kontron

>> Kontron Technical Product Specification <<

Kontron CG2200 Carrier Grade Server

Document Revision 1.4

Revision History

Date	Revision Number	Modifications
July 2012	1.0	Final draft
August 2012	1.1	Modify PSU LED indicator tables 39 and 47.
August 2012	1.2	Correct LED behavior for power supply warning events
December 2013	1.3	Adding new E5-2600 v2 processors family
March 2017	1.4	Correct some infos into Regulatory Specifications section

Disclaimers

Copyright © 2012 Kontron AG. All rights reserved. All data is for information purposed only and not guaranteed for legal purposes. Information has been carefully checked and is believed to be accurate; however, no responsibility is assumed for inaccuracies. Kontron and the Kontron logo and all other trademarks or registered trademarks are the property of their respective owners and are recognized. Specifications are subject to change without notice.

Contents

Table of Contents

Revision History 2

1. Introduction 8

2. System Overview 9

2.1 Introduction 9

Kontron CG2200 Carrier Grade Server 9

CG2200 Server Feature Summary 12

2.2 CG2200 Server External Chassis Features 16

Chassis -- Front Views 16

Front Panel 17

Hard Drives 18

Chassis -- Rear View 19

2.3 CG2200 Server Internal Features 20

Intel® S2600CO Server Board 20

PCI Riser Card Assembly 20

Cooling Subsystem 22

2.4 CG2200 Server Platform Management Subsystem 23

IPMI 2.0 Features 23

Non IPMI Features 24

New Manageability Features 25

2.5 CG2200 Server Specifications 25

Environmental Specifications 25

Physical Specifications 26

3. Cables and Connectors 28

3.1 Interconnect Block Diagrams 28

3.2 Cable and System Interconnections 31

Baseboard SSI Main Power Cable 31

CPU 1 + DIMM Power Cable 32

CPU 2 + DIMM Power Cable 33

SAS HDD Backplane Board Power Cable 34

Fan Control Board Power Cable 34

Auxilliary I/O Power Dongle Cable 34

Baseboard SSI Power Control Signal Cable 35

Multifunction Front Panel Board Cable 36

SSI Front Panel Board Cable 37

Fan I2C Cable 38
Front Panel Board USB Cable 39
LED/Switch Board Power and Signal Cable 40
TAM Signal Cable 40
Alarms Cable 41
Fan Cables 42
Mini-SAS 1 (HDD 0-3/SGPIO1) 44
Mini-SAS 2 (HDD 4-5/SGPIO2) 45
HSBP I2C/LED Cable 45
3.3 User-Accessible Connectors 46
Keyboard and Mouse Ports 46
Serial Port 46
Video Port Connector 47
Universal Serial Bus (USB) Interface 48
Ethernet Connector 49
4. Front Panel Board 51
4.1 Introduction 51
4.2 Front Panel Board Features 52
4.3 Front Panel Board Block Diagram 52
4.4 Front Panel Board Functional Description 53
Front Panel Board USB Ports 53
Front Panel Board Serial Port Connector 53
Front Panel Board LED Board Interface 53
Front Panel Board TAM Module Interface 54
Front Panel Board BaseBoard Interface 54
Front Panel Board Miscellaneous Circuits 54
Front Panel Temperature Sensor and FRU EEPROM 54
4.5 Front Panel Board Power Distribution 54
4.6 Front Panel Board Connector Specifications 55
Baseboard SSI Power/Signal Connector 55
Multifunction Power/Signal Connector 56
Front Panel LED Board Connector 58
Front Panel TAM Signal Connector 59
Front Panel RJ45/USB Connector 60
Front Panel Board Baseboard USB Connector 60
Front Panel External SD Flash Module Connectors 61
5. LED/Switch Board 64
5.1 Introduction 64
5.2 LED/Switch Board Features 64
Front Panel System Control Buttons 65

Front Panel Status LEDs....65
5.3 LED/Switch Board Connector Specification....68
6. Fan Control Board....69
6.1 Introduction:....69
6.2 Fan Controller Functions....69
6.3 Fan Control Board Connectors....70
Input Power Connector....70
Output Power Connector....70
Fan Control Board System Fan Connectors....71
6.4 Fan Control Board Connector Specification....71
7. SAS Backplane Board....75
7.1 Introduction....75
7.2 SAS Backplane Board Features....76
7.3 Hard Disk Drive Activity and Fault LEDs....77
7.4 SAS Backplane Board Power Connector....78
7.5 SAS Backplane Mini-SAS Connector....78
8. Telco Alarms Module (TAM)....81
8.1 Introduction....81
8.2 Telco Alarms Module Features....82
Telco Alarms Relays....83
8.3 Telco Alarms Module Connector Specifications....83
Telco Alarms External Interface Connector....83
Telco Alarms System Interface Connector....84
9. PCI Riser Card Assembly....86
9.1 Introduction....86
9.2 Riser Card Options....86
9.3 Riser Card Installation....87
10. DC Power Subsystem....89
10.1 Introduction....89
10.2 DC Power Supply Input Connector and Earth Ground Connection....90
DC Power Supply 48V Input Power Mating Connector....91
DC Power Supply Earth Grounding Studs on Chassis....91
10.3 DC Power Supply Input Voltage and Current Requirements....92
10.4 DC Power Supply Output Connector and Pin Definitions....93
10.5 DC Power Supply Output Current Requirements....94
10.6 DC Power Supply LED Indicator....94
10.7 DC Power Supply Air Flow....95
10.8 DC Power Supply Thermal Protection....95
11. Power Distribution Board (PDB)....96
11.1 Introduction....96
11.2 PDB Input Connectors....97
11.3 PDB Output Load and Voltage Regulation Requirements....99
11.4 PDB Protection Circuits....99
11.5 PDB PMBus Requirements....99
11.6 PDB Output Harness....100

12. AC Power Subsystem 101

12.1 Introduction 101
12.2 AC Power Supply Input Connector and Voltage/Current Requirements ... 102
12.3 AC Power Supply Output Connector, Voltage, and Current Requirements 103
12.4 AC Power Supply LED Indicator 105
12.5 AC Power Supply Air Flow 105
12.6 AC Power Supply Thermal Protection 106

13. POST Error Reporting 107

14. Regulatory Specifications 108

14.1 Safety Compliance 108
14.2 Electromagnetic Compatibility 108
14.3 CE Mark 108
14.4 NEBS Compliance 108

Appendix A: Glossary 109

List of Figures

Figure 1: Kontron Carrier Grade Server CG2200 (Top Cover On) 10
Figure 2: Kontron CG2200 Carrier Grade Server (Cover Removed) 11
Figure 3: CG2200 Server Block Diagram 15
Figure 4: Front View of the CG2200 Server (Bezel Installed) 16
Figure 5: Front View of CG2200 Server (Bezel Removed) 16
Figure 6: Front Panel Details 17
Figure 7: Hard Disk Drives 18
Figure 8: SAS Hard Drive Tray Assembly 18
Figure 9: Chassis Rear View 19
Figure 10 S2600CO Server Board Layout 20
Figure 11: Riser Card Assemblies 21
Figure 12: Cooling Subsystem 22
Figure 13: CG2200 Server Interconnect Block Diagram 29
Figure 14: Baseboard SSI Main Power Cable Mechanical Drawing 32
Figure 15: CPU 1 + DIMM Power Cable Mechanical Drawing 33
Figure 16: CPU 2 + DIMM Power Cable Mechanical Drawing 34
Figure 17: HDD Backplane, Fan Control Board, and Auxiliary I/O Power Cables Mechanical Drawing 35
Figure 18: Baseboard SSI Power Control Signal Cable Mechanical Drawing 36
Figure 19: Multifunction Front Panel Board Cable Mechanical Drawing 37
Figure 20: SSI Front Panel Board Cable Mechanical Drawing 38
Figure 21: Fan I2C Cable Mechanical Drawing 39
Figure 22: Front Panel Board USB Cable Mechanical Drawing 39
Figure 23: LED/Switch Board Power and Signal Cable Mechanical Drawing 40
Figure 24: TAM Signal Cable Mechanical Drawing 41

Figure 25 Alarms Cable Mechanical Drawing 42
Figure 26. Fan Cable Mechanical Drawing 43
Figure 27: Mini-SAS 1 (HDD 0-3/SGPIO1) Mechanical Drawing 44
Figure 28: Mini-SAS 2 (HDD 4-5/SGPIO2) Mechanical Drawing 45
Figure 29: HSBP I2C/LED Cable Mechanical Drawing 46
Figure 30: Front Panel Board Serial Port Connector (RJ45) 46
Figure 31: Rear Panel Serial Port Connector (DB9) 47
Figure 32: Video Connector 48
Figure 33: USB Connector 49
Figure 34: RJ45 Ethernet Connector 49
Figure 35: FP Board Layout (Primary Side 52
Figure 36: FP Board Block Diagram 53
Figure 37: FP Board Power Distribution 55
Figure 38: Front Panel Buttons/LEDs 64
Figure 39: Fan Control Board Layout 70
Figure 40: SAS Backplane Board Layout 76
Figure 41: SAS Backplane Board Block Diagram 77
Figure 42: Hard Disk Drive Bay Numbering 77
Figure 43: Telco Alarms Module Layout (Primary Side) 81
Figure 44: TAM Block Diagram 82
Figure 46: PCI Add-In Card Options 87
Figure 47: Adding Riser Cards into the Assemblies 88
Figure 48: DC Power Supply Module Mechanical Drawing 90
Figure 49: DC Power Supply Input Connector 90
Figure 50: DC Power Supply Mating Connector 91
Figure 51: DC Power Supply Grounding 92
Figure 52: DC Power Supply Output Connector 93
Figure 53: Power Distribution Board Mechanical Drawing 97
Figure 54: PDB Input Connector 98
Figure 55: AC Power Supply Module Mechanical Drawing 102
Figure 56: AC Power Supply Module Output Connector 103

1. Introduction

This technical product specification provides detailed information about the Kontron CG2200 Carrier Grade Server, including information about the chassis hardware, cables, connectors, system boards, power subsystem, and regulatory requirements.

The document is organized into the following chapters:

Chapter 1: **Introduction**
Provides an overview of this document

Chapter 2: **System Overview**
Provides an overview of the Kontron CG2200 Carrier Grade Server hardware

Chapter3: **Cables and Connectors**
Describes the cables and connectors used to interconnect the system board set and the server system components

Chapter4: **Front Panel Board**
Describes the specifications of the front panel I/O board

Chapter 5: **Front Panel LED/Switch Board**
Describes the specifications of the front panel LED/switch board

Chapter 6: **Fan Control Board**
Describes the specifications of the Fan Control board

Chapter 7: **SAS/SATA Backplane Board**
Describes the specifications of the SAS backplane board

Chapter 8: **Telco Alarms Module (TAM)**
Describes the specifications for the Telco alarms module

Chapter 9: **Riser Card Assembly**
Describes the specifications of the PCI riser card assembly

Chapter 10: **DC Power Subsystem**
Describes the specifications of the DC power subsystem

Chapter 11: **Power Distribution Board (PDB)**
Describes the specifications of the power distribution board

Chapter 12: **AC Power Subsystem**
Describes the specifications of the AC power subsystem

Chapter 13: **Regulatory Specifications**
Describes system compliance to regulatory specifications

Appendix A: **Glossary**
Provides definition of key terms used in this document

2. System Overview

This chapter provides an overview of the key features of the Kontron CG2200 Carrier Grade Server in the following sections:

Section 2.1: Introduction
Provides an overview of the server features and a block diagram of the Kontron CG2200 Carrier Grade Server

Section 2.2: CG2200 Server External Chassis Features
Describes the user-accessible features of the CG2200 server chassis in detail (buttons, switches, bezel, etc.)

Section 2.3: CG2200 Server Internal Chassis Features
Provides an overview of the internal functional components of the CG2200 server

Section 2.4: CG2200 Server Platform Management
Describes the server management features of the CG2200 server

Section 2.5: CG2200 Server Specifications
Summarizes the environmental and physical specifications of the CG2200 server

2.1 Introduction

Kontron CG2200 Carrier Grade Server

The Kontron CG2200 Carrier Grade Server is a compact, high-density, rack-mount server with support for the Intel® Xeon® E5-2600 and E5-2600 v2 processors family and up to sixteen DDR3 DIMMs (eight for each processor). The CG2200 server supports high availability features such as hot-swappable and redundant power supply modules, hot-swappable and redundant fans, and up to six hot swappable 2.5-inch hard disk drives. The scalable architecture of the CG2200 server supports a variety of operating systems.

NOTE: Refer to the CG2200's Configuration Guide for the complete and detail list of the approved Intel's processors.

Figure 1 shows the CG2200 server completely assembled. Figure 2 shows the CG2200 server with the top cover removed.

Figure 1: Kontron Carrier Grade Server CG2200 (Top Cover On)

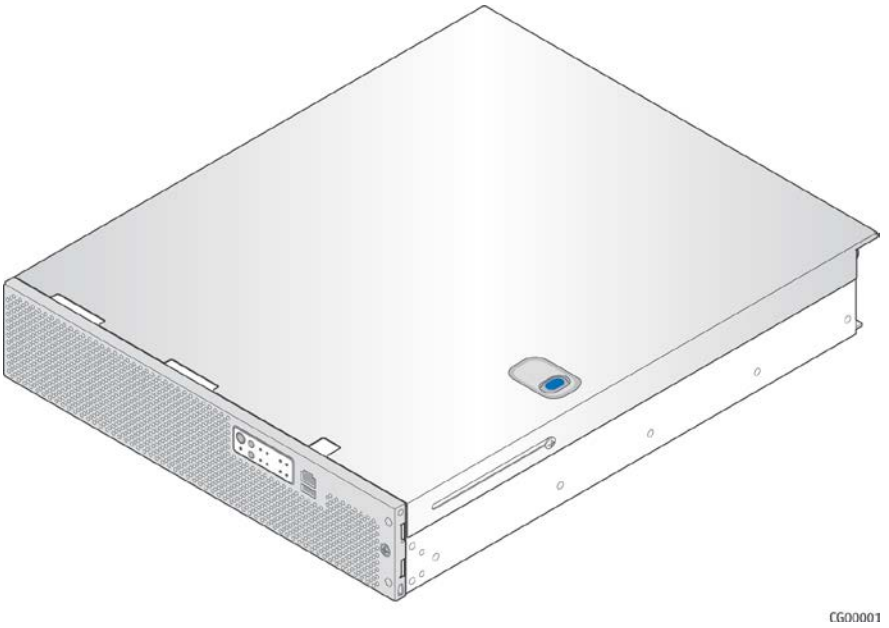
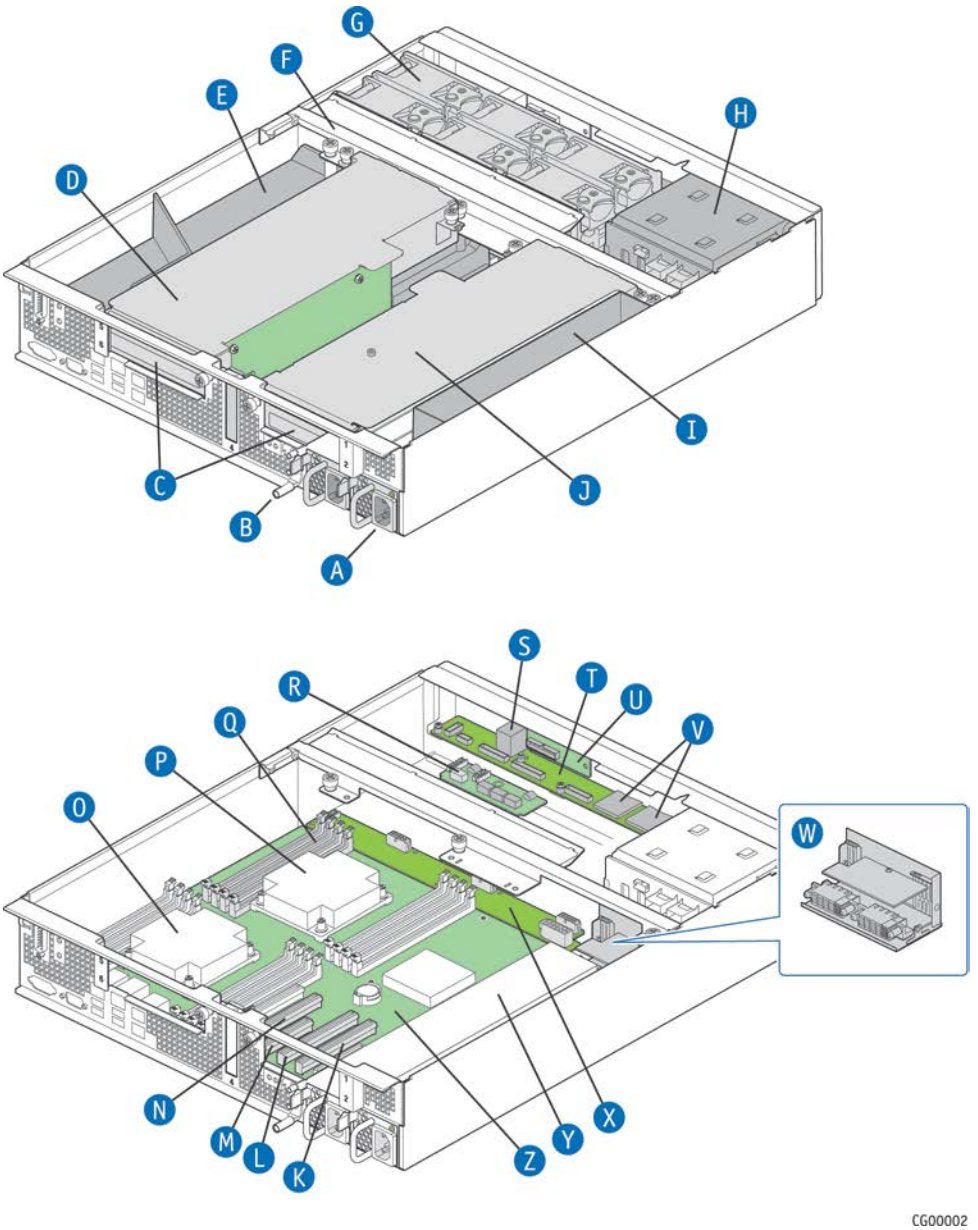


Figure 2: Kontron CG2200 Carrier Grade Server (Cover Removed)



Item	Description	Item	Description
A	Redundant, hot-swappable AC or DC power supply modules	N	Baseboard PCI slot 5, for right-side risers only
B	Earth Ground	O	CPU 2
C	PCI adapter external port access for five adapters.	P	CPU 1
D	Right-side riser card assembly	Q	16 DDR3 memory DIMM slots, two banks of four DIMMs for each processor (CPU 1 slots shown)
E	CPU and DIMM air duct	R	Telco alarm module (TAM) board
F	Chassis support crossbeam	S	RJ45 COM1 port and USB port (2 connectors)
G	System fans (six)	T	Front panel board
H	SAS Hard Drive Bay	U	LED board
I	Air baffle for left- side riser card	V	SD flash card slots (2)
J	Left-side riser card assembly	W	Power distribution board (PDB)
K	Baseboard PCI slot 2 for left-side risers only	X	Fan control board
L	Baseboard PCI slot 3 for internal hardware RAID adapter only	Y	Power supply cage for two power supply modules
M	Baseboard PCI slot 4, for LP adapters only	Z	Intel® S2600CO Server Board

CG2200 Server Feature Summary

Table 1 lists the features of the CG2200 server.

Table 1: CG2200 Server Feature List

Product Features	
System	• NEBS GR63 and GR1089 NEBS level 1 and 3/ETSI compliant • Telco Alarm Manager (TAM) front panel LEDs and relays • RoHS 6/6 compliant • Managed life support (3-5 years)
Chassis	• Ruggedized 2U x 500mm (20” depth) • Locking cover provides 240VA protection during hot swap of system fans • Post plated external sheet metal
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)
Storage	• Up to six hot-swappable 2.5” SAS HDDs/SATA SSDs • Integrated SAS/SATA interface with SW RAID 0/1/10 • Various third-party LSI-based HW RAID controllers supported • Two front access SD media flash modules • Internal flash storage supported (eUSB and SATADOM)
System Cooling	• Six 80mm hot-swappable, redundant fans
Power	• Dual redundant 650W AC hot-swappable power supplies, 80Plus® Gold • Dual redundant 650W DC hot-swappable power supplies,

Product Features	
	• Common 650W Power Distribution Board (PDB) • PMBus 1.2 specification support • Auxiliary I/O power dongle
Baseboard	• Intel® S2600CO Server Board • SSI EEB (12in x13in) form factor • One low profile 2x5-pin header for low profile eUSB solid state drives • Two SATA connectors supporting up to 6Gb/sec • Eight SAS/SATA connectors supporting up to 3Gb/sec • Intel® RAID C600 upgrade key connector with RKSAS8 pre-installed • One RMM4 Lite connector • One RMM4 Dedicated Server Management NIC (DMN) connector
SW RAID Support	• 8-port SAS with Intel® ESRT2 RAID 0/1/10 Intel® RSTe RAID 0/1/10
HW RAID Adapter Support (PCI slot 3)	• Optional 6Gb SAS RAID controller with eight internal ports and maintenance-free (SuperCap) backup (flash-based) for SAS drives
Processor	• Two LGA 2011 (socket R) support for Intel® Xeon® E5-2600 and E5-2600 v2 processors family
Chipset	• Intel® C600-A Chipset with embedded SAS controller
Memory	• 16 DIMM slots – 2 DIMM slots/channel – 4 memory channels per processor • Support for Registered DDR3 Memory (RDIMM), LV-RDIMM, Unbuffered DDR3 Memory (UDIMM) with ECC and Load Reduced DDR3 Memory (LR-DIMM). • Memory DDR3 data transfer rate of 800, 1066, 1333, and 1600 MT/s. • DDR3 standard I/O voltage of 1.5V B DIMMS

I/O	• Supports two risers (4 FL/FH cards) and 2 LP adapters for a total of 6 PCI-E Gen2/Gen 3 I/O cards
	• Five Riser Options
	  • 2 slot FL/FH PCI-E x8 passive (right side - Gen3*)
	  • 2 slot FL/FH PCI-E x8 passive (left side - Gen2/Gen3*)
	  • 1 slot FL/FH PCI-E x16 passive (right side - Gen3*)
	  • 1 slot FL/FH PCI-E x16 passive (left side - Gen2/Gen3*)
	  • 2 slot PCI-X active (right side **only***)
	  * Right- or left-side orientation is looking from front of chassis
	• Front panel: one RJ-45 serial connector, , one USB 2.0 connector
	• Rear panel: one DB9 serial connector, four USB 2.0 connectors, one management NIC port (Optional Intel® RMM4), four RJ-45 network interface connectors supporting 10/100/1000 Mbps, one TAM dry relay connector, one DB15 Video VGA connector.

Server Management	• Integrated BMC (iBMC) with advanced options
Video	• Integrated Matrox G200 2D Video Graphics controller

The CG2200 S2600CO Server Board is mounted horizontally toward the rear of the chassis behind the fan board.

Up to six 2.5-inch hot-swappable SAS technology rotating hard drives and/or SATA solid state drives can be mounted in the drive bay, which is accessed from the front of the chassis with the front bezel removed. Figure 2 shows the location of the drive bay.

NOTE: SATA rotating HDDs are not recommended for use in this system because they are sensitive to rotational vibration from system fan blades and other HDDs.

The Front Panel (FP) board and LED/switch board that provide the user interface for the system and the Telco Alarms Management board are located in front of the CPU fans.

Up to two hot-swappable 650W power supply modules can be installed at the rear of the chassis for a 1+1 redundant configuration. The server comes with a filler module that must be installed in the empty power supply slot in systems without redundancy. The left slot (looking from the front of the system) is the non-redundant power supply module location.

Three redundant pairs of 80x38mm hot-swappable system fans cool the S2600CO server board and other components. These fans are installed directly behind the FP board and in front of the fan control board and the S2600CO server board. The fan control board has three 2x6-pin connectors to power and control the system fans. Each fan has its own separate carrier that includes a fault LED.

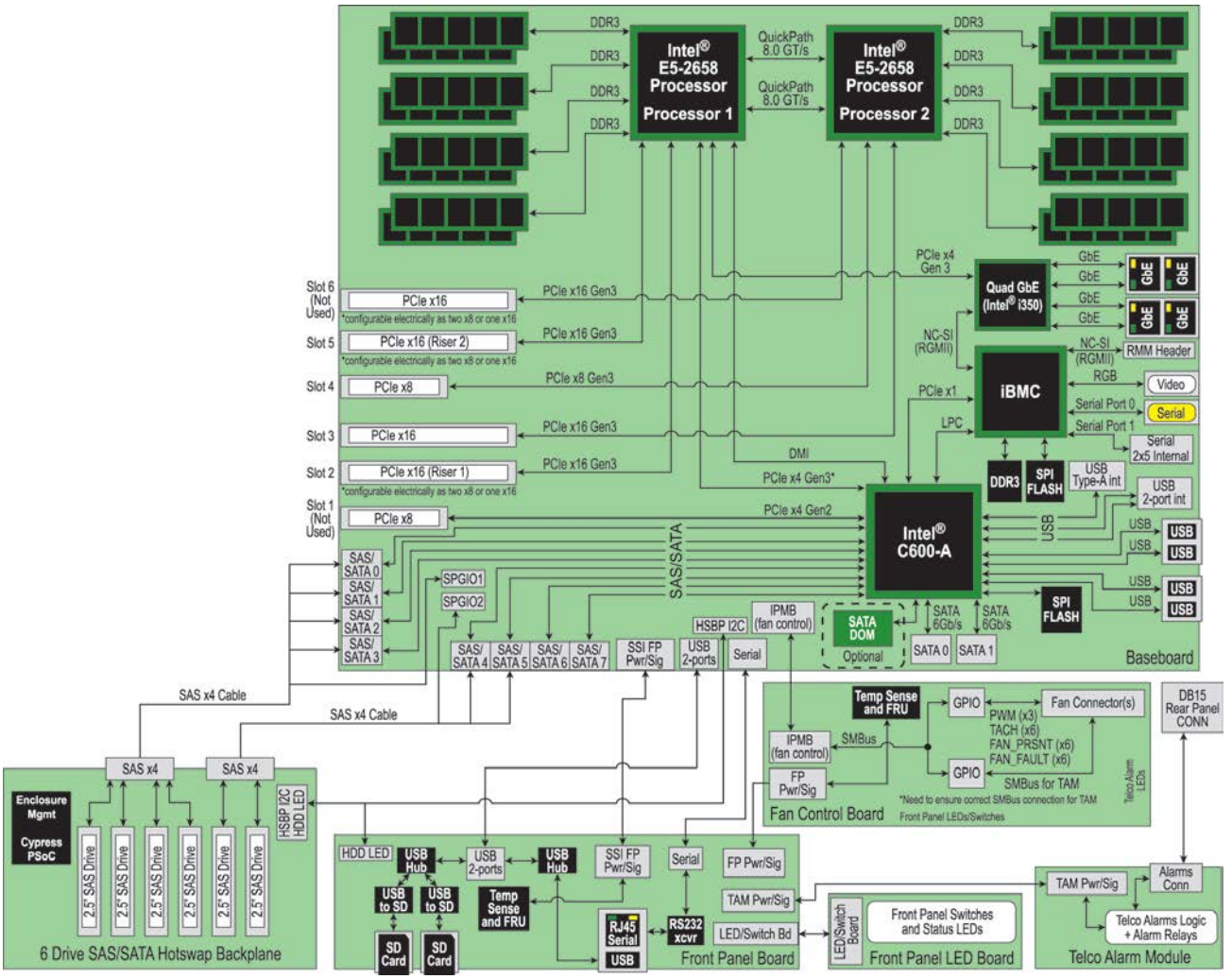
Unlike some previous Kontron servers, cooling for the hard disk drives (HDDs) in the CG2200 server is provided from the left-most redundant pair of 80x38mm system fans rather than from 40x40mm power supply fans, which are not strong enough to provide sufficient cooling for the HDDs in this server. Cooling air is drawn through an L-shaped air duct located behind and to the right side of the HDD bay. The front panel of the chassis is designed to ensure that sufficient air is drawn through the HDD air duct.

Cooling air for the power distribution board (PDB) is provided by the left-most pair of 80x38mm system fans.

The front bezel design allows adequate airflow for cooling the system components and it can also be customized to meet OEM industrial design requirements. The bezel has to be removed to access the drive carriers in the hard drive bay and the SD flash card slots.

Figure 3 is a block diagram of the CG2200 server subsystems.

Figure 3: CG2200 Server Block Diagram



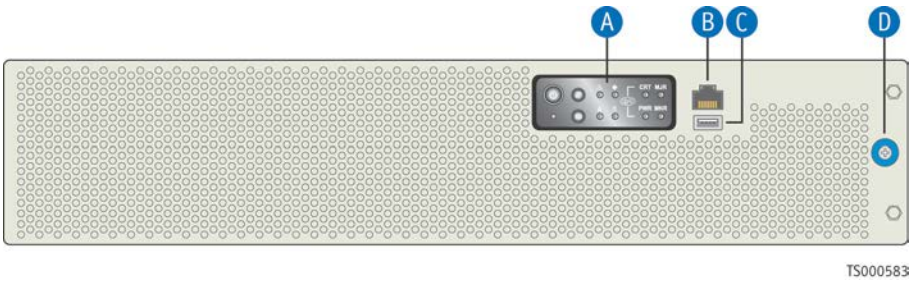
2.2 CG2200 Server External Chassis Features

Chassis -- Front Views

Figure 4 shows the front of the CG2200 server with the bezel installed.

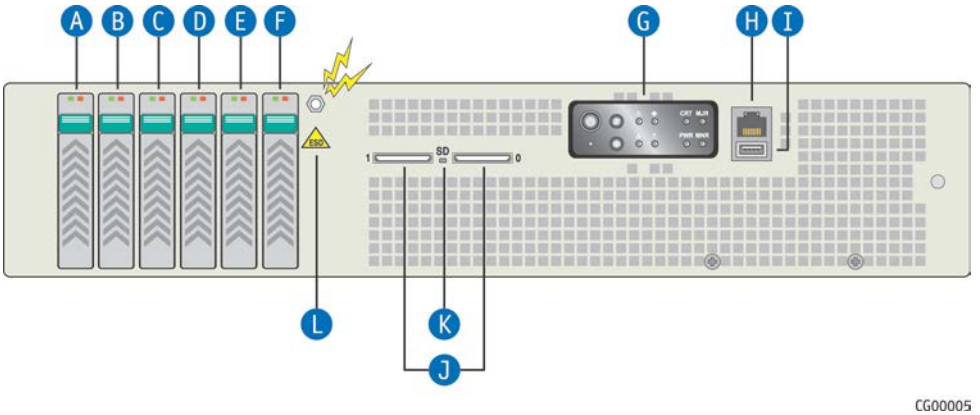
Figure 5 shows the front of the server with the bezel removed. Removing the bezel provides access to the hard drive carriers and SD card slots.

