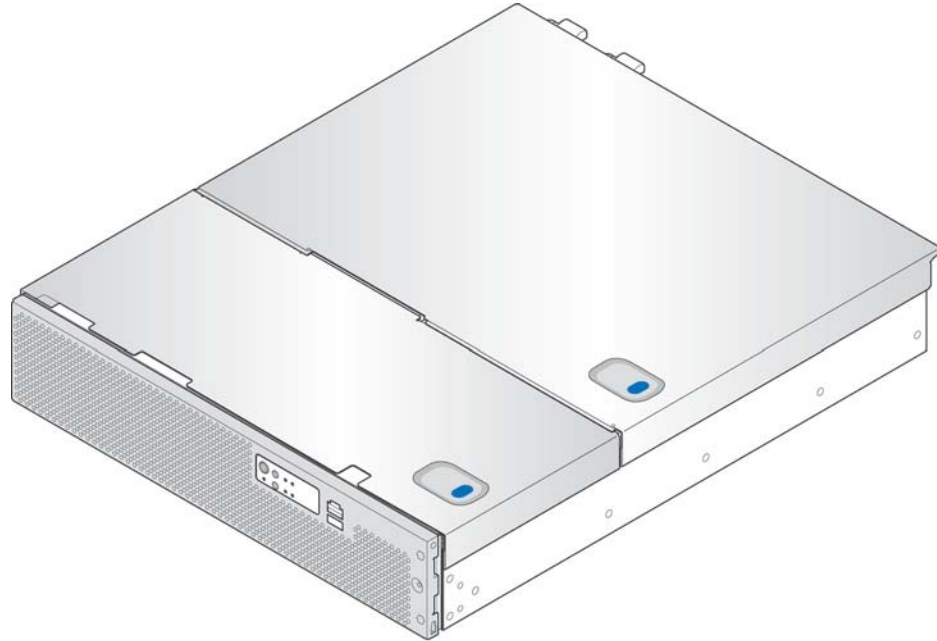# kontron

>> Kontron Installation and Maintenance Guide <<

TS000581

Kontron CG2100 Carrier Grade Server

Document Revision 1.2

» Table of Contents «

1 Introduction

1.1 About this Manual

Thank you for purchasing and using the Kontron CG2100 Carrier Grade Server.

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 followed by a list of accessories or other components you may need or want to purchase, instructions for how to add or replace components in the CG2100 server, and troubleshooting information.

NOTE: Always be sure to search for CG2100 on the Support website at http://us.kontron.com/support/ for the latest version of this manual with possible updates since this version was published.

1.2 Manual Organization

Chapter 2 Features
provides a brief overview of the CG2100 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 Standard Component Installations and Upgrades
provides instructions for adding and replacing 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 Optional Component Installation Procedures
provides instructions for adding optional components such as PCI add-in cards, personality modules, hardware RAID5 components, and an SD flash module. Use this chapter for step-by-step instructions and diagrams for installing components.

Chapter 5 Server Component Replacements
provides instructions for replacing components such boards and fans. Use this chapter for step-by-step instructions and diagrams for replacing components.

Chapter 6 Server Utilities
provides instructions for 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 S5520UR Technical Product Specification.

Chapter 7 Troubleshooting
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.

Chapter 8 Warranty
provides the warranty information

Appendix A: Safety Information
provides the emissions disclaimer, power supply information, temperature and ventilation guidelines, and safety cautions in multiple languages.

Appendix B: Regulatory and Certification Information
presents the regulatory and safety compliances and electromagnetic compatibility notices

Appendix C: Getting Help

1.3 What Your Server Includes

Your CG2100 server includes the following components:

- One 2U chassis
- One Intel® Server Board T5520UR with DDR3 memory slots (memory not included)
- Six removable hard drive carriers
- One DC or AC power subsystem: one hot-swappable power supply module and a power distribution board. (A filler panel is in the other power supply bay. For redundancy another separately orderable power supply module must be added.)
- Six fan assemblies for cooling the processor(s), DIMM(s), PCI slot(s), and other internal components in three cooling zones.
- A front panel board ,LED/switch board, and telco alarms module (TAM) board
- Internal cables and connectors

See Chapter 3 for initial installation and configuration instructions.

1.4 Product Accessories

The following list shows the separately orderable components and optional accessories available for inclusion in the initial order or to have as spares. Refer to the *CG2100 Carrier Grade Server Configuration Guide* for a complete list of orderable spares and options. The Configuration Guide can be found on the Kontron Support Website at http://us.kontron.com/support/ (search for CG2100, click on Product Downloads, then Ordering Guide).

- Six-core processor(s) from the Intel® Xeon® processor 5600 series and appropriate heat sink(s)
- RDIMM/UDIMM DDR3 memory
- SAS or SATA hard disk drives (system maximum = six HDDs)
- Hard disk drive carriers
- SAS/SATA control module for basic hard drive support
- Hardware RAID 5 and 6 kit
- Optional battery backup (IBBU) for hardware RAID
- SMART* embedded USB solid state drive (for use on front panel board and baseboard)
- SD flash module for up to two SD cards
- 2U PCIe active "butterfly" riser (three full-height/full-length PCIe slots and two low-profile PCIe slots
- 2U PCIe/PCI-X active "butterfly" riser (two full-height PCI-X 133 slots, one full-height/full-length PCIe slot, and two low-profile PCIe x4 slots)
- 2U PCIe passive riser (three full-height/full-length PCIe slots)
- Power cord(s)
- AC or DC power supply module (600W) for redundancy
- GCM4 network interface module to enable Intel® Remote Management Module 3(RMM3) functionality
- Rack mount kits

For information about the accessories, memory, processors, and ordering information, refer to the *CG2100 Carrier Grade Server Configuration Guide* on http://us.kontron.com/support/(search for CG2100, click on Product Downloads, then Ordering Guide).

For information about third-party hardware that has been tested and can be used with your system, refer to the *CG2100 Carrier Grade Server Tested Hardware and Operating System List* (THOL) on http://us.kontron.com/support/ (search for CG2100, click on Product Downloads, then Compatibility Matrix).

1.5 Additional Information and Software

If you need more technical information or information about the accessories that can be used with this CG2100 server, refer to the Technical Product Specifications (TPSs) for the system and the server board. The TPS documents are located on the Kontron support website at http://us.kontron.com/support. The system TPS provides in-depth technical information about the server. The server board TPS provides in-depth technical information about the server board, including BIOS settings and chipset information.

2 Features

This chapter briefly describes the main features of the Kontron CG2100 Carrier Grade Server. It provides a diagram of the product, a list of the server features, and a diagram showing the location of important components and connections on the server system.

Figure 1 shows the CG2100 server.

Figure 1. Kontron CG2100 Carrier Grade Server

Table 1 summarizes the major features of the server system.

Table 1. CG2100 Server Features

Feature	Description
Peripheral Interfaces	**External connections:** DB-15 video connector (rear) DB-15 alarms connector (rear) RJ45 COM2 connector (one front and one rear with same physical connection that allows front or rear use only) Two RJ45 10/100/1000 Mbps network connections (rear) Four USB 2.0 connectors (rear) One USB 2.0 connector (front) **Internal connections:** Two low-profile USB 2x5-pin headers for low-profile USB solid state drives, such as the SMART* Embedded USB Solid-State Drive. One header is located on the front panel board and the other header is on the baseboard. One DH-10 serial port B header Six serial ATA (SATA) II connectors Two I/O personality module connectors One GCM4/RMM3 connector for an optional Intel® Remote Management Module 3
Video	On-board ServerEngines* LLC Pilot II Controller Integrated 2D video controller 32 MB DDR2 Memory
LAN	Two 10/100/1000 Mbps Intel® 82575 PHYs
Expansion	Riser card options:

Feature	Description
Capabilities	Three full-height PCI Express* slots (passive) Five-slot PCI-X riser: Two full-height PCI-X slots with on-board PCI Express to PCI-X bridge chips One full-height PCI Express slot and two low-profile PCI Express slots Five-slot PCI Express riser: Three full-height PCI Express slots and two low-profile PCI Express slots
Hard Drive Options	Up to six 2.5-inch SAS or SATA hard drives SAS/SATA RAID drive controller SAS/SATA backplane
Peripherals	Up to two SD flash modules (front panel access)PCI riser card assembly bracket
Front Panel Buttons	Power on/off System reset Chassis ID NMI
Front Panel LEDs	Power status Chassis identification System status Fan status HDD activity/fault NIC activity Alarms (critical, major, minor, power)
Power Supply	Up to two 600W power supply modules (AC or DC)
Fans	Four redundant, hot-swappable CPU/memory area cooling fans Two redundant, hot-swappable PCI area cooling fans Two optional redundant power supply fans (with PS redundancy configuration only)
System Management	On-board ServerEngines* LLC Pilot II Controller Integrated Baseboard Management Controller (Integrated BMC), IPMI 2.0-compliant Integrated Super I/O on LPC interface

2.1 Server Components

Figure 2 shows the CG2100 server with top covers and front bezel removed to show the internal components.

Figure 2. CG2100 Carrier Grade Server Components
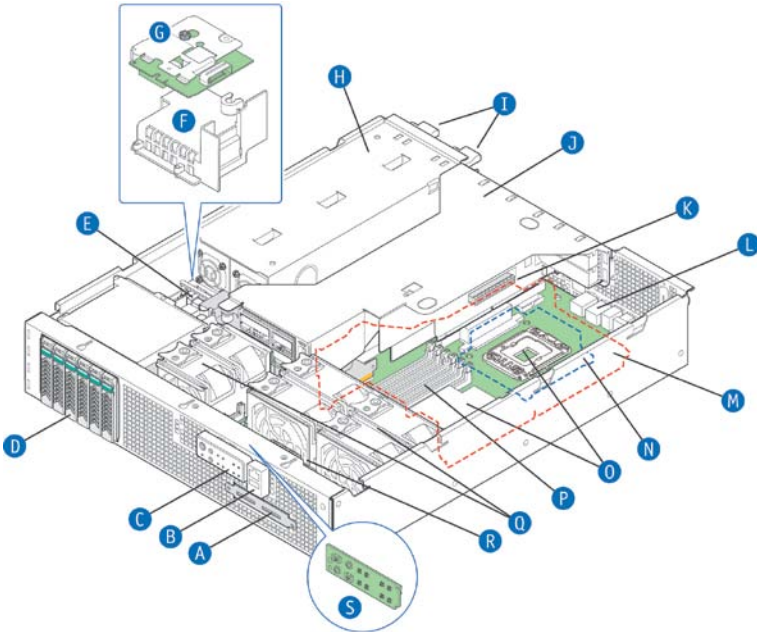
TS000582

Table 2. CG2100 Carrier Grade Server Components

Item	Description	Item	Description
A	SD flash modules	K	PCI riser options: 3x PCIe, 5x PCIe butterfly, or 2x PCI-X +3x PCIe butterfly
B	RJ45 COM2 port and USB port (2 connectors)	L	Rear I/O modules
C	Control panel and status/alarm indicators	M	Intel server board T5520UR (baseboard)
D	SAS or SATA hard disk drives (up to six)	N	DDR3 memory DIMM sockets (CPU 1 DIMM slots shown)
E	Power distribution board and SAS/SATA module location	O	Two CPUs (CPU 1 shown)
F	Power distribution board (PDB)	P	DDR3 memory DIMM sockets (CPU 2 DIMM slots shown)
G	SAS/SATA control module or SAS/SATA RAID module	Q	System fans
H	Power supply cage for two power supply modules	R	Front panel board with optional SD flash module and TAM module
I	Redundant hot-swappable power supply modules	S	LED/switch board and telco alarm LEDs
J	Riser card assembly (containing both full-height and low-profile riser cards		

2.2 CG2100 Server Front Panel

Figure 3 shows the front panel of the CG2100 server with the bezel installed.

Figure 3. CG2100 Server Front View (Bezel Installed)
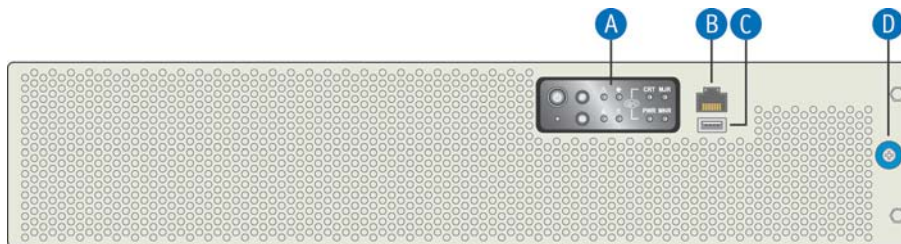
TS000583

Item	Description	Item	Description
A	Front panel control buttons and status indicator and telco alarm LEDs	**C**	USB port
B	RJ45 COM2 port	**D**	Bezel captive screw

Figure 4shows the front panel of the CG2100 server with the bezel removed.

Figure 4. CG2100 Server Front View (Bezel Removed)
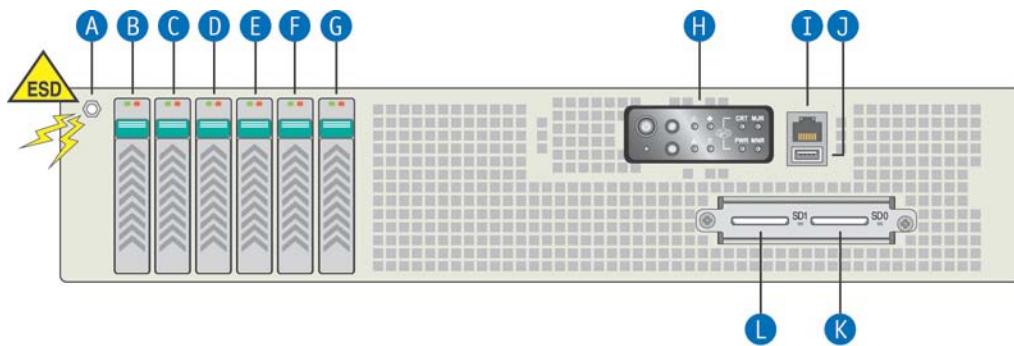
TS000584

Item	Description	Item	Description
A	ESD ground strap attachment	**G**	Hard drive bay 0
B	Hard drive bay 5	**H**	Front panel control buttons, status indicator and telco alarm LEDs
C	Hard drive bay 4	**I**	RJ45 serial port (COM2/serial B)
D	Hard drive bay 3	**J**	USB port
E	Hard drive bay 2	**K**	SD flash module 0 (optional)
F	Hard drive bay 1	**L**	SD flash module 1 (optional)

Figure 5 shows the CG2100 server control panel.

Figure 5. CG2100 Server Control Panel
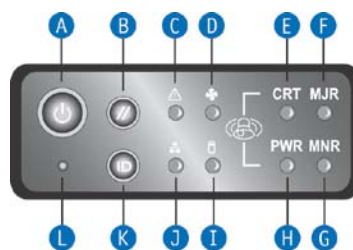
TS000585

Item	Description	Item	Description
A	Power button	G	Minor alarm (amber)
B	System reset button	H	Power alarm (amber)
C	Chassis information LED	I	HDD activity LED
D	Fan status LED	J	NIC1/NIC2 activity LED
E	Critical alarm (amber or red†)	K	Chassis ID button
F	Major alarm (amber or red†)	L	NMI button

† Critical and Major alarm indicators are bi-color LEDs that can be configured to be yellow or red by means of an SDR TAM setting. Yellow is the default color.

2.3 CG2100 Server Back Panel

Figure 6 shows the back panel of the CG2100 server.

Figure 6. CG2100 Server Rear View
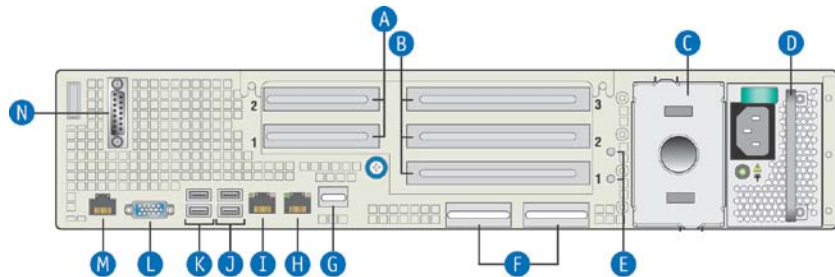
TS000588

Item	Description	Item	Description
A	Two low-profile PCIe add-in cards (or filler panels)	H	GbE NIC #2 connector[4]
B	Three full-length PCIe add-in cards (or filler panels)	I	GbE NIC #1 connector[4]
C	Power supply 2 (optional, filler panel shown)[1]	J	USB 2 and 3 (#3 on top)
D	Power supply 1 (AC power supply shown)[1]	K	USB 0 and 1 (#1 on top)
E	Two ground studs (used for DC-input system)	L	Video connector
F	Two personality card slots (for I/O expansion modules)[2]	M	RJ45 serial port (COM2/serial B)

Item	Description	Item	Description
G	GCM4 NIC module to enable RMM3 functionality (optional, filler panel shown)[3]	N	Alarms cable connector

NOTES:

1. Figure 6 shows the AC configuration. Items C and D can also be configured for DC operation. The filler panel is mandatory in non-redundant configurations.

2. Only one personality card can be installed at any time. These slots can be used for an optional Gbit Ethernet port or an external SAS port. Dual- and four-port 10/100/1000 Ethernet modules use both openings. A four-port external SAS module uses only one opening. If neither option is installed, filler panels occupy these slots.

3. If the RMM3/GCM4 NIC is not used, the filler panel occupies this space

4. The GbE ports are only designed to pass intra-building lightning surge when used with shielded cabling, which must be grounded at both ends.

2.4 Front Panel Board

The front panel (FP) board is located behind the front bezel and in front of the 80 mm CPU fans. The FP Board provides the following feature set:

- Three USB ports used for the embedded USB solid-state drive connector, the combo RJ45 and USB connector, and the SD flash card module
- Serial RS-232 signals
- Control circuitry for driving the NIC activity LED, the system status LED, the power LED and the disk activity LED, all located on the LED/switch board
- Control circuitry for driving a composite fan fault LED to the LED/switch board
- On-board LED indicating USB flash drive activity
- System power state and status indicators -- power, reset, and NMI switches
- Control circuitry for driving telco alarm activity LEDs to the LED/switch board
- Telco alarms -- power, critical, major, and minor switches

2.5 LED/Switch Board

The LED/switch board provides input selection switches and LED status indicators for the server system. The LED/switch board is connected to the FP board and receives status and alarm signals from it. The board has the following features:

- Connects the front panel board signals to the front panel. There are four switches and ten LEDs. The power status LED and the chassis ID LED are embedded in the switch and the other eight are on the control panel. (See Figure 5.)
- On board switches for power, reset, ID, and NMI
- On board LEDs to indicate power status, chassis ID, system status, HDD activity/fault, NIC activity, and fan status
- On board LEDs to indicate power, critical, major, and minor alarms

2.6 Hard Disk Drives

The CG2100 server supports up to six hot-swappable hard drive carriers accessible from the front of the chassis with the front bezel removed. Both SAS and SATA drives are supported.

Drives can consume up to 12W of power, each. Drives used in this server must be
specified to run at a maximum ambient temperature of 40°C.

2.7 SD Flash Module

There is an optional front-accessible USB SD flash module that supports two SD cards.
For a list of validated SD cards to use with this module, see the Tested Hardware and
Operating System List (THOL) on the Kontron website at http://us.kontron.com/support/
(search for CG2100, click on Product Downloads, and then Compatibility Matrix).

2.8 Server Board (Baseboard)

The CG2100 server uses the Intel® server board T5520UR for the baseboard. The
processors and memory DIMMs are on the server board and support for several optional
accessories, such as a 280-pin Intel® adaptive riser card slot super slot, personality
modules, and GCM4, also .

Figure 7 shows the key component and connectors on the T5520UR server board.

Figure 7. Baseboard Components and Connectors
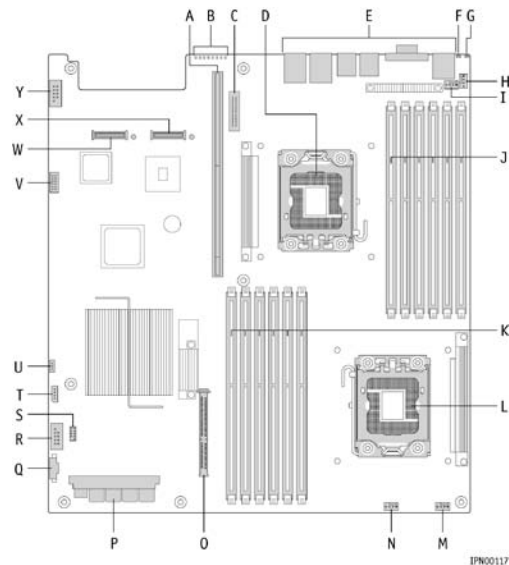
ITEM	Description	ITEM	Description

ITEM	Description	ITEM	Description
A	280-pin Intel® adaptive riser card slot	N	Fan header
B	POST code LEDs	O	Bridge board connector
C	GCM4 NIC connector	P	Main power connector
D	CPU1	Q	Power Supply SMBus connector
E	Rear panel I/O	R	USB header
F	System status LED	S	Low-profile USB solid-state drive header
G	ID LED	T	Fan header
H	Fan header	U	LCP IPMB header
I	Fan header	V	Serial port COM2 connector
J	CPU1 DIMM slots	W	Personality module connector
K	CPU2 DIMM slots	X	Personality module connector
L	CPU2	Y	Internal USB header
M	Fan header		

2.9 Riser Card Assembly

The CG2100 server has a PCI riser assembly that supports the installation of both PCI-X and PCI Express* add-in cards. There are three riser card options that can each use the super slot on the T5520UR server board (the baseboard).

Once PCI add-in cards are installed and the riser card assembly is remounted in the chassis, the cards are accessible from the rear of the server chassis. There are two slots for low profile PCIe add-in cards and three slots for full-length PCI-X/PCIe add-in cards.

Figure 8 shows the possible PCI card configurations with the different riser card options.

