

Kontron Carrier Grade Server TIGH2U

Product Guide

December 2009

Rev. 1.2

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Contents

1	Introduction	8
1.1	About this Manual	8
1.1.1	Manual Organization	8
1.2	What Your Server Includes	9
1.3	Product Accessories	9
1.4	Additional Information and Software	10
2	Features	11
2.1	Server Components	13
2.2	Back Panel	14
2.3	Front Panel	15
2.4	Rear Panel Ethernet Ports	18
2.5	SAS Front Panel (SFP) Board	18
2.5.1	SFP Board Features	18
2.6	Telco Alarms Manager Board	18
2.6.1	TAM Board Features	19
2.7	Server Board Connector and Component Locations	19
2.8	Hard Disk Drives	20
2.9	Riser Card Assembly	21
2.9.1	Full-Height PCI-X/PCIe Riser Card	21
2.9.2	Low-Profile PCIe Riser Card	21
2.10	Power Supply	22
2.11	System Cooling	22
2.11.1	CPU 1 and Memory Cooling Area	23
2.11.2	CPU 2 and Chipset Cooling Area	23
2.11.3	PCI Cooling Area	23
2.11.4	Hard Disk Drive and Power Supply Cooling	23
2.11.5	Fan Speed Control	23
2.11.6	Cooling Summary	24
2.12	Hardware Requirements	24
2.12.1	Processor	24
2.12.2	Memory	24
3	Server Component Installations and Upgrades	25
3.1	Before You Begin	25
3.1.1	Tools and Supplies Needed	25
3.1.2	System References	25
3.2	General Installation Procedures	25
3.2.1	Removing the Front Bezel	25
3.2.2	Installing the Front Bezel	26
3.2.3	Removing the Chassis Cover	26
3.2.4	Installing the Chassis Cover	27
3.2.5	Removing the Processor Air Duct	28
3.2.6	Installing the Processor Air Duct	29
3.3	Hot-Swappable Component Installation Procedures	30
3.3.1	Installing or Replacing a Hard Drive	30
3.3.1.1	Removing a Hard Drive Tray	30
3.3.1.2	Attaching a Hard Drive to the Drive Tray	31
3.3.2	Replacing a Power Supply	32
3.3.2.1	Removing the Power Supply Module	33
3.3.2.2	Installing a Power Supply Module	33
3.3.2.3	Installing or Replacing a DC Power Supply	34
3.3.2.4	Grounding a DC-Powered System	34

3.4	Internal System Component Configuration and Installation Procedures	34
3.4.1	Configuring Jumpers on the Server Board	34
3.4.1.1	Configuration Jumpers	35
3.4.1.2	BIOS Select Jumper.....	36
3.4.1.3	DCD/DSR Signal Select Jumper	37
3.4.2	Configuring Memory DIMMs.....	37
3.4.2.1	Memory RASUM Features	39
3.4.2.2	Supported Memory	39
3.4.2.3	DIMM Population Rules and Supported DIMM Configurations	40
3.4.2.4	Non-Mirrored Mode Minimum Configuration.....	41
3.4.2.5	Non-Mirrored Mode Memory Upgrades.....	42
3.4.2.6	Mirrored Mode Memory Configuration.....	42
3.4.2.7	DIMM Sparing Mode Memory Configuration	43
3.4.2.8	Single Branch Mode Sparing	43
3.4.2.9	Dual Branch Mode Sparing.....	43
3.4.3	Installing DIMMs.....	44
3.4.4	Removing Memory DIMMs.....	45
3.4.5	Adding or Replacing a Processor	46
3.4.5.1	ESD and Processor Handling Precautions	46
3.4.5.2	Removing a Processor.....	47
3.4.5.3	Installing a New Processor.....	48
3.4.5.4	Installing the Heat Sink.....	50
3.4.6	Other Installation and Upgrade Options	50
3.5	Installing the Server into a Rack	50
3.5.1	Connecting the Power Cord	50
3.5.2	Equipment Rack Precautions	51
4	Optional Component Installations	52
4.1	Before You Begin	52
4.1.1	Tools and Supplies Needed.....	52
4.1.2	System References	52
4.1.3	Cable Routing Reference.....	53
4.2	Installing or Replacing a PCI Add-in Card	53
4.2.1	Riser Card Options	54
4.2.2	Removing the PCI Riser Card Assembly.....	56
4.2.3	Removing an Add-in Card from the Riser Card Assembly	57
4.2.4	Installing an Add-in Card in the Riser Card Assembly	58
4.2.5	Installing the PCI Riser Card Assembly	59
4.3	Installing an I/O Expansion Module	59
4.4	Installing Remote Management Module 2 Components	61
4.4.1	Installing the RMM2 NIC Module	61
4.4.2	Installing the Remote Management Module 2.....	62
4.5	Installing an Embedded USB Solid-State Drive.....	62
4.6	Installing Hardware RAID 5 Components.....	65
4.6.1	Installing the RAID Activation Key and the RAID DIMM	66
4.6.2	Installing the RAID Smart Battery	67
4.7	Installing an Optical Device	69
4.7.1	Removing the Optical Device Filler Panel	69
4.7.2	Installing a New Optical Device.....	71
5	Server Component Replacements	73
5.1	Before You Begin	73
5.1.1	Tools and Supplies Needed.....	73
5.1.2	System References	73
5.1.3	Cable Routing Reference.....	73
5.2	Replacing the Fan Assemblies.....	74
5.2.1	Removing the CPU Fan Assembly	75

5.2.2	Replacing the CPU Fans in the Bracket	76
5.2.3	Installing the CPU Fan Assembly.....	77
5.2.4	Removing the PCI Fan Assembly	78
5.2.5	Replacing the PCI Fans in the Fan Bracket	81
5.2.6	Installing the Fan Assembly	82
5.3	Replacing the TAM Board.....	83
5.3.1	Removing the TAM Board	84
5.3.2	Removing the LED Light Pipe Assembly	87
5.3.3	Installing the TAM Board	88
5.4	Replacing the SAS Front Panel Board	89
5.4.1	Removing the Front Panel Board.....	89
5.4.2	Installing the Front Panel Board	92
5.5	Replacing the Removable Drive Bay Assembly and the SAS Backplane Board.....	93
5.5.1	Removing the Drive Bay Assembly.....	93
5.5.2	Removing the SAS Backplane Board from the Drive Bay Assembly	94
5.5.3	Installing a New SAS Backplane Board	95
5.5.4	Installing the Drive Bay Assembly.....	96
5.6	Replacing the Power Distribution Assembly	97
5.6.1	Removing the Power Distribution Board.....	97
5.6.2	Installing the Power Distribution Board.....	99
5.7	Replacing the Server Board	100
5.7.1	Removing the Server Board	100
5.7.2	Installing the Server Board.....	103
5.8	Replacing the CMOS Battery on the Server Board	104
6	Server Utilities	106
6.1	Using the BIOS Setup Utility	106
6.1.1	Starting Setup	106
6.1.2	If You Cannot Access Setup	106
6.1.3	Setup Menus	106
6.2	Upgrading the BIOS.....	107
6.2.1	Preparing for the Upgrade	108
6.2.1.1	Recording the Current BIOS Settings	108
6.2.1.2	Obtaining the Upgrade.....	108
6.2.2	Updating the BIOS	108
6.3	Clearing the CMOS	108
6.4	Clearing the Password.....	109
6.5	BMC Force Update Procedure	109
7	Troubleshooting	110
7.1	Resetting the System.....	110
7.2	Problems Following Initial System Installation	110
7.2.1	First Steps Checklist	110
7.3	Hardware Diagnostic Testing.....	111
7.3.1	Verifying Proper Operation of Key System Lights	111
7.3.2	Confirming the Operating System Load	111
7.4	Specific Problems and Corrective Actions	112
7.4.1	Power Light does not Light	112
7.4.2	No Characters Appear on Screen	112
7.4.3	Characters are Distorted or Incorrect	112
7.4.4	Ctrl-G Option is not available to Configure RAID	113
7.4.5	System Cooling Fans do not Rotate Properly	113
7.4.6	Cannot Connect to a Server.....	113
7.4.7	Diagnostics Pass but the Connection Fails.....	113
7.4.8	The Controller Stopped Working When an Add-in Adapter was Installed	113
7.4.9	The Add-in Adapter Stopped Working Without Apparent Cause	114

7.4.10	System Boots When Installing a PCI Card	114
7.4.11	Problems with Newly Installed Application Software.....	114
7.4.12	Problems with Application Software that Ran Correctly Earlier.....	114
7.4.13	Devices are not Recognized under Device Manager (Windows* OS)	115
7.4.14	Hard Drive(s) are not Recognized	115
7.5	LED Information	115
7.6	BIOS Error Messages.....	116
7.6.1	BIOS POST Beep Codes	117
8	Warranty	118

Revision History

Date	Revision	Description
September 2007	001	Initial release; rev 0.5
November 2007	002	Gold release
April 2008	003	Minor edits for SRA posting. Primarily grammar edits. Replaced SysCon board text and art with Intel Z-U130 Value Solid State Drive.
December 2009	004	Kontron version: Changed Intel Z-U130 Value Solid State Drive to SMART Embedded USB Solid-State Drive

1 Introduction

1.1 About this Manual

Thank you for purchasing and using the Kontron Carrier Grade Server TIGH2U.

This manual is for trained system technicians who are responsible for troubleshooting, upgrading, and maintaining this server. This document provides a brief overview of the features of the system, a list of accessories or other components you may need, troubleshooting information, and instructions on how to add and replace components on the TIGH2U Server.

Note: Always be sure to check the Support web site at <http://us.kontron.com/> for the latest version of this manual.

1.1.1 Manual Organization

Chapter 2 provides a brief overview of the TIGH2U Server. In this chapter, you will find a list of the server board features, chassis features, illustrations of the product, and product diagrams to help you identify components and their locations.

Chapter 3 provides instructions on adding and replacing hot-swappable and standard components such as processors and memory DIMMs. Use this chapter for step-by-step instructions and diagrams for installing or replacing components.

Chapter 4 provides instructions on adding optional components such as PCI add-in cards, I/O expansion modules, hardware RAID 5 components, and optical devices. Use this chapter for step-by-step instructions and diagrams for installing components.

Chapter 5 provides instructions on replacing components such as fans, boards, the drive bay assembly, and the battery. Use this chapter for step-by-step instructions and diagrams for replacing components.

Chapter 6 provides instructions on using the utilities that are shipped with the board or that may be required to update the system. This includes how to navigate through the BIOS (Basic Input/Output System) setup screens, how to perform a BIOS update, and how to reset the password or CMOS (Complementary Metal Oxide Semiconductor). Information about the specific BIOS settings and screens is available in the *Intel® Server Board S5000PAL/S5000XAL Technical Product Specification*.

Chapter 7 provides troubleshooting information. In this chapter, you will find BIOS error messages and POST (Power-on Self Test) code messages. You will also find suggestions for performing troubleshooting activities to identify the source of a problem.

1.2 What Your Server Includes

Your Kontron Carrier Grade Server TIGH2U includes the following components:

- One Intel® Server Board T5000PAL
- One 2U chassis
- Six internal hard disk drive trays in a removable drive bay assembly. A SAS backplane board is attached to the rear of the drive bay assembly.
- A riser card assembly for PCI-X* and PCI Express* (PCIe*) add-in cards
- DC or AC power subsystem: one hot-swappable PSU and power distribution board (PDB). You must order a second power supply for a redundant system.
- Four dual-rotor fan assemblies for cooling the processor(s), DIMM(s), PCI slot(s), power supply modules, and other internal components
- SAS front panel (SFP) board
- Telco Alarms Manager (TAM) board
- Internal cables and connectors

See [Chapter 3](#) for initial system installation and configuration instructions. See [Chapter 4](#) for optional component installation and configuration instructions.

1.3 Product Accessories

You may need or want to purchase one or more of the following items for your server as spares or for more processing power:

- Quad-Core Intel® Xeon® processor 5400 series and appropriate heat sink(s)
- DDR2-667 FBD ECC memory DIMM(s) (system maximum = 32 Gbytes)
- SAS hard disk drives (system maximum = six HDDs)
- 0.5-inch slim-line optical drive
- PCI-X* or PCIe* add-in cards
- Additional AC or DC power supply for redundancy and hot-swapping
- Intel® Remote Management Module 2 (Intel® RMM2) and RMM2 NIC module
- I/O expansion module for dual-GbE or 4xSAS external drive support
- SMART Embedded USB Solid-State Drive

For information about the accessories, memory, processors, and third-party hardware that have been tested and can be used with your system, and for ordering information, see the accessories and spares list on

<http://us.kontron.com/support/>

1.4 Additional Information and Software

For more technical information about this product or information about the accessories that can be used with this TIGH2U Server, see <http://us.kontron.com/support>. This site also contains information about:

- In-depth technical information about the server board included with this server, including BIOS settings and chipset information
- The latest product information
- Accessories or other server products
- Hardware (peripheral boards, add-in cards) and operating systems that have been tested with this product
- DIMMs that have been tested with this product
- The power budget for this product
- Software to manage your server
- Diagnostics testing software
- Firmware and BIOS updates
- System drivers

2 Features

This chapter briefly describes the main features of the Kontron Carrier Grade Server TIGH2U. This chapter provides a diagram of the product, a list of the server features, and diagrams that show the location of important components and connections.

Figure 1 shows the Kontron Carrier Grade Server TIGH2U.

Figure 1. Kontron Carrier Grade Server TIGH2U

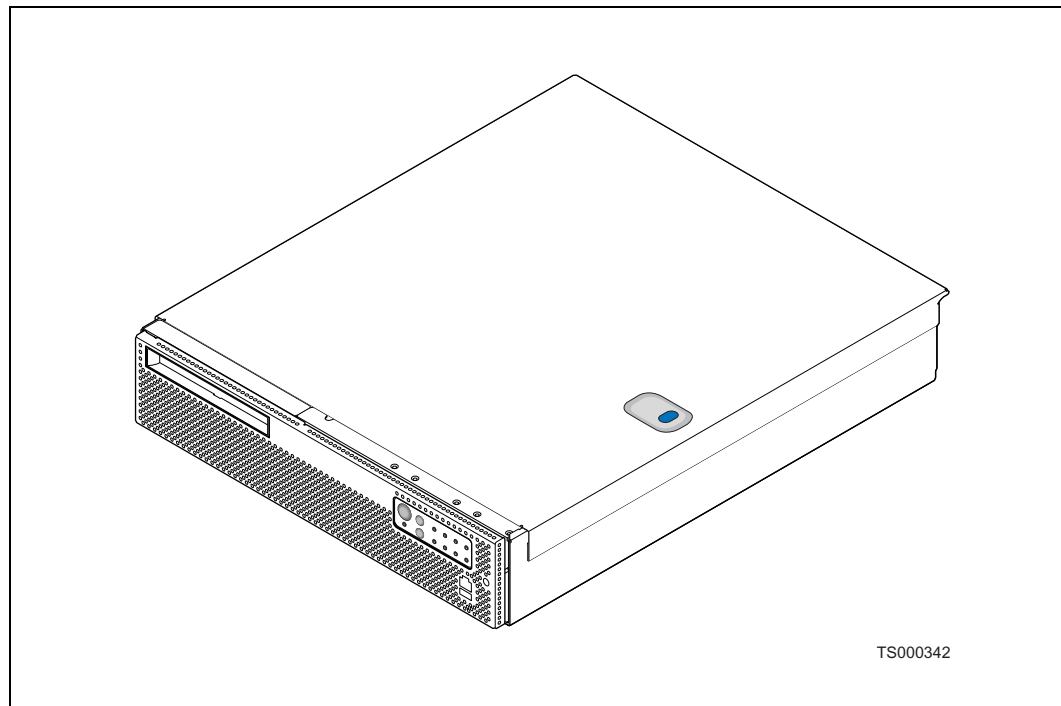


Table 1 summarizes the major features of the server system.

Table 1. Kontron Carrier Grade Server TIGH2U Features

Feature	Description
Compact, high-density system	Rack-mount server with a height of 2U (3.45 inches, 8.9 cm) and a depth of 20.0 inches (50.8 cm)
Configuration flexibility	One- or two-way capability in low-profile and cost / value-effective packaging Stand-alone system Supports up to two Quad-Core Intel® Xeon® processor 5400 series †
Serviceability	Rear access to hot-swappable power supplies Front access to hot-swappable SAS disk drives Front access to optical drive Ability to swap the entire drive bay as a unit

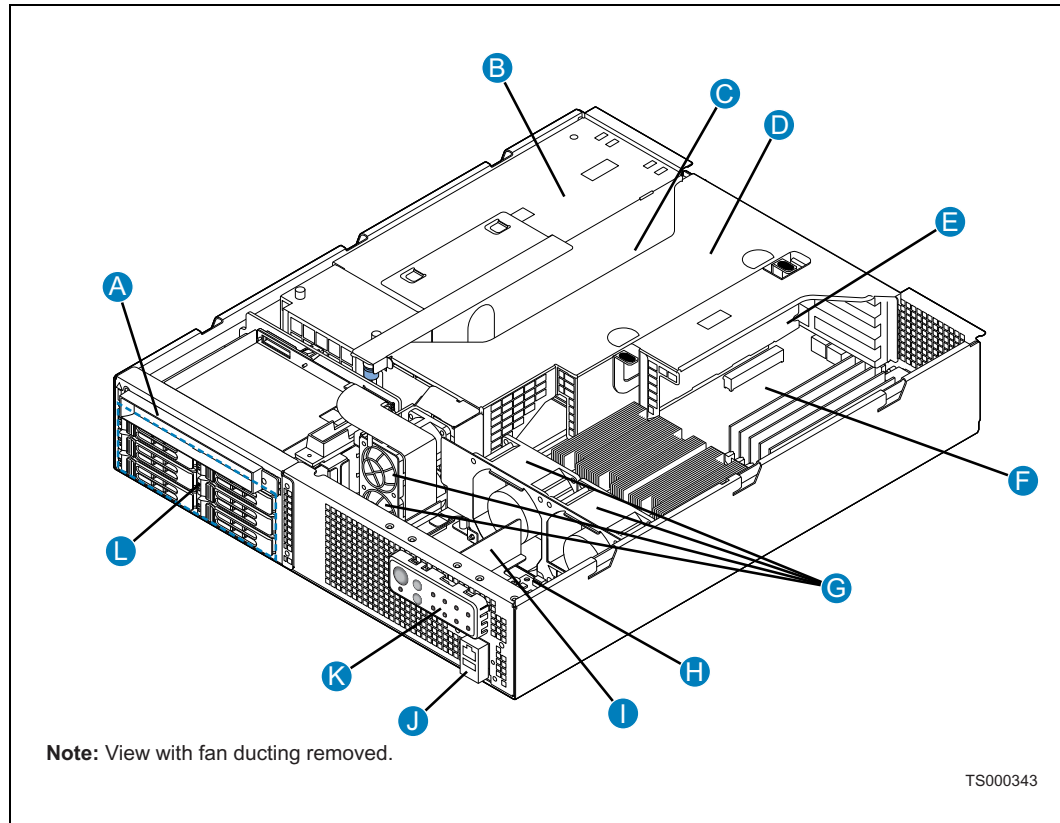
Table 1. Kontron Carrier Grade Server TIGH2U **Features (Continued)**

Feature	Description				
Availability	Two hot-swappable 600 W power supplies in a redundant (1+1) configuration Disk subsystem configurable as hardware or software RAID Memory sparing and memory mirroring configurations supported				
Manageability	Remote management Emergency management port (serial and LAN) IPMI 2.0 compliant Remote diagnostics support Optional SMART Embedded USB Solid-State Drive Optional Intel® Remote Management Module 2 (Intel® RMM2) providing GCM support				
Upgradeability and investment protection	Supports up to two Quad-Core Intel® Xeon® processor 5400 series † Multi-generational chassis Intel® 64 architecture support				
System-level scalability	Supports up to 32 Gbytes FBDIMM memory in non-mirrored mode Supports up to 16 Gbytes FBDIMM memory in mirrored mode Supports up to two Quad-Core Intel® Xeon® processor 5400 series † Two full-height / full-length x4 PCI Express* (PCIe)* slots One full-height / full-length 64-bit x 133 MHz PCI-X* slot Two low-profile / half-length x4 PCI Express slots Six internal hot-swappable 2.5-inch SAS disk drives One optical drive (optional)				
Front panel	<table border="0"> <tr> <td>Switches:</td> <td>LEDs / Relays:</td> </tr> <tr> <td> <ul style="list-style-type: none"> • Power switch • Reset switch • NMI switch • ID switch </td> <td> <ul style="list-style-type: none"> • Telco critical alarm fault LED / relay • Telco major alarm fault LED / relay • Telco minor alarm fault LED / relay • Telco power alarm fault LED / relay • ID LED • NIC activity LED • Main power LED • HDD activity LED </td> </tr> </table>	Switches:	LEDs / Relays:	<ul style="list-style-type: none"> • Power switch • Reset switch • NMI switch • ID switch 	<ul style="list-style-type: none"> • Telco critical alarm fault LED / relay • Telco major alarm fault LED / relay • Telco minor alarm fault LED / relay • Telco power alarm fault LED / relay • ID LED • NIC activity LED • Main power LED • HDD activity LED
Switches:	LEDs / Relays:				
<ul style="list-style-type: none"> • Power switch • Reset switch • NMI switch • ID switch 	<ul style="list-style-type: none"> • Telco critical alarm fault LED / relay • Telco major alarm fault LED / relay • Telco minor alarm fault LED / relay • Telco power alarm fault LED / relay • ID LED • NIC activity LED • Main power LED • HDD activity LED 				
I/O	<table border="0"> <tr> <td>Front panel:</td> <td>Rear panel:</td> </tr> <tr> <td> <ul style="list-style-type: none"> • Serial B port (RJ45) • USB 2.0 port </td> <td> <ul style="list-style-type: none"> • Dual PS/2 ports for keyboard and mouse • Serial B port (RJ45) • Two USB 2.0 ports • Intel® RMM2 NIC 100 Mbps management port • Two RJ45 NIC connectors for 10 / 100 / 1000 Mbps connections • Video connector • Alarms connector </td> </tr> </table>	Front panel:	Rear panel:	<ul style="list-style-type: none"> • Serial B port (RJ45) • USB 2.0 port 	<ul style="list-style-type: none"> • Dual PS/2 ports for keyboard and mouse • Serial B port (RJ45) • Two USB 2.0 ports • Intel® RMM2 NIC 100 Mbps management port • Two RJ45 NIC connectors for 10 / 100 / 1000 Mbps connections • Video connector • Alarms connector
Front panel:	Rear panel:				
<ul style="list-style-type: none"> • Serial B port (RJ45) • USB 2.0 port 	<ul style="list-style-type: none"> • Dual PS/2 ports for keyboard and mouse • Serial B port (RJ45) • Two USB 2.0 ports • Intel® RMM2 NIC 100 Mbps management port • Two RJ45 NIC connectors for 10 / 100 / 1000 Mbps connections • Video connector • Alarms connector 				
Internal connection options	Internal connectors/headers: <ul style="list-style-type: none"> • One 44-pin ATA/100 connector (power and I/O) for optical drive • One Intel® Remote Management Module 2 (Intel® RMM2) connector • One Intel® I/O Expansion Module (optional) supporting either: <ul style="list-style-type: none"> - a dual GbE NIC Intel® connection - an external x4 SAS drive 				
Add-in card support	One full-height riser slot supporting 2U PCI-X and PCIe add-in cards One low-profile riser slot supporting PCIe add-in cards				
† For a list of compatible processors, see http://us.kontron.com/support/ .					

2.1 Server Components

Figure 2 shows the TIGH2U Server with top cover and front bezel removed to show the internal components. The components are listed on the next page.

Figure 2. Carrier Grade Server TIGH2U Components

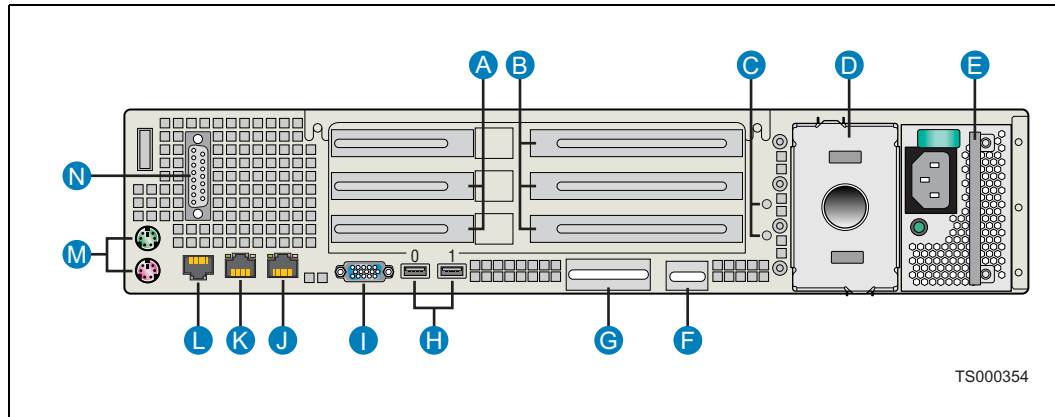


Item	Description	Item	Description
A	Optical drive (optional)	G	System fans
B	Power supply cage (contains one power supply module with provision for an optional second module)	H	SAS front panel (SFP) board
C	Provision for PCI-X* and PCI Express* (PCIe*) full-height and full-length add-in cards	I	TAM board (behind front panel) Note: The bracket on which the TAM board is installed can also include an optional SMART Embedded USB Solid-State Drive, which provides local memory storage
D	Riser card assembly (containing riser cards for both full-height and low-profile add-in cards)	J	RJ45 COM2 and USB port 2 connectors
E	Provision for two PCI Express low-profile add-in cards	K	Control panel and status indicators
F	Intel® Server Board T5000PAL	L	Hot-swappable SAS 2.5-inch disk drives (up to six)

2.2 Back Panel

Figure 3 shows the back panel of the TIGH2U Server.

Figure 3. Rear View

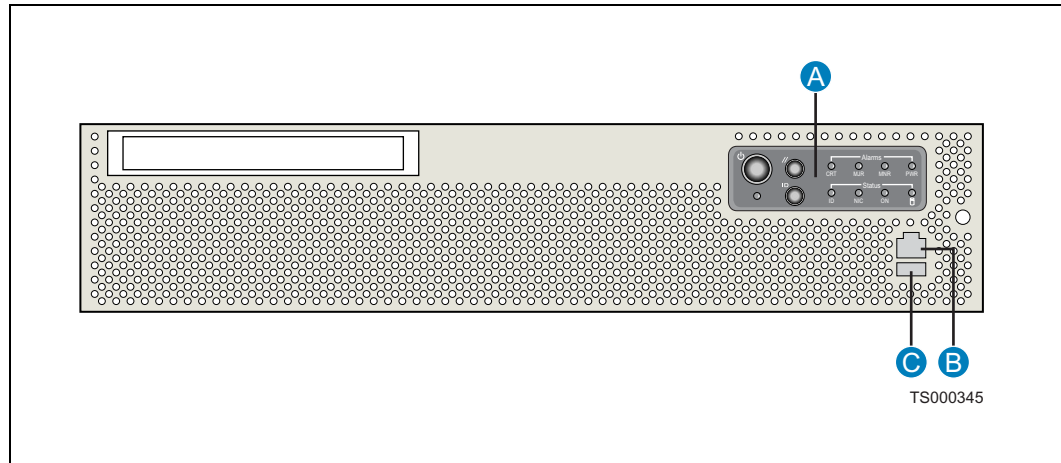


Item	Description	Item	Description
A	Low-profile PCI Express add-in cards (or filler panels)	H	USB 0 and USB 1 port connectors
B	Full-height PCI-X/PCI Express add-in cards (or filler panels)	I	Video connector
C	Ground studs (used for DC-input system)	J	GbE NIC #2 connector †††
D	Power supply 2 slot; filler panel shown	K	GbE NIC #1 connector †††
E	Power supply 1 †	L	RJ45 serial port connector
F	RMM2 NIC connector (optional) ††	M	PS/2 keyboard and mouse connectors
G	I/O expansion module connector (optional) †††	N	Alarms connector
†	In Figure 3, the power supply shown is an AC-input module. DC-input modules are also available.		
††	If an RMM2 NIC is not present, a filler panel occupies this space.		
†††	May be either an external SAS port connector or Gigabit Etherport port connector. If neither of the optional modules is installed, a filler panel occupies this space.		
††††	The GbE ports are only designed to pass intra-building lightning surge when used with shielded cabling, which must be grounded at both ends.		

2.3 Front Panel

Figure 4 shows the front panel of the TIGH2U Server with the bezel installed.

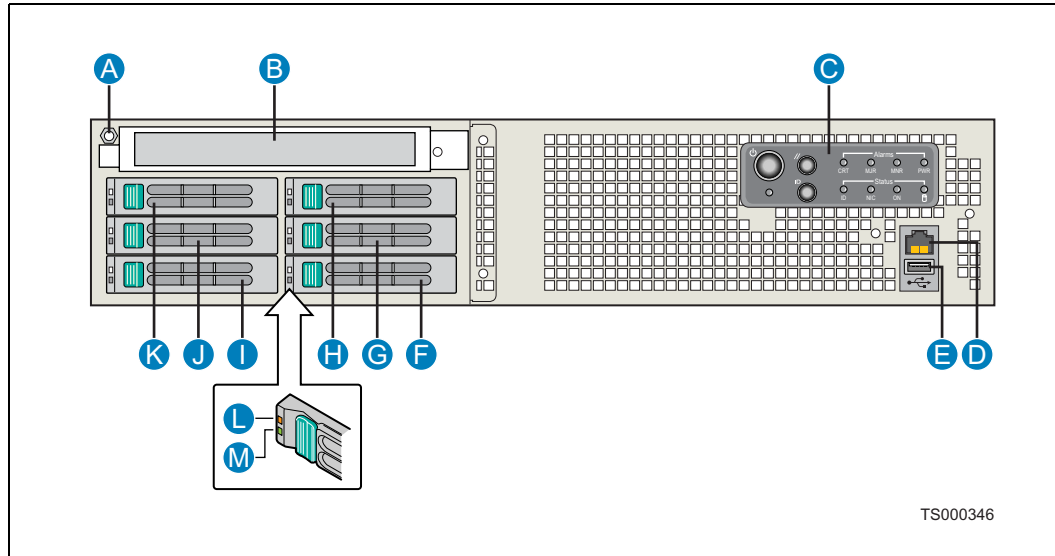
Figure 4. Front View (Bezel Installed)



Item	Description	Item	Description
A	Front panel control switches and status LEDs	C	USB port
B	COM port		

Figure 5 shows the front panel of the TIGH2U Server with the bezel removed. The components are listed on the next page.

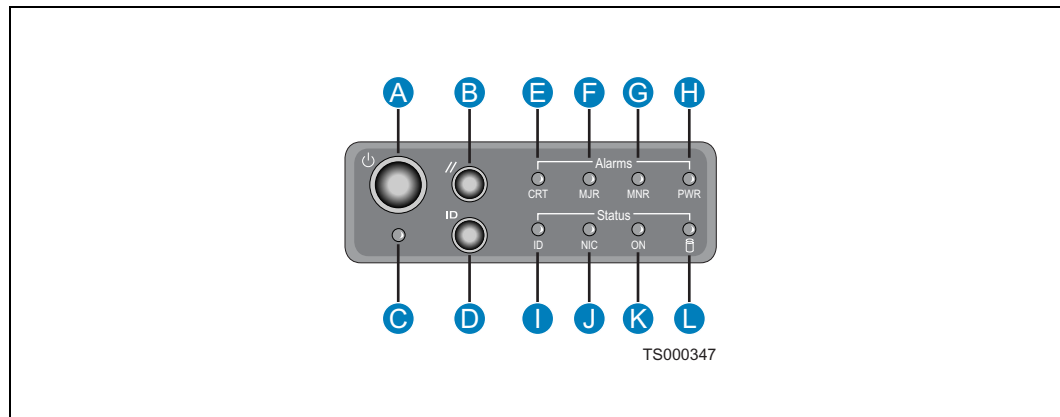
Figure 5. Front View (Bezel Removed)



Item	Description	Item	Description
A	Anti-static connection point	H	Hard drive bay 4
B	Optical drive (optional) or filler panel if no drive is installed	I	Hard drive bay 1
C	Front panel control switches and status LEDs (See Figure 6 for details)	J	Hard drive bay 3
D	Front panel serial port connector (RJ45)	K	Hard drive bay 5
E	USB port 2 connector	L	Drive fault indicator (one per hard drive)
F	Hard drive bay 0	M	Drive activity indicator (one per hard drive)
G	Hard drive bay 2		

Figure 6 shows the control panel.

Figure 6. Control Panel



Item	Feature	Description
Front Panel Switches		
A	Power switch	Toggles the system power
B	Reset switch	Resets the system
C	NMI switch (pin hole)	Asserts NMI to the server board
D	ID switch	Toggles the system ID LED on / off
Front Panel Alarm LEDs and Relays		
E	Critical (amber or red)	The Critical alarm LED can be either amber (default) or red (set with an FRUSDR update). When continuously lit, indicates a Critical System Fault occurred. A critical system fault is an error or event that has a fatal system impact. In this case, the system cannot continue to operate. An example is the loss of a large section of memory, or other corruption. The front panel critical alarm relay is engaged.
F	Major (amber or red)	The Major alarm LED can be either amber (default) or red (set with an FRUSDR update). When continuously lit, indicates a Major System Fault occurred. A major system fault is an error or event that has discernible impact to the system operation. In this case, the system can continue to operate, but in a degraded fashion (reduce performance or with the loss of non-fatal features). An example is the loss of a mirrored disk. The front panel major alarm relay is engaged.
G	Minor (amber)	When continuously lit, indicates a Minor System Fault occurred. A minor system fault typically has little impact to the system operation. An example is a correctable ECC error. The front panel minor alarm relay is engaged.
H	Power (amber)	When continuously lit, indicates a Power System Fault occurred. The front panel power alarm relay is engaged.
Front Panel Status LEDs		
I	System ID LED (white)	Indicates system identity This LED can be toggled remotely or by front panel ID switch
J	NIC activity LED (green)	Indicates NIC activity when lit
K	Main power LED (green)	When continuously lit, indicates the presence of power supply DC output power in the server. The LED turns off when the main output power from the power supply is turned off or if the power source is disrupted.
L	HDD activity / fault LED (green / amber)	Indicates HDD activity when green or an HDD fault when amber. This is an aggregated indication for all hard drives in the system (up to six). Each hard disk contains its own activity and fault indicators.

2.4 Rear Panel Ethernet Ports

The TIGH2U Server has two GbE NIC ports that are mounted on the server board and accessible from the rear of the chassis. Additional rear-accessible GbE NIC ports can be added by using full-height PCI-X/PCIe add-in cards or low-profile PCIe add-in cards.

A dual GbE I/O option module is available. This module adds two RJ45, 1 Gigabit Ethernet ports accessible on the rear panel. The GbE NIC ports are intended to be installed with shielded cabling that is grounded at both ends of the cable.

The possible configurations of full-height PCI-X/PCIe add-in cards are in [Table 2 on page 21](#) and the possible configurations of low-profile PCIe add-in cards are in [Table 3 on page 21](#).

Warning: The intra-building port(s) of the equipment or subassembly is suitable for connection to intra-building or unexposed wiring or cabling only. The intra-building port(s) of the equipment or subassembly **MUST NOT** be metalically connected to interfaces that connect to the OSP or its wiring. These interfaces are designed for use as intra-building interfaces only (Type 2 or Type 4 ports as described in GR-1089-CORE, Issue 4) and require isolation from the exposed OSP cabling. The addition of Primary Protectors is not sufficient protection to connect these interfaces metalically to OSP wiring.

2.5 SAS Front Panel (SFP) Board

The SAS Front Panel (SFP) board adds SAS support and provides support for hardware RAID 0, 1, 10, and 5, and software RAID 0, 1, and 10. This board is located on the floor of the chassis between the front panel and the two 80 mm fans.

2.5.1 SFP Board Features

The TIGH2U Server SFP board has the following features:

- One RS-232 front panel port
- One USB2.0 front panel port
- One USB2.0 interface to local memory storage
- One flex cable connection to the SAS backplane to support the interface to six independent 2.5-inch SAS hard drives
- One socket for a DDR2 mini-DIMM that provides data caching for hardware RAID
- One connector for the Intel® RAID Smart Battery that allows the contents of the DDR2 mini-DIMM to be preserved if power falls below specifications.
- Four fan connectors to provide power, control, and monitoring for the four cooling fans
- Four fan fault LEDs (for diagnostics purposes only, not visible on front panel)

2.6 Telco Alarms Manager Board

The Telco Alarms Manager (TAM) board adds LEDs and power functions to the front of the server chassis. It also uses a cable to provide an alarms function with fault relays to the back of the chassis. This board is located over the top of the SFP board between the front panel and the two 80 mm fans.

2.6.1 TAM Board Features

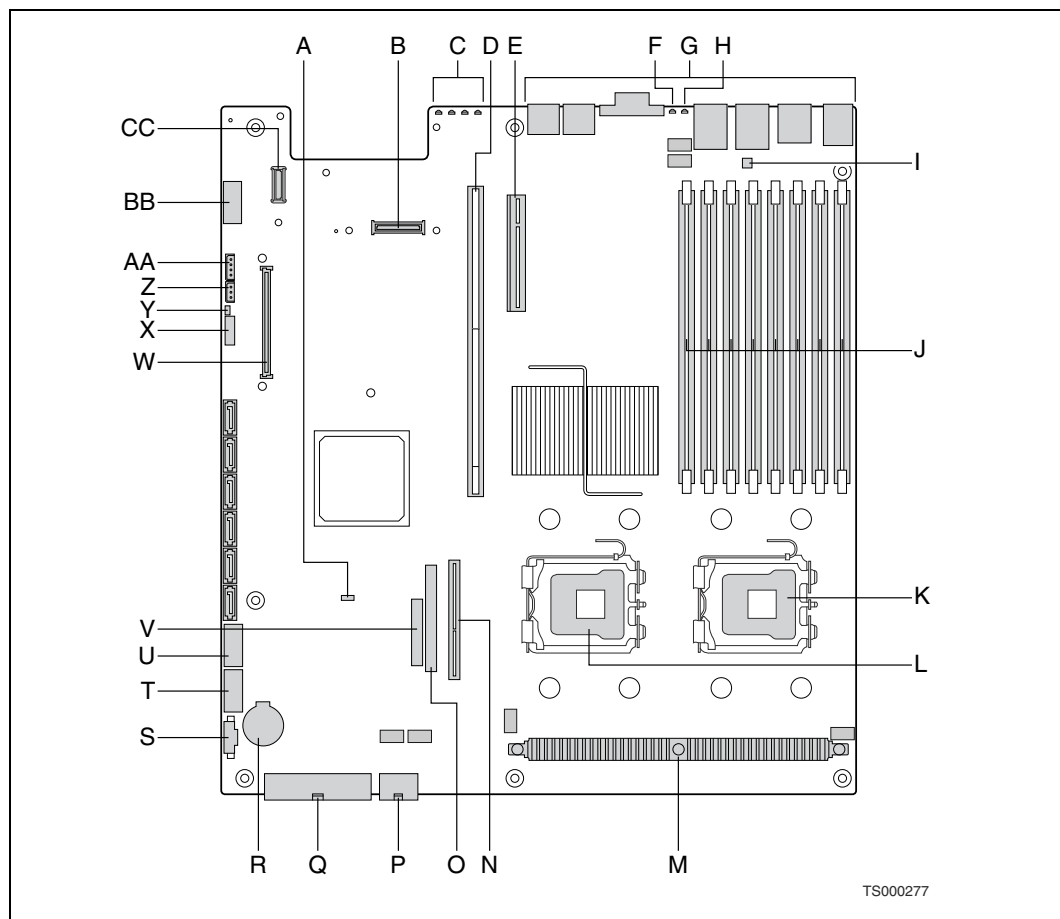
The TIGH2U Server TAM board has the following features:

- 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
- One hard drive / fault LED that indicates activity or faults for any of the six HDDs
- 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 connector to interface with the SFP board
- One connector to route the contacts of the four system fault relays to a connector at the back of the chassis

2.7 Server Board Connector and Component Locations

Figure 7 shows the locations of connectors and components on the T5000PAL Server Board.

Figure 7. Intel® Server Board T5000PAL Layout



	Description		Description
A	BIOS Bank Select Jumper	P	CPU Power Connector
B	I/O Module Option Connector	Q	Main Power Connector
C	POST Code Diagnostic LEDs	R	Battery
D	Intel® Adaptive Slot – Full-height	S	Power Supply Management Connector
E	PCI Express Riser Slot – Low-profile	T	Dual Port USB 2.0 Header
F	System Identification LED - Blue	U	Serial Port Connector
G	External I/O Connectors	V	SSI 24-pin Control Panel Header
H	Status LED – Green/Amber	W	Intel® Remote Management Module 2 (Intel® RMM) Connector
I	Serial 'B' Port Configuration Jumper	X	System Recovery Jumper Block
J	FBDIMM Sockets	Y	Chassis Intrusion Switch Header
K	CPU #1 Connector	Z	3-pin IPMB Header
L	CPU #2 Connector	AA	Intel® Local Control Panel Header
M	Voltage Regulator Heat Sink	BB	Serial 'A' Header
N	Bridge Board Connector	CC	Intel® RMM2 NIC Connector
O	ATA-100 Optical Drive Connector (power and I/O)		
Note: In Figure 7, connectors shown but not called out are "not used".			

2.8 Hard Disk Drives

The TIGH2U Server chassis supports up to six 2.5-inch SAS drives in hot-swappable hard drive tray assemblies at the front of the chassis.

For information on how to install these drives, see [Section 3.3.1, "Installing or Replacing a Hard Drive"](#).

Note: The TIGH2U Server does not support all SAS hard drives. For a list of validated hard drive manufacturers and hard drive types, see the *Tested Hardware and Operating Systems List* (THOL) at <http://us.kontron.com/support/>

Drives can consume up to 17 W of power each. Drives must be specified to run at a maximum ambient temperature of 45° C.

2.9 Riser Card Assembly

The Carrier Grade Server TIGH2U incorporates a PCI riser assembly that supports installation of PCI-X and PCI Express add-in boards. The assembly includes two riser cards that connect into the Intel® Server Board S5000PAL.

- One of the riser card slots facilitates installing PCI-X* and PCI Express* add-in cards.
- The second riser card slot facilitates installing low-profile PCIe add-in cards.

See [Section 4.2, “Installing or Replacing a PCI Add-in Card” on page 53](#), for instructions describing how to install a PCI-X or PCIe add-in card. After the add-in cards are installed, the riser assembly is plugged back into the system and the I/O brackets of all the add-in cards are accessible through the rear panel of the server chassis.