Figure 4: Front View of the CG2200 Server (Bezel Installed)



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

Figure 5: Front View of CG2200 Server (Bezel Removed)

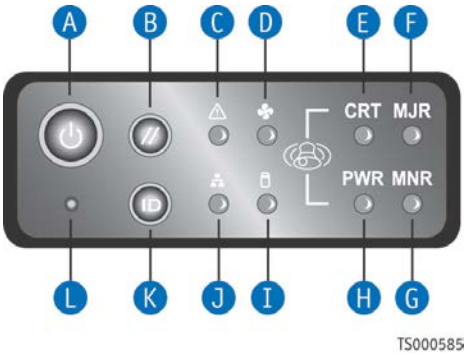


Item	Description	Item	Description
A	Hard disk drive slot 5	**G**	Front panel control buttons, status indicator and telco alarm LEDs
B	Hard disk drive slot 4	**H**	RJ45 serial port (COM2/serial B)
C	Hard disk drive slot 3	**I**	USB port
D	Hard disk drive slot 2	**J**	SD flash card slots
E	Hard disk drive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

Front Panel

The front panel features are shown in Figure 6. All front panel switches and status LEDs are located on the LED/switch board. See Section 5.2 “LED/Switch Board Features” for a detailed description of the control switches and status LEDs on the front panel.

Figure 6: Front Panel Details



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

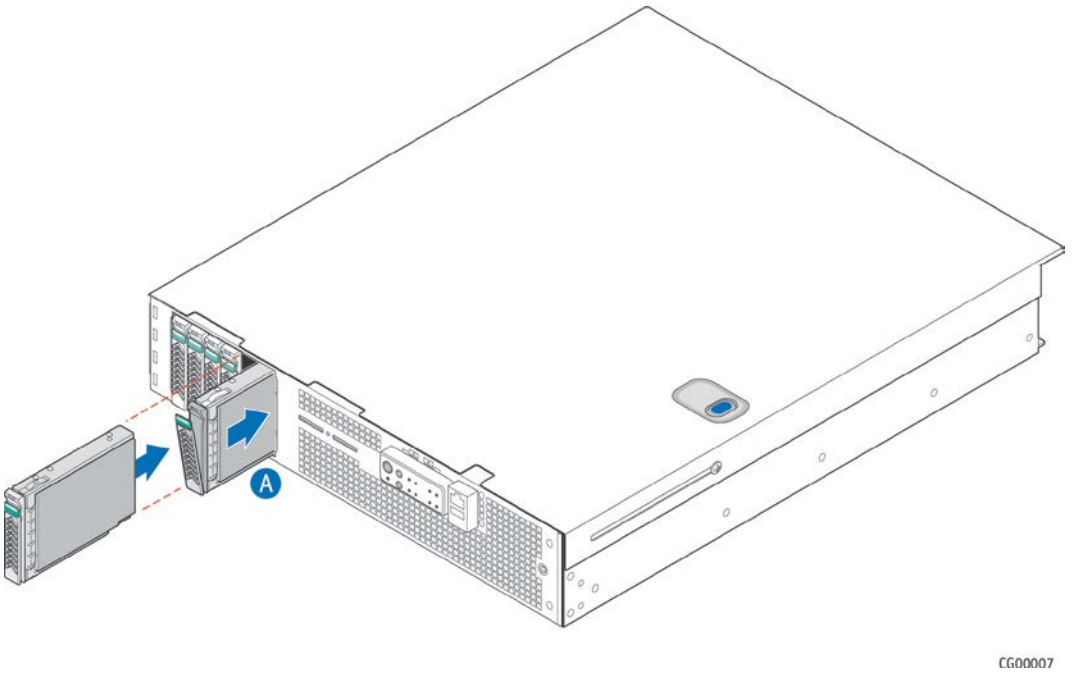
† Critical and Major alarm indicators are bi-color LEDs that can be configured to be amber or red by means of an SDR TAM setting. Amber is the default color.

Hard Drives

The CG2200 Carrier Grade Server chassis supports up to six SAS hard disk drives which are accessible from the front of the chassis. SAS 2.5-inch hard disk drives are mounted in removable drive carriers (Figure 7, “A”) that latch into the drive bay sub-assembly. The hard disk drives installed in the carriers are hot-swappable.

The front bezel must be removed to access the hard disk drive slots.

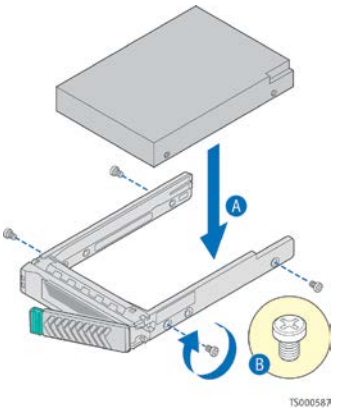
Figure 7: Hard Disk Drives



SAS Hard Drive Carriers

Each hard drive used in the server must be mounted to a drive carrier (A) using four screws (B) inserted into the sides of the drive as shown in Figure 8.

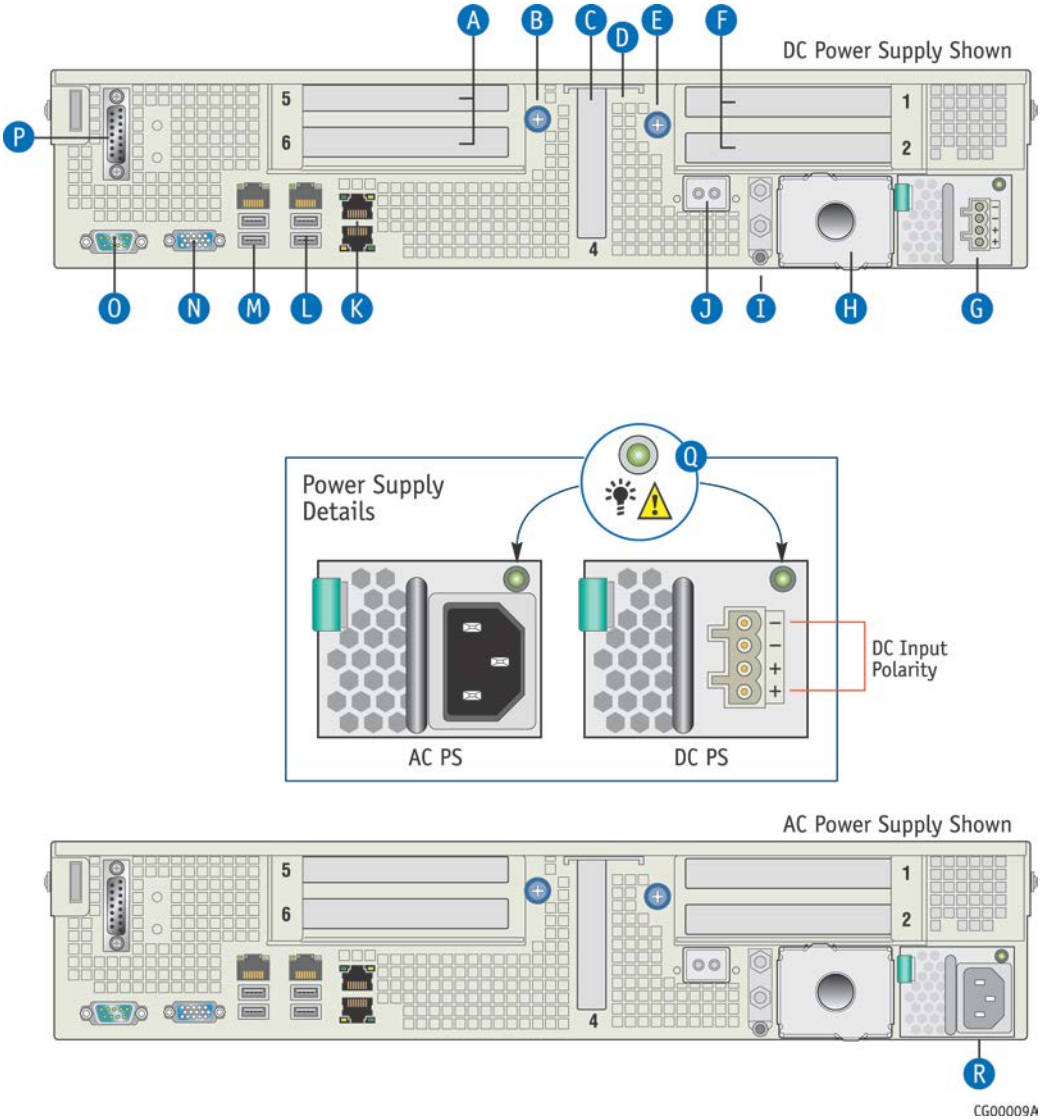
Figure 8: SAS Hard Drive Tray Assembly



Chassis -- Rear View

Figure 9 shows the rear of the CG2200 Server chassis.

Figure 9: Chassis Rear View



Item	Description	Item	Description
A	Right[1] 2-slot FL/FH PCI assembly (slots 5 and 6)	**J**	RMM4 NIC (Optional)
B	Thumb screw to secure right PCI assembly (A)	**K**	GbE NIC3 and NIC 4 (NIC3 on top)
C	LP PCI adapter (slot 4)	**L**	GbE NIC2, USB2 and USB3 (USB2 on top)
D	Internal LP PCI adapter (baseboard slot 3, not visible from outside of chassis)	**M**	GbE NIC1, USB0 and USB1 (USB0 on top)
E	Thumb screw to secure left PCI assembly (F)"	**N**	Video connector
F	Left[1] 2-slot FL/FH PCI assembly (slots 1 and 2)	**O**	DB9 COM1 connector
G	Power supply 1 (shown with DC power supply installed)	**P**	TAM dry relay connector

Item	Description	Item	Description
H	Optional power supply 2 (filler panel shown)[2]	**Q**	Power supply LED signals
I	Earth Ground studs (dual hole lug shown)	**R**	Power supply 1 (shown with AC power supply installed)

NOTES:
1. Right and left notation for PCI assemblies is when looking from the front of the system.
2: In non-redundant configurations, power supply slot 2 must have a filler panel installed.
3. If RMM4 NIC is not used, a filler panel occupies this space

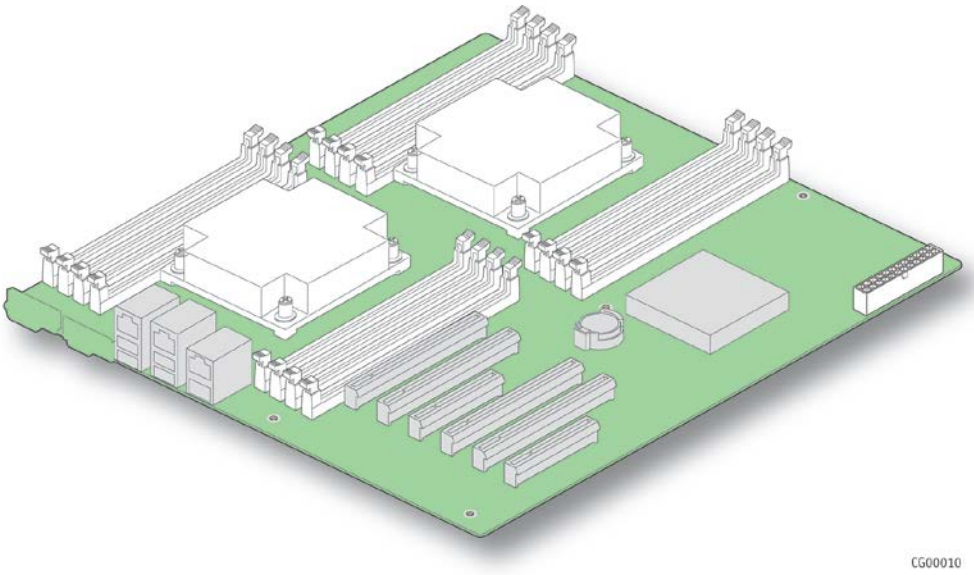
2.3 CG2200 Server Internal Features

Intel® S2600CO Server Board

NOTE: See the *Intel*® S2600CO *Server Board Technical Product Specification* on the Kontron website for detailed information about the baseboard used in this server.

Figure 10 shows the S2600C0 server board (rear view).

Figure 10 S2600CO Server Board Layout



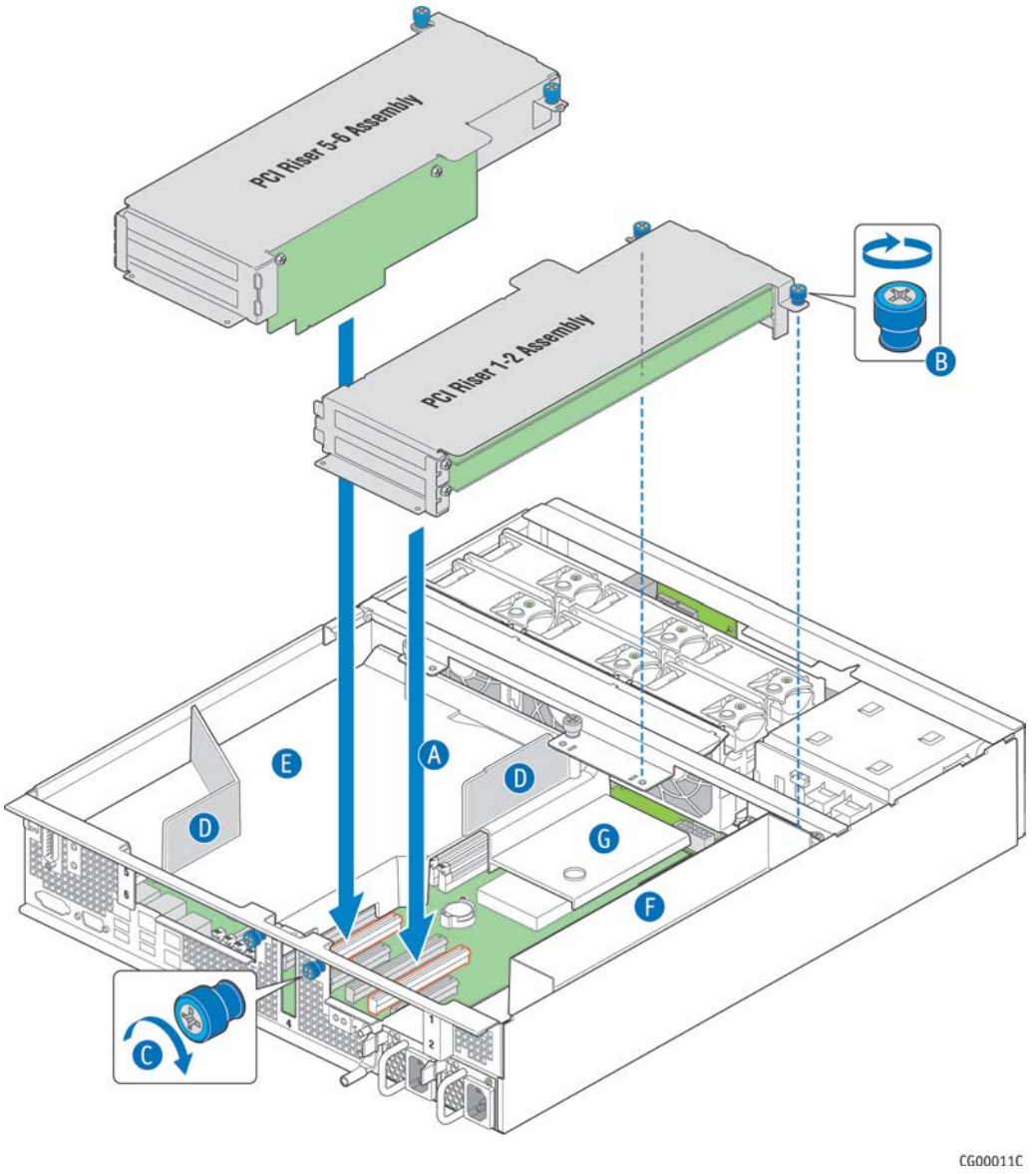
PCI Riser Card Assembly

There are two PCI riser card assemblies; left-side and right-side, as seen from the front of the system. The left riser assembly houses one of two different PCI riser card options, and the right riser assembly houses one of three different PCI riser card options, as defined in Chapter 9 , “PCI Riser Card Assembly”.

The riser cards, along with the appropriate PCI adapter cards, are assembled into the sheet metal housing while the assembly is removed from the chassis.

Figure 11 shows the installation or removal of the riser card assemblies.

Figure 11: Riser Card Assemblies



NOTE: Since there are no chassis alignment features to assist with mating the riser card and assembly to the baseboard, do not install (or if already installed, remove) adapter cards in baseboard slots 3 and 4 before installing the left or right PCI assemblies (A).

Two captive screws (B) at the front of the riser assemblies and one on the rear panel (C) secure each assembly in the chassis.

The vertical features on the CPU/memory air duct (D) help to direct the air flow through the right-side riser card assembly.

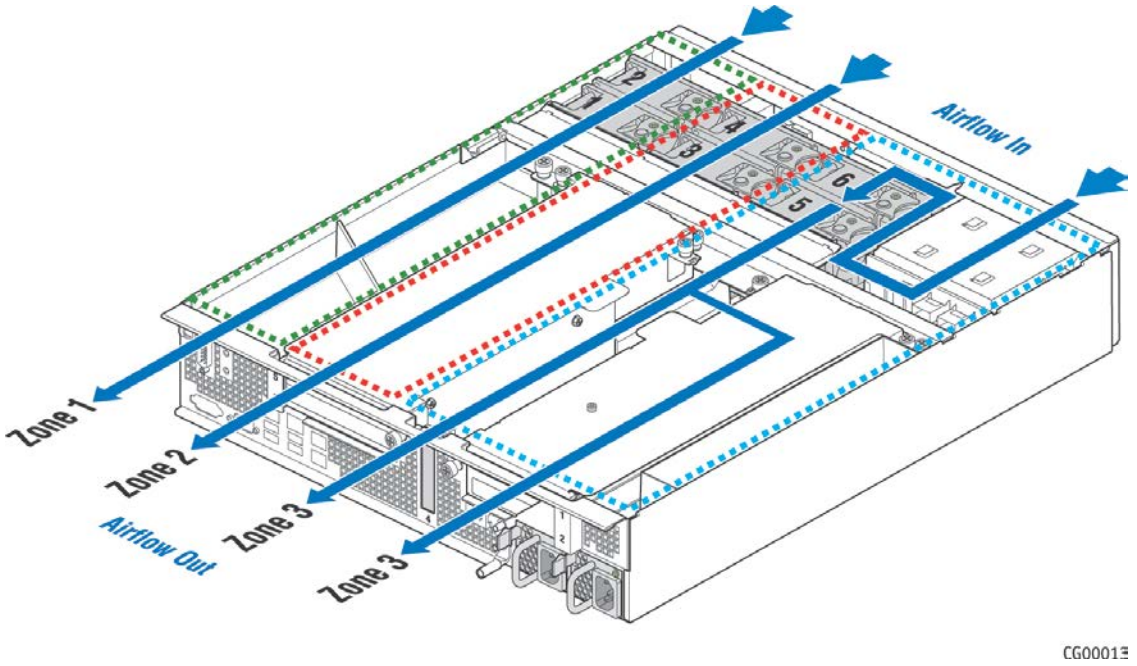
Item	Description	Item	Description
A	Left and right riser card assemblies	**E**	CPU/memory air duct

Item	Description	Item	Description
B	Front riser card assembly captive screws	F	Left riser card assembly air duct
C	Rear panel riser card assembly captive screw	G	C600-A air duct
D	CPU/memory air duct vertical features		

Cooling Subsystem

All system components except the power distribution board and power supplies are cooled by a set of six fans mounted near the front of the chassis behind the front panel board, as shown in Figure 12

Figure 12: Cooling Subsystem



The CG2200 server has six 80x38mm fans, configured as three redundant pairs. There are three cooling zones indicated by the colored dotted lines in Figure 12.

- Zone 1 (green dotted lines) contains fans 1 and 2, which cool CPU1, CPU2, DIMMs A1, A2, B1, B2, G1, G2, H1, H2 and all other components in this zone. Air flows through the front bezel to the rear of the chassis (zone 1 arrow).
- Zone 2 (red dotted lines) contains fans 3 and 4 which cool DIMMs C1, C2, D1, D2, E1, E2, F1, F2, the right-side PCI riser assembly, and all other components in this zone. . Air flows through the front bezel to the rear of the chassis (zone 2 arrow).
- Zone 3 (blue dotted lines) contains fans 5 and 6 which cool the six HDDs, the two LP PCI adapters in baseboard slots 3 and 4, the left-side PCI riser assembly and all the other components in this area. Air flow takes two routes for this zone; from the front bezel over the drive bay to the fans and straight back to the rear of the chassis (left zone 3 arrow) or over the drive bay to the fans and then back over the power supplies to the rear of the chassis. (right zone 3 arrow).

- Internal power supply fans as well as system fans 5 and 6 cool the power distribution board (PDB) and power supply modules.

Air ducts directs air over the a) CPUs and memory area of the baseboard in cooling zones 1 and 2, b) the C600-A, IC chip, in cooling zone 3, and c) the left PCI assembly also in cooling zone 3. See Figure 11.

The right riser card assembly sits above the CPU/memory air duct in zone 2. Vertical baffles on the top surface of the CPU/memory air duct combined with the riser card assembly and its sheet metal housing form an air duct for the PCI adapters installed in the right side riser card assembly. See Figure 11.

The left riser card assembly sits above the left-most portion of the baseboard and power supply module 2 in Zone 3. The left riser card assembly and its sheet metal housing and the air baffle installed to the left of the riser card assembly form an air duct for the PCI adapters installed in the left riser card assembly. See Figure 11.

Ambient Temperature Control

The fan board contains three separate pulse-width-modulation (PWM) circuit domains that control the speed of the six system fans. PWM fan speed control enables quiet system operation when the ambient temperature is low and there are no fan failures. Domain 0 controls fans 1 and 2, domain 1 controls fans 3 and 4, and domain 2 controls fans 5 and 6.

Cooling Summary

The six-fan cooling subsystem is sized to provide cooling for:

- Up to two processors
- 256 Gbytes of DDR3 DIMM memory
- Six hard drives
- Up to six PCI cards (250W max for six slots)

The cooling subsystem meets acoustic and thermal requirements at lower fan speed settings, i.e., at $23^{O}C+/-2^{O}C$. Thermal requirements are met for the maximum ambient temperatures. However, acoustic limits are not specified above $23^{O}C+/-2^{O}C$. The environmental specifications are summarized in Chapter14, “Regulatory Specifications”.

2.4 CG2200 Server Platform Management Subsystem

See the *Intel® S2600CO Server Board Technical Product Specification* for a detailed description of the Platform Management design and features.

The platform management subsystem is based on the Integrated Baseboard Management Controller (iBMC) features of the Emulex Pilot III controller. The on-board platform management subsystem consists of communication buses, sensors, system BIOS, and server management firmware.

The platform management system supports standard IPMI features as well as other features not part of IPMI.

IPMI 2.0 Features

- Baseboard management controller (BMC)
- IPMI Watchdog timer
- Messaging support, including command bridging and user/session support

- Chassis device functionality, including power/reset control and BIOS boot flags support
- Event receiver device: The BMC receives and processes events from other platform subsystems.
- Field Replaceable Unit (FRU) inventory device functionality
  The BMC supports access to system FRU devices using IPMI FRU commands.
- System Event Log (SEL) device functionality
  The BMC supports and provides access to a SEL.
- Sensor Data Record (SDR) repository device functionality
  The BMC supports storage and access of system SDRs.
- Sensor device and sensor scanning/monitoring
  The BMC provides IPMI management of sensors and polls sensors to monitor and report system health.
- IPMI interfaces
  - Host interfaces include System Management Software (SMS) with receive message queue support, and Server Management Mode (SMM)
  - IPMB interface
  - LAN interface that supports the IPMI-over-LAN protocol (RMCP, RMCP+)
- Serial-over-LAN (SOL)
- ACPI state synchronization
  The BMC tracks ACPI state changes that are provided by the BIOS.
- BMC self test
  The BMC performs initialization and run-time self-tests and makes results available to external entities.

Non IPMI Features

The Integrated BMC also supports the following non-IPMI features.

- In-circuit BMC firmware update
- Fault resilient booting (FRB): FRB2 is supported by the watchdog timer functionality.
- Limits number of system resets due to CPU fan speed control
- Power supply redundancy monitoring and support
- Fan redundancy monitoring and support
- Hot-swap fan support
- System airflow monitoring
- Acoustic management, support for multiple fan profiles
- Ethernet controller thermal monitoring
- Platform environment control interface (PECI) thermal management support
- Memory thermal management
- DIMM temperature monitoring
  New sensors and improved acoustic management using a closed-loop fan control algorithm taking into account DIMM temperature readings.
- BIOS logs CPU and memory events via IPMI
- Power supply redundancy monitoring and support
- Power unit management
  Support for power unit sensor
  The BMC handles power-good dropout conditions.
- Intel® Intelligent Power Node Manager support
- Signal testing support
  The BMC provides test commands for setting and getting platform signal states.
- The BMC generates diagnostic beep codes for fault conditions.
- System GUID storage and retrieval

- Front panel management
  The BMC controls the system status LED and chassis ID LED and supports secure lockout of certain front panel functionality and monitors button presses.
  The chassis ID LED is turned on using a front panel button or a command.
- Basic fan control using TControl version 2 SDRs
- Power state retention
- Power fault analysis
- Intel® Light-Guided Diagnostics
- Address Resolution Protocol (ARP)
  The BMC sends and responds to ARPs (supported on embedded NICs).
- Dynamic Host Configuration Protocol (DHCP)
  The BMC performs DHCP (supported on embedded NICs).
- E-mail alerting
- Embedded web server
- Integrated KVM.
- Integrated Remote Media Redirection
- Local Directory Access Protocol (LDAP) support

New Manageability Features

The Intel Server Board S2600CO also offers a number of new features:

- Sensor and SEL logging additions/enhancements (for example, additional thermal monitoring capability, better isolation of faults to the FRU level)
- Embedded platform debug feature that allows capture of detailed data for later analysis by Intel engineering.
- Provisioning and inventory enhancements:
  - Signed firmware (improved security)
  - Inventory data/system information export (partial SMBIOS table)
- Enhancements to fan speed control.
- DCMI compliance (product-specific).
- Support for embedded web server UI in Basic Manageability feature set.
- Enhancements to embedded web server
  - Human-readable SEL
  - Additional system configurability
  - Additional system monitoring capability
  - Enhanced on-line help
- Enhancements to KVM redirection
  - Support for higher resolution
- Support for EU Lot6 compliance
- Management support for PMBus rev1.2 compliant power supplies
- DCMI 1.1 compliance

2.5 CG2200 Server Specifications

This section lists the environmental and physical specifications for the CG2200 server.

Environmental Specifications

The CG2200 server is designed and tested to meet K00158, the CRMS environmental test standards specification

.Table 2: Environmental Specifications Summary

Environment	Specification
Temperature, operating	NEBS Level 3 +5°C to 40°C (41° F to 104° F) NEBS Level 1 +10°C to 35°C (50° F to 95° F)
Temperature, non-operating	-40° C to 70° C (-40° F to 158° F)
Temperature, short-term* NEBS Level 3 only	-5°C to 55 °C (23° F to 131° F) *Short-term refers to a period of not more than 96 consecutive hours and a total of not more than 15 days in 1 year. (This refers to a total of 360 hours in any given year, but no more than 15 occurrences during that one-year period.)
Humidity, operating	5% to 85%
Humidity, non-operating	95%, non-condensing at temperatures of 23° C to 40° C (73° F to 104° F)
Altitude	-60 to 1800m (-197 to 5906 ft) @ 40°C max. 1801 to 4000m (5909 to 13,123 ft) @ 30°C
Vibration, non-operating	Random profile 5Hz @ 0.001g^2/Hz to 20Hz @ 0.01g^2/Hz (slope up) 20Hz to 500Hz @ 0.01g^2/Hz (flat) Input acceleration is 2.20g RMS 10 min. per axis, in all 3 axes, on all samples Random control limit tolerance in +/- 3dB
Shock operating	Half-sine 2G, 11 ms pulse, 100 pulses in each direction, on each of the three axes
Shock non-operating	Trapezoidal, 25G, 205 inches/sec delta V, two drops in per face, (total 12 drops)
Electrostatic discharge (ESD)	Tested ESD levels up to 12kV (kilovolts) air discharge and up to 8kV contact discharge without physical damage
Acoustic	Sound power: 7B max at ambient temperatures < 23°C +/-2°C
RoHS	Complies with RoHS Directive 2011/65/EU and RoHS 6/6

Physical Specifications

Table 3 describes the physical specifications of the CG2200 server.

Table 3: Physical Dimensions (Max)

Height	3.45 inches (87.6 mm)
Width	17.14 inches (435.3 mm)
Depth	20 inches (508mm)
Front clearance	2 inches (76 mm)

Side clearance	1 inch (25 mm)
Rear clearance	3.6 inches (92 mm)

Table 4: Shipping Weights (Max)

Descriptions	Weight (kg)	Weight (lbs)
System weight - max configuration (all LP PCI adapters, AC or DC PS)	17.98	39.64
System weight - model 0 configuration (as shipped from factory)	13.98	30.80
System packaging	2.78	6.12
AC power supply	1.05	2.32
DC power supply	1.06	2.34
CPU heatsink with hardware and TIM	0.41	0.92
RAID kit (mini-SAS and flashback cache module cables)	0.15	0.34
RAID adapter and flashback cache module	0.18	0.38
RMM4	0.04	0.08
HDD carrier	0.09	0.20
Bezel	0.25	0.54
Riser card (dual slot PCIe x8)	0.08	0.16
Generic 2.5in SAS HDD (spinning media)	0.22	0.48
Generic DIMMs (quantity of 2)	0.04	0.08
Solid state HDD	0.08	0.19
eUSB module	0.01	0.02
SATA DOM	0.01	0.02
CPU without heatsink	0.04	0.09

3. Cables and Connectors

This chapter describes interconnections between various components of the Kontron CG2200 Carrier Grade Server using overview diagrams as well as tables that describe the signals and pin-outs for the system connectors. Refer to the *Intel® Server Board S2600CO Technical Product Specification* or the board sections in this document for any signal descriptions and pin-outs that are not listed in this section.

