Intel® Server Chassis SR1400

Technical Product Specification

Intel order number C78846-001

Revision 1.0

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Enterprise Platforms and Services Marketing

Revision History

Date	Revision Number	Modifications
February 2004	0.52	Updated to reflect Alpha – first external release
July 2004	0.9	Added CPU air duct, updated SATA and SCSI backplane info, added LCP info, added riser card info,
August 2004	1.0	Final scrub and review. First public non-NDA release.

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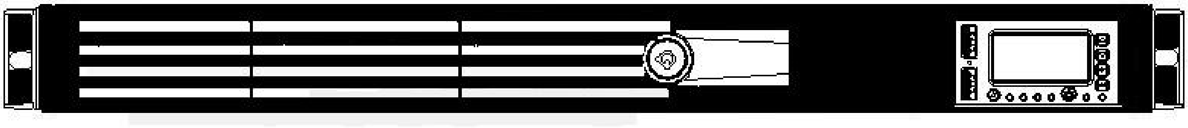
1. SR1400 Feature Summary

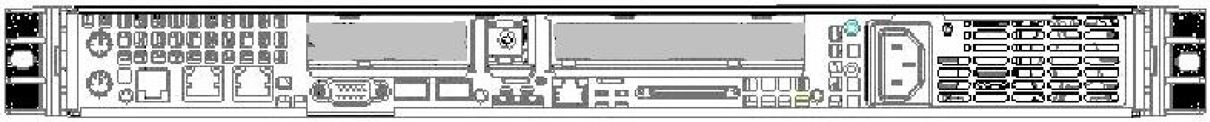
The Intel® Server Chassis SR1400 is a 1U server chassis designed to support the Intel® Server Board SE7520JR2. Both board and chassis have a feature set that is designed to support the high-density server market. This chapter provides a high level overview of the chassis feature set. More detailed descriptions for each feature and major sub-system can be found in the following chapters.

