do not attempt to modify or use an AC power cord that is not the exact type required. You must use a power cord that meets the following criteria:

1. **Rating: For U.S./Canada cords must be UL Listed/CSA Certified type SJT, 18-3 AWG. For outside U.S./Canada cords must be flexible harmonized (<HAR>) or VDE certified cord with 3 x 0.75 mm conductors rated 250 VAC.**

2. **Connector, wall outlet end: Cords must be terminated in grounding-type male plug designed for use in your region. It must have certification marks showing certification by an agency acceptable in your region and for U.S. must be rated 125% of overall current rating of the server.**

3. **Connector, server end: The connector that plugs into the AC receptacle on the server must be an IEC 320, sheet C19, type female connector.**

4. **Cord length and flexibility: Cords must be less than 4.5 meters (14.76 feet) long.**

4 Upgrading the Hardware

Tools and Supplies Needed

Procedures in this section require the following tools and supplies:

- Jumper-removal tool or needle-nosed pliers
- Small flat-bladed screwdriver
- Phillips† (cross-head) screwdriver (#2)
- Pen or pencil
- Anti-static wrist strap and conductive foam pad (recommended)
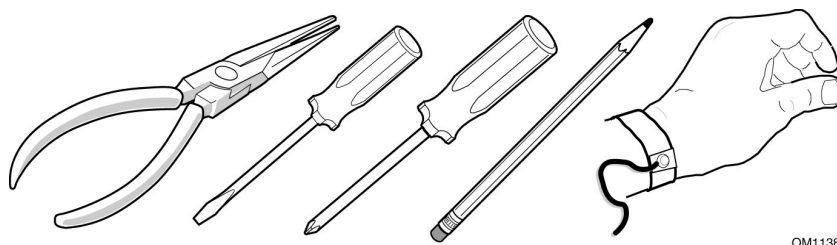
OM11389

Figure 11. Tools and Supplies Needed

Equipment log: as you integrate new parts into the system, add information about them to your equipment log (Appendix B). Record the model and serial number of the system, all installed options, and any other pertinent information specific to the system.

Cautions

These warnings and cautions apply throughout this chapter. Only a technically qualified person should configure the server hardware.

⚠ **CAUTIONS**

System power on/off: The power button DOES NOT switch off system power. To remove power from the system, you must unplug/disconnect the power connections. Make sure power connections are unplugged/disconnected before you open the chassis, add, or remove any components.

Hazardous conditions, devices and cables: Hazardous electrical conditions may be present on power, telephone, and communication cables. Turn off the server and disconnect the power cord, telecommunications systems, networks, and modems attached to the server before opening it. Otherwise, personal injury or equipment damage can result.

Electrostatic discharge (ESD) and ESD protection: ESD can damage disk drives, boards, and other parts. We recommend that you perform all procedures in this chapter only at an ESD workstation. If one is not available, provide some ESD protection by wearing an antistatic wrist strap attached to chassis ground (any unpainted metal surface) on your server when handling parts.

ESD and handling boards: Always handle boards carefully. They can be extremely sensitive to ESD. Hold boards only by their edges. After removing a board from its protective wrapper or from the server, place the board component side up on a grounded, static free surface. Use a conductive foam pad if available but not the board wrapper. Do not slide board over any surface.

Working Inside the System

This section presents the following procedures that describe removal and installation of most components inside the system.

Safety: Before You Remove Server Covers

Before removing covers at any time to work inside the system, observe these safety guidelines.
1. Turn off all peripheral devices connected to the system.
2. Power down the system by pressing and holding the Power button on the front of the chassis for several seconds. After the server shuts down, unplug/disconnect the power cord to remove standby power from the server.
3. Label and disconnect all peripheral cables and all telecommunication lines connected to I/O connectors or ports on the back of the system.

Provide electrostatic discharge (ESD) protection by wearing an anti-static wrist strap attached to chassis ground of the system-any unpainted metal surface-when handling components.

Warnings and Cautions

These warnings and cautions apply whenever you remove covers of the system. Only a technically qualified person should integrate, configure, or service the system.

⚠ **WARNINGS**

Power Button: **Shutting down the server with the Power button on the front of the chassis DOES NOT remove all power from the system. To remove all power from system, you must also unplug/disconnect the power cord from the system. Unplugging/disconnecting the power cord from the system removes the +12 Volt standby power that is present when the server is powered down.**

Hazardous conditions, power supply: **Hazardous voltage, current, and energy levels are present inside the power supply. There are no user-serviceable parts inside the power supply; technically qualified personnel should do servicing.**

Hazardous conditions, devices, and cables: **Hazardous electrical conditions may be present on power, telephone, and communication cables. Turn off the system and unplug/disconnect the power cord, telecommunications systems, networks, and modems attached to the system before opening it. Otherwise, personal injury or equipment damage can result.**

Hazardous conditions, processors and power supplies: **Thermal conditions may be present in the Processor/Memory Complex. Allow all fans to continue to run until they shut down on their own after power has been turned off. After the fans stop, you can unplug/disconnect the power cord.**

⚠ **CAUTIONS**

Electrostatic discharge (ESD) and ESD protection: ESD can damage disk drives, boards, and other parts. We recommend that you do all procedures in this section only at an ESD-protected workstation. If one is not available, provide some ESD protection by wearing an anti-static wrist strap attached to chassis ground—any unpainted metal surface—on your system when handling parts.

ESD and handling boards: Always handle boards carefully. They can be extremely sensitive to ESD. Hold boards only by their edges. After removing a board from its protective wrapper or from the system, place it on a grounded surface free of static electricity. Do not slide boards over any surface.

Cooling and airflow: For proper cooling and airflow, always install the chassis covers before turning on the system. Operating the system without the covers in place can damage system parts.

Removing the Bezel and Top Cover

⚠ CAUTION

For proper cooling and airflow, do not operate the server with the cover removed. Always reinstall the cover before turning the server on.

To remove the top cover, follow this procedure:

1. Loosen the two captive screws on the front panel and remove the bezel (A in Figure 12).
2. Remove the two screws securing the front of the top cover (B in Figure 12).
3. Lift the front edge of the top cover (C in Figure 12) and push the cover toward the back of the server (D in Figure 12) until free of the rear lip.
4. Lift the top cover up to remove.
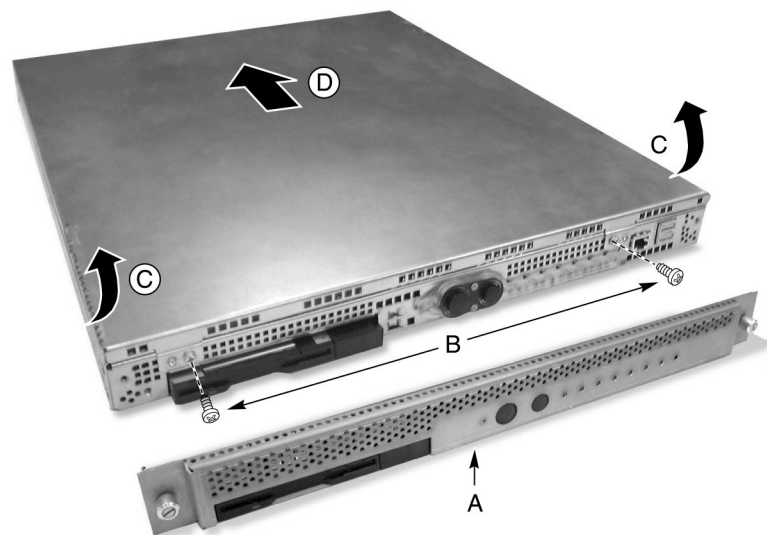
OM12849

Figure 12. Removing the Top Cover and Bezel Assembly

Internal Chassis Layout

The server board contains connectors for installing up to two Pentium III processors utilizing the FCPGA sockets. The server board has six DIMM slots and supports up to 6 GB error checking and correcting (ECC) SDRAM memory. The server board also contains two PCI slots (implemented via riser cards), input/output (I/O) ports and various controllers.

OM13110
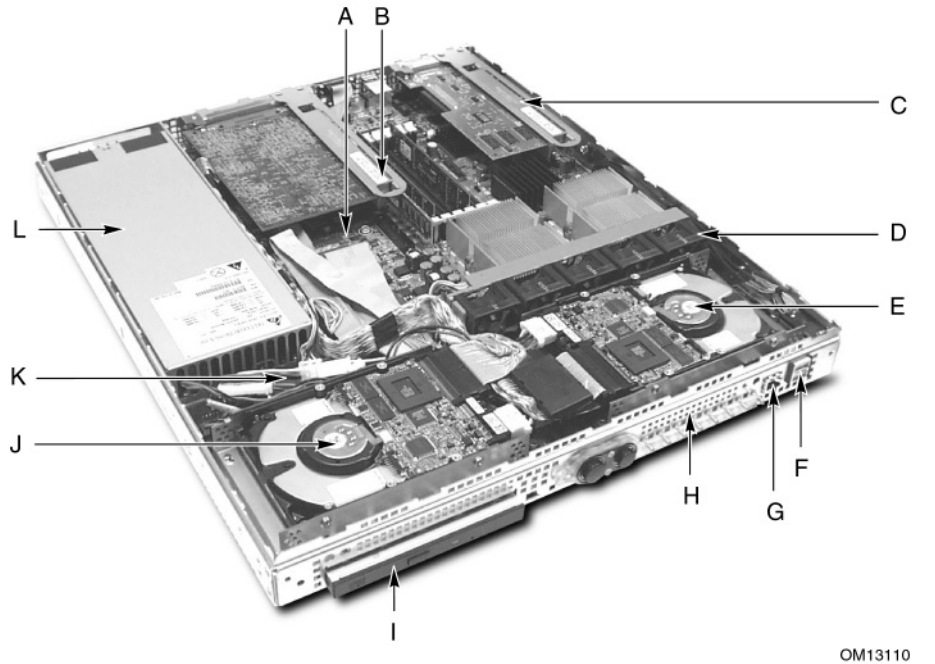
A	Server board	G	Serial port
B	5 V PCI add-in card riser	H	Front panel board (located beneath right HDD)
C	3.3 V PCI add-in card riser	I	Peripheral drive bay
D	Fan module	J	SCSI hard disk drive (left)
E	SCSI hard disk drive (right)	K	Power board (located beneath cables)
F	USB connectors	L	Power supply

Figure 13. Internal Chassis Layout

The server board is mounted horizontally toward the rear of the chassis behind the system fan array. Up to two 1.0-inch SCSI Ultra160 hard drives can be mounted in the chassis.

Underneath the left side hard drive is located the peripheral bay. The server is normally supplied with a slim-line (1/2-inch) CD-ROM drive. Optionally a slim-line (1/2-inch) floppy drive may be installed in place of the CD-ROM drive.

The front panel is located below the right side hard drive and provides user interface for system management.

Replacing a PCI Add-in Card

To replace a PCI add-in card in either the full-height or half-height riser, follow this procedure:

1. Grip the riser card and lift upward to unplug the riser card and remove.
2. Release the PCI add-in card hold-down bracket.
3. Unplug the PCI add-in card from the riser card.

Replacing the Power Supply Module

To replace an AC or DC power supply, follow this procedure:

1. Remove the bezel and top cover.
2. Lift up the rear edge of the power supply slightly and slide it back (A in Figure 14) until the power supply connector disengages from the power board.
3. Lift up the front edge of the power supply (B in Figure 14) and slide it forward (C in Figure 14).
4. Lift the power supply out of the chassis.
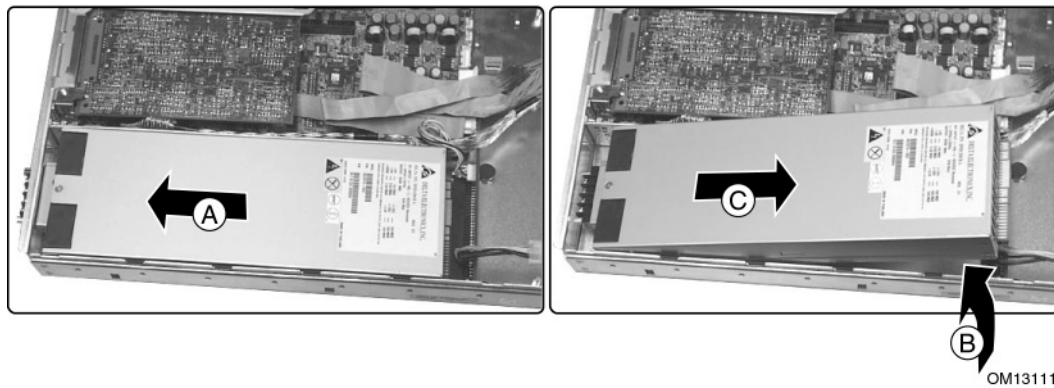
Figure 14. Power Supply Module Replacement

Replacing the Fan Module

To replace the fan module, follow this procedure:

1. Disconnect the fan module's power cable from the server board.
2. Press in on the plastic catch (A in Figure 15) to release the fan module.
3. Swing the fan module upward (B in Figure 15) and lift it out of the chassis.
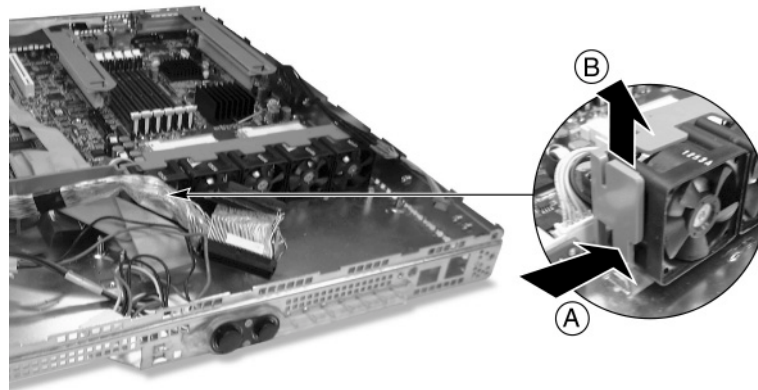
OM13112

Figure 15. Fan Module Replacement

✏ **NOTE**

When replacing the fan module, verify that the chassis attachment point and the mating notch on the end of the fan module opposite the latch have fully engaged.

Replacing the Hard Disk Drives

To replace a hard disk drive, follow this procedure:

1. Remove the bezel and top cover.
2. Unplug the signal cables (A in Figure 16) and power cables (B in Figure 16) from one or both hard disk drives.
3. Remove the securing screws (C in Figure 16) from the hard disk drive carriers and slide in the directions indicated (D in Figure 16) to release from the keyhole standoffs.
4. Lift out the hard disk drives (E in Figure 16) and place on a clean, static-free work surface.
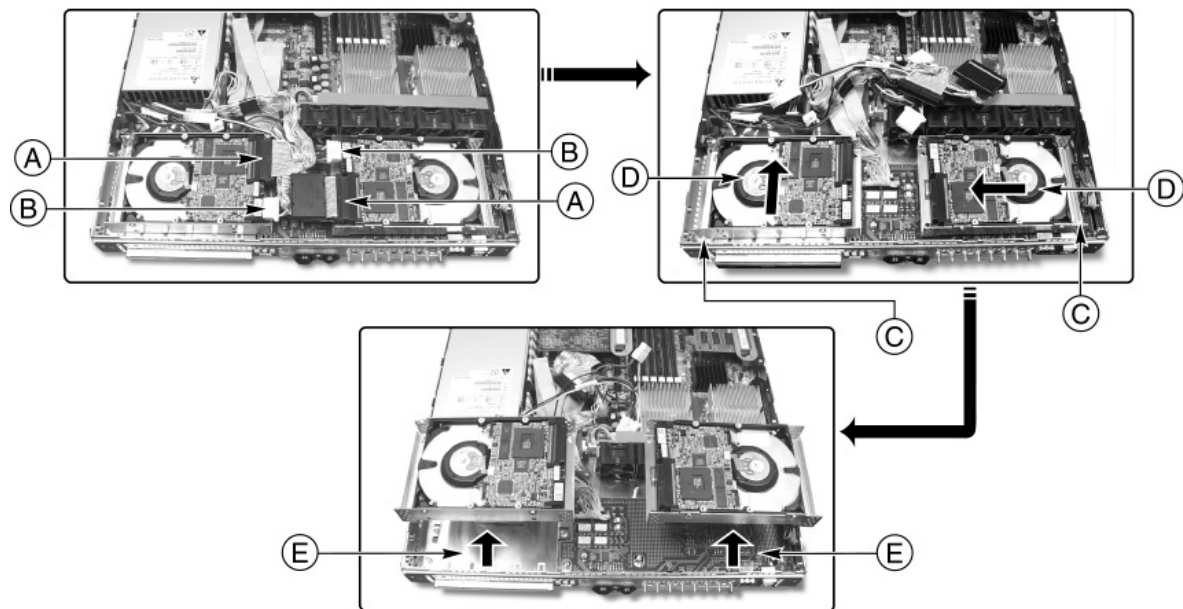
OM13113

Figure 16. Removing a Hard Disk Drive

Disassembling the Hard Disk Drive Carrier

1. Turn the hard disk drive carrier so that component side of the drive is face up.
2. In this position, the bottom edge of the sheet metal is aligned with the top of the drive and allows for easy removal and replacement of four retaining screws.