2.9.1 Full-Height PCI-X/PCIe Riser Card

The PCI-X/PCIe riser card plugs into the super slot on the server board. For PCI-X add-in cards, the super slot riser card implements a 64-bit PCI-X slot with bus speeds of 66 MHz, 100 MHz, or 133 MHz. For PCIe cards, the super slot has eight PCIe lanes which can be used for a single x8 add-in card or for one or two x4 or x1 add-in cards. See [Table 2](#) for the supported configurations. For detailed information about the pinouts and electrical specifications, see the *Kontron Carrier Grade Server TIGH2U Technical Product Specification*.

Table 2. Full-Height Riser Card Configurations and Throughput

Configuration	Bottom Slot	Middle Slot	Top Slot
One add-in card	PCI-X †	-	-
	-	x8 or x4 PCIe	-
	-	-	x4 PCIe
Two add-in cards	PCI-X †	x8 or x4 PCIe	-
	PCI-X †	-	x4 PCIe
	-	x4 PCIe	x4 PCIe
Three add-in cards	PCI-X †	x4 PCIe	x4 PCIe
Note: † Up to 133 MHz bus speed			

2.9.2 Low-Profile PCIe Riser Card

The low-profile PCIe riser card plugs into the server board and supports the connection of low-profile PCIe add-in cards only. The low-profile PCIe riser card implements two x4 link interfaces. Up to two low-profile PCIe add-in cards can be installed. See [Table 3](#) for the supported configurations. For detailed information about the pinouts and electrical specifications, see the *Kontron Carrier Grade Server TIGH2U Technical Product Specification*.

Table 3. Low-Profile PCI Add-in Card Configurations and Throughput

Configuration	Lower Slot	Upper Slot
One add-in card	x4 PCIe	
		x4 PCIe
Two add-in cards	x4 PCIe	x4 PCIe

2.10 Power Supply

The power subsystem has a power distribution board (PDB) and up to two hot-swap power supply modules capable of operating in redundant mode. A power supply filler panel for the empty power supply site is supplied for systems without redundancy.

The power supply is rated for 600 W output capability in full AC (or DC) input voltage range.

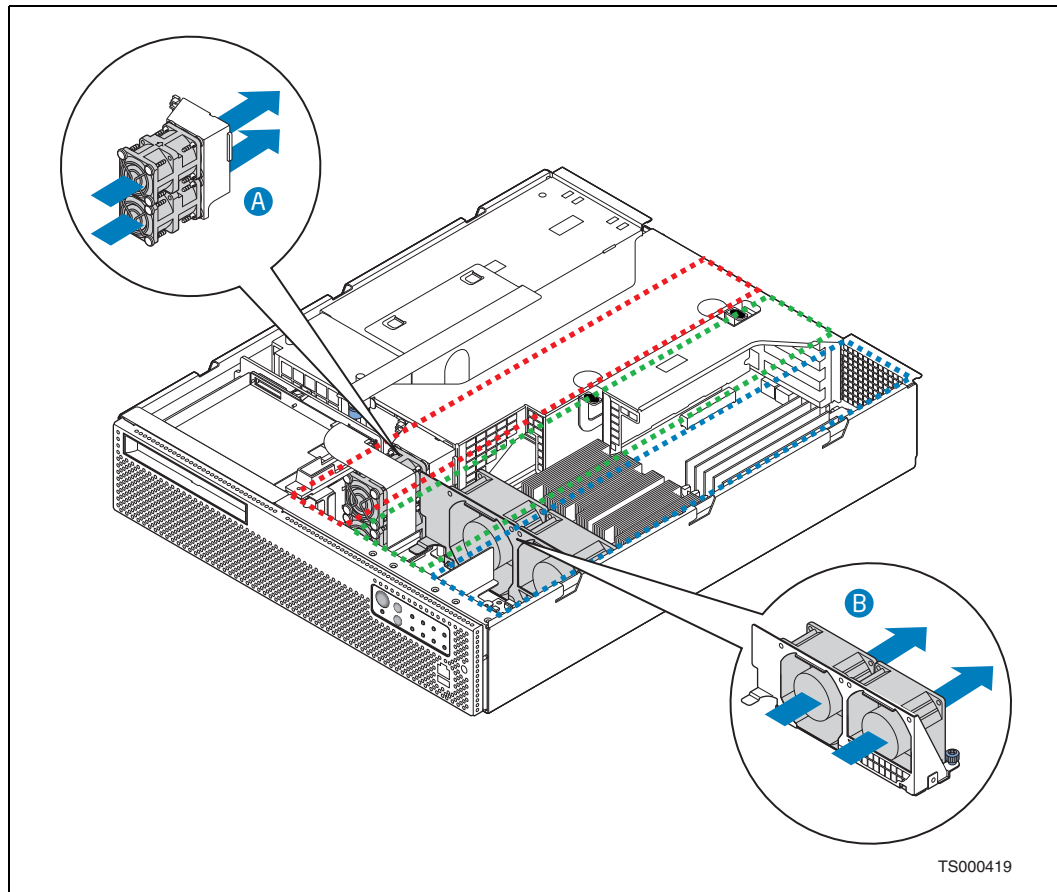
2.11 System Cooling

There are three cooling areas (domains) in the TIGH2U Server system:

- Domain 1 - CPU 1 and memory; see area outlined in blue in [Figure 8](#)
- Domain 2 - CPU 2, chipset, and any low-profile PCIe add-in cards; see area outlined in green in [Figure 8](#)
- Domain 3 - any full length PCI-X or PCIe add-in cards; see area outlined in red in [Figure 8](#)

Letter A in the following figure calls out the PCI fans. Letter B calls out the CPU fans.

Figure 8. System Cooling Areas



2.11.1 CPU 1 and Memory Cooling Area

One of the system’s large fans provides cooling for domain 1, outlined in blue in [Figure 8](#). This fan facilitates the flow of air through the front bezel over the SFP, through the fan, and over the server board, CPU 1, memory, and ultimately out through the rear of the chassis.

2.11.2 CPU 2 and Chipset Cooling Area

One of the system’s large fans provides cooling for domain 2, outlined in green in [Figure 8](#). This fan facilitates the flow of air through the front bezel over the SFP, through the fan, and over the server board, CPU 2, chipset and any low-profile PCIe add-in cards, and ultimately out through the rear of the chassis.

2.11.3 PCI Cooling Area

The two 40 × 40 × 56 mm dual-rotor fans (A in [Figure 8](#)) facilitate the flow of air through the front bezel, through the fans, over the server board and any full-length PCI-X or PCIe add-in cards, and ultimately out through the rear of the chassis.

2.11.4 Hard Disk Drive and Power Supply Cooling

Fans that are integrated into the PSUs provide the airflow to cool the hard disk drives. The airflow is adequate even with a single PSU installed as long as a filler panel is installed in the other PSU slot.

2.11.5 Fan Speed Control

The server board contains Pulse Width Modulation (PWM) circuits, which control the 12 VDC fan voltage to provide quiet operation when system ambient temperature is low and there are no fan failures. There is one PWM circuit for each cooling domain, resulting in one PWM being connected to each of the two 80 × 38 mm fans and the other PWM connected to the two dual-rotor 56 × 40 mm fans. Based on the ambient temperature, monitored by the front panel sensor, the fan speeds (PWM duty cycle) are set per [Table 4](#).

Table 4. Fan Speed Settings

Temperature (°C)	CPU1 Fan PWM DC (%)	CPU2 Fan PWM DC (%)	PCI Fans PWM DC (%)
0 - 28	46	46	46
29	47	47	47
30	48	48	48
31	53	53	53
32	58	58	58
33	63	63	63
34	68	68	68
35	73	73	73
36	78	78	78
37	84	84	84
38	89	89	89
39	95	95	95
40	100	100	100

2.11.6 Cooling Summary

The four-fan cooling subsystem of the TIGH2U Server is sized to provide cooling for:

- Up to two server board processors
- Up to 32 Gbytes of FBDIMM memory
- Up to six SAS hard drives
- Up to five PCI add-in cards consuming a maximum of 25 W for each full-height PCI-X / PCIe add-in cards and 10 W for each low-profile PCIe add-in card

The cooling subsystem meets acoustic and thermal requirements at the lower fan speed settings. At the higher fan speed settings, thermal requirements are met for the maximum ambient temperatures, but acoustic requirements are not met.

2.12 Hardware Requirements

To avoid integration difficulties and possible board damage, your system must meet the requirements outlined below. For a list of qualified components, see [Section 1.4, "Additional Information and Software"](#).

2.12.1 Processor

The server board accommodates two Quad-Core Intel® Xeon® processor 5400 series. For a list of the currently supported processors, see the product support page at: <http://us.kontron.com/support/>

2.12.2 Memory

The memory controller hub (MCH) on the T5000PAL server board accommodates four channels of fully buffered DIMM (FBDIMM) memory. Each channel can support up to two dual-ranked FBDIMM DDR2 DIMMs. FBDIMM memory channels are organized into two branches for support of RAID 1 (mirroring). See [Section 3.4.2, "Configuring Memory DIMMs"](#) for detailed information about population rules and instructions for installing DIMMs in the sockets on the server board.

3 Server Component Installations and Upgrades

3.1 Before You Begin

Before working with your server product, pay close attention to the safety instructions provided in this manual. See [Appendix A, "Safety Information"](#).

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

3.1.1 Tools and Supplies Needed

- #1 and #2 Phillips (cross-point) screwdrivers (or interchangeable tip screwdriver with #1 and #2 Phillips bits)
- Personal grounding device such as an anti-static wrist strap and a grounded conductive pad

3.1.2 System References

All references to left, right, front, top, and bottom assume that you are facing the front of the server, as it would be positioned for normal operation.

3.2 General Installation Procedures

The following sections present general installation and removal procedures that are required before removing or installing internal components that are not hot-swappable.

3.2.1 Removing the Front Bezel

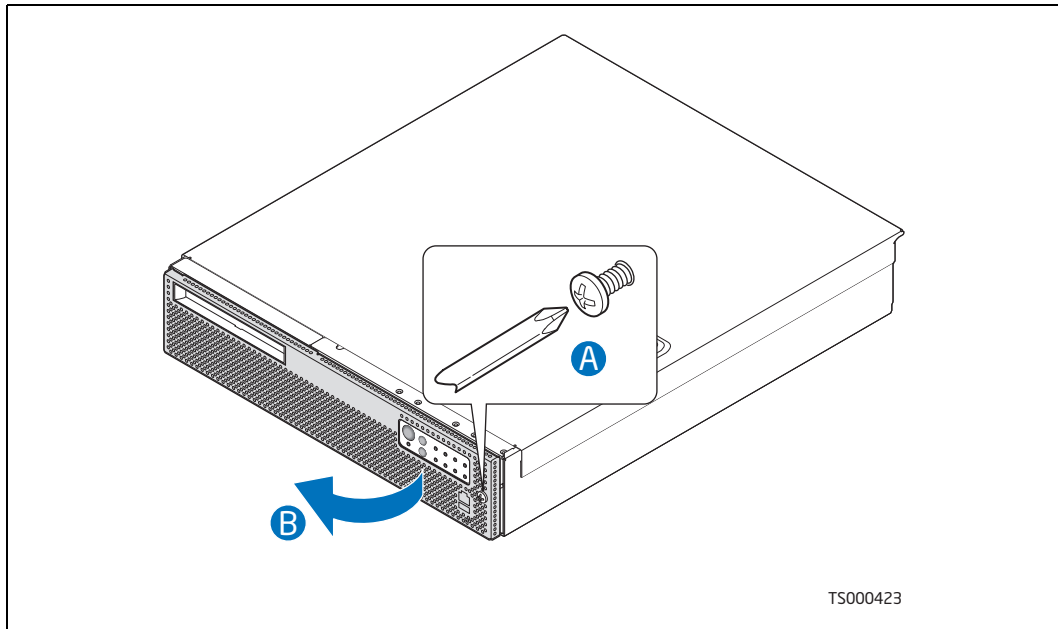
Remove the front bezel to

- Install or remove hard drives or an optical device
- Access the front-panel serial port and USB connectors
- Observe the individual HDD activity/fault indicators
- Install or remove the optional Intel® RAID Smart Battery

Note: The front bezel can be removed while the server power is on.

1. Disconnect the cables from the front panel USB port and / or serial port connectors.
2. Loosen the bezel retention screw from the right side. ("A")
3. Rotate the bezel outward as shown and remove. ("B")

Figure 9. Removing the Front Bezel



TS000423

3.2.2 Installing the Front Bezel

1. Align the four tabs on the left side of the bezel with the slots in the front panel and then rotate the free end of the bezel to the closed position.
2. Snap the front bezel into place and tighten the screw at the right edge of the bezel (if used).
3. Re-connect the serial port and USB cables if they are used.

3.2.3 Removing the Chassis Cover

The TIGH2U Server must be operated with the top cover in place to ensure proper cooling. You will need to remove the top cover to add or replace components inside of the server that are not hot-swappable from the front or rear panels.

Caution: 5 V standby power is present inside the chassis whenever the PSU(s) are connected to a source of power.

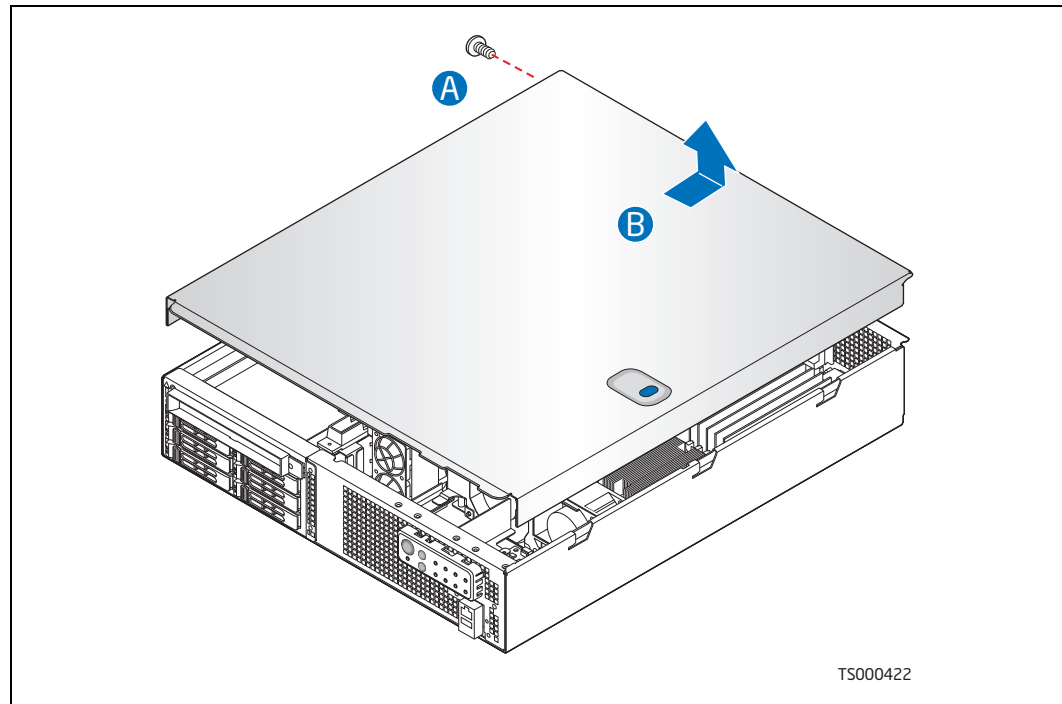
Before removing the top cover, power down the server system and unplug all peripheral devices and the power cable.

Note: A non-skid surface or a stop behind the server may be needed to prevent the server from sliding on your work surface.

1. Observe the safety and ESD precautions in [Appendix A, "Safety Information"](#).
2. Turn off all peripheral devices connected to the server. Turn off the server.
3. Disconnect the power cord(s).

4. Remove the shipping screw at the left side, near the rear.
5. While holding the blue button at the top of the chassis in ("A"), slide the top cover back until it stops.
6. Lift the cover straight up to remove it from the server.

Figure 10. Removing the Chassis Cover



3.2.4 Installing the Chassis Cover

1. Place the cover over the chassis so that the side edges of the cover sit just inside the chassis side walls, with the front of the cover with about 1/8-inch (3-mm) gap showing between the chassis cover and the sheet-metal at the front of the chassis.
2. Press down slightly on the chassis cover behind the peripheral area and slide the cover forward until it clicks into place.
3. Install the shipping screw if tooled entry is required or if the system will be shipped.
4. Reconnect all peripheral devices and the power cord(s).

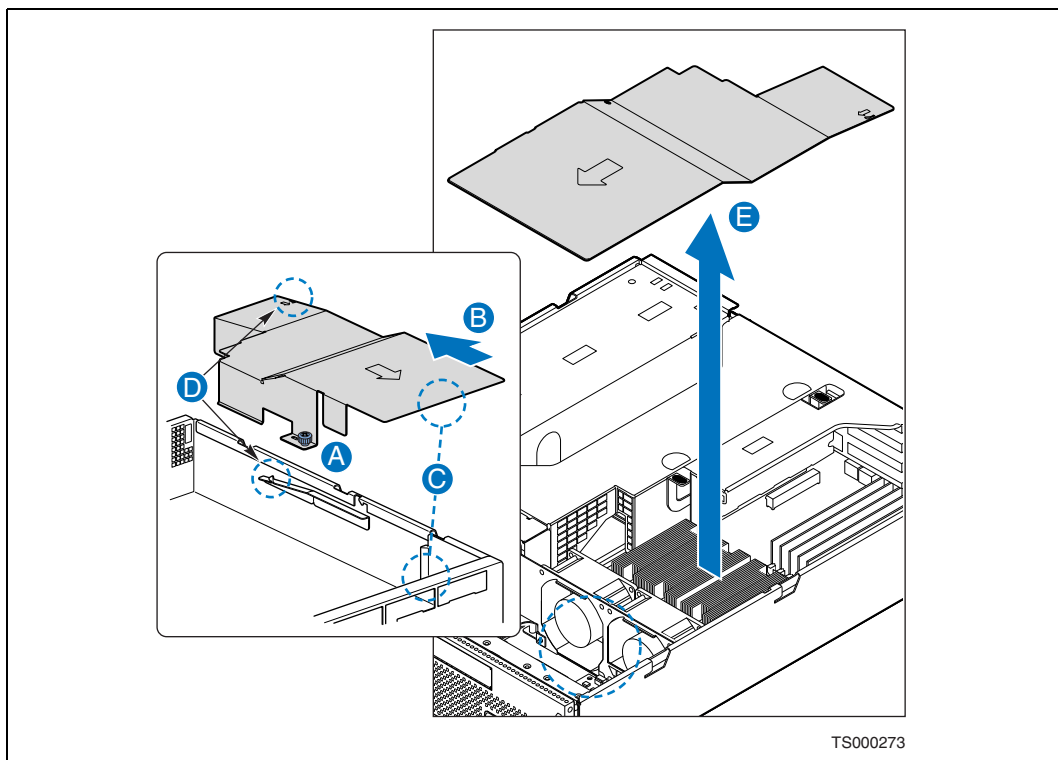
Caution: This unit must be operated with the top cover installed to ensure proper cooling.

3.2.5 Removing the Processor Air Duct

The air duct must be removed to access the processors, memory DIMMs, CPU fan assembly, the SFP board, or the inside of the front panel. The processor air duct is required for proper airflow within the chassis. Be sure the air duct is in place before installing the chassis cover.

1. Power down the server system and unplug all peripheral devices and the AC power cable.
2. Remove the chassis cover. For instructions, see [Section 3.2.3, "Removing the Chassis Cover"](#).
3. Loosen the captive fastener on the left side of the air duct. ("A")
4. Slide the duct several millimeters toward the rear panel until it stops. ("B")
The front edge will disengage from the front panel. ("C")
The metal tab at the rear will release. ("D")
5. Lift the air duct straight up and remove it from the chassis. ("E")

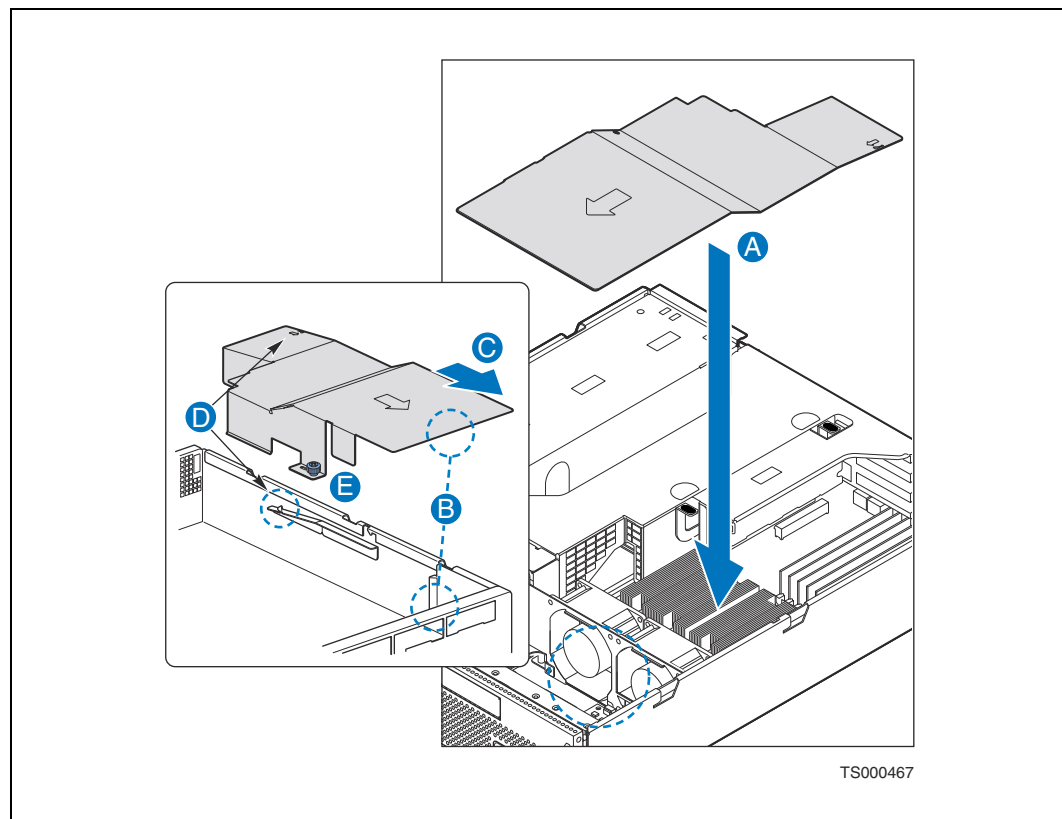
Figure 11. Removing the Processor Air Duct



3.2.6 Installing the Processor Air Duct

1. Place the processor air duct over the processor sockets and fan assembly, using caution to make sure you do not pinch any cables beneath the edges of the air duct. ("A")
The top of the installed air duct should be flush with the top surface of the PCI riser card assembly.
The front of the air duct should line up with the metal tab. ("B")
2. Slide the air duct forward until it is flush with the front panel. ("C")
3. Ensure that the rear of the air duct is fastened to the metal tab on the chassis. ("D")
4. Tighten the captive fastener. ("E")
5. Replace the chassis cover if you have completed all work inside of the chassis.

Figure 12. Installing the Processor Air Duct



3.3 Hot-Swappable Component Installation Procedures

The following components are hot-swappable and do not require powering down the system or removing the chassis cover:

- Hard disk drives
- AC and DC power supplies (if power redundancy is available)

3.3.1 Installing or Replacing a Hard Drive

Up to six hot-swappable SAS drives can be installed in your TIGH2U Server. You must remove the front bezel to add or replace a hard drive in one of the six drive bays.

Caution: If you install fewer than six hard drives, the empty bays must have drive trays with baffles in them to maintain proper system cooling.

The Carrier Grade Server TIGH2U does not support all SAS hard drives. To see a list of validated manufacturers and hard drive types, see the Tested Hardware and Operating System List (THOL) at : <http://us.kontron.com/support/> Click on Downloads and then Compatability Matrix.

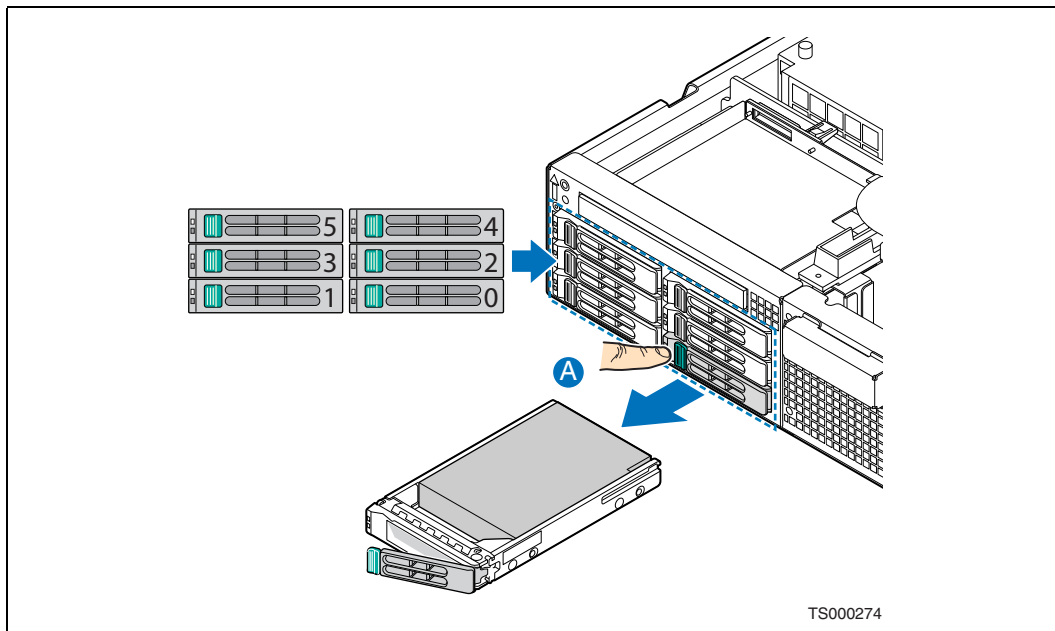
3.3.1.1 Removing a Hard Drive Tray

1. Remove the front bezel. For instructions, see [Section 3.2.1, "Removing the Front Bezel"](#).
2. Select the drive bay where you want to install the drive and remove the drive tray by pressing the green button to open the lever. ("A")

Note: If you will have fewer than six drives installed, drive bay 0 must be used first, then drive bay 1, and so forth.

3. Pull the drive tray assembly out of the chassis.

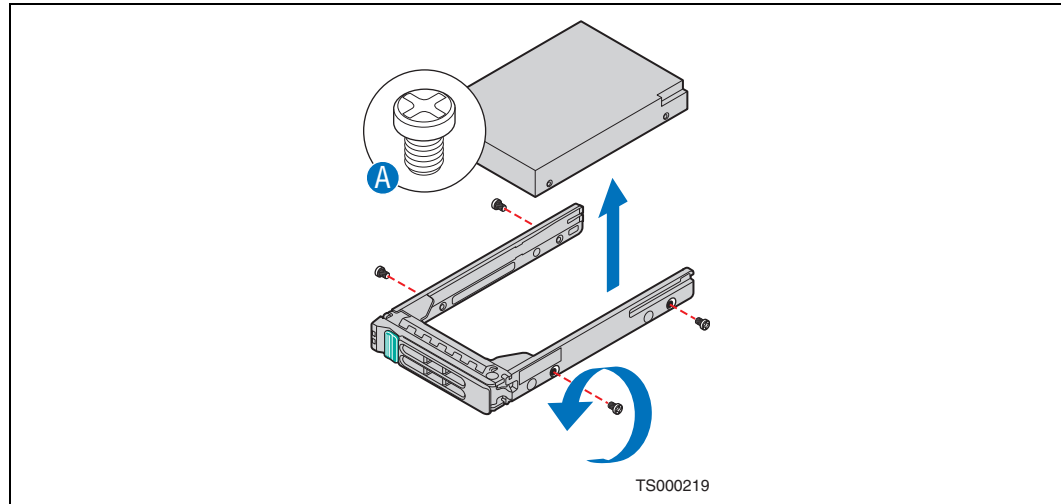
Figure 13. Removing a Drive Tray



3.3.1.2 Attaching a Hard Drive to the Drive Tray

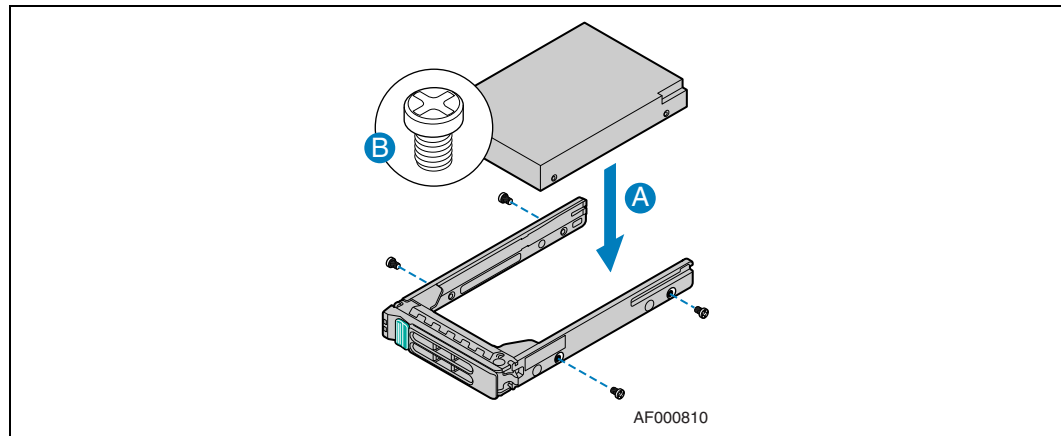
1. If a drive is already installed (that is, if you are replacing the drive), remove it by unfastening the four screws that attach it to the drive tray. ("A")

Figure 14. Removing a Hard Drive from the Drive Tray



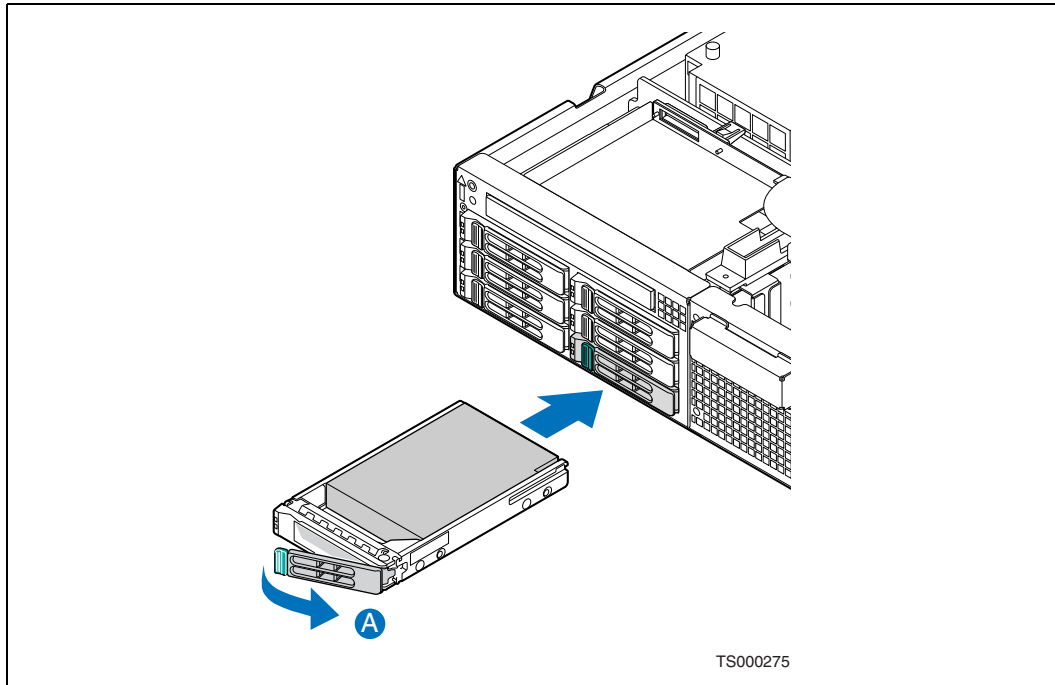
2. Install the new drive in the drive tray and secure the drive with the four screws provided with the drive tray. (Figure 15, "A" and "B")

Figure 15. Installing a Hard Drive in the Drive Tray



3. With the drive tray locking lever fully open, push the hard drive tray into the drive bay in the chassis until it stops. (Figure 16, "A")
4. Press the lever until it snaps shut to secure the drive in the bay.
5. Replace the front bezel.

Figure 16. Inserting a New SAS Drive Assembly



3.3.2 Replacing a Power Supply

Caution: Your server does not have a redundant power supply unless you have purchased the optional second power supply. If there is no second supply, before replacing the power supply you must first take the server out of service, turn off all peripheral devices connected to the system, turn off the system by pressing the power button, and unplug the power cord(s) from the system or wall outlet.

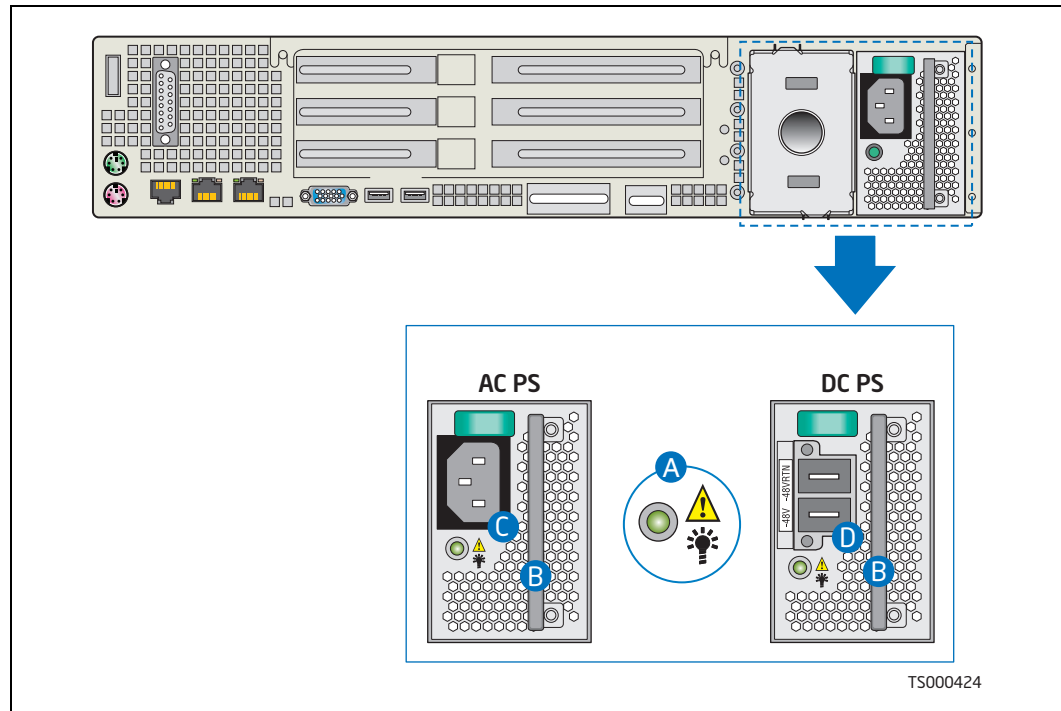
To maintain hot-swap capability, make sure that there is an active power supply module in both chassis slots before replacing (hot-swapping) a power supply module.

The TIGH2U Server supports the use of either AC (Figure 17, "C") or DC ("D") power supply modules.

3.3.2.1 Removing the Power Supply Module

1. Check the status LED to determine which power supply has failed and disconnect the appropriate power cable. (Figure 17, "A")
2. Press and hold the green safety lock downward to disengage the power supply module.
3. Grasp the handle ("B") and pull the power supply module from the chassis.

Figure 17. AC and DC Power Supplies



3.3.2.2 Installing a Power Supply Module

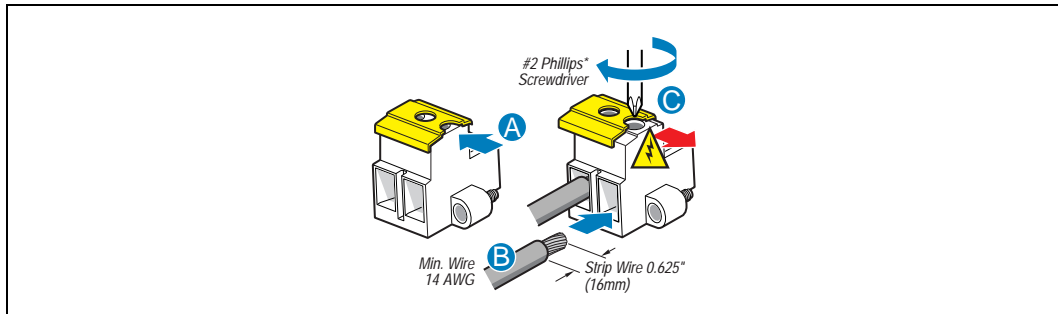
1. Slide the power supply module into the chassis slot until it clicks into place.
2. Make sure the power supply is fully inserted by pulling on the handle. When correctly installed, the power supply will not slide out without pressing the green safety lock.

3.3.2.3 Installing or Replacing a DC Power Supply

1. Slide open top of male connector to reveal screw holes. ("A")
2. Strip the wire insulation as shown. Note minimum wire gauge. ("B")

Insert each wire all the way and tighten to 24 in-lb (2.7 N-m) torque. ("C")

Figure 18. DC Power In Male Connector Configuration



3.3.2.4 Grounding a DC-Powered System

The DC chassis provides two #10-32 threaded studs for chassis enclosure grounding. A single 90° standard barrel, two-hole, compression terminal lug with 5/8-inch pitch suitable for a #14-10 AWG conductor (such as the Thomas & Betts* terminal lug, p/n 256-31426-141) must be used for proper safety grounding. See "C" in [Figure 3](#) for the location of the ground studs.

A crimping tool may be needed to secure the terminal lug to the grounding cable.

3.4 Internal System Component Configuration and Installation Procedures

Note: The procedures in this section assume that you have powered down the server and removed the chassis cover as described in [Section 3.2, "General Installation Procedures"](#).

3.4.1 Configuring Jumpers on the Server Board

The jumpers are located on the T5000PAL server board, which is in the rear right section of the Carrier Grade Server TIGH2U chassis. To configure the jumpers on the server board, you must first remove the chassis cover, the processor air duct (see [Section 3.2.5, "Removing the Processor Air Duct"](#)), and the PCI riser card assembly (see [Section 4.2.2, "Removing the PCI Riser Card Assembly" on page 56](#)). All other components installed on the server board can remain in place.

3.4.1.1 Configuration Jumpers

The server board has several 2-pin and 3-pin jumper blocks (see Figure 19) that can be used to configure, protect, or recover specific features of the server board. Pin 1 on each jumper block is denoted by "*" or "▲".

Figure 19. Recovery Jumper Blocks (J1D1, J1D2, J1D3)

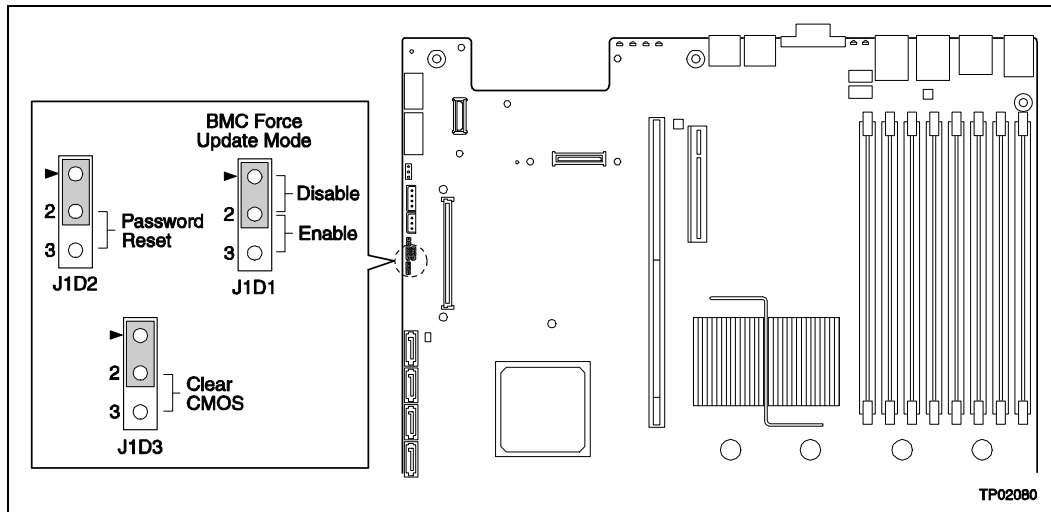


Table 5 defines the jumper positions and identifies the default configuration of each jumper.

Table 5. Recovery Jumpers

Jumper Name	Pins	What happens at system reset...
J1D1: BMC Force Update	1-2	BMC Firmware Force Update Mode – Disabled (Default)
	2-3	BMC Firmware Force Update Mode – Enabled
J1D2: Password Clear	1-2	These pins should have a jumper in place for normal system operation. (Default)
	2-3	If these pins are jumpered, administrator and user passwords will be cleared at the next system reset. These pins should not be jumpered for normal operation.
J1D3: CMOS Clear	1-2	These pins should have a jumper in place for normal system operation. (Default)
	2-3	If these pins are jumpered, the CMOS settings will be cleared at the next system reset. These pins should not be jumpered for normal operation.

3.4.1.2 BIOS Select Jumper

The jumper block at J3H1, located to the left of the SSI control panel header (see Figure 20), is used to select which BIOS image the system will boot to. Pin 1 on the jumper is identified with a “▲”.