The information contained in this chapter is organized into three sections:

Section 3.1: **Interconnect Block Diagram**
Provides an overview of system interconnects

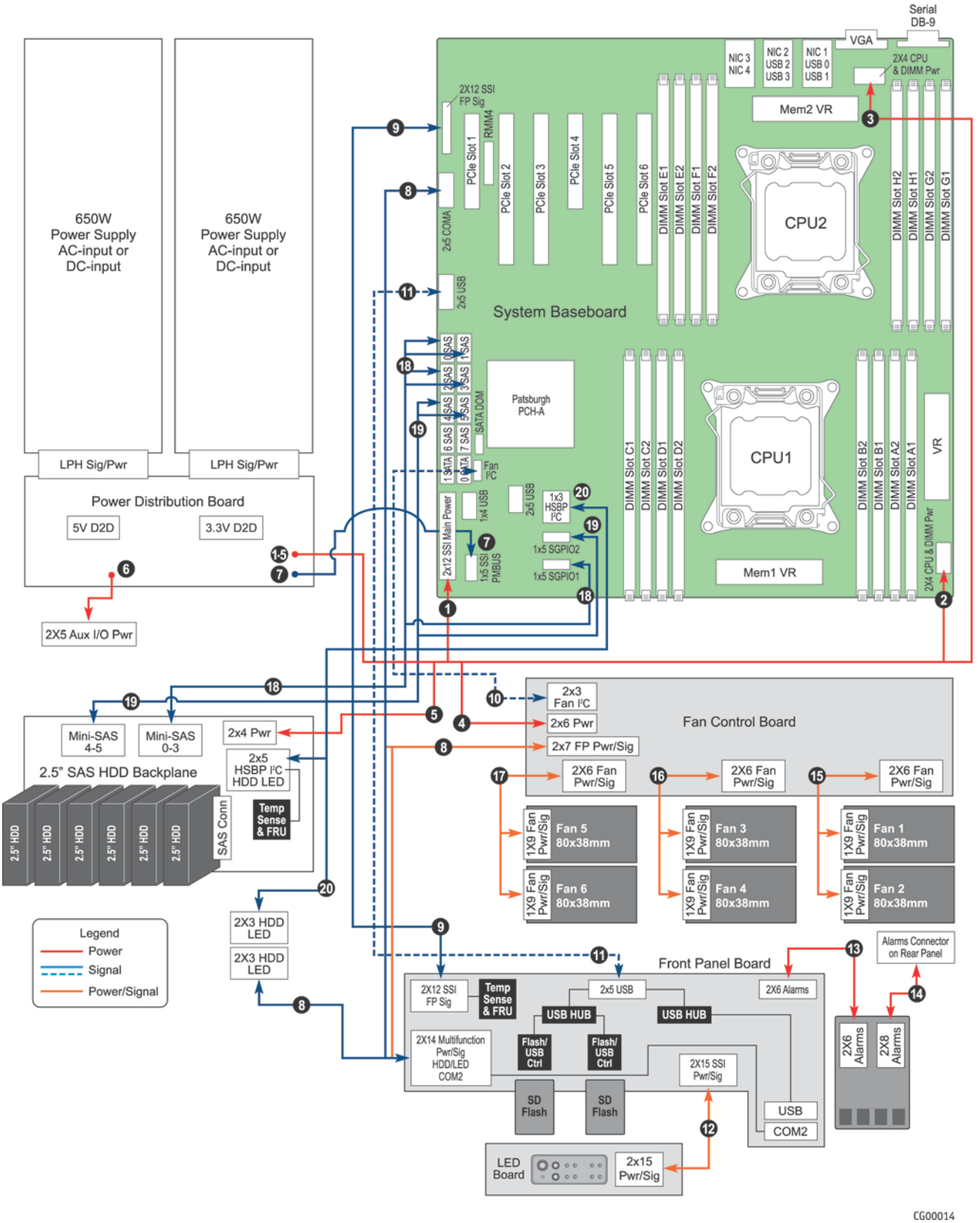
Section 3.2: **Cable and System Interconnect Descriptions**
Provides a list of all the connectors and cables in the system

Section 0: **User-Accessible Interconnects**
Describes the form-factor and pin-out for user-accessible interconnects

3.1 Interconnect Block Diagrams

Figure 13 shows all of the system level cabled interconnections. Each cable is identified and defined in Table 5.

Figure 13: CG2200 Server Interconnect Block Diagram



.

Table 5 System Cables

Interconnect #: Name:	KAI Cable P/N	End #1 Connection End #2 Connection	End #3 Connection End #4 Connection
1. Baseboard SSI Main Power	K00597-002	End #1: Power Distribution Board End #2: Baseboard	End #3: NA End #4: NA
2. CPU 1 and DIMM Power	K00597-002	End #1:Power Distribution Board End #2: Baseboard	End #3: NA End #4: NA
3. CPU 2 and DIMM Power	K00597-002	End #1:Power Distribution Board End #2: Baseboard	End #3: NA End #4: NA
4. Fan Control Board Power	K00597-002	End #1:Power Distribution Board End #2: Fan Control Board	End #3: NA End #4: NA
5. SAS HDD Backplane Board Power	K00597-002	End #1:Power Distribution Board End #2: SAS HDD Backplane	End #3: NA End #4: NA
6. Aux I/O Power Dongle	K00597-002	End #1:Power Distribution Board End #2: Cable-to-cable connector	End #3: NA End #4: NA
7. Baseboard SSI Power Control Signal	K00597-002	End #1:Power Distribution Board End #2: Baseboard	End #3: NA End #4: NA
8. Multifunction Front Panel Board (Power and Signal, HDD LED, COM2)	K00539-001	End #1:Front Panel Board (multifunction) End #2: Fan Control Board (pwr/sig)	End #3: Baseboard (COM2) End #4: C-2-C (HDD-LED)
9. SSI Front Panel Board ł	K00540-001	End #1: Baseboard End #2: Front Panel Board	End #3: NA End #4: NA
10. Fan I2C	K00542-001	End #1: Baseboard End #2: Fan Control Board	End #3: NA End #4: NA
11. Front Panel Board USB	K00543-001	End #1: Baseboard End #2: Front Panel Board	End #3: NA End #4: NA
12. LED/Switch Board Power and Signal	E36035-001	End #1:Front Panel Board End #2: LED/Switch Board	End #3: NA End #4: NA
13. TAM Signal	K00544-001	End #1:Front Panel Board End #2: TAM Module	End #3: NA End #4: NA
14. Alarms	K00545-001	End #1:TAM Module End #2: System Rear Panel Alarms Connector	End #3: NA End #4: NA
15. Fan (Fans 1-2)	K00546-001 Used 3 places	End #1:Fan Control Board End #2: Fan Pair (1-2)	End #3: NA End #4: NA
16. Fan (Fans 3-4)	K00546-001	End #1:Fan Control Board End #2: Fan Pair (3-4)	End #3: NA End #4: NA
17. Fan (Fans 5-6)	K00546-001	End #1:Fan Control Board End #2: Fan Pair (5-6)	End #3: NA End #4: NA

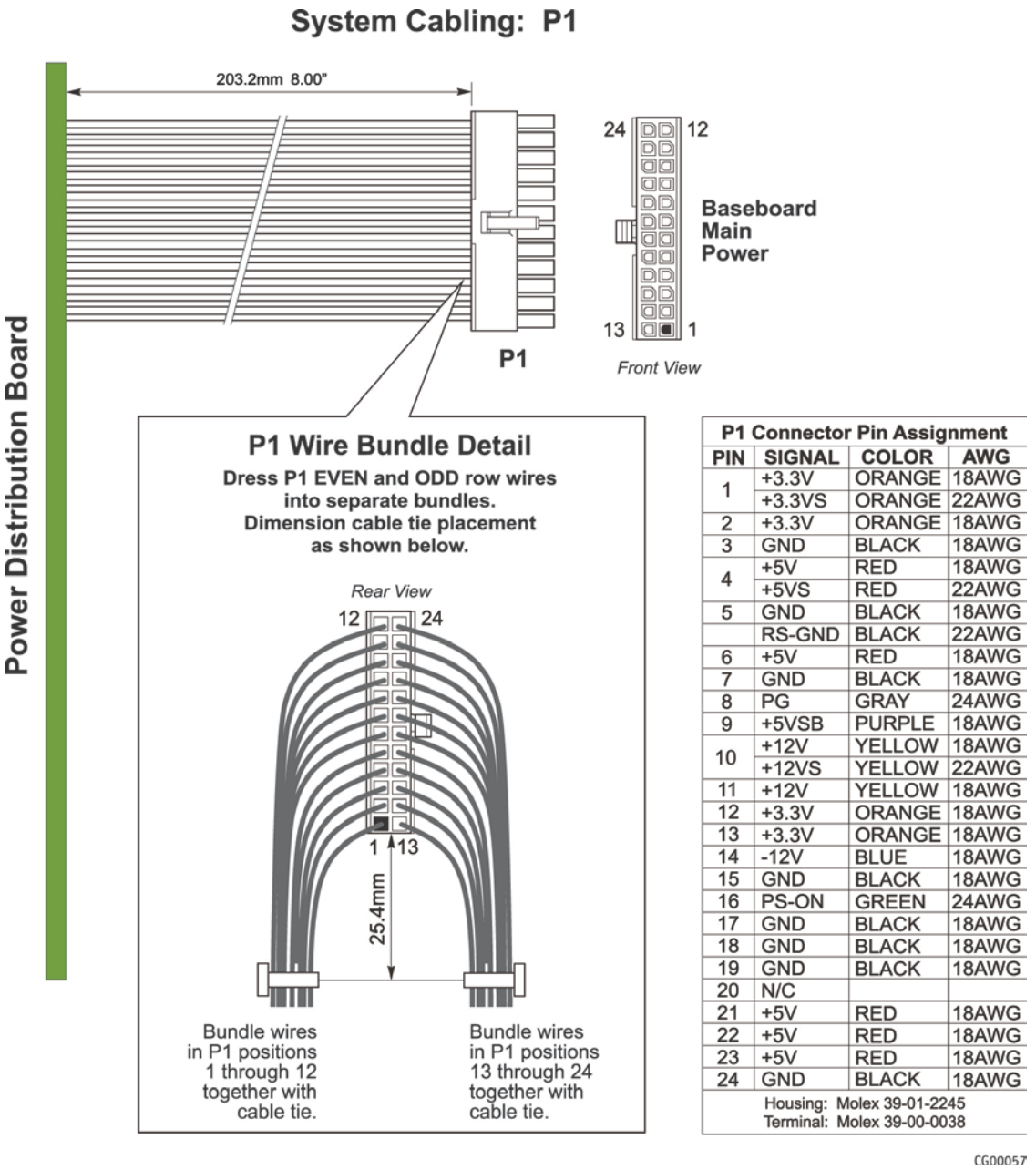
Interconnect #: Name:	KAI Cable P/N	End #1 Connection End #2 Connection	End #3 Connection End #4 Connection
18. Mini-SAS 1 (HDD 0-3 / SGPIO1)	K00547-001	End #1:SAS HDD Backplane Board End #2: Baseboard SAS 0-3 Conn	End #3: Baseboard SGPIO1 End #4: NA
19. Mini SAS 2 (HDD 4-5 / SGPIO2)	K00548-001	End #1:SAS HDD Backplane Board End #2: Baseboard SAS 4-5 Conn	End #3: Baseboard SGPIO2 End #4: NA
20. HSBP I2C / HDD LED	K00549-001	End #1:SAS HDD Backplane Board End #2: Baseboard HSBP I^2C	End #3: C-2-C (HDD-LED) End #4:

3.2 Cable and System Interconnections

Baseboard SSI Main Power Cable

One end of the baseboard SSI main power cable is soldered to the power distribution board and the other end connects to the baseboard providing power to the baseboard and the power supply with the PS-ON signal. Figure 14 shows the mechanical details of the baseboard SSI main power cable.

Figure 14: Baseboard SSI Main Power Cable Mechanical Drawing



P1 Connector Pin Assignment

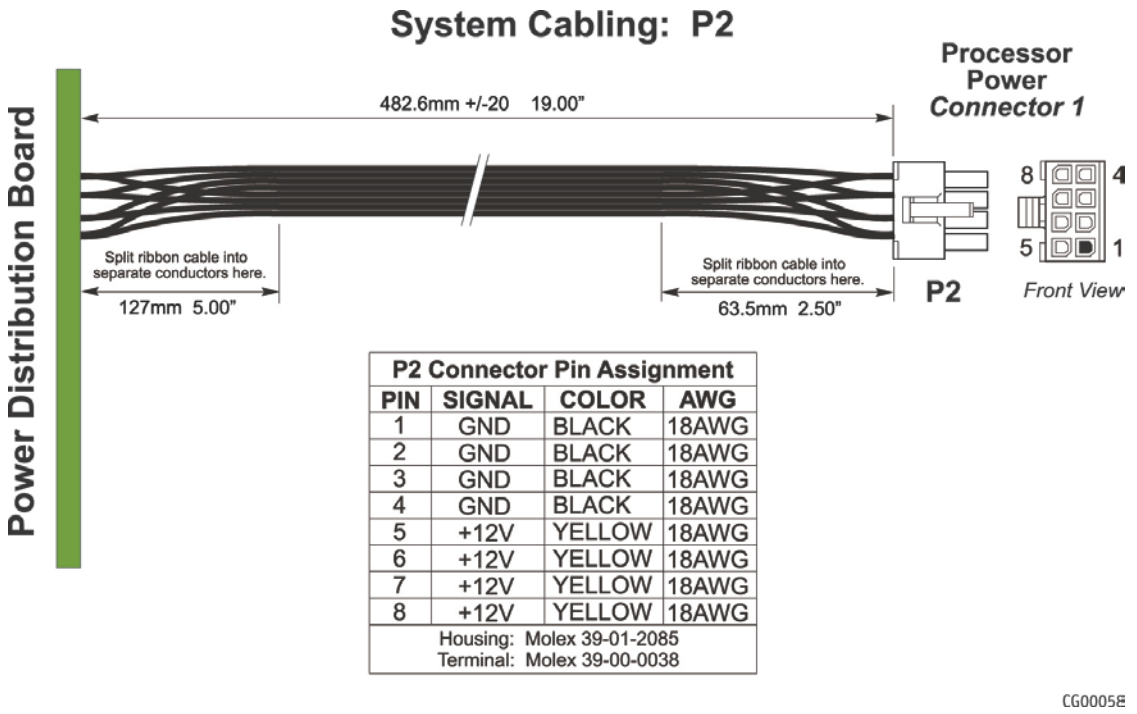
PIN	SIGNAL	COLOR	AWG
1	+3.3V	ORANGE	18AWG
	+3.3VS	ORANGE	22AWG
2	+3.3V	ORANGE	18AWG
3	GND	BLACK	18AWG
4	+5V	RED	18AWG
	+5VS	RED	22AWG
5	GND	BLACK	18AWG
	RS-GND	BLACK	22AWG
6	+5V	RED	18AWG
7	GND	BLACK	18AWG
8	PG	GRAY	24AWG
9	+5VSB	PURPLE	18AWG
10	+12V	YELLOW	18AWG
	+12VS	YELLOW	22AWG
11	+12V	YELLOW	18AWG
12	+3.3V	ORANGE	18AWG
13	+3.3V	ORANGE	18AWG
14	-12V	BLUE	18AWG
15	GND	BLACK	18AWG
16	PS-ON	GREEN	24AWG
17	GND	BLACK	18AWG
18	GND	BLACK	18AWG
19	GND	BLACK	18AWG
20	N/C		
21	+5V	RED	18AWG
22	+5V	RED	18AWG
23	+5V	RED	18AWG
24	GND	BLACK	18AWG

Housing: Molex 39-01-2245
Terminal: Molex 39-00-0038

CPU 1 + DIMM Power Cable

One end of the CPU 1 + DIMM power cable is soldered to the power distribution board and the other end connects to the baseboard providing power only for CPU 1 and the DIMMs associated with CPU 1. Figure 15 shows the mechanical details of the CPU 1 + DIMM power cable.

Figure 15: CPU 1 + DIMM Power Cable Mechanical Drawing

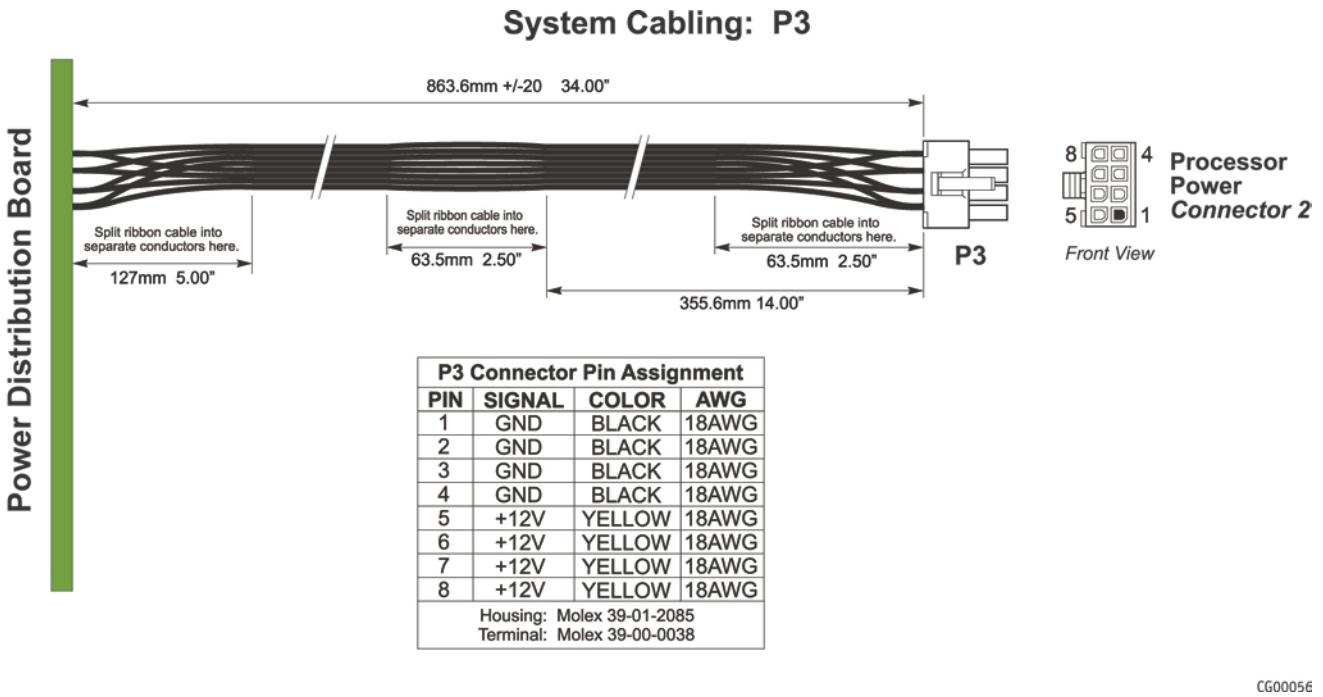


P2 Connector Pin Assignment			
PIN	SIGNAL	COLOR	AWG
1	GND	BLACK	18AWG
2	GND	BLACK	18AWG
3	GND	BLACK	18AWG
4	GND	BLACK	18AWG
5	+12V	YELLOW	18AWG
6	+12V	YELLOW	18AWG
7	+12V	YELLOW	18AWG
8	+12V	YELLOW	18AWG
Housing: Molex 39-01-2085 Terminal: Molex 39-00-0038			

CPU 2 + DIMM Power Cable

One end of the CPU 2 + DIMM power cable is soldered to the power distribution board and the other end connects to the baseboard providing power only for CPU 2 and the DIMMs associated with CPU 2. Figure 16 shows the mechanical details of the CPU 2 + DIMM power cable.

Figure 16: CPU 2 + DIMM Power Cable Mechanical Drawing



P3 Connector Pin Assignment			
PIN	SIGNAL	COLOR	AWG
1	GND	BLACK	18AWG
2	GND	BLACK	18AWG
3	GND	BLACK	18AWG
4	GND	BLACK	18AWG
5	+12V	YELLOW	18AWG
6	+12V	YELLOW	18AWG
7	+12V	YELLOW	18AWG
8	+12V	YELLOW	18AWG
Housing: Molex 39-01-2085 Terminal: Molex 39-00-0038			

SAS HDD Backplane Board Power Cable

One end of the SAS HDD backplane board power cable is soldered to the power distribution board and the other end connects to the SAS HDD backplane board providing power for the HDD backplane board and six SAS HDDS. Figure 17 shows the mechanical details of the SAS HDD backplane board power cable

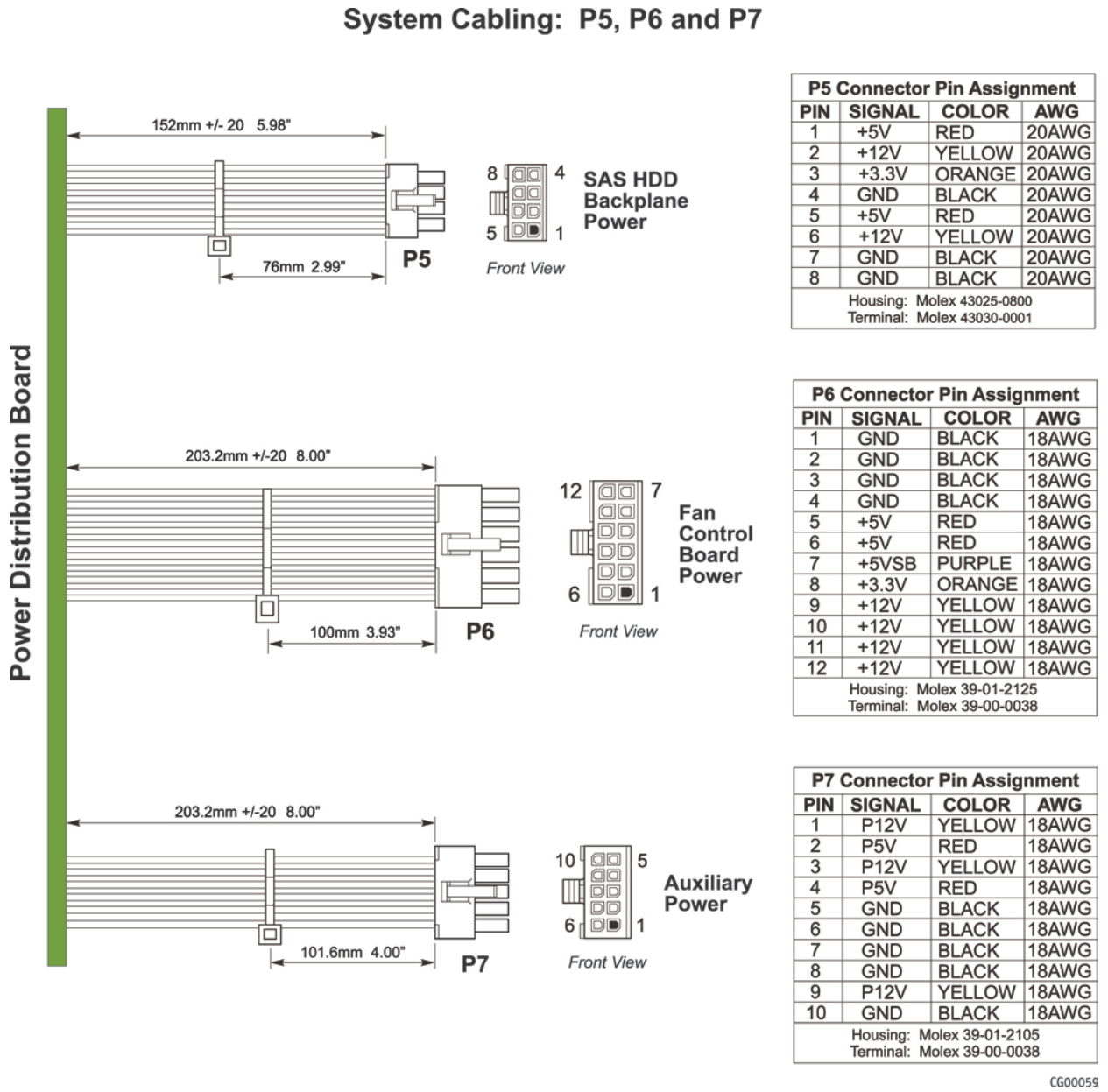
Fan Control Board Power Cable

One end of the fan control board cable is soldered to the power distribution board and the other end connects to the fan control board providing power for fan control board and the six 80mm system fans Figure 17 shows the mechanical details of the fan control board power cable

Auxilliary I/O Power Dongle Cable

One end of the Aux I/O power dongle cable is soldered to the power distribution board and the other end provides a 10-pin connector where customers can connect a custom cable of their own design to provide auxiliary power to high-power PCI adapters. Figure 17 shows the mechanical details of the auxiliary I/O power dongle cable.

Figure 17: HDD Backplane, Fan Control Board, and Auxiliary I/O Power Cables Mechanical Drawing



P5 Connector Pin Assignment			
PIN	SIGNAL	COLOR	AWG
1	+5V	RED	20AWG
2	+12V	YELLOW	20AWG
3	+3.3V	ORANGE	20AWG
4	GND	BLACK	20AWG
5	+5V	RED	20AWG
6	+12V	YELLOW	20AWG
7	GND	BLACK	20AWG
8	GND	BLACK	20AWG
Housing: Molex 43025-0800 Terminal: Molex 43030-0001			

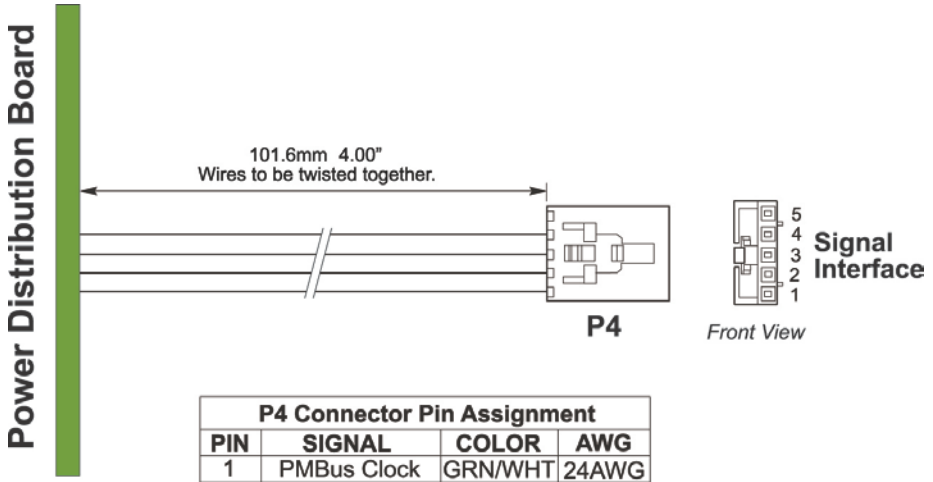
P6 Connector Pin Assignment			
PIN	SIGNAL	COLOR	AWG
1	GND	BLACK	18AWG
2	GND	BLACK	18AWG
3	GND	BLACK	18AWG
4	GND	BLACK	18AWG
5	+5V	RED	18AWG
6	+5V	RED	18AWG
7	+5VSB	PURPLE	18AWG
8	+3.3V	ORANGE	18AWG
9	+12V	YELLOW	18AWG
10	+12V	YELLOW	18AWG
11	+12V	YELLOW	18AWG
12	+12V	YELLOW	18AWG
Housing: Molex 39-01-2125 Terminal: Molex 39-00-0038			

P7 Connector Pin Assignment			
PIN	SIGNAL	COLOR	AWG
1	P12V	YELLOW	18AWG
2	P5V	RED	18AWG
3	P12V	YELLOW	18AWG
4	P5V	RED	18AWG
5	GND	BLACK	18AWG
6	GND	BLACK	18AWG
7	GND	BLACK	18AWG
8	GND	BLACK	18AWG
9	P12V	YELLOW	18AWG
10	GND	BLACK	18AWG
Housing: Molex 39-01-2105 Terminal: Molex 39-00-0038			

Baseboard SSI Power Control Signal Cable

One end of the SSI power control signal cable is soldered to the power distribution board and the other connects to the baseboard connector providing PMBus signals between the power supplies and the baseboard. Figure 18 shows the mechanical details of the SSI power control signal cable

Figure 18: Baseboard SSI Power Control Signal Cable Mechanical Drawing



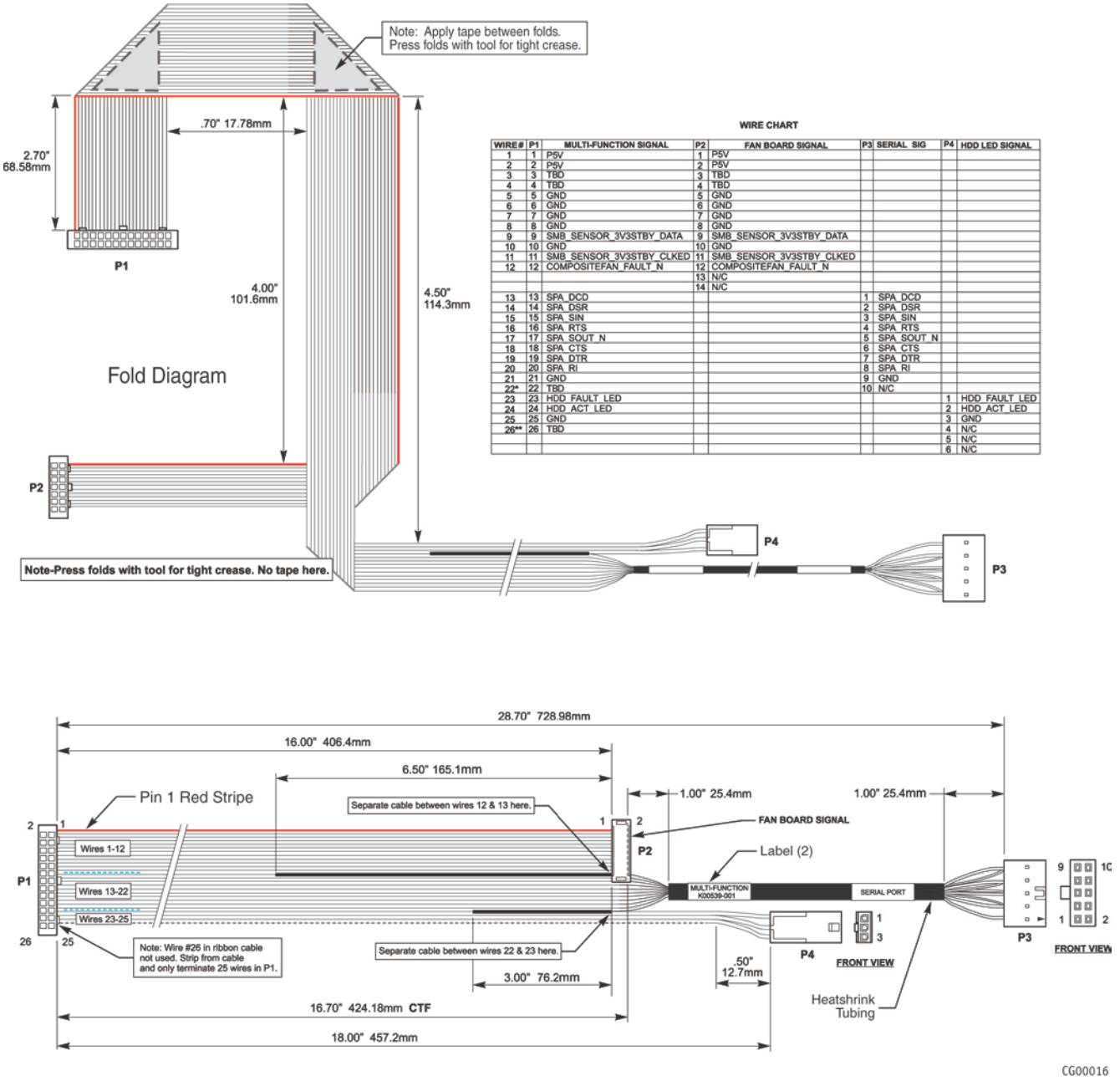
P4 Connector Pin Assignment			
PIN	SIGNAL	COLOR	AWG
1	PMBus Clock	GRN/WHT	24AWG
2	PMBus Data	YEL/WHT	24AWG
3	SMBAlert	WHITE	24AWG
4	GND	BLACK	24AWG
5	N/C		
Housing: Molex 50-57-9405 Terminal: Molex 16-02-0088			

CG00067

Multifunction Front Panel Board Cable

The multifunction cable interconnects the front panel board, fan control board, baseboard, and HDD backplane. . Figure 19 shows shows the mechanical details of the multifunction cable.