Removing and Installing Memory

The server board supports only PC133-compliant SDRAM. Install from 128 MB to 6 GB of registered memory, using up to six single- or double-banked DIMMs.

DIMMs must be installed in pairs in the following order: 1A-1B, 2A-2B, and 3A-3B as shown in Figure 17. The DIMM sockets are further identified on the board's silkscreen.

Installed DIMMs must be the same speed and must all be registered. For a list of supported memory, call your service representative or visit the Intel Support website.
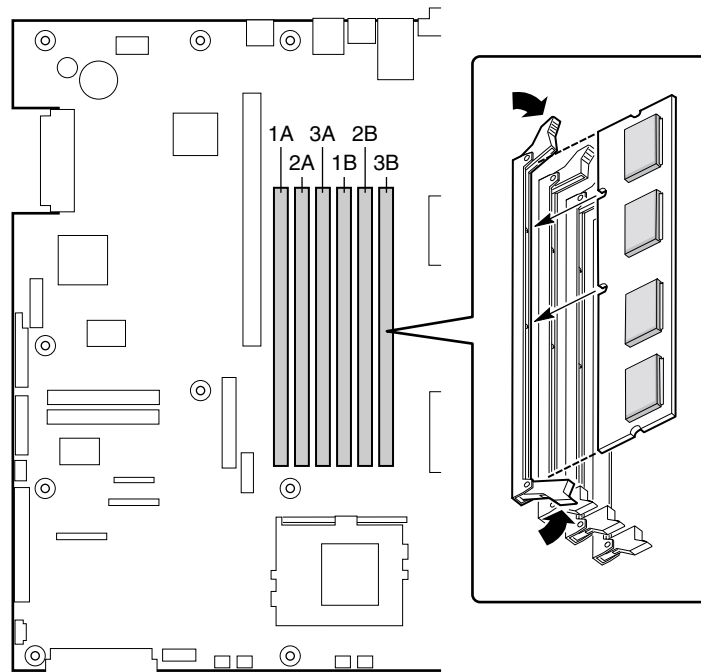
OM11790

Figure 17. Installing DIMMs

Removing and Installing Processors

⚠️ **WARNING**

If the server has been running, any installed processor and heat sink on the processor board(s) will be hot. To avoid the possibility of a burn, allow the unit to cool-down and be careful when removing or installing server board components that are located near processors.

⚠️ **CAUTIONS**

Processor must be appropriate: You may damage the server if you install a processor that is inappropriate for your server. Make sure your server can handle a newer, faster processor (thermal and power considerations). For exact information about processor interchangeability, contact your customer service representative.

ESD and handling processors: Reduce the risk of electrostatic discharge (ESD) damage to the processor by doing the following: (1) Touch the metal chassis before touching the processor or server board. Keep part of your body in contact with the metal chassis to dissipate the static charge while handling the processor. (2) Avoid moving around unnecessarily.

Retail boxed processor's fans and heatsink clips: If installing a retail boxed processor, do not use the retail boxed processor's fan (the server uses internal fans to cool the processors) or the plastic heatsink clip (not NEBS certified). You should order MM# 837176/PID# THLSNKCLP01 which contains the correct parts.

Adding or Replacing a Processor

If you are adding a second processor to your system, you must first remove the terminator from the secondary processor socket. The second processor must be compatible with the first processor (within one stepping, same voltage, same speed, see the Intel support website for details).

1. Observe the safety and ESD precautions at the beginning of this chapter.
2. Remove the top cover.
3. Remove any PCI cards that may obscure the processors.
4. Raise the locking bar on the processor socket and remove the terminator as shown in Figure 18.
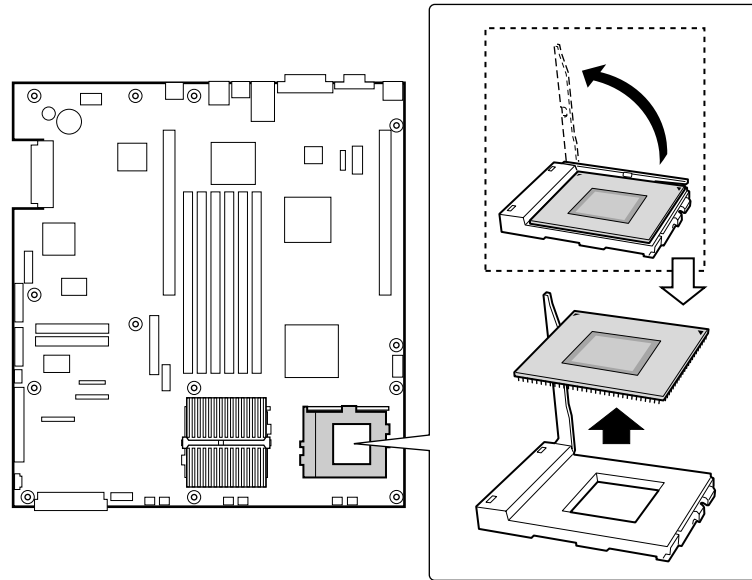
OM11814

Figure 18. Raising the Locking Bar and Removing the Terminator

5. Using Figure 19 as a guide, align the corner mark on the processor with the corner mark on the socket and insert the processor into the socket. Lower the locking bar completely and verify that it has fully latched.
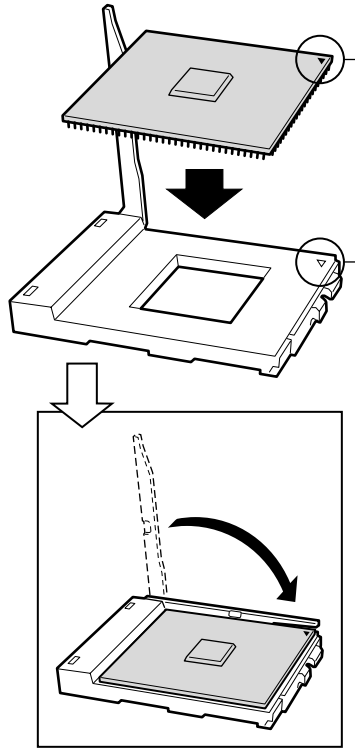
OM11789

Figure 19. Inserting the Processor and Lowering the Locking Bar

6. Following the instructions packaged with the applicator, apply thermal grease to the processor.
7. Align the processor and heatsink (D in Figure 20) so that the raised areas can make full contact when assembled (the blades of the heatsink should point toward the fans).
8. Place the heatsink (B in Figure 20) on top of the processor (A in Figure 20).
9. Hook the heatsink retention clip (C in Figure 20) to one end of the processor socket. Using a screwdriver or other tool, attach the other side of the clip to the other side of the processor socket.
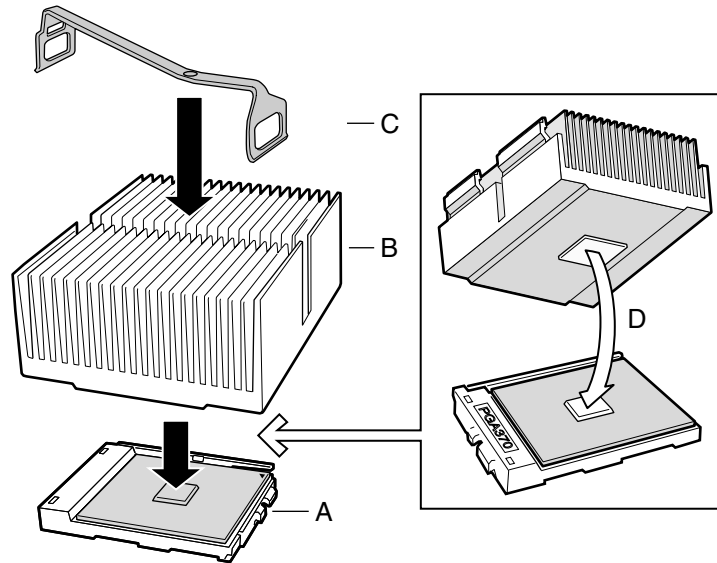
OM14562

Figure 20. Aligning the Heatsink and Installing the Heatsink Retaining Clip

Removing a Processor

1. Observe the safety and ESD precautions at the beginning of this chapter and the additional cautions given here.
2. Detach the heatsink-retaining clip from the processor socket using a screwdriver or other tool as shown in Figure 21.
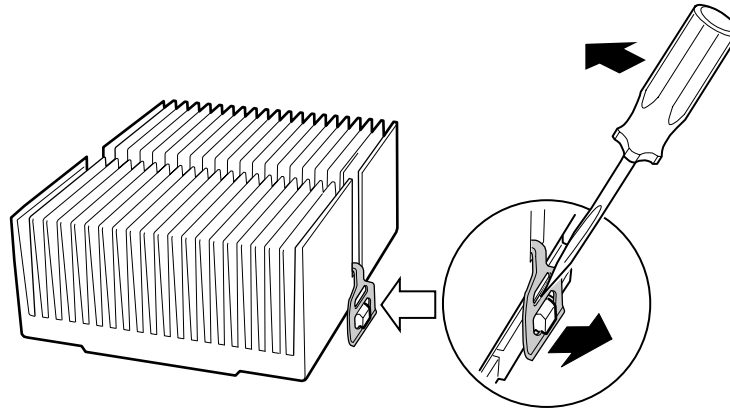
OM12827

Figure 21. Unlatching the Heatsink Retaining Clip (Shown from Power Supply Side)

3. Remove the heatsink from the processor.
4. Raise the locking bar on the socket as shown in Figure 22.
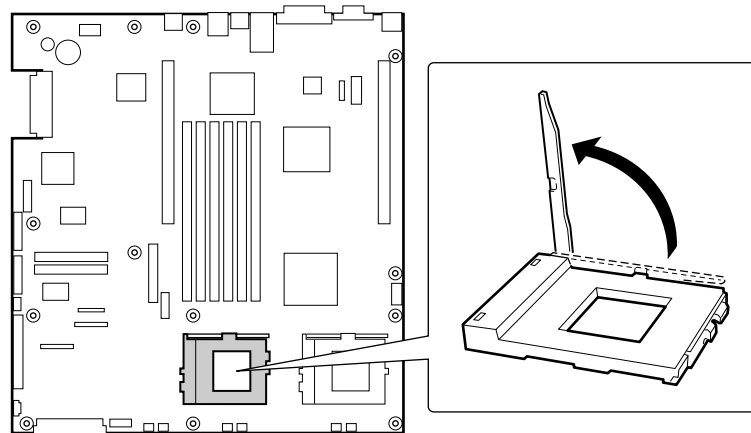
OM11788

Figure 22. Raising the Locking Bar on the Processor Socket

5. Remove the processor from the socket.
6. If you removed the processor from the secondary socket and are not replacing it, you must install a terminator in its place.

Installing or Removing a Terminator

1. Observe the safety and ESD precautions at the beginning of this chapter and the additional cautions given here.
2. Raise the locking bar (B in Figure 23) on the socket (A in Figure 23).
3. Align the corner marks on the terminator (C in Figure 23) along the locking bar side of the processor socket.
4. Place the terminator into the socket.
5. Lower the locking bar (D in Figure 23) until it latches to the side of the processor socket.
6. Perform these steps in reverse to remove the terminator.
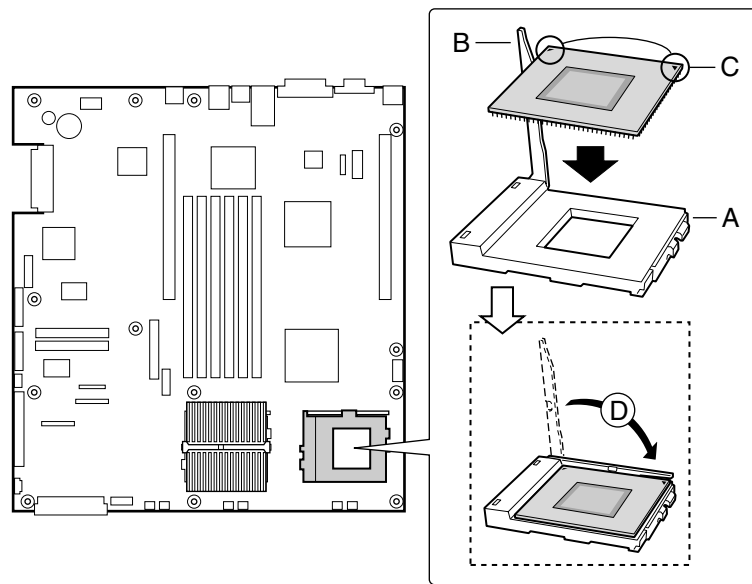
OM11787

Figure 23. Installing a Terminator

Replacing 3.3 Volt or 5 Volt PCI Add-in Cards

The server supports two types of PCI riser boards: 3.3 Volt and 5 Volt. The 5 Volt PCI riser supports a full-length, full-height 64-bit 33 MHz PCI add-in card. The 3.3 Volt PCI riser supports a low profile, half-length, 64-bit, 66 MHz PCI add-in card.

To replace a 3.3 V or 5.0 V add-in card, follow this procedure:

1. Lift the 3.3 V or 5.0 V PCI card retainer bracket up to unplug the riser board from the server board.
2. Insert or remove a PCI add-in card. Make sure that the add-in card fully seats in the riser card.
3. Replace the PCI retainer bracket. Make sure that the riser card fully seats in the server board.

Replacing the CD-ROM Drive

To replace the CD-ROM drive, see CD-ROM and Floppy Disk Drive Installation on Page 127.

Replacing the Backup Battery

The lithium battery on the server board 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) may be wrong. Contact your customer service representative or dealer for a list of approved devices.

⚠ **WARNING**

> **Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the equipment manufacturer. Discard used batteries according to 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 backup battery, follow this procedure:

1. Observe the safety and ESD precautions at the beginning of this chapter.
2. Remove the top cover and locate the backup battery on the server board (see Figure 24).
3. Insert the tip of a small flat bladed screwdriver, or equivalent, under the tab in the plastic retainer. Gently push down on the screwdriver to lift the battery.
4. Remove the battery from its socket.
5. Dispose of the battery according to local ordinance.
6. Remove the new lithium battery from its package, and, being careful to observe the correct polarity, insert it in the battery socket.
7. Reinstall the plastic retainer on the lithium battery socket.
8. Replace the top cover.
9. Run Setup to restore the configuration settings to the RTC.
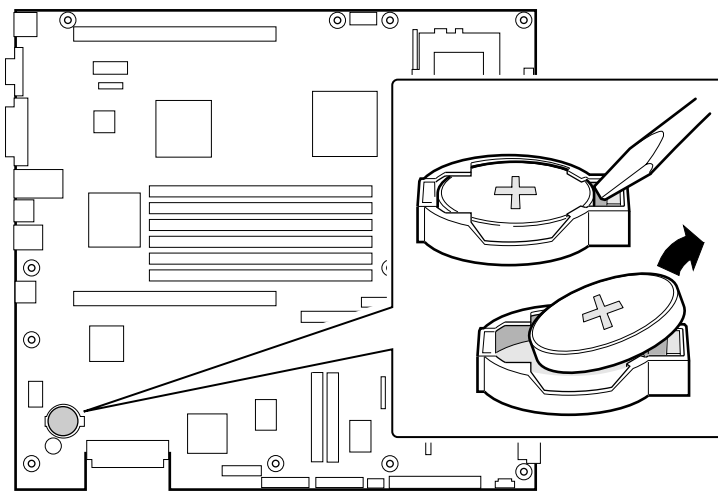
OM12830

Figure 24. Replacing the Backup Battery

5 Upgrading the Chassis

Replacing the Server Board

To remove the server board, follow this procedure:

1. Remove the power supply.
2. Remove the 3.3 Volt and 5 Volt riser boards and any installed PCI cards and place them on a clean, static-free surface.
3. Remove the heatsink(s) and processor(s) from the server board and place them on a clean, static-free surface.
4. Disconnect the cables attached to the board (see Figure 25) and fold them clear of the board.
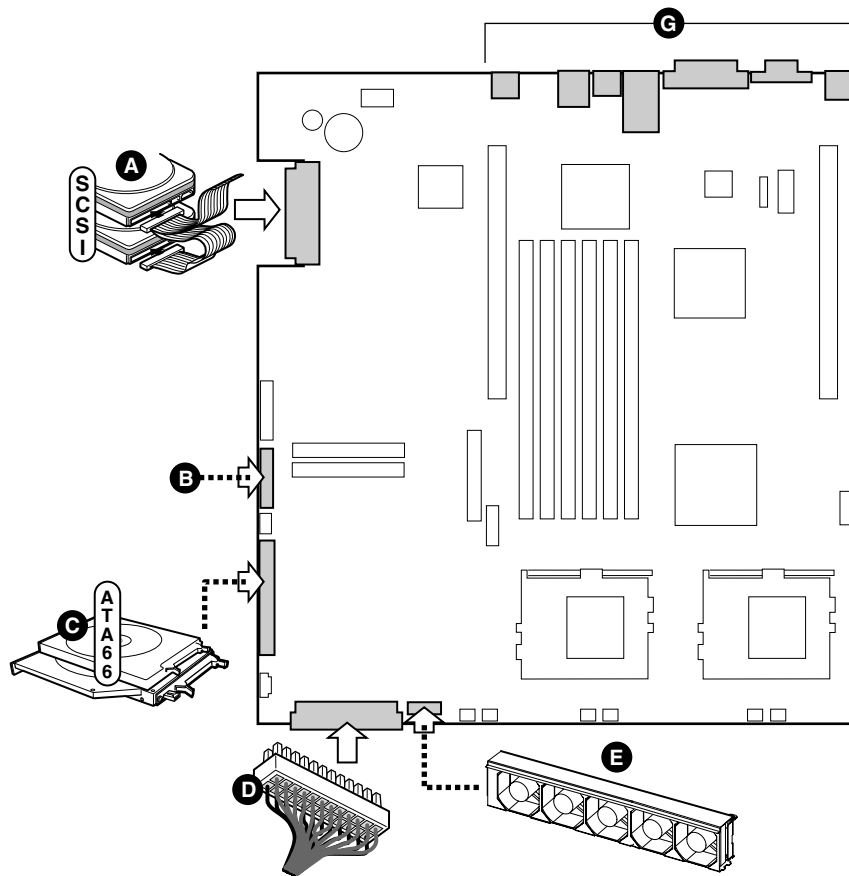
OM12865

Figure 25. Disconnecting the Server Board Cabling

5. Remove the server board securing screws indicated in Figure 26.
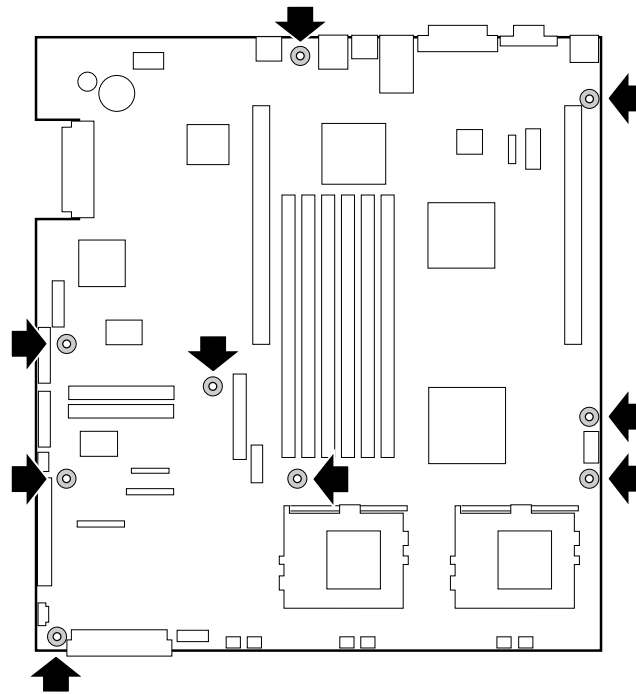
OM12832

Figure 26. Removing the Server Board Retaining Screws

6. As you lift the board out of the chassis, angle the front edge upward enough to clear the power board bumpers (see Figure 27) and slide the board forward to release the rear panel connectors from the I/O shield. Place the server board on a clean, static-free work surface.
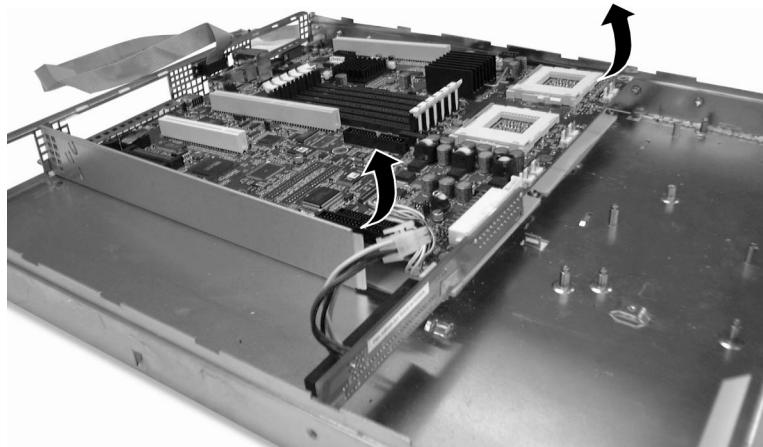
OM12863

Figure 27. Removing the Server Board from the Chassis

7. Disconnect the plug (A in Figure 28) from the server board connector (B in Figure 28).
8. Unplug the power board (C in Figure 28) from the server board's power connector (D in Figure 28).
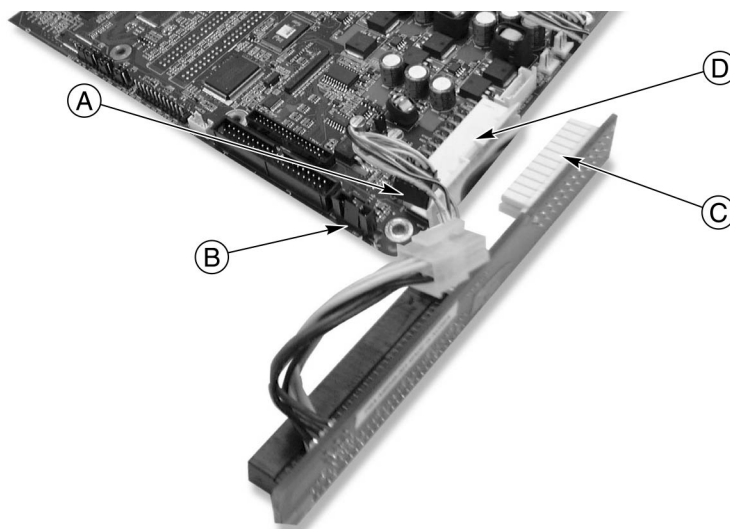
OM12862

Figure 28. Removing the Power Board from the Server Board

Replacing the Front Panel Board

To replace the front panel board, follow this procedure:

1. Disconnect the USB, alarms, and front panel signal cables (A in Figure 29) from the front panel board.
2. Remove the screw securing the front panel board to the front panel (B in Figure 29).
3. Slide the front panel board in the direction of the arrow (C in Figure 29) to release from the keyhole standoffs.
4. Lift out the front panel board and place it on a clean, static-free work surface.
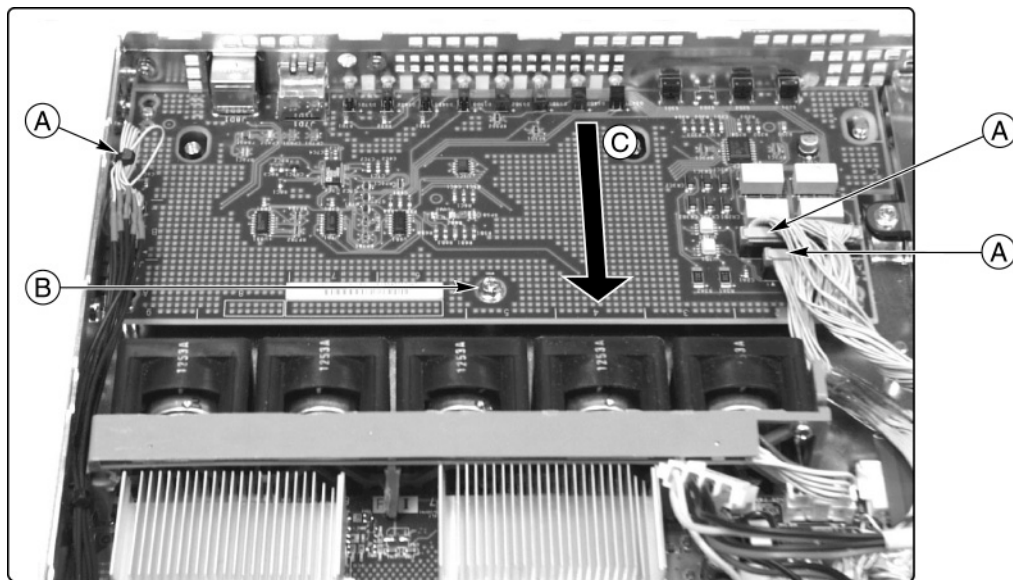
OM13118

Figure 29. Front Panel Board Removal

6 Technical Reference

This section includes:
* Connector pinouts
* Information on jumpers

Connectors

This section describes certain I/O interface connectors of the TSRMT2 server system.

Serial Port Connector (Front Panel)

An RJ45 connector on the front panel located behind the bezel supplies a serial interface (see Table 14). The interface may be used for either an emergency management port (EMP) for "Crash Cart" or PC-to-PC connection, or as a normal serial port. The front panel serial port does not support modem operation as it lacks a RI (Ring Indicate) signal.

If the system is configured for both back and front panel serial port operation, by default the back panel connector is enabled and the front panel connector is disabled. Plugging a cable into the front panel connector disables the back panel connector and enables the front panel connector (if pins 4 and 5 are connected together).

Figure 30 shows the front panel serial port's connector.
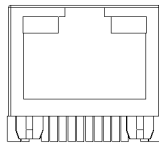
Figure 30. Front Panel Serial Port Connector

Table 14.   Front Panel Serial Port Connector Pinout

Pin	Signal	Description
1	RTS	Request to send
2	DTR	Data terminal ready
3	TXD	Transmit data
4	GND	Ground
5	No Connection	No Connection
6	RXD	Receive data
7	DSR/DCD	Date set ready / data carrier detect[1]
8	CTS	Clear to send

[1] Use jumper on server board to select

USB Connectors (Front Panel)

The server board provides two USB ports located behind the bezel. The built-in USB ports permit the direct connection of two USB peripherals without an external hub. If more devices are required, you may connect an external hub to either of the built-in ports.

Alarms

The alarms port interface is a standard DB15-pin connector (see Figure 31). This connector allows remote display of alarm conditions. Each alarm (Major, Minor, Critical and Power) is the output of a STDT relay contact. A common contact with normally open and normally closed connections is included. Power alarm has just common and normally open contact outputs. The major and minor alarms contain external reset circuits. Table 15 gives the pinout of the telco alarms connector.

⚠ **CAUTION**

Do not apply more than 60 Volts (maximum) to any pin or combination of pins on the Telco Alarms connector.
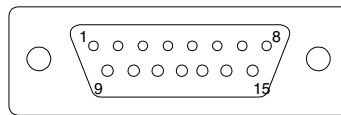
Figure 31. 15-pin Alarms Connector

Table 15.   Alarms Connector Pinout

Pin	Description	Pin	Description
1	Minor reset, positive	9	Minor alarm, normally closed
2	Minor reset, negative	10	Minor alarm, common
3	Major reset, positive	11	Major alarm, normally open
4	Major reset, negative	12	Major alarm, normally closed
5	Critical alarm, normally open	13	Major alarm, common
6	Critical alarm, normally closed	14	Power alarm, normally open
7	Critical alarm, common	15	Power alarm, common
8	Minor alarm, normally open		

DC Power Input for DC-Input Power Supply Cage

A DC power terminal block is provided at the rear of the DC-input power supply cage. It is recommended to use appropriately sized power wire and DC mains.

OM13119
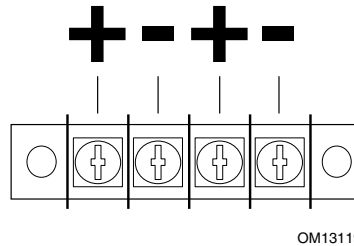
Figure 32. DC Power Input Connector

The terminal block will accept standard terminal lugs size Newark[†] stock # 81N1501 type CRS-T0-1406-HT that accept 14 AWG wire gauge. The width (W in Figure 33) of the lug can be no larger than 0.25 inches.

Figure 33. DC Power Terminal Lug

To connect the earth ground or power conductors to the chassis studs:
1. Place a #8-32 nut on the chassis stud and tighten to 10 in-lb.
2. Place the earth ground or power wire terminal lug on the chassis stud.
3. Place another #8-32 nut on the chassis stud so that the earth ground wire terminal is between the two nuts and tighten the second nut to 10 in-lb.

Serial Port (Back Panel)

An RJ45 connector on the back panel I/O supplies a serial interface (see Table 16). The interface may be used either as an emergency management port (EMP) or as a normal serial port. As an EMP, COM2 is used as a communication path by the server management software that provides a level of emergency management through an external modem. Table 16 describes the serial port's connections.
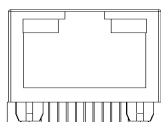
Figure 34. Serial Port

The rear serial port is a fully functional COM port and will support any standard serial device as well as providing support for serial concentrators, which typically support RJ45 serial connectors. For those server applications that use a serial concentrator to access the server management features of the baseboard, a standard 8-pin CAT-5 cable from the serial concentrator is plugged directly into the rear RJ45 serial port. The 8 pins of the RJ45 connector can be configured to match either of two pin-out standards used by serial port concentrators. To accommodate either standard, the J6A2 jumper block, located directly behind the rear RJ45 serial port, must be jumpered appropriately according to the desired standard (see Figure 36).

Table 16.   Serial Port Connector Pinout

Pin	Signal	Description
1	RTS	Request to send
2	DTR	Data terminal ready
3	TXD	Transmit data
4	GND	
5	RIA	Ring indicator
6	RXD	Receive data
7	DSR/DCD	Date set ready / data carrier detect[1]
8	CTS	Clear to send

[1] Use jumper on server board to select

✏ NOTE

> By default as configured in the factory, the TSRMT2 baseboard will have the rear RJ45 serial port configured to support a DSR signal.

For those server applications that require a DB9 type serial connector, an 8-pin RJ45-to-DB9 adapter must be used.

✏ **NOTES**

1. The RJ45-to-DB9 adapter should match the configuration of the serial device used. One of two pinouts configurations are used depending on whether the serial device requires a DSR or DCD signal. The final adapter configuration should also match the desired pinout of the RJ45 connector, as it can also be configured to support either DSR or DCD.

2. For systems configured with both a front and rear RJ45 serial connectors, the adapters used for the rear port cannot be used with the front port, as the pin-out for both RJ45 ports are different.

Configuration Jumpers

This section describes the jumper blocks that control various configuration options. Figure 35 shows the names and location of the configuration jumpers. The shaded areas show the default jumper placement for each configurable option. Table 17 describes the system recovery and update jumper options.
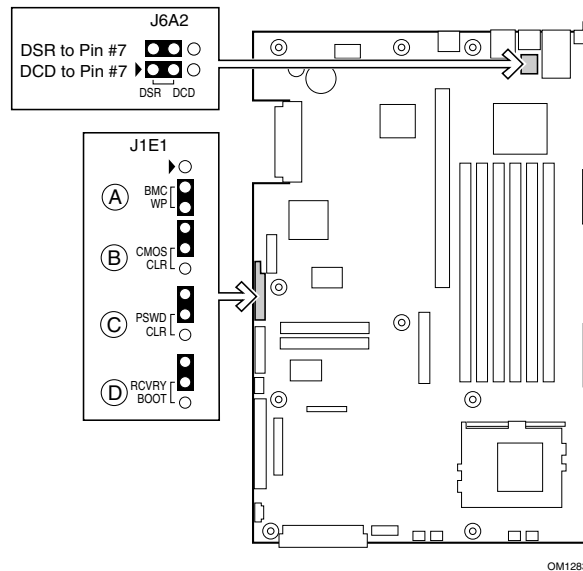
Figure 35. Jumper Locations (J1E1 and J6A2)

System Recovery and Update Jumpers (J1E1)

Table 17.   System Recovery and Update Jumper Options

Option	Description
BMC Write Protect	If pins 2 and 3 are jumpered (default), the BIOS boot block is write-protected. If pins 1 and 2 are jumpered, the boot block is erasable and programmable. ***WARNING: Incorrect programming of the boot block will render the system unbootable.*** With this option set to its default factory setting, the BMC's operational code can still be programmed without moving the jumper.
CMOS Clear	If pins 4 and 5 are jumpered (default), preservation of configuration CMOS through system reset is controlled by the BMC. If pins 5 and 6 are jumpered, CMOS contents are set to the manufacturing default during system reset.
Password Clear	If pins 7 and 8 are jumpered (default), the current system password is maintained during system reset. If pins 8 and 9 are jumpered, the password is cleared on reset.
Recovery Boot	If pins 10 and 11 are jumpered (default) the system will attempt to boot using the BIOS programmed in the Flash memory. If pins 11 and 12 are jumpered, the BIOS will attempt a recovery boot, loading BIOS code from a CD-ROM disk into the Flash device. This feature is typically used when the BIOS code has been corrupted.

