Intel® Server Chassis SR1550

Technical Product Specification

Intel order number D31982-001

Revision – 0.5 (Preliminary)

December 2005

Enterprise Platforms and Services Marketing

Revision History

Date	Revision Number	Modifications
December 2005	0.5	Preliminary release.

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1. Product Overview

The Intel® Server Chassis SR1550 is a 1U server chassis that is designed to support the Intel® Server Board S5000PAL. The server board and chassis have feature sets 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.

The Intel® Server Chassis SR1550 represents a major departure from previous generation products. Most cables have been removed from the system. The cables are replaced by a series of board-to-board interconnects. Using board-to-board interconnects simplifies platform integration and improves airflow for more reliable cooling.

A second significant change from the previous generation of products is the introduction of the mid-plane circuit board. There are two options for the mid-plane circuit board: The first mid-plane option provides onboard SAS/RAID support. The second option is a "passive" mid-plane interconnected to either the server board onboard SATA, or to a SATA or SAS PCI add-in card.

1.1 Chassis Views

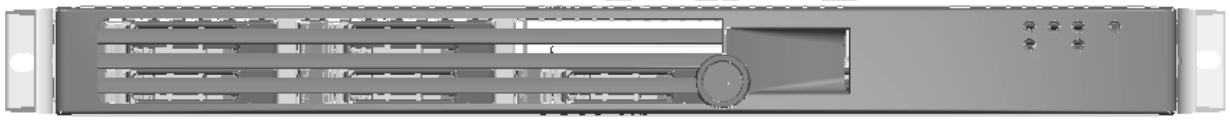


Figure 1. Front View (Shown with Standard Control Panel Bezel)

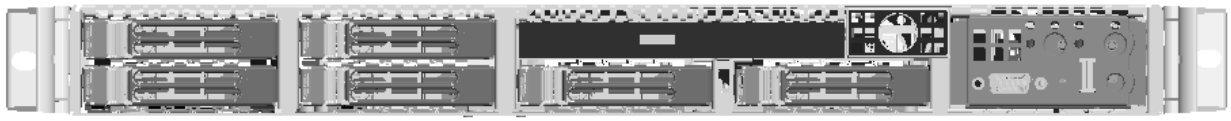


Figure 2. Front View without Bezel (Shown with Standard Control Panel Option)

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

1.2 System Dimensions

Table 1. System Dimensions

System Height	43.2 mm	1.70 ”
System Width	430.0 mm	16.93 ”
System Width with Tool-less Slide Rail	470.0 mm	18.50 “
System Depth	654.4 mm	25.76 ”
System Depth with CMA (Without Bezel)	812.8 mm	32.00 ”
Bezel Depth Adder	38.1 mm	1.50 “
Max. Weight (Without Slide Rail or CMA)	16.8 kg	37.0 lbs

1.3 System Components

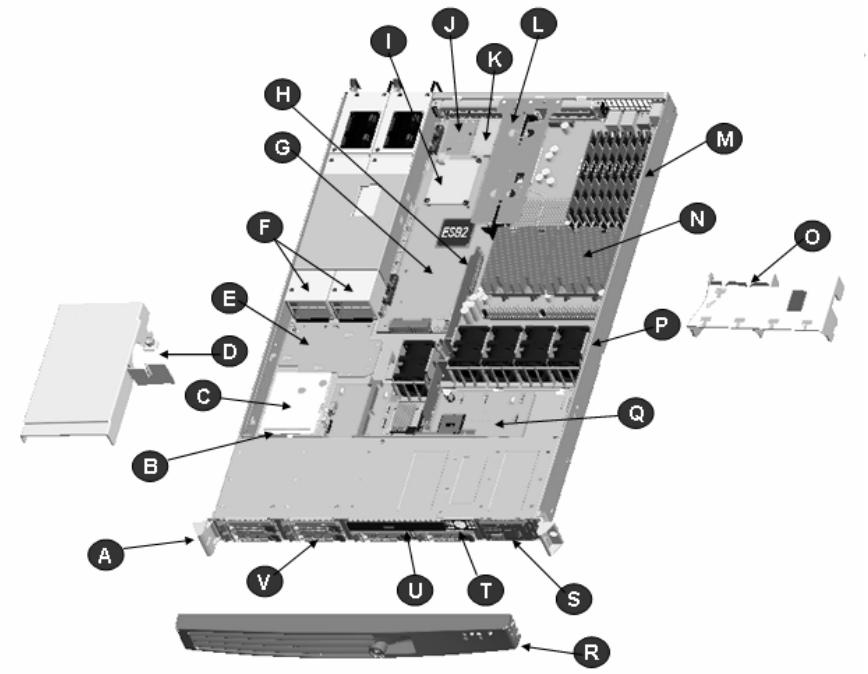


Figure 4. Major Chassis Components

A	Rack Handles	L	Riser Card Assembly
B	SAS/SATA Backplane	M	System Memory
C	Battery Pack (Optional)	N	Processor and Heat Sink
D	Power Supply Air Duct	O	Processor Air Duct
E	Power Distribution Board	P	System Fan Bank
F	Power Supply Modules	Q	Mid-plane Board (Active version shown)
G	Server Board	R	Front Bezel (Optional; Standard Control Panel shown)
H	Bridge Board	S	Standard Control Panel or Intel® Local Control Panel
I	Intel® RMM Module (Optional)	T	Mini Control Panel Bay
J	GCM Module (Optional)	U	Slimline Optical Drive Bay
K	IO Module (Optional)	V	Hard Drive Bays

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

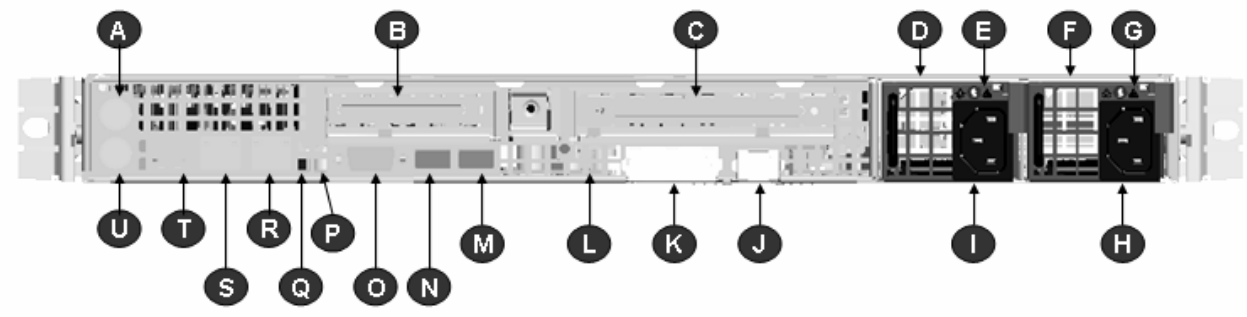


Figure 5. Back Panel Feature Overview

A	PS2 Mouse Connector	L	BIOS Post Code LED's
B	Low Profile PCI EXPRESS Add-in Card Slot	M	USB 5
C	Full Height PCI Add-in Card Slot	N	USB 6
D	Supply Module #1	O	Video
E	Supply Module #1 Status LED	P	System Identification LED
F	Supply Module #2 (Optional)	Q	System Fault LED
G	Supply Module #2 Status LED	R	NIC 2
H	Supply Module #2 AC Recepticle	S	NIC 1
I	Supply Module #1 AC Recepticle	T	RJ45 Serial B connector
J	GCM Module (Optional)	U	PS2 Keyboard Connector
K	I/O Module (Optional)		

1.4 Control Panel Options

The Intel® Server Chassis SR1550 can support three types of control panels: Mini control Panel, Standard Control Panel, and an Intel® Local Control Panel with LCD support. Each control panel is pre-assembled and modular in design. The entire control panel slides into a predefined slot in the front of the chassis.

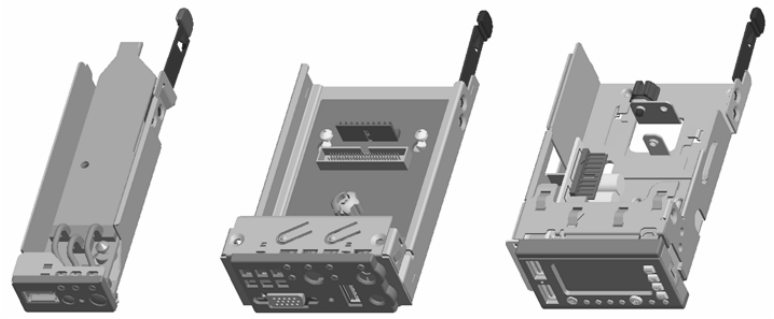


Figure 6. Control Panel Modules

The mini control panel supports three push buttons and three status LED's, along with USB port to centralize system control, monitoring, and accessibility to within a very compact design. The following diagram overviews the layout and functions of the mini control panel.

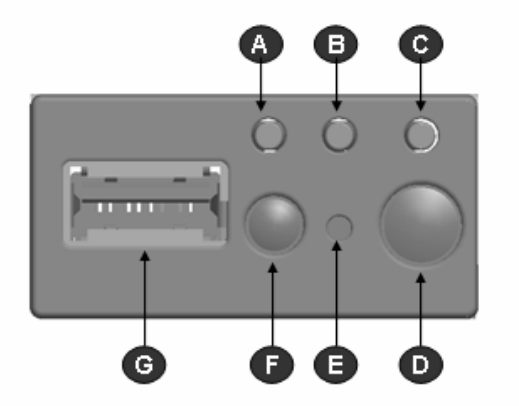


Figure 7. Mini Control Panel Overview

A	System Identification LED	E	Recessed NMI Button (Tool Required)
B	System Status LED	F	System Identification Button
C	Power / Sleep LED	G	USB 2.0 Connector
D	Power / Sleep Button		

The standard control panel supports several push buttons and status LED's, 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 standard control panel.

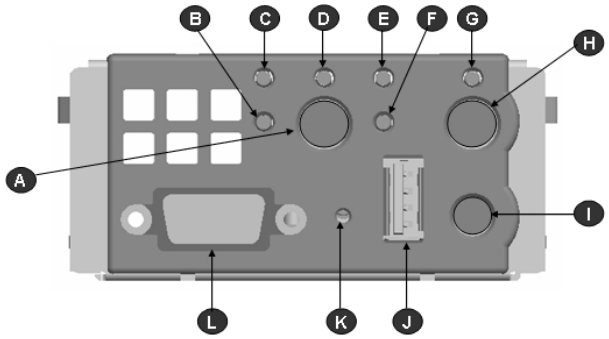


Figure 8. Standard Control Panel Overview

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, LED's, and LCD display to provide system accessibility, monitoring, and control functions. The following diagram provides an overview of this control panel.

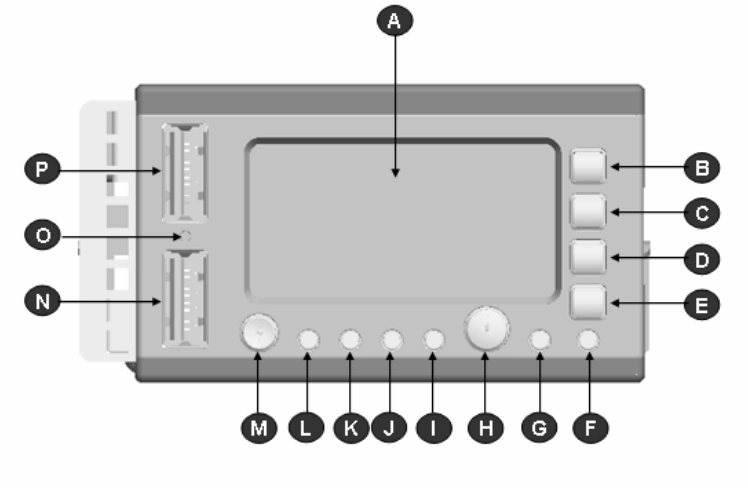


Figure 9. Intel® Local Contol Panel Overview

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

1.5 Hard Drive and Peripheral Bays

The chassis is designed to support 2.5” hot-swap SAS or SATA hard disk drives. Using the mini control panel option, the chassis can support up to eight 2.5” drives. With the standard control panel or Intel® Local Control Panel, up to six drives is supported.

The slimline peripheral bay is capable of supporting one of the following devices: CDROM, DVD, DVD-CDR.

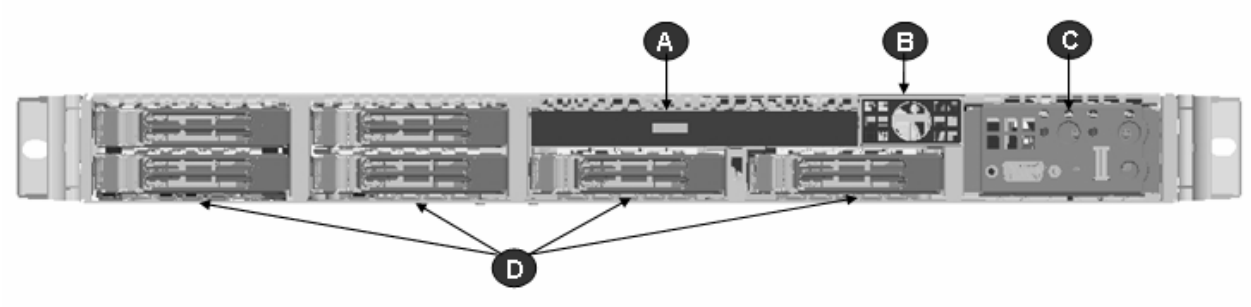


Figure 10. Front Panel Feature Overview

A Slimline Optical Drive Bay

B Mini Control Panel Bay (Filler Panel Shown)

C Standard Control Panel

D 2.5” Hard Drive Bays (Up to Eight Possible with Mini Control Panel)

1.6 Power Sub-system

The chassis can support up to two 650 Watt power supply modules providing support for either a non-redundant 1+0 or redundant 1+1 power configuration. In a 1+1 redundant configuration, each power supply module is hot-swappable should one fail.

The power sub-system has several integrated management features including:

- Status LED on each power module
- Over temperature protection circuitry
- Over voltage protection circuitry
- Over current and 240VA protection circuitry
- Power dropout and brownout recovery

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

- Remote Power On/Off
- Status Alerting
- Module and PDB FRU Information Reporting
- PSMI Capabilities:

  Thermal management
  - Relative temperature sensor for monitoring hot spot in power supply
  - Fan speed sensor
  - System control of power supply fan
  - Power supply fan control override indicator

  Power monitoring
  - Output currents (12V)
  - AC Input current
  - AC input voltage

  Diagnostics
  - Shutdown events; general failure, over current, over temperature, and loss of AC input
  - Warning events; low input voltage, high current, high temperature, slowing fan

  Status
  - Fan control override mode
  - Signals; PWOK, PSON
  - Input voltage range indicator
  - SMBAlert#

  Control
  - Fan control mode; system or power supply
  - Failure and Warning LED indication

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

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	TBD A_{rms} [1,3]	TBD A_{rms} [4]
Line Voltage (220)	$180V_{rms}$	200-240 V_{rms}	$264V_{rms}$	-	-	TBD A_{rms} [2,3]	TBD A_{rms} [4]
Frequency	47 Hz	50/60Hz	63 Hz				

Notes:
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.

1.7 System Cooling

The cooling subsystem for this chassis consists of air baffles, a CPU air duct, and a tool-less fan module which houses five 56 mm dual rotor system fans. In addition, each power supply module includes a 56 mm dual rotor fan module which pulls air from inside the chassis and blows it out the back. Coupled with the onboard server management functionality of the server board, the cooling sub-system provides sufficient airflow to maintain internal system thermal requirements when the external ambient temperature remain within specified limits.

The cooling sub-system for this chassis provides no fan redundancy. Should any of the system fans fail, the system should be shut down as soon as possible to have the failed fan replaced.

1.8 Chassis Security

The chassis provides support for a lockable front bezel which prevents unauthorized access to the system control buttons and hard drives. In addition, a chassis intrusion switch is provided allowing server management software to monitor removal of the top cover from the chassis.

1.9 Rack and Cabinet Mounting Options

The chassis 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. An optional Cable Management Arm can be used with the tool-less sliding rail kit.

1.10 Front Bezel Features

The optional front bezel options are made of molded plastic and use a snap-on design with a key lock. When installed, the design allows for maximum airflow.

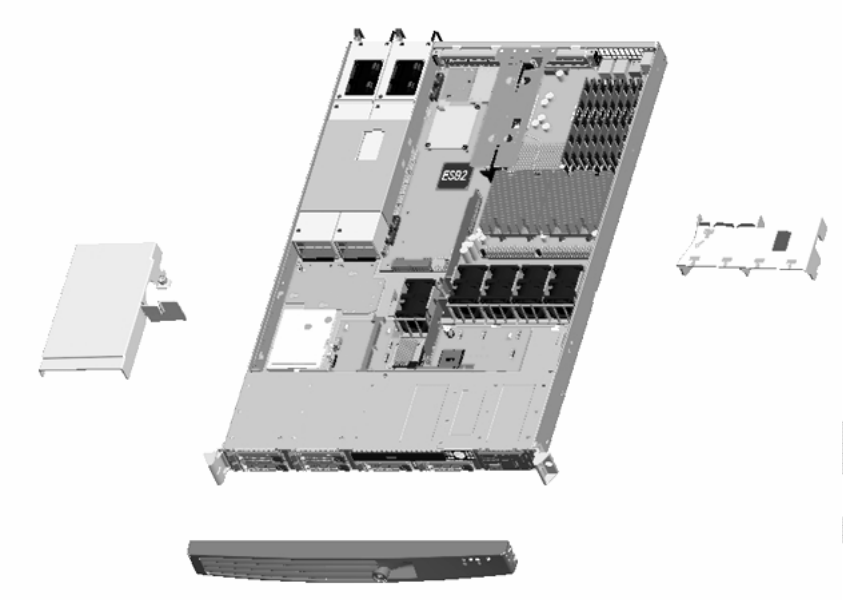


Figure 11. Optional Front Bezel

Separate front bezels are available to support systems that use a mini control panel, standard control panel or Intel® Local Control Panel with LCD support.