Figure 8. Riser Card Configuration Options
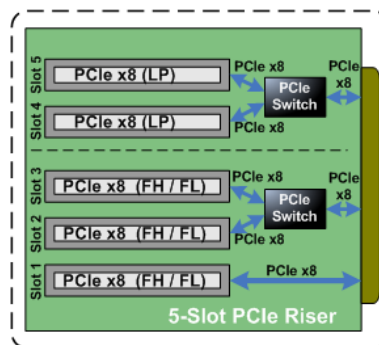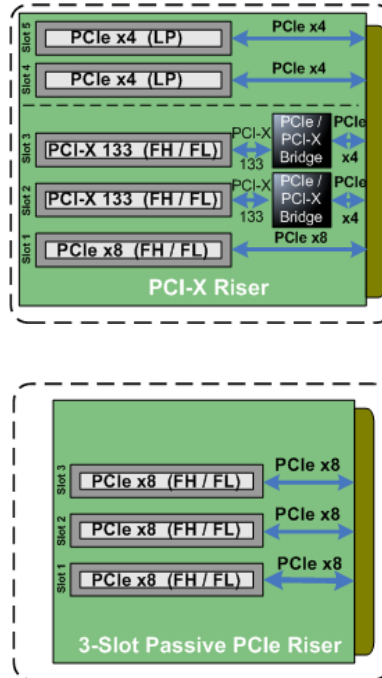
2.10 Ethernet NIC Ports

The CG2100 server has two GbE NIC ports mounted on the baseboard that are accessible from the rear of the chassis. Additional rear-accessible GbE NIC ports can be added to the system by using

- Full-height PCI-X/PCIe add-in cards or low-profile PCIe add-in cards
- Personality module slots accessible from the rear of the chassis

The GbE personality card options are:

- Dual-port 10GbE I/O module
- Quad-port GbE I/O module

2.11 Remote Management Module 3

RMM3 is implemented on the iBMC on the server board. To use this feature, a separately-orderable GCM4 NIC module must be installed.

2.12 Power Supply Subsystem

The power supply subsystem consists of up to two AC or DC power supply modules (two needed for redundancy) and a power distribution board (PDB). One power supply module is included with the server with a filler panel in the second power supply slot.

The power supply module is rated for 600W output capability in full AC or DC input voltage range. The minimum steady-state DC input voltage at which the equipment remains fully operational is -38 VDC.   The nominal operating voltage of the DC system is -48 VDC.

2.13 System Cooling

There are three main cooling areas in the CG2100 server as illustrated in Figure 9.

- CPU2 and memory (blue in Figure 9) with two redundant , hot-swappable 80mm fans
  These fans facilitate the air flow through the front bezel, over the server board, CPU2, and out through the rear of the chassis.
- CPU1 and memory (green in Figure 9) with two redundant, hot-swappable 80mm fans
  These fans facilitate the air flow through the front bezel, over the server board, CPU1, and out through the rear of the chassis.
- PCI riser assembly (red in Figure 9) with two redundant, hot-swappable 60mm fans
  These fans facilitate air flow through the fans, over the server board, any PCI add-in cards in the riser assembly, and out through the rear of the chassis.

There is also another cooling area with two fans in redundant power supply configurations for the power supply subsystem. These fan(s) also cool the hard disk drives. The air flow is adequate even with a single power supply module installed as long as the filler panel is installed in the unused power supply slot.

Figure 9. CG2100 Server Cooling Areas
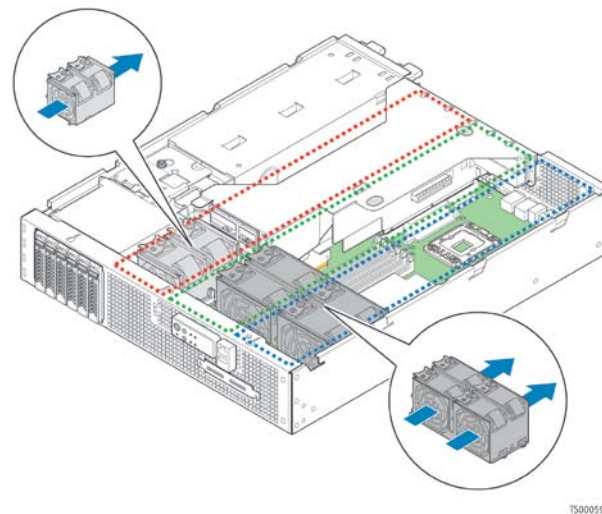
The three-zone cooling subsystem is sized to provide cooling for:

- Up to two server board processors
- Up to 96 GB of DDR3 memory
- Up to six SAS/SATA hard disk drives
- Up to five PCI add-in cards consuming a maximum of 25W for each full-height PCI-X/PCIe add-in card and 10W 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.

2.14 Processors and Memory DIMMs

NOTE: To avoid integration difficulties and possible board damage, your server must meet the requirements outlined below. For a list of qualified processors refer to the Configuration Guide located on the support website at http://us.kontron.com/support/ (search for CG2100, click on Product Downloads,

Processors

The T5520UR server board accommodates two six-core processors from the Intel® Xeon® processor 5600 series. These processors can be ordered from Kontron using the Kontron part numbers listed in the *CG2100 Carrier Grade Server Configuration Guide*.

Memory

The Intel® QuickPath Memory Controller integrated in the Xeon 5600 processor supports DDR3 800, DDR3 1066 and DDR3 1333 memory technologies. The memory controller supports both registered DIMMs (RDIMMs) and unbuffered DIMMs (UDIMMs). RDIMMs must be ECC only, while UDIMMs can be ECC or non-ECC. RDIMMs and UDIMMs cannot be mixed. ECC and non-ECC UDIMMs can be mixed, but the presence of a single non-ECC UDIMM disables ECC functionality.

The T5520UR server board supports six DDR3 memory channels (three per processor socket) with two DIMMs per channel, thereby supporting up to 12 DIMMs and a 96GB maximum memory capacity when two processors are installed. Memory modules of mixed speed are supported by automatic selection of the highest common frequency of all memory modules.

3 Standard 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, "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.**

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

System References

All references to left, right, front, rear, 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 from the front or rear panels.

Removing the Chassis Covers

The CG2100 server must be operated with the top covers in place to ensure proper cooling. You will need to remove one or both top covers to add or replace components inside the chassis that are not hot-swappable from the front or rear panels.

> **CAUTION: 5V standby power is present inside the chassis whenever the power supply module(s) are connected to a power source. Before removing either top cover, power down the server and unplug all peripheral devices and the power cable.**

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, "Appendix A: Safety Information".

2. Turn off all peripheral devices connected to the server.
   Turn off the server.

3. Disconnect the power cord(s).

Figure 10 shows the top covers and how they are removed.

Removing the Front Cover

1. Remove the shipping screw on the left side edge of the cover, if it is still attached, and save it for future use. (Figure 10, "A")

2. While holding the blue button at the top right of the front cover (Figure 10, "B"), slide the cover forward until it stops.

3. Lift the cover straight up to remove it from the chassis.

Removing the Back Cover

1. Remove the shipping screw on the left side edge of the cover, if it is still attached, and save it for future use. (Figure 10, "A")

2. While holding the blue button at the top right of the rear cover (Figure 10, "B"), slide the cover backwards until it stops and the edge clears the lock bracket on the rear panel of the chassis.

3. Lift the cover straight up to remove it from the chassis.

Figure 10. Removing the Covers
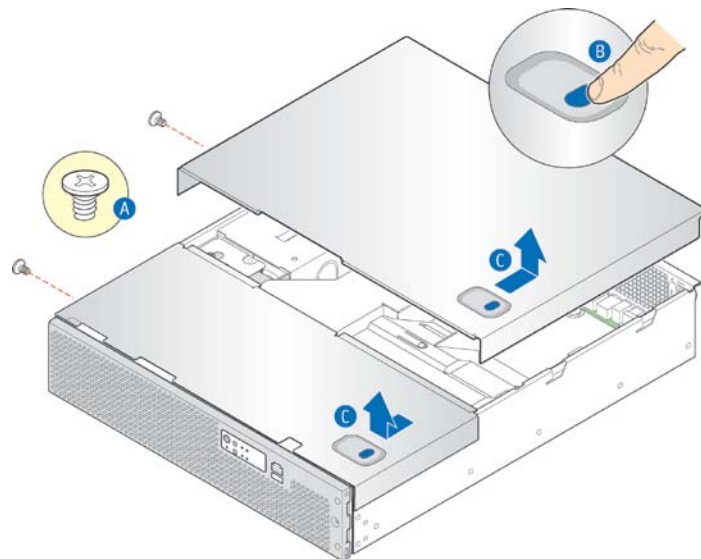
Re-installing the Chassis Covers

When you are finished working inside the chassis, you must put the cover(s) back on before turning the server back on. This step is required to ensure proper cooling.

If you are reinstalling both covers, start with the back cover and then install the front cover.

Re-Installing the Back Cover

1. Starting from the rear of the chassis, align the tab on the rear left edge of the back cover with the lock bracket on the outside of the rear panel and place the cover down over the chassis with the side edges outside the chassis walls.

2. Slide the cover forward until it clicks into place.

3. Install the shipping screw if tooled entry is required or if the unit will be shipped.

4. Reconnect all peripheral devices and the power cord(s).

Re-Installing the Front Cover

1. Place the front cover over the chassis with the side edges of the cover outside the chassis walls.

2. Slide the front cover toward the back cover until the tabs fit together and the front cover is firmly in place.

3. Install the shipping screw if tooled entry is required or if the unit will be shipped.

4. Reconnect all peripheral devices and the power cord(s).

> **CAUTION: This unit must have both covers installed when it is running to ensure proper cooling.**

Removing the Front Bezel

You need to remove the front bezel for tasks such as:

- Installing or removing hard disk drives or an SD flash card
- Observing the individual hard disk drive activity/fault indicators
- Replacing the control panel LED/switch board

The server does not have to be powered down just to remove the front bezel.

1. Loosen the captive bezel retention screw on the right side of the bezel ("A").

2. Rotate the bezel to the left to free it from the pins on the front panel, as shown in Figure 11 ("B") and remove it.

Figure 11. Removing the Front Bezel
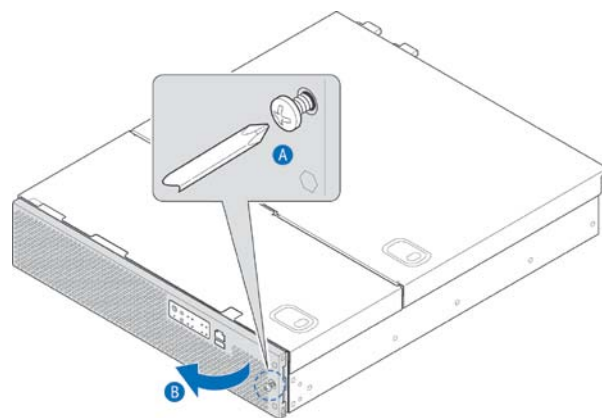
Re-Installing the Front Bezel

1. Insert the tabs on the left side of the bezel into the slots on the front panel of the chassis.

2. Move the bezel toward the right of the front panel and align it on the front panel pins.

3. Snap the bezel into place and tighten the retention screw to secure it.

Removing the Riser Card Assembly

The riser card assembly cage has to be removed from the chassis to perform tasks such as:

- Installing or replacing the riser card and any PCI add-in card(s)
- Working with any components on the server board that are near the riser card assembly
- Removing the air duct to install or replace processors or memory DIMMs
- Removing the bridge board
- Removing the server board

To remove the riser card assembly:

1. Power down the server and remove all peripheral devices and the power cord(s)

2. Remove the back chassis cover. For instructions, see "Removing the Chassis Covers" in Section 3.2.

3. Loosen the blue captive thumb screw (Figure 12, "B") at the rear of the chassis. Notice the guide pins that will be used to re-install the riser assembly into the chassis. ("A")

4. Lift the riser card assembly out of the chassis.

5. If there is a riser card in the assembly, rest the assembly upside-down with the sheet metal cover on the bottom so the assembly is not resting on the card edge.

Figure 12. Riser Card Assembly Retention Screw
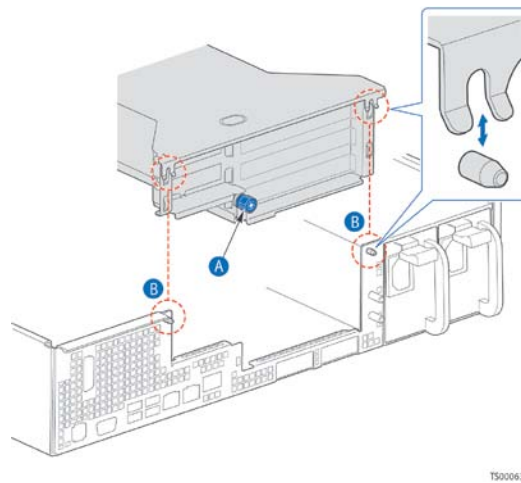
Re-Installing the Riser Card Assembly

To re-install the riser card assembly:

1. Position the riser front tab guide hole over the guide pin on the server board. See Figure 13, ("C").

2. Make sure the forks on the back of the assembly rest securely on the guide pins on the rear of the chassis ("B").

3. Using the blue touch points on the top of the assembly (A), press down to mate the riser card with the header on the server board.

NOTE: To avoid damaging the card edge, be sure that the card is lined up straight with the header, not on an angle.

4. Tighten the blue retention screw on the rear of the chassis. See Figure 12.

5. Replace the chassis back cover. For instructions see "Re-Installing the Back Cover" in Section 3.2.

Figure 13. Installing the Riser Card Assembly

TS000590
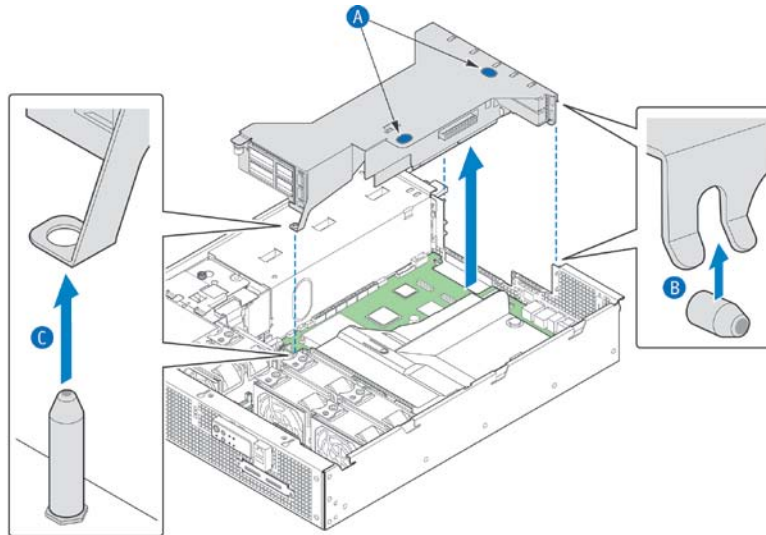
Removing the Processor Air Duct

The processor air duct is black plastic with rubber grommets that reduce vibration. It must be removed to access the processors and the memory DIMMs. The air duct is required to ensure proper air flow within the chassis, so be sure that it is in place again before re-installing the back cover.

To remove the processor air duct:

1. Power down the server and remove all peripheral devices and the power cord(s)

2. Remove the back chassis cover. For instructions, see "Removing the Chassis Covers".

3. Remove the riser card assembly. For instructions, see "Removing the Riser Card Assembly".

4. Slide the air duct back to free it from the fan bracket and towards the center of the chassis to free it from the edge. (Figure 14, "A")

5. Lift the air duct straight up to remove it.

Figure 14. Removing the Processor Air Duct

TS000632
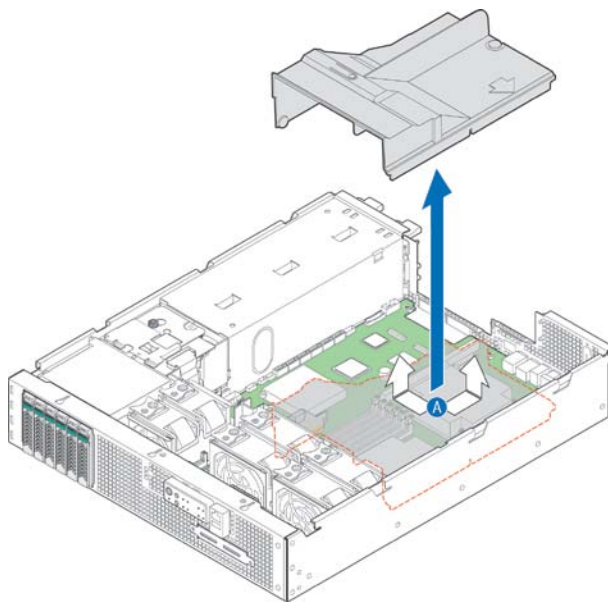
Re-Installing the Processor Air Duct

The air duct is required to ensure proper air flow within the chassis, so be sure that it is in place again before re-installing the back cover.

1. Place the processor air duct over the processor sockets and DIMMs, being careful not to pinch any cables beneath the edges of the air duct.

2. Slide the air duct flush with the chassis wall and the fan bracket.

3. Re-install the riser card assembly. For instructions, see "Re-Installing the Riser Card Assembly".

4. Replace the chassis back cover. For instructions, see "Re-Installing the Back Cover".

3.3 Internal System Components Configuration and Installation Procedures

This section covers separately-orderable components that must be installed for your server to operate. It also covers replacing these components and where relevant, such as with memory DIMMs, how to configure them.

You install your separately-orderable DIMMs and processors on the Intel® Server Board T5520UR, which is the baseboard for this server.

> NOTE: Be sure to read the following detailed information about the configuration rules and memory feature options before you begin.

Configuring Memory DIMMs

The memory DIMM slots are located in two separate banks on the T5520UR server board. Detailed information about the memory subsystem in the CG2100 server can be found in the *Intel® Server Board S5520UR Technical Product Specification* located on the Kontron support website http://us.kontron.com/support (search for CG2100, click on Product Downloads, then Technical Info). The following sections give an overview of the memory system.

Intel® QuickPath Memory Controller

The Intel® Xeon® Processor 5600 Series has an integrated memory controller in its package. The Intel® QuickPath Memory Controller supports DDR3 800, DDR3 1066 and DDR3 1333 memory technologies. The memory controller requires the following configuration rules:

- Both registered DIMMs (RDIMMs) and unbuffered DIMMs (UDIMMs)
- RDIMMs must be ECC only, while UDIMMs can be ECC or non-ECC
- RDIMMs and UDIMMs cannot be mixed
- ECC and non-ECC UDIMMs can be mixed, but the presence of a single, non-ECC UDIMM disables ECC functionality
- Channel Independent mode is the only memory RAS mode that supports non-ECC DIMMs.
-

DIMMs with different timing parameters can be installed on different slots within the same channel. But the timing that supports the slowest DIMM is applied to all. As a consequence, faster DIMMs operate at timings supported by the slowest DIMM populated. The same interface frequency is applied to all DIMMs on all channels.

Supported Memory

The Intel® Server Board T5520UR supports six DDR3 memory channels (three per processor socket) with two DIMMs per channel. Up to 12 DIMMs can be used with dual-processor sockets giving a maximum memory capacity of 96 GB.

The server board supports DDR3 800, DDR3 1066, and DDR3 1333 memory technologies. Memory modules of mixed speed are supported by automatic selection of the highest common frequency of all memory modules.

Publishing System Memory

The BIOS displays the "Total Memory" of the system on the diagnostic screen at the end of POST if "Display Logo" is disabled in the BIOS setup. This is the total size of memory discovered by the BIOS during POST and it is the sum of the individual installed DDR3 DIMMs in the system. The BIOS provides the total memory of the system in the main page of the BIOS setup.

The BIOS displays the "Effective Memory" of the system in the BIOS setup. The term "Effective Memory" refers to the total size of all DDR3 DIMMs that are active (not disabled) and not used as redundant units.

Memory Map and Population Rules

The nomenclature for DIMM sockets implemented on the Intel® Server Board T5520UR is shown in Table X.

Table 3. Memory Map

Processor Socket 1						Processor Socket 2					
Channel A		Channel B		Channel C		Channel D		Channel E		Channel F	
A1	A2	B1	B2	C1	C2	D1	D2	E1	E2	F1	F2

Memory Population Rules

The T5520UR server board memory is implemented according to the following rules

- DIMMs are organized into physical slots on DDR3 memory channels that belong to processor sockets.
- The memory channels from processor socket 1 are identified as Channel A, B, and C. The memory channels from processor socket 2 are identified as Channel D, E, and F.

- The silk screened DIMM slot identifiers on the board provide information about the channel and the processor to which they belong.
  For example, DIMM_A1 is the first slot on Channel A on processor 1; DIMM_D1 is the first DIMM socket on Channel D on processor 2.
- The memory slots associated with a given processor are unavailable if the given processor socket is not populated.
- A processor can be installed without populating the associated memory slots, provided the other processor is installed with associated memory. In this case, the memory is shared by the processors. However, the platform suffers performance degradation and latency because of the remote memory accesses.
- Processor sockets are self-contained and autonomous. However, all memory subsystem support (i.e., Memory RAS, Error Management, etc.) in the BIOS setup are applied commonly across processor sockets.

Memory RAS

The server board supports the following memory RAS features:

- Channel Independent Mode
- Channel Mirroring Mode

The memory RAS offered by the Intel® Xeon® Processor 5600 Series is done at the channel level, i.e., during mirroring, channel B mirrors channel A. All DIMM matching requirements are on a slot- to-slot basis on adjacent channels. For example, to enable mirroring, corresponding slots on channel A and channel B must have DIMMS of identical parameters. But DIMMs on adjacent slots on the same channel do not need identical parameters.

If one socket fails the population requirements for RAS, the BIOS sets all six channels to the Channel Independent mode. One exception to this rule is when all DIMM slots for a socket are empty, for example, when only sockets A1, B1, C1 are populated, mirroring is possible on the platform.

The memory slots of DDR3 channels from the Intel® Xeon® Processor 5600 Series should be populated in a "farthest first" fashion. This holds true even in the Channel Independent mode. This means, for example, that A2 cannot be populated/used if A1 is empty.

Channel Independent Mode

In Channel Independent mode, multiple channels can be populated in any order (e.g., channels B and C can be populated while channel A is empty). Also, DIMMs on adjacent channels need not have identical parameters. Therefore, all DIMMs are enabled and used in the Channel Independent mode.

Adjacent slots on a DDR3 channel for the Intel® Xeon® Processor 5600 Series do not need matching size and organization. However, the speed of the channel is configured to the maximum common speed of the DIMMs.

Single channel mode is established by using the Channel Independent mode and populating DIMM slots from channel A only.

Channel Mirroring Mode

The Intel® Xeon® Processor 5600 Series supports channel mirroring to configure available channels of DDR3 DIMMS in a mirrored configuration. Unlike channel sparing, the mirrored configuration is a redundant image of the memory, and can continue to operate despite the presence of sporadic uncorrectable errors.

Channel mirroring is a RAS feature in which two identical images of memory data are maintained, thus providing maximum redundancy. On Intel® Xeon® Processor 5600 Series based server boards, mirroring is achieved across channels. Active channels hold the primary image and the other channels hold the secondary image of the system memory.

The integrated memory controller in the Intel® Xeon® Processor 5600 Series alternates between both channels for read transactions. Write transactions are issued to both channels under normal circumstances.

When the system is in the Channel Mirroring mode, channel C and channel F of socket 1 and socket 2 respectively are not used. Thus, the DIMMs populated on these channels are disabled and do not contribute to the available physical memory. For example, if the system is operating in Channel Mirroring mode and the total size of the DDR3 DIMMs is 1.5 GB (3 x 512 MB DIMMs), then the active memory is only 1 GB.