Figure 20. BIOS Select Jumper (J3H1)

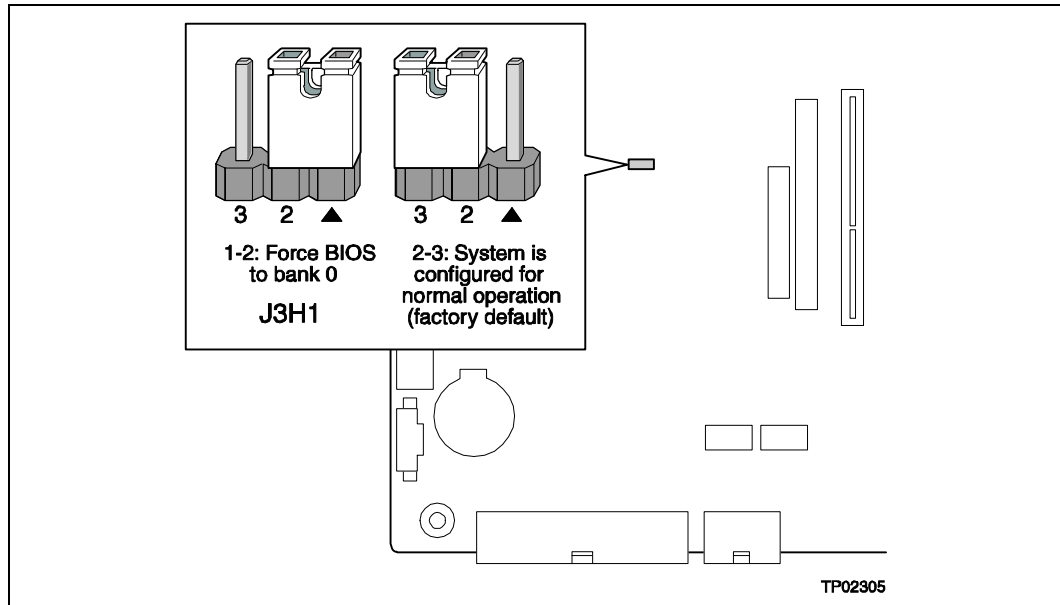


Table 6 gives the possible configuration options. This jumper should only be moved if you wish to force the BIOS to boot to the secondary bank, which may hold a different version of the BIOS.

Table 6. BIOS Select Jumper

Pins	What happens at system reset...
1-2	Force BIOS to bank 0
2-3	System is configured for normal operation (Default)

The rolling BIOS feature of the server board automatically alternates the boot BIOS to the secondary bank if the BIOS image in the primary bank is corrupted or cannot boot.

Note: When performing a BIOS update procedure, the BIOS select jumper must be set to its default position (pins 2-3).

3.4.1.3 DCD/DSR Signal Select Jumper

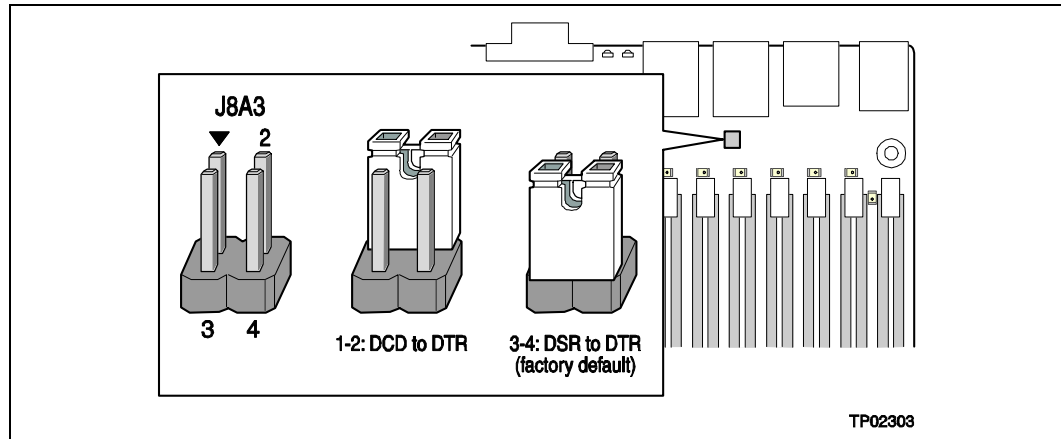
Note: This jumper affects the rear panel serial port only.

Various serial port concentrators may require either the DCD (Data Carrier Detect) or DSR (Data Signal Ready) signal on Pin 7 of the RJ45 connector. To allow support for either of these two serial port configuration standards, a jumper block (J8A3) located directly behind the rear RJ45 serial port (see [Figure 21](#)) must be configured appropriately according to the desired standard:

- For configurations that are compatible with Cisco serial concentrators and require a DSR signal, the jumper block must be configured with the serial port jumper over pins 3 and 4. This is the factory-installed default setting for this jumper.
- For configurations that are compatible with many modems and other serial devices that require a DCD signal, the jumper block must be configured with the serial port jumper over pins 1 and 2.

Pin 1 on the jumper is identified by “ ”.

Figure 21. BIOS Select Jumper (J3H1)



3.4.2 Configuring Memory DIMMs

The memory DIMM sockets are located on the T5000PAL server board at the rear right portion of the TIGH2U Server chassis. See [Figure 22](#) for the location of the DIMM sockets. The silkscreen on the board for the DIMMs displays DIMMA1, DIMMA2, DIMMA3, DIMMB1, DIMMB2 and DIMMB3, starting from the inside (left side) of the server board. DIMMB3 is the socket closest to the outside edge of the server board.

The Memory Controller Hub (MCH) on the T5000PAL server board provides for four channels of Fully Buffered DIMM (FB-DIMM) memory. Each channel can support up to two Dual Ranked FB-DIMM DDR2 DIMMs. FB-DIMM memory channels are organized into two branches for support of RAID 1 (mirroring). The MCH can support up to 8 DIMMs for a maximum memory size of 32 Gbytes of physical memory in non-mirrored mode and 16 Gbytes of physical memory in a mirrored configuration.

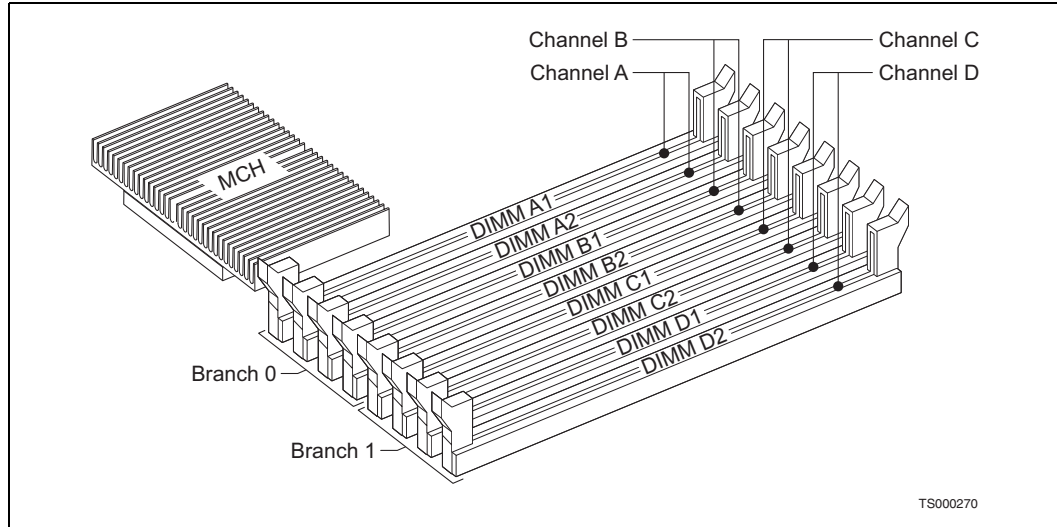
For DDR2 533 FB-DIMM memory, the read bandwidth for each FB-DIMM channel is 4.25 Gbytes/s, which gives a total read bandwidth of 17 Gbytes/s for four FB-DIMM channels. This provides 8.5 Gbytes/s of write memory bandwidth for four FB-DIMM channels.

For DDR2 667 FBDIMM memory, the read bandwidth for each FBDIMM channel is 5.3 Gbytes/s, which gives a total read bandwidth of 21 Gbytes/s for four FBDIMM channels. This provides 10.7 Gbytes/s of write memory bandwidth for four FBDIMM channels.

The total bandwidth is based on read bandwidth, so the total bandwidth is 17 Gbytes/s for DDR2 533 FB-DIMMs and 21.0 Gbytes/s for DDR2 667 FB-DIMMs.

On the T5000PAL server board, a pair of channels becomes a branch where Branch 0 consists of channels A and B, and Branch 1 consists of channels C and D. FBD memory channels are organized into two branches for support of RAID 1 (mirroring).

Figure 22. DIMM Sockets and Channels



To boot the system, the system BIOS on the server board uses a dedicated I²C bus to retrieve the DIMM information needed to program the MCH memory registers. Table 7 provides the I²C addresses for each DIMM socket.

Table 7. I²C Addresses for Memory Module SMB

Device	Address
DIMM A1	0xA0
DIMM A2	0xA2
DIMM B1	0xA0
DIMM B2	0xA2
DIMM C1	0xA0
DIMM C2	0xA2
DIMM D1	0xA0
DIMM D2	0xA2

3.4.2.1 Memory RASUM Features

The MCH supports several memory Reliability, Availability, Serviceability, Usability, and Manageability (RASUM) features. These features include the Intel® x4 Single Device Data Correction (Intel® x4 SDDC) for memory error detection and correction, memory scrubbing, retry on correctable errors, memory built in self test, DIMM sparing, and memory mirroring. See the *Intel® S5000 Series Chipsets Server Board Family Datasheet* for more information about these features.

3.4.2.2 Supported Memory

The server board supports up to eight DDR2-533 or DDR2-667 Fully Buffered DIMMs (FBD memory). The following tables show the maximum memory configurations supported using the specified memory technology.

Table 8. Maximum Eight-DIMM System Memory Configuration - x8 Single Rank

DRAM Technology x8 Single Rank	Maximum Capacity Mirrored Mode	Maximum Capacity Non-Mirrored Mode
256 Mbit	1 GB	2 GB
512 Mbit	2 GB	4 GB
1024 Mbit	4 GB	8 GB
2048 Mbit	8 GB	16 GB

Table 9. Maximum Eight-DIMM System Memory Configuration - x4 Dual Rank

DRAM Technology x4 Dual Rank	Maximum Capacity Mirrored Mode	Maximum Capacity Non-Mirrored Mode
256 Mbit	4 GB	8 GB
512 Mbit	8 GB	16 GB
1024 Mbit	16 GB	32 GB
2048 Mbit	16 GB	32 GB

Note: DDR2 DIMMs that are not fully buffered are **not** supported. See <http://www.cmtlabs.com/mbSearchResults.asp?sManuf+Kontron&sMem=FBDIMM&sMN=S50000PHB&oSubmit=Search> for a list of supported memory.

3.4.2.3 DIMM Population Rules and Supported DIMM Configurations

DIMM population rules depend on the operating mode of the memory controller, which is determined by the number of DIMMs installed. DIMMs must be populated in pairs. DIMM pairs are populated in the following DIMM socket order:

1. A1 and B1
2. C1 and D1
3. A2 and B2
4. C2 and D2

DIMMs within a given pair must be identical with respect to size, speed, and organization. However, DIMM capacities can be different between different DIMM pairs.

For example, a valid mixed-DIMM configuration may have:

- 512 Mbyte FBDIMMs installed in DIMM sockets A1 and B1
- 1 Gbyte FBDIMMs installed in DIMM sockets C1 and D1

The supported DIMM configurations for the T5000PAL server board are in [Table 10](#).

Table 10. Supported DIMM Configurations

Branch 0				Branch 1				Mirroring Possible	Sparing Possible
Channel A		Channel B		Channel C		Channel D			
DIMM A1	DIMM A2	DIMM B1	DIMM B2	DIMM C1	DIMM C2	DIMM D1	DIMM D2		
									Y (0)
								Y	
									Y (0)
								Y	Y (0, 1)
<ul style="list-style-type: none"> ■ = Supported and validated configuration; socket is populated. ■ = Supported, not validated configuration; socket is populated. ■ = Socket is not populated. 				<p>Mirroring: Y = Yes. Indicates that configuration supports memory mirroring.</p> <p>Sparing: Y(x) = Yes. Indicates that configuration supports memory sparing, where x is one of the following:</p> <ul style="list-style-type: none"> • 0: Sparing supported on Branch 0 only • 1: Sparing supported on Branch 1 only • 0,1: Sparing supported on both branches 					

The following restrictions apply:

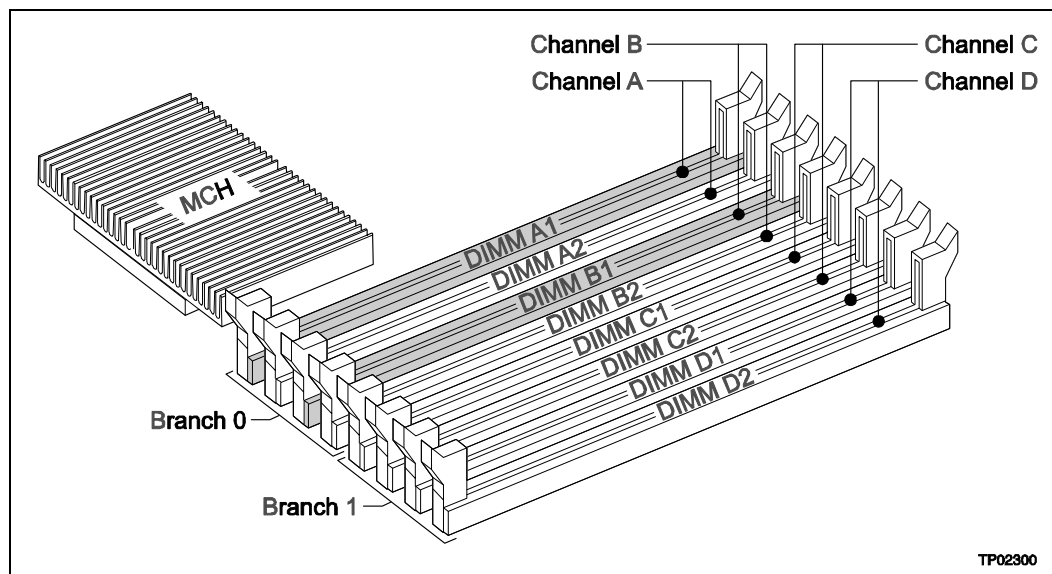
- Single channel mode is only tested and supported with a 512 Mbyte x8 FBDIMM installed in DIMM socket A1.
- The supported memory configurations must meet the population rules defined above.
- For best performance, the number of DIMMs installed should be balanced across both memory branches. For example: a four-DIMM configuration performs better than a two-DIMM configuration and should be installed in DIMM sockets A1, B1, C1, and D1. An eight-DIMM configuration performs better than a six-DIMM configuration.
- Although mixed DIMM capacities between channels is supported, Kontron does not validate DIMMs in mixed-DIMM configurations.

3.4.2.4 Non-Mirrored Mode Minimum Configuration

The server board can be operated with only one DIMM. For better system performance, Kontron recommends that at least two DIMMs be installed.

Figure 23 shows the recommended minimum DIMM memory configuration. Populated DIMM sockets are shown in grey.

Figure 23. Recommended Minimum Two-DIMM Memory Configuration



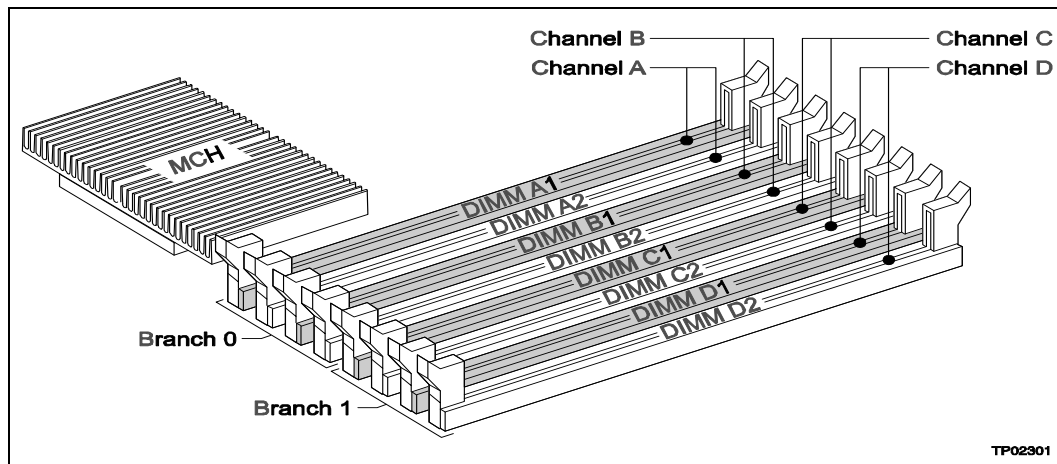
Note: The server board supports single DIMM mode operation. Kontron will only validate and support this configuration with a single 512 MB x8 FBDIMM installed in DIMM socket A1.

3.4.2.5 Non-Mirrored Mode Memory Upgrades

The minimum memory upgrade increment is two DIMMs per branch. The DIMMs must cover the same socket position on both channels. DIMM pairs must be identical with respect to size, speed, and organization. DIMMs that cover adjacent socket positions do not need to be identical.

When adding two DIMMs to the configuration shown in [Figure 23](#), the DIMMs should be populated in DIMM sockets C1 and D1 as shown in [Figure 24](#). Populated DIMM sockets are shown in grey.

Figure 24. Recommended Four-DIMM Configuration



Functionally, DIMM sockets A2 and B2 could also have been populated instead of DIMM sockets C1 and D1. However, the system will not achieve equivalent performance. [Figure 24](#) shows the supported DIMM configuration that is recommended because it allows both memory branches from the MCH to operate independently and simultaneously. FBD bandwidth is doubled when both branches operate in parallel.

3.4.2.6 Mirrored Mode Memory Configuration

When operating in mirrored mode, both branches operate in lock step. In mirrored mode, branch 1 contains a replica of the data in branch 0. The minimum DIMM configuration to support memory mirroring is four DIMMs, populated as shown in [Figure 24](#). All four DIMMs must be identical with respect to size, speed, and organization.

To upgrade a four DIMM mirrored memory configuration, four additional DIMMs must be added to the system. All four DIMMs in the second set must be identical to the first with the exception of speed. The MCH will adjust to the lowest speed DIMM.

3.4.2.7 DIMM Sparing Mode Memory Configuration

The MCH provides DIMM sparing capabilities. Sparing is a RAS feature that involves configuring a DIMM to be placed in reserve so it can be used to replace a DIMM that fails. DIMM sparing occurs within a given bank of memory and is not supported across branches.

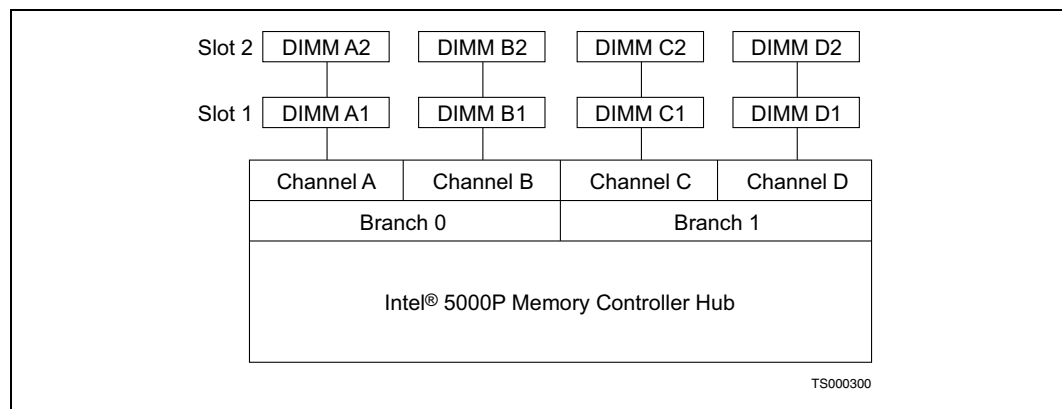
There are two supported memory sparing configurations:

- Single Branch Mode Sparing
- Dual Branch Mode Sparing

3.4.2.8 Single Branch Mode Sparing

Figure 25 shows the single branch memory sparing configuration.

Figure 25. Single Branch Mode Sparing DIMM Configuration



The following rules apply:

- DIMM A1 and DIMM B1 must be identical in organization, size and speed.
- DIMM A2 and DIMM B2 must be identical in organization, size and speed.
- DIMM A1 and DIMM A2 need not be identical in organization, size and speed.
- DIMM B1 and DIMM B2 need not be identical in organization, size and speed.
- Sparing should be enabled in BIOS setup. The BIOS configures Rank Sparing Mode.
- The larger of the pairs {DIMM A1, DIMM B1} and {DIMM A2, DIMM B2} will be selected as the spare pair unit.

3.4.2.9 Dual Branch Mode Sparing

Dual branch mode sparing requires that all eight DIMM sockets be populated and must comply with the following population rules:

- DIMM A1 and DIMM B1 must be identical in organization, size and speed.
- DIMM A2 and DIMM B2 must be identical in organization, size and speed.
- DIMM C1 and DIMM D1 must be identical in organization, size and speed.
- DIMM C2 and DIMM D2 must be identical in organization, size and speed.
- DIMM A1 and DIMM A2 need not be identical in organization, size and speed.
- DIMM B1 and DIMM B2 need not be identical in organization, size and speed.
- DIMM C1 and DIMM C2 need not be identical in organization, size and speed.

- DIMM D1 and DIMM D2 need not be identical in organization, size and speed.
- Sparing should be enabled in BIOS setup. The BIOS configures Rank Sparing Mode.
- The larger of the pairs {DIMM A1, DIMM B1}, {DIMM A2, DIMM B2}, {DIMM C1, DIMM D1} and {DIMM C2, DIMM D2} will be selected as the spare pair units.

3.4.3 Installing DIMMs

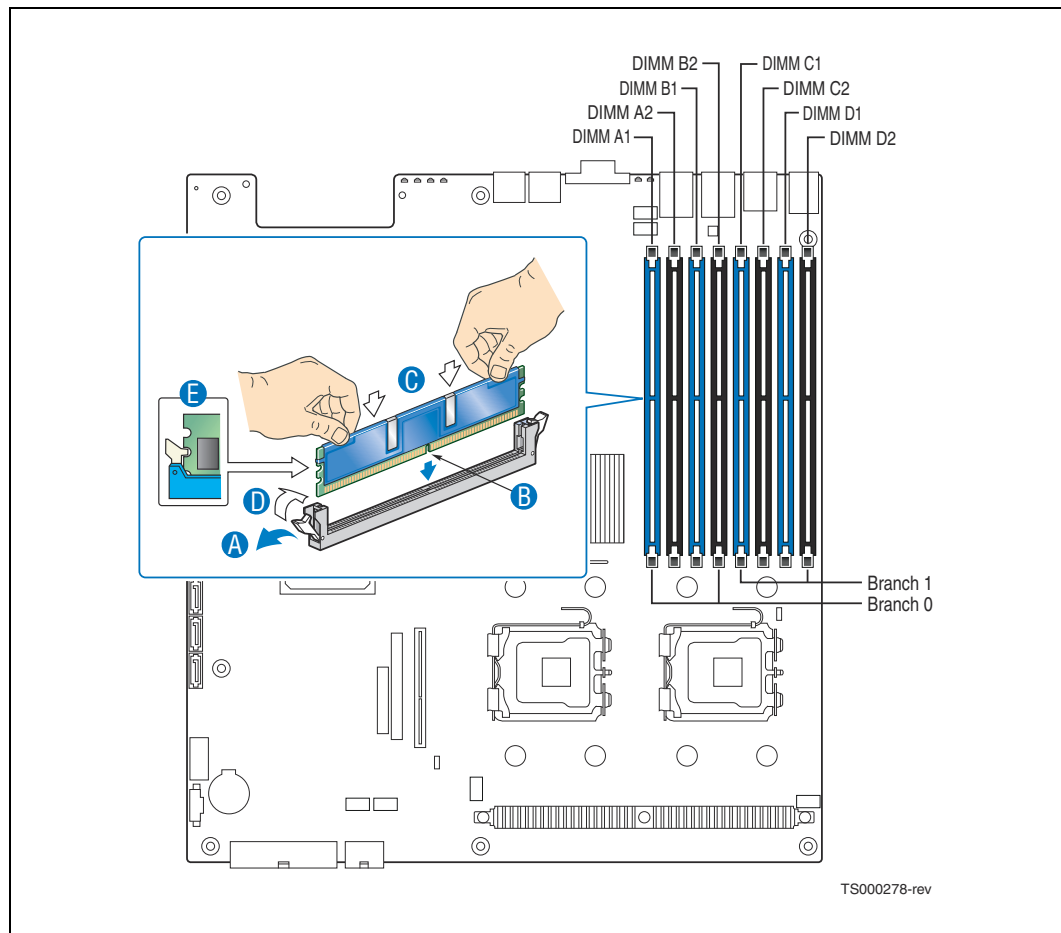
To reduce the risk of electrostatic discharge (ESD) damage to the processor:

- Touch the metal chassis before touching the DIMM or server board.
- Keep part of your body in contact with the metal chassis to dissipate the static charge while handling the DIMM.
- Avoid unnecessary movement.
- Use a ground strap attached to the front panel (with the bezel removed.)

To install DIMMs, follow these steps:

1. Remove the chassis cover. For instructions, see [Section 3.2.3, “Removing the Chassis Cover” on page 26](#).
2. Remove the processor air duct. For instructions, see [Section 3.2.5, “Removing the Processor Air Duct” on page 28](#).
3. Locate the DIMM sockets on the server board. (See [Figure 26](#).)
4. Open both DIMM socket levers. (“A”)
5. Note the location of the alignment notch. (“B”)
6. Insert the DIMM making sure the connector edge of the DIMM aligns correctly with the socket. (“E”)
7. Using both hands, push down firmly and evenly on both sides of the DIMM until it snaps into place and the levers close. (“C” and “D”)
IMPORTANT: Visually check that each latch is fully closed and correctly engaged with notch on the DIMM edge. (“E”)
8. Replace the air duct and chassis cover if you have completed all work inside of the server.

Figure 26. Installing Memory DIMMs



3.4.4 Removing Memory DIMMs

To reduce the risk of electrostatic discharge (ESD) damage to the DIMMs and server board:

- Touch the metal chassis before touching the DIMM or server board.
- Keep part of your body in contact with the metal chassis to dissipate the static charge while handling the processor.
- Avoid unnecessary movement.
- Use a ground strap attached to the front panel (with the bezel removed.)

To remove a DIMM, follow these steps:

1. Remove the chassis cover. For instructions, see [Section 3.2.3, “Removing the Chassis Cover”](#) on page 26.
2. Remove the processor air duct. For instructions, see [Section 3.2.5, “Removing the Processor Air Duct”](#) on page 28.
3. Locate the DIMM(s) and select the ones to be removed. See [Figure 26](#).
4. Open the DIMM socket levers.

5. Holding the DIMM by the edges, lift it from the socket, and store it in an anti-static package.
6. Replace the air duct and chassis cover if you have completed all work inside of the server.

3.4.5 Adding or Replacing a Processor

Note: Use the instructions provided below to add or replace a processor instead of using the instructions that came with the processor.

Warning: Use only an approved processor. Otherwise, system damage may occur. For a list of compatible processors see the Spares and Configuration Guide at <http://us.kontron.com/products/systems+and+platforms/communication+rackmount+servers/ip+network+servers/ip+network+server+tigh2u.html> Click on downloads, and then Ordering Guide.

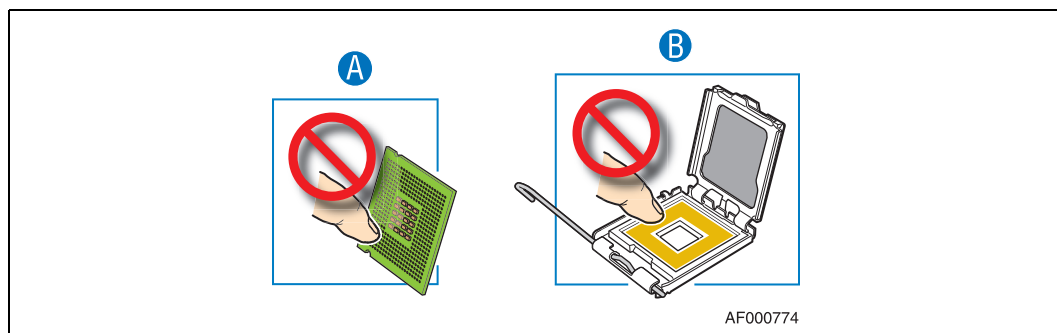
Before you begin, remove the processor air duct. For instructions, see [Section 3.2.5, "Removing the Processor Air Duct"](#) on page 28.

3.4.5.1 ESD and Processor Handling Precautions

Be mindful of the following points when handling the processors and sockets:

- To reduce the risk of electrostatic discharge (ESD) damage to the processor:
 - 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.
 - Avoid unnecessary movement.
 - Use a ground strap attached to the front panel (with the bezel removed.)
- Do not touch the gold wires in the socket.
- Hold the processor only at the edges to avoid touching the gold contacts on the processor.

Figure 27. Cautions for Handling Processors

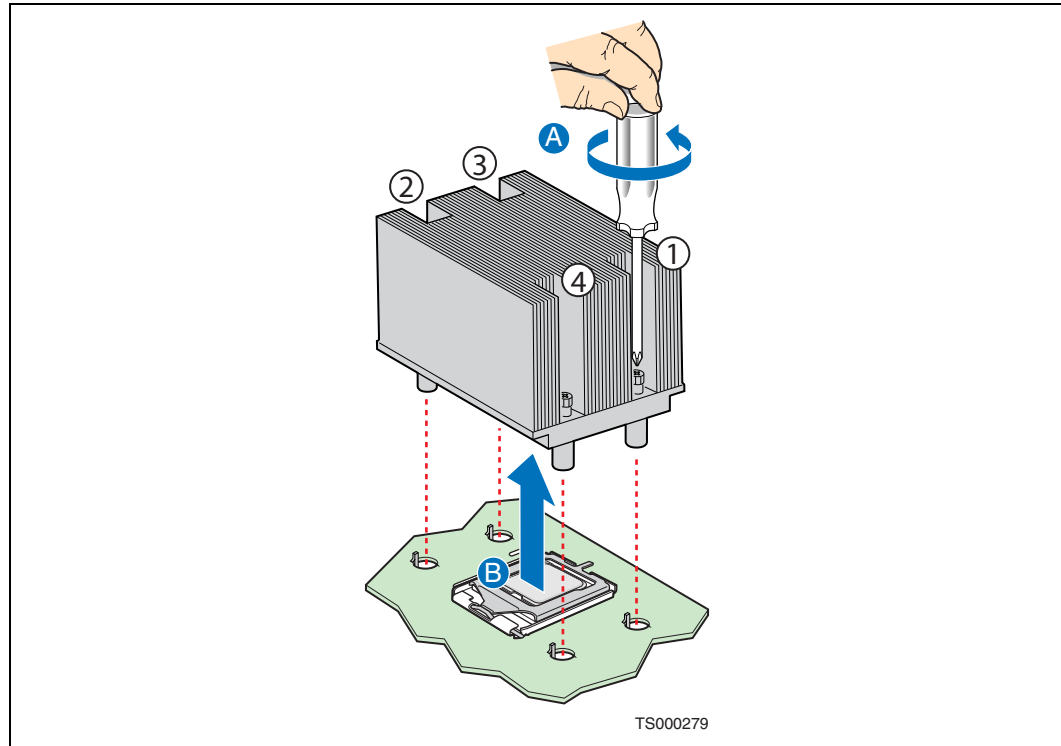


3.4.5.2 Removing a Processor

1. Loosen the four captive screws on the corners of the heat sink with a #2 Phillips screwdriver. (Figure 28, "A")
2. Twist the heat sink slightly to break the seal between the heat sink and the processor. ("B")
3. Lift the heat sink from the processor. If it does not pull up easily, twist the heat sink again.

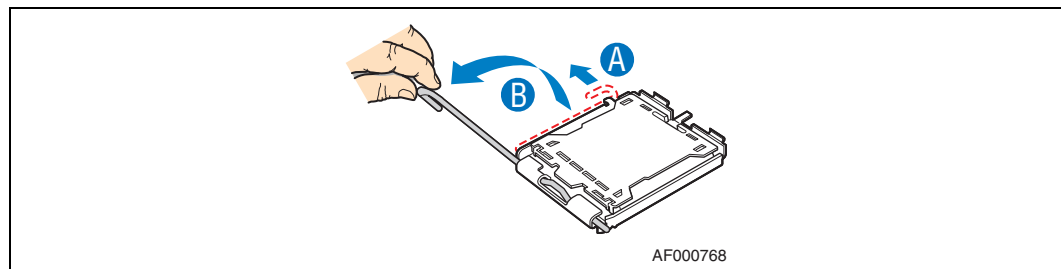
Note: Do not force the heat sink from the processor. Doing so could damage the processor.

Figure 28. Removing the Heat Sink



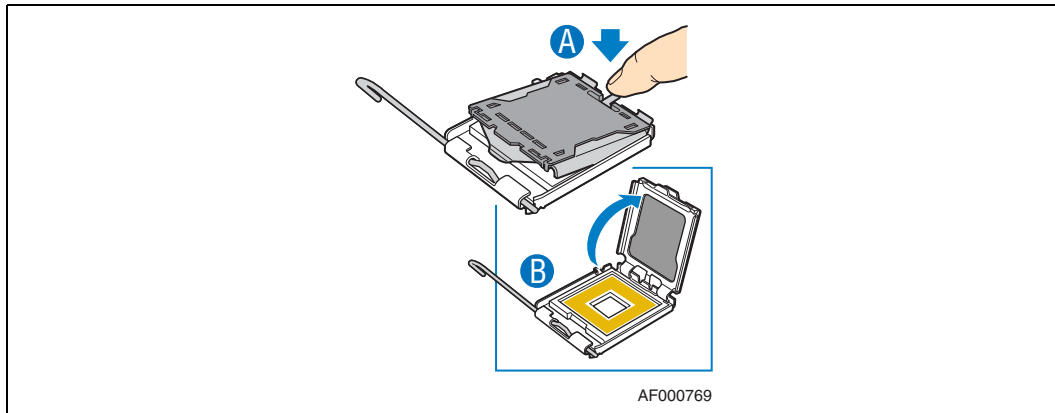
4. Open the socket by pushing the lever handle down and away from the socket to release it. ("A" and "B" in Figure 29)

Figure 29. Using the Socket Lever



5. Pull the lever and open the load plate all the way. ("A" and "B" in Figure 30)

Figure 30. Opening the Load Plate



6. Remove the processor.

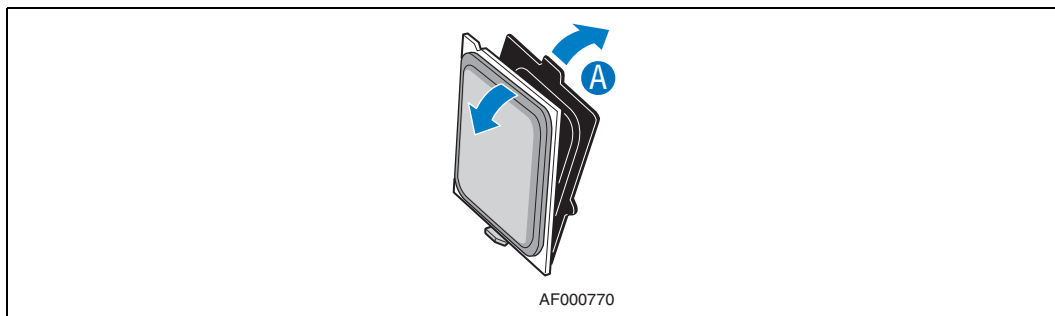
3.4.5.3 Installing a New Processor

Note: Follow the ESD precautions in Section 3.4.5.1, "ESD and Processor Handling Precautions" on page 46.

To install a processor, follow these instructions:

1. Take the processor out of its packaging and remove the protective shipping cover. ("A")

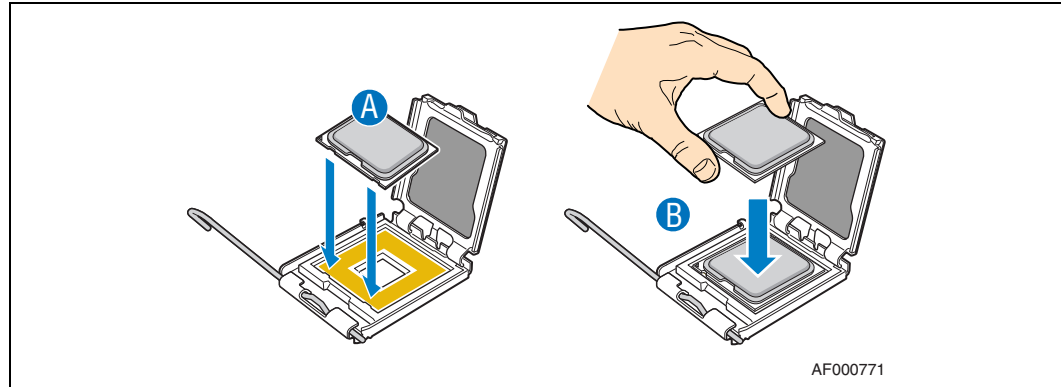
Figure 31. Removing the Processor Protective Cover



Caution: The underside of the processor has components that may damage the socket pins if installed improperly. The processor must align correctly with the socket opening before installation. Gently place the processor onto the socket surface. Do not drop or push the processor into the socket!

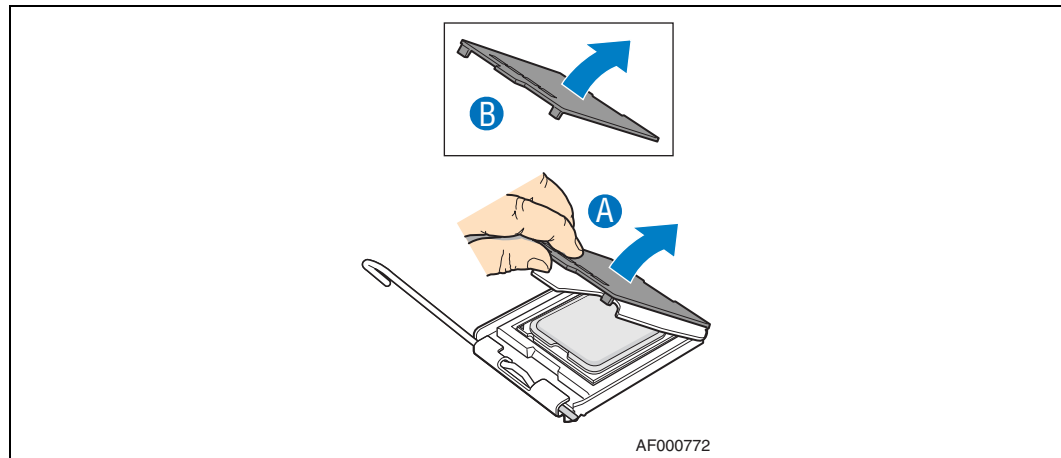
2. Orient the processor with the socket so that the processor cutouts match the socket notches. (See Figure 32, "A".)
3. Gently place the processor in the socket. ("B")

Figure 32. Installing the Processor in the Processor Socket



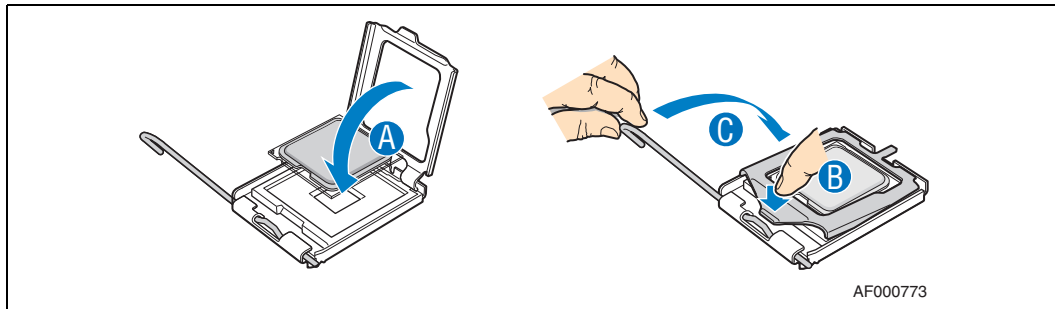
4. Remove the socket protective cover by grasping the cover tab and pulling it away from the load plate. Store the protective cover for future use. ("A" and "B")

Figure 33. Removing the Socket Protective Cover



5. Close the load plate completely. (Figure 34, "A")

Figure 34. Closing the Processor Load Plate and Socket Lever



6. Close the socket lever and ensure that the load plate tab engages under the socket lever when fully closed. ("B" and "C")

3.4.5.4 Installing the Heat Sink

1. If this is a new heat sink (not the one you removed above), remove the protective film, if present, on the Thermal Interface Material (TIM) located on the bottom of the heat sink.
2. Set the heat sink over the processor, lining up the four captive screws with the four posts surrounding the processor. Align the heat sink fins to the front and back of the chassis for correct airflow (front to back). Use caution and make sure that cables are not pinched beneath the heat sink. (See Figure 28.)
3. Loosely screw in the captive screws on the heat sink corners by tightening one, then the one diagonally opposite, and so on.
4. Gradually and equally tighten each captive screw in diagonal order until each is firmly tightened. See Figure 28 for the order.

Caution: The torque spec for these screws is 8-inch pounds. Be careful not to exceed it.

3.4.6 Other Installation and Upgrade Options

To install the server into a rack, see "Installing the Server into a Rack", below. If you want to install other optional components, see Chapter 4, "Optional Component Installations".

If you are finished setting up your TIGH2U Server, replace the front bezel, the top cover, and reconnect the external cables and power cord(s).

3.5 Installing the Server into a Rack

Installation instructions for the standard bracket kit and the optional rail kit are included with each kit. These instructions can also be found on the server deployment toolkit CD and at <http://us.kontron.com/support/> (Search for TIGH2U, click on Product Downloads, and then Ordering Guide) or on the *Kontron Deployment Assistant* CD.

3.5.1 Connecting the Power Cord

Note: When using a rack, only install the power cord(s) after the server is successfully installed in the rack.

3.5.2 Equipment Rack Precautions

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

Mains power disconnect — The 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 a 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 power cords must be removed.

Grounding the rack installation — To avoid the potential for an electrical shock hazard, for DC power you must include a third wire safety ground conductor with the rack installation. For DC power the two studs for chassis enclosure grounding must be used for proper safety grounding. See "C" in [Figure 3](#) for the location of the ground studs.

With AC power, if the server power cord is plugged into an 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 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.

AC overcurrent protection — When AC power is used, the server is designed for a 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 6 amperes. It is intended that an external Surge Protective Device (SPD) will be utilized at the AC power service for the equipment.

Caution: **Temperature** — The operating temperature of the server, when installed in an equipment rack, must not go below 5° C (41° F) or rise above 35° C (95° F). Extreme fluctuations in temperature can cause a variety of problems in your server.

Ventilation — The equipment rack must provide sufficient airflow to the front of the server to maintain proper cooling. It must also include ventilation sufficient to exhaust a maximum of 1200 BTU/hour for a fully loaded server system using the Kontron Carrier Grade Server TIGH2U.