Figure 19: Multifunction Front Panel Board Cable Mechanical Drawing



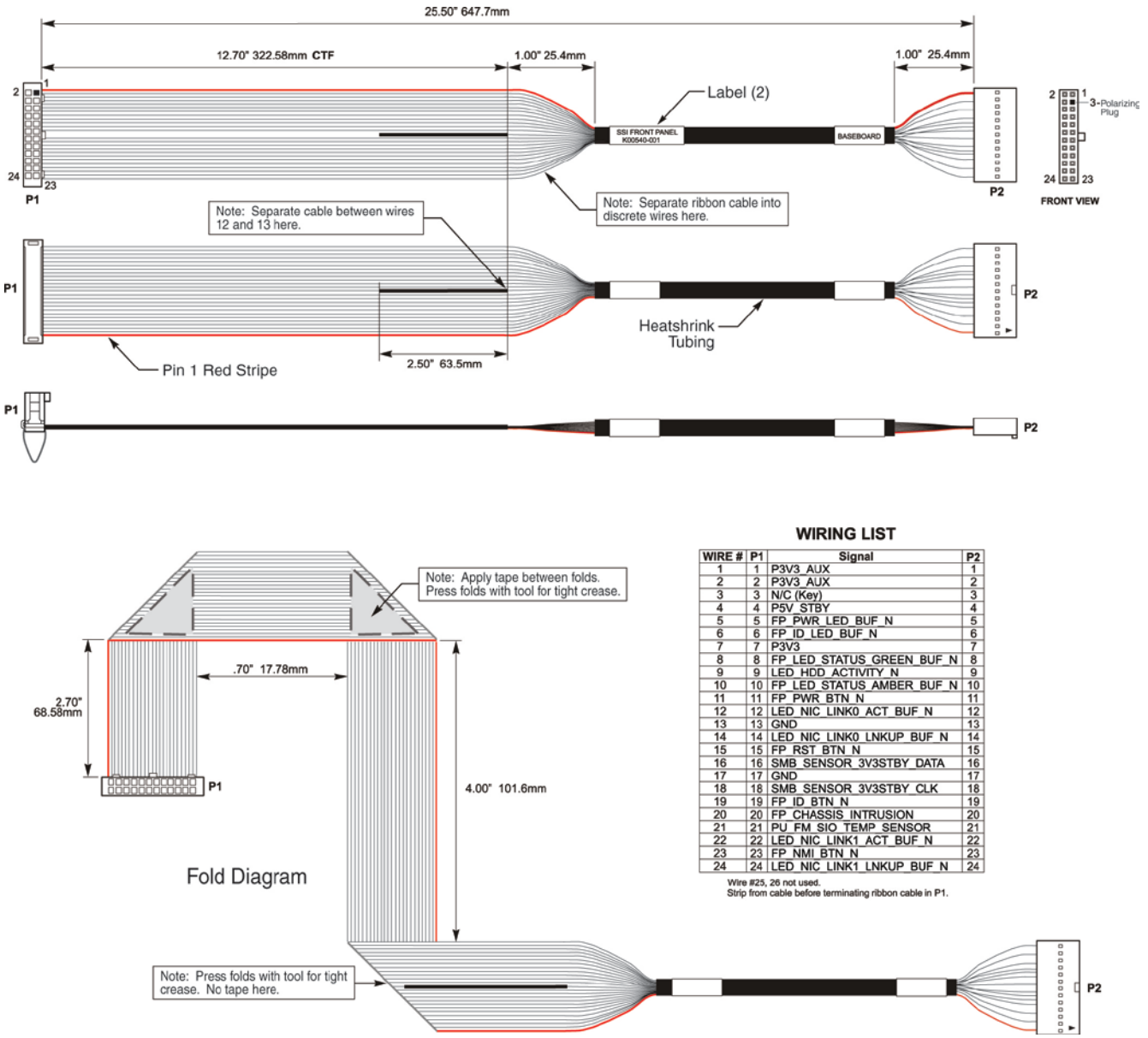
WIRE CHART

WIRE #	P1	MULTI-FUNCTION SIGNAL	P2	FAN BOARD SIGNAL	P3	SERIAL SIG	P4	HDD LED SIGNAL
1	1	P5V	1	P5V				
2	2	P5V	2	P5V				
3	3	TBD	3	TBD				
4	4	TBD	4	TBD				
5	5	GND	5	GND				
6	6	GND	6	GND				
7	7	GND	7	GND				
8	8	GND	8	GND				
9	9	SMB_SENSOR_3V3STBY_DATA	9	SMB_SENSOR_3V3STBY_DATA				
10	10	GND	10	GND				
11	11	SMB_SENSOR_3V3STBY_CLKED	11	SMB_SENSOR_3V3STBY_CLKED				
12	12	COMPOSITEFAN_FAULT_N	12	COMPOSITEFAN_FAULT_N				
			13	N/C				
			14	N/C				
13	13	SPA_DCD			1	SPA_DCD		
14	14	SPA_DSR			2	SPA_DSR		
15	15	SPA_SIN			3	SPA_SIN		
16	16	SPA_RTS			4	SPA_RTS		
17	17	SPA_SOUT_N			5	SPA_SOUT_N		
18	18	SPA_CTS			6	SPA_CTS		
19	19	SPA_DTR			7	SPA_DTR		
20	20	SPA_RI			8	SPA_RI		
21	21	GND			9	GND		
22*	22	TBD			10	N/C		
23	23	HDD_FAULT_LED					1	HDD_FAULT_LED
24	24	HDD_ACT_LED					2	HDD_ACT_LED
25	25	GND					3	GND
26**	26	TBD					4	N/C
							5	N/C
							6	N/C

SSI Front Panel Board Cable

The SSI front panel board cable connects the front panel board with the baseboard. Figure 20 shows the mechanical details of the SSI FP board cable.

Figure 20: SSI Front Panel Board Cable Mechanical Drawing



WIRING LIST

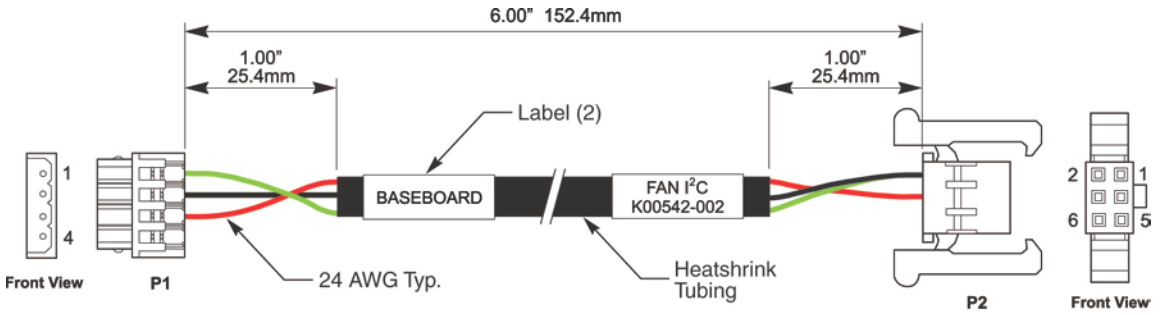
WIRE #	P1	Signal	P2
1	1	P3V3_AUX	1
2	2	P3V3_AUX	2
3	3	N/C (Key)	3
4	4	P5V_STBY	4
5	5	FP_PWR_LED_BUF_N	5
6	6	FP_ID_LED_BUF_N	6
7	7	P3V3	7
8	8	FP_LED_STATUS_GREEN_BUF_N	8
9	9	LED_HDD_ACTIVITY_N	9
10	10	FP_LED_STATUS_AMBER_BUF_N	10
11	11	FP_PWR_BTN_N	11
12	12	LED_NIC_LINK0_ACT_BUF_N	12
13	13	GND	13
14	14	LED_NIC_LINK0_LNKUP_BUF_N	14
15	15	FP_RST_BTN_N	15
16	16	SMB_SENSOR_3V3STBY_DATA	16
17	17	GND	17
18	18	SMB_SENSOR_3V3STBY_CLK	18
19	19	FP_ID_BTN_N	19
20	20	FP_CHASSIS_INTRUSION	20
21	21	PU_FM_SIO_TEMP_SENSOR	21
22	22	LED_NIC_LINK1_ACT_BUF_N	22
23	23	FP_NMI_BTN_N	23
24	24	LED_NIC_LINK1_LNKUP_BUF_N	24

Wire #25, 26 not used.
Strip from cable before terminating ribbon cable in P1.

Fan I2C Cable

The fan I2C cable connects the baseboard and the fan control board to provide fan control signals. Figure 21 shows the mechanical details of the fan I2C cable.

Figure 21: Fan I2C Cable Mechanical Drawing



WIRE CHART

P1	SIGNAL	P2	COLOR
1	*SMB_3V3SB_DAT	1	GREEN
2	*GND	2	BLACK
3	*SMB_3V3SB_CLK	3	RED
4	N/C	4	
	N/C	5	
	N/C	6	

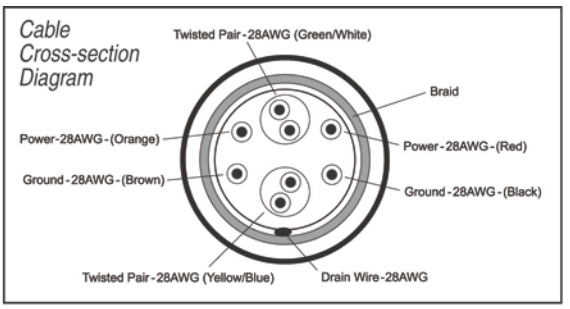
* Note- Twist wires together 1 turn per inch/25.4mm

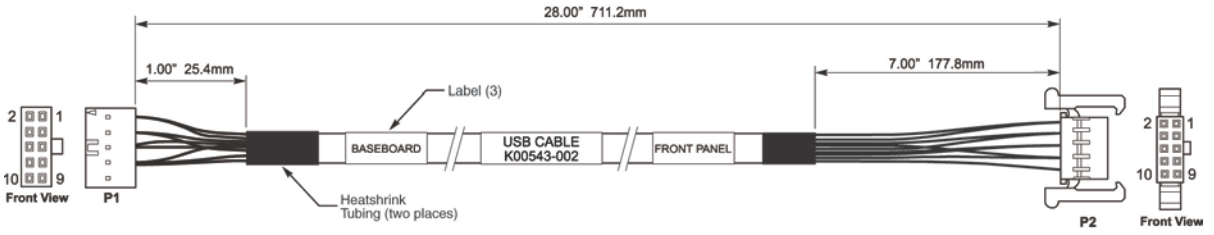
CG00018

Front Panel Board USB Cable

The front panel board USB cable connects the baseboard to the front panel board to provide USB2.0 signals. Figure 22 shows the mechanical details of the front panel board USB cable.

Figure 22: Front Panel Board USB Cable Mechanical Drawing





WIRE CHART

P1	SIGNAL	P2	SIGNAL	COLOR	AWG
1	P5V_USB_FP	1	P5V_USB_FP	RED	28 AWG
2	P5V_USB_FP	2	P5V_USB_FP	ORANGE	28 AWG
3	USB2_P13_F_DN	3	USB2_P13_F_DN	WHITE	28 AWG
4	USB2_P11_F_DN	4	USB2_P11_F_DN	YELLOW	28AWG
5	USB2_P13_F_DP	5	USB2_P13_F_DP	GREEN	28 AWG
6	USB2_P11_F_DP	6	USB2_P11_F_DP	BLUE	28 AWG
7	GND	7	GND	BLACK	28 AWG
8	GND/*DRAIN WIRE	8	GND	BROWN	28 AWG
9	N/C	9	N/C		
10	N/C	10	**DRAIN WIRE		28 AWG

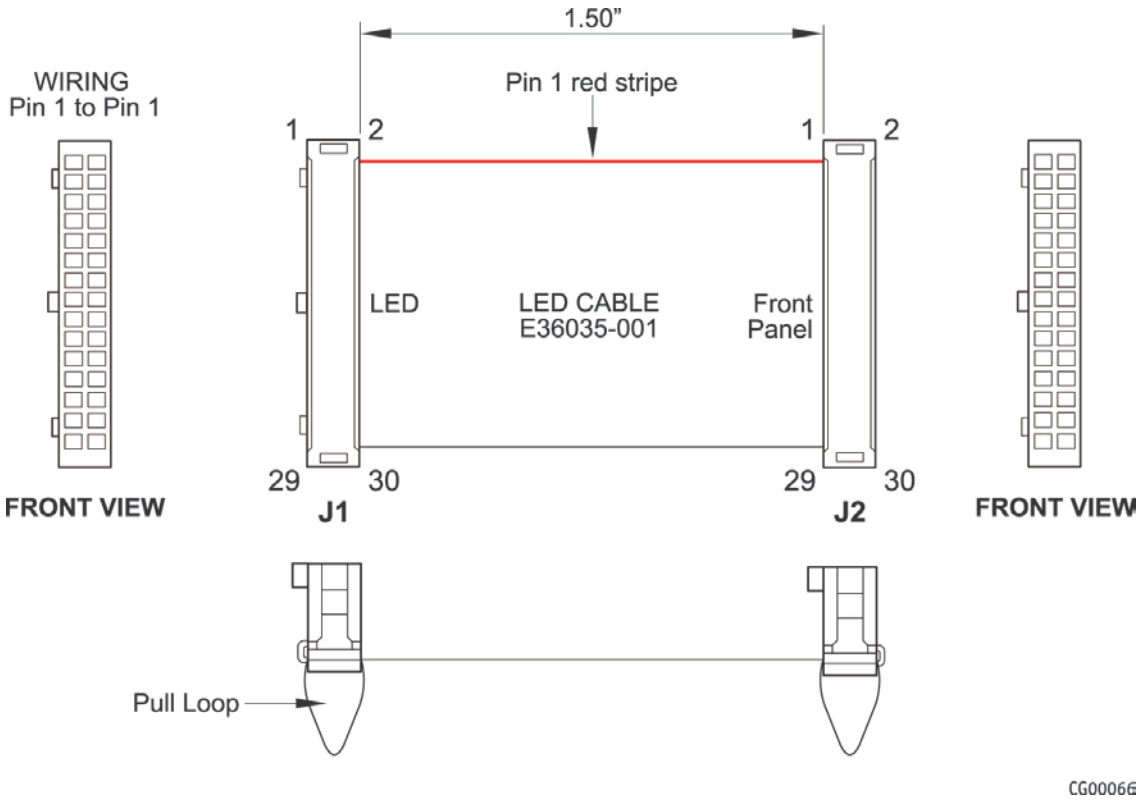
* Drain Wire spliced with GND and inserted into P1-pin 8. Add heat shrink.
** Drain Wire inserted into P2-pin 10. Add heat shrink.

CG00019

LED/Switch Board Power and Signal Cable

The LED/switch board power and signal cable connects the LED/switch board to the front panel board. Figure 23 shows the mechanical details of the LED/switch board cable.

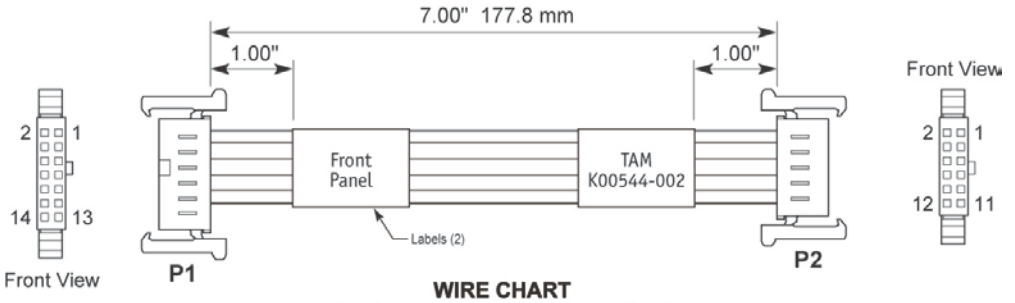
Figure 23: LED/Switch Board Power and Signal Cable Mechanical Drawing



TAM Signal Cable

The TAM signal cable connects the TAM board to the front panel board. Figure 24 shows the mechanical details of the TAM signal cable.

Figure 24: TAM Signal Cable Mechanical Drawing



WIRE CHART

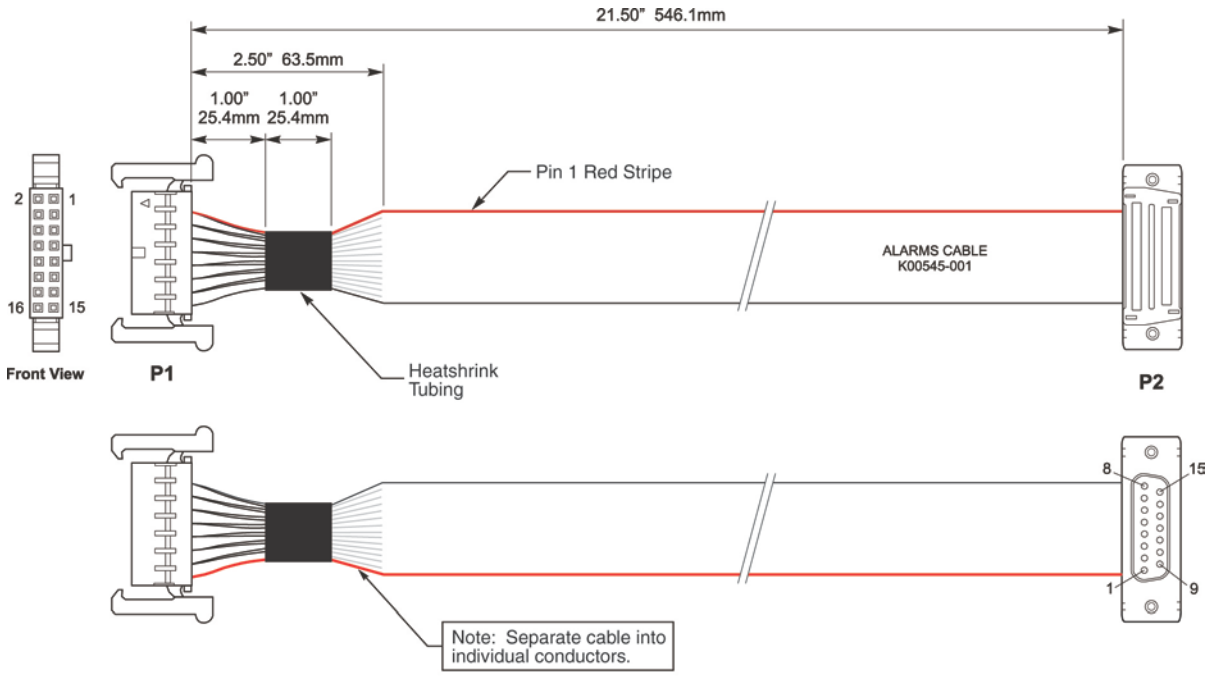
P1	SIGNAL	P2
1	TELCO_PWR_LED_N	1
2	TELCO_MIN_LED_N	2
3	TELCO_MAJ_LED_R_N	3
4	TELCO_MAJ_LED_Y_N	4
5	TELCO_CRIT_LED_R_N	5
6	TELCO_CRIT_LED_Y_N	6
7	TELCO_ALRM_PRST_N	7
8	P5V_STBY	8
9	SMB_SEN_3V3SB_CLK	9
10	SMB_SEN_3V3SB_DAT	10
11	P3V3_STBY	11
12	GND	12
13	N/C	
14	N/C	

CG00021

Alarms Cable

The alarms cable connects the TAM board to the chassis rear panel. Figure 25 shows the mechanical details of the alarms cable.

Figure 25 Alarms Cable Mechanical Drawing



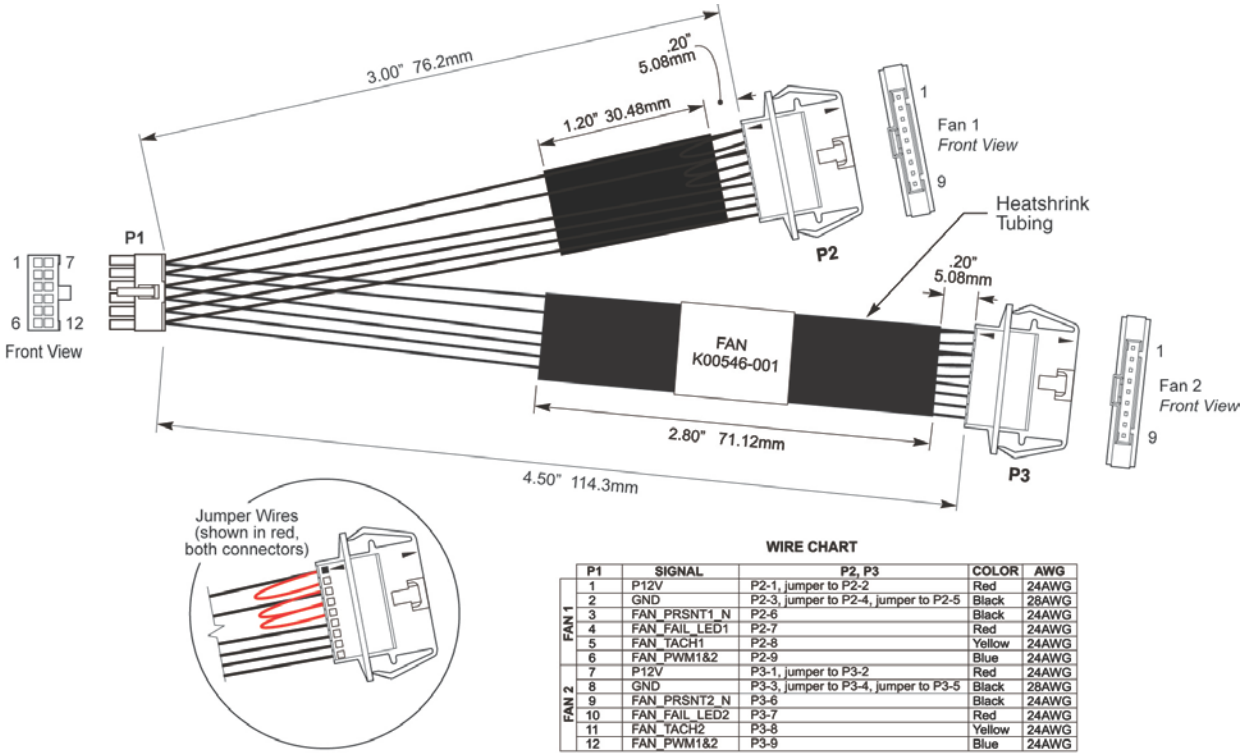
WIRING DIAGRAM		
P1	**Alarms Signal**	**P2**
1	MinorReset +	1
2	MinorReset -	2
3	MajorReset +	3
4	MajorReset -	4
5	CriticalAlarm-NO	5
6	CriticalAlarm-NC	6
7	CriticalAlarm-COM	7
8	MinorAlarm-NO	8
9	MinorAlarm-NC	9
10	MinorAlarm-COM	10
11	MajorAlarm-NO	11
12	MajorAlarm-NC	12
13	MajorAlarm-COM	13
14	PwrAlarm-NO	14
15	PwrAlarm-COM	15
16	N/C	

CG00022

Fan Cables

The fan cable connects system fans to the fan control board. The CG2200 server uses three fan cables, one for each redundant fan set. Figure 26 shows the mechanical details of the fan cable.

Figure 26. Fan Cable Mechanical Drawing



WIRE CHART

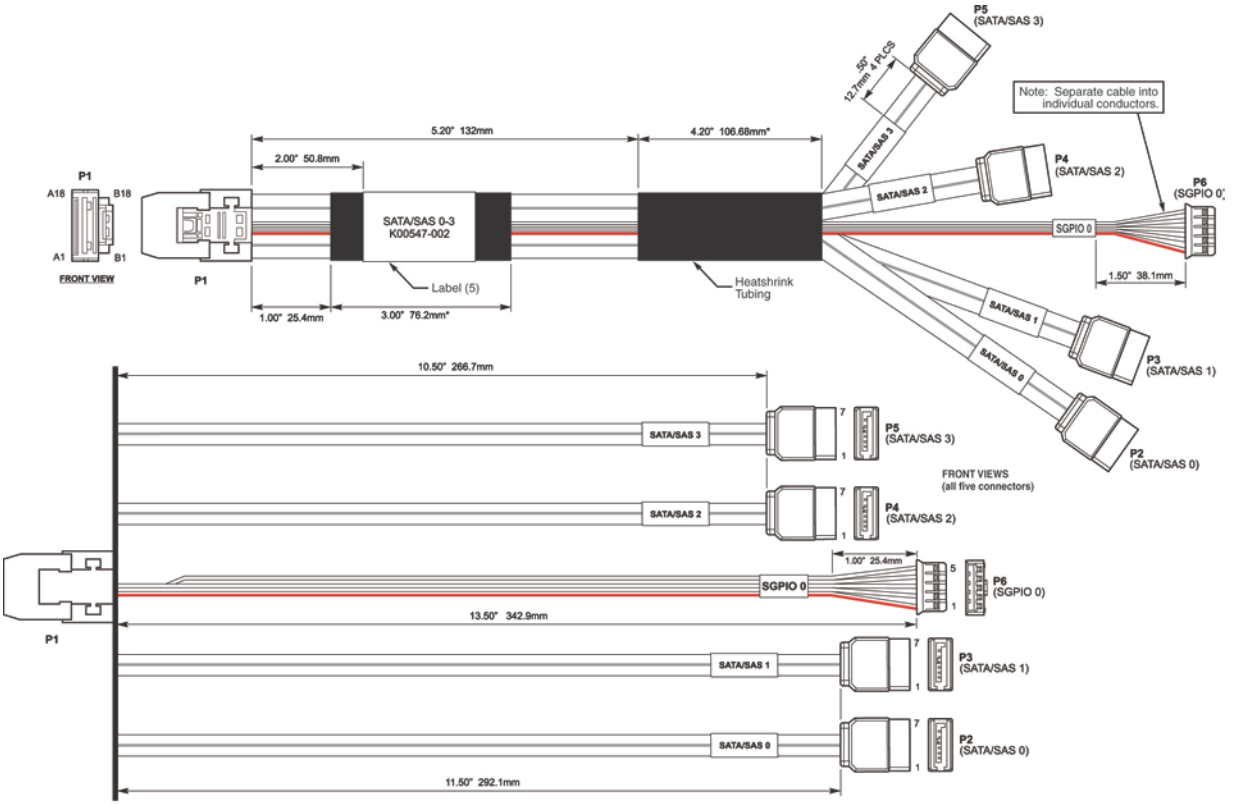
	P1	SIGNAL	P2, P3	COLOR	AWG
FAN 1	1	P12V	P2-1, jumper to P2-2	Red	24AWG
	2	GND	P2-3, jumper to P2-4, jumper to P2-5	Black	28AWG
	3	FAN_PRSNT1_N	P2-6	Black	24AWG
	4	FAN_FAIL_LED1	P2-7	Red	24AWG
	5	FAN_TACH1	P2-8	Yellow	24AWG
	6	FAN_PWM1&2	P2-9	Blue	24AWG
FAN 2	7	P12V	P3-1, jumper to P3-2	Red	24AWG
	8	GND	P3-3, jumper to P3-4, jumper to P3-5	Black	28AWG
	9	FAN_PRSNT2_N	P3-6	Black	24AWG
	10	FAN_FAIL_LED2	P3-7	Red	24AWG
	11	FAN_TACH2	P3-8	Yellow	24AWG
	12	FAN_PWM1&2	P3-9	Blue	24AWG

CG00002

Mini-SAS 1 (HDD 0-3/SGPIO1)

The mini-SAS 1 cable interconnects the HDD backplane board to the SAS connectors HDD 0-3 and to the SGPIO1 header on the baseboard. Figure 27 shows the mechanical details of the mini-SAS 1 cable.