Because the available system memory is divided into a primary image and a copy of the image, the system memory is reduced by at least one-half. For example, if the system is operating in the Channel Mirroring mode and the total capacity of the DDR3 DIMMs is 1 GB, then the effective size of the memory is 512 MB because half of the DDR3 DIMMs are the secondary images.

For channel mirroring to work, DDR3 DIMMs in the same slots on adjacent channels must be identical in terms of technology, number of ranks, and size. DIMMs within the channel do not need matching parameters.

The BIOS setup provides an option to enable mirroring if the current DIMM population is valid for channel mirroring. When memory mirroring is enabled, the BIOS attempts to configure the memory system, if the BIOS finds that the DIMM population is not suitable for mirroring, it falls back to the default Channel Independent mode with maximum memory interleaving.

Minimum DDR3 DIMM Population for Channel Mirroring

Memory mirroring has the following minimum requirements:

- **Channel configuration**: Mirroring requires the first two adjacent channels to be active.
- **Socket configuration**: Mirroring requires that both socket 1 and socket 2 DIMM population meets the requirements for mirroring mode. The platform BIOS configures the system in mirroring mode only if both nodes qualify. The only exception to this rule is when all socket 2 DIMM slots are empty.

Because of these requirements, the minimal DIMM population is {A1, B1}. In this configuration, processor cores on socket 2 suffer memory latency from the remote memory on socket 1. An optimal DIMM population for channel mirroring in a DP server platform is {A1, B1, D1, E1}. {A1, B1} must be identical and {D1, E1} must be identical. However, DIMMs do not need to be identical across sockets.

In this configuration, DIMMs {A1, B1} and {D1, E1} operate as (primary copy, secondary copy) pairs independent from each other. Therefore, the optimal number of DDR3 DIMMs for channel mirroring is a multiple of four, arranged as mentioned above. The BIOS disables all non-identical DDR3 DIMMs or pairs of DDR3 DIMMs across the channels to achieve symmetry and balance between the channels.

Mirroring DIMM Population Rules Variance Across Nodes

Memory mirroring in Intel® Xeon® Processor 5600 Series-based platforms is channel mirroring. Mirroring is not done across sockets, so each socket may have a different memory configuration. Channel mirroring in socket 1 and socket 2 is mutually independent. As a result, if channel A and channel B DIMMs are populated identically and channel D and channel E DIMMs are identically populated, then mirroring is possible even if the DIMMs in each socket are not identical with the DIMMs in the other socket, i.e., for channel A and channel D.

For example, if the system is populated with six DIMMS {A1, B1, A2, B2, D1, E1}, channel mirroring is possible. Both socket populations shown in the following table are valid.

Table 4. Mirroring DIMM Population Rules Variance across Nodes

A1	A2	B1	B2	C1	C2	D1	D2	E1	E2	F1	F2	Mirroring Possible?
P		P				P		P				YES
P	P	P	P			P		P				YES

Memory Upgrade Rules

Upgrading the system memory requires careful positioning of the DDR3 DIMMs based on the following factors:

- Current RAS mode of operation
- Existing DDR3 DIMM population
- DDR3 DIMM characteristics

- Optimization techniques used by the Intel® Xeon® Processor 5600 Series to maximize memory bandwidth

In the Channel Independent mode, all DDR3 channels operate independently. Slot to slot DIMM matching is not required across channels, that is, A1 and B1 do not have to match with each other in terms of size, organization, and timing. DIMMs within a channel can be of different size and organization but they operate in the maximum common frequency. The Channel Independent mode can also be used to support a single DIMM configuration in channel A and in the single channel mode.

The following general rules must be observed when selecting and configuring memory to obtain the best performance from the system:

- Mixing RDIMMs and UDIMMs is not supported.
- When CPU socket 1 is empty, any DIMM memory in channel A through channel C is unavailable.
- When CPU socket 2 is empty, any DIMM memory in channel D through channel F is unavailable.
- If both processor sockets are populated but channel A through channel C are empty, the platform can still function with remote memory in channel D through channel F. However, platform performance suffers latency with remote memory.
- The memory operational mode is configurable at the channel level. Two modes are supported: Independent Channel and Mirrored Channel.
- The memory slots of each DDR3 channel from the Intel® Xeon® Processor 5600 Series are populated on a farthest first fashion. This holds true even for the Independent Channel mode. Therefore, if A1 is empty, A2 cannot be populated or used.
- The BIOS selects Independent Channel mode by default, which enables all installed memory on all channels simultaneously.
- Mirrored Channel mode is not available when only one processor is populated (CPU socket 1).
- If both processor sockets are populated and the installed DIMMs are associated with both processor sockets, then a given RAS mode is selected only if both of the processor sockets are populated to conform to that mode.
- The minimum memory population possible is one DIMM in slot A1. In this configuration, the system operates in the Independent Channel mode. RAS is not available.
- If both processor sockets are populated, the next upgrade from the Single Channel mode installs DIMM D1. This configuration results in an optimal memory thermal spread, as well as Non-Uniform Memory Architecture (NUMA)-aware interleaving. The BIOS selects the Independent Channel mode of operation.

- If only one processor socket is populated, the next upgrade from the Single Channel mode is installing DIMM B1 to allow channel interleaving. The system operates in the Independent Channel mode.
- The DIMM parameter-matching requirements for memory RAS is local to a socket. For example, while Channels A/B/C can have one match of timing, technology, and size, channels D/E/F can have a different set of parameters and RAS still functions.
- DDR3 DIMMs on adjacent slots on the same channel do not need to be identical.
- For the Mirrored Channel mode, the memory in channels A and B of socket 1 must be identical and channel C should be empty. Similarly, the memory in Channels D and E of Socket 2 must be identical and Channel F should be empty.

    a. The minimum population upgrade for the Mirrored Channel mode is DIMM A1, DIMM B1, DIMM D1, and DIMM E1 with both processor sockets populated. DIMM A1 and DIMM B1 as a pair must be identical, and so must DIMM D1 and DIMM E1, but the DIMMs on different processor sockets do not need to be identical.
    Failure to comply with these rules results in a switch back to Independent Channel mode.

    b. If Mirrored Channel mode is selected and the third channel of each processor socket is not empty, the BIOS disables the memory in the third channel of each processor socket.

- In the Mirrored Channel mode, both sockets must simultaneously satisfy the DIMM matching rules on their respective adjacent channels. If the DDR3 DIMMs on adjacent channels of a socket are not identical, the BIOS configures both the processor sockets to default to the Independent Channel mode. If DIMM D1 and DIMM E1 are not identical, then the system switches to the Independent Channel Mode.

Installing Memory DIMMs

NOTE: To reduce the risk of electrostatic discharge (ESD) damage to the processor or the DIMM, be sure to follow these procedures:

1. Touch the metal chassis before touching the DIMM or server board.
2. Keep part of your body in contact with the metal chassis to dissipate the static charge while handling the DIMM.
3. Avoid moving around unnecessarily.
4. Use a ground strap attached to the front panel (with the bezel removed).

To install DIMMs in the T5520UR server board slots, follow these steps:

1. Remove the back chassis cover. For instructions see "Removing the Back Cover".

2. Remove the riser card assembly (so the processor air duct can be removed). For instructions see "Removing the Riser Card Assembly".

3. Remove the processor air duct. For instructions, see "Removing the Processor Air Duct".

4. Locate the DIMM slots you want to use, depending on which processor the memory is for. See Figure 7 and Figure 15.
    If you are replacing an installed DIMM rather than installing one in an empty slot, see "Replacing or Removing Memory DIMMs" for instructions and then return to step 5 here.

   5. Open both DIMM slot levers. (Figure 15, "A")

   6. Note the location of the alignment notch. ("B")

   7. Insert the DIMM, making sure the connector edge of the DIMM aligns correctly with slot. ("E")

   8. 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 the notch on the DIMM edge. ("E")

9. Replace the air duct, riser card assembly, and back chassis cover if you have completed all work inside of the server.

Figure 15. Memory DIMM Installation

Replacing or Removing Memory DIMMs

NOTE: To reduce the risk of electrostatic discharge (ESD) damage to the processor or the DIMM, be sure to follow these procedures:

1. Touch the metal chassis before touching the DIMM or server board.
2. Keep part of your body in contact with the metal chassis to dissipate the static charge while handling the DIMM.
3. Avoid moving around unnecessarily.
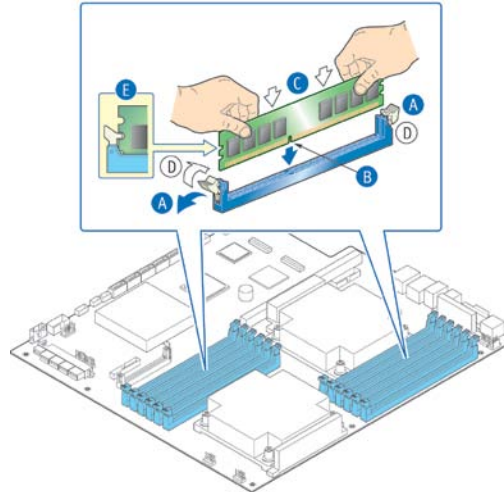4. Use a ground strap attached to the front panel (with the bezel removed).

To remove a DIMM from the T5520UR server board, follow these steps:

1. Remove the back chassis cover. For instructions see "Removing the Back Cover".

2. Remove the riser card assembly (so the processor air duct can be removed). For instructions see "Removing the Riser Card Assembly".

3. Remove the processor air duct. For instructions, see "Removing the Processor Air Duct".

4. Open the DIMM slot levers for the DIMM you want to remove.

5. Using both hands, hold the DIMM by the edges and lift it up from the slot. Store the DIMM in an anti-static package.

6. If you are installing a replacement DIMM in this slot, return to Step 5 in "Installing Memory DIMMs".
   Otherwise, replace the air duct, riser card assembly, and back chassis cover if you have completed all work inside the server.

Adding or Replacing a Processor

CAUTION: The processor must be appropriate: You could damage the server board if you install a processor that is inappropriate for your server. Refer to the Configuration Guide located on the support web page http://us.kontron.com/support/

Use the instructions provided below to add or replace a processor instead of using the instructions that came with the processor. Before you begin, remove the riser card assembly and processor air duct from the chassis. For instructions, see "Removing the Riser Card Assembly" and "Removing the Processor Air Duct" in this chapter.

Follow the instructions below to remove and then install a processor, referring to Figure 25 through Figure 32.

ESD and Processor Handling Precautions

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

- Reduce the risk of electrostatic discharge (ESD) damage to the processor by doing the following:

  – 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 moving around unnecessarily.

  – Use a ground strap attached to the front panel (with the bezel removed.)

- When opening a socket, do not touch the gold socket wires.
- When unpacking a processor, hold it only at the edges to avoid touching the gold contacts.

Figure 16. Cautions for Handling Processors
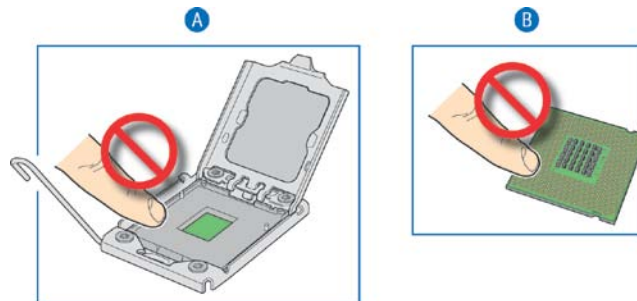
IPN00109

Removing a Processor

1. Loosen the four captive screws on the corners of the heat sink with a #2 Phillips screwdriver. (Figure 17, "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 17. Removing the Heat Sink
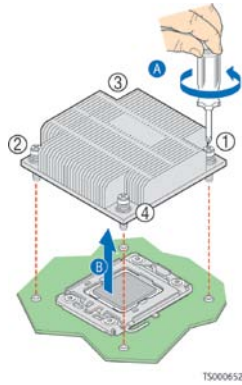
4. Open the socket by pushing the lever handle down and away from the socket to release it. ("A" and "B" in

5. Figure 18)

Figure 18. Using the Socket Lever
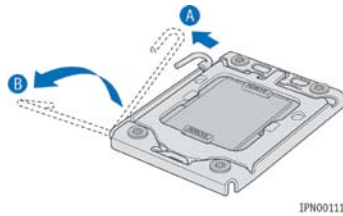
5.   Pull the lever and open the load plate all the way. (Figure 19, "A")

Figure 19.Opening the Load Plate
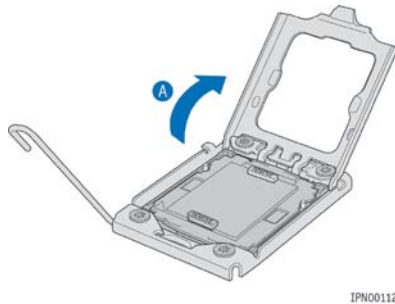
6. Remove the processor.

Installing a New Processor

NOTE: Follow the ESD precautions covered in "ESD and Processor Handling Precautions".

To install a processor, follow these instructions:

1. Take the processor out of its packaging and remove the protective shipping cover. (Figure 20, "A")

Figure 20. Removing the Shipping 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 the processor into the socket!

2. 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. (Figure 21, "A")

Figure 21. Removing the Socket Protective Cover
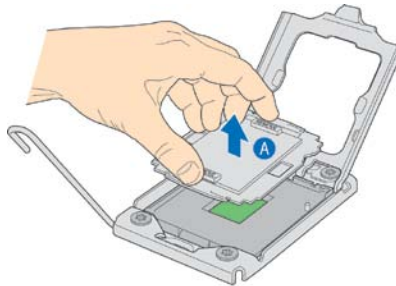
3. Orient the processor with the socket so that the processor cutouts match the socket notches. (
4. Figure 22, "A")
5. Gently place the processor in the socket. ("B")

Figure 22. Installing the Processor in the Processor Socket
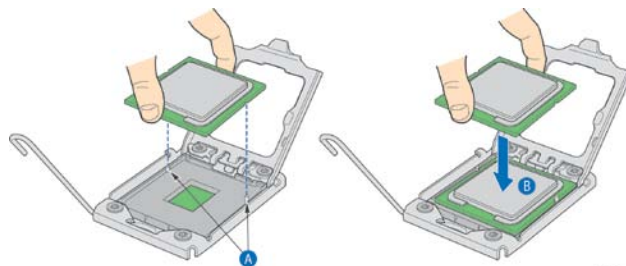
6. Close the load plate. (
7. Figure 23 "A")

Figure 23. Closing the Processor Load Plate and Socket Lever
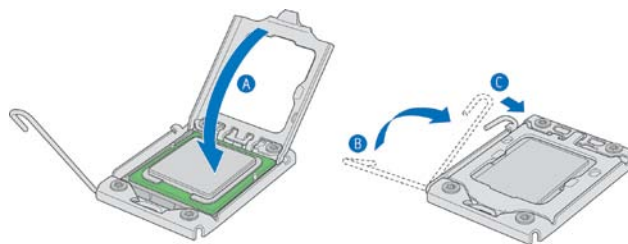
8. Close the socket lever and ensure that the load plate tab engages under the socket lever when fully closed. ("B" and "C")

Inserting 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 17.)

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 17 for the order.

> **CAUTION: the torque spec for these screws is 8 inch pounds. Be careful not to exceed it.**

Configuring Jumpers on the Server Board

The jumpers are located on the T5520UR server board. To work with the jumpers defined in this section, you must first power down the chassis, remove the back cover, remove the riser card assembly, and remove the processor air duct, as described in Section 3.2, "General Installation Procedures". The other components on the server board can remain in place.

The server board has several 3-pin jumper blocks that can be used to configure, protect, or recover specific features of the server board. This section shows the jumper blocks available and what they do. For detailed information about using these jumpers, see the *Intel® Server Board S5520UR Technical Product Specification*, Chapter 6, "Jumper Blocks".

Pin 1 on each jumper block is identified by this symbol on the silkscreen: ▼

Figure 24 shows the jumper blocks

Figure 24. Jumper Blocks (J1D4, J1E8, J1E7, J1H2)
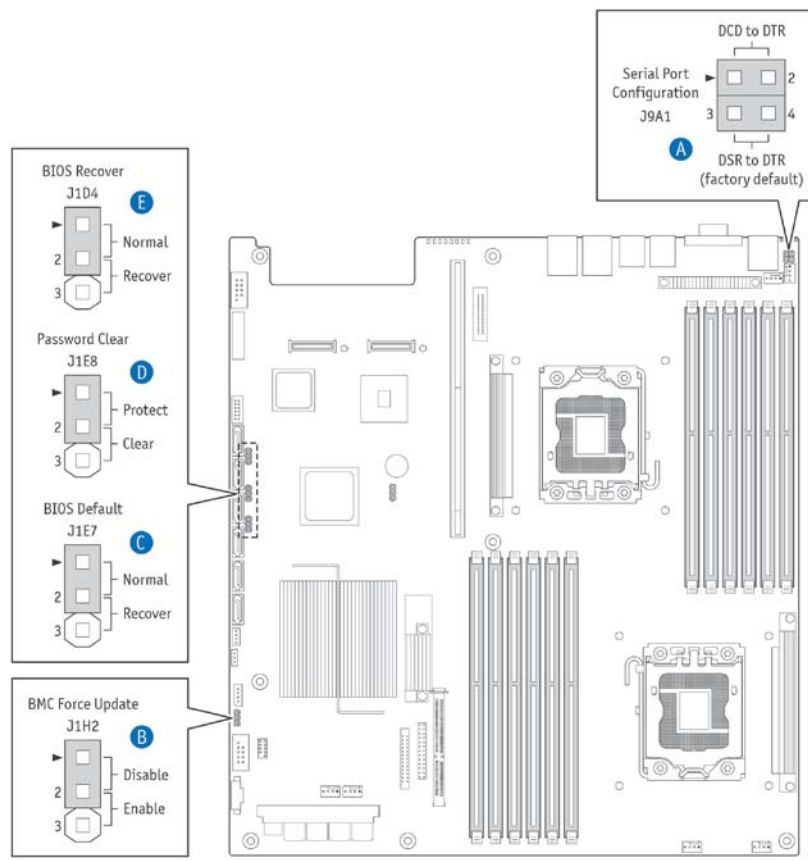
Table 4. Server Board Jumpers (J1E7, J1E8, J1D4, J1H2)

Jumper Name	Pins	System Results
J1E7: BIOS Default	1 – 2	These pins should have a jumper in place for normal system operation (**Default**)
	2 – 3	If these pins are jumpered with AC power plugged, the BIOS settings are cleared within five seconds. These pins should not be jumpered for normal operation.
J1E8: 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 are cleared within 5 – 10 seconds after the system is powered on. These pins should not be jumpered for normal operation.
J1D4: BIOS Recover	1 – 2	These pins should have a jumper in place for normal system operation (**Default**)
	2 – 3	Since the main system BIOS will not boot with these pins jumpered, the system can only boot from EFI-bootable recovery media with the recovery BIOS image.
J1H2: BMC Force Update	1 – 2	Integrated BMC Firmware Force Update Mode – Disabled (**Default**)
	2 – 3	Integrated BMC Firmware Force Update Mode –Enabled

See Section 6.1, "BIOS Defaults and Password Clear Usage Procedure" in the S5520UR Server Board Technical Product Specification for information about the recovery features.

4 Optional Component Installation Procedures

This chapter covers separately-orderable components that you may want to add or replace in your Kontron CG2100 Carrier Grade Server. Most of these components can be ordered as accessories from Kontron and some are from third party vendors. For more information about what is available from Kontron, see the *CG2100 Carrier Grade Server Configuration Guide*. For a list of qualified third party vendors, see the *Tested Hardware and Operating System List* (THOL). The latest version of the Configuration Guide is located on the Kontron support website at http://us.kontron.com/support/ (search for CG2100, click on Product Downloads, then Ordering Guide). The latest version of the THOL is located on the support website at http://us.kontron.com/support (search for CG2100, click on Product Downloads, then Compatibility Matrix).

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 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.**

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

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.

Cable Routing Reference

It is important for cables to be connected correctly. See Figure 25 and Table 5 for cable routing and for more detailed information, see the *Kontron CG2100 Carrier Grade Server Technical Product Specification*.

Figure 25. Cable Routing
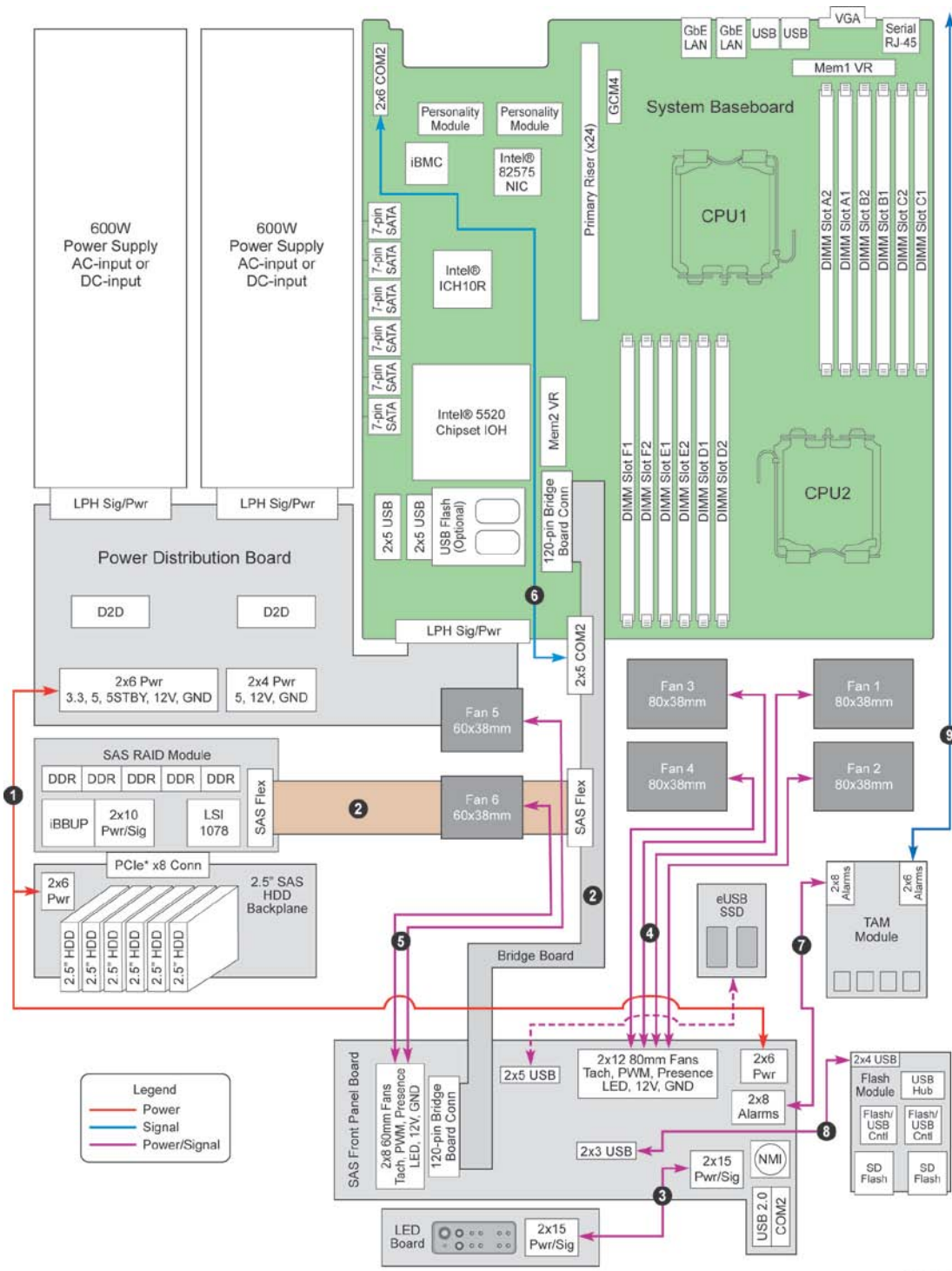
Table 5. System Cables

Cable Number and Name	End 1 Connection	End 2 Connection	End 3 Connection
1: Power distribution	Power distribution board	SAS/SATA backplane	Front panel board

Cable Number and Name	End 1 Connection	End 2 Connection	End 3 Connection
2: Flex Circuit / Bridgeboard Assembly	SAS/SATA RAID module	Baseboard	Front panel board
3: LED/Switch Board Power and Signal	Front panel board	LED/switch board	
4: 80mm Fan Power and Signal	Front panel board	Ganged cable to 4 fans	
5: 60mm Fan Power and Signal	Front panel board	Ganged cable to 2 fans	
6: Serial Port (COM2)	Bridge board	Baseboard	
7: TAM Front Panel	TAM Module	Front Panel Board	
8: USB SD Flash	SD Flash Card	Front Panel Board	
9: Alarms Cable	TAM Module	Chassis Rear Panel	

4.2 Installing or Replacing Hard Disk Drives

Up to six hot-swappable SAS or SATA hard disk drives can be installed in your CG2100 server. The drives go into carriers that connect to the SAS/SATA backplane board once the carriers with drives attached are inserted back into the drive bays. The CG2100 server ships with six drive carriers.