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

4 Optional Component Installations

4.1 Before You Begin

Before working with your server product, pay close attention to the safety instructions provided in this manual. See [Appendix A, "Safety Information"](#).

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

4.1.1 Tools and Supplies Needed

- #1 and #2 Phillips (cross-point) screwdrivers, or interchangeable-tip screwdriver with #1 and #2 Phillips bits
- Personal grounding device such as an anti-static wrist strap and a grounded conductive pad

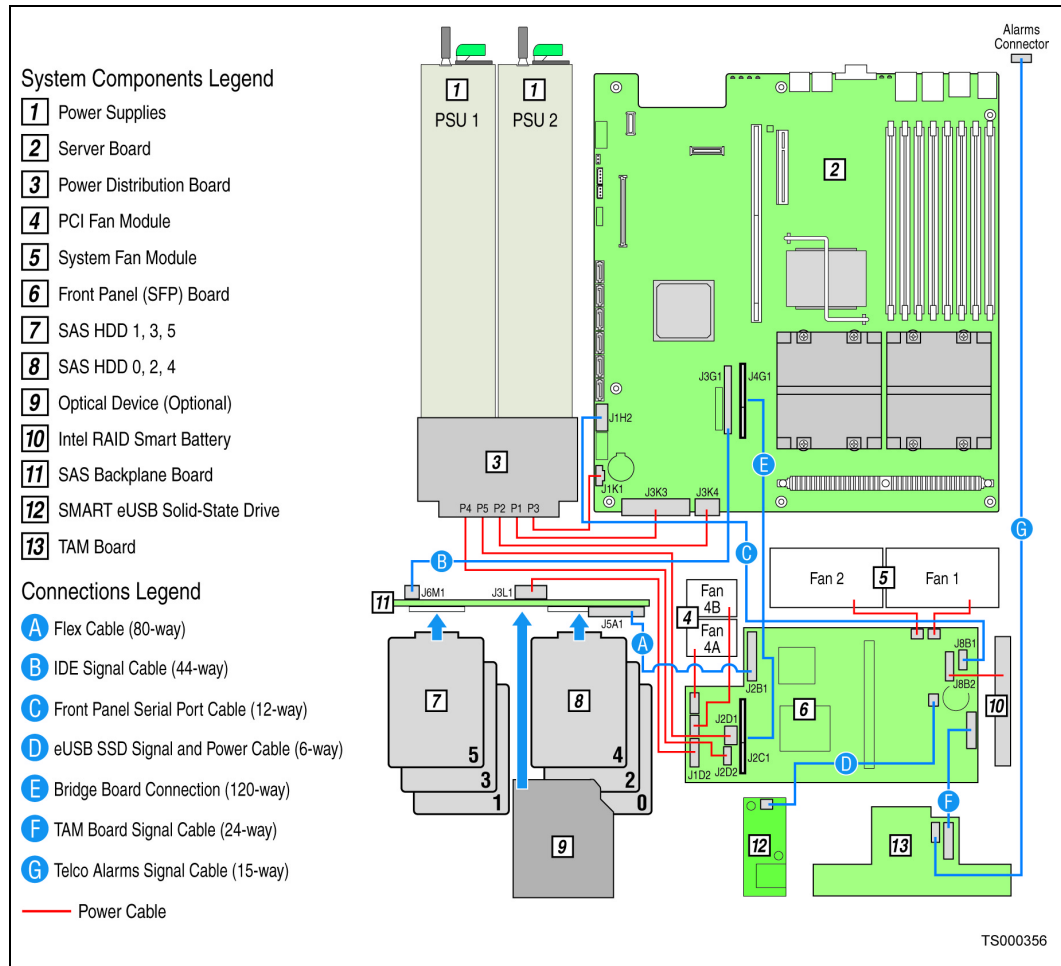
4.1.2 System References

All references to left, right, front, top, and bottom assume that you are facing the front of the server, as it would be positioned for normal operation.

4.1.3 Cable Routing Reference

It is important for cables to be connected correctly. See [Figure 35](#) and for more detailed information about cable connectors, see the *Kontron Carrier Grade Server TIGH2U Technical Product Specification*.

Figure 35. System Cable Routing



4.2 Installing or Replacing a PCI Add-in Card

The Carrier Grade Server TIGH2U is delivered with a riser card assembly that includes the two riser cards:

- A combination PCI-X*/PCI Express* (PCIe*) riser card for full-height add-in cards.
- A PCIe riser card with two slots for low-profile add-in cards

The riser card assembly is attached to the server board by two connectors in the middle of the server board. (See [Figure 7](#) on page 19 for these locations.)

Note: PCI-X*/PCI Express add-in cards are referred to generically as “add-in cards” in the following procedures.

Note: Only PCI-X/PCIe cards tested and supported by Kontron are recommended. See the *Tested Hardware and Operating System List* (THOL). The latest version of the THOL is located on the Kontron support website at <http://us.kontron.com/support/support/>. (Search for TIGH2U, click on Product Downloads, and then Compatibility Matrix.)

To install an add-in card, you first need to remove the top cover, PCI riser retention plate, PCI fan assembly locking pin, and the riser card assembly. You then need to remove the I/O filler panel from the slot in which you will be installing the add-in card. Once the PCI-X or PCIe add-in card is attached to the appropriate riser card connector, this assembly is then plugged back into the connectors on the T5000PAL server board.

4.2.1 Riser Card Options

The server board has two riser slots. The full-height riser slot (J4F1) implements Intel® Adaptive Slot technology and uses a 280-pin connector that meets both PCI-X and PCI Express technology specifications. When using a full-height riser card, the TIGH2U Server supports PCI-X, PCIe x1, PCIe x4, and PCIe x8. [Table 11](#) summarizes the possible board installation configurations.

Table 11. Full Height Riser Card Configurations and Throughput

Configuration	Bottom Slot	Middle Slot	Top Slot
One add-in card	PCI-X †	–	–
	–	x8 or x4 PCIe	–
	–	–	x4 PCIe
Two add-in cards	PCI-X †	x8 or x4 PCIe	–
	PCI-X †	–	x4 PCIe
	–	x4 PCIe	x4 PCIe
Three add-in cards	PCI-X †	x4 PCIe	x4 PCIe
Note: † Up to 133 MHz bus speed			

The low-profile riser slot (J5B1) uses a 98-pin connector. It supports up to two low-profile PCIe x4 add-in cards. [Table 12](#) shows the supported throughput and the number of add-in cards installed for each possible configuration.

Table 12. Low-Profile Riser Card Configurations and Throughput

Configuration	Lower Slot	Upper Slot
One add-in card	x4 PCIe	
		x4 PCIe
Two add-in cards	x4 PCIe	x4 PCIe

Note: There are no population rules for installing a single low-profile add-in card in the low-profile riser card slot; a card can be installed in either PCI Express slot. Although the slots physically accommodate an x8 card, each slot only supports an x4 interface.

See the *Intel® Server Board S5000PAL Technical Product Specification* for the electrical characteristics for the two PCI-X/PCIe riser card assembly slots.

4.2.2 Removing the PCI Riser Card Assembly

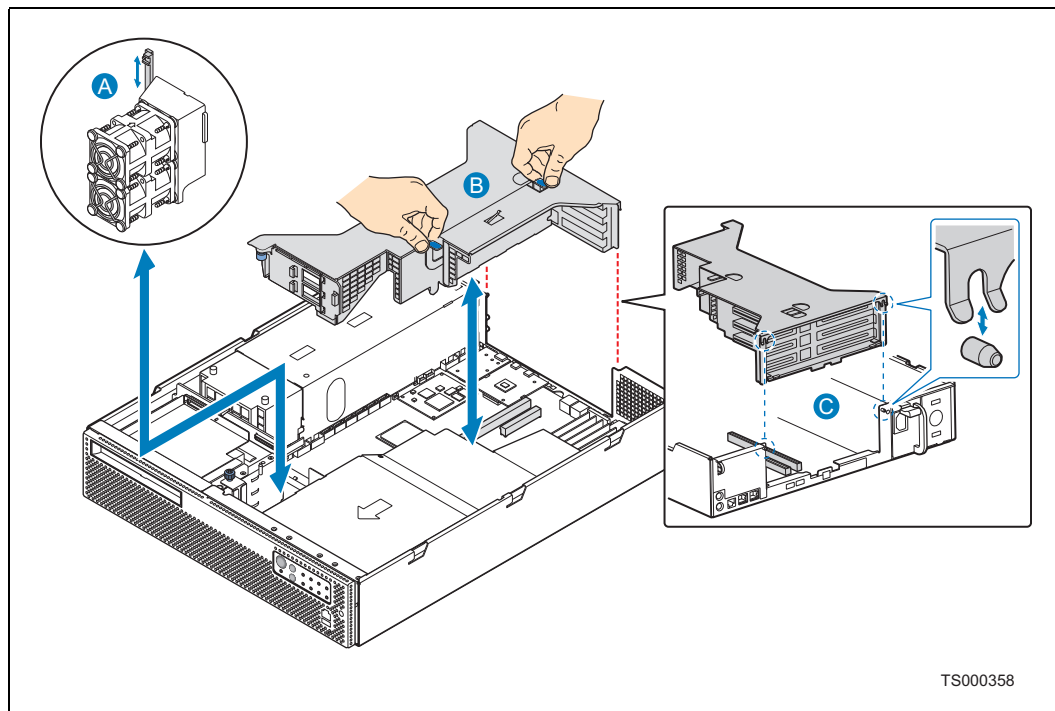
To remove the riser card assembly from the chassis, follow these steps:

1. Remove the chassis top cover. For instructions, see [Section 3.2.3, “Removing the Chassis Cover”](#) on page 26.
2. Remove the locking pin for the PCI fan assembly. See [Figure 36 \(“A”\)](#).
3. Slide the PCI fan assembly slightly left to release it from the clip on the right side.

Note: It is not necessary to detach the flex cable over the fan assembly. However, use caution so you do not damage this cable when moving the fan assembly.

4. Slide the PCI fan assembly slightly forward to clear it from the riser card assembly.
5. Lift up on the front of the PCI riser retention plate until it clears the riser card assembly.
6. Slide the PCI riser retention plate rearward to disengage the two tabs that hold it in place over the power supply area. Lift the retention plate from the chassis.
7. Grasp the PCI riser card assembly by the two flexible blue handles and carefully pull the assembly out of the chassis. (“B”)
8. Note the pins on each side of the rear panel opening where the riser card assembly bracket forks attach. (“C”) These pins are important when you re-install the riser card assembly.

Figure 36. Removing the Riser Card Assembly



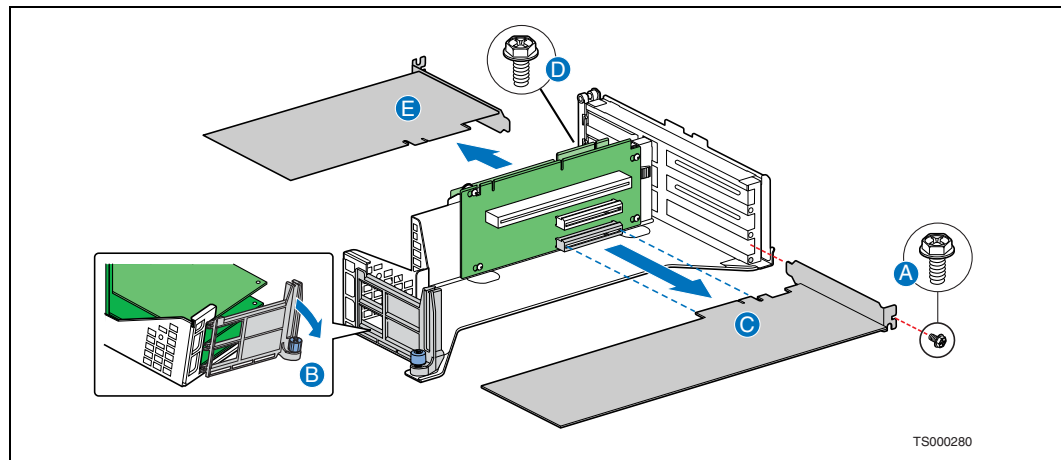
9. Determine your next steps and follow the appropriate procedures:
 - Remove or install an add-in card. See [Section 4.2.3, “Removing an Add-in Card from the Riser Card Assembly”](#) on page 57 or [Section 4.2.4, “Installing an Add-in Card in the Riser Card Assembly”](#) on page 58.
 - If you are following these steps as part of another procedure, return to that procedure.

4.2.3 Removing an Add-in Card from the Riser Card Assembly

Caution: When handling an add-in card, observe normal safety and ESD precautions. See [Appendix A, “Safety Information”](#) for more information.

1. Remove the PCI riser card assembly. For instructions, see [Section 4.2.2, “Removing the PCI Riser Card Assembly”](#) on page 56.
2. Turn the riser card assembly upside-down.
3. Remove the rear retention screw that fastens the riser card to the rear bracket. (“A” or “D”)
4. When removing a full-height add-in card, remove the front retention clip by loosening the blue captive screw and rotating the clip outward. (“B”)
5. Remove the add-in card from the riser card socket. (“C” or “E”)
6. Determine your next steps and follow the appropriate procedures:
 - If you are installing a replacement add-in card, see [Section 4.2.4, “Installing an Add-in Card in the Riser Card Assembly”](#) on page 58.
 - If you are ready to reassemble your system, see [Section 4.2.5, “Installing the PCI Riser Card Assembly”](#) on page 59.

Figure 37. Removing an Add-in Card from the Riser Card Assembly



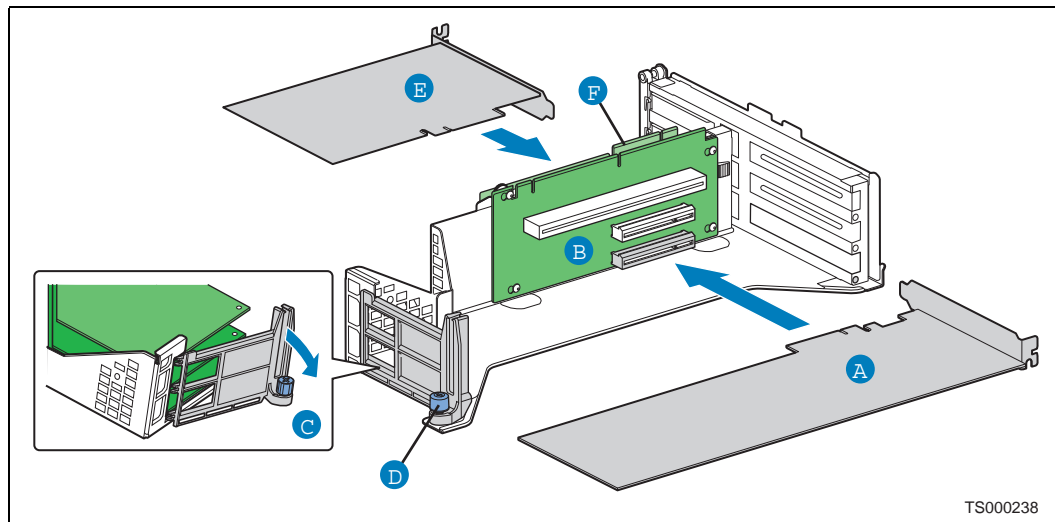
4.2.4 Installing an Add-in Card in the Riser Card Assembly

Caution: When handling an add-in card, observe normal safety and ESD precautions. (See Appendix A, “Safety Information” for more information.)

See Section 4.2.1, “Riser Card Options” on page 54 for information about what cards can be used with the two riser cards in this assembly.

1. Remove the PCI riser card assembly. For instructions, Section 4.2.2, “Removing the PCI Riser Card Assembly” on page 56.
2. Turn the riser card assembly upside-down.
3. If the add-in card slot was empty before installing the new card, remove the add-in card filler panel.
4. For a full-height card, remove the front retention clip by loosening the blue captive screw and rotating the clip outward. (Figure 38, “D” and “C”).
5. Slide the add-in card onto the sheet metal and attach it to the appropriate riser card connector. (“B”) Be sure that the add-in card edge connector is seated in the riser card connector.
6. Use the rear retention screw to fasten the add-in card to the riser card.
7. Install the front retention clip and tighten the captive thumbscrew. (“D”)
8. If this is the last task you are performing, install any other components that you removed.
 - For instructions to replace the PCI riser assembly, see Section 4.2.5, “Installing the PCI Riser Card Assembly” on page 59.
 - Insert the locking pin for the PCI fan assembly. See Figure 36 (“A”).
 - For instructions to replace the top cover, see Section 3.2.4, “Installing the Chassis Cover” on page 27.

Figure 38. Adding a PCI-X/PCIe Card into the Riser Card Assembly



TS000238

4.2.5 Installing the PCI Riser Card Assembly

1. Hold the riser card assembly by the two blue handles.
2. Insert the two riser card edge connectors into the super slot header and the smaller low-profile riser card header next to it on the server board. (See "A" in [Figure 36](#).)
3. Align the forks on the riser card assembly with the pins on the rear chassis panel. (See "B" in [Figure 36](#))
4. Slide the PCI fan assembly back and then to the right to attach the fan assembly to the riser card assembly.
5. Insert the locking pin for the PCI fan assembly. See [Figure 36](#) ("A").
6. Set the PCI riser retention plate in place over the power supply area and pull it forward to lock it into place.
7. If this is the last task you are performing, replace the top cover, see [Section 3.2.4, "Installing the Chassis Cover"](#) on page 27.

4.3 Installing an I/O Expansion Module

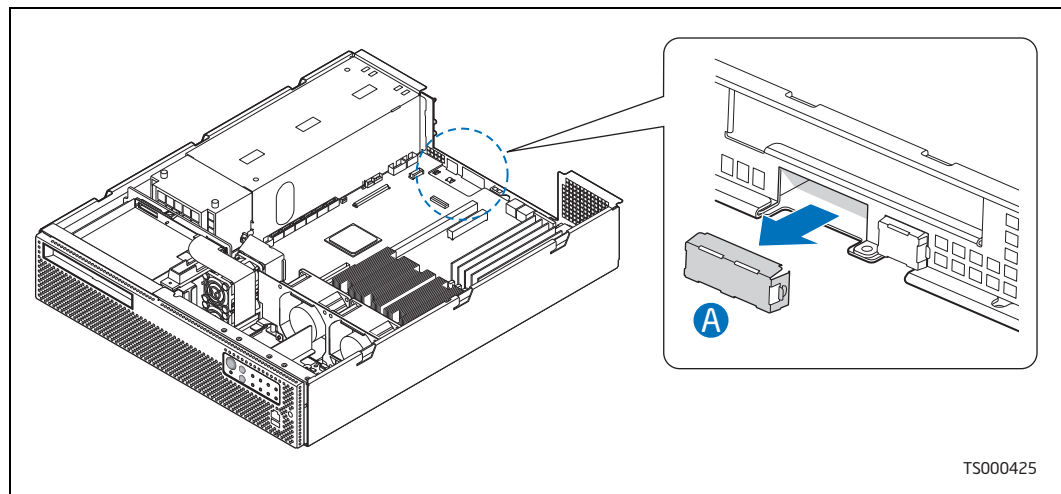
Two types of optional I/O expansion modules are available for the Carrier Grade Server TIGH2U:

- A dual GbE NIC module
- An external SAS hard disk drive module

Before installing an I/O expansion module you must remove the top cover and the PCI riser card assembly.

1. Remove the chassis top cover. For instructions, see [Section 3.2.3, "Removing the Chassis Cover"](#) on page 26.
2. Remove the PCI riser card assembly. For instructions, [Section 4.2.2, "Removing the PCI Riser Card Assembly"](#) on page 56.
3. From the inside of the chassis, squeeze the sides of the I/O expansion module filler panel to remove it from the rear panel. ([Figure 39, "A"](#))

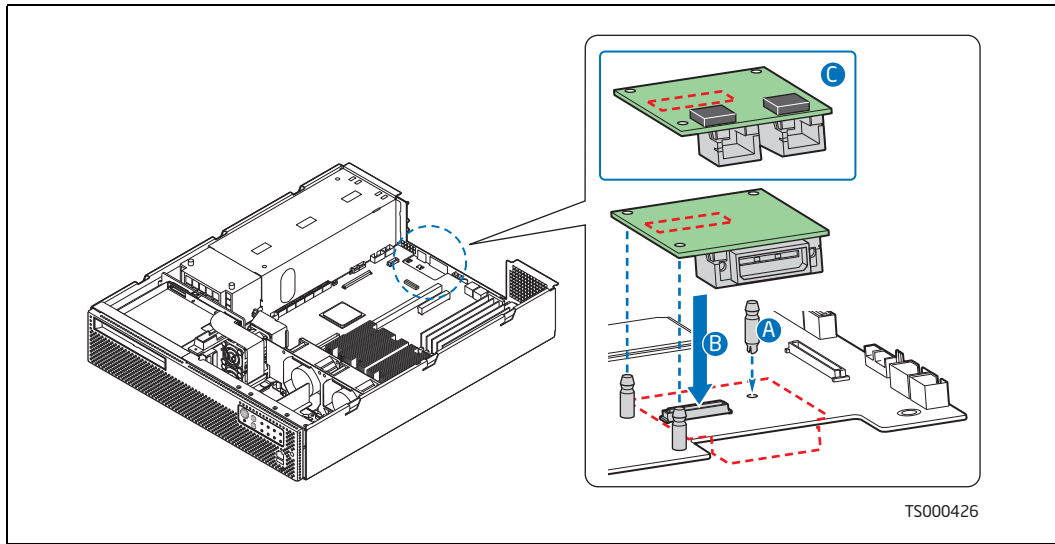
Figure 39. Removing the I/O Module Filler Panel



4. Snap the three I/O expansion module standoffs into the server board. ([Figure 40, "A"](#))
5. Attach the I/O expansion module to the server board connector ("B") and the standoffs.

6. If this is the last task you are performing, install any other components you removed.
 - For instructions to replace the PCI riser assembly, see [Section 4.2.5, “Installing the PCI Riser Card Assembly”](#) on page 59.
 - Insert the locking pin for the PCI fan assembly. See [Figure 36 \(“A”\)](#).
 - For instructions to replace the top cover, see [Section 3.2.4, “Installing the Chassis Cover”](#) on page 27.

Figure 40. Installing an I/O Expansion Module



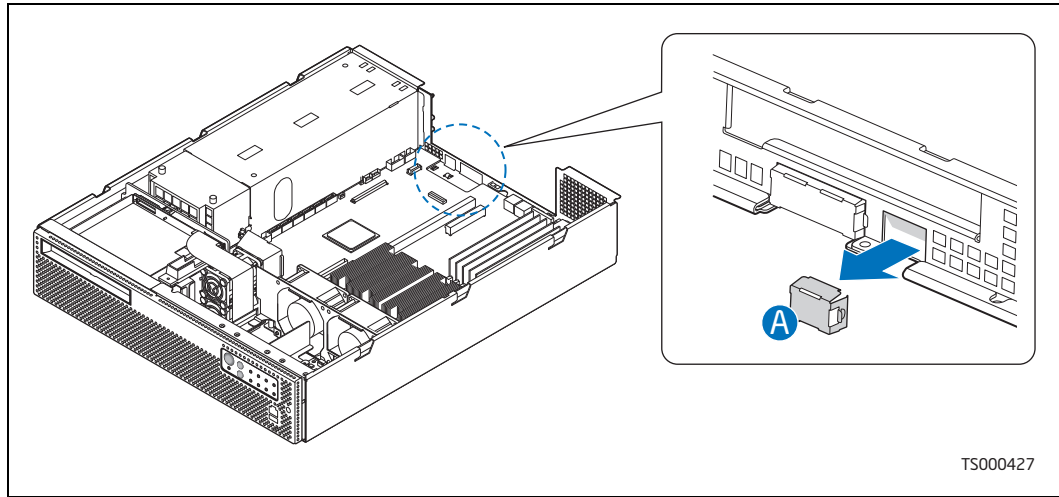
4.4 Installing Remote Management Module 2 Components

The Intel® RMM2 NIC Module and Remote Management Module 2 must be installed together.

4.4.1 Installing the RMM2 NIC Module

1. Remove the chassis top cover. For instructions, see [Section 3.2.3, “Removing the Chassis Cover”](#) on page 26.
2. Remove the PCI riser card assembly. For instructions, [Section 4.2.2, “Removing the PCI Riser Card Assembly”](#) on page 56.
3. Remove the filler panel from the rear panel of the chassis by squeezing the side edges and pulling it out. ([Figure 41](#))
4. Press the two standoffs into the server board. ([Figure 42, “C”](#))
5. Attach the RMM2 NIC to the server board connector. (“D”)
6. Install the Remote Management Module 2. See [Section 4.4.2, “Installing the Remote Management Module 2”](#) on page 62.

Figure 41. Removing the RMM2 NIC Port Filler Panel

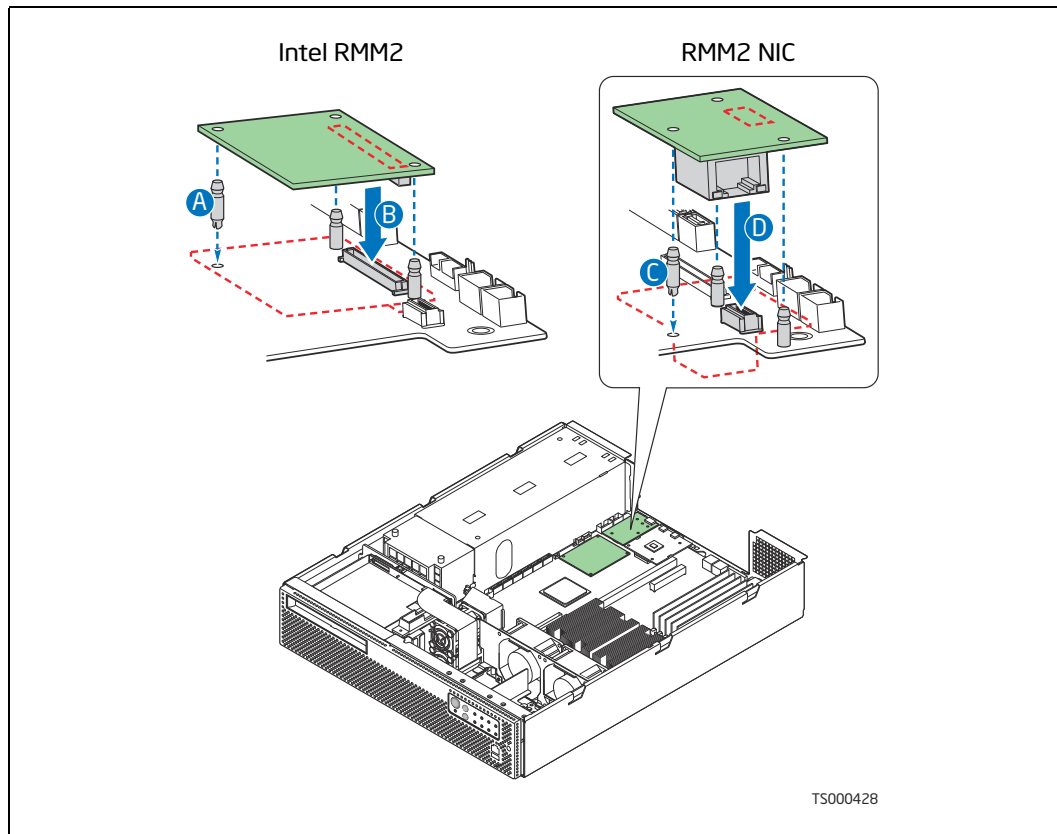


4.4.2 Installing the Remote Management Module 2

Note: These steps assume you have just finished installing the RMM2 NIC module.

1. Insert the standoff into the T5000PAL server board. (Figure 42, “A”)
2. Fasten the RMM2 to the RMM connector on the server (“B”) and press it over the standoffs. (“A”)

Figure 42. Installing the Remote Management Module 2



3. If this is the last task you are performing, install any other components you removed.
 - For instructions to replace the PCI riser assembly, see [Section 4.2.5, “Installing the PCI Riser Card Assembly”](#) on page 59.
 - For instructions to replace the top cover, see [Section 3.2.4, “Installing the Chassis Cover”](#) on page 27.

4.5 Installing an Embedded USB Solid-State Drive

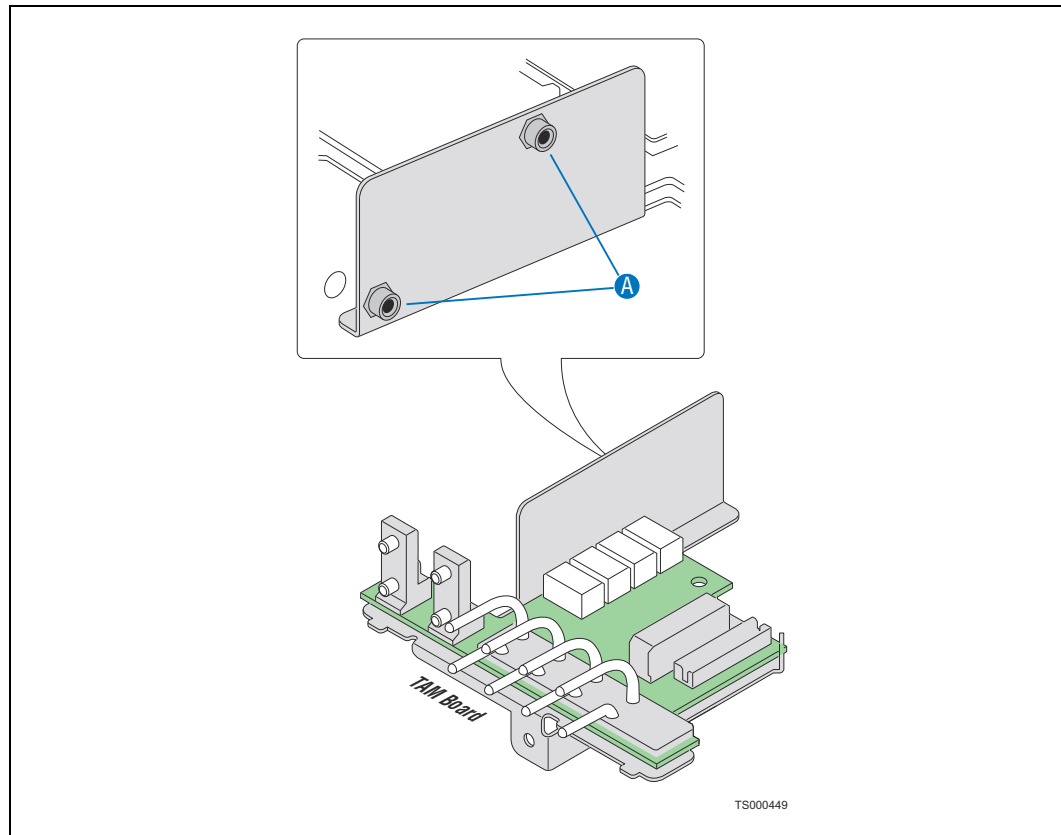
The optional SMART Embedded USB Solid-State Drive (eUSB SSD) provides internal storage for OEM applications. It is used with the SAS front panel (SFP) board to provide local memory storage for options such as system information, diagnostic partitions, and configuration data. The eUSB SSD is installed onto the TAM board. Before you install this component, you must remove the chassis top cover and the processor air duct.

1. Remove the chassis top cover. For instructions, see [Section 3.2.3, “Removing the Chassis Cover”](#) on page 26.

Optional Component Installations—TIGH2U Server

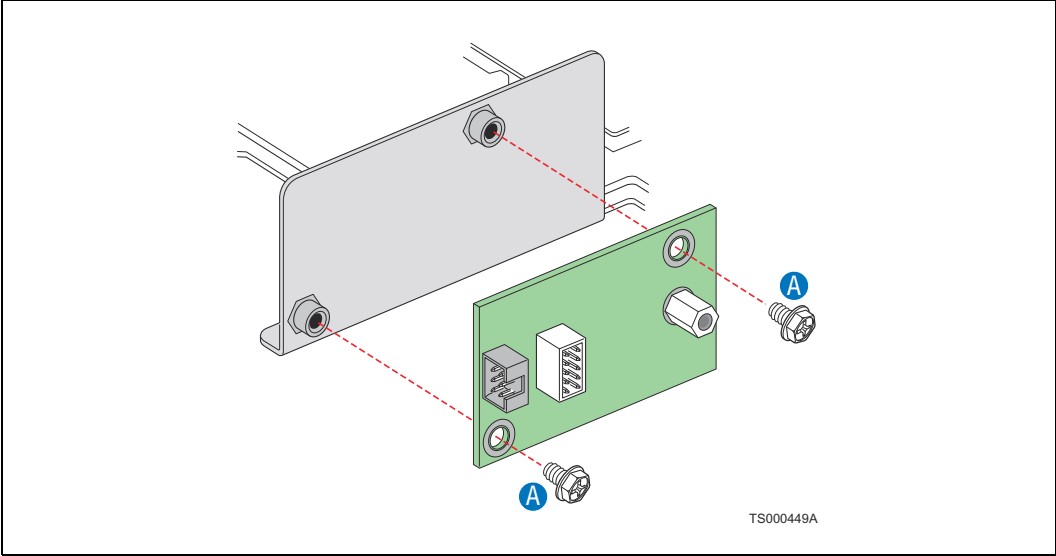
2. Remove the processor air duct. For instructions see [Section 3.2.5, "Removing the Processor Air Duct" on page 28](#).
3. The eUSB SSD attaches vertically to the TAM board. See the following figure, then choose your installation method:
 - Use a #1 Phillips offset screwdriver to install the Solid State Drive without removing the TAM board. Continue with step 4, below.
 - Remove the TAM board and then use a #1 Phillips screwdriver. For instructions to remove the TAM board, see [Section 5.3.1, "Removing the TAM Board" on page 84](#). Continue with step 4, below.

Figure 43. Embedded USB Solid-State Drive Mounting Location



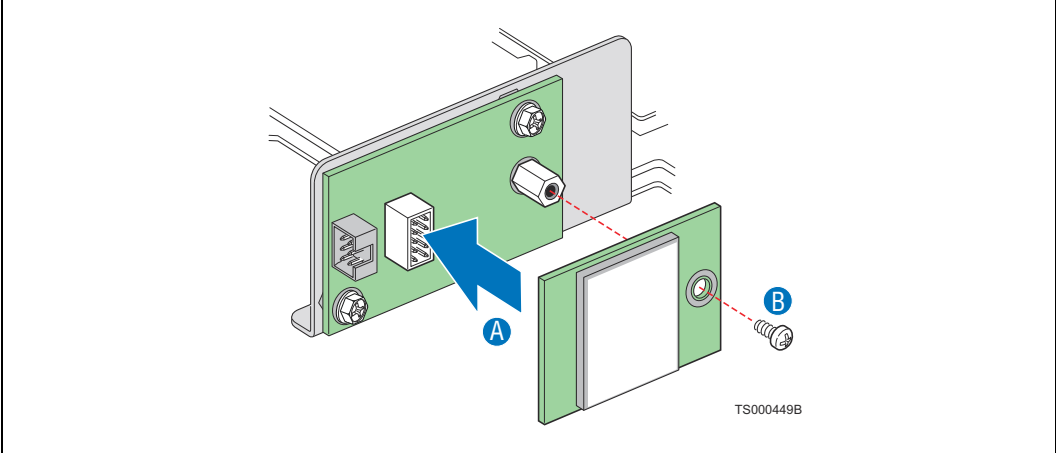
- 4. Use the two screws provided to attach the interposer board to the bracket at the left side of the TAM board. ("A")

Figure 44. Installing the Interposer Board



- 5. Attach the eUSB SSD to the interposer board, matching the connector ("A") and inserting the screw ("B").

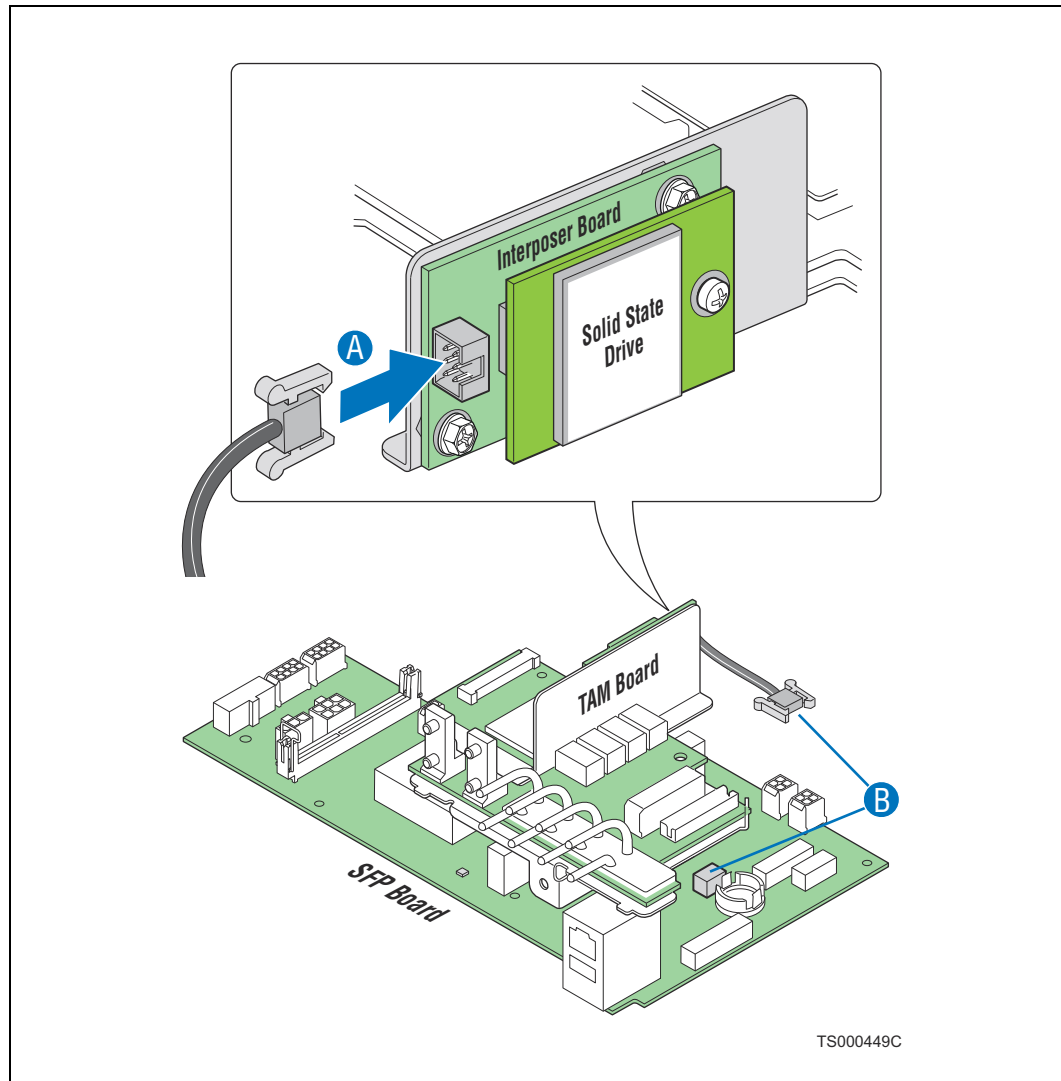
Figure 45. Installing the eUSB SSD



Note: Your SMART Embedded USB Solid-State Drive came with two cables. You will only need the 2.5-inch cable for this installation.

6. Plug one end of the 2.5-inch SSD cable into the connector on the rear of the eUSB SSD. (“A”)
7. If you chose to remove the TAM board, reinstall it. For instructions, see [Section 5.3.3, “Installing the TAM Board”](#) on page 88.
8. Connect the other end of the SSD cable into the connector header on the SFP board. (“B”)

Figure 46. Connecting the Embedded USB Solid-State Drive Cable



9. If this is the last task you are performing, replace the processor air duct and the chassis top cover. Reconnect all the external devices and plug in the power cord(s).

4.6 Installing Hardware RAID 5 Components

The RAID 5 Kit includes three components for hardware RAID support:

- Intel® RAID Activation Key

- RAID DDR2 mini-DIMM
- Intel® RAID Smart Battery

The optional hardware RAID 5 components are installed on the SAS front panel (SFP) board at the front right side of the chassis.

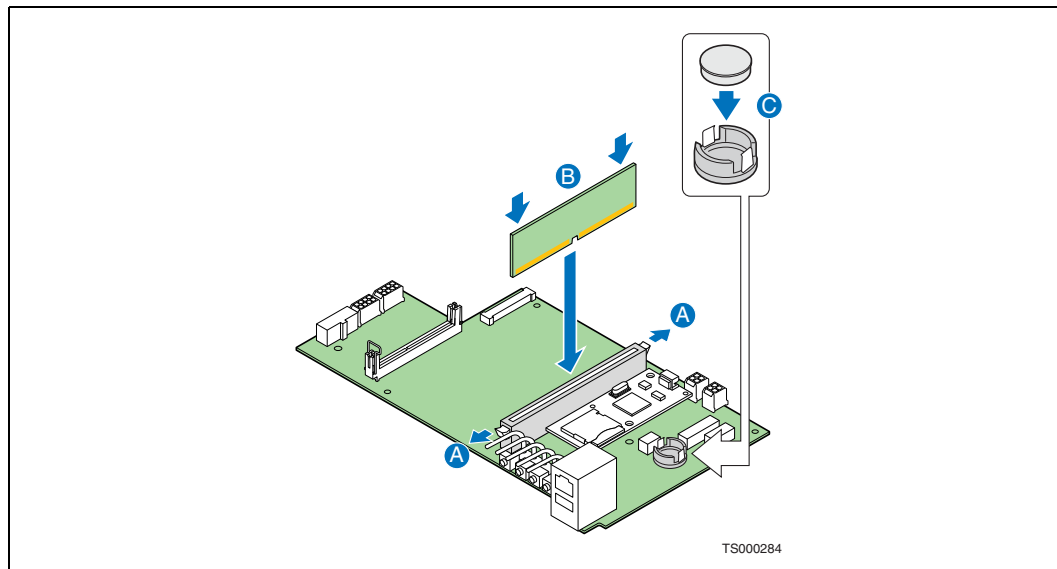
4.6.1 Installing the RAID Activation Key and the RAID DIMM

1. Remove the chassis top cover. For instructions, see [Section 3.2.3, “Removing the Chassis Cover” on page 26](#).
2. Remove the processor air duct. For instructions, see [Section 3.2.5, “Removing the Processor Air Duct” on page 28](#).
3. Optional: For ease of installation, remove the TAM board. For instructions, see [Section 5.3.1, “Removing the TAM Board” on page 84](#).

Caution: Observe proper ESD and safety procedures when handling the RAID DIMM and the SFP board.