When either the mini control panel or the standard control panel is used, light pipes on the backside of the front bezel allow the system status LED's to be monitored with the front bezel installed. The front bezel lock is provided to prevent unauthorized access to hard drives, peripheral devices and the control panel buttons and I/O ports.

Figure 12. Front Bezel Supporting Mini Control Panel

Figure 13. 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.

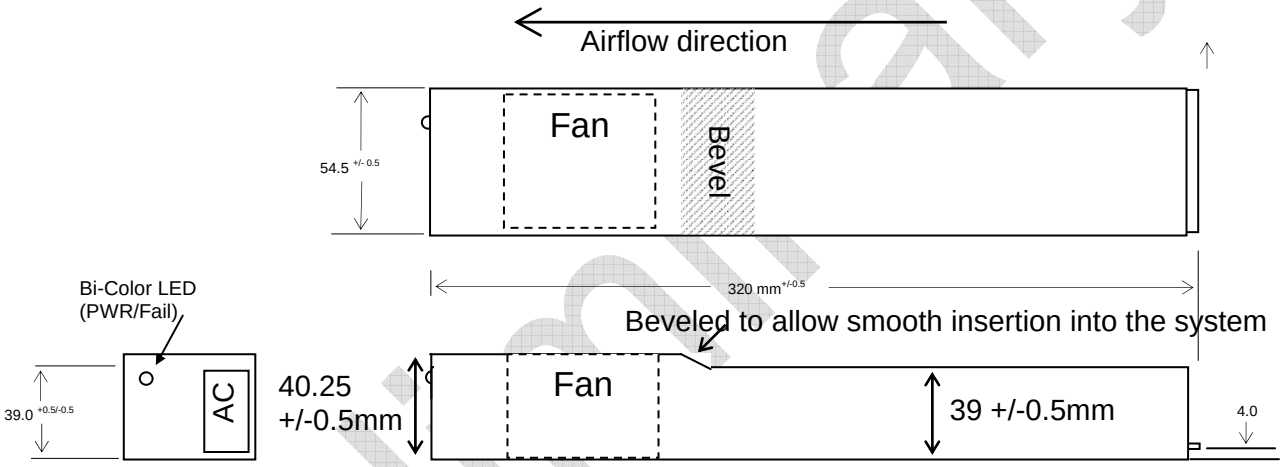
Figure 14. Front Bezel Supporting Intel Local Control Panel

2. Power Sub-system

The power sub-system of the chassis consists of an integrated Power Distribution Module (PDM), a Power Module Enclosure, and support for up to two 650 Watt power supply modules. The power sub-system 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 650 Watts of power.

This chapter provides technical details to the operation of the power supply module and power sub-system. For additional information refer to the Intel® Server Chassis SR1550 AC Power Supply Specification and the Intel® Server Chassis SR1550 Power Distribution Module Specification.

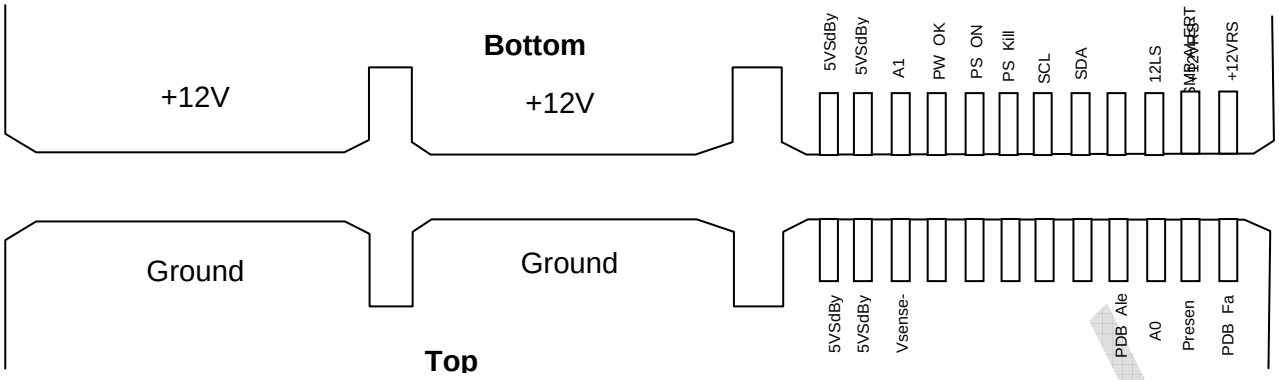
2.1 Mechanical Overview



Notes:
1. All dimensions are in mm.
2. AC inlet can protrude beyond front panel of power supply module
3. Fans powered from +12V when power supplies are ON.
4. Fans shall be powered from 5VSB when in standby mode.

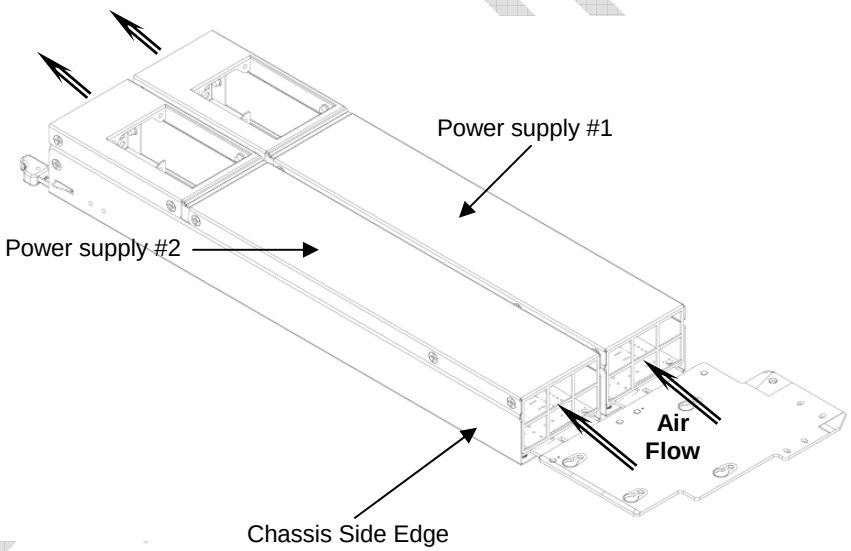
Figure 15. PS Module Enclosure - Dimensional Drawing

2.1.1 DC Output Connection (card edge)



2.2 Single Power Supply Module Population

In single power module configurations, server management firmware requires that power supply module #1 be populated. The power module #1 slot is located closest to the baseboard away from the side edge of the chassis. See the diagram below. The non-operating slot must have the power supply blank installed.



Configuring a single power supply module in the #2 module slot will cause the server management firmware and BIOS to generate a system error during POST and to the System Event Log and will cause the System Status LED on the control panel to blink green, denoting a degraded system configuration.

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 extracting and re-inserting a power supply module from an operating power system. During this process the output voltages shall remain within specified limits. Up to two 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 Output Cable Harness

The power distribution board connects to the system via a wire harness. The harness size, connectors, and pin outs are shown below. Listed or recognized component appliance wiring material (**AVLV2), CN, Rated 105°C Min, 300Vdc Min** shall be used for all output wiring.

Table 2. Power Harness Cable Definitions

Connector #	No of pins	Description
P1	2x12	Main Power Connector
P2	2x4	Processor Power Connector
P3	1x5	Baseboard Signal Connector
P4	2x4	Backplane Power Connector
P5	2x5	Mid-plane Power Connector

2.5.1 P1 – Baseboard Power Connector

Connector housing: 24- Pin Molex* Mini-Fit Jr. 39-01-2245 or equivalent
Contact: Molex Mini-Fit, HCS, Female, Crimp 44476 or equivalent

Table 3. P1 Main 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	COM (GND)	Black	15	COM	Black
4*	5 VDC	Red	16	PS_ON#	Green
	5V RS	Red (24 AWG)	17	COM	Black
5	COM	Black	18	COM	Black
6	+5 VDC	Red	19	COM	Black
7	COM	Black	20	*Reserved (-5V in ATX)*	*N.C.*
8	PWR OK	Gray	21	+5 VDC	Red
9	5Vsb	Purple	22	+5 VDC	Red
10	+12 V3	Yellow/Blue	23	+5 VDC	Red
11	+12 V3	Yellow/Blue	24	COM	Black
12	+3.3 VDC	Orange			

2.5.2 P2 – Processor Power Connector

Connector housing: 8- Pin Molex 39-01-2085 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
2	COM	Black	6	+12 V1	Yellow
3	COM	Black	7	+12 V2	Yellow/Black
4	COM	Black	8	+12 V2	Yellow/Black

2.5.3 P3 – Power Signal Connector

Connector housing: 5-pin Molex 50-57-9705 or equivalent
Contacts: Molex 16-02-0087 or equivalent

Table 5. P3 Power Signal Connector

PIN	SIGNAL	24 AWG COLORS
1	I2C Clock (SCL)	White/Green
2	I2C Data (SDL)	White/Yellow
3	SMBAlert#	White
4	ReturnS	Black
5	3.3RS	White/Brown

2.5.4 P4 – Backplane Power Connector

Connector housing: 8 Pin Molex Mini-Fit Jr. PN# 39-01-2245 or equivalent
Contact: Molex Mini-Fit, HCS, Female, Crimp 44476 or equivalent

Table 6. P4 Hard Drive Interface Board Power Connector

PIN	SIGNAL	18 AWG COLORS	PIN	SIGNAL	18 AWG COLORS
1	COM	Black	5	+12 V4	Yellow/Green
2	COM	Black	6	+12 V4	Yellow/Green
3	+5V	Red	7	+5Vsb	Purple
4	+5V	Red	8	+3.3V	Orange

2.5.5 P5 Mid-Plane Power Connector

Connector housing: 10-Pin Molex Mini-Fit Jr. 43025-1000 or equivalent
Contact: Molex Mini-Fit, HCS, Female, Crimp 43030-0007 or equivalent

Table 7. P5 Mid-plane Power Connector

PIN	SIGNAL	20 AWG Colors	PIN	SIGNAL	20 AWG Colors
1	COM	Black	6	+12 V4	Yellow/Green
2	COM	Black	7	+12 V4	Yellow/Green
3	+5V	Red	8	+12 V4	Yellow/Green
4	+3.3V	Orange	9	+12 V4	Yellow/Green
5	COM	Black	10	+5Vsb	Purple

2.6 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.

2.6.1 AC Inlet Connector

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

2.6.2 Efficiency

The following table provides the recommended efficiency level for the power supply module. Efficiency shall be tested over an AC input voltage range of 90VAC to 264VAC.

Table 8. Efficiency

Power Supply Version	20% of maximum	50% of maximum	100% of maximum
650W	~80-85%	~90%	~90%

2.6.3 AC Input Voltage Specification

The power supply must operate 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 9. 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)	90 V_{rms}	100-127 V_{rms}	140 V_{rms}	**85 Vac ±4 Vac**	**75 Vac ±5 Vac**	**TBD A_{rms} [1,3]**	**TBD A_{rms} [4]**
Line Voltage (220)	180 V_{rms}	200-240 V_{rms}	264 V_{rms}	**-**	-	**TBD A_{rms} [2,3]**	**TBD A_{rms} [4]**
Frequency	47 Hz	50/60 Hz	63 Hz				

Notes:
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.

2.6.4 Power Factor Correction

The power supply shall incorporate a Power Factor Correction circuit. The power supply shall be tested as described in EN 61000-3-2: Electromagnetic Compatibility (EMC) Part 3: Limits-Section 2: Limits for harmonic current emissions, and shall meet the harmonic current emissions limits specified for ITE equipment. The power supply shall be tested as described in JEIDA MITI Guideline for Suppression of High Harmonics in Appliances and General-Use Equipment and shall meet the harmonic current emissions limits specified for ITE equipment.

2.7 Protection Circuits

Protection circuits inside the PDB and the power supply 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 entire power supply combo. If the power supply latches off due to a protection circuit tripping, an AC cycle OFF for 15sec min or a PSON# cycle HIGH for 1sec shall be able to reset the power supply and the PDB.

2.7.1 Over-Current Protection (OCP)

Each DC/DC converter output on the PDB shall have individual OCP protection circuits. The power supply and power distribution board combination (PS+PDB) 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 +12 V output from the power supply is divided on the PDB into 4 channels and each is limited to 240 VA of power. There shall be current sensors and limit circuits to shut down the entire PS+PDB if the limit is exceeded. The limits are listed below. -12 V and 5 VSB shall be protected under over current or shorted conditions so that no damage can occur to the power supply. Auto-recovery feature is a requirement on 5 VSB rail.

Table 10. Over Current Protection Limits / 240VA Protection

Output Voltage	MIN OCP TRIP LIMITS	MAX OCP TRIP LIMITS
+3.3V	13.2A	18A
+5V	26A	30A
-12V	protected under over current or shorted conditions	
+12V1	18.2A	20A
+12V2	18.2A	20A
+12V3	18.2A	20A
+12V4	18.2A	20A
+5Vsb	protected under over current or shorted conditions w/auto recovery	

2.7.2 Over Voltage Protection (OVP)

Each DC/DC converter output on PDB shall have individual OVP protection circuits built in and it shall be locally sensed. The PS+PDB shall shutdown and latch off after an over voltage condition occurs. This latch shall be cleared by toggling the PSON# signal or by an AC power interruption. The following table provides contains 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 11. Over Voltage Protection (OVP) Limits

Output Voltage	OVP MIN (V)	OVP MAX (V)
+3.3V	3.9	4.5
+5V	5.7	6.2
+12V1,2, 3, 4	13.3	14.5
-12V	-13.3	-14.5
+5VSB	5.7	6.5

2.7.3 Over Temperature Protection (OTP)

The PS+PDB will be protected against over-temperature conditions caused by loss of fan cooling, excessive ambient temperature, or excessive loading. Two sensing points shall be placed at hot spots; one near the exterior face and one near the interior face of the module. 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 5 VSB remains always on. The OTP circuit must have built in hysteresis such that the power supply will not oscillate on and off due to temperature recovering condition. The OTP trip level shall have a minimum of 4°C of ambient temperature hysteresis.

2.8 Power Supply Status LED

Each power supply module will have a single bi-color LED to indicate power supply status. The LED operation is defined below.

Table 12. 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.

3. Cooling Subsystem

Several components and configuration requirements make up the cooling sub-system of the chassis. These include the system fan module, the power supply fans, power supply air duct, CPU air duct, and drive bay population. All are necessary to provide and regulate the air flow and air pressure needed to maintain the system's thermals when operating at or below maximum specified thermal limits. See Table 53. System Environmental Limits.

The chassis has a non-redundant system cooling configuration consisting of five 40x40x56mm dual rotor system fans to provide sufficient airflow to maintain internal system thermal requirements when the external ambient temperature remains within specified limits. Should a single fan failure occur, the system should be shut down as soon as possible.

In addition to the system fans, each power supply module installed provides an additional 56mm dual rotor fan which pulls air from inside the chassis and blows it out the back.

The system fans use a variable fan speed control engine to provide adequate cooling for the system at various ambient temperature conditions, under various server workloads, and with the least amount of acoustic noise possible. The fans operate at the lowest speed for any given condition in order to minimize acoustics. The server board Baseboard Management Controller (BMC) is used for the variable fan speed control function. The controller monitors selective component temperatures and the ambient temperature as well as each fan's RPM to determine the necessary airflow, and sets the fan speeds to the appropriate RPM in order to maintain proper cooling. The BMC will also log errors into the System Event Log (SEL) when temperature sensors exceed their safe operating ranges or if any of the fans fail to operate at safe airflow speeds. In the event of a fan failure, the BMC will boost the remaining fans as a means to compensate for the lost air flow. If the cooling is not sufficient under a failed fan condition the system will eventually shutdown as a means to protect itself from thermal damage.

3.1 Fan Module

The system fan module houses five 40x40x56mm dual rotor system fans. The module has been designed for ease of use and has support for several management features that can be utilized by the baseboard management system. The system fan module and individual fans do not require tools for installation or removal.