CAUTION: If you install fewer than six hard disk drives, the unused drive bays must contain the empty carriers that ship with the server to maintain proper cooling.

The CG2100 server does not support all SAS/SATA hard disk drives. To see a list of validated manufacturers and drive models, refer to the THOL. The latest version of the THOL is located on the Kontron support website at http://us.kontron.com/support/. (Search for CG2100, click on Product Downloads, then Compatibility Matrix).

You must remove the front bezel to add or replace a hard drive in one of the drive bays. It is not necessary to remove the front chassis cover or to power down the system. The hard drives are hot-swappable.

Removing an HDD Carrier from the Chassis

1. Remove the front bezel. For instructions, see "Removing the Front Cover" in Section 3.2.

2. Select the drive bay where you want to install/replace the drive.
   Drive bay 0 must be used first, then drive bay 1 and so on.
   (Drive bay numbers are printed on the front panel below the drive bays.)

3. Remove the drive carrier by pressing the green button to open the lever. (Figure 26, "A").

4. Pull the drive carrier out of the chassis.

Figure 26. Removing the Drive Carrier

TS000629
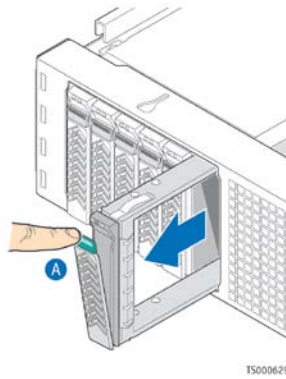
Installing a Hard Drive in a Carrier

1. If a drive is already installed (that is, if you are replacing the drive), remove it by unfastening the four screws that attach the drive to the drive carrier. (Figure 27, "A")
   Set the screws aside for use with the new drive.

2. Lift the drive out of the carrier. ("B")

Figure 27. Removing a Hard Drive

IPN00105
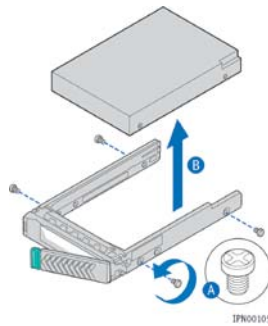
3. Install the new drive in the drive carrier (Figure 28, "A") and secure the drive with the four screws that come with the carrier. ("B")

Figure 28. Installing a Hard Drive

IPN00106
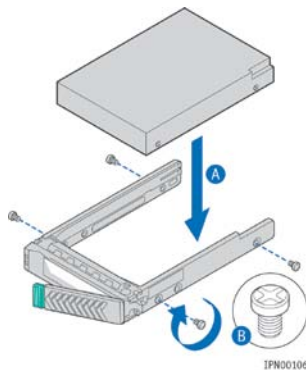
4. With the drive carrier locking lever fully open, push the hard drive carrier into the drive bay in the chassis until it stops. (Figure 29 "A")

5. Press the locking lever until it snaps shut and secures the drive in the bay.

6. Replace the front bezel. For instructions, see "Re-Installing the Front Bezel" in Section 3.2.

Figure 29. Inserting a New Hard Drive into the Chassis
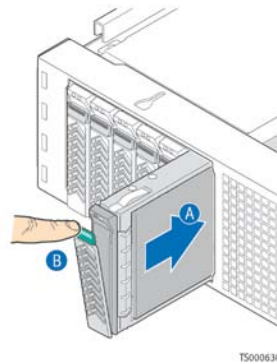
4.3 Installing a SAS/SATA Control Module

Hard disk drives are not supported on the CG2100 server by default. One of two separately-orderable controller options is required. The SAS/SATA control module is the solution for basic SAS/SATA drive support. If you need hardware RAID support, however, please see Section 4.4, "Installing a Hardware RAID Module".

Figure 30 shows the SAS/SATA control module, which adds SAS/SATA support for the server. The module's interface to the baseboard for integrated software RAID 0/1/10 capability is through a PCI Express bus flex cable ("A") to the bridge board. The SAS/SATA control module is located in the front left of the chassis between the power supply system and the SAS/SATA backplane board. The module's gold edge connector ("C") mates with the SAS/SATA backplane board.

Figure 30. SAS/SATA Control Module
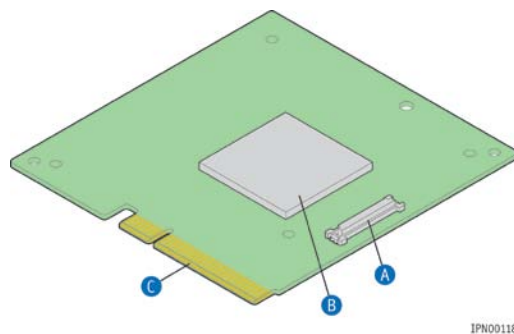
Before you can install the SAS/SATA control module, you need to slide the power supply module(s) out a little for easy access to the module bracket. There is also a sheet metal bracket that the SAS/SATA control module will sit in and this has to come off also before the module can be installed.

1. Remove the front chassis cover. For instructions, see "Removing the Front Cover" in Section 3.2.

2. Slide the power supply modules(s) out a few inches for easier access when installing the SAS/SATA module and bracket. (Figure 31, "A")

3. Unscrew the sheet metal bracket in the SAS/SATA control module location ("B")

4. Install the control module into the bracket using the screw provided. ("C")

Figure 31. Installing the SAS/SATA Control Module in the Bracket
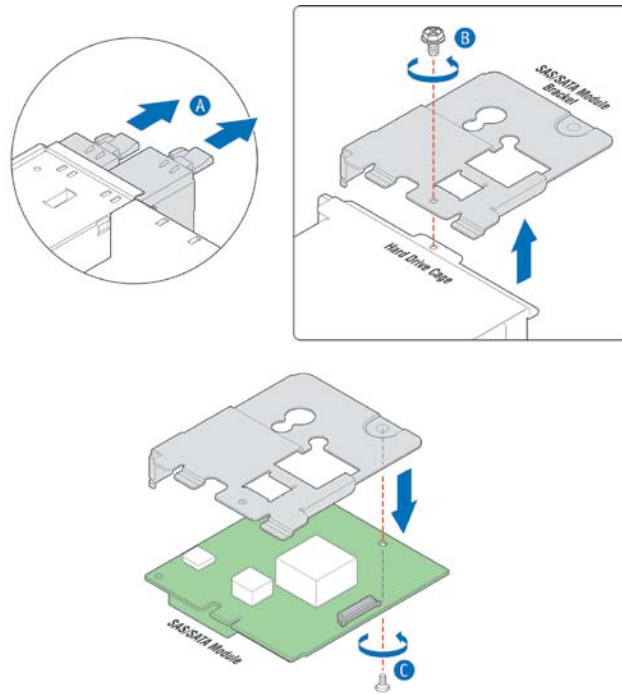
5. Line the SAS/SATA control module and bracket up close to the SAS/SATA backplane board and insert the SAS/SATA control module card edge into the edge connector on the backplane board. (Figure 32, "A" and "B")

Figure 32 Installing the SAS/SATA Control Module
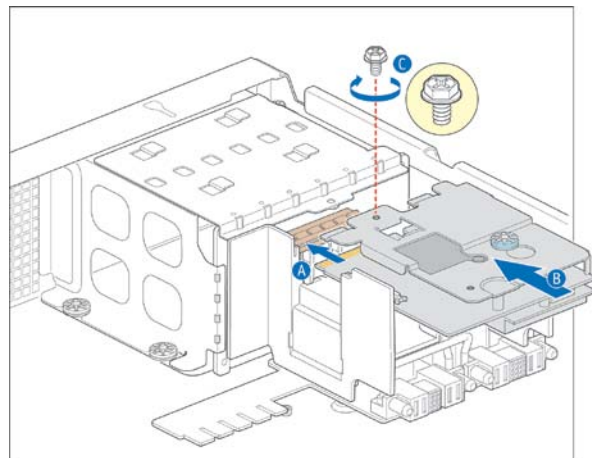
6. Fasten the bracket to the SAS/SATA backplane hold-down plate with one screw. ("C")

7. Attach the flex circuit cable (Figure 33, "A") to the connector on the SAS/SATA control module ("B").

Figure 33. Attaching the Flex Circuit Cable

8. Place the plastic protective cover (Figure 34, "A") over the flex cable and snap it into the grooves on the side wall ("B" and "C")

Figure 34. Installing the Flex Circuit Cable Cover
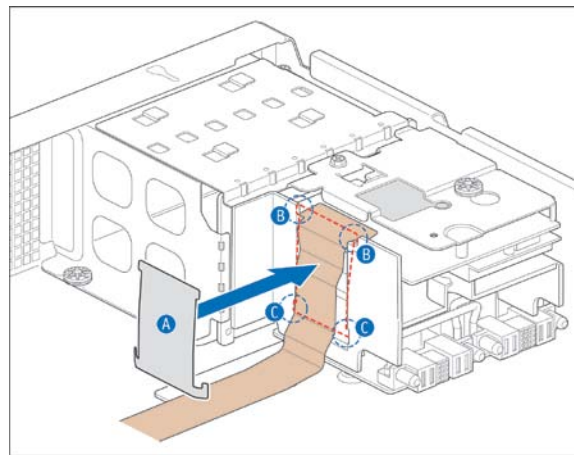
9. Place the metal retention clip over the flex circuit cable connector. (Figure 35, "A") and secure it with the screw ("B").

Figure 35. Installing the Flex Circuit Cable Retention Clip
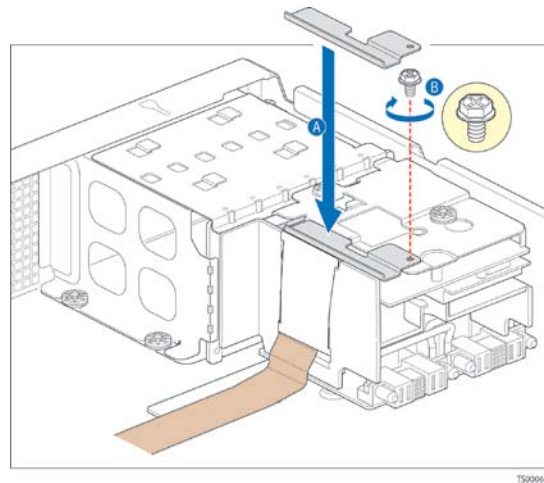
10. If this is the last task you are doing inside the chassis, slide the power supply module(s) back into place and replace the top front cover.

4.4 Installing a Hardware RAID Module

Hard disk drives are not supported on the CG2100 server by default. One of two separately-orderable controller options is required. Hardware RAID support requires a SAS/SATA hardware RAID module, which is described in this section. If basic, non-RAID support is all that your solution requires, then the SAS/SATA control module is adequate. See Section 4.3, "Installing a SAS/SATA Control Module", if basic support is what you want.

Figure 36 shows the SAS/SATA hardware RAID module, which provides SAS/SATA RAID functionality for the server using an LSI Logic LSISAS1078* hardware RAID controller ("B"). The module's interface to the baseboard is through a PCI Express bus flex circuit cable ("A") to the bridge board. The SAS/SATA hardware RAID module is located in the front left of the chassis between the power supply system and the SAS/SATA backplane board. The module's gold edge connector ("C") mates with the SAS/SATA backplane board.

Figure 36. SAS/SATA Hardware RAID Module
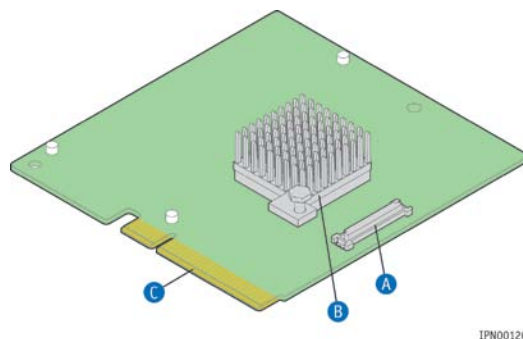
Before you can install the SAS/SATA hardware RAID module, you need to slide the power supply module(s) out a bit for easy access to the module bracket. There is also a protective sheet metal bracket that will hold the SAS/SATA hardware RAID module and this has to come off also before the module can be installed.

1. Remove the front chassis cover. For instructions, see "Removing the Front Cover" in Section 3.2.

2. Slide the power supply module(s) out a few inches for access to the SAS/SATA hardware RAID module bracket.

3. Unscrew the SAS/SATA RAID module sheet metal bracket. (See Figure 31, "A")

4. If you are using an IBBU on the SAS/SATA hardware RAID module, install it now. For instructions see Section 4.5 "Installing a RAID Intelligent Battery Backup Unit (IBBU)"

5. Fasten the SAS/SATA RAID module to the bracket with the screws provided. (See Figure 31, "B")

6. Line the SAS/SATA hardware RAID module and bracket up close to the SAS/SATA backplane board and insert the card edge into the edge connector on the backplane board. (See Figure 32, "A" and "B")

7. Fasten the bracket to the SAS/SATA backplane hold-down plate with one screw. (See Figure 32, "C"

8. Attach the flex circuit cable (see Figure 33"A") to the connector on the SAS/SATA hardware RAID module. ("B")

9. Place the plastic protective cover (see Figure 34, "A") over the flex cable and snap it into the grooves on the side wall ("B" and "C")

10. Place the metal retention clip over the flex circuit cable connector. (See Figure 35, "A") Secure it with the screw ("B").
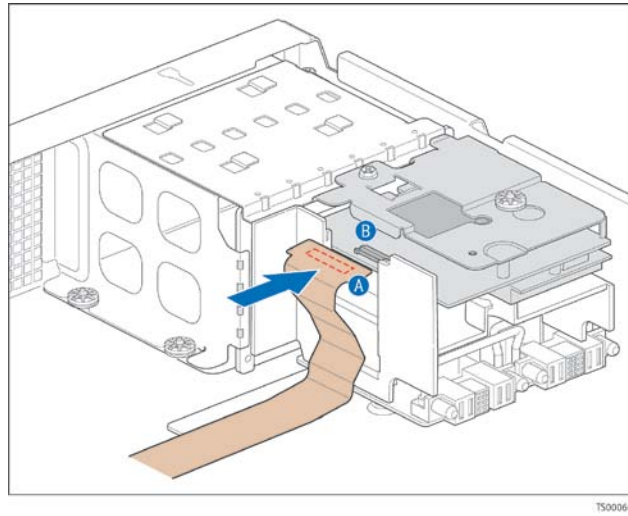
11. If this is the last task you are performing inside the chassis, slide the power supply modules back into place and replace the top front cover.

4.5 Installing a RAID Intelligent Battery Backup Unit (IBBU)

The RAID IBBU, which is optional and separately orderable, mounts on the bottom side of the hardware RAID module. To install the battery, you must first remove the hardware RAID module from the chassis if it is already installed. See Section 4.4 for the hardware RAID module procedures.

To install the battery:

1. Remove the battery cable from the kit package and attach it to the connector on the top of the IBBU module, as shown in Figure 37.

Figure 37. Connecting the IBBU Cable
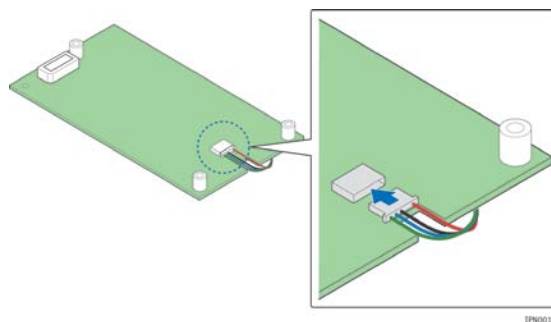
IPN00124

2. Turn the SAS/SATA hardware RAID module upside-down and carefully mate the IBBU connector to the connector on the RAID module. (Figure 38, "A" and "B")

Figure 38. Attaching the IBBU to the RAID Module
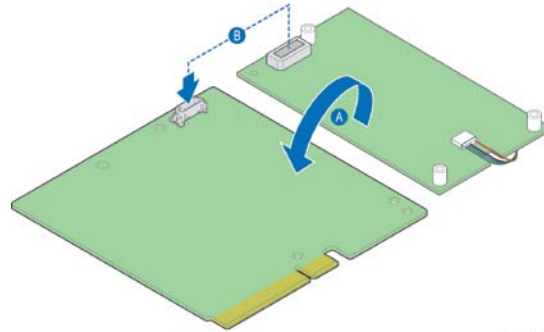
3. Secure the IBBU module to the bottom of the RAID module with the three screws in the kit packet. (Figure 39 "A")

Figure 39. Securing the IBBU to the RAID Module
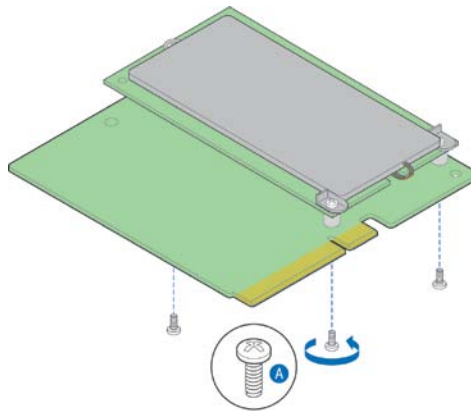
4.6 Adding a Second Power Supply Module

Depending on which model you order, your server has one AC or one DC power supply module. A second power supply provides redundancy. The power supply modules are hot-swappable, so no chassis components have to be removed to add or replace a module. To add a second power supply module:

1. Remove the filler panel. (Figure 40, "A")

2. Press and hold the green safety lock downward and using the handle, slide the power supply into the slot until it latches into place. ("B" and "C")

3. If you are installing a DC power supply, there are two threaded studs for chassis enclosure grounding.
   ("D")
   A 90°standard barrel, two-hole, compression terminal lug with 5/8-inch pitch suitable for a #14-10 AWG conductor must be used for proper safety grounding. A crimping tool may be needed to secure the terminal lug to the grounding cable.

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

Figure 40. AC and DC Power Supplies
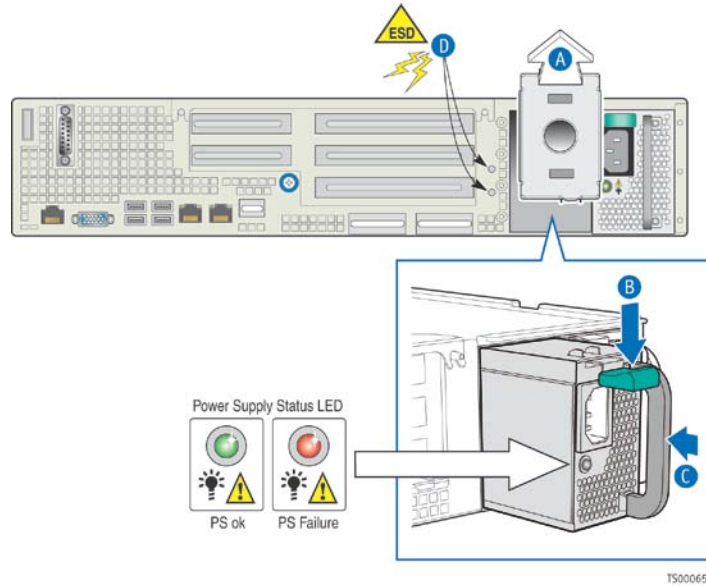
4.7 Installing a PCI Riser Card

The CG2100 server does not ship with a PCI riser card, just the sheet metal bracket where the riser card and PCI add-in cards are housed. There are three different PCI riser card options that all use the same header connection on the T5520 UR server board:

- 2U PCIe "butterfly" riser (three full-height/full-length PCIe x8 slots and two low-profile PCIe x4 slots
- 2U PCIe/PCI-X "butterfly" riser (two PCI-X 133 slots, one full-height/full-length PCIe x8 slot, and two low-profile PCIe x4 slots)
- 2U PCIe passive riser (three full-height/full-length PCIe x8 slots)

In this section, the riser card example is a full-height, full-length riser, as shown in Figure 41.

Figure 41. Riser Card Assembly with 2U PCIe/PCI-X "Butterfly" Riser
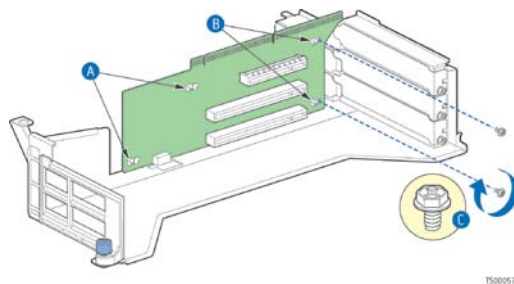
CAUTION: When handling the riser card, observe normal safety and ESD precautions. (See Appendix A: Safety Information" for more information.

To install the riser card in the sheet metal bracket:

1. Remove the back chassis cover. For instructions, see "Removing the Back Cover" in Section 3.2.

2. Remove the riser card assembly from the chassis and place it upside-down. For instructions, see "Removing the Riser Card Assembly" in Section 3.2.