4. Open the latches on both ends of the RAID DIMM connector header. (“A”)
5. Note the location of the alignment notch (“B”) and insert the DIMM. Make sure the edge connector on the DIMM aligns properly with the connection header.
6. Using both hands, press down firmly and evenly on both sides of the DIMM until it snaps into place and the latches at each end close.
7. Insert the RAID activation key. (“C”) The wider rim is the top of the key. Make sure the metal clips on the socket snap securely over the edge of the Activation Key top rim.
8. If you removed the TAM board, reinstall it. For instructions, see [Section 5.3.3, “Installing the TAM Board” on page 88](#).

Figure 47. Installing the RAID DIMM and the RAID Activation Key



4.6.2 Installing the RAID Smart Battery

WARNING

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

WARNING

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

ADVARSEL

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

VARNING

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

VAROITUS

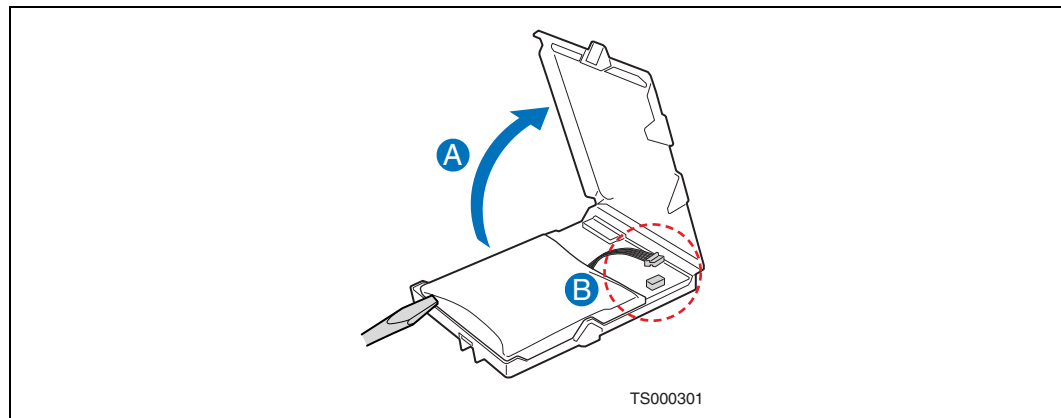
Paristo voi räjähtää, jos se on virheellisesti asennettu. Vaihda paristo ainoastaan laitevalmistajan suosittelemaan tyyppiin. Hävitä käytetty paristo valmistajan ohjeiden mukaisesti.

The Intel® RAID Smart Battery is installed on the side wall of the chassis by the SAS Front Panel (SFP) board. The connector, C8B3, is on the right end of the SFP board. You need to remove the front bezel before installing the Smart Battery.

The Intel® RAID Smart Battery has an internal battery power cable that must be connected.

1. Open the Intel® RAID Smart Battery case lid. If necessary, use a small flat-blade screwdriver to pry open the lid at the corners. (Figure 48, "A")
2. Connect the battery cable. ("B")

Figure 48. Connecting the RAID Smart Battery Power Cable

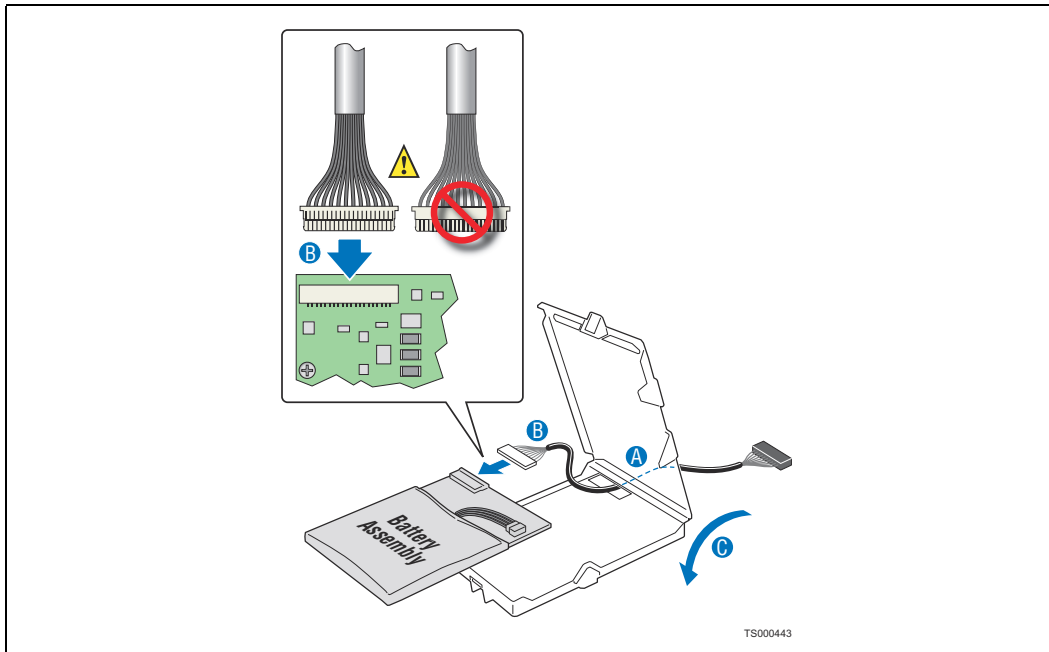


3. Lift the battery assembly from the case and insert the battery cable through the opening in the bottom of the case. (Figure 49, "A")
4. Attach the battery cable to the connector on the back of the battery assembly. ("B")

Caution: It is easy to connect the cable backwards. Make sure the flat white surface of the cable connector faces down.

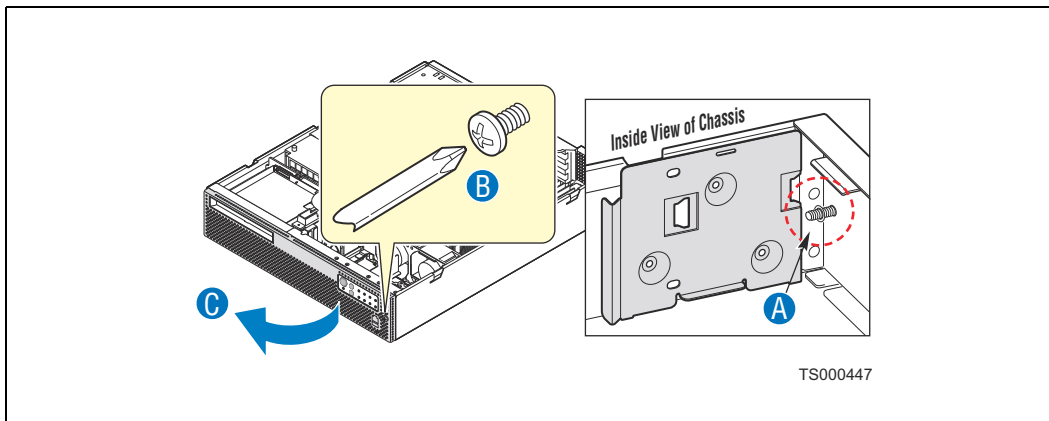
5. Return the battery assembly back to the case. Close and latch the lid. ("C")

Figure 49. Connecting the RAID Smart Battery Cable through the Battery Case



Note: The front bezel screw acts as an additional attachment for the smart battery.

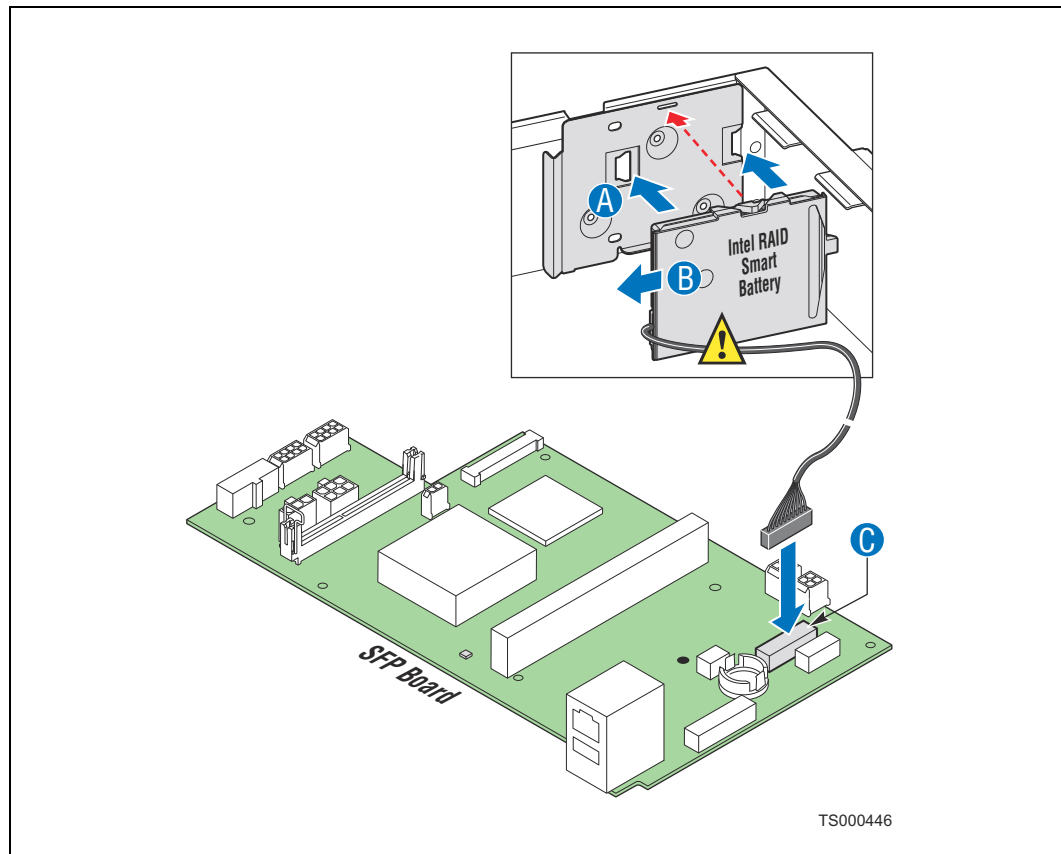
Figure 50. Front Bezel Screw Relationship to RAID Smart Battery



6. Remove the front bezel. For instructions, see Section 3.2.1, "Removing the Front Bezel" on page 25.

7. Remove the TAM board. For instructions, see [Section 5.3.1, “Removing the TAM Board”](#) on [page 84](#).
8. Place the smart battery on the bracket on the side wall of the chassis. ([Figure 51, “A”](#)). The plastic tab on the battery case goes into the slot in the chassis. (See the red arrow in the figure.)
9. Slide the battery toward the chassis rear to lock it into place. (“B”)
10. Connect the cable from the battery to the connector on the SFP board. (“C”)

Figure 51. Installing the Intel® RAID Smart Battery



11. Install the TAM board. For instructions, see [Section 5.3.3, “Installing the TAM Board”](#) on [page 88](#).
12. Install the front panel bezel. For instructions, see [Section 3.2.2, “Installing the Front Bezel”](#) on [page 26](#).
13. If this is the last task you are performing, replace the processor air duct and the chassis top cover. Reconnect all the external devices and plug in the power cord(s).

4.7 Installing an Optical Device

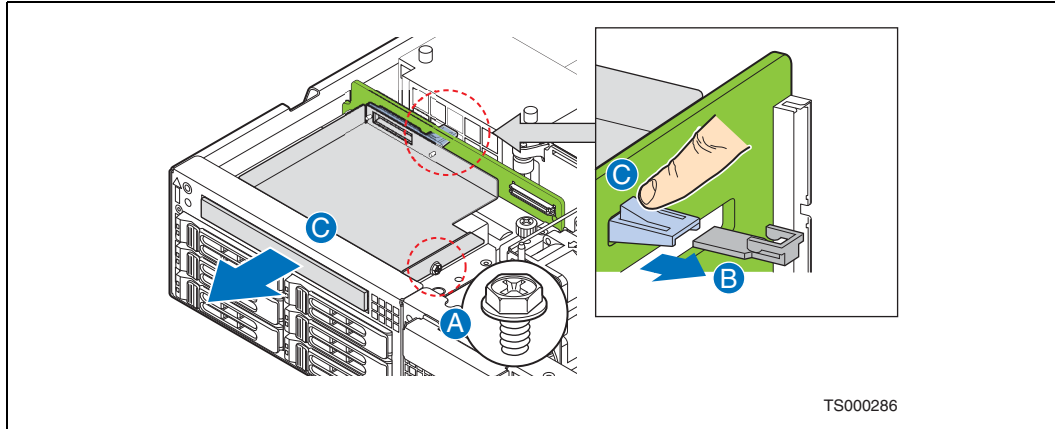
The optical device is not hot-swappable. To replace a previously installed device or install a new one, you must first power down the system and remove the chassis cover and front bezel.

4.7.1 Removing the Optical Device Filler Panel

1. Remove the chassis top cover. See [Section 3.2.3, “Removing the Chassis Cover”](#) on [page 26](#).

2. Remove the front panel bezel. See [Section 3.2.1, "Removing the Front Bezel"](#) on page 25.
3. Loosen the shipping screw that fastens the optical drive filler panel to the chassis. ("A")
4. Detach the retention clip from the filler panel engagement guide behind the SAS backplane board. Save it for use on the optical drive.
5. Press on the latch on the back of the engagement guide to release the optical device filler panel from the backplane. ("B")
6. Remove the filler panel from the chassis. ("C")

Figure 52. Removing the Optical Device Filler Panel

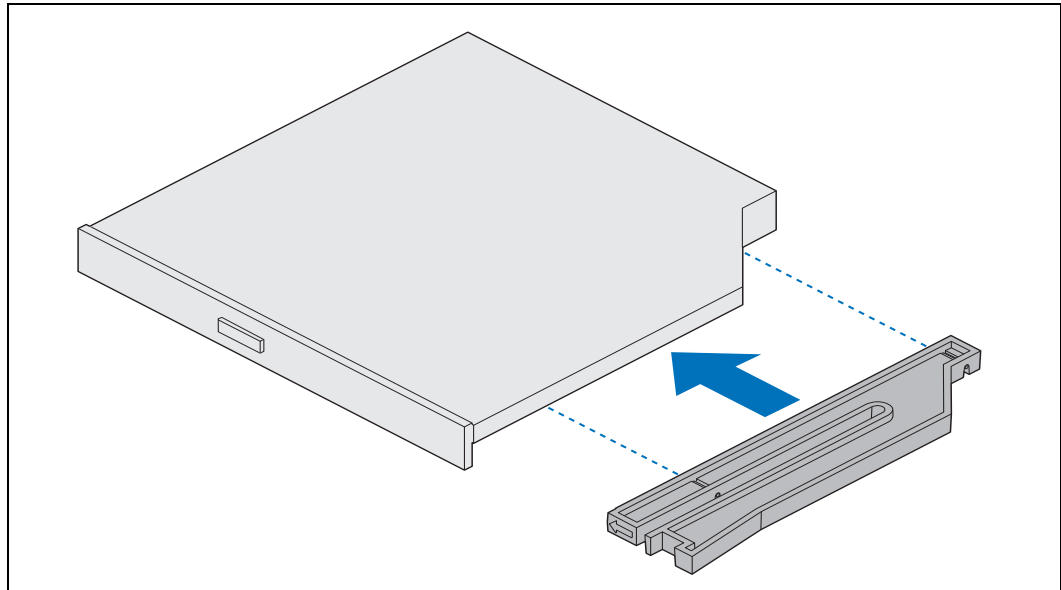


7. Remove the engagement guide from the back of the filler panel. Save the guide and the two screws for use on the new optical device.

4.7.2 Installing a New Optical Device

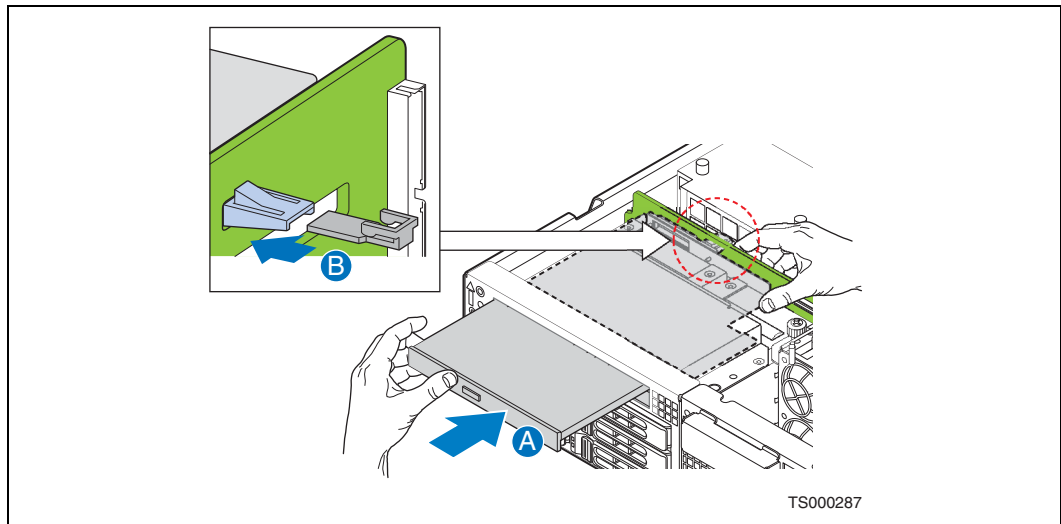
1. Use the two screws to attach the engagement guide to the optical device.

Figure 53. Attaching the Engagement Guide to the Optical Device



2. Slide the optical drive into the open slot.
With one hand on the front panel and the other behind the backplane board, push against both sides of the optical drive slot until the engagement guide goes through the backplane board and the latch pops up to secure the drive in the properly aligned position.
3. Re-attach the retention clip to the engagement guide to ensure the latch keeps the optical drive properly aligned and locked in place.

Figure 54. Installing the Optical Device into the Chassis



4. If this is the last task you are performing, replace the bezel and the chassis top cover. Reconnect all the external devices and plug in the power cord(s).

5 Server Component Replacements

5.1 Before You Begin

Before working with your server product, pay close attention to the safety instructions provided in this manual. See [Appendix A, "Safety Information"](#).

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

5.1.1 Tools and Supplies Needed

- #1 and #2 Phillips (cross-point) screwdrivers, or interchangeable tip screwdriver with #1 and #2 Phillips bits
- Socket wrench
- Personal grounding device such as an anti-static wrist strap and a grounded conductive pad

5.1.2 System References

All references to left, right, front, top, and bottom assume that you are facing the front of the server, as it would be positioned for normal operation.

5.1.3 Cable Routing Reference

It is important for cables to be connected correctly. See [Figure 35 on page 53](#), and for more detailed information about cable connectors, see the *Kontron Carrier Grade Server TIGH2U Technical Product Specification*.

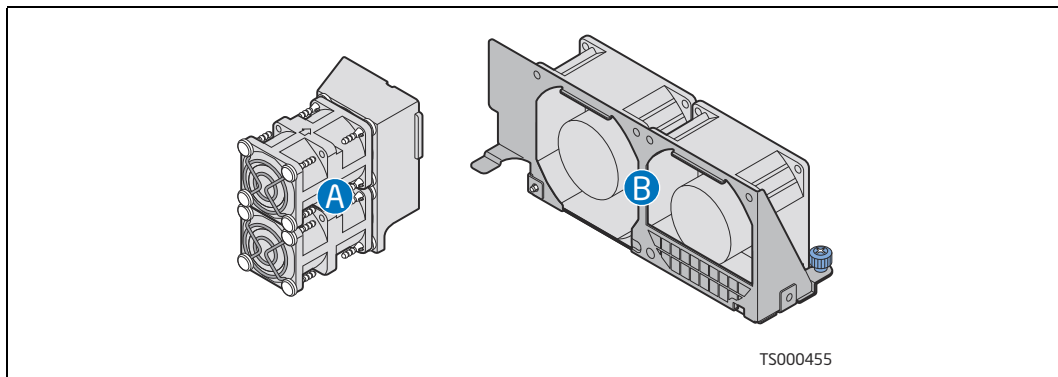
5.2 Replacing the Fan Assemblies

Caution: Your server does not have hot-swappable fans. Before replacing any of the fan assemblies, you must first take the server out of service, turn off all peripheral devices connected to the system, turn off the system by pressing the power button, and unplug the power cord(s) from the system or wall outlet.

The replacement/spare fan set consists of two dual-rotor PCI fans as shown in [Figure 55](#) (“A”), two dual-rotor CPU fans (“B”), and push rivets to attach the fans to the fan brackets.

Kontron specifies that a skilled technician can service the fans in approximately 15 minutes.

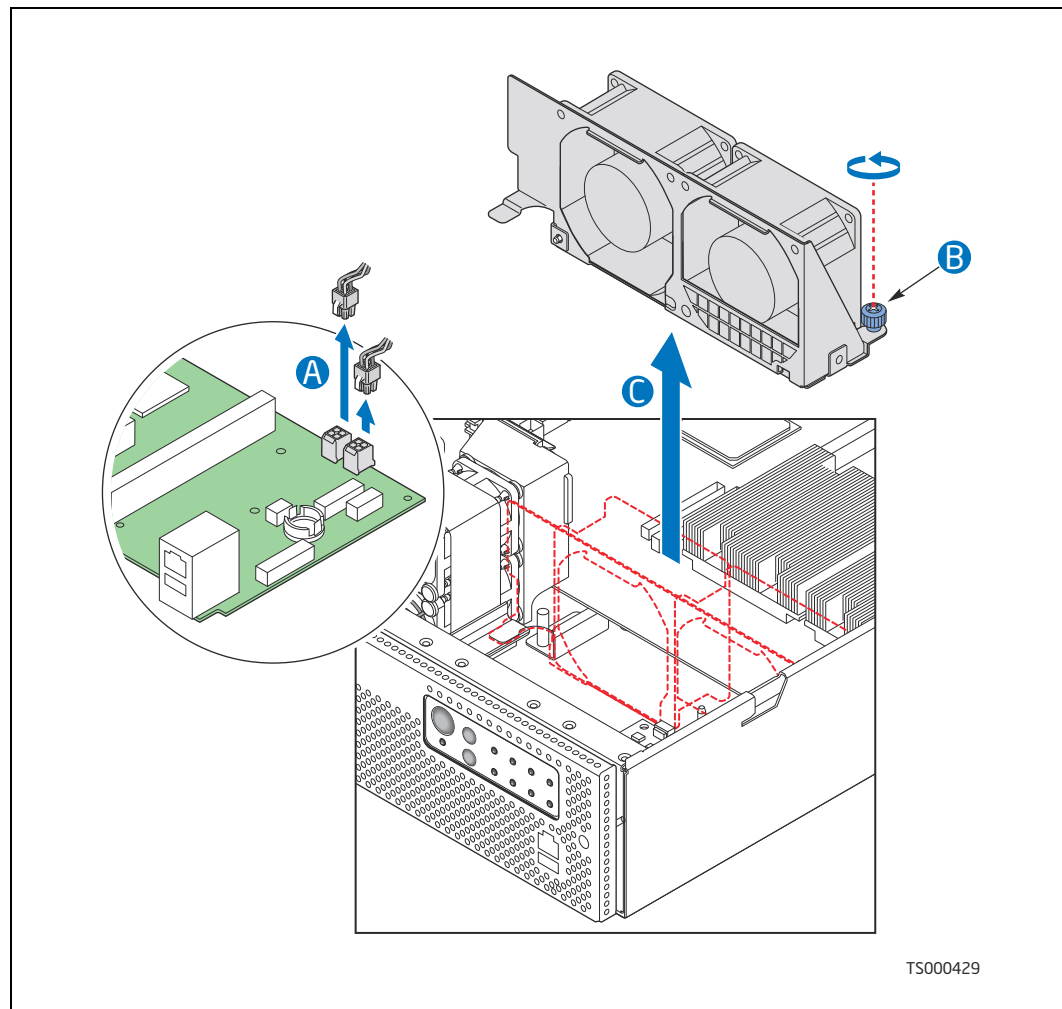
Figure 55. PCI Fan and CPU Fan Assemblies



5.2.1 Removing the CPU Fan Assembly

1. Remove the chassis top cover. For instructions, see [Section 3.2.3, “Removing the Chassis Cover”](#) on page 26.
2. Remove the processor air duct. For instructions, see [Section 3.2.5, “Removing the Processor Air Duct”](#) on page 28.
3. Unplug the CPU fan assembly power cables from the front panel board. (Figure 56, “A”)
4. Loosen the blue thumbscrew fastener on the CPU fan assembly bracket. (“B”)
5. Lift the fan assembly from the chassis. (“C”)

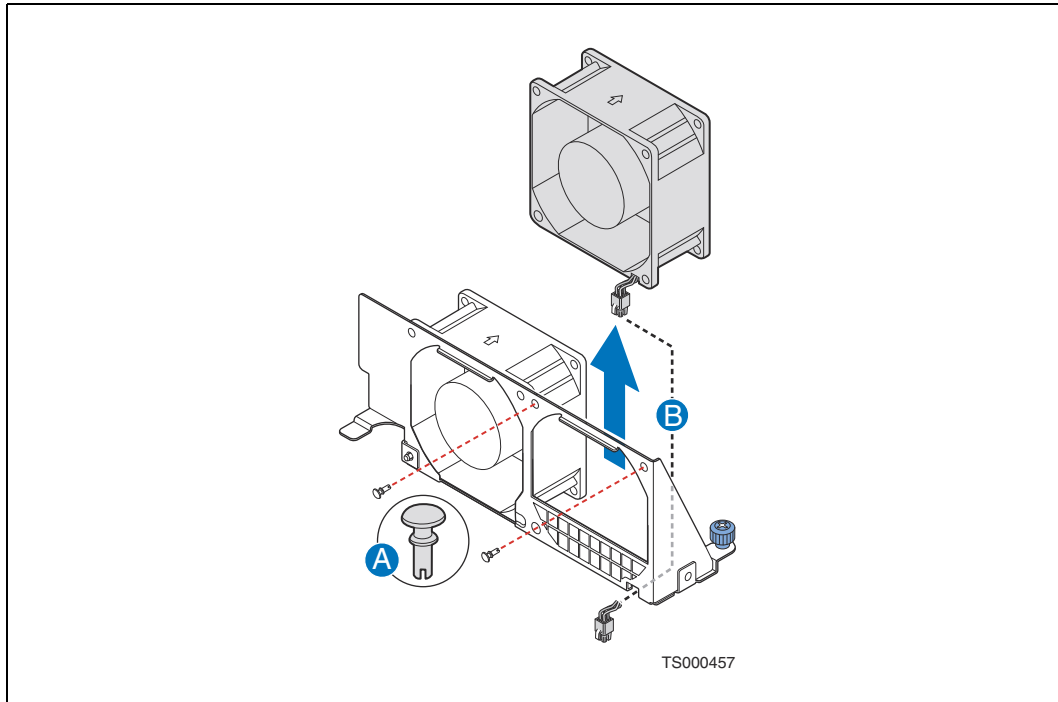
Figure 56. Removing the CPU Fan Assemblies



5.2.2 Replacing the CPU Fans in the Bracket

1. Remove the rivets connecting the fans to the bracket. ("A")
2. Lift the fans from the bracket. ("B")

Figure 57. Removing the CPU Fans from the Bracket

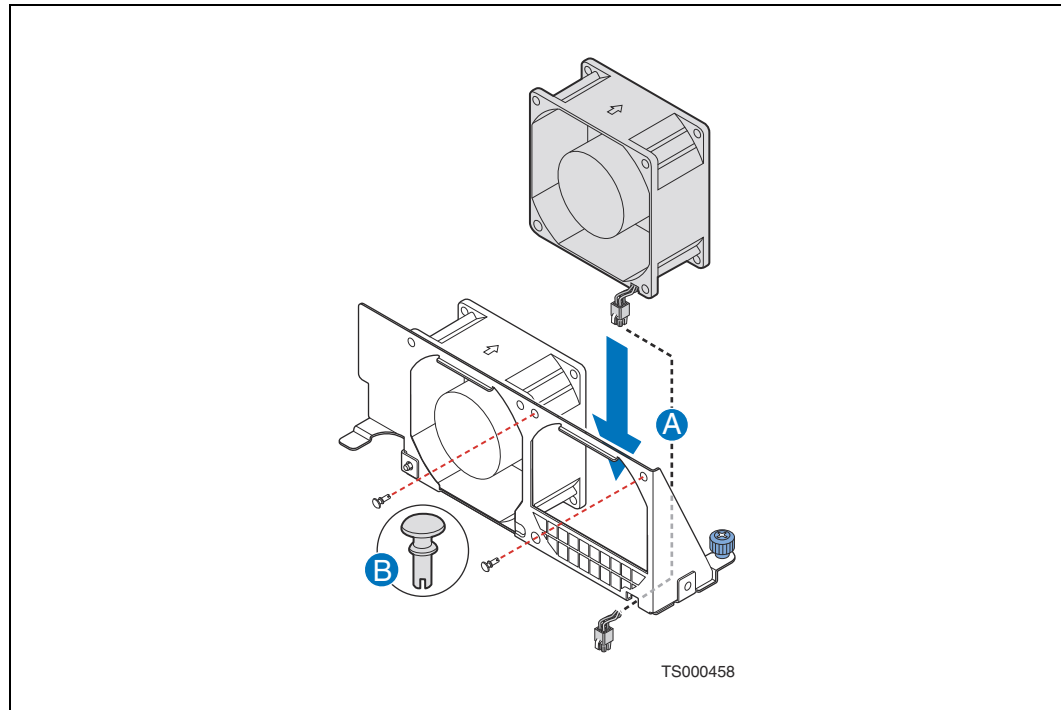


3. Place the new fans into the fan assembly bracket with the airflow arrows or the labels if there are no airflow labels, pointing toward the rear of the chassis.

Note: It is important to insert the fans in the correct direction. The air must flow from the front of the chassis to the back.

4. Route the fan power cable through the cut-out on the bottom of the bracket and bring it to the front corner opening. (Figure 58, "A")
5. Fasten each fan to the bracket with two rivets. ("B")

Figure 58. Installing New Fans into the Bracket



5.2.3 Installing the CPU Fan Assembly

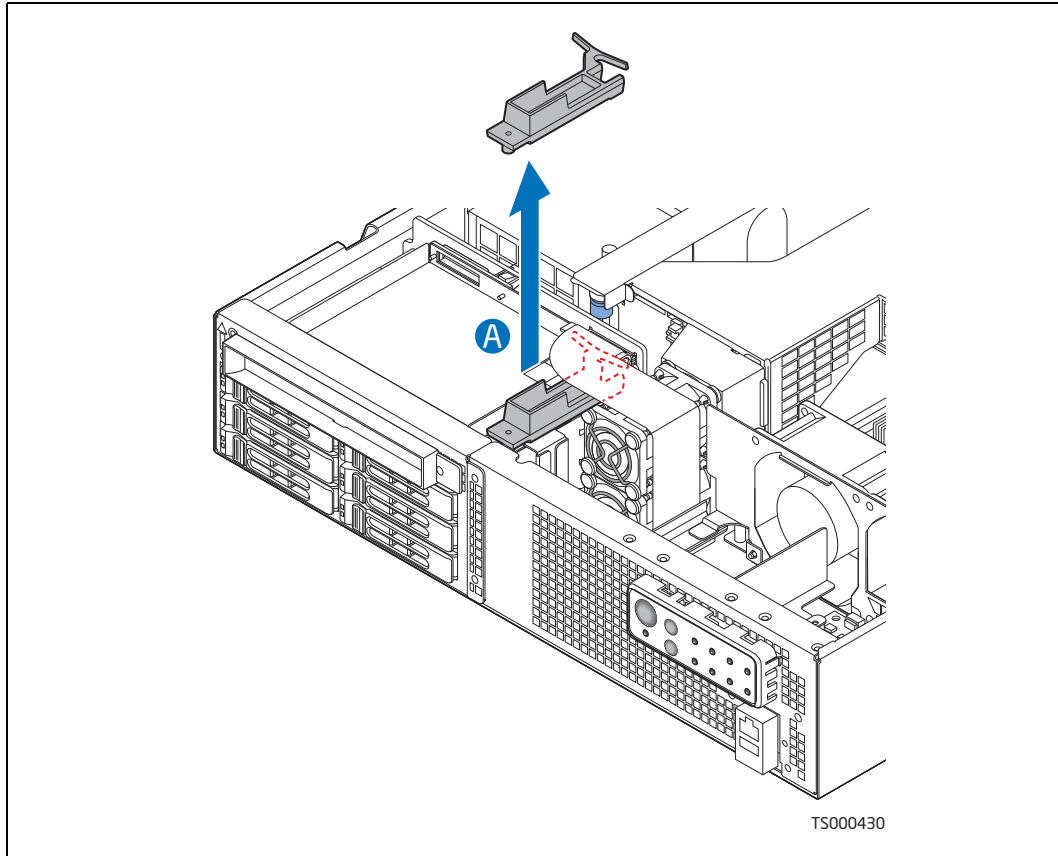
1. Position the fan assembly bracket in the chassis. (See Figure 56.)
2. Tighten the blue thumbscrew to secure the fan bracket in the chassis. ("B")
3. Plug the fan power cables back into the SFP board connectors. See "F" on Figure 35, "System Cable Routing" on page 53 for the location of these connectors:
 - Connect the left fan to connector J7A2 on the SFP board
 - Connect the right cable to connector J7A1 on the SFP board
4. If this is the last task you are performing, replace the processor air duct and the chassis top cover. Reconnect all the external devices and plug in the power cord(s).

5.2.4 Removing the PCI Fan Assembly

Before the PCI fan assembly can be removed from the chassis, the chassis cover must be removed and the flex cable that runs across the fan bracket must be disconnected.

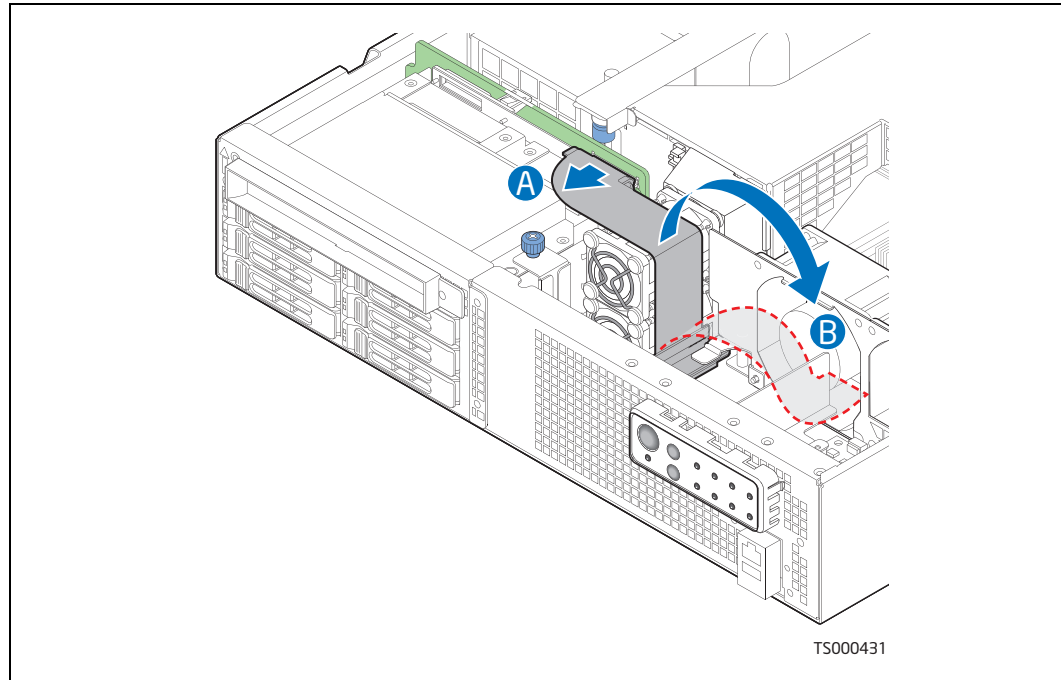
1. Remove the flex cable support bracket. (Figure 59, "A")

Figure 59. Removing the Flex Cable Support Bracket



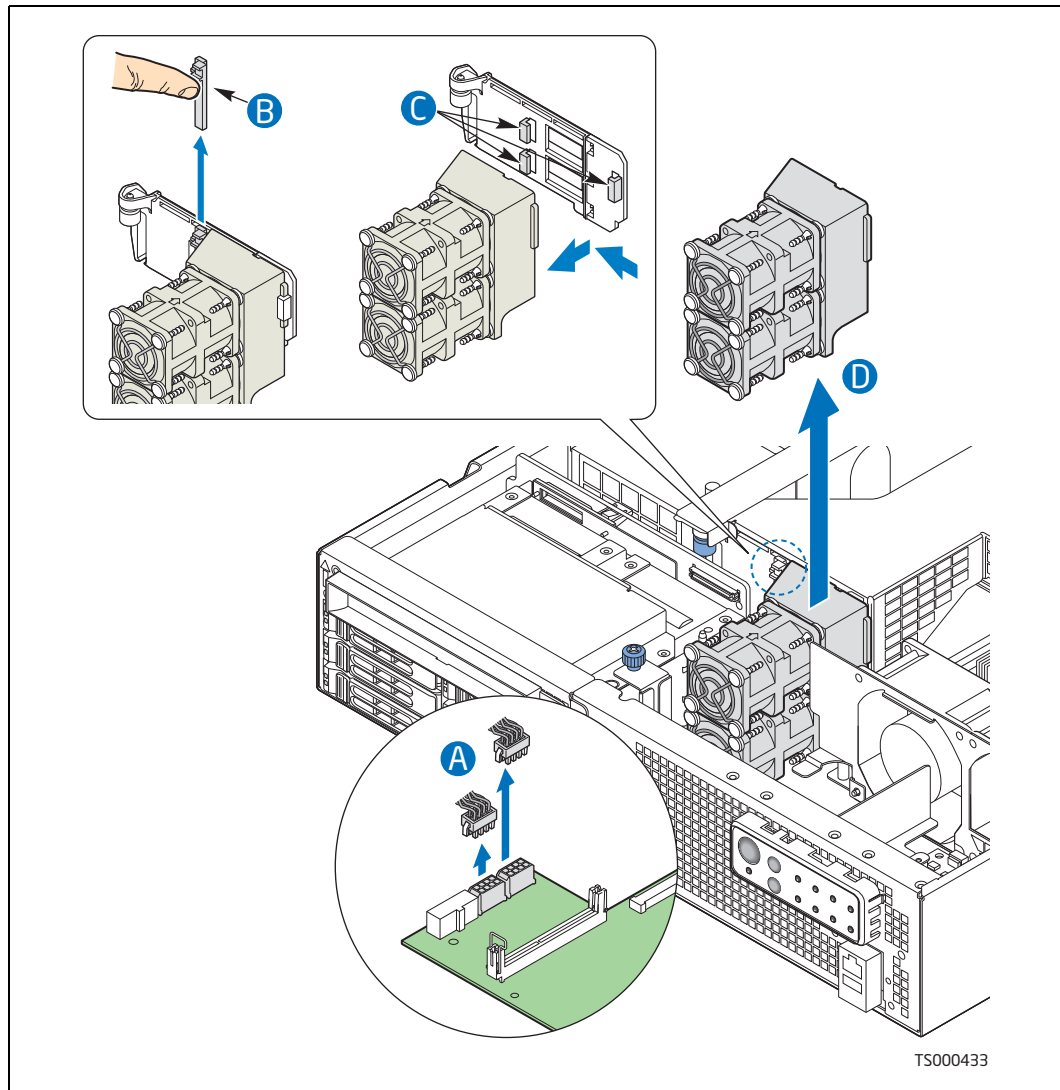
2. Disconnect the flex cable from the SAS backplane board and lift the cable from the PCI fan assembly. (Figure 60, "A" and "B")

Figure 60. Removing the Flex Cable from over the PCI Fan Assembly



3. Disconnect the PCI fan assembly power cables from the SAS front panel (SFP) board. (Figure 61, "A")
4. Pull up on the locking pin for the PCI fan assembly to remove it. ("B")
5. Slide the fan assembly to the left to disengage the hooks. ("C")
6. Lift the fan assembly. ("D")

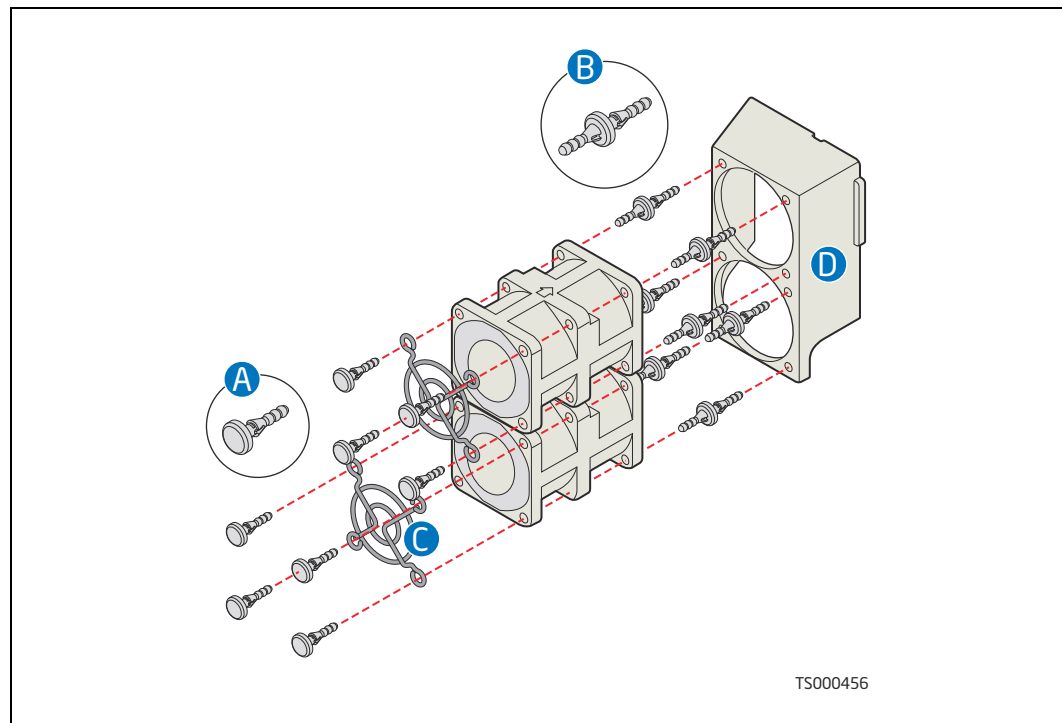
Figure 61. Removing the PCI Fan Assembly



5.2.5 Replacing the PCI Fans in the Fan Bracket

1. Remove the four single-ended rubber bumpers that connect the finger-guard to the failed fan. ("A")
2. Remove the four double-ended rubber bumpers ("B") that connect the fan to the bracket. ("D")
3. Set the the new fan against the bracket with the airflow arrows pointing toward the bracket and with the power cables extending to the right (cable is not shown). (Figure 62, "A")
4. Fasten each fan to the bracket with four double-ended rubber bumpers. ("B")
5. Fasten the finger-guard ("C") to each fan with four single-ended rubber bumpers ("A")
6. Use the next set of instructions to install the fan assembly.