Figure 27: Mini-SAS 1 (HDD 0-3/SGPIO1) Mechanical Drawing



WIRING LIST

SIGNAL	PIN		PIN	SIGNAL	
*GND			S7	**GND	SATA/SAS 3 P5
TX 3+	B16	→	S6	RX 3+	
TX 3-	B17	→	S5	RX 3-	
*GND			S4	**GND	
RX 3-	A17	←	S3	TX 3-	
RX 3+	A16	←	S2	TX 3+	
*GND			S1	**GND	
*GND	A15		S7	**GND	SATA/SAS 2 P4
TX 2+	B13	→	S6	RX 2+	
TX 2-	B14	→	S5	RX 2-	
*GND			S4	**GND	
RX 2-	A14	←	S3	TX 2-	
RX 2+	A13	←	S2	TX 2+	
*GND			S1	**GND	

P1				P6
SB0	A8	→	P6-1	SB0 (CLOCK)
SB1	A9	→	P6-2	SB1 (LOAD)
SB2	A10	→	P6-3	SB2 (GND)
SB4	B10	→	P6-4	SB4 (DATAOUT)
SB5	B11	→	P6-5	SB5 (DATAIN)

N/C	A11				
N/C	B8				
N/C	B9				
*GND			S7	**GND	SATA/SAS 1 P3
TX 1+	B5	→	S6	RX 1+	
TX 1-	B6	→	S5	RX 1-	
*GND			S4	**GND	
RX 1-	A6	←	S3	TX 1-	
Rx 1+	A5	←	S2	TX 1+	
GND			S1	**GND	
*GND			S7	**GND	SATA/SAS 0 P2
TX 0+	B2	→	S6	RX 0+	
TX 0-	B3	→	S5	RX 0-	
*GND			S4	**GND	
RX 0-	A3	←	S3	TX 0-	
RX 0+	A2	←	S2	TX 0+	
*GND			S1	**GND	

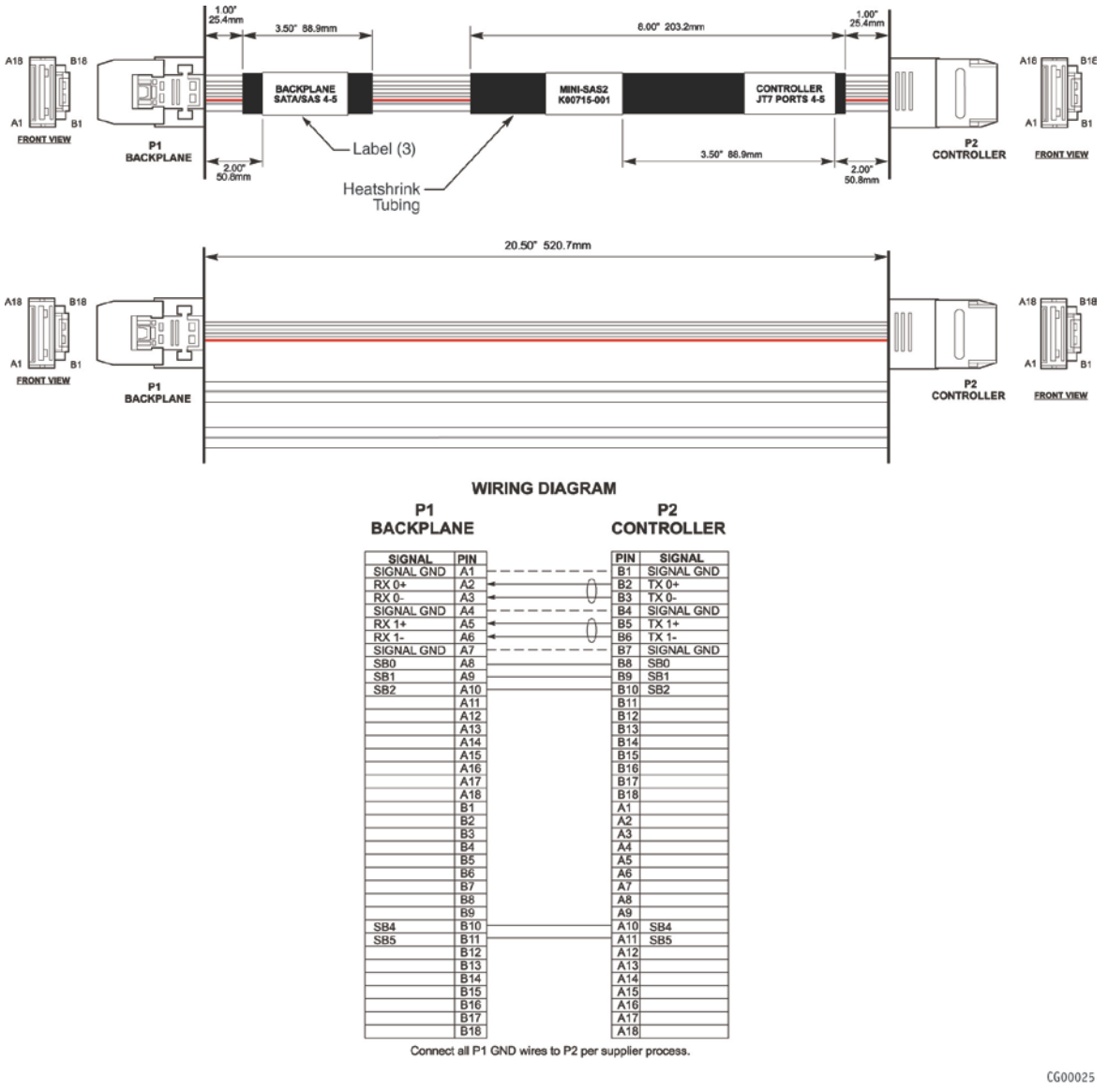
*GND wires in cable not shown. Connect all P1 GND wires to P2, P3, P4, P5 GND per supplier process.

**GND wires in cable not shown. Connect all P2, P3, P4, P5 GND wires to P1 GND per supplier process.

Mini-SAS 2 (HDD 4-5/SGPIO2)

The mini-SAS 2 cable interconnects the HDD backplane board to the SAS connectors HDD 4-5 and to the SGPIO2 header on the baseboard. Figure 28 shows the mechanical details of the mini-SAS 1 cable.

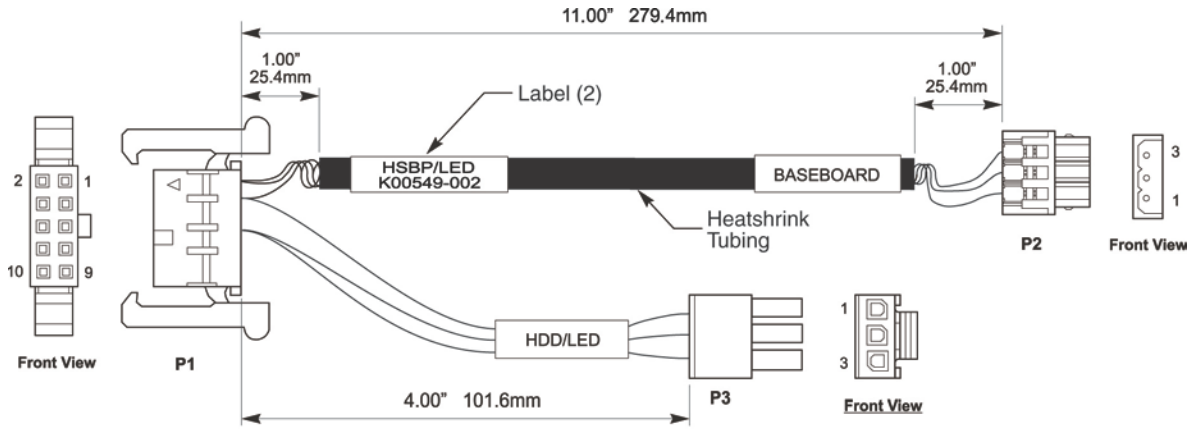
Figure 28: Mini-SAS 2 (HDD 4-5/SGPIO2) Mechanical Drawing



HSBP I2C/LED Cable

The HSBP I^2C/LED cable connects the HDD HSBP (hot swap backplane) board to the baseboard and front panel board providing HDD LED signal control on the disk drive carriers and on the system front panel. Figure 29 shows the mechanical details of the HSBP cable.

Figure 29: HSBP I2C/LED Cable Mechanical Drawing



WIRE CHART

P1	SIGNAL	P2	P3	COLOR
1*	SMB_HSBP_3V3STBY_DATA	1		BLUE
2*	GND	2		BLACK
3*	SMB_HSBP_3V3STBY_CLK	3		RED
4	HDD_FAULT_LED		1	YELLOW
5	HDD_ACT_LED		2	GREEN
6	GND		3	BLACK
7	N/C			
8	N/C			
9	N/C			
10	N/C			

*Wires in P1-1,2,3 to be twisted together at 1 full turn per inch.

3.3 User-Accessible Connectors

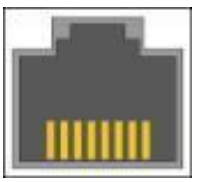
Keyboard and Mouse Ports

The keyboard and mouse connect to two of the four USB ports on the rear panel. See the “Universal Serial Bus (USB) Interface” section for the USB port pin definitions.

Serial Port

There are two serial ports on the CG2200 server: one 8-pin RJ45 connector on the front panel board (COM2) and one DB9 serial port connector (COM1) on the rear panel. Connections can be made to either the front or the rear port, but never both. The front port is described in the “Front Panel Board USB Ports” section.

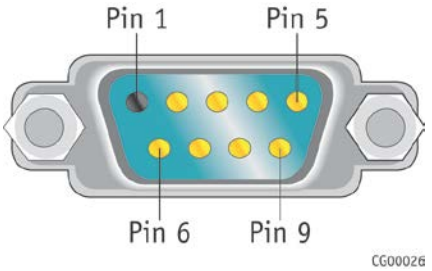
Figure 30: Front Panel Board Serial Port Connector (RJ45)



Pin	Signal
1	RTS (request to send)

Pin	Signal
2	DTR (data terminal ready)
3	TXD (transmit data)
4	GND
5	RIA (ring indicator)
6	RXD (receive data)
7	DSR/DCD (date set ready / data carrier detect
8	CTS (clear to send)

Figure 31: Rear Panel Serial Port Connector (DB9)

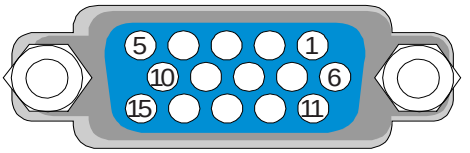


Pin	Signal Name	Pin	Signal Name
1	SPA_DCD	2	SPA_SIN_N
3	SPA_OUT_N	4	SPA_DTR
5	GND	6	SPA_DSR
7	SPA_RTS	8	SPA_CTS
9	SPA_RI		

Video Port Connector

The video port interface is a standard VGA-compatible, 15-pin connector. Video is supplied by an on-board ServerEngines* video controller with 32 Mbytes of on-board video DDR2 SDRAM.

Figure 32: Video Connector



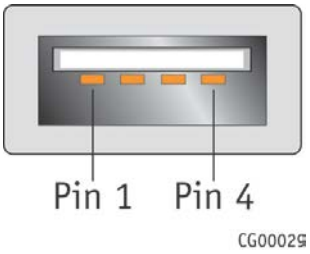
AF000839

Pin	Signal
1	Red (analog color signal R)
2	Green (analog color signal G)
3	Blue (analog color signal B)
4	No connection
5	GND
6	GND
7	GND
8	GND
9	VCC (+5 V)
10	GND
11	No connection
12	DDC_SDA
13	HSYNC (horizontal sync)
14	VSYNC (vertical sync)
15	DDC_SCL

Universal Serial Bus (USB) Interface

There are five externally accessible USB ports on the CG2200 server: four ports at the rear of the system and one at the front. The port on the front panel is accessible without removing the front bezel The built-in USB ports permit the direct connection of five (one front, four rear) USB peripherals without an external hub. If more devices are required, an external hub can be connected to any of the user accessible built-in ports. There are also two internal USB ports that can be used for embedded flash drives.

Figure 33: USB Connector



Pin	Signal
1	Fused VCC (+5 V w/over-current monitor of ports 0, 1, 2, and 3)
2	DATAL0 (differential data line paired with DATAH0)
3	DATAH0 (differential data line paired with DATAL0)
4	GND
5	GND
6	GND

Ethernet Connector

The S2600CO server board (baseboard) provides four network interface controller (NIC) RJ45 connectors oriented side-by-side on the back edge of the board and accessible at the rear I/O panel. The pin-outs for each connector are identical and defined in the table below.

Figure 34: RJ45 Ethernet Connector

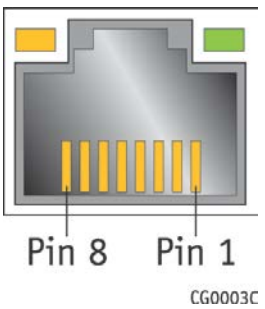


Table 6 RJ45 Ethernet Connector Pin-Out

Pin	Signal Name	Description
1	BI_DA+	Bi-directional pair A, +
2	BI_DA-	Bi-directional pair A, -

Pin	Signal Name	Description
3	BI_DB+	Bi-directional pair B, +
4	BI_DC+	Bi-directional pair C, +
5	BI_DC-	Bi-directional pair C, -
6	BI_DB-	Bi-directional pair B, -
7	BI_DD+	Bi-directional pair D, +
8	BI_DD-	Bi-directional pair D, -

Each network interface controller drives two LEDs located on the RJ45 connector. The link / activity LED (at the right of the connector) indicates network connection when on, and transmit / receive activity when blinking. The speed LED (at the left of the connector) indicates 1000-Mbps operation when amber, 100-Mbps operation when green, and 10-Mbps when off. Table 7 defines the LEDs.

Table 7: NIC Status LED

LED Color	LED State	NIC State
Green/Amber (Left)	Off	10Mbps
	Green	100 Mbps
	Amber	1000 Mbps
Green (Right)	On	Active Connection
	Blinking	Transmit / Receive activity

4. Front Panel Board

This chapter provides an overview of the Kontron CG2200 Carrier Grade Server Front Panel (FP) board and includes information on board hardware, connectors, power subsystem, optional add-ins, and regulatory requirements. This chapter is organized into the following sections:

Section 4.1: **Introduction**
Provides an overview of the CG2200 server FP board and shows the functional blocks

Section 4.2: **Front Panel Board Features**
Describes the CG2200 FP functional blocks

Section 0: **Front Panel Board Block Diagram**
Describes additional functions not described in the Functional Description section.

Section 4.4 **Front Panel Board Functional Description**
Provides a high-level description of the functionality distributed among the architectural blocks of the FP board

Section 0 **Front Panel Board Power Distribution**

Defines the power interface to the front panel board and the power distribution to the circuits on the board

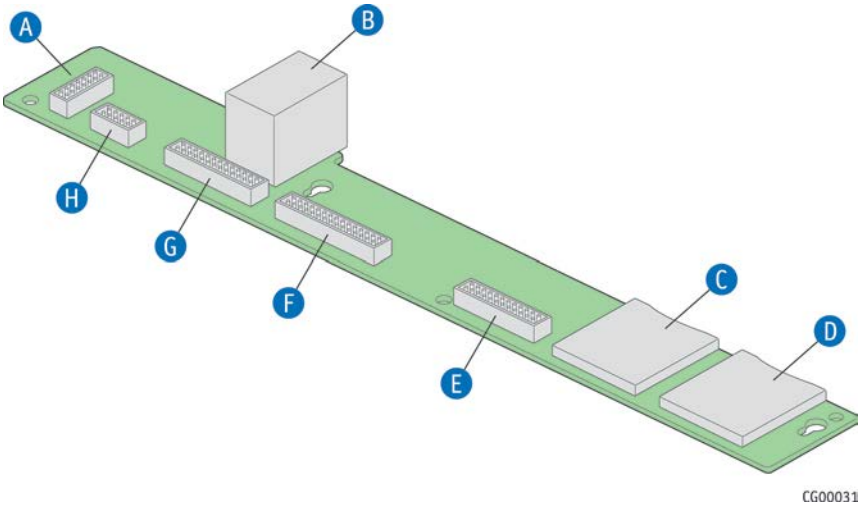
Section 4.6 **Front Panel Board Connector Specifications**
Provides detailed descriptions and the connector pin-out for each of the front panel board connectors

4.1 Introduction

The CG2200 server Front Panel (FP) board provides a connector interface and supporting logic for the Front Panel LED/switch board, which contains power, reset, and system ID switches, as well as various status LEDs. The FP board provides support for an external combined connector with both a USB and a serial (RJ45) port. Most signals pass from the front panel interface off the baseboard directly to the appropriate device (switch, LED, etc.).

Figure 35 shows the FP board components.

Figure 35: FP Board Layout (Primary Side



Item	Description	Item	Description
A	TAM signal cable connector	**E**	SSI front panel power cable connector
B	USB/RJ45 serial stacked header	**F**	LED/switch board power/signal cable connector
C	SD 0 flash module	**G**	Multifunction power/signal cable connector
D	SD 1flash module	**H**	Front panel board USB cable connector

4.2 Front Panel Board Features

The FP Board provides the following feature set:

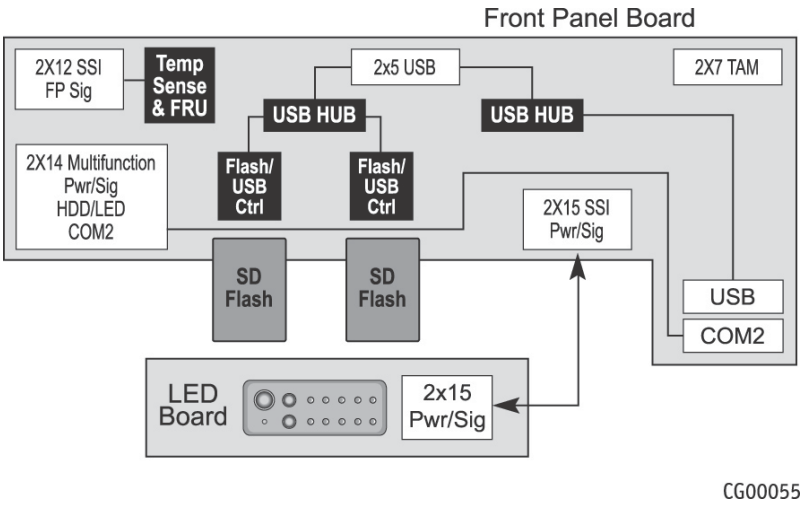
- Two USB ports: one to drive the USB port on the combo RJ45 and USB connector and one to drive the SD flash module controller(s).
- Serial RS-232 signals to the front panel serial port on the combo RJ45 and USB connector
- Control circuitry for driving the NIC activity LED, the system status LED, the power LED, and the disk activity LED, which are all located on the LED/switch board
- On-board LED that indicates USB flash drive activity
- System power state and status indicators -- power, reset, and NMI switches

NOTE: There may be features (for future use) in addition to those in this list.

4.3 Front Panel Board Block Diagram

Figure 36 is a block diagram that shows the major hardware components and interconnections on the front panel board.

Figure 36: FP Board Block Diagram



4.4 Front Panel Board Functional Description

This section provides a high-level description of the functions handled by the architectural blocks on the FP board.

Front Panel Board USB Ports

There are two USB channels on the CG2200 server FP board. The USB channels are connected to the front panel board from the baseboard by a (2X5) 10-pin connector. One USB channel goes to the SD flash module controller and the second USB channel goes first to a USB hub and then to an external USB port accessible through the combo RJ45/USB connector on the front of the chassis.

The FP board provides the P5V power to the external USB connector and over current monitoring for the external USB port.

Front Panel Board Serial Port Connector

The combo RJ45/USB connector on the front panel provides the serial port connector, (COM2). A multifunction 2x13 (26-pin) cable for the serial port connector goes from the baseboard to the front panel board RJ45 serial port connector. The RJ45 serial port electrical interface supports RS-232 voltage levels. The baseboard provides the control functionality for the serial port.

Front Panel Board LED Board Interface

The front panel board uses a (2x15) 30-pin power and signal connector as the interface between the front panel board and the LED board. The signals in this connector are the telco alarm LED signals, the system status LED signals, and the front panel push button signals.

Front Panel Board TAM Module Interface

The front panel board uses a 2x7 (14-pin) cable as the interface to the telco alarm module (TAM). This connection provides the telco alarm LED signals from the TAM module to the front panel LED board so the alarm status can be displayed on the front panel LEDs. This connector also provides the SMB Sensor bus connections for communications with the TAM Module.

Front Panel Board BaseBoard Interface

The front panel board uses a standard SSI 24-pin connector for the electrical connection to the baseboard. The SSI connector provides the connections for the DC voltage, the SMB Sensor bus, the LED status signals and the front panel power, Reset, ID, and NMI buttons.

Front Panel Board Miscellaneous Circuits

The front panel board provides the de-bounce circuit for the front panel push buttons as well as the isolation and drive circuits for the system status LEDs that are visible on the front panel LED board.

Front Panel Temperature Sensor and FRU EEPROM

A TMP75 combination digital temperature sensor and thermal watchdog provides temperature sensing. The temperature is monitored by the baseboard management controller (BMC) via the SMB sensor bus. The SMBus address is 0x9Ah.

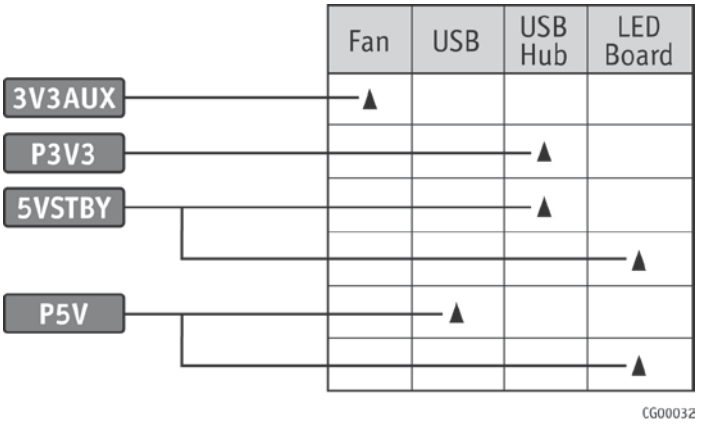
A serial EEPROM location on the FP board can be used as a FRU device, if required. The EEPROM is connected to the SMB sensor bus

NOTE: This location is currently not populated.

4.5 Front Panel Board Power Distribution

The power distribution for the front panel board is shown in Figure 37.

Figure 37: FP Board Power Distribution



4.6 Front Panel Board Connector Specifications

The following sections provide the pin definitions for the FP board connectors.

Baseboard SSI Power/Signal Connector

The SSI connector brings power and control signals from the baseboard to the front panel board. Table 8 shows the SSI connector pin-out.

Table 8 SSI Connector Pin-Out

Pin	Signal Name	Description
1	P3V3_AUX	Baseboard STBY Power
2	P3V3_AUX	Baseboard STBY Power
3	NC	No Connect ion
4	P5V-STBY	Baseboard STBY Power
5	FP_PWR_LED_BUF_N	PWR LED signal
6	FP_ID_LED_BUF_N	System ID LED signal
7	P3V3	Baseboard Power
8	FP_LED_STATUS_GREEN_BUF_N	System Status LED Good
9	LED HDD_ACTIVITY_N	Composite HDD Activity LED
10	FP_LED_STATUS_AMBER_BUF_N	System Status LED Fault
11	FP_PWR_BTN_J1_N	System Power Button
12	LED_NIC_LINK0_ACT_BUF_N	Link0 Activity LED signal
13	Ground	Ground Power Supply
14	LED NIC LINK0 LNKUP BUF_N	NIC LINK0 Up LED
15	FP_RST_BTN_J1_N	System Reset Button
16	SMB_SENSOR_3V3STBY_DATA	SMB Sensor Bus Data
17	Ground	Ground Power Supply
18	[8] SMB_SENSOR_3V3STBY_CLK	SMB Sensor Bus Clock
19	FP_ID_BTN_J1_N	System ID Button
20	FP_CHASSIS_INTRUSION	Chassis Intrusion switch input (Not used)
21	PU_FW_SIO_TEMP_SENSOR	Temperature Sensor Alert signal to baseboard
22	LED_NIC_LINK1_ACT_BUF_N	Link1 Activity LED signal
23	FP_NMI_BTN_J1_N	System NMI Button
24	LED_NIC_LINK1_LNKUP_BUF_N	NIC LINK1 Up LED

Multifunction Power/Signal Connector

The multifunction connector provides the connections for the serial port signals from the baseboard, the SMB sensor bus signals, the HDD composite Activity LEDs signal and P5V. The signals are defined in Table 9.

Table 9: Multi-Function Connector Pin-Out

Pin	Signal Name	Description
1	P5V	Power Supply 5V
2	P5V	Power Supply 5V
3	TP_J5_3	No Connect ion
4	TP_J5_4	No Connection
5	GND	Power Supply Ground
6	GND	Power Supply Ground
7	GND	Power Supply Ground
8	GND	Power Supply Ground
9	SMB_SENSOR_3V3STBY_DATA	SMB Sensor Bus Data
10	GND	Power Supply Ground
11	SMB_SENSOR_3V3STBY_CLK	SMB Sensor Bus Clock
12	Composite Fan Fault_N	Fan Fault signal to Front Panel LED Board
13	SPA_DCDP12V	Serial Port DCD signal
14	SPA_DSR	Serial Port DSR signal
15	SPA-SIN	Serial Port Data Input signal
16	SPA_RTS	Serial Port RTS signal
17	SPA_SOUT_N	Serial Port Data Out signal
18	SPA-CTS	Serial Port CTS signal
19	SPA-DTR	Serial Port DTR signal
20	SPA-RI	Serial Port RI signal
21	GND	Power Supply Ground
22	TP_J5_22	No Connection
23	HDD_Fault_LED	HDD Fault LED signal
24	HDD Activity LED	HDD Activity LED signal
25	GND	Power Supply Ground
26	TP_J5_26	No Connection

Front Panel LED Board Connector

The front panel LED board connector sends power and signals from the FP board to the LED/Switch board for display on the front panel status LEDs. Table 10 shows the front panel LED board connector pin-out.

Table 10 Front Panel LED Board Connector Pin-Out

Pin	Signal Name	Description
1	P5VSTBY	Power Supply 5V standby
2	GND	Power Supply Ground
3	P5VSTBY	Power Supply 5V standby
4	GND	Power Supply Ground
5	FP_PWR_LED1_N	Power LED 1 Signal
6	TELCO_PWR_LED_N	Telco Power LED signal
7	FP_PWR_LED2_N	Power LED 2 Signal
8	TELCO_MIN_LED_N	Telco Minor LED signal
9	FP_ID_LED_W_N	System ID White LED signal
10	TELCO_MAJ_LED_R_N	Telco Major Red LED signal
11	FP_ID_LED_B_N	System ID Blue LED signal
12	TELCO_MAJ_LED_Y_N	Telco Major Yellow LED signal
13	FP_STAT_LED_G_N	Status Green LED signal
14	TELCO_CRIT_LED_R_N	Telco Critical Red LED signal
15	FP_STAT_LED_A_N	Status Amber LED signal
16	TELCO_CRIT_LED_Y_N	Telco Critical Yellow LED signal
17	FP_NIC_LED_N	NIC Activity LED signal
18	FP_PWR_BTN_N	Power switch signal
19	FP_HDD_LED_G_N	Hard disk Activity LED signal
20	FP_RST_BTN_N	Reset switch signal
21	FP_HDD_LED_A_N	Hard disk Fault LED signal
22	FP_ID_BTN_N	ID switch signal

Pin	Signal Name	Description
23	FP_BB_LED_A_N	Baseboard Fault LED signal
24	FP_NMI_BTN_N	NMI switch signal
25	FP_PS_LED_A_N	Power Supply Fault LED signal
26	P5V	Power Supply 5V
27	FP_FAN_LED_A_N	Fan Fault LED signal
28	GND	Ground
29	NC	No connection
30	NC	No connection

Front Panel TAM Signal Connector

The TAM board connector sends the telco alarm signals from the front panel board to the telco alarm module, which drives the external telco relays and alarms. Table 11 shows the TAM board connector pin-out.

Table 11 TAM Board Connector Pin-Out

Pin	Signal Name	Description
1	Telco_PWR_LED_N	Telco Power LED signal
2	Telco_MIN_LED_N	Telco Minor Alarm LED signal
3	Telco_MAJ_LED_R_N	Telco Major Alarm LED RED signal
4	Telco_MAJ_LED_Y_N	Telco Major Alarm LED Yellow signal
5	Telco_CRIT_LED_R_N	Telco Critical Alarm LED RED signal
6	Telco_CRIT_LED_Y_N	Telco Critical Alarm LED Yellow signal
7	Telco_ALRM_PRST_N	Telco Alarm Present signal Ground
8	P5V_STBY	Power Supply P5V Standby Voltage
9	SMB_SEN_3V3SB_CLK	SMB Sensor Bus Clock signal
10	SMB_SEN_3V3SB_DAT	SMB Sensor Bus Data signal
11	P3V3_STBY	Power Supply P3V3 Standby Voltage
12	GND	Power Supply Ground
13	NC_J3_13	No Connection
14	NC_J3_14	No Connection

Front Panel RJ45/USB Connector

Table 12 shows the pin definitions for the serial port (SP) on the combo RJ45/USB connector

Table 12 RJ45/USB Connector Pin-Out

RJ45 Pin	SP Pin	Signal Name	Description
NA	12	NC	No connection
NA	4	NC	No connection
NA	6	NC	No connection
NA	1	NC	No Connection
NA	7	NC	No connection
1	11	RJ45_SPA__RTS	Connects to baseboard
2	10	RJ45_SPA__DTR	Connects to baseboard
3	4	RJ45_SPA__SOUT_L	Connects to baseboard
4	3	GND	Ground
5	2	RJ45_SPA_RI	Connects to baseboard
6	5	RJ45_SPA_SIN	Connects to baseboard
7	8	RJ45_SPA_DSR_DCD	Connects to baseboard
8	9	RJ45_SPA_CTS	Connects to baseboard

Table 13 shows the pin-out for the USB port on the combo connector.

Table 13: **USB Port Connector Pin-Out**

Pin	Signal Name	Description
1	USB_GND	Connects to ferrite bead and filtered cap
2	USB0_DP	Connects to protection diode and choke
3	USB0_DN	Connects to protection diode and choke
4	USB_PWR	Connects to ferrite bead

Front Panel Board Baseboard USB Connector

The FP board USB connector carries signals between the FP board and the baseboard. Table 14 shows the USB connector pin-out.