3. Holding the riser card upside-down with the edge connector on top, line the keyhole features up with the standoffs on the bracket. (Figure 41, "A")

4. Fasten the riser card to the bracket with the two 6/32 screws. ("B" and "C")
    Torque screws to 8 lbf*in.

At this point the riser card is ready for you to install add-in cards.

4.8 Installing PCI Add-in Cards

The three riser card options support different combinations of PCI-X and/or PCIe add-in cards. See Figure 8 for the possible configurations. The figures in this section use the 2U PCI-X/PCIe "butterfly" riser card and add-in card options as the example.

CAUTION: When handling a PCI add-in card, observe the normal safety and ESD precautions. See Appendix A: Safety Information for more information.

To install a PCI add-in card, you must first remove the riser card assembly from the server chassis. See "Removing the Riser Card Assembly" in Section 3.2 for more information.

1. Turn the riser card assembly upside down so it is resting on the top of the sheet metal cage.

2. Figure 42, "A")
    Save the screw to use with the new add-in card.

3. If you are replacing a PCI card in a slot, remove the rear retention screw that fastens the add-in card to the riser card. ("B") and remove the card from the riser card socket.

4. For a full-height add-in card, remove the front retention clip by loosening the blue captive screw ("C"), rotating the clip outward, and disengaging the plastic tabs from the metal sidewall. ("D")

5. Attach the add-in card to the appropriate riser card connector. ("E")
    Be sure that the add-in card edge connector is seated in the riser card connector correctly.

6. Fasten the add-in card to the riser card assembly bracket using the rear retention screw. ("B")
    For full-height cards, also replace the front retention clip and tighten the blue captive thumb screw. ("C")

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

Figure 42. Installing a PCI-X/PCIe Card in the Riser Card Assembly
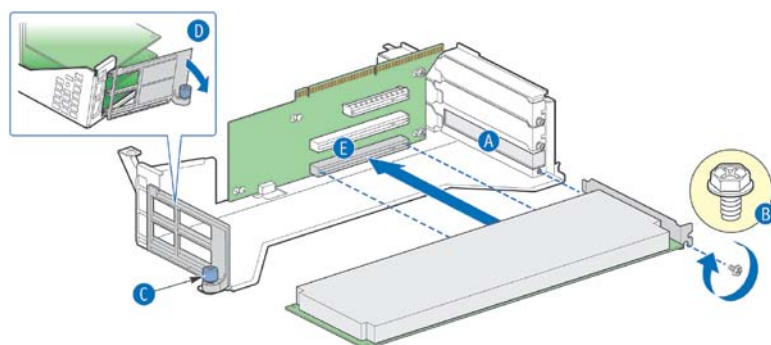
4.9 Installing a Personality Module

The CG2100 server support three different GbE I/O modules and a SAS I/O module as separately orderable, optional accessories. For information about these options and how to order them, see the *Kontron CG2100 Carrier Grade Server Configuration Guide*. These I/O expansion modules are installed in the personality card slots accessible from the rear of the chassis.

This section uses the 10-GbE I/O module as the example.

Before installing the personality module, you must remove the back chassis cover, the PCI riser card assembly, and the processor air duct.

1. Remove the back chassis cover. For instructions see "Removing the Back Cover" in Section 3.2.

2. Remove the riser card assembly (so the processor air duct can be removed). For instructions see "Removing the Riser Card Assembly" in Section 3.2.

3. Remove the processor air duct. For instructions, see "Removing the Processor Air Duct" in Section 3.2.

4. For the 10-GbE I/O module, both filler panels must be removed to support all the ports.
   Squeeze the sides of the module filler panel to remove it from the rear panel of the chassis. (Figure 43, "A")

Figure 43. Removing a Personality Module Filler Panel
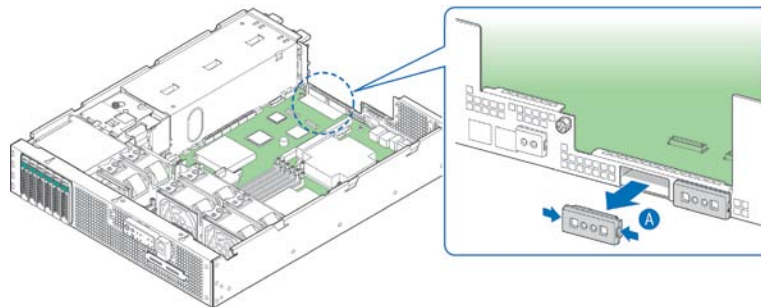
5. Locate the three plastic standoffs on the server board or snap them into place if they are not already installed. (Figure 44, "A")

6. Attach the double face plate to the I/O module using the two screws. ("B")

7. Slide the personality module under the rim of the rear panel and push the module down onto the three standoffs and the two I/O connectors on the server board. ("C")

8. Tighten the two screws to secure the module and face plate to the chassis rear panel. ("B")

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

Figure 44. Installing the Personality Module
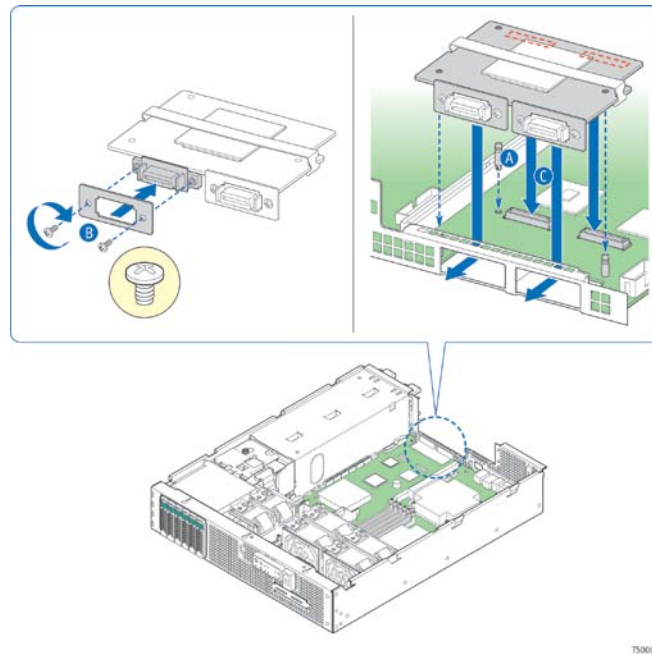

4.10 Installing a Remote Management Module

The Remote Management Module (RMM) solution for the CG2100 server has RMM3 in the iBMC on the T5520UR server board. To use the RMM3 functionality a separately orderable GCM4 NIC must be installed at the rear of the chassis. The GCM NIC package includes a bracket with four screws to fasten the module to the rear panel of the chassis and a ribbon cable to connect the module to the server board.

To install the GCM NIC module you must first remove the back chassis cover, the riser card assembly, and the processor air duct.

1. Remove the back chassis cover. For instructions see "Removing the Back Cover" in Section 3.2.

2. Remove the riser card assembly (so the processor air duct can be removed). For instructions see "Removing the Riser Card Assembly" in Section 3.2.

3. Remove the processor air duct. For instructions, see "Removing the Processor Air Duct" in Section 3.2.

4. Remove the filler panel from the rear panel of the chassis by squeezing the side edges and pulling it out. (Figure 45, "A")

Figure 45. Removing the GCM Port Filler Panel
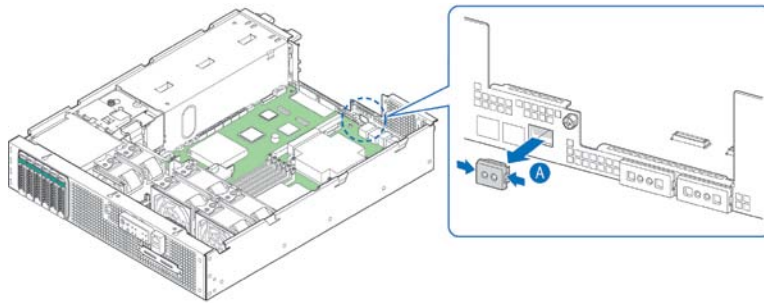
5. Attach the bracket to the top of the module with the two smaller screws in the package. (Figure 46, "A")

6. Attach one end of the cable to the bottom of the module and the other end to the connector on the server board. ("B")

7. Line the module up with rear panel of the chassis so that the NIC is positioned in the connector slot.
Use the two larger screws in the package to fasten the bracket to the rear panel over the NIC. ("C")

Figure 46. Installing the GCM NIC Module
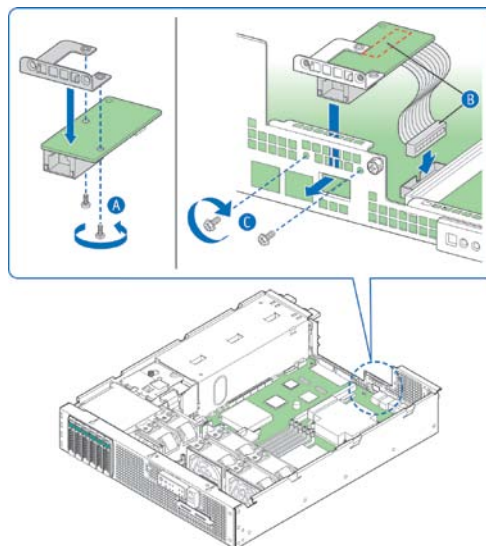
8. If this is the last task you are performing, replace the processor air duct, the riser card assembly, and the back chassis cover. Reconnect all the external devices and plug in the power cord(s).

4.11 Installing an SD Flash Module

The CG2100 server SD flash module supports the use of two SD flash memory card. The SD flash module package includes the board, a bracket, and a USB cable. The server chassis comes with a filler panel on the front panel where the optional SD flash module bracket is installed.

Note: Check the bracket to be sure all eight EMI shield clips are installed.

To install the SD flash module, you must first power-down the system and remove the chassis front cover and front bezel.

1. Remove the front chassis cover. For instructions, see "Removing the Front Cover" in Section 3.2.

2. Remove the front panel bezel from the chassis to access the optical device slot.

3. Unfasten the black protective cover over the front panel board.

4. Remove the filler panel from the front on the server chassis. (Figure 47, "A") and save the two screws for use with the SD flash module bracket.
   Slide the filler panel out of the chassis through the front. ("B")

Figure 47. Removing the SD Flash Module Filler Panel
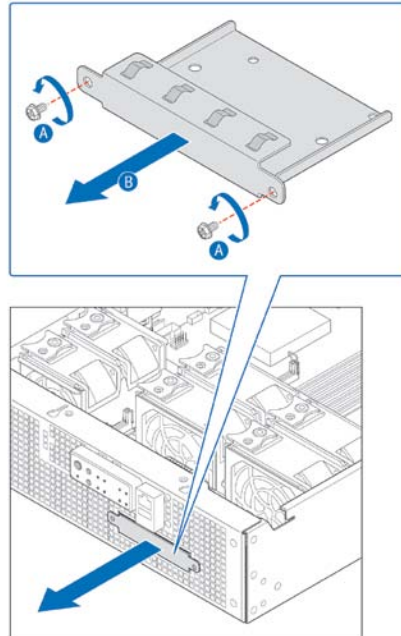
5. Line up the SD flash module with the stand-offs on the bracket and secure the module with the two hex screws in the package. (Figure 48, "A" and "B")

Figure 48. Installing the SD Flash Module in the Bracket
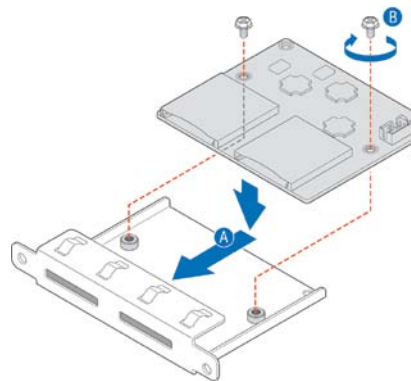
6. Connect the USB cable to the 2x3 USB connector on the front panel board (Figure 49, "A")

Figure 49. Connecting the USB Cable
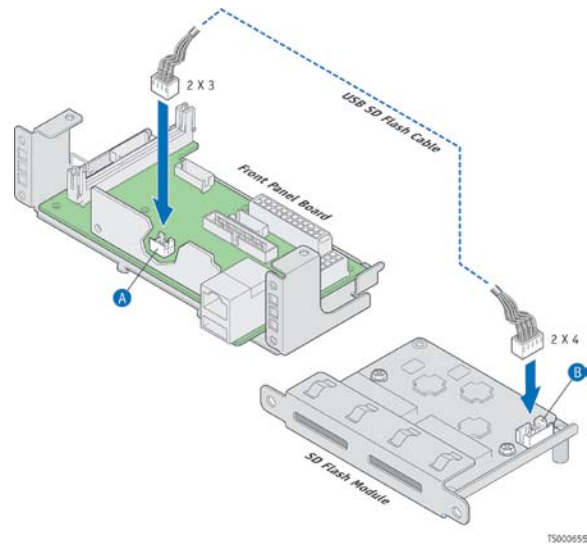
7. Insert the SD flash module bracket from the front of the chassis. (Figure 50, "A")

8. Fasten the bracket with the two screws that were used to attach the filler panel originally. ("B")

Figure 50. Attaching the SD Module Bracket to the Front Panel
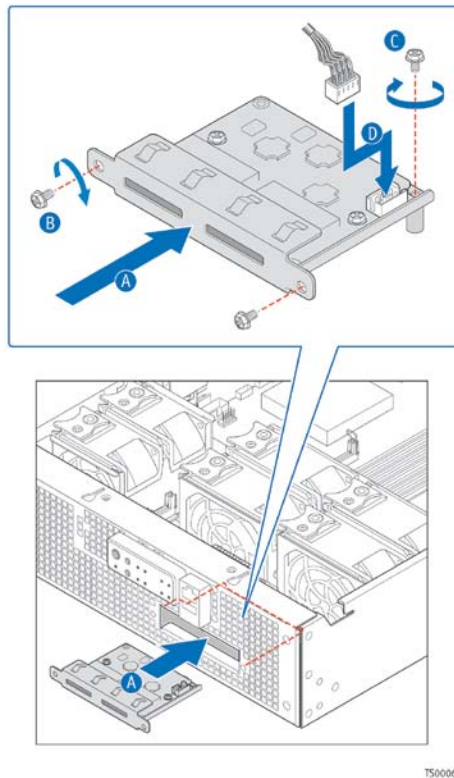
9. Secure the SD flash module to the FP board with the screw provided. ("C")

10. Connect the USB cable previously connected to the FP board to the SD flash module USB connector ("D")

11. If this is the last task you are performing, fasten the black protective cover over the front panel board and replace the front chassis cover and the front panel bezel.
Reconnect all external devices and the power cord(s).

4.12 Installing a USB Solid-State Drive

The separately orderable, optional SMART*Embedded USB Solid-State Drive (eUSB SSD) provides local USB flash memory storage for various uses, such as system information, diagnostic partitions, and configuration data. There are two places where a solid state drive can be installed on the CG2100 server; on the front panel board and on the server board.

Installing a Solid-State Drive on the Front Panel Board

1. Remove the front chassis cover. For instructions, see "Removing the Front Cover" in Section 3.2.

2. Unfasten the black protective cover over the front panel board.

3. Insert the drive module onto the front panel board by connecting the standoff (Figure 51, "A") onto the FP board and the USB connector on the module onto the FP board header. ("B")

4. If this is the last task you are performing, refasten the protective cover over the FP board and replace the front chassis cover.
Reconnect all external devices and the power cord(s).

Figure 51. Installing the SSD on the FP Board
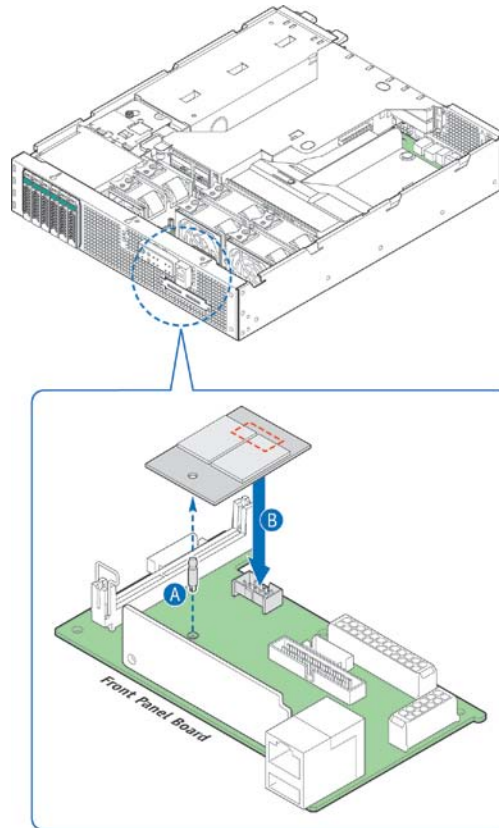
TS000575

Installing a Solid-State Drive on the Server Board

1. Remove the back chassis cover. For instructions, see "Removing the Back Cover" in Section 3.2.

2. Remove the riser card assembly. For instructions, see "Removing the Riser Card Assembly" in Section 3.2.

3. Remove the processor air duct. For instructions, see "Removing the Processor Air Duct" in Section 3.2.

4. Locate the white plastic standoff on the server board. (Figure 52, "A")

5. Insert the drive module onto the server board by connecting the drive module to the standoff on the server board and the USB connector on the drive module onto the server board USB header. ("B")

6. If this is the last task you are performing, re-install the processor air duct, the riser card assembly, and the back chassis cover. Reconnect all external devices and the power cord(s).

Figure 52. Installing the SSD on the Server Board
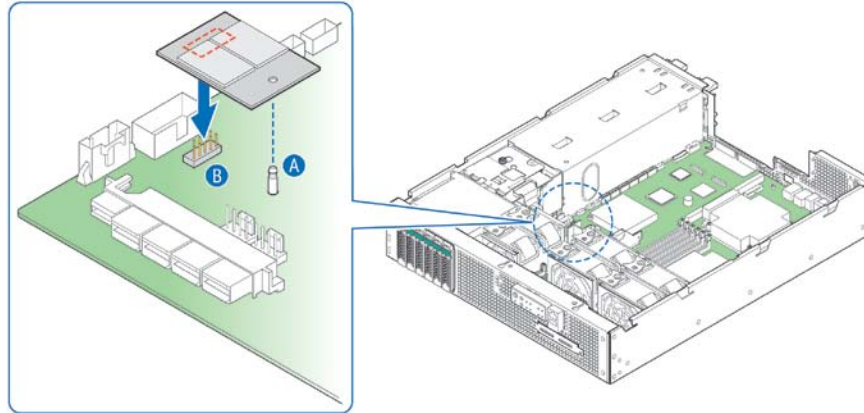
TS000576

4.13 Installing the Server into a Rack

Several different rack mounting kits are available, depending on whether you need 2-post or 4-post mounting and whether you need 19-inch or 23-inch rack widths. Also available are a basic slide rail kit and a rail enabling kit. For detailed information about the rack mounting kits and how to order them, see the *Carrier Grade Server Configuration Guide.* The latest version of the Configuration Guide is located on the Kontron support website at http://us.kontron.com/support/ (search for CG2100, click on Product Downloads, then Ordering Guide).

Installation instructions are included in each of the rack mounting kits.

Connecting the Power Cord

NOTE: When using a rack, wait to install the power cord(s) until after the server is in the rack.

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 AC 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 "E" in Figure 6 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 4 amperes.

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

5 Server Component Replacements

This chapter covers separately-orderable replacement spare components that you may need to replace in your Kontron CG2100 Carrier Grade Server if they fail. For information about what is available from Kontron, see the *CG2100 Carrier Grade Server Configuration Guide*. The latest version of the Configuration Guide is located on the Kontron support website at http://us.kontron.com/support/ (search for CG2100, click on Product Downloads, then Ordering Guide).

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.**

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

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.

Cable Routing Reference

It is important for cables to be connected correctly. See Figure 25 and Table 5 for cable routing and for more detailed information, see the *Kontron CG2100 Carrier Grade Server Technical Product Specification*.

5.2 Replacing Fans

The fan replacement spare kit for the CG2100 server contains two 60mm fans and four 80mm fans. Each fan module is exactly like the fans in the server, i.e., the bracket and plastic finger guard are attached. For ordering information, see the *CG2100 Carrier Grade Server Configuration Guide*. The latest version of the Configuration Guide is located on the Kontron support website at http://us.kontron.com/support/ (search for CG2100, click on Product Downloads, then Ordering Guide).

> **NOTE: Before replacing any of the fans, you must remove the front chassis cover. Because the fans are hot-swappable, you do not need to shut down the server system and disconnect the power and external devices as is customary when removing the top cover(s). Kontron specifies that a skilled technician can service the fans in approximately 5 minutes.**

Replacing 80mm CPU Fans

The four 80mm fan assemblies are located behind the front panel board. (See Figure 2, "Q")These fans are in front of the T5520UR server board and provide cooling for the CPUs and memory DIMMs

1. Remove the front chassis cover. For instructions see "Removing the Front Cover" in Section 3.2.

2. Determine which fan has failed by finding the LED that is amber. (The LED is next to the blue grommet on the top of each fan assembly. Figure 53, "A")

3. Remove the failing fan by grasping both sides of the fan assembly, using the plastic finger guard on the left side and pulling the fan out of the metal enclosure that houses the fans and the power cables. ("B")

Figure 53. Removing a Fan from the Chassis
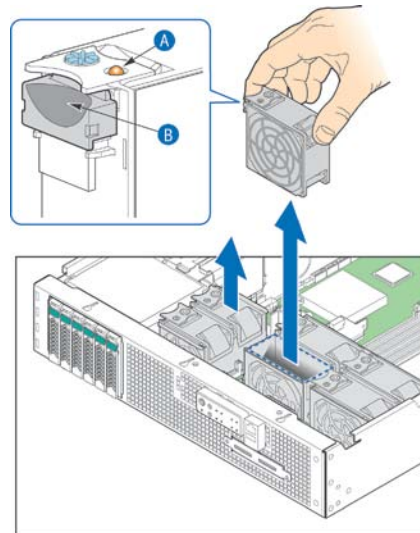
TS000577

4. Replace the fan by inserting it into the same slot. Use the edges of the metal enclosure to align the fan assembly properly and to make sure the power connector is seated properly in the header on the side of the metal enclosure.

5. If this is the last task you are performing, close the front chassis cover.

Replacing 60mm PCI Fans

The two 60mm fan assemblies are located next to the HDD bay enclosure. (See Figure 2, "Q")These fans are in front of the riser card assembly and provide cooling for the PCI cards in this assembly.

1. Remove the front chassis cover. For instructions see "Removing the Front Cover" in Section 3.2.

2. Determine which fan has failed by finding the LED that is amber. (The LED is next to the blue grommet on the top of each fan assembly. Figure 53, "A")

3. Remove the failing fan by grasping both sides of the fan assembly, using the plastic finger guard on the left side and pulling the fan out of the metal enclosure that houses the fans and the power cables. ("B")

4. Replace the fan by inserting it into the same slot. Use the edges of the metal enclosure to align the fan assembly properly and to make sure the power connector is seated properly in the header on the side of the metal enclosure.

