

Intel® Telco/Industrial Grade Server TIGPR2U Product Guide

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Part I: User's Guide

This document provides an overview of the Intel® Telco/Industrial Grade Server TIGPR2U.

This manual consists of two parts:

- *User's Guide*: 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*: 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

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.



WARNING

If AC power supplies are installed:

Mains AC power disconnect: The AC power cord(s) is considered the mains disconnect for the server and must be readily accessible when installed. If the individual server power cord(s) will not be readily accessible for disconnection then you are responsible for installing an AC power disconnect for the entire rack unit. This main disconnect must be readily accessible, and it must be labeled as controlling power to the entire rack, not just to the server(s). To remove all power, two AC cords must be removed.



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 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.



WARNING

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 server configured with two power supplies is less than 4 amperes.



WARNING

If DC power supplies are installed:

Connection with a DC source should only be performed by trained service personnel. The server with DC input is to be installed in a Restricted Access Location in accordance with articles 110-16, 110-17, and 110-18 of the National Electric Code, ANSI/NFPA 70. The DC source must be electrically isolated by double or reinforced insulation from any hazardous AC source. The DC source must be capable of providing up to 650 Watts of continuous power per feed pair.

Main DC power disconnect: You are responsible for installing a properly rated DC power disconnect for the server system. This main disconnect must be readily accessible, and it must be labeled as controlling power to the server. The circuit breaker of a centralized DC power system may be used as a disconnect device when easily accessible and should be rated no more than 10 amps.



WARNING

Grounding the server:

To avoid the potential for an electrical shock hazard, you must reliably connect an earth grounding conductor to the server. The earth grounding conductor must be a minimum 14AWG connected to the earth ground stud(s) on the rear of the server. The safety ground conductor should be connected to the chassis stud with a Listed closed two-hole crimp terminal. The nuts on the chassis earth ground 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.



WARNING

Overcurrent protection:

Overcurrent protection circuit breakers must be provided as part of each host equipment rack and must be incorporated in the field wiring between the DC source and the server. The branch circuit protection shall be rated minimum 75Vdc, 10 A maximum 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 server configured with two power supplies is 8 amperes.



WARNING

Do not attempt to modify or use an AC power cordset that is not the exact type required. You must use a power cordset 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. The connector must have certification marks showing certification by an agency acceptable in your region and for U.S. must be Listed and 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 approved IEC 320, sheet C13, 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.

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1 Chassis Description

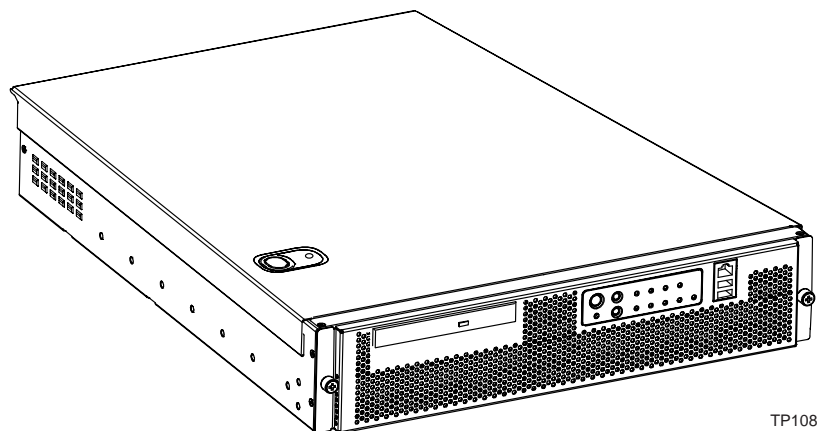
The Intel® Telco/Industrial Grade Server TIGPR2U is a compact, high-density, rack mount server system with support for 1 or 2 Intel® Xeon™ processors with 512 KB L2 cache and 12 GB DDR266 SDRAM DIMM memory. The TIGPR2U supports high availability features such as hot swap disk drives and hot swap and redundant power supply modules. The scalable architecture of the TIGPR2U supports symmetric multiprocessing (SMP) and a variety of operating systems (OS).

Physical Specifications

Table 1 lists the server's physical specifications while Figure 1 presents a view of the TIGPR2U server chassis.

Table 1. Server Physical Specifications

Specification	Value
Height	3.45 inches (87.6 mm)
Width	17.11 inches (434.6 mm)
Depth	20 inches (508 mm)
Front clearance	2 inches (76 mm)
Side clearance	1 inches (25 mm)
Rear clearance	3.6 inches (92 mm)



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Figure 1. Intel® Telco/Industrial Grade Server TIGPR2U Chassis

Environmental Specifications

The TIGPR2U system has been tested to the environmental specifications listed in Table 2. All testing has been 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 Summary

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 <i>Intel® Environmental Standards Handbook</i> .
Safety	UL 60950, CSA 60950, IEC 950, TUV/GS EN60950
Emissions	Verified to FCC Class A; tested to CISPR 22 Class A, EN 55022 Class A, VCCI Class A ITE, AS/NZS 3548 Class A, CNS13438
Immunity	Verified to comply with EN 55024
Shock operating	Half-sine 2 G, 11 ms pulse, 100 pulses in each direction, on each of the three axes as per the <i>Intel® Environmental Standards Handbook</i> .
Shock non-operating	Trapezoidal, 25 G, 170 inches/sec delta V, three drops in each direction, on each of the three axes as per <i>Intel® Environmental Standards Handbook</i>
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 <i>Intel® Environmental Standards Handbook</i> .
Acoustic	Sound pressure: < 55 dBA at ambient temperatures < 28 °C measured at bystander positions in operating mode

Chassis Feature Location

Front Panel

Figure 2 shows the front view of the system including the front panel. The front panel contains system control switches, alarm indicators and relays, and status indicators. Front panel controls and LEDs are summarized in Table 3.

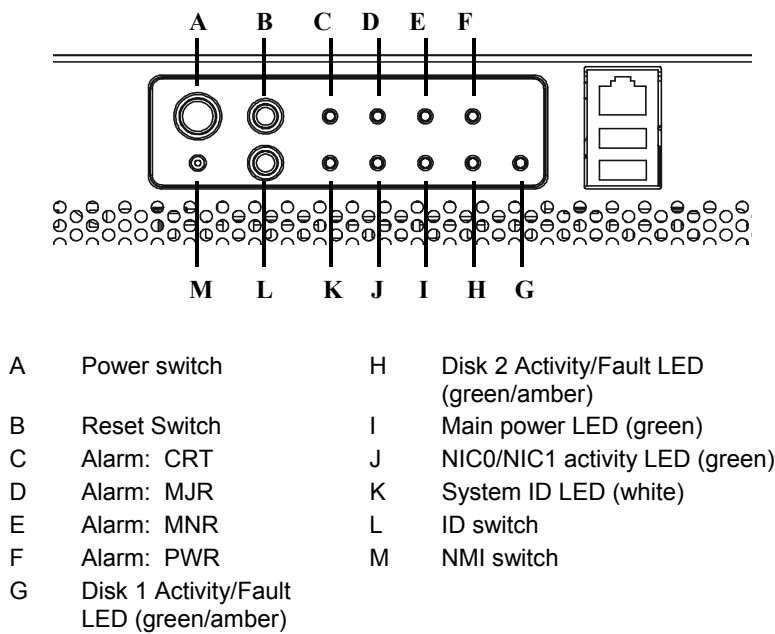
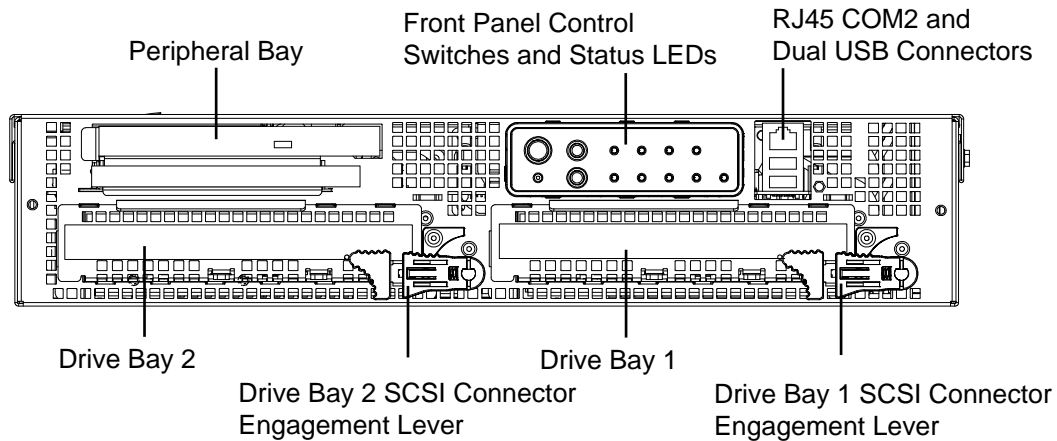


Figure 2. Front Panel

Table 3. Front Panel Features

Item	Feature	Description
Front Panel Switches		
A	Power switch	Toggles the system power
B	Reset switch	Resets the system
L	ID switch	Toggles system ID LED
M	NMI switch	Assert NMI to baseboard
Front Panel Alarm LEDs and Relays		
C	Critical (amber or red)	When continuously lit, indicates the presence of a Critical System Fault. A critical system fault is an error or event that is 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. The front panel critical alarm relay will be engaged.
D	Major (amber or red)	When continuously lit, indicates the presence of a Major System Fault. A major system fault is an error or event that is 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. The front panel major alarm relay will be engaged.
E	Minor (amber)	When continuously lit, indicates the presence of a Minor System Fault. A minor system fault is an error or event that is detected by the system but has little impact to actual system operation. An example would be a correctable ECC error. The front panel minor alarm relay will be engaged.
F	Power (amber)	When continuously lit, indicates the presence of a Power System Fault. The front panel power alarm relay will be engaged.
Front Panel Status LEDs		
G	Disk 1 Activity/Fault LED (green/amber or red)	Indicates disk 1 SCSI hard drive activity when green, or a disk 1 SCSI hard drive fault when amber or red.
H	Disk 2 Activity/Fault LED (green/amber or red)	Indicates disk 2 SCSI hard drive activity when green, or a disk 2 SCSI hard drive fault when amber or red.
I	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.
J	NIC0/NIC1 activity LED (green)	Indicates activity on either NIC0 or NIC1.
K	System ID LED (white)	Used to help locate a given server platform requiring service when installed in a multi-system rack.

Figure 3 shows the front view of the system with the bezel removed.

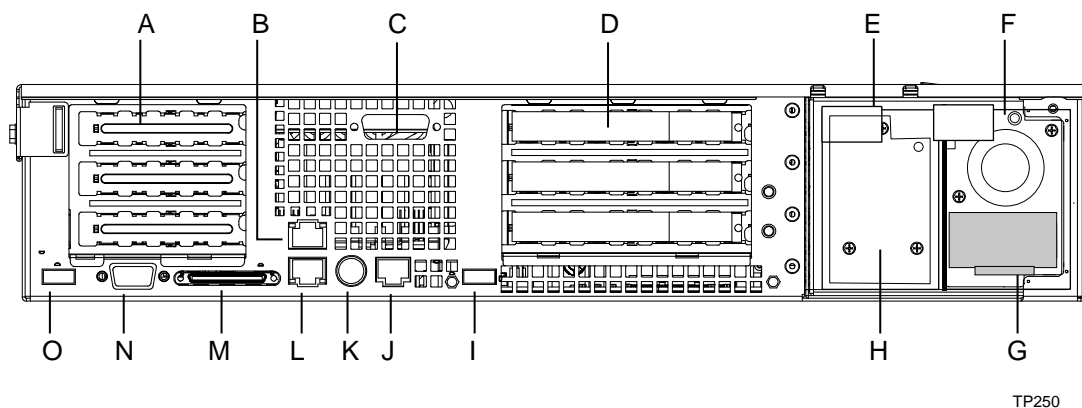


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Figure 3. Front View with Bezel Removed

Back Panel

Figure 4 shows the back panel view of the system and Table 4 lists the features of the back panel.



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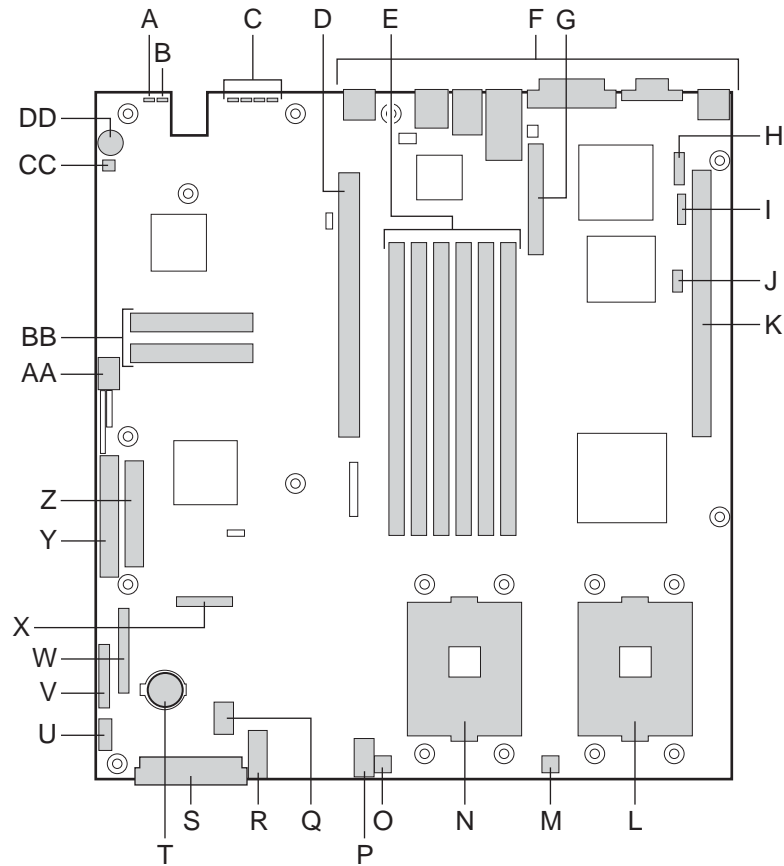
Figure 4. Back Panel DC Version

Table 4. Back Panel Features

Item	Description
A	PCI card bracket (low profile)
B	RJ-45 NIC 2 connector - Green Status LED / Yellow Status LED
C	DB15 Alarm Connector
D	PCI card bracket (full-height)
E	DC power input (primary)
F	DC power input (redundant)
G	Power supply module, redundant (system accessory)
H	Power supply module, primary
I	USB connector 0
J	RJ-45 serial 2 port
K	PS/2 mouse/keyboard connector – requires dongle (“Y” cable) to connect both keyboard and mouse
L	RJ-45 NIC 1 connector
M	U-320 SCSI connector
N	Video connector
O	USB connector 1

Internal Chassis Features

Figure 5 shows the location of the connectors and components on the TIGPR2U server board.



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- | | |
|--|----------------------------------|
| A. System status LED | P. Auxiliary signal connector |
| B. ID LED | Q. Sys fan 1 connector |
| C. Diagnostic LEDs (POST code) | R. Sys fan 2 connector |
| D. 64-bit PCI riser slot for PCI-X bus B (full height) | S. Main power connector |
| E. DIMM slots | T. Battery |
| F. I/O ports | U. Power supply signal connector |
| G. SCSI channel B connector (SCSI version only) | V. ATX front panel connector |
| H. COM 1 serial header | W. SSI front panel connector |
| I. ICMB connector | X. Floppy/FP/IDE connector |
| J. IPMB connector | Y. ATA/IDE connector |
| K. 64-bit PCI riser slot for PCI-X bus C (low profile)
RADIOS enabled. Modular ROM-B card support
is provided via the riser card (SCSI only) | Z. Floppy drive connector |
| L. Secondary processor socket | AA. USB 2 & 3 connector |
| M. Secondary processor fan connector | BB. N/A |
| N. Primary processor socket | CC. Hard Disk Drive LED header |
| O. Primary processor fan connector | DD. Speaker |

Figure 5. Server Board Connector and Component Locations

Processor

The server board accommodates one or two Intel® Xeon™ 2.4 GHz/512KB L2 cache processors in the INT3/FCPGA Socket 604 package operating at 533MHz. This processor uses the 0.13 micron technology.

Memory

The system board has six 168-pin DIMM slots each supporting 72-bit ECC registered DDR DIMMs (DDR266 compatible). Memory is partitioned in three banks. A minimum of 256 MB (128 MB x 2) and as much as 12 GB may be installed. Memory must be installed in pairs, starting with bank 1 (slots 1B and 1A).

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

➡ NOTE

Use DIMMs that have been tested for compatibility with the 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. The Segment B PCI adapter subsystem provides the following features:

- 184-pin, 5-volt keyed, 64-bit expansion slot connector
- Support for a 3-slot PCI riser card
- Support for both 5-volt and 3.3-volt PCI riser cards

The Segment C PCI adapter subsystem provides the following features:

- 184-pin, 5-volt keyed, 64-bit expansion slot connector
- Support for a 3-slot PCI riser card
- Support for only low-profile 3.3-volt PCI riser cards
- RADIOS enabled for use with zero channel RAID cards (SCSI version only)

Video

The server board uses an ATI* RAGE XL PCI graphics accelerator with 8 MB of video SDRAM. The embedded SVGA video subsystem supports:

- 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 SCSI version of the server board includes an embedded Adaptec* AIC-7902W controller providing dual Ultra-320 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 must also be terminated. LVD devices generally do not have termination built-in and need to have a termination source provided. Non-LVD devices generally are terminated through a jumper or resistor pack on the device itself.

Network Controller

⇒ NOTE

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

The server board uses the Intel® Fast Ethernet Controller 82546EB and supports two 10Base-T/100Base-T/1000Base-TX network subsystems.

The 82546EB controller supports the following features:

- 32-bit PCI master interface
- Integrated IEEE 802.3 10Base-T, 100Base-TX and 1000Base-TX compatible PHY
- IEEE 820.3u auto-negotiation support
- Full-duplex support at 10 Mbps, 100 Mbps, and 1000 Mbps operation
- Low power +3.3 V device

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

NIC Connector and Status LEDs

The E82546EB controller drives LEDs on the network interface connector that indicates link/activity on the LAN and speed of operation. The green LED indicates network connection when on and TX/RX activity when blinking. The speed LED indicates 1000 Mbps when amber, 100 Mbps when green, and 10 Mbps when off.

Keyboard and Mouse

The keyboard/mouse controller is PS/2-compatible. If specified through the System Setup Utility, 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. A Y-cable can be used if both a PS/2 mouse and keyboard are required at the same time.

RJ-45 Serial Port

The rear RJ-45 serial port is a fully functional serial port that supports any standard serial device and provides support for serial concentrators. 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 RJ-45 serial port. The 8 pins of the RJ-45 connector can be configured to match either of two pin-out standards used by serial port devices. To accommodate either standard, the J5A2 jumper block located directly behind the rear RJ-45 serial port must be jumpered appropriately according to the desired standard.

⇒ NOTE

By default, the RJ-45 serial port is configured to support a DSR signal.

ACPI

The server board supports the Advanced Configuration and Power Interface (ACPI) as defined by the ACPI 2.0 specification. 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 TIGPR2U 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 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 an administrator 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 can set 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 System Setup Utility.
- Must enter the user password to boot the server if “Password on Boot” is enabled in either the BIOS Setup or System Setup Utility.

- Must enter the user password to exit secure mode.

If only the supervisor password is set, you:

- Must enter the administrator password to enter BIOS Setup or the System Setup Utility.
- Must enter the administrator password to boot the server if “Password on Boot” is enabled in either the BIOS Setup or System Setup Utility.
- Must enter the administrator password to exit secure mode.

If both passwords are set, you:

- May enter the user password to enter BIOS Setup or the System Setup Utility. However, you will not be able to change many of the options.
- Must enter the administrator password if you want to enter BIOS Setup or the System Setup Utility 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 System Setup Utility.
- May enter either password to exit secure mode.

Secure Mode

Configure and enable the secure boot mode by using the System Setup Utility. 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 5 lists the software security features and describes what protection each offers. In general, to enable or set the features listed, you must run the System Setup Utility and select “Security” from the “Available Tasks” window. Table 5 also refers to other System Setup Utility menus and to the Setup utility.

Table 5. Software Security Features

Feature	Description
Secure mode	<p>How to enter secure mode:</p> <p>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.</p> <p>When the system is in secure mode:</p> <p>The server can boot and run the operating system, but mouse and keyboard input are not accepted until the user password is entered.</p> <p>At boot time, if a CD is detected in the CD-ROM drive, the system prompts for a</p>

	<p>password. When the password is entered, the server boots from CD and disables the secure mode.</p> <p>If there is no CD in the CD-ROM drive, the server boots from drive C and automatically goes into secure mode. All enabled secure mode features go into effect at boot time.</p> <p>To leave secure mode: Enter the correct password(s).</p>
<p>Set a time-out period so that keyboard and mouse input are not accepted.</p> <p>Also, screen can be blanked.</p>	<p>Specify and enable an inactivity time-out period of from 1 to 120 minutes.</p> <p>If no keyboard or mouse action occurs for the specified period, attempted keyboard and mouse input will not be accepted.</p> <p>The monitor display will go blank.</p> <p>To resume activity: Enter the correct password(s).</p>
<p>Control access to using the System Setup Utility: set administrator password</p>	<p>To control access to setting or changing the system configuration, set an administrator password and enable it through Setup.</p> <p>If both the administrator and user passwords are enabled, either can be used to boot the server or enable the keyboard and/or mouse, but only the administrator password will allow Setup to be changed.</p> <p>To disable a password, change it to a blank entry or press CTRL-D in the Change Password menu of the Administrator Password Option menu found in the Security subsystem group.</p> <p>To clear the password if you cannot access Setup, change the Clear Password jumper (see Table 21).</p>
<p>Control access to the system other than System Setup Utility: set user password</p>	<p>To control access to using the system, set a user password and enable it through Setup.</p> <p>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.</p> <p>To clear the password if you cannot access Setup, change the Clear Password jumper (see Table 21).</p>
<p>Boot without keyboard</p>	<p>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.</p>
<p>Specify the boot sequence</p>	<p>The sequence that you specify in Setup will determine the boot order. If secure mode is enabled (a user password is set), 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.</p>

2 System Description

This chapter describes the basic subsystems of the Intel® Telco/Industrial Grade Server TIGPR2U.

Front Panel IO (FPIO) System Board

Features

The TIGPR2U server system has the following FPIO features:

- Four switches to control power-on, reset, NMI, and the system ID LED
- One system ID LED that can be controlled remotely or by the system ID switch
- Two system activity LEDs that indicate power-on and NIC activity
- Two hard drive activity/fault LEDs that indicate activity/fault status for drives 1 and 2
- Four system fault LEDs that indicate critical, major, minor, and power system fault status
- Four system fault relays for external critical, major, minor, and power fault indicators
- One SCSI bus with hot-swap circuitry for controlling hot-swap SCSI disk drives 1 and 2
- IDE Bus from IDE Connector to blind mate connector
- Floppy Bus from Floppy Connector to blind mate connector
- One blind mate connector for interfacing to CDROM or floppy drive carrier assembly
- Connectors for interfacing to the power supply, server baseboard, drive carrier assemblies, and hot plug disk drives 1 and 2

FPIO SCSI Subsystem Status LEDs

The status LEDs give the user a visual indication of the drives' condition. There is a single LED for each drive. The LEDs are bi-colored and use a combination of color and blinking frequency to indicate multiple conditions. The LEDs are mounted on the FPIO board, and the light is directed to the front panel through the use of a light pipe assembly. See Table 6 for LED activity definitions. See the Firmware EPS for definitions of the different blink rates.

Table 6. LED Activity Definitions

LED State	Drive Active	Fault Condition
Solid Green		
Blinking Green	X	
Blinking Yellow/Green		X
Blinking Yellow/Blank		X
Blank		

Riser Boards

The server board supports two riser boards, a 3.3V/5V Segment B full-length riser board, and a 3.3V Segment C low-profile riser board. Features of the Segment B riser board include:

- Support for three 33-MHz 5-Volt 64-bit PCI add-in cards
- Provides 5-Volt to 3.3-Volt signal level translation
- Support for a Zero Channel RAID (ZCR) card

The 3.3V/5V Segment B riser board contains voltage level translation converting the 5-Volt PCI add-in card signals to conform to the server board, which has 3.3 Volt-signaling levels. The board supports a limit of 25 Watts per slot. Figure 6 illustrates the Segment B riser board.



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Figure 6. 3.3-Volt/5-Volt Segment B Full-Length Riser Board

The 3.3-Volt Segment C low-profile riser board supports three 3.3-Volt 64-bit slots. The bus speed varies from 33MHz to 100MHz depending on the type of PCI adapters configured in the 3.3-Volt riser card. Figure 7 illustrates the 3.3-Volt Segment C low-profile riser board.