DSR/DCD Configuration Jumper (J6A2)

For serial concentrators that require a DCD signal, configure the J6A2 jumper block as shown in Figure 36.

OM12841
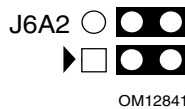
Figure 36. J6A2 Jumper Block for DCD Signal

For serial concentrators that require a DSR signal, configure the J6A2 jumper block as shown in Figure 37.

OM12842
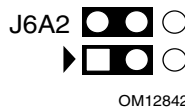
Figure 37. J6A2 Jumper Block for DSR Signal (Default)

7 Solving Problems

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

Resetting the System

To do this:	Press:
Soft boot reset, which clears system memory and reloads the operating system.	<Ctrl+Alt+Del>
Clear system memory, restart POST, and reload the operating system.	Reset button
Cold boot reset. Turn the system power off and then on. This clears system memory, restarts POST, reloads the operating system, and halts power to all peripherals.	Power off/on

Initial System Startup

Problems that occur at initial system startup are usually caused by incorrect installation or configuration. Hardware failure is a less frequent cause.

Initial System Startup Checklist

- Are the power supplies turned on? Check the switches on the back of the chassis.
- Are all cables correctly connected and secured?
- Are the processors or processor termination board fully seated in their slots on the server board?
- Are all add-in PCI boards fully seated in their slots on the server board?
- Are all jumper settings on the server board correct?
- Are all jumper and switch settings on add-in boards and peripheral devices correct? To check these settings, refer to the manufacturer's documentation that comes with them. 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?
- If the system has a hard disk drive, is it properly formatted or configured?
- Are all device drivers properly installed?
- Are the configuration settings made in Setup 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 (power on light should be lit)?
- Is the system power cord properly connected to the system and plugged into a NEMA 5-15R outlet for 100-120 V~ or a NEMA 6-15R outlet for 200-240 V~?
- Is AC power available at the wall outlet?
- Are all integrated components from the tested components lists? Check the tested memory and chassis lists, as well as the supported hardware and operating system list on the Intel Customer Support website.

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.

Running New Application Software Checklist

- Does the system meet the minimum hardware requirements for the software? See the software documentation.
- Is the software an authorized copy? If not, get one; unauthorized copies often do not work.
- If you are running the software from a diskette, is it a good copy?
- 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 disk 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 the problems persist, contact the software vendor's customer service representative.

After the System Has Been Running Correctly

Problems that occur after the system hardware and software have been running correctly often indicate equipment failure. Many situations that are easy to correct, however, can also cause such problems.

After the System Has Been Running Correctly Checklist

- 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 disk drive, try running it from a diskette. If the software runs correctly, there may be a problem with the copy on the hard disk 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 may be a loose cable, dirt in the keyboard (if keyboard input is incorrect), a marginal power supply, or other random 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.)

✏ **NOTE**

> **Random errors in data files:** If you are getting random errors in your data files, they may be getting corrupted by voltage spikes on your power line. If you are experiencing any of the above symptoms that might indicate voltage spikes on the power line, you may want to install a surge suppressor between the power outlet and the system power cord.

More Problem Solving Procedures

This section provides a more detailed approach to identifying a problem and locating its source.

Preparing the System for Diagnostic Testing

⚠ **CAUTION**

> **Turn off devices before disconnecting cables:** Before disconnecting any peripheral cables from the system; turn off the system and any external peripheral devices. Failure to do so can cause permanent damage to the system and/or the peripheral devices.

- Turn off the system and all external peripheral devices. Disconnect all of them from the system, except the keyboard and video monitor.
- Make sure the system power cord is plugged into a properly grounded AC outlet.
- Make sure your video display monitor and keyboard are correctly connected to the system. Turn on the video monitor. Set its brightness and contrast controls to at least two thirds of their maximum ranges (see the documentation supplied with your video display monitor).
- If the operating system normally loads from the hard disk drive, make sure there is no diskette in drive A. Otherwise, place a diskette containing the operating system files in drive A.
- Turn on the system. If the power LED does not light, see "Power Light Does Not Light" on page 98.

Monitoring POST

See Chapter 3.

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 each device is checked, its activity light should turn on briefly. Check for the following:

Does the diskette drive activity light turn on briefly? If not, see "Diskette Drive (Optional) Activity Light Does Not Light" on page 99.

If a second diskette drive is installed, does its activity light turn on briefly? If not, see "Diskette Drive (Optional) Activity Light Does Not Light" on page 99.

Confirming Loading of the 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 95.

Specific Problems and Corrective Actions

This section provides possible solutions for these specific problems:

- Power light does not light.
- There is no beep or an incorrect beep pattern.
- No characters appear on screen.
- Characters on the screen appear distorted or incorrect.
- System cooling fans do not rotate.
- Diskette drive activity light does not light.
- CD-ROM drive activity light does not light.
- There are problems with application software.
- 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 help.

Power Light Does Not Light

Check the following:

- Is the system operating normally? If so, the power LED is probably defective or the cable from the front panel to the server board is loose.
- Are there other problems with the system? If so, check the items listed under "System Cooling Fans Do Not Rotate Properly."
- If all items are correct and problems persist, contact your service representative or authorized dealer for help.

No Characters Appear on Screen

Check the following:

- Is the keyboard functioning? Check to see that the "Num Lock" light is functioning.
- Is the video monitor plugged in and turned on?
- 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:

- Verify that the video controller board is fully seated in the server board connector.
- Reboot the system for changes to take effect.
- 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.
- If you do not receive a beep code and characters do not appear, the video display monitor or video controller may have failed. Contact your service representative or authorized dealer for help.

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.
- Is the video monitor signal and power cable properly installed?
- If the problem persists, the video monitor may be faulty or it may be the incorrect type. Contact your service representative or authorized dealer for help.

System Cooling Fans Do Not Rotate Properly

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

Check the following:

- Is AC power available at the wall outlet?
- Is the system power cord properly connected to the system and the wall outlet?
- Did you press the power button?
- Is the power on light lit?
- Have any of the fan motors stopped (use the server management subsystem to check the fan status)?
- Are the fan power connectors properly connected to the server board?
- Is the cable from the front panel board connected to the server board?
- Are the power supply cables properly connected to the server board?
- Are there any shorted wires caused by pinched cables, or power connector plugs forced into power connector sockets the wrong way?

If the switches and connections are correct and AC power is available at the wall outlet, contact your service representative or authorized dealer for help.

Diskette Drive (Optional) Activity Light Does Not Light

Check the following:

- Are the diskette drive's 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 may be plugged in incorrectly.
- If you are using the onboard diskette controller, use the Setup Utility 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 may be a problem with the diskette drive, server board, or drive signal cable. Contact your service representative or authorized dealer for help.

Hard Disk Drive Activity Light Does Not Light

The hard disk drive activity light is not connected to the TSRMT2 server board.

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?

Cannot Connect to a Server

- Make sure you are using the drivers that are shipped on the system Configuration Software CD for the onboard network controller.
- Make sure the driver is loaded and the protocols are bound.
- Make sure the network cable is securely attached to the connector at the system back panel. If the cable is attached but the problem persists, try a different cable.
- Make sure the hub port is configured for the same duplex mode as the network controller.
- Check with your LAN administrator about the correct networking software that needs to be installed.
- If you are directly connecting two servers (no hub), you will need a crossover cable (see your hub documentation for more information on crossover cables).

Check the network controller LEDs that are visible through an opening at the system back panel.

Problems with Network

The server hangs when the drivers are loaded.

Change the PCI BIOS 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 Activity LED doesn't light.

- The network activity light is not connected to the TSRMT2 server board.

The controller stopped working when an add-in adapter was installed.

- Make sure the cable is connected to the port from the onboard network controller.
- 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 may be corrupt or deleted. Delete and then reinstall the drivers.
- Run the diagnostics.

PCI Installation Tips

Some common PCI tips are listed here.

- Reserve interrupts (IRQs) and/or memory addresses specifically for ISA adapters. This prevents PCI cards from trying to use the same settings ISA cards are using. Use the SSU to keep track of ISA adapter resources.
- Certain drivers may 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 may be necessary to alter settings so that interrupts are not shared.

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.
- Verify that the server board jumpers are set correctly. See Chapter 5.
- 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 help.

Bootable CD-ROM Is Not Detected

Check the following:

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

A POST Error Codes and Messages

The following table defines POST error codes and their associated messages. The BIOS will prompt the user to press a key in case of serious errors. A string "Error" precedes some error messages to highlight possible system malfunctions. The BIOS vendor specific error codes are not listed here since not all error codes are applicable to every platform. All POST errors and warnings are logged in the system event log unless it is full.

After the video adapter has been successfully initialized, the BIOS indicates the current testing phase during POST by writing a 2-digit hex code to I/O location 80h. If a Port-80h card (Postcard[†]) is installed, it displays this 2-digit code on a pair of hex display LEDs.

Table 18. Port-80h Code Definition

Code	Meaning
CP	AMI* check point (port-80) code

Table 19. Boot Block POST Codes

Checkpoint Code	Description
D0h	The NMI is disabled. Power-on delay is starting. Next, the initialization code checksum will be verified.
D1h	Initializing the DMA controller, performing the keyboard controller Basic Acceptance Test (BAT) test, starting memory refresh, and entering 4 GB flat mode next.
D3h	Starting memory sizing next.
D4h	Returning to real mode. Executing any OEM patches and setting the stack next.
D5h	Passing control to the uncompressed code in shadow RAM. The initialization code is copied to segment 0 and control will be transferred to segment 0.
D6h	Control is in segment 0. Next verifying the system BIOS checksum. If the system BIOS checksum is bad, go to checkpoint code E0h. Otherwise, going to checkpoint code D7h.
D7h	Passing control to the interface module next.
D8h	The main system BIOS runtime code will be decompressed next.
D9h	Passing control to the main system BIOS in shadow RAM next.
03h	The NMI is disabled. Next, checking for a soft reset or a power-on condition.
05h	The BIOS stack has been built. Next, disabling cache memory.
06h	Uncompressing the POST code next.

Table 20.   POST Code - Port 80h Codes

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

continued

Table 20. POST Code - Port 80h Codes (continued)

Post Code	Diagnostic LED Decoder				Description
	MSB			**LSB**	**Note: G=Green, R=Red, A=Amber**
12h	Off	Off	G	R	Initializing APP CMOS RAM for appliance servers only.
12h	Off	Off	G	R	Check point after CMOS initialized.
27h	Off	G	A	G	Validate date and time in RTC.
F4h	R	A	R	R	Load micro code to all CPUs.
F6h	R	A	A	R	Scan SMBIOS GPNV areas.
15h	Off	G	Off	A	8254 timer test on channel 2.
15h	Off	G	Off	A	Enable 8042.
15h	Off	G	Off	A	Keyboard reset.
26h	Off	G	A	Off	Initialize LCD, if supported.
28h	G	Off	R	Off	Set Video Mode: initialization before setting the video mode is complete. Configuring the monochrome mode and color mode settings next.
29h	G	Off	R	G	Debugger hook.
2Ah	G	Off	A	Off	Init PCI devices and motherboard devices. Pass control to video BIOS Start serial console redirection.
2Bh	G	Off	A	G	Platform hook.
2Dh	G	G	R	G	Initialize AMI display manager module. Initialize support code for headless system if no video controller is detected.
2Dh	G	G	R	G	Scan flash for logos and Initialize logo data areas.
30h	Off	Off	R	R	Detect PS/2 mouse.
30h	Off	Off	R	R	Hook after c000 ROM control.
2Eh	R	R	A	Off	Set up video parameters in BIOS data area.
37h	Off	G	A	A	Activate ADM: the display mode is set. Displaying the power-on message next.
37h	Off	G	A	A	Initialize language module. Display splash logo.
37h	Off	G	A	A	Display Sign-On Message BIOS ID and processor information.
38h	G	Off	R	R	Detect USB mouse: initializing the bus input, and general devices next, if present.
34h	Off	G	R	R	Reset IDE controllers.
39h	G	Off	R	A	Displaying bus initialization error messages.
3Ah	G	Off	A	R	Display Setup Message the new cursor position has been read and saved. Displaying the hit setup message next.
40h	Off	R	Off	Off	Ensure timer keyboard interrupts are on.

Table 20. POST Code - Port 80h Codes (continued)

Post Code	Diagnostic LED Decoder				Description
	MSB			LSB	Note: G=Green, R=Red, A=Amber
4Bh	G	R	G	G	Memory Test: the amount of memory above 8 MB has been found and verified. Checking for a soft reset and clearing the memory below 8 MB for the soft reset next. If this is a power-on situation, going to checkpoint 4Eh next.
57h	Off	A	G	A	Chipset hook after memory size.
53h	Off	R	A	A	Display processor cache size.
54h	Off	A	Off	R	Disable parity and NMI reporting.
60h	Off	R	R	Off	Test 8237 DMA Controller the DMA page register test passed. Performing the DMA Controller 1 base register test next.
65h	Off	A	R	G	Init 8237 DMA Controller the DMA controller 2 base register test passed. Programming DMA controllers 1 and 2 next.
7Fh	G	A	A	A	Extended NMI Enable: extended NMI source enabling is in progress.
80h	R	Off	Off	Off	Enable Mouse and Keyboard: the keyboard test has started. Clearing the output buffer and checking for stuck keys. Issuing the keyboard reset command next.
81h	R	Off	Off	G	Keyboard Interface Test: a keyboard reset error or stuck key was found. Issuing the keyboard controller interface test command next.
82h	R	Off	G	Off	Check Stuck Key Enable Keyboard: the keyboard controller interface test completed. Writing the command byte and initializing the circular buffer next.
83h	R	Off	G	G	Disable Parity NMI the command byte was written and global data initialization has completed. Checking for a locked key next.
84h	R	G	Off	Off	Verify RAM Size: checking for a memory size mismatch with CMOS RAM data next.
84h	R	G	Off	Off	Check ATA cable type presence of ATAPI devices.
84h	R	G	Off	Off	Display keyboard message.
16h	Off	G	G	R	Display IDE mass storage devices.
17h	Off	G	G	A	Display USB mass storage devices.
85h	R	G	Off	G	Report the first set of POST errors to error manager.
86h	R	G	G	Off	Boot Password Check: the password was checked. Performing any required programming before Setup next.
8Dh	A	G	Off	G	OEM Patch 9.
8Dh	A	G	Off	G	Set Printer RS-232 timeout
8Dh	A	G	Off	G	Init FDD Devices: resetting the hard disk controller next.

continued

Table 20. POST Code - Port 80h Codes (continued)

Post Code	Diagnostic LED Decoder				Description
	MSB			**LSB**	**Note: G=Green, R=Red, A=Amber**
95h	R	G	Off	A	Lock out PS/2 keyboard/mouse if unattended start is enabled.
92h	R	Off	G	R	Option ROM scan.
98h	A	Off	Off	R	Init Boot Devices: the adapter ROM had control and has now returned control to BIOS POST Performing any required processing after the option ROM returned control.
9Bh	A	Off	G	A	Float Processor Initialize: performing any required initialization before the coprocessor test next.
9Eh	A	G	G	R	Enable Interrupts 0,1,2: checking the extended keyboard, keyboard ID, and NUM Lock key next. Issuing the keyboard ID command next.
A2h	R	Off	A	Off	Report second set of POST errors to error messenger.
86h	R	G	G	Off	Prepare And Run Setup: error manager displays and logs POST errors. Waits for user input for certain errors. Execute setup.
8Bh	A	Off	G	G	Set base expansion memory size.
8Ch	A	G	Off	Off	Adjust Setup: programming the Setup options next.
A5h	R	G	R	G	Set display mode.
A7h	R	G	A	G	OEM Patch 12.
A7h	R	G	A	G	Build SMBIOS table and MP tables.
A7h	R	G	A	G	Program hot key and timeout settings in keyboard controller.
A7h	R	G	A	G	Processor initialization before boot.
A7h	R	G	A	G	Copy required language strings to shadow RAM.
AAh	A	Off	A	Off	Clear video screen.
000h	Off	Off	Off	Off	One beep to indicate end of POST. No beep if silent boot is enabled.
000h	Off	Off	Off	Off	POST completed. Passing control to INT 19h boot loader next.

POST Codes and Error Messages

The following table defines POST error codes and their associated messages. The BIOS prompts the user to press a key in case of a serious error. Some error messages are preceded by the string "Error" to highlight that the system might be malfunctioning. All POST errors and warnings are logged in the system event log unless it is full.