Table 14: Front Panel USB Connector Pin-Out

Pin	Signal Name	Description
1	P5V_USB_FP	Power Supply 5V to external USB device
2	P5V_USB_FP	Power Supply 5V to external USB device
3	USB2_P13_F_DN	USB Channel P13 Negative signal
4	USB2_P11_F_DN	USB Channel P11 Negative signal
5	USB2_P13_F_DP	USB Channel P13 Positive signal
6	USB2_P11_F_DP	USB Channel P11 Positive signal
7	GND	Power Supply Ground
8	GND	Power Supply Ground
9	NC	No connection
10	GND	Power Supply Ground

Front Panel External SD Flash Module Connectors

The external SD flash module connectors send signals from the FP board to the SD1 and SD2 flash modules. Table 15 shows the SD1 flash module pin-out and Table 16 shows the SD2 flash module pin-out.

Table 15: Front Panel Board SD1 Flash Module Pin-Out

Pin	Signal Name	Description
1	SD1_D3_R	Flash Data 3 signal
2	SD1_SD1_CMD_R	SD1 Command signal
3	SD1 VSS0	Power Supply Ground
4	SD1_VDD	SD Flash Power
5	SD1_CLK_R	SD Clock signal
6	SD1_VSS1	Power Supply Ground
7	SD1_D0_R	Flash Data 0 signal
8	SD1_D1_R	Flash Data 1 signal
9	SD1_D2_R	Flash Data 2 signal
10	SD1_DS	Flash Control
11	SD1_WP	Flash Write Protect
12	SD1_PS/DS	Power Supply Ground

NOTE: The SD 1 module is called SD 1 on the front panel SD drive silkscreen, also. The SD 2 module is called SD 0 on the front panel SD drive silk screen. This is to maintain consistency with the HDD slots that start with “0” on the right and increase going left.

Table 16: Front Panel Board SD1 Flash Module Pin-Out

Pin	Signal Name	Description
1	SD2_D3_R	Flash Data 3 signal
2	SD2_SD1_CMD_R N	SD1 Command signal
3	SD2_VSS0	Power Supply Ground
4	SD2_VDD	SD Flash Power
5	SD2_CLK_R	SD Clock signal
6	SD2_VSS1	Power Supply Ground
7	SD2_D0_R	Flash Data 0 signal
8	SD2_D1_R	Flash Data 1 signal
9	SD2_D2_R	Flash Data 2 signal
10	SD2_DS	Flash Control
11	SD2_WP	Flash Write Protect
12	SD2_PS/DS	Power Supply Ground

NOTE: The SD 1 module is called SD 1 on the front panel SD drive silkscreen, also. The SD 2 module is called SD 0 on the front panel SD drive silk screen. This is to maintain consistency with the HDD slots that start with “0” on the right and increase going left.

5. LED/Switch Board

This chapter provides an overview of the Kontron Carrier Grade Server CG2200 LED/switch board, including information about the board hardware, connectors, power subsystem, optional add-ins, and regulatory requirements.

This chapter is organized into the following sections:

Section 5.1 **Introduction**
Provides an overview and mechanical image of the LED/switch board

Section 5.2 **LED/Switch Board Features**
Describes the LED/switch board feature set

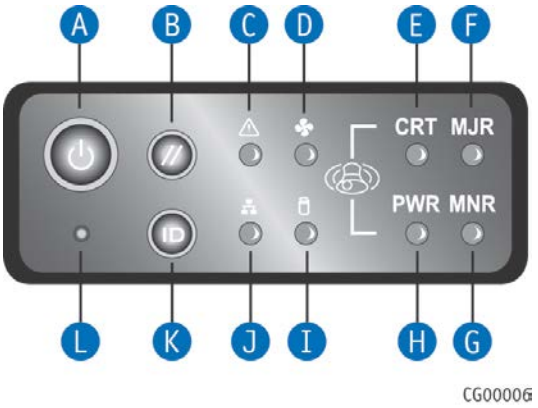
Section 5.3 **LED/Switch Board Connector Specification**
Provides the connector and pin-out information for the LED/switch board components

5.1 Introduction

The CG2200 server LED/switch board provides input selection switches and LED status indicators for the server system. There are four switches and six LEDs on the panel. The power status LED and the chassis ID LED are embedded in the switch and the other four are shown in Figure 38.

Figure 38 shows the front panel LED/switch panel layout.

Figure 38: Front Panel Buttons/LEDs



5.2 LED/Switch Board Features

The front panel LED/switch board has the following features:

- Connects the front panel board signals and the front panel
- 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.

NOTE: For information about the telco alarm LEDs that are also on the front panel, see Chapter 8, Section 0, “Table 31Telco Alarms Fault LEDs”.

Front Panel System Control Buttons

The LED/switch board houses a system control button for each of the four switches. The function of each is listed in Table 17.

Table 17: Control Button Functions

Switch/Button	Feature	Function
A	Power button	Toggles the system power on/off, also functions as a sleep button if enabled by an ACPI-compliant operating system. A status LED is embedded in this switch and displayed on the button
B	System reset button	Reboots and initializes the system
K	Chassis ID Button	Toggles the front panel chassis ID LED and the rear server board chassis ID LED on/off. The front panel LED is embedded in the switch and displayed on the button.
L	NMI Button	Puts the system in a halt state for diagnostic purposes and allows issuance of a non-maskable interrupt when pressed. After issuing the interrupt, a memory download can be performed to determine the cause of the problem. **NOTE:** This button is for diagnostic purposes only and can only be accessed by using a thin stylus or a paper clip.

Front Panel Status LEDs

The front panel LED/switch board contains six status LEDs; four separate and two embedded and displayed with their buttons. The LED functions are listed in Table 18.

Table 18: Front Panel LED Functions

LED Description	LED Power	Color	Condition	Description
Power/Sleep (on button)	P5V	Green	On	Legacy power on / ACPI S0 state
		Green	Blinking	Sleep / ACPI S1 state
		-	Off	Power off / ACPI S4 or S5 state
Chassis Identification (K) (on button)	P5VSTBY	White	On	Chassis identification active via command or button
			Off	Chassis identification inactive
System Status (see Table 19)	P5VSTBY	Green	On	System ready/normal operation
		Green	Blinking	System ready but degraded
	P5VSTBY	Amber	On	Critical or non-recoverable condition

LED Description	LED Power	Color	Condition	Description
		Amber	Blinking	Non-critical alarm
		-	OFF	System not ready: POST/system stop
HDD activity (I)	P5V	Green	BLINK	Hard disk drive activity
	P5V	Amber	ON	Hard disk drive fault
			OFF	No access and no hard disk drive fault
NIC1/NIC2 activity (J)	P5V	Green	ON	LAN link for NIC1 and NIC2
		Green	BLINK	LAN activity for NIC1 and NIC2
		-	OFF	Idle / No link
Fan Status (D)	P5VSTBY	Amber	ON	Fan fault
		-	OFF	Fan subsystem OK - no fault

NOTE: .Letters in LED Description column entries refer to the letter labels on Figure 38.
For detailed information about the HDD LED settings, see Section 7.3 “Hard Disk Drive Activity and Fault LEDs”.

System Status LED

Table 19 shows the meaning of each state on the system status LED.

Table 19: System Status LED States

Color	State	Criticality	Description
Off	N/A	Not ready	AC (or DC if DC power supplies used) power is off.
Green	On	OK	System booted and ready
Green	Blinking	Degraded	System degraded Including, but not limited to: Unable to use all of the installed memory (more than one DIMM installed) Correctable errors over a threshold of 10 and migrating to a spare DIMM (memory sparing). This indicates that the user no longer has spare DIMMs specifying a redundancy lost condition. The corresponding DIMM LED should light up. In a mirrored configuration, when memory mirroring takes place and system loses memory redundancy (This is not covered by the second bullet above) Redundancy loss, such as power supply or fan (This does not apply to non-redundant subsystems) PCI Express* link errors CPU failure/disabled – if there are two processors and one of them fails Fan alarm – Fan failure. Number of operational fans should be more than the minimum number needed to cool the system Non-critical threshold crossed – temperature and/or voltage
Amber	Blinking	Non-critical	Non-fatal alarm – system is likely to fail Including, but not limited to: • Critical voltage threshold crossed • VRD hot asserted • Minimum number of fans to cool the system are not present or have failed • In non-sparing and non-mirroring mode if the threshold of ten correctable errors is crossed within the window
Amber	On	Critical, non-recoverable	Fatal alarm – system has failed or shut down Including, but not limited to: • DIMM failure when there is one DIMM and no good memory present • Run-time memory uncorrectable error in non-redundant mode • IERR signal asserted • Processor 1 missing • Temperature (e.g., CPU ThermTrip, memory TempHi, critical threshold crossed) • No power good – power fault • Processor configuration error (e.g., processor stepping mismatch)

Chassis Identification LED

The blue chassis identification LED on the baseboard is used to help identify a system for servicing. This is especially useful when the system is installed in a high-density rack or cabinet with several similar systems.

The chassis ID LED can be turned on by:

- Pressing the white chassis ID button on the front panel will illuminate the blue ID LED on the rear of the chassis until the button is pressed again.
- Issuing the appropriate hex IPMI system identify value, the chassis ID LED either blinks for 15 seconds and turns off or blinks indefinitely until the appropriate hex IPMI system identify value is issued to turn it off.

5.3 LED/Switch Board Connector Specification

The LED/switch board has a 2x15-pin connector to the front panel (FP) board. The connector pin definitions are shown in Table 20.

Table 20 LED/Switch Board Connector Pin-Out

Pin	Definition	Pin	Definition
1	P5VSTBY	16	TELCO_CRIT_LED_Y_N
2	GND	17	FP_NIC_LED_N
3	P5VSTBY	18	FP_PWR_BTN_N
4	GND	19	FP_HDD_LED_G_N
5	FP_PWR_LED1_N	20	FP_RST_BTN_N
6	TELCO_PWR_LED_N	21	FP_HDD_LED_A_N
7	FP_PWR_LED2_N	22	FP_ID_BTN_N
8	TELCO_MIN_LED_N	23	FP_BB_LED_A_N
9	FP_ID_LED_W_N	24	FP_NMI_BTN_N
10	TELCO_MAJ_LED_R_N	25	FP_PS_LED_A_N
11	FP_ID_LED_B_N	26	P5V
12	TELCO_MAJ_LED_Y_N	27	FP_FAN_LED_A_N
13	FP_STAT_LED_G_N	28	GND
14	TELCO_CRIT_LED_R_N	29	NC
15	FP_STAT_LED_A_N	30	NC

6. Fan Control Board

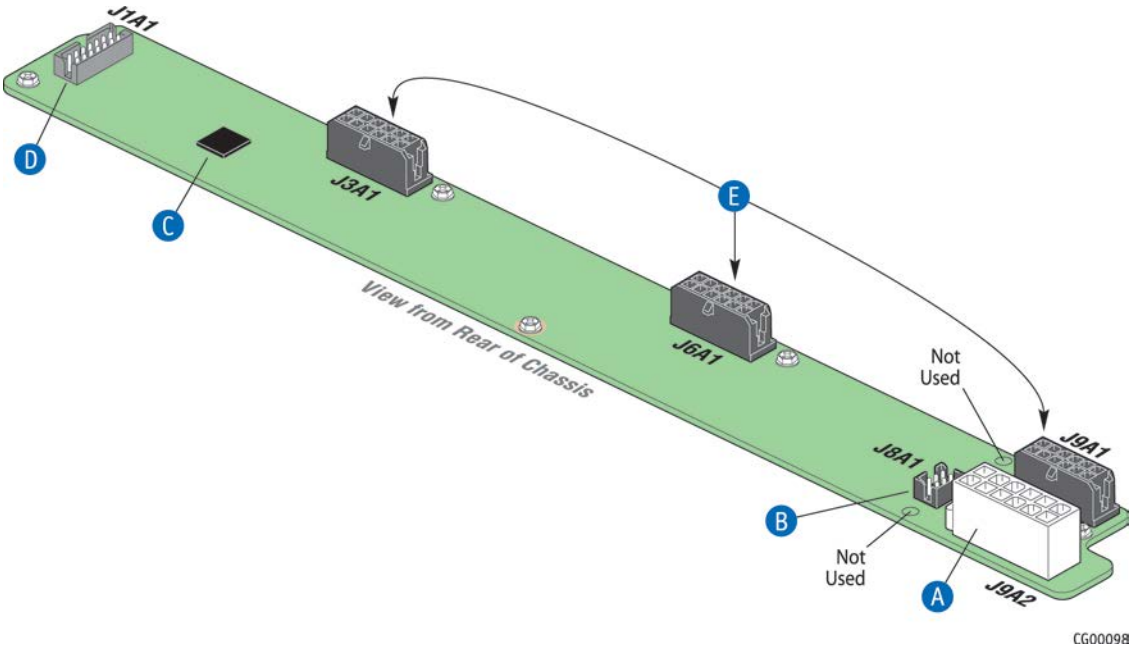
6.1 Introduction:

The fan control board uses a modular concept for controlling the system fans. The system baseboard sends the fan control functions to the fan control board via the SMbus. The fan control functions are controlled by a Maxim 72408 fan controller IC. This controller monitors the “Fan Present” signals from each of the fan positions, drives the “Fan PWM” signals, monitors the “Fan Tach” signals, and drives the “Fan Fail” signals. Figure 39 shows the layout of the Fan Control Board.

6.2 Fan Controller Functions

The fan controller is initialized at start-up by reading a configuration code from the boot SEEPROM. After start-up the fan speeds are monitored and controlled by the fan controller through the baseboard SMbus. Fan speed is controlled using temperature sensors located on the baseboard. When a fan fault is detected the fan controller drives the “Fan Fault” signal “ON” in the fault LED on the fan assembly. Simultaneously, a composite fan fault LED, visible at the chassis front bezel, is turned “ON” on the front panel LED board.

Figure 39: Fan Control Board Layout



Item	Description	Item	Description
A	Fan control board input power connector	**D**	Multifunction output power and signal connector
B	Fan I^2C connector	**E**	Sysstem fan connectors (three) for fan pairs
C	Fan controller		

6.3 Fan Control Board Connectors

There are two power connectors (input and output) from the power distribution board to the fan control board and three connectors on the fan control board to deliver power to the six system fan assemblies. Figure 26 in Section 3.2, “Cable and System Interconnections” shows the fan cable connectors

Input Power Connector

Power is provided to the fan control board by a 2x6 12-pin power connector from the power distribution board (PDB). The fan control board receives P12V, P5V, P5V-STBY and P3V3 input.

Output Power Connector

The fan control board distributes the P5V power to the front panel via a multifunction 2x7 14-pin connector. This connector is also used to connect the sensor SMB to the fan control board for reading and writing to the FRU data EEPROM. The system firmware reads the FRU data to determine the manufacturer of the system, i.e., Kontron America. The composite “Fan Fault”

signal generated on the fan control board is connected to the front panel board by a pin in the output power connector.

Fan Control Board System Fan Connectors

The Fan Control Board provides the electrical connections to the fan assemblies. There are three fan assembly 2x6 12-pin connectors that drive two fans each.

6.4 Fan Control Board Connector Specification

This section provides the pin definitions for the connectors used on the fan control board.

Table 21.. Fan Control Board Input Power Connector Pin-Out

Pin	Signal Name	Description
1	GND	Power Supply Ground
2	GND	Power Supply Ground
3	GND	Power Supply Ground
4	GND	Power Supply Ground
5	P5V	Input Power 5 Volts
6	P5V	Input Power 5 Volts
7	P5V_STBY	Input Power 5 Volt Standby
8	P3V3	Input Power 3.3 Volts
9	P12V	Input Power 12 Volts
10	P12V	Input Power 12 Volts
11	P12V	Input Power 12 Volts
12	P12V	Input Power 12 Volts

Table 22: Fan Control Board Output Power Connector Pin-Out

Pin	Signal Name	Description
1	P5V	Output Power 5 Volts to FPB
2	P5V	Output Power 5 Volts to FPB
3	NC_FP_3	No Connection
4	NC_FP_4	No Connection
5	GND	Power Supply Ground
6	GND	Power Supply Ground
7	GND	Power Supply Ground
8	GND	Power Supply Ground
9	SMB_SEN_DAT	SMB Sensor Bus Data
10	GND	Power Supply Ground
11	SMB_SEN_CLK	SMB Sensor Bus Clock
12	Compositle_Fan_Fail_N	Composite Fan Fail signal to Front Panel
13	NC_FP_13	No Connection
14	NC_FP_14	No Connection

Table 23: Fan Control Board SMBus Connector Pin-Out

Pin	Signal Name	Description
1	SMB_IPMB_3V3STBY_DAT	IPMB Bus Data to Fan Controller
2	GND	Power Supply Ground
3	SMB_IPMB_3V3STBY_CLK	IPMB Bus Clock to Fan Controller
4	NC_IPMB_4	No Connection
5	NC_IPMB_5	No Connection
6	NC_IRQ	No Connect ion (reserved for Fan IRQ signal

Table 24: Fan Control Board Fan Assembly 1 and 2 Connector Pin-Out

Pin	Signal Name	Description
1	P12V	12 Volts to Fan 1
2	GND	Power Supply Ground
3	Fan_Prsnt1_N	Fan Present Signal Fan 1
4	Fan_Fail_1	Fan Fail Signal Fan 1
5	Fan_Tach_1_N	Fan Tach Signal Fan 1
6	FAN_PWM_12_BUF	Fan PWM Signal Fan 1 and Fan 2
7	P12V	12 Volts to Fan 2
8	GND	Power Supply Ground
9	Fan_Prsnt2_N	Fan Present Signal Fan 2
10	Fan_Fail_2	Fan Fail Signal Fan 2
11	Fan_Tach_2_N	Fan Tach Signal Fan 2
12	FAN_PWM_12_BUF	Fan PWM signal Fan 1 and Fan 2

Table 25: Fan Control Board Fan Assembly 3 and 4 Connector Pin-Out

Pin	Signal Name	Description
1	P12V	12 Volts to Fan 3
2	GND	Power Supply Ground
3	Fan_Prsnt3_N	Fan Present Signal Fan 3
4	Fan_Fail_3	Fan Fail Signal Fan 3
5	Fan_Tach_3_N	Fan Tach Signal Fan 3
6	FAN_PWM_34_BUF	Fan PWM signal Fan 3 and Fan 4
7	P12V	12 Volts to Fan 4
8	GND	Power Supply Ground
9	Fan_Prsnt4_N	Fan Present Signal Fan 4
10	Fan_Fail_4	Fan Fail Signal Fan 4
11	Fan_Tach_4_N	Fan Tach Signal Fan 4
12	FAN_PWM_34_BUF	Fan PWM signal Fan 3 and Fan 4

Table 26: Fan Control Board Fan Assembly 5 and 6 Connector Pin-Out

Pin	Signal Name	Description
1	P12V	12 Volts to Fan 5
2	GND	Power Supply Ground
3	Fan_Prsnt5_N	Fan Present Signal Fan 5
4	Fan_Fail_5	Fan Fail Signal Fan 5
5	Fan_Tach_5_N	Fan Tach Signal Fan 5
6	FAN_PWM_56_BUF	Fan PWM signal Fan 5 and Fan 6
7	P12V	12 Volts to Fan 6
8	GND	Power Supply Ground
9	Fan_Prsnt6_N	Fan Present Signal Fan 6
10	Fan_Fail_6	Fan Fail Signal Fan 6
11	Fan_Tach_6_N	Fan Tach Signal Fan 6
12	FAN_PWM_56_BUF	Fan PWM signal Fan 5 and Fan 6

7. SAS Backplane Board

This chapter describes the features of the Kontron Carrier Grade Server CG2200 SAS backplane board. The chapter is organized into the following sections:

Section 7.1 Introduction

Section 7.2 SAS Backplane Board Features

Section 7.3 Hard Disk Drive Activity and Fault LEDs

Section 7.4 SAS Backplane Board Power Connectors

Section 7.5 SAS Backplane Card Edge Finger Connector

7.1 Introduction

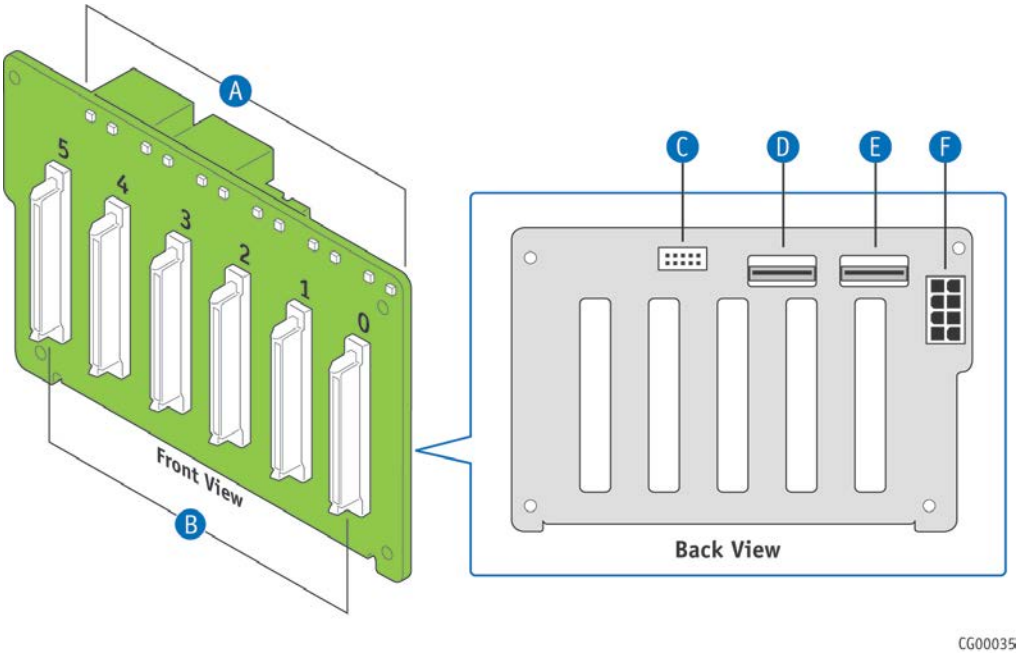
The CG2200 server contains a single SAS backplane board that provides support for up to six 2.5" SAS hard disk drives (HDDs). The backplane can optionally connect with a SAS hardware RAID module using two 36-pin mini-SAS connectors. Each mini-SAS connector/cable supports up to four SAS HDDs. By default, and when hardware RAID is not used, the two mini-SAS cables are connected to the server board and a key enabling SAS drive support is installed on the server board.

On the HDD backplane one mini-SAS connector supports HDD0 through HDD3 and the second mini-SAS connector supports HDD4 through HDD5. The mini-SAS connectors provide the sideband signals between the server board or the (optional) RAID controller and the backplane enclosure management controller on the SAS backplane board. The HSBP SMBus, the HDD activity, and HDD Fault connections are provided by a 2x5 10-pin connector. A 2x4 8-pin connector provides the power to the HDD backplane.

Fault and activity LEDs are provided for each of the six HDD positions. Composite fault and activity LED signals for all six drives are sent to the front panel board to drive the front panel drive activity/fault LED.

Figure 40 shows the SAS backplane.

Figure 40: SAS Backplane Board Layout



Item	Description
A	Hard disk drive LEDs
B	Six hard disk drive connectors
C	Hot Swap Backplane I^2C connector
D	Mini-SAS 2 connector
E	Mini-SAS 1 connector
F	Power connector

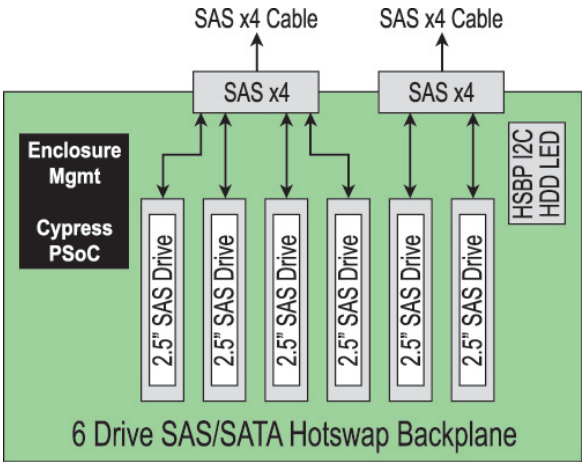
7.2 SAS Backplane Board Features

The backplane board contains the following features:

- Connectors for six hot-swappable disk drives
- Enclosure management using a Cypress CY8C22545 PSoC embedded controller
- Serial EEPROM location for a FRU device (unused)
- Control circuitry for driving the disk drive activity and fault LED on the HDD carrier.
- Control circuitry for driving a composite disk drive fault and activity LED on the FP board

Figure 41 is an overall block diagram of the SAS backplane board, using a SAS hardware RAID module.

Figure 41: SAS Backplane Board Block Diagram



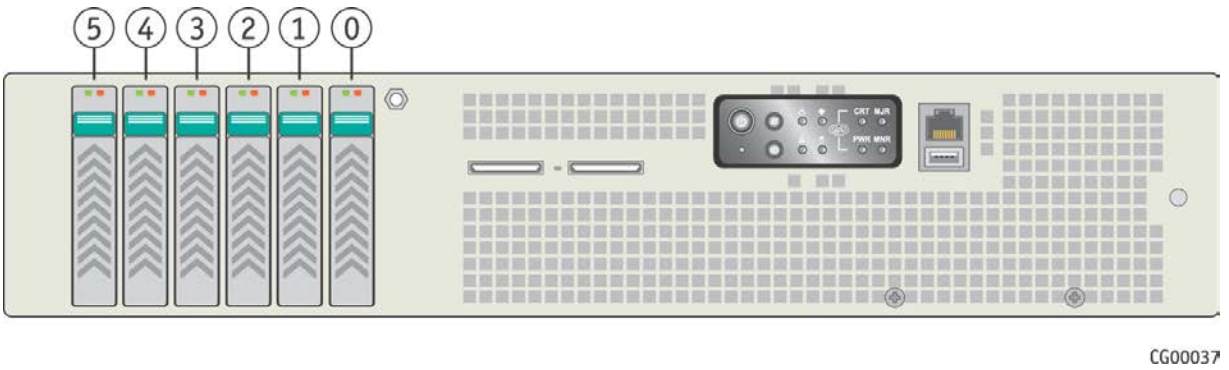
There are two main sections:

Power Distribution: The main supply rails are P12V and P5V, which come from the PDB through a 2x4 power connector, as specified in Figure 41. Power is connected directly to all six HDDs.

Enclosure Management: The HDD enclosure management controller coordinates the hard disk drive fault LED indicators.

Figure 42 shows the physical ordering of the hard disk drives.

Figure 42: Hard Disk Drive Bay Numbering



7.3 Hard Disk Drive Activity and Fault LEDs

The backplane board supports an activity/fault LED for each of the hard drive connections. The LED is green for activity or amber for a drive fault. The green activity setting is driven by the SAS HDD directly. The amber fault LED is driven by the enclosure management controller whenever a fault condition is detected.

NOTE: When drives are used in a RAID configuration, the RAID controller manages the fault LED and the LED may exhibit different behavior then when the enclosure management controller drives it.

Table 27: Hard Drive LED Function Definitions

Status LED	Definition
Green	HDD activity
Amber	HDD fault

7.4 SAS Backplane Board Power Connector

There is one power connector on the backplane board that connects to the power distribution board.

The pin definitions and power rating of the P5V, P12V, P3V3 and GND rails coming from the Power Distribution Board (PDB) through a 2x4 8-pin power connector are shown in Table 28.

Table 28: Backplane Power Connector Pin-Out

Pin #	Definition	Pin #	Definition
1	P5V	5	P5V
2	P12	6	TP_J11_6
3	P3V3	7	GND
4	GND	8	GND

7.5 SAS Backplane Mini-SAS Connector

The main connectors on the backplane connect with either the SAS control module on the baseboard or a plug-in SAS RAID adapter using industry standard mini-SAS connectors. Table 29 and Table 30 show the pin definitions for the mini-SAS connectors.

Table 29: SAS Backplane Board Mini-SAS Connector 1 Pin-Out

Pin #	Definition	Pin #	Definition
A1	GND	B1	GND
A2	SAS_TX0_DP	B2	SAS_RX0_DP
A3	SAS_TX0_DN	B3	SAS_RX0_DN
A4	GND	B4	GND
A5	SAS_TX1_DP	B5	SAS_RX1_DP
A6	SAS_TX1_DN	B6	SAS_RX1_DN
A7	GND	B7	GDN
A8	SGPIO_CLK0	B8	TP_SB7

Pin #	Definition	Pin #	Definition
A9	SGPIO_LOAD0	B9	GND
A10	GND	B10	SGPIO_DOUT0
A11	TP_SB86	B11	SGPIO_DIN0
A12	GND	B12	GND
A13	SAS_TX2_DP	B13	SAS_RX2_DP
A14	SAS_TX2_DN	B14	SAS_RX2_DN
A15	GND	B15	GND
A16	SAS_TX3_DP	B16	SAS_RX3_DP
A17	SAS_TX#_DN	B17	SAS_RX3_DN
A18	GND	B18	GND

Table 30: SAS Backplane Board Mini-SAS Connector 2 Pin-Out

Pin #	Definition	Pin #	Definition
A1	GND	B1	GND
A2	SAS_TX4_DP	B2	SAS_RX4_DP
A3	SAS_TX4_DN	B3	SAS_RX4_DN
A4	GND	B4	GND
A5	SAS_TX5_DP	B5	SAS_RX5_DP
A6	SAS_TX5_DN	B6	SAS_RX5_DN
A7	GND	B7	GDN
A8	SGPIO_CLK1	B8	TP_SB7
A9	SGPIO_LOAD1	B9	GND
A10	GND	B10	SGPIO_DOUT1
A11	TP_SB6	B11	SGPIO_DIN1
A12	GND	B12	GND
A13	TP_SAS1_A13	B13	TP_SAS1_B13
A14	TP_SAS1_A14	B14	TP_SAS1_B14
A15	GND	B15	GND
A16	TP_SAS1_A16	B16	TP_SAS1_B16

Pin #	Definition	Pin #	Definition
A1	GND	B1	GND
A17	TP_SAS1_A17_	B17	TP_SAS1_B17
A18	GND	B18	GND

8. Telco Alarms Module (TAM)

This chapter describes the design and external interface of the Kontron Carrier Grade Server CG2200 Telco Alarms Module assembly. The chapter is organized into the following sections:

Section 8.1 **Introduction**

Section 8.2 **Telco Alarms Module Features**

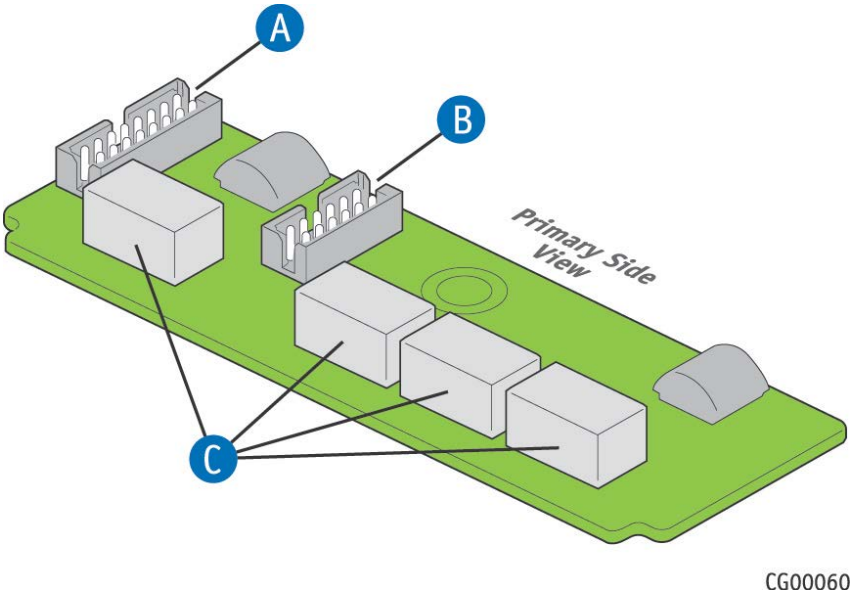
Section 8.3 **Telco Alarms Module Connector Specification**

8.1 Introduction

The CG2200 server Telco Alarms Module (TAM) board provides the connector interface and supporting logic for the telco alarms function. The TAM board also provides an alarms function with fault relays and access by cable to the fault relay contacts at the back of the system. A ribbon cable connects the TAM board to the front panel board.