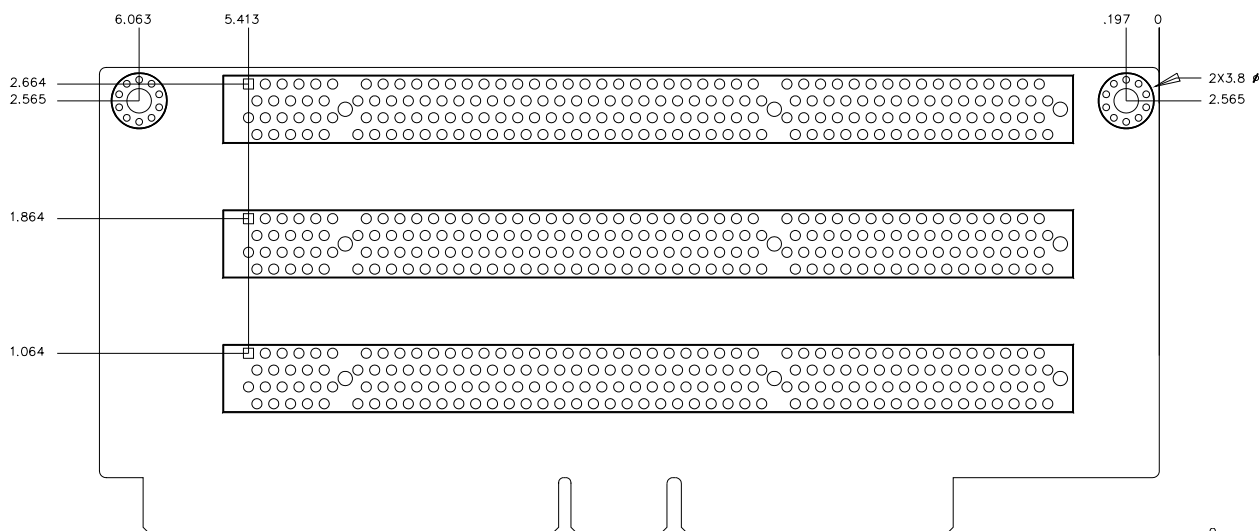


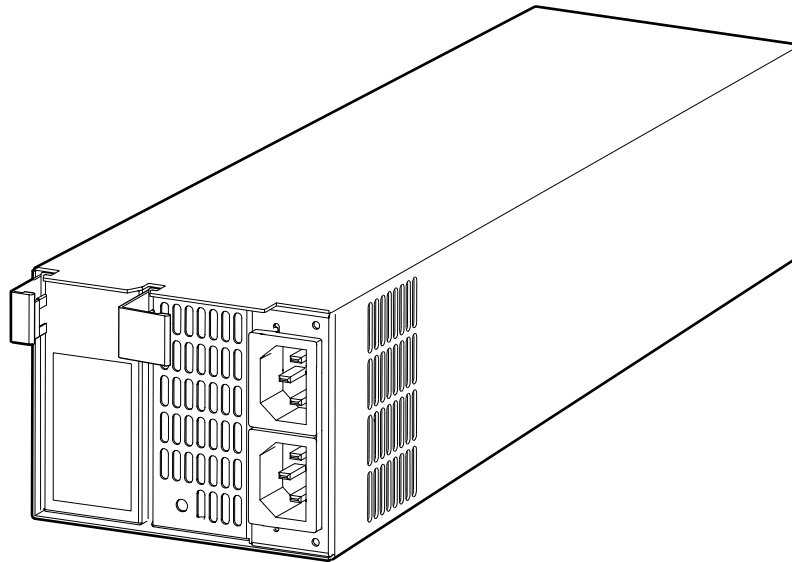
Figure 7. 3.3-Volt Segment C Low-Profile PCI Adapter Subsystem

The 3.3-Volt Segment C low-profile riser board supports ZCR cards. To operate correctly, insert the ZCR card into the lower slot of the Segment C riser board, and then insert the Segment C

riser board into the low-profile riser board slot on the server board. For the location of the low-profile riser board slot, see callout K on Figure 5.

Power Supplies

The power supply cage shown in Figure 8 is accessed from the rear of the chassis. The power supply cage supports up to two hot-swap power supplies (either AC input or DC input) in a (1+1) redundant configuration. A power supply filler module (shown at left in Figure 8) for the empty power supply site is supplied for systems without redundancy. Only the DC input version is NEBS certified.



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Figure 8. Non-redundant AC-Power Supply Subsystem (Filler Module Shown at Left)

DC Power Subsystem

This section defines the features of the DC input switching power subsystem.

Features

- Power Supply Module Rating - 470W
- Power Supply Cage Rating – 450W
- “Power Good” indication LEDs
- Predictive failure warning
- Internal cooling fans with multi-speed capability
- Remote sense of 3.3-Volt and 5-Volt DC outputs
- “DC_OK” circuitry for brown-out protection and recovery
- Built-in load sharing capability
- Built-in overloading protection capability

- Onboard field replaceable unit (FRU) information
- I²C interface for server management functions
- Integral handle for insertion/extraction

Introduction

The DC version of the TIGPR2U server system uses a -48 to -60 VDC input switching power subsystem, which provides up to 470 Watts with -48 to -60 VDC input and with current and remote sense regulation. The power subsystem consists of one or two 470-Watt power supply modules. A system with two modules forms a redundant, hot-swappable (1+1) power subsystem.

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 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
- Remote sense return
- Power Subsystem On (DC PWR enable)
- Power Good
- I²C interface chip¹

Power Supply Module LED Indicators

There is a single bi-color LED to indicate power supply status that is visible on the back of the system. Table 7 shows the conditions confirmed by the LED indicators.

Table 7. LED Indicators

Power Supply Condition	Power Supply LED
No DC power to all PSUs	OFF
No DC power to this PSU only	AMBER
DC present/Only Standby Outputs On	BLINK GREEN

¹ 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 I²C interface chip.

Power supply DC outputs ON and OK	GREEN
Current limit	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	Maximum Input Current
Voltage	-38VDC	-48 to -60VDC	-75VDC	17.0 Amps

DC Output Current Specifications

The combined output power of all outputs will not exceed 450 W. Each output has a maximum and minimum current rating, as 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. DC Power Supply Input/Output Summary

Voltage	Current Rating
+3.3 VDC Output	20 Amp Max ¹
+5 VDC Output	26 Amp Max ¹
+12 V1DC Output	16 Amp Max ²
+12 V2DC Output	12.0 Amp Max ²
+12 V3DC Output	12.0 Amp Max ²
-12 VDC Output	0.5 Amp Max
+5 VDC Standby	2.0 Amp Max
Output balancing	Total combined output power of all output shall not exceed 450 W.
DC Line Voltage	-48VDC to -60VDC
DC Input Current	17.0 Amp maximum

1. Combined 3.3V/5V shall not exceed 150W.
2. Maximum continuous load on the combined 12V output shall not exceed 25A. Peak load on the combined 12V output shall not exceed 30A for greater than 10 seconds.

AC Power Subsystem

This section defines the AC input switching power subsystem.

Features

- Power Supply Module Rating - 500W
- Power Supply Cage Rating – 480W
- “Power Good” indication LEDs
- Predictive failure warning
- Internal cooling fans with multi-speed capability

- Remote sense of 3.3 Volt and 5 Volt DC 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
- I²C interface for server management functions
- Integral handle for insertion/extraction

Introduction

The AC version of the TIGPR2U server system uses an AC input switching power subsystem that provides up to 500-Watt DC with 100–240 VAC input with current and remote sense regulation. The power subsystem consists of one or two 500-Watt power supply modules. A system with two modules forms a redundant, hot-swappable (1+1) power subsystem. There is a single bi-color LED to indicate power supply status. 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 PSUs	OFF
No AC power to this PSU only	AMBER
AC power present/Only Standby Outputs On	BLINK GREEN
Power supply DC outputs ON and OK	GREEN
Power Supply in Alert Condition	AMBER
Power supply failure (OTP, OCP, OVP, UV)	AMBER

AC Input Voltage Specification

The power supply operates within all specified limits over the voltage ranges outlined in Table 11.

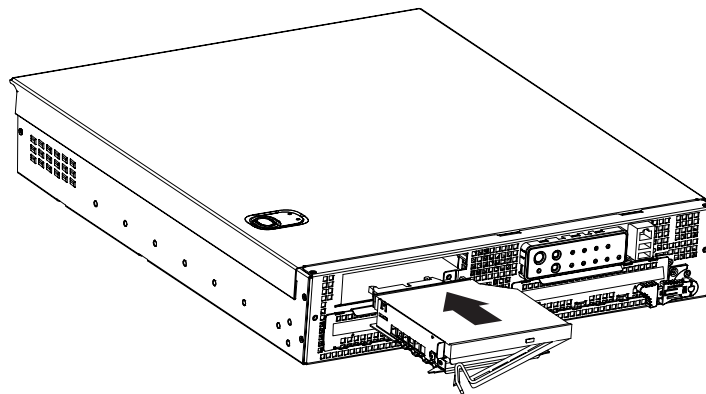
Table 11. AC Power Supply Input/Output Summary

Voltage	Current Rating
+3.3 VDC Output	20 Amp Max ¹
+5 VDC Output	20 Amp Max ¹
+12 V1DC Output	18 Amp Max ²
+12 V2DC Output	18.0 Amp Max ²
-12 VDC Output	0.5 Amp Max
+5 VDC Standby	2.0 Amp Max
Output balancing	Total combined output power of all output shall not exceed 500 W.
AC Line Voltage	Auto-ranging for either 100-127 VAC or 200-240 VAC
AC Line Frequency	50/60 Hz
AC Input Current	4 Amp at 100-127 VAC 2 Amp at 200-240 VAC

1. Combined 3.3/5V shall not exceed 120W.
2. Maximum continuous load on the combined 12V output shall not exceed 25A. Peak load on the combined 12V output shall not exceed 30A for greater than 10 seconds.

Peripheral Bay

One peripheral drive (either a slim-line floppy drive or a slim-line CD-ROM drive) can be mounted in the system using a blind-mate peripheral drive carrier inserted into the peripheral drive bay. The peripheral drive bay is located above the hard drive tray and to the left. The blind-mate peripheral drive carrier for the floppy drive is different from the blind-mate peripheral drive carrier for the CD-ROM drive.



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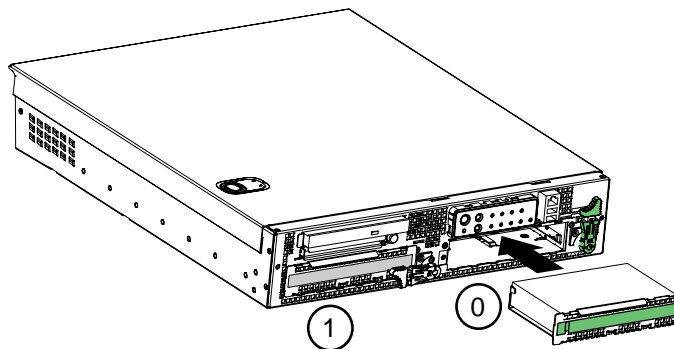
Figure 9. Peripheral Drive Bay

Hard Drive Tray

Hard Drive Bays

Up to two 1.0-inch Ultra-320* SCSI technology hard drives can be mounted in the hot swap drive bays, which are located in the bottom front of the chassis. The front bezel must be removed to access the hot swap drive bays.

Installed hard drives are auto assigned addresses 0 and 1. Do not jumper the SCSI ID Selector Block on the hard drives. Refer to the following figure for SCSI ID assignment details.



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Figure 10. Hard Drive Bays

Cooling Subsystem

All system components except the power supply cage are cooled by a set of fans mounted near the middle of the chassis and behind the hard drive bays. This is shown in Figure 11.

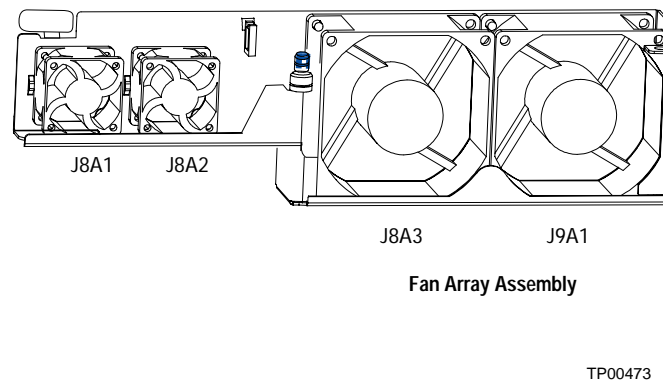


Figure 11. Fan Array with Four System Fans Installed

The TIGPR2U system comes in a non-redundant, four-fan configuration that consists of two 80mm x 38mm fans and two 40mm x 28mm fans.

Air flows in through the front bezel over the peripheral bay and the hard drive bays, passes through the fans and over the baseboard, and exhausts through the rear of the chassis. Each fan provides tachometer signal output to the server baseboard to indicate a fan failure.

The cooling subsystem contains a fan array (as shown in Figure 11) consisting of two 80 x 38 mm fans and two 40 x 28 mm fans to cool the server board and other components. A fan failure is indicated by one of the fault LEDs located on the front panel.

Ambient Temperature Control

The server baseboard contains a pulse-width-modulation (PWM) circuit, which cycles the 12 VDC fan voltage to provide quiet operation when system ambient temperature is low and no fan failures exist. There are 16 fan speed settings between 20 °C and 35 °C, with the lowest fan speed setting at 20 °C or below. When the room ambient temperature exceeds 35 °C, the fan control circuit ceases cycling and delivers 12 VDC. Following a room temperature excursion above 35°C the fan voltage does not reenter PWM mode until the room temperature drops below 35 °C and all fans are operational.

Server Management Summary

The TIGPR2U baseboard server management architecture features a Baseboard 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).

Server Board Management Controller

The BMC on the system baseboard provides server management monitoring capabilities. A flash memory is associated with the BMC that holds the operational code, sensor data records (SDRs), and system event log (SEL). There is also a serial EEPROM that holds the BMC configuration defaults and FRU information. The various server management functions provided by the BMC are listed as follows:

- Baseboard 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
- I²C master controller for the IPMB
- Two private I²C management bus interfaces
- Server management software (SMS) and server management mode (SMM) IPMB message receiver
- Event message receiver
- SEL management and access
- SDR repository management and access
- Processor non-maskable interrupt (NMI) monitoring
- Processor SMI monitoring
- Time-stamp clock
- Secure mode, video blank, and floppy write protect
- Software front panel NMI generation

3 Regulatory Specifications and Disclaimers

Declaration of the Manufacturer or Importer

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 60950 – 3rd Edition/CSA 22.2. No. 950-M93
Canada:	cUL Certified – CAN/CSA 22.2. No. 60950-00 for Canada (product bears the single UL mark for U.S. and Canada)
Europe:	Low Voltage Directive, 73/23/EECTUV/GS to EN60950 2 nd Edition with Amendments, A1 = A2 + A3 + A4
International:	TUV/CB to IEC 60950 3 rd Edition, EN60 950 2 nd Edition + Amd 1-4, EMKO-TSE (74-SEC) 207/94 plus International deviations
Australian / New Zealand:	CB Report to IEC 60950, 3 rd Edition plus International 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 <ul style="list-style-type: none">• 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
China:	CCC 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 his or her 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:

- Re-orient 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: TIGPR2U

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 to, 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自主規制協議会（VCCI）の基準に基づくクラスA情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

English translation of the notice above:

This is a Class A product based on the standard of the Voluntary Control Council for Interference (VCCI) by Information Technology Equipment. 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 Canadien des Communications.

English translation of the above notice:

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 are located on the product safety label that 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。

4 POST and BIOS Setup Utilities

This chapter describes the POST and BIOS setup utilities provided with the TIGPR2U server. It also includes information about the Adaptec* SCSI Utility. For information about server management utilities, see Chapter 5.

Table 12. POST and BIOS Setup Utilities

Utility	Description and brief procedure	Page
Changing boot priority through POST	Change the boot device for the current boot.	41
Adaptec SCSI Utility	Use to view/configure the settings for the Adaptec AIC-7902 SCSI host adapter.	41
BIOS Setup	Use to configure system options.	43
BIOS Update Utility	Use to update the BIOS or recover from a corrupted BIOS update.	45

Hot Keys

Use the numeric pad of the keyboard to enter numbers and symbols.

Table 13. Hot Keys

To Do This:	Press These Keys
Secure your system immediately.	<Ctrl+Alt> + hot key (Set your hot key combination with the System Setup Utility or BIOS Setup)
Enter the Adaptec SCSI Utility during POST.	<Ctrl+A> (SCSI version only)
Enter BIOS Setup during POST.	<F2>
Abort memory test during POST.	<ESC> (Press while BIOS is updating memory size on screen)
Display a menu for selecting the boot device.	<ESC> (Press anytime after memory check)
To remove the splash screen.	<ESC>
To perform a network boot.	<F12>

Power-On Self-Test (POST)

Each time the system is turned on, the BIOS begins executing the Power-On Self-Test (POST), which is stored in flash memory. POST discovers, configures, and tests the processors, memory, keyboard, and most installed peripheral devices. During the memory test, POST displays the amount of memory that it is able to access and test. The time needed to test memory depends on the amount of memory installed.

1. Turn on your server and monitor. After a few seconds, POST begins to run and displays a splash screen.
2. While the splash screen is displayed, make one of the following selections:
 - Press <F2> to enter the BIOS Setup.

- Press <Ctrl-A> to enter the Adaptec SCSI*Select** Utility. See page 41 for information about the Adaptec SCSI*Select* Utility.
 - Press <Esc> to view POST diagnostic messages and change the boot device priority for this boot only.
 - Press <F12> to perform a network boot.
3. If you do NOT make one of the above selections and do NOT have a device with an operating system loaded, the boot process continues and the system beeps once. The following message is displayed:

Operating System not found

What appears on the screen after this depends on whether you have an operating system loaded and if so, which one.

If the system halts before POST completes running, it emits a beep code indicating a fatal system error that requires immediate attention. If POST can display a message on the video display screen, it causes the speaker to beep twice as the message appears.

Write down both the screen display and the beep code you hear; this information is useful for your service representative. For a listing of common beep codes and error messages that POST can generate, see Chapter 7, “Technical Reference,” in this manual.

Temporarily Changing the Boot Device Priority

During POST, you can change the boot device priority for the current boot process. The changes are not saved for the next boot process.

1. Boot the server.
2. At any time during POST, press <Esc>. When POST completes, a popup Boot menu displays.
3. Use the arrow keys to highlight the device you want the server system to boot from first. For example, if you want the server system to boot from the CD-ROM first, then select “ATAPI CD-ROM Drive.”

⇒ NOTE

If you boot to a CD-ROM, make sure the CD is in the CD drive before selecting. One of the options on the popup Boot menu is “Enter Setup.” Selecting this option brings you into the BIOS Setup.

4. Press <Enter> and the boot process continues.

The Adaptec SCSI*Select* Utility

Each host adapter includes an onboard SCSI*Select* configuration utility that allows you to configure/view the settings of the host adapter and devices in the server.

The system finds the Adaptec* AIC-7902 SCSI host adapter and displays the message Adaptec* AIC-7902 SCSI BIOS V x.xxx where x.xxx is the version number of the SCSI*Select* utility. Pressing <Ctrl+A> at this time allows you to configure the Adaptec* AIC-7902 SCSI host adapter.

When to Run the Adaptec SCSISelect Utility

Use the *SCSISelect* utility to:

- Change default values
- Check and/or change SCSI device settings that may conflict with those of other devices in the server
- Do a low-level format on SCSI devices installed in the server

Running the SCSISelect Utility

1. When this message appears on the video monitor:

<<<Press <Ctrl><A> for SCSISelect(TM) Utility!>>>

2. Press <Ctrl+A> to run the utility. When the main menu for the host adapter appears, choose the device that you want to configure; each SCSI bus accepts up to 15 devices.

Use the following keys to navigate through the menus and submenus:

Table 14. SCSISelect Navigation Keys

Press	To
ESC	Exit the utility
Enter	Select an option
↑	Return to a previous option
↓	Move to the next option
F5	Switch between color and monochrome
F6	Reset to host adapter defaults

Configuring the Adaptec AIC-7902 SCSI Adapter

The Adaptec AIC-7902 SCSI adapter has two buses. Select the bus from the following menu.

Table 15. Adaptec Main Menu

Menu Item	Options
You have an AIC-7902 adapter in your system. Move the cursor to the bus:device:channel of the one for configuration and press <Enter>.	Bus:Device:Channel 01:06:A 01:06:B
<F5> - Toggle color/monochrome.	

After selecting the bus, the following menu displays.

Table 16. Menu for each SCSI Channel

Host Adapter	Option	Comment
AIC-7902 at Bus:Device:Channel 01:06:A (or 01:06:B)	Configure/View Host Adapter Settings	Press <Enter> to view the Configuration Menu.
	SCSI Disk Utilities	Press <Enter> to view the SCSI Disk Utilities Menu. This menu allows you to format hard disks and/or verify disk media.

When you are finished, press <Esc> and make your selection from the following menu.

Table 17. Exit Menu

Feature	Option	Comment
---------	--------	---------

BIOS Setup

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

Record your BIOS Setup settings. If default values ever need restoring (after a CMOS clear, for example), you must run BIOS Setup again. Your record will make this much easier.

If BIOS Setup Is Inaccessible

If you are not able to access BIOS Setup, you might need to clear the CMOS memory. To clear CMOS, either of two methods can be used:

- Press the reset button and hold it down for four seconds or more, and then, while holding the reset button down, press the power button. Release both buttons at the same time
OR
- Move the Clear CMOS jumper found on the configuration jumper block on the baseboard (see Table 21).

Starting BIOS Setup

You can enter and start BIOS Setup under several conditions:

- When you turn on the server, after POST completes the memory test
- When you have moved the CMOS jumper on the server board to the “Clear CMOS” position (enabled). For instructions on moving the jumper, see Table 21.

Under either of these two conditions, after rebooting, you will see this prompt:

Press <F2> to enter SETUP

- Under a third condition, when CMOS/NVRAM has been corrupted, you will see other messages 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.

BIOS Setup Menus

Each BIOS Setup menu page contains a number of features. Except those used for information purposes, each feature is associated with a value field that contains user-selectable parameters. Parameters may be changed depending upon the security option chosen. If a value is not changeable due to insufficient security privileges (or other reasons), the feature’s value field becomes inaccessible.

The bottom portion of the BIOS Setup screen provides a list of commands that are used for navigating the Setup utility.

Table 18. Keyboard Commands

Press	Description
← →	The left and right arrow keys are used to move between the major menu pages. The keys have no affect if a submenu or pick list is displayed.
↑	Select Item up - The up arrow is used to select the previous value in a menu item's option list, or a value field pick list. Pressing the Enter key activates the selected item.
↓	Select Item down - The down arrow is used to select the next value in a menu item's option list, or a value field pick list. Pressing the Enter key activates the selected item.
-	Change Value - The minus key or the F5 function key is used to change the value of the current item to the previous value. This key scrolls through the values in the associated pick list without displaying the full list.
+	Change Value - The plus key or the F6 function key is used to change the value of the current menu item to the next value. This key scrolls through the values in the associated pick list without displaying the full list. On 106-key Japanese keyboards, the plus key has a different scan code than the plus key on the other keyboard, but it has the same effect.
<Enter>	Execute Command - The Enter key is used to activate submenus when the selected feature is a submenu, or to display a pick list if a selected feature has a value field, or to select a sub-field for multi-valued features like time and date. If a pick list is displayed, the Enter key will undo the pick list, and allow another selection in the parent menu.
<Esc>	Exit - The ESC key provides a mechanism for backing out of any field. This key will undo the pressing of the Enter key. When the ESC key is pressed while editing any field or selecting features of a menu, the parent menu is re-entered. When the ESC key is pressed in any submenu, the parent menu is re-entered. When the ESC key is pressed in any major menu, the exit confirmation window is displayed and the user is asked whether changes can be discarded.
<F9>	<p>Setup Defaults - Pressing F9 causes the following to appear:</p> <div style="border: 1px solid black; padding: 10px; margin: 10px auto; width: fit-content;"> <p style="text-align: center;">Load Setup Defaults?</p> <p style="text-align: center;">[Yes] [No]</p> </div> <p>If "Yes" is selected and the Enter key is pressed, all Setup fields are set to their default values. If "No" is selected and the Enter key is pressed, or if the ESC key is pressed, the user is returned to where they were before F9 was pressed without affecting any existing field values.</p>
<F10>	<p>Save and Exit - Pressing F10 causes the following message to appear:</p> <div style="border: 1px solid black; padding: 10px; margin: 10px auto; width: fit-content;"> <p style="text-align: center;">Save Configuration changes and exit now?</p> <p style="text-align: center;">[Yes] [No]</p> </div> <p>If "Yes" is selected and the Enter key is pressed, all changes are saved and Setup is exited. If "No" is selected and the Enter key is pressed, or the ESC key is pressed, the user is returned to where they were before F10 was pressed without affecting any existing values.</p>

Table 19. On-Screen Options

When you see this:	What 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 BIOS Setup screen.
On screen, the phrase "Press Enter" appears next to the option.	Press <Enter> to display a sub-menu that is either a separate full screen menu or a popup menu with one or more choices.

Upgrading the BIOS

Preparing for the BIOS Upgrade

Before you upgrade the BIOS, prepare for the upgrade by recording the current BIOS settings and obtaining the upgrade utility.

Recording the Current BIOS Settings

1. Boot the computer and press <F2> when you see the message:
Press <F2> to enter 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 Intel Customer Support.

⇒ NOTE

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. The following steps explain how to upgrade the BIOS.

Creating a Bootable Diskette

1. Use a DOS 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/CD

The BIOS upgrade file is a compressed self-extracting archive that contains the files you need to upgrade the BIOS. If your TIGPR2U system does not have a diskette drive, then extract the BIOS files on a system with a diskette drive and transfer the extracted files to a bootable CD-ROM.

On a system with a diskette drive:

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, type
`BIOS.EXE A:`
3. The BIOS upgrade image files are extracted directly onto the floppy disk.

If your TIGPR2U system has a CD drive and no diskette drive (standard or USB), then perform the following steps to create a bootable BIOS update CD:

1. Insert the bootable diskette into a system with a CD-R (CD writer) drive and “Easy CD Creator” or “Nero” CD writing software.
2. Start the CD writer application and choose “Bootable CD” or “CD-ROM (Boot)”.
3. Set the source of the bootable image to the floppy drive (A:\) and choose “Floppy Emulation 1.44MB”.
4. Set the “Load Segment” to 0x7C0 or 07C0.
5. Set the “Sector Count” or “Number of loaded sectors” to 1.
6. Start the CD burn.

Performing the BIOS Upgrade

1. Place the bootable diskette (or CD) containing the BIOS update files into the diskette (or CD) drive of your system. Boot the system with the diskette in the drive (or the BIOS update CD in the CD 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 (or the BIOS upgrade CD from the CD drive).
4. Verify that the BIOS version displayed during POST is the new version as the system reboots.
5. Enter BIOS Setup by pressing the <F2> key during boot. Once in BIOS Setup, press <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 BIOS Setup, check your settings, save your settings, and exit Setup.

It is unlikely that anything will interrupt the BIOS upgrade; however, if an interruption occurs, the BIOS could be damaged.