Table 21.   POST Codes and Error Messages

Error Code	Error Message	Pause on Boot
8100	Processor 1 failed BIST	No
8101	Processor 2 failed BIST	No
8102	Processor 3 failed BIST	No
8103	Processor 4 failed BIST	No
8104	Processor 1 Internal error (IERR)	No
8105	Processor 2 Internal error (IERR)	No
8106	Processor 1 Thermal Trip error	No
8107	Processor 2 Thermal Trip error	No
8108	Watchdog Timer failed on last boot	No
810A	Processor 1 failed initialization on last boot	No
810B	Processor 1 failed initialization	No
810C	Processor 1 disabled	No
810D	Processor 2 disabled	No
810E	Processor 1 failed FRB-3 timer	No
810F	Processor 2 failed FRB-3 timer	No
8110	Server Management Interface failed to function	Yes
8114	Processor 2 Internal Error (IERR) failure	No
8115	Processor 3 Internal Error (IERR) failure	No
8116	Processor 2 Thermal Trip failure	No
8117	Processor 3 Thermal Trip failure	No
811A	Processor 2 failed initialization on last boot	No
811B	Processor 3 failed initialization on last boot	No
811C	Processor 2 disabled	No
811D	Processor 3 disabled	No
811E	Processor 2 failed FRB Level 3 timer	No
811F	Processor 3 failed FRB Level 3 timer	No
8121	2:1 core to bus speed ratio: Processor cache disabled	No
8128	Processor 3 Internal error (IERR)	No
8129	Processor 4 Internal error (IERR)	No
8130	Processor 3 Thermal Trip error	No
8131	Processor 4 Thermal Trip error	No

Table 21   POST Codes and Error Messages (continued)

Error Code	Error Message	Pause on Boot
8138	Processor 3 failed FRB-3 timer	No
8139	Processor 4 failed FRB-3 timer	No
8140	Processor 3 disabled	No
8141	Processor 4 disabled	No
8148	Processor 2 failed initialization	No
8149	Processor 3 failed initialization	No
814A	Processor 4 failed initialization	No
814B	BMC in Update Mode	No
8150	NVRAM cleared by Jumper	Yes
8151	NVRAM Checksum Error, NVRAM cleared	No
8152	NVRAM Data Invalid, NVRAM cleared	No
8153	Password cleared by Jumper	Yes
8154	System Data Record is empty	No
8155	System Event Logging is full	No
8160	Unable to apply BIOS Update for (Right) Processor 4	No
8161	Unable to apply BIOS Update for (Right) Processor 3	No
8162	Unable to apply BIOS Update for (Right) Processor 2	No
8163	Unable to apply BIOS Update for (Right) Processor 1	No
8164	Unable to apply BIOS Update for Left Processor 4	No
8165	Unable to apply BIOS Update for Left Processor 3	No
8166	Unable to apply BIOS Update for Left Processor 2	No
8167	Unable to apply BIOS Update for Left Processor 1	No
8168	Right Processor 4 L2 cache failed	No
8169	Right Processor 3 L2 cache failed	No
816A	Right Processor 2 L2 cache failed	No
816B	Right Processor 1 L2 cache failed	No
816C	Left Processor 4 L2 cache failed	No
816D	Left Processor 3 L2 cache failed	No
816E	Left Processor 2 L2 cache failed	No
816F	Left Processor 1 L2 cache failed	No
8170	BIOS does not support current stepping for (Right) Processor 4	Yes
8171	BIOS does not support current stepping for (Right) Processor 3	Yes
8172	BIOS does not support current stepping for (Right) Processor 2	Yes
8173	BIOS does not support current stepping for (Right) Processor 1	Yes
8174	BIOS does not support current stepping for Left Processor 4	Yes
8175	BIOS does not support current stepping for Left Processor 3	Yes
8176	BIOS does not support current stepping for Left Processor 2	Yes
8177	BIOS does not support current stepping for Left Processor 1	Yes

Table 21. POST Codes and Error Messages (continued)

Error Code	Error Message	Pause on Boot
8178	Pentium III XXXB detected. Pentium III XXXB processors not supported on S820PN2. See product guide for details. System Halted.	Yes, system halted
8180	PB64 Failed to respond	Yes
8181	CPUID, Processor steppings are different	No
8182	L2 cache size mismatch	No
8186	CPUID, Processor families are different	No
8188	Processor Models are Different	No
8189	Current Processor Not Supported by this Base Board Revision	Yes, system halted
8190	66-MHz FSB Processor Detected. See *Product Guide* for details	Yes, system halted
8191	133-MHz FSB Processor Detected. See *Product Guide* for details	Yes, system halted
8200	Baseboard Management Controller failed to function	No
8201	Front Panel Controller failed to function	No
8202	Power Share Controller failed to function	No
8203	Primary Hotswap Controller failed to function	No
8204	Secondary Hotswap Controller failed to function	No
8205	Hotswap Controller failed to function	No
8210	Board 2 Processor 1 failed BIST	No
8211	Board 2 Processor 2 failed BIST	No
8212	Board 2 Processor 3 failed BIST	No
8213	Board 2 Processor 4 failed BIST	No
8214	Board 1 Processor 1 failed BIST	No
8215	Board 1 Processor 2 failed BIST	No
8216	Board 1 Processor 3 failed BIST	No
8217	Board 1 Processor 4 failed BIST	No
8220	Right Processor 4 Internal Error (IERR) failure	No
8221	Right Processor 3 Internal Error (IERR) failure	No
8222	Right Processor 2 Internal Error (IERR) failure	No
8223	Right Processor 1 Internal Error (IERR) failure	No
8224	Left Processor 4 Internal Error (IERR) failure	No
8225	Left Processor 3 Internal Error (IERR) failure	No
8226	Left Processor 2 Internal Error (IERR) failure	No
8227	Left Processor 1 Internal Error (IERR) failure	No
8230	Right Processor 4 Thermal Trip failure	No
8231	Right Processor 3 Thermal Trip failure	No
8232	Right Processor 2 Thermal Trip failure	No
8233	Right Processor 1 Thermal Trip failure	No
8234	Left Processor 4 Thermal Trip failure	No

Table 21. POST Codes and Error Messages (continued)

Error Code	Error Message	Pause on Boot
8235	Left Processor 3 Thermal Trip failure	No
8236	Left Processor 2 Thermal Trip failure	No
8237	Left Processor 1 Thermal Trip failure	No
8240	Right Processor 4 disabled	No
8241	Right Processor 3 disabled	No
8242	Right Processor 2 disabled	No
8243	Right Processor 1 disabled	No
8244	Left Processor 4 disabled	No
8245	Left Processor 3 disabled	No
8246	Left Processor 2 disabled	No
8247	Left Processor 1 disabled	No
8250	Right Processor 4 failed FRB Level 3 timer	No
8251	Right Processor 3 failed FRB Level 3 timer	No
8252	Right Processor 2 failed FRB Level 3 timer	No
8253	Right Processor 1 failed FRB Level 3 timer	No
8254	Left Processor 4 failed FRB Level 3 timer	No
8255	Left Processor 3 failed FRB Level 3 timer	No
8256	Left Processor 2 failed FRB Level 3 timer	No
8257	Left Processor 1 failed FRB Level 3 timer	No
8260	Right Processor 4 failed initialization	No
8261	Right Processor 3 failed initialization	No
8262	Right Processor 2 failed initialization	No
8263	Right Processor 1 failed initialization	No
8264	Left Processor 4 failed initialization	No
8265	Left Processor 3 failed initialization	No
8266	Left Processor 2 failed initialization	No
8267	Left Processor 1 failed initialization	No
8270	Left Memory Carrier failed	No
8271	Right Memory Carrier failed	No
8272	DIMM Not Fully Configured - Left J	No
8273	DIMM Not Fully Configured - Right J	No
8274	Memory error detected in DIMM Left J	No
8275	Memory error detected in DIMM Right J	No
8276	DIMM size mismatch	No
8277	Non-ECC memory detected with Accelerated Graphics Port (AGP) video enabled. Use ECC DIMMs with AGP video or non-ECC DIMMs with PCI Video. System Halted	Yes, system halted
8280	Left Coherency Filter failed data test	No

continued

Table 21. POST Codes and Error Messages (continued)

Error Code	Error Message	Pause on Boot
8281	Right Coherency Filter failed data test	No
8290	Left Coherency Filter failed address test	No
8291	Right Coherency Filter failed address test	No
8292	Speed mismatched processors have been disabled	No
8293	Coherency Filter size mismatch	No
8306	Please power down the system and exchange DIMM1 and DIMM2, system halted	Yes, system halted
8307	Please power down the system and exchange DIMM1 and DIMM3, system halted	Yes, system halted
8308	Please power down the system and exchange DIMM2 and DIMM3, system halted	Yes, system halted
8309	Double data row DIMM detected in DIMM2 socket, system halted	Yes, system halted
830A	Double data row DIMM detected in DIMM3 socket, system halted	Yes, system halted
8400	Switch fault on PCI hot-plug	No
8401	Hot plug switches overridden by jumper or setup	No
8402	Hot plug power-up sequence did not complete	No
8500	Memory not detected in location: XX, XX, XX …	Yes
8501	Memory SPD error in location: XX, XX, XX …	Yes
8502	Incorrect memory type in location: XX, XX, XX …	Yes
8503	Incorrect memory speed in location: XX, XX, XX …	Yes
8504	Non-Specific memory error in location: XX, XX, XX …	Yes

B Equipment Log and Configuration Worksheet

Equipment Log

Use the blank equipment log provided here to record information about your system. You will need some of this information when you run BIOS Setup.

Item	Manufacturer Name and Model Number	Serial Number	Date Installed
System			
System Baseboard			
Processor Speed and Cache			
Keyboard			
Mouse			
Floppy Disk Drive (optional)			
CD-ROM Drive			
Hard Disk Drive (1)			
Hard Disk Drive (2)			
First Installed Power Supply			
Second Installed Power Supply			
PCI Slot (1)			
PCI Slot (2)			

Intel TSRMT2 Carrier/Industrial Grade Server Product Guide

C Warnings

WARNING: English (US)
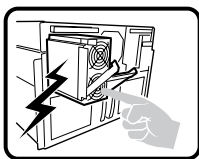
AVERTISSEMENTS : Français

WARNUNG: Deutsch
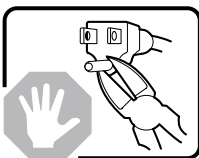
AVVERTENZA: Italiano

ADVERTENCIA: Español
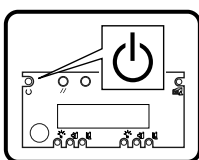
WARNING: English (US)
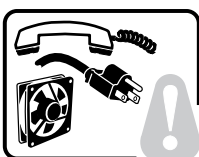
The power supply in this product contains no user-serviceable parts. There may be more than one supply in this product. Refer servicing only to qualified personnel.

Do not attempt to modify or use the supplied AC power cord if it is not the exact type required. A product might be equipped with more than one AC power cord.

The Power button on the system does not turn off all system power. To remove all power from the system, you must unplug/disconnect the power cord from the system.

To avoid injury from electrical and mechanical hazards, chassis covers should only be removed by qualified service personnel.

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/disconnect the power cord from the system.
4.   Label and disconnect all telecommunication cables and all other cables connected to I/O connectors or ports on the back of the system.
5.   Provide some electrostatic discharge (ESD) protection by wearing an anti-static 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.
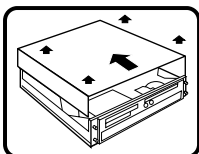
After you have completed the five SAFETY steps above, you can remove the system covers. To do this:

1.   Remove and save all screws from the covers.
2.   Remove the covers.
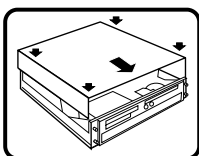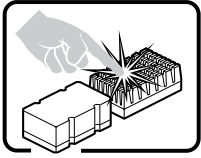
For proper cooling and airflow, always reinstall the chassis covers before turning on the system. Operating the system without the covers in place can damage system parts. To install the covers:

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.   Connect all external cables and the power cord to the system.

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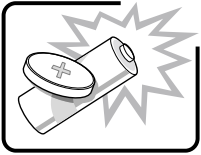
Danger of explosion if the battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the equipment manufacturer. Discard used batteries according to manufacturer's instructions.
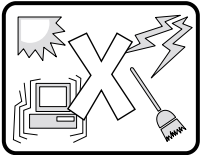
The system is designed to operate in a typical office environment. Choose a site that is:

- 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.
- Protected when 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 cords, because they serve as the product's mains power disconnect.
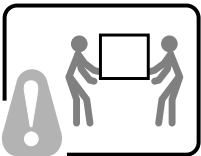
Servers can be too heavy for a single person to lift or move safely. Depending on the server, use two people or a mechanical assist to lift or move the server.

AVERTISSEMENTS : Français
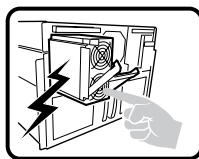
Le bloc d'alimentation de ce produit ne contient aucune pièce pouvant être réparée par l'utilisateur. Ce produit peut contenir plusieurs blocs d'alimentation. Veuillez contacter un technicien qualifié en cas de problème.
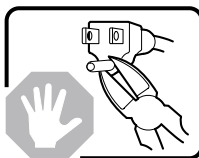
Ne pas essayer d'utiliser ni de modifier le câble d'alimentation CA fourni, s'il ne correspond pas exactement au type requis. Un produit peut être équipé de plus d'un câble d'alimentation CA.
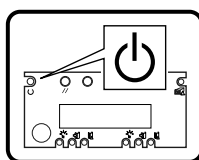
Le bouton d'alimentation du système n'éteint pas toutes les alimentations CA du système. Pour mettre complètement le système hors tension, vous devez débrancher chaque cordon d'alimentation CA de sa prise.
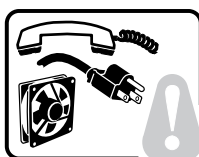
Pour éviter toute lésion à la suite de risques électriques et mécaniques, les panneaux du châssis ne doivent être démontés que par un personnel qualifié.

CONSIGNES DE SÉCURITÉ : Lorsque vous retirez les panneaux du châssis pour accéder à l'intérieur du système, suivez les étapes ci-dessous :

1. Mettez hors tension tous les périphériques connectés au système.
2. Mettez hors tension le système en appuyant sur le bouton d'alimentation.
3. Débranchez tous les cordons d'alimentation CA du système ou des prises murales.
4. Identifiez et déconnectez tous les câbles de télécommunications et tous les autres câbles reliés aux connecteurs E/S ou aux ports 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 si les panneaux du châssis sont enlevés.
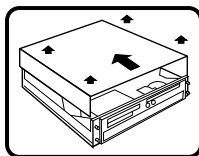
Après avoir suivi les six consignes de SECURITE ci-dessus, vous pouvez retirer les panneaux du système. Pour effectuer cette opération :

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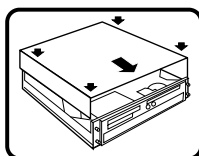
Afin de permettre le refroidissement et l'aération du système, réinstallez toujours les panneaux du châssis avant de mettre le système sous tension. Le fonctionnement du système en l'absence des panneaux risque d'endommager ses pièces. Pour installer les panneaux, procédez comme suit :

1. Assurez-vous 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 châssis avec les vis retirées plus tôt.
4. Rebranchez tous les cordons d'alimentation CA et câbles externes au système.

Avertissements : **Français** (suite)
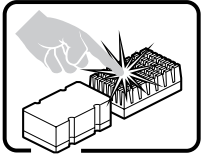
Le microprocesseur et le dissipateur de chaleur peuvent être chauds si le système a été sous tension. Faites également attention aux broches aiguës des cartes et aux bords tranchants du capot. Les contacts doivent être établis avec soin. L'usage de gants de protection est conseillé.
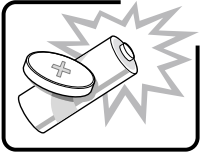
Danger d'explosion si la batterie n'est pas remontée correctement. Remplacer uniquement par une pile du même type ou de type équivalent recommandé par le fabricant. Débarrassez-vous des piles usagées conformément aux instructions du fabricant.
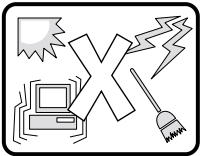
Le système a été conçu pour fonctionner dans un cadre de travail normal. L'emplacement choisi doit être :

1. Propre et dépourvu de poussières en suspension (sauf la poussière normale).
2. Bien aéré et loin des sources de chaleur, y compris du soleil direct.
3. À l'abri des chocs et des sources de vibration.
4. Isolé des forts champs électromagnétiques générés par des appareils électriques.
5. Protégé s'il se trouve dans des régions sujettes aux orages magnétiques. Nous vous recommandons de connecter votre système à un suppresseur de surtension et de déconnecter les lignes de télécommunications de votre modem pendant un orage magnétique.
6. Muni d'une prise murale correctement mise à la terre.
7. Suffisamment spacieux pour vous permettre d'accéder aux câbles d'alimentation (ceux-ci étant le seul moyen de mettre le système hors tension).
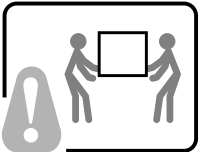
Il se peut que les serveurs soient trop lourds pour qu'une seule personne puisse les soulever et les déplacer en toute sécurité. En fonction du serveur, utilisez deux personnes ou utilisez un équipement mécanique auxiliaire pour soulever ou déplacer le serveur.