Figure 43 shows the Telco Alarms Module components.

Figure 43: Telco Alarms Module Layout (Primary Side)



Item	Description
A	Alarms connector (to rear panel)
B	TAM signal connector (to front panel board)
C	Telco alarm relays

8.2 Telco Alarms Module Features

The Telco Alarms Module (TAM) provides the logic and relays for controlling the telco alarm LEDs displayed on the front panel board. Figure 44 is the TAM block diagram

Figure 44: TAM Block Diagram

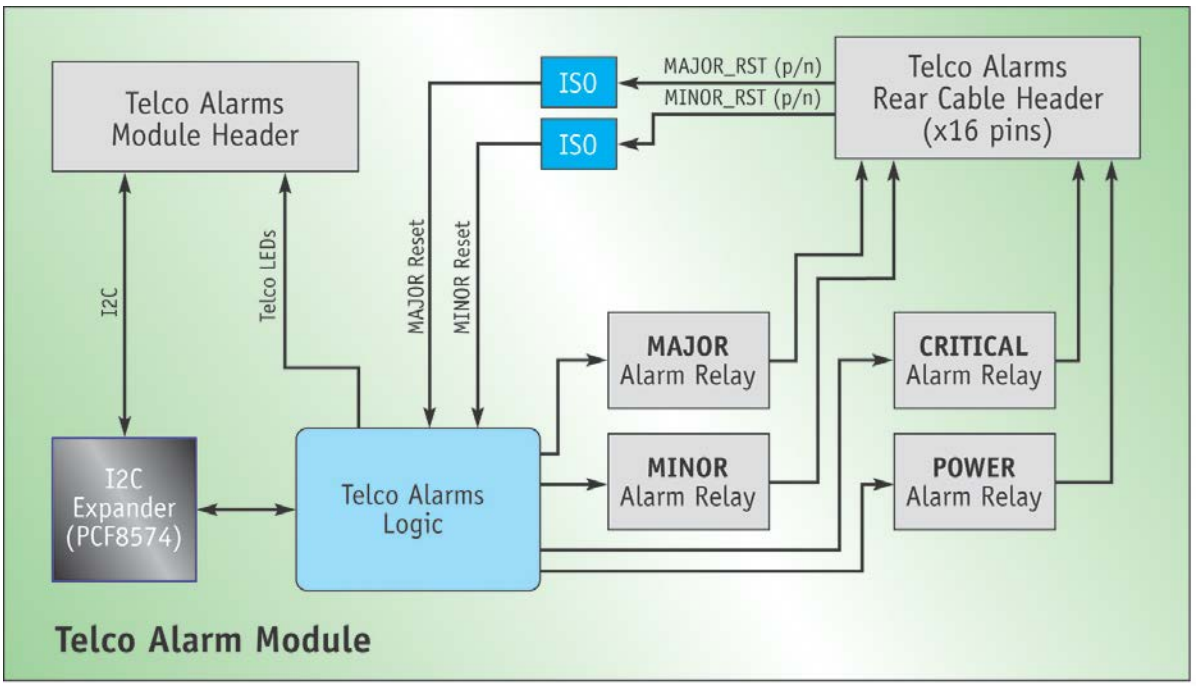


Table 31Telco Alarms Fault LEDs

Switch	Function
Critical	The critical alarm LED can be either amber (default) or red (set with a FRUSDR update). This LED is illuminated by the BMC private I^2C bus, and can only be turned off through BMC private I^2C control. When continuously lit, this alarm LED indicates the presence of a "critical system fault". A critical system fault is a system-detected error or event that has a fatal impact to the system, which means the system cannot continue to operate. An example is the loss of a large section of memory, or other corruption, that renders the system non-operational. The TAM board critical alarm relay is engaged.
Major	The major alarm LED can be either amber (default) or red (set with an FRUSDR update). This LED is illuminated by the BMC private I^2C bus, and can be turned off via BMC private I^2C control or alarm connector reset. When continuously lit, this alarm LED indicates the presence of a "major system fault". A major system fault is a system-detected error or event that has discernible impact to system operation, which means the system can continue to operate, but in a "degraded" fashion (reduced performance or loss of non-fatal feature reduction). An example is the loss of one of two mirrored disks. The TAM board major alarm relay is engaged.
Minor	The minor alarm LED is amber. The LED is illuminated by the BMC private I^2C bus, and can be turned off via BMC private I^2C control or alarm connector reset. When continuously lit, this alarm LED indicates the presence of a "minor system fault". A minor system fault is a system-detected error or event that has little impact to system operation. An example is a correctable ECC error. The front panel minor alarm relay is engaged.
Power	The power alarm LED is amber. The LED is illuminated by the BMC private I^2C bus or the SYS_FLT_LED_L signal, and can only be turned off via BMC private I^2C control. When continuously lit, this alarm LED indicates the presence of a "power system fault". The TAM board power alarm relay is engaged.

Telco Alarms Relays

The TAM board contains four relays for power, and critical, major, and minor alarms. The relays are controlled by the SMBus.

8.3 Telco Alarms Module Connector Specifications

Telco Alarms External Interface Connector

The telco alarms external interface connector connects the TAM board and the alarms port on the back of the system. The alarms port interface is a standard DB15 connector. Each alarm (major, minor, critical, and power) is the output of a Single Pole, Double Throw (SPDT) relay contact. A common contact with normally-open and normally-closed connections is included. The power alarm has common and normally-open contacts only. Reset circuit contacts are provided for the major and minor alarms.

Table 32 shows the pin definitions for the 2x8 16-pin alarms external interface connector on the TAM board.

Table 32 Telco Alarms External Interface Connector Pin-Out

Pin	Signal Name	Description
1	MINOR_RST_POS	Minor reset positive
2	MINOR_RST_NEG	Minor reset negative
3	MAJOR_RST_POS	Major reset positive
4	MAJOR_RST_NEG	Major reset negative
5	CRITICAL_NO	Critical alarm normally open
6	CRITICAL_NC	Critical alarm normally closed
7	CRITICAL_COMM	Critical alarm common
8	MINOR_NO	Minor alarm normally open
9	MINOR_NC	Minor alarm normally closed
10	MINOR_COMM	Minor alarm common
11	MAJOR_NO	Major alarm normally open
12	MINOR_NC	Major alarm normally closed
13	MAJOR_COMM	Major alarm common
14	PWR_NO	Power alarm normally open
15	PWR_COMM	Power alarm common
16	GND	Ground

Telco Alarms System Interface Connector

The telco alarms system interface connector is a signal ribbon cable used to connect the telco alarms module (TAM) to the front panel board . Table 33 shows the pin definitions for the 2x6 system interface connector on the TAM board.

Table 33 Telco Alarms System Interface Connector Pin-Out

Pin	Signal Name	Description
1	TELCO_PWR_LED_N	Telco Power Alarm LED indicator signal
2	TELCO_MIN_LED_N	Telco Minor Alarm LED indicator signal
3	TELCO_MAJ_LED_R_N	Telco Major Alarm Red LED indicator signal
4	TELCO_MAJ_LED_Y_N	Telco Major Alarm Yellow LED indicator signal
5	TELCO_CRIT_LED_R_N	Telco Critical Alarm Red LED indicator signal

Pin	Signal Name	Description
6	TELCO_CRIT_LED_Y_N	Telco Critical Alarm Yellow LED indicator signal
7	TELCO_ALRM_PRST_N	Telco Alarm Module present indicator
8	P5V_STBY	+5V standby power
9	SMB_SEN_3V3SB_CLK	SMBus Clock
10	SMB_SEN_3V3SB_DAT	SMBus Data
11	P3V3_STBY	+3.3V standby power
12	GND	Ground

9. PCI Riser Card Assembly

This chapter describes the design and external interface of the Kontron Carrier Grade Server CG2200 PCI riser card assembly. This chapter has the following sections:

Section 9.1 Introduction

Section 9.2 Riser Card Options

Section 9.3 Riser Card Mechanical Drawings

9.1 Introduction

The CG2200 server supports different riser card options depending on which add-in card configuration option is selected. Riser card(s) are installed in the PCI cage assembly using two keyhole features and two 6/32 screws for each riser.

9.2 Riser Card Options

The Intel® Server Board S26000CO has two riser slots capable of supporting riser cards on the right side and left side of the chassis. Baseboard PCIe slot 2 and PCIe slot 5 support the riser boards in the CG2200 system. Baseboard PCIe slot 2 supports a single slot PCIe X16 riser and a dual slot PCIe X8 riser. These risers are referred to as the “left side’ risers since the boards plug in on the left side of the chassis as viewed from the front of the server. Baseboard PCIe slot 5 supports a single slot PCIe X16 riser, a dual slot PCIe X8 riser, and a dual PCI-X active riser. These risers are referred to as the “right side” risers since the boards plug in on the right side of the chassis.

Table 34 identifies the card configurations and the connector types used.

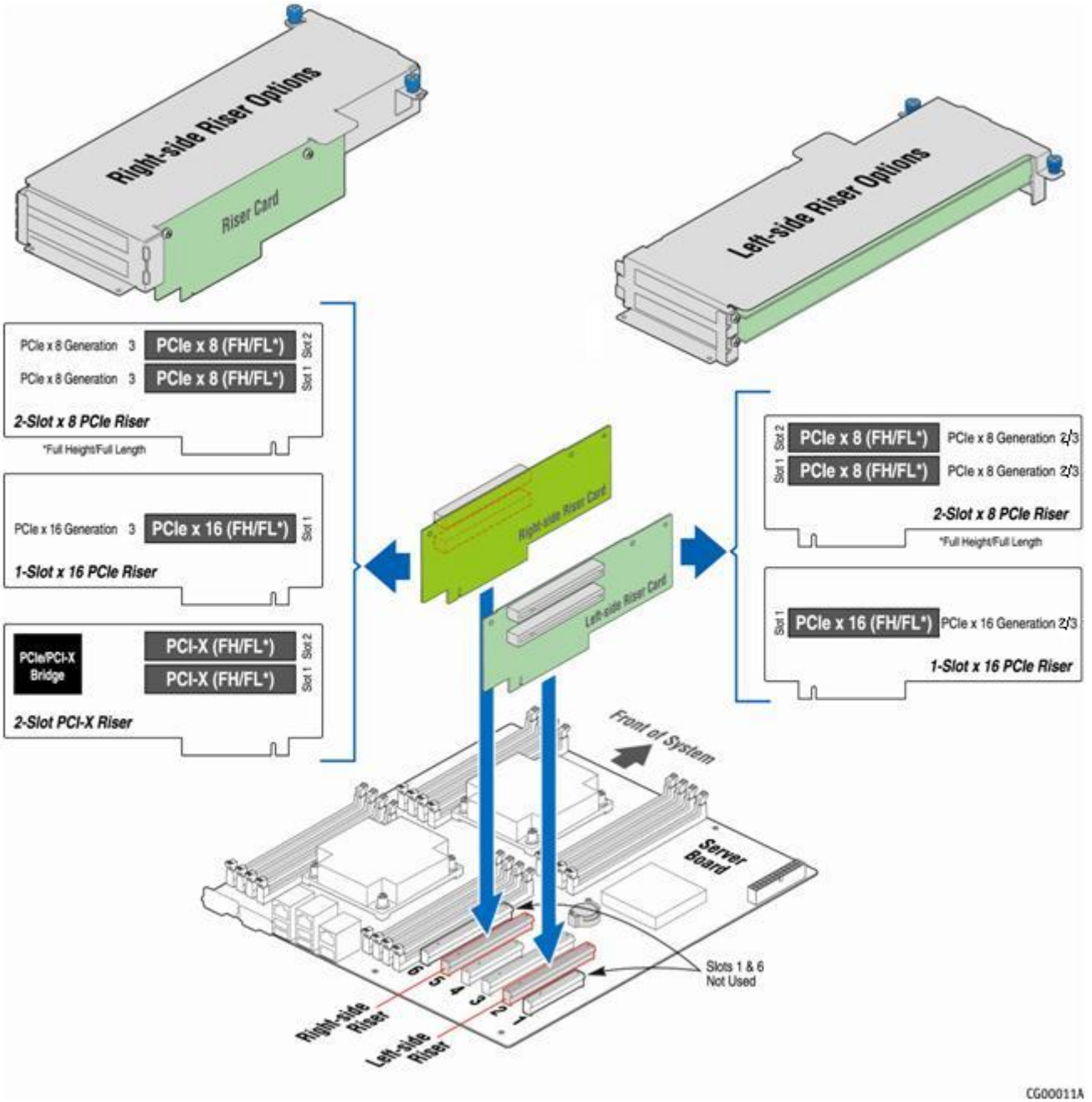
Table 34 Riser Card Configurations

Riser Card Option	Slot Configuration
PCI Express passive riser single slot x16 Right side riser (baseboard slot 5)	Single full-height PCI Express connector
PCI Express passive riser dual slot x8 Right side riser (baseboard slot 5)	Two full height PCI Express x8 connectors
PCI Express/PCI-X active riser Right side riser (baseboard slot 5)	Two full-height PCI-X 133 connectors
PCI Express passive riser single slot x16 Left side riser (baseboard slot 2)	Single full-height PCI Express connector
PCI Express passive riser dual slot x8 Left side riser (baseboard slot 2)	Two Full height PCI Express x8 connectors

NOTE: The riser plugged into slot 5 can run at PCIe Gen3 speeds.

Figure 45 shows the five different configuration options.

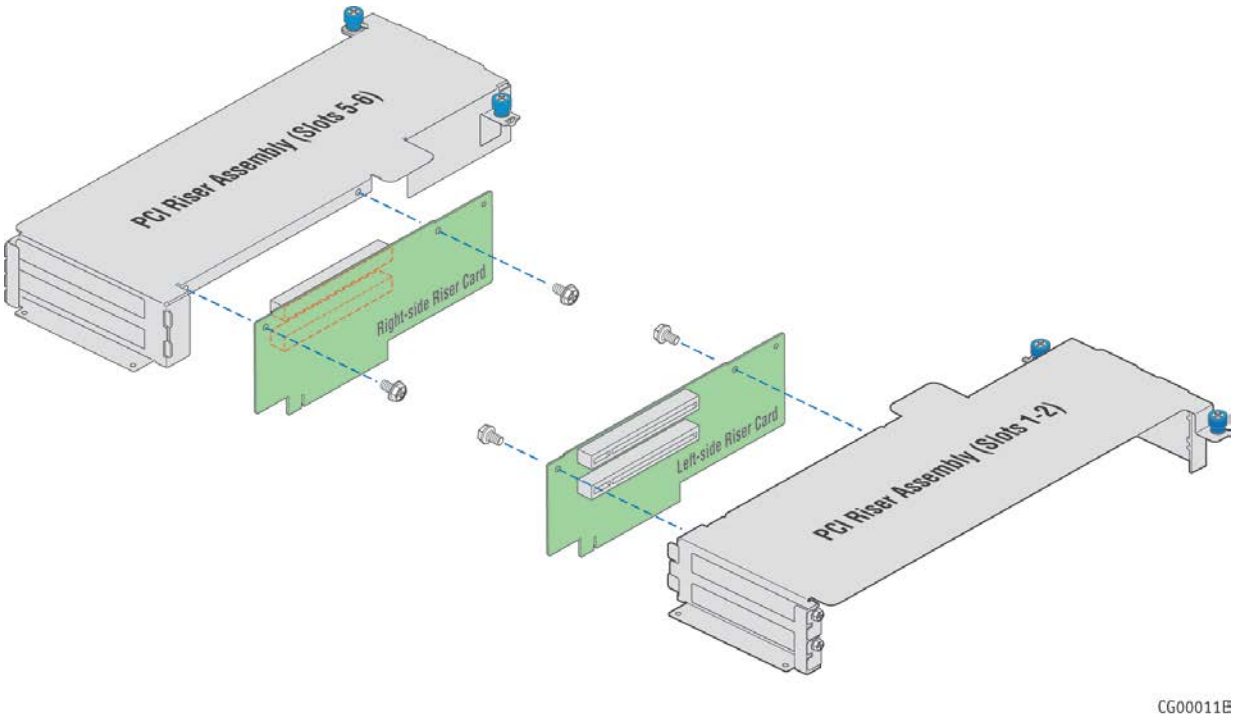
Figure 45: PCI Add-In Card Options



9.3 Riser Card Installation

Figure 46 shows how the riser cards are installed in the assembly enclosures.

Figure 46: Adding Riser Cards into the Assemblies



10. DC Power Subsystem

This chapter defines the features and functionality of the DC-input switching power supply subsystem. The information in this chapter is organized as follows:

Section 10.1 Introduction

Section 10.2 DC Power Supply Input Connector and Earth Ground Connection

Section 10.3: DC Power Supply Input Voltage and Current Requirements

Section 10.4 DC Power Supply Output Connector and Pin Definitions

Section 10.5: DC Power Supply Output Current Requirements

Section 10.6: DC Power Supply LED Indicator

Section 10.7 DC Power Supply Air Flow

Section 10.8 DC Power Supply Thermal Protection

10.1 Introduction

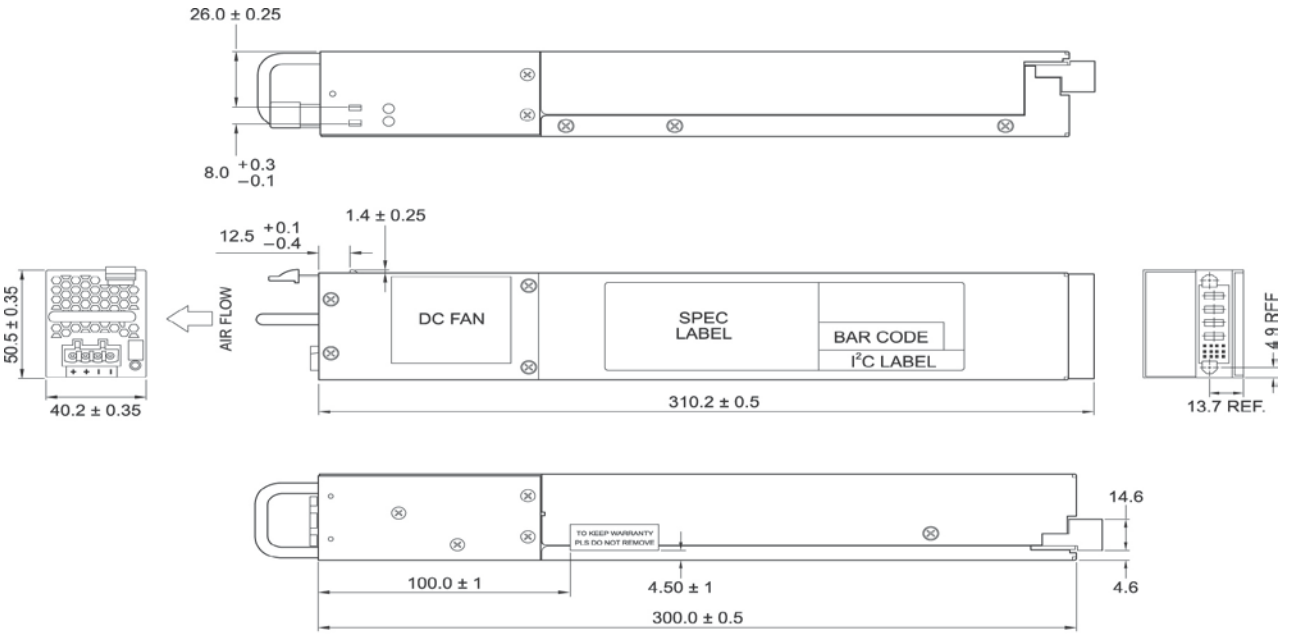
The DC power subsystem consists of up to two DC power supply modules, capable of operating in redundant mode, and a power distribution board (PDB). Although this power supply output can deliver up to 650W, the estimated maximum system power draw stated on the system rating label (located on the top cover) is calculated using a theoretical maximum configuration. A typical maximum configuration will consume much less power.

Features of the DC input power supply subsystem are:

- 650W power module output capability throughout the full DC input voltage range
- Power Good indication LEDs
- Predictive fan failure warning
- Internal cooling fans with multi-speed capability
- Remote sensing of 3.3V, 5V, and 12 Vdc (on the PDB) outputs
- DC_OK circuitry for brown-out protection and recovery
- Built-in load sharing capability
- Built-in overload protection capability
- Onboard field replaceable unit (FRU) information
- PMBus 1.2 interface for server management functions
- Integral handle for hot-swappable insertion/extraction

Figure 47 shows the DC power supply module.

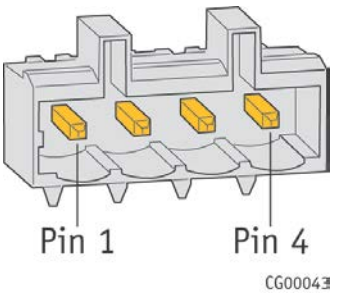
Figure 47: DC Power Supply Module Mechanical Drawing



10.2 DC Power Supply Input Connector and Earth Ground Connection

The input connector on the DC power supply is a 4-pin Molex 55757-0420. This connector is rated at 16A/pin. An earth ground pin is not required because the system provides two earth ground studs on the rear panel of the chassis. Figure 48, the input connector mechanical drawing and table, show the DC input power connector and pin-out.

Figure 48: DC Power Supply Input Connector

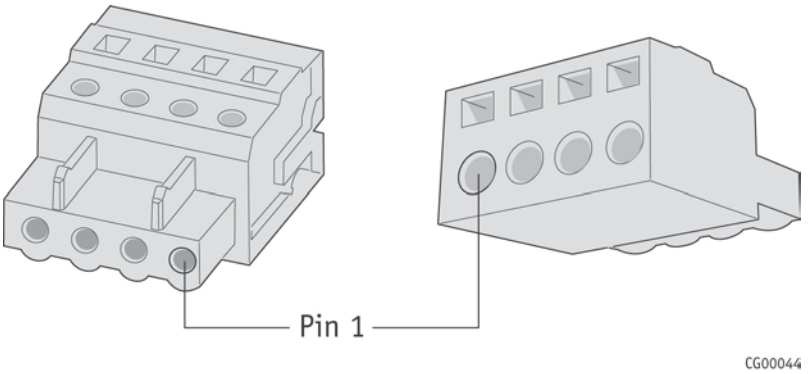


Pin#	Description
1 +	RTN
2 +	RTN
3 -	–48V
4 -	–48V

DC Power Supply 48V Input Power Mating Connector

The mating connector for the DC power supply module input connector, a Molex 54927-0420 4-pin connector shown in Figure 49 provides a -48V input power connection to the system. The input wiring connections are shown in the table in Figure 48.

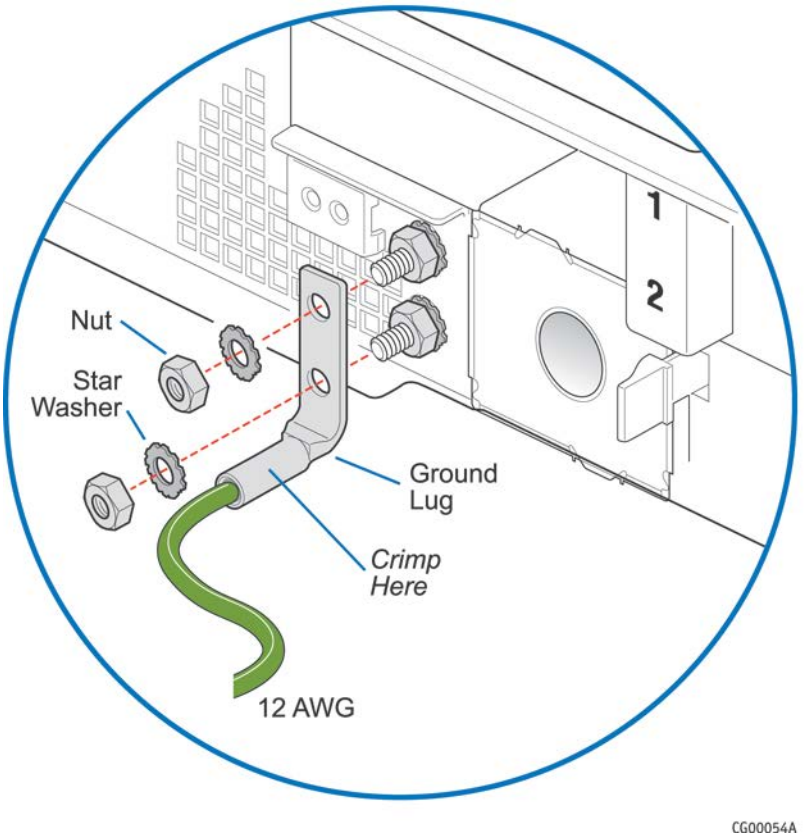
Figure 49: DC Power Supply Mating Connector



DC Power Supply Earth Grounding Studs on Chassis

Figure 50 shows how the safety earth grounding wire is attached to the chassis for use with DC power supplies.

Figure 50: DC Power Supply Grounding



10.3 DC Power Supply Input Voltage and Current Requirements

The DC power supply input voltage and input current requirements are listed in Table 35.

NOTE: The maximum current listed in Table 35 below is the maximum current the system will draw from the power supply at -48V input voltage.

Table 35: DC Power Supply Input Requirements

DC Input Voltage	
Nominal	-48Vdc
Minimum[1]	-40V_{rms}
Rated	-48Vdc to -72Vdc
Maximum	-75Vdc
DC Input Current	
Maximum	13A @ -48Vdc

[1]*The minimum steady-state DC input voltage at which the equipment remains fully operational is –40VDC.

10.4 DC Power Supply Output Connector and Pin Definitions

The DC power supply provides a hot-pluggable output connector that mates to a compatible connector on the PDB. This is a blind-mating connector that connects the power supply output voltages and signals.

The power supply provides a reliable protective earth ground on the power supply chassis with all secondary ground return circuits connected. Resistance of the ground returns to thechassis does not exceed 1.0 mΩ. This path can be used to carry DC current.

Figure 51: DC Power Supply Output Connector

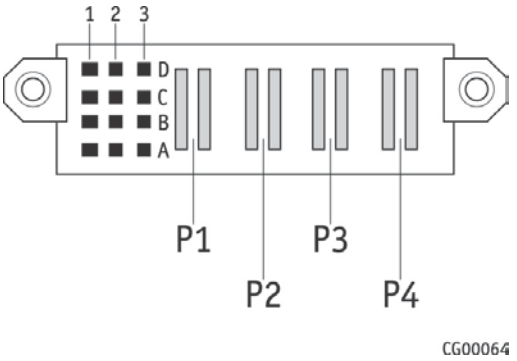


Table 36: Output Connector Pin-Out

Signal Pins			
Position	**1**	**2**	**3**
D	A0	PWOK	+5VSB
C	+12VLS	+15VCC	+12VRS
B	PS ON	SCL	B/P FAIL
A	PS-KILL	SDA	+5VSB
Power Blades			
P1	P2	P3	P4
RTN	RTN	+12V	+12V

Table 37 Output Signal Definitions

Signal	Description	Signal	Description
+12VLS	+12V load share bus	PS-KILL	Supply fast shutdown/I2Caddress bit1
+5VSB	5V standby output	+15VCC	For B/P use (10mA)
PS ON	Power enable input	SCL	I2C clock signal
B/P* FAIL	B/P fail input & fan speed control	A0	I2C address bit 0
PWOK	Power output OK	SDA	I2C data signal
+12VRS	12V sense		

NOTE: *B/P = Back Plane which is the signal name for the PDB (Power Disribution Board)

10.5 DC Power Supply Output Current Requirements

The DC power supply module provides two outputs; +12V and 5V standby. The combined maximum output power is 650W. Each output has a maximum and minimum current rating, as shown in Table 38.

Table 38: DC Power Supply 650W Load Ratings

	+12V	+5Vsb	+15V
Max Load	52.9A	3.0A	10ma
Min Static Load	2A	0A	NA
Max Output Power (continuous), see note	12V x 52.9A = 635W max	5V x 3A = 15W max	15V x 10mA = 150mW
	Total = 650W		

NOTE: At max and peak loads the 12V output voltage is allowed to sag to –4 %(11.52V

10.6 DC Power Supply LED Indicator

The power supply module provides a single external bi-color LED to indicate the status of the power supply.

- When DC power is applied to the power supply module and standby voltages are available, the LED is blinking green.
- The LED is green when all the power outputs are available.
- The LED is red when the power supply module has failed and is shut down because of over-current or over-temperature.

See Table 39 for definitions of the LED conditions.