Changing the BIOS Language

You can use the BIOS upgrade utility to change the language that the BIOS uses for messages and for the Setup program. Use a bootable diskette (or bootable CD) containing the Intel flash utility and language files. Please refer to the “Creating the BIOS Upgrade Diskette/CD” section on Page 46 for instructions on creating a bootable BIOS upgrade diskette or CD.

To change the BIOS language, do the following:

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>.
7. The computer will reboot and the changes will take effect.

5 Configuration Software and Utilities

System Software Update Sequence

When updating the system software, you should do it in the following order:

1. Update firmware (BMC and Hot Swap Controller)
2. Update FRU/SDR
3. Unplug system for 30 seconds
4. Update BIOS
5. Clear CMOS

Server Configuration Wizard

The Server Configuration Wizard is a utility that is provided to help you configure your server. The Server Configuration Wizard is located on the System Resource CD-ROM shipped with the server and runs automatically when you boot your server to this CD-ROM. The Server Configuration Wizard includes a help system that can be accessed by clicking the Help button.

Run the Server Configuration Wizard to:

- Create or update a Service Partition and install service partition files, including files that are necessary to run the System Setup Utility
- Load FRUs and SDRs
- Set the System Asset Tag
- Set Server Management settings, including an IP address, emergency management port (EMP) settings, platform event paging (PEP) settings, and LAN/Alert settings
- Execute utility applications that can be used to manually configure the server

When first executed, the Server Configuration Wizard probes the server for installed devices, firmware, chassis information, hard disks, and other relevant data. This information is used to determine what questions the application needs to ask you to complete the configuration.

When you select the option Server Configuration Wizard > Run Wizard, you will be shown a selection window allowing you to choose the items you want to configure. You can select one or more options to configure at the same time. Some options have dependencies that make you select multiple options. These are:

- If you select “Configure this server for LAN Alerting”, the option for “Configure this server for remote Server Management over a LAN connection” will automatically be selected.
- If you select “Configure this server for Serial/Modem alerting”, the option for “Configure this server for remote Server Management over a Serial/Modem connection” will automatically be selected.

In addition, you can select only one of the following at a time:

- Load SDRs only onto this server
OR
- Load FRUs and SDRs onto this server

If you select multiple options, the Server Configuration Wizard will run each option to completion.

To use the Server Configuration utility to	Description of procedure	Page
Configure the server for remote LAN management	Enable a connection to the server from a workstation on the LAN to allow remote management functions, such as powering the server on or off, or running diagnostic utilities.	56
Configure for Remote Serial/Modem management	Enable a connection to the server from a serial or Modem connection to allow remote management functions, such as powering the server on or off, or running diagnostic utilities.	58
Configure for Serial/Modem alerting	Configure the server to send a telephone page in the event that a hardware or firmware error occurs at the server.	59
Configure for LAN alerting	Configure the server to send a notification message to a workstation segment of the network in the event that a hardware or firmware error occurs at the server.	61
Run the FRU/SDR Load Utility	Use to update the Field Replaceable Unit (FRU) and Sensor Data Record (SDR) flash components. NOTE: You must run the FRU/SDR Load utility whenever the BMC is updated or if you change your processors.	64
Configure an Asset Tag	Assign an identification number or serial number to the server.	67
Create/modify the service partition	If a service partition does not already exist, create one. If a service partition has been created earlier, update it.	67
Save/load configuration data	Save the configuration data to a file. Use this saved file to configure other servers identically.	68

Direct Platform Control (DPC) Console

The DPC Console is part of Intel Server Management. Direct Platform Control is a server management application that supports remote system management via LAN, or an RS-232 serial connection to the server's Serial B port over a modem or a direct serial cable. The DPC Console provides the ability for remote management of Intel® servers via modem or LAN with a capability to run DOS-based programs.

⇒ NOTE

NIC 1 is the only network port that supports DPC.

The DPC Console runs on a client workstation and is independent of the server operating system. It communicates with a server by:

- Accessing the server management capabilities of the on-board NIC
- A Windows 2000 compatible modem
- An RS-232 connection to the server's Serial B port

Even when the server is off, you can use the DPC Console to verify the state of a server or diagnose a problem with the server hardware.

The DPC Console features allow you to:

- Establish connection to remote servers
- Server Control: power on, power off, and reset operations
- Retrieve and display entries in the SEL
- Retrieve and display SDRs
- Retrieve and display FDR information
- Retrieve and display current Remote Sensor Access (RSA) information
- Access a phonebook for remote connection management
- Establish remote control of the service partition
- Allow file transfer to/from the server

DPC Console Modes of Operation

There are four DPC Console modes of operation:

- EMP mode: Access the DPC Console features using the DPC console window menus and/or toolbar. Active when a connection is established through the EMP port (Serial B port).
- DPC over LAN mode: Access the DPC Console features using the DPC console window menus and/or toolbar. Active when a connection is established through the LAN.
- Re-direct mode: Active when the server is running BIOS console redirection. In this mode, the DPC Console launches a separate window. The window operates as an ANSI terminal and communicates with the server through the port. Character-based commands typed in the DPC Console go directly to the server, and the DPC Console displays the text that you would normally see on the server console.

To use this mode, you must configure the “Console Redirection” option in BIOS Setup for Re-direct mode (this option is found on the BIOS Setup “Server” menu). Enabling Console Redirection also requires that the “Boot Time Diag Screen” option be Enabled in BIOS Setup (this option is found on the BIOS Setup “Advanced” menu). If the redirection window does not display information, the Console Redirection is either incorrectly configured or disabled, the EMP is disabled in BIOS Setup, or the server is in protected mode. For DPC to function in this mode, the server must NOT be in graphics mode.

If the DPC Console fails to connect in EMP within 10 seconds and the server can operate in Re-direct mode, a prompt is displayed with the option to switch to Re-direct mode.

- Service Partition mode: Entered when the server reboots from the service partition and the DPC Console has successfully connected to the server. This mode allows transferring of files and running of DOS-based programs that are stored on the service partition.

Running the DPC Console

For more information about setting up and running the DPC Console, see the ISM Installation User’s Guide. This document is on the TIGPR2U System Resource CD-ROM.

Using the System Setup Utility

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

Run the System Setup Utility to:

- Set boot device priority
- Set passwords and security options
- View the System Event Log
- View SDRs
- View FRU information
- Save and restore the system configuration (available from Expert mode only)
- Update system firmware and BIOS (available from Expert mode only)
- Access the Platform Event Manager to configure the PEP, LAN or EMP

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

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

Running the System Setup Utility

You can run the System Setup Utility from the Server Configuration Utilities menu of the Server Configuration Wizard, or from the service partition of the hard disk.

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

If you run the System Setup Utility from read-only media, you cannot save user preference settings (such as screen colors).

The System Setup Utility supports ROM-DOS version 6.22. The System Setup Utility will not operate from a “DOS box” running under an operating system such as Windows.

Start the System Setup Utility using one of the following methods:

- From the System Resource CD-ROM: Boot the server to the Server Configuration Wizard and start the System Setup Utility from the Server Configuration Utilities menu.
- From the Service Partition: Boot the server to the Service Partition and execute the following DOS commands:

```
C:\> cd SSU  
C:\SSU> SSU.bat
```

The mouse driver loads if it is available; press <Enter> to continue.

When the System Setup Utility title appears on the screen, press any key to continue.

Working with the System Setup Utility Interface

You can access features of the System Setup Utility interface using the mouse or keyboard:

- **Mouse:** Click once to choose menu items and buttons or to select items in a list, such as the Available Tasks list. To run a list item, such as one from the Available Tasks list, select the item and click OK or double-click the item.

- **Keyboard:** Use the tab and arrow keys to highlight buttons and press the spacebar or <Enter> to execute. You can also execute a menu or button by using the <Alt> key in combination with the underlined letter in the name of the menu or button.

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

The System Setup Utility has a built-in help system, which you access by clicking a Help button or choosing the Help menu.

Customizing the System Setup Utility Interface

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

- **Color:** Lets you change the default colors associated with different items on the screen using predefined color combinations. The color changes take effect immediately.
- **Mode:** Lets you set the desired expertise level: novice, intermediate, or expert. The expertise level determines which tasks are visible in the Available Tasks section and which actions each task performs. For a new mode setting to take effect, you must exit the System Setup Utility and restart it.
- **Language:** Lets you change the text in the System Setup Utility to the appropriate language. For a new language setting to take effect, you must exit the System Setup Utility and restart it.
- **Other:** Lets you show or hide the status bar at the bottom of the System Setup Utility main window. The change takes effect immediately.

⇒ NOTE

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

Exiting the System Setup Utility

Exiting the System Setup Utility closes all System Setup Utility windows.

Setting Boot Device Priority

To change the boot priority of a device:

1. From the System Setup Utility “Available Tasks” window, choose Boot Devices.
2. In the “Boot Device Priority” window, select a device.
3. Click the “Move Up” button to move up the list. Click the “Move Down” button to move down the list.

Setting Passwords and Security Options

You can set a user password and an administrator password for the server. You must set an administrator password before you can set a user password. (You can set the same passwords and security options by using BIOS Setup.)

Setting the Administrator Password

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

To change or clear the administrator password:

1. From the System Setup Utility “Available Tasks” window, choose Security.
2. Click the “Admin Password” button.
3. If you are changing passwords, enter the old password.
4. Enter the new password (or leave blank to clear).
5. Confirm the password by entering it again (or leave blank to clear).
6. Click OK to save the password and return to the Security window.

Setting the User Password

The “User Password” button lets you set or change the user password used by both the System Setup Utility and the system BIOS. You must set an administrator password before you can set a user password. All changes to the user password take effect immediately.

To change or clear the user password:

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

Setting Security Options

To set the security options:

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

Viewing the System Event Log (SEL)

To view the SEL:

1. From the System Setup Utility “Available Tasks” window, choose SEL Manager.
When you start the SEL Manager, it automatically loads the current list of events from non-volatile memory.
2. Use the <F4> and <F5> keys to scroll the window contents to the left and right to view all of the columns.
3. Use the <tab> key to move from field to field.
4. Use the File and SEL menu items to work with the SEL information:
 - **Open:** Views data from a previously saved SEL file.
 - **Save As:** Saves the currently loaded SEL data to a file.
 - **Properties:** Displays information about the SEL.
 - **Clear SEL:** Clears the SEL data from the non-volatile storage area.
 - **Reload:** Refreshes the display by reading the current SEL entries from the server.
 - **Sort By:** Sorts the displayed events by event number, time stamp, sensor type and number, event description, or event generator ID.

Viewing Sensor Data Records (SDRs)

To view the SDRs:

1. From the System Setup Utility “Available Tasks” window, choose SDR Manager.
When you start the SDR Manager, it automatically loads the SDR entries from non-volatile memory.
The SDR Manager window has a navigation pane on the left that displays, in a tree format, the SDRs. The tree has categories for each type of record. Clicking on a category expands or collapses a list of SDRs for that category. Clicking on an individual SDR displays the information for that SDR in the presentation pane in the upper right. The description pane in the lower right displays a description of the currently selected SDR type.
2. Use the <F4> and <F5> keys to scroll the window contents to the left and right to view all of the columns.
3. Use the <tab> key to move from field to field.
4. Use the File and SDR menu items to work with the SDR information:
 - **Open:** Views data from a previously saved SDR file.
 - **Save As:** Saves the currently loaded SDR data to a file.
 - **Properties:** Displays information about the SDR, including IPMI version, number of SDR entries, time stamps for changes to the SDR information, and free space remaining.
 - **Reload:** Refreshes the display by reading the SDR data from the server.

Viewing Field Replacement Unit (FRU) Information

To view FRU information:

1. From the System Setup Utility “Available Tasks” window, choose FRU Manager.
When you start the FRU Manager, it automatically loads the current list of FRU devices from non-volatile memory.
The FRU Manager window has a navigation pane on the left that displays, in a tree format, the inventory of components in the server. The tree has three categories: Product, Chassis, and Board. Clicking on a category expands or collapses a list of components for that category. Clicking on an individual component displays the FRU information for that component in the presentation pane in the upper right. The description pane in the lower right displays a description of the currently selected FRU area.
2. Use the <F4> and <F5> keys to scroll the window contents to the left and right to view all of the columns.
3. Use the <tab> key to move from field to field.
4. Use the File and FRU menu items to work with the FRU information:
 - **Open:** Views data from a previously saved FRU file.
 - **Save As:** Saves the currently loaded FRU data to a file.
 - **Properties:** Displays the number of FRU devices in the system and the number being displayed. Only FRU devices with valid FRU areas are displayed.
 - **Reload:** Refreshes the display by reading the current FRU entries from the server.

Updating System BIOS and Firmware

Using the System Setup Utility, you can update the BIOS, update the firmware, and verify the firmware. Procedures for each are given below. (You can also update the BIOS and firmware using the BIOS System program.)

Updating the BIOS

To update the BIOS:

1. Download the update from the Intel support website. Please refer to the “Creating the BIOS Upgrade Diskette/CD” section on Page 46 for instructions on creating a bootable BIOS upgrade diskette or CD.
2. From the System Setup Utility “Available Tasks” window, choose System Update. (System Update is available only in Expert mode.)
When you start System Update, it automatically displays the current revision information for the system firmware and BIOS.
3. From the File menu, choose Load and choose a .uif or .bio file to use for the update.
4. Click the “Update” button to update the BIOS.

Updating the Firmware

To update the system firmware:

1. Download the update from the Intel support website. Please refer to the “How to Run the Firmware Update Utility” section on Page 64 for instructions on creating a firmware upgrade diskette or CD.

2. From the System Setup Utility “Available Tasks” window, choose System Update. (System Update is available only in Expert mode.)
When you start System Update, it automatically displays the current revision information for the system firmware and BIOS.
3. From the Firmware menu, choose Update and choose a .uif or .hex file to use for the update.
4. Click the “Update” button to perform the update.

Verifying the Firmware

To compare the system firmware in non-volatile memory with a firmware file:

1. Download the update from the Intel support website. Please refer to the “How to Run the Firmware Update Utility” section on Page 64 for instructions on creating a firmware upgrade diskette or CD.
2. From the System Setup Utility “Available Tasks” window, choose System Update. (System Update is available only in Expert mode.)
When you start System Update, it automatically displays the current revision information for the system firmware and BIOS.
3. From the Firmware menu, choose Verify and choose a .hex file to use for the update.
4. Click the Verify button to compare the firmware code in non-volatile storage with the selected file.

Managing the Server Remotely

You can set up the server so that you can connect to it from a remote client system to perform management tasks and so that the server can contact you if a system error occurs. You can make the connection over a LAN or by using a modem or direct serial cable to the EMP. You can set up the server to notify you when various events occur. Alerts can be delivered either as telephone pages or over the LAN.

Instructions for setting up the server for remote LAN and serial/modem access and for setting up the server to proactively alert or page you are given in the following sections.

How to Set Up Remote LAN Access

To set up the server so you can access it from a remote workstation, you can use either the Server Configuration Wizard or the System Setup Utility.

To use the Server Configuration Wizard to configure remote LAN access:

1. Use the System Resource CD to boot the server to the Server Configuration Wizard.
2. Click on the “Continue>>” button.
3. Select the “Server Configuration Wizard” option and click on the “Continue” button.
4. Select the “Run Wizard” option and click on the “Continue” button.
5. Select the “Configure this server for remote Server Management over a LAN connection” option and click on the “Continue” button.
6. Review the system date and time for accuracy and click on the “Continue” button.
7. In the IP Setup screen, choose either:
 - **DHCP:** The IP address for the server is automatically assigned by the DHCP (dynamic host control protocol) server on the network. The Host, Gateway, and Subnet Mask boxes in the dialog are ignored.

- **Static:** Assign the IP address for the server using the Host, Gateway, and Subnet Mask boxes in the dialog.
8. If you chose Static IP setup in the previous step, fill in the IP addressing boxes:
 - **Host IP Address:** The IP address of this server.
 - **Subnet Mask:** The IP address for the server's subnet. The server uses this to decide if the alert destination is on the same subnet.
 - **Gateway IP Address:** The IP address of the router for this server.
 - **Backup Gateway IP Address:** (optional) The IP address of the alternate router for this server.
 9. Click on "Continue". Click the LAN Password button (optional) to require that a password be entered before a user can perform server management functions on this server from a workstation on the LAN.
 10. Select the LAN Access Mode to set the points at which LAN connectivity can be activated:
 - **Always Available:** A remote system can initiate a LAN connection, regardless of the server's state or health.
 - **Restricted:** Power control functions, such as power down, front panel NMI, and system reset cannot be performed remotely.
 - **Disabled:** Remote LAN connections cannot be initiated.
 11. Select the "Serial Over LAN Access Mode" to set the user access level that is required for connecting to the server using Serial over LAN.
 - **Always Available:** An individual can access the server through Serial over LAN if that user knows the server's User password.
 - **Restricted:** An individual can access the server through Serial over LAN if that user knows the server's Administrator password.
 - **Disabled:** Serial over LAN cannot be used.
 12. Select the appropriate Server Over LAN Baud Rate and click on "Continue".

To use the System Setup Utility to configure remote LAN access:

1. From the System Setup Utility "Available Tasks" window, choose Platform Event Manager (PEM).
2. In the PEM window, click "Configure LAN" and fill in the boxes described in the following steps (boxes that are not listed here are not required for remote access).
3. To require a password for remote access, enter the password in the Enter New Password box and in the Verify New Password box. Passwords can be from 1 to 16 characters long, using any ASCII character in the range [32-126]. To clear the passwords, leave both boxes blank. (You can also clear the password by selecting the menu Options > Clear LAN Password.)
4. From the "LAN Access Mode" list, select the remote access mode:
 - **Restricted:** A remote system can initiate a LAN connection, but cannot perform control operations such as power down, reset, or front panel NMI.
 - **Always Available:** A remote system can initiate a LAN connection regardless of the state or health of the server.
 - **Disabled:** Remote systems are not allowed to initiate LAN connections.
5. In the IP Setup box, choose either:

- **DHCP:** The IP address for the server is automatically assigned by the DHCP (dynamic host control protocol) server on the network. The Host, Gateway, and Subnet Mask boxes in the dialog are ignored.
 - **Static:** Assign the IP address for the server using the Host, Gateway, and Subnet Mask boxes in the dialog.
6. If you chose Static IP setup in the previous step, fill in the IP addressing boxes:
 - **Host IP Address:** The IP address of this server.
 - **Gateway IP Address:** The IP address of the router for this server.
 - **Subnet Mask:** The IP address for the server's subnet. The server uses this to decide if the alert destination is on the same subnet.
 7. Click Save to save the changes.
 8. Click Close to return to the PEM window.

How to Set Up Remote Modem or Serial Access

To set up the server so you can access it through a modem or a serial connection, you can use either the Server Configuration Wizard or the System Setup Utility.

To use the Server Configuration Wizard to configure remote modem or serial access:

1. Use the System Resource CD to boot the server to the Server Configuration Wizard.
2. Click on the "Continue>>" button.
3. Select the "Server Configuration Wizard" option and click on the "Continue" button.
4. Select the "Run Wizard" option and click on the "Continue" button.
5. Select the "Configure this server for remote Server Management over a Serial/Modem connection" option and click on the "Continue" button.
6. Review the system date and time for accuracy and click on the "Continue" button.
7. Enter the appropriate Serial/Modem parameters and click on the "Continue" button.
8. Click the "Serial/Modem Password" button (optional) to require that a password be entered before a user can perform server management functions on this server from a serial or modem connection.
9. Select the "Access Mode" to set the points at which serial/modem connectivity can be activated:
 - **Preboot Only:** The EMP is available only when the server is powered down or is running POST during startup. Once the operating system is loaded, a connection cannot be made.
 - **Always Active:** The EMP is available at any time.
 - **Disabled:** A connection cannot be made to the server using serial/modem access.
10. Select the "Restricted Mode" to set the restrict power control operations:
 - **Enable:** Enable restrictions. A user cannot use Serial/Modem access to affect the power state of the system, such as powering the server on or off.
 - **Disable:** Disables restrictions. A user can choose to power the server on or off through a Serial/Modem connection.
11. Select the "Connection Mode":
 - **Direct Connect:** Use direct connect when a system is connected directly to the server through the serial port, without using an external modem.
 - **Modem Connect:** Use Modem Mode when the serial port is connected to an external modem.

12. Enter a “System Phone Number” (the telephone number that is being used to connect to this server).
13. Click on the “Continue” button.

To use the System Setup Utility to configure remote modem or serial access:

1. From the System Setup Utility “Available Tasks” window, choose Platform Event Manager (PEM).
2. In the PEM window, click “Configure EMP” and fill in the boxes described in the following steps (boxes that are not listed here are not required for remote access).
3. To require a password for remote access, enter the password in the “Enter New Password” box and in the “Verify New Password” box. Passwords can be from 1 to 16 characters long, using any ASCII character in the range [32-126]. To clear the passwords, leave both boxes blank. (You can also clear the password by selecting the menu Options > Clear EMP Password.)
4. In the “Modem Ring Time” box, enter the number of 500ms intervals that the BMC should wait before taking control of the Serial 2 port and answering an incoming call. A value greater than zero gives the BIOS time to answer before the BMC takes control. A value of zero causes the BMC to answer immediately. The maximum value, 63, tells the BMC to ignore the call. Modem Ring Time applies only to Preboot access mode and is ignored for other access modes.
5. In the “System Phone Number” box, enter the number of the phone line connected to the modem on the EMP.
6. From the “Access Mode” list, choose the remote access mode:
 - **Preboot:** The EMP is available only when the server is powered down or is running POST during startup. Once the operating system is loaded, a connection cannot be made.
 - **Always Active:** The EMP is available at any time.
 - **Disabled:** Remote systems are not allowed to initiate connections.
7. From the “Restricted Mode” list, choose either:
 - **Enable:** A remote system can initiate a connection, but cannot perform control operations such as power down, reset, or front panel NMI.
 - **Disable:** The remote system has full control of the server.
8. From the “Connection Mode” list, choose either:
 - **Direct Connect:** The Serial B port on the server is connected by a serial cable to the remote system.
 - **Modem Connect:** The Serial B port on the server is connected to a modem.
9. Click “Save” to save the changes.
10. Click “Close” to return to the PEM window.

How to Set Up Paging Alerts

To set up the server so it pages you in the event of an alert, you can use either the Server Configuration Wizard or the System Setup Utility.

To use the Server Configuration Wizard to configure the server to send alerts as telephone pages:

1. Use the System Resource CD to boot the server to the Server Configuration Wizard.
2. Click on the “Continue>>” button.
3. Select the “Server Configuration Wizard” option and click on the “Continue” button.

4. Select the “Run Wizard” option and click on the “Continue” button.
5. Select the “Configure this server for Serial/Modem Alerting” option. The box that says “Configure this server for remote Server Management over a Serial/Modem connection” will be automatically selected as a dependency. Click on the “Continue” button.
6. Review the system date and time for accuracy and click on the “Continue” button.
7. Enter the appropriate Serial/Modem parameters and click on the “Continue” button.
8. Click the “Serial/Modem Password” button (optional) to require that a password be entered before a user can perform server management functions on this server from a serial or modem connection.
9. Select the “Access Mode” to set the points at which Serial/Modem connectivity can be activated:
 - **Preboot:** A serial or Modem connection can be made when the server is powered down or hard reset. Once the operating system is loaded, a connection cannot be made.
 - **Always Active:** A connection to the server can be established at any time.
 - **Disabled:** A connection cannot be made to the server using Serial/Modem access.
10. Select the “Restricted Mode” to set the restrict power control operations:
 - **Enabled:** Enable restrictions. A user cannot use Serial/Modem access to affect the power state of the system, such as powering the server on or off.
 - **Disabled:** Disables restrictions. A user can choose to power the server on or off through a Serial/Modem connection.
11. Select the “Connection Mode”:
 - **Direct Connect:** Use direct connect when a system is connected directly to the server through the serial port, without using an external modem.
 - **Modem Connect:** Use modem mode when the serial port is connected to an external modem.
12. System Phone Number: Enter the telephone number that is being used to connect to this server.
13. Click Continue.
14. Select the Enable Serial/Modem Paging option.
15. In the “Alert Destination Phone Number” box, enter the telephone number that the system should send the page to if an event happens.
16. In the “Paging String” box, enter the paging string that the server should send after a phone connection is made.
17. Enter the “Blackout Period” in minutes. This is the time (in minutes) that should be allowed between pages. The valid range is [0 - 255] where 0 disables the blackout period. Setting a blackout period can save you from being flooded with repeat pages. After you receive a PEP page, no additional pages are sent by PEP for the duration of the blackout period.
18. Click the “Alert Paging Filters” button. Click the appropriate boxes to enable/disable filters. Click “OK” when you are done, and then click on “Continue”.

To use the System Setup Utility to set up the server to send alerts as telephone pages:

1. Install an external modem on the EMP (Serial B port).
2. From the System Setup Utility “Available Tasks” window, choose Platform Event Manager (PEM).
3. In the PEM window, click Configure EMP.
4. In the corresponding boxes, enter the following command strings for the modem attached to the EMP port (boxes that are not listed here are not required for paging alerts):

- **ESC Sequence:** The escape sequence. This string is sent to the modem before sending command strings. The maximum length for the string is five characters; longer strings are truncated.
 - **Hangup String:** Hang up or drop the connection. The EMP automatically sends an <ENTER> character following this string. The maximum length for the string is eight characters; longer strings are truncated.
 - **Modem Dial Command:** The command to dial a phone number. This string is sent to the modem before sending the paging string.
 - **Modem Init String:** Initialization string for the modem. This string is sent every time the EMP initializes. The maximum length for the string is determined at run-time from firmware. You will be notified if the string is truncated. Following a save, the actual string saved is displayed in the edit box.
5. Click Save to save the changes.
 6. Click Close to return to the PEM window.
 7. In the PEM window, click “Configure PEP”.
 8. Select the “Enable PEP” check box.
 9. In the “Blackout Period in Minutes” box, enter the minimum time, in minutes, between successive pages. The valid range is [0 - 255] where 0 disables the blackout period. Setting a blackout period can save you from being flooded with repeat pages. After you receive a PEP page, no additional pages are sent by PEP for the duration of the blackout period.
 10. In the “Paging String” box, enter the phone number to dial for the page and the message you want sent with the page. The maximum length for the paging string is determined at run-time from firmware. You will be notified if the string is truncated. Following a save, the actual string saved is displayed in the edit box.
 11. From the Options menu, choose Configure Event Actions.
 12. In the “Platform Event Paging Actions” window, move the events that you want to generate an alert for to the Enabled column and move all other events to the Disabled column using the following buttons:
 - >>: Moves all events from the enabled list to the disabled list.
 - >: Moves the selected event from the enabled list to the disabled list.
 - <: Moves the selected event from the disabled list to the enabled list.
 - <<: Moves all events from the disabled list to the enabled list.
 13. Click “Save” to save the changes.
 14. Click “Close” to return to the PEP Configuration window.
 15. To send a test page to verify that you have correctly configured PEP, from the Options menu, choose Send Alert.
 16. Click “Save” to save the configuration.
 17. Click “Close” to return to the PEM window.