WARNUNG: Deutsch
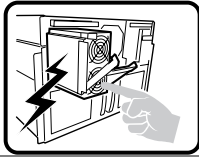
Das Netzteil dieses Computers enthält keine wartungsbedürftigen Teile. Dieses Produkt kann über mehrere Netzteile verfügen. Überlassen Sie Wartungsarbeiten nur qualifizierten Fachleuten.
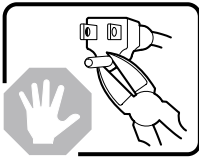
Versuchen Sie nicht, das mitgelieferte Netzkabel zu verändern oder einzusetzen, wenn es nicht exakt dem benötigten Kabeltyp entspricht. Das Produkt kann über mehrere Netzkabel verfügen.
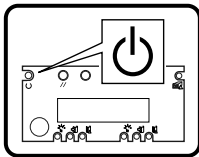
Durch Ausschalten des Netzschalters wird die Wechselstromversorgung des Systems nicht unterbrochen. Um das System vom Netz zu trennen, müssen Sie das Netzkabel aus der Steckdose oder vom Netzteil abziehen.
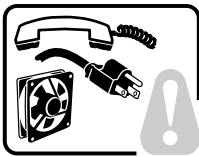
Vermeiden Sie Verletzungen aufgrund elektrischer oder mechanischer Gefahren; lassen Sie daher den Gehäusedeckel nur von technisch qualifiziertem Personal abnehmen.

SICHERHEITSHINWEISE: Beachten Sie beim Abnehmen der Gehäuseabdeckung und Arbeiten im Inneren des Systems folgende Schritte:
1. Schalten Sie alle am System angeschlossenen Peripheriegeräte ab.
2. Drücken Sie den Netzschalter, um das System abzuschalten.
3. Ziehen Sie alle Wechselstromkabel vom System und den Steckdosen ab.
4. Kennzeichnen Sie alle Telekommunikationsleitungen und sonstigen Kabel an den E/A-Steckern bzw. Anschlüssen an der Rückseite des Systems, und trennen Sie diese vom Netz.
5. Um sich gegen elektrostatische Entladung zu schützen, sollten Sie eine Antistatik-Manschette tragen, die Sie beim Arbeiten mit Komponenten zur Erdung an einem beliebigen unlackierten Metallteil befestigen.
6. Nehmen Sie das System nicht ohne Abdeckung in Betrieb.
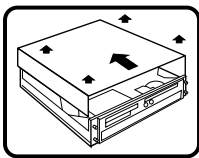
Nachdem Sie die fünf Sicherheitshinweise oben beachtet haben, können Sie die Gehäuse-abdeckung abnehmen. Gehen Sie wie folgt vor:
1. Entfernen Sie sämtliche Schrauben der Gehäuseabdeckung, und bewahren Sie diese auf.
2. Nehmen Sie die Gehäuseabdeckung ab.
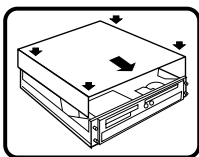
Um eine ordnungsgemäße Kühlung und Belüftung zu gewährleisten, sollten Sie stets die Gehäuseabdeckung anbringen, bevor Sie das System in Betrieb nehmen. Wenn das System ohne obere und vordere Abdeckung betrieben wird, kann es zu einer Beschädigung der Systemkomponenten kommen. So entfernen Sie die Gehäuseabdeckung:
1. Prüfen Sie, daß weder Werkzeuge noch Kleinteile im Innern des Systems vergessen wurden.
2. Prüfen Sie, ob die Kabel und anderen Komponenten richtig installiert sind.
3. Schrauben Sie die Abdeckung mit den zuvor gelösten Schrauben gut am Gehäuse fest.
4. Schließen Sie alle externen Kabel und das Netzkabel an das System an.

Fortsetzung
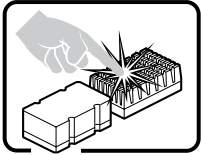
Mikroprozessor und Kühlkörper können heiß sein, wenn das System längere Zeit einge-schaltet war. Einige Platinen- und Gehäuseteile können scharfe Spitzen und Kanten auf-weisen. Gehen Sie auf jeden Fall mit Vorsicht heran. Das Tragen von Schutzhandschuhen wird empfohlen.
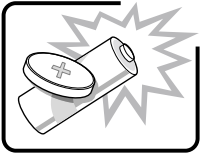
Wird die Batterie unsachgemäß ausgewechselt, besteht Explosionsgefahr. Ersetzen Sie die Batterie nur durch denselben oder einen gleichwertigen Batterietyp, der vom Geräte-hersteller empfohlen wird. Entsorgen Sie verbrauchte Batterien gemäß den Hersteller-empfehlungen.
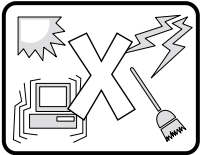
Das System ist für den Betrieb innerhalb normaler Büroumgebungen geeignet. Der Standort sollte folgende Anforderungen erfüllen:

- Saubere, möglichst staubfreie Umgebung.
- Gut belüftet und weit entfernt von Wärmequellen wie direkte Sonneneinstrahlung.
- Vibrations- und erschütterungsfreie Umgebung.
- Abgeschirmt von starken elektromagnetischen Feldern, die durch elektrische Geräte erzeugt werden.
- Entsprechender Schutz bei Betrieb in gewittergefährdeten Gebieten. Es empfiehlt sich, den Computer über einen Überspannungsschutz anzuschließen und die Verbindung zwischen dem Modem und dem Telefonanschluß im Falle eines Gewitters zu trennen.
- Ausgestattet mit einer ordnungsgemäß geerdeten Wandsteckdose.
- Sorgen Sie für ausreichend Platz, damit das Servernetzkabel problemlos erreicht werden kann, da das Gerät nur über dieses Kabel vom Netz getrennt wird.
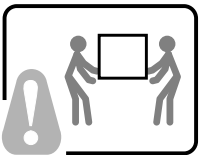
Um einen Server sicher anzuheben und zu bewegen ist eine Person nicht ausreichend. Bewegen Sie den Server, je nach Größe, entweder zu zweit oder mittels einer mecha-nischen Hilfe.

AVVERTENZA: Italiano
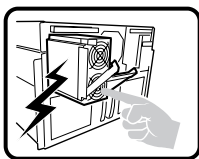
L'alimentatore contenuto nel computer non contiene parti riparabili dall'utente. Questo prodotto può essere fornito con più alimentatori. Per l'assistenza fare riferimento solo a personale qualificato.
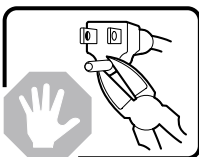
Non tentare di modificare o utilizzare cavi di alimentazione in c.a. che non siano del tipo prescritto. Un prodotto potrebbe contenere più di un cavo di alimentazione in c.a.
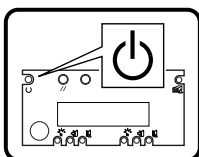
L'interruttore di accensione del sistema non scollega tutta l'alimentazione in c.a. del sistema. Per scollegare tutta l'alimentazione in c.a., è necessario disinserire ogni cavo di alimentazione in c.a. dalla presa a muro o dall'alimentatore.
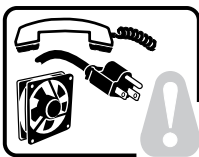
Per evitare incidenti elettrici e meccanici, i coperchi del telaio devono essere rimossi da personale qualificato.

MISURE DI SICUREZZA: Nel caso sia necessario rimuovere i coperchi del telaio per accedere alle parti interne del sistema, procedere nel seguente modo:
1. Spegnere tutte le periferiche collegate al sistema.
2. Spegnere il sistema premendo il pulsante di accensione.
3. Scollegare tutti i cavi di alimentazione in c.a. dal sistema o dalle prese a muro.
4. Apporre un'etichetta e scollegare tutti i cavi di telecomunicazione e i cavi collegati ai connettori di I/O o alle porte sulla parte posteriore del sistema.
5. Assicurare un minimo di protezione da scariche elettrostatiche (ESD) indossando un bracciale antistatico collegato a un componente metallico non verniciato del telaio quando si maneggiano i componenti.
6. Non attivare il sistema nel caso in cui i coperchi del telaio siano stati rimossi.
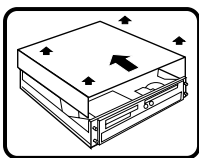
Dopo aver effettuato le operazioni di SICUREZZA descritte in precedenza, è possibile rimuovere i coperchi del sistema. Procedere nel modo seguente:
1. Rimuovere e conservare tutte le viti dei coperchi.
2. Rimuovere i coperchi.
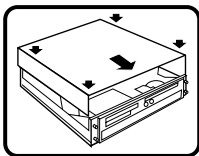
Per evitare che il sistema si surriscaldi e per garantire una ventilazione adeguata, reinstallare sempre i coperchi prima di attivare il sistema. Se si attiva il sistema senza aver riposizionato i coperchi correttamente, alcune parti del sistema potrebbero risultare danneggiate. Per installare i coperchi:
1. Verificare innanzitutto di non aver lasciato utensili o altre parti all'interno del sistema.
2. Verificare che i cavi, le schede aggiuntive e gli altri componenti siano stati installati correttamente.
3. Fissare saldamente i coperchi al telaio utilizzando le viti precedentemente rimosse.
4. Collegare tutti i cavi esterni e il cavo o i cavi di alimentazione in c.a. al sistema.
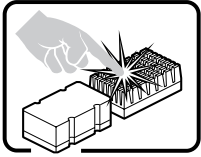
Se il sistema è stato in funzione, il microprocessore e il dissipatore di calore potrebbero essere caldi. Inoltre su alcune parti della scheda e del telaio potrebbero esserci piedini appuntiti e bordi taglienti. Prestare quindi molta attenzione nel toccarli. Indossare guanti protettivi.
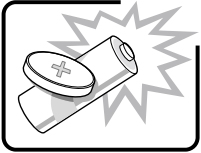
Se sostituita in modo errato, la batteria potrebbe esplodere. Sostituire le batterie scariche solo con batterie originali o del tipo consigliato dal produttore dell'apparecchiatura. Per lo smaltimento delle batterie usate attenersi alle istruzioni del produttore.
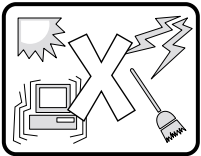
Il sistema è concepito per l'utilizzo in ambienti adibiti a ufficio. Scegliere una postazione con le caratteristiche riportate di seguito.

- Pulita, priva di particelle diverse dalla polvere normalmente presente nell'ambiente di lavoro.

- Aerata e lontana da fonti di calore, compresa la luce solare diretta.

- Lontana da fonti di vibrazione o urti.

- Isolata da forti campi elettromagnetici prodotti da apparecchi elettrici.

- Protetta nelle regioni soggette a temporali. Durante un temporale, si consiglia di collegare il sistema a un limitatore di corrente e di scollegare le linee di telecomunicazione dal modem.

- La posizione prescelta deve essere dotata di una presa a muro con adeguata messa a terra.

- Deve inoltre esserci sufficiente spazio per accedere ai cavi di alimentazione nel caso sia necessario scollegare l'alimentazione principale.
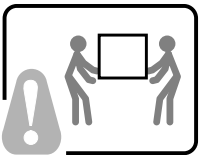
I server possono risultare troppo pesanti per essere sollevati o spostati da una sola persona. Alcuni server devono dunque essere sollevati o spostati da due persone o da un assistente tecnico.

ADVERTENCIA: Español

La fuente de alimentación de este producto no contiene piezas que puedan ser reparadas por el usuario. Puede que haya más de una fuente de alimentación en este producto. Para las reparaciones, consulte sólo con el personal cualificado.

No intente modifica ni utilizar el cable de alimentación de CA suministrado si no es del tipo exacto requerido. Un producto puede estar equipado con más de un cable de alimentación de CA.

El botón de alimentación del sistema no desactiva toda la alimentación de CA del sistema. Para eliminar toda la alimentación de CA del sistema, deberá desenchufar todos los cables de alimentación de CA del enchufe de pared o de la fuente de alimentación.

Para evitar lesiones causadas por descargas eléctricas y mecánicas, únicamente puede retirar las cubiertas de las carcasas el personal técnico cualificado.

PASOS DE SEGURIDAD: Siempre que retire las cubiertas de las carcasas para acceder al interior del sistema, siga las instrucciones que se especifican a continuación:

1. Desactive todos los dispositivos periféricos conectados al sistema.
2. Pulse el botón de alimentación para desactivar el sistema.
3. Desenchufe todos los cables de alimentación de CA del sistema o de los enchufes de pared.
4. Etiquete y desconecte todas las líneas de telecomunicaciones y todos los cables conectados a los puertos o conectores de E/S de la parte posterior del sistema.
5. Para contar con cierto grado de protección contra descargas electrostáticas (ESD), utilice un brazalete antiestático conectado a la toma de tierra del sistema (cualquier superficie de metal que no esté pintada) al manipular sus componentes.
6. No utilice el sistema sin las cubiertas de la carcasa.
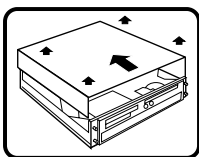
Una vez que haya completado los cinco pasos de SEGURIDAD, podrá retirar las cubiertas del sistema. Para ello:

1. Retire y guarde todos los tornillos de las cubiertas.
2. Retire las cubiertas.
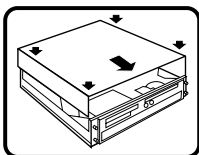
Para obtener una ventilación y un flujo de aire adecuados, reinstale siempre las cubiertas de la carcasa antes de encender el sistema. Si utiliza el sistema sin las cubiertas en su lugar, puede que se dañen algunas piezas del sistema. Para instalar las cubiertas:

1. Asegúrese primero de no haber dejado piezas o herramientas sueltas en el sistema.
2. Compruebe que los cables, tarjetas adicionales y demás componentes están correctamente instalados.
3. Fije las cubiertas a la carcasa con los tornillos que ha retirado anteriormente y apriételos firmemente.
4. Conecte todos los cables externos y los cables de alimentación de CA al sistema.

Puede que el microprocesador y el disipador de calor se recalienten si se ha estado ejecutando el sistema. Asimismo, puede que algunas tarjetas o piezas de la carcasa tengan patillas o bordes afilados. Los contactos deberán realizarse cuidadosamente. Puede que sea conveniente llevar guantes de protección.
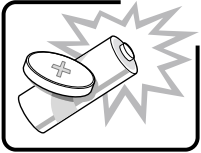
Existe peligro de explosión si la batería se sustituye incorrectamente. Sustitúyala sólo por el mismo tipo o uno equivalente recomendado por el fabricante del equipo. Deseche las baterías usadas según las instrucciones del fabricante.
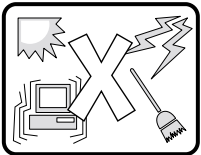
El sistema está diseñado para que funcione en un entorno de oficina típico. Elija un emplazamiento:

- Limpio y libre de partículas de transportadas por aire (aparte del polvo normal de la habitación).
- Bien ventilado y alejado de las fuentes de calor, incluida la luz del sol directa.
- Alejado de las fuentes de vibración o de los golpes físicos.
- Aislado de campos electromagnéticos fuertes producidos por dispositivos eléctricos.
- Protegido, si se encuentra en regiones susceptibles de tormentas eléctricas. Se recomienda que enchufe el sistema a un supresor de sobretensiones y desconecte las líneas de telecomunicaciones al módem durante una tormenta eléctrica.
- Que tenga un enchufe de pared correctamente conectado a tierra.
- Con suficiente espacio para acceder a los cables de la fuente de alimentación, ya que éstos sirven como desconectador de alimentación principal del sistema.
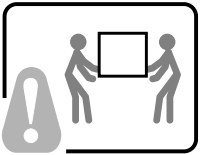
Los servidores pueden ser demasiado pesados para que una sola persona los levante o los mueva de forma segura.

Dependiendo del servido, utilice dos personas o una ayuda mecánica para levantar o mover el servidor.