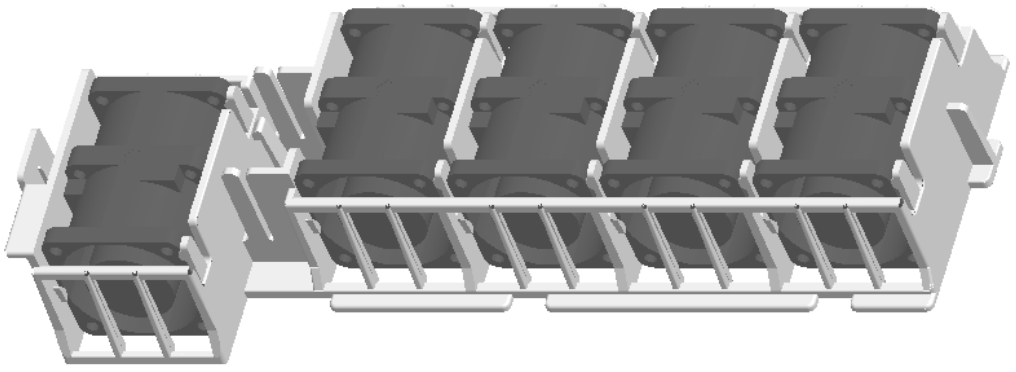


Figure 16. Fan Module

The individual system fans are not hot-swappable and require the system to be turned off before being replaced. The chassis is classified as a “Service Access Only” device and caution should be exercised when replacing a system fan as they do not have finger guards. However provisions are built into the fan bracket to prevent service technician from accidental contact with fan rotors. 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 BMC firmware will increase the speed for all the fans within the fan module.

Each fan connector within the module supplies two tachometer signals (one for each fan rotor) allowing for baseboard management to monitor the status of each fan rotor. 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 system fan has an associated fan fault LED which is located next to its respective fan cable connector on the mid-plane board. The fan fault LED is controlled by the BMC. If either fan rotor within a system fan fails, it will illuminate the fan fault LED and log the failure into the System Event Log.

Table 13. Fan Connector Pin Assingment

Pin	Signal Name	Description
1	Tachometer B	Fan RPM sensor output
2	PWM	Fan speed control signal
3	12V	Power for fan
4	12V	Power for fan
5	Tachometer A	Fan RPM sensor output
6	Return	Return path to ground
7	Return	Return path to ground
8	Fan Presence	Detection if fan is installed in system
9	LED Cathode	Loopback signal to pin 10
10	LED Anode	Loopback signal to pin 9

The system fan cables plug onto connectors on the mid-plane board according the following scheme. Both passive and active mid-planes have the same fan numbering and fan connector locations.

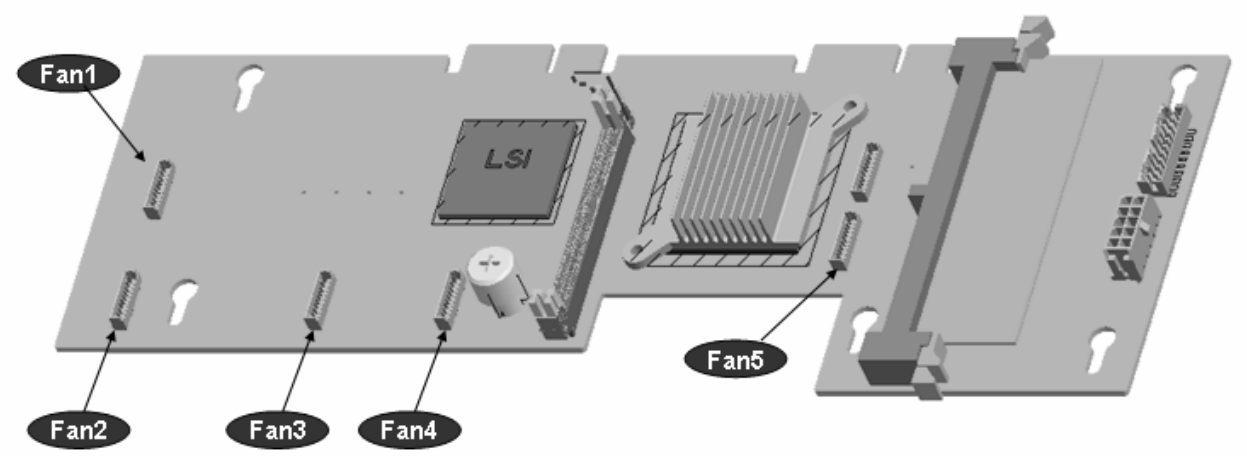


Figure 17. Fan Header Assignments on Mid-Plane

Table 14. Fan Header Assignment

Fan ID	Mid-plane Fan Header Name
Fan #1 - CPU1 cooling	FAN_1
Fan #2 - CPU1 cooling	FAN_2
Fan #3 - CPU2 cooling	FAN_3
Fan #4 - CPU2 cooling	FAN_4
Fan #5 - PCI Cooling	FAN_5

.

3.2 Air Flow Support

To control airflow within the system, a power supply air duct 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.

3.2.1 Power Supply Zone

An air baffle is used to isolate the air flow of the main system board zones from the zone directly in front of the power supply modules. The power supply fans pull pre-heated air from the leftmost drive bays across the PDB to cool its voltage regulators.

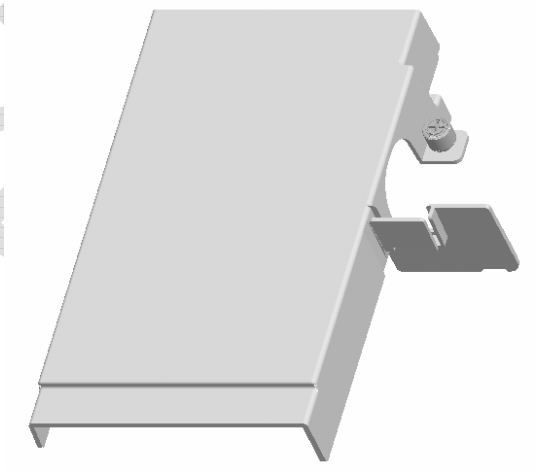


Figure 18. Power Supply Air Duct

3.2.2 Full Height Riser Zone

The full height riser zone is the area between the power supply assembly and the full height riser card of the riser assembly. The air flow through this area is generated by FAN #5 of the fan module. Air is drawn from the drive bay area through the fan and pushed out of the system through ventilation holes at back of the chassis.

3.2.3 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. The air flow for this zone is generated by system fans FAN #1 - #4 of the fan module. 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 dual processor configurations, an air baffle tab is snapped off the air duct as shown in the following diagram.

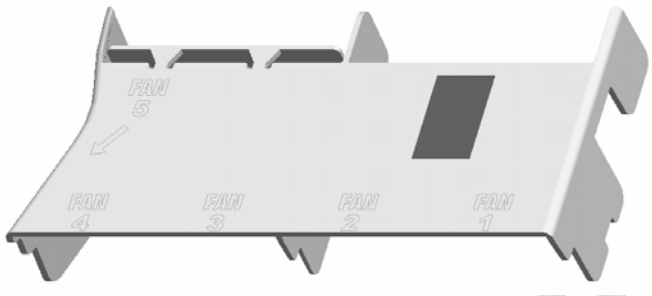


Figure 19. CPU Air Duct (Design Subject to Change)

Operating a single processor configuration with the air baffle removed may result in the processor over heating and may cause the system to shutdown.

3.3 Drive Bay Population

To maintain the proper air pressure within the system, all hard drive bays must be populated with a 2.5” carrier with either a hard drive, or drive blank installed.

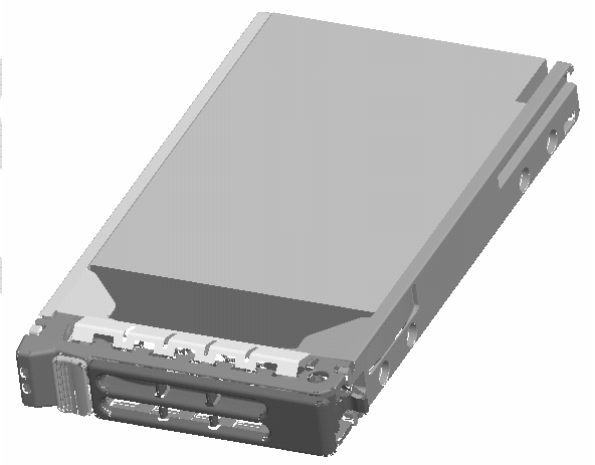


Figure 20. 2.5” Drive Blank

4. System Board Interconnects

The chassis incorporates several design changes from the previous generation Intel 1U server chassis, resulting in improved cable routing or eliminating several cable interconnects altogether. System boards within the chassis include two types of mid-planes, a bridge board, a hard drive backplane, three types of PCI riser boards, and three types of control panels. This chapter describes the interconnect features of each and defines the pin-outs for each of their connectors. Functional details of each system board are described in later chapters.

4.1 Mid-Plane

The mid-plane is new to this generation of Intel high density server platform system board. Its design and use along with that of the bridge board and hot-swap backplane, improve cable routing or eliminate several cable interconnects within the system. The mid-plane serves as the primary interface between the baseboard, backplane, and control panel. Two mid-planes are offered for this chassis: passive SATA/SAS, and an active SAS/SAS RAID.

The following diagram shows the location for each connector found on the passive mid-plane board.

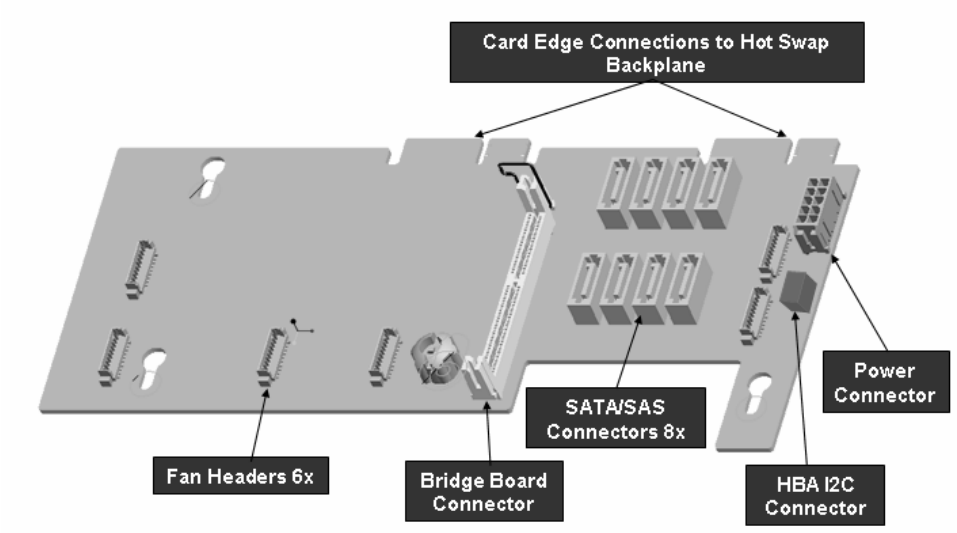


Figure 21. Passive Mid-Plane Board

The chassis also supports an active SAS / SAS RAID mid-plane. This system board incorporates an LSI* LSISAS1068 SAS controller onto the board. See Chapter 5 for details describing SAS / SAS RAID support. The following diagram shows the location for each connector found on this board.

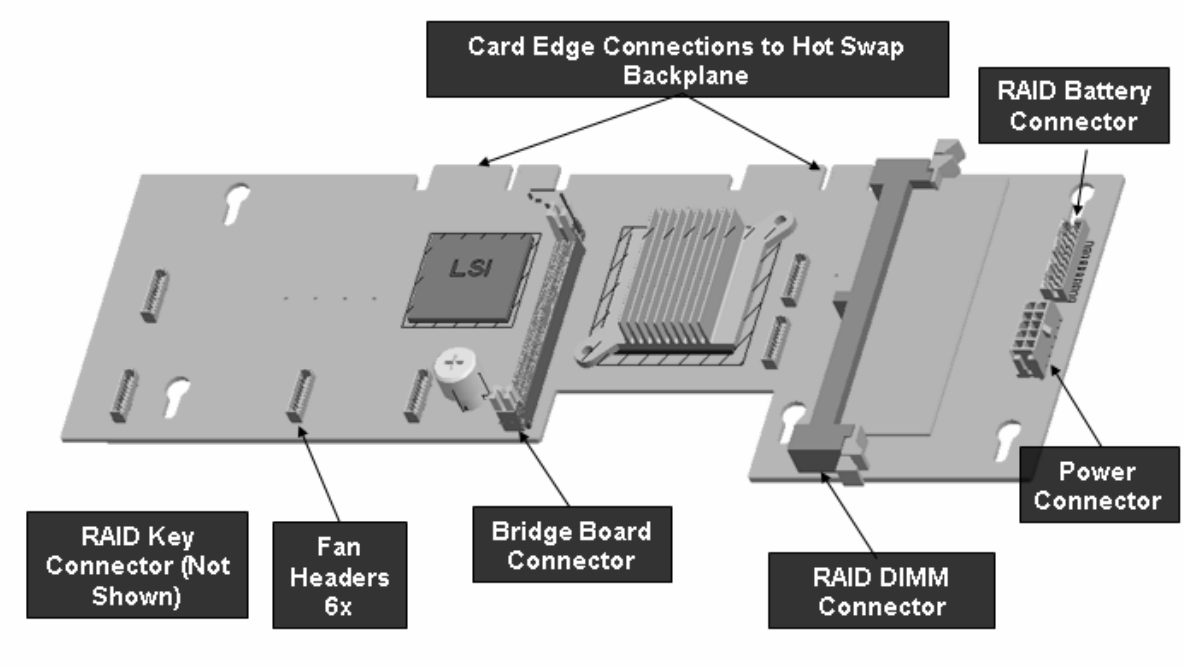


Figure 22. SAS/SAS RAID Mid-Plane Board

The following tables define the connector pin-outs for both mid-plane boards.

Table 15. 120-pin Bridge Board Connector Pin-Out

PIN	SIGNAL NAME	PIN	SIGNAL NAME
1	GND	61	SMB_SENSOR_3V3SB_CLK_BUF
2	PE1_ESB_TX_DN3	62	SMB_SENSOR_3V3SB_DAT_BUF
3	PE1_ESB_TX_DP3	63	FM_BRIDGE_PRSNT_N
4	GND	64	GND
5	PE_WAKE_N	65	PE1_ESB_RX_DN_C3
6	GND	66	PE1_ESB_RX_DP_C3
7	PE1_ESB_TX_DN2	67	GND
8	PE1_ESB_TX_DP2	68	FAN_PRSNT6_N
9	GND	69	GND
10	FAN_PRSNT5_N	70	PE1_ESB_RX_DN_C2
11	GND	71	PE1_ESB_RX_DP_C2
12	PE1_ESB_TX_DN1	72	GND
13	PE1_ESB_TX_DP1	73	FAN_PRSNT4_N
14	GND	74	GND
15	RST_PS_PWRGD	75	PE1_ESB_RX_DN_C1
16	GND	76	PE1_ESB_RX_DP_C1
17	PE1_ESB_TX_DN0	77	GND
18	PE1_ESB_TX_DP0	78	RAID_KEY_PRES
19	GND	79	GND
20	FM_RAID_MODE	80	PE1_ESB_RX_DN_C0
21	GND	81	PE1_ESB_RX_DP_C0
22	CLK_IOP_DN	82	GND
23	CLK_IOP_DP	83	FAN_PRSNT1_N

PIN	SIGNAL NAME	PIN	SIGNAL NAME
24	GND	84	FAN_PRSNT3_N
25	SGPIO_DATAOUT1	85	FAN_PRSNT2_N
26	SGPIO_DATAOUT0	86	GND
27	SGPIO_LOAD	87	USB1_ESB_DP
28	SGPIO_CLOCK	88	USB1_ESB_DN
29	GND	89	GND
30	USB2_ESB_DP	90	USB1_ESB_OC_N
31	USB2_ESB_DN	91	USB0_ESB_OC_N
32	GND	92	GND
33	USB2_ESB_OC_N	93	USB0_ESB_DP
34	NIC1_LINK_LED_N	94	USB0_ESB_DN
35	NIC1_ACT_LED_N	95	GND
36	LED_STATUS_AMBER_R1	96	FP_NMI_BTN_N
37	NIC2_LINK_LED_N	97	BMC_RST_BTN_N
38	NIC2_ACT_LED_N	98	FP_PWR_BTN_N
39	LED_STATUS_GREEN_BUF_R1	99	FP_ID_SW_L
40	GND	100	GND
41	SMB_PBI_5VSB_DAT	101	SMB_IPMB_5VSB_DAT
42	SMB_PBI_5VSB_CLK	102	SMB_IPMB_5VSB_CLK
43	GND	103	GND
44	V_IO_HSYNC2_BUF_FP	104	LED_HDD_ACTIVITY_N
45	V_IO_VSYNC2_BUF_FP	105	LED_HDD_5V_A
46	GND	106	FP_PWR_LED_R_N
47	V_IO_BLUE_CONN_FP	107	FP_PWR_LED_3VSB
48	V_IO_GREEN_CONN_FP	108	FP_ID_LED_R1_N
49	V_IO_RED_CONN_FP	109	FM_SIO_TEMP_SENSOR
50	GND	110	LED_FAN3_FAULT
51	LED_FAN6_FAULT	111	LED_FAN2_FAULT
52	LED_FAN5_FAULT	112	LED_FAN1_FAULT
53	LED_FAN4_FAULT	113	FAN_PWM_CPU1
54	FAN_PWM3	114	GND
55	GND	115	FAN_PWM_CPU2
56	PCI_FAN_TACH10	116	PCI_FAN_TACH9
57	FAN_TACH8	117	FAN_TACH7
58	FAN_TACH6	118	FAN_TACH5
59	FAN_TACH4_H7	119	FAN_TACH3_H7
60	FAN_TACH2_H7	120	FAN_TACH1_H7