How to Set Up LAN Alerts

To set up the server to send alerts over the LAN, you can use either the Server Configuration Wizard or the System Setup Utility. For more information about LAN alerts, see the documentation for Intel Server Management software.

To use the Server Configuration Wizard to configure the server to send alerts over the LAN:

1. Use the System Resource CD to boot the server to the Server Configuration Wizard.

2. Click on the “Continue>>” button.
3. Select the “Server Configuration Wizard” option and click on “Continue”.
4. Select the “Run Wizard” option and click on the “Continue” button.
5. Select the “Configure this server for LAN Alerting” option. The box that says “Configure this server for remote Server Management over a LAN connection” will be automatically selected as a dependency. Click on the “Continue” button.
6. Review the system date and time for accuracy and click on the “Continue” button.
7. In the IP Setup screen, choose either:
 - **DHCP:** The IP address for the server is automatically assigned by the DHCP (dynamic host control protocol) server on the network. The Host, Gateway, and Subnet Mask boxes in the dialog are ignored.
 - **Static:** Assign the IP address for the server using the Host, Gateway, and Subnet Mask boxes in the dialog.
8. If you chose Static IP setup in the previous step, fill in the IP addressing boxes:
 - **Host IP Address:** The IP address of this server.
 - **Gateway IP Address:** The IP address of the router for this server.
 - **Subnet Mask:** The IP address for the server’s subnet. The server uses this to decide if the alert destination is on the same subnet.
 - **Backup Gateway IP Address:** (optional). The IP address of the alternate router for this server.
9. Click “Continue”. Click the LAN Password button (optional) to require that a password be entered before a user can perform server management functions on this server from a workstation on the LAN.
10. Select the LAN Access Mode to set the points at which LAN connectivity can be activated:
 - **Always Available:** A remote system can initiate a LAN connection, regardless of the server’s state or health.
 - **Restricted:** Power control functions, such as power down, front panel NMI, and system reset cannot be performed remotely.
 - **Disabled:** Remote LAN connections cannot be initiated.
11. Select the SOL Access Mode to set the user access level that is required for connecting to the server using Serial over LAN.
 - **Always Available:** An individual can access the server through Serial over LAN if that user knows the server’s User password.
 - **Restricted:** An individual can access the server through Serial over LAN if that user knows the server’s Administrator password.
 - **Disabled:** Serial over LAN cannot be used.
12. Select the baud rate and then click on “Continue”.
13. Select the “Enable LAN Alerting” option.
14. Enter the IP address for the system that should receive notifications if an event happens.
15. Enter the SNMP Community String. The default is public.
16. Check the box to resolve the Gateway MAC address (optional).
17. Click on the “LAN Alert Filters” button. Click the boxes to enable/disable filters. Click “OK” when you are done, and then click on “Continue”.

To use the System Setup Utility to configure the server to send alerts over the LAN:

1. From the System Setup Utility “Available Tasks” window, choose Platform Event Manager (PEM).
2. In the PEM window, click Configure LAN and fill in the boxes described in the following steps (boxes that are not listed here are not required for LAN alerts).
3. Select the Enable LAN Alerts check box.
4. (Optional) In the SNMP Community String box, enter a string for the community field in the Header section of the SNMP trap sent for an alert. The string must be from 5 to 16 characters. The default string is public.
5. In the IP Setup box, choose either:
 - **DHCP:** The IP address for the server is automatically assigned by the DHCP (dynamic host control protocol) server on the network. The Host, Gateway, and Subnet Mask boxes in the dialog are ignored.
 - **Static:** Assign the IP address for the server using the Host, Gateway, and Subnet Mask boxes in the dialog.
6. If you chose Static IP setup in the previous step, fill in the IP addressing boxes:
 - **Host IP Address:** The IP address of this server.
 - **Gateway IP Address:** The IP address of the router for this server.
 - **Subnet Mask:** The IP address for the server’s subnet. The server uses this to decide if the alert destination is on the same subnet.
7. Fill in the Alert IP Address1 and Alert IP Address2 boxes. Enter the IP address of the system you want the server to send alerts to. If you want the alert to be broadcast to an entire subnet, enter the IP address for the subnet.
8. From the Options menu, choose Configure Event Actions.
9. In the BMC-LAN Alerting Actions window, move the events that you want to generate an alert for to the Enabled column and move all other events to the Disabled column using the following buttons:
 - >>: Moves all events from the enabled list to the disabled list.
 - >: Moves the selected event from the enabled list to the disabled list.
 - <: Moves the selected event from the disabled list to the enabled list.
 - <<: Moves all events from the disabled list to the enabled list.
10. Click “Save” to save the changes.
11. Click “Close” to return to the BMC LAN Configuration window.
12. Click “Save” to save the changes.
13. Click “Close” to return to the PEM window.

Firmware Update Utility Description

The Firmware Update Utility is a DOS-based program used to update the BMC’s firmware code. You need to run the utility only if new firmware code is necessary.

How to Run the Firmware Update Utility

Review the release notes before proceeding. If your TIGPR2U system does not have a diskette drive, the firmware files must be extracted to a floppy diskette from a system with a diskette drive and then the extracted files transferred to a bootable CD-ROM.

Creating the Firmware Upgrade Diskette/CD:

1. Create a DOS-bootable diskette. The version of DOS must be 6.22 or higher.
2. Place the firmware update utility (FWPIAUPD.EXE), the AUTOEXEC.BAT, and the *.hex file on the diskette.

If your TIGPR2U system has a CD drive and no floppy diskette drive (either standard or USB), then perform the following steps to create a bootable Firmware Update CD:

1. Insert the bootable firmware diskette into a system with a CD-R (CD writer) drive and “Easy CD Creator” or “Nero” CD writing software.
2. Start the CD writer application and choose “Bootable CD” or “CD-ROM (Boot)”.
3. Set the source of the bootable image to the floppy drive (A:\) and choose “Floppy Emulation 1.44MB”.
4. Set the “Load Segment” to “0x7C0” or “07C0”.
5. Set the “Sector Count” or “Number of loaded sectors” to 1.
6. Start the CD burn.

Performing the Firmware Update:

1. Insert the diskette (or CD) into the diskette (or CD) drive of your system and boot to it.
2. The update utility will automatically run and display “Loading” messages.
3. When complete, the program will exit. You should proceed to the next section to load the FRU/SDR data.

FRU/SDR Load Utility Description

The FRU/SDR Load Utility is a DOS-based program that is used to update the server management subsystem’s product level FRU and SDR non-volatile storage components (EEPROMs). The utility:

- Discovers the product configuration based on instructions in a master configuration file.
- Displays the FRU information.
- Updates the EEPROM associated with the BMC that holds the SDR and FRU area.
- Generically handles FRU devices that might not be associated with the BMC.

The utility can be run directly from the System Resource CD.

How to Use the FRU/SDR Load Utility

The Server Configuration Wizard offers two routes to load the FRU/SDR records. One method is through the Server Configuration Wizard > Run Wizard menu. The other is through the Server Configuration Utilities menu. Instructions for each method follow.

To use the Server Configuration Wizard > Run Wizard menu to load the FRU/SDR records:

1. Use the System Resource CD to boot the server to the Server Configuration Wizard.

2. Click on the “Continue>>” button.
3. Select “Server Configuration Wizard” and click on the “Continue” button.
4. Select “Run Wizard” and click on the “Continue” button.
5. To load only SDRs, select the “Load SDRs only onto this server” option and click on the “Continue” button. (To load both SDR records and FRU records, go to Step 12.
6. Review the system date and time for accuracy and click on the “Continue” button.
7. Select the appropriate chassis type and click on the “Continue” button.
8. Select “Update just the SDR repository” and click on the “Continue” button.
9. Select whether or not you wish to configure the BMC-TAM and click on the “Continue” button.
10. If yes, select the configuration you wish to use. Click on the “Continue” button.
11. Click “OK” to save.
12. To load both SDR records and FRU records, select the “Load FRUs and SDRs onto this server” option and click on the “Continue” button.
13. Review the system date and time for accuracy and click on the “Continue” button.
14. Select the appropriate chassis type and click on the “Continue” button.
15. Select “Update FRUs and the SDR repository” and click on the “Continue” button.
16. Select whether or not you wish to configure the BMC-TAM and click on the “Continue” button.
17. If yes, select the configuration you wish to use. Click on the “Continue” button.
18. Select whether or not you would like to enter the chassis serial number. Click on the “Continue” button.
19. If yes, enter the chassis serial number when prompted to do so. Click on the “Continue” button.
20. Select whether or not you would like to enter an asset tag. Click on the “Continue” button.
21. If yes, enter the product asset tag when prompted to do so. Click on the “Continue” button.
22. Click “OK” to save.

To use the Server Configuration Wizard > Server Configuration Utilities menu to load the FRU/SDR records:

1. Use the Resource CD to boot the server to the Server Configuration Wizard.
2. Select Server Configuration Utilities and Continue.
3. Select FRU/SDR Load Utility and Continue.
4. You will see a black screen with a numbered prompt. Select the appropriate chassis type.
5. Choose to load both FRU and SDR records, to load only SDR records, to modify the system asset tag, or to exit the application and return to the Server Configuration Wizard.

Command Line Format

You can also update the FRU/SDR files from a command-line prompt, separately from the Server Configuration Wizard. This utility:

- Is compatible with ROM-DOS Ver. 6.22, MS-DOS* Ver. 6.22 (and later versions), Windows* 95 DOS, and Window* 98 DOS.
- Accepts CFG, SDR, and FRU load files (the executable file for the utility is FRUSDR.exe)
- Requires the following support files:
 - One or more .fru files describing the system’s field replaceable units
 - A .cfg file describing the system configuration

- An .sdr file describing the sensors in the system

The command line format to do this is:

```
cd c:\frusdr
FRUSDR [-?] [-h] [-d {fru, sdr}] [-cfg filename.cfg] [-fru filename.fru]
```

Table 20. Command Line Format

Command	Description
-? or -h	Displays usage information.
-d {fru, sdr}	Displays requested area only.
-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 can consist of two parameters. Example: -cfg filename.cfg. Invalid parameters cause an error message and exit the program. You can use either a slash (/) or a minus sign (-) to specify command line options. Use the -p and flags with any of the other options.

Displaying a Given Area

When the utility is run with the -d FRU or -d SDR command line flag, information about each area is read from memory and printed on the screen. Each area represents 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.

Using Specified CFG File

Run the utility 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 that file to probe the hardware and to select the proper SDRs to load into non-volatile storage.

Displaying Utility Title and Version

The utility displays its title:

FRU & SDR Load Utility, Version Y.Y, Revision X.XX, where Y.Y is the version number and X.XX is the revision number for the utility.

Configuration File

The configuration file is in ASCII text format. The utility executes commands formed by the strings present in the configuration file. These commands cause the utility to run tasks needed to load the proper SDRs into the non-volatile 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

With a configuration file, the utility might prompt you for FRU information.

Filtering Records from the SDR File

The MASTER.SDR file has all the possible SDRs for the system. You might need to filter these records based on the current product configuration. The configuration file directs the filtering of the SDRs.

Updating the SDR Non-volatile 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 utility filters all tagged SDRs depending on the product configuration set in the configuration file. Untagged SDRs come automatically programmed. The utility also copies all written SDRs to the SDR.TMP file; it contains an image of what was loaded. The TMP file is also useful for debugging the server.

Updating FRU Non-volatile Storage Area

After the configuration is determined, the utility updates the FRU non-volatile storage area. First, it verifies the common header area and checksum from the specified FRU file. The internal use area reads from the specified .FRU file then programmed into the non-volatile storage. The chassis area reads from the specified .FRU file. Finally, the utility reads the product area from the specified FRU file. All areas write to the FRU.TMP file.

Setting a System Asset Tag

You can use the Server Configuration Wizard to set an asset tag on the server. An asset tag is a user-defined identification number or serial number and can contain both letters and numbers.

Use the steps below to set a system asset tag using the Server Configuration Wizard.

1. Use the System Resource CD to boot the server to the Server Configuration Wizard.
2. Click on the “Continue>>” button.
3. Select the “Server Configuration Wizard” option and click on the “Continue” button.
4. Select the “Run Wizard” option and click on the “Continue” button.
5. Select the option for “Configure this Server with a System Asset Tag” and click on the “Continue” button.
6. Verify the system date and time for accuracy and click on “Continue”.
7. Type in the system asset tag and click on “Continue”.

Installing a Service Partition

When you are setting up your server system, you can optionally install a service partition onto your hard drive. The service partition includes utilities and other software that can be run locally or remotely to assist in server management. The service partition uses approximately 40 MB of hard disk space.

The service partition can be installed with the Server Configuration Wizard on the System Resource CD.

⇒ NOTE

It is highly recommended that you install the service partition **before** installing an operating system. For more information, see the Service Partition section in the *Installation and User's Guide for Intel Server Management*. This document is included on the System Resource CD shipped with your server board.

To install the service partition using the Server Configuration Wizard:

1. Use the System Resource CD to boot the server to the Server Configuration Wizard.
2. Click on the “Continue>>” button.
3. Select the “Server Configuration Wizard” option and click on the “Continue” button.
4. Select the “Run Wizard” option and click on the “Continue” button.
5. Select the “Install/Update a Service Partition” option and click on the “Continue” button.
6. Review the system date and time for accuracy and click on the “Continue” button.
7. If a service partition does not exist, you will see a screen listing the drives that the Server Configuration Wizard has identified. The fields are as follows:
 - Drive#: The order in which the drives were reported by the BIOS. Drive 1 is always the CD-ROM Drive and cannot have a service partition installed on it.
 - Size: The size of the drive in megabytes.
 - Formatted?: Whether or not the drive has already been formatted for data storage.
 - Unused Space: The amount of space on the drive that has not been used.
 - SP Capable: Whether or not a service partition can be created on the drive. The drive must be a minimum of 32 MB. Drives over 8 gigabytes must be empty, and the service partition can only be created on one of the first 8 drives reported. If you do not see a screen listing the available drives, it means a service partition has already been created. When you click “Continue”, the existing service partition will be updated.
8. Click “Continue”. The service partition will be created or updated.

⇒ **NOTE**

After the service partition is installed, you can boot to it by pressing <F4> during POST. The service partition operating system is ROM-DOS. Once you have booted to the service partition, you will be at a DOS prompt. From the prompt, you can access utilities and perform server management functions by running batch files and executables. Example utilities include the System Setup Utility and FRU/SDR Load Utilities.

Saving and Restoring the System Configuration

Using the System Setup Utility, you can save the following configuration information to a file:

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

Data is saved from all sources. You cannot choose only certain pieces of configuration data to save. You can also restore the information from a saved configuration file.

⇒ **NOTE**

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

Using the Server Configuration Wizard, you can save the following configuration information to a file:

- Serial/Modem data
- Paging data
- LAN configuration data
- LAN alert data
- Service partition configuration
- System asset tag

⇒ NOTE

LAN passwords are not stored in the file. Passwords cannot be saved or restored.

Saving a Configuration

To save the system configuration from the System Setup Utility:

1. From the System Setup Utility “Available Tasks” window, choose Config Save/Restore. (Config Save/Restore is available only in Expert mode.)
2. Click “Save To File” and specify a filename and location.

To save the system configuration from the Server Configuration Wizard:

1. Follow the configuration prompts until you see “Save Server Configuration to Disk.”
2. Select the “Save Server Configuration to Disk” checkbox and click on the “Continue” button.
3. Specify a filename and location as prompted.
4. You will receive the following warning message: “If passwords are set for Serial Mode or LAN access, they will be viewable in the saved configuration file should someone view it with a text editor.” Click on “OK” to continue.

Loading a Saved Configuration

To load a previously saved system configuration from a file using the System Setup Utility:

1. From the System Setup Utility “Available Tasks” window, choose Config Save/Restore. (Config Save/Restore is available only in Expert mode.)
2. Click “Restore from File” and specify a filename and location.

⇒ NOTE

You can only load a configuration that has been previously saved with the System Setup Utility.

To restore the system configuration from a file using the Server Configuration Utility:

1. Use the System Resource CD to boot the server to the Server Configuration Wizard.
2. Click on the “Continue>>” button.
3. Select the “Server Configuration Wizard” option and click on the “Continue” button.
4. Select the “Load from Diskette” option and click on the “Continue” button.

⇒ NOTE

You can only load a configuration that has been previously saved with the Server Configuration Wizard.

The utility reads the platform type, BIOS revision, and firmware revision from the file and compares that information with the same information retrieved from the server. If the two do not match, an error message is displayed and the load operation aborts. If they do match, the utility saves the configuration data to the server. You will need to reboot your server for the changes to take effect.

Using the Intel® Server Management and Intel® SMaRT Tool (Optional)

⇒ NOTE

Prior to installation, uninstall any previous version of Intel® Server Management.

Intel® Server Management and the hard drive Service Partition provide real-time monitoring and alerting for your TIGPR2U server hardware, emergency remote management, and remote server setup. Intel® Server Management is implemented by installing it within client-server architecture.

The Service Partition provides you with the ability to remotely access a local partition on the server and to identify and diagnose server health issues. Remote access is provided through either a modem or network connection.

To get started with Intel® Server Management, install the Service Partition first. See “Installing a Service Partition,” page 67. After the service partition is installed, install the operating system first, then the Intel® Server Management software and finally, the Intel® SMaRT Tool. The information here describes installation on a system running a Microsoft Windows operating system.

The Intel® Server Maintenance and Reference Training (SMaRT) Tool is an interactive software tool providing support information to assist with the maintenance and repair of Intel® -based server systems and accessories. The Intel® SMaRT Tool features visual, step-by-step instructions for replacing parts, a complete FRU database containing part numbers and images, product spares lists, and worldwide Intel support information.

Intel® Server Management provides an interface to the Intel® SMaRT Tool, combining remote error detection and alerting with interactive maintenance and repair assistance. When Intel® Server Management detects a hardware error and a part needs replacing, the Intel® SMaRT Tool can be launched directly from Intel® Server Management to locate the correct part information and corresponding “How to Replace” steps required to quickly get the server back up and running.

Both software programs need to be installed to activate the Intel® Server Management’s interface with the Intel® SMaRT Tool. You can install the software on a server or on a workstation used to manage the server. The information here describes installation on a system running a Microsoft Windows operating system. For other operating systems, see the *Installation Guide and User*

Guide located on the System Resource CD-ROM. The Intel® SMaRT Tool and Intel® Server Management Console may only be installed on a system running a Microsoft Windows operating system.

Installing Intel® Server Management

You can install Intel® Server Management on a local server or on a remote workstation that is used to manage a LAN/WAN.

1. Ensure the server has either a Linux* or Windows* environment installed on it.
2. Insert the System Resource CD into the system's CD-ROM.
3. Select the "Server Management" menu (from the left menu bar) and select "Intel Server Management/TAM."
4. Select the applicable system option.
5. Review the Intel Software License Agreement and click Accept.
6. If installing to a local server, click "Install Now". If this is a multiple system installation, click "Add" to compile a list of systems and then click "Install Now".
7. Select "Reboot Now" or "Reboot Later".
8. Remove the System Resource CD.

6 Solving Problems

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

Resetting the System

To do this:	Press:
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. Check the following:

- Are all cables correctly connected and secured?
- Are the processors fully seated in their sockets 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 BIOS 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 Volt (or a NEMA 6-15R outlet for 200-240 Volt)?
- 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. Check the following:

- 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. Check the following:

- If you are running the software from a diskette, try a new copy of the software.
- If you are running the software from a CD-ROM disk, try a different CD-ROM 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, voltage spikes on your power line may be corrupting them. 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.

Check the following:

- 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 75.
- If errors are encountered, power off the system and remove all add-in cards.

Monitoring POST

See “Power-On Self-Test (POST),” on page 40.

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 the following:

- Does the diskette drive activity light turn on briefly? If not, see “Diskette Drive Activity Light Does Not Light” on page 76.
- If a second diskette drive is installed, does its activity light turn on briefly? If not, see “Diskette Drive Activity Light Does Not Light” on page 76.

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 Setup” on page 72.

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 the 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, check 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.
- Are the video monitor signal and power cables 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 Activity Light Does Not Light

Check the following:

- Are the diskette drive power and signal cables properly installed?
- Are all relevant switches and jumpers on the diskette drive set correctly?
- Is the diskette drive properly configured?
- Is the diskette drive activity light always on? If so, the signal cable may be plugged in incorrectly.
- If you are using the onboard diskette controller, use the BIOS 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.

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?

Problems With Application Software

If you have problems with application software, check 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 7.
- 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?
- Check cable connections.
- Verify CD is bootable in another known good CD-ROM drive (especially if the CD is a copy).

Problems with Network

Server Hangs When Drivers Are Loaded

- Change the PCI BIOS interrupt settings.

Diagnostics Pass, But Connection Fails

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

Activity LED Does Not Light

- Make sure the network hub has power.

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.
- Make sure the other adapter supports shared interrupts. Also, make sure your operating system supports shared interrupts.
- Try re-seating the add-in adapter.

Add-in Adapter Stopped Working Without Apparent Cause

- Try re-seating 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.

Cannot Connect to a Server

- Make sure you are using the drivers that are shipped on the System Resource 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 on the system's back panel.

7 Technical Reference

Server Board Jumpers

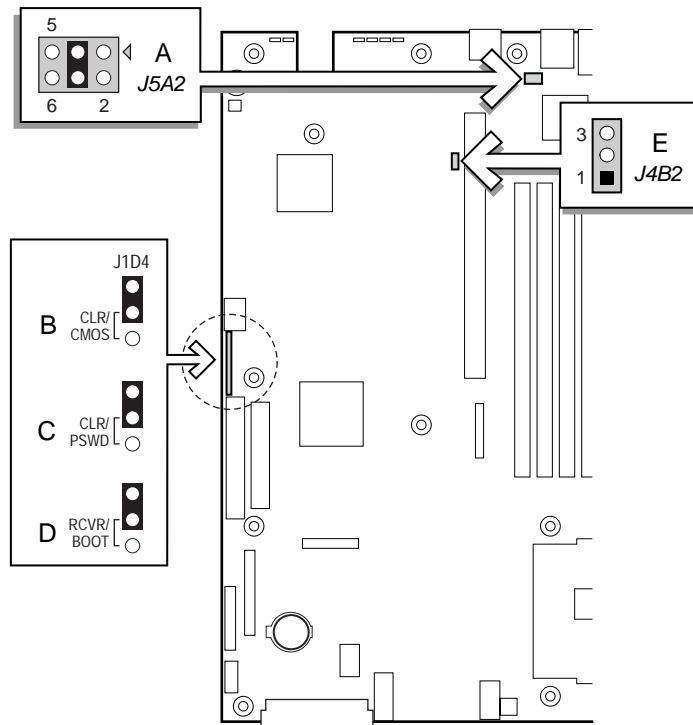


Figure 12. Jumper Locations

Table 21. Configuration Jumper

	Jumper Name	What it does at system reset
A	RJ-45 Serial Port Config	Configures either a DSR or a DCD signal to the connector.
B	CMOS CLR	If these pins are jumpered, the CMOS settings are cleared. These pins should not be jumpered for normal operation.
C	PSWD CLR	If these pins are jumpered, the password is cleared. These pins should not be jumpered for normal operation.
D	RCVRY BOOT	If these pins are jumpered, the system will attempt BIOS recovery. These pins should not be jumpered for normal operation.
E	BMC Boot Block Write Enable	If these pins are jumpered, the BMC boot block is erasable and programmable at next reset. These pins should not be jumpered for normal operation.

Diagnostic LEDs

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

The LED diagnostics feature consists of a hardware decoder and four dual color LEDs. During POST, the LEDs will display all normal Port-80 codes representing the progress of the BIOS POST. Each POST code will be represented by a combination of colors from the four LEDs.

The LEDs are in pairs of green and red. The post codes are broken into two nibbles, an upper and a lower nibble. Each bit in the upper nibble is represented by a red LED and each bit in the lower nibble is represented by a green LED. If both bits are set in the upper and lower nibble then both red and green LEDs are lit, resulting in an amber color. Likewise, if both bits are clear then the red and green LEDs are off.

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

⇒ NOTE

When comparing a diagnostic LED color string from the baseboard to those listed in the diagnostic LED decoder in the following tables, the LEDs on the baseboard should be referenced when viewed by looking into the system from the back. Reading the LEDs from left to right, the Hi bit is located on the left.

Table 22. POST Codes

Post Code	Diagnostic LED Decoder				Description
	G=Green, R=Red, A=Amber				
	MSB			LSB	
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 boot strap processor (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.