1.1 Chassis Views



Front view with Bezel – Showing Intel Local Control Panel option

Front view without bezel – Showing Standard Control Panel option



Rear view

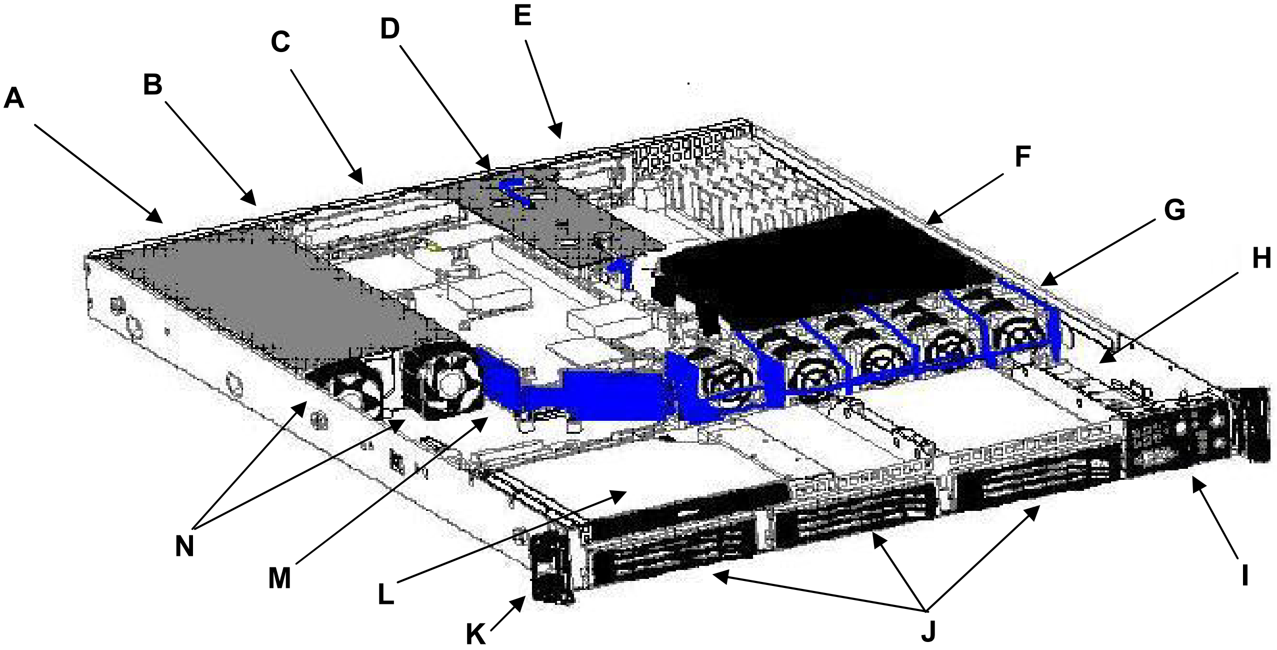
Figure 1. Front and Rear Chassis Views

1.2 Chassis Dimensions

Table 1. Chassis Dimensions

Height	43.25 mm	1.703"
Width	430 mm	16.930"
Depth	672 mm	26.457"
Max. Weight	14.1 kg	31 LBS

1.3 System Components



A	Power supply	H	Control Panel Interface Board
B	Chassis Intrusion Switch	I	Control Panel (Standard Shown)
C	Full length PCI Add in card slot	J	Hard Drive Bays
D	PCI Riser Card Assembly	K	Chassis Handle
E	Low profile PCI Add in card slot	L	Slim Line Drive Bay (CDROM Shown)
F	Processor Air Duct	M	PS / Electronics Bay Isolation Air Baffle
G	System Fan Module	N	Power Supply Fans

Figure 2. Major Chassis Components

On the back of the chassis are cutouts for all external I/O connectors found on the server board. The I/O connector locations are pre-cut, so the use of an I/O shield is not required.

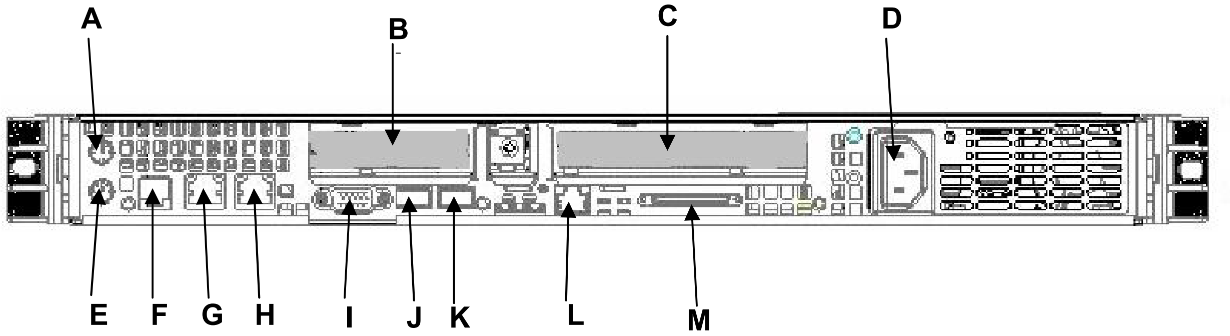


Figure 3. Back Panel Feature Overview

A	PS2 mouse connector	H	NIC 2 connector
B	PCI card bracket (low profile)	I	Video connector
C	PCI card bracket (full-height)	J	USB 1 connector
D	AC Power Receptacle	K	USB 2 connector
E	PS2 keyboard connector	L	Management Network Interface (Optional)
F	RJ45 serial B port	M	SCSI connector (SCSI version only)
G	NIC 1 connector		

1.4 Hard Drive and Peripheral Bays

The Server Chassis SR1400 is designed to support several different hard drive and peripheral configurations. The hard drive bay is designed to support up to three cabled SATA drives or hot-swappable SATA or SCSI drives. Each drive configuration requires an orderable kit which includes the necessary cables, drive trays and applicable backplane.

The slim-line peripheral bay is capable of supporting any of the following slim-line devices: CDROM drive, DVD Drive, DVD/