Table 16. Mid-Plane Fan Header Pin-Outs

J2B1 - FAN_1		J2B3 - FAN_3		J7B1 - FAN_5	
PIN	**SIGNAL NAME**	**PIN**	**SIGNAL NAME**	**PIN**	**SIGNAL NAME**
1	FAN_TACH5	1	FAN_TACH7	1	FAN_TACH10
2	FAN_PWM_CPU1	2	FAN_PWM_CPU2	2	FAN_PWM3
3	P12V	3	P12V	3	P12V
4	P12V	4	P12V	4	P12V
5	FAN_TACH1_H7	5	FAN_TACH3_H7	5	FAN_TACH9
6	GND	6	GND	6	GND
7	GND	7	GND	7	GND
8	FAN_PRSNT1_N	8	FAN_PRSNT3_N	8	FAN_PRSNT5_N
9	LED_FAN1_FAULT	9	LED_FAN3_FAULT	9	LED_FAN5_FAULT
10	LED_FAN1	10	LED_FAN3	10	LED_FAN5

J2B2 - FAN_2		J3B1 - FAN_4		J7B2 - FAN_6	
PIN	**SIGNAL NAME**	**PIN**	**SIGNAL NAME**	**PIN**	**SIGNAL NAME**
1	FAN_TACH6	1	FAN_TACH8	1	UNUSED
2	FAN_PWM_CPU1	2	FAN_PWM_CPU2	2	FAN_PWM3
3	P12V	3	P12V	3	P12V
4	P12V	4	P12V	4	P12V
5	FAN_TACH2_H7	5	FAN_TACH4_H7	5	FAN_TACH10
6	GND	6	GND	6	GND
7	GND	7	GND	7	GND
8	FAN_PRSNT2_N	8	FAN_PRSNT4_N	8	FAN_PRSNT6_N
9	LED_FAN2_FAULT	9	LED_FAN4_FAULT	9	LED_FAN6_FAULT
10	LED_FAN2	10	LED_FAN4	10	LED_FAN6

Table 17. Mid-Plane Power Connector Pin-Out

PIN	Signal Description
1	GND
2	GND
3	P5V
4	P3V3
5	GND
6	P12V
7	P12V
8	P12V
9	P12V
10	P5V_STBY

Table 18. Mid-Plane to Backplane Card Edge Connector #1 Pin-Out

J7A1 - HSBP#1 I/F			
PIN	**SIGNAL NAME**	**PIN**	**SIGNAL NAME**
A1	RST_PS_PWRGD	B1	GND
A2	GND	B2	SATA0_RX_N
A3	GND	B3	SATA0_RX_P
A4	SATA1_RX_N	B4	GND
A5	SATA1_RX_P	B5	GND
A6	GND	B6	SATA0_TX_N
A7	GND	B7	SATA0_TX_P
A8	SATA1_TX_P	B8	GND
A9	SATA1_TX_N	B9	GND
A10	GND	B10	USB2_ESB_DN
A11	GND	B11	USB2_ESB_DP
A12	USB2_ESB_OC_N	B12	GND
A13	GND	B13	SATA2_RX_N
A14	GND	B14	SATA2_RX_P
A15	SATA3_RX_N	B15	GND
A16	SATA3_RX_P	B16	NC_RESERVEDB16
A17	GND	B17	SMB_SAS_EDGE_DAT
A18	GND	B18	NC_RESERVEDB18
A19	GND	B19	SMB_SAS_EDGE_CLK
A20	SATA3_TX_P	B20	NC_RESERVEDB20
A21	SATA3_TX_N	B21	GND
A22	GND	B22	SATA2_TX_P
A23	GND	B23	SATA2_TX_N
A24	SATA5_RX_N	B24	GND
A25	SATA5_RX_P	B25	GND
A26	GND	B26	SATA4_RX_N
A27	GND	B27	SATA4_RX_P
A28	SATA5_TX_P	B28	GND
A29	SATA5_TX_N	B29	GND
A30	GND	B30	SATA4_TX_P
A31	GND	B31	SATA4_TX_N
A32	P5V_STBY	B32	GND

Table 19. Mid-Plane to Backplane Card Edge Connector #2 Pin-Out

J4A1 - HSBP#2 I/F			
PIN	**SIGNAL NAME**	**PIN**	**SIGNAL NAME**
A1	SGPIO_DATAOUT0	B1	SGPIO_CLOCK
A2	SGPIO_DATAOUT1	B2	GND
A3	GND	B3	SATA_ADDIN1_RX_N
A4	GND	B4	SATA_ADDIN1_RX_P
A5	SATA_ADDIN2_RX_N	B5	GND
A6	SATA_ADDIN2_RX_P	B6	GND
A7	GND	B7	SATA_ADDIN1_TX_N
A8	GND	B8	SATA_ADDIN1_TX_P
A9	SATA_ADDIN2_TX_P	B9	GND
A10	SATA_ADDIN2_TX_N	B10	GND
A11	GND	B11	SGPIO_LOAD
A12	SMB_PBI_3VSB_DAT	B12	SMB_IPMB_5VSB_DAT
A13	SMB_PBI_3VSB_CLK	B13	SMB_IPMB_5VSB_CLK
A14	USB0_ESB_OC_N	B14	GND
A15	GND	B15	USB1_ESB_DP
A16	GND	B16	USB1_ESB_DN
A17	USB0_ESB_DP	B17	GND
A18	USB0_ESB_DN	B18	GND
A19	GND	B19	USB1_ESB_OC_N
A20	LED_NIC1_ACT_N	B20	LED_HDD_ACTIVITY_N
A21	LED_NIC1_LINK_N	B21	LED_HDD_5V_A
A22	FM_SIO_TEMP_SENSOR	B22	FP_ID_SW_L
A23	LED_NIC2_LINK_N	B23	BMC_RST_BTN_N
A24	LED_NIC2_ACT_N	B24	FP_PWR_BTN_N
A25	GND	B25	FP_NMI_BTN_N
A26	V_BLUE_CONN_FP	B26	FP_PWR_LED_3VSB
A27	V_GREEN_CONN_FP	B27	FP_PWR_LED_R_N
A28	V_RED_CONN_FP	B28	FP_ID_LED_R1_N
A29	GND	B29	GND
A30	V_HSYNC2_BUF_FP	B30	LED_STATUS_AMBER_R1
A31	V_VSYNC2_BUF_FP	B31	LED_STATUS_GREEN_BUF_R1
A32	GND	B32	FP_LED

Table 20. Active Mid-Plane SAS RAID Battery Backup Connector Pin-Out

PIN	Signal Description
1	P12V
2	GND
3	NC_P5V_MONITOR
4	GND
5	P1V8_VBAT_RAID
6	GND
7	PWRGD_P3V3_STBY
8	GND
9	P1V8_VBAT_RAID
10	GND
11	PX_RESET_N
12	GND
13	SMB_CLK_P3V3
14	GND
15	SMB_DAT_P3V3
16	BBU_PFAIL_N
17	BBU_DDR_SEL
18	BBU_BBE
19	BBU_BBSTROBE
20	BBU_BBSTATUS

Table 21. Passive Mid-Plane SATA/SAS Drive Control Connector Pin-Outs

J5A2 - SAS_7		J6A1 - SAS_6		J5B1 - SAS_4		J6B1 - SAS_2	
PIN	**SIGNAL NAME**	**PIN**	**SIGNAL NAME**	**PIN**	**SIGNAL NAME**	**PIN**	**SIGNAL NAME**
1	GND	1	GND	1	GND	1	GND
2	SATA_ADDIN1_TX_P	2	SATA5_TX_P	2	SATA3_TX_P	2	SATA1_TX_P
3	SATA_ADDIN1_TX_N	3	SATA5_TX_N	3	SATA3_TX_N	3	SATA1_TX_N
4	GND	4	GND	4	GND	4	GND
5	SATA_ADDIN1_RX_N	5	SATA5_RX_N	5	SATA3_RX_N	5	SATA1_RX_N
6	SATA_ADDIN1_RX_P	6	SATA5_RX_P	6	SATA3_RX_P	6	SATA1_RX_P
7	GND	7	GND	7	GND	7	GND
J5A1- SAS_8		**J6A2 - SAS_5**		**J5B2 - SAS_3**		**J6B2 - SAS_1**	
PIN	**SIGNAL NAME**	**PIN**	**SIGNAL NAME**	**PIN**	**SIGNAL NAME**	**PIN**	**SIGNAL NAME**
1	GND	1	GND	1	GND	1	GND
2	SATA_ADDIN2_TX_P	2	SATA4_TX_P	2	SATA2_TX_P	2	SATA0_TX_P
3	SATA_ADDIN2_TX_N	3	SATA4_TX_N	3	SATA2_TX_N	3	SATA0_TX_N
4	GND	4	GND	4	GND	4	GND
5	SATA_ADDIN2_RX_N	5	SATA4_RX_N	5	SATA2_RX_N	5	SATA0_RX_N
6	SATA_ADDIN2_RX_P	6	SATA4_RX_P	6	SATA2_RX_P	6	SATA0_RX_P
7	GND	7	GND	7	GND	7	GND

Table 22. Passive MidPlane HBA I2C Connector Pinout

PIN	Signal Description
1	SMB_SAS_EDGE_DAT
2	GND
3	SMB_SAS_EDGE_CLK

4.2 Bridge Board

The chassis utilizes a bridge board to route signals from the baseboard to the mid-plane board. The bridge board carries signals for three USB ports, SSI front panel control signals, video, various I2C buses, fan control signals, and a PCI Express* x4 bus for SAS controller function. See Table 15. 120-pin Bridge Board Connector Pin-Out.

Figure 23. Bridge Board

4.3 Hot-Swap SATA/SAS Backplane

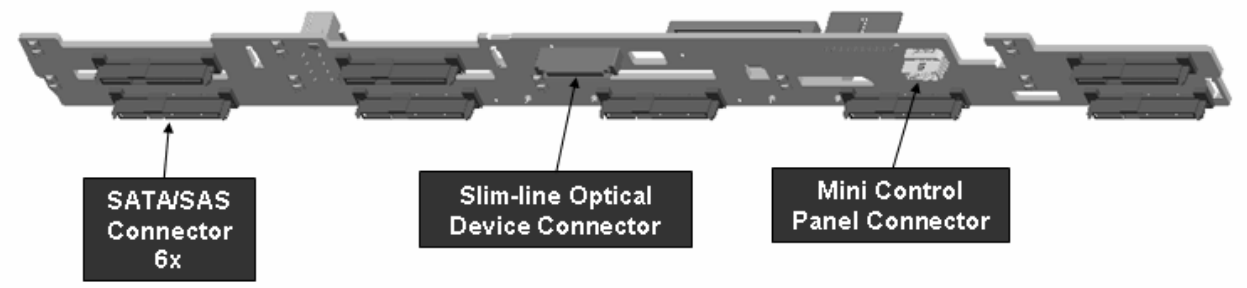


Figure 24. Hot-Swap SAS/SATA Backplane (Front Side View) (Subject to Change)

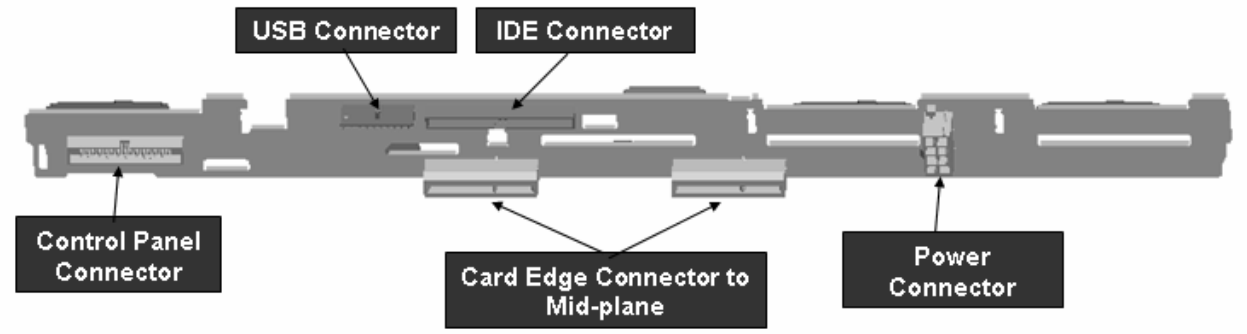


Figure 25. Hot-Swap SAS/SATA Backplane (Back Side View)

Table 23. 2x4 SAS/SATA Backplane Power Connector Pin-out

Pin #	Signal Name
1	Ground
2	Ground
3	P5V
4	P5V
5	P12V
6	P12V
7	P5V_STBY
8	P3V3

Table 24. 2x22 IDE Optical Drive Connector Pin-out

Pin #	Signal Name
1	RST_IDE_L
2	Ground
3	RIDE_DD <15..0> 7
4	RIDE_DD <15..0> 8
5	RIDE_DD <15..0> 6
6	RIDE_DD <15..0> 9
7	RIDE_DD <15..0> 5
8	RIDE_DD <15..0> 10
9	RIDE_DD <15..0> 4
10	RIDE_DD <15..0> 11
11	RIDE_DD <15..0> 3
12	RIDE_DD <15..0> 12
13	RIDE_DD <15..0> 2
14	RIDE_DD <15..0> 13
15	RIDE_DD <15..0> 1
16	RIDE_DD <15..0> 14
17	RIDE_DD <15..0> 0
18	RIDE_DD <15..0> 15
19	Ground
20	Not Used
21	RIDE_DDREQ
22	Ground
23	RIDE_DIOW_N
24	Ground
25	RIDE_DIOR_N
26	Ground
27	RIDE_DIORDY
28	IDE_ALE_H
29	RIDE_DDACK_N
30	Ground
31	IRQ_IDE
32	TP_PIDE_32
33	RIDE_DA1
34	IDE_PRI_CBLSNS
35	RIDE_DA0
36	RIDE_DA2
37	RIDE_DCS1_N
38	RIDE_DCS3_N
39	LED_IDE_L
40	Ground
41	Not Used
42	Not Used
43	Not Used
44	Not Used

Table 25. Slimline Optical Drive Connector

Pin #	Signal Name	Pin #	Signal Name
1	Not Used	2	Not Used
3	Not Used	4	GND
5	RST_IDE_L	6	RIDE_DD8
7	RIDE_DD7	8	RIDE_DD9
9	RIDE_DD6	10	RIDE_DD10
11	RIDE_DD5	12	RIDE_DD11
13	RIDE_DD4	14	RIDE_DD12
15	RIDE_DD3	16	RIDE_DD13
17	RIDE_DD2	18	RIDE_DD14
19	RIDE_DD1	20	RIDE_DD15
21	RIDE_DD0	22	RIDE_DDREQ
23	GND	24	RIDE_DIOR_N
25	RIDE_DIOW_N	26	GND
27	RIDE_DIORDY	28	RIDE_DDACK_N
29	IRQ_IDE	30	RIDE_P32
31	RIDE_DA1	32	IDE_PRI_CBLSNS
33	RIDE_DA0	34	RIDE_DA2
35	RIDE_DCS1_N	36	RIDE_DCS3_N
37	LED_IDE_N	38	P5V
39	P5V	40	P5V
41	P5V	42	P5V
43	GND	44	GND
45	GND	46	GND
47	IDE_ALE_S_H	48	GND
49	Not Used	50	Not Used

Table 26. IDE Device Master/Slave Configuration Jumper

Jumper Setting	Configuration
1-2	IDE Master
2-3	IDE Slave

Table 27. I2C Connector

Pin #	Signal Description
1	SMB_VSC_12C_DAT0
2	GROUND
3	SMB_VSC_12C_CLK0
4	Not Used

Table 28. PCI_E X4 Slot Connector from MidPlane

Pin #	Signal Name	Pin #	Signal Name
A1	SGPIO_DATA0	B1	SGPIO_CLOCK
A2	SGPIO_DATA1	B2	Ground
A3	Ground	B3	SAS6_RX_DN
A4	Ground	B4	SAS6_RX_DP
A5	SAS7_RX_DN	B5	Ground
A6	SAS7_RX_DP	B6	Ground
A7	Ground	B7	SAS6_TX_DN
A8	Ground	B8	SAS6_TX_DP
A9	SAS7_TX_DP	B9	Ground
A10	SAS7_TX_DN	B10	Ground
A11	Ground	B11	SGPIO_LOAD
A12	SMB_PB1_5VSB_DAT	B12	SMB_IPMB_5VSB_DAT
A13	SMB_PB1_5VSB_CLK	B13	SMB_IPMB_5VSB_CLK
A14	USB_OC1_N	B14	Ground
A15	Ground	B15	USB_P2P
A16	Ground	B16	USB_P2N
A17	USB_P1P	B17	Ground
A18	USB_P1N	B18	Ground
A19	Ground	B19	USB_OC2_N
A20	LED_NIC1_ACT_L	B20	LED_HDD_ACT_R_L
A21	LED_NIC1_LINK_R_L	B21	PV_HDD_LED_3V_A
A22	FP_THERM_SENSOR	B22	FP_ID_SW_L
A23	LED_NIC2_LINK_R_L	B23	RST_FP_BTN_L
A24	LED_NIC2_ACT_L	B24	FP_PWR_BTN_L
A25	Ground	B25	FP_NMI_BTN_L
A26	V_IO_BLUE_CONN_FP	B26	FP_PWR_LED_5VSB
A27	V_IO_GREEN_CONN_FP	B27	LED_FP_PWR_R_L
A28	V_IO_RED_CONN_FP	B28	LED_FP_ID_R_L
A29	Ground	B29	Ground
A30	V_IO_HSYNC_BUFF_FP_L	B30	LED_FP_SYS_FLT1_R_L
A31	V_IO_VSYNC_BUFF_FP_L	B31	LED_FP_SYS_FLT2_R_L
A32	Ground	B32	FP_FLT_LED_5VSB