Table 22. POST Codes (continued)

Post Code	Diagnostic LED Decoder				Description
	G=Green, R=Red, A=Amber				
	MSB			LSB	
0Fh	G	G	G	G	Write Command Byte 8042: The initialization after the keyboard controller BAT command test is done. The keyboard command byte will be written next.
10h	Off	Off	Off	R	Keyboard Init: The keyboard controller command byte is written. Next, issuing the pin 23 and 24 blocking and unblocking commands.
10h	Off	Off	Off	R	Disable and initialize 8259.
11h	Off	Off	Off	A	Detect Configuration Mode, such as CMOS clear.
13h	Off	Off	G	A	Chipset Initialization before CMOS initialization.
19h	G	Off	Off	A	Init System Timer: The 8254 timer test is over. Starting the memory refresh test next.
1Ah	G	Off	G	R	Check Refresh Toggle: The memory refresh line is toggling. Checking the 15 second on/off time next.
23h	Off	Off	A	G	Setup Interrupt Vectors: Reading the 8042 input port and disabling the MEGAKEY Green PC feature next. Making the BIOS code segment writable and performing any necessary configuration before initializing the interrupt vectors.
24h	Off	G	R	Off	Before Vector: Configuration is required before interrupt vector initialization has completed. Interrupt vector initialization is about to begin.
25h	Off	G	R	G	Init interrupt Vectors: Interrupt vector initialization is done.
F2h	R	R	A	R	Initialize SMM handler. Initialize USB emulation.
F5h	R	A	R	A	Validate NVRAM areas. Restore from backup if corrupted.
12h	Off	Off	G	R	Load defaults in CMOS RAM if bad checksum or CMOS clear jumper is detected.
12h	Off	Off	G	R	Initializing APP CMOS RAM for appliance servers only.
12h	Off	Off	G	R	Check point After CMOS Initialized.
27h	Off	G	A	G	Validate date and time in RTC.
F4h	R	A	R	R	Load Micro Code To All CPUs.
F6h	R	A	A	R	Scan SMBIOS GPNV areas.
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.

continued

Table 22. POST Codes (continued)

Post Code	Diagnostic LED Decoder				Description
	G=Green, R=Red, A=Amber				
	MSB			LSB	
2Bh	G	Off	A	G	Platform hook.
2Dh	G	G	R	G	Initialize AMI display manager Module. Initialize support code for headless system if no video controller is detected.
2Dh	G	G	R	G	Scan flash for logos and Initialize logo data areas.
30h	Off	Off	R	R	Detect PS/2 Mouse.
30h	Off	Off	R	R	Hook after c000 ROM control.
2Eh	R	R	A	Off	Set up video parameters in BIOS data area.
37h	Off	G	A	A	Activate ADM: The display mode is set. Displaying the power-on message next.
37h	Off	G	A	A	Initialize language module. Display splash logo.
37h	Off	G	A	A	Display Sign on message, BIOS ID and processor information.
38h	G	Off	R	R	Detect USB Mouse: Initializing the bus input, and general devices next, if present.
34h	Off	G	R	R	Reset IDE Controllers.
39h	G	Off	R	A	Displaying bus initialization error messages.
3Ah	G	Off	A	R	Display Setup Message: The new cursor position has been read and saved. Displaying the Hit Setup message next.
40h	Off	R	Off	Off	Ensure Timer Keyboard Interrupts are on.
4Bh	G	R	G	G	Memory Test: The amount of memory above 8 MB has been found and verified. Checking for a soft reset and clearing the memory below 8 MB for the soft reset next. If this is a power-on situation, going to checkpoint 4Eh next.
57h	Off	A	G	A	Chipset hook after memory size.
53h	Off	R	A	A	Display processor cache size.
54h	Off	A	Off	R	Disable parity and NMI reporting.
60h	Off	R	R	Off	Test 8237 DMA Controller: The DMA page register test passed. Performing the DMA Controller 1 base register test next.
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.

continued

Table 22. POST Codes (continued)

Post Code	Diagnostic LED Decoder				Description
	G=Green, R=Red, A=Amber				
	MSB			LSB	
82h	R	Off	G	Off	Check Stuck Key Enable Keyboard: The keyboard controller interface test completed. Writing the command byte and initializing the circular buffer next.
83h	R	Off	G	G	Disable parity NMI: The command byte was written and global data initialization has completed. Checking for a locked key next.
84h	R	G	Off	Off	Verify RAM Size: Checking for a memory size mismatch with CMOS RAM data next.
84h	R	G	Off	Off	Check ATA Cable Type presence of ATAPI devices.
84h	R	G	Off	Off	Display Keyboard Message.
16h	Off	G	G	R	Display IDE mass storage devices.
17h	Off	G	G	A	Display USB mass storage devices.
85h	R	G	Off	G	Report the first set of POST Errors to Error Manager.
86h	R	G	G	Off	Boot Password Check: The password was checked. Performing any required programming before Setup next.
8Dh	A	G	Off	G	OEM Patch 9.
8Dh	A	G	Off	G	Set Printer RS-232 Timeout.
8Dh	A	G	Off	G	Init FDD Devices: Resetting the hard disk controller next.
95h	R	G	Off	A	Lock out PS/2 keyboard/mouse if unattended start is enabled.
92h	R	Off	G	R	Option ROM Scan.
98h	A	Off	Off	R	Init Boot Devices: The adapter ROM had control and has now returned control to BIOS POST. Performing any required processing after the option ROM returned control.
9Bh	A	Off	G	A	Float Processor Initialize: Performing any required initialization before the coprocessor test next.
9Eh	A	G	G	R	Enable Interrupts 0,1,2: Checking the extended keyboard, keyboard ID, and NUM Lock key next. Issuing the keyboard ID command next.
A2h	R	Off	A	Off	Report second set of POST errors to Error Manager.
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 hotkey 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.

continued

Table 22. POST Codes (continued)

Post Code	Diagnostic LED Decoder				Description
	G=Green, R=Red, A=Amber				
	MSB			LSB	
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 Error Codes and Messages

Tables 23 and 24 define the POST error codes and their associated messages. The BIOS prompts the user to press a key in case of serious errors. Some error messages are preceded by the word "Error" to highlight the fact that the system might be malfunctioning. All POST errors and warnings are logged in the SEL, unless the SEL is full.

Table 23. Standard POST Error Messages and Codes

Error Code	Error Message	Pause on Boot
100	Timer Channel 2 Error	Yes
101	Master Interrupt Controller	Yes
102	Slave Interrupt Controller	Yes
103	CMOS Battery Failure	Yes
104	CMOS Options not Set	Yes
105	CMOS Checksum Failure	Yes
106	CMOS Display Error	Yes
107	Insert Key Pressed	Yes
108	Keyboard Locked Message	Yes
109	Keyboard Stuck Key	Yes
10A	Keyboard Interface Error	Yes
10B	System Memory Size Error	Yes
10E	External Cache Failure	Yes
110	Floppy Controller Error	Yes
111	Floppy A: Error	Yes
112	Floppy B: Error	Yes
113	Hard disk 0 Error	Yes
114	Hard disk 1 Error	Yes
115	Hard disk 2 Error	Yes
116	Hard disk 3 Error	Yes
117	CD-ROM disk 0 Error	Yes
118	CD-ROM disk 1 Error	Yes

continued

Table 23. Standard POST Error Messages and Codes (continued)

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

Table 24. Extended POST Error Messages and Codes

Error Code	Error Message	Pause on Boot
8100	Processor 1 failed BIST	No
8101	Processor 2 failed BIST	No
8110	Processor 1 Internal error (IERR)	No
8111	Processor 2 Internal error (IERR)	No
8120	Processor 1 Thermal Trip error	No
8121	Processor 2 Thermal Trip error	No
8130	Processor 1 disabled	No
8131	Processor 2 disabled	No
8140	Processor 1 failed FRB-3 timer	No
8141	Processor 2 failed FRB-3 timer	No
8150	Processor 1 failed initialization on last boot	No
8151	Processor 2 failed initialization on last boot	No
8160	Processor 01: unable to apply BIOS update	Yes
8161	Processor 02: unable to apply BIOS update	Yes
8170	Processor P1 :L2 cache Failed	Yes
8171	Processor P2 :L2 cache Failed	Yes
8180	BIOS does not support current stepping for Processor P1	Yes
8181	BIOS does not support current stepping for Processor P2	Yes
8190	Watchdog Timer failed on last boot	No
8191	4:1 Core to bus ratio: Processor Cache disabled	Yes
8192	L2 Cache size mismatch	Yes
8193	CPUID, Processor Stepping are different	Yes
8194	CPUID, Processor Family are different	Yes
8195	Front Side Bus Speed mismatch. System Halted	Yes, Halt
8196	Processor Model are different	Yes
8197	CPU Speed mismatch	Yes
8300	Baseboard Management Controller failed to function	Yes
8301	Front Panel Controller failed to Function	Yes
8305	Hotswap Controller failed to Function	Yes
8420	Intelligent System Monitoring Chassis Opened	Yes
84F1	Intelligent System Monitoring Forced Shutdown	Yes
84F2	Server Management Interface Failed	Yes
84F3	BMC in Update Mode	Yes
84F4	Sensor Data Record Empty	Yes
84FF	System Event Log Full	Yes

BIOS Recovery Beep Codes

In the case of a Bootblock update, where video is not available for text messages to be displayed, speaker beeps are necessary to inform the user of any errors. Table 25 describes the type of error beep codes that may occur during the Bootblock update.

Table 25. BIOS Recovery Beep Codes

Beeps	Error message	POST Progress Code	Description
1	Recovery started		Start recovery process.
2	Recovery boot error	Flashing series of POST codes: E9h EEh EBh ECh EFh	Unable to boot to floppy, ATAPI, or ATAPI CD-ROM. Recovery process will retry.
Series of long low-pitched single beeps	Recovery failed	EEh	Unable to process valid BIOS recovery images. BIOS already passed control to operating system and flash utility.
2 long high-pitched beeps	Recovery complete	EFh	BIOS recovery succeeded, ready for power-down, reboot.

Bootblock Error Beep Codes

Table 26. Bootblock Error Beep Codes

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

BMC Error Beep Codes

Table 277. BMC Error Beep Codes

Beeps	Description
1	Front panel CMOS clear initiated
1-5-1-1	FRB failure (processor failure)
1-5-2-1	No processors installed
1-5-2-3	Processor configuration error (e.g., mismatched VIDs, Processor slot 1 is empty)
1-5-2-4	Front-side bus select configuration error (e.g., mismatched BSELs)
1-5-4-2	Power fault: DC power unexpectedly lost (e.g. power good from the power supply was deasserted)
1-5-4-3	Chipset control failure
1-5-4-4	Power control failure (e.g., power good from the power supply did not respond to power request)

Part II: Service Technician's Guide

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*.

8 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)
- Heat Sink Clip Attach/Removal Tool - may be ordered/purchased from:
Dexter Design (United States)
(503) 648-7000
Contact: jennelle@dexterdesign.net
P/N: 650308-003-P6
- Anti-static wrist strap and conductive foam pad (recommended)

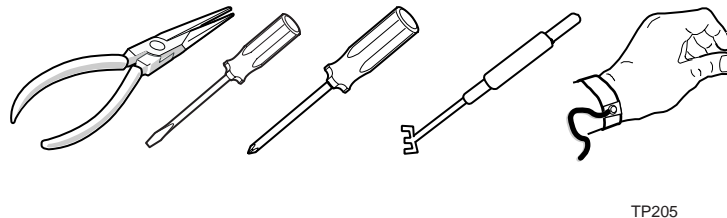


Figure 13. Tools and Supplies Needed

➡ NOTE

Blue-colored items (such as handles, buttons, and screws) represent service touch points. *Remove power from system before servicing these components.*

Green-colored items (such as handles, levers, and buttons) represent hot-pluggable components.

Equipment log: As you integrate new parts into the system, add information about them to your equipment log (see Appendix A). 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 anti-static 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.

Replacing Power Supply Modules

⇒ NOTE

To maintain hot plug capability, ensure that an active AC or DC Power Supply Module is in the second Power Supply Module slot before replacing a Power Supply Module.

To replace an AC power supply module, follow this procedure:

1. Press in locking tab inside of green handle (A in Figure 14).
2. Pull green handle slightly downward and rearward, sliding AC Power Supply Module out of AC Power Supply Cage (B and C in Figure 14).
3. When reinserting AC Power Supply Module, make sure the green handle is in the downward position before sliding AC Power Supply Module into AC Power Supply Cage.

To replace a DC power supply module, follow this procedure:

1. Using a small flat-head screwdriver, unlatch the black connector cover from the connector base and flip connector cover up (see D in Figure 14).
2. Disconnect DC power plug from power supply module by pulling DC power plug rearward (see E in Figure 14). Flip black connector cover down and re-latch connector cover to connector base.
3. Press in green button on handle and pull handle downward. At the same time, pull DC Power Supply Module out of DC Power Supply Cage (see F, G, and H in Figure 14).
4. When reinserting DC Power Supply Module, make sure the handle is in the downward position before sliding DC Power Supply Module into DC Power Supply Cage.

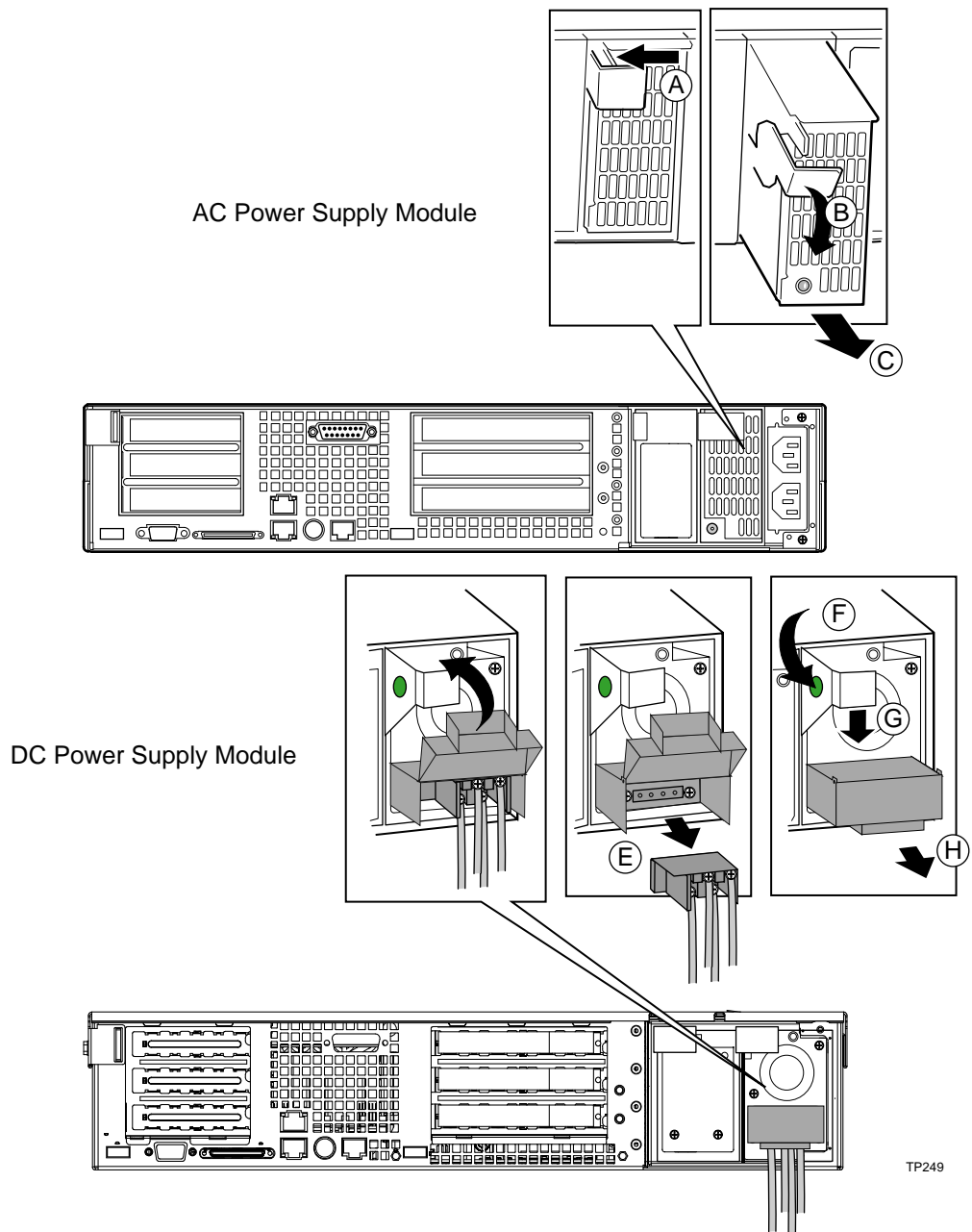
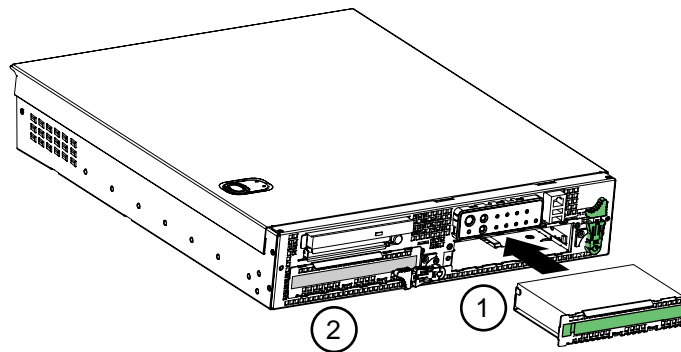


Figure 14. Removing the Power Supply Modules

Replacing Hard Disk Drives

There are two hard drive bays in the system (see (1) and (2) in Figure 15). Each hard drive bay supports a tray-mounted Ultra-320 SCSI disk drive with single connector attach (SCA) interconnect. The drive tray is installed into the front of the chassis in the hard drive bay, and then secured in place using the horizontal handle on the drive tray. A small lever on the front of the system is then rotated into the horizontal position to connect the SCA connector on the system flex circuit SCSI cable to the SCA connector on the drive. Ultra-320 SCSI technology (SCA interconnect) or slower hard disk drives can be installed in this hard drive tray. The hard drive bays are designed to accept 15,000 RPM (and below) hard drives that consume up to 18 Watts of power.

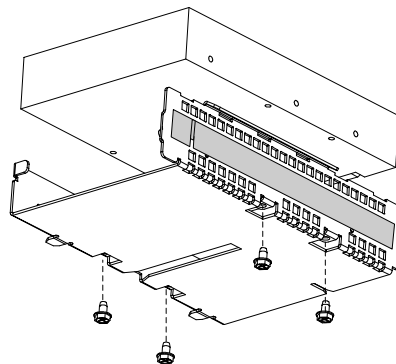


TP130

Figure 15. Hard Drive Bays

Hard Drive Tray

Each hard drive used in the system must be mounted to a drive tray using four screws inserted into the bottom of the drive as shown in Figure 16.



TP131

Figure 16. Hard Drive Tray

Replacing Floppy or CD-ROM Drives

The peripheral bay supports either a floppy drive carrier assembly or a CD-ROM drive carrier assembly. Both the blind-mate floppy drive carrier assembly and the blind-mate CD-ROM drive carrier assembly can be inserted or removed when the system power is off. After the drive carrier assembly is installed into the system, a horizontal handle is used to secure it to the chassis.

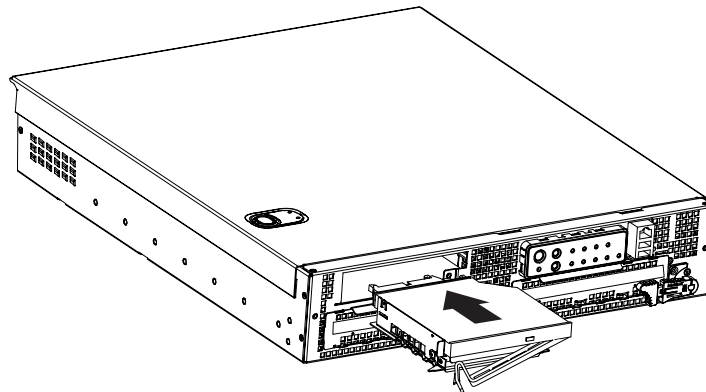
⇒ NOTE

A floppy drive and a CD-ROM drive cannot be installed in the system at the same time.

⇒ NOTE

Disconnect power from system before replacing floppy or CD-ROM drives.

The floppy drive carrier assembly utilizes a 0.5-inch (12.7mm) slim-line 3.5-inch floppy drive. The CD-ROM drive carrier assembly utilizes a 0.5-inch (12.7mm) slim-line CD-ROM or DVD drive.



TP127

Figure 17. Peripheral Drive Bay

CD-ROM Drive Carrier Assembly

The CD-ROM drive is installed in a CD-ROM drive carrier assembly before installing it into the system. An exploded view of the CD-ROM drive carrier assembly is shown in Figure 18.

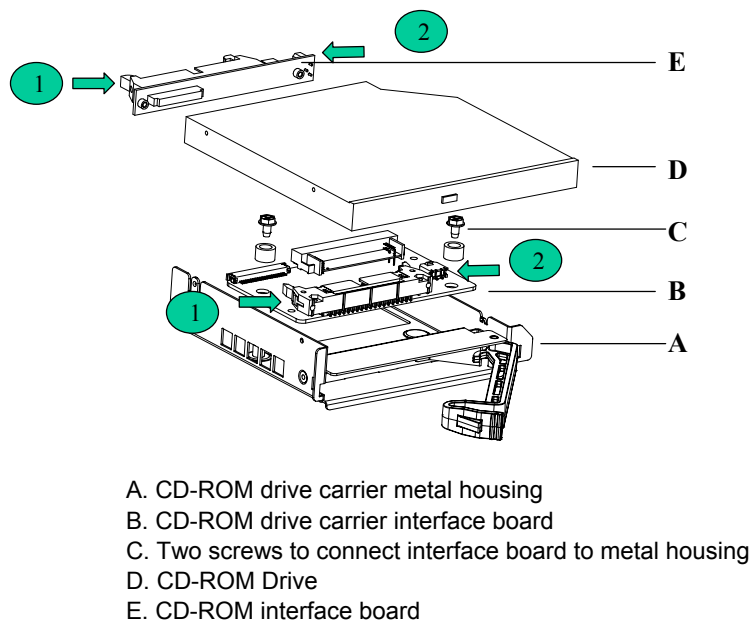


Figure 18. CD-ROM Drive Carrier Assembly

Two cables are required to connect between the CD-ROM drive carrier interface board (B) and the CD-ROM interface board (E). An IDE cable is used to connect between the 2x20 IDE connector on both these interface boards as indicated in (1). A 1x2 power cable is used to connect between the power connector on both of these interface boards as indicated in (2).

The CD-ROM drive carrier assembly inserts into the peripheral bay on the front of the system. The mating connectors on the CD-ROM drive carrier assembly and the FPIO board are blind-mate style connectors, and will seat fully when the horizontal handle on the CD-ROM drive carrier assembly is fully secured.

Floppy Drive Carrier Assembly

The Floppy drive is installed in a Floppy drive carrier assembly before installing it into the system. An exploded view of the Floppy drive carrier assembly is shown in Figure 19.

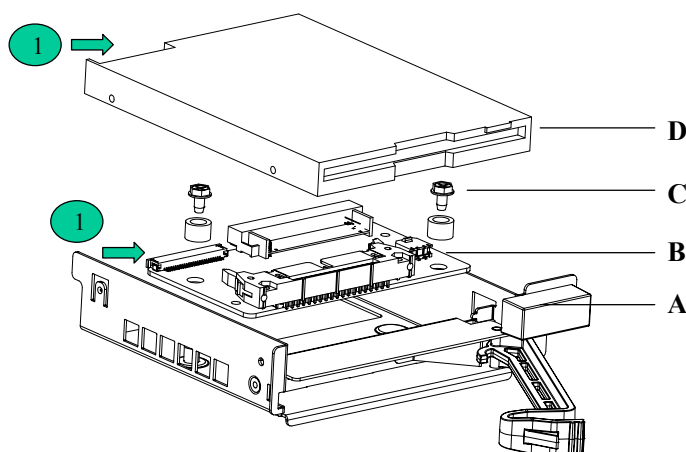


Figure 19. Floppy Driver Carrier Assembly

- A. Floppy drive carrier metal housing
- B. Floppy drive carrier interface board
- C. Two screws to connect interface board to metal housing
- D. Floppy Drive

One FFC cable is required to connect between the Floppy drive carrier interface board (B) and the Floppy drive (D). This FFC cable has a keying feature that allows it to be inserted correctly in only one orientation.

The Floppy drive carrier assembly inserts into the peripheral bay on the front of the system. The mating connectors on the Floppy drive carrier assembly and the FPIO board are blind-mate, and will seat fully when the horizontal handle on the Floppy drive carrier assembly is fully secured.

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 ESD protection by wearing an anti-static wrist strap attached to chassis ground (any unpainted metal surface) of the server 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(s) from the system. Unplugging/disconnecting the power cord(s) from the system removes the +5 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(s), 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(s).



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 and Installing the 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.

The server comes with a removable Top Cover. Removal of this cover is necessary when installing or removing many components. You do not have to remove the Top Cover when removing or installing power supplies, peripheral drive assembly (CD-ROM or floppy), or hard drives.



WARNING

If rack mounted, make sure that the rack is anchored securely so it will not tilt forward when the server chassis is extended. A crush hazard exists should the rack tilt forward that could cause serious injury.

To remove the top cover, follow this procedure:

1. Push down on the blue locking button on the top cover while sliding the top cover rearward to release it from the chassis.
2. Lift the top cover up to remove.