D CD-ROM and Floppy Disk Drive Installation

⚠️ **CAUTION**

Failure to properly install the Flex Cable on the Floppy and CD-ROM drives can result in broken traces in the cable. Follow these instructions to avoid damage to the cable.
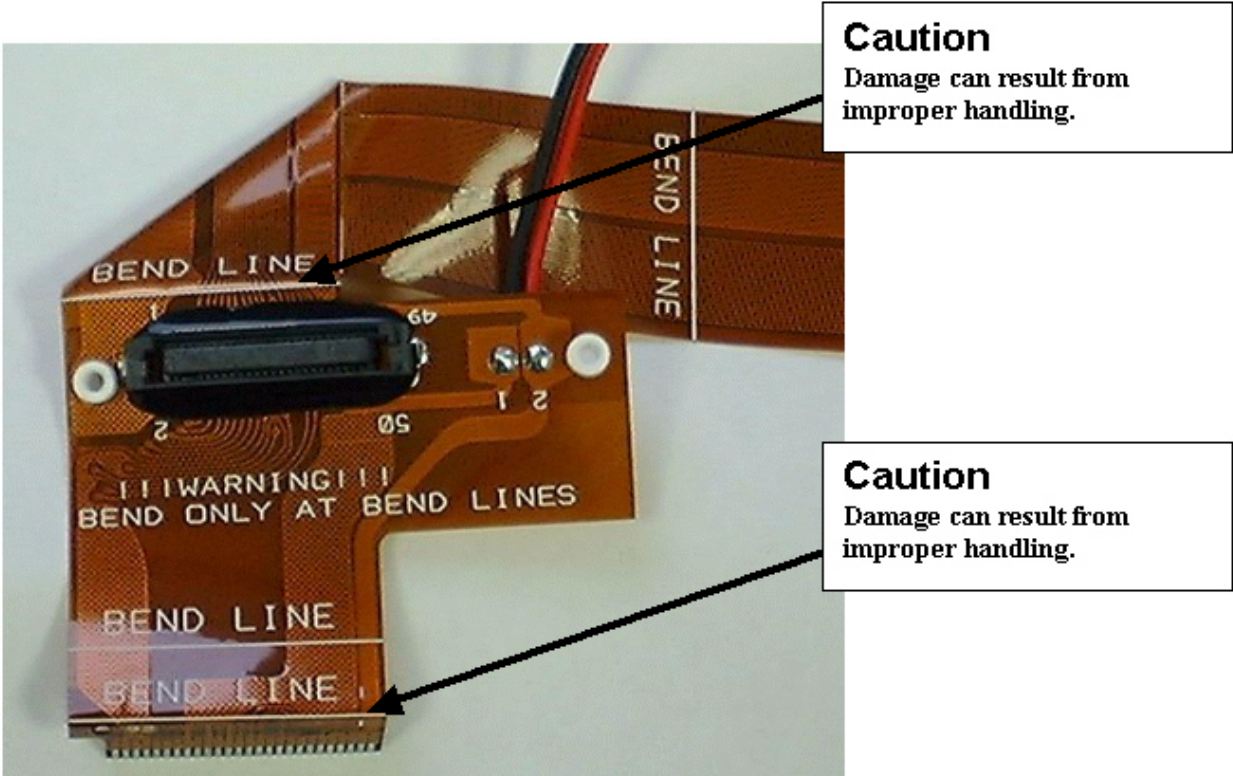
Removing the CD-ROM or Floppy Drive

To remove the CD-ROM or floppy disk drive from the system, follow this procedure:

1. Remove the hard disk drive above the peripheral drive carrier (A). Remove the air baffle (B) next to the fan assembly.
2. Move cables above the Flex cable out of the way and disconnect the cable (A) from the server board.
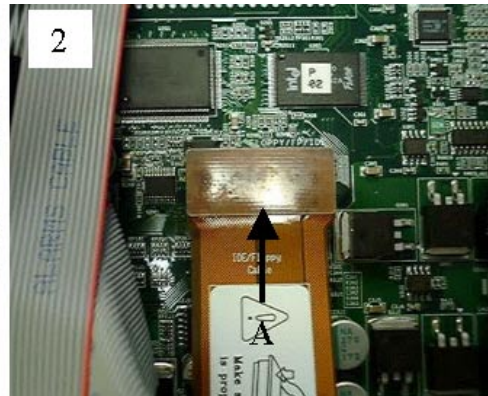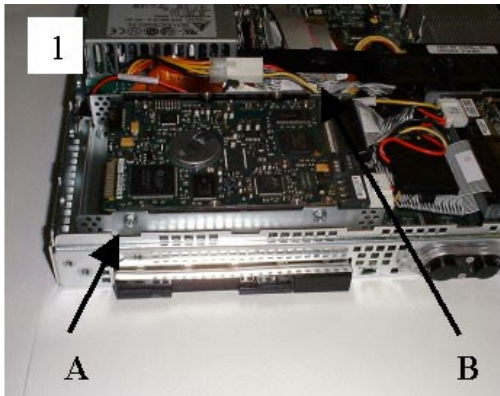
3. Remove the two screws securing the peripheral drive carrier.
4. Disconnect the power cable from the CR-ROM or floppy drive (A).
5. Slide the peripheral drive carrier to the rear and lift it up out of the chassis. Place the drive on a clean static-free work surface.
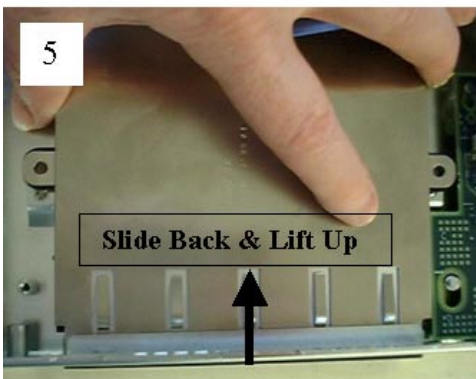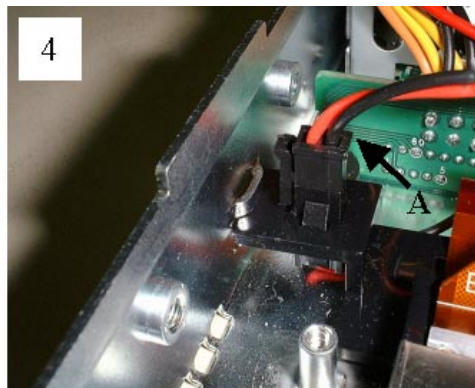
Removing the Floppy Drive from the Carrier

To remove a floppy disk drive from the carrier, follow this procedure:

1. Remove the top and bottom EMI covers from the drive assembly.
2. Unplug power cable from carrier opening (A).
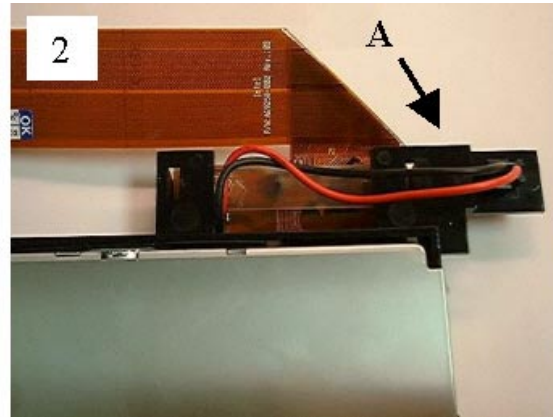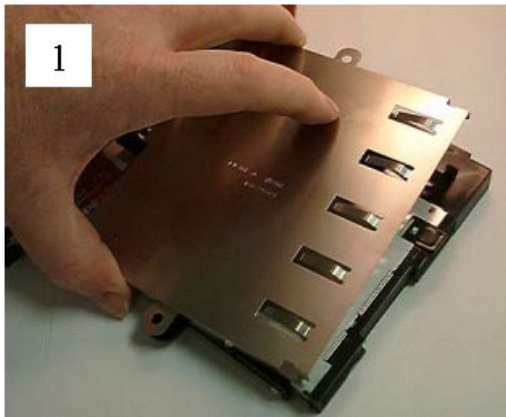
3. Loosen the cable from the latch features (A).
4. Flex the plastic carrier to disengage the carrier pins from the floppy drive's mounting holes. Remove the drive from the carrier.
5. Lift up the securing latch on drive ZIF connector (A) and remove cable. Place the drive on a clean static-free work surface.
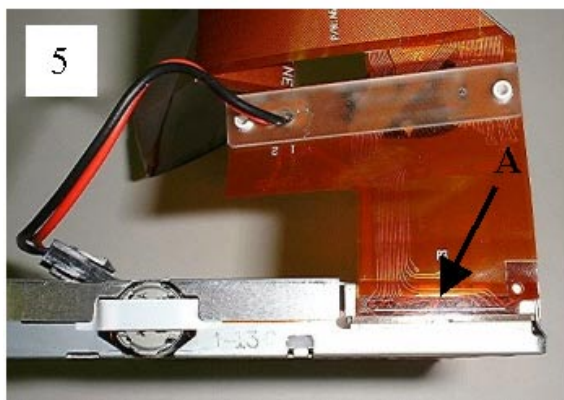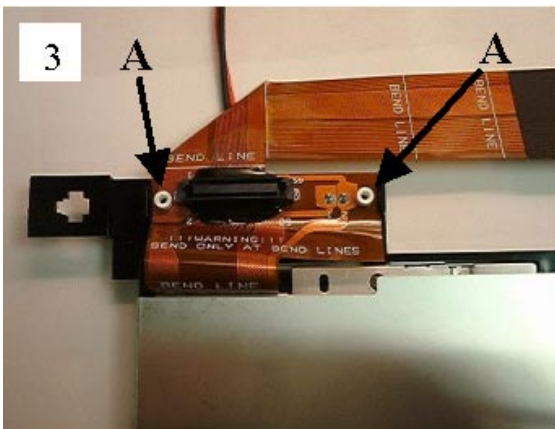
Removing the CD-ROM Drive from the Carrier

To remove a CD-ROM drive from the carrier, follow this procedure:

1. Remove the top and bottom EMI covers from the drive assembly.
2. Unplug power cable from carrier opening (A).
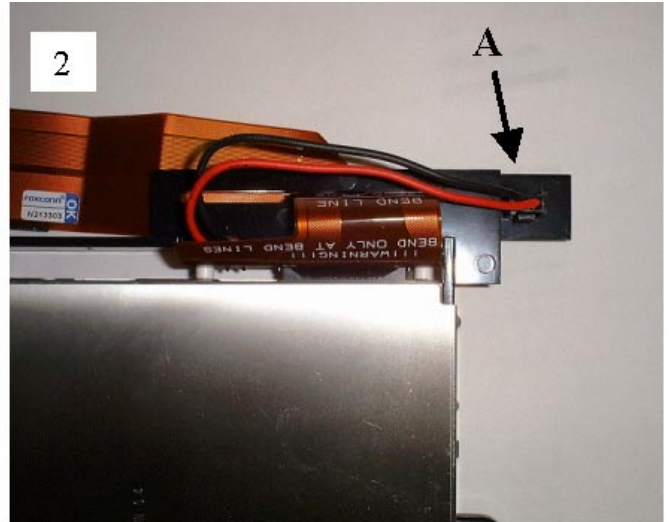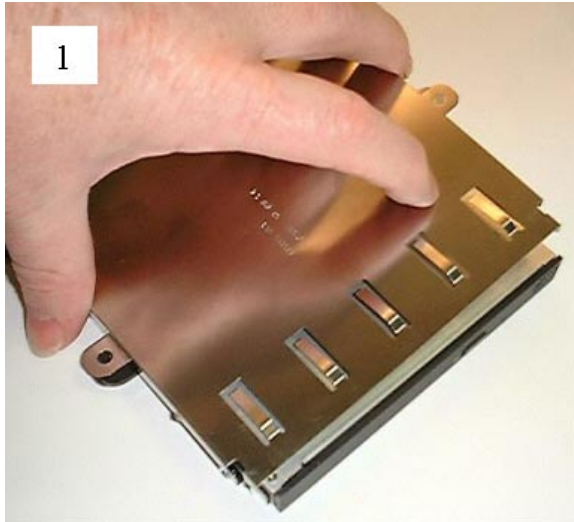
3. Flex the plastic carrier to disengage the carrier pins from the CD-ROM drive's mounting holes.
4. Pull the CD-ROM drive out of the plastic carrier to disconnect the drive from the cable. Place the drive on a clean static-free work surface.

Installing a Floppy Drive

To install a floppy disk drive, follow this procedure:

1. Remove the pull-tab from the floppy drive contacts (A). Leave tab in place for CD-ROM drive installation.
2. Lift up the securing latch on drive ZIF connector (A). Install cable into the ZIF connector. Ensure the cable is not cocked in the connector and push down on the ZIF securing latch. (**DON'T** bend the cable in contact area where it enters the ZIF connector. Damage to the contacts can occur.)
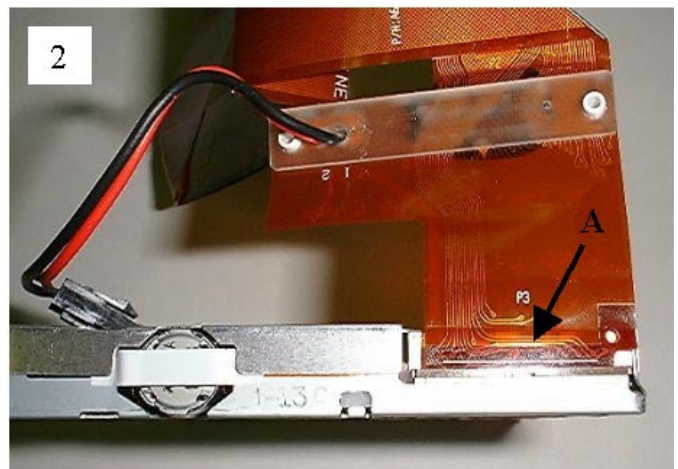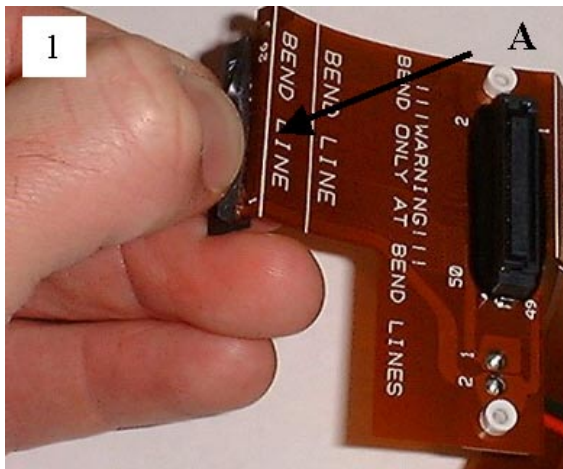
3. Place floppy drive into plastic carrier.
4. Align pins (A) on both sides of the carrier to fit into the screw holes of the drive for proper engagement.
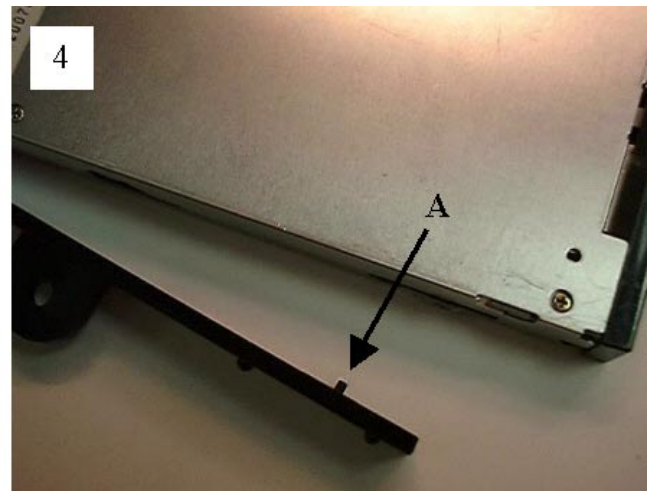
5. Place EMI covers on top and bottom of drive (Top shown).
6. Align the guide pins on the carrier to engage the plastic standoffs on the cable and push the cable down to snap into the latches (A).
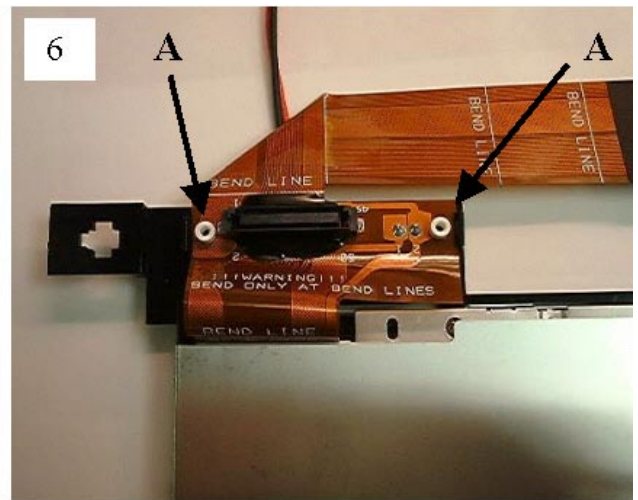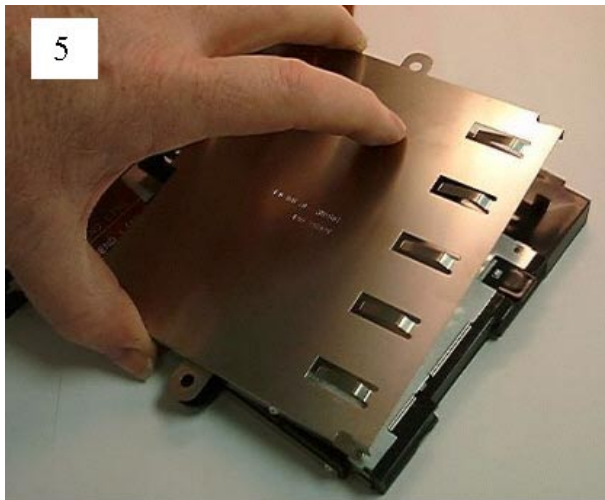
7. Press down on the cable to put bend in the cable at the BEND LINE location.
8. The power cable should plug into carrier opening (A) and be positioned as shown.
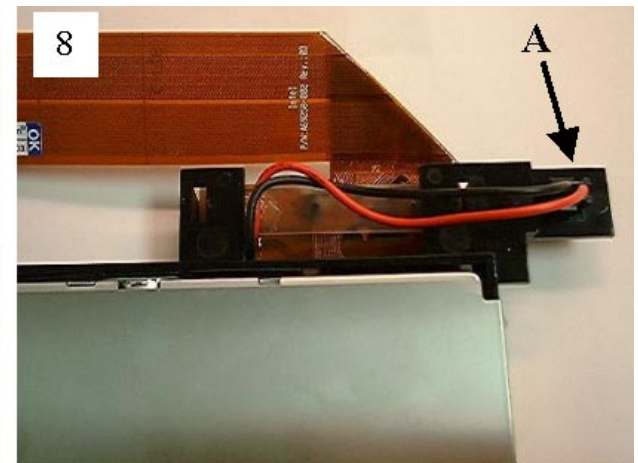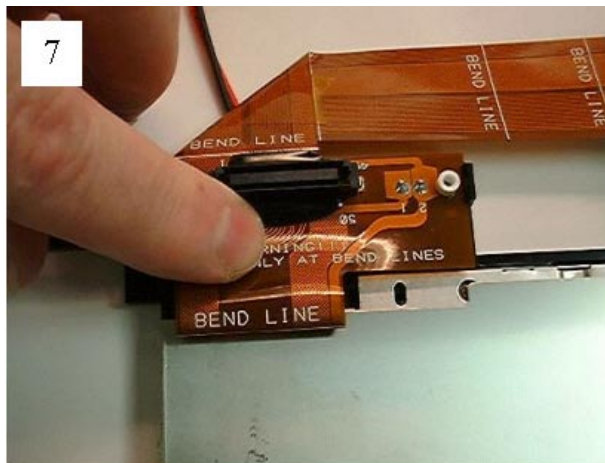
9. Install drive assembly down into the top of the unit and then forward through the opening in the front of the unit as shown.