Table 29. PCI_E X4 Slot Connector from MidPlane

Pin #	Signal Name	Pin #	Signal Name
A1	RST_PWRGD_PS	B1	Ground
A2	Ground	B2	SAS0_RX_DN
A3	Ground	B3	SAS0_RX_DP
A4	SAS1_RX_DN	B4	Ground
A5	SAS1_RX_DP	B5	Ground
A6	Ground	B6	SAS0_TX_DN
A7	Ground	B7	SAS0_TX_DP
A8	SAS1_TX_DP	B8	Ground
A9	SAS1_TX_DN	B9	Ground
A10	Ground	B10	USB_P3N
A11	Ground	B11	USB_P3P
A12	USB_OC3_N	B12	Ground
A13	Ground	B13	SAS2_RX_DN
A14	Ground	B14	SAS2_RX_DP
A15	SAS3_RX_DN	B15	Ground
A16	SAS3_RX_DP	B16	Not Used
A17	Ground	B17	SMB_SAS_3V3_SDA
A18	Ground	B18	Not Used
A19	Ground	B19	SMB_SAS_3V3_SCL
A20	SAS3_TX_DP	B20	Not Used
A21	SAS3_RT_DN	B21	Ground
A22	Ground	B22	SAS2_TX_DP
A23	Ground	B23	SAS2_TX_DN
A24	SAS5_RX_DN	B24	Ground
A25	SAS5_RX_DP	B25	Ground
A26	Ground	B26	SAS4_RX_DN
A27	Ground	B27	SAS4_RX_DP
A28	SAS5_TX_DP	B28	Ground
A29	SAS5_TX_DN	B29	Ground
A30	Ground	B30	SAS4_TX_DP
A31	Ground	B31	SAS4_TX_DN
A32	P5V_STBY	B32	Ground

Table 30. Intel Local Control Panel (LCP) Connector

Pin #	Signal Description
1	SMB_IPMB_5VSB_DAT
2	Ground
3	SMB_IPMB_5VSB_CLK
4	P5V_STBY_R

Table 31. Control Panel Signal Connector

Pin #	Signal Name	Pin #	Signal Name
1	V_IO_RED_CONN_FP	2	GND
3	V_IO_GREEN_CONN_FP	4	GND
5	V_IO_BLUE_CONN_FP	6	GND
7	V_IO_HSYNC_BUFF_FP_L	8	GND
9	V_IO_VSYNC_BUFF_FP_L	10	GND
11	V_VIDEO_IN_USE	12	FP_THERM_SENSOR
13	SP_DTR2_L	14	SP_DCD2_L
15	SP_RTS2_L	16	SP_CTS2_L
17	SP_SIN2	18	SP_SOUT2
19	SP_DSR2_L	20	SP_IN_USE
21	FP_NMI_BTN_L	22	GND
23	LED_NIC1_ACT_L	24	LED_NIC1_LINK_R_L
25	Not Used	26	FP_CHASSIS_INTRU
27	FP_ID_SW_L	28	SMB_PB1_5VSB_CLK
29	GND	30	SMB_PB1_5VSB_DAT
31	RST_FP_BTN_L	32	LED_NIC2_ACT_L
33	LED_HDD_FLT_R_L	34	LED_NIC2_LINK_R_L
35	FP_PWR_BTN_L	36	LED_FP_ID_R_L
37	SMB_IPMB_5VSB_CLK	38	GND
39	SMB_IPMB_5VSB_DAT	40	PV_HDD_LED_3V_A
41	LED_FP_PWR_R_L	42	FP_FLT_LED_5VSB
43	FP_PWR_LED_5VSB	44	LED_FP_SYS_FLT2_R_L
45	RST_PWRGD_PS	46	LED_FP_SYS_FLT1_R_L
47	LED_HDD_ACT_RR_L	48	P5V
49	P5V_STBY	50	P5V_STBY

Table 32. Control Panel USB Connector

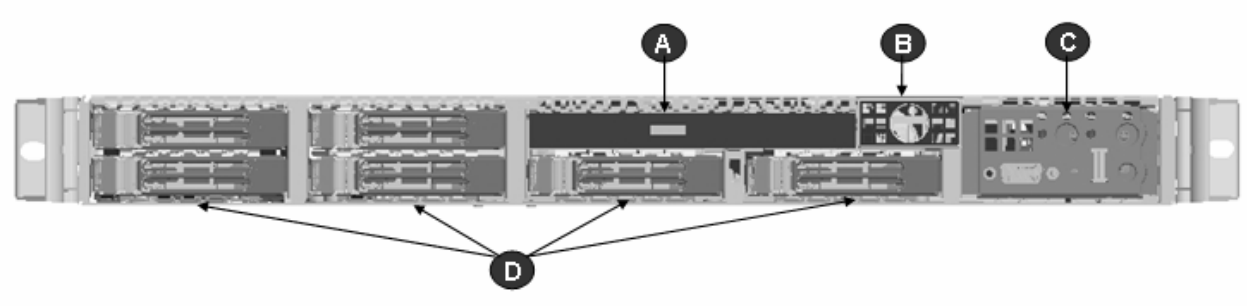
Pin #	Signal Description
1	P5V_USB_P1
2	USB_P1N
3	USB_P1P
4	GND
5	GND
6	P5V_USB_P2
7	USB_P2N
8	USB_P2P
9	GND
10	GND

Table 33. SAS/SATA Hard Drive Connector Pin-outs

Pin#	Signal Description
SI	Ground
S2	SAS#_TX_DP (# = 0…7)
S3	SAS#_TX_DN (# = 0…7)
S4	Ground
S5	SAS#_RX_DN (# = 0…7)
S6	SAS#_RX_DP (# = 0…7)
S7	Ground
S8	Not Used
S9	Not Used
S10	Not Used
S11	Not Used
S12	Not Used
S13	Not Used
S14	Not Used
P1	Not Used
P2	Not Used
P3	Not Used
P4	Ground
P5	Ground
P6	P3V3
P7	P5V
P8	P5V
P9	P5V
P10	Ground
P11	LED_SAS#_ACT_L (# = 0…7)
P12	Ground
P13	P12V
P14	P12V
P15	P12V
PTH0	Ground
PTY1	Ground

5. Peripheral and Hard Drive Sub-System

The chassis can be configured to support several different hard drive and peripheral configurations. The peripheral/hard drive sub-system consists of a drive bay, supporting a slimline IDE optical drive, up to eight 2.5” SATA/SAS hard drives, two types of mid-planes, and a hot-swap backplane. This chapter describes the details for each sub-system component.



A	Slimline Optical Drive Bay
B	Mini Control Panel Bay (Filler Panel Shown)
C	Control Panel Bay or HDD bays #7 and #8
D	2.5” Hard Drive Bays (Up to eight possible with mini control panel)

5.1 Slimline IDE Optical Drive Bay

The chassis provides a slimline drive bay that is designed to support a single slimline IDE optical drive. A plastic guide is mounted to the slimline drive to provide blind mate tool-less installation of the device for easy installation into and removal from the chassis. Once inserted into the chassis, the assembly locks into place to the backplane board. No adapter board or mounting tray is needed. For removal, the chassis top cover must be removed and the locking latch disengaged.

Figure 26. Slimline Optical Drive Assembly

5.2 Hard Drive Bays

The chassis can be configured to support up to eight hot-swap 2.5” SAS or SATA hard disk drives. Hard drives are mounted to hot-swap drive trays for easy insertion to or extraction from the drive bay.

5.2.1 Hot-swap Drive Trays

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 two light pipes viewable from the front of the chassis. The light pipes provide a green drive activity indicator and amber drive fault indicator. The drive activity and fault LEDs are located on the backplane next to each drive connector.

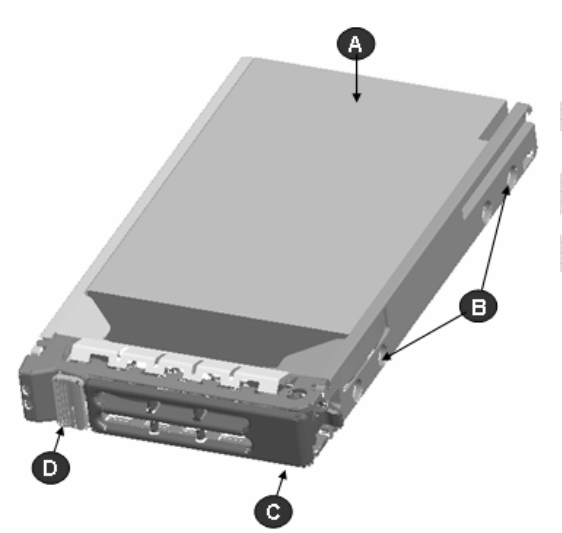


Figure 27. Hard Drive Tray Assembly

A	2.5” hard drive
B	4 screws to mount the hard drive
C	Hard drive carrier
D	Green touch point to extract the carrier

5.3 Mid-Plane Options

The mid-plane is the interconnect between the server board and both the hot-swap backplane and the control panel. It is also used to determine which hard drive technology is to be supported. Two different mid-plane options are available for this platform: 1) a passive mid-plane capable of supporting either SATA ports from the server board or SAS/SATA ports from an add-in card; 2) an active SAS / SAS RAID mid-plane. This section will describe the hard drive interface support of each of the mid-plane boards.

5.3.1 Passive Mid-Plane

The passive mid-plane is used to connect either SATA ports from the server board or SAS/SATA ports from an add-in card to the hot-swap backplane. The SAS/SATA port signals are directed to the hot-swap backplane through two edge connectors that plug directly into it.

NOTE: The passive mid-plane can also be used to attach SAS or SATA ports from an an add-in card. However, cables supplied with the chassis are designed to support SATA ports from the server board only. Intel does not provide cables to support add-in cards.

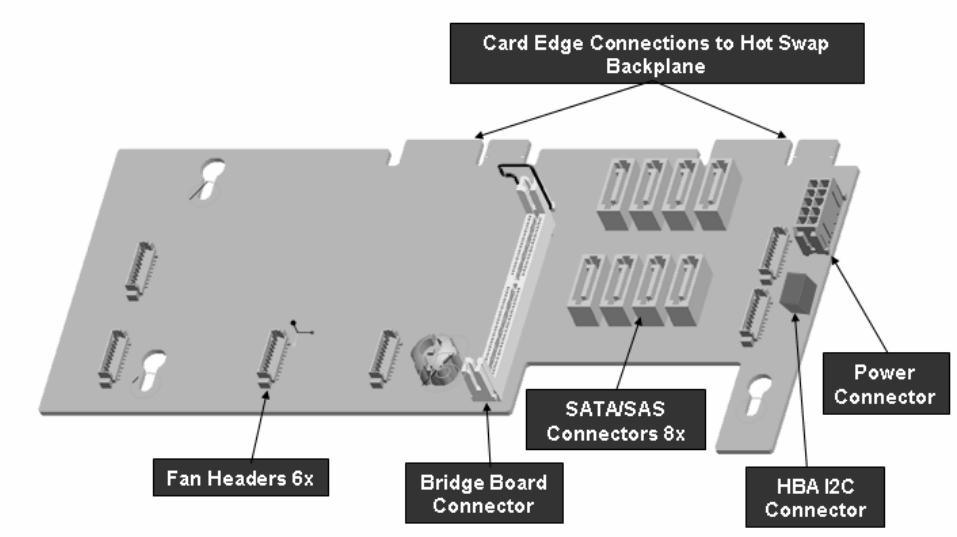


Figure 28. Passive Mid-Plane Board

5.3.2 Active Mid-Plane with Intel® SAS /SAS RAID Support

The active mid-plane is used to provide SAS / SAS RAID support. It has an integrated Intel IOP80333 IO processor and an LSI* LSLSAS1068 3Gb/s SAS controller. Together they provide support for up to eight SAS drives in this chassis. By default, this mid-plane option provides software RAID support for levels 0, 1, and 10. With the addition of an optional RAID key, RAID support changes from software based to hardware based and expands the RAID levels supported to 0,1, 5, 6, 10, and 50. The mid-plane attaches to the hot-swap backplane by two card edge connectors which eliminates the need for any hard drive cables. The following sub-sections describe the board level SAS / SAS RAID functionality.

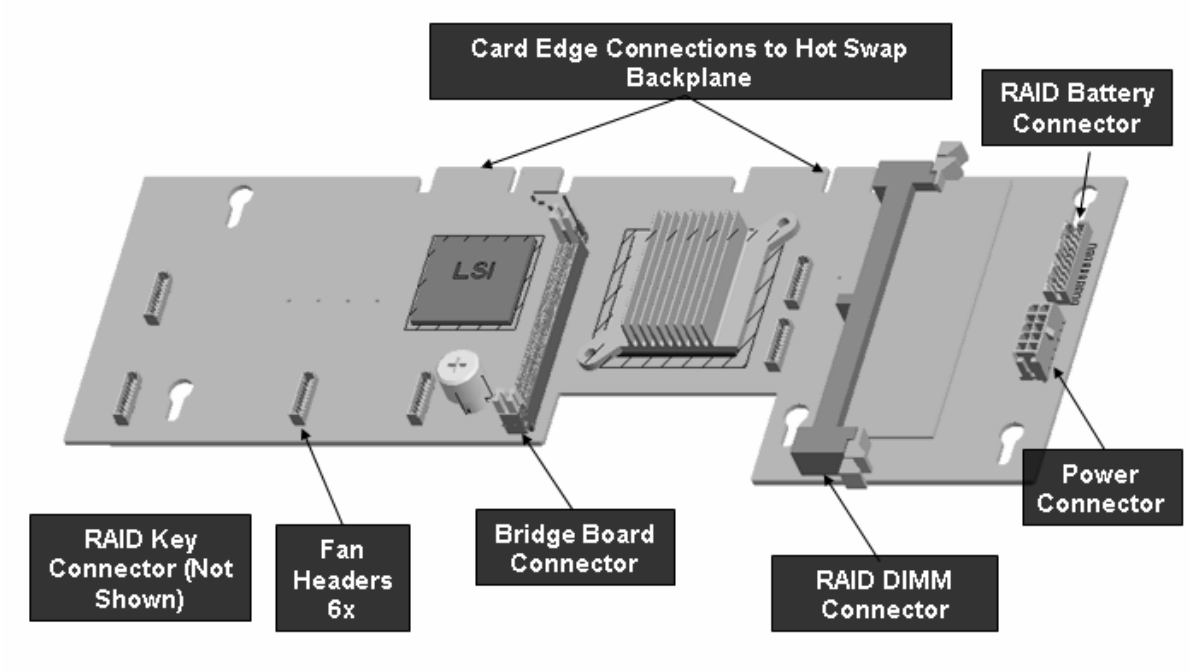


Figure 29. Active Mid-Plane with SAS / SAS RAID Support

5.3.2.1 Features

1) IOP80333 IO processor
The Intel 80333 IO processor is a multi-function device that integrates the Intel Xscale core with intelligent peripherals and two PCI Express* to PCI-X* bridges. The IO processor will be connected to system's x4 PCI Express lane and serve as bridge for PCI-X 133MHz secondary bus. The IOP80333 also includes fully functional RAID support.

2) LSI* LSISAS1068 SAS Controller
The LSI LSISAS1068 controller resides on the Channel A PCI-X bus of the IOP80333, supporting transfer rates of up to 3GB/s. It includes an Address Translation Unit (ATU) supporting transactions between PCI address space and 80333 address space. Address translation for the ATU is controlled through programmable registers accessible from both the PCI interface and the Xscale core. The LSISAS1068 controller includes its own flash ROM and NVSRAM to support SAS only software RAID. Software RAID levels supported include 0,1, and 10.