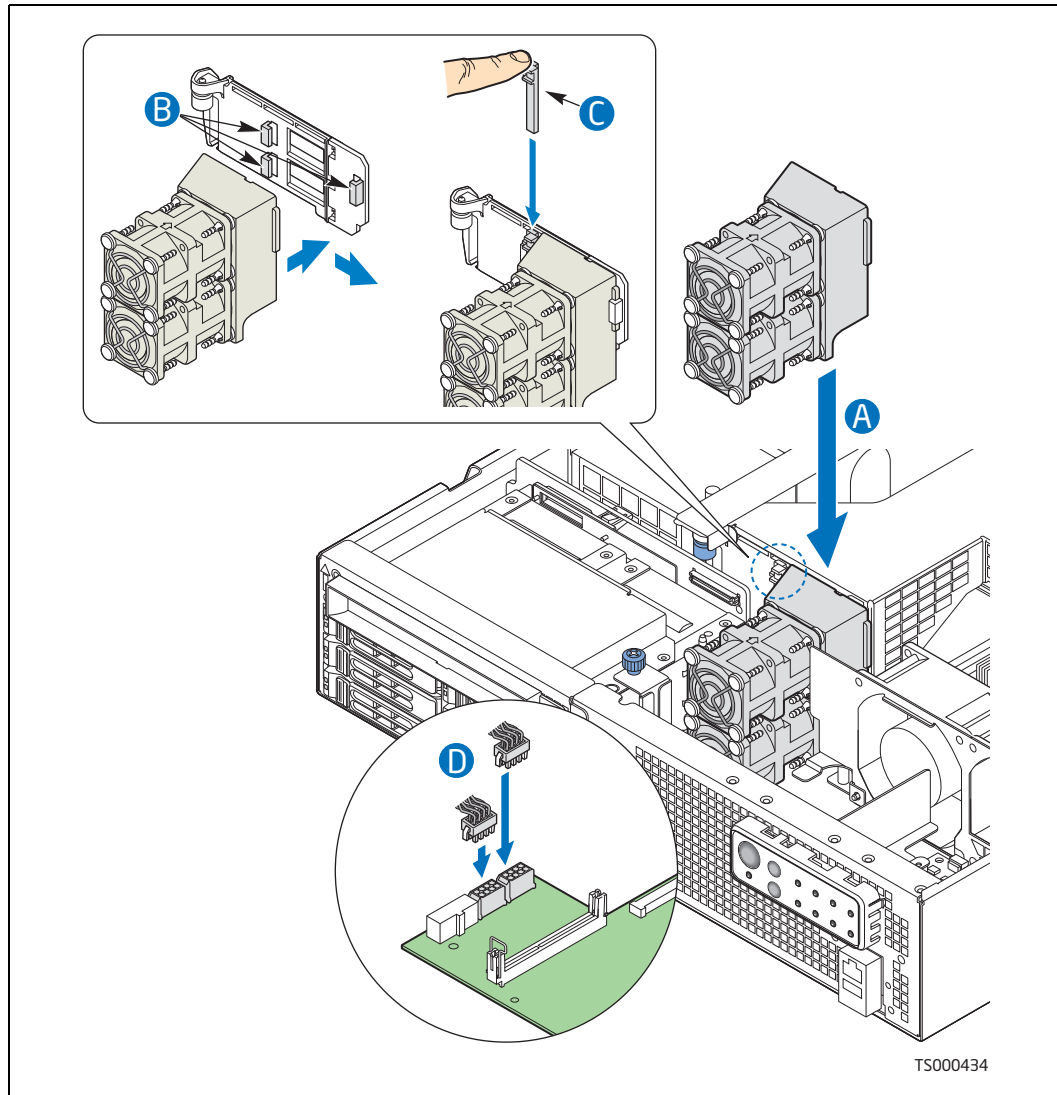
Figure 62. Installing the PCI Fan into the Bracket



5.2.6 Installing the Fan Assembly

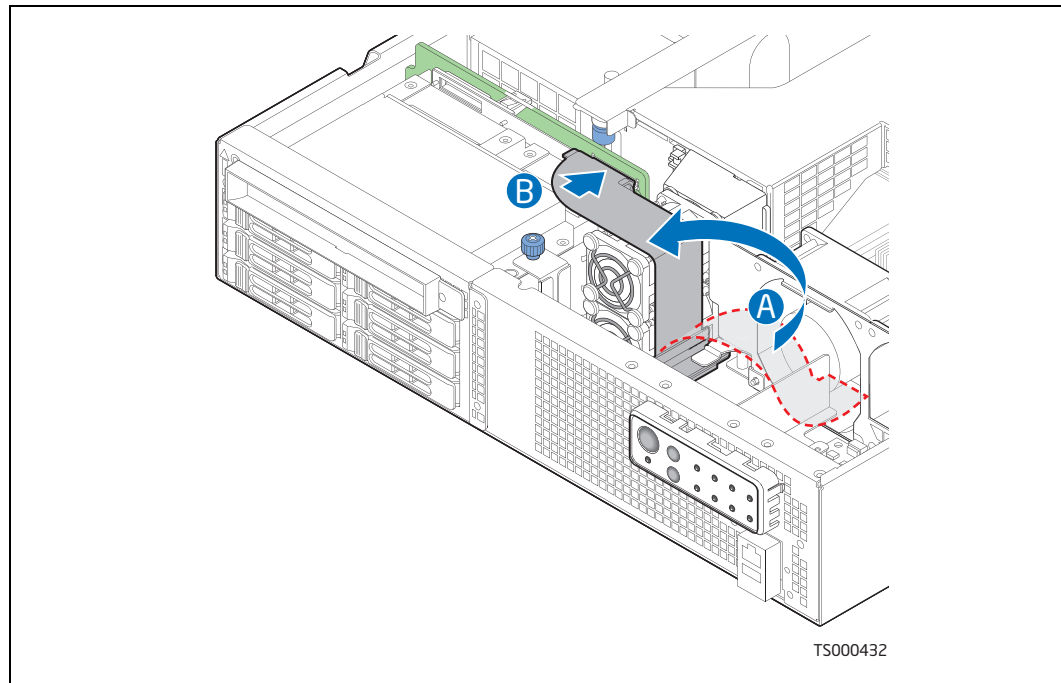
1. Set the fan assembly into the chassis. (Figure 64, "A")
2. Push the fan assembly back and slide it right to engage the hooks. ("B")
3. Insert the locking pin. ("C")
4. Plug the PCI fan power cables into the connectors on the SFP board. ("D")
 - Connect the bottom fan to connector J1C1 on the SFP board
 - Connect the top cable to connector J1D1 on the SFP board

Figure 63. Installing the PCI Fan Assembly



5. Lay the flex cable over the PCI fan assembly. (Figure 64, "A")
6. Connect the flex cable to connector J5A1 on the SAS backplane board. ("B")
7. Install the flex cable support bracket.
8. If this is the last task you are performing, replace the chassis top cover. Reconnect all the external devices and plug in the power cord(s).

Figure 64. Connecting the Flex Cable to the Backplane Board



5.3 Replacing the TAM Board

The Telco Alarms Manager (TAM) board provides front panel LEDs, power controls, and a cable to relay alarm information to the back of the system.

To replace the TAM board, the following components must be removed:

- Chassis top cover
- Processor air duct
- All cables connected to on the TAM board

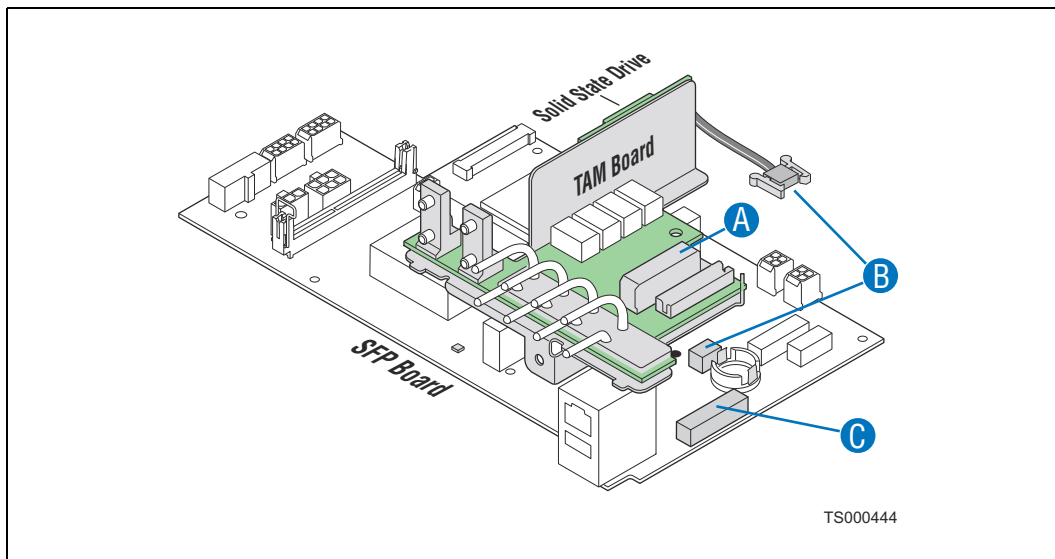
Caution: Before replacing any of the boards or components in the TIGH2U Server, you must first take the server out of service, turn off all peripheral devices connected to the system, turn off the system by pressing the power button, and unplug the power cord(s) from the system or wall outlet.

When handling the TAM board, observe normal safety and ESD precautions. (See [Appendix A, "Safety Information"](#) for more information.)

5.3.1 Removing the TAM Board

1. Remove the chassis cover. For instructions, see [Section 3.2.3, “Removing the Chassis Cover”](#) on page 26.
2. Remove the processor air duct. For instructions, see [Section 3.2.5, “Removing the Processor Air Duct”](#) on page 28.
3. Disconnect the TAM cable. (“A”)
4. Disconnect the FPIO cable. (“C”)
5. Disconnect the SMART eUSB SDD cable if the solid state drive is installed. (“B”)

Figure 65. Cable Connections on TAM Board

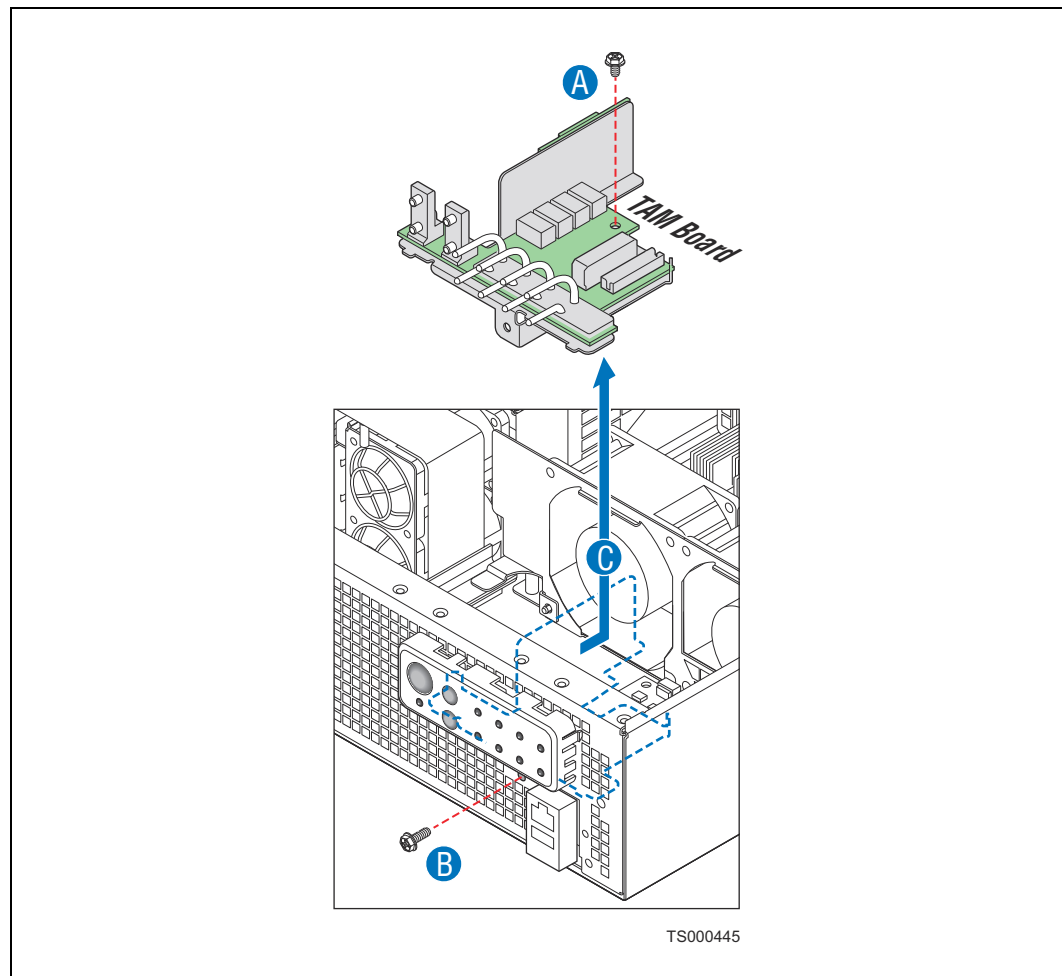


Item	Description	Item	Description
A	TAM cable	C	FPIO cable
B	SMART Embedded USB Solid-State Drive cable		

Note: If you will be re-installing the same TAM board instead of replacing it, skip the following step. You do not need to remove the Solid State Drive.

6. Remove the SMART Embedded USB Solid-State Drive if it is installed. For instructions, see [Section 4.5, "Installing an Embedded USB Solid-State Drive" on page 62.](#)
7. Remove the screw at the top rear of the TAM board. ("A")
8. Remove the screw at the front of the chassis, below the control panel. ("B")
9. Gently work the TAM board toward the rear of the chassis to disengage the LED light pipe assembly from behind the front control panel, then lift the TAM board from the chassis. ("C")

Figure 66. Removing TAM Board

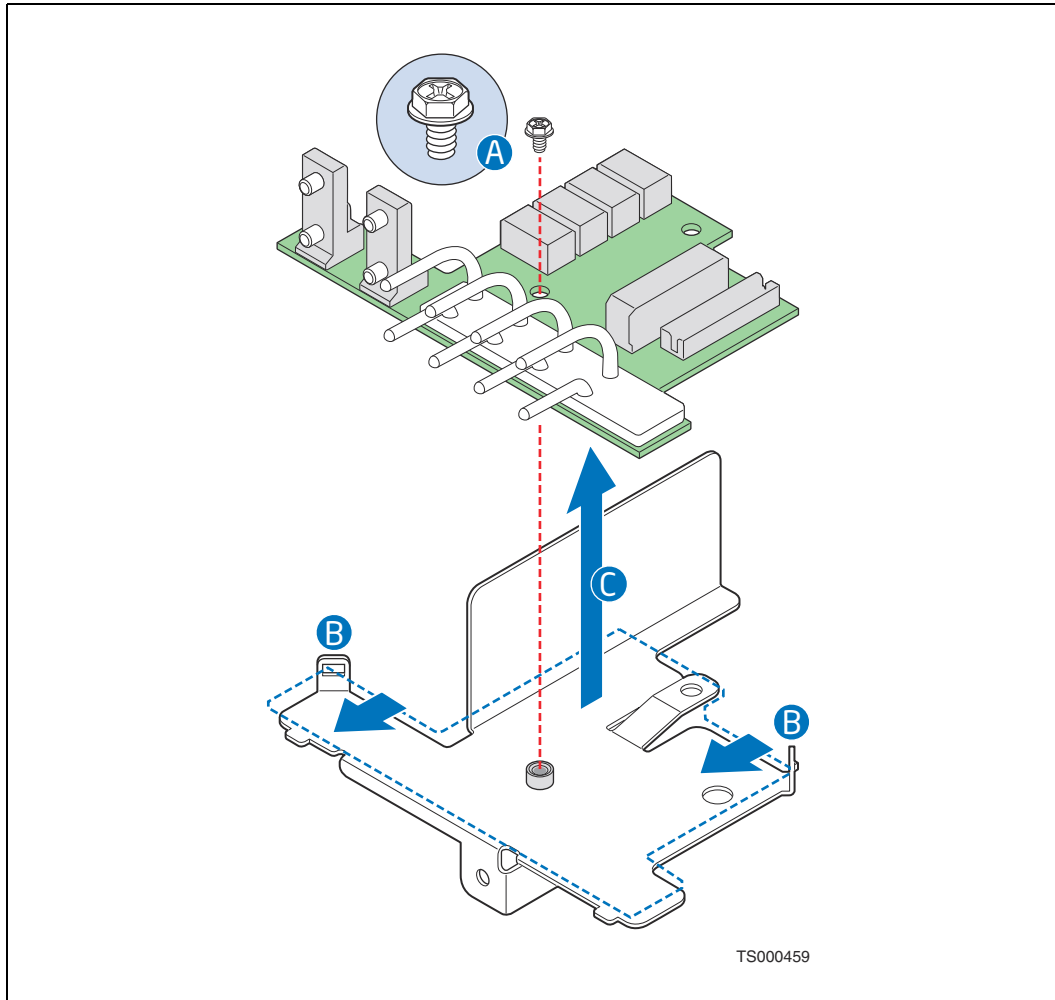


Note: If you are following these steps as directed by another procedure and are not installing a new TAM board, disregard steps 10 - 12 and return to your original procedure.

10. Remove the screw at the top front of the TAM board. ("A")

11. Slide the TAM board slightly forward ("B"), then lift it from the bracket. ("C")

Figure 67. Removing TAM Board from Bracket

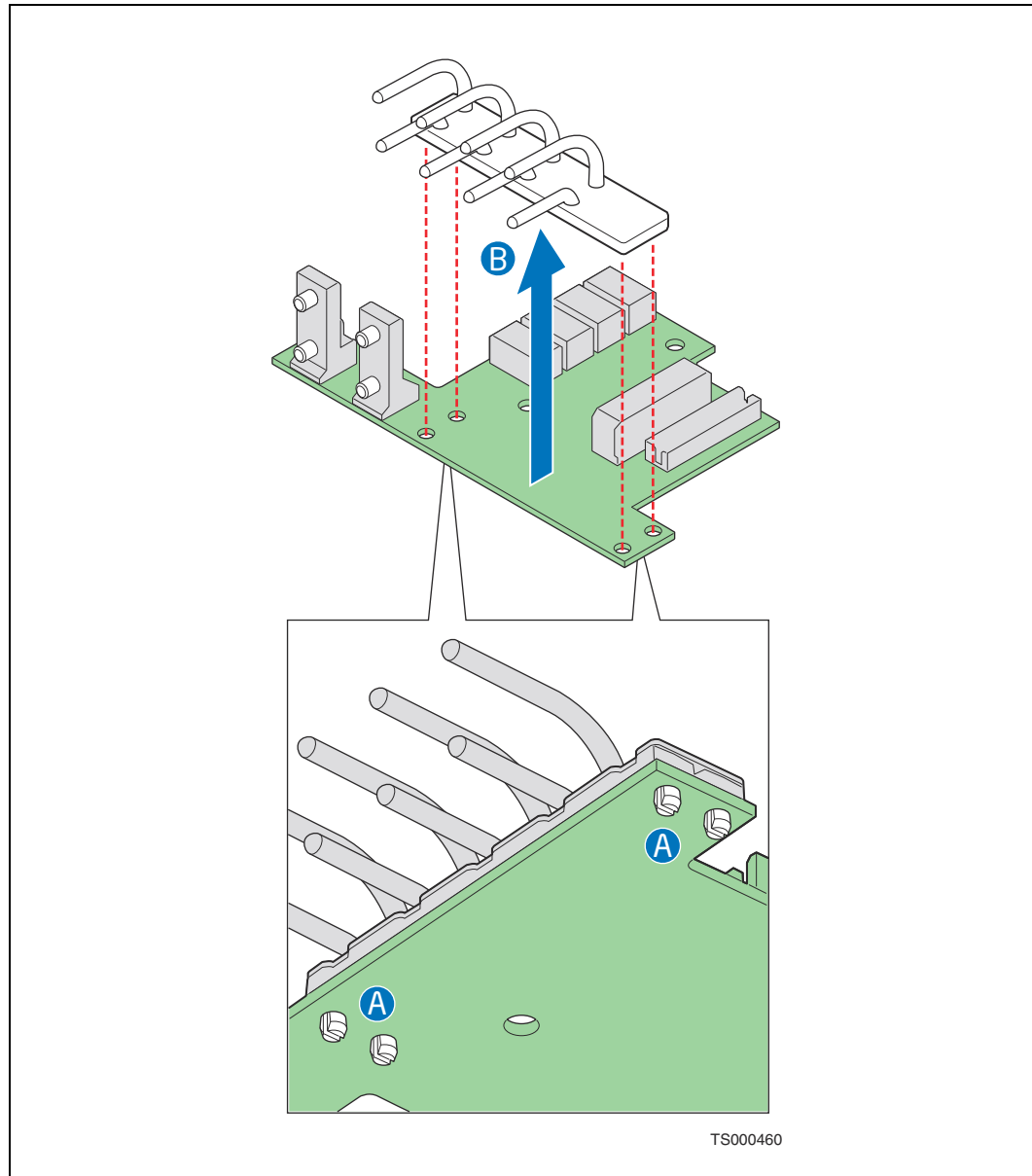


12. See the sections that follow to remove the LED light pipe assembly and to re-install the replacement TAM board.

5.3.2 Removing the LED Light Pipe Assembly

1. Note the position of the light pipe assembly so that you will be able to correctly position it (or a replacement) on the new TAM board.
The light pipes extend outward from the TAM board to the front control panel.
2. Remove the light pipe assembly by gently pressing the four plastic clips from the under-side of the TAM board until the bottom of the clips are flush with the bottom of the TAM board. ("A")
3. Gently ease the light pipe assembly from the TAM board. ("B")

Figure 68. Removing LED Light Pipe Assembly

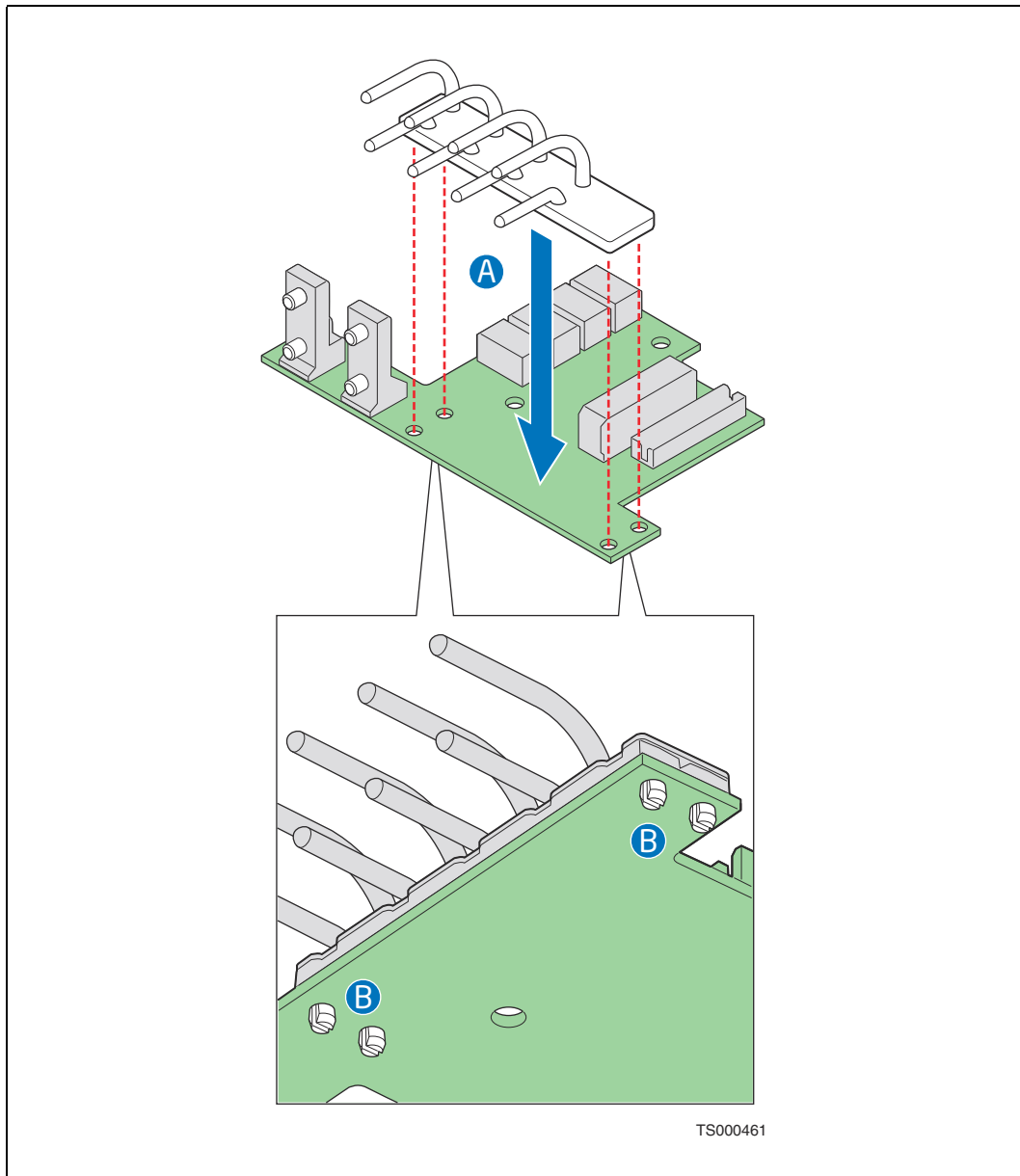


5.3.3 Installing the TAM Board

Note: If you are following these steps as directed by another procedure and are not installing a new TAM board, first install a SMART Embedded USB Solid-State Drive if necessary, then begin with step 4 below. For instructions about installing the SMART eUSB Solid-State Drive, see [Section 4.5, “Installing an Embedded USB Solid-State Drive”](#) on [page 62](#).

1. Insert the four plastic clips on the light pipe assembly into the matching holes in the new TAM board. Insert the clips gently and evenly; do not insert one clip fully without first partially pressing the others into place. (“A”, “B”)

Figure 69. Removing LED Light Pipe Assembly



2. Set the replacement TAM board onto the metal bracket.
3. Insert a screw at the front of the TAM board, right behind the light pipe assembly.
4. Set the TAM board assembly into the chassis, carefully inserting the light pipes through the corresponding holes at the front of the chassis.
5. Insert the screws at the top rear of the TAM board and at the front of the chassis.
6. Connect the cables. See [Figure 65 on page 84](#):
 - Connect the TAM cable to connector J3. Make sure the red stripe faces the front of the chassis. The other end of this cable is attached to the SFP board.
 - Connect the alarm cable to the left of the TAM cable. Make sure the red stripe faces the back of the chassis. The other end of this cable is attached at the back of the chassis.
 - Connect the eUSB SSD cable if the solid-state drive is installed.
7. Install the processor air duct. For instructions, see [Section 3.2.6, “Installing the Processor Air Duct” on page 29](#).
8. Install the chassis cover. For instructions, see [Section 3.2.4, “Installing the Chassis Cover” on page 27](#).

5.4 Replacing the SAS Front Panel Board

The SAS Front Panel (SFP) board adds the power interconnect for the server board, the USB2 and Serial B interface, SAS support, and provides support for hardware RAID 0, 1, 10, and 5, and software RAID 1, 1, and 10. This board is located on the floor of the chassis between the front panel and the two 80 mm fans.

To replace the SFP board, the following components must be removed:

- Chassis top cover
- Processor air duct
- All cables connected to the SFP board
- PCI riser card assembly
- CPU fan assembly
- Telco Alarms Manager (TAM) board

Caution: Before replacing any of the boards or components in the TIGH2U Server, you must first take the server out of service, turn off all peripheral devices connected to the system, turn off the system by pressing the power button, and unplug the power cord(s) from the system or wall outlet.

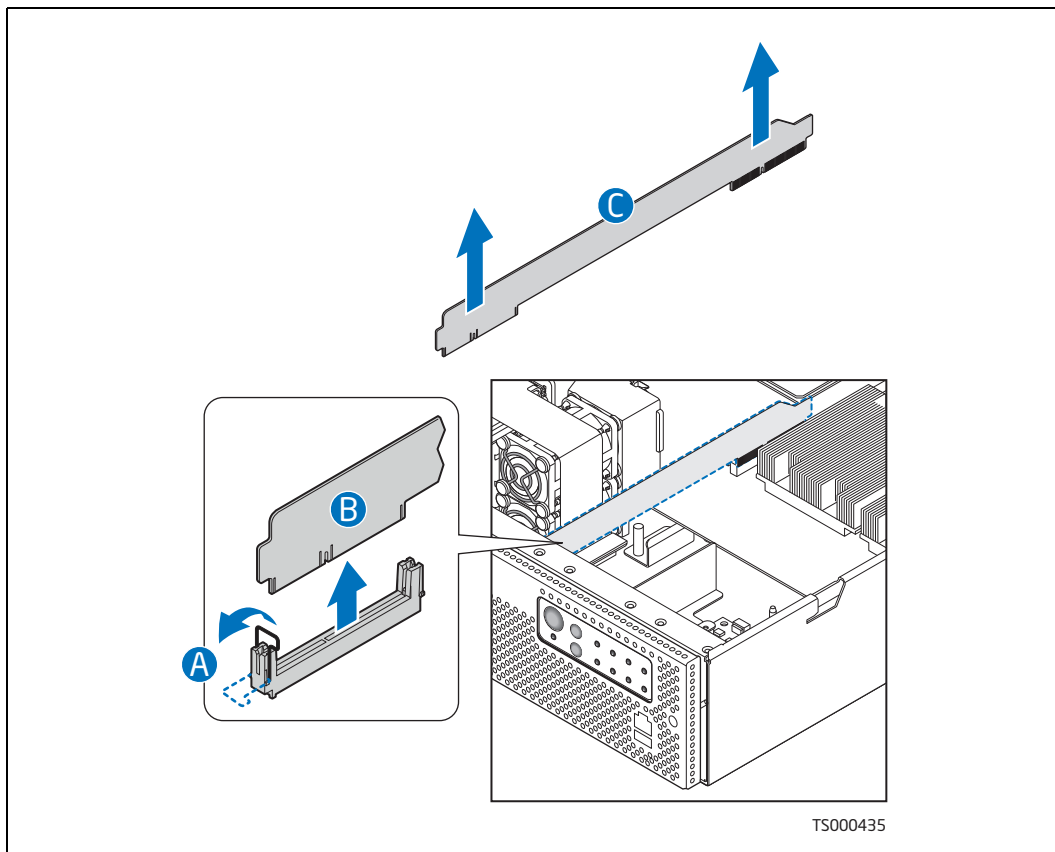
When handling the SFP board, observe normal safety and ESD precautions. (See [Appendix A, “Safety Information”](#) for more information.)

5.4.1 Removing the Front Panel Board

1. Remove the chassis cover. For instructions, see [Section 3.2.3, “Removing the Chassis Cover” on page 26](#).
2. Remove the processor air duct. For instructions, see [Section 3.2.5, “Removing the Processor Air Duct” on page 28](#).
3. Remove the front bezel. For instructions, see [Section 3.2.1, “Removing the Front Bezel” on page 25](#).
4. Remove the SMART eUSB solid state drive if it is installed. [Section 4.5, “Installing an Embedded USB Solid-State Drive” on page 62](#).

5. Remove the TAM board. For instructions, see [Section 5.3.1, “Removing the TAM Board” on page 84](#).
6. Remove the PCI fan assembly. For instructions, see [Section 5.2.4, “Removing the PCI Fan Assembly” on page 78](#).
7. Remove the CPU fan assembly. For instructions, see [Section 5.2.1, “Removing the CPU Fan Assembly” on page 75](#).
8. Disconnect all of the cables connected to the SFP board:
 - SAS backplane power cable
 - All four fan power cables
 - Two power input cables from the power distribution board
 - Flex cable
 - Intel® RAID Smart Battery cable, if the smart battery is installed
 - Front serial port cable
 Use [Section 35, “System Cable Routing” on page 53](#) as a reference for the connectors.
9. Open the bridge board connector latches. ([Figure 70, “A”](#))
10. Lift the bridge board from the chassis (“B” and “C”)

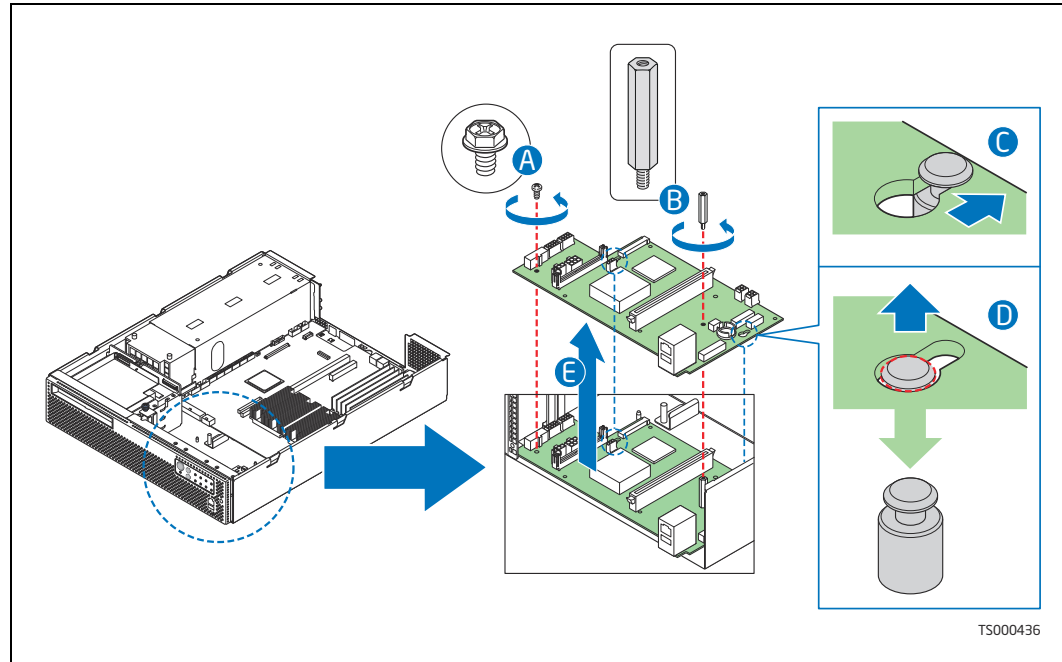
Figure 70. Removing the Bridge Board



11. Remove the SFP board screw ([Figure 71, “A”](#)).
12. Remove the threaded TAM board standoff. (“B”)

13. Push the SFP board toward the rear of the chassis to disengage the placement peg. ("C")
14. Pull the SFP board up over the placement peg and lift it from the chassis. ("D", "E")
15. Remove the Intel® RAID Activation Key and DDR2 mini-DIMM if they are installed and set them aside for re-installation on the replacement SFP board.

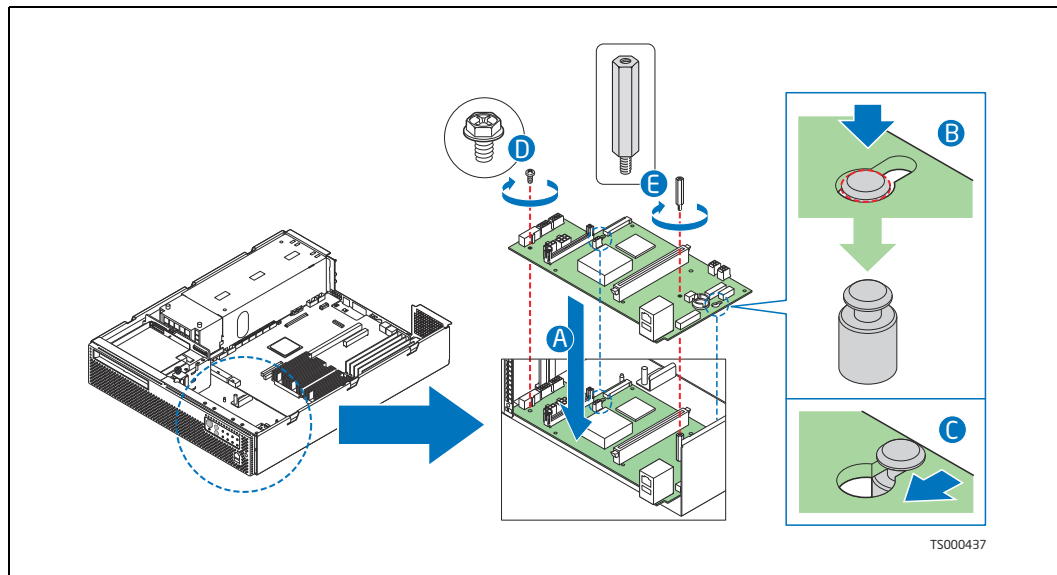
Figure 71. Removing the Front Panel Board



5.4.2 Installing the Front Panel Board

1. Lower the replacement front panel board into the chassis. (Figure 72, "A")
2. While holding the rear edge of the board, push the board forward, sliding the serial port connector through the matching cutouts in the front panel of the chassis.
3. Lower the rear of the board into position, fitting the board over the placement peg. ("B")
4. Push the board forward, locking the board onto the placement peg. ("C")
5. Screw the board into place. ("D")
6. Screw in the TAM board standoff. ("E")

Figure 72. Installing the Front Panel Board



7. (Optional) Install the hardware RAID components, see [Section 4.4, "Installing Remote Management Module 2 Components" on page 61](#) components that you removed from the old front panel board:
8. (Optional) Install the SMART eUSB SSD, see [Section 4.5, "Installing an Embedded USB Solid-State Drive" on page 62](#).
9. Install the TAM board. For instructions, see [Section 5.3.3, "Installing the TAM Board" on page 88](#).
10. Install the PCI fan assembly. For instructions, see [Section 5.2.6, "Installing the Fan Assembly" on page 82](#).
11. Install the CPU fan assembly. For instructions, see [Section 5.2.3, "Installing the CPU Fan Assembly" on page 77](#).
12. Connect the power cables.
13. Install the bridge board.
14. Connect the Intel® RAID Smart Battery. For instructions, see [Section 4.6.2, "Installing the RAID Smart Battery" on page 67](#).
15. If this is the last task you are performing, replace the front bezel and the chassis top cover. Reconnect the external devices and plug in the power cord(s).

5.5 Replacing the Removable Drive Bay Assembly and the SAS Backplane Board

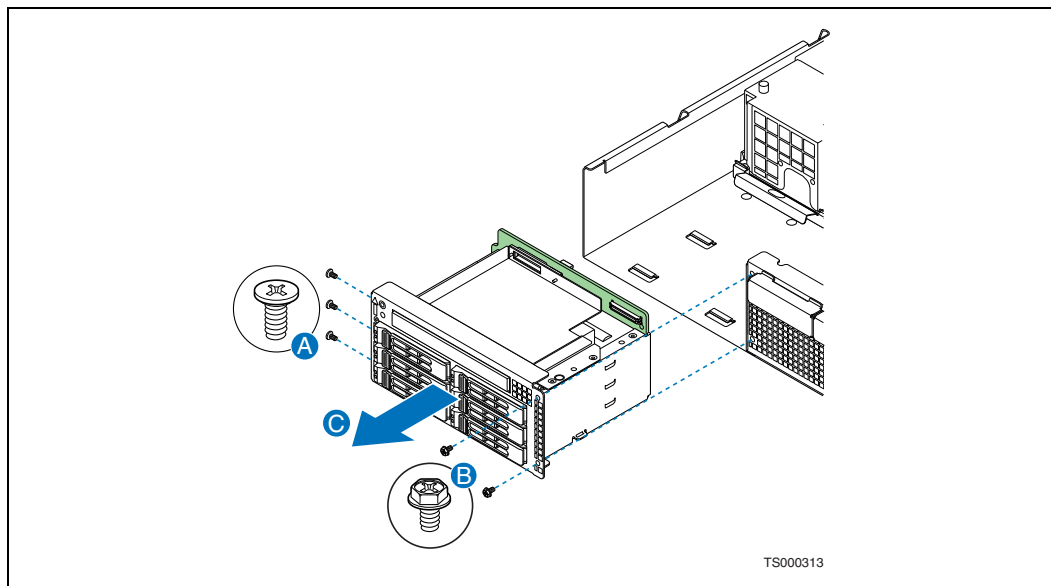
The drive bay assembly can be removed and placed in another server or swapped out for another assembly using the same HDDs. The drive bay assembly must be removed to replace the SAS backplane board or power distribution board (PDB) module.

Caution: Before replacing any of the boards or components in the TIGH2U Server, you must first take the server out of service, turn off all peripheral devices connected to the system, turn off the system by pressing the power button, and unplug the power cord(s) from the system or wall outlet.