⚠ **CAUTION**

Carefully install the assembly to avoid deforming the EMI top-cover spring fingers.

10. If tabs are present, position the carrier to engage between the chassis tabs (A). Note: Latest style carriers do not engage tabs.
11. Plug power cable from power supply to the cable power plug on the carrier (B).
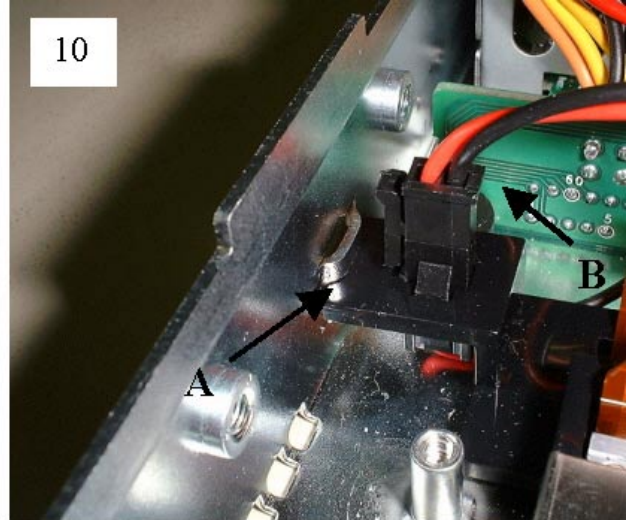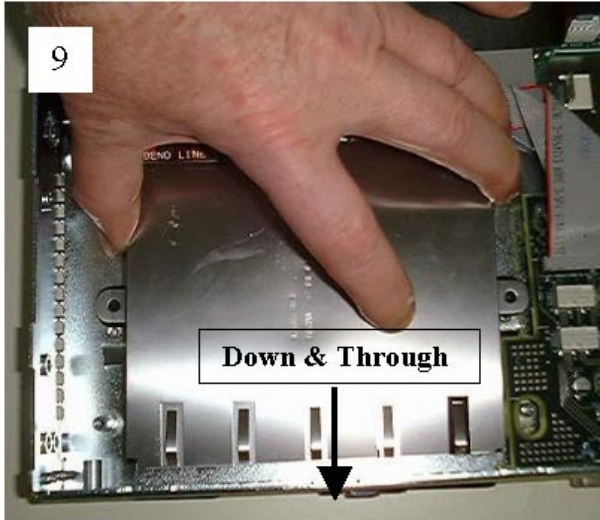
12. Secure the assembly into the server using screws at the two carrier mounting locations.
13. Notice the two BEND LINES shown.
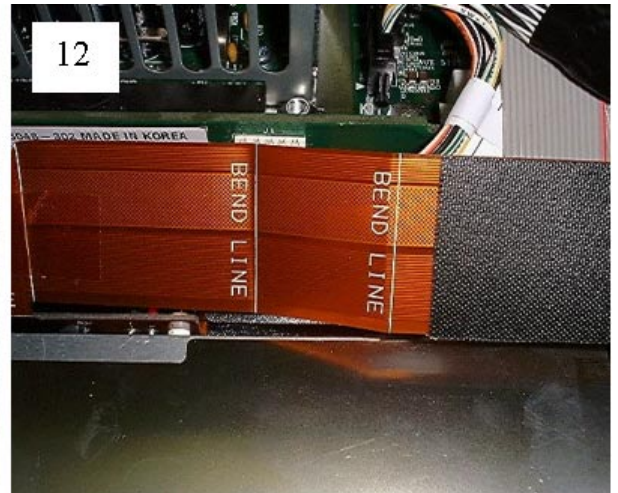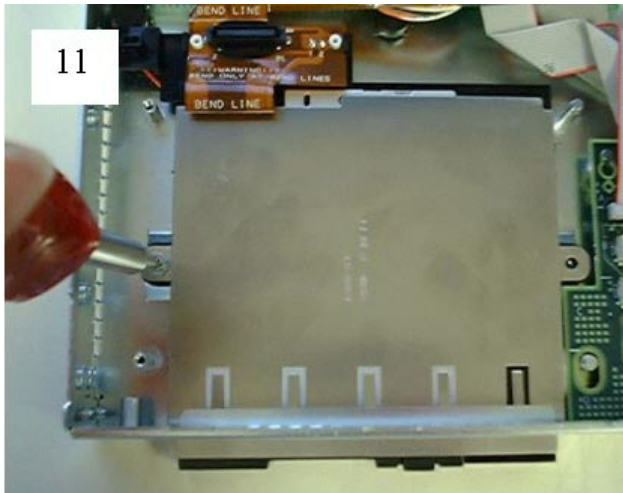
14. Make a Z fold in the cable at the BEND LINE locations.
15. Plug connector onto baseboard (A) and ensure that it is not cocked to either side. Reinstall the hard disk drive and air baffle.
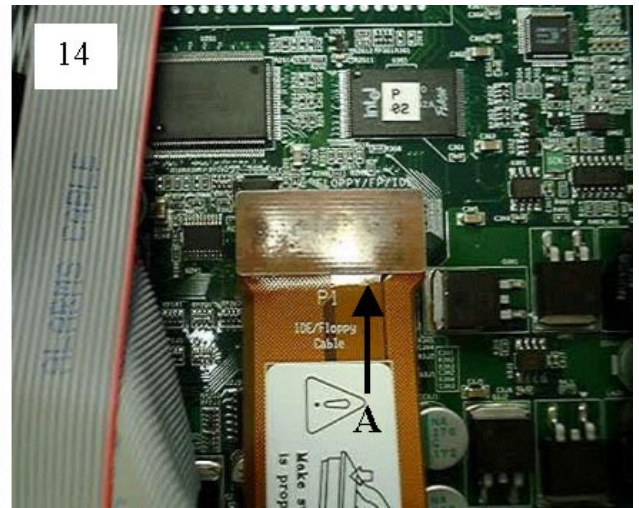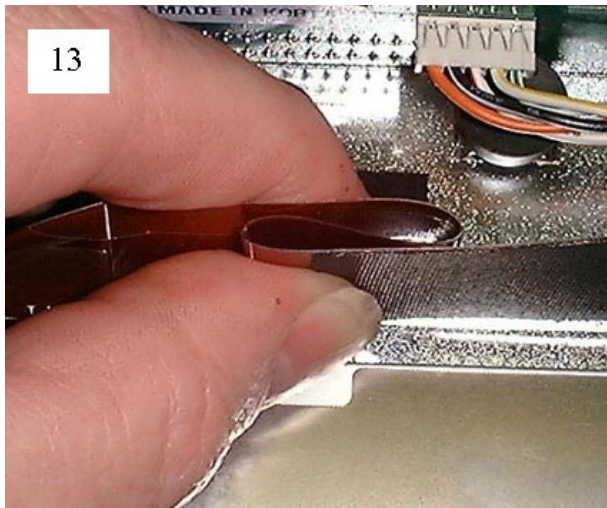
Installing a CD-ROM Drive

To install a CD-ROM drive, follow this procedure:

1. Carefully align the connector for the CD-ROM and plug into the drive. Bends at location (A) greater than 90 degrees can cause damage to circuit traces.
2. Place the CD-ROM drive into the plastic carrier. Make sure to align the two metal mounting pins on the carrier with the plastic standoffs (A) on the cable and fully insert drive into the carrier.
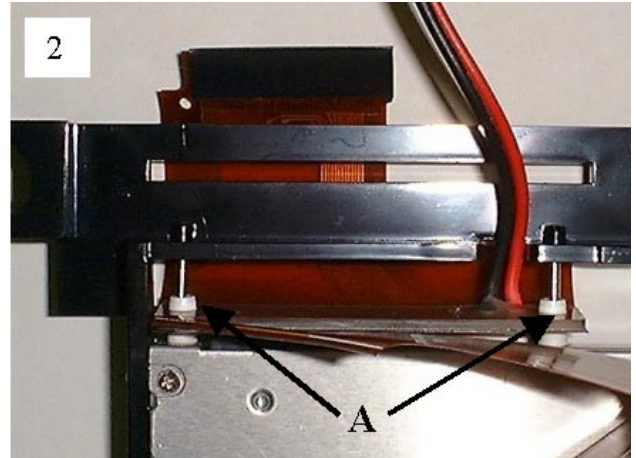
3. If no pull-tab is on the floppy drive ZIF connector, install the cable as follows. The carrier mounting pin at location (A) should go through the mounting hole in the end of the cable as shown. This prevents the exposed ZIF contacts from potential shorting.
4. Align pin on side of the carrier (A) to fit into the screw hole of the drive for proper engagement.

5. Power cable should plug into carrier opening (A) and be positioned as shown. The end of the Flex cable should route up through the slot in carrier (B) if pull-tab is present.
6. Place EMI covers on top and bottom of drive (Top shown).
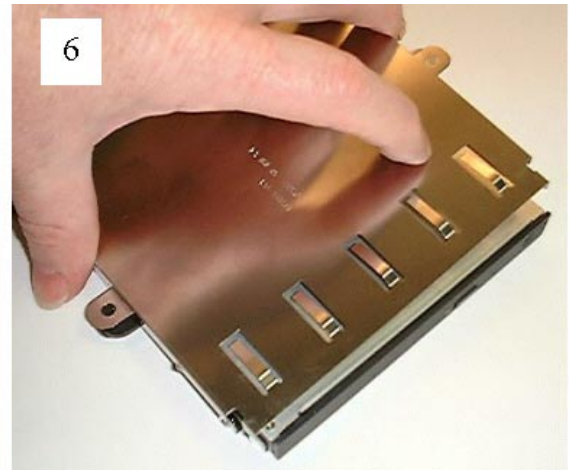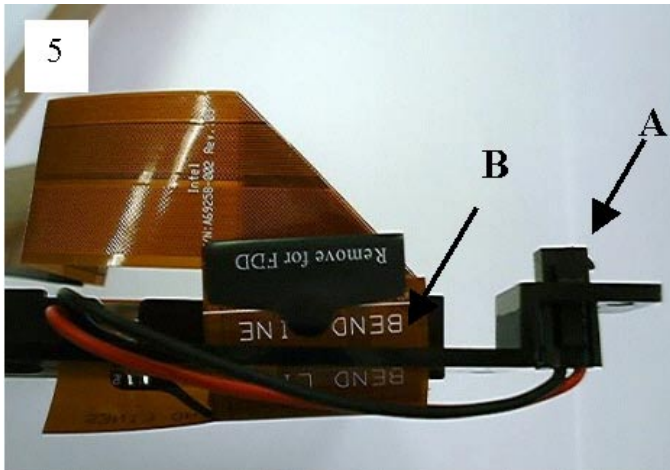
7. Install drive assembly down into the top of the unit and then forward through the opening in the front of the unit as shown.

⚠ **CAUTION**

Carefully install the assembly to avoid deforming the EMI top cover spring fingers.

8. If tabs are present, position the carrier to engage between the chassis tabs (A). Note: Latest style carriers do not engage tabs.
9. Plug power cable from power supply to the cable power plug on the carrier (B).
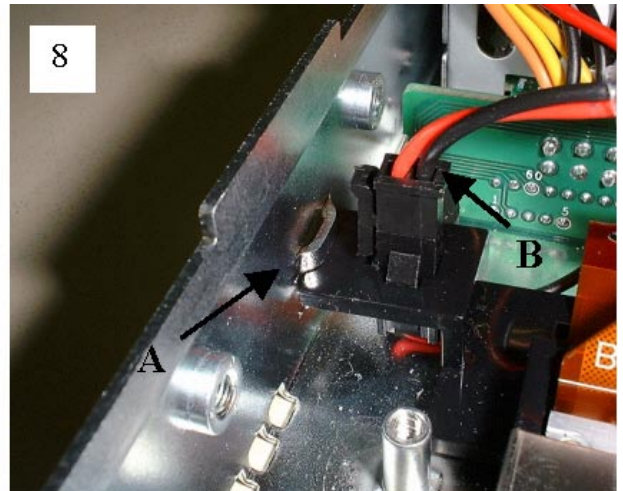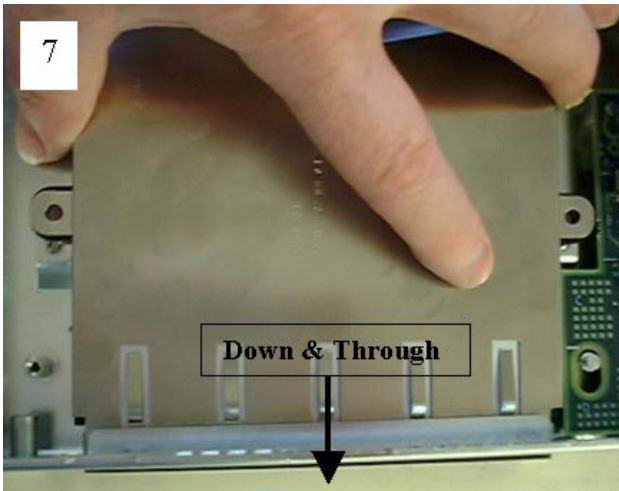
10. Secure the assembly in the chassis using screws at the two carrier mounting locations.
11. Notice the two BEND LINES shown.

12. Make a Z fold in the cable at the BEND LINE locations.
13. Plug connector onto baseboard (A) and ensure that it is not cocked to either side. Reinstall the hard disk drive and air baffle.

Intel TSRMT2 Carrier/Industrial Grade Server Product Guide

Index