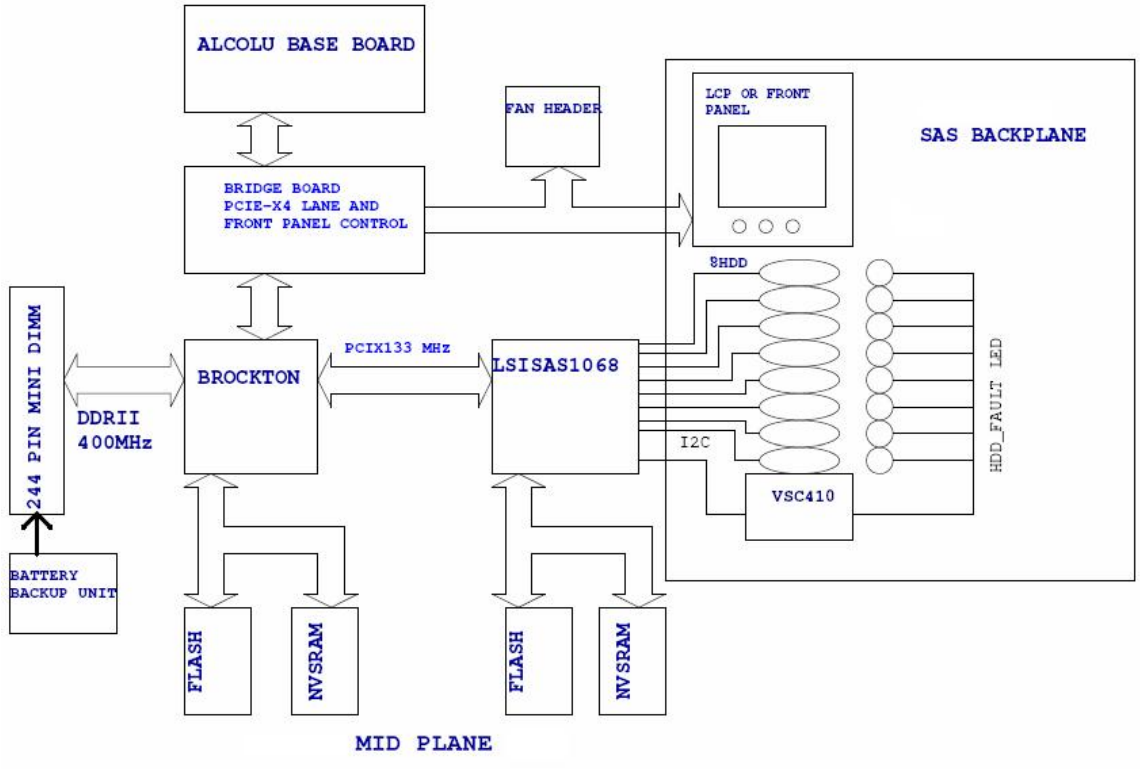
3) Optional Hardware RAID Key (I-Button)
With the additional of an optional hardware RAID key (I-Button), the active mid-plane is capable of expanding its RAID support by enabling the hardware RAID functionality of the Intel IOP80333 and the LSI LSISAS1068 controller. Hardware RAID levels supported include 0, 1, 5, 6,10, and 50.

4) Optional RAID Controller Cache
For full hardware RAID support, the active mid-plane provides a mini DIMM slot for Intel RAID caching. The 244-pin mini DIMM socket supports a single registered DDR2-400 MHz DIMM with capacities ranging from 256 MB to 1 GB.

5) Optional Battery Backup Unit
To prevent data loss in the event of AC power loss, the mid-plane provides support for a battery backup unit. Depending on DIMM capacity, the battery backup unit will provide 48 to 72 hours of battery backup power to allow data stored in the RAID cache to be processed. A 2x10 connector on the mid-plane is used to cable the battery backup unit. See Table 20. Active Mid-Plane SAS RAID Battery Backup Connector Pin-Out for details.

6) x4 PCI Express card edge interfaces
Two x4 PCI Express card edges are used to connect the active mid-plane to the hot-swap backplane. The use of card edge connectors to the backplane eliminates all hard drive cabling.

5.3.2.2 Architectural Overview



The LSI LSISAS1068 resides on the PCIX* "A" bus of the Intel 80333. This allows the LSISAS1068 to access the 80333's local memory through its Address Translation Unit which interfaces with 80333 internal bus and PCIX "A" bus. RAID firmware is kept in the 4MB flash connected to the peripheral bus interface (PBI) of the 80333. 80333 boots off the flash and downloads a portion of the firmware to the LSISAS1068. RAID configuration settings are stored in NVRAM also connected to the PBI of the 80333. In order to preserve the dirty cache in the event of a power failure, an intelligent battery backup unit (BBU) is attached to the mid-plane. The BBU contains a Gas Gauge IC which monitors capacity and other critical battery parameters for the rechargeable battery. The Gas Gauge IC communicates data with the 80333 using an SM bus. The charger circuitry for the battery is on the mid-plane. To enable the hardware RAID functionality, the mid-plane includes support for an IBUTTON which is a serial EEPROM that includes the validation code. For the SAS only modes, the LSISAS1068 controller will have its own option ROM and NVSRAM for RAID 1 (limited RAID).

5.4 Hot-Swap SAS/SATA Backplane

The chassis supports a multifunctional SAS/SATA backplane supporting the following features:

- Vitesse* VSC410 enclosure management controller
    - External non-volatile Flash ROM
    - Four I^2C interfaces
    - Compliance with SCSI Accessed Fault Tolerant Enclosures (SAF-TE) specification
    - Compliance with Intelligent Platform Management Interface (IPMI)
- Eight SAS/SATA compatible hot-swap hard drive connectors
- Hard Drive Status and Fault LED's for each hard drive connector
- Card edge connectors for most interconnects, including:
    - Mid-Plane
    - Mini Control Panel
    - Slimline IDE Optical Drive
- Temperature Sensor
- FRU EEPROM
- One 2x4-pin Power Connector

5.4.1 SAS/SATA Backplane Layout

The hot-swap 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.

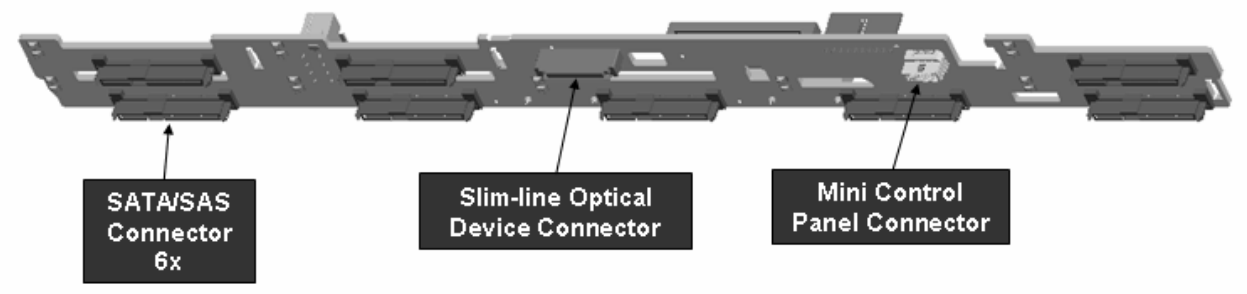


Figure 30. Hot-Swap SAS/SATA Backplane (Front Side View)

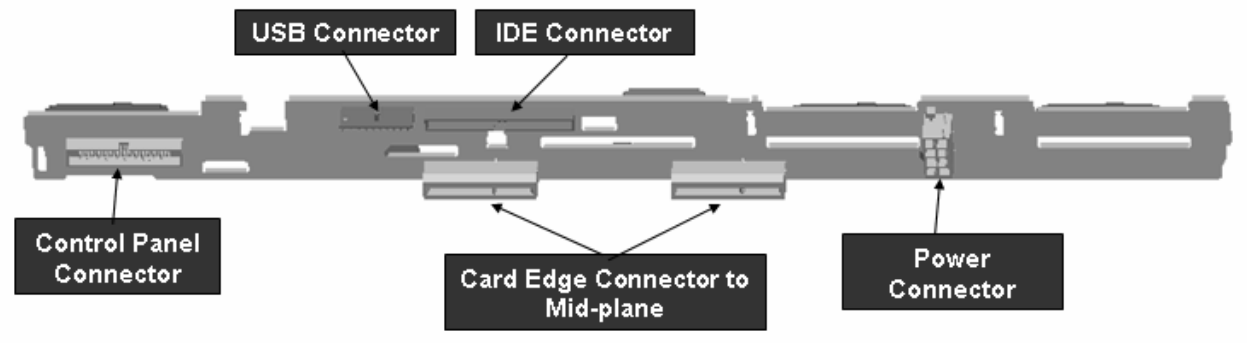


Figure 31. Hot-Swap SAS/SATA Backplane (Back Side View)

Note: Make sure all system boards, peripherals, and cables are detached from the backplane before removing the backplane from the system. Failure to detach components from the backplane before removal may result in component damage.

5.4.2 SAS/SATA Backplane Functional Architecture

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

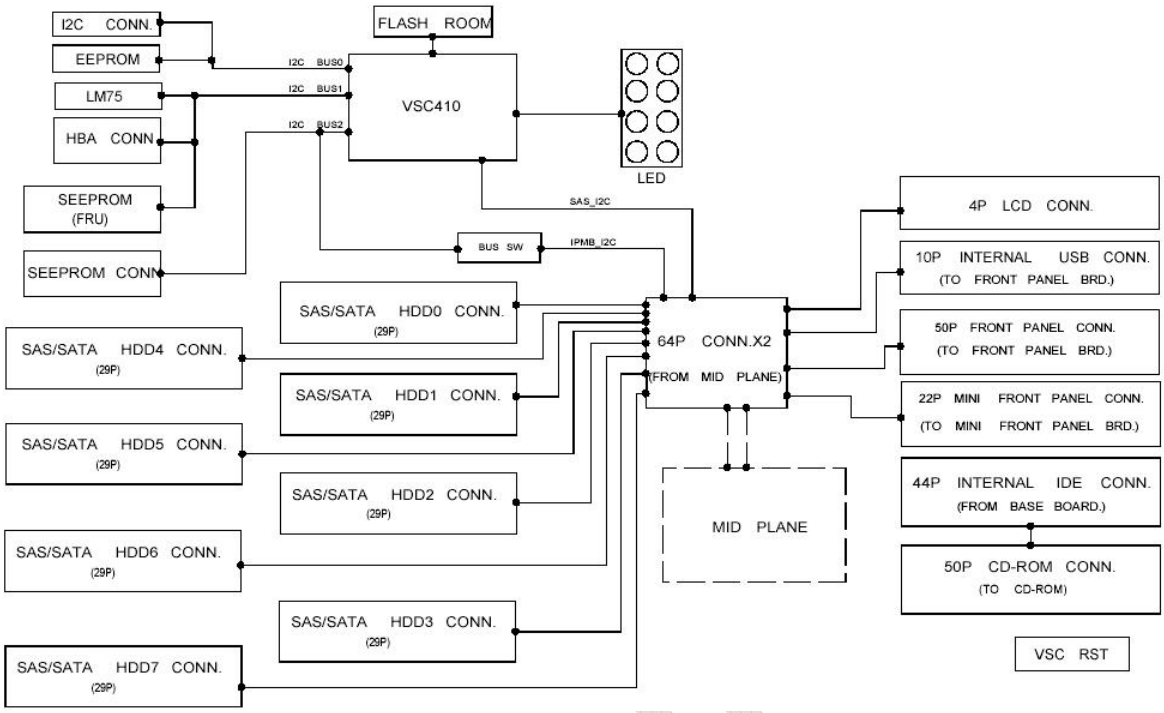


Figure 32. SAS/SATA Backplane Functional Block Diagram

5.4.2.1 Enclosure Management Controller

The backplane utilizes the features of the Vitesse* VSC410 to implement several enclosure management functions. The chip provides in-band SAF-TE and SES management and utilizes four I^2C interfaces.

1. I2C bus 0 is connected to an EEPROM which stores configuration and FRU data
2. I2C bus 1 is connected to an LM75 temperature sensor
3. I2C bus 2 is connected to an IPMB bus from the server board.
4. I2C bus 3 is connected to the LSISAS1068 SAS controller.

5.4.2.2 Hard Drive Activity and Fault LED's

The backplane provides a green activity LED and an amber fault LED for each of the eight drive connectors. The activity LED is driven by the VSC410 or, for drives that support the feature, by the hard drive itself, whenever the drive gets accessed. The fault LED is driven by the VSC410 controller whenever an error condition is detected.

Table 34. Hard Drive LED Function Definitions

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

6. Mini Control Panel

For system configurations that require eight 2.5” hard drives, a mini control panel is used in place of the Standard Control Panel. The mini control panel is modular in design and supports several push buttons and status LED’s, along with one USB port within a very compact, low cost design.

The control panel assembly slides into a slot on the front of the chassis and is blind mated with a slot connector on the backplane.

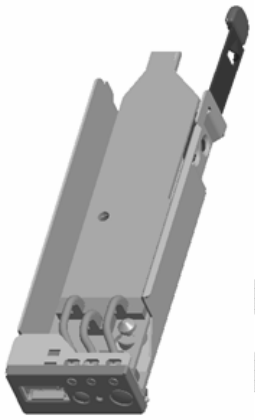


Figure 33. Mini Control Panel Assembly Module

6.1 Mini Control Panel Buttons

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

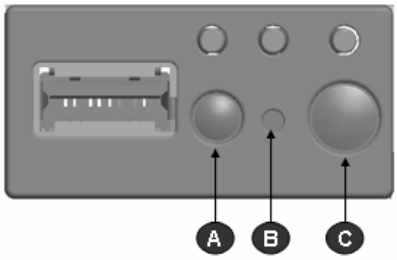


Table 35. Mini Contol Panel Button Functions

Reference	Feature	Function
A	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.
B	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.
C1	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.

6.2 Mini Control Panel LED Indicators

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

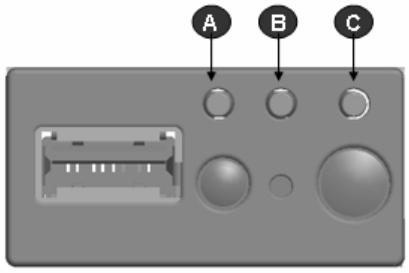


Figure 34. Mini Control Panel LED's

The following table identifies each LED and describes their functionality.

Table 36. Mini Control Panel LED Functions

Reference	LED	Color	State	Description
A	System Identification	Blue	Blink	Identify active via command or button.
		Off	Off	No Identification.
B	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.
C	Power / Sleep (on standby power)	Green	On	Legacy power on / ACPI S0 state
		Off	Blink [1,3]	Sleep / ACPI S1 state

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. 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.

6.2.1 Power / Sleep LED

Table 37. 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

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 LED's 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 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 External Mini Control Panel Connectors

The mini control panel has one external USB port.

Table 38. External USB Connectors

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

.

6.4 Internal Mini Control Panel Interconnects

All mini control panel signals are directed through a single 20-pin card edge interconnect. When installed into the chassis, the mini control panel board blind mates to the hot-swap backplane.

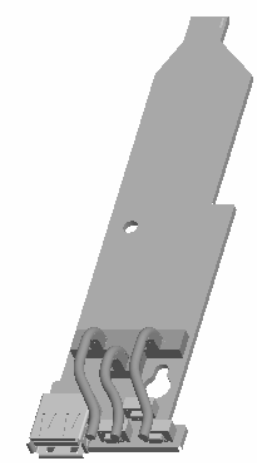


Figure 35. Mini Control Panel PCB

Table 39. 20-Pin Mini Control Panel Interconnect

Pin #	Signal Name	Pin #	Signal Name
1	FP_PWR_LED_R_L	2	FP_PWR_BTN_L
3	FP_SYS_FLT_LED1_R_L	4	FAULT_LED_5VSB
5	FP_SYS_FLT_LED2_R_L	6	FP_NMI_BTN_L
7	P5V_STBY_PWRLED_ANODE	8	GND
9	BP_I2C_5V_SCL	10	1_WIRE_BUS
11	BP_I2C_5V_SDA	12	P5V_STBY
13	GND	14	P5V_STBY
15	USB_DP2_FP	16	FP_ID_SW_L
17	USB_DN2_FP	18	FP_ID_LED_R_L
19	GND	20	P5V_FP_USB2_PWR

7. Standard Control Panel

The standard control panel supports several push buttons and status LED's, along with USB and video ports to centralize system control, monitoring, and accessibility to within a compact design. Using the standard control panel allows up to six 2.5" hard drives to be installed in the system.

The standard control panel assembly comes pre-assembled and is modular in design. The control panel assembly module slides into a slot on the front of the chassis and is cabled to the hot-swap backplane.

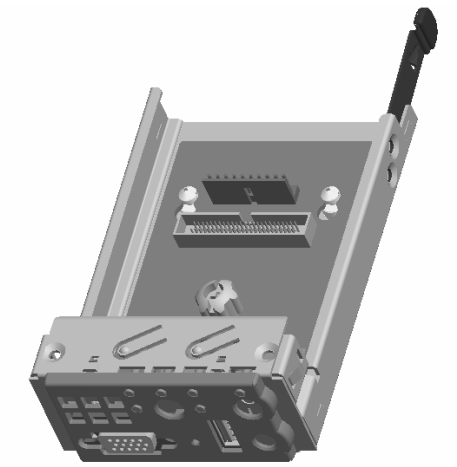


Figure 36. Standard Control Panel Assembly Module

7.1 Standard Control Panel Buttons

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

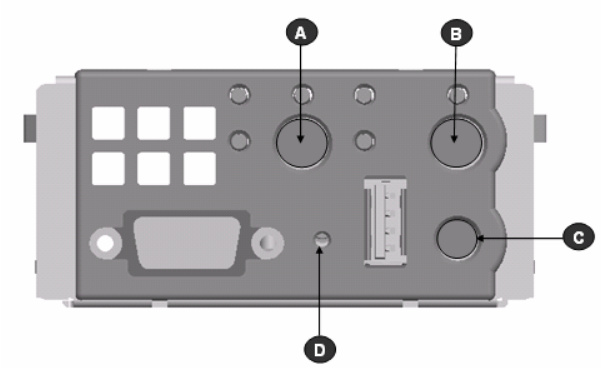


Figure 37. Standard Control Panel Buttons

Table 40. Standard 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.