5.5.1 Removing the Drive Bay Assembly

1. Remove the chassis cover. For instructions, see [Section 3.2.3, "Removing the Chassis Cover"](#) on [page 26](#).
2. Remove the front bezel. For instructions, see [Section 3.2.1, "Removing the Front Bezel"](#) on [page 25](#).
1. Disconnect the cables that are attached to the SAS backplane board at the rear of the drive bay assembly:
 - flex cable
 - power cable from the SFP board
 - IDE cable from the server board
2. Loosen the screw on the PCI fan assembly.
3. Lift the PCI fan assembly from position. It is not necessary to disconnect the fan cables.
4. Remove the three screws from the left side of the chassis and the two screws on the right side of the drive bay front panel. (Figure 73, "A", "B")
5. Pull the drive bay assembly from the chassis. ("C")

Figure 73. Removing the Drive Bay Assembly

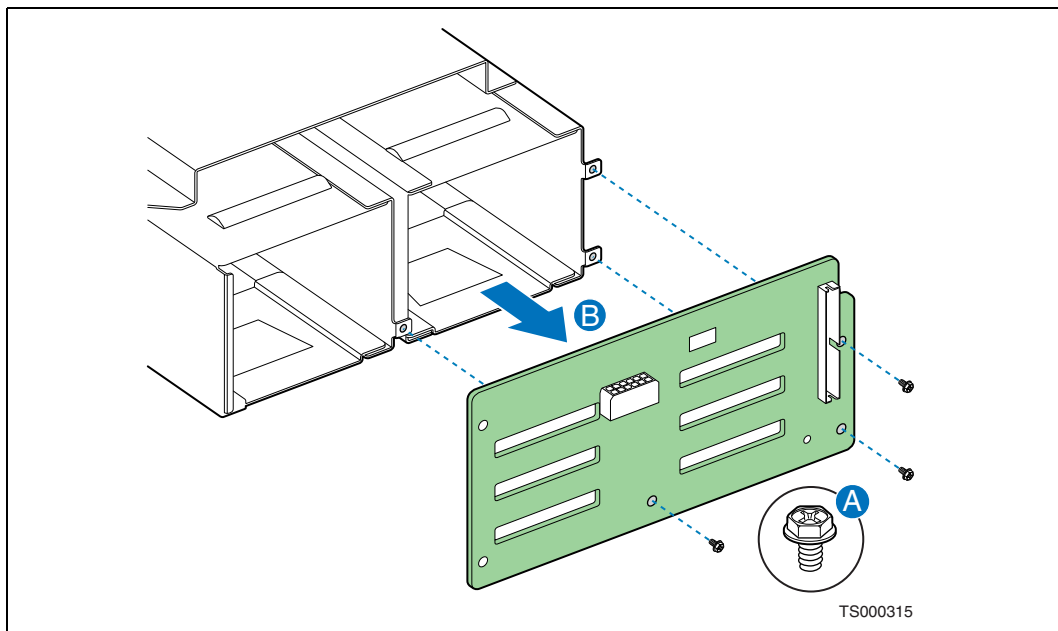


5.5.2 Removing the SAS Backplane Board from the Drive Bay Assembly

If you need to replace the SAS backplane board or use it on another drive bay assembly, follow these steps:

1. Detach all drives or filler blanks attached to the backplane board. For instructions, see [Table 3.3.1, "Installing or Replacing a Hard Drive" on page 30](#) and [Section 4.7.1, "Removing the Optical Device Filler Panel" on page 69](#).
2. Disconnect the IDE cable and the power cable from the backplane board.
3. Loosen the three screws that fasten the backplane board to the drive bay assembly. ([Figure 74, "A"](#))
4. Pull the backplane board from the rear of the drive bay assembly

Figure 74. Removing the SAS Backplane Board

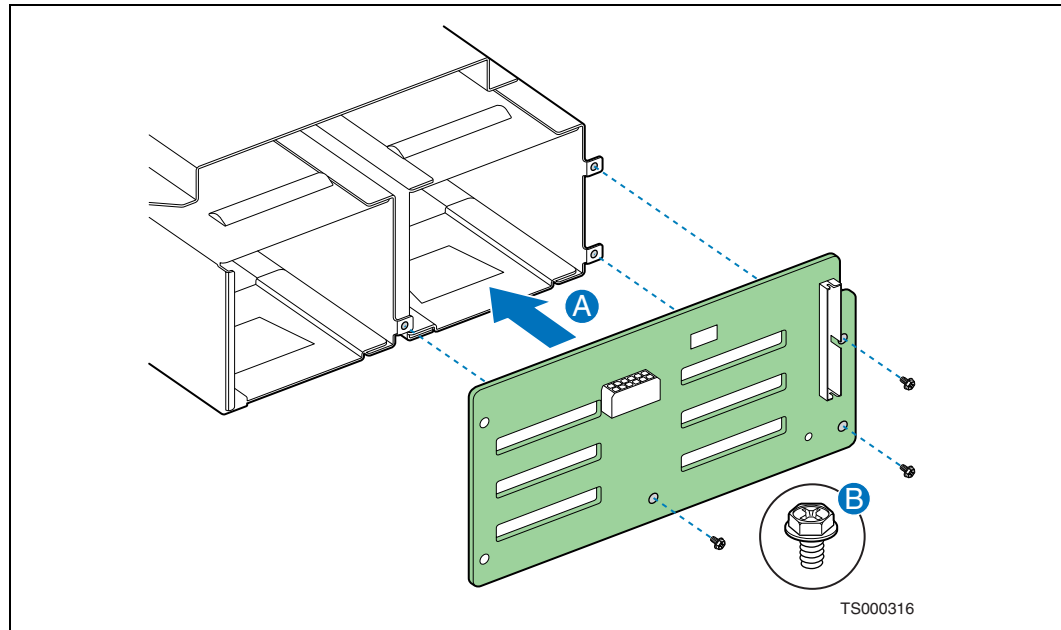


5.5.3 Installing a New SAS Backplane Board

To install a new backplane board, the drive bay assembly must be removed from the chassis and the old backplane board removed. For instructions, see [Table 5.5.1, “Removing the Drive Bay Assembly”](#) on page 93 and [Table 5.5.2, “Removing the SAS Backplane Board from the Drive Bay Assembly”](#) on page 94.

1. Line up the new backplane board with the back of the drive bay assembly. (Figure 75 “A”)
2. Fasten the backplane board to the drive bay assembly with three screws, as shown. (“B”)

Figure 75. Installing the SAS Backplane Board

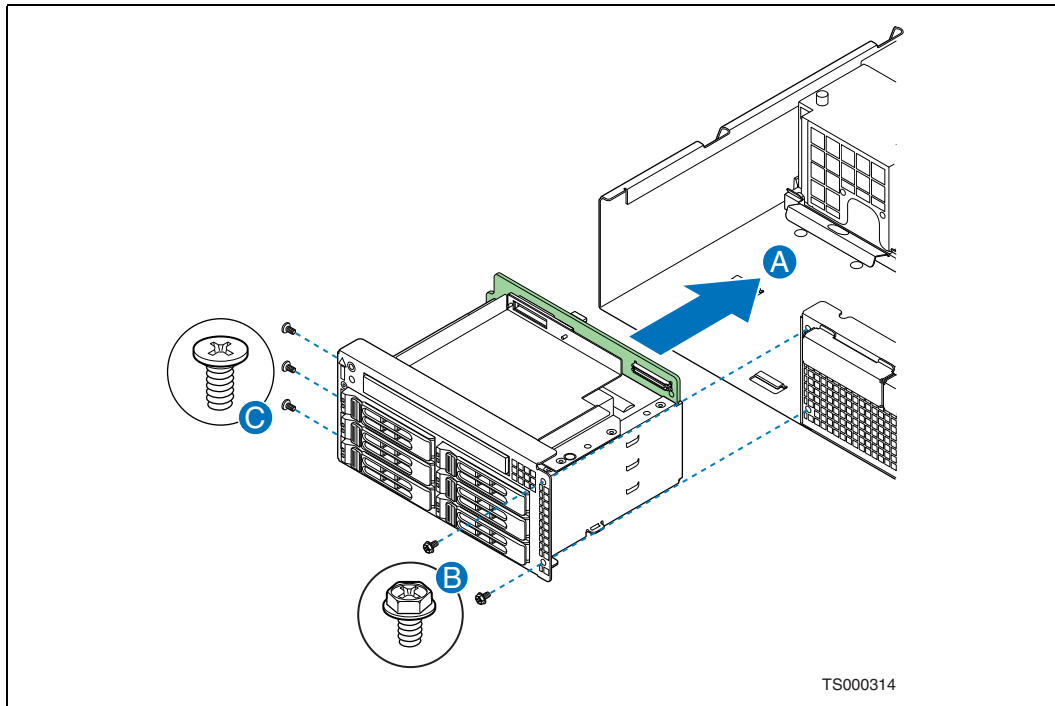


5.5.4 Installing the Drive Bay Assembly

Note: Once the SAS backplane is attached to the drive bay assembly, the HDDs and an optical device (or filler blanks if not all slots are used) can be installed into the drive bay assembly either before or after the assembly is installed in the chassis.

1. Connect the IDE cable and the power cable to the backplane board.
2. Insert the drive bay assembly into the chassis. (Figure 76, "A")
3. Secure the drive bay assembly to the chassis by fastening the screws on both sides. ("B")
4. Reconnect the SFP power cable to the backplane board.
5. Connect the IDE cable to the server board.
6. Install the PCI fan assembly. For instructions, see [Section 63, "Installing the PCI Fan Assembly" on page 82](#).

Figure 76. Installing the Drive Bay Assembly



7. If this is the last task you are performing, replace the front bezel and the chassis top cover. Reconnect all the external devices and plug in the power cord(s).

5.6 Replacing the Power Distribution Assembly

The power distribution board (PDB) routes power from the power supply to the rest of the server system through an integral wiring harness. The PDB is covered by a metal cage for safety, ventilation, and heat dissipation. It is this whole assembly that must be removed and replaced, not just the board.

Caution: Before replacing any of the boards or components in the TIGH2U Server, you must first take the server out of service, turn off all peripheral devices connected to the system, turn off the system by pressing the power button, and unplug the power cord(s) from the system or wall outlet.

When handling this board, observe normal safety and ESD precautions. (See [Appendix A, "Safety Information"](#) for more information.)

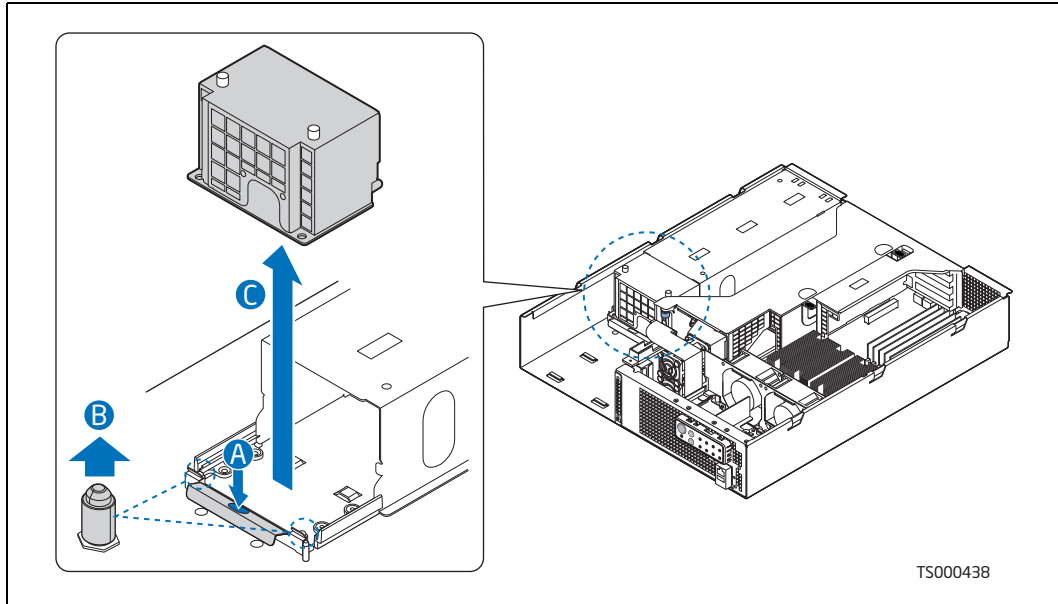
To safely remove the PDB, you must first remove the chassis top cover, the front panel bezel, and the drive bay assembly, which sits in front of the PDB module in the chassis.

5.6.1 Removing the Power Distribution Board

1. Remove the chassis cover. For instructions, see [Section 3.2.3, "Removing the Chassis Cover"](#) on page 26.
2. Remove the front bezel. For instructions, see [Section 3.2.1, "Removing the Front Bezel"](#) on page 25.
3. Remove the processor air duct. For instructions, see [Section 3.2.5, "Removing the Processor Air Duct"](#) on page 28.
4. Remove the drive bay assembly. For instructions, see [Section 5.5.1, "Removing the Drive Bay Assembly"](#) on page 93.
5. Remove the power supply module(s). For instructions, see [Section 3.3.2, "Replacing a Power Supply"](#) on page 32.
6. Remove the PCI fan assembly. For instructions, see [Section 5.2.4, "Removing the PCI Fan Assembly"](#) on page 78.
7. Remove the PCI riser card assembly. For instructions, see [Section 4.2.2, "Removing the PCI Riser Card Assembly"](#) on page 56.
8. Remove the CPU fan assembly. For instructions, see [Section 5.2.1, "Removing the CPU Fan Assembly"](#) on page 75.

9. Disconnect the five power cables from the server board and from the SFP board.
10. Press and hold down the metal clip at the base of the PDB assembly. (Figure 77, "A")
11. Pull the PDB assembly from the placement pegs. ("B").
12. Lift the PDB from the chassis ("C").

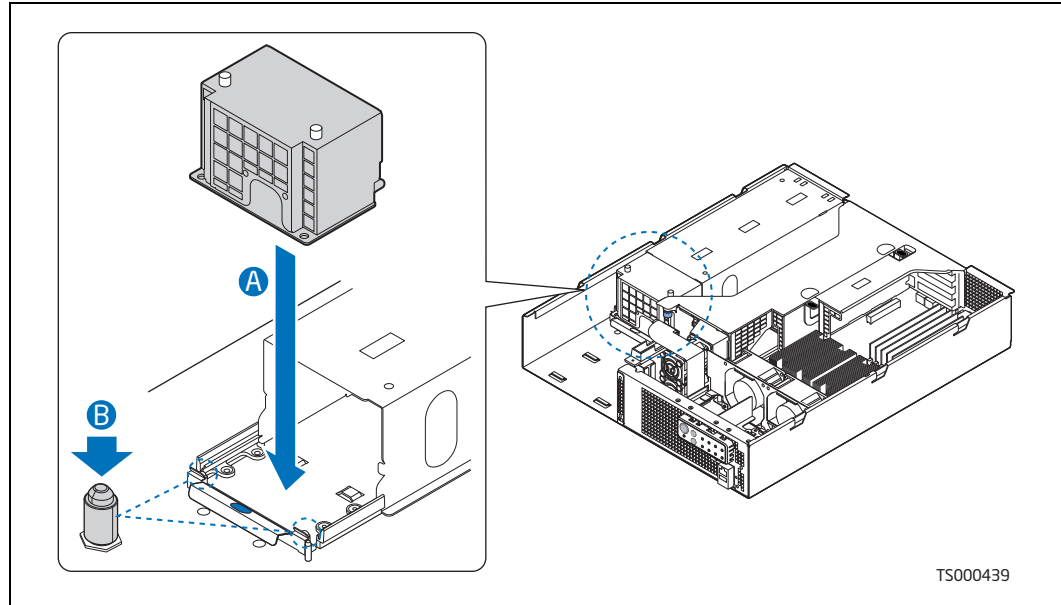
Figure 77. Removing the PDB



5.6.2 Installing the Power Distribution Board

1. Lower the replacement power distribution board (PDB) into place. (Figure 78, "A")
2. Make sure that the PDB is placed over the placement pegs and push down until it clicks into place. ("B")

Figure 78. Installing the PDB



3. Connect the five power supply connectors on the server board and the SFP board.
4. Install the drive bay assembly. For instructions, see [Section 5.5.4, "Installing the Drive Bay Assembly" on page 96](#).
5. Install the PCI riser card assembly. For instructions, see [Section 4.2.5, "Installing the PCI Riser Card Assembly" on page 59](#).
6. Install the PCI fan assembly. For instructions, see [Section 5.2.6, "Installing the Fan Assembly" on page 82](#).
7. Install the CPU fan assembly. For instructions, see [Section 5.2.3, "Installing the CPU Fan Assembly" on page 77](#).
8. Install the processor air duct. For instructions, see [Section 3.2.6, "Installing the Processor Air Duct" on page 29](#).
9. If this is the last task you are performing, replace the chassis top cover. For instructions, see [Section 3.2.4, "Installing the Chassis Cover" on page 27](#).

5.7 Replacing the Server Board

The Carrier Grade Server TIGH2U uses the Intel® Server Board T5000PAL. To replace the server board, the following components must be removed:

- Processor air duct
- CPU fan assembly
- PCI fan assembly
- PCI riser assembly and add-in cards
- Any I/O expansion module or Intel® Remote Management Module 2
- Cables connected to the board and the bridge board
- The HDD bay assembly

In addition, you may want to remove the following components on the board to re-use them on the replacement board if it isn't already populated:

- Heat sink(s)
- Processor(s)
- All DIMMs

Caution: Before replacing any of the TIGH2U Server boards or components, you must first take the server out of service, turn off all peripheral devices connected to the system, turn off the system by pressing the power button, and unplug the power cord(s) from the system or wall outlet.

When handling this board or any of the components on it, observe normal safety and ESD precautions. (See [Appendix A, "Safety Information"](#) for more information.)

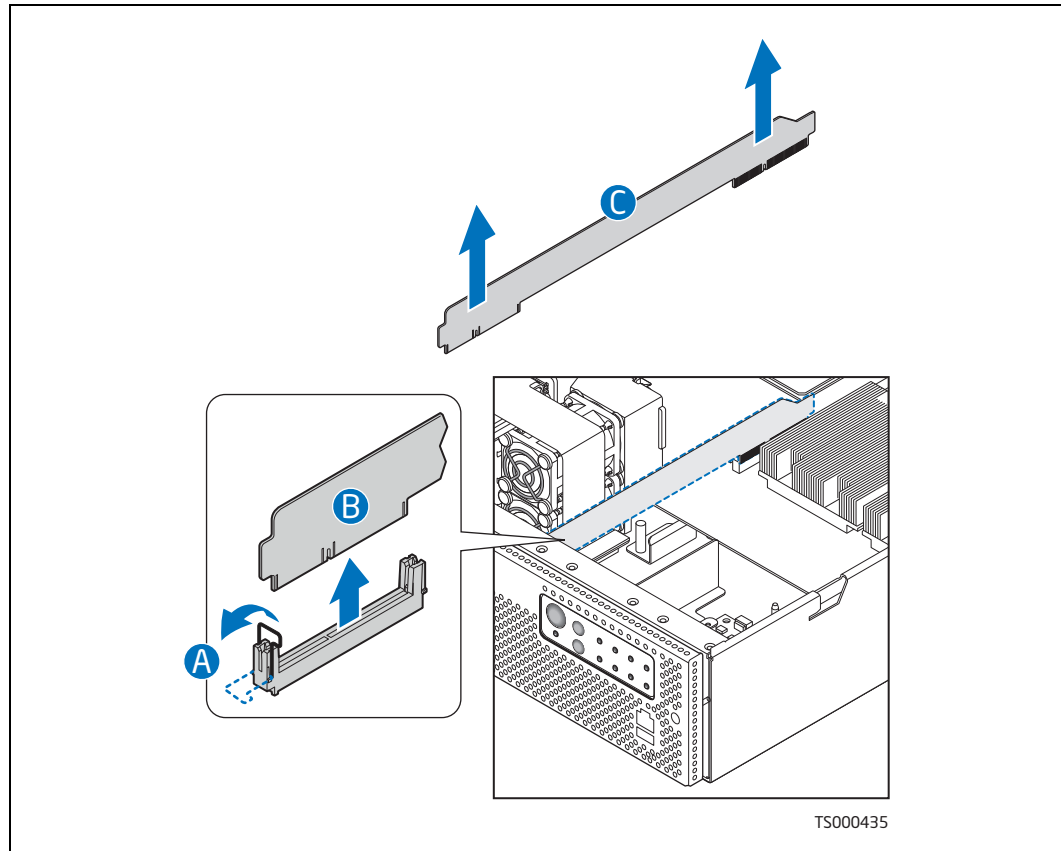
5.7.1 Removing the Server Board

To replace the server board, use the following instructions.

1. Remove the chassis cover. For instructions, see [Section 3.2.3, "Removing the Chassis Cover"](#) on [page 26](#).
2. Remove the processor air duct. For instructions, see [Section 3.2.5, "Removing the Processor Air Duct"](#) on [page 28](#).
3. Remove the PCI fan assembly. For instructions, see [Section 5.2.4, "Removing the PCI Fan Assembly"](#) on [page 78](#).
4. Remove the PCI riser assembly. For instructions, see [Section 4.2.2, "Removing the PCI Riser Card Assembly"](#) on [page 56](#).
5. Remove the CPU fan assembly. For instructions, see [Section 5.2.1, "Removing the CPU Fan Assembly"](#) on [page 75](#).
6. Remove the drive bay assembly. For instructions, see [Figure 73, "Removing the Drive Bay Assembly"](#) on [page 93](#).
7. Disconnect all cables from the server board. Use [Figure 35, "System Cable Routing"](#) on [page 53](#) as a reference.

8. Open the bridge board connector latches. ("A")
9. Lift the bridge board from the chassis ("B" and "C")

Figure 79. Removing the Bridge Board

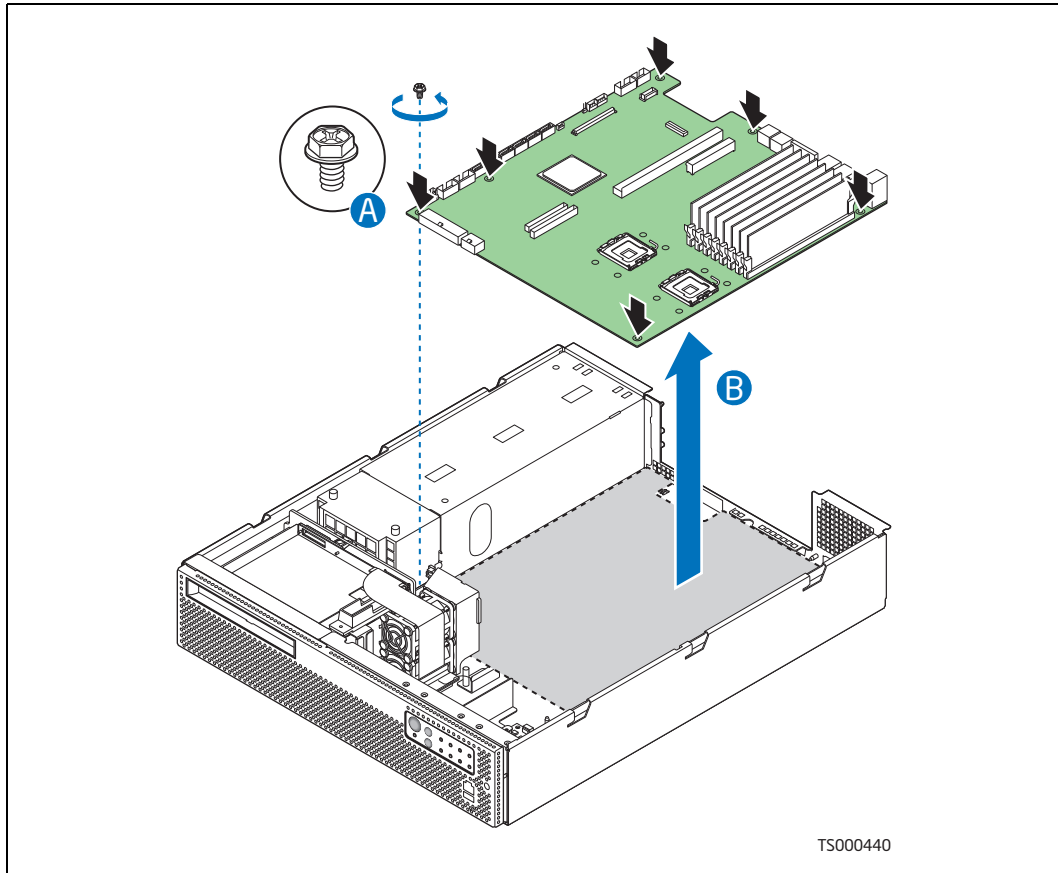


Note: If you want to re-use components from this server board on the replacement board you can remove them now or remove them after you lift the server board from the chassis.

- To remove an I/O expansion module or remote management module, see [Section 4.3, "Installing an I/O Expansion Module"](#) on page 59 or [Section 4.4, "Installing Remote Management Module 2 Components"](#) on page 61.
- To remove DIMMs, see [Section 3.4.4, "Removing Memory DIMMs"](#) on page 45.
- To remove the heat sink(s) and processor(s), see [Section 3.4.5.2, "Removing a Processor"](#) on page 47.

10. Remove the six screws that attach the server board to the chassis. ("A")
11. Tilt the server board at the front edge and lift it from the chassis. ("B")
Use caution in pulling it out from beneath the Serial B connector at the rear of the chassis.

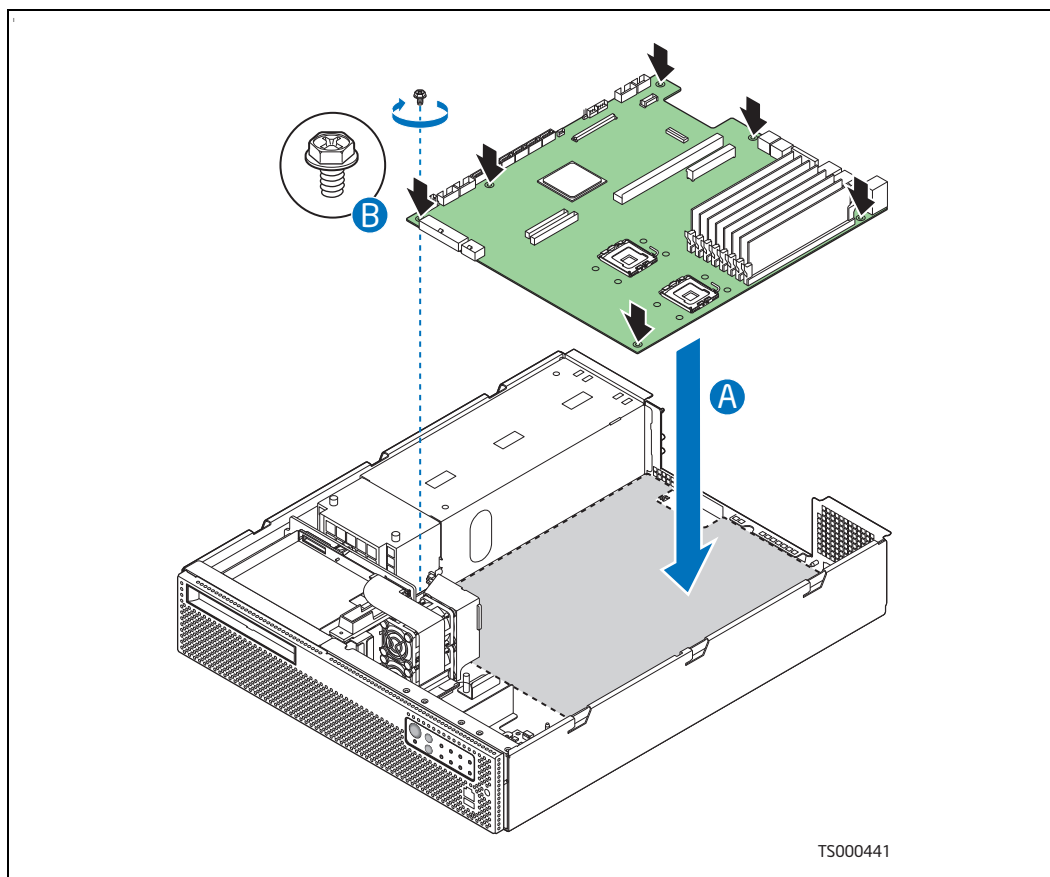
Figure 80. Removing the Server Board



5.7.2 Installing the Server Board

1. Set the replacement board into place ("A"), using caution to make sure no cables are pinched under the board. Insert the rear edge of the board first, and line up the I/O ports at the rear of the system.
2. Make sure the standoff locations line up correctly, then insert the six screws that you removed previously. ("B")

Figure 81. Installing the Server Board



3. If the replacement board does not have processor(s) / heat sink(s), DIMMs, or optional modules installed, do the following:
 - a. Install the processor(s) and heat sink(s). For instructions, see [Section 3.4.5.3, "Installing a New Processor" on page 48.](#)
 - b. Install all DIMMs. For instructions, see [Section 3.4.3, "Installing DIMMs" on page 44.](#)
 - c. Install any I/O expansion modules or remote management modules that you might need. For instructions see [Section 4.3, "Installing an I/O Expansion Module" on page 59](#) or [Section 4.4, "Installing Remote Management Module 2 Components" on page 61.](#)
4. Install the PCI riser assembly. For instructions, see [Section 4.2.5, "Installing the PCI Riser Card Assembly" on page 59.](#)
5. Install the PCI fan assembly. For instructions, see [Section 5.2.6, "Installing the Fan Assembly" on page 82.](#)

6. Install the CPU fan assembly. For instructions, see [Section 5.2.3, “Installing the CPU Fan Assembly” on page 77](#).
7. Install the drive bay assembly. For instructions, see [Figure 76, “Installing the Drive Bay Assembly” on page 96](#).
8. Connect all cables. Use [Figure 35, “System Cable Routing” on page 53](#) as a reference.
9. Install the bridge board.
10. Install the processor air duct. For instructions, see [Section 3.2.6, “Installing the Processor Air Duct” on page 29](#).
11. If this is the last task you are performing, replace the chassis top cover. Reconnect all the external devices and plug in the power cord(s).

5.8 Replacing the CMOS Battery on the Server Board

The lithium battery on the server board powers the real-time clock (RTC) for up to 10 years in the absence of power. When the battery starts to weaken, it loses voltage, and the server settings (for example, the date and time) stored in CMOS RAM in the RTC may be wrong. Contact your Kontron sales representative or dealer for a list of approved devices.

Caution: Before replacing the battery, you must first take the server out of service, turn off all peripheral devices connected to the system, turn off the system by pressing the power button, and unplug the power cord from the system or wall outlet.

WARNING

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

WARNING

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

ADVARSEL

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

WARNING

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

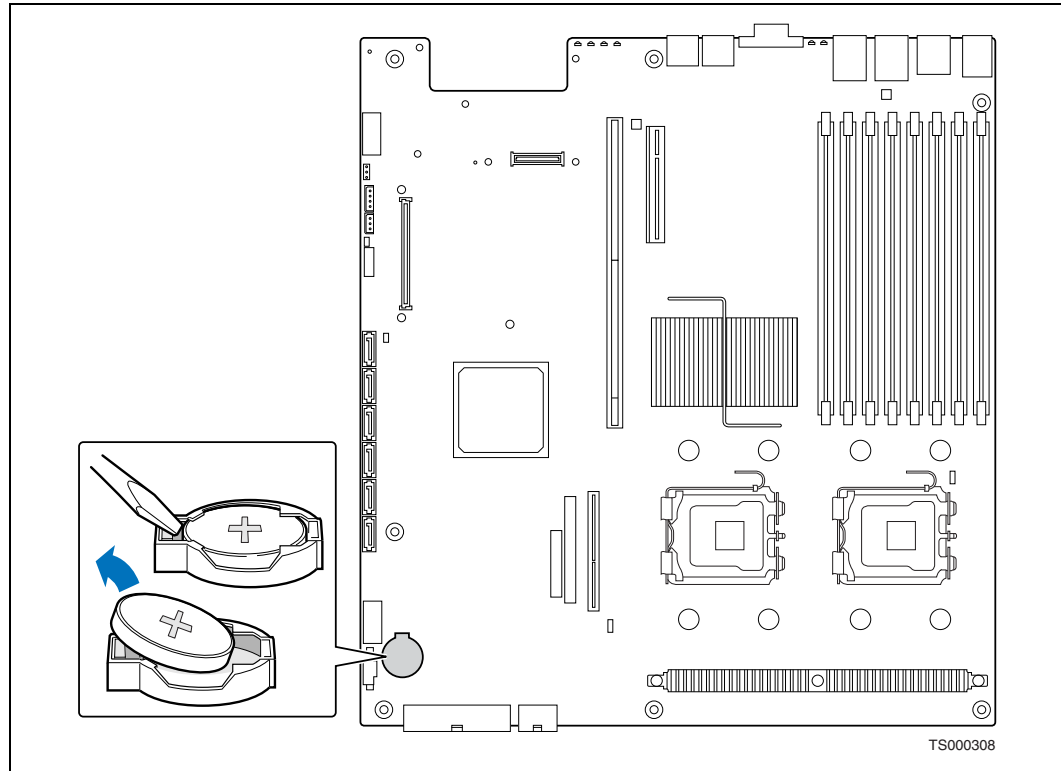
VAROITUS

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

1. Power down the server system and unplug all peripheral devices and the power cable.
2. Remove the chassis cover. For instructions, see [Section 3.2.3, “Removing the Chassis Cover” on page 26](#).
3. Remove the processor air duct. For instructions, see [Section 3.2.5, “Removing the Processor Air Duct” on page 28](#).
4. Remove the PCI fan assembly. For instructions, see [Section 5.2.4, “Removing the PCI Fan Assembly” on page 78](#).
5. Remove the riser card assembly. For instructions see [Section 4.2.2, “Removing the PCI Riser Card Assembly” on page 56](#).
6. Locate the battery. (See [Figure 82](#).)

7. Insert the tip of a small flat bladed screwdriver, or better yet an equivalent non-metallic tool, under the tab in the plastic retainer. Gently push down on the screwdriver to lift the battery.
8. Remove the battery from its socket.

Figure 82. Replacing the Battery



9. Dispose of the battery according to local ordinance.
10. Remove the new lithium battery from its package, and, being careful to observe the correct polarity, insert it in the battery socket.
11. Install the riser card assembly. For instructions see [Section 4.2.5, "Installing the PCI Riser Card Assembly" on page 59](#).
12. Install the PCI fan assembly. For instructions, see [Section 5.2.6, "Installing the Fan Assembly" on page 82](#).
13. Install the processor air duct. For instructions, see [Section 3.2.6, "Installing the Processor Air Duct" on page 29](#).
14. Install the chassis cover. For instructions, see [Section 3.2.4, "Installing the Chassis Cover" on page 27](#).
15. Use the BIOS Setup Utility to restore the configuration settings. For instructions, see [Section 6.1, "Using the BIOS Setup Utility" on page 106](#).

6 Server Utilities

6.1 Using the BIOS Setup Utility

This section describes the BIOS Setup Utility options, which is used to change configuration defaults for the Kontron Carrier Grade Server TIGH2U. You can run BIOS Setup with or without an operating system present. See the *Intel® Server Board S5000PAL Technical Product Specification* for details about BIOS setup screens.

6.1.1 Starting 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)

In the two conditions listed above, during the Power On Self Test (POST), you will see the prompt
Press <F2> to enter SETUP

In a third condition, when CMOS/NVRAM has been corrupted, you will see other prompts but not the <F2> prompt:

```
Warning: CMOS checksum invalid
```

```
Warning: CMOS time and date not set
```

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

6.1.2 If You Cannot Access Setup

If you are not able to access BIOS Setup, you might need to clear the CMOS memory. For instructions on clearing the CMOS, see [Section 6.5, “BMC Force Update Procedure”](#).

6.1.3 Setup Menus

Each BIOS Setup menu page contains a number of features. Except for those features that are provided only to display automatically configured information, each feature is associated with a value field that contains user-selectable parameters. These parameters can be changed if the user has adequate security rights. If a value cannot be changed, the feature's value field is inaccessible.

[Table 13](#) describes the keyboard commands you can use in the BIOS Setup menus.

Table 13. Keyboard Commands

Key	Description
<F1>	Help - Pressing F1 on any menu invokes the general Help window.
← →	The left and right arrow keys are used to move between the major menu pages. The keys have no effect 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.
F5/-	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.
F6/+	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>	Setup Defaults - Pressing F9 causes the following to appear: Setup Confirmation Load default configuration now? [Yes] [No] 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.
<F10>	Save and Exit - Pressing F10 causes the following message to appear: Setup Confirmation Save Configuration changes and exit now? [Yes] [No] 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.

6.2 Upgrading the BIOS

The upgrade utility allows you to upgrade the BIOS in flash memory. The code and data in the upgrade file include the following:

- On-board system BIOS, including the recovery code, BIOS Setup Utility, and strings.
- On-board video BIOS, SCSI BIOS, and other option ROMs for devices embedded on the server board.
- OEM binary area
- Microcode
- A means to change the BIOS language

6.2.1 Preparing for the Upgrade

The steps below explain how to prepare to upgrade the BIOS, including how to record the current BIOS settings and how to obtain the upgrade utility.

Note: In the unlikely event that a BIOS error occurs during the BIOS update process, a recovery process may need to be followed to return the system to service. See [Section 1.4, “Additional Information and Software”](#) for additional information.

6.2.1.1 Recording the Current BIOS Settings

1. Boot the computer and press <F2> when you see the message:
Press <F2> Key if you want to run SETUP
2. Write down the current settings in the BIOS Setup program.

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

6.2.1.2 Obtaining the Upgrade

Download the BIOS image file to a temporary folder on your hard drive. See [Section 1.4, “Additional Information and Software”](#) for additional information.

Note: Review the instructions and release notes that are provided in the readme.txt file distributed with the BIOS image file before attempting a BIOS upgrade. The release notes contain critical information regarding jumper settings, specific fixes, or other information to complete the upgrade.

6.2.2 Updating the BIOS

Follow the instructions in the readme file that came with the BIOS upgrade. When the update completes, remove the bootable media from which you performed the upgrade.

Note: Do not power down the system during the BIOS update process! The system will reset automatically when the BIOS update process is completed.

Note: You may encounter a CMOS Checksum error or other problem after reboot. If this happens, shut down the system and boot it again. CMOS checksum errors require that you enter Setup, check your settings, save your settings, and exit Setup.

6.3 Clearing the CMOS

If you are not able to access the BIOS setup screens, the CMOS Clear jumper will need to be used to reset the configuration RAM. The CMOS clear jumper (J1D3) is shown in [Figure 19, “Recovery Jumper Blocks \(J1D1, J1D2, J1D3\)”](#) on page 35.

1. Power down the system and disconnect the power cord.
2. Open the server. See [Section 3.2.3, “Removing the Chassis Cover”](#) for instructions.
3. Move jumper (J1D3) from the normal operation position, CMOS Clear by BMC, at pins 1 and 2 to the CMOS Clear Force Erase position, covering pins 2 and 3.
4. Wait five seconds.
5. Move the jumper (J1D3) back to the default position (pins 1-2).
6. Close the server chassis. See [Section 3.2.4, “Installing the Chassis Cover”](#) for instructions.
7. Reconnect the power and power up the system.

6.4 Clearing the Password

If the user or administrator password(s) is lost or forgotten, moving the password clear jumper into the “clear” position clears both passwords. The password clear jumper must be restored to its original position before a new password(s) can be set. The password clear jumper (J1D2) is shown in Figure 19, “Recovery Jumper Blocks (J1D1, J1D2, J1D3)” on page 35.

1. Power down the system and disconnect the power.
2. Open the server chassis. See Section 3.2.3, “Removing the Chassis Cover” for instructions.
3. Move the jumper (J1D2) from the normal operation position, Password Clear Protect, at pins 1 and 2 to the Password Clear Erase position, covering pins 2 and 3.
4. Reconnect the power, power up the system.
5. Power down the system and disconnect the power cord.
6. Return the Password Clear jumper (J1D2) to the Password Clear Protect position, covering pins 1 and 2.
7. Close the server chassis. See Section 3.2.4, “Installing the Chassis Cover” for instructions.
8. Reconnect the power and power up the server.

6.5 BMC Force Update Procedure

When performing a standard BMC firmware update procedure, the update utility places the BMC into an update mode to allow the firmware to load safely onto the flash device. In the unlikely event that the BMC firmware update process fails because the BMC is not in the proper update state, the server board provides a BMC Force Update jumper that can force the BMC into the proper update state. Use the following procedure if the standard BMC firmware update process fails.

Once the firmware update process completes successfully, the firmware update utility may generate an error stating that the BMC is still in update mode. Use the following procedure to get out of Update mode:

1. Power down and remove the power cord.
2. Open the server chassis (remove the top cover).
3. Locate jumper block J1D1 and move the jumper to the Enable position (pins 2-3).
4. Close the server chassis.
5. Reconnect the power and restart the system.

Now perform the standard BMC firmware update procedure as documented in the README.TXT file included in the BMC Firmware Update package.

Note: Normal BMC functionality is disabled when the Force BMC Update jumper is populated. The server should never be run with the BMC Force Update jumper populated and this header should only be used when the standard firmware update process fails. This header should remain unpopulated by default when the server is running normally.

6. When the update has finished, power down the system and remove the power cord.
7. Open the server chassis (remove the top cover).
8. Close the server chassis.
9. Reconnect the power and restart the system.
10. Locate jumper block J1D1 and move the jumper to the Disable position (pins 1-2).

7 Troubleshooting

This chapter helps you identify and solve problems that might occur while you are using the Kontron Carrier Grade Server TIGH2U.

For any issue, first ensure you are using the latest firmware and files. Firmware upgrades include updates for BIOS and the baseboard management controller (BMC). Go to <http://us.kontron.com/support/> for information about the latest updates. In addition to the server firmware and files, also update any drivers used for components you have installed in your system, such as video drivers, network drivers, and SCSI drivers.

Kontron provides a package called the “Platform Confidence Test” that may help with your diagnostics. Go to <http://us.kontron.com/products/systems+and+platforms/commuication+rackmount+servers/ip+network+server+nsc2u.html> for a link to this software.

If you are unable to resolve your server problems on your own, see [Appendix C, “Getting Help”](#) for assistance.

7.1 Resetting the System

Before going through in-depth troubleshooting, first attempt to reset your system using one of the methods below.

To do this:	Press:
Soft boot reset to clear the system memory and reload 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

7.2 Problems Following Initial System Installation

Problems that occur at initial system startup are usually caused by an incorrect installation or configuration. Hardware failure is a less frequent cause. If the problem you are experiencing is with a specific software application, see [Section 7.4.11, “Problems with Newly Installed Application Software”](#).

7.2.1 First Steps Checklist

- Is power available at the source?
- Are the power supplies plugged in? Check the power cable on the back of the server and at the power source.
- Is the system power cord properly connected to the system? For AC-powered systems, is the power cord plugged into a NEMA (National Electrical Manufacturing Association) 5-15R outlet for 100-120V or a NEMA 6-15R outlet for 200-240V?
- Are all cables correctly connected and secured?
- Are the processors fully seated in their sockets on the server board?

- Are all standoffs in the proper location and not touching any components, causing a potential short?
- Are all PCI-X* and PCI Express* (PCIe*) add-in cards fully seated in their slots in the respective riser cards?
- 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 peripheral devices installed correctly?
- Are the hard disk drives (up to 6) properly formatted or configured?
- Are all device drivers properly installed?
- Are the configuration settings made in Setup correct?
- Is the operating system properly loaded? Refer to the operating system documentation.
- Did you press the system power on/off switch on the front panel to turn the server on (power on light should be lit)?
- Are all integrated components from the tested components lists? Check the tested memory list and the supported hardware and operating system list. Go to <http://us.kontron.com/support/> for links to the tested component lists.

7.3 Hardware Diagnostic Testing

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

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.

1. Turn off the system and all external peripheral devices. Disconnect each of devices from the system, except for the keyboard and the video monitor.
2. Make sure the system power cord is plugged into a properly grounded AC outlet.
3. 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).
4. Turn on the system. If the power LED does not light, see [Section 7.4.1, "Power Light does not Light"](#).