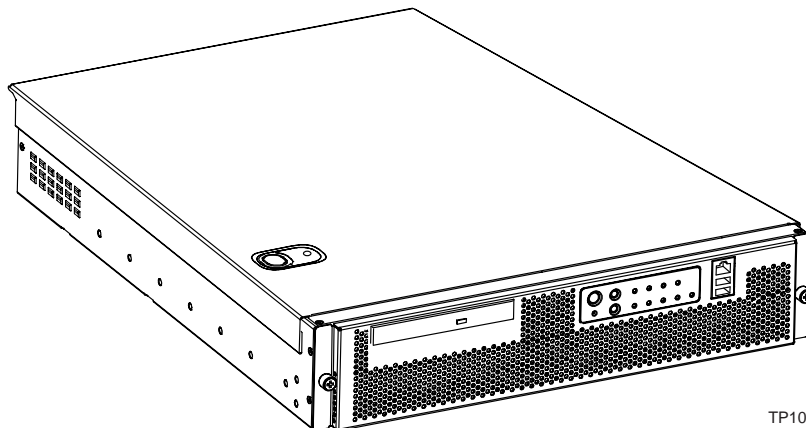
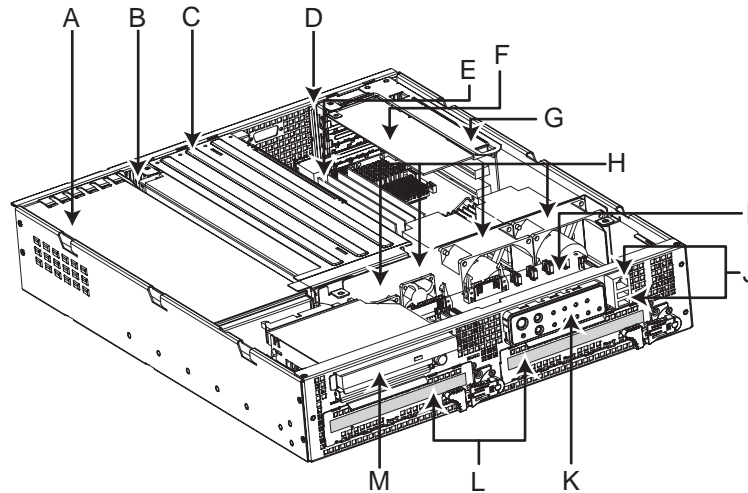


Figure 20. Removing the Top Cover

Internal Chassis Layout

The TIGPR2U uses the Telco and Industrial Grade system baseboard, which contains connectors for installing up to two Intel® Xeon™ processors with 512 KB L2 cache utilizing the FCPGA sockets. The baseboard has 6 DIMM slots and supports up to 12 GB error checking and correcting

(ECC) SDRAM memory. The TIGPR2U Telco and Industrial Grade system baseboard also contains 6 PCI slots (implemented via riser cards), input/output (I/O) ports and various controllers.



TP00485

A. Power Supply	H. System Fans
B. PCI card bracket (full-length)	I. FPIO system board
C. Riser card assembly (full-length)	J. RJ-45 COM2 and Dual USB ports
D. PCI card bracket (low-profile)	K. Control Panel
E. Server Baseboard	L. SCSI Hard Disk Drive Bays
F. PCI add-in card (accessory to system)	M. Peripheral bay (optional CD-ROM module or FDD module available)
G. Riser card assembly (low-profile)	

Figure 21. Intel® Telco/Industrial Grade Server TIGPR2U (shown with top cover and bezel removed)

Tools and Supplies Needed

- Jumper removal tool or needle-nosed pliers
- Small flat-headed screwdriver
- Phillips* (cross head) screwdriver (#1 bit and #2 bit)
- Anti-static wrist strap and conductive foam pad (recommended)
- Heat Sink Clip Attach/Removal Tool

Cautions

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



CAUTIONS

System power on/off: The power button DOES NOT completely turn off the system AC power; 5 Volt standby is still active whenever the system is plugged in. To remove power from system, you must unplug the AC power

cord from the wall outlet. Make sure the AC power cord is unplugged 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.

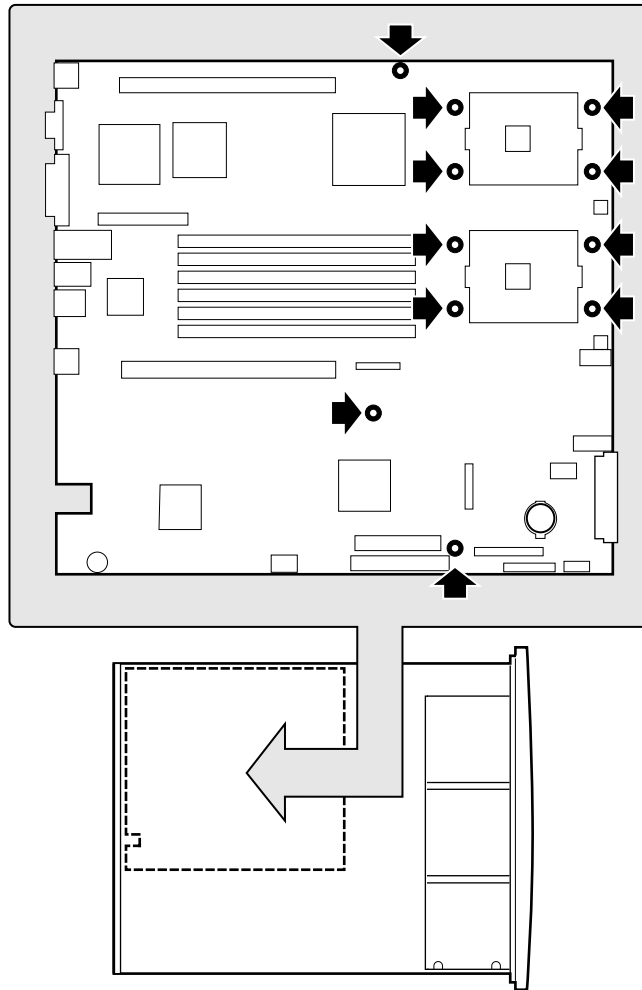
Electrostatic discharge (ESD) and ESD protection: ESD can damage disk drives, boards, and other parts. We recommend that you perform all procedures in this chapter only at an ESD workstation. If one is not available, provide some ESD protection by wearing an anti-static wrist strap attached to chassis 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.

Installing or removing jumpers: A jumper is a small plastic encased conductor that slips over two jumper pins. Some jumpers have a small tab on top that you can grip with your fingertips or with a pair of fine needle-nosed pliers. If your jumpers do not have such a tab, take care when using needle-nosed pliers to remove or install a jumper; grip the narrow sides of the jumper with the pliers, never the wide sides. Gripping the wide sides can damage the contacts inside the jumper, causing intermittent problems with the function controlled by that jumper. Take care to grip with, but not squeeze, the pliers or other tool you use to remove a jumper, or you may bend or break the stake pins on the board.

Rearrange the Standoffs

If your chassis does not have board mount standoffs placed as shown in Figure 22, you must rearrange them so they match the holes in the server board. Failure to properly rearrange the metal standoffs may cause the server board to malfunction and may permanently damage it. Your chassis may be different from the illustration.



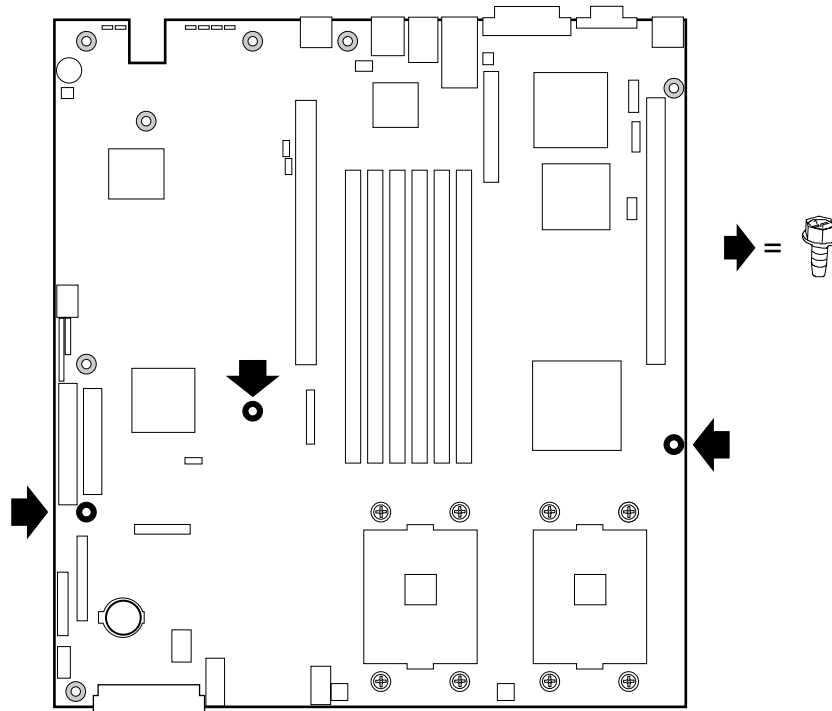
TP121

Figure 22. Rearrange the Standoffs

Install the Server Board

To ensure proper grounding and support, it is recommended that you install screws in all the required mounting holes for your chassis. You may need to move cables out of the way to properly install your server board.

1. While placing the board on the chassis standoffs, carefully position the board I/O connectors into the rear chassis I/O openings.
2. Adjust board position to align mounting holes with standoffs.
3. Using the screws that came with your chassis, mount the board to the chassis.



TP00476

Figure 23. Installing the Server Board

Installing or Replacing Processor(s)

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, be careful when removing or installing server board components that are located near processors.

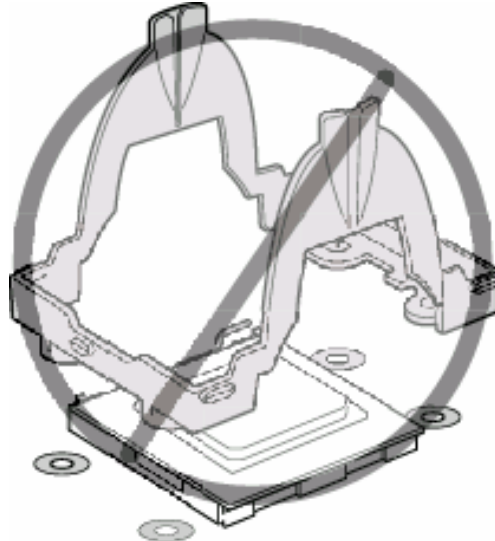
CAUTION

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). If you are adding a second processor to your system, the second processor must be compatible with the first processor (within one stepping, same voltage, same speed). For exact information about processor interchangeability, contact your customer service representative or visit the Intel Customer Support website at <http://support.intel.com/>.

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.

Retention Mechanism (RM): In 2U and greater chassis, use the RM brackets that ship with the chassis, not the RM that ships with the processor kit.

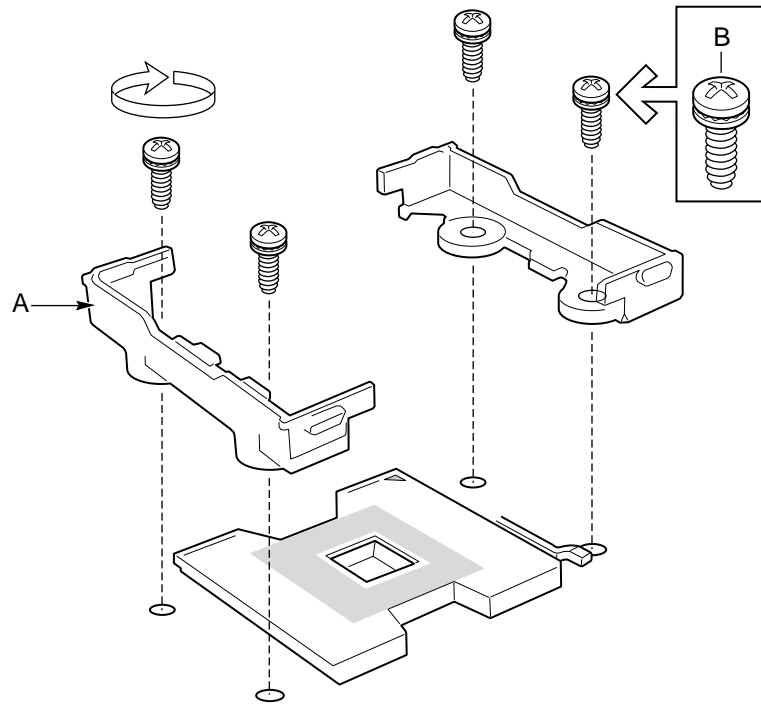


OM15078

Installing the Retention Mechanism (RM) Brackets

There are four RM brackets, two for each processor socket. For each bracket, do the following:

1. Place the bracket (A) on the server board.
2. Insert and tighten two screws (B) to secure the bracket.

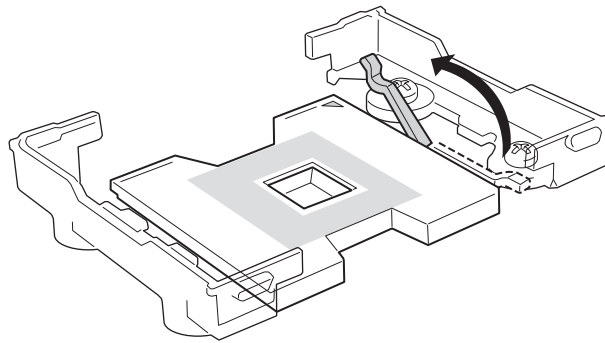


OM14144

Figure 24. Installing the Processor RM Brackets

Installing Processors

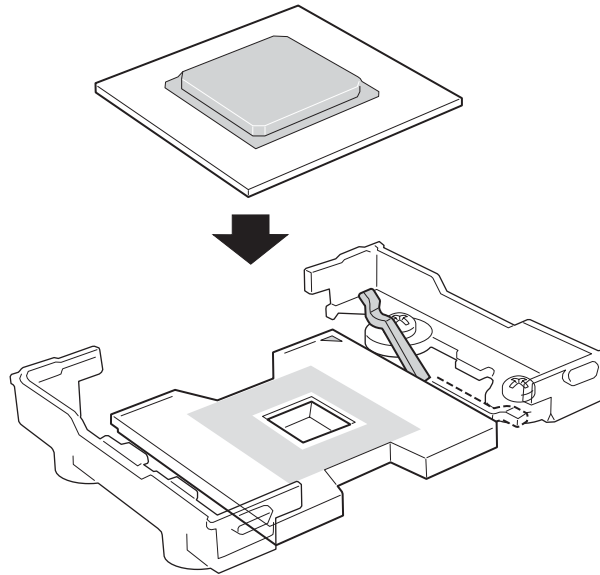
1. Raise the locking bar on the socket.



OM14132

Figure 25. Raising the Locking Bar

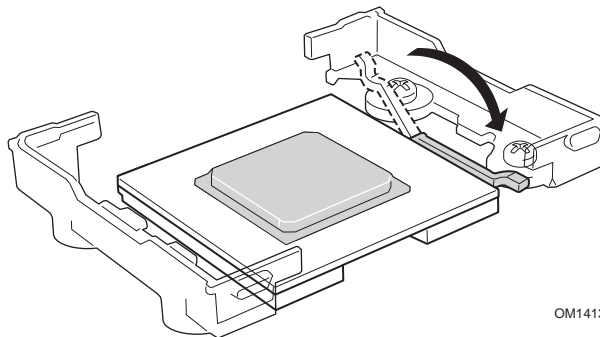
2. Aligning the pins of the processor with the socket, insert the processor into the socket.



OM14133

Figure 26. Installing Processors

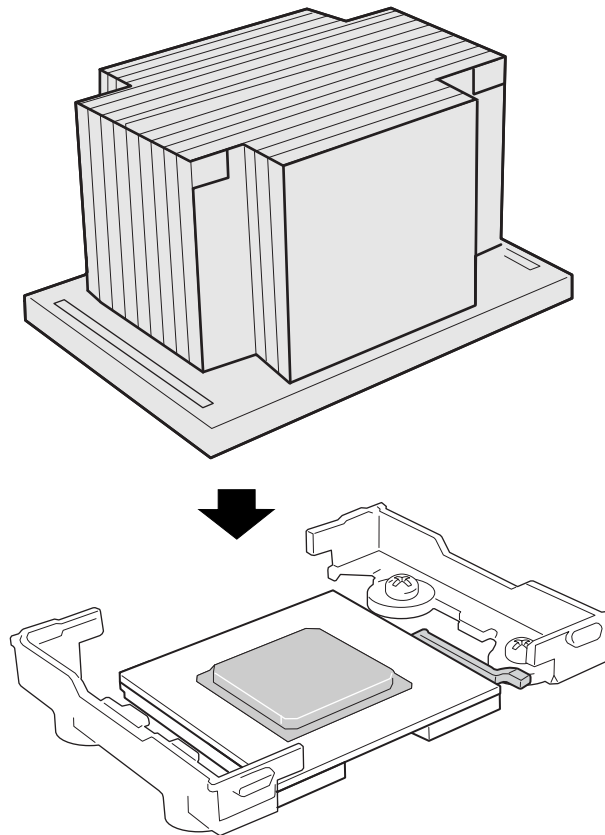
3. Lower the locking bar completely.



OM14135

Figure 27. Lowering the Locking Bar

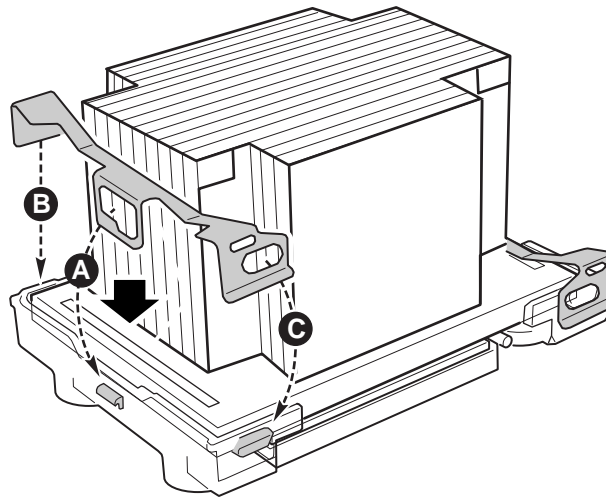
4. Follow the instructions packaged with your boxed processor for preparing the heat sink and processor for installation. *It is important to ensure proper installation of the thermal interface material (TIM), either approved grease or pad.*
5. Position the heat sink above the processor.
6. Aligning the raised metal surfaces, place the heat sink on top of the processor.



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Figure 28. Installing the Heat Sink

7. Place the heat sink clip so the tab on the clip engages the slot on the heat sink and the hole opposite the tab slides over the stud on the mounting bracket (A). Refer to Figure 29.
8. When the clip is mounted in the slot on the heat sink and over the stud on the mounting bracket, move the clip to the right as far as it will travel (towards C).
9. Press down on the left end of the clip (B) until firmly engaged over the stud on the mounting bracket.
10. With the left (B) end of the clip firmly attached to the stud on the mounting bracket, press down on the other end of the clip (C) until it is firmly engaged.
11. Repeat the process for the clip on the opposite side of the heat sink.

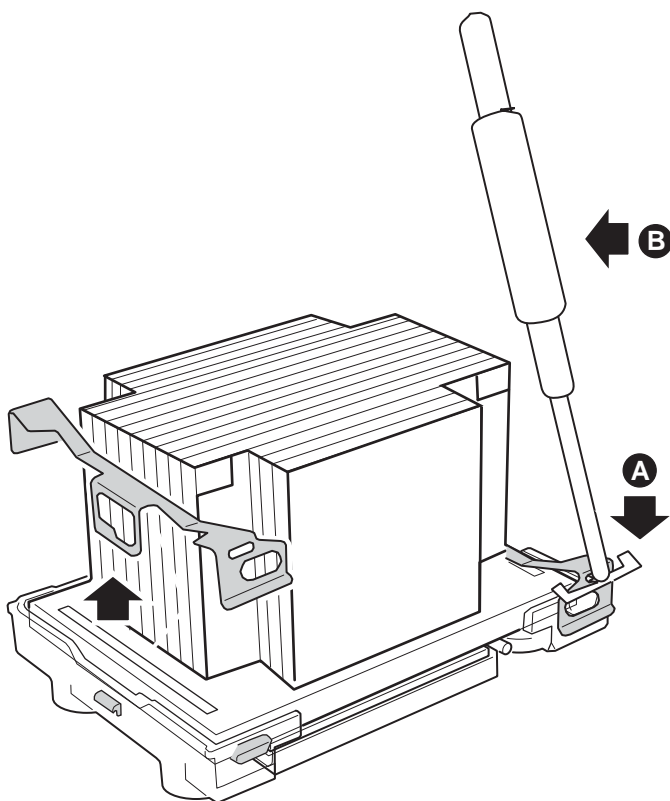


TP111

Figure 29. Installing the Heat Sink Clip

Replacing a Processor

1. Observe the safety and ESD precautions at the beginning of this chapter and the additional cautions given here.
2. Remove the fan guard (see Figure 36).
3. Using the Heat Sink Clip Attach/Removal Tool (see Figure 30), disengage the retention clip from the processor socket. Slide the Heat Sink Clip Attach/Removal Tool into the small slot on the end of the retention clip (A). While pressing down on the Heat Sink Clip Attach/Removal Tool, pull the Heat Sink Clip Attach/Removal Tool inward towards the heat sink (B). The end of the retention clip will pop off the retention mechanism bracket. Repeat process for the other end of retention clip.



TP00486

Figure 30. Disengaging the Retention Clips from the Processor Socket

The Heat Sink Clip Attach/Removal Tool may be ordered/purchased from:

Dexter Design (United States)

(503) 648-7000

Contact: jennelle@dexterdesign.net

P/N: 650308-003-P6

4. Once the retention clips are free, lift the heat sink upward off the retention mechanism brackets.
5. Raise the locking bar on the socket. Refer to Figure 25.
6. Remove the old processor from the socket.
7. Aligning the pins of the replacement processor with the socket, insert the replacement processor into the socket. Refer to Figure 26.
8. Lower the locking bar completely. Refer to Figure 27.
9. Follow the instructions packaged with your boxed processor for preparing the heat sink and processor for installation.
10. Position the heat sink above the processor. Refer to Figure 28.
11. Aligning the raised metal surfaces, place the heat sink on top of the processor.
12. Place the heat sink clip so the tab on the clip engages the slot on the heat sink and the hole opposite the tab slides over the stud on the mounting bracket (A). Refer to Figure 29.

13. When the clip is mounted in the slot on the heat sink and over the stud on the mounting bracket, move the clip to the right as far as it will travel (towards C). Refer to Figure 29.
14. Press down on the left end of the clip (B) until firmly engaged over the stud on the mounting bracket. Refer to Figure 29.
15. With the left (B) end of the clip firmly attached to the stud on the mounting bracket, press down on the other end of the clip (C) until it is firmly engaged. Refer to Figure 29.
16. Repeat the process for the clip on the opposite side of the heat sink.

Memory

Only DDR266 compliant SDRAM is supported by the server board. Install from 256 MB to 12 GB of registered, ECC memory, using up to six DIMMs.

⇒ NOTE

Only DDR266 is supported with a 533 MHz Front Side Bus.

DIMMs must be installed in pairs and in the following order: 1B and 1A, 2B and 2A, 3B and 3A.

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.

Memory DIMM Support

The Intel® Telco/Industrial Grade Server TIGPR2U server board supports DDR266 compliant registered ECC DIMMs operating at 266MHz.

Only DIMMs tested and qualified by Intel or a designated memory test vendor are supported on the Intel® Telco/Industrial Grade Server TIGPR2U server board. A list of tested DIMMs will be made available. Note that all DIMMs are supported by design, but only fully tested DIMMs will be supported.

The minimum supported DIMM size is 128 MB. Therefore, the minimum main memory configuration is 2 x 128 MB or 256 MB. The largest size DIMM supported is a 2 GB stacked registered DDR266 ECC DIMM based on 512 megabit technology.

Only registered DDR266 compliant, ECC, DDR memory DIMMs will be supported.

- ECC single-bit errors will be corrected and multiple-bit errors will be detected. The server board also supports the Intel® Single Device Data Correction (SDCC) feature.
- The maximum memory capacity is 12 GB.
- The minimum memory capacity is 256 MB.

Memory Configuration

The memory interface between the MCH and DIMMs is 144 bits wide. This requires that two DIMMs be populated per bank in order for the system to operate. At least one bank has to be populated in order for the system to boot. If additional banks have less than two DIMMs, the memory for that bank(s) will not be available to the system.

There are three banks of DIMMs, labeled 1, 2, and 3. Bank 1 contains DIMM locations 1A and 1B, Bank 2 contains 2A and 2B, and Bank 3 contains 3A and 3B. DIMM socket identifiers are marked with silkscreen next to each DIMM socket on the baseboard. Note that the sockets associated with any given bank are located next to each other.

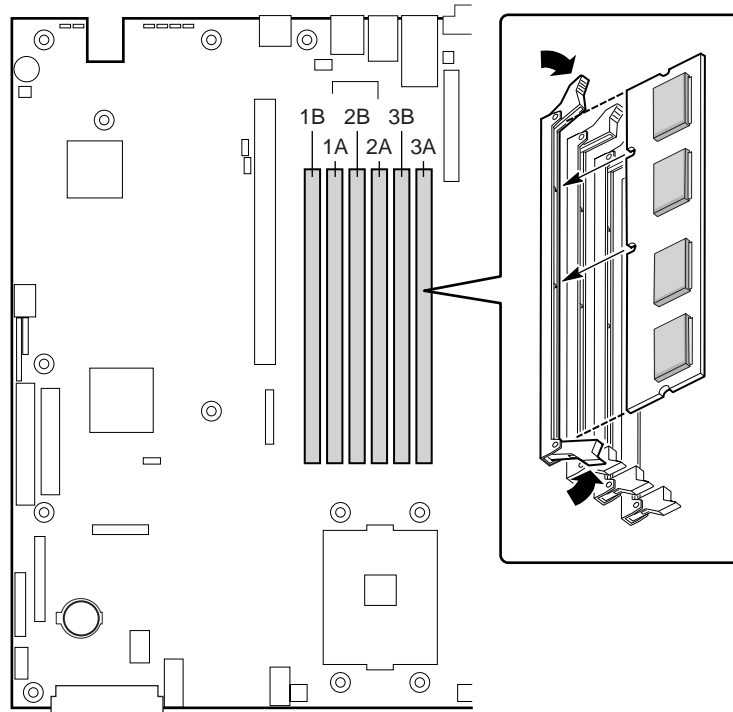
Certain combinations of DIMM types in the same system can violate the Write Ringback measurement specification during analog validation.

- When mixing double-ranked DIMMs (x4 or x8) with single-ranked DIMMs (x4 or x8), if a single-ranked DIMM is placed in the populated slot closest to the MCH, the Write Ringback at that DIMM violates the JEDEC DRAM specification.

The baseboard's signal integrity and cooling are optimized when memory banks are populated in order. Therefore, when installing memory, DIMMs should be installed starting with Bank 1 and ending with Bank 3.