5. If this is the last task you are performing, close the front chassis cover.

5.3 Replacing the Bridge Board

The CG2100 server bridge board provides the fan tachometer and SAS/SATA signal paths between the front panel board and the baseboard. Because it spans both the front panel board and the baseboard, several components must be removed before you can replace the bridge board:

- Both top chassis covers
- The riser card assembly
- The processor air duct
- The protective cover on the front panel board
- The flex circuit cable connection on the SAS/SATA module
- The serial port connection on the bridge board

> CAUTION: Before replacing any of the boards on the CG2100 server, you must first take the server out of service, turn off all peripheral devices connected to the server, turn off the server by pressing the power button, and unplug the power cord(s) from the system and wall outlet.

When handling the bridge board, observe the normal safety and ESD precautions. See Appendix A: Safety Information for more information.

For the location of the cables connected to the bridge board, see Figure 7 and Table 5.

Removing the Bridge Board

To remove the bridge board from the chassis:

1. Remove both of the chassis covers. For instructions, see "Removing the Chassis Covers" in Section 3.2.

2. Remove the riser card assembly. For instructions, see "Removing the Riser Card Assembly" in Section 3.2.

3. Remove the processor air duct. For instructions, see "Removing the Processor Air Duct" in Section 3.2.

4. Unfasten the black protective cover on top of the FP board.

Disconnecting the Flex Circuit Cable

1. Remove the retention clip from the flex circuit cable connector on the SAS/SATA control module or SAS/SATA RAID module, whichever is installed. (Figure 54, "A" and "B")

Figure 54. Removing the Flex Circuit Cable Retention Clip
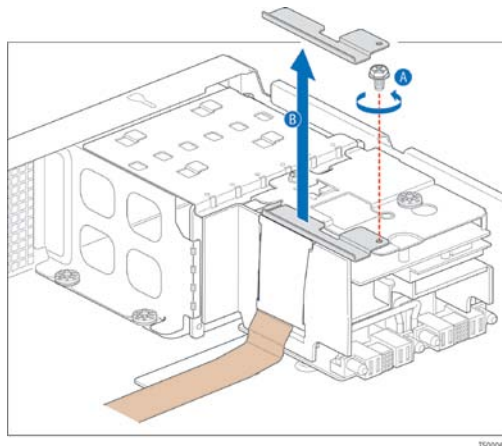
2. Unfasten the plastic protective cover from the flex circuit cable. (Figure 55, "A", "B", and "C"

Figure 55. Removing the Flex Circuit Cable Cover
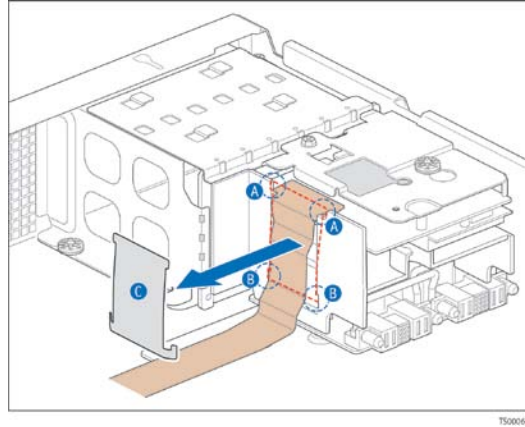
3. Disconnect the flex cable from the SAS/SATA module. (Figure 56, "A" and "B")

Figure 56. Disconnecting the Flex Circuit Cable
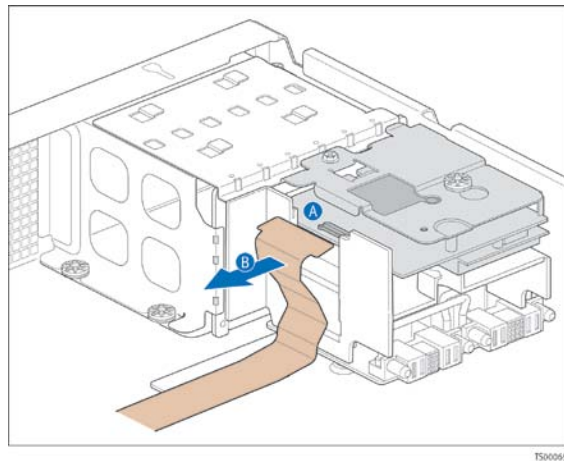
Removing the Guide Bracket and Releasing the Bridge Board

1. Disconnect the serial port cable from the bridge board.

2. Remove the black plastic riser card assembly baffle/bridge board guide bracket by loosening the two screws that secure it to the chassis base. (Figure 57, "A" and "B")

Figure 57. Removing the Guide Bracket from the Bridge Board
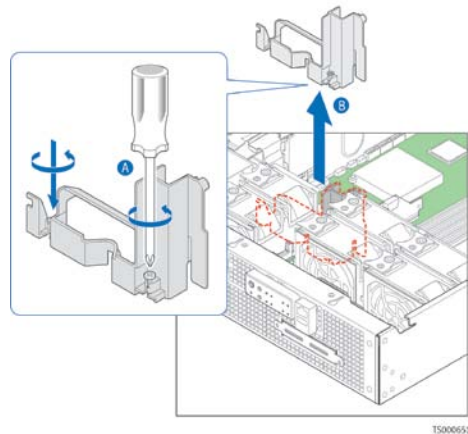
3. Remove the bridge board from the chassis by opening the connector latch clips at both ends of the board to free the board. (Figure 58, "A")
   The FP board connector latch clip is under the top edge of the chassis front panel. You cannot see it, but you can feel the latch and unhook it from the board.

Figure 58. Removing the Bridge Board from the Chassis
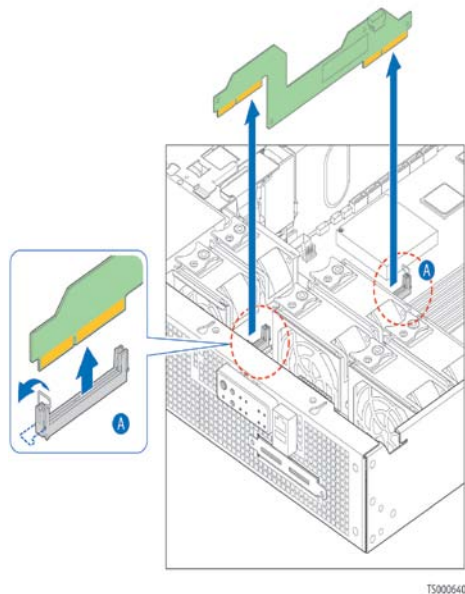
Re-Installing the Bridge Board

To replace the bridge board back into the chassis:

1. Align the bridge board edge connectors with the latch clip headers on the FP board and the baseboard.
   Make sure that the keying slot in the rear bridge board edge connector aligns with the key in the baseboard header.
2. Press down to make a firm connection at both ends of the bridge board and refasten the connector latching clips on each end. (See Figure 58.)

3. Re-attach the black guide bracket by fastening the two screws to the chassis base. (See Figure 57.)

4. Re-connect the serial port cable.

5. Re-connect the SAS/SATA flex cable to the SAS/SATA control module (or RAID module) and re-install the plastic protective cover and retention clip. (See Figure 33 through Figure 35 in Section 4.3 for instructions.)

6. Re-attach the protective cover on top of the FP board.

7. Re-install the processor air duct.

8. Re-install the riser card assembly.

9. If this is the last task you are performing inside the server chassis, replace both top chassis covers and reconnect the power cord(s) and any external devices.

5.4 Replacing the Front Panel Board

The front panel board provides the interface to the controls at the front of the server, the power interconnect for the server board, the USB and serial port B interface. The FP board also houses the LED/switch board that controls the front panel LEDs and the telco alarm manager, as well as the optional USB SSD and SD flash modules.

To replace the FP board, you must first remove the following components:

- The front chassis cover
- The black protective cover over the board
- All cable connections on the FP board
- Any modules connected to the FP board, such as a USB SSD drive
- The bridge board
  And because the bridge board, which connects the FP board and the T5520UR server board, must come off, you must also remove:
  - The back chassis cover
  - The riser card assembly
  - The processor air duct

Figure 59 shows the location of all the connectors on the FP board.

Figure 59. Front Panel Board Connectors
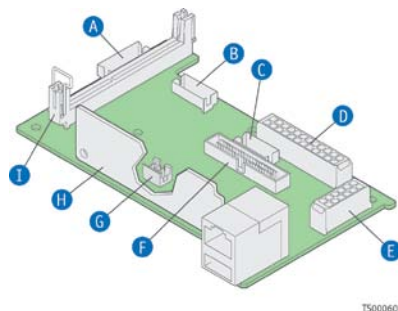
Item	Description	Item	Description
A	60mm PCI fan power and signal cable connector	F	LED/switch board power and signal cable connector
B	Internal eUSB SSD connector	G	SD flash module connector
C	TAM module alarms connector	H	LED/switch board
D	80mm CPU fan power and signal cable connector	I	Bridge board connector
E	Front panel input power cable connector		

> **CAUTION: Before replacing any of the boards on the CG2100 server, you must first take the server out of service, turn off all peripheral devices connected to the server, turn off the server by pressing the power button, and unplug the power cord(s) from the system and wall outlet.**

When handling the FP board, observe the normal safety and ESD precautions. See Appendix A: Safety Information for more information.

Removing the Old Front Panel Board

1. Remove both of the chassis covers. For instructions, see "Removing the Chassis Covers" in Section 3.2.

2. Remove the riser card assembly. For instructions, see "Removing the Riser Card Assembly" in Section 3.2.

3. Remove the processor air duct. For instructions, see "Removing the Processor Air Duct" in Section 3.2.

4. Unfasten the black protective cover on top of the FP board.

5. Disconnect all of the cables connected to the FP board. See Figure 7 and Table 4 for the cable routing. For the location of each connector, see Figure 59.

   5.1.   Disconnect the front panel power cable that comes from the SAS/SATA backplane board.

   5.2.   Disconnect the ganged 80mm CPU fan power cable.

   5.3.   Disconnect the LED/switch board power and signal ribbon cable.

   5.4.   Disconnect the 60mm PCI fan power cable.

   5.5.   Disconnect the TAM module alarms cable.

   5.6.   Disconnect the bridge board. For instructions, see Section 5.3, "Replacing the Bridge Board".

   5.7.   Disconnect the SD flash module USB cable, if installed.

6. Unscrew the fastener at the rear of the FP board and slide the board away from the front panel to lift it up and out of the chassis. (Figure 60, "A")
   Save the screw for reuse with the new replacement FP board.

Figure 60. Removing the Front Panel Board from the Chassis
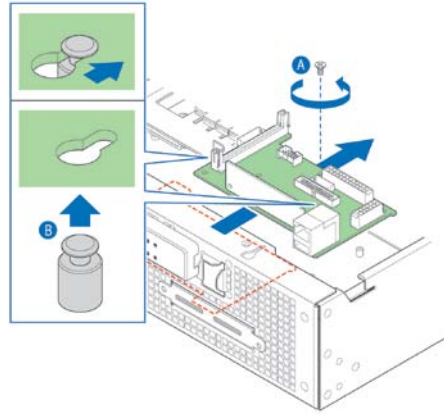
7. Remove the USB flash memory from the FP board (if present) so it can be used on the replacement board. For more information, see Section 4.12 "Installing a Solid-State Drive on the Front Panel Board".

Installing the New Front Panel Board

1. Install the USB flash memory if you are using this option. For instructions, see Section 4.12,"Installing a Solid-State Drive on the Front Panel Board".

2. Slide the new FP board toward the front of the chassis so the serial port connector fits through the slot on the front panel of the chassis and the two keyhole slots fit over the standoffs on the bottom of the chassis. (Figure 61, "A")

3. Tighten the screw at the rear of the board to secure it to the chassis base. ("B")

Figure 61. Installing the New FP Board
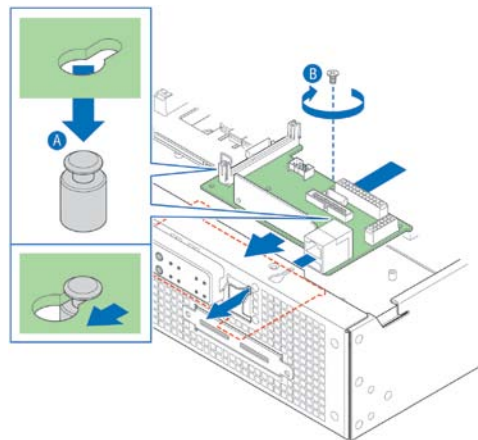
4. Reconnect all of the cables on the FP board. For locations of each header on the board, see Figure 59.

    4.1.   Reconnect the front panel power cable that comes from the SAS/SATA backplane board.

    4.2.   Re connect the 80mm CPU fan ganged power cable.

    4.3.   Reconnect the LED/switch board power and signal cable.

    4.4.   Reconnect the 60mm PCI fan power cable.

    4.5.   Reconnect the TAM module alarms cable.

    4.6.   Reconnect the bridge board. For instructions see "Re-Installing the Bridge Board" in Section 5.3.

4.7.   Reconnect the SD flash module USB cable, if this option is installed.

5. Refasten the protective cover over the FP board.

6. If this is the last task you are performing inside the chassis, replace the air duct, the riser card assembly, and the top chassis covers. For instructions, see Section 3.2, "General Installation Procedures".

5.5 Replacing the LED/Switch Board

The LED/switch board is mounted against the front panel of the CG2100 server chassis because it supports the LEDs and switches that are on the control panel on the front of the chassis. Before you can replace the LED/switch board, you must remove the front chassis cover and the front bezel. You may also have to remove the front panel board, or at least loosen it and slide it back, in order to access the LED/switch board retaining screw.

Removing the Old LED/Switch Board

To remove the LED/Switch board:

1. Remove the front chassis cover. For instructions, see "Removing the Front Cover" in Section 3.2.

2. Remove the front bezel. For instructions, see "Removing the Front Bezel" in Section 3.2.

3. Disconnect the LED/switch board power and signal ribbon cable from the FP board and save it for reuse with the replacement board.
   See Figure 59 for the location of this connector.

4. From behind the front panel, disconnect the LED/switch board ribbon cable and then unfasten the screw on the top right side of the LED/switch board.
   If you do not have enough room to access this screw, you will have to remove (or at least slide back) the FP board. For instructions, see "Removing the Old Front Panel Board" in Section 5.4.

5. The LED/switch board is also attached to the front of the chassis by two standoffs. Once the retaining screw is removed, you need to pry the LED/switch board loose from these standoffs to remove it.

Replacing the LED/Switch Light Pipe Assembly

1. Remove the black control panel module from the front of the chassis by lifting up from the bottom and then pulling down to release the top tabs holding it into the chassis frame.

2. Position the new control panel module with the top tabs in the appropriate slots. Gently push down and in to secure the bottom of the panel to attach it to the LED/switch board.

Installing the New LED/Switch Board

1. Connect the LED/switch board power and signal ribbon cable to the new LED/switch board.

2. Align the left side of the LED/switch board with the two standoffs on the inside of the front panel of the chassis and gently push the board to secure it to the chassis frame.

3. Fasten the screw at the right of the LED/switch board to hold the board in place.

4. Replace the front panel board if you removed it or slid it out to work on the LED/switch board installation. For instructions, see "Installing the New Front Panel Board" in Section 5.4.

5. Reconnect the LED/switch board power and signal ribbon cable to the FP board.

6. Replace the front bezel. For instructions, see "Re-Installing the Front Bezel" in Section 3.2.

7. If this is the last task you are performing inside the server chassis, replace the front chassis cover, reconnect the power cord(s), and reconnect any external devices.

5.6 Replacing the Telco Alarms Module (TAM)

The TAM board is on the right side of the CG2100 server chassis floor, just behind the front panel. Before you can replace the TAM board, you must remove the front chassis cover and black protective cover over the front panel board. You may also have to remove the front panel board, or at least loosen it and slide it back, in order to access the TAM board.

CAUTION: **Before replacing any of the boards on the CG2100 server, you must first take the server out of service, turn off all peripheral devices connected to the server, turn off the server by pressing the power button, and unplug the power cord(s) from the system and wall outlet.**

Removing the Old Telco Alarms Module

To remove the TAM board:

1. Remove the front chassis cover. For instructions, see "Removing the Front Cover" in Section 3.2.

2. Unfasten the black protective cover and fold it away from the TAM board.

3. Loosen the retaining screw on the TAM board (Figure 62 "A").

Figure 62. Removing the TAM Board
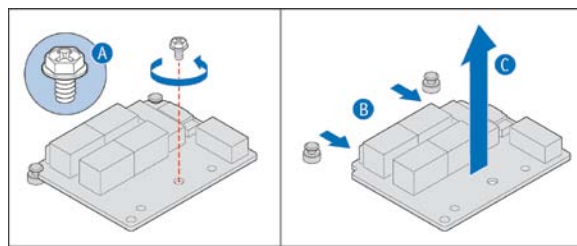
4. Disconnect the alarms cable that is connected to the FP board. (Figure 63 "A")

5. Disconnect the TAM board alarms cable that is routed to the rear of the chassis. ("B")

Figure 63. Disconnecting the TAM Cables
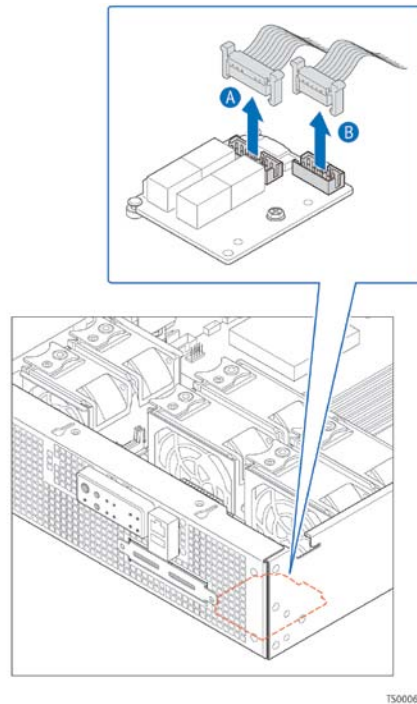
6. Remove the TAM board from the chassis by lifting it off of the two standoffs on the left side of the board. (Figure 62 "B" and "C")

Installing the New Telco Alarms Module

1. Align the left side of the TAM board with the two standoffs on the floor of the chassis where the black protective cover is mounted and gently push the board to secure it on the standoffs. (Figure 62, "B")

2. Fasten the retaining screw at the right of the TAM board to hold the board in place. ("A")

3. Replace the front panel board if you removed it or slid it out to work on the LED/switch board installation. For instructions, see "Installing the New Front Panel Board" in Section 5.4.

4. Connect the alarms cable from the FP board to the TAM board. (Figure 63, "A")

5. Connect the alarms cable from the rear of the chassis to the TAM board. ("B")

6. Re-fasten the black protective cover over the FP board.

7. If this is the last task you are performing inside the server chassis, replace the front chassis cover, reconnect the power cord(s), and reconnect any external devices.

5.7 Replacing the Power Distribution Board

The power distribution board (PDB) routes power from the power supply module(s) to the rest of the server through an integral wiring harness. For safety, ventilation, and heat dissipation, the PDB has a black plastic cover around it, which also provides guides for some of the cables.

To replace the PDB, you must first remove the following components:

- Both top covers
- Riser card assembly and plastic guide
- SAS/SATA control module or hardware RAID module if either is installed
- All cables connected to the PDB or components that have to be removed to access it:
  -- HDD power cable
  -- SAS/SATA control module or SAS/SATA hardware RAID module flex circuit cable

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CAUTION: Before replacing any of the boards on the CG2100 server, you must first take the server out of service, turn off all peripheral devices connected to the server, turn off the server by pressing the power button, and unplug the power cord(s) from the system and wall outlet.

When handling the power distribution board, observe the normal safety and ESD precautions. See Appendix A: Safety Information for more information.

Removing the Old Power Distribution Board

1. Power down the server and unplug all peripheral devices and the power cable(s).

2. Remove both of the chassis covers. For instructions, see "Removing the Chassis Covers" in Section 3.2.

3. Remove the riser card assembly. For instructions, see "Removing the Riser Card Assembly" in Section 3.2.

4. Remove the black plastic riser card assembly/bridge board guide bracket by loosening the two screws that secure it to the chassis base. See Figure 57 for the location of this bracket and the screws that attach it.

5. Slide the power supply module(s) out a few inches to disengage it from the PDB.

6. Remove the SAS/SATA control module or SAS/SATA hardware RAID module, if installed. See Section 4.3, "Installing a SAS/SATA Control Module" or Section 4.4, "Installing a Hardware RAID Module" for help with how these modules are fastened.
   NOTE: Other components that are removed to fully install a SAS/SATA module do not need to be touched when replacing the PDB; only the sheet metal cover, the module itself, and the flex cable connection on the SAS/SATA module side.

7. Remove the black plastic cover that shields the PDB.
   There are two screws that fasten this cover below where the SAS/SATA modules are installed. (Figure 64, "A")

8. Loosen the two screws that secure the PDB to the chassis and save them for re-installing the new board. ("C")

9. Gently pull the five edge connectors away from the T5520UR server board to free the PDB from the chassis. ("D")

10. Unplug the power distribution cable from the PDB. ("B")

Figure 64. Removing the PDB from the Chassis

TS000635
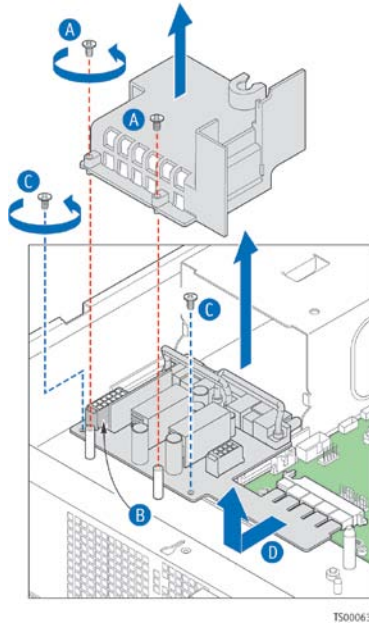
Installing the New Power Distribution Board

1. Connect the edge connector on the new PDB to the T5520UR server board. See Figure 64, "D" for location.

2. Secure the PDB with the two screws reserved from removing the old PDB. See Figure 64, "C" for location.

3. Reconnect the power distribution cable to the header on the PDB See Figure 64, "B" for location.

4. Replace the black plastic cover and fasten it to the chassis floor. See Figure 64, "A" for location.

5. Ensure that the power cable is inside the cover guide slots.

6. Re-install the SAS/SATA control module or the SAS/SATA hardware RAID module if either one was installed.
Reconnect the flex cable to the control module and replace the sheet metal cover. See Section 4.3, "Installing a SAS/SATA Control Module" or Section 4.4, "Installing a Hardware RAID Module" for help with how to fasten the module, reconnect the flex cable, and replace the sheet metal cover.