7.2 Standard Control Panel LED Indicators

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

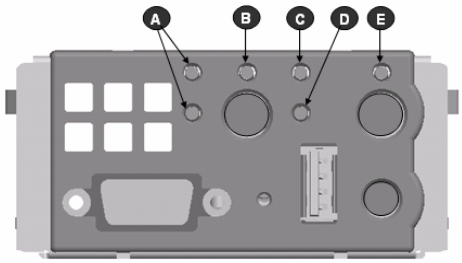


Figure 38. Standard Control Panel LED's

The following table identifies each LED and describes their functionality.

Table 41. Standard Control Panel LED Functions

Reference	LED	Color	State	Description
A	NIC1 / NIC2 Activity	Green	On	NIC Link
		Green	Blink	NIC Activity
B	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
C	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.
D	Disk Activity	Green	Random blink	Provides an indicator for disk activity.
		Off	Off [3]	No hard disk activity
E	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 LED's are located on the baseboard.

7.2.1 Power / Sleep LED

Table 42. 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.

7.2.2 System Status LED

7.2.2.1 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 LED's 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.

7.2.2.2 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.

7.2.2.3 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.

7.2.3 Drive Activity LED

The drive activity LED on the front panel indicates drive activity from the onboard hard disk controllers. The Intel® Server Board S5000PAL also provides a header giving access to this LED for add-in controllers.

7.2.4 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.

7.3 External Standard Control Panel Connectors

The standard control panel has two external I/O connectors:

- One USB port
- One VGA video port

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

Table 43. External USB Connectors

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 44. Video Connector

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.

7.4 Internal Standard Control Panel Interconnect

All standard control panel signals are directed through a single 50-pin signal connector and 10-pin USB connector. The standard control panel board is cabled to the hot-swap backplane.

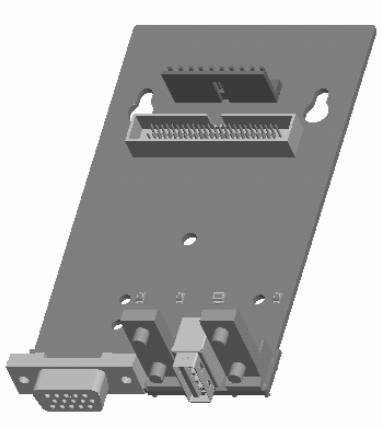


Figure 39. Standard Control Panel PCB

Table 45. 50-Pin Standard Control Panel Signal Connector

Pin #	Signal Name	Pin #	Signal Name
1	V_IO_RED_CONN_FP	2	GND
3	V_IO_GREEN_CONN_FP	4	GND
5	V_IO_BLUE_CONN_FP	6	GND
7	V_IO_HSYNC_BUFF_FP_L	8	GND
9	V_IO_VSYNC_BUFF_FP_L	10	GND
11	V_VIDEO_IN_USE	12	FP_THERM_SENSOR
13	SP_DTR2_L	14	SP_DCD2_L
15	SP_RTS2_L	16	SP_CTS2_L
17	SP_SIN2	18	SP_SOUT2
19	SP_DSR2_L	20	SP_IN_USE
21	FP_NMI_BTN_L	22	GND
23	LED_NIC1_ACT_L	24	LED_NIC1_LINK_R_L
25	Not Used	26	FP_CHASSIS_INTRU
27	FP_ID_SW_L	28	SMB_PB1_5VSB_CLK
29	GND	30	SMB_PB1_5VSB_DAT
31	RST_FP_BTN_L	32	LED_NIC2_ACT_L
33	LED_HDD_FLT_R_L	34	LED_NIC2_LINK_R_L
35	FP_PWR_BTN_L	36	LED_FP_ID_R_L
37	SMB_IPMB_5VSB_CLK	38	GND
39	SMB_IPMB_5VSB_DAT	40	PV_HDD_LED_3V_A
41	LED_FP_PWR_R_L	42	FP_FLT_LED_5VSB
43	FP_PWR_LED_5VSB	44	LED_FP_SYS_FLT2_R_L
45	RST_PWRGD_PS	46	LED_FP_SYS_FLT1_R_L
47	LED_HDD_ACT_RR_L	48	P5V
49	P5V_STBY	50	P5V_STBY

Table 46. 10-Pin Standard Control Panel USB Connector

Pin #	Signal Description
1	P5V_USB_P1
2	USB_P1N
3	USB_P1P
4	GND
5	GND
6	P5V_USB_P2
7	USB_P2N
8	USB_P2P
9	GND
10	GND

8. Intel® Local Control Panel

The Intel® Local Control Panel utilizes a combination of control buttons, LED's, and LCD display to provide system accessibility, monitoring, and control functions. The pre-assembled module slides into a slot on the front of the chassis where it is cabled to the backplane. The LCP module is designed so that it can be adjusted for use with or without an outer front bezel. Using the Intel® Local Control Panel allows up to six 2.5" hard drives to be installed in the system.

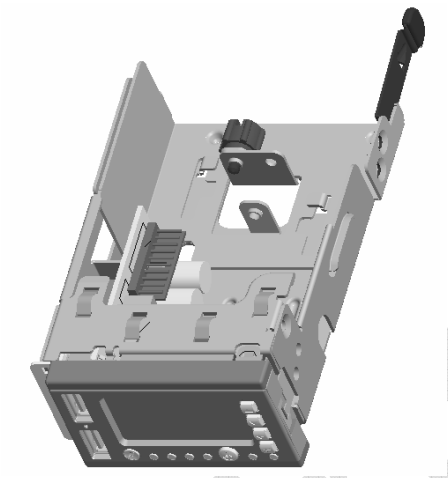


Figure 40. Intel® Local Control Panel Assembly Module

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

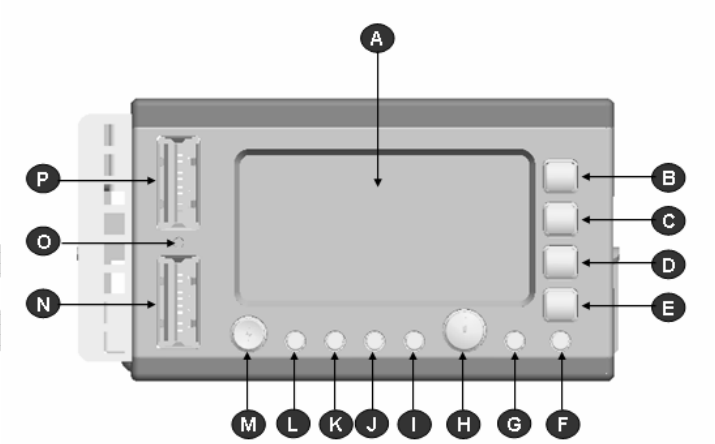


Figure 41. Intel® Local Control Panel Overview

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 Button (Tool Required)
H	System Power Button	P	USB 2.0 Port

8.1 LED Functionality

The following table identifies each LED and describes their functionality.

Table 47. LCP 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 LED's are located on the Intel® Server Board S5000PAL.

8.1.1 Power / Sleep LED

Table 48. 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.

8.1.2 System Status LED

8.1.2.1 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 LED's 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.

8.1.2.2 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.

8.1.2.3 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.

8.1.3 Drive Activity LED

The drive activity LED on the front panel indicates drive activity from the onboard hard disk controllers. The Intel® Server Board S5000PAL also provides a header giving access to this LED for add-in controllers.

8.1.4 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.

8.2 Intel® Local Control Panel Interconnects

The Intel® Local Control Panel module includes the Intel® Local Control Panel interface board and a USB interface board. Connectors on the Intel® Local Control Panel interface board and USB interface board are cabled to matching connectors on the hot-swap backplane. This section will define the pin-out for each connector and header found on both the Intel® Local Control Panel interface board and interposer board.

- Signals from the card edge connector are routed to the Intel® Local Control Panel interface board through matching 50-pin connectors on the interposer board and the Intel® Local Control Panel interface board. The 50-pin connectors are attached using a small 50-pin flat cable.

- USB signals from the card edge connector are routed to the Intel® Local Control Panel interface board through matching 10-pin connectors on the interposer board and the Intel® Local Control Panel interface board. The 10-pin connectors are attached using a small 10-pin round cable.

- A 4-pin NMI/Temp Sensor Header (cables between the Intel® Local Control Panel interface board and the USB interface board).

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

Table 49. 50-Pin Intel® Local Control Panel Signal Connector

Pin #	Signal Name	Pin #	Signal Name
1	V_IO_RED_CONN_FP	2	GND
3	V_IO_GREEN_CONN_FP	4	GND
5	V_IO_BLUE_CONN_FP	6	GND
7	V_IO_HSYNC_BUFF_FP_L	8	GND
9	V_IO_VSYNC_BUFF_FP_L	10	GND
11	V_VIDEO_IN_USE	12	FP_THERM_SENSOR
13	SP_DTR2_L	14	SP_DCD2_L
15	SP_RTS2_L	16	SP_CTS2_L
17	SP_SIN2	18	SP_SOUT2
19	SP_DSR2_L	20	SP_IN_USE
21	FP_NMI_BTN_L	22	GND
23	LED_NIC1_ACT_L	24	LED_NIC1_LINK_R_L
25	Not Used	26	FP_CHASSIS_INTRU
27	FP_ID_SW_L	28	SMB_PB1_5VSB_CLK
29	GND	30	SMB_PB1_5VSB_DAT
31	RST_FP_BTN_L	32	LED_NIC2_ACT_L
33	LED_HDD_FLT_R_L	34	LED_NIC2_LINK_R_L
35	FP_PWR_BTN_L	36	LED_FP_ID_R_L
37	SMB_IPMB_5VSB_CLK	38	GND
39	SMB_IPMB_5VSB_DAT	40	PV_HDD_LED_3V_A
41	LED_FP_PWR_R_L	42	FP_FLT_LED_5VSB
43	FP_PWR_LED_5VSB	44	LED_FP_SYS_FLT2_R_L
45	RST_PWRGD_PS	46	LED_FP_SYS_FLT1_R_L
47	LED_HDD_ACT_RR_L	48	P5V
49	P5V_STBY	50	P5V_STBY

Table 50. 10-Pin Control Panel USB Connector

Pin #	Signal Description
1	P5V_USB_P1
2	USB_P1N
3	USB_P1P
4	GND
5	GND
6	P5V_USB_P2
7	USB_P2N
8	USB_P2P
9	GND
10	GND

Table 51. Internal NMI/Temp Sensor Header

Pin #	Description
1	DGND
2	FP_NMI_BTN_L
3	+3_3VSB
4	1_WIRE_BUS

9. PCI Riser Cards and Assembly

The Intel® Server Board S5000XAL provides two PCI riser slots, one supporting a low profile add-in card riser, and the other used for full height add-in card risers. The riser cards for these slots are not interchangeable due to their orientation on the board and connector differences. The low profile riser slot is only capable of supporting a riser using PCI Express* cards. The full height riser slot is capable of supporting risers that follow either the PCI-X* or PCI Express specifications.

The riser assembly for the server chassis is tool-less. Stand-offs 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.

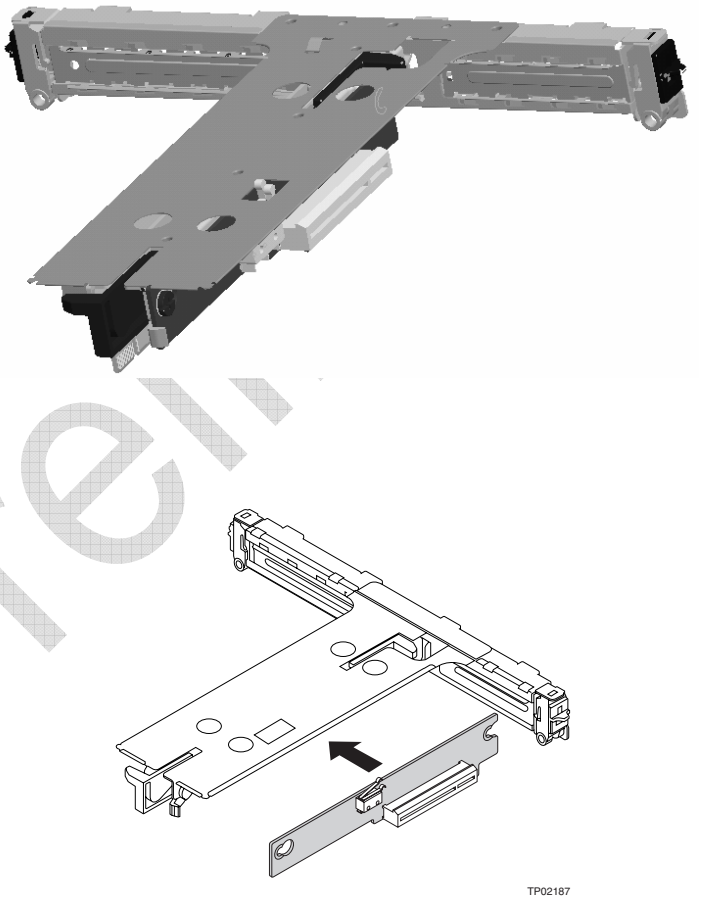


Figure 42. PCI Riser Card Assembly – LP View

9.1 Riser Card Options

The low profile riser slot utilizes a 98-pin connector. It is capable of supporting one low profile PCI Express* add-in card. The X8 PCI Express bus can support bus speeds of up to 20Gb/S.

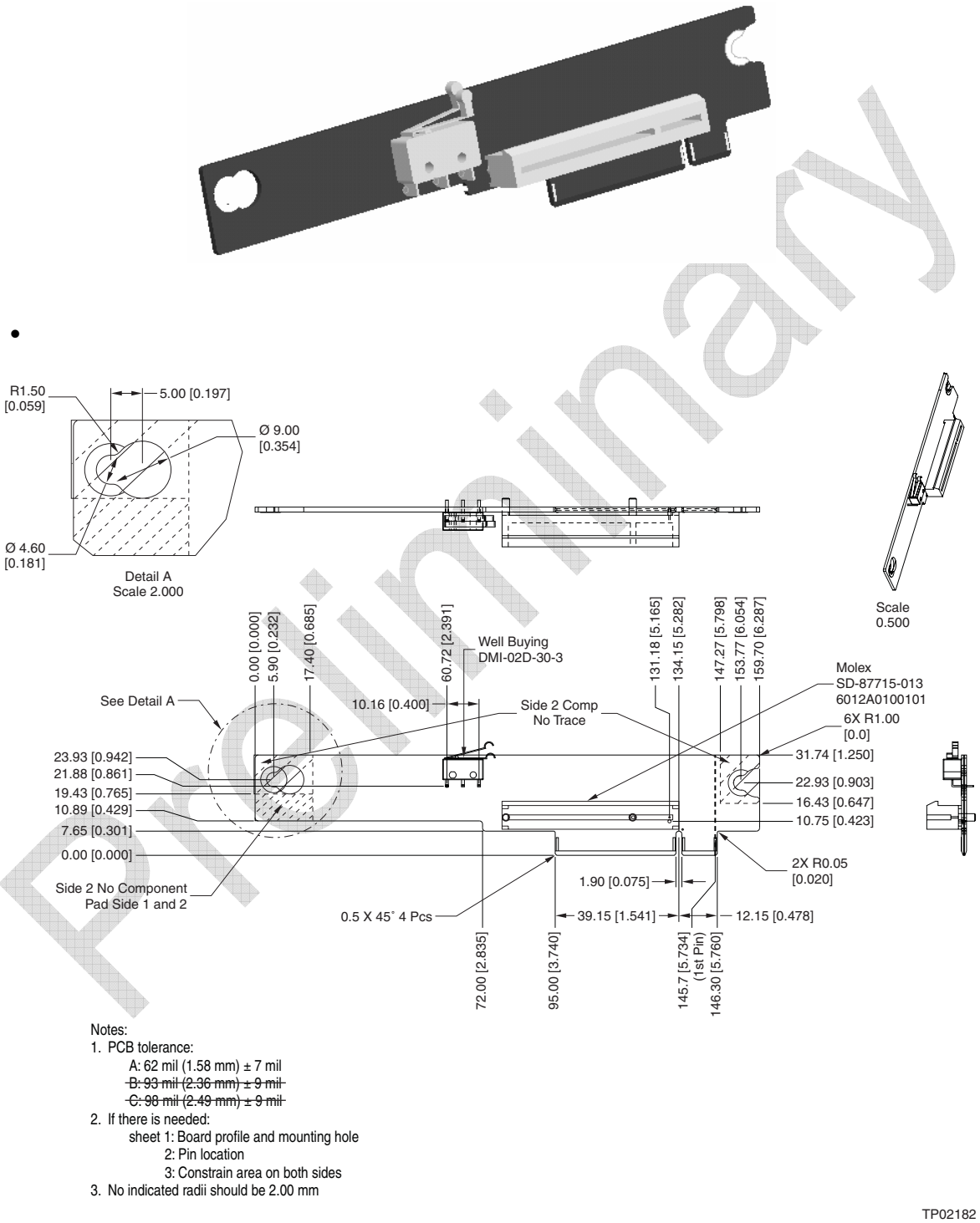


Figure 43. 1U Low Profile PCI-X* Riser Card Mechanical Drawing

The full height riser slot implements Intel® Adaptive Slot Technology. This 280-pin connector is capable of supporting riser cards that meet either the PCI-X* or PCI Express* technology specifications. The following tables show the maximum bus speed supported with different add-in card populations.