Table 39: LED Indicators

Power Supply Condition	Bi-Color LED
No DC power to all power supplies	Off
DC present / Only 5Vsb ON (PS Off)	1Hz blinking green
Output ON and OK	Green
No DC power to this PSU only (for 1+1 configuration)	1Hz blinking red
Power supply warning events where the power supply continues to operate: high temp, high power/high current, slow fan.	Alternating 1Hz blinking red 1Hz blinking green
Power supply critical event causing a shutdown: failure, fuse blown (1+1 only), OCP(12V), OVP(12V), fan failed	Red

10.7 DC Power Supply Air Flow

Each power supply has one 40mm fan for self-cooling. The fans provide no less than 10 CFM airflow through the power supply when installed in the system and operating at maximum fan speed. The cooling air enters the power module from the PDB side (pre-heated air from the system). Variable fan speed is based on output load and ambient temperature. Under standby mode, the fans must run at minimum RPM.

10.8 DC Power Supply Thermal Protection

The power supply subsystem is protected against over-temperature conditions caused by loss of fan cooling or excessive ambient temperature. In an over-temperature condition the +12V output of the power supply module shuts down. When the power supply temperature drops to within the specified limits, the power supply restores power automatically while the 5VSB standby power remains on. The OTP circuit has built-in hysteresis so the power supply does not oscillate on and off because of a temperature recovering condition. The OTP trip level has a minimum of 4°C of ambient temperature hysteresis.

11. Power Distribution Board (PDB)

This chapter defines the features and functionality of the power distribution board (PDB), which is used in conjunction with DC or AC input power supply modules to complete the power subsystem. The information in this chapter is presented in the following sections:

Section 11.1 **Introduction**

Section 11.2 **PDB Input Connectors**

Section 0 **PDB Output Load and Voltage Regulation Requirements**

Section 0 **PDB Protection Circuits**

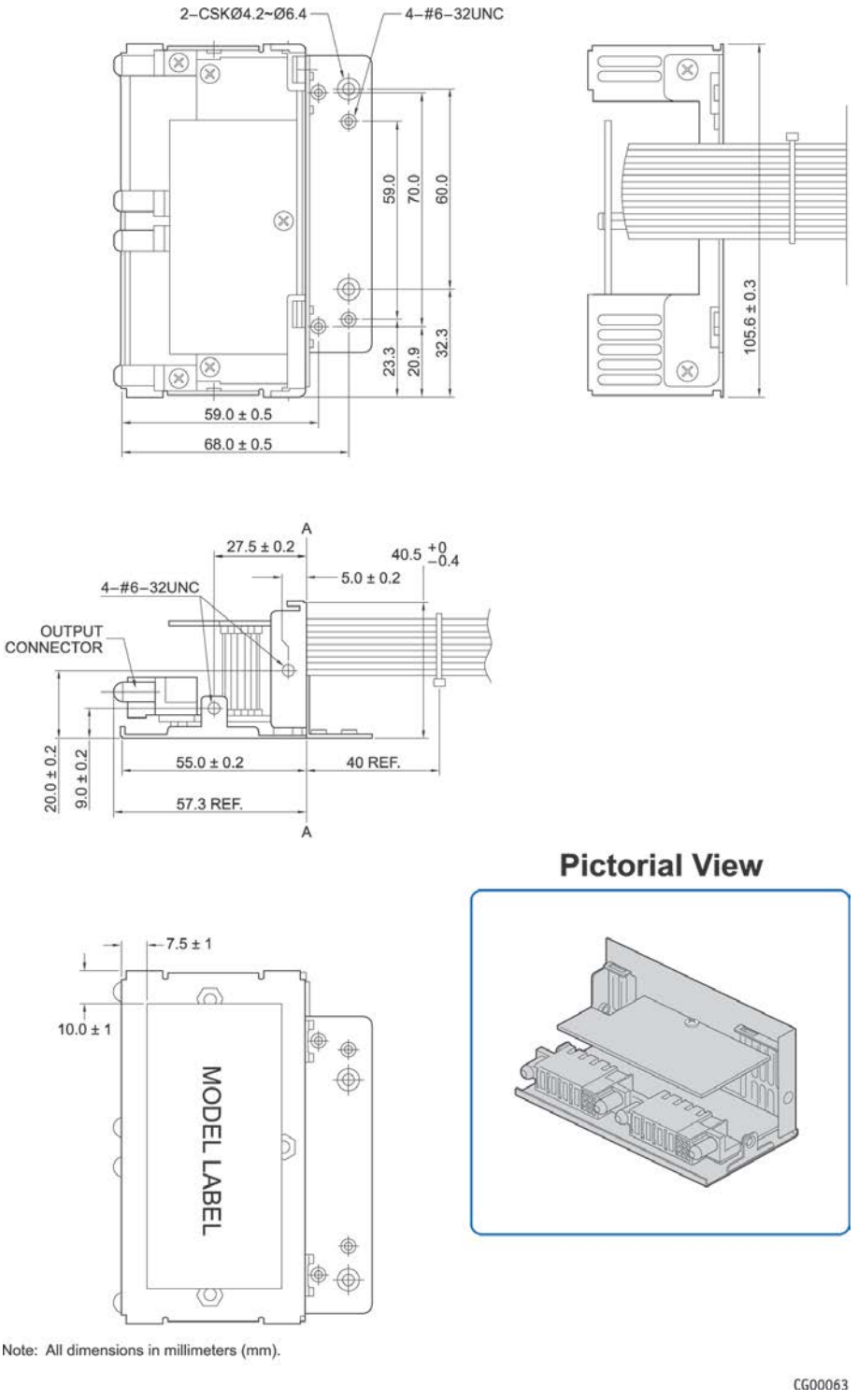
Section 11.5 **PDB PMBus Requirements**

Section 11.6 **PDB Output Harness**

11.1 Introduction

The PDB provides power to the system via an output harness which connects to various places on the baseboard, fan control board, and the HDD backplane board. AC or DC power supply modules blind mate into the PDB. +12V is generated by the PSUs and passed through the PDB which then provides one 240VA limited +12V power rail a second full power +12V rail. The PDB DC-to-DC converters generate +3.3VDC, +5VDC and -12V outputs from the AC or DC PSU +12V output. Protection circuitry for the PDB-generated outputs is provided. The AC or DC PSUs provide +12V protection circuitry. The PDB includes a FRU EEPROM. Figure 52 shows the mechanical details of the power distribution board.

Figure 52: Power Distribution Board Mechanical Drawing



11.2 PDB Input Connectors

The power distribution board (PDB) has two female input connectors that mate to male output connectors located on the power supply modules. The connector mechanical drawing, pinout tables, and input signal descriptions are shown in Figure 53 and Table 40.

Figure 53: PDB Input Connector

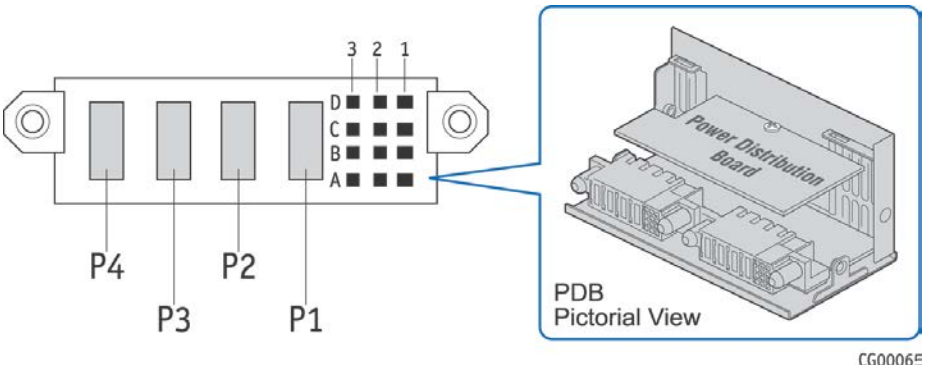


Table 40. PDB Input Connector Pin-Out

Signal Pins			
Position	**1**	**2**	**3**
D	A0	PWOK	+5VSB
C	+12VLS	+15VCC	+12VRS
B	PS ON	SCL	B/P FAIL
A	PS-KILL	SDA	+5VSB
Power Blades			
P1	P2	P3	P4
RTN	RTN	+12V	+12V

Table 41. Input Signal Definitions

Signal	Description	Signal	Description
12VLS	+12V load share bus	PS-KILL	Supply fast shutdown/I2C address bit1
5VSB	5V standby output	+15VCC	For B/P use (10mA)
PSON	Power enable input	SCL	I2C clock signal
B/P* FAIL	B/P fail input and fan speed control	A0	I2C address bit 0
PWOK	Power output OK	SDA	I2C data signal
+12VRS	12V sense		

NOTE: *B/P = Back Plane which is the signal name for the PDB (Power Disribution Board)

11.3 PDB Output Load and Voltage Regulation Requirements

Table 42 defines the total loading, power, and voltage regulation requirements for the PDB and 1+1 redundant PSUs.

The output voltages must stay within the voltage limits, including peak-peak ripple and noise, as specified in the table below when operating at steady state and dynamic loading conditions. All outputs are measured with reference to the return remote sense signal (ReturnS). The 3.3V and 5V outputs are measured at the remote sense point and all other voltages are measured at the output interface connector.

Table 42: PDB and PSU Output Requirements

Output Voltage Rails	+12V1	+12V2	+5V	+3.3V	-12V	5VSB
MAX Load / Rail	41.3A	3A	10.5A	13.5A	0.5A	3A
MIN Static Load	0.5A	05A	1.0A	0A	0A	0A
Max Output Power / Rail	495.6W	36W	52.5W	44.55W	6W	15W
Total Watts	649.65W					
Voltage Regulation +/-%	+/-3%	+/-3%	+/-5%	+/-5%	+/-5%	+/-5%
Voltage Regulation +/- V	12.36V 11.64V	12.36V 11.64V	5.25V 4.75V	3.47 3.14	12.6V 11.4V	5.25V 4.75V
Max Ripple / Noise	120mVp-p	120mVp-p	50mVp-p	50mVp-p	120mVp-p	50mVp-p

NOTE: The 3.3V + 5V combined power limit is 140W maximum

11.4 PDB Protection Circuits

Protection circuits inside the power distribution board and power supply can cause either 1) the power supply main +12V output to shut down, which in turn shuts down the PDB outputs, or 2) first shuts down any of the three outputs on the PDB, which in turn also shuts down the entire power supply subsystem. If the power supply latches off because of a protection circuit tripping, an AC or DC cycle OFF for 15 seconds minimum and a PSON$^{\#}$ cycle HIGH for one second resets the power supply and the PDB.

11.5 PDB PMBus Requirements

The PDB meets the requirements of PMBus specifications parts I and II, revision 1.2. The AC and DC PSUs meet PMBus revision 1.1.

The following related documents give more detailed information about PMBus requirements:

- PMBus™ Power System Management Protocol Specification Part I – General Requirements, Transport And Electrical Interface; Revision 1.2
- PMBus™ Power System Management Protocol Specification Part II – Command Language; Revision 1.2

- System Management Bus (SMBus) Specification Version 2.0

11.6 PDB Output Harness

The PDB output harness is defined in Section 3.2, “Cable and System Interconnections”.

12. AC Power Subsystem

This chapter covers the AC power supply system in the following sections:

Section 12.1 Introduction

Section 12.2 AC Power Supply Input Connector, Voltage and Current Requirements

Section 12.3 AC Power Supply Output Connector, Voltage and Current Requirements

Section 12.4 AC Power Supply LED Indicator

Section 12.5 AC Power Supply Air Flow

Section 12.6 AC Power Supply Thermal Protection

The power supply provides a hot-pluggable connector that mates to a compatible connector on the PDB. This is a blind mating connector that connects the power supply output voltages and signals.

The power supply provides a reliable protective earth ground with the power supply's chassis with all secondary ground return circuits connected. Resistance of the ground returns to chassis does not exceed 1.0 mΩ. This path can be used to carry DC current.

12.1 Introduction

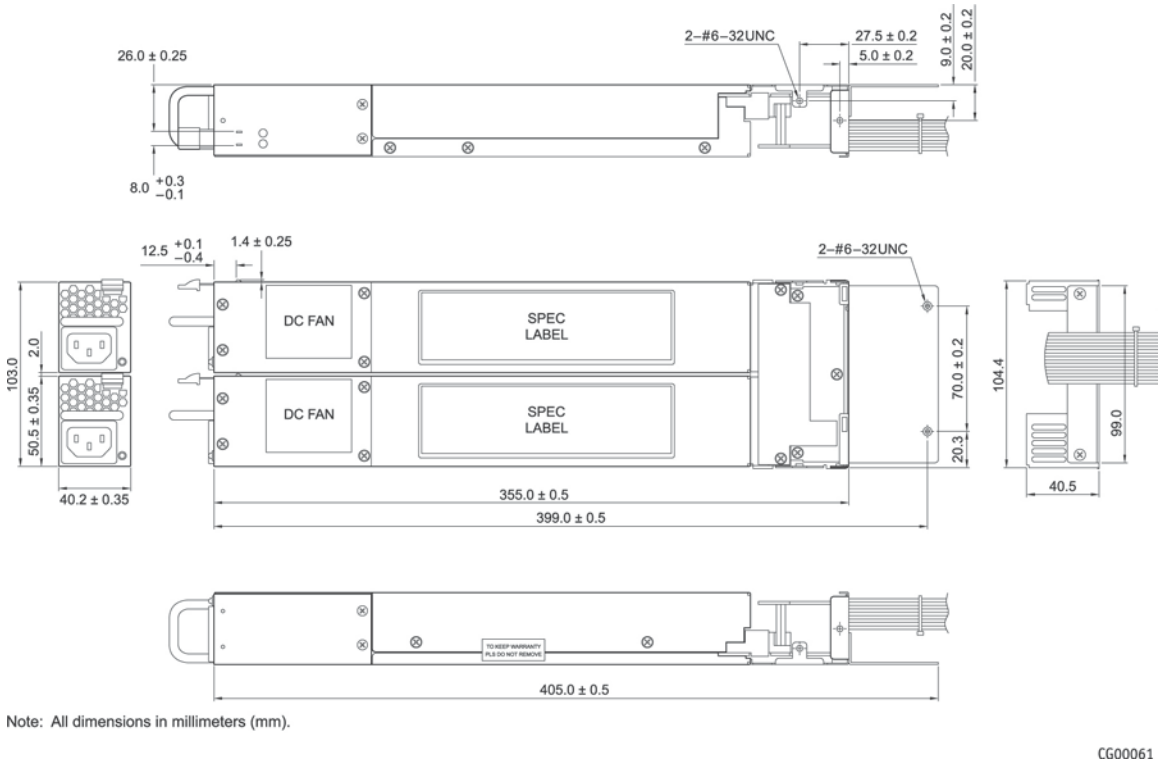
The AC power subsystem has up to two redundant AC power supply modules and a power distribution board (PDB). Although this power supply output can deliver up to 650W, the estimated maximum system power draw stated on the system rating label (located on the top cover) is calculated using a theoretical maximum configuration. A typical maximum configuration will consume much less power.

The AC input power supply subsystem has the following features:

- 650W module output capability in full AC input voltage range
- 650W subsystem output capability in full AC input voltage range
- Power Good indication LEDs
- Predictive failure warning
- Internal cooling fans with multi-speed capability
- Remote sense of 3.3V, 5V, and 12 Vdc outputs
- AC_OK circuitry for brown out protection and recovery
- Brown out protection and recovery
- Built-in overloading protection capability
- Onboard field replaceable unit (FRU) information
- PMBus interface for server management functions
- Integral handle for insertion/extraction

The power supply module, which is shown in Figure 54, contains one 40mm fan. The module has a handle for inserting and extracting it without using tools.

Figure 54: AC Power Supply Module Mechanical Drawing



12.2 AC Power Supply Input Connector and Voltage/Current Requirements

The AC power supply input connector is an IEC320 C14 standard AC inlet connector. The AC power supply input voltage and current requirements are listed in Table 43.

Table 43. AC Input Rating

Line Voltage	
Nominal110Vrms	
Minimum	90V_{rms}
Rated	100-127 V_{rms}
Maximum	140V_{rms}
Nominal 220Vrms	
Minimum	180V_{rms}
Rated	200-240 V_{rms}
Maximum	264V_{rms}
Start-up Voltage	88Vrms +/-4Vrms
Power-Off Voltage	75Vrms +/-5Vrms
Line Current	
Maximum	6A @ 100Vrms / 3 A @200Vrms
Frequency	
Minimum	47 Hz
Rated	50/60 Hz
Maximum	63 Hz

12.3 AC Power Supply Output Connector, Voltage, and Current Requirements

The AC power supply provides a hot-pluggable output connector that mates with a compatible connector on the PDB. This is a blind-mating connector that connects the power supply output voltages and signals.

The power supply provides a reliable protective earth ground on the power supply chassis with all secondary ground return circuits connected. Resistance of the ground returns to chassis does not exceed 1.0 mΩ. This path can be used to carry DC current.

Figure 55: AC Power Supply Module Output Connector

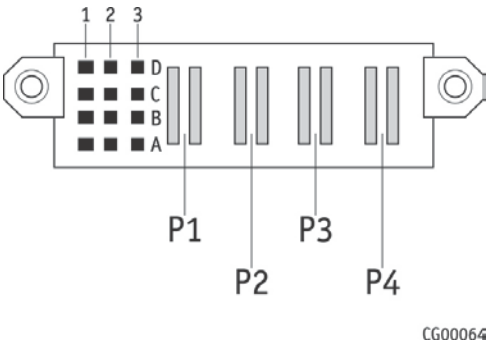


Table 44: AC Output Connector Pin-Out

Signal Pins			
Position	**1**	**2**	**3**
D	A0	PWOK	+5VSB
C	+12VLS	+15VCC	+12VRS
B	PS ON	SCL	B/P FAIL
A	PS-KILL	SDA	+5VSB
Power Blades			
P1	P2	P3	P4
RTN	RTN	+12V	+12V

Table 45: Output Signal Definitions

Signal	Description	Signal	Description
+12VLS	+12V load share bus	PS-KILL	Supply fast shutdown/I2Caddress bit1
+5VSB	5V standby output	+15VCC	For B/P use (10mA)
PS ON	Power enable input	SCL	I2C clock signal
B/P* FAIL	B/P fail input & fan speed control	A0	I2C address bit 0
PWOK	Power output OK	SDA	I2C data signal
+12VRS	12V sense		

NOTE: *B/P = Back Plane which is the signal name for the PDB (Power Disribution Board)

The power supply module provides three main outputs; +12V, -12V, and 5V standby, along with the 15VBIAS voltage. D2D converters located in the PDB provide the 3.3V and 5V rails from the 12V provided by the power supply module.

The combined maximum output power of all outputs is 650W (680W peak). Each output has a maximum and minimum current rating as shown in Table 46.

Table 46. AC Power Supply 650W Load Ratings

	+12V	+5Vsb	+15V
Maximum Load	52.9A	3.0A	0. 10mA
Minimum Static Load	0.5A	0.0A	N/A
Maximum Output Power (Continuous), See Note 1	12V x 52.9A = 635W max	5V x 3A = 15W max	15V x .10mA = 150mW
	Total = 650W		

NOTE: At max load the 12V output voltage is allowed to sag to –4%, which is 11.52V

12.4 AC Power Supply LED Indicator

The power supply module provides a single external bi-color LED to indicate the status of the power supply.

- When AC is applied to the power supply module and standby voltages are available, the LED is blinking green.
- The LED is green when all power outputs are available.
- The LED is red when the power supply has failed and is shut down because of over- current or over-temperature.

See Table 47 for definitions of the LED conditions.

Table 47: LED Indicator Status Conditions

Power Supply Condition	Bi-color LED
No AC power to all power supplies	Off
AC present / Only 5Vsb ON (PS Off)	1Hz blinking green
Output ON and OK	Green
No AC power to this PSU only (for 1+1 configuration)	1Hz blinking red
Power supply warning events where the power supply continues to operate: high temp, high power/high current, slow fan.	Alternating 1Hz blinking red 1Hz blinking green
Power supply critical event causing a shutdown: failure, fuse blown (1+1 only), OCP(12V), OVP(12V), fan failed	Red

12.5 AC Power Supply Air Flow

Each power supply has one 40mm fan for self-cooling. The fans provide no less than 10 CFM airflow through the power supply when installed in the system and operating at maximum fan speed. The cooling air enters the power module from the PDB side (pre-heated air from the system). Variable fan speed is based on output load and ambient temperature. Under standby mode, the fans must run minimum the RPM.

12.6 AC Power Supply Thermal Protection

The power supply subsystem is protected against over-temperature conditions caused by loss of fan cooling or excessive ambient temperature. In an over-temperature condition the +12V output of the power supply module shuts down. When the power supply temperature drops to within the specified limits, the power supply restores power automatically while the 5VSB standby power remains on. The OTP circuit has built-in hysteresis so the power supply does not oscillate on and off because of a temperature recovering condition. The OTP trip level has a minimum of 4°C of ambient temperature hysteresis.

13. POST Error Reporting

The system BIOS sends error messages a few different ways:

- Beep codes
- Diagnostic LED codes
- POST error codes
- SEL error codes

Before video initialization, beep codes are sent to indicate serious errors. Most such errors cause fatal halts to the system. Diagnostic LED codes may also be sent with these beep codes.

During the POST sequence, the system displays POST process codes in the diagnostic LEDs to show where in the POST process the system is. These codes are useful for debugging if a halt occurs in the POST process.

Later in the POST sequence, the system displays POST error codes on the video monitor and the error managert display. POST error codes are also automatically logged in the System Event Log.

For detailed information, including definitions of all codes and messages, please see the *Intel® S2600CO Server Board Technical Product Specification* on the Kontron website.

14. Regulatory Specifications

The Kontron CG2200 Carrier Grade Server meets the specifications and regulations for safety and EMC defined in this chapter.

14.1 Safety Compliance

USA/Canada	UL 60950-1 2nd Edition//CSA C22.2 No. 60950-1-07 2nd Edition
Europe	Low Voltage Directive, 2006/95/EC Safety Directive, 2001/95/EC
International	CB Certificate and Report to IEC60950-1, 2nd Edition and all international deviations

14.2 Electromagnetic Compatibility

USA	FCC 47 CFR Parts 15, Verified Class A Limit
Canada	ICES-003 Class A Limit
Europe	EMC Directive, 2004/108/EC EN55022, Class A Limit, Radiated & Conducted Emissions EN55024 Immunity Characteristics for ITE EN61000-4-2 ESD Immunity EN61000-4-3 Radiated Immunity EN61000-4-4 Electrical Fast Transient EN61000-4-5 Surge EN61000-4-6 Conducted RF EN61000-4-8 Power Frequency Magnetic Fields EN61000-4-11 Voltage Fluctuations and Short Interrupts EN61000-3-2 Harmonic Currents EN61000-3-3 Voltage Flicker
Australia/New Zealand	EN55022, Class A Limit
Japan	VCCI Class A ITE (CISPR 22, Class A Limit)
Taiwan	BSMI Approval, CNS 13438, Class A and CNS13436 Safety
Korea	KCC Approval, Class A
Russia	Gost Approval (EMC and safety)
International	CISPR 22, Class A Limit, CISPR 24 Immunity

14.3 CE Mark

The CE marking on this product indicates that it is in compliance with the European Union EMC Directive 2004/108/EC, Safety Directive 2001/95/EC, Low Voltage Directive 2006/95/EC, and RoHS (recast) Directive 2011/65/EU.

14.4 NEBS Compliance

The CG2200 Carrier Grade Server system is compliant with:

- Telcordia SR-3580 NEBS Level 3
- Telcordia GR-63 Physical Protection
- Telcordia GR-1089 Electromagnetic Compatibility and Safety
- ETSI EN 300 386 EMC Requirements for Telecom Equipment
- ETSI EN 300 019-2-1 Storage Class T1.2
- ETSI EN 300 019-2-2 Transportation Class T2.3
- ETSI EN 300 019-2-3 Operational Class T3.1E
- ETSI EN 300 753 Acoustic Noise
- ETSI EN 300 132-2 Power Supply Interface (DC input)
- ETSI EN 300 132-3 Power Supply Interface (AC input)

Appendix A: Glossary

This appendix contains acronyms and terms used in the preceding chapters.

Term	Definition
A, Amp	Ampere
A/µs	Amps per microsecond
AC	Alternating current
ACPI	Advanced Configuration and Power Interface
ANSI	American National Standards Institute
APIC	Advanced Programmable Interrupt Controller
ASIC	Application specific integrated circuit
AWG	American wire gauge
BIOS	Basic input/output system
BMC	Bus management controller
Bridge	Circuitry that connects one computer bus to another
Byte	8-bit quantity
C	Centigrade
CE	Community European (EU mark)
CFM	Cubic feet per minute
CISPR	International Special Committee on Radio Interference
CSA	Canadian Standards Organization
CTS	Clear to send
DAT	Digital audio tape
dB	Decibel
dBA	Acoustic decibel
B	Acoustic Bel
DC	Direct current
DC/DC	DC to DC (converter); also termed D2D
DIMM	Dual inline memory module
DMI	Desktop management interface
DOS	Disk operating system
DRAM	Dynamic random access memory
DSR	Data set ready
DTR	Data terminal ready
DWORD	Double word – 32-bit quantity
ECC	Error checking and correcting
EEPROM	Electrically erasable programmable read-only memory
EFP	Ethernet Front Panel
EMC	Electromagnetic compatibility
EMI	Electromagnetic interference
EMP	Emergency management port
EN	European Standard (Norme Européenne or Europäische Norm)
EPS	External product specification
ESCD	Extended system configuration data
ESD	Electrostatic discharge
ESR	Equivalent series resistance

Term	Definition
F	Fahrenheit
FCC	Federal Communications Commission
FFC	Flexible flat connector
Flash ROM	EEPROM
FPC	Front panel controller
FRB	Fault resilient booting
FRU	Field replaceable unit
G	Acceleration in gravity units, 1G = 980665 m/s2
Gb, Gbit	Gigabit
GB, Gbyte	Gigabyte – 1024 MB
GND	Ground
GPIO	General purpose input/output
Grms	Root mean square of acceleration in gravity units
GUI	Graphical user interface
HDD	Hard disk drive
HPIB	Hot-plug indicator board
HSC	Hot-swap controller
Hz	Hertz – 1 cycle/second
I/O	Input/output
I^2C*	Inter-integrated circuit bus
ICMB	Intelligent Chassis Management Bus
IDE	Integrated drive electronics
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
IFLASH	Utility to update flash EEPROM
IMB	Intelligent management bus
IPMB	Intelligent Platform Management Bus
IPMI	Intelligent Platform Management Initiative
IRQ	Interrupt request line
ITE	Information technology equipment
ITP	In-target probe
JAE	Japan Aviation Electronics
KB, Kbyte	Kilobyte – 1024 bytes
kV	Kilovolt – 1,000 volts
L2	Second-level cache
LAN	Local Area Network
LED	Light-Emitting Diode
LVDS	Low Voltage Differential SCSI
mA	Milliamp
MB, Mbyte	Megabyte – 1024 KB
MEC	Memory expansion card
mm	Millimeter
MPS	Multiprocessor specification
MTTR	Mean time to repair
m□	Milliohm
NEMKO	Norges Elektriske Materiellkontroll (Norwegian Board of Testing and Approval of Electrical Equipment)

Term	Definition
NIC	Network interface card, or Network Interface Controller, or Network Interface Controller port
NMI	Non-maskable interrupt
NWPA	NetWare* Peripheral Architecture
ODI	Open data-link interface
OEM	Original equipment manufacturer
OPROM	Option ROM (expansion BIOS for a peripheral)
OS	Operating system
OTP	Over-temperature protection
OVP	Over-voltage protection
PC-100	Collection of specifications for 100 MHz memory modules
PCB	Printed circuit board
PCI	Peripheral component interconnect
PHP	PCI hot-plug
PID	Programmable interrupt device
PIRQ	PCI interrupt request line
PMM	POST memory manager
PnP	Plug and play
POST	Power-On Self Test
PSU	Power Supply Unit
PVC	Polyvinyl chloride
PWM	Pulse Width Modulation
RAS	Reliability, Availability, and Serviceability
RIA	Ring indicator
RPM	Revolutions Per Minute
RTS	Request To Send
SAF-TE	SCSI Accessed Fault-Tolerant Enclosures
SCA	Single Connector Attachment
SCL	Serial clock
SCSI	Small Computer Systems Interface
SDR	Sensor Data Records
SDRAM	Synchronous Dynamic RAM
SEC	Single Edge Connector
SEL	System Event Log
SELV	Safety Extra Low Voltage
SEMKO	Sverge Elektriske Materiellkontroll (Swedish Board of Testing and Approval of Electrical Equipment)
FP	(SAS) Front Panel
SGRAM	Synchronous Graphics RAM
SM	Server Management
SMBIOS	System Management BIOS
SMBus	Subset of I^2C bus/protocol (developed by Intel), System Management Bus
SMI	System Management Interrupt
SMM	Server Management Mode
SMP	Symmetric multiprocessing
SMRAM	System Management RAM

Term	Definition
SMS	Server Management Software
SPD	Serial Presence Detect
SSI	Server System Infrastructure
TUV	Technischer Uberwachungs-Verein (A safety testing laboratory with headquarters in Germany)
UL	Underwriters Laboratories, Inc.
USB	Universal Serial Bus
UV	Under-Voltage
V	Volt
VA	Volt-amps (volts multiplied by amps)
Vac	Volts alternating current
VCCI	Voluntary Control Council for Interference
Vdc	Volts direct current
VDE	Verband Deutscher Electrotechniker (German Institute of Electrical Engineers)
VGA	Video Graphics Array
VRM	Voltage Regulator Module
VSB	Voltage standby
W	Watt
WfM	Wired for Management
Word	A 16-bit quantity
Ω	Ohm
µf	Microfarad
µs	Microsecond

Corporate Offices

Europe, Middle East & Africa
Oskar-von-Miller-Str. 1
85386 Eching/Munich
Germany
Tel.: +49 (0)8165/ 77 777
Fax: +49 (0)8165/ 77 219
info@kontron.com

North America
14118 Stowe Drive
Poway, CA 92064-7147
USA
Tel.: +1 888 294 4558
Fax: +1 858 677 0898
info@us.kontron.com

Asia Pacific
17 Building, Block #1, ABP.
188 Southern West 4th Ring Road
Beijing 100070, P.R.China
Tel.: + 86 10 63751188
Fax: + 86 10 83682438
info@kontron.cn