7. Replace the power supply module(s) so they are mated with the PDB.

8. Replace the black plastic PCI air baffle/bridge board guide bracket with the two screws that secure it to the chassis base. See Figure 57 for the location of this bracket and the screws that attach it.

9. Replace the riser card assembly. For instructions, see "Re-Installing the Riser Card Assembly" in Section 3.2.

10. If this is the last task you are performing inside the server chassis, replace both chassis covers, reconnect the power cord(s), and reconnect any external devices.

5.8 Replacing the T5520UR Server Board

The CG2100 Carrier Grade Server uses the Intel® server board T5520UR. To replace the server board, the following components must be removed first:

• Both top chassis covers

- Riser card assembly and plastic guide bracket
- Processor air duct
- Any personality module or RMM GCM module
- Any cables attached to the server board or routed over it
- Bridge board
- Power distribution board

In addition, you will probably want to remove the following components for reuse on the replacement server board if it hasn't already been populated with spare components:

- Heat sink(s)
- Processor(s)
- All DIMMs
- Flash memory drive, if installed

> **CAUTION: Before replacing any of the boards on the CG2100 server, you must first take the server out of service, turn off all peripheral devices connected to the server, turn off the server by pressing the power button, and unplug the power cord(s) from the system and wall outlet.**

When handling the power distribution board, observe the normal safety and ESD precautions. See Appendix A: Safety Information for more information.

Removing the Old Server Board from the Chassis

1. Power down the server and unplug all peripheral devices and the power cable(s).

2. Remove both of the chassis covers. For instructions, see "Removing the Chassis Covers" in Section 3.2.

3. Remove the riser card assembly. For instructions, see "Removing the Riser Card Assembly" in Section 3.2.

4. Remove the processor air duct. For instructions, see "Removing the Processor Air Duct" in Section 3.2.

5. Remove the black plastic riser card assembly/bridge board guide bracket by loosening the two screws that secure it to the chassis base. See Figure 57 for the location of this bracket and the screws that attach it.

6. Disconnect all the cables attached to the server board or routed over it:

   a. Telco alarms cable

   b. Serial port cable

7. Remove the bridge board. For instructions see "Removing the Bridge Board" in Section 5.3.

8. Remove the personality module(s) if installed. For information about how these cards are installed, see Section 4.9, "Installing a Personality Module".

9. Remove the GCM4 module if installed. For information about how this card is installed, see Section 4.10, "Installing a Remote Management Module".

If you want to reuse components from this server board on the new replacement board, you can remove them now or after you have removed the server board from the chassis.

- To remove memory DIMMs, see "Replacing or Removing Memory DIMMs" in Section 3.3.
- To remove the heat sink(s) and processor(s), see "Removing a Processor" in Section 3.3.

10. Loosen all nine screws holding the server board to the chassis. See Figure 65 for the location of these screws.

11. Tilt the server board up at the front edge and lift it from the chassis being careful to clear the rear panel of the chassis.

Figure 65. Removing the Server Board

TS000631
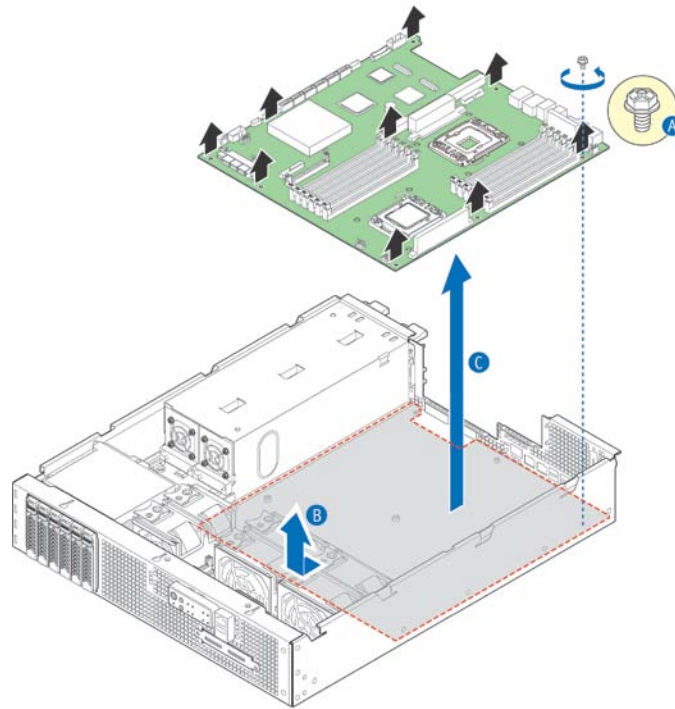
Installing the New Server Board

1. Set the replacement server board into place.
   Insert the rear edge of the board first and line up the I/O ports with the slots in the rear panel of the chassis.

2. Make sure all three self-aligning standoffs go through the holes at the front of the board. (Figure 65, "B")

> **NOTE: If the standoffs are misaligned when the board is screwed down the holes will be damaged and the standoffs may be cross-threaded.**

3. Fasten the server board to the chassis base with the nine screws that were removed and saved.

If the new server board does not have components pre-installed and you are re-using components from the old server board, install components as follows"

- To install memory DIMMs, see "Installing Memory DIMMs" in Section 3.3.
- To install heat sink(s) and processor(s), see "Installing a New Processor" in Section 3.3.

4. Re-install the personality module(s) if used. For information about how these cards are installed, see Section 4.9, "Installing a Personality Module".

5. Re-install the GCM4 module if used. For information about how this card is installed, see Section 4.10, "Installing a Remote Management Module".

6. Re-install the bridge board. For instructions, see "Re-Installing the Bridge Board" in Section 5.3.

7. Re-connect the serial port connector to the bridge board. See Figure 25 for the cable connector location

8. Re-connect the TAM signal cable that runs from the module to the rear panel of the chassis.

9. Re-install the power distribution board and its protective cover.

10. Re-install the processor air duct.

11. Re-install the black plastic air baffle/guide bracket used to route the bridge board and line up the riser card assembly.

12. Re-install the riser card assembly. See Re-Installing the Riser Card Assembly" in Section 4.7.

13. If this is the last task you are performing inside the server chassis, replace both chassis covers, reconnect the power cord(s), and reconnect any external devices.

5.9 Replacing the SAS/SATA Backplane Board

The six-slot SAS/SATA backplane board is located at the rear of the HDD drive bay assembly. It is held in place by a cover plate on top of the HDD bay assembly that goes over the top edge of the backplane board. In order to access the SAS/SATA backplane board to remove it, you need to first remove the following components:

- Front bezel
- SAS/SATA control module or hardware RAID module, if installed, or empty bracket
- Any hard disk drives installed
- HDD bay assembly cover plate
- The power cable connected to the front of the backplane board

CAUTION: Before replacing any of the boards on the CG2100 server, you must first take the server out of service, turn off all peripheral devices connected to the server, turn off the server by pressing the power button, and unplug the power cord(s) from the system and wall outlet.

When handling the SAS/SATA backplane board, observe the normal safety and ESD precautions. See "Appendix A: Safety Information" for more information.

Removing the Old SAS/SATA Backplane Board

1. Remove the front chassis cover. For instructions, see "Removing the Front Cover" in Section 3.2.

2. Remove the front panel bezel. For instructions, see "Removing the Front Bezel" in Section 3.2.

3. Remove any hard disk drives from the drive bays.

4. Remove the SAS/SATA control module or the SAS/SATA hardware RAID module, if installed, or the empty bracket if no module is installed.

    a. Disconnect the flex circuit cable from the SAS/SATA module. For instructions, see "Disconnecting the Flex Circuit Cable" in Section 5.3.

    b. Unscrew the SAS/SATA module from the HDD bay assembly cover plate. (Figure 66, "A")

    c. Loosen the SAS/SATA module card edge from the connector on the SAS/SATA backplane board. ("B")

    d. Slide the SAS/SATA bracket out of the chassis.

Figure 66. Removing the SAS/SATA Module or Bracket
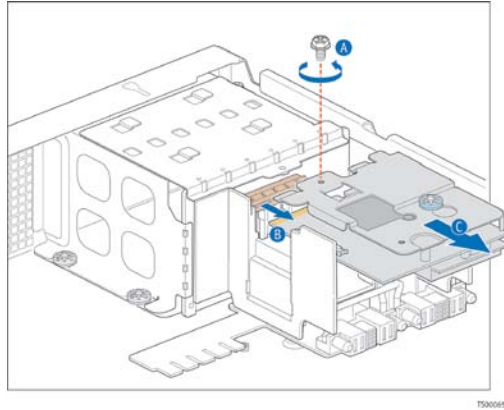
5. Disconnect all cables attached to the backplane board.

6. Remove the HDD bay assembly cover plate by loosening the screw that fastens it to the drive bay assembly. (Figure 67 "A")
Slide the cover plate towards the side chassis wall ("B") to release the four tabs. ("C")
Lift the cover plate off of the HDD bay assembly. ("D")

Figure 67. Removing the HDD Bay Assembly Cover Plate
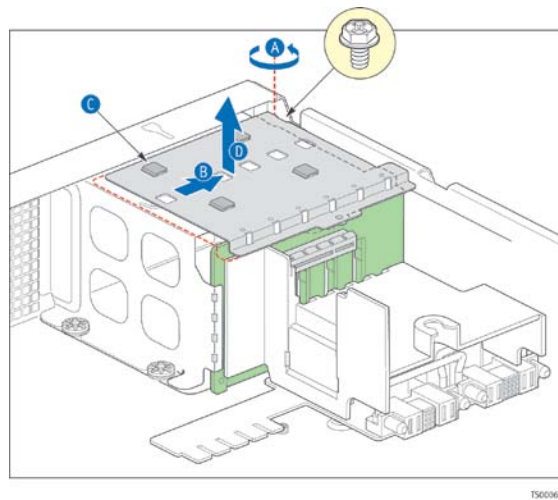
7. Lift the backplane board part way out. (Figure 68, "A")
Disconnect the power cable. ("B") from the front of the backplane board ("C")

Figure 68. Removing the Backplane Board
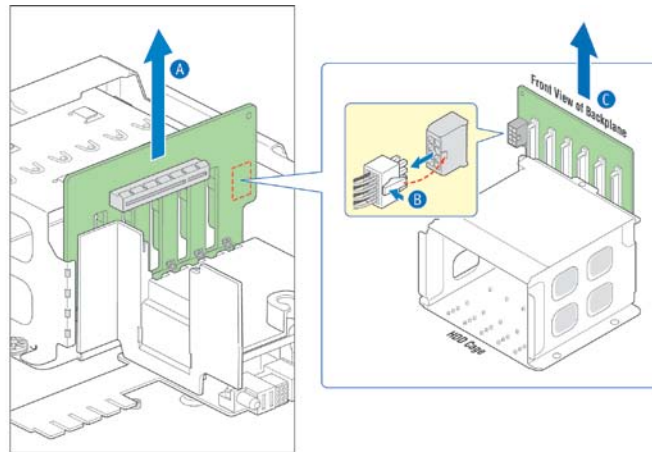
Installing the New SAS/SATA Backplane Board

NOTE: Make sure the six-slot HDD backplane has top and bottom insulators on the rear side of the board.

1. Slide the backplane board part way into place behind the HDD bay assembly, making sure the board fits securely between the edge of the HDD bay assembly and the guide pins on the HDD bay assembly. (Figure 69, "A" and "B")

Figure 69. Installing the Backplane Board
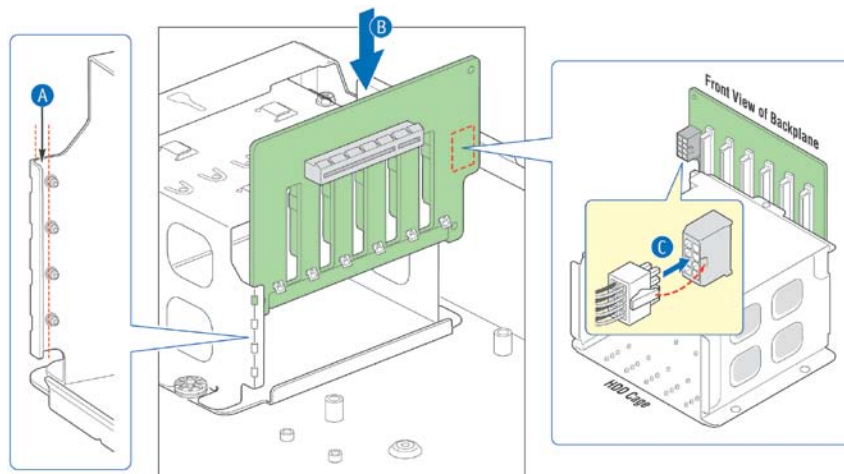
2. Connect the power cable into the front of the backplane board, leaving the board only partially inserted. ("C")

3. Make sure the metal clips on the bottom of the backplane board line up with the HDD bay assemble flange. (Figure 70, "A")
   Press the backplane board all the way down so the metal clips capture the flange. ("C")

Figure 70. Fastening the Backplane Board
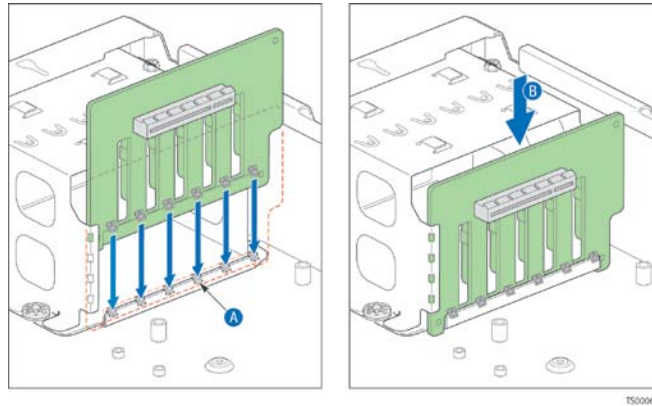
4. Secure the six-slot HDD backplane in place by placing the cover plate over the HDD bay assembly.
    The cover plate goes over the HDD bay notches and then slides to the right.
    Re-fasten the screw that holds the cover plate in place. (See Figure 68, "A" for the location.)

5. Re-install the SAS/SATA control module or SAS/SATA hardware RAID module, if used, and the sheet metal bracket.
    For instructions, see either Section 4.3, "Installing a SAS/SATA Control Module" or Section 4.4, "Installing a Hardware RAID Module".

6. Re-attach the front panel bezel. For instructions, see "Re-Installing the Front Bezel" in Section 3.2

7. If this is the last task you are performing inside the server chassis, replace the front top chassis cover, reconnect the power cord(s), and reconnect any external devices.

6   Server Utilities

6.1 Using the BIOS Setup Utility

This section describes the BIOS Setup Utility, which is used to change configuration values for the Kontron CG2100 Carrier Grade Server. You can run BIOS Setup with or without an operating system present

Using BIOS Setup

You may want to use BIOS Setup for the following purposes:

- Selecting a particular boot device
- Adjusting settings for the processor, memory, and other devices
- Configuring RAS, acoustic, and performance settings
- Setting security and server management options
- Viewing hardware and system information
- Restoring settings after replacing the baseboard battery

> **NOTE: Most modern devices do not require manual configuration, so many users will never need to use BIOS Setup.**

Starting Setup

After you turn on or reset the server, BIOS prepares the server to boot an operating system. During this time, you will see the prompt:

Press <F2> to enter SETUP

Pressing F2 when prompted invokes BIOS setup. The BIOS continues to perform necessary initialization procedures and then displays the BIOS Setup menus.

If You Cannot Access Setup

If you are not able to access BIOS Setup, you might need to restore the BIOS options to their factory settings. For instructions on restoring factory defaults, see Section 6.3, "Restoring Factory Default Settings".

Setup Menus

Each BIOS Setup menu page has a number of features. Except for features that only display automatically configured information, each feature is associated with a value field with user-selectable parameters. These parameters can be changed if you have adequate security rights. Value fields are inaccessible if the value cannot be changed.

Table 6 describes the keyboard commands you can use in the BIOS Setup menus.

Table 6. 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.

Key	Description
↑	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 undoes the pick list and allows another selection in the parent menu.
<Esc>	Exit - The **ESC** key provides a mechanism for backing out of any field. This key undoes pressing the **Ente**r key. When the **ESC** key is pressed while editing a field or selecting menu features, 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 message to appear: **Setup Confirmation** **Load default configuration now?** **[Yes] [No]** If **Yes** is selected and the **Ente**r 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, you are returned to where you 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]**

Key	Description
	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, you are returned to where you were before **F10** was pressed without affecting any existing values.

6.2 Upgrading the BIOS

The upgrade utility lets you 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
- Splash Screen

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.

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 more information.

> Note: Review the instructions and release notes that are provided in the readme 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.

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!

6.3 Restoring BIOS Default Settings

If you are not able to access the BIOS setup screens, you may need to restore the BIOS settings to their factory defaults. This procedure requires physical access to the inside of the server.

1. Power down the system but do not disconnect the power cord.

2. Open the server. See "Removing the Chassis Covers", in Section 3.2 for instructions.

3. Locate the "Restore Defaults" jumper (J1E7) as shown in Figure 24.

4. Move jumper (J1E7) from the normal position (pins 1-2) to the restore position (2-3) and wait five seconds.

5. Move the jumper (J1E7) back to the normal position (pins 1-2).

6. Close the server chassis. See" Re-installing the Chassis Covers" in Section 3.2 for instructions.

7. 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 (J1E8) 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 is shown in Figure 24.

1. Power down the system and disconnect the power cord(s).

2. Open the server chassis. See "Removing the Chassis Covers", in Section 3.2 for instructions.

3. Move the jumper (J1E8) 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 cord(s) and power up the system.

5. Power down the system and disconnect the power cord(s).

6. Return the Password Clear jumper (J1E8) to the "Password Clear Protect" position, covering pins 1 and 2.

7. Close the server chassis. See" Re-installing the Chassis Covers" in Section 3.2 for instructions.

8. Reconnect the power cord(s) and power up the server.

6.5 BMC Force Update Procedure

The standard BMC firmware update procedure replaces 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 procedure 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 procedure fails.

Once the firmware update procedure 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 the server and unplug the power cord(s).

2. Open the server chassis. See "Removing the Chassis Covers", in Section 3.2 for instructions.

3. Locate jumper block J1H2 and move the jumper to the "Enable" position (pins 2-3).

4. Close the server chassis. See" Re-installing the Chassis Covers" in Section 3.2 for instructions.

5. Reconnect the power cord(s) and restart the system.

6. 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.**

7. When the update has finished, power down the system and remove the power cord(s).

8. Open the server chassis (remove the top cover).

9. Locate jumper block J1H2 and move the jumper to the Disable position (pins 1-2).

10. Close the server chassis. See" Re-installing the Chassis Covers" in Section 3.2 for instructions.

11. Reconnect the power cord(s) and restart the system.

7   Troubleshooting

This chapter helps you identify and solve problems that might occur while you are using the Kontron CG2100 Carrier Grade Server.

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/products/systems+and+platforms/communication+rackmount+servers/carrier+grade+servers/cg2100+carrier+grade+server.html, click on downloads, BIOS 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.

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 on/off

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 "Problems with Newly Installed Application Software".

First Steps Checklist

l   Is power available at the source?
l   Are the power supplies plugged in? Check the power cable on the back of the server and at the power source.
l   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
l   Are all cables correctly connected and secured?
l   Are the processors fully seated in their sockets on the server board?
l   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/products/systems+and+platforms/communication+rackmount+servers/carrier+grade+servers/cg2100+carrier+grade+server.html 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".

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.

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 "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.

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.

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.

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?

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 front panel (FP) 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 FP board?
- Are there any shorted wires caused by pinched-cables or have power connector plugs been forced into power connector sockets the wrong way?

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/products/systems+and+platforms/communication+rackmount+servers/carrier+grade+servers/cg2100+carrier+grade+server.html 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.

Diagnostics Pass but the Connection Fails

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

The 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/products/systems+and+platforms/communication+rackmount+servers/carrier+grade+servers/cg2100+carrier+grade+server.html for a link to the current version.
- Try reseating the add-in adapter.

The Add-in Adapter Stopped Working without Apparent Cause

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

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.

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.

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.

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

The Windows* operating systems do not include all of the drivers for the Intel® chipsets, onboard NICs, and other components. Check the Kontron Deployment CD that came with your server or go to http://us.kontron.com/products/systems+and+platforms/communication+rackmount+servers/carrier+grade+servers/cg2100+carrier+grade+server.html for a link to the current drivers and chipset files.

Hard Drive(s) are not Recognized

Check the following:

l   Make sure the drive is not disabled in BIOS Setup.

l   Make sure the drive is compatible. Go to http://us.kontron.com/products/systems+and+platforms/communication+rackmount+servers/carrier+grade+servers/cg2100+carrier+grade+server.html for a link to the list tested drives.

l   Make sure you have not exceeded the power budget for the server. Go to http://us.kontron.com/products/systems+and+platforms/communication+rackmount+servers/carrier+grade+servers/cg2100+carrier+grade+server.html for a link to software to check your power budget.

7.5 LED Information

The Intel® Server Board T5520UR includes LEDs that can aid in troubleshooting your system. Table 7 defines these LEDs with a description of their use.

Table 7. LED Definitions

LED Name	Function	Location	Color	Notes
ID	Aid in server identification from the back panel	Control panel ID button and rear right corner of server board	Blue	On = chassis identification active via command or by pressing the button
System status	Visible fault warning	Control panel and rear corner of server board	Green or amber	Green = system ready Green blinking = degraded Amber = critical error or non-recoverable Amber blinking = non-critical error
Hard disk drive activity*	Drive state	Control panel	Green or amber	Green blinking = activity, no action required Amber = drive fault Off = no access/no HDD fault *See CG2100 Technical Product Specification for more information about hard drive LED operation
Memory fault (1 – 12)	Identify failing memory module	DIMM end, rear of server	Amber	On = fault
Diagnostic LEDs, 1 – 8 (LSB, bit1, bit2, MSB)	Display port 80 POST codes	Center back edge of server board	Each LED can be off, green, amber, red	See the POST code table in the S5520UR Technical Product Specification
CPU 1 and CPU 2 fan fault	Identify fan failure	On each fan carrier	Amber	On = fault
CPU 1 and CPU 2 fault	Identify processor failure	Behind processor socket	Amber	On = fault
5v Standby	Identify 5v standby power	Front left of server board	Amber	On = 5v standby power on

LED Name	Function	Location	Color	Notes
	on state			
Power LED	Identify system power state	Control panel (on button)	Red	Off = power off (ACPI S4 or S5) On = power on (ACPI S0) Slow blinking = low power state (ACPI S1)
NIC1 and NIC2 LEDs	Identify NIC state and speed	Left and right sides of RJ45 connector	Left LED can be off, green, amber Right LED, green	Off = 10 Mbps Green = 100 Mbps Amber = 1000 Mbps Green on = active connection Green blinking = transmit/receive activity

BIOS POST Beep Codes

Table 8 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 8. 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 (RMM) is installed. The RMM provide the following additional beep codes:

Table 9. Error Beep Codes Provided by an Intel® Remote Management Module

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.