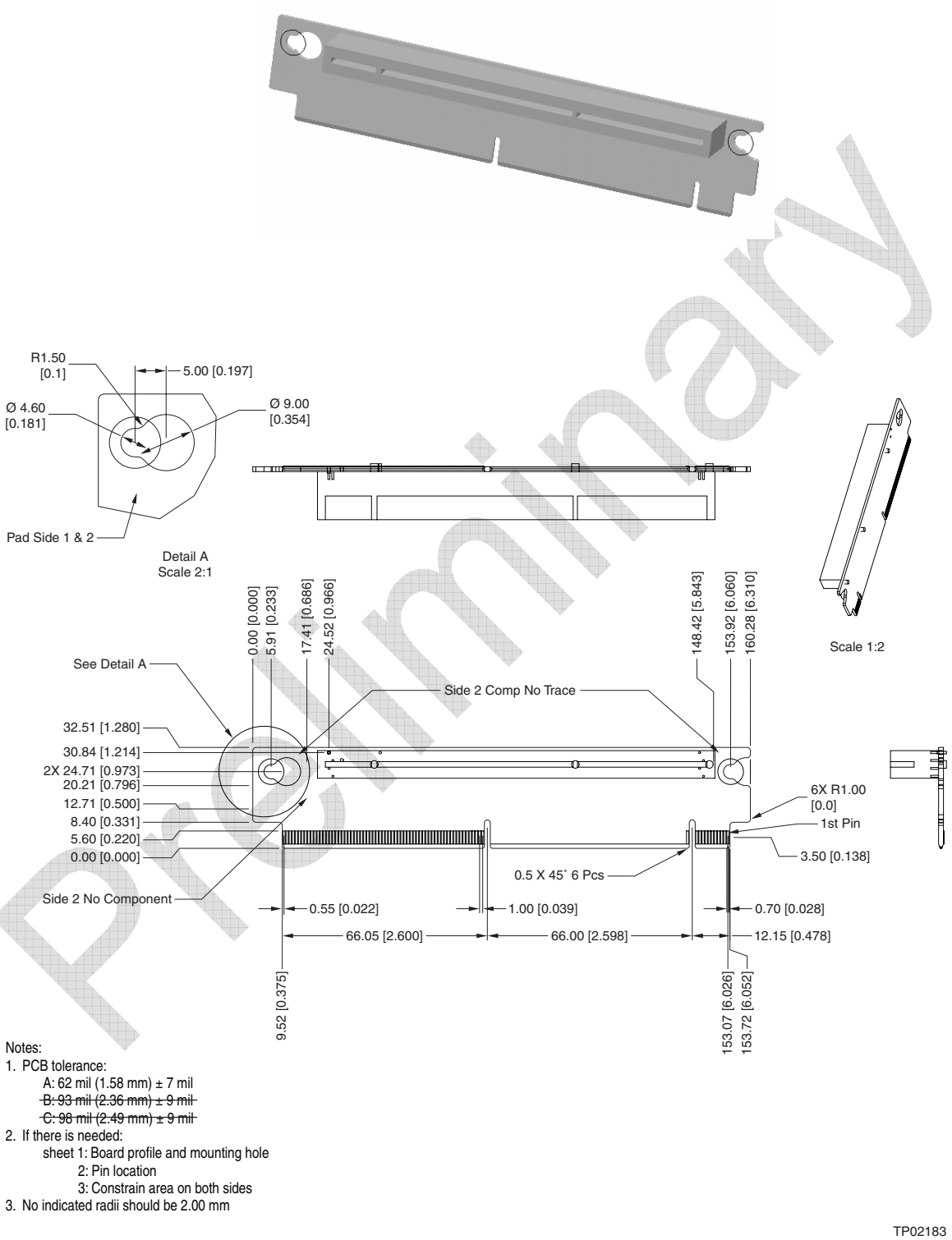


Figure 44. 1U Full Height PCI-X* Riser Card Mechanical Drawing

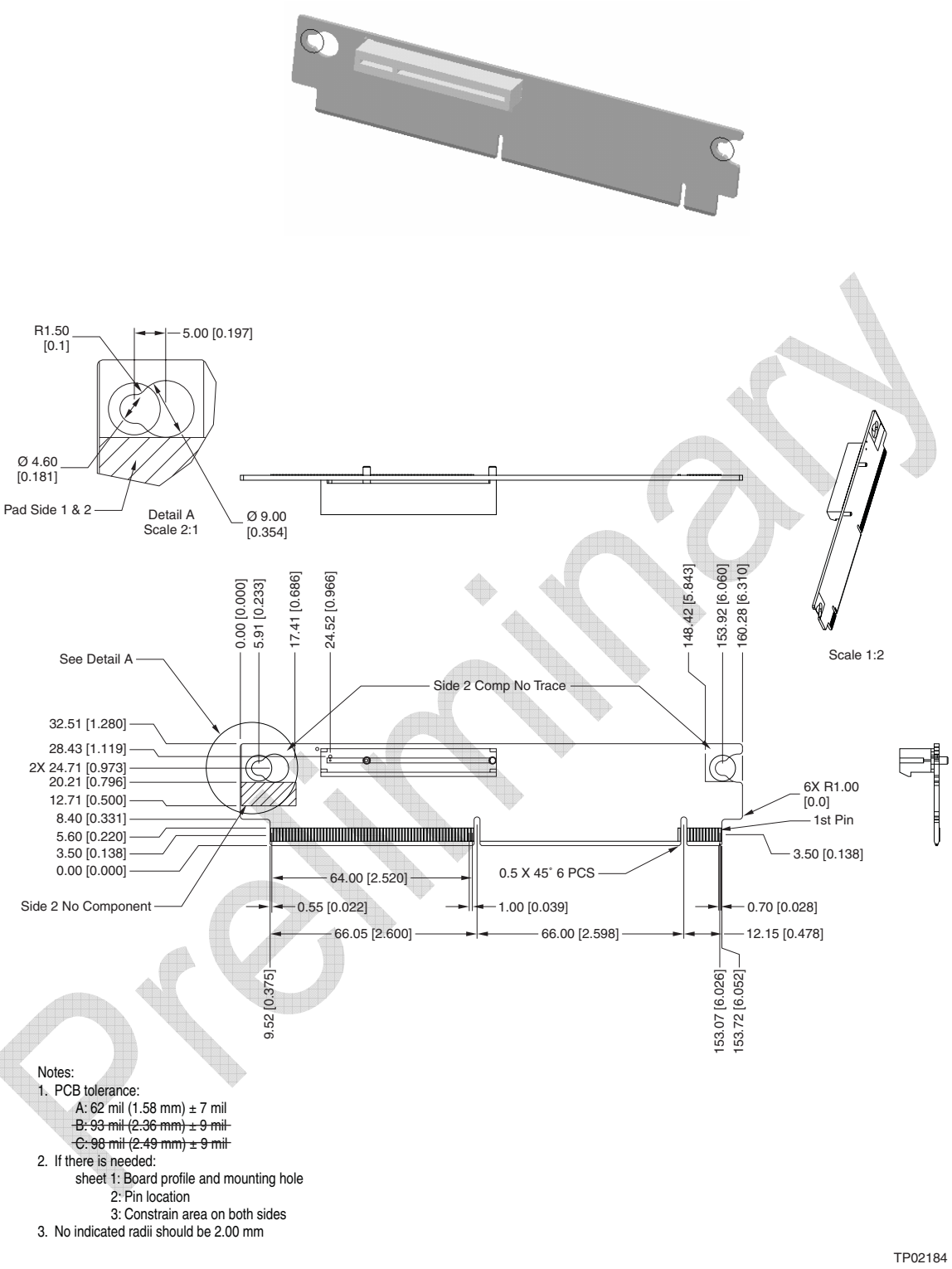


Figure 45. 1U Full Height PCI Express* Riser Card Mechanical Drawing

10. Supported Intel® Server Boards

The chassis is mechanically and functionally designed to support the Intel® Server Board S5000PAL. The following sections provide an overview of the baseboard feature sets. The Technical Product Specification for the server board should be referenced for more detailed information.

10.1 Intel® Server Board S5000PAL

The Intel® Server Board S5000PAL is a monolithic printed circuit board with features that were designed to support the high-density 1U server markets.

Feature	Description
Processors	Support for up to two Intel® Xeon® processors with a 1066 MHz front side bus and frequencies starting at 3.73 GHz.
Memory	8 DIMM slots supporting fully buffered DIMM technology (FBDIMM) memory. 240-pin DDR2-533 and DDR2-677 FBDIMMs can be used.
Chipset	Intel® S5000X chipset, including: Intel® S5000X MCH Intel® ESB2-E
I/O Control	External connections: ▪ Stacked PS/2* ports for keyboard and mouse ▪ RJ45 Serial B port ▪ Two RJ45 NIC connectors for 10/100/1000 Mb connections ▪ Two USB 2.0 ports ▪ One USB port header, which supports two USB ports ▪ One DH10 Serial A header ▪ Six SATA-150 (150MB/s) connectors with integrated RAID 0/1 support ▪ One ATA/100 44pin connector for optical drive support. ▪ SSI-compliant front panel header ▪ SSI-compliant 24-pin main power connector, supporting the ATX-12V standard on the first 20 pins
Add-in PCI, PCI-X*, PCI EXPRESSxpress* Cards	• One low profile riser slot supporting 1U or 2U PCIe* riser cards • One Full-height riser slot supporting 1U or 2U PCI-X* and PCIe riser cards
Video	On-board ATI* ES1000 video controller with 16MB DDR SDRAM
Hard Drive	Support for Six SATA-150
LAN	Two 10/100/1000 Intel 82563EB PHYs
Fans	Support for two CPU, two I/O and two memory fans
Server Management	Support for Intel® System Management Software

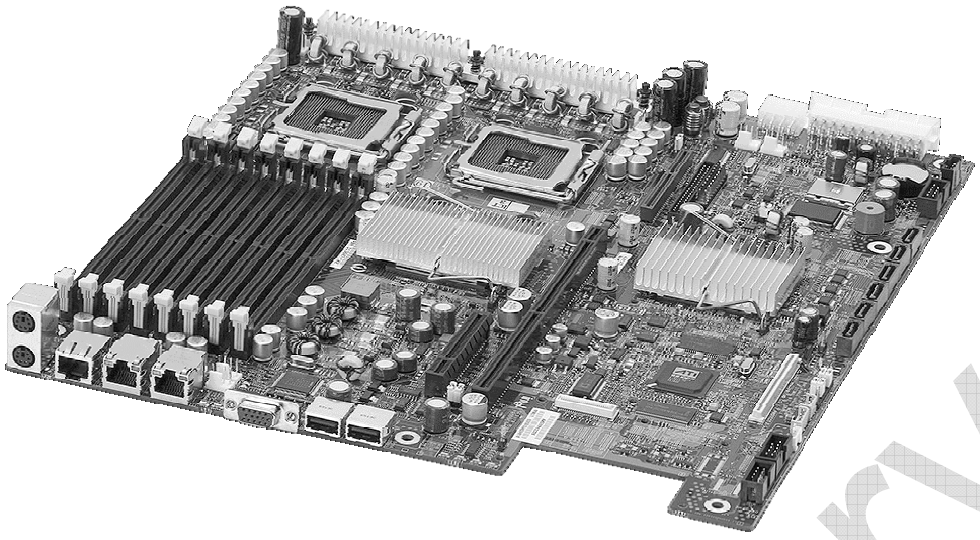


Figure 46. Intel® Server Board S5000PAL

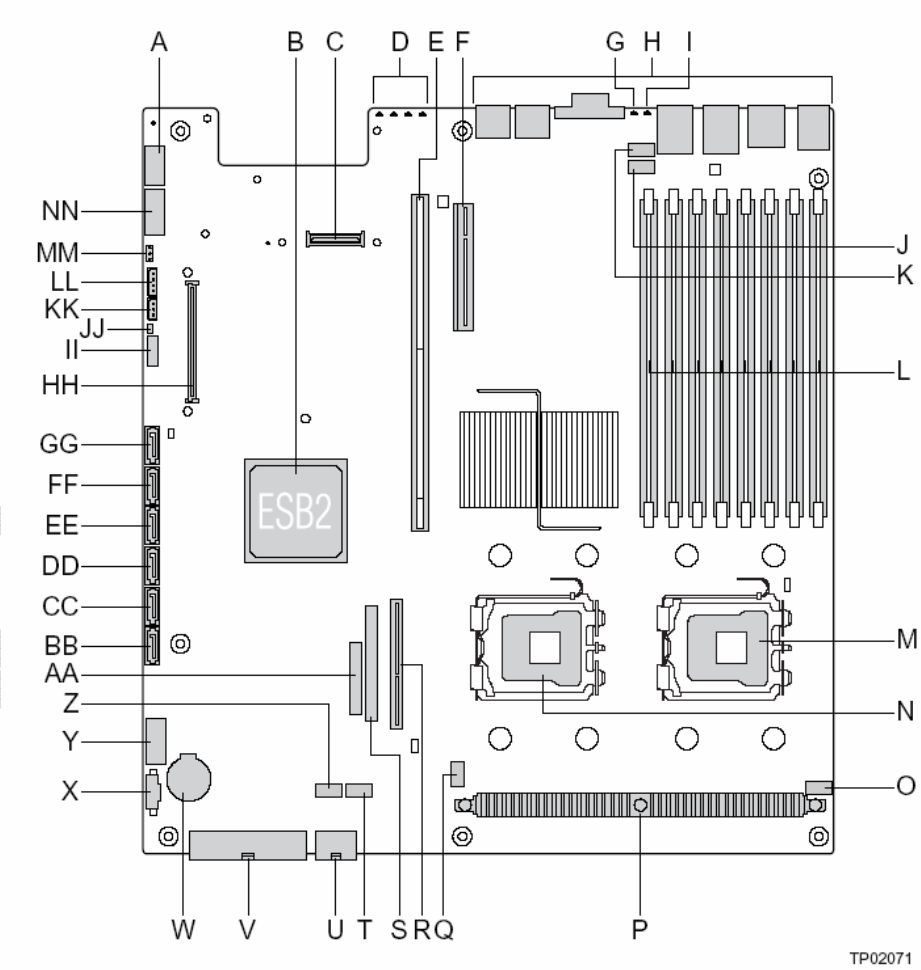


Figure 47. Intel® Server Board S5000PAL Connector Assignments

Table 52. Intel® Server Board S5000PAL Connector Assignments

	Description		Description
A	Not populated at production*****	U	+12V processor power
B	ESB2 South Bridge Chipset Component	V	24-pin SSI power connector
C	I/O Module Connector	W	Battery
D	POST Progress LED's	X	Power supply signal cable
E	Full Height Riser Slot	Y	USB 2 Header
F	Low Profile Riser Slot	Z	I/O Fan 1 Header
G	System Identifier (ID) LED	AA	24 pin SSI front panel connector
H	Back panel I/O ports	BB	SATA Port 1
I	System Status LED	CC	SATA Port 2
J	Memory Fan 2 Header	DD	SATA Port 3
K	Memory Fan 1 Header	EE	SATA Port 4
L	DIMM sockets	FF	SATA Port 5
M	Processor 1 Socket	GG	SATA Port 6
N	Processor 2 Socket	HH	ASMI Connector
O	Processor Fan 1 Header	II	System configuration jumpers
P	VR11 FET Heatsink	JJ	Chassis Intrusion Header
Q	Processor Fan 2 Header	KK	OEM IPMB Header
R	Bridge Board Connector	LL	LCP/AUX IPMB Header
S	44 Pin IDE ATA-100 Connector	MM	RAID Key Connector
T	I/O Fan 2 Header	NN	Serial Port A

11. Environmental and Regulatory Specifications

11.1 System Level Environmental Limits

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

Table 53. 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

11.2 Product Regulatory Compliance

< This section to be updated in later revision >

11.2.1 Product Safety Compliance

The SR1550 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)

11.2.2 Product EMC Compliance

The SR1550 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)

11.2.3 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	

11.3 Electromagnetic Compatibility Notices

11.3.1 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.

11.3.2 FCC Verification Statement

Product Type: SR1550; Intel® Server Board S5000PAL
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

11.3.3 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.

11.3.4 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.

11.3.5 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.

11.3.6 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。

11.3.7 Korean RRL Compliance

MIC

1. 기기의 명칭(모델명) :
2. 인증번호 :
3. 인증받은 자의 상호 :
4. 제조년월일:
5. 제조자/제조국가 :

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

11.4 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.

11.5 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	TBD
Remove and replace hard disk drive	TBD
Remove and replace power supply module	TBD
Remove and replace system fan	TBD
Remove and replace backplane board	TBD
Remove and replace control panel module	TBD
Remove and replace baseboard	TBD

11.6 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.

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Appendix A: Integration and Usage Tips

This appendix provides a list of useful information that is unique to the SR1550 server chassis and should be kept in mind while integrating and configuring your system.

< This section to be updated in later revision >

- 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 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 this server chassis