DIMM and memory configurations must adhere to the following:

- DDR266 registered ECC DIMM modules
- DIMM organization: x72 ECC
- Pin count: 184
- DIMM capacity: 128 MB, 256 MB, 512 MB, 1 GB, 2 GB
- Serial PD: JEDEC Rev 2.0
- Voltage options: 2.5 V (VDD/VDDQ)
- Interface: SSTL2
- Two DIMMs must be populated in a bank for a x144 wide memory data path.
- Any or all memory banks may be populated.



TP123

Figure 31. Installing Memory

Replacing the Back up Battery

The lithium battery on the server board powers the real time clock (RTC) in the absence of AC 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 - Eksplosjonsfare ved feilagtig 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.



WARNING

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



VAROITUS

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

To replace the battery

1. Before proceeding, record your custom BIOS settings.
2. Observe the safety and ESD precautions at the beginning of this chapter.
3. Open the chassis and locate the battery.
4. Push the upper end of the metal retainer away from the battery—the battery pops up.
5. Remove the battery from its socket.
6. Dispose of the battery according to local ordinance.
7. Remove the new lithium battery from its package.
8. Being careful to observe the correct polarity, lay the battery in the socket.

9. Push the battery down—the metal retainer locks the battery in the socket.
10. Close the chassis.
11. Run BIOS Setup to restore the configuration settings to the RTC.
12. Restore your custom BIOS settings.

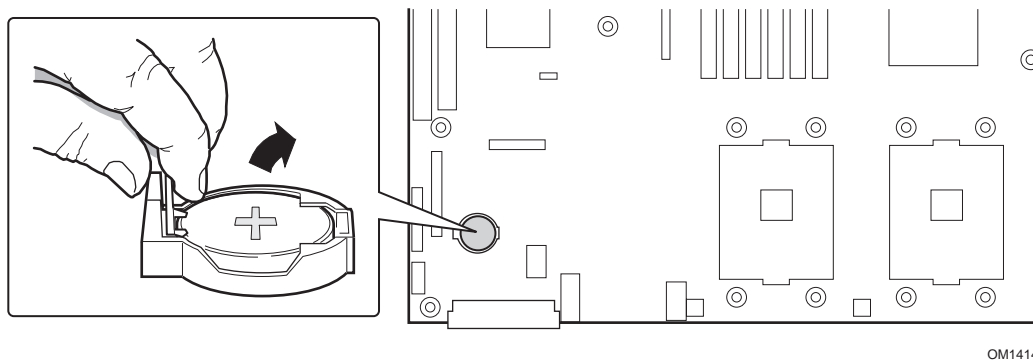


Figure 32. Replacing the Back-up Battery

Replacing 3.3 Volt and 5 Volt PCI Add-in Cards in Full-Length PCI Adapter Subsystem

This PCI adapter assembly is configured and installed as shown in Figure 33. After the PCI adapter assembly is removed from the system, it is configured with PCI adapters by plugging the PCI adapters into the PCI connectors on the riser card (either a 3.3-Volt riser card or a 5-Volt riser card) that is part of the PCI adapter assembly. The PCI adapter assembly is then installed into the system by plugging the riser card into the riser card connector on the server baseboard. In addition, it is necessary to make sure that the interlocking metal tabs on the back of the PCI adapter assembly are correctly inserted into the slots in the back of the chassis.

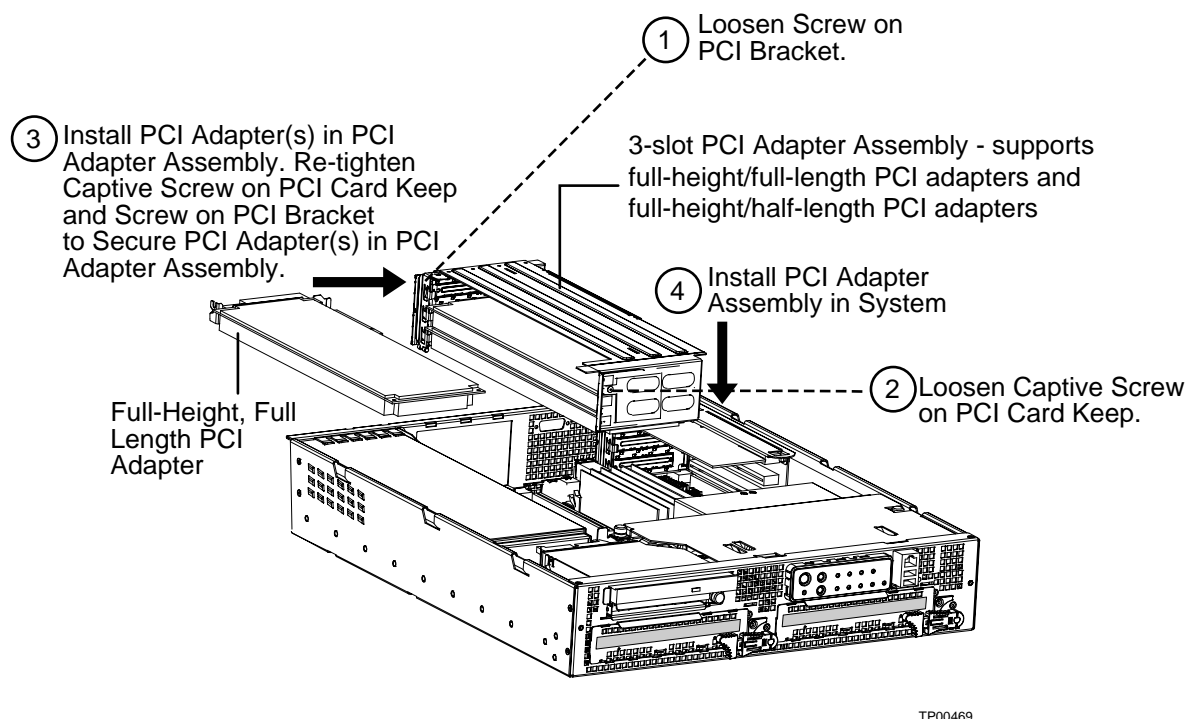


Figure 33. Segment B Full-Height, Full-Length PCI Adapter Subsystem

Table 28 shows the maximum PCI bus speed achievable on PCI Bus Segment B. Any slower PCI adapter installed in the PCI Adapter Subsystem will gate the speed.

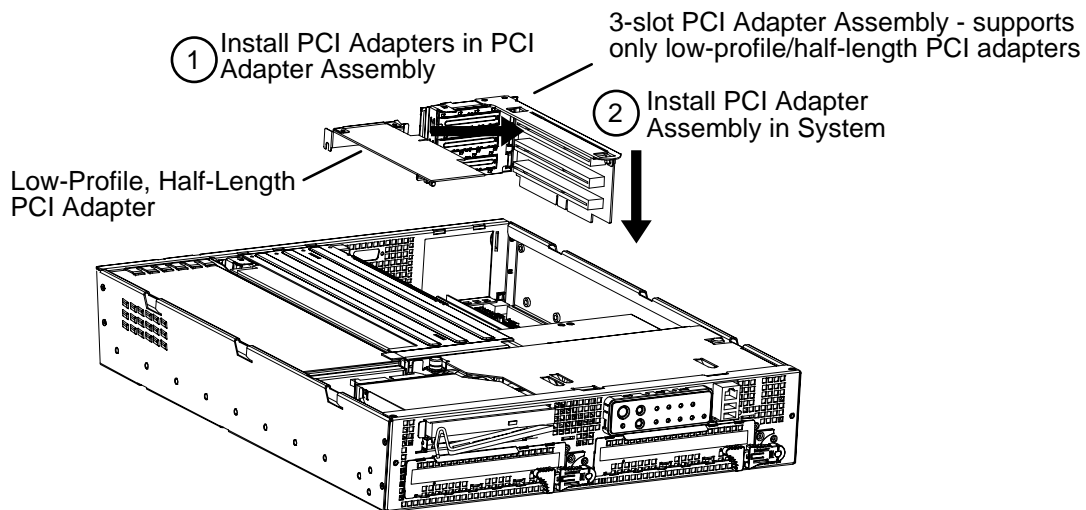
Table 288. Segment B Full-Height, Full-Length PCI Adapter Maximum Speed

Configuration	3.3 Volt Riser Card	5-Volt Riser Card
0 Adapter Cards installed and on-board Dual NIC device enabled	PCI-X 64 bit/100 MHz	PCI-X 32 bit/33 MHz
1 Adapter Card installed and on-board Dual NIC device enabled	PCI-X 64 bit/100 MHz	PCI-X 32 bit/33 MHz
2 Adapter Cards installed and on-board Dual NIC device enabled	PCI-X 64 bit/66 MHz	PCI-X 32 bit/33 MHz
3 Adapter Cards installed and on-board Dual NIC device enabled	PCI-X 64 bit/66 MHz	PCI-X 32 bit/33 MHz

Configuration	3.3 Volt Riser Card	5-Volt Riser Card
1 Adapter Card installed and on-board Dual NIC device disabled	PCI-X 64 bit/100 MHz	PCI-X 32 bit/33 MHz
2 Adapter Cards installed and on-board Dual NIC device disabled	PCI-X 64 bit/66 MHz	PCI-X 32 bit/33 MHz
3 Adapter Cards installed and on-board Dual NIC device disabled	PCI-X 64 bit/66 MHz	PCI-X 32 bit/33 MHz

Replacing 3.3 Volt Add-in Cards in Low Profile, Half-Length PCI Adapter Subsystem

A three-slot PCI adapter assembly that supports only low-profile, half-length PCI adapters is installed in the Segment C PCI riser slot located on the right side of the server baseboard. This PCI adapter assembly is configured and installed as shown in Figure 34. After the PCI adapter assembly is removed from the system, it is configured with PCI adapters by plugging the PCI adapters into the PCI connectors on the 3.3-Volt riser card that is part of the PCI adapter assembly. The PCI adapter assembly is then installed into the system by plugging the riser card into the riser card connector on the server baseboard. In addition, it is necessary to make sure that the interlocking metal tabs on the back of the PCI adapter assembly are correctly inserted into the slots in the back of the chassis.



TP00470

Figure 34. Segment C Low-Profile, Half-Length PCI Adapter Subsystem

Table 29 shows the maximum PCI bus speed achievable on PCI Bus Segment C. Note that only 3.3-V PCI riser cards are supported in the Segment C PCI Adapter Subsystem. 5-V PCI riser cards are not supported.

Table 299. Segment C Low-Profile, Half-Length PCI Adapter Maximum Speed

Configuration	3.3 Volt Riser Card
0 Adapter Cards installed and on board Adaptec* AIC7902 SCSI device enabled	PCI-X 64 bit/100 MHz
1 Adapter Card installed and on board Adaptec* AIC7902 SCSI device enabled	PCI-X 64 bit/100 MHz
2 Adapter Cards installed and on board Adaptec* AIC7902 SCSI device enabled	PCI-X 64 bit/100 MHz
3 Adapter Cards installed and on board Adaptec* AIC7902 SCSI device enabled	PCI-X 64 bit/66 MHz
1 Adapter Card installed and on board Adaptec* AIC7902 SCSI device disabled	PCI-X 64 bit/100 MHz
2 Adapter Cards installed and on board Adaptec* AIC7902 SCSI device disabled	PCI-X 64 bit/100 MHz
3 Adapter Cards installed and on board Adaptec* AIC7902 SCSI device disabled	PCI-X 64 bit/66 MHz

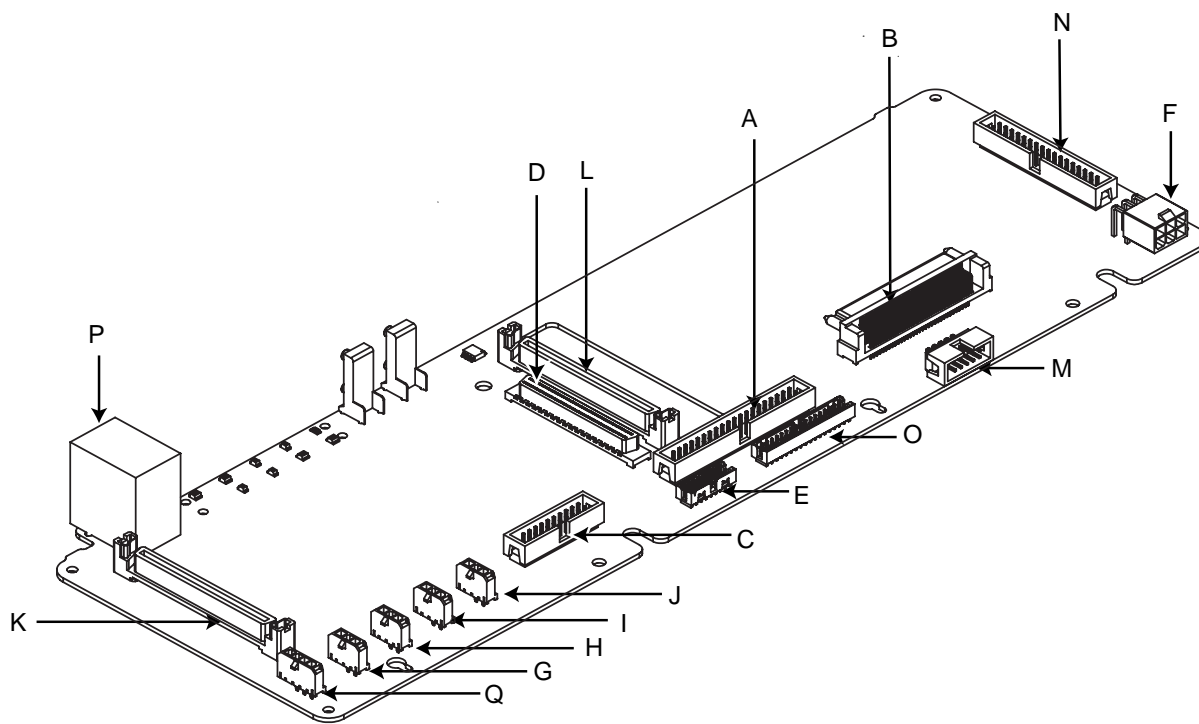
Front Panel Board Connectors (FPIO Board)

Table shows all the connectors on the FPIO system board, the interconnect used for each connector, and the destination for the interconnect. In addition, the first column references the location of the connector location (see Figure 35).

Table 30. FPIO Board Connections

Loc	Ref Des	Function	Interconnect	Connects to
A	J5A1	2x20 IDE Connector	IDE Cable	Baseboard IDE Connector
B	J2A1	68 Pin Blind Mate receptacle	CDFDD I/F	CDROM or Floppy Carrier
C	J7A1	2x10 System Fan Cntrl conn	Fan Cntrl Cbl	Baseboard Fan Connectors
D	J5B1	68 pin SCSI Connector	SCSI BB Cbl	Baseboard SCSI Connector
E	J6A1	2x8 Alarms Connector	Alarms Cable	System Chassis Back
F	J1A1	2x3 P/S Power Connector	P/S harness	Power Supply Assembly
G	J9A1	1x3 System Fan 1 Conn	Fan 1 harness	Fan 1

Loc	Ref Des	Function	Interconnect	Connects to
H	J8A3	1x3 System Fan 2 Conn	Fan 2 harness	Fan 2
I	J8A2	1x3 System Fan 3 Conn	Fan 3 harness	Fan 3
J	J8A1	1x3 System Fan 4 Conn	Fan 4 harness	Fan 4
K	J9D1	80 pin SCA Connector	SCSI Flex 1	SCSI Disk Drive 1
L	J5D1	80 pin SCA Connector	SCSI Flex 2	SCSI Disk Drive 2
M	J3A1	2x5 USB Connector	USB Cable	Baseboard USB Connector
N	J1C1	2x17 Floppy Conn	Floppy Cable	Baseboard Floppy Connector
O	J4A1	2x17 Front Panel conn 2mm	FP Cable	Baseboard Front Panel Connector
P	J9D2	RJ45 COM2/Dual USB conn	N/C	
Q	J9A2	I ² C Connector	IPMB Harness	Baseboard IPMB Conn



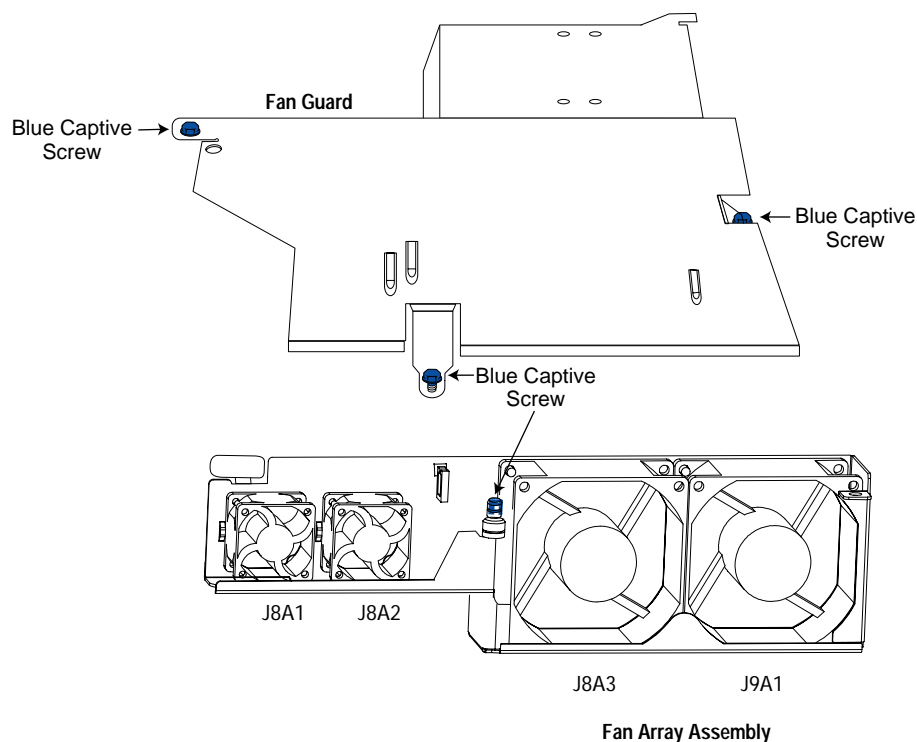
TP183

Figure 35. FPIO Connector Location

Replacing the Fan Array Assembly

To replace the fan array assembly, do the following:

1. Loosen the three captive screws that secure the fan guard and remove the fan guard.
2. Disconnect the 4 fan power cables from the FPIO board.
3. Loosen the 1 captive screw on the fan array assembly.
4. Remove the fan array assembly.
5. Insert the new fan array assembly.
6. Tighten the one captive screw on the fan array assembly.
7. Re-connect the 4 fan power cables to the connectors on the FPIO board. Take care to re-connect each fan power cable to the correct connector.
8. Replace the fan guard.
9. Tighten the three captive screws on the fan guard.



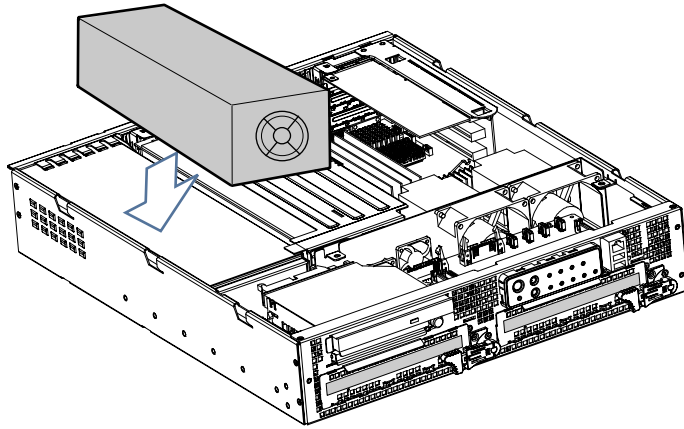
TP00471

Figure 36. Replacing the Fan Array Assembly

Removing the Power Supply Cage

To replace the power supply cage, follow these instructions:

1. Remove the front bezel.
2. Remove the peripheral drive tray.
3. Remove the fan guard and fan array assembly (see Figure 36).
4. Remove the full-length PCI Adapter subsystem (see Figure 33).
5. Disconnect the PS/2 power connector from the FPIO board (see “F” on Figure 35).
6. Disconnect the SSI front panel connector from the server board (see “W” on Figure 5).
7. Disconnect the ID LED connector from the server board (see “B” on Figure 5).
8. Disconnect the auxiliary signal connector from the server board (see “P” on Figure 5).
9. Disconnect the PS Signal Connector from the server board (see “U” on Figure 5).
10. Remove the power supply modules from the power supply cage (see Figure 14).
11. Loosen the 2 screws at the rear of the power supply cage, connecting the power supply cage to the chassis.
12. Loosen the one screw at the front of the power supply cage, connecting the power supply cage to the chassis.
13. Pull power supply cage forward (towards front of system) and upward. Lift cage out of chassis.



TP00472

Figure 37. Removing the Power Supply Cage

9 Technical Reference

This section includes:

- Connector pinouts
- Information on jumpers

Connector Pinouts

This section describes certain I/O interface connectors of the TIGPR2U server system.

Alarms

The alarms port interface is a standard DB15-pin connector (see Figure 38). 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. The power alarm has just a common and normally open contact outputs. The major and minor alarms contain external reset circuits. Table 30 gives the pinout of the alarms connector.



CAUTION

Do not apply more than 60 Volts (maximum) to any pin or combination of pins on the alarms connector.

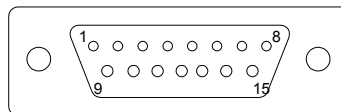


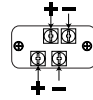
Figure 38. 15-pin Alarms Connector

Table 301. 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 each DC-input power supply module.

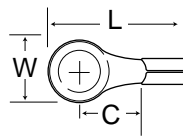


TP136

Figure 39. DC Power Input Connector

The terminal block will accept standard terminal lugs, size Newark* stock # 81N1501 type CRS-T0-1406-HT. These lugs accept 14 AWG wire gauge. The width (W in Figure 40) of the lug can be no larger than 0.25 inches.

The DC-input connector has two sets of screw terminals. Both sets of terminals should be wired using 14AWG wire. Each terminal input should be fused with a maximum of a 20A fuse.



TP137

Figure 40. DC Power Terminal Lug

To connect the earth ground conductor to the chassis stud:

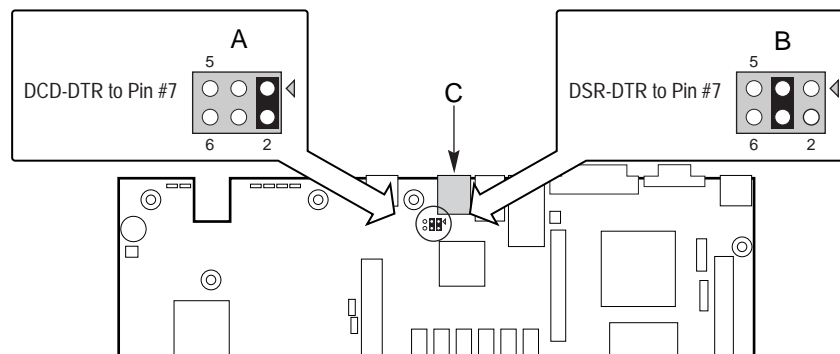
1. Place a #8-32 nut on the chassis stud and tighten to 10 in-lb.
2. Place the earth ground wire terminal lug on the chassis stud.
3. Place another #8-32 nut on the chassis stud so that the earth ground wire terminal is between the two nuts and tighten the second nut to 10 in-lb.

Serial Ports

The rear RJ-45 serial port is a fully functional serial port that supports any standard serial device and provides support for serial concentrators. 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 RJ-45 serial port. The 8 pins of the RJ-45 connector can be configured to match either of two pinout standards used by serial port devices. To accommodate either standard, the J5A2 jumper block located directly behind the rear RJ-45 serial port must be jumpered appropriately according to the desired standard.

➡ NOTE

By default, the RJ-45 serial port is configured to support a DSR signal. For serial devices that require a DSR signal (default), the J5A2 jumper must be configured in position 3-4 (Figure 41, B). For serial devices that require a DCD signal, the jumper must be in position 1-2 (Figure 41, A).



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Figure 41. J5A2 Jumper Block for DSR Signal

Appendix A: Equipment Log and Configuration Worksheet

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 Drive			
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)			
PCI Slot (3)			
PCI Slot (4)			
PCI Slot (5)			
PCI Slot (6)			

Appendix B: Warnings

WARNING: English (US)

AVERTISSEMENTS: Français

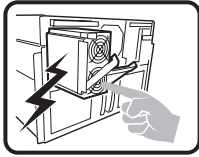
WARNUNG: Deutsch

AVVERTENZA: Italiano

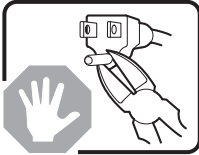
ADVERTENCIA: Español

警告: 中文

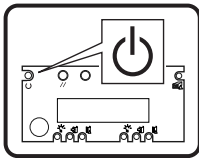
WARNING: English (US)



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.



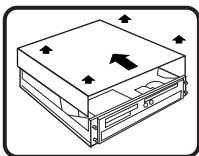
The Power button on the system does not turn off all system power. To remove all power from the system, you must unplug/disconnect the power cord from the system.



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

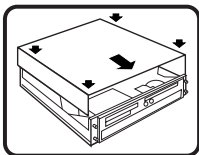
SAFETY STEPS: Whenever you remove the chassis covers to access the inside of the system, follow these steps:

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.
-

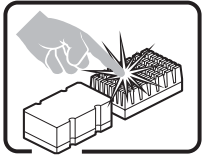


For proper cooling and airflow, always reinstall the chassis covers before turning on the system. Operating the system without the covers in place can damage system parts. To install the covers:

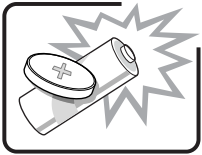
1. Check first to make sure you have not left loose tools or parts inside the system.
 2. Check that cables, add-in boards, and other components are properly installed.
 3. Attach the covers to the chassis with the screws removed earlier, and tighten them firmly.
 4. Connect all external cables and the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

continued

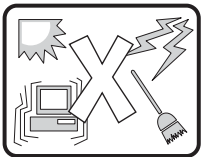
Warning: English (US) (continued)



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.