7.3.1 Verifying Proper Operation of Key System Lights

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

- If system LEDs are illuminated, see [Section 7.5, "LED Information"](#) for a description of the LED lights and steps that need to be taken to correct the problem.

7.3.2 Confirming the Operating System Load

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 [Section 7.4.2, "No Characters Appear on Screen"](#).

7.4 Specific Problems and Corrective Actions

This section provides possible solutions for specific problems.

Try the solutions below in the order given. If you cannot correct the problem, contact your service representative or authorized dealer for help. See [Appendix C, "Getting Help"](#) for contact details.

7.4.1 Power Light does not Light

Check the following:

- Did you press the power-on button?
- Is the system operating normally? If so, the power LED might be defective or the cable from the front panel to the server board might be loose.
- Have you securely plugged the server power cord into the power supply?
- For AC, will other items plugged into the same power outlet function correctly?
- Remove all add-in cards and see if the system boots. If successful, re-insert the cards one at a time with a reboot between each addition.
- Make sure the memory DIMMs comply with the system requirements.
- Make sure the memory DIMMs have been populated according to the system requirements.
- Remove the memory DIMMs and re-seat them.
- Make sure the processor complies with the system requirements.
- Remove the processor and re-seat it.

7.4.2 No Characters Appear on Screen

Check the following:

- Is the keyboard functioning? Test it by turning the "Num Lock" function on and off to make sure the Num Lock light is functioning.
- Is the video monitor plugged in and turned on? If you are using a switch box, is it switched to the correct system?
- Are the brightness and contrast controls on the video monitor properly adjusted?
- Is the video monitor signal cable properly installed?
- Does this video monitor work correctly if plugged into a different system?
- Is the onboard video controller enabled in the BIOS?
- Remove all add-in cards and see if the video returns. If successful, re-insert the cards one at a time with a reboot between each addition.
- Make sure the memory DIMMs comply with the system requirements.
- Make sure the memory DIMMs have been populated according to the system requirements.
- Remove the memory DIMMs and re-seat them.
- Make sure the processor complies with the system requirements.
- Remove the processor and re-seat it.

7.4.3 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's signal and power cables properly installed?
- Does this video monitor work correctly if plugged into a different system?

7.4.4 Ctrl-G Option is not available to Configure RAID

Check the following:

- The cable at the rear of the Intel® RAID Smart Battery might be plugged in backward. Remove the battery pack and check the connection.

7.4.5 System Cooling Fans do not Rotate Properly

If the system cooling fans are not operating properly, it is an indication of possible system component failure.

Check the following:

- Is the power-on light lit? If not, see [Section 7.4.1, "Power Light does not Light"](#).
- Are any other front panel LEDs lit?
- Have any of the fan motors stopped? Use the server management subsystem to check the fan status.
- Have the fans sped up in response to an overheating situation?
- Have the fans sped up in response to a fan that has failed?
- Are the fan power connectors properly connected to the SFP board?
- Is the cable from the front panel board connected to the both the front panel board and to the server board?
- Are the power supply cables properly connected to the SFP board?
- Are there any shorted wires caused by pinched-cables or have power connector plugs been forced into power connector sockets the wrong way?

7.4.6 Cannot Connect to a Server

- Make sure the network cable is securely attached to the correct connector at the system back panel.
- Try a different network cable.
- Make sure you are using the correct and the current drivers. Go to <http://us.kontron.com/support/> for a link to the drivers.
- Make sure the driver is loaded and the protocols are bound.
- Make sure the hub port is configured for the same duplex mode as the network controller.
- Make sure the correct networking software is installed.
- If you are directly connecting two servers (without a hub), you will need a crossover cable.

7.4.7 Diagnostics Pass but the Connection Fails

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

7.4.8 The Controller Stopped Working When an Add-in Adapter was Installed

- Make sure the cable is connected to the port from the onboard network controller.

- ❑ Make sure your BIOS is current. Go to <http://us.kontron.com/support/> for a link to the current version.
- ❑ Try reseating the add-in adapter.

7.4.9 The Add-in Adapter Stopped Working Without Apparent Cause

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

7.4.10 System Boots When Installing a PCI Card

System Server Management features require full-time “standby” power. This means some parts of the system have power going to them whenever the power cord is plugged in, even if you have turned the system power off with the power button on the front panel. If you install a PCI card with the power cord plugged in, a signal may be sent to command the system to boot. Before installing a PCI card, you should always:

1. Turn off the server power by using the power button on the front of the system.
2. Unplug the power cord from the server.

7.4.11 Problems with Newly Installed Application Software

Problems that occur when you run new application software are usually related to the software, not the server hardware. Faulty equipment is unlikely, especially if other software runs correctly.

Check the following:

- ❑ Make sure the system meets the minimum hardware requirements for the software. See the software documentation.
- ❑ Make sure the software is properly installed and configured for the system. See the software documentation.
- ❑ Use only an authorized copy. Unauthorized copies often do not work.
- ❑ Make sure the correct device drivers installed.

If the problems persist, contact the software vendor’s customer service representative.

7.4.12 Problems with Application Software that Ran Correctly Earlier

Problems that occur after the system hardware and software have been running correctly sometimes indicate equipment failure. However, they can also be caused by file corruption or changes to the software configuration.

Check the following:

- ❑ Uninstall and reinstall the software. 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: For AC power, if you are getting random errors in your data files, they may be getting corrupted by voltage spikes on your power line. If you are experiencing any of the above symptoms that might indicate voltage spikes on the power line, you may want to install a surge suppressor between the power outlet and the system power cord.

7.4.13 Devices are not Recognized under Device Manager (Windows* OS)

The Windows* operating systems do not include all of the drivers for the chipsets, onboard NICs, and other components. See <http://us.kontron.com/support/> for a link to the current drivers and chipset files.

7.4.14 Hard Drive(s) are not Recognized

Check the following:

- Make sure the drive is not disabled in BIOS Setup.
- Make sure the drive is compatible. Go to <http://us.kontron.com/support/> for a link to the list of tested drives.
- Make sure you have not exceeded the power budget for the server. Go to <http://us.kontron.com/support/> for a link to software to check your power budget.

7.5 LED Information

The Intel® Server Board T5000PAL includes LEDs that can aid in troubleshooting your system. Table 14 defines these LEDs with a description of their use.

Table 14. LED Definitions

LED Name	Function	Location	Color	Notes
ID	Aid in server identification from the back panel	Control panel and rear left corner of server board	Blue	Press ID LED button or user Server Management software to turn on the LED.
System fault	Visible fault warning	Control panel and rear left corner of server board	Green or amber	Green = No Fault Green blinking = degraded Amber = critical error or non-recoverable Amber blinking = non-critical error
ATA drive activity	Control panel	Control panel	Green	Blinking = Activity. No action required.
Memory fault 1-6	Identify failing memory module	DIMM end rear of server board	Amber	On = Fault
Diagnostic LEDs. 1-4 (LSB, bit1, bit2, MSB)	Displays port 80 POST codes	Center back edge of server board	Each LED can be off, green, amber, red	See the POST code table
CPU 1 and 2 Fan Fault	Identify fan failure	Front center of server board	Amber	On = Fault
CPU 1 and 2 Fault	Identify processor failure	1 inch behind processor socket	Amber	On = Fault
5v Standby	Identify 5v standby power on state	Front left of server board	Amber	On = 5v standby power on
Power LED	Identify the power state of the system	Control Panel	Green	Off = Power is off (off or S5) On = Power on or S0 Slow Blink = Low power state (S1 - S3)

7.6 BIOS Error Messages

When a recoverable error occurs during the POST, the BIOS displays an error message describing the problem. See [Table 15](#)

Table 15. BIOS Error Messages

Error Message	Explanation
GA20 Error	An error occurred with Gate A20 when switching to protected mode during the memory test.
Pri Master HDD Error Pri Slave HDD Error Sec Master HDD Error Sec Slave HDD Error	Could not read sector from corresponding drive.
Pri Master Drive - ATAPI Incompatible Pri Slave Drive - ATAPI Incompatible Sec Master Drive - ATAPI Incompatible Sec Slave Drive - ATAPI Incompatible	Corresponding drive is not an ATAPI (Advanced Technology Attachment Packet Interface) device. Run Setup to make sure device is selected correctly.
CMOS Battery Low	The battery may be losing power. Replace the battery soon.
CMOS Display Type Wrong	The display type is different from what has been stored in CMOS. Check Setup to make sure type is correct.
CMOS Checksum Bad	The CMOS checksum is incorrect. CMOS memory may have been corrupted. Run Setup to reset values.
CMOS Settings Wrong	CMOS values are not the same as the last boot. Either these values have been corrupted or the battery has failed.
CMOS Date/Time Not Set	The time and/or date values stored in CMOS are invalid. Run Setup to set correct values.
DMA Error	Error during read/write test of DMA (Direct Memory Access) controller.
FDC Failure	Error occurred trying to access diskette drive controller.
HDC Failure	Error occurred trying to access hard disk controller.
Checking NVRAM.....	NVRAM (Non-Volatile Random Access Memory) is being checked to see if it is valid.
Update OK!	NVRAM was invalid and has been updated.
Updated Failed	NVRAM was invalid but was unable to be updated.
Keyboard Error	Error in the keyboard connection. Make sure keyboard is connected properly.
KB/Interface Error	Keyboard interface test failed.
Memory Size Decreased	Memory size has decreased since the last boot. If no memory was removed, then memory may be bad.
Memory Size Increased	Memory size has increased since the last boot. If no memory was added, there may be a problem with the system.
Memory Size Changed	Memory size has changed since the last boot. If no memory was added or removed, then memory may be bad.
No Boot Device Available	System did not find a device to boot.
Off Board Parity Error	A parity error occurred on an off-board card. This error is followed by an address.
On Board Parity Error	A parity error occurred in onboard memory. This error is followed by an address.
Parity Error	A parity error occurred in onboard memory at an unknown address.
NVRAM / CMOS / PASSWORD cleared by Jumper	NVRAM, CMOS, and passwords have been cleared. The system should be powered down and the jumper removed.
<CTRL_N> Pressed	CMOS is ignored and NVRAM is cleared. User must enter Setup.

7.6.1 BIOS POST Beep Codes

Table 16 lists the POST error beep codes. Prior to system video initialization, the BIOS uses these beep codes to inform users of error conditions. Please note that not all error conditions are supported by BIOS beep codes.

Table 16. POST Error Beep Codes

Number of Beeps	Reason for the beeps and action to take
1, 2, or 3	Memory error. Reseat the memory or replace the DIMMs with known good modules.
4 - 7 or 9 - 11	Fatal error indicating a possible serious system problem. Remove all add-in cards and re-start the system. If the error still occurs, contact your system manufacturer. If the beep codes are not generated after the add-in cards are removed, insert the cards one at a time, booting the system between each card addition, until the beeps again occur to reveal the malfunctioning card.
8	Replace or reseat the system video add-in card. If on-board video is being used, the server board may be faulty.

In addition to the beep codes above, additional beep codes are provided if an Intel® Remote Management Module 2 is installed. The RMM2 provides the following additional beep codes.

Table 17. Error Beep Codes Provided by a Remote Management Module 2

Beep Code	Reason for the beeps and action to take
1	Control panel CMOS clear has been initiated.
1-5-1-1	Processor failure. Reseat or replace the failed processor.
1-5-2-1	No processor is installed or the CPU 1 socket is empty. Reseat or replace the failed processor.
1-5-2-3	Processor configuration error or CPU 1 socket is empty. Reseat or replace the failed processor. In a two-processor system, make sure the processors are identical.
1-5-2-4	Front-side bus select configuration error.
1-5-4-2	DC power unexpectedly lost.
1-5-4-3	Chipset control failure.
1-5-4-4	Power control failure.

8 **Warranty**

This Kontron product is warranted against defects in material and workmanship for the warranty period from the date of shipment. During the warranty period, Kontron will at its discretion decide to repair or replace defective products. Within the warranty period, the repair of products is free of charge as long as warranty conditions are observed. The warranty does not apply to defects resulting from improper or inadequate maintenance or handling by the buyer, unauthorized modification or misuse, operation outside of the product's environmental specifications or improper installation or maintenance.

Kontron will not be responsible for any defects or damages to other products not supplied by Kontron that are caused by a faulty Kontron product.

Appendix A: Safety Information

Warning: Although you may be using this guide or another resource as a reference, before working with your server product pay close attention to these safety instructions. You must adhere to the assembly instructions in this guide to ensure and maintain compliance with existing product certifications and approvals. Use only the described, regulated components specified in this guide. Use of other products / components will void the UL listing and other regulatory approvals of the product and will most likely result in noncompliance with product regulations in the region(s) in which the product is sold.

A.1 Emissions Disclaimer

To ensure EMC (Electromagnetic Compatibility) compliance with your local regional rules and regulations, the final configuration of your end system product may require additional EMC compliance testing. For more information, please contact your local Kontron representative.

See [Appendix B, "Regulatory and Certification Information"](#) for product Safety and EMC regulatory compliance information. This is an FCC (Federal Communications Commission) Class A device.

A.2 Intended Uses

This product was evaluated as Information Technology Equipment (ITE), which may be installed in Central Offices, Telecommunication Centers, offices, schools, computer rooms, and similar commercial type locations where the National Electric Code (NEC) applies. The suitability of this product for other product categories and environments (medical, industrial, OSP, telecommunications, residential, alarm systems, test equipment, etc.), other than an ITE application, may require further evaluation.

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.

A.2.1 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 must install 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).

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

Overcurrent protection: The server is designed for an AC line voltage source with up to 20 amperes of overcurrent protection per cord feed. If the power system for the equipment rack is installed on a branch circuit with more than 20 amperes of protection, you must provide supplemental protection for the server. The overall current rating of a configured server is less than 6 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:

- Rating: In the U.S. and Canada, cords must be UL (Underwriters Laboratories, Inc.) Listed/CSA (Canadian Standards Organization) Certified type SJT, 18-3 AWG (American Wire Gauge). Outside of the U.S. and Canada, cords must be flexible harmonized (<HAR>) or VDE (Verbena Deutscher Elektrotechniker, German Institute of Electrical Engineers) certified cord with 3x 0.75 mm conductors rated 250 VAC.
- 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 for 125% of the overall current rating of the server.
- Connector, server end: The connectors that plug into the AC receptacle on the server must be an approved IEC (International Electrotechnical Commission) 320, sheet C13, type female connector.
- Cord length and flexibility: Cords must be less than 4.5 meters (14.8 feet) long.

A.2.2 If DC Power Supplies are Installed

Connection with a DC (Direct Current) 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 from any hazardous AC source by double or reinforced insulation. The DC source must be capable of providing up to 300 watts of continuous power per feed pair.

Mains DC power disconnect: You are responsible for installing a properly rated DC power disconnect for the server system. This mains disconnect must be readily accessible, and it must be labeled as controlling power to the server. The UL listed 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.

Grounding the server: This server is intended for installation with an isolated DC return (DC-I) and is to be installed in a Common Bondng Network (CBN) per NEBS GR-1089. 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 14 AWG 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 having 5/8-inch pitch. The nuts on the chassis earth ground studs should be installed with a 10 in-lbs of torque. The safety ground conductor provides proper grounding only for the server. You must provide additional, proper grounding for the rack and other devices installed in it.

Overcurrent protection: Overcurrent protection UL Listed 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 75 Vdc, 10A 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 maximum configured server is 8 amperes.

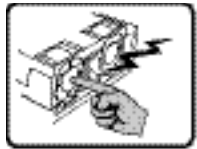
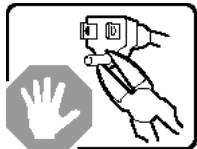
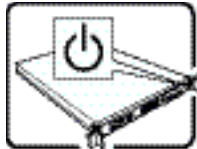

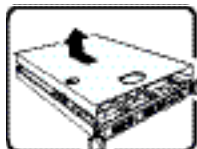
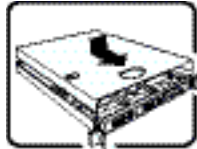
A.2.3 Temperature and Ventilation

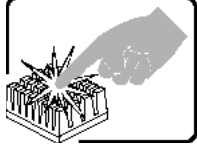
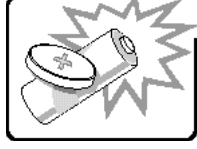
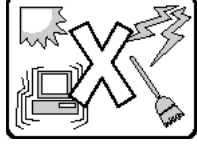
Caution: Temperature -- The temperature, in which the server operates when installed in an equipment rack, must not go below 5°C (41°F) or rise above 40°C (95°F). Extreme fluctuations in temperature can cause a variety of problems in your server.

Caution: 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 1200 BTUs (British Thermal Units) 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.

A.3 Safety Cautions

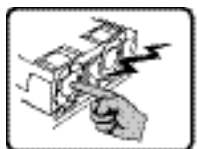
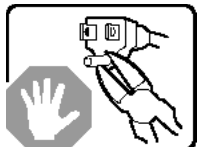
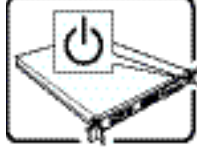
Read all caution and safety statements in this document before performing any of the instructions. See also the most current Server Boards and Server Chassis Safety Information which is provided at <http://us.kontron.com/support/>


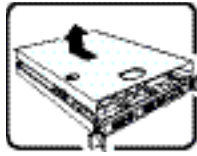
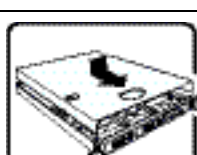
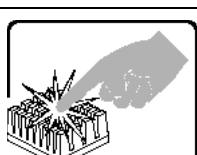
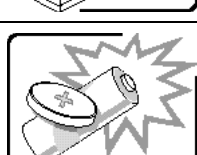

	<p>The power supply in this product contains no user-serviceable parts. There may be more than one supply in this product. Refer servicing only to qualified personnel.</p>
	<p>Do not attempt to modify or use the supplied AC power cord if it is not the exact type required. A product with more than one power supply will have a separate AC power cord for each supply.</p>
	<p>The power button on the system does not turn off system AC power. To remove AC power from the system, you must unplug each AC power cord from the wall outlet or power supply. The power cord(s) is considered the disconnect device to the main (AC) power. The socket outlet that the system plugs into must be installed near the equipment and must be easily accessible.</p>
	<p>SAFETY STEPS: Whenever you remove the chassis covers to access the inside of the system, follow these steps:</p> <ol style="list-style-type: none"> 1. Turn off all peripheral devices connected to the system. 2. Turn off the system by pressing the power button. 3. Unplug all AC power cords from the system or from wall outlets. 4. Label and disconnect all cables connected to I/O connectors or ports on the back of the system. 5. Provide electrostatic discharge (ESD) protection by wearing an antistatic wrist strap attached to chassis ground of the system—any unpainted metal surface—when handling components. 6.
	<p>After you have completed the six SAFETY STEPS_{above}, you can remove the system covers. To do this:</p> <ol style="list-style-type: none"> 1. Unlock and remove the padlock from the back of the system if a padlock has been installed. 2. Remove and save all screws from the covers. 3. Remove the covers. 4. Do not operate the system with the chassis covers removed.
	<p>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:</p> <ol style="list-style-type: none"> 1. Check first to make sure you have not left loose tools or parts inside the system. 2. Check that cables, add-in boards, and other components are properly installed. 3. Attach the covers to the chassis with the screws removed earlier, and tighten them firmly. 4. Insert and lock the padlock to the system to prevent unauthorized access inside the system. 5. Connect all external cables and the AC power cord(s) to the system.

	<p>A microprocessor and heat sink may be hot if the system has been running. Also, there may be sharp pins and edges on some board and chassis parts. Contact should be made with care. Consider wearing protective gloves.</p>
	<p>Danger of explosion if the battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the equipment manufacturer. Dispose of used batteries according to manufacturer's instructions.</p>
	<p>The system is designed to operate in a typical office environment. Choose a site that is:</p> <ul style="list-style-type: none"> • Clean and free of airborne particles (other than normal room dust). • Well ventilated and away from sources of heat including direct sunlight. • Away from sources of vibration or physical shock. • Isolated from strong electromagnetic fields produced by electrical devices. • In regions that are susceptible to electrical storms, we recommend you plug your system into a surge suppressor and disconnect telecommunication lines to your modem during an electrical storm. • Provided with a properly grounded wall outlet. • Provided with sufficient space to access the power supply cord(s), because they serve as the product's main power disconnect.

Wichtige Sicherheitshinweise

Lesen Sie zunächst sämtliche Warn- und Sicherheitshinweise in diesem Dokument, bevor Sie eine der Anweisungen ausführen. Beachten Sie hierzu auch die Sicherheitshinweise zu Serverplatinen und - Servergehäusen unter <http://us.kontron.com/support/>

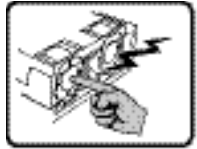
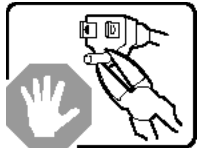
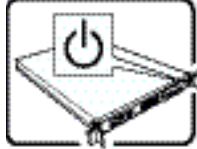

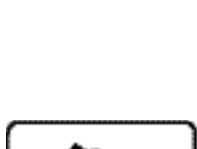
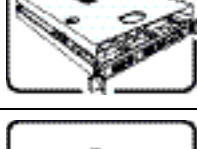
	<p>Benutzer können am Netzgerät dieses Produkts keine Reparaturen vornehmen. Das Produkt enthält möglicherweise mehrere Netzgeräte. Wartungsarbeiten müssen von qualifizierten Technikern ausgeführt werden.</p>
	<p>Versuchen Sie nicht, das mitgelieferte Netzkabel zu ändern oder zu verwenden, wenn es sich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

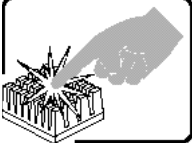
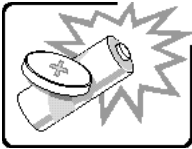
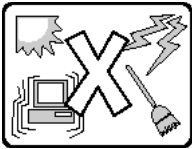
	<p>SICHERHEISSCHRIFFEN: Immer wenn Sie die Gehäuseabdeckung abnehmen um an das Systeminnere zu gelangen, sollten Sie folgende Schritte beachten:</p> <ol style="list-style-type: none"> 1. Schalten Sie alle an Ihr System angeschlossenen Peripheriegeräte aus. 2. Schalten Sie das System mit dem Hauptschalter aus. 3. Ziehen Sie den Stromanschlußstecker Ihres Systems aus der Steckdose. 4. Auf der Rückseite des Systems beschriften und ziehen Sie alle Anschlußkabel von den I/O Anschlüssen oder Ports ab. 5. Tragen Sie ein geerdetes Antistatik Gelenkband, um elektrostatische Ladungen (ESD) über blanke Metallstellen bei der Handhabung der Komponenten zu vermeiden. 6. Schalten Sie das System niemals ohne ordnungsgemäß montiertes Gehäuse ein.
	<p>Nachdem Sie die oben erwähnten ersten sechs SICHERHEITSSCHRITTE durchgeführt haben, können Sie die Abdeckung abnehmen, indem Sie:</p> <ol style="list-style-type: none"> 1. Öffnen und entfernen Sie die Verschlusseinrichtung (Padlock) auf der Rückseite des Systems, falls eine Verschlusseinrichtung installiert ist. 2. Entfernen Sie alle Schrauben der Gehäuseabdeckung. 3. Nehmen Sie die Abdeckung ab.
	<p>Zur ordnungsgemäßen Kühlung und Lüftung muß die Gehäuseabdeckung immer wieder vor dem Einschalten installiert werden. Ein Betrieb des Systems ohne angebrachte Abdeckung kann Ihrem System oder Teile darin beschädigen. Um die Abdeckung wieder anzubringen:</p> <ol style="list-style-type: none"> 1. Vergewissern Sie sich, daß Sie keine Werkzeuge oder Teile im Innern des Systems zurückgelassen haben. 2. Überprüfen Sie alle Kabel, Zusatzkarten und andere Komponenten auf ordnungsgemäßen Sitz und Installation. 3. Bringen Sie die Abdeckungen wieder am Gehäuse an, indem Sie die zuvor gelösten Schrauben wieder anbringen. Ziehen Sie diese gut an. 4. Bringen Sie die Verschlusseinrichtung (Padlock) wieder an und schließen Sie diese, um ein unerlaubtes Öffnen des Systems zu verhindern. 5. Schließen Sie alle externen Kabel und den AC Stromanschlußstecker Ihres Systems wieder an.
	<p>Der Mikroprozessor und der Kühler sind möglicherweise erhitzt, wenn das System in Betrieb ist. Außerdem können einige Platinen und Gehäuseteile scharfe Spitzen und Kanten aufweisen. Arbeiten an Platinen und Gehäuse sollten vorsichtig ausgeführt werden. Sie sollten Schutzhandschuhe tragen.</p>
	<p>Bei falschem Einsetzen einer neuen Batterie besteht Explosionsgefahr. Die Batterie darf nur durch denselben oder einen entsprechenden, vom Hersteller empfohlenen Batterietyp ersetzt werden. Entsorgen Sie verbrauchte Batterien den Anweisungen des Herstellers entsprechend.</p>
	<p>Das System wurde für den Betrieb in einer normalen Büroumgebung entwickelt. Der Standort sollte:</p> <ul style="list-style-type: none"> • sauber und staubfrei sein (Hausstaub ausgenommen); • gut gelüftet und keinen Heizquellen ausgesetzt sein (einschließlich direkter Sonneneinstrahlung); • keinen Erschütterungen ausgesetzt sein; • keine starken, von elektrischen Geräten erzeugten elektromagnetischen Felder aufweisen; • in Regionen, in denen elektrische Stürme auftreten, mit einem Überspannungsschutzgerät verbunden sein; während eines elektrischen Sturms sollte keine Verbindung der Telekommunikationsleitungen mit dem Modem bestehen; • mit einer geerdeten Wechselstromsteckdose ausgerüstet sein; • über ausreichend Platz verfügen, um Zugang zu den Netzkabeln zu gewährleisten, da der Stromanschluß des Produkts hauptsächlich über die Kabel unterbrochen wird.

Consignes de sécurité

Lisez attention toutes les consignes de sécurité et les mises en garde indiquées dans ce document avant de suivre toute instruction. Consultez Server Boards and Server Chassis Safety Information sur le site

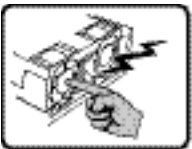
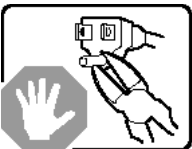

<http://us.kontron.com/support/>

	<p>Le bloc d'alimentation de ce produit ne contient aucune pièce pouvant être réparée par l'utilisateur. Ce produit peut contenir plus d'un bloc d'alimentation. Veuillez contacter un technicien qualifié en cas de problème.</p>
	<p>Ne pas essayer d'utiliser ni modifier le câble d'alimentation CA fourni, s'il ne correspond pas exactement au type requis. Le nombre de câbles d'alimentation CA fournis correspond au nombre de blocs d'alimentation du produit.</p>
	<p>Notez que le commutateur CC de mise sous tension /hors tension du panneau avant n'éteint pas l'alimentation CA du système. Pour mettre le système hors tension, vous devez débrancher chaque câble d'alimentation de sa prise.</p>
	<p>CONSIGNES DE SÉCURITÉ -Lorsque vous ouvrez le boîtier pour accéder à l'intérieur du système, suivez les consignes suivantes:</p> <ol style="list-style-type: none"> 1. Mettez hors tension tous les périphériques connectés au système. 2. Mettez le système hors tension en mettant l'interrupteur général en position OFF (bouton-poussoir). 3. Débranchez tous les cordons d'alimentation c.a. du système et des prises murales. 4. Identifiez et débranchez tous les câbles reliés aux connecteurs d'E-S ou aux accès derrière le système. 5. Pour prévenir les décharges électrostatiques lorsque vous touchez aux composants, portez une bande antistatique pour poignet et reliez-la à la masse du système (toute surface métallique non peinte du boîtier). 6. Ne faites pas fonctionner le système tandis que le boîtier est ouvert.
	<p>Une fois TOUTES les étapes précédentes accomplies, vous pouvez retirer les panneaux du système. Procédez comme suit:</p> <ol style="list-style-type: none"> 1. Si un cadenas a été installé sur à l'arrière du système, déverrouillez-le et retirez-le. 2. Retirez toutes les vis des panneaux et mettez-les dans un endroit sûr. 3. Retirez les panneaux.
	<p>Afin de permettre le refroidissement et l'aération du système, réinstallez toujours les panneaux du boîtier avant de mettre le système sous tension. Le fonctionnement du système en l'absence des panneaux risque d'endommager ses pièces. Pour installer les panneaux, procédez comme suit:</p> <ol style="list-style-type: none"> 1. Assurez-vous de ne pas avoir oublié d'outils ou de pièces démontées dans le système. 2. Assurez-vous que les câbles, les cartes d'extension et les autres composants sont bien installés. 3. Revissez solidement les panneaux du boîtier avec les vis retirées plus tôt. 4. Remettez le cadenas en place et verrouillez-le afin de prévenir tout accès non autorisé à l'intérieur du système. 5. Rebranchez tous les cordons d'alimentation c. a. et câbles externes au système.

	<p>Le microprocesseur et le dissipateur de chaleur peuvent être chauds si le système a été sous tension. Faites également attention aux broches aiguës des cartes et aux bords tranchants du capot. Nous vous recommandons l'usage de gants de protection.</p>
	<p>Danger d'explosion si la batterie n'est pas remontée correctement. Remplacer uniquement avec une batterie du même type ou d'un type équivalent recommandé par le fabricant. Disposez des piles usées selon les instructions du fabricant.</p>
	<p>Le système a été conçu pour fonctionner dans un cadre de travail normal. L'emplacement choisi doit être:</p> <ul style="list-style-type: none"> • Propre et dépourvu de poussière en suspension (sauf la poussière normale). • Bien aéré et loin des sources de chaleur, y compris du soleil direct. • A l'abri des chocs et des sources de vibrations. • Isolé de forts champs électromagnétiques génerés par des appareils électriques. • Dans les régions sujettes aux orages magnétiques il est recommandé de brancher votre système à un supresseur de surtension, et de débrancher toutes les lignes de télécommunications de votre modem durant un orage. • Muni d'une prise murale correctement mise à la terre. • Suffisamment spacieux pour vous permettre d'accéder aux câbles d'alimentation (ceux-ci étant le seul moyen de mettre le système hors tension).

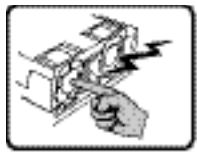
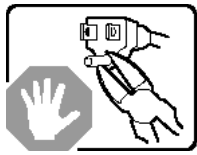
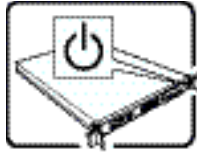

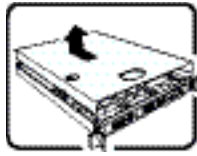
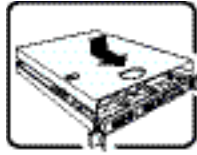
Instrucciones de seguridad importantes

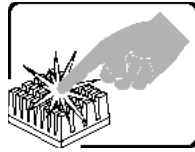
Lea todas las declaraciones de seguridad y precaución de este documento antes de realizar cualquiera de las instrucciones. Vea Server Boards and Server Chassis Safety Information en <http://us.kontron.com/support/>

	<p>El usuario debe abstenerse de manipular los componentes de la fuente de alimentación de este producto, cuya reparación debe dejarse exclusivamente en manos de personal técnico especializado. Puede que este producto disponga de más de una fuente de alimentación.</p>
	<p>No intente modificar ni usar el cable de alimentación de corriente alterna, si no corresponde exactamente con el tipo requerido. El número de cables suministrados se corresponden con el número de fuentes de alimentación de corriente alterna que tenga el producto.</p>
	<p>Nótese que el interruptor activado/desactivado en el panel frontal no desconecta la corriente alterna del sistema. Para desconectarla, deberá desenchufar todos los cables de corriente alterna de la pared o desconectar la fuente de alimentación.</p>

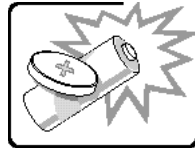
	<p>INSTRUCCIONES DE SEGURIDAD: Cuando extraiga la tapa del chasis para acceder al interior del sistema, siga las siguientes instrucciones:</p> <ol style="list-style-type: none"> 1. Apague todos los dispositivos periféricos conectados al sistema. 2. Apague el sistema presionando el interruptor encendido/apagado. 3. Desconecte todos los cables de alimentación CA del sistema o de las tomas de corriente alterna. 4. Identifique y desconecte todos los cables enchufados a los conectores E/S o a los puertos situados en la parte posterior del sistema. 5. Cuando manipule los componentes, es importante protegerse contra la descarga electrostática (ESD). Puede hacerlo si utiliza una muñequera antiestática sujeta a la toma de tierra del chasis - o a cualquier tipo de superficie de metal sin pintar. 6. No ponga en marcha el sistema si se han extraído las tapas del chasis.
	<p>Después de completar las seis instrucciones de SEGURIDAD mencionadas, ya puede extraer las tapas del sistema. Para ello:</p> <ol style="list-style-type: none"> 1. Desbloquee y extraiga el bloqueo de seguridad de la parte posterior del sistema, si se ha instalado uno. 2. Extraiga y guarde todos los tornillos de las tapas. 3. Extraiga las tapas.
	<p>Para obtener un enfriamiento y un flujo de aire adecuados, reinstale siempre las tapas del chasis antes de poner en marcha el sistema. Si pone en funcionamiento el sistema sin las tapas bien colocadas puede dañar los componentes del sistema. Para instalar las tapas:</p> <ol style="list-style-type: none"> 1. Asegúrese primero de no haber dejado herramientas o componentes sueltos dentro del sistema. 2. Compruebe que los cables, las placas adicionales y otros componentes se hayan instalado correctamente. 3. Incorpore las tapas al chasis mediante los tornillos extraídos anteriormente, tensándolos firmemente. 4. Inserte el bloqueo de seguridad en el sistema y bloquéelo para impedir que pueda accederse al mismo sin autorización. 5. Conecte todos los cables externos y los cables de alimentación CA al sistema.
	<p>Si el sistema ha estado en funcionamiento, el microprocesador y el disipador de calor pueden estar aún calientes. También conviene tener en cuenta que en el chasis o en el tablero puede haber piezas cortantes o punzantes. Por ello, se recomienda precaución y el uso de guantes protectores.</p>
	<p>Existe peligro de explosión si la pila no se cambia de forma adecuada. Utilice solamente pilas iguales o del mismo tipo que las recomendadas por el fabricante del equipo. Para deshacerse de las pilas usadas, siga igualmente las instrucciones del fabricante.</p>
	<p>El sistema está diseñado para funcionar en un entorno de trabajo normal. Escoja un lugar:</p> <ul style="list-style-type: none"> • Limpio y libre de partículas en suspensión (salvo el polvo normal). • Bien ventilado y alejado de fuentes de calor, incluida la luz solar directa. • Alejado de fuentes de vibración. • Aislado de campos electromagnéticos fuertes producidos por dispositivos eléctricos. • En regiones con frecuentes tormentas eléctricas, se recomienda conectar su sistema a un eliminador de sobrevoltage y desconectar el módem de las líneas de telecomunicación durante las tormentas. • Provisto de una toma de tierra correctamente instalada. • Provisto de espacio suficiente como para acceder a los cables de alimentación, ya que éstos hacen de medio principal de desconexión del sistema.

Informazioni di Sicurezza importanti

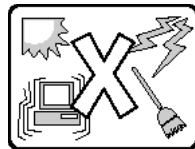
	<p>Rivolgersi ad un tecnico specializzato per la riparazione dei componenti dell'alimentazione di questo prodotto. È possibile che il prodotto disponga di più fonti di alimentazione.</p>
	<p>Non modificare o utilizzare il cavo di alimentazione in c.a. fornito dal produttore, se non corrisponde esattamente al tipo richiesto. Ad ogni fonte di alimentazione corrisponde un cavo di alimentazione in c.a. separato.</p>
	<p>L'interruttore attivato/disattivato nel pannello anteriore non interrompe l'alimentazione in c.a. del sistema. Per interromperla, è necessario scollegare tutti i cavi di alimentazione in c.a. dalle prese a muro o dall'alimentazione di corrente.</p>
	<p>PASSI DI SICUREZZA: Qualora si rimuovano le coperture del telaio per accedere all'interno del sistema, seguire i seguenti passi:</p> <ol style="list-style-type: none"> 1. Spegner tutti i dispositivi periferici collegati al sistema. 2. Spegner il sistema, usando il pulsante spento/acceso dell'interruttore del sistema. 3. Togliere tutte le spine dei cavi del sistema dalle prese elettriche. 4. Identificare e sconnettere tutti i cavi attaccati ai collegamenti I/O od alle prese installate sul retro del sistema. 5. Qualora si tocchino i componenti, proteggersi dallo scarico elettrostatico (SES), portando un cinghia anti-statica da polso che è attaccata alla presa a terra del telaio del sistema - qualsiasi superficie non dipinta - . 6. Non far operare il sistema quando il telaio è senza le coperture.
	<p>Dopo aver seguito i sei passi di SICUREZZA sopracitati, togliere le coperture del telaio del sistema come segue:</p> <ol style="list-style-type: none"> 1. Aprire e rimuovere il lucchetto dal retro del sistema qualora ve ne fosse uno installato. 2. Togliere e mettere in un posto sicuro tutte le viti delle coperture. 3. Togliere le coperture.
	<p>Per il giusto flusso dell'aria e raffreddamento del sistema, rimettere sempre le coperture del telaio prima di riaccendere il sistema. Operare il sistema senza le coperture al loro proprio posto potrebbe danneggiare i componenti del sistema. Per rimettere le coperture del telaio:</p> <ol style="list-style-type: none"> 1. Controllare prima che non si siano lasciati degli attrezzi o dei componenti dentro il sistema. 2. Controllare che i cavi, dei supporti aggiuntivi ed altri componenti siano stati installati appropriatamente. 3. Attaccare le coperture al telaio con le viti tolte in precedenza e avvitarle strettamente. 4. Inserire e chiudere a chiave il lucchetto sul retro del sistema per impedire l'accesso non autorizzato al sistema. 5. Ricollegare tutti i cavi esterni e le prolunghie AC del sistema.



Se il sistema è stato a lungo in funzione, il microprocessore e il dissipatore di calore potrebbero essere surriscaldati. Fare attenzione alla presenza di piedini appuntiti e parti taglienti sulle schede e sul telaio. È consigliabile l'uso di guanti di protezione.



Esiste il pericolo di un'esplosione se la pila non viene sostituita in modo corretto. Utilizzare solo pile uguali o di tipo equivalente a quelle consigliate dal produttore. Per disfarsi delle pile usate, seguire le istruzioni del produttore.



Il sistema è progettato per funzionare in un ambiente di lavoro tipo. Scegliere una postazione che sia:

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

Appendix B: Regulatory and Certification Information

The Kontron Carrier Grade Server TIGH2U system meets the specifications and regulations for safety and EMC defined in this chapter.

B.1 Safety Compliance

USA / Canada	UL 60950-1, 1 st Edition / CSA 22.2
Europe	Low Voltage Directive, 73/23/EEC TUV/GS to EN60950-1, 1 st Edition
International	CB Certificate and Report to IEC60950-1, 1 st Edition and all international deviations

B.2 Electromagnetic Compatibility

USA	FCC 47 CFR Parts 2 and 15, Verified Class A Limit
Canada	IC ICES-003 Class A Limit
Europe	EMC Directive, 2004/108/EC EN55022, Class A Limit, Radiated & Conducted Emissions EN55024 Immunity Characteristics for ITE 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 Surge EN61000-4-6 Conducted RF EN61000-4-8 Power Frequency Magnetic Fields EN61000-4-11 Voltage Fluctuations and Short Interrupts EN61000-3-2 Harmonic Currents EN61000-3-3 Voltage Flicker
Australia/New Zealand	EN55022, Class A Limit
Japan	VCCI Class A ITE (CISPR 22, Class A Limit)
Taiwan	BSMI Approval, CNS 13438, Class A and CNS13436 Safety
Korea	RRL Approval, Class A
China	CCC Approval, Class A (EMC and Safety)
Russia	Gost Approval (EMC and safety)
International	CISPR 22, Class A Limit, CISPR 24 Immunity

B.3 Electromagnetic Compatibility Notices

B.3.1 FCC (USA)

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 your Kontron sales representative

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 in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment to an outlet on a circuit other than the one to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

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.

Only peripherals (computer input/output devices, terminals, printers, etc.) that comply with FCC Class A or B limits may be attached to this computer product. Operation with noncompliant peripherals is likely to result in interference to radio and TV reception.

All cables used to connect to peripherals must be shielded and grounded. Operation with cables connected to peripherals that are not shielded and grounded may result in interference to radio and TV reception.

B.3.2 Industry Canada (ICES-003)

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 notice above:

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

B.3.3 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.

The CE marking on this product indicates that it is in compliance with the European Union's EMC Directive 89/336/EEC, and Low Voltage Directive 73/23/EEC. The TIGH2U Server is not suitable for use with a visual display workplace device according to the German Ordinance for Work with Visual Display Units because it has a glossy front.

B.3.4 VCCI (Japan)

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) from Information Technology Equipment. If this is used near a radio or television receiver in a domestic environment, it may cause radio interference. Install and use the equipment according to the instruction manual.

B.3.5 BSMI (Taiwan)

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

The BSMI Certification Marking and EMC warning is located on the outside rear area of the product.

B.3.6 Regulated Specified Components

To maintain the UL listing and compliance to other regulatory certifications and/or declarations, the following conditions must be adhered to and the following regulated components must be used. Interchanging or using other components will void the UL listing and other product certifications and approvals.

1. Add-in boards must have a printed wiring board flammability rating of minimum UL94V-1. Add-in boards containing external power connectors and/or lithium batteries must be UL recognized or UL listed. Any add-in board containing modem telecommunication circuitry must be UL listed. In addition, the modem must have the appropriate telecommunications, safety, and EMC approvals for the region in which it is sold.
2. Peripheral Storage Devices must be a UL recognized or UL listed accessory and TUV or VDE licensed. Maximum power rating of any one device is 19 watts. Total server configuration is not to exceed the maximum loading conditions of the power supply.

Appendix C: Getting Help

C.1 World Wide Web

Technicians and engineers from Kontron and/or its subsidiaries are available for technical support. We are committed to making our product easy to use and will help you use our products in your systems.

Please consult our Web site at [.http://us.kontron.com/support/](http://us.kontron.com/support/) for the latest product documentation, utilities, drivers and support contacts or to obtain an RMA/return form.

C.2 Telephone

(800) 480-0044

C.3 Email

support@us.kontron.com