9 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 non-compliance with product regulations in the region(s) in which the product is sold.**

9.1 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.

9.2 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. The suitability of this product for other product categories and environments (medical, industrial, 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.

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 metallically 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 in order to connect these interfaces metallically to OSP wiring.

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 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 cord set that is not the exact type required. You must use a power cord set 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 Electrotechniker, 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.
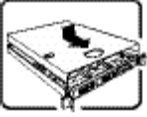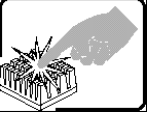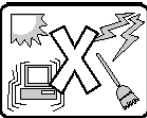- Cord length and flexibility: Cords must be less than 4.5 meters (14.8 feet) long.

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 110-26 and 110-27 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.
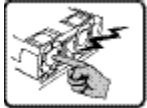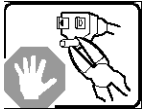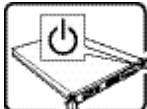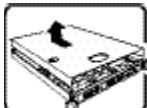
Grounding the server: This server is intended for installation with an isolated DC return (DC-I and is to be installed in a Common Bonding Network (CBN) per NEBS GR-1089). To avoid the potential for an electrical shock hazard, you must reliably connect an earth grounding conductor to the server. The 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.
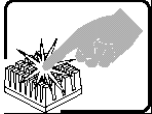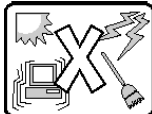
Overcurrent protection: Overcurrent protection UL Listed circuit breakers must be provided as part of each host equipment rack and must be incorporated in the field wiring between the DC source and the server. The branch circuit protection shall be rated minimum 75 VDC, 10A maximum per feed pair. If 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.

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 35°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 1023 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.**

9.3 Safety Cautions

Read all caution and safety statements in this document before performing any of the instructions.

	The power supply in this product contains no user-serviceable parts. There may be more than one supply in this product. Refer servicing only to qualified personnel.
	Do not attempt to modify or use the supplied AC power cord if it is not the exact type required. A product with more than one power supply will have a separate AC power cord for each supply.
	The power button on the system does not turn off system AC power. To remove AC power from the system, you must unplug each AC power cord from the wall outlet or power supply. The power cord(s) is considered the disconnect device to the main (AC) power. The socket outlet that the system plugs into must be installed near the equipment and must be easily accessible.
	SAFETY STEPS: Whenever you remove the chassis covers to access the inside of the system, follow these steps: 1. Turn off all peripheral devices connected to the system. 2. Turn off the system by pressing the power button. 3. Unplug all AC power cords from the system or from wall outlets. 4. Label and disconnect all cables connected to I/O connectors or ports on the back of the system. 5. Provide electrostatic discharge (ESD) protection by wearing an antistatic wrist strap attached to chassis ground of the system—any unpainted metal surface—when handling components. After you have completed the six SAFETY STEPS above, you can remove the system covers. To do this: 1. Unlock and remove the padlock from the back of the system if a

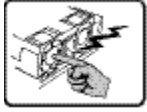|	
	padlock has been installed. 2. Remove and save all screws from the covers. 3. Remove the covers. 4. Do not operate the system with the chassis covers removed.
	For proper cooling and airflow, always reinstall the chassis covers before turning on the system. Operating the system without the covers in place can damage system parts. To install the covers: 1. Check first to make sure you have not left loose tools or parts inside the system. 2. Check that cables, add-in boards, and other components are properly installed. 3. Attach the covers to the chassis with the screws removed earlier, and tighten them firmly. 4. Insert and lock the padlock to the system to prevent unauthorized access inside the system. 5. Connect all external cables and the AC power cord(s) to the system.
	A microprocessor and heat sink may be hot if the system has been running. Also, there may be sharp pins and edges on some board and chassis parts. Contact should be made with care. Consider wearing protective gloves.
	Danger of explosion if the battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the equipment manufacturer. Dispose of used batteries according to manufacturer's instructions.
	The system is designed to operate in a typical office environment. Choose a site that is: • Clean and free of airborne particles (other than normal room dust). • Well ventilated and away from sources of heat including direct sunlight. • Away from sources of vibration or physical shock. • Isolated from strong electromagnetic fields produced by electrical devices. • In regions that are susceptible to electrical storms, we recommend you plug your system into a surge 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.
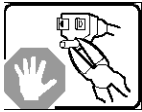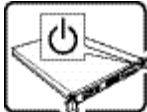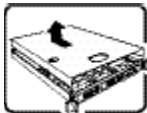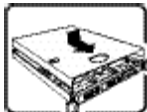
	Benutzer können am Netzgerät dieses Produkts keine Reparaturen vornehmen. Das Produkt enthält möglicherweise mehrere Netzgeräte. Wartungsarbeiten müssen von qualifizierten Technikern ausgeführt werden.
	Versuchen Sie nicht, das mitgelieferte Netzkabel zu ändern oder zu verwenden, wenn es sich nicht genau um den erforderlichen Typ handelt. Ein Produkt mit mehreren Netzgeräten hat für jedes Netzgerät ein eigenes Netzkabel.
	Der Wechselstrom des Systems wird durch den Ein-/Aus-Schalter für Gleichstrom nicht ausgeschaltet. Ziehen Sie jedes Wechselstrom-Netzkabel aus der Steckdose bzw. dem Netzgerät, um den Stromanschluß des Systems zu unterbrechen.
	SICHERHEISMASSNAHMEN: Immer wenn Sie die Gehäuseabdeckung abnehmen um an das Systeminnere zu gelangen, sollten Sie folgende Schritte beachten:

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

2. Schalten Sie das System mit dem Hauptschalter aus.

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

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

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

6. Schalten Sie das System niemals ohne ordnungsgemäß montiertes Gehäuse ein.

Nachdem Sie die oben erwähnten ersten sechs SICHERHEITSSCHRITTE durchgeführt haben, können Sie die Abdeckung abnehmen, indem Sie:

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

2. Entfernen Sie alle Schrauben der Gehäuseabdeckung.

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

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

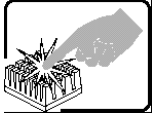2. Überprüfen Sie alle Kabel, Zusatzkarten und andere Komponenten auf |
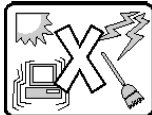
	ordnungsgemäßen Sitz und Installation.
	3. Bringen Sie die Abdeckungen wieder am Gehäuse an, indem Sie die zuvor gelösten Schrauben wieder anbringen. Ziehen Sie diese gut an.
	4. Bringen Sie die Verschlußeinrichtung (Padlock) wieder an und schließen Sie diese, um ein unerlaubtes Öffnen des Systems zu verhindern.
	5. Schließen Sie alle externen Kabel und den AC Stromanschlußstecker Ihres Systems wieder an.
	Der Mikroprozessor und der Kühler sind möglicherweise erhitzt, wenn das System in Betrieb ist. Außerdem können einige Platinen und Gehäuseteile scharfe Spitzen und Kanten aufweisen. Arbeiten an Platinen und Gehäuse sollten vorsichtig ausgeführt werden. Sie sollten Schutzhandschuhe tragen.
	Bei falschem Einsetzen einer neuen Batterie besteht Explosionsgefahr. Die Batterie darf nur durch denselben oder einen entsprechenden, vom Hersteller empfohlenen Batterietyp ersetzt werden. Entsorgen Sie verbrauchte Batterien den Anweisungen des Herstellers entsprechend.
	Das System wurde für den Betrieb in einer normalen Büroumgebung entwickelt. Der Standort sollte: • sauber und staubfrei sein (Hausstaub ausgenommen); • gut gelüftet und keinen Heizquellen ausgesetzt sein (einschließlich direkter Sonneneinstrahlung); • keinen Erschütterungen ausgesetzt sein; • keine starken, von elektrischen Geräten erzeugten elektromagnetischen Felder aufweisen; • in Regionen, in denen elektrische Stürme auftreten, mit einem Überspannungsschutzgerät verbunden sein; während eines elektrischen Sturms sollte keine Verbindung der Telekommunikationsleitungen mit dem Modem bestehen; • mit einer geerdeten Wechselstromsteckdose ausgerüstet sein; • über ausreichend Platz verfügen, um Zugang zu den Netzkabeln zu gewährleisten, da der Stromanschluß des Produkts hauptsächlich über die Kabel unterbrochen wird.

Consignes de sécurité

Lisez attention toutes les consignes de sécurité et les mises en garde indiquées dans ce document avant de suivre toute instruction.

	Le bloc d'alimentation de ce produit ne contient aucune pièce pouvant être réparée par l'utilisateur. Ce produit peut contenir plus d'un bloc d'alimentation. Veuillez contacter un technicien qualifié en cas

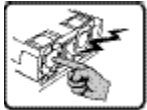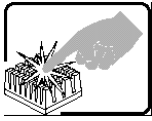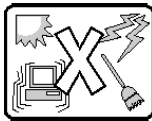|	
	de problème.
	Ne pas essayer d'utiliser ni modifier le câble d'alimentation CA fourni, s'il ne correspond pas exactement au type requis. Le nombre de câbles d'alimentation CA fournis correspond au nombre de blocs d'alimentation du produit.
	Notez que le commutateur CC de mise sous tension /hors tension du panneau avant n'éteint pas l'alimentation CA du système. Pour mettre le système hors tension, vous devez débrancher chaque câble d'alimentation de sa prise.
	CONSIGNES DE SÉCURITÉ -Lorsque vous ouvrez le boîtier pour accéder à l'intérieur du système, suivez les consignes suivantes: 1. Mettez hors tension tous les périphériques connectés au système. 2. Mettez le système hors tension en mettant l'interrupteur général en position OFF (bouton-poussoir). 3. Débranchez tous les cordons d'alimentation c.a. du système et des prises murales. 4. Identifiez et débranchez tous les câbles reliés aux connecteurs d'E-S ou aux accès derrière le système. 5. Pour prévenir les décharges électrostatiques lorsque vous touchez aux composants, portez une bande antistatique pour poignet et reliez-la à la masse du système (toute surface métallique non peinte du boîtier). 6. Ne faites pas fonctionner le système tandis que le boîtier est ouvert. Une fois TOUTES les étapes précédentes accomplies, vous pouvez retirer les panneaux du système. Procédez comme suit: 1. Si un cadenas a été installé sur à l'arrière du système, déverrouillez-le et retirez-le. 2. Retirez toutes les vis des panneaux et mettez-les dans un endroit sûr. 3. Retirez les panneaux.
	Afin de permettre le refroidissement et l'aération du système, réinstallez toujours les panneaux du boîtier avant de mettre le système sous tension. Le fonctionnement du système en l'absence des panneaux risque d'endommager ses pièces. Pour installer les panneaux, procédez comme suit: 1. Assurez-vous de ne pas avoir oublié d'outils ou de pièces démontées dans le système. 2. Assurez-vous que les câbles, les cartes d'extension et les autres composants sont bien installés. 3. Revissez solidement les panneaux du boîtier avec les vis retirées

	plus tôt. 4. Remettez le cadenas en place et verrouillez-le afin de prévenir tout accès non autorisé à l'intérieur du système. 5. Rebranchez tous les cordons d'alimentation c. a. et câbles externes ausystème.
	Le microprocesseur et le dissipateur de chaleur peuvent être chauds si le système a été sous tension. Faites également attention aux broches aiguës des cartes et aux bords tranchants du capot. Nous vous recommandons l'usage de gants de protection.
	Danger d'explosion si la batterie n'est pas remontée correctement. Remplacer uniquement avec une batterie du même type ou d'un type équivalent recommandé par le fabricant. Disposez des piles usées selon les instructions du fabricant.
	Le système a été conçu pour fonctionner dans un cadre de travail normal. L'emplacement choisi doit être: • Propre et dépourvu de poussière en suspension (sauf la poussière normale). • Bien aéré et loin des sources de chaleur, y compris du soleil direct. • A l'abri des chocs et des sources de vibrations. • Isolé de forts champs électromagnétiques géenérés par des appareils électriques. • Dans les régions sujettes aux orages magnétiques il est recomandé de brancher votre système à un supresseur de surtension, et de débrancher toutes les lignes de télécommunications de votre modem durant un orage. • Muni d'une prise murale correctement mise à la terre. • Suffisamment spacieux pour vous permettre d'accéder aux câbles d'alimentation (ceux-ci étant le seul moyen de mettre le système hors tension).

Instrucciones de seguridad importantes
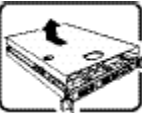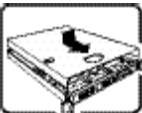
Lea todas las declaraciones de seguridad y precaución de este documento antes de realizar cualquiera de las instrucciones.

	El usuario debe abstenerse de manipular los componentes de la fuente de alimentación de este producto, cuya reparación debe dejarse exclusivamente en manos de personal técnico especializado. Puede que este producto disponga de más de una fuente de alimentación.

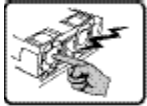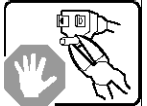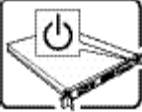|	
	No intente modificar ni usar el cable de alimentación de corriente alterna, si no corresponde exactamente con el tipo requerido. El número de cables suministrados se corresponden con el número de fuentes de alimentación de corriente alterna que tenga el producto.
	Nótese que el interruptor activado/desactivado en el panel frontal no desconecta la corriente alterna del sistema. Para desconectarla, deberá desenchufar todos los cables de corriente alterna de la pared o desconectar la fuente de alimentación.
	INSTRUCCIONES DE SEGURIDAD: Cuando extraiga la tapa del chasis para acceder al interior del sistema, siga las siguientes instrucciones: 1. Apague todos los dispositivos periféricos conectados al sistema. 2. Apague el sistema presionando el interruptor encendido/apagado. 3. Desconecte todos los cables de alimentación CA del sistema o de las tomas de corriente alterna. 4. Identifique y desconecte todos los cables enchufados a los conectores E/S o a los puertos situados en la parte posterior del sistema. 5. Cuando manipule los componentes, es importante protegerse contra la descarga electrostática (ESD). Puede hacerlo si utiliza una muñequera antiestática sujetada a la toma de tierra del chasis - o a cualquier tipo de superficie de metal sin pintar. 6. No ponga en marcha el sistema si se han extraído las tapas del chasis. Después de completar las seis instrucciones de SEGURIDAD mencionadas, ya puede extraer las tapas del sistema. Para ello: 1. Desbloquee y extraiga el bloqueo de seguridad de la parte posterior del sistema, si se ha instalado uno. 2. Extraiga y guarde todos los tornillos de las tapas. 3. Extraiga las tapas.
	Para obtener un enfriamiento y un flujo de aire adecuados, reinstale siempre las tapas del chasis antes de poner en marcha el sistema. Si pone en funcionamiento el sistema sin las tapas bien colocadas puede dañar los componentes del sistema. Para instalar las tapas: 1. Asegúrese primero de no haber dejado herramientas o componentes sueltos dentro del sistema. 2. Compruebe que los cables, las placas adicionales y otros componentes se hayan instalado correctamente. 3. Incorpore las tapas al chasis mediante los tornillos extraídos anteriormente, tensándolos firmemente. 4. Inserte el bloqueo de seguridad en el sistema y bloquéelo para impedir que pueda accederse al mismo sin autorización.

	5. Conecte todos los cables externos y los cables de alimentación CA al sistema.
	Si el sistema ha estado en funcionamiento, el microprocesador y el disipador de calor pueden estar aún calientes. También conviene tener en cuenta que en el chasis o en el tablero puede haber piezas cortantes o punzantes. Por ello, se recomienda precaución y el uso de guantes protectores.
	Existe peligro de explosión si la pila no se cambia de forma adecuada. Utilice solamente pilas iguales o del mismo tipo que las recomendadas por el fabricante del equipo. Para deshacerse de las pilas usadas, siga igualmente las instrucciones del fabricante.
	El sistema está diseñado para funcionar en un entorno de trabajo normal. Escoja un lugar: • Limpio y libre de partículas en suspensión (salvo el polvo normal). • Bien ventilado y alejado de fuentes de calor, incluida la luz solar directa. • Alejado de fuentes de vibración. • Aislado de campos electromagnéticos fuertes producidos por dispositivos eléctricos. • En regiones con frecuentes tormentas eléctricas, se recomienda conectar su sistema a un eliminador de sobrevoltage y desconectar el módem de las líneas de telecomunicación durante las tormentas. • Provisto de una toma de tierra correctamente instalada. • Provisto de espacio suficiente como para acceder a los cables de alimentación, ya que éstos hacen de medio principal de desconexión del sistema.

Informazioni di Sicurezza importanti

	Rivolgersi ad un tecnico specializzato per la riparazione dei component dell'alimentazione di questo prodotto. È possibile che il prodotto disponga di più fonti di alimentazione.
	Non modificare o utilizzare il cavo di alimentazione in c.a. fornito dal produttore, se non corrisponde esattamente al tipo richiesto. Ad ogni fonte di alimentazione corrisponde un cavo di alimentazione in c.a. separato.

	L'interruttore attivato/disattivato nel pannello anteriore non interrompe l'alimentazione in c.a. del sistema. Per interromperla, è necessario scollegare tutti I cavi di alimentazione in c.a. dalle prese a muro o dall'alimentazione di corrente.
	PASSI DI SICUREZZA: Qualora si rimuovano le coperture del telaio per accedere all'interno del sistema, seguire i seguenti passi:
	1. Spegnere tutti i dispositivi periferici collegati al sistema.
	2. Spegnere il sistema, usando il pulsante spento/acceso dell'interruttore del sistema.
	3. Togliere tutte le spine dei cavi del sistema dalle prese elettriche.
	4. Identificare e sconnettere tutti i cavi attaccati ai collegamenti I/O od alle prese installate sul retro del sistema.
	5. Qualora si tocchino i componenti, proteggersi dallo scarico elettrostatico (SES), portando un cinghia anti-statica da polso che è attaccata alla presa a terra del telaio del sistema - qualsiasi superficie non dipinta - .
	6. Non far operare il sistema quando il telaio è senza le coperture.
	Dopo aver seguito i sei passi di SICUREZZA sopracitati, togliere le coperture del telaio del sistema come seque:
	1. Aprire e rimuovere il lucchetto dal retro del sistema qualora ve ne fosse uno installato.
	2. Togliere e mettere in un posto sicuro tutte le viti delle coperture.
	3. Togliere le coperture.
	Per il giusto flusso dell'aria e raffreddamento del sistema, rimettere sempre le coperture del telaio prima di riaccendere il sistema. Operare il sistema senza le coperture al loro proprio posto potrebbe danneggiare i componenti del sistema. Per rimettere le coperture del telaio:
	1. Controllare prima che non si siano lasciati degli attrezzi o dei component dentro il sistema.
	2. Controllare che i cavi, dei supporti aggiuntivi ed altri componenti siano stati installati appropriatamente.
	3. Attaccare le coperture al telaio con le viti tolte in precedenza e avvitarle strettamente.
	4. Inserire e chiudere a chiave il lucchetto sul retro del sistema per impedire l'accesso non autorizzato al sistema.
	5. Ricollegare tutti i cavi esterni e le prolunghe AC del sistema.

	Se il sistema è stato a lungo in funzione, il microprocessore e il dissipatore di calore potrebbero essere surriscaldati. Fare attenzione alla presenza di piedini appuntiti e parti taglienti sulle schede e sul telaio. È consigliabile l'uso di guanti di protezione.
	Esiste il pericolo di un esplosione se la pila non viene sostituita in modo corretto. Utilizzare solo pile uguali o di tipo equivalente a quelle consigliate dal produttore. Per disfarsi delle pile usate, seguire le istruzioni del produttore.
	Il sistema è progettato per funzionare in un ambiente di lavoro tipo. Scegliere una postazione che sia: • Pulita e libera da particelle in sospensione (a parte la normale polvere presente nell'ambiente). • Ben ventilata e lontana da fonti di calore, compresa la luce solare diretta. • Al riparo da urti e lontana da fonti di vibrazione. • Isolata dai forti campi magnetici prodotti da dispositivi elettrici. • In aree soggette a temporali, è consigliabile collegare il sistema ad un limitatore di corrente. In caso di temporali, scollegare le linee di comunicazione dal modem. • Dotata di una presa a muro correttamente installata. • Dotata di spazio sufficiente ad accedere ai cavi di alimentazione, i quail rappresentano il mezzo principale di scollegamento del sistema.

10 Appendix B: Regulatory and Certification Information

10.1 Product Regulatory Compliance

Product Safety Compliance

The Carrier Grade server complies with the following safety requirements:

- UL60950-1 /CSA 60950-1 (USA / Canada)
- EN60950-1 (Europe)
- IEC60950-1 (International), CB Certificate & Report including all international deviations
- GS Certificate (Germany)
- GOST R Approval (Russia)
- CE – Low Voltage Directive 73/23/EEE (Europe)
- CCC Certification (China)
- BSMI CNS 13436 (Taiwan)

Product EMC Compliance - Class A Compliance

The Carrier Grade server has been has been tested and verified to comply with the following electromagnetic compatibility (EMC) regulations.

- FCC /ICES-003 – Emissions (USA/Canada)
- CISPR 22 – Emissions (International)
- EN55022 – Emissions (Europe)
- EN55024 – Immunity (Europe)
- EN61000-3-2 – Harmonics (Europe)
- EN61000-3-3 – Voltage Flicker (Europe)
- CE- EMC Directive 89/336/EEC (Europe)
- VCCI Emissions (Japan)
- AS/NZS: CISPR 22 Emissions (Australia / New Zealand)
- BSMI CNS13438 Emissions (Taiwan)
- GOST R Approval Emissions and Immunity (Russia)
- KCC Approval (Korea)
- CCC Certification (China)

Certifications/Registrations/Declarations

- UL Listing (US/Canada)
- CE Declaration of Conformity (Europe)
- FCC/ICES-003 Class A Verification Report (USA/Canada)
- VCCI Certification (Japan)
- C-Tick Declaration of Conformity (Australia)
- BSMI Certification (Taiwan)
- GOST R Certification / License (Russia)
- KCC Certification (Korea)
- CNCA Certification (China)
- Ecology Declaration (International)

10.2 Electromagnetic Compatibility Notices

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:

Kontron America, Inc.

14118 Stowe Drive

Poway, CA 92064-7147

(888) 294-4558

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.

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 Canadian des Communications.

English translation of the notice above:

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

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 (2004/108/EC). The product has been marked with the CE Mark to illustrate its compliance.

VCCI (Japan)

この装置は、クラスA情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。　　　　　　　VCCI－ A

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.

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.

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.

11 Appendix C: Getting Help

11.1 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 for the latest product documentation, utilities, drivers and support contacts.

11.2 Telephone

(800) 480-0044

11.3 Email

support@us.kontron.com

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