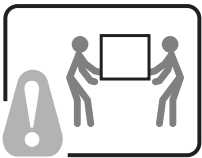


Danger of explosion if the battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the equipment manufacturer. Discard used batteries according to manufacturer's instructions.



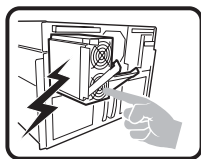
The system is designed to operate in a typical office environment. Choose a site that is:

- 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.
-

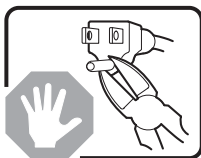


Servers can be too heavy for a single person to lift or move safely. Depending on the server, use two people or a mechanical assist to lift or move the server.

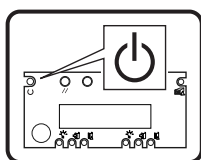
AVERTISSEMENTS: Français



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.



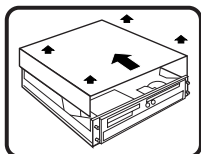
Le bouton d'alimentation du système n'éteint pas toutes les alimentations CA du système. Pour mettre complètement le système hors tension, vous devez débrancher chaque cordon d'alimentation CA de sa prise.



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.

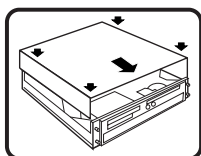
CONSIGNES DE SÉCURITÉ : Lorsque vous retirez les panneaux du châssis pour accéder à l'intérieur du système, suivez les étapes ci-dessous :

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-deSystem Setup Utilitys, vous pouvez retirer les panneaux du système. Pour effectuer cette opération :

1. Retirez et conservez toutes les vis des panneaux.
2. Retirez les panneaux.

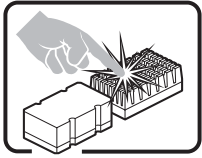


Afin de permettre le refroidissement et l'aération du système, réinstallez toujours les panneaux du châssis avant de mettre le système sous tension. Le fonctionnement du système en l'absence des panneaux risque d'endommager ses pièces. Pour installer les panneaux, procédez comme suit :

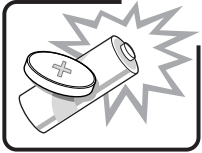
1. Assurez-vous ne pas avoir oublié d'outils ou de pièces démontées dans le système.
2. Assurez-vous que les câbles, les cartes d'extension et les autres composants sont bien installés.
3. Revissez solidement les panneaux du châssis avec les vis retirées plus tôt.
4. Rebranchez tous les cordons d'alimentation CA et câbles externes au système.

suite

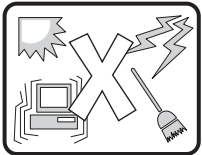
Avertissements: Français (suite)



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.

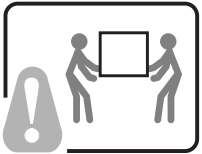


Danger d'explosion si la batterie n'est pas remontée correctement. Remplacer uniquement par une pile du même type ou de type équivalent recommandé par le fabricant. Débarrassez-vous des piles usagées conformément aux instructions du fabricant.



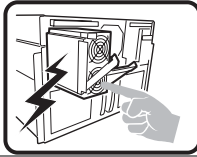
Le système a été conçu pour fonctionner dans un cadre de travail normal. L'emplacement choisi doit être :

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).

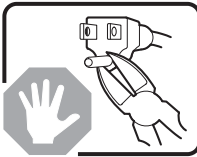


Il se peut que les serveurs soient trop lourds pour qu'une seule personne puisse les soulever et les déplacer en toute sécurité. En fonction du serveur, utilisez deux personnes ou utilisez un équipement mécanique auxiliaire pour soulever ou déplacer le serveur.

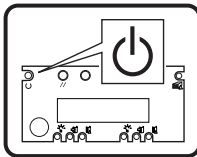
WARNUNG: Deutsch



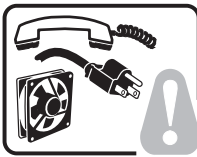
Das Netzteil dieses Computers enthält keine wartungsbedürftigen Teile. Dieses Produkt kann über mehrere Netzteile verfügen. Überlassen Sie Wartungsarbeiten nur qualifizierten Fachleuten.



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.



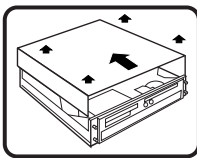
Durch Ausschalten des Netzschalters wird die Wechselstromversorgung des Systems nicht unterbrochen. Um das System vom Netz zu trennen, müssen Sie das Netzkabel aus der Steckdose oder vom Netzteil abziehen.



Vermeiden Sie Verletzungen aufgrund elektrischer oder mechanischer Gefahren; lassen Sie daher den Gehäusedeckel nur von technisch qualifiziertem Personal abnehmen.

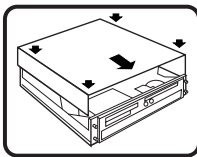
SICHERHEITSHINWEISE: Beachten Sie beim Abnehmen der Gehäuseabdeckung und Arbeiten im Inneren des Systems folgende Schritte:

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 Gehäuseabdeckung abnehmen. Gehen Sie wie folgt vor:

1. Entfernen Sie sämtliche Schrauben der Gehäuseabdeckung, und bewahren Sie diese auf.
2. Nehmen Sie die Gehäuseabdeckung ab.

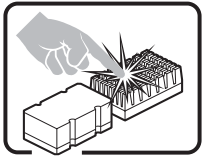


Um eine ordnungsgemäße Kühlung und Belüftung zu gewährleisten, sollten Sie stets die Gehäuseabdeckung anbringen, bevor Sie das System in Betrieb nehmen. Wenn das System ohne obere und vordere Abdeckung betrieben wird, kann es zu einer Beschädigung der Systemkomponenten kommen. So entfernen Sie die Gehäuseabdeckung:

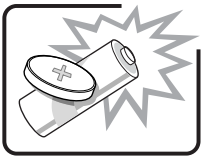
1. Prüfen Sie, daß weder Werkzeuge noch Kleinteile im Innern des Systems vergessen wurden.
2. Prüfen Sie, ob die Kabel und anderen Komponenten richtig installiert sind.
3. Schrauben Sie die Abdeckung mit den zuvor gelösten Schrauben gut am Gehäuse fest.
4. Schließen Sie alle externen Kabel und das Netzkabel an das System an.

Fortsetzung

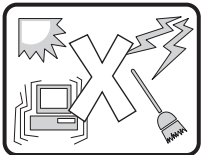
Warnung: Deutsch (Fortsetzung)



Mikroprozessor und Kühlkörper können heiß sein, wenn das System längere Zeit eingeschaltet war. Einige Platinen- und Gehäuseteile können scharfe Spitzen und Kanten aufweisen. Gehen Sie auf jeden Fall mit Vorsicht heran. Das Tragen von Schutzhandschuhen wird empfohlen.

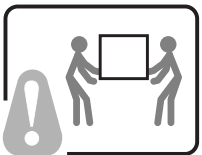


Wird die Batterie unsachgemäß ausgewechselt, besteht Explosionsgefahr. Ersetzen Sie die Batterie nur durch denselben oder einen gleichwertigen Batterietyp, der vom Gerätehersteller empfohlen wird. Entsorgen Sie verbrauchte Batterien gemäß den Herstellerempfehlungen.



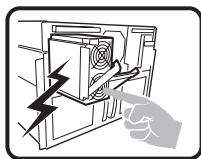
Das System ist für den Betrieb innerhalb normaler Büroumgebungen geeignet. Der Standort sollte folgende Anforderungen erfüllen:

- 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 Servernetzwerkabel problemlos erreicht werden kann, da das Gerät nur über dieses Kabel vom Netz getrennt wird.

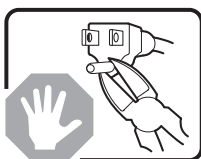


Um einen Server sicher anzuheben und zu bewegen ist eine Person nicht ausreichend. Bewegen Sie den Server, je nach Größe, entweder zu zweit oder mittels einer mechanischen Hilfe.

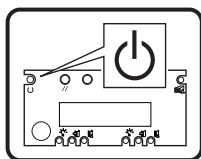
AVVERTENZA: Italiano



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.



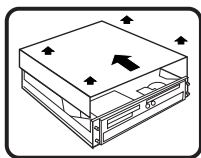
L'interruttore di accensione del sistema non scollega tutta l'alimentazione in c.a. del sistema. Per scollegare tutta l'alimentazione in c.a., è necessario disinserire ogni cavo di alimentazione in c.a. dalla presa a muro o dall'alimentatore.



Per evitare incidenti elettrici e meccanici, i coperchi del telaio devono essere rimossi da personale qualificato.

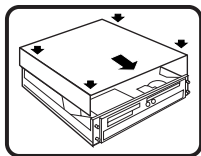
MISURE DI SICUREZZA: Nel caso sia necessario rimuovere i coperchi del telaio per accedere alle parti interne del sistema, procedere nel seguente modo:

1. Spegnerne tutte le periferiche collegate al sistema.
2. Spegnerne 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.

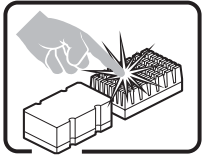


Per evitare che il sistema si surriscaldi e per garantire una ventilazione adeguata, reinstallare sempre i coperchi prima di attivare il sistema. Se si attiva il sistema senza aver riposizionato i coperchi correttamente, alcune parti del sistema potrebbero risultare danneggiate. Per installare i coperchi:

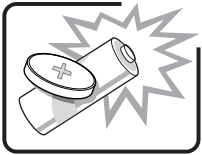
1. Verificare innanzitutto di non aver lasciato utensili o altre parti all'interno del sistema.
2. Verificare che i cavi, le schede aggiuntive e gli altri componenti siano stati installati correttamente.
3. Fissare saldamente i coperchi al telaio utilizzando le viti precedentemente rimosse.
4. Collegare tutti i cavi esterni e il cavo o i cavi di alimentazione in c.a. al sistema.

continua

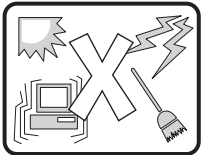
Avvertenza: Italiano (continua)



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.

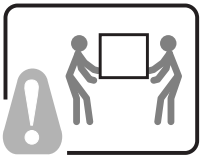


Se sostituita in modo errato, la batteria potrebbe esplodere. Sostituire le batterie scariche solo con batterie originali o del tipo consigliato dal produttore dell'apparecchiatura. Per lo smaltimento delle batterie usate attenersi alle istruzioni del produttore.



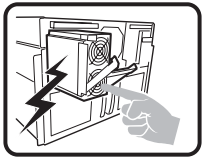
Il sistema è concepito per l'utilizzo in ambienti adibiti a ufficio. Scegliere una postazione con le caratteristiche riportate di seguito.

- 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.

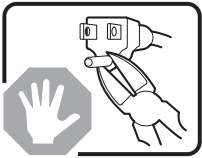


I server possono risultare troppo pesanti per essere sollevati o spostati da una sola persona. Alcuni server devono dunque essere sollevati o spostati da due persone o da un assistente tecnico.

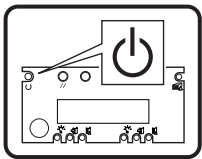
ADVERTENCIA: Español



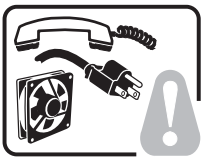
La fuente de alimentación de este producto no contiene piezas que puedan ser reparadas por el usuario. Puede que haya más de una fuente de alimentación en este producto. Para las reparaciones, consulte sólo con el personal cualificado.



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.



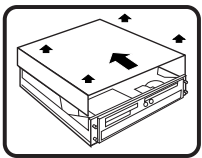
El botón de alimentación del sistema no desactiva toda la alimentación de CA del sistema. Para eliminar toda la alimentación de CA del sistema, deberá desenchufar todos los cables de alimentación de CA del enchufe de pared o de la fuente de alimentación.



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

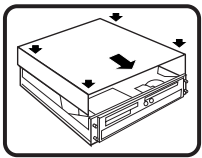
PASOS DE SEGURIDAD: Siempre que retire las cubiertas de las carcassas para acceder al interior del sistema, siga las instrucciones que se especifican a continuación:

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 brazaete 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 carcassas.



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.

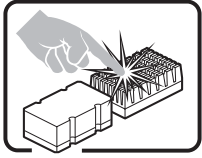


Para obtener una ventilación y un flujo de aire adecuados, reinstale siempre las cubiertas de la carcassas antes de encender el sistema. Si utiliza el sistema sin las cubiertas en su lugar, puede que se dañen algunas piezas del sistema. Para instalar las cubiertas:

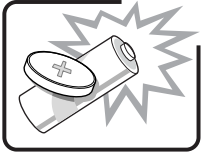
1. Asegúrese primero de no haber dejado piezas o herramientas sueltas en el sistema.
2. Compruebe que los cables, tarjetas adicionales y demás componentes están correctamente instalados.
3. Fije las cubiertas a la carcassas con los tornillos que ha retirado anteriormente y apriételos firmemente.
4. Conecte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

continuación

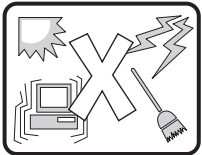
Advertencia: Español (continuación)



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.

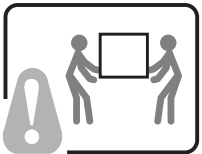


Existe peligro de explosión si la batería se sustituye incorrectamente. Sustitúyala sólo por el mismo tipo o uno equivalente recomendado por el fabricante del equipo. Deseche las baterías usadas según las instrucciones del fabricante.



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 servicio, utilice dos personas o una ayuda mecánica para levantar o mover el servidor.

Intel® TIGPR2U

Telco Carrier Grade 服务器系统

产品指南



警告

只有合格的维修技术人员方可获权打开本服务器的箱盖，并对服务器内部部件执行操作。在打开箱盖之前，请参阅“警告与注意事项”。



警告

固定设备机架：设备机架必须固定在一个不可移动的支架上，以防止当一台或多台服务器向前方沿其滑动组件伸出时机架倾倒。您必须同时考虑机架中安装的其它设备的重量。如果机架向前倾斜则有发生倾倒碾轧的危险，并可能导致严重的人身伤害。

只能使用螺丝刀的平口插入机架滑轨的锁销夹片下。此情况下若使用手指，则有夹伤手指的危险。

如果已安装交流电源系统：

断开主交流电源：交流电源电缆是切断服务器电源连接的主要部件，因此安装服务器时必须考虑方便插拔电缆的因素。如果某条服务器电源电缆不方便插拔，您有责任安装一个交流电源断开开关，以方便断开整个机架的电源。此主电源断开开关必须安装在便于操作的位置，并且必须贴上标签，指明它是用来控制整个机架而不仅是服务器的电源。要完全切断电源，两条交流电源电缆必须全部拔下。

使机架接地：为避免潜在的电击危险，您必须在机架上连接第三条线缆作为安全接地导线。如果服务器电源电缆插在属于机架一部分的交流电插座中，则必须为机架本身提供适当的接地。如果服务器电源电缆连接在墙壁交流电插座中，则电缆中的安全接地导线只为服务器提供适当的接地保护。您必须为机架和安装在其中的其它设备另外提供适当的接地保护。

过流保护：根据服务器的设计，可以承受交流电压电源，每条馈线具备最大 20 安培的过流保护功能。如果设备机架的电源系统连接在具备 20 安培以上过流保护的分支电路上，则必须为服务器提供附加的过流保护。配置两个电源系统的服务器其整体电流额定值不超过 4 安培。

如果已安装直流电源系统：

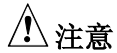
直流电源必须使用双层或加强绝缘材料绝缘，与任何危险交流或直流电源隔离。直流电源的每个馈线对必须具备提供最高 300 瓦连续供电的能力。直流电源的连接只能由训练有素的维修人员完成。

断开主直流电源：您有责任为整个机架部件安装一个直流电源断开开关。此主电源断开开关必须安装在便于操作的位置，并且必须贴上标签，指明它是用来控制整个设备而不仅是服务器的电源。

使机架接地：为避免潜在的电击危险，您必须在机架上连接第三条线缆作为安全接地导线。安全接地导线必须至少为 14AWG 线缆，并连接到服务器背面的接地接线柱上。此安全接地导线应通过一个双孔线夹连接到机箱接线柱上，两个孔位之间的最大距离应为 0.25 英寸。机箱接线柱上的螺帽应达到 10

英寸 / 磅的扭矩。此安全接地导线只为服务器提供适当的接地保护。您必须为机架和安装在其中的其它设备另外提供适当的接地保护。

过流保护：在每一台主机设备机架上，都必须安装过流保护断路器，断路器作为机架的一部分，必须安装在直流电源和服务器之间。根据服务器的设计，可以承受直流电压电源，每个馈线对具备最大 10 安培的过流保护功能。如果设备机架的直流电源系统安装在具备 10 安培以上过流保护的电路上，则必须为服务器提供附加的过流保护。配置两个电源系统的服务器其整体电流额定值不超过 7 安培。



注意

温度：本服务器安装到设备机架后，服务器在操作状态下其温度不得低于 5 ° C (41 ° F) 或高于 40 ° C (104

° F)。若温度出现大幅度波动，则会引起服务器产生诸多问题。

通风：设备机架必须为服务器的前部提供足够的气流，以确保适当的冷却效果。机架内还必须提供足够的通风，以排尽服务器每小时高达 1023 BTU

的热量。所选机架和提供的通风设施必须适合服务器的使用环境。

警告与注意事项

以下警告与注意事项适用于任何卸下系统箱盖执行操作的情形。只有合格的技术人员方可组装、配置或维修本服务器系统。



警告

电源按钮：按机箱前面的电源按钮关闭服务器时，并不能关闭系统的所有电源。要断开系统的所有电源，必须将交流电源电缆从服务器系统上拔下 / 断开。从系统上拔下 / 断开电源电缆将同时断开 +12 V 备用电源，此电源在服务器断电期间为服务器提供电源。

电源系统的危险状况：电源系统内部存在危险的电压、电流及能级。电源系统中没有用户可维修的部件，需对电源系统进行维修时，应由合格的技术人员进行。

设备及电缆的危险状况：电源、电话和通信线缆上可能会存在危险的带电状态。在打开服务器箱盖之前，请关闭服务器系统电源，并拔下 / 断开电源电缆及与服务器相连的电信系统、网络和调制解调器等。否则，有可能导致人身伤害或对设备造成损害。

处理器和电源系统的危险状况：处理器 / 内存模块可能出现高温状态。在关闭系统电源之后，应允许所有风扇继续运转，直到它们自行停止。在所有风扇停止转动后，方可拔下 / 断开电源电缆。



注意

静电放电 (ESD) 和 ESD 保护：静电放电 (ESD)

可能会损坏磁盘驱动器、板卡及其它部件。建议您只在防静电工作台上执行本章所述的所有操作。如果没有防静电工作台可用，在对部件执行操作时，应佩戴防静电腕带并将其连接到机箱的接地部位（任何未涂漆的金属表面），以便获得相应的防静电保护。

ESD

及拿取板卡注意事项：拿取板卡时应始终小心谨慎。板卡对静电放电

(ESD)

极为敏感。拿取板卡时只能握取板卡的边缘。在将板卡从其保护包装或系统中取出后，应将其放置在接地的无静电平面上。不要让板卡在任何表面上滑动。

冷却与通风：为确保适当的冷却效果和通风，请始终在启动系统之前先安装好箱盖。不安装箱盖而开机可能会损坏系统部件。

更换备用电池

在不接通电源的情况下，服务器主板上的锂电池可为实时时钟（RTC）持续供电长达十年之久。当电池电量开始减弱时，电压将会降低，而存储于实时时钟（RTC）CMOS RAM 中的服务器设置（例如日期和时间）可能会出错。欲查阅合格设备的列表，请与您的客户服务代表或经销商联系。



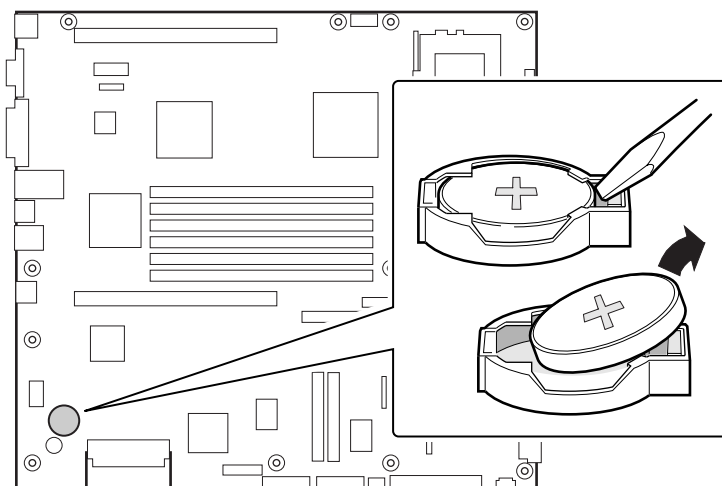
警告

如果电池更换不当，将有发生爆炸的危险。更换电池时，仅限于使用相同型号的电池或由制造商推荐的同等类型的电池。请按照制造商的说明处理废旧电池。



要更换备用电池，请按以下步骤操作：

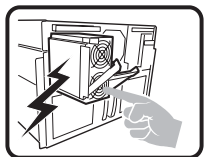
1. 请遵守本章开始部分所述的安全与 ESD 注意事项。
2. 打开服务器顶部箱盖，并在服务器母板上找到备用电池（参见图 2）。
3. 将一只小型平口螺丝刀或同类型工具的平口插入电池座塑料夹的夹片下面。轻轻向下按螺丝刀，撬起电池。
4. 从电池座中取出电池。
5. 按当地的有关规定处理旧电池。
6. 从包装中取出新的锂电池，并按照正确的极性将其插入电池插座中。
7. 重新将锂电池插座上的塑料夹片装好。
8. 重新安装好顶部箱盖。
9. 运行 Setup（设置）实用程序，以恢复 RTC 的配置设置值。



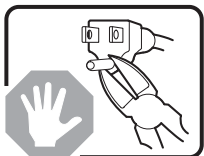
OM11808

图 42. 更换备用电池

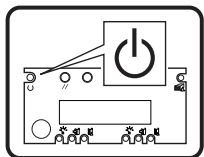
警告：中文



本产品的电源系统中没有用户可维修的部件。本产品中可能安装多个电源系统。电源系统的维护只能由合格的技术人员完成。



如果随本产品提供的电源电缆类型不完全符合您当地的交流电源电缆要求，请勿尝试使用或随意进行改动。一台产品上可能附带多条交流电源电缆。



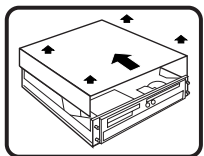
系统上的电源按钮并不能关闭系统的所有交流电源。要断开系统的所有电源，必须将交流电源电缆从服务器系统上拔下 / 断开。



为避免电击或机械性人身伤害，只有合格的维护人员方可拆卸机箱护盖。

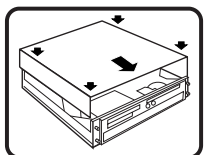
安全步骤：每次需要打开箱盖并对系统内部部件进行操作时，请按以下步骤操作：

1. 关闭所有与系统连接的外围设备。
2. 按电源按钮以关闭系统。
3. 从系统上拔下 / 断开电源电缆。
4. 从系统背面的 I/O 连接器或端口上拔下所有通信线缆及所有其它线缆，并在线缆上作好接口对应标记。
5. 拿取组件时，请戴上防静电腕带，并将其连接到系统机箱的接地部位（任何未涂漆的金属表面），以提供相应的静电放电（ESD）保护。
6. 切勿在打开箱盖时操作系统。



完成以上六个安全步骤后，您就可以打开系统箱盖了。要打开系统箱盖：

3. 卸下箱盖上的所有螺丝并保存好。
4. 卸下箱盖。

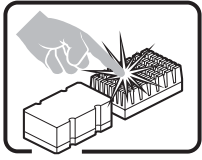


为确保适当的冷却效果和通风，请始终在启动系统之前先安装好箱盖。不安装箱盖而开机可能会损坏系统部件。要安装箱盖：

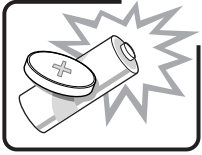
1. 首先进行检查，确保系统内部未遗留任何工具或部件。
2. 检查电缆、附加卡和其它组件是否均已正确安装。
3. 用先前卸下的螺丝将箱盖安装到机箱上，然后旋紧螺丝。
4. 将所有外部电缆及电源电缆连接到系统上。

待 ▪

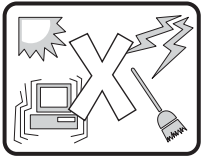
警告：中文（•）



系统运行一段时间后，微处理器和散热器可能很热。而且，某些板卡和机箱部件上可能有尖锐的引脚和锋利的边缘。接触这些部件时应小心谨慎。应考虑戴上保护手套。

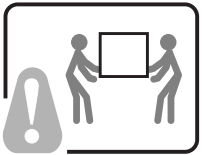


如果电池更换不当，将有发生爆炸的危险。更换电池时，仅限于使用相同型号的电池或由制造商推荐的同等类型的电池。请按照制造商的说明处理废旧电池。



本系统设计用于典型的办公室环境中。选择的场地应符合以下要求：

- 干净且无空气传播的微粒（不是指普通的房间灰尘）。
- 通风良好且远离热源，包括不遭受阳光直射。
- 远离震动源或物理撞击源。
- 与电气设备所产生的强电磁场隔离。
- 在易受电暴影响的地区应采取相应的保护措施。建议在发生电暴期间将系统连接到电涌抑制器上，并且断开通信线路与调制解调器的连接。
- 提供正确接地的墙壁电源插座。
- 提供足够的空间以便接触到电源系统电缆，因为它们是产品的主电源断开部件。



服务器较重，一个人可能不能安全地抬起或搬移。视服务器的具体情况而定，在需要抬起或搬移服务器时应由两人共同完成或使用辅助机械装置。

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