Intel® Server Chassis SR2400

Technical Product Specification

Intel order number C78845-001

Revision 2.0

February 2006

Enterprise Platforms and Services Marketing

Revision History

Date	Revision Number	Modifications
Jan. 2004	0.52	Updated to reflect the Alpha hardware. First external release
July 2004	0.9	Added iLCP, updated diagrams, updated backplane info, updated riser card info, increased over all detail.
September 2004	1.0	Final updates, and review. First non-NDA Release – Added content supporting SE7320VP2, updated cooling section, updated regulatory section,
February 2006	2.0	Added DC power configuration. Corrected the single power module population rule and the description of SATA drive ACTIVITY LED.

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1. Product Overview

The Intel® Server Chassis SR2400 is a 2U server chassis that is designed to support the Intel® Server Board SE7520JR2 and Intel Server Board SE7320VP2. The baseboards and the chassis have feature sets that are designed to support the high-density server market. This chapter provides a high-level overview of the chassis features. Greater detail for each major chassis component or feature is provided in the following chapters.

Note: Support for some chassis features described in this document is dependent on which server board is used and whether or not an Intel Management Module is installed in the system.

1.1 Chassis Views

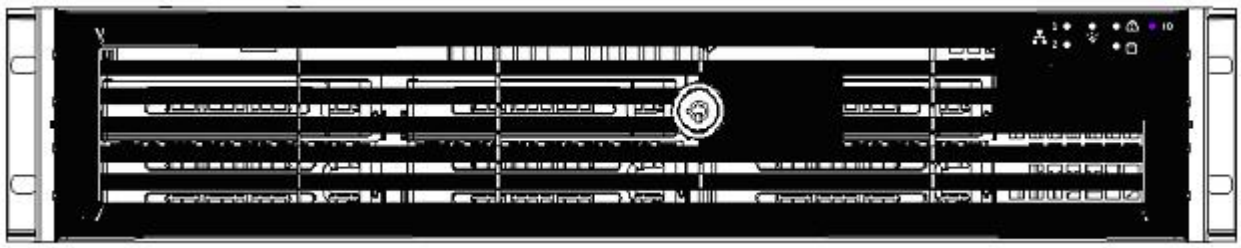


Figure 1. Front View with optional Bezel

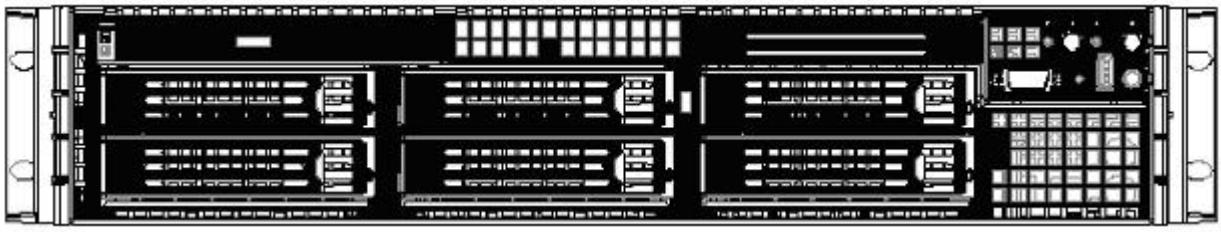


Figure 2. Front View without Bezel (Shown with Standard Control Panel option)

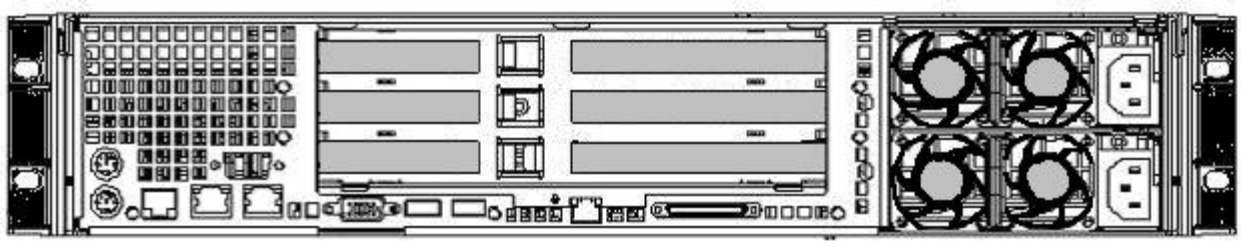


Figure 3. Back View (Shown with 1+1 AC Power Supply Configuration)

1.2 Chassis Dimensions

Table 1. Chassis Dimensions

Height	87.5 mm	3.445”
Width	430 mm	16.930”
Depth	672 mm	26.457”
Max. Weight	27.22 kg	60 Lbs

1.3 System Components

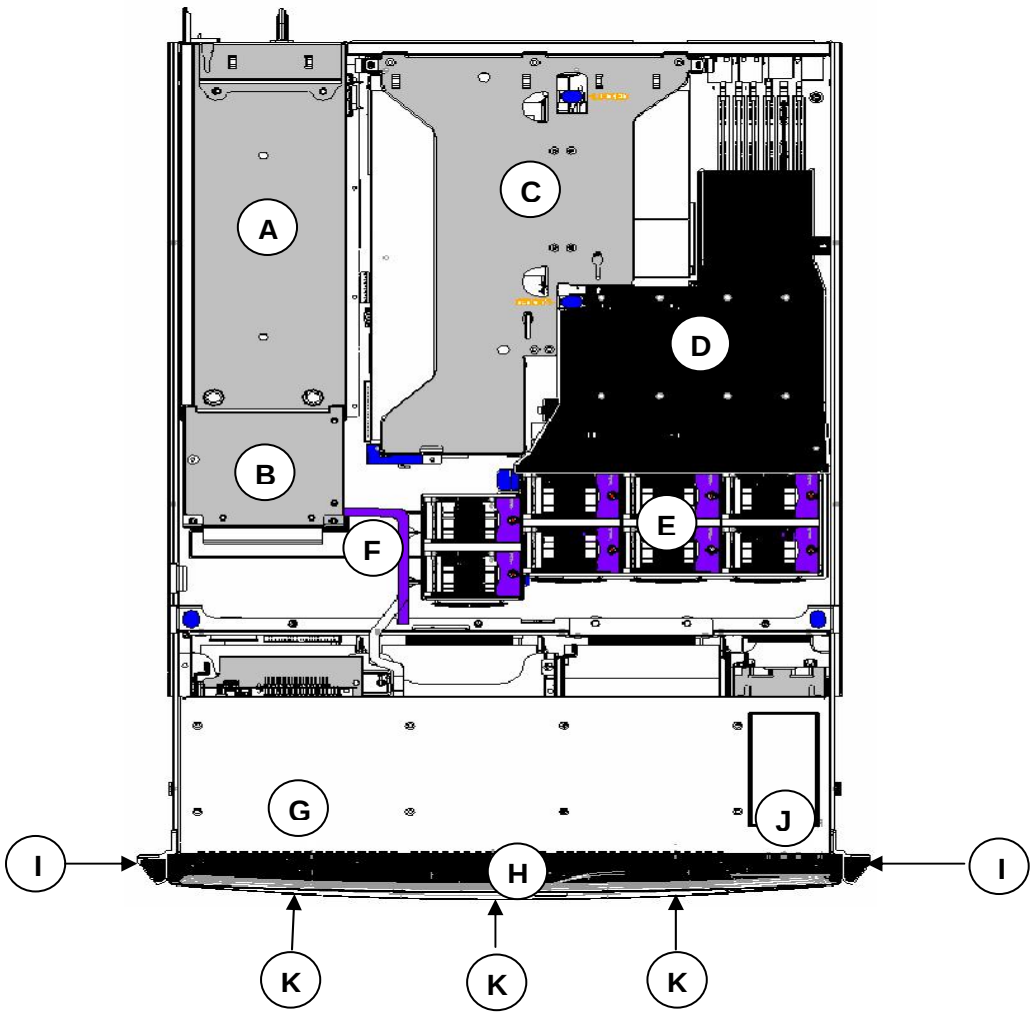


Figure 4. Major Chassis Components (Shown with AC Power Supply Configuration)

A. Power Supply Modules
B. Power Distribution Board
C. Riser Card Assembly
D. Processor Air Duct
E. Fan Module (Shown with redundant fan configuration option)
F. Air Baffle
G Slim Line Drive Bay
H Front Bezel (Optional)
I Chassis Handles
J Control Panel
K Hard Drive Bays

The I/O connector locations on the back of the chassis are pre-cut, so the use of an I/O shield is not required. The supplied EMI gasket must be installed to maintain Electromagnetic Interference (EMI) compliance levels.

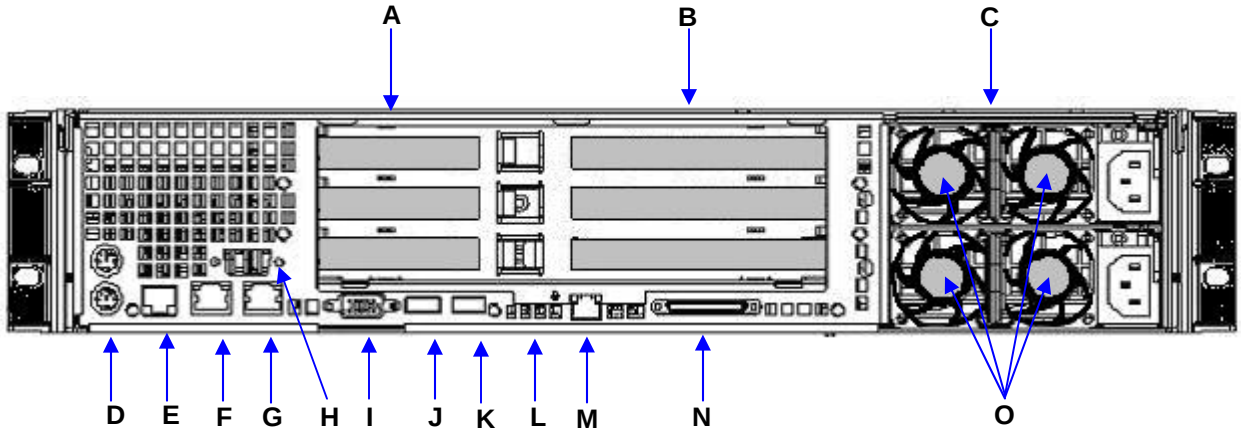


Figure 5. Back Panel Feature Overview (Shown with 1+1 AC Power Supply Configuration)

A	Low Profile PCI Add-in Card Slots	I	Video Connector
B	Full Height PCI Add-in Card Slots	J	USB 1 Connector
C	Power Supply Modules (1+1 Configuration Shown)	K	USB 2 Connector
D	PS2 Keyboard and Mouse Ports	L	Diagnostic Post Code LEDs
E	RJ45 Serial B Port	M	Management NIC (IMM - Advanced Edition required)
F	NIC #1 Connector	N	External SCSI Channel B Connector
G	NIC #2 Connector	O	Non-redundant Power Module Fans
H	DB9 Serial A Port Cut-out		

1.4 Hard Drive and Peripheral Bays

The SR2400 is designed to support several different hard drive and peripheral configurations. The system can be configured to support either hot swap SCSI or SATA drives, or can be configured to support cabled SATA drives. Each drive configuration requires an orderable kit which includes the necessary cables, drive trays and applicable backplane. The sixth bay, labeled “B” in the diagram below, can optionally be configured to support a sixth hard drive or 3.5” Tape Drive.

The slim-line peripheral bay (A) is capable of supporting one of the following devices: CDROM, DVD, DVD-CDR, floppy drive. If both an optical drive and floppy drive are required, an optional kit can be purchased to convert the first 1” drive bay (D) to a floppy drive bay. The kit includes the necessary cables and mounting tray.

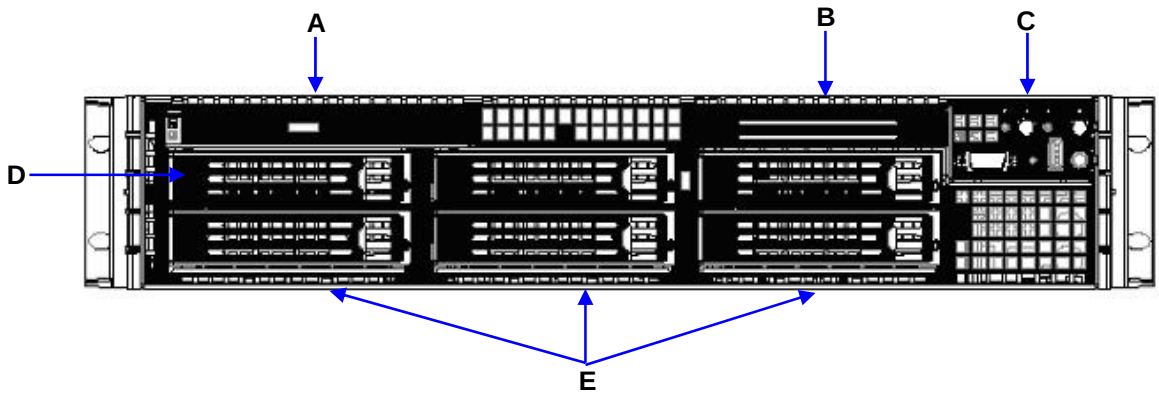


Figure 6. Front Panel Feature Overview

A Slimline drive bay (Floppy or Optical)
B Optional 6th HDD Drive or Tape Drive Bay
C System Control Panel
D 1” Hard Drive Bay or optional Floppy Drive Bay
E 1” Hard Drive Bays x5

1.5 Control Panel Options

The Server Chassis SR2400 can support either of two control panels: a Standard Control Panel and an Intel® Local Control Panel with LCD support. The control panel assemblies are pre-assembled and modular in design. The entire module assembly slides into a predefined slot in the front of the chassis.

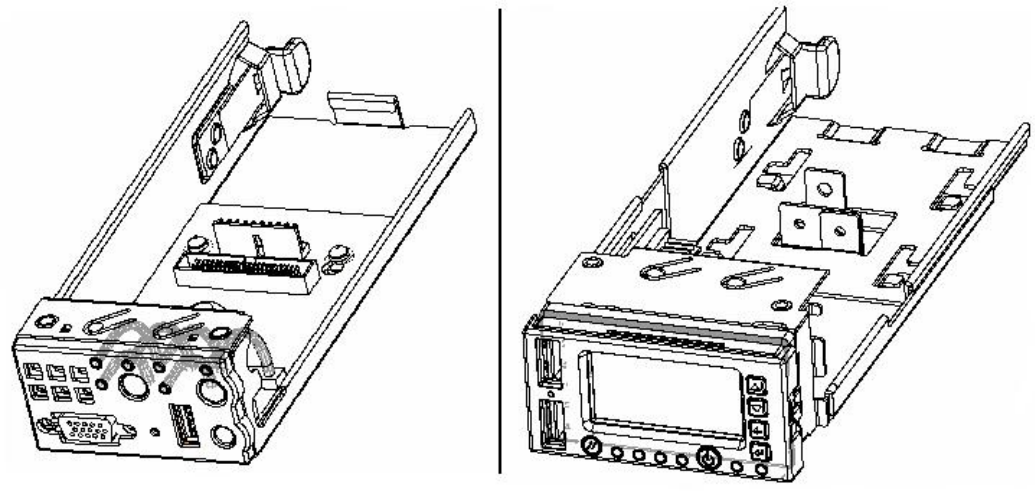


Figure 7. Control Panel Modules

The standard control panel supports several push buttons and status LEDs, along with USB and video ports to centralize system control, monitoring, and accessibility to within a common compact design. The following diagram overviews the layout and functions of the control panel.

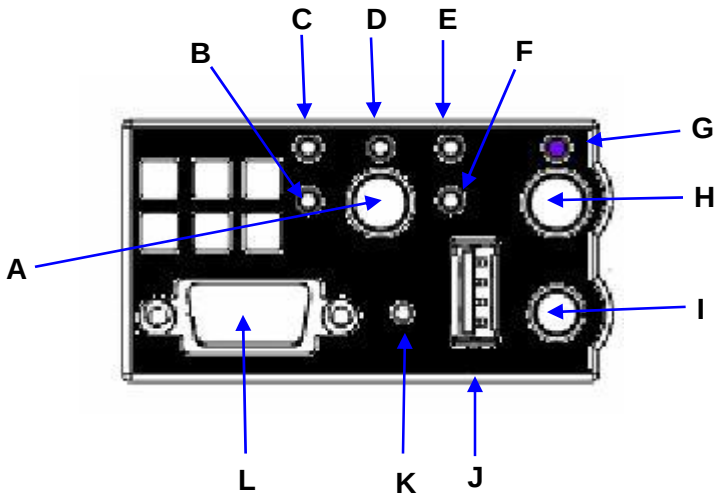


Figure 8. Standard Control Panel Overview

A	Power / Sleep Button	G	System Identification LED
B	NIC #2 Activity LED	H	System Identification Button
C	NIC #1 Activity LED	I	System Reset Button
D	Power / Sleep LED	J	USB 2.0 Connector
E	System Status LED	K	Recessed NMI Button (Tool Required)
F	Hard Drive Activity LED	L	Video Connector

The Intel® Local Control Panel utilizes a combination of control buttons, LEDs, and LCD display to provide system accessibility, monitoring, and control functions. The following diagram provides an overview of this control panel.

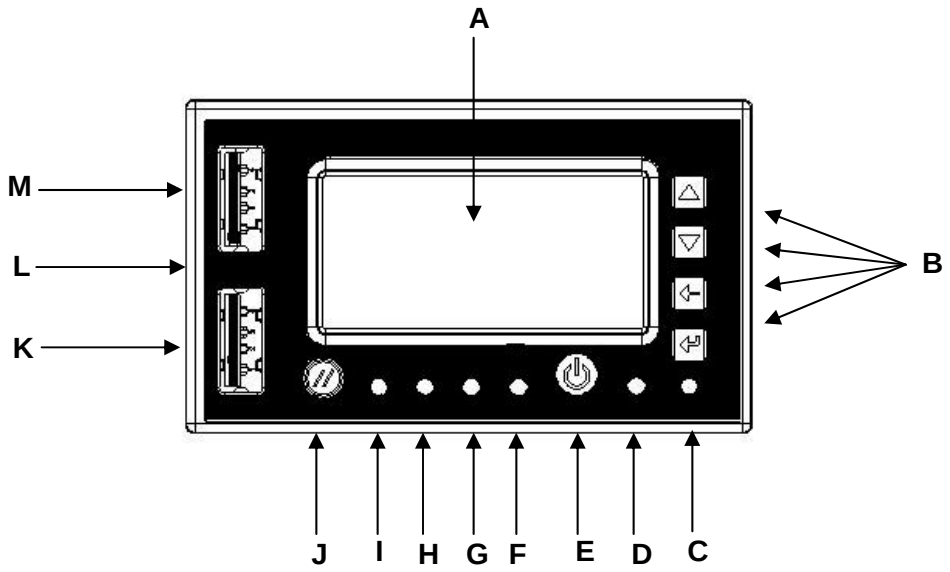


Figure 9. LCD Contol Panel Overview

A	LCD Display	G	NIC 2 Activity LED
B	LCD Menu Control Buttons	H	NIC 1 Activity LED
C	ID LED	I	Hard Drive Activity LED
D	Power LED	J	System Reset Button
E	System Power Button	K	USB 2.0 Port
F	System Status LED	L	NMI Buttom (Tool Required)
		M	USB 2.0 Port

Note: The Intel Local Control Panel can only be used when either the Intel Management Module Professional Edition or Advanced Edition is installed in the system.

1.6 Power Subsystem

The SR2400 can be configured with either an AC-input power subsystem or a DC-input power subsystem.

The AC power subsystem consists of an integrated power share board and module enclosure which is capable of housing up to two 700 Watt AC power supply modules supporting 1+0 or redundant 1+1 power configurations. In a 1+1 redundant configuration, each power supply module is hot swappable should one fail.

The AC power subsystem has several integrated management features including:

- Status LED on each power module
- Over temperature protection circuitry
- Over voltage protection circuitry

With the addition of Server Management Software, the AC power subsystem is capable of supporting several system management features including:

- Remote Power On/Off
- Status Alerting
- FRU Information Reporting

Each power supply module operates within the following voltage ranges and ratings:

- 100 - 127VAC~ at 50/60 Hertz (Hz); 8.9A maximum
- 200 - 240VAC~ at 50/60 Hz; 4.5A maximum

The DC power subsystem consists of a Power Distribution Board (PDB) and up to two 600 Watt DC power supply modules supporting 1+0 or redundant 1+1 power configurations. In a 1+1 redundant configuration, each power supply module is hot swappable should one fail.

1.7 System Cooling

The SR2400 has support for up to eight system fans in a modular 4+4 configuration. The bank of fans closest to the baseboard is the default configuration providing sufficient airflow for both cabled drive and hot-swap drive system configurations when external ambient temperatures remain within specified limits. With the addition of a SATA or SCSI backplane to supply power, the optional second bank of fans can be used to give the system fan redundancy should a fan fail. In addition to the eight system fans, each power supply module installed provides an additional two non-redundant fans pulling air from inside the chassis out the back.

1.8 Chassis Security

The SR2400 provides support for a lockable front bezel and a chassis intrusion switch.

1.9 Rack and Cabinet Mounting Options

The Server Chassis SR2400 was designed to support 19” wide by up to 30” deep server cabinets. The chassis supports either of two rack mount options: A fixed mount relay rack / cabinet mount or a tool-less sliding rail kit. The fixed mount relay rack / cabinet mount kit can be configured to support both 2-post racks and 4-post cabinets. The tool-less sliding rail kit is used to mount the chassis into a standard (19” by up to 30” deep) EIA-310D compatible server cabinet.

1.10 Front Bezel Features

The optional front bezel is made of molded plastic and uses a snap-on design. When installed, its design allows for maximum airflow.

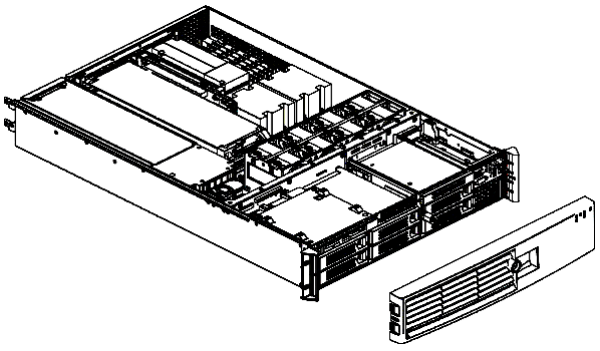


Figure 10. Optional Front Bezel

Separate front bezels are available to support systems that use either a Standard Control Panel or Intel Local Control Panel.

When the Standard Control Panel is used, light pipes on the backside of the front bezel allow the system status LEDs to be monitored with the front bezel in the closed position. The front bezel lock is provided to prevent unauthorized access to hard drives, peripheral devices and the control panel.

Figure 11. Front Bezel Supporting Standard Control Panel

When the Intel Local Control Panel is used, the control panel module can be adjusted to extend further out from the chassis face to allow the LCD panel to protrude from the front bezel.

Figure 12. Front Bezel Supporting Intel Local Control Panel

2. AC Power Subsystem

The AC power subsystem of the SR2400 consists of an integrated Power Distribution Board (PDB) and Power Module Enclosure assembly, with support for up to two 700 Watt AC power supply modules. The power subsystem can be configured to support a single module in a 1+0 non-redundant configuration, or dual modules in a 1+1 redundant power configuration. In a 1+1 configuration, a single failed power module can be hot-swapped with the system running. Either configuration will support up to a maximum of 700 Watts of power.

This chapter provides technical details to the operation of the power supply module and power subsystem.

2.1 Mechanical Overview

The drawing below displays the Power Distribution Board + Module Enclosure assembly

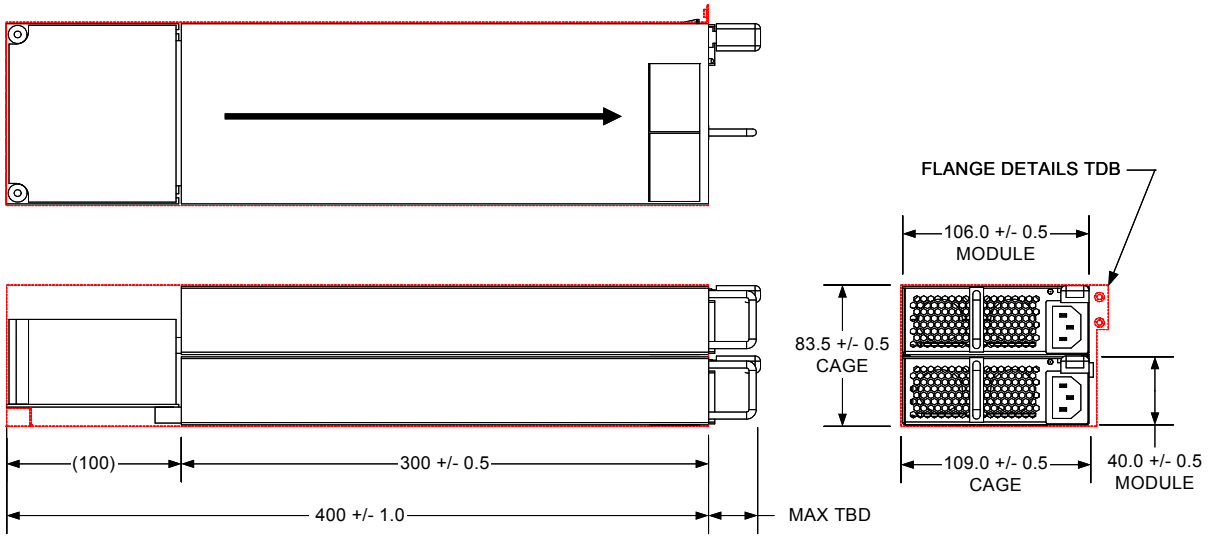


Figure 13. Mechanical Drawing for Dual (1+1 configuration) PS enclosure with PDB

2.2 Power Module Population

In single power module configurations, the power module must be inserted into the top slot of the power module enclosure. System and Power Supply thermals are not affected, however the non-operating slot must have the power supply blank installed.

2.3 Handle and Retention Mechanism

Each power supply module includes a handle allowing for module insertion to or removal from the module enclosure. Each module has a simple retention mechanism to hold the power module in place once it is inserted. This mechanism will withstand the specified platform mechanical shock and vibration requirements. The tab on the retention mechanism is colored **Green** to indicate it is a hot swap touch point. The latch mechanism is designed in such a way, so that it prevents inserting the module with the power cord plugged in. This will aid the hot swapping procedure.

2.4 Hot Swap Support

Hot swapping a power supply module is the process of inserting and extracting a power supply module from an operating power system. During this process the output voltages shall remain within specified limits. Up to 2 power supply modules may be on a single AC line. The power supply module can be hot swapped by the following method:

Extraction: on removal, the power cord is unplugged first, and then the power module is removed. This could occur in standby mode or power-on mode.

Insertion: The module is inserted first and then the power cord is plugged in. The system and the supply will power on into Standby Mode or Power-On Mode.

2.5 Airflow

Each power supply module incorporates two non-redundant 40mm fans for self cooling and is also used for partial system cooling. When installed in the system, the fans will provide approximately 15.5 CFM airflow at max load/ max temp in a 1+0 configuration, through the power supply and min 10CFM to the system. The air used to cool the power module is pre-heated from the system before being drawn through the power module.

2.6 Output Cable Harness

A cable harness from the power distribution board is used to provide the system with the various power interconnects. The harness size, connectors, and pin outs are shown below. Listed or recognized component appliance wiring material (AVLV2), CN,

Rated 85°C Min, 300Vdc Min shall be used for all output wiring.

Table 2. Power Harness Cable Definitions

From	Length mm	To connector #	No of pins	Description
Power Distribution Board	140, turn 90°	P1	2x12	Baseboard Power Connector
Power Distribution Board	270	P2	2x4	Processor Power Connector
Power Distribution Board	240	P3	1x5	Power Signal Connector
Power Distribution Board	100	P4	2x3	Hard Drive / Backplane Power Connector
Power Distribution Board	100	P5	1x4	Peripheral Power Connector

2.6.1 P1 – Baseboard Power Connector

- Connector Housing: 24-pin Molex Mini-Fit Jr. 39-01-2240 or equivalent.
- Contact: Molex 44476-1111 or equivalent

Table 3. P1 Baseboard Power Connector

PIN	SIGNALS	18 AWG COLOR	PIN	SIGNAL	18 AWG COLORS
1	+3.3 VDC	Orange	13	+3.3 VDC	Orange
2*	+3.3 VDC	Orange	14	-12 VDC	Blue
	3.3V RS	Orange/white (24 AWG)	15	COM	Black
3*	COM (GND)	Black	16	PS_ON#	Green
	COM	Black (24 AWG)	17	COM	Black
4*	5 VDC	Red	18	COM	Black
	5V RS	Red (24 AWG)	19	COM	Black
5	COM	Black	20	*Reserved (-5V in ATX)*	*N.C.*
6	+5 VDC	Red	21	+5 VDC	Red
7	COM	Black	22	+5 VDC	Red
8	PWR OK	Gray	23	+5 VDC	Red
9	5VSB	Purple	24	COM	Black
10	+12 V3	Yellow / Blue Stripe			
11	+12 V3	Yellow / Blue Stripe			
12	+3.3 VDC	Orange			

* Remote Sense wire double crimped

2.6.2 P2 – Processor Power Connector

- Connector Housing: 8-pin Molex 39-01-2080 or equivalent
- Contact: Molex 44476-1111 or equivalent

Table 4. P2 Processor Power Connector

PIN	SIGNAL	18 AWG COLORS	PIN	SIGNAL	18 AWG COLORS
1	COM	Black	5	+12 V1	Yellow / Black Stripe
2	COM	Black	6	+12 V1	Yellow / Black Stripe
3	COM	Black	7	+12 V2	Yellow / White Stripe
4	COM	Black	8	+12 V2	Yellow / White Stripe

Note: the 12V remote sense should be connected just before the 240VA current sense resistors on the PDB.

2.6.3 P3 – Power Signal Connector

Connector housing: 5-pin Molex 50-57-9405 or equivalent
Contacts: Molex 16-02-0088 or equivalent

Table 5. P3 Power Signal Connector

PIN	SIGNAL	24 AWG COLORS
1	SMBus Clock (SCL)	White /Green Stripe
2	SMBus Data (SDL)	White / Yellow Stripe
3	SMBAlert#	White
4	ReturnS	Black / White Stripe
5	3.3RS	Orange / White Stripe

Notes:
1. It is recommended to use gold plated signal connector contacts on both the PDB connector and the baseboard header.
2. If the server signal connector is unplugged, the PS/PDB-combo shall not shut down or go into an OVP condition.

2.6.4 P4 – Hard Drive / Backplane Power Connector

Connector housing: 6 Pin Molex Mini-Fit Jr. PN# 39-01-2065
Contact: Molex Mini-Fit, HCS, Female, Crimp 44476

Table 6. P4 Hard Drive Interface Board Power Connector

PIN	SIGNAL	18 AWG Colors	PIN	SIGNAL	18 AWG Colors
1	COM	Black	4	+12 V4	Yellow
2	COM	Black	5	+12 V4	Yellow
3	5V	Red	6	5VSB	Purple

2.6.5 P5 – Peripheral Power Connector

Connector housing: Amp 1-480424-0 or equivalent
Contact: Amp 61314-1 or equivalent

Table 7. P5 HDD Power Connector

PIN	SIGNAL	18 AWG Colors
1	+12 V4	Yellow
2	COM	Black
3	COM	Black
4	+5 VDC	Red

2.7 AC Input Requirements

The power supply module incorporates universal power input with active power factor correction, which reduces line harmonics in accordance with the EN61000-3-2 and JEIDA MITI standards.

2.7.1 AC Inlet Connector

The AC input connector is an *IEC 320 C-14* power inlet. This inlet is rated for 15A / 250VAC.

2.7.2 Efficiency

The power supply combo (PS+PDB) has a minimum efficiency of **80%** at maximum load and over 100-240VAC line voltage range to guarantee proper power supply cooling while mounted in the system.

2.7.3 AC Input Voltage Specification

The power supply module operates within all specified limits over the following input voltage range, shown in the following table. Harmonic distortion of up to 10% of rated AC Input Voltage must not cause the power supply to go out of specified limits. The power supply shall power off on or after/below 75Vac ±5Vac range. The power supply shall start up on or before/above 85VAC ±4Vac. Application of an input voltage below 85VAC shall not cause damage to the power supply, including a fuse blow.

Table 8. AC Input Rating

PARAMETER	MIN	RATED	MAX	Start-up Vac	Power Off Vac	Max Input AC Current	Max Rated Input AC Current
Line Voltage (110)	$90V_{rms}$	100-127 V_{rms}	$140V_{rms}$	**85Vac ±4Vac**	**75Vac ±5Vac**	**9.9 A_{rms}** [1,3]	$8.9A_{rms}$ 4
Line Voltage (220)	$180V_{rms}$	200-240 V_{rms}	$264V_{rms}$	-	-	**5.0 A_{rms}** [2,3]	$4.5A_{rms}$ 4
Frequency	47 Hz	50/60Hz	63 Hz				

1 Maximum input current at low input voltage range shall be measured at 90Vac, at max load.
2 Maximum input current at high input voltage range shall be measured at 180VAC, at max load.
3 This is not to be used for determining agency input current markings.
4 Maximum rated input current is measured at 100VAC and 200VAC.

2.7.4 AC Line Dropout / Holdup

An AC line dropout is defined to be when the AC input drops to 0VAC at any phase of the AC line for any length of time. During an AC dropout of one cycle or less the power supply must meet dynamic voltage regulation requirements over the rated load. An AC line dropout of one cycle or less (20ms min) shall not cause any tripping of control signals or protection circuits (= 20ms holdup time requirement). If the AC dropout lasts longer than one cycle the power supply should recover and meet all turn-on requirements. The power supply must meet the AC dropout requirement over rated AC voltages, frequencies, and output loading conditions. Any dropout of the AC line shall not cause damage to the power supply. The min holdup time requirement is as follows:

20ms Min when tested under the following conditions: Max combined load = 600W, Line = 90Vac/47Hz,

18ms Min when tested under the following conditions: Max combined load = 650W, Line = 90Vac/47Hz, and 14ms Min when tested under the following conditions: Max combined load = 700W, Line = 90Vac/47Hz.

Note: The B+ bulk cap voltage shall not exceed 400Vpk at any time.

2.7.4.1 AC Line 5VSB Holdup

The 5VSB output voltage should stay in regulation under its full load (static or dynamic) during an AC dropout of 70ms min (=5VSB holdup time) whether the power supply is in ON or OFF state (PSON asserted or de-asserted).

2.7.5 AC Line Fuse

The power supply has a single line fuse, on the Line (Hot) wire of the AC input. The line fusing is acceptable for all safety agency requirements. The input fuse is a slow blow type. AC inrush current shall not cause the AC line fuse to blow under any conditions. All protection circuits in the power supply shall not cause the AC fuse to blow unless a component in the power supply has failed. This includes DC output load short conditions.

2.7.6 AC Inrush

The peak AC inrush current shall be less than 40A peak for one-quarter of the AC cycle and less then the ratings of power supply's critical AC input components, including: input fuse, bulk caps, rectifiers, and surge limiting device. Also, a single inrush current disturbance I^2t value MUST NOT exceed 20% of the I^2t rating of the power supply's AC input fuse. The power supply must meet the AC inrush current requirements for any rated AC voltage, during turn-on at any phase of AC voltage, during a single cycle AC dropout condition as well as upon recovery after AC dropout of any duration, and over the specified temperature range T_{op}, (includes hot and cold inrush).

2.7.7 AC Line Surge

The power supply is tested with the system for immunity to AC Ring Wave and AC Unidirectional wave, both up to 2kV, per EN 55024:1998, EN 61000-4-5:1995 and ANSI C62.45: 1992.

The pass criteria include: No unsafe operation is allowed under any condition; all power supply output voltage levels to stay within proper spec levels; No change in operating state or loss of data during and after the test profile; No component damage under any condition.

2.7.8 AC Line Transient Specification

AC line transient conditions shall be defined as "sag" and "surge" conditions. "Sag" conditions are also commonly referred to as "brownout", these conditions will be defined as the AC line voltage dropping below nominal voltage conditions. "Surge" will be defined to refer to conditions when the AC line voltage rises above nominal voltage.

The power supply shall meet the requirements under the following AC line sag and surge conditions.

Table 9. AC Line Sag Transient Performance

AC Line Sag (10sec interval between each sagging)				
Duration	Sag	Operating AC Voltage	Line Frequency	Performance Criteria
Continuous	10%	Nominal AC Voltage ranges	50/60Hz	No loss of function or performance
0 to 1 AC cycle	95%	Nominal AC Voltage ranges	50/60Hz	No loss of function or performance
> 1 AC cycle	>30%	Nominal AC Voltage ranges	50/60Hz	Loss of function acceptable, self recoverable

Table 10. AC Line Surge Transient Performance

AC Line Surge				
Duration	Surge	Operating AC Voltage	Line Frequency	Performance Criteria
Continuous	10%	Nominal AC Voltages	50/60Hz	No loss of function or performance
0 to ½ AC cycle	30%	Mid-point of nominal AC Voltages	50/60Hz	No loss of function or performance

2.7.9 AC Line Fast Transient (EFT) Specification

The power supply meets the *EN61000-4-5* directive and any additional requirements in *IEC1000-4-5:1995* and the Level 3 requirements for surge-withstand capability, with the following conditions and exceptions:

- These input transients must not cause any out-of-regulation conditions, such as overshoot and undershoot, nor must it cause any nuisance trips of any of the power supply protection circuits.
- The surge-withstand test must not produce damage to the power supply.
- The supply must meet surge-withstand test conditions under maximum and minimum DC-output load conditions.

2.7.10 AC Line Leakage Current

The maximum leakage current to ground for each power supply module shall be not more then 3.5mA when tested at 240VAC.

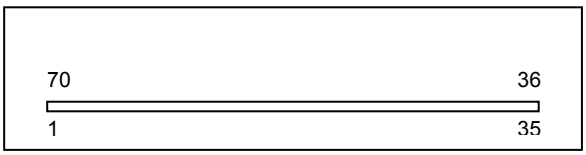
2.8 DC Output Specification

2.8.1 Power Supply Mating Connector

The power distribution board provides an edge connector slot for each of the supported power supply modules. Each power module has a keyed edge connector which is blind mated to the edge connector slot of the PDB. The following table provides the pinout for both the connector and slot.

Table 11. Power Supply Edge Connector Slot Pinout

Description	Pin#	Pin#	Description
12VLS	1	70	PSON#
PWOK	2	69	PSKill
Reserved	3	68	SMBus SDA
Reserved	4	67	SMBus SCL
5VSB	5	66	Address A0
5VSB	6	65	Address A1
15Vcc (SB)	7	64	PSAlert#
ReturnS	8	63	12VS
Ground	9	62	Ground
Ground	10	61	Ground
Ground	11	60	Ground
Ground	12	59	Ground
Ground	13	58	Ground
Ground	14	57	Ground
Ground	15	56	Ground
Ground	16	55	Ground
Ground	17	54	Ground
Ground	18	53	Ground



Description	Pin#	Pin#	Description
Ground	19	52	Ground
Ground	20	51	Ground
Ground	21	50	Ground
Ground	22	49	Ground
Keying Notch			
+12V	23	48	+12V
+12V	24	47	+12V
+12V	25	46	+12V
+12V	26	45	+12V
+12V	27	44	+12V
+12V	28	43	+12V
+12V	29	42	+12V
+12V	30	41	+12V
+12V	31	40	+12V
+12V	32	39	+12V
+12V	33	38	+12V
+12V	34	37	+12V
+12V	35	36	+12V

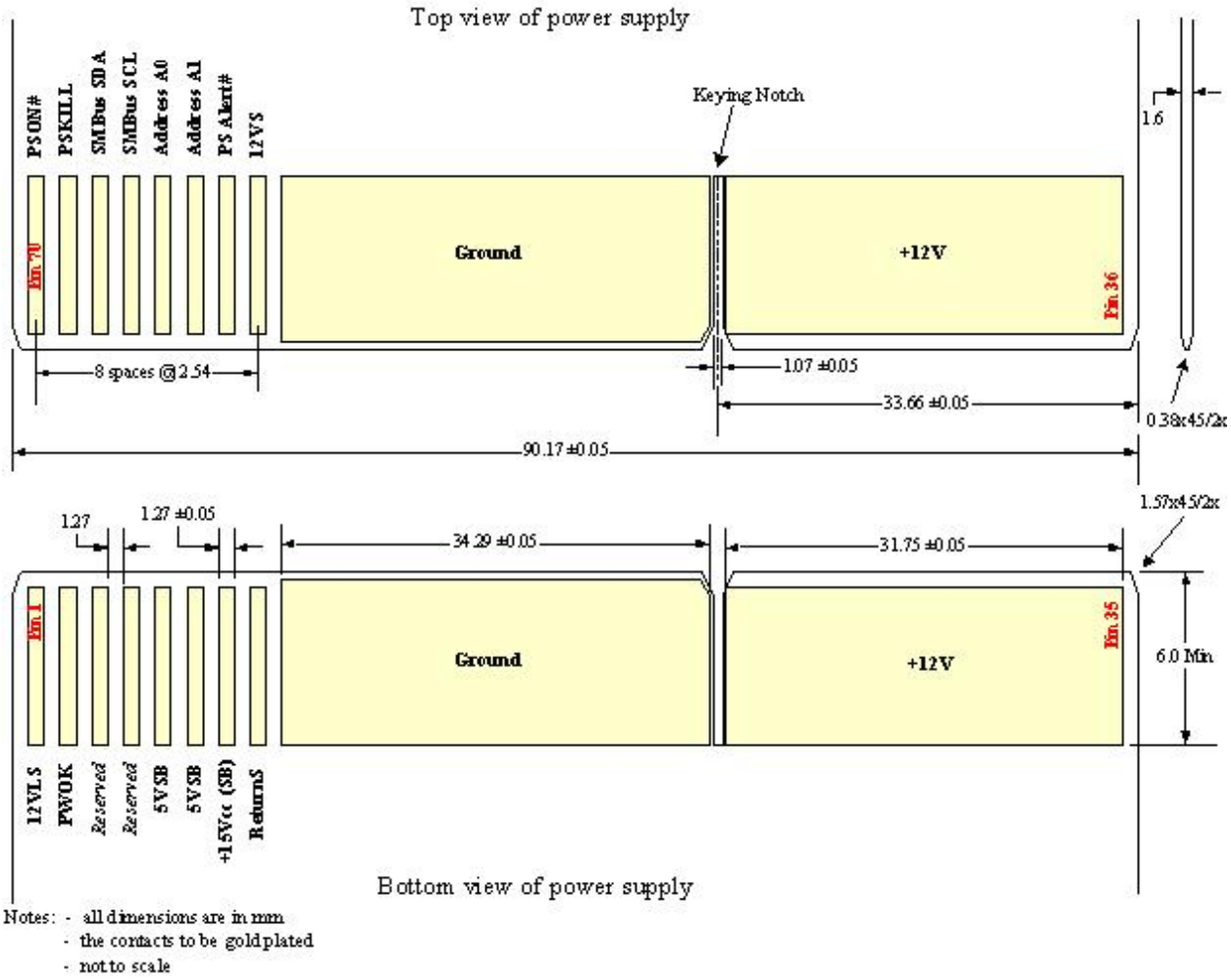


Figure 14. Power Module Edge Connector View

2.8.2 Grounding

The ground of the pins of the PDB output connectors provides the power return path. The output connector ground pins are connected to safety ground (PDB enclosure).

2.8.3 Standby Output / Standby Mode

The 5VSB output shall be present when an AC input greater than the power supply turn-on AC voltage is applied. Applying an external 5.25V to 5Vsb shall not cause the power supply to shut down or exceed operating limits. When the external voltage is removed the voltage shall return to the power supplies operating voltage without exceeding the dynamic voltage limits.

2.8.4 Remote Sense

The PDB 12V to 3.3V and 5V converters use remote senses to regulate out voltage drops in the system for the +3.3V output. The remote sense output impedance to this DC/DC converter must be greater than 200Ω. This is the value of the resistor connecting the remote sense to the output voltage internal to the DC/DC converter. Remote sense must be able to regulate out of up to 300mV drop on the +3.3V and 5V outputs. Also, the power supply ground return remote sense (ReturnS) passes through the PDB and the output harness to regulate out ground drops for its +12V and 5Vsb output voltages. The power supply uses remote sense (12VRS) to regulate out drops up to the 240VA protection circuit on the PDB.

2.8.5 Power Module Output Power / Currents

The following table defines power and current ratings for the 700W continuous (810W pk) power supply in 1+0 or 1+1 redundant configurations. The combined output power of both outputs shall not exceed the rated output power. The power supply module must meet both static and dynamic voltage regulation requirements for the minimum loading conditions. Also, the power module shall be able to supply the listed peak currents and power for a minimum of 10 seconds. Outputs are not required to be peak loaded simultaneously.

Table 12. Load Ratings

	+12V	+5Vsb
MAX Load	**58.0A**	**2.0A**
MIN DYNAMIC Load	**5.0A**	**0.1A**
MIN STATIC Load	**1.0A**	**0A**
PEAK Load (10 sec min)	**67.0A**	**2.5A**
Max Output Power (continuous), see note 1	**12V x 58A = 696W max**	**5V x 2A = 10W max**
Peak Output Power (for 10s min), see note 2	**12V x 67A = 804W pk**	**5V x 2.5A = 12.5W pk**

Note:
1. In reality, at max load the 12V output voltage is allowed to sag to –3%, which is 11.64V; so the actual max power will then be: 11.64V x 58A = 675.12 W, and the same applies for 5VSB: 4.85Vx2A=9.7W; so total max continuous Power = 675.12+9.7=684.82W
2. In reality, at peak load the 12V output voltage is allowed to sag to –3%, which is 11.64V; so the actual peak power will then be: 11.64V x 67A = 780 W; and the same applies to 5VSB: 4.85Vx2.5A=12.125W. The total peak power = 792 W pk.

2.8.6 +12V Outputs Load Requirements

This section describes the +12V output power requirements from the power distribution board with a either single or dual ERP700W power supply module plugged into the input of the power distribution board.

Note: The combined total power limit for all outputs is 700W max.

Table 13. +12V Outputs Load Ratings

	+12V1/2/3/4 combined output limit = 48A / 60A pk max			
	+12V1	+12V2	+12V3	+12V4
MAX Load	**12.5A**	**12.5A**	**14A**	**10A**
MIN Static / Dynamic Load	**0.5**	**0.5**	**1.5A**	**1.5A**
Peak load	**15A**	**15A**	**17A**	**16A**
Max Output Power, see note 1	**12 x12.5 =150W**	**12 x12.5 =150W**	**12V x14A =168W**	**12V x10A =120W**

2.8.7 DC/DC Converters Loading

The following table defines power and current ratings of 3 DC/DC converters located on the PDB, each powered from the +12V rail. The 3 converters must meet both static and dynamic voltage regulation requirements for the minimum and maximum loading conditions.

Note: 3.3V / 5V combined power limit: 140W max.

Table 14. DC/DC Converters Load Ratings

	+12VDC Input DC/DC Converters		
	+3.3V Converter	**+5V Converter**	**-12V Converter**
MAX Load	**24.0A**	**24.0A**	**0.5A**
MIN Static / Dynamic Load	**0.5A**	**0.5A**	**0A**
Max Output Power, see note 1	**3.3x24=79.2W**	**5x24=120W**	**0.5x12=6W**

Notes:
1. The straight sum of the 3 max powers = 205.2W, but considering the 3.3/5V power limit, it may be 140W +6W = 146W max combined power. In reality, at max load, each output voltage is allowed to sag to Vmin, so the actual each max power will then be: for 3.3V: 3.2Vx24A = 76.8W, for 5V: 4.8Vx24A=115.2W; and for -12V: 11.4Vx0.5A=5.7W.

2.8.8 DC/DC Converters Voltage Regulation

The DC/DC converters' output voltages must stay within the following voltage limits 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, all other voltages measured at the output harness connectors.

Table 15. Voltage Regulation Limits

Converter Output	TOLERANCE	MIN	NOM	MAX	UNITS
+ 3.3VDC	- 3% / +5%	+3.20	+3.30	+3.465	VDC
+ 5VDC	- 4% / +5%	+4.80	+5.00	+5.25	VDC
+12VDC (12V1/2/3/4)	-3%/ +5%	+11.64	+12.00	+12.60	VDC
- 12VDC	- 5% / +9%	-11.40	-12.00	-13.08	VDC
5Vsb	See PS spec, measured at the PDB harness connectors				

2.8.9 DC/DC Converters Dynamic Loading

The output voltages shall remain within limits specified in the table above for the step loading and capacitive loading specified in the following table. The load transient repetition rate shall be tested between 50Hz and 5 kHz at duty cycles ranging from 10%-90%. The load transient repetition rate is only a test specification.

Table 16. Transient Load Requirements

Output	Max Δ Step Load Size	Max Load Slew Rate	Test capacitive Load
+ 3.3VDC	5.0A (note 1)	0.5 A/μs	2000 μF
+ 5VDC	5.0A (note 1)	0.5 A/μs	2000 μF
+12VDC (12V1/2/3/4)	See the PS spec for details		
- 12VDC	*Not rated*	*Not rated*	10 μF
+5Vsb	See PS spec, measured at the PDB harness connectors		As needed on PDB

Note 1: Min loads for Step loads on 3.3V and 5V outputs per table 3.

2.8.10 DC/DC Converter Capacitive Loading

The DC/DC converters shall be stable and meet all requirements with the following capacitive loading ranges. Min capacitive loading applies to static load only.

Table 17. Capacitive Loading Conditions

Converter Output	MIN	MAX	Units
+3.3VDC	**10**	**10,000**	μF
+5VDC	**10**	**10,000**	μF
-12VDC	**1**	**100**	μF

Note: Refer to the PS spec for the equivalent data on +12V output.

2.8.11 DC/DC Converters Closed Loop stability

Each DC/DC converter shall be unconditionally stable under all line/load/transient load conditions. A minimum of: 45 degrees phase margin and -10dB-gain margin is required. Closed-loop stability must be ensured at the maximum and minimum loads as applicable.

2.8.12 Common Mode Noise

The Common Mode noise on any output shall not exceed 350mV pk-pk over the frequency band of 10Hz to 20MHz.

1. The measurement shall be made across a 100Ω resistor between each of DC outputs, including ground,at the DC power connector and chassis ground (power subsystem enclosure).
2. The test set-up shall use a FET probe such as Tektronix model P6046 or equivalent.

2.8.13 DC/DC Converters Ripple / Noise

The maximum allowed ripple/noise output of each DC/DC Converter is defined in the following table. This is measured over a bandwidth of 0Hz to 20MHz at the PDB output connectors. A 10μF tantalum capacitor in parallel with a 0.1μF ceramic capacitor are placed at the point of measurement.

Table 18. Ripple and Noise

+3.3V Output	+5V Output	-12V Output
50mVp-p	50mVp-p	120mVp-p

2.8.14 Timing Requirements

These are the timing requirements for the PSM/PDB combo operation. The output voltages must rise from 10% to within regulation limits (T_{vout_rise}) within 5 to 200ms, except for 5Vsb - it is allowed to rise from 1.0 to 200ms. All outputs must rise monotonically.

The following table shows the timing requirements for the power supply/PDB combo being turned on and off via the AC input, with PSON held low and the PSON signal, with the AC input applied.

Table 19. Turn On / Off Timing

Item	Description	MIN	MAX	UNITS
$T_{sb\_on\_delay}$	Delay from AC being applied to 5VSB being within regulation.		**1500**	ms
T_{vout_on}	All main outputs must be within regulation of each other within this time		**50**	ms
T_{vout_off}	All main outputs must be leave regulation of each other within this time		**70**	ms
T_{5Vsb_rise}	5Vsb Output voltage rise time	**1.0**	**200**	ms
T_{vout_rise}	Output voltages rise time	**5.0**	**200**	ms
$T_{ac\_on\_delay}$	Delay from AC being applied to all output voltages being within regulation.		**2500**	ms
T_{vout_holdup}	Time all output voltages stay within regulation after loss of AC.	**21**		ms
T_{pwok_holdup}	Delay from loss of AC to de-assertion of PWOK	**20**		ms
$T_{pson\_on\_delay}$	Delay from PSON# active to output voltages within regulation limits.	**5**	**400**	ms
T_{pson_pwok}	Delay from PSON# de-active to PWOK being de-asserted.		**50**	ms
T_{pwok_on}	Delay from output voltages within regulation limits to PWOK asserted at turn on.	**100**	**1000**	ms
T_{pwok_off}	Delay from PWOK de-asserted to output voltages dropping out of regulation limits.	**1**		ms
T_{pwok_low}	Duration of PWOK being in the de-asserted state during an off/on cycle using AC or the PSON signal.	**100**		ms
T_{sb_vout}	Delay from 5Vsb being in regulation to O/Ps being in regulation at AC turn on.	**50**	**1000**	ms
T_{5Vsb_holdup}	Time the 5Vsb output voltage stays within regulation after loss of AC.	**70**		ms

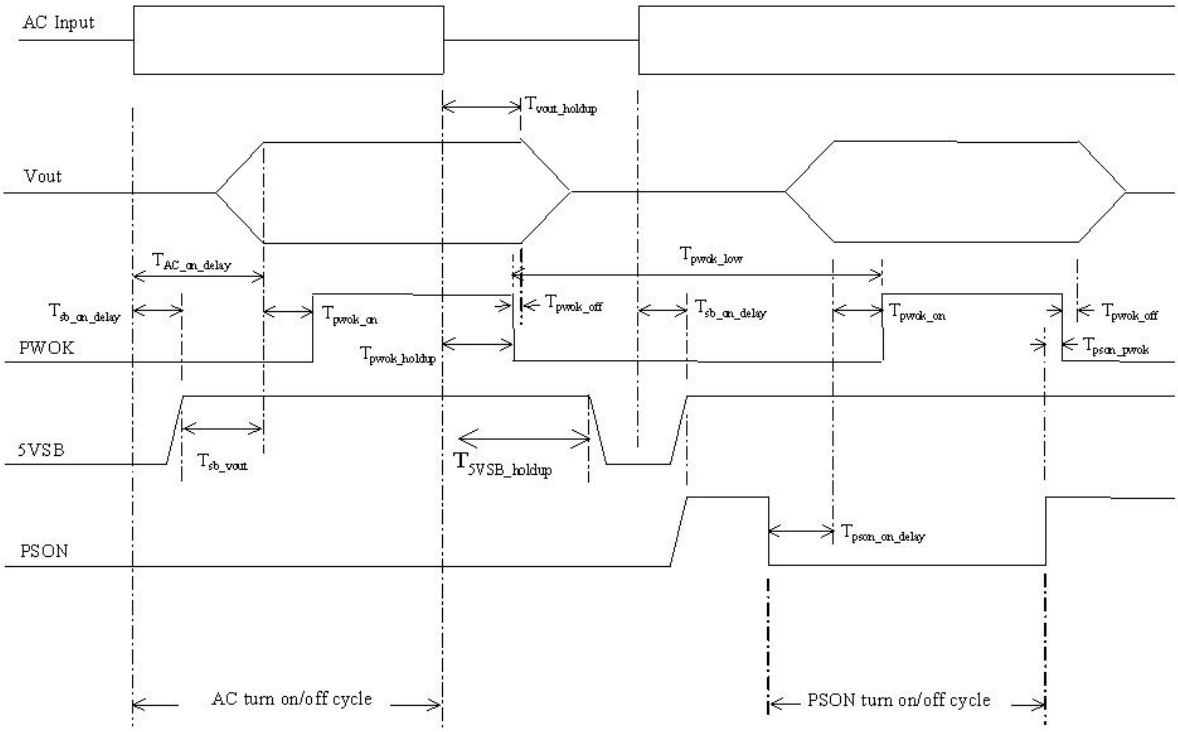


Figure 15. Turn On/Off Timing (Power Supply/PDB combo Signals)

2.8.15 Residual Voltage Immunity in Standby Mode

Each DC/DC converter is immune to any residual voltage placed on its respective output (typically a leakage voltage through the system from standby output) up to 1000mV. This residual voltage shall not have any adverse effect on each DC/DC converter, such as: no additional power dissipation or over-stressing / over-heating any internal components or adversely affecting the turn-on performance (no protection circuits tripping during turn on).

While in Stand-by mode, at no load condition, the residual voltage on each DC/DC converter output shall not exceed 100mV.

2.9 Protection Circuits

Protection circuits inside the PDB and the power supply module shall cause either the power supply's main +12V output to shutdown, which in turn shuts down the other 3 outputs on the PDB or first shut down any of the 3 outputs on the PDB, which in turn also shuts down the entire power supply combo. If the power supply latches off due to a protection circuit tripping, an AC cycle OFF for 15sec min and a PSON# cycle HIGH for 1sec shall be able to reset the power supply and the PDB.

2.9.1 Over-Current Protection (OCP)

Each DC/DC converter output on PDB shall have individual OCP protection circuits. The PS+PDB combo shall shutdown and latch off after an over current condition occurs. This latch shall be cleared by toggling the PSON# signal or by an AC power interruption. The following table provides the over current limits. The values are measured at the PDB harness connectors. The DC/DC converters shall not be damaged from repeated power cycling in this condition. Also, the +12V output from the power supply is divided on the PDB into 4 channels and each is limited to 240VA of power. There shall be current sensors and limit circuits to shut down the entire PS+PDB combo if the limit is exceeded. The limits are listed below.

Table 20. Over Current Protection Limits / 240VA Protection

Output Voltage	MIN OCP TRIP LIMITS	MAX OCP TRIP LIMITS
+3.3V	150% min (= 36A min)	187% max (= 45A max)
+5V	150% min (= 36A min)	187% max (= 45A max)
-12V	125% min (= 0.625A min)	560% max (= 2.8A max)
+12V1	120% min (= 18.0A min)	20A max (= 240VA max)
+12V2	120% min (= 18.0A min)	20A max (= 240VA max)
+12V3	111% min (= 19.0A min)	20A max (= 240VA max)
+12V4	112% min (= 18.0A min)	20A max (= 240VA max)
+5VSB	**See PS spec**	

The power supply module has a current limit to prevent the +12V and 5VSB outputs from exceeding the values shown below. If the current limits are exceeded, the power supply module shall shutdown and latch off. The latch will be cleared by toggling the PSON# signal or by an AC power interruption. The power supply shall not be damaged from repeated power cycling in this condition. 5VSB shall be protected under over-current or shorted conditions, so that no damage can occur to the power supply.

Table 21. Power Module Over Current Protection Limit

Output Voltage	OCP LIMITS
+12V	**120% min (= 70.0A min); 140% max (= 80.0A max)**
+5Vsb	**120% min (= 2.4A min); 300% max (= 6.0A max)**

2.9.2 Over Voltage Protection (OVP)

Each DC/DC converter output from the PDB has individual OVP protection circuits built in and is locally sensed. The PS+PDB combo shall shutdown and latch off after an over voltage condition occurs. This latch is cleared by toggling the PSON# signal or by an AC power interruption. The following table provides the over voltage limits. The values are measured at the PDB harness connectors. The voltage shall never exceed the maximum levels when measured at the power pins of the output harness connector during any single point of fail. The voltage shall never trip any lower than the minimum levels when measured at the power pins of the PDB connector.

Table 22. Over Voltage Protection Limits

Output Voltage	OVP MIN (V)	OVP MAX (V)
+3.3V	4.0	4.5
+5V	5.7	6.5
-12V	-13.5	-14.5
+12V1/2/3/4	See PS spec	

The power supply module over voltage protection shall be locally sensed. The power supply module will shutdown and latch off after an over voltage condition occurs. This latch can be cleared by toggling the PSON# signal or by an AC power interruption. The following table provides the over voltage limits for the power supply module. The values are measured at the output of the power module's connectors. The voltage shall never exceed the maximum levels when measured at the power pins of the power module connector during any single point of fail. The voltage shall never trip any lower than the minimum levels when measured at the power pins of the power module connector.

Table 23. Power Module Over Voltage Protection Limits

Output Voltage	OVP MIN (V)	OVP MAX (V)
+12V	13.0	14.0
+5Vsb	5.7	6.5

2.9.3 Over Temperature Protection (OTP)

The power supply will be protected against over temperature conditions caused by loss of fan cooling or excessive ambient temperature. In an OTP condition the PSU will shutdown. When the power supply temperature drops to within specified limits, the power supply shall restore power automatically, while the 5VSB remains always on. The OTP trip level shall have a minimum of 4°C of ambient temperature hysteresis, so that the power supply will not oscillate on and off due to temperature recovery condition. The power supply shall alert the system of the OTP condition via the power supply FAIL signal and the PWR LED.

2.10 SMBus Monitoring Interface

The PS+PDB combo provides a monitoring interface to the system over a server management bus. The SMBus pull-ups are located on the motherboard.

This shall provide power monitoring, failure conditions, warning conditions, and FRU data. Two pins have been reserved on the connector to provide this information. One pin is the Serial Clock (PSM Clock). The second pin is used for Serial Data (PSM Data). Both pins are bi-directional and are used to form a serial I2C bus. For redundant power supplies: The device(s) in the power supply shall be located at an address(s) determined by address pins A0 and A1. The circuits inside the power supply shall be powered from the 5VSB bus and grounded to ReturnS (remote sense return). For redundant power supplies the device(s) shall be powered from the system side of the OR-ing device. The EEPROM for FRU data in each power supply is hard wired to allow writing data to the device.

There are two usage modes depending on the system. The system shall control the usage mode by setting the Usage Mode bit.

- Default Mode: In this mode, the LEDs and registers must automatically clear when a warning event has occurred, because there is no software, BIOS, or other agent that will access the power supply via SMBus to do any clearing.

- Intelligent Mode: A system management controller or BIOS agent exists that can read and clear status. In this mode, the LEDs and registers should latch when a warning event occurs so that the system and user can read their status before it changes during transient events. There should also be a mechanism to allow the system management or BIOS to ‘force’ the LED states in order to identify which power supply should be replaced.

Critical events will cause the power supply to shutdown and latch the LED and SMBAlert signal no matter what mode the power supply is in: “default mode” or “intelligent mode”.

Warning events latch the LED and SMBAlert signal when in “intelligent” mode. If in the “default mode”, the LED and SMBAlert signal will de-assert as soon as the condition driving the event clears.

For redundant 1+1 configuration: If the power supply has failed due to an open AC fuse and therefore has no input power, the LED and SMBAlert signal must still operate with another operating power supply in parallel. Therefore, these circuits must be powered from the output side of the 5VSB OR-ing device.

For non-redundant 1+0 configuration: If the power supply fails due to over temperature shutdown, over current shutdown, over power shutdown, or fan failure: the LED, SMBAlert signal, and critical event registers, shall still operate correctly. If the supply fails due to loss of AC or open fuse, then the LED and signals will have no power and therefore will not operate.

2.10.1 Hot Plug I2C Requirements

Since the redundant power supplies will be asynchronously installed and powered-on in a system, the SMBus devices on the supply need to be tolerant of joining the SMBus in the middle of a SMBus transaction and ignore bus activity after being powered on until a valid start of transaction is seen.

2.10.2 Power Supply Failure Communication

Here, there is no failure signal from the power supply to the PDB. The SMBus Alert signal will assert if something (critical or warning) is going wrong with the power supply. Then the system will need to poll the power supply via the SMBus to see what type of warning or failure condition has occurred.

2.10.3 LED Control

There shall be two bits to control the power supply LEDs. One bit forces the Amber LED ON and Green LED OFF. Another bit forces the Amber LED to blink at 1Hz and the Green LED OFF. Writing a 1b to these bits forces the LEDs to these states. Writing a 0b allows control of the LED back to the power supply.

There will be a single bi-color LED to indicate power supply status. The LED operation is defined below.

Table 24. LED Indicators

Power Supply Condition	Bi-Color LED
No AC power to all power supplies	**OFF**
No AC power to this PSU only (for 1+1 configuration) or Power supply critical event causing a shutdown: failure, fuse blown (1+1 only), OCP, OVP, Fan Failed	**AMBER**
Power supply warning events where the power supply continues to operate: high temp, high power, high current, slow fan.	**1Hz Blink AMBER**
AC present / Only 5VSB on (PS Off)	**1Hz Blink GREEN**
Output ON and OK	**GREEN**

The LED is visible on the rear panel of each installed power supply module.

There shall be bits that allow the LED state to be forced via SMBus. The following capabilities are required:

- Force Amber ON for failure conditions.
- Force Amber 1Hz Blink for warning conditions.
- No Force (LED state follows power supply present state)

The power-on default should be ‘No Force’. The default is restored whenever PSON transitions to assert.

3. DC Power Subsystem

The DC power subsystem of the SR2400 consists of a Power Distribution Board (PDB) and up to two 600 Watt DC power supply modules. The power subsystem can be configured to support a single module in a 1+0 non-redundant configuration, or dual modules in a 1+1 redundant power configuration. In a 1+1 configuration, a single failed power module can be hot-swapped with the system running. Either configuration will support up to a maximum of 600 Watts of power.

The PDB and the 600 Watt DC power supply module are identical to the ones used in Intel® Carrier Grade Server TIGI2U. For technical details, refer to *TIGI2U PDB specification* and *TIGI2U DC Power Supply specification*.

4. Cooling Subsystem

A 4+4 system fan module, the power supply fans, air baffle, CPU air duct and drive bay population are the necessary components to provide the system with the necessary air flow and air pressure to maintain the system's thermals when operating at or below maximum specified thermal limits. See Table 70. System Environmental Limits.

4.1 4+4 System Fan Module

The primary airflow for the system is provided by a removable plastic fan housing which secures up to eight 60mm x 38mm multi-speed fans.

Eight 6-pin connectors on the fan distribution board provide each fan with power and tachometer output, allowing it to be monitored independently by server management software. The following table provides the pin-out for the connectors on each fan and corresponding header on the fan distribution board.

Table 25. Individual Fan Pinout (J8B2, J6B1, J3B1, J1B1, J8A1, J6A1, J3A1, J1A1)

Pin	Signal Name	Description
1	Speed Control	Control the fan speed
2	Err LED	Show the fan active status
3	Tachometer	Two pulse per revolution speed monitor
4	GND	Ground return
5	GND	Ground return
6	Reserved	Reserved

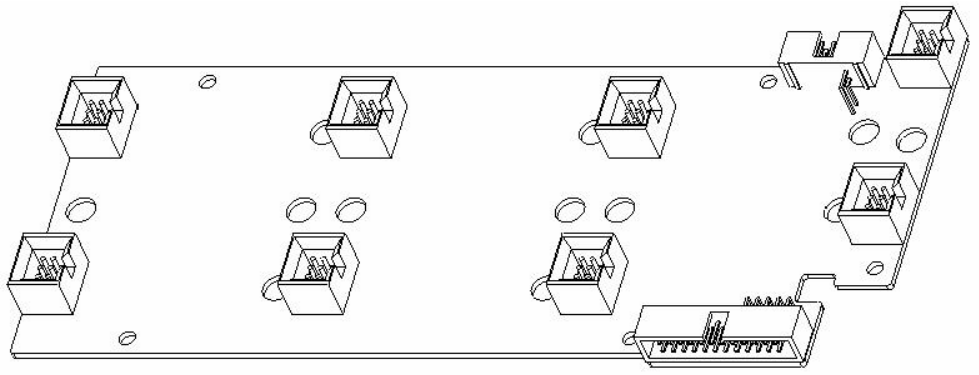


Figure 16. Fan Distribution Board Layout

There are two fan control connectors located on the fan distribution board. The 24-pin connector, found on the side of the board closest to the baseboard, is cabled to a matching connector on the baseboard. This connector provides power and fan speed control to the first four fans and provides management pins for all eight fans. The 2x5 connector found on the opposite edge of the board is used to provide power and fan speed control for the optional remaining bank of four fans and is cabled to either the SCSI or SATA backplane. The following tables provide the pin-out for each of the two fan control connectors.

Table 26. 24-pin Fan Control Connector Pinout (J3K6, J8C1)

24-pin connector on Baseboard (J3K6)		24-pin connector on FDB (J8C1)	
Pin	**Signal Name**	**Pin**	**Signal Name**
1	BB_LED_FAN4_R	1	BB_LED_FAN6_R
2	BB_LED_FAN2_R	2	BB_LED_FAN8_R
3	BB_LED_FAN3_R	3	BB_LED_FAN5_R
4	BB_LED_FAN1_R	4	BB_LED_FAN7_R
5	FAN_TACH_8	5	FAN_SPEED_CNTL2
6	FAN_TACH_4	6	FAN_SPEED_CNTL2
7	FAN_TACH_7	7	FAN_SPEED_CNTL1
8	FAN_TACH_3	8	FAN_SPEED_CNTL2
9	FAN_TACH_6	9	GND
10	FAN_TACH_2	10	GND
11	FAN_TACH_5	11	GND
12	FAN_TACH_1	12	GND
13	GND	13	FAN_TACH_1
14	GND	14	FAN_TACH_5
15	GND	15	FAN_TACH_2
16	GND	16	FAN_TACH_6
17	FAN_SPEED_CNTL2	17	FAN_TACH_3
18	FAN_SPEED_CNTL1	18	FAN_TACH_7
19	FAN_SPEED_CNTL2	19	FAN_TACH_4
20	FAN_SPEED_CNTL2	20	FAN_TACH_8
21	BB_LED_FAN7_R	21	BB_LED_FAN1_R
22	BB_LED_FAN5_R	22	BB_LED_FAN3_R
23	BB_LED_FAN8_R	23	BB_LED_FAN2_R
24	BB_LED_FAN6_R	24	BB_LED_FAN4_R

Table 27. 10-pin Fan Control Connector Pinout (J4l1, J7A1)

10-pin connector on Backplane (J4L1)		10-pin connector on FDB (J7A1)	
Pin	**Signal Name**	**Pin**	**Signal Name**
1	BP_FAN_SPEED_CNTL1	1	BP_FAN_SPEED_CNTL1
2	FAN_PRESENT	2	FAN_PRESENT
3	GND	3	GND
4	GND	4	GND
5	BP_FAN_SPEED_CNTL2	5	BP_FAN_SPEED_CNTL2
6	GND	6	GND
7	BP_FAN_SPEED_CNTL2	7	BP_FAN_SPEED_CNTL2
8	GND	8	GND
9	BP_FAN_SPEED_CNTL2	9	BP_FAN_SPEED_CNTL2
10	Key	10	Key

The system fan module has been designed for ease of use and has support for several management features that can be utilized by the baseboard management system.

- Each fan is designed for tool-less insertion to or removal from the fan module. However, **the fans are not hot swappable**. The server must be turned off before a fan can be replaced.
- Each fan within the module is capable of supporting multiple speeds. If the internal ambient temperature of the system exceeds the value programmed into the thermal sensor data record (SDR), the Baseboard Management Controller (BMC) firmware will increase the speed for all the fans within fan module.

- Each fan connector within the module supplies a tachometer signal allowing for baseboard management to monitor the status of each fan. If one of the fans should fail, the remaining fans will increase their rotation and attempt to maintain the thermal requirements of the system.
- Each fan within the module is equipped with a failure LED. In the event of a fan failure, the failure LED on the failing fan can be illuminated by baseboard management. Note: the fan failure LED functionality is only supported when the system is configured with an Intel® Management Module (IMM).

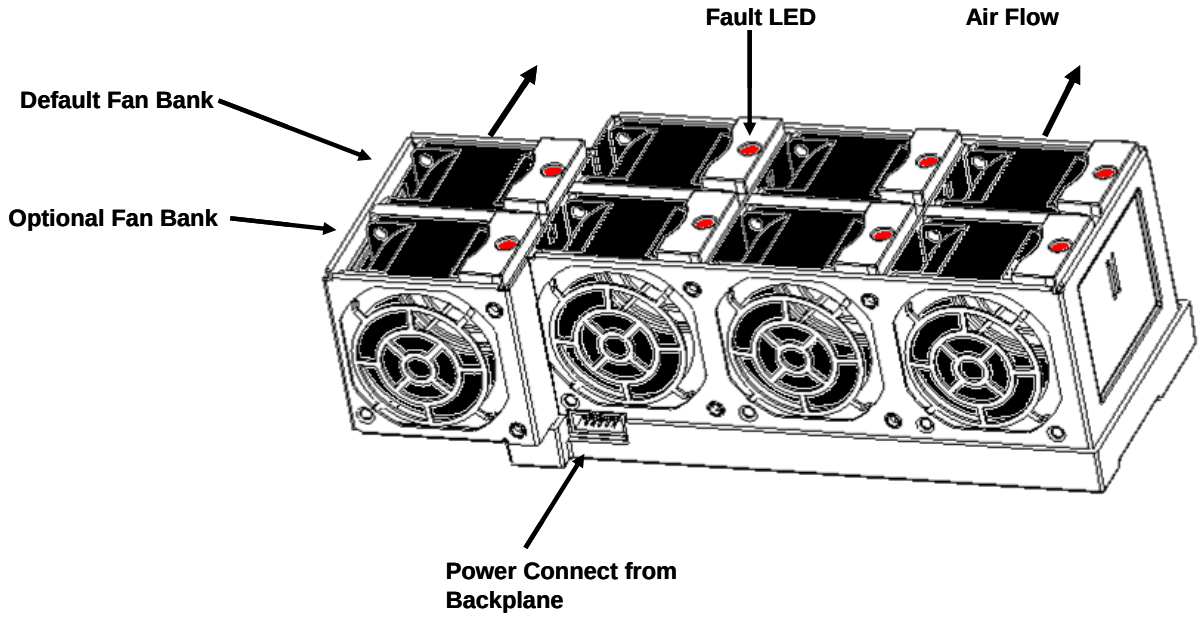


Figure 17. Fan Module Assembly

4.2 Fan Redundancy

By default, the Server Chassis SR2400 comes with four system fans. Under normal operating conditions, these fans provide enough cooling for the system but offer no fan redundancy. If a fan should fail, the system may heat up beyond its thermal limits causing the system to shutdown.

The fan module is designed to support an additional four system fans, supporting a 4+4 fan configuration. In systems configured with an Intel Management Module, fan redundancy is supported in the event of a fan failure. Should a fan fail, the remaining seven system fans will speed up providing adequate cooling to the system. This redundancy model will allow for a single fan failure only. Should a second fan fail, fan redundancy is lost and the system may heat up beyond its thermal limits. A failed fan should be replaced as soon as possible.

With no Intel Management Module installed, a 4+4 fan configuration can be used but is not recommended due to increased acoustics. Fans will operate faster with little cooling benefit. In this configuration there is no fan redundancy. Should any of the eight fans fail, the system may heat up beyond its thermal limits.

4.3 Air Flow Support

To control airflow within the system, the Server Chassis SR2400 uses a combination air baffle and CPU Air Duct to isolate and direct airflow to three critical areas or zones: the Power Supply Zone, the Full Height PCI Zone, and the CPU/Memory/Low Profile PCI Zone.

4.3.1 Power Supply Zone

An air baffle is used to isolate the air flow of the main system board zones from the zone directly behind the power supply. As the power supply fans pull pre-heated air through the power supply from inside the chassis, the zone behind it must remain as cool as possible by drawing air from the leftmost drive bays only.

4.3.2 Full Height Riser Zone

The Full Height Riser zone is the area between the power supply and the full height riser card of the riser assembly. The air flow through this area is generated by FAN4 of the fan module in a non-redundant fan configuration. In a redundant fan configuration, the air flow for this zone is provided by FAN4 and FAN8. Air is drawn from the drive bay area through the fan and pushed out of the system through ventilation holes the back side of the chassis.

4.3.3 CPU / Memory / Low Profile PCI Zone

The CPU / Memory / Low Profile PCI zone is the area between the Low Profile Riser card of the riser assembly and the right chassis wall. In a non-redundant fan configuration, the air flow for this zone is generated by system fans FAN1, FAN2, and FAN3 of the fan module. In a redundant fan configuration, the air flow for this zone is provided by system fans FAN1 and FAN5, FAN2 and FAN6, and FAN3 and FAN7. Air is drawn from the drive bay area, through the fans, directed through the CPU Air Duct, and out through ventilation holes on both the back wall and rear side wall of the chassis.

The CPU Air duct is used to direct air flow through the processor heat sinks for both single and dual processor configurations. For single processor configurations, a flexible air baffle is attached to the air duct as shown in the following diagram.

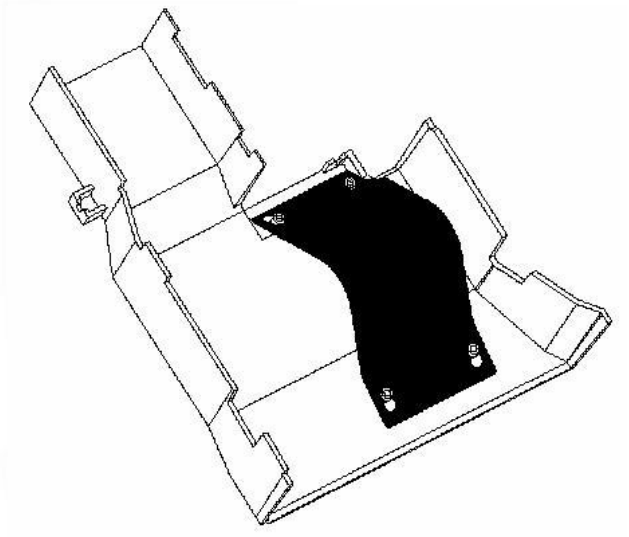


Figure 18. CPU Air Duct with Air Baffle

Operating a single processor configuration without the air baffle installed will result in the processor over heating and may cause the system to shutdown.

4.4 Drive Bay Population

To maintain the proper air pressure within the system, all hard drive bays must be populated with either a hard drive, or drive blank.

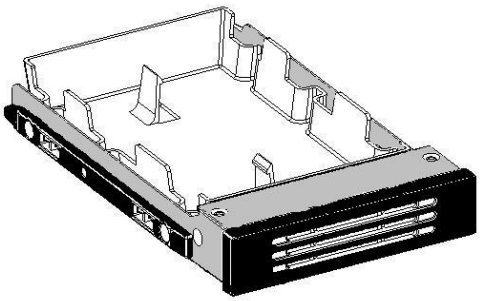


Figure 19. Drive Blank

5. Peripheral and Hard Drive Support

The SR2400 server chassis can be configured to support several different types of hard drive and peripheral configurations. The chassis can support up to five hard disk drives, a slim-line optical or floppy drive, and an optional 6th hard drive or tape drive.

5.1 Slimline Drive Bay

The chassis provides a slim-line drive bay that can be configured for either CDROM, DVD, or Floppy drives with or without the presence of a backplane. The peripheral drives are mounted on a tool-less tray which allows for easy installation into and removal from the chassis. Once inserted into the chassis, the assembly locks into place. For removal, the chassis top cover must be removed and the locking latch disengaged.

5.1.1 Floppy Drive Support

A slim-line floppy drive can be supported in multiple system configurations.

5.1.1.1 Floppy Drive Use with Installed Backplane

When either a SCSI or SATA backplane is installed, the slim-line floppy drive is cabled directly to a connector on the backplane. The following table defines the 28-pin connector which supplies both power and IO signals.

Table 28. 28-pin floppy connector Pinout (J4)

Pin	Name	Pin	Name
1	P5V	15	GND
2	FD_INDEX_L	16	FD_WDATA_L
3	P5V	17	GND
4	FD_DS0_L	18	FD_WGATE_L
5	P5V	19	GND
6	FD_DSKCHG_L	20	FD_TRK0_L
7	Unused	21	GND
8	Unused	22	FD_WP_L
9	2M_MEDIA	23	GND
10	FD_MTR0_L	24	FD_RDATA_L
11	Unused	25	GND
12	FD_DIR_L	26	FD_HDSEL_L
13	FD_DENSEL0	27	GND
14	FD_STEP_L	28	GND

5.1.1.2 Floppy Drive Use with No Backplane Present

When no backplane is present, an interposer card is attached to the floppy drive providing power and IO interconnects between the drive, power supply and baseboard. The interposer card has three connectors; the first has 28 pins which is mated directly to the drive. The pinout for this connector is defined in the previous table. The second connector has 4 pins and is cabled to the 2x3 pin power lead from the power supply. This connector has the following pinout.

Table 29. 4-pin floppy power connector Pinout (J3)

Pin	Name

1	P12V
2	GND
3	GND
4	P5V

The power cable for the floppy drive is included in the Cabled Drive Accessory kit.

The third connector has 34 pins and is cabled to the legacy floppy connector on the baseboard. This connector has the following pinout.

Table 30. 34-pin floppy connector Pinout (J2)

Name	Pin	Pin	Name
GND	1	2	FD_DENSEL0
GND	3	4	2M_MEDIA
GND	5	6	FD_DRATE0_L
GND	7	8	FD_INDEX_L
GND	9	10	FD_MTR0_L
GND	11	12	FD_DS1_L
GND	13	14	FD_DS0_L
GND	15	16	FD_MTR1_L
Unused	17	18	FD_DIR_L
GND	19	20	FD_STEP_L
GND	21	22	FD_WDATA_L
GND	23	24	FD_WGATE_L
GND	25	26	FD_TRK0_L
Unused	27	28	FD_WP_L
GND_FDD	29	30	FD_RDATA_L
GND	31	32	FD_HDSEL_L
MSEN0	33	34	FD_DSKCHG_L

5.1.1.3 Optional Floppy Drive Configuration

For system configurations that require both Optical and Floppy drives, where using a USB Floppy or USB CDROM is not desired or feasible, an accessory kit is available which allows a slim-line floppy drive to be mounted into the hard drive bay directly beneath the slim-line bay as shown in the following diagram.

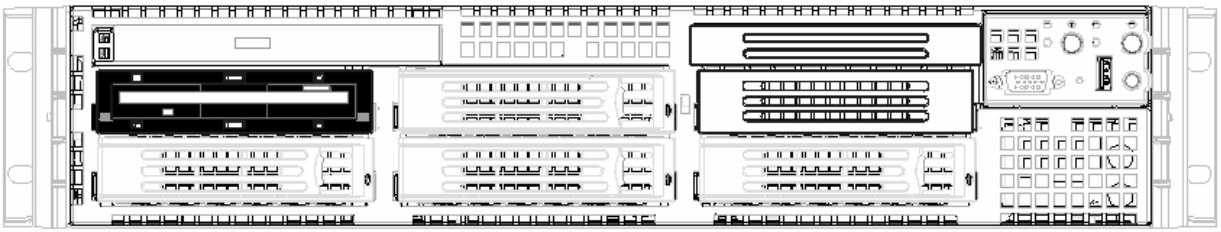


Figure 20. Optional Floppy Drive Configuration

5.1.2 IDE Optical Drive Support

A slim-line IDE CDROM or DVD drive can be supported in different system configurations as defined in the following sub-sections.

5.1.2.1 Optical Drive Use with Installed Backplane

When either a SCSI or SATA backplane is installed, an interposer card is attached to the drive providing the interface to the backplane. The interposer has two connectors; the first has 50 pins and plugs directly into the back of the drive. The following table defines the 50-pin connector which supplies both power and IO signals.

Table 31. 50-pin Drive connector Pinout (J6)

Name	Pin	Pin	Name
RSV_LCM	1	2	RSV_RCM
RSV_GND	3	4	GND
RST_IDE_S_L	5	6	IDE_SDD<8>
IDE_SDD<7>	7	8	IDE_SDD<9>
IDE_SDD<6>	9	10	IDE_SDD<10>
IDE_SDD<5>	11	12	IDE_SDD<11>
IDE_SDD<4>	13	14	IDE_SDD<12>
IDE_SDD<3>	15	16	IDE_SDD<13>
IDE_SDD<2>	17	18	IDE_SDD<14>
IDE_SDD<1>	19	20	IDE_SDD<15>
IDE_SDD<0>	21	22	IDE_SDDREQ
GND	23	24	IDE_SDIOR_L
IDE_SDIOW_L	25	26	GND
IDE_SIORDY	27	28	IDE_SDDACK_L
IRQ_IDE_S	29	30	NC_IDEIO16_L
IDE_SDA<1>	31	32	NC_CBL_DET_S
IDE_SDA<0>	33	34	IDE_SDA<2>
IDE_SDCS0_L	35	36	IDE_SDCS1_L
IDE_SEC_HD_ACT_L	37	38	P5V
P5V	39	40	P5V
P5V	41	42	P5V
GND	43	44	GND
GND	45	46	GND
IDEP_ALE_H	47	48	GND
	49	50	
		52	Unused (50 pin or 52 pin)

The second connector located on the opposite side of the PCB from the first, has 44 pins and is cabled directly to a matching connector on the backplane. The pinout for this connector is defined in the following table.

Table 32. 44-pin internal Drive Interposer-to-Backplane Connector Pinout (J6)

Name	Pin	Pin	Name
RST_IDE_S_L	1	2	GND
IDE_SDD<7>	3	4	IDE_SDD<8>
IDE_SDD<6>	5	6	IDE_SDD<9>
IDE_SDD<5>	7	8	IDE_SDD<10>
IDE_SDD<4>	9	10	IDE_SDD<11>
IDE_SDD<3>	11	12	IDE_SDD<12>
IDE_SDD<2>	13	14	IDE_SDD<13>
IDE_SDD<1>	15	16	IDE_SDD<14>
IDE_SDD<0>	17	18	IDE_SDD<15>
GND	19	20	Unused
IDE_SDDREQ	21	22	GND
IDE_SDIOW_L	23	24	GND
IDE_SDIOR_L	25	26	GND
IDE_SIORDY	27	28	IDEP_ALE_H
IDE_SDDACK_L	29	30	GND

Name	Pin	Pin	Name
IDE_IDE_S	31	32	NC_IDEIO16_L
IDE_SDA<1>	33	34	IDE_CBL_DET_S
IDE_SDA<0>	35	36	IDE_SDA<2>
IDE_SDCS0_L	37	38	IDE_SDCS1_L
IDE_SEC_HD_ACT_L	39	40	GND
P5V	41	42	GND
P5V	43	44	P5V

5.1.2.2 IDE Optical Drive Use with No Backplane Present

When no backplane is present, an interposer card is attached to the drive providing the interface to the baseboard and power. The interposer card has three connectors; the first has 50 pins and is plugged directly into the drive connector. The pinout for this 50 pin connector is defined in the previous sub-section. The second connector has 4 pins and is cabled to the 2x3 pin power cable from the power supply. This connector has the following pinout.

Table 33. 4-pin Drive Power Connector Pinout (J5)

Pin	Name
1	P12V
2	GND
3	GND
4	P5V

Note: The power cable adapter used to connect the drive to the power cable from the power supply is included in the Cabled Drive Accessory kit.

The third connector has 40 pins and is cabled to the legacy IDE connector on the baseboard. This connector has the following pinout.

Table 34. 40-pin IDE Optical Drive Interposer-to-Baseboard connector Pinout (J1)

Name	Pin	Pin	Name
RST_IDE_S_L	1	2	GND
IDE_SDD<7>	3	4	IDE_SDD<8>
IDE_SDD<6>	5	6	IDE_SDD<9>
IDE_SDD<5>	7	8	IDE_SDD<10>
IDE_SDD<4>	9	10	IDE_SDD<11>
IDE_SDD<3>	11	12	IDE_SDD<12>
IDE_SDD<2>	13	14	IDE_SDD<13>
IDE_SDD<1>	15	16	IDE_SDD<14>
IDE_SDD<0>	17	18	IDE_SDD<15>
GND	19	20	Unused
IDE_SDDREQ	21	22	GND
IDE_SDIOW_L	23	24	GND
IDE_SDIOR_L	25	26	GND
IDE_SIORDY	27	28	IDEP_ALE_H
IDE_SDDACK_L	29	30	GND
IDE_IDE_S	31	32	NC_IDEIO16_L
IDE_SDA<1>	33	34	IDE_CBL_DET_S
IDE_SDA<0>	35	36	IDE_SDA<2>
IDE_SDCS0_L	37	38	IDE_SDCS1_L
IDE_SEC_HD_ACT_L	39	40	GND

5.2 Hard Disk Drive Bays

The Server Chassis SR2400 can be configured to support 5 (default) + 1 optional hot swap SCSI or SATA hard disk drives or 3 SATA cabled hard disk drive configurations. For hot swap drive configurations, 3.5” x 1” hard disk drives are mounted to hot swap drive trays for easy insertion to or extraction from the drive bay. For cabled drive configurations, the SATA hard drives are mounted to a fixed mount drive tray which is only removable when detached from inside the chassis.

5.2.1 Hot Swap Drive Trays

In a hot swap configuration, each hard drive must be mounted to a hot swap drive tray, making insertion and extraction of the drive from the chassis very simple. Each drive tray has its own dual purpose latching mechanism which is used to both insert/extract drives from the chassis and lock the tray in place. Each drive tray supports a light pipe providing a drive status indicator, located on the backplane, to be viewable from the front of the chassis.

Note: Depending on the controller used, SATA hard disk drives may not report errors using the drive’s status indicator.

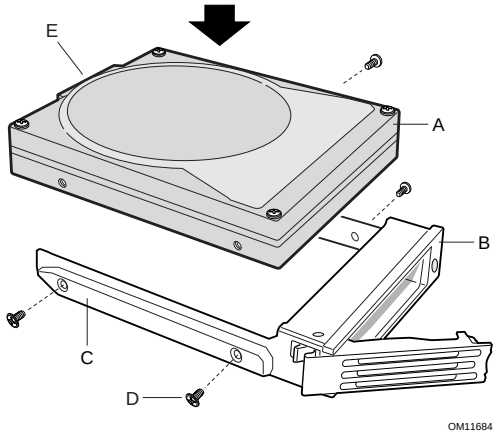


Figure 21. Hard Drive Tray Assembly

A. Hard Drive
B. Drive Carrier
C. Side Rail
D. Mounting Screw
E. Hard Drive Connector

5.2.2 Fixed Mount Drive Trays

In a cabled SATA drive configuration, each hard drive must be mounted to a fixed mount drive tray. The tray is designed to slide into the drive bay and lock into place. To remove the drive, the chassis must be opened to disengage the drive tray latch from the bay.

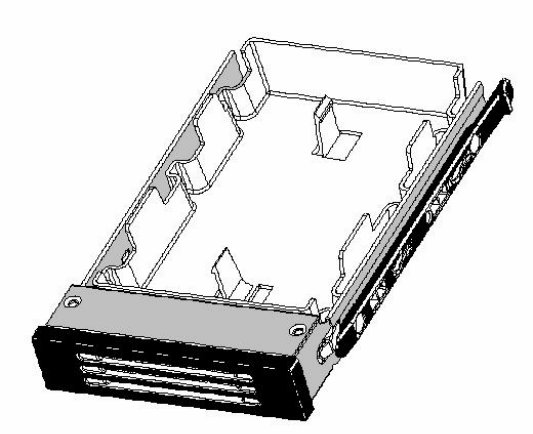


Figure 22. Fixed Drive Tray w/Blank

5.3 Hot-Swap SCSI Backplane

The Server Chassis SR2400 supports a multifunctional SCSI Backplane, designed around the QLogic® GEM359 enclosure management controller and provides the following feature set and functionality:

- QLogic® GEM359 enclosure management controller
  - External non-volatile Flash ROM
  - Two I^2C interfaces
  - Low Voltage Differential (LVD) SCSI Interface
  - SCSI-3 compatible
  - Compliance with SCSI Accessed Fault Tolerant Enclosures (SAF-TE) specification, version 1.00 and addendum
  - Compliance with Intelligent Platform Management Interface (IPMI)
- Five SCA-2 compatible hot-swap SCSI connectors
- Designed to support an optional 6th SCSI hard drive, or power for a tape drive.
- Onboard LVD SCSI Termination – SPI-4 compatible
- Temperature Sensor
- FRU EEPROM
- One 2x3-pin Power Connector
- Fan Control Connector
- Slim-line IDE Connector for optical drive support
- Slim-line Floppy Drive Connector
- Control Panel Connector
- Provides a pathway for floppy, control panel, IDE, and video signals from the baseboard to the appropriate connectors

5.3.1 Hot-Swap SCSI Backplane Placement and Board Layout

The Hot-Swap SCSI Backplane installs on the back side of the hot-swap drive bay inside the chassis. Alignment features on the chassis and backplane assembly make for easy tool-less installation. The following diagram shows the layout of components and connectors on the Hot-swap SCSI Backplane printed circuit board.

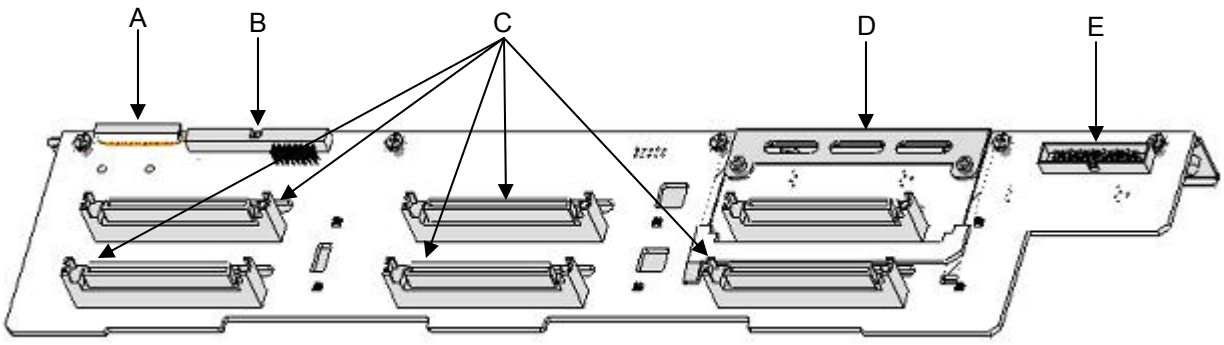


Figure 23. Hot-Swap SCSI Backplane Layout

Note: To prevent the backplane from flexing when installing or removing hard drives from the drive bay, the system top cover must be on the system. Having the top cover installed will ensure the drives attach securely to the drive connectors on the backplane.

Table 35. SCSI Backplane Layout Description

Reference	Description
A	Floppy Drive Connector
B	IDE Optical Drive Connector
C	SCA2 Hard Drive Connectors
D	6th Drive Insert (optional)
E	Control Panel Connector

5.3.2 SCSI Backplane Functional Architecture

The following figure shows the functional blocks of the hot-swap SCSI backplane. This section provides a high-level description of the functionality distributed between them.

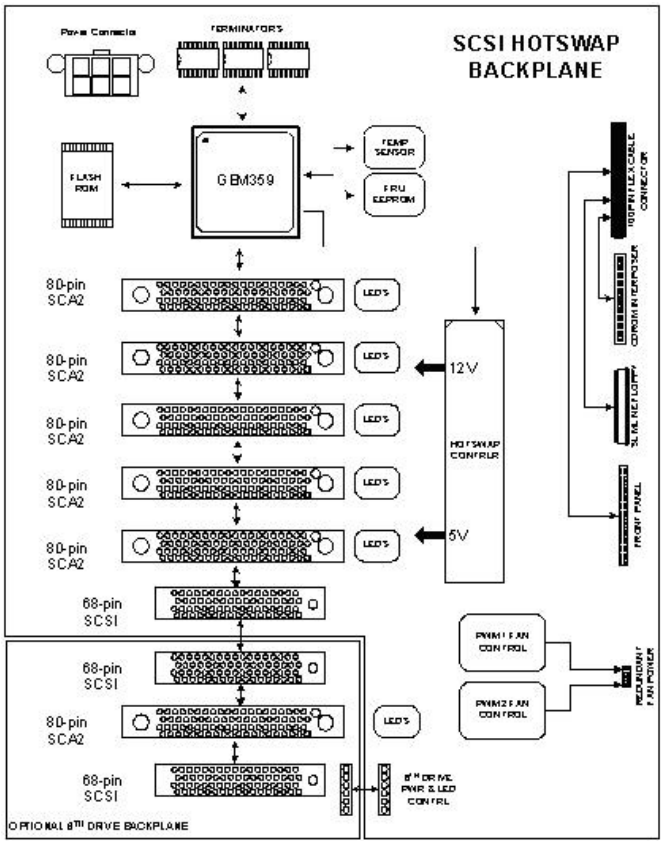


Figure 24. SCSI Backplane Block Diagram

5.3.2.1 Enclosure Management Controller

The QLogic® GEM359 is an enclosure management controller for the SCSI backplane and monitors various aspects of a storage enclosure. The chip provides in-band SAF-TE and SES management through the SCSI interface. The GEM359 also supports the IPMI specification by

providing management data to a baseboard management controller through the 100-pin connector.

The GEM359 comes in a 144-pin Low profile Quad Flat Pack package and operates from 3.3V and has an input clock frequency of 10MHz. It has general input and output pins that allow customization. Some of these GPIOs are used for drive detection and power controller enable/disable functionality.

5.3.2.1.1 SCSI Interface

The GEM359 supports LVD SCSI operation through 8-bit asynchronous SCSI data transfers. The following SCSI Command Set is supported:

- Inquiry
- Read Buffer
- Write Buffer
- Test Unit Ready
- Request Sense
- Send Diagnostic
- Receive Diagnostic

The GEM359 supports the following SAF-TE Command Set:

- Read Enclosure Configuration
- Read Enclosure Status
- Red Device Slot Status
- Read Global Flags
- Write Device Slot Status
- Perform Slot Operation

5.3.2.1.2 I^2C Serial Bus Interface

The GEM359 supports two independent I2C interface ports with bus speeds of up to 400Kbits. The I2C core incorporates 8-bit FIFOs for data transfer buffering. The I^2C bus supports the National® LM75 or equivalent I^2C -based temperature sensors. This enables actual temperature value readings to be returned to the host. The Intelligent Platform Management Bus (IPMB) is supported through I^2C port 1.

The figure below provides a block diagram of the I^2C bus connection implemented on the SCSI HSBP.

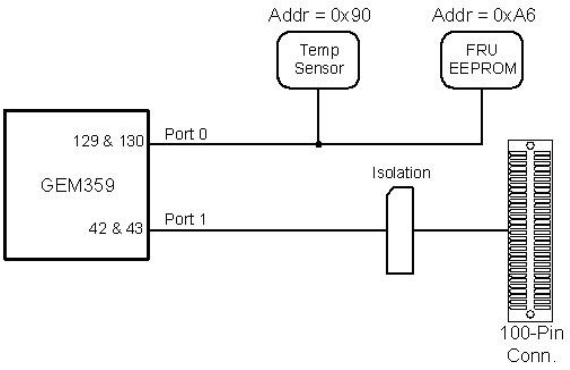


Figure 25. SCSI I2C Block Diagram

5.3.2.1.3 Temperature Sensor

The SCSI HSBP provides a National* LM75 or equivalent temperature sensor with over-temperature detector. The host can query the LM75 at any time to read the temperature. The host can program both the temperature alarm threshold and the temperature at which the alarm condition goes away.

The temperature sensor has the I^2C address of 0x90 on GEM359's Port 0.

5.3.2.1.4 Serial EEPROM

The SCSI HSBP provides an Atmel* 24C02 or equivalent serial EEPROM for storing the FRU information. The 24C02 provides 2048 bits of serial electrically erasable and programmable read-only

The seriall EEPROM has the I^2C addres of 0xA6 on GEM359's Port 0.

5.3.2.1.5 External Memory Device

The SCSI HSBP contains a non-volatile 16K Top Boot Block, 4Mbit Flash memory device that stores the configuration data and operating firmware executed by the GEM359's internal CPU.

The Flash memory operates off the 3.3V rail and housed in a 48-pin TSOP Type 1 package.

5.3.2.1.6 Drive Activity / Fault LEDs

The SCSI backplane provides Drive Activity/Fault LED Indicators, mounted near each SCA-2 connector. The driving circuitry is entirely contained on the backplane. The SCSI HD itself drives the ACTIVITY LED whenever the drive gets accessed. The GEM359 controller drives the FAULT LED whenever an error condition, as defined by the FW, gets detected.

5.3.3 SCSI Backplane Connector Definitions

As a multifunctional board, several different connectors can be found on the SCSI backplane. This section defines the purpose and pin-out associated with each connector.

5.3.3.1 Power Connectors

The SCSI backplane provides power to the six drive bays supporting up to six hard drives or five hard drives and an optional type drive. The SCSI backplane also provides 5VSB to the optional Intel Local Control Panel.

A 6-pin power cable from the power supply harness is routed to the backplane and plugs into a 2x3 shrouded plastic PC power connector. The following table provides the connector pinout.

Table 36. SCSI Backplane Power Connector Pinout (J9)

Pin	Name	Pin	Name
1	GND	4	P12V
2	GND	5	P12V
3	P5V	6	P5V_STBY

To support an optional tape drive or 6th SCSI hard drive, a cable is routed from a 7-pin connector on the backplane to either the tape drive or the optionally installed 6th drive add-in board. This connector routes both power and LED control to these devices. The following table provides the pin-out to the 1x7 un-shrouded header.

Table 37. 7-pin SCSI power connector Pinout (J1)

Pin	Name
1	P12V
2	GND
3	GND
4	P5V
5	SCSI5_MATED_L
6	GND
7	HD5_ACT_LED_L

5.3.3.2 Redundant Fan Power Connector

The SCSI backplane provides two pulse width modulated (PWM) power outputs to control the optional bank of four system fans. Two control PWM inputs are generated from the baseboard's LM93 health monitor IC and routed through the high density 100 pin Front Panel/Floppy/IDE flex circuit interface. Two high frequency PWM amplifying circuits are located on the backplane and the output is routed to a 2X5 pin header for the bank of redundant fans.

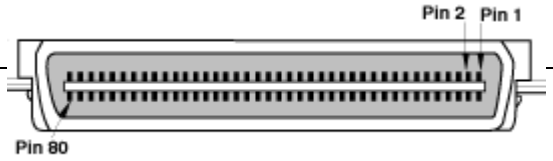
Table 38. 10-pin Redundant Fan Connector Pinout (J5)

Pin	Name	Pin	Name
1	FAN_SPEED_CTL_1	2	R_FAN_PRESENT
3	GND	4	GND
5	FAN_SPEED_CTL_2	6	GND
7	FAN_SPEED_CTL_2	8	GND
9	FAN_SPEED_CTL_2	10	KEY

PWM 1 supports one system fan with max current of 1.7A. PWM 2 supports up to three system fans with max current limit of 5.0A.

5.3.3.3 SCA2 Hot-Swap Connectors

The SCSI Backplane provides five hot-swap SCA2 connectors that provide power and SCSI



signals using a single connector. An optional sixth drive connector can be added by installing the 6th Drive Option Kit. Each SCA drive attaches to the backplane using one of these connectors.

Figure 26. 80-pn SCA2 Connector

Table 39. 80-pin SCA-2 SCSI Interface Pinout (J9, J2, J10, J11, J12)

Signal Name	Pin	Pin	Signal Name
GND	41	1	P12V
GND	42	2	P12V
GND	43	3	P12V
SCSI_MATED	44	4	P12V
NC_3V_CHG	45	5	NC_3V_1
BP_SCSI_DIFSNS	46	6	NC_3V_2
BP_SCSI_D11P	47	7	BP_SCSI_D11N
BP_SCSI_D10P	48	8	BP_SCSI_D10N
BP_SCSI_D9P	49	9	BP_SCSI_D9N
BP_SCSI_D8P	50	10	BP_SCSI_D8N
BP_SCSI_IOP	51	11	BP_SCSI_ION
BP_SCSI_REQP	52	12	BP_SCSI_REQN
BP_SCSI_CDP	53	13	BP_SCSI_CDN
BP_SCSI_SELP	54	14	BP_SCSI_SELN
BP_SCSI_MSGP	55	15	BP_SCSI_MSGN
BP_SCSI_RSTP	56	16	BP_SCSI_RSTN
BP_SCSI_ACKP	57	17	BP_SCSI_ACKN
BP_SCSI_BSYP	58	18	BP_SCSI_BSYN
BP_SCSI_ATNP	59	19	BP_SCSI_ATNN
BP_SCSI_DP0P	60	20	BP_SCSI_DP0N
BP_SCSI_D7P	61	21	BP_SCSI_D7N
BP_SCSI_D6P	62	22	BP_SCSI_D6N
BP_SCSI_D5P	63	23	BP_SCSI_D5N
BP_SCSI_D4P	64	24	BP_SCSI_D4N
BP_SCSI_D3P	65	25	BP_SCSI_D3N
BP_SCSI_D2P	66	26	BP_SCSI_D2N
BP_SCSI_D1P	67	27	BP_SCSI_D1N
BP_SCSI_D0P	68	28	BP_SCSI_D0N
BP_SCSI_DP1P	69	29	BP_SCSI_DP1N
BP_SCSI_D15P	70	30	BP_SCSI_D15N
BP_SCSI_D14P	71	31	BP_SCSI_D14N
BP_SCSI_D13P	72	32	BP_SCSI_D13N
BP_SCSI_D12P	73	33	BP_SCSI_D12N
SCSI_MATED	74	34	P5V
GND	75	35	P5V
GND	76	36	P5V
HD_ACT_LED_L	77	37	Unused
Unused	78	38	GND
Unused	79	39	Unused
Unused	80	40	Unused
GND	B2	B1	GND

The HSBP provides active termination, termination voltage, a reset-able fuse, and a protection diode for each SCSI channel. By design, the on-board termination cannot be disabled.

5.3.3.4 Serverboard to SCSI Interconnect

A 68-pin SCSI cable is used to interface the SCSI backplane with either the on-board SCSI channel of the server board or an add-in PCI SCSI controller.

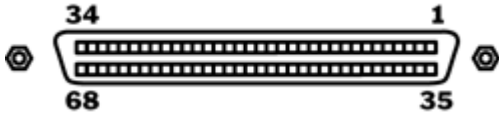


Figure 27. 68-pin SCSI Cable Connector

Table 40. Ultra2 (LVD) SCSI Connector Pinout (J8)

Name	Pin	Pin	Name
BP_SCSI_D12P	A1	B1	BP_SCSI_D12N
BP_SCSI_D13P	A2	B2	BP_SCSI_D13N
BP_SCSI_D14P	A3	B3	BP_SCSI_D14N
BP_SCSI_D15P	A4	B4	BP_SCSI_D15N
BP_SCSI_DP1P	A5	B5	BP_SCSI_DP1N
BP_SCSI_D0P	A6	B6	BP_SCSI_D0N
BP_SCSI_D1P	A7	B7	BP_SCSI_D1N
BP_SCSI_D2P	A8	B8	BP_SCSI_D2N
BP_SCSI_D3P	A9	B9	BP_SCSI_D3N
BP_SCSI_D4P	A10	B10	BP_SCSI_D4N
BP_SCSI_D5P	A11	B11	BP_SCSI_D5N
BP_SCSI_D6P	A12	B12	BP_SCSI_D6N
BP_SCSI_D7P	A13	B13	BP_SCSI_D7N
BP_SCSI_DP0P	A14	B14	BP_SCSI_DP0N
GND	A15	B15	GND
BP_SCSI_DIFSNS	A16	B16	GND
TERMI_PWR	A17	B17	TERMI_PWR
TERMI_PWR	A18	B18	TERMI_PWR
Unused	A19	B19	Unused
GND	A20	B20	GND
BP_SCSI_ATNP	A21	B21	BP_SCSI_ATNN
GND	A22	B22	GND
BP_SCSI_BSYP	A23	B23	BP_SCSI_BSYN
BP_SCSI_ACKP	A24	B24	BP_SCSI_ACKN
BP_SCSI_RSTP	A25	B25	BP_SCSI_RSTN
BP_SCSI_MSGP	A26	B26	BP_SCSI_MSGN
BP_SCSI_SELP	A27	B27	BP_SCSI_SELN
BP_SCSI_CDP	A28	B28	BP_SCSI_CDN
BP_SCSI_REQP	A29	B29	BP_SCSI_REQN
BP_SCSI_IOP	A30	B30	BP_SCSI_ION
BP_SCSI_D8P	A31	B31	BP_SCSI_D8N
BP_SCSI_D9P	A32	B32	BP_SCSI_D9N
BP_SCSI_D10P	A33	B33	BP_SCSI_D10N
BP_SCSI_D11P	A34	B34	BP_SCSI_D11N

5.3.3.5 Server Board to Floppy/CP/IDE/Video Interface

As a multifunctional board, the SCSI backplane provides a pathway for Floppy Disk, Control Panel and CD-ROM signals from the server board to connector interfaces for each of the devices. The baseboard and backplane have matching 100-pin high density connectors which are attached using a mylar flex cable. The following table provides the pin-out for the 100-pin connector.

Table 41. 100-pin Floppy / CP / CD-ROM / Video Connector Pinout (J6)

Pin	Name	Pin	Name
A1	GND	B1	V_IO_VSYNC_BUFF_FP_L
A2	V_IO_RED_CONN_FP	B2	V_IO_HSYNC_BUFF_FP_L
A3	V_IO_GREEN_CONN_FP	B3	1_WIRE_BUS
A4	V_IO_BLUE_CONN_FP	B4	EMP_DCD2_L
A5	VIDEO_IN_USE	B5	EMP_CTS2_L
A6	EMP_DTR2_L	B6	EMP_SOUT2
A7	EMP_RTS2_L	B7	EMP_IN_USE
A8	EMP_SIN2	B8	NIC2_ACT_LED_L
A9	EMP_DSR2_L	B9	NIC2_LINK_LED_R_L
A10	FP_NMI_BTN_L	B10	FP_CHASSIS_INTRU
A11	GND	B11	PB1_I2C_5VSB_SCL
A12	FP_ID_SW_L	B12	PB1_I2C_5VSB_SDA
A13	FAULT_LED_5VSB_P	B13	NIC1_ACT_LED_L
A14	FP_RST_BTN_L	B14	NIC1_LINK_LED_R_L
A15	HDD_FAULT_LED_R_L	B15	FP_ID_LED_R_L
A16	FP_PWR_BTN_L	B16	IPMB_I2C_5VSB_SCL
A17	HDD_LED_ACT_R_L	B17	P5V_STBY
A18	HDD_LED_5V_A	B18	FP_SYS_FLT_LED2_R_L
A19	IMPB_I2C_5VSB_SDA	B19	FP_SYS_FLT_LED_R_L
A20	GND	B20	FP_PWR_LED_R_L
A21	FP_PWR_LED_5VSB	B21	RST_IDE_S_L
A22	RST_P6_PWRGOOD	B22	FD_HDSEL_L
A23	FD_DSKCHG_L	B23	FD_RDATA_L
A24	FD_WPD_L	B24	FD_WDATA_L
A25	FD_TRK0_L	B25	FD_STEP_L
A26	FD_WGATE_L	B26	FD_MTR0_L
A27	FD_DIR_L	B27	FD_DENSEL0
A28	FD_DS0_L	B28	FD_INDEX_L
A29	GND	B29	IDE_SDD<8>
A30	IDE_SDD<7>	B30	IDE_SDD<9>
A31	IDE_SDD<6>	B31	IDE_SDD<10>
A32	IDE_SDD<5>	B32	IDE_SDD<11>
A33	IDE_SDD<4>	B33	IDE_SDD<12>
A34	IDE_SDD<3>	B34	IDE_SDD<13>
A35	IDE_SDD<2>	B35	IDE_SDD<14>
A36	IDE_SDD<1>	B36	IDE_SDD<15>
A37	IDE_SDD<0>	B37	IDE_SDDREQ
A38	GND	B38	IDE_SDIOW_L
A39	IDE_SDDACK_L	B39	IDE_SDIOR_L
A40	IDE_SDA<1>	B40	IDE_SIORDY
A41	IDE_SDA<0>	B41	IRQ_IDE_S
A42	IDE_SDCS0_L	B42	IDE_SDA<2>
A43	IDE_SEC_HD_ACT_L	B43	IDE_SDCS1_L
A44	GND	B44	FAN_PWM1
A45	Reserved	B45	R_FAN_PRESENT
A46	Reserved	B46	Reserved
A47	Reserved	B47	Reserved
A48	Reserved	B48	Reserved
A49	FAN_PWM2	B49	Reserved
A50	P5V_STBY	B50	GND

5.3.3.6 Floppy Drive Connector

With a slim-line floppy drive installed into either the slim-line drive bay or the optionally installed floppy drive kit located in one of the hard drive bays, the floppy cable is routed to a 28-pin connector on the backplane. The following table provides the pin-out for the floppy connector.

Table 42. 28-pin floppy connector Pinout (J15)

Pin	Name	Pin	Name
1	P5V	15	GND
2	FD_INDEX_L	16	FD_WDATA_L
3	P5V	17	GND
4	FD_DS0_L	18	FD_WGATE_L
5	P5V	19	GND
6	FD_DSKCHG_L	20	FD_TRK0_L
7	Unused	21	GND
8	Unused	22	FD_WP_L
9		23	GND
10	FD_MTR0_L	24	FD_RDATA_L
11	Unused	25	GND
12	FD_DIR_L	26	FD_HDSEL_L
13	FD_DENSEL0	27	GND
14	FD_STEP_L	28	GND

5.3.3.7 Internal IDE Optical Drive Connector

With an IDE Optical drive installed in the slim-line drive bay, the drive cable is routed from a connector on the drive interposer card to a 44-pin connector on the backplane. This connector houses pins for both power and IO signals. The following table provides the connector pinout.

Table 43. 44-pin internal CD-ROM connector Pinout (J3)

Name	Pin	Pin	Name
RST_IDE_S_L	1	2	GND
IDE_SDD<7>	3	4	IDE_SDD<8>
IDE_SDD<6>	5	6	IDE_SDD<9>
IDE_SDD<5>	7	8	IDE_SDD<10>
IDE_SDD<4>	9	10	IDE_SDD<11>
IDE_SDD<3>	11	12	IDE_SDD<12>
IDE_SDD<2>	13	14	IDE_SDD<13>
IDE_SDD<1>	15	16	IDE_SDD<14>
IDE_SDD<0>	17	18	IDE_SDD<15>
GND	19	20	Unused
IDE_SDDREQ	21	22	GND
IDE_SDIOW_L	23	24	GND
IDE_SDIOR_L	25	26	GND
IDE_SIORDY	27	28	IDEP_ALE_H
IDE_SDDACK_L	29	30	GND
IDE_IDE_S	31	32	NC_IDEIO16_L
IDE_SDA<1>	33	34	IDE_CBL_DET_S
IDE_SDA<0>	35	36	IDE_SDA<2>
IDE_SDCS0_L	37	38	IDE_SDCS1_L
IDE_SEC_HD_ACT_L	39	40	GND
P5V	41	42	GND
P5V	43	44	P5V

5.3.3.8 Control Panel Interface Connector

The SCSI backplane provides a pathway for control panel signals from the high density 100-pin connector to a 50-pin control panel connector. The pin-out for the connector is shown in the following table.

Table 44. 50-pin SCSI Backplane to Control Panel Connector Pinout (J5)

Description	Pin #	Pin #	Description
V_IO_RED_CONN_FP	1	2	GND
V_IO_GREEN_CONN_FP	3	4	GND
V_IO_BLUE_CONN_FP	5	6	GND
V_IO_HSYNC_BUFF_FP_L	7	8	GND
V_IO_VSYNC_BUFF_FP_L	9	10	GND
VIDEO_IN_USE	11	12	1_WIRE_BUS
EMP_DTR2_L	13	14	EMP_DCD2_L
EMP_RTS2_L	15	16	EMP_CTS2_L
EMP_SIN2_L	17	18	EMP_SOUT2
EMP_DSR2_L	19	20	EMP_IN_USE
FP_NMI_BTN_L	21	22	Unused
NIC2_ACT_LED_L	23	24	NIC2_LINK_LED_R_L
FP_ID_SW_GND	25	26	FP_CHASSIS_INTRU
FP_ID_SW_L	27	28	BP_I2C_SCL
GND	29	30	BP_I2C_SDA
FP_RST_BTN_L	31	32	NIC1_ACT_LED_L
HDD_FAULT_LED_R_L	33	34	NIC1_LINK_LED_R_L
FP_PWR_BTN_L	35	36	FP_ID_LED_R_L
IPMB_I2C_5VSB_SCL	37	38	GND
IPMB_I2C_5VSB_SDA	39	40	HDD_LED_5V_A
FP_PWER_LED_R_L	41	42	FAULT_LED_5VSB_P
FP_PWR_LED_5VSB	43	44	FP_SYS_FLT_LED2_R_L
RST_P6_PWRGOOD	45	46	FP_SYS_FLT_LED_R_L
HDD_LED_ACT_R_L	47	48	P5V
PWR_LCD_5VSB	49	50	PWR_LCD_5VSB

5.3.4 Optional 6Th SCSI Drive

The SCSI Backplane is capable of supporting a 6th SCSI hard drive with the addition of an optionally installed backplane add-in board. The 6th drive add-in board assembly consists of a PCB with power and interface connectors, and a mounting bracket allowing for the add-in card to slide into a fitted cut out on the existing backplane.

Using a standard SCA2 type connector, the 6th SCSI hard drive is fully hot swappable.

When the 6th drive add-in card is installed, the SCSI cable from the serverboard is routed to the lower of two 68 pin connectors on the backside of the add-in card. Then a second custom cable is routed from the second (upper) 68-pin connector to a matching connector on the backplane. See the SCSI Connector tables found early in this chapter for details on the pinout definition for each of the connectors.

Power for the 6th hard drive is provided by attaching a seven wire cable from the backplane to a matching connector on the add-in board. The following table provides the pinout for the 7-pin power connector.

Table 45. 6th Drive 7-pin Power Connector Pinout

Pin	Name

1	P12V
2	GND
3	GND
4	P5V
5	SCSI5_MATED_L
6	GND
7	HD5_ACT_LED_L

The entire 6th Drive assembly, including: PCB, bracket, power cable, and SCSI BP to Add-in Board cable are available in on optional accessory kit.

5.4 Hot-Swap SATA Backplane

The SR2400 server chassis supports a multifunctional SATA Backplane designed around the QLogic* GEM424 enclosure management controller. The following features and functions are supported:

- QLogic® GEM424 enclosure management controller
  - External non-volatile SEEPROMs
  - Three I^2C interfaces
  - SATA and SATA-II extension compatible
  - Compliance with SATA Accessed Fault Tolerant Enclosures (SAF-TE) specification, version 1.00 and addendum
  - Compliance with Intelligent Platform Management Interface 1.5 (IPMI)
- Support for up to five hot swap SATA Drives
- Designed to support an optional 6th hot swap SATA hard drive or power for a tape drive.
- Temperature Sensor
- FRU EEPROM
- One 2 x 3-pin Power Connector
- Fan Control Connector
- Slim-line IDE Connector for optical drive support
- Slim-line Floppy Drive Connector
- Control Panel Connector
- Drive Status LEDs
- Provides a pathway for floppy, control panel, IDE, and video signals from the baseboard to the appropriate connectors

5.4.1 SATA Backplane Layout

The Hot-Swap SATA Backplane installs on the back side of the hot-swap drive bay inside the chassis. Alignment features on the chassis and backplane assembly make for easy tool-less installation. The following diagram shows the layout of components and connectors found on the board.

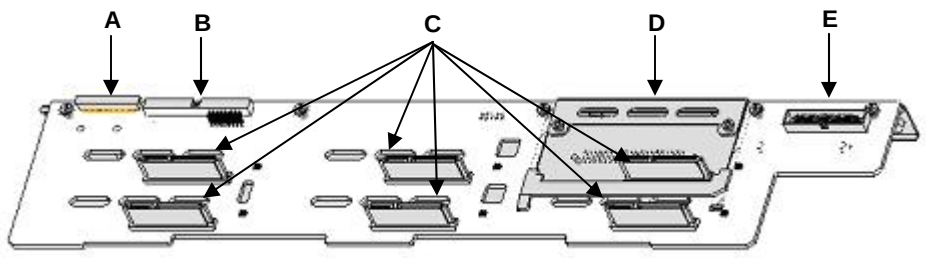


Figure 28. SATA Backplane Layout

Table 46. SATA Backplane Layout Reference Descriptions

Reference	Description
A	Floppy Drive Connector
B	IDE Optical Drive Connector
C	Hot Swap SATA Drive Connectors
D	6th Hot Swap SATA Drive Add-in Module (Optional)
E	50-Pin Control Panel Connector

Note: To prevent the backplane from flexing when installing or removing hard drives from the drive bay, the system top cover must be on the system. Having the top cover installed will ensure the drives attach securely to the drive connectors on the backplane.

5.4.2 SATA Backplane Functional Architecture

The figure below shows the functional blocks of the SATA backplane.

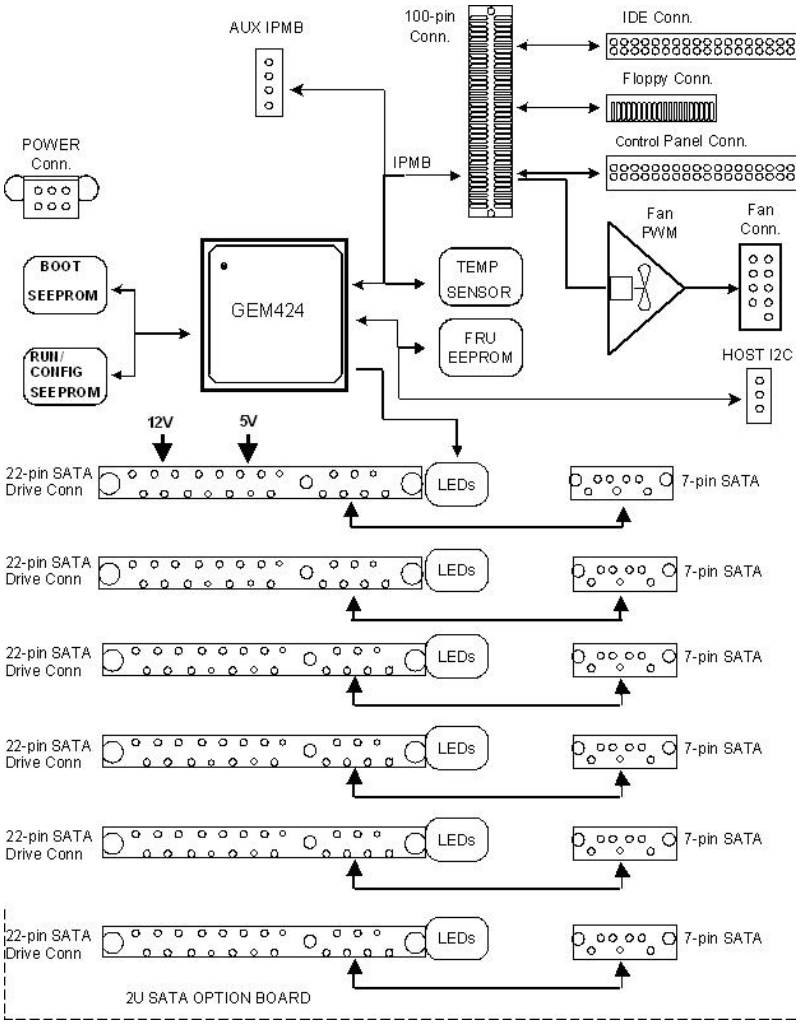


Figure 29. SATA Backplane Functional Block Diagram

5.4.2.1 Enclosure Management Controller

The QLogic* GEM424 is an enclosure management controller for the SATA backplane and monitors various aspects of a storage enclosure. The chip provides in-band SAF-TE and SES management through the SATA Host I^2C interface. The GEM424 also supports the IPMI specification by providing management data to a baseboard management controller through the IPMB via the 100-pin connector.

The GEM424 comes in a 80-pin Thin Quad Flat Pack (TQFP) package and operates from 3.3V and input clock frequency of 20MHz. It has general input and output pins that allow for customization. These GPIOs are used for hardware drive detection and driving FAULT and ACTIVITY LEDs.

5.4.2.1.1 SATA Interface

The GEM424 implements SAF-TE over the HBA I^2C interface, and supports the following SAF-TE Command Set:

- Read Enclosure Configuration
- Read Enclosure Status
- Red Device Slot Status
- Read Global Flags
- Write Device Slot Status
- Perform Slot Operation

5.4.2.1.2 I2C Serial Bus Interface

The GEM424 supports two independent I2C interface ports with bus speeds of up to 400Kbits. The I^2C core incorporates 8-bit FIFOs for data transfer buffering. The I^2C bus supports the National* LM75 or equivalent I^2C -based temperature sensors. This enables actual temperature value readings to be returned to the host. The Intelligent Platform Management Bus (IPMB) is supported through I^2C port 0.

The figure below provides a block diagram of I^2C bus connection implemented on the SR2400 2U SATA HSBP.

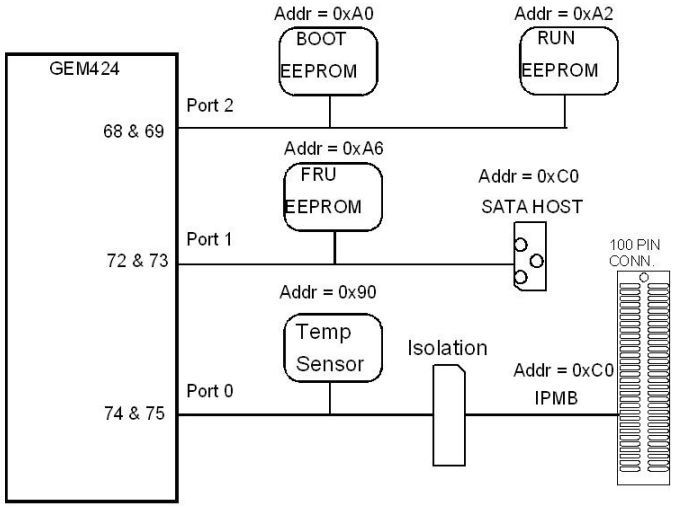


Figure 30. SATA Backplane I2C Block Diagram

5.4.2.2 Temperature Sensor

The SATA HSBP uses a National® LM75 or equivalent temperature sensor with over-temperature detector. The host can query the LM75 at any time to read the temperature.

The temperature sensor has the I^2C address of 0x90h on GEM424's Port 0.

5.4.2.3 Serial EEPROM

The SATA HSBP uses an Atmel* 24C02 or equivalent serial EEPROM for storing the FRU information. The 24C02 provides 2048 bits of serial electrically erasable and programmable read-only

The serial EEPROM has the I^2C addres of 0xA6h on GEM424's Port 1.

5.4.2.4 External Memory Device

The SATA HSBP uses non-volatile 32K and 64K Serial EEPROM devices for Boot and Run-Time/Configuration code storage respectively. These devices reside on the GEM424's private I^2C bus.

The SEEPROMs operate off the 5.0V rail and are housed in 8-pin SOIC packages

5.4.3 LEDs

The SATA HSBP contains a green ACTIVITY LED and an amber FAULT LED for each of the six drive connectors. The ACTIVITY LED is driven by both the GEM424 controller and SATA drives themselves using pin 11 on the connector. Therefore systems with newer SATA drives supporting pin 11 can support drive activity regardless of what SATA controller is used. The FAULT LED is driven by the GEM424 controller whenever an error condition is detected.

Activity and Fault LED functions are only available when a SATA host controller that supports the SAF-TE protocol over I^2C is connected to the SR2400 2U SATA HSBP via the SATA Host I^2C connector, J7M3.

Table 47. SATA LED Function Definitions

STATUS LED	DEFINITION
GREEN ON	HDD Activity
AMBER ON	HDD Fault
AMBER Blinking	Rebuild in Progress

5.4.4 SATA Backplane Connectors

As a multifunctional board, several different connectors can be found on the SATA backplane. This section defines the purpose and pin-out associated with each connector.

5.4.4.1 Power Connectors

The SATA backplane provides power to the six drive bays supporting up to six hard drives or five hard drives and an optional type drive. The SCSI backplane also provides 5VSB to the optional LCD control panel assembly.

A 6-pin power cable from the power supply harness is routed to the backplane and plugs into a 2x3 shrouded plastic PC power connector. The following table provides the connector pinout.

Table 48. SATA Backplane Power Connector Pinout

Pin	Name	Pin	Name
1	GND	4	P12V
2	GND	5	P12V
3	P5V	6	P5V_STBY

The SATA HSBP has one connector that allows integration of the 2U SATA Option Board into the HSBP. This connector provides power from the HSBP to the Option board and Drive presence detect and HDD5 Activity from the option board back to the HSBP.

The following table defines the pin-out of the 2U SATA Option Board power connector J2L1.

Table 49. Option Board Power Connector Pin-out

Pin	Signal Name	Definition
1	SCSI5+12V	12V power to SATA HD5
2	GND	Ground
3	GND	Ground
4	SCSI5+5V	5V power to SATA HD5
5	HD5_PRESENT	SATA HD5 Presence Detect
6	GND	Ground
7	HDD5_ACT_LED_L	SATA HD5 Activity (driven directly from HDDs that support the feature)

To support an optional tape drive, a power cable is routed from a 4-pin connector on the backplane to the tape drive. The following table provides the pin-out for this connector.

Table 50. 4-pin SATA optional tape dirve power connector Pinout (J15)

Pin	Name
1	P12V
2	GND
3	GND
4	P5V

The power cable for this connector is provided with the Tape Drive Accessory Kit.

5.4.4.2 Redundant Fan Power Connector

The SATA backplane provides two pulse width modulated (PWM) power outputs to control the optional bank of four system fans. Two control PWM inputs are generated from the baseboard's LM93 health monitor IC and routed through the high density 100 pin Control Panel/Floppy/IDE flex circuit interface. Two high frequency PWM amplifying circuits are located on the backplane and the output is routed to a 2X5 pin header for the bank of redundant fans.

Table 51. 10-pin Redundant Fan Connector Pinout (J5)

Pin	Name	Pin	Name
1	FAN_SPEED_CTL_1	2	R_FAN_PRESENT
3	GND	4	GND
5	FAN_SPEED_CTL_2	6	GND
7	FAN_SPEED_CTL_2	8	GND
9	FAN_SPEED_CTL_2	10	KEY

PWM 1 supports one system fan with max current of 1.5A. PWM 2 supports up to three system fans with max current limit of 4.5A

5.4.4.3 SATA Connectors

The SATA backplane has five 7-pin SATA connectors. These connectors relay SATA signals from the baseboard to the ATA drives. Each connector is used for a separate SATA channel and is configured as a bus master. The following table provides the connector pinout.

Table 52. 7-Pin SATA Connector Pinout (J2, J3, J4, J5, J6)

Pin	Name
1	GND
2	DRV_RX_P
3	DRV_RX_N
4	GND
5	DRV_TX_P
6	DRV_TX_N
7	GND
8	GND
9	GND

5.4.4.4 Hot-Swap SATA Connectors to Drive

The SATA drive interface combines both SATA and power signals into a single connector. The pin-out of the drive interface connector is the same as a standard ATA and power connector. The following table provides the pinout.

Table 53. 22-Pin SATA Connector Pinout (J7, J8, J9, J10, J11)

Name	Pin	Pin	Name
GND	1	13	GND
DRV_RX_P	2	14	SCSI+5V
DRV_RX_N	3	15	SCSI+5V
GND	4	16	SCSI+5V
DRV_TX_P	5	17	GND
DRV_TX_N	6	18	Unused
GND	7	19	GND
P3V3	8	20	SCSI+12V
P3V3	9	21	SCSI+12V
P3V3	10	22	SCSI+12V
GND	11	23	GND
GND	12	24	GND

5.4.4.5 Baseboard to Floppy/FP/IDE/Video Interface

As a multifunctional board, the SATA backplane provides a pathway for Floppy Disk, Control Panel and CD-ROM signals from the server board to connector interfaces for each of the devices. The server board and backplane have matching 100-pin high density connectors which are attached using a mylar flex cable. The following table provides the pin-out for the 100-pin connector.

Table 54. 100-pin Floppy/FP/IDE/Video Connector

Pin	Name	Pin	Name
A1	GND	B1	V_IO_VSYNC_BUFF_FP_L
A2	V_IO_RED_CONN_FP	B2	V_IO_HSYNC_BUFF_FP_L
A3	V_IO_GREEN_CONN_FP	B3	1_WIRE_BUS
A4	V_IO_BLUE_CONN_FP	B4	EMP_DCD2_L
A5	VIDEO_IN_USE	B5	EMP_CTS2_L
A6	EMP_DTR2_L	B6	EMP_SOUT2
A7	EMP_RTS2_L	B7	EMP_IN_USE
A8	EMP_SIN2	B8	NIC2_ACT_LED_L
A9	EMP_DSR2_L	B9	NIC2_LINK_LED_R_L
A10	FP_NMI_BTN_L	B10	FP_CHASSIS_INTRU
A11	GND	B11	PB1_I2C_5VSB_SCL
A12	FP_ID_SW_L	B12	PB1_I2C_5VSB_SDA
A13	FAULT_LED_5VSB_P	B13	NIC1_ACT_LED_L
A14	FP_RST_BTN_L	B14	NIC1_LINK_LED_R_L
A15	HDD_FAULT_LED_R_L	B15	FP_ID_LED_R_L
A16	FP_PWR_BTN_L	B16	IPMB_I2C_5VSB_SCL
A17	HDD_LED_ACT_R_L	B17	P5V_STBY
A18	HDD_LED_5V_A	B18	FP_SYS_FLT_LED2_R_L
A19	IMPB_I2C_5VSB_SDA	B19	FP_SYS_FLT_LED_R_L
A20	GND	B20	FP_PWR_LED_R_L
A21	FP_PWR_LED_5VSB	B21	RST_IDE_S_L
A22	RST_P6_PWRGOOD	B22	FD_HDSEL_L
A23	FD_DSKCHG_L	B23	FD_RDATA_L
A24	FD_WPD_L	B24	FD_WDATA_L
A25	FD_TRK0_L	B25	FD_STEP_L
A26	FD_WGATE_L	B26	FD_MTR0_L
A27	FD_DIR_L	B27	FD_DENSEL0

Pin	Name	Pin	Name
A28	FD_DS0_L	B28	FD_INDEX_L
A29	GND	B29	IDE_SDD<8>
A30	IDE_SDD<7>	B30	IDE_SDD<9>
A31	IDE_SDD<6>	B31	IDE_SDD<10>
A32	IDE_SDD<5>	B32	IDE_SDD<11>
A33	IDE_SDD<4>	B33	IDE_SDD<12>
A34	IDE_SDD<3>	B34	IDE_SDD<13>
A35	IDE_SDD<2>	B35	IDE_SDD<14>
A36	IDE_SDD<1>	B36	IDE_SDD<15>
A37	IDE_SDD<0>	B37	IDE_SDDREQ
A38	GND	B38	IDE_SDIOW_L
A39	IDE_SDDACK_L	B39	IDE_SDIOR_L
A40	IDE_SDA<1>	B40	IDE_SIORDY
A41	IDE_SDA<0>	B41	IRQ_IDE_S
A42	IDE_SDCS0_L	B42	IDE_SDA<2>
A43	IDE_SEC_HD_ACT_L	B43	IDE_SDCS1_L
A44	GND	B44	FAN_PWM1
A45	FAN5_TACH	B45	R_FAN_PRESENT
A46	FAN6_TACH	B46	FAN5_ERR_LED
A47	FAN7_TACH	B47	FAN6_ERR_LED
A48	FAN8_TACH	B48	FAN7_ERR_LED
A49	FAN_PWM2	B49	FAN8_ERR_LED
A50	P5V_STBY	B50	GND

5.4.4.6 Control Panel Interface Connector

The SATA backplane provides a pathway for control panel signals from the 100-pin connector to the control panel (FP) connector. The pinout for the FP connector is shown in the following table.

Table 55. 50-pin Control Panel Connector

Description	Pin #	Pin #	Description
V_IO_RED_CONN_FP	1	2	GND
V_IO_GREEN_CONN_FP	3	4	GND
V_IO_BLUE_CONN_FP	5	6	GND
V_IO_HSYNC_BUFF_FP_L	7	8	GND
V_IO_VSYNC_BUFF_FP_L	9	10	GND
VIDEO_IN_USE	11	12	1_WIRE_BUS
EMP_DTR2_L	13	14	EMP_DCD2_L
EMP_RTS2_L	15	16	EMP_CTS2_L
EMP_SIN2_L	17	18	EMP_SOUT2
EMP_DSR2_L	19	20	EMP_IN_USE
FP_NMI_BTN_L	21	22	Unused
NIC2_ACT_LED_L	23	24	NIC2_LINK_LED_R_L
FP_ID_SW_GND	25	26	FP_CHASSIS_INTRU
FP_ID_SW_L	27	28	BP_I2C_SCL
GND	29	30	BP_I2C_SDA
FP_RST_BTN_L	31	32	NIC1_ACT_LED_L
HDD_FAULT_LED_R_L	33	34	NIC1_LINK_LED_R_L
FP_PWR_BTN_L	35	36	FP_ID_LED_R_L
IPMB_I2C_5VSB_SCL	37	38	GND
IPMB_I2C_5VSB_SDA	39	40	HDD_LED_5V_A
FP_PWER_LED_R_L	41	42	FAULT_LED_5VSB_P
FP_PWR_LED_5VSB	43	44	FP_SYS_FLT_LED2_R_L
RST_P6_PWRGOOD	45	46	FP_SYS_FLT_LED_R_L
HDD_LED_ACT_R_L	47	48	Unused
PWR_LCD_5VSB	49	50	PWR_LCD_5VSB

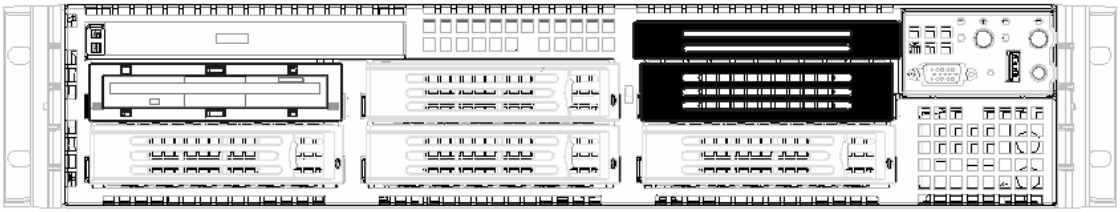
5.4.5 Optional 6th SATA Drive Board Functional Architecture

The SATA Backplane is capable of supporting a 6th SATA hard drive with the addition of an optionally installed backplane add-in board. The 6th drive add-in board assembly consists of a PCB with power and interface connectors, and a mounting bracket allowing for the add-in card to slide into a fitted cut out on the existing backplane.

The 6th SATA hard drive is fully hot swappable. The 6th drive add-in card has similar drive connectors to those of the SATA backplane.

5.5 Optional Tape Drive or 6th Hard Drive Bay

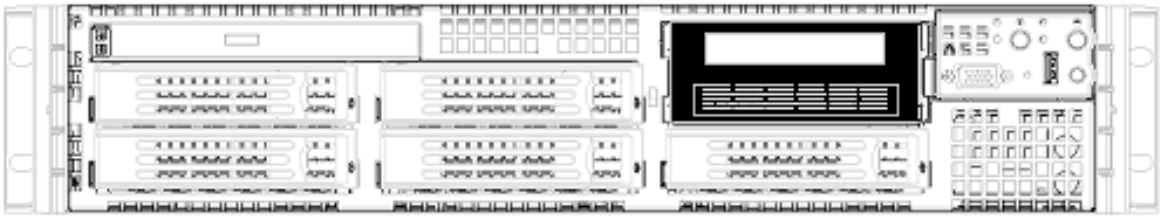
For system configurations that require either a Tape Drive or a 6th hard disk drive, a dual purpose drive bay is available. By default this drive bay is covered by two face plates as shown in the following diagram. The drive bay is located next to the control panel.



To configure a 6th hard drive, the lower face plate is removed and the appropriate 6th hard drive accessory kit is installed. The accessory kit consists of the following components: hot-swap drive tray, SCSI or SATA Add-in Board, power cable, and interface cable.

To install a 3.5" tape drive, both face plates are removed and the optional tape drive kit is installed. The tape drive kit consists of a drive tray, power cable, and round SCSI cable.

Note: To remove the tape drive tray from the chassis, a spring latch located inside the chassis on the back right side of the carrier must be released to allow the drive tray to slide free. Do not attempt to pull out the drive tray without first releasing the spring latch. Doing so may damage the plastic faceplate.



6. Standard Control Panel

The standard control panel supports several push buttons and status LEDs, along with USB and video ports to centralize system control, monitoring, and accessibility to within a common compact design.

The control panel assembly comes pre-assembled and is modular in design. The control panel assembly module slides into a predefined slot on the front of the chassis. Once installed, communication to the baseboard can be achieved by either attaching a 50-pin cable to a hot-swap backplane, or if cabled drives are used, can be connected directly to the baseboard. In addition, a USB cable is routed to a USB port on the baseboard.

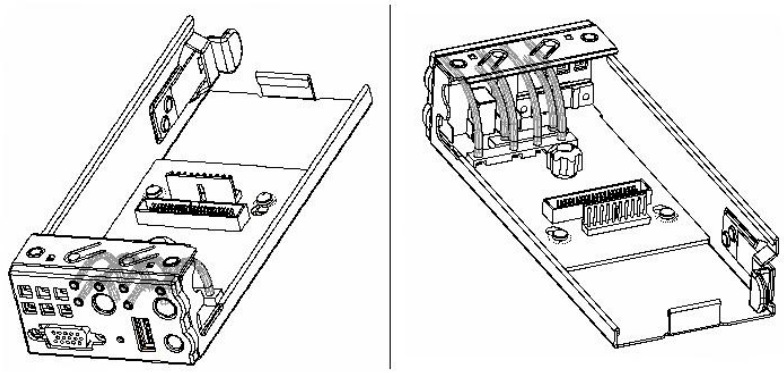


Figure 31. Standard Control Panel Assembly Module

6.1 Control Panel Buttons

The standard control panel assembly houses several system control buttons. Each of their functions is listed in the table below.

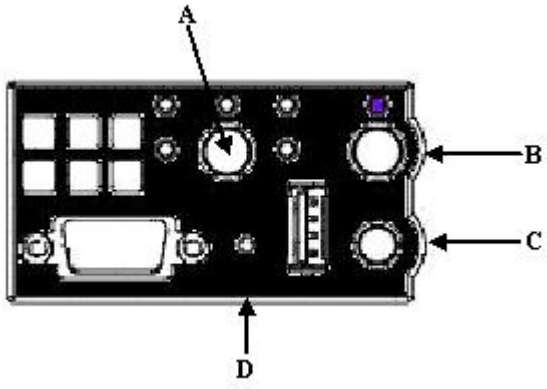


Figure 32. Control Panel Buttons

Table 56. Contol Button and Intrusion Switch Functions

Reference	Feature	Function
A	Power / Sleep Button	Toggles the system power on/off. This button also functions as a Sleep Button if enabled by an ACPI-compliant operating system.
B	ID Button	Toggles the front panel ID LED and the baseboard ID LED on/off. The baseboard ID LED is visible through the rear of the chassis and allows you to locate the server you're working on from behind a rack of servers.
C	Reset Button	Reboots and initializes the system.
D	NMI Button	Pressing the recessed button with a paper clip or pin puts the server in a halt state for diagnostic purposes and allows you to issue a non-maskable interrupt. After issuing the interrupt, a memory download can be performed to determine the cause of the problem.

6.2 Control Panel LED Indicators

The control panel houses six LEDs, which are viewable with or without the front bezel to display the system's operating state.

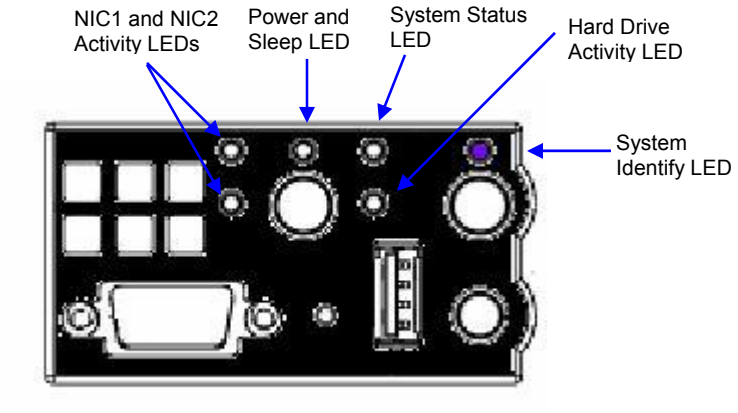


Figure 33. Control Panel LEDs

The following table identifies each LED and describes their functionality.

Table 57. Control Panel LED Functions

LED	Color	State	Description
NIC1 / NIC2 Activity	Green	On	NIC Link
	Green	Blink	NIC Activity
Power / Sleep (on standby power)	Green	On	Legacy power on / ACPI S0 state
		Blink [1,4]	Sleep / ACPI S1 state
	Off	Off	Power Off / ACPI S4 or S5 state
System Status (on standby power)	Green	On	Running / normal operation
		Blink [1,2]	Degraded
	Amber	On	Critical or non-recoverable condition.
		Blink [1,2]	Non-critical condition.
	Off	Off	POST / system stop.
Disk Activity	Green	Random blink	Provides an indicator for disk activity.
	Off	Off [3]	No hard disk activity
System Identification	Blue	Blink	Identify active via command or button.
	Off	Off	No Identification.

Notes:

1. Blink rate is ~1 Hz with at 50% duty cycle.
2. The amber status takes precedence over the green status. When the amber LED is on or blinking, the green LED is off.
3. Also off when the system is powered off (S4/S5) or in a sleep state (S1).
4. The power LED sleep indication is maintained on standby by the chipset. If the system is powered down without going through BIOS, the LED state in effect at the time of power off will be restored when the system is powered on until the BIOS clears it. If the system is not powered down normally, it is possible that the Power LED will be blinking at the same time that the system status LED is off due to a failure or configuration change that prevents the BIOS from running.

The current limiting resistors for the power LED, the system fault LED, and the NIC LEDs are located on the baseboard.

6.2.1 Power / Sleep LED

Table 58. SSI Power LED Operation

State	Power Mode	LED	Description
Power Off	Non-ACPI	Off	System power is off, and the BIOS has not initialized the chipset.
Power On	Non-ACPI	On	System power is on, but the BIOS has not yet initialized the chipset.
S5	ACPI	Off	Mechanical is off, and the operating system has not saved any context to the hard disk.
S4	ACPI	Off	Mechanical is off. The operating system has saved context to the hard disk.
S3-S1	ACPI	Slow blink 1	DC power is still on. The operating system has saved context and gone into a level of low-power state.
S0	ACPI	Steady on	System and the operating system are up and running.

Notes:
1. Blink rate is ~ 1Hz with at 50% duty cycle.

6.2.2 System Status LED

Note: Some of the following status conditions may or may not be reported if the system is not configured with an Intel Management Module. Refer to the baseboard technical product specification for details.

6.2.2.1 Critical Conditions

A critical condition is any critical or non-recoverable threshold crossing associated with the following events:

- Temperature, voltage, or fan critical threshold crossing.
- Power subsystem failure. The BMC asserts this failure whenever it detects a power control fault (e.g., the BMC detects that the system power is remaining ON even though the BMC has deserted the signal to turn off power to the system.
- A hot-swap backplane would use the Set Fault Indication command to indicate when one or more of the drive fault status LEDs are asserted on the hot-swap backplane.
- The system is unable to power up due to incorrectly installed processor(s), or processor incompatibility.
- Satellite controller sends a critical or non-recoverable state, via the Set Fault Indication command to the BMC.
- Critical event logging errors, including: System Memory Uncorrectable ECC error, and fatal / uncorrectable bus errors such as PCI SERR and PERR.

6.2.2.2 Non-Critical Conditions

A non-critical condition is threshold crossing associated with the following events:

- Temperature, voltage, or fan non-critical threshold crossing
- Chassis intrusion
- Satellite controller sends a non-critical state, via the Set Fault Indication command, to the BMC.
- Set Fault Indication command from system BIOS. The BIOS may use the Set Fault Indication command to indicate additional 'non-critical' status such as a system memory or CPU configuration changes.

6.2.2.3 Degraded Conditions

A degraded condition is associated with the following events:

- Non-redundant power supply operation. This applies only when the BMC is configured for a redundant power subsystem.
- One or more processors are disabled by Fault Reliant Booting (FRB) or BIOS.
- BIOS has disabled or mapped out some of the system memory.

6.2.3 Drive Activity LED

The drive activity LED on the front panel indicates drive activity from the onboard hard disk controllers. The server board SE7520JR2 also provides a header giving access to this LED for add-in controllers.

6.2.4 System Identification LED

The blue system identification LED is used to help identify a system for servicing. This is especially useful when the system is installed when in a high density rack or cabinet that is populated with several similar systems. The system ID LED will blink when the System ID button on the control panel is pressed or it can be illuminated remotely through server management software.

6.3 Control Panel Connectors

The control panel has two external I/O connectors:

- One USB port
- One VGA video port

The following tables provide the pin-outs for each connectors.

Table 59. External USB Connectors (J1B1)

Pin #	Description
1	PWR_FP_USB2
2	USB_DN2_FP_R
3	USB_DP2_FP_R
4	GND
5	GND
6	GND
7	GND

Table 60. Video Connector (J1A1)

Description	Pin #	Pin #	Description
VGA_RED	1	9	GND
VGA_GREEN	2	10	GND
VGA_BLUE	3	11	Unused
Unused	4	12	VGA_DDCDAT
GND	5	13	VGA_HSYNC_L
GND	6	14	VGA_VSYNC_L
VGA_INUSE_L	7	15	VGA_DDCCLK
GND	8	16	GND
		17	GND

If a monitor is connected to the control panel video connector, the rear video port on the server board will be disabled and the control panel video will be enabled. The video source is the same for both connectors and is switched between the two, with the control panel having priority over the rear video. This provides for easy front accessibility to the server.

6.4 Internal Control Panel Assembly Headers

The Control Panel interface board has two internal headers:

A 50-pin header provides control and status information to/from the server board. Using a 50-pin flat cable, the header can either be connected to a matching connector on a hot swap backplane or, in cabled drive configurations, can be connected to a matching connector on the baseboard.

A 10-pin header is used to provide USB support to the control panel. The round 10-pin cable is routed from the control panel assembly to a matching connector on the baseboard.

The following tables provide the pin-outs for both types of connectors.

Table 61. 50-pin Control Panel Connector (J6B1)

Description	Pin #	Pin #	Description
PWR_LCD_5VSB	2	1	PWR_LCD_5VSB
HDD_LED_ACT_R_L	4	3	Unused
RST_P6_PWRGOOD	6	5	FP_SYS_FLT_LED1_R_L
P5V_STBY	8	7	FP_SYS_FLT_LED2_R_L
FP_PWR_LED_R_L	10	9	P5V_STBY
IPMB_5VSB_SDA	12	11	P3V3
IPMB_5VSB_SCL	14	13	GND
FP_PWR_BTN_L	16	15	FP_ID_LED_R_L
HDD_FAULT_LED_R_L	18	17	NIC2_LINK_LED_R_L
FP_RST_BTN_L	20	19	NIC2_ACT_LED_L
GND	22	21	BP_I2C_5V_SDA
FP_ID_SW_L	24	23	BP_I2C_5V_SCL
NIC1_ACT_LED_L	26	25	FP_CHASSIS_L
FP_NMI_BTN_L	28	27	NIC1_LINK_LED_R_L
EMP_DSR2_L	30	29	GND
EMP_SIN2	32	31	EMP_INUSE_L
EMP_RTS2_L	34	33	EMP_SOUT2
EMP_DTR2_L	36	35	EMP_CTS2_L
VGA_INUSE_L	38	37	EMP_DCD2_L
VGA_VSYNC_FP_L	40	39	1_WIRE_BUS
VGA_HSYNC_FP_L	42	41	GND
VGA_BLUE_FP	44	43	GND
VGA_GREEN_FP	46	45	GND

Description	Pin #	Pin #	Description
VGA_RED_FP	48	47	GND
	50	49	GND

A 10-pin USB header provides control for one USB port from the server board.

Table 62. Internal USB Header (J2B1)

Pin #	Description
1	PWR_FP_USB2
2	PWR_FP_USB3
3	USB_DP2_FP
4	USB_DN2_FP
5	USB_DP3_FP
6	USB_DN3_FP
7	GND
8	GND
9	TP_USB0_P9
10	TP_USB0_P10

7. Intel® Local Control Panel

The Intel® Local Control Panel utilizes a combination of control buttons, LEDs, and LCD display to provide system accessibility, monitoring, and control functions. The control panel assembly is pre-assembled and is modular in design. The module slides into a slot on the front of the chassis and is designed so that it can be adjusted for use with or without an outer front bezel.

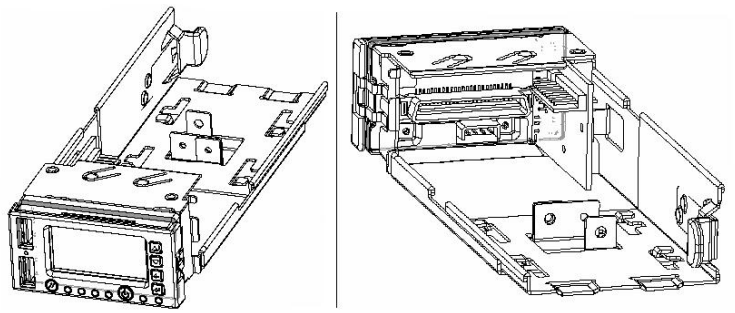


Figure 34. Intel Local Control Panel Assembly Module

Note: The Intel Local Control Panel can only be used when either the Intel Management Module Professional Edition or Advanced Edition is installed in the system.

The following diagram provides an overview of the control panel features.

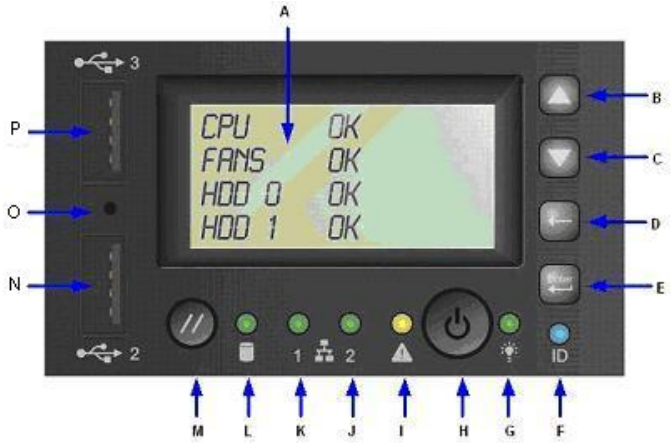


Figure 35. Intel Local Contol Panel Overview

A	LCD Display	I	System Status LED
B	LCD Menu Control Button – Up	J	NIC 2 Activity LED
C	LCD Menu Control Button – Down	K	NIC 1 Activity LED
D	LCD Menu Control Button – Previous Option	L	Hard Drive Activity LED
E	LCD Menu Control Button – Previous Page	M	System Reset Button
F	ID LED	N	USB 2.0 Port
G	Power LED	O	NMI Buttom (Tool Required)
H	System Power Button	P	USB 2.0 Port

7.1 LED Functionality

The following table identifies each LED and describes their functionality.

Table 63. Control Panel LED Functions

LED	Color	State	Description
NIC1 / NIC2 Activity	Green	On	NIC Link
	Green	Blink	NIC Activity
Power / Sleep (on standby power)	Green	On	Legacy power on / ACPI S0 state
		Blink [1,4]	Sleep / ACPI S1 state
	Off	Off	Power Off / ACPI S4 or S5 state
System Status (on standby power)	Green	On	Running / normal operation
		Blink [1,2]	Degraded
	Amber	On	Critical or non-recoverable condition.
		Blink [1,2]	Non-critical condition.
	Off	Off	POST / system stop.
Disk Activity	Green	Random blink	Provides an indicator for disk activity.
	Off	Off [3]	No hard disk activity
System Identification	Blue	Blink	Identify active via command or button.
	Off	Off	No Identification.

Notes:
1. Blink rate is ~1 Hz with at 50% duty cycle.
2. The amber status takes precedence over the green status. When the amber LED is on or blinking, the green LED is off.
3. Also off when the system is powered off (S4/S5) or in a sleep state (S1).
4. The power LED sleep indication is maintained on standby by the chipset. If the system is powered down without going through BIOS, the LED state in effect at the time of power off will be restored when the system is powered on until the BIOS clears it. If the system is not powered down normally, it is possible that the Power LED will be blinking at the same time that the system status LED is off due to a failure or configuration change that prevents the BIOS from running.

The current limiting resistors for the power LED, the system fault LED, and the NIC LEDs are located on the server board SE7520JR2.

7.1.1 Power / Sleep LED

Table 64. SSI Power LED Operation

State	Power Mode	LED	Description
Power Off	Non-ACPI	Off	System power is off, and the BIOS has not initialized the chipset.
Power On	Non-ACPI	On	System power is on, but the BIOS has not yet initialized the chipset.
S5	ACPI	Off	Mechanical is off, and the operating system has not saved any context to the hard disk.
S4	ACPI	Off	Mechanical is off. The operating system has saved context to the hard disk.
S3-S1	ACPI	Slow blink 1	DC power is still on. The operating system has saved context and gone into a level of low-power state.
S0	ACPI	Steady on	System and the operating system are up and running.

Notes:
1. Blink rate is ~ 1Hz with at 50% duty cycle.

7.1.2 System Status LED

7.1.2.1 Critical Conditions

A critical condition is any critical or non-recoverable threshold crossing associated with the following events:

- Temperature, voltage, or fan critical threshold crossing.
- Power subsystem failure. The BMC asserts this failure whenever it detects a power control fault (e.g., the BMC detects that the system power is remaining ON even though the BMC has deserted the signal to turn off power to the system.
- A hot-swap backplane would use the Set Fault Indication command to indicate when one or more of the drive fault status LEDs are asserted on the hot-swap backplane.
- The system is unable to power up due to incorrectly installed processor(s), or processor incompatibility.
- Satellite controller sends a critical or non-recoverable state, via the Set Fault Indication command to the BMC.
- Critical event logging errors, including: System Memory Uncorrectable ECC error, and fatal / uncorrectable bus errors such as PCI SERR and PERR.

7.1.2.2 Non-Critical Conditions

A non-critical condition is threshold crossing associated with the following events:

- Temperature, voltage, or fan non-critical threshold crossing
- Chassis intrusion
- Satellite controller sends a non-critical state, via the Set Fault Indication command, to the BMC.
- Set Fault Indication command from system BIOS. The BIOS may use the Set Fault Indication command to indicate additional ‘non-critical’ status such as a system memory or CPU configuration changes.

7.1.2.3 Degraded Conditions

A degraded condition is associated with the following events:

- Non-redundant power supply operation. This applies only when the BMC is configured for a redundant power subsystem.
- One or more processors are disabled by Fault Reliant Booting (FRB) or BIOS.
- BIOS has disabled or mapped out some of the system memory.

7.1.3 Drive Activity LED

The drive activity LED on the front panel indicates drive activity from the onboard hard disk controllers. The server board SE7520JR2 also provides a header giving access to this LED for add-in controllers.

7.1.4 System Identification LED

The blue system identification LED is used to help identify a system for servicing. This is especially useful when the system is installed when in a high density rack or cabinet that is populated with several similar systems. The system ID LED will blink when the System ID button on the control panel is pressed or it can be illuminated remotely through server management software.

7.2 Internal Control Panel Headers

The Control Panel interface board has four internal headers:

- A 50-pin header provides control and status information to/from the server board. Using a 50-pin flat cable, the header can either be connected to a matching connector on a hot swap backplane or, in cabled drive configurations, can be connected to a matching connector on the baseboard.

- A 10-pin header is used to provide USB support to the control panel. The round 10-pin cable is routed from the control panel assembly to a matching connector on the baseboard.
- A 4-pin IPMI Header (Not used).
- A 4-pin NMI/Temp Sensor Header.

The following tables provide the pin-outs for each of the headers.

Table 65. 50-pin Control Panel Connector

Description	Pin #	Pin #	Description
PWR_LCD_5VSB	2	1	PWR_LCD_5VSB
HDD_LED_ACT_R_L	4	3	Unused
RST_P6_PWRGOOD	6	5	FP_SYS_FLT_LED1_R_L
P5V_STBY	8	7	FP_SYS_FLT_LED2_R_L
FP_PWR_LED_R_L	10	9	P5V_STBY
IPMB_5VSB_SDA	12	11	P3V3
IPMB_5VSB_SCL	14	13	GND
FP_PWR_BTN_L	16	15	FP_ID_LED_R_L
HDD_FAULT_LED_R_L	18	17	NIC2_LINK_LED_R_L
FP_RST_BTN_L	20	19	NIC2_ACT_LED_L
GND	22	21	BP_I2C_5V_SDA
FP_ID_SW_L	24	23	BP_I2C_5V_SCL
NIC1_ACT_LED_L	26	25	FP_CHASSIS_L
FP_NMI_BTN_L	28	27	NIC1_LINK_LED_R_L
EMP_DSR2_L	30	29	GND
EMP_SIN2	32	31	EMP_INUSE_L
EMP_RTS2_L	34	33	EMP_SOUT2
EMP_DTR2_L	36	35	EMP_CTS2_L
VGA_INUSE_L	38	37	EMP_DCD2_L
VGA_VSYNC_FP_L	40	39	1_WIRE_BUS
VGA_HSYNC_FP_L	42	41	GND
VGA_BLUE_FP	44	43	GND
VGA_GREEN_FP	46	45	GND
VGA_RED_FP	48	47	GND
	50	49	GND

Table 66. Internal USB Header

Pin #	Description
1	PWR_FP_USB2
2	PWR_FP_USB3
3	USB_DP2_FP
4	USB_DN2_FP
5	USB_DP3_FP
6	USB_DN3_FP
7	GND
8	GND
9	TP_USB0_P9
10	TP_USB0_P10

Table 67. IPMI Header

Pin #	Description
1	IPMB_5VSB_SDA
2	GND
3	IPMB_5VSB_SCL
4	P5V_STBY

Table 68. Internal NMI/Temp Sensor Header

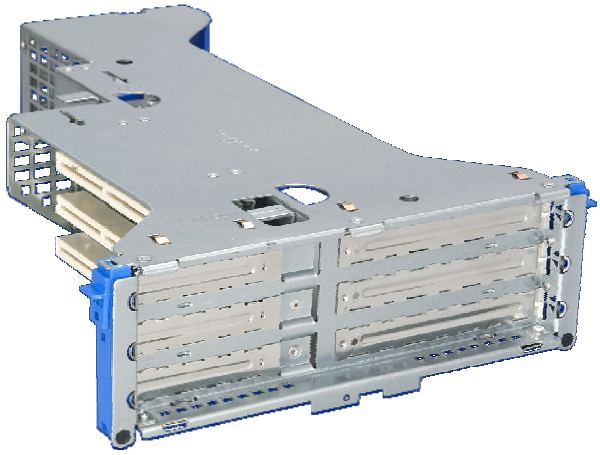
Pin #	Description
1	TBD
2	TBD
3	TBD
4	TBD

8. PCI Riser Cards and Assembly

The Server Chassis SR2400 supports different riser card options depending on the add-in card configuration desired. The riser assembly for the Server Chassis SR2400 is tool-less. Stand-offs on the bracket allow the riser cards to slide onto the assembly where a latching mechanism than holds each riser in place. Holding down the latch releases the risers for easy removal.

When re-inserting the riser assembly into the chassis, tabs on the back of the assembly should be aligned with slots on the back edge of the chassis. The tabs fit into the slots securing the riser assembly to the chassis when the top cover is in place.

The riser assembly provides two extraction levers to assist with riser assembly removal from the riser slots.



There are 4 different riser card options offered:

- Low profile PCI-X – This riser card is capable of supporting up to three low profile 66/100 MHz PCI-X cards
- Full height PCI-X – This riser card is capable of supporting up to three full height/full length 66/100 MHz PCI-X cards
- Full height PCI-X (active) – This riser card is capable of supporting two 133 MHz PCI-X cards and one 66/100 MHz PCI-X card.
- Full height PCI-Express – This riser card is capable of supporting two X4 PCI-Express cards and one 66/100 PCI-X card.

8.1 PCI Riser Card Mechanical Drawings

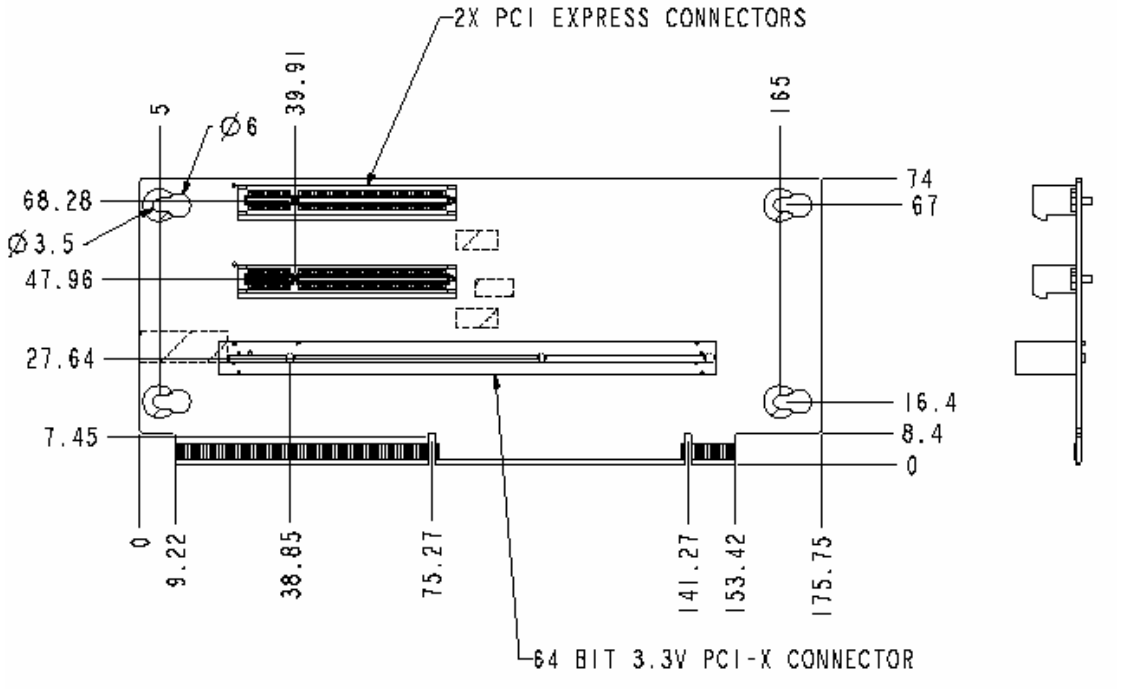


Figure 36. Full Height PCI-Express Riser Card

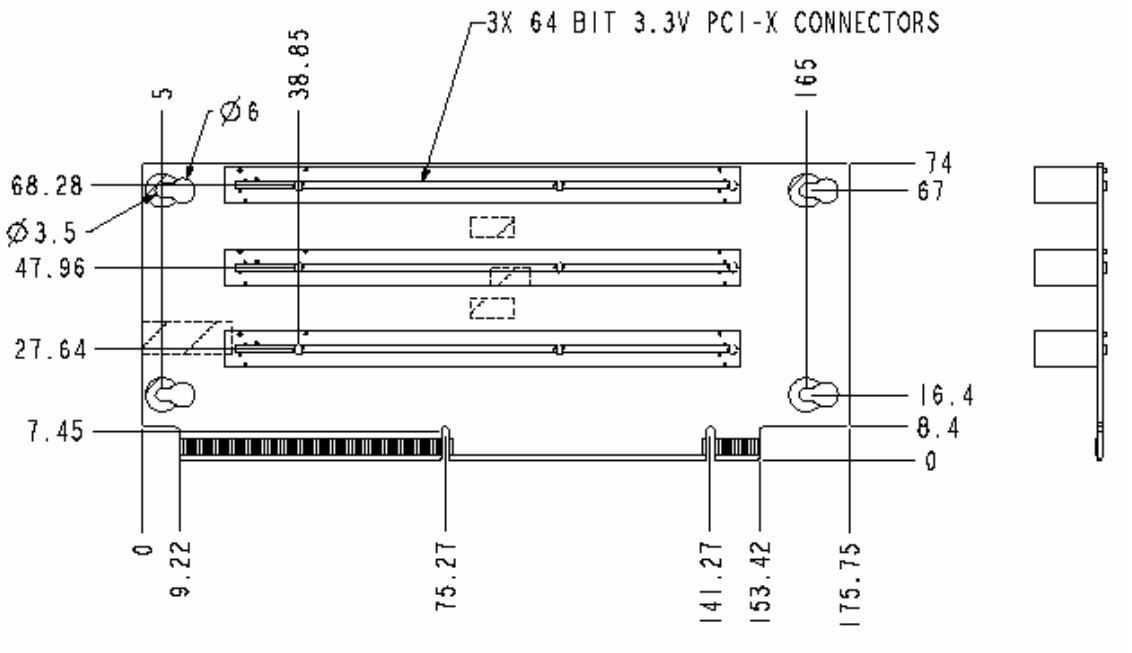


Figure 37. Full Height Passive PCI-X Riser Card

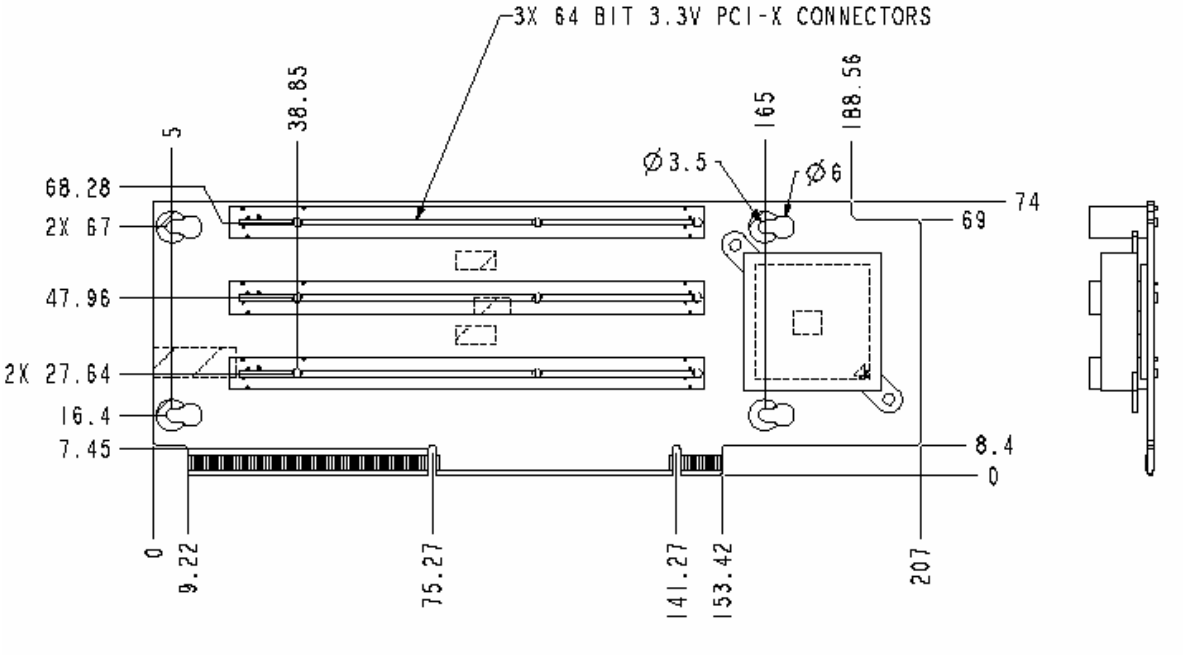


Figure 38. Full Height Active PCI-X Riser Card

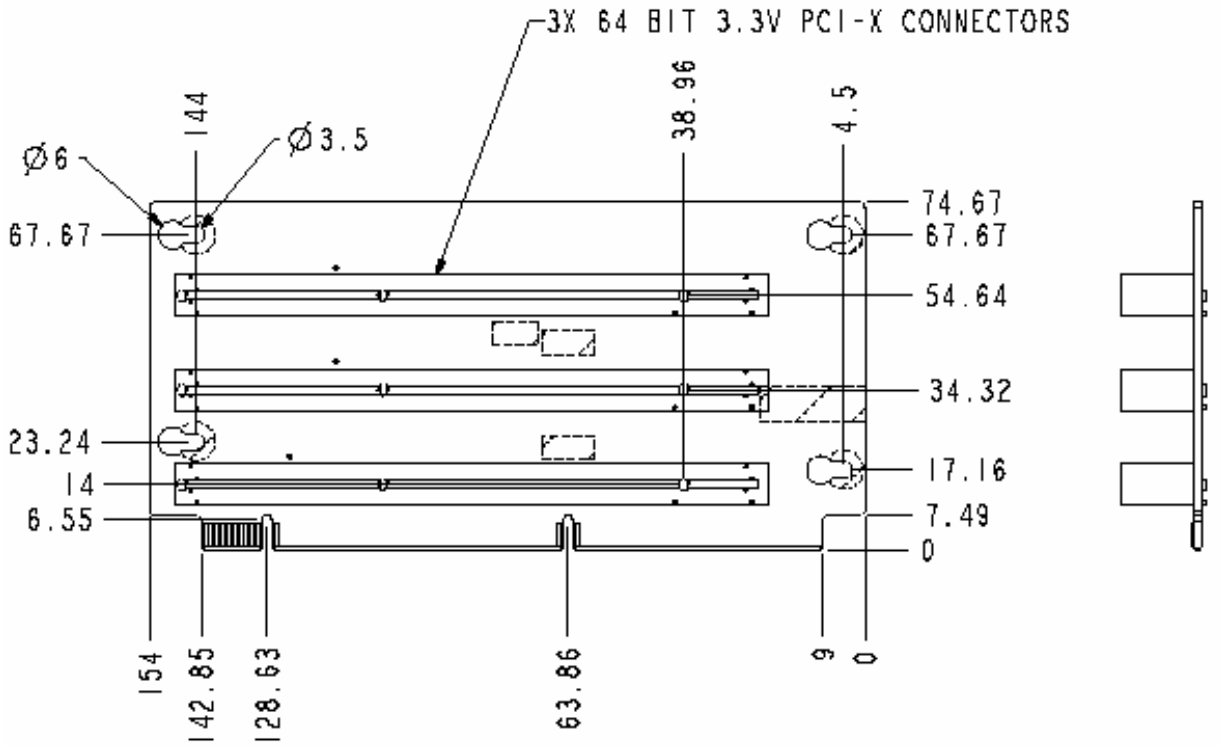


Figure 39. Low Profile Passive PCI-X Riser Card

9. Supported Intel® Server Boards

The Server Chassis SR2400 is mechanically and functionally designed to support the Intel® Server Board SE7520JR2.and Intel Server Board SE7320VP2. The following sections provide an overview of the baseboard feature sets. The Technical Product Specification for each server board should be referenced for more detailed information. The documents can be downloaded from the following web sites:

http://support.intel.com/support/motherboards/server/se7520jr2

http://support.intel.com/support/motherboards/server/se7320vp2

9.1 Intel Server Board SE7520JR2

9.1.1 Server Board SE7520JR2 SKU Availability

The name SE7520JR2 is used to describe the family of boards made available under a common product name. The core features for each board will be common; however each board will have the following distinctions:

Product Code	Feature Distinctions
SE7520JR2SCSID2	Onboard SCSI + Onboard SATA (RAID) + DDR2–400 MHz
SE7520JR2SCSID1	Onboard SCSI + Onboard SATA (RAID) + DDR–266/333 MHz
SE7520JR2ATAD2	Onboard SATA (RAID) + DDR2–400 MHz
SE7520JR2ATAD1	Onboard SATA (RAID) + DDR–266/333 MHz

9.1.2 Server Board SE7520JR2 Feature Set

- Dual processor slots supporting 800MHz Front Side Bus (FSB) Intel® Xeon™ processors
- Intel E7520 Chipset (MCH, PXH, ICH-5R)
- Two PCI riser slots
  - Riser Slot 1: Supports low profile PCI-X 66/100MHz PCI-X cards
  - Riser Slot 2: Using Intel® adaptive slot technology and different riser cards, this slot is capable of supporting full height PCI-X 66/100/133 or PCI-Express cards.
- Six DIMM slots supporting DDR2– 400MHz memory or DDR–266/333 MHz[1]
- Dual channel LSI* 53C1030 Ultra320 SCSI Controller with integrated RAID 0/1 support
- Dual Intel® 82546GB 10/100/1000 Network Interface Controllers (NICs)
- On board ATI* Rage XL video controller with 8MB SDRAM
- On-board platform instrumentation using a National* PC87431M mini-BMC
- External IO connectors
- Stacked PS2 ports for keyboard and mouse

[1] The use of DDR2 - 400 MHz or DDR - 266/333 MHz DIMMs is dependant on which board SKU is used. DDR-2 DIMMs cannot be used on a board designed to support DDR. DDR DIMMs cannot be used on boards designed to support DDR-2.

- RJ45 Serial B Port
    - Two RJ45 NIC connectors
    - 15-pin video connector
    - Two USB 2.0 ports
    - U320 High density SCSI connector (Channel B)
- Internal IO Connectors / Headers
    - Two onboard USB port headers. Each header is capable of supporting two USB 2.0 ports.
    - One 10-pin DH10 Serial A Header
    - One Ultra320 68-pin SCSI Connector (Channel A)
    - Two SATA connectors with integrated chipset RAID 0/1 support
    - One ATA100 connector
    - One floppy connector
    - SSI-compliant and custom control panel headers
    - SSI-compliant 24-pin main power connector. This supports ATX-12V standard in the first 20 pins
    - Intel® Management Module (IMM) connector
- Intel® Light-Guided Diagnostics on all FRU devices (processors, memory, power)
- Port-80 Diagnostic LEDs displaying POST codes

The following image shows the board layout of the Server Board SE7520JR2. Each connector and major component is identified by number and is identified in Table 69.

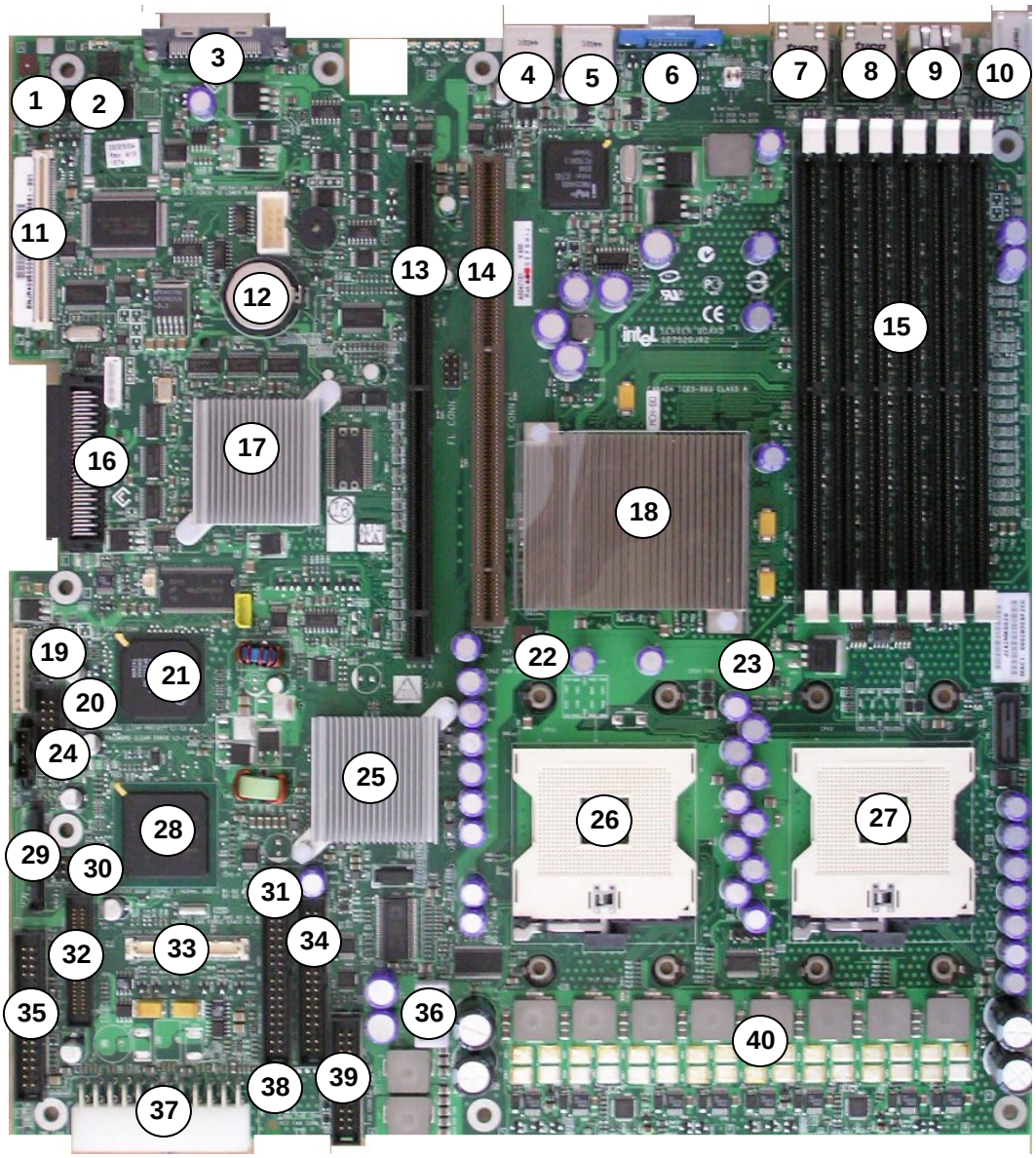


Figure 40. Intel® Server Board SE7520JR2 Board Layout

Table 69. Baseboard Layout Reference

Ref #	Description	Ref #	Description
1	(J1A1) 2-Pin Chassis Intrusion Header (J1A2) 2-Pin Hard Drive Act LED Header (J1A4) Rolling BIOS Jumper	22	CPU #2 Fan Header
2	10-Pin DH10 Serial A Header	23	CPU #1 Fan Header
3	Ext SCSI Channel B Connector	24	5-pin Power Sense Header
4	USB Port 2	25	PXH – Chipset Component
5	USB Port 1	26	CPU #2 Socket
6	Video Connector	27	CPU #1 Socket
7	NIC #2	28	ICH5-R – Chipset Component
8	NIC #1	29	SATA Ports
9	RJ-45 Serial B Port	30	(J1H2) Recovery Boot Jumper (J1H3) Password Clear Jumper (J1H4) CMOS Clear Jumper
10	Stacked PS/2 Keyboard and Mouse Ports	31	Legacy ATA-100 connector
11	Intel Management Module Connector	32	50-pin Control Panel Header
12	CMOS Battery	33	100-pin Control Panel, Floppy, IDE Connector
13	Full Height Riser Card Slot	34	Legacy Floppy Connector
14	Low Profile Riser Card Slot	35	SSI 34-pin Control Panel Header
15	DIMM Slots	36	8-Pin AUX Power Connector
16	68-pin SCSI Channel A Connector	37	24-Pin Main Power Connector
17	LSI 53C1030 SCSI Controller	38	SSI System Fan Header
18	MCH – Chipset Component	39	SR1400/SR2400 System Fan Header
19	1x10 USB Header	40	Processor Voltage Regulator Circuitry
20	2x5 USB Header		
21	ATI RageXL Video Controller		

9.2 Intel Server Board SE7320VP2

9.2.1 Intel Server Board SE7320VP2 SKU Availability

The SE7320VP2 product will be offered in one board SKU with Onboard SATA (RAID) and support for DDR266/333 MHz memory.

9.2.2 Intel Server Board SE7320VP2 Feature Set

- Dual processor slots supporting 800MHz Front Side Bus (FSB) Intel® Xeon™ processors
- Intel E7320 Chipset (MCH, 6300ESB ICH)
- Two PCI riser slots

  Full Height Riser Slot: “Intel® Adaptive Slot Technology”. Depending on the riser used, is capable of supporting full height PCI-X 66MHz cards (with Passive Riser), or one x4 PCI-Express card (with PCI-Express Riser).

  Low Profile Riser Slot: Capable of supporting one low profile PCI-X 66MHz card.
- Six DIMM slots supporting DDR 266/333 MHz
- Dual 10/100/1000 Network Interface Controllers (NICs) (Intel® 82541PI Network interface Controller & Marvell* 88E8050 Network Interface Controller)
- On board ATI* Rage XL video controller with 8MB SDRAM
- Mini-BMC providing “Essentials” server management option
- External IO connectors

  Stacked PS2 ports for keyboard and mouse

  RJ45 Serial B Port

  Two RJ45 NIC connectors

  15-pin video connector

  Two USB 2.0 ports
- Internal IO Connectors / Headers

  One onboard USB header capable of supporting two USB ports

  One DH10 Serial A Header

  Two SATA-100 connectors with integrated chipset RAID 0/1 support

  Two ATA100 connections (one 40-pin Legacy connector & one through the 100-pin high

  density Front Panel connector)

  One floppy connector

  SSI-compliant and custom front panel headers

  SSI-compliant 24-pin main power connector. This supports ATX-12V standard in the first 20 pins
- Port-80 diagnostic LEDs displaying POST codes

The following figure shows the board layout of the Server Board SE7320VP2.

Figure 41. Intel® Server Board SE7320VP2 Board Layout

10. Regulatory, Environmentals, and Specifications

10.1 Product Regulatory Compliance

10.1.1 Product Safety Compliance

The SR2400 complies with the following safety requirements:

- UL60950 – CSA 60950(USA / Canada)
- EN60950 (Europe)
- IEC60950 (International)
- CB Certificate & Report, IEC60950 (report to include all country national deviations)
- GS License (Germany)
- GOST R 50377-92 - License (Russia)
- Belarus License (Belarus)
- Ukraine License (Ukraine)
- CE - Low Voltage Directive 73/23/EEE (Europe)
- IRAM Certification (Argentina)
- GB4943- CNCA Certification (China)

10.1.2 Product EMC Compliance

The SR2400 has been tested and verified to comply with the following electromagnetic compatibility (EMC) regulations when installed a compatible Intel host system. For information on compatible host system(s) refer to Intel's Server Builder website or contact your local Intel representative.

- FCC (Class A Verification) – Radiated & Conducted Emissions (USA)
- CISPR 22 – Emissions (International)
- EN55022 - Emissions (Europe)
- EN55024 - Immunity (Europe)
- EN61000-3-2 - Harmonics (Europe)
- EN61000-3-3 - Voltage Flicker (Europe)
- CE – EMC Directive 89/336/EEC (Europe)
- VCCI Emissions (Japan)
- AS/NZS 3548 Emissions (Australia / New Zealand)
- BSMI CNS13438 Emissions (Taiwan)
- GOST R 29216-91 Emissions (Russia)
- GOST R 50628-95 Immunity (Russia)
- Belarus License (Belarus)
- Ukraine License (Ukraine)
- RRL MIC Notice No. 1997-41 (EMC) & 1997-42 (EMI) (Korea)
- GB 9254 - CNCA Certification (China)
- GB 17625 - (Harmonics) CNCA Certification (China)

10.1.3 Product Regulatory Compliance Markings

This product is provided with the following Product Certification Markings.

Regulatory Compliance	Country	Marking
cULus Listing Marks	USA/Canada	
GS Mark	Germany	
CE Mark	Europe	
FCC Marking (Class A)	USA	This device complies with Part 15 of the FCC Rules. Operation of this device is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation. Manufactured by Intel Corporation
EMC Marking (Class A)	Canada	CANADA ICES-003 CLASS A CANADA NMB-003 CLASSE A
VCCI Marking (Class A)	Japan	この装置は、クラス A 情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。VCCI-A
BSMI Certification Number & Class A Warning	Taiwan	
		警告使用者： 這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策
GOST R Marking	Russia	
RRL MIC Mark	Korea	
China Compulsory Certification Mark	China	

10.2 Electromagnetic Compatibility Notices

10.2.1 USA

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
For questions related to the EMC performance of this product, contact:

Intel Corporation
5200 N.E. Elam Young Parkway
Hillsboro, OR 97124
1-800-628-8686

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

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

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

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

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

10.2.2 FCC Verification Statement

Product Type: SR2400; SE7520JR2

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

For questions related to the EMC performance of this product, contact:

Intel Corporation
5200 N.E. Elam Young Parkway
Hillsboro, OR 97124-6497
Phone: 1 (800)-INTEL4U or 1 (800) 628-8686

10.2.3 ICES-003 (Canada)

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

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

10.2.4 Europe (CE Declaration of Conformity)

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

10.2.5 Japan EMC Compatibility

Electromagnetic Compatibility Notices (International)

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

English translation of the notice above:
This is a Class A product based on the standard of the Voluntary Control Council For Interference (VCCI) from Information Technology Equipment. If this is used near a radio or television receiver in a domestic environment, it may cause radio interference. Install and use the equipment according to the instruction manual.

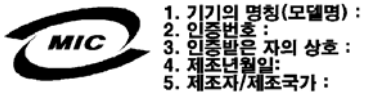
10.2.6 BSMI (Taiwan)

The BSMI Certification number and the following warning is located on the product safety label which is located on the bottom side (pedestal orientation) or side (rack mount configuration).

警告使用者：

這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

10.2.7 Korean RRL Compliance



English translation of the notice above:

1. Type of Equipment (Model Name): On License and Product
2. Certification No.: On RRL certificate. Obtain certificate from local Intel representative
3. Name of Certification Recipient: Intel Corporation
4. Date of Manufacturer: Refer to date code on product
5. Manufacturer/Nation: Intel Corporation/Refer to country of origin marked on product

10.3 Replacing the Back up Battery

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

⚠ WARNING

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

ADVARSEL!

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

ADVARSEL

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

VARNING

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

VAROITUS

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

10.4 System Level Environmental Limits

The table below defines the system level operating and non-operating environmental limits

Table 70. System Environmental Limits Summary

Parameter	Limits
Operating Temperature	+10°C to +35°C with the maximum rate of change not to exceed 10°C per hour
Non-Operating Temperature	-40°C to +70°C
Non-Operating Humidity	90%, non-condensing @ 35°C
Acoustic noise	Sound Pressure: 55 dBA (Rackmount) in an idle state at typical office ambient temperature. (23 +/- degrees C) Sound Power: 7.0 BA in an idle state at typical office ambient temperature. (23 +/- 2 degrees C)
Shock, operating	Half sine, 2 g peak, 11 mSec
Shock, unpackaged	Trapezoidal, 25 g, velocity change 136 inches/sec (≧40 lbs to > 80 lbs)
Shock, packaged	Non-palletized free fall in height 24 inches (≧40 lbs to > 80 lbs)
Vibration, unpackaged	5 Hz to 500 Hz, 2.20 g RMS random
Shock, operating	Half sine, 2 g peak, 11 mSec
ESD	+/-15kV except I/O port +/-8KV per Intel Environmental test specification
System Cooling Requirement in BTU/Hr	1826 BTU/hour

10.5 Serviceability and Availability

The system is designed to be serviced by qualified technical personnel only.

The desired Mean Time To Repair (MTTR) of the system is 30 minutes including diagnosis of the system problem. To meet this goal, the system enclosure and hardware have been designed to minimize the MTTR.

Following are the maximum times that a trained field service technician should take to perform the listed system maintenance procedures, after diagnosis of the system and having identified the failed component.

Activity	Time Estimate
Remove cover	10 Seconds
Remove and replace hard disk drive	2 Minutes [2]
Remove and replace power supply module	30 Seconds
Remove and replace system fan	30 Seconds
Remove and replace backplane board	5 Minutes
Remove and replace control panel module	5 Minutes
Remove and replace baseboard	10 Minutes

10.6 Regulated Specified Components

To maintain the UL listing and compliance to other regulatory certifications and/or declarations, the following regulated components must be used and conditions adhered to. Interchanging or use of other component will void the UL listing and other product certifications and approvals. Updated product information for configurations can be found on the Intel Server Builder Web site at the following URL:
http://channel.intel.com/go/serverbuilder
If you do not have access to Intel's Web address, please contact your local Intel representative.

Server Chassis (base chassis is provided with power supply and fans)—UL listed.

Server board—you must use an Intel server board—UL recognized.

Add-in boards—must have a printed wiring board flammability rating of minimum UL94V-1. Add-in boards containing external power connectors and/or lithium batteries must be UL recognized or UL listed. Any add-in board containing modem telecommunication circuitry must be UL listed. In addition, the modem must have the appropriate telecommunications, safety, and EMC approvals for the region in which it is sold.

Peripheral Storage Devices—must be UL recognized or UL listed accessory and TUV or VDE licensed. Maximum power rating of any one device is 19 watts. Total server configuration is not to exceed the maximum loading conditions of the power supply

[2] Includes drive removal from and replacement into a drive tray

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Appendix A: SR2400 Integration and Usage Tips

This appendix provides a list of useful information that is unique to the SR2400 server chassis and should be kept in mind while integrating and configuring your system.

- To prevent a hot swap backplane from flexing when installing or removing hard drives, the system top cover must be in place. Having the top cover installed will ensure the drives attach securely to the drive connectors on the backplane.
- You must run the FRUSDR utility to load the proper Sensor Data Records for this chassis on to the server board. Failure to do so may result in possible false errors being reported to the System Event Log. It is best to download the latest FRUSDR Utility for your particular server board from the following web site: http://support.intel.com/support/motherboards/server
- To ensure proper cooling of your server, all air baffles and air ducts must be in place. In addition, all drive bays must be populated with either a drive or a drive blank.
- Processor fans are not supported and are not needed in the server chassis SR2400.
- When installing the high density 100-pin flex cable, verify that both cable connectors are seated securely and lay flat to the connectors located on the baseboard and backplane.
- System fans are not hot swappable
- The Intel Local Control Panel is only supported when an Intel Management Module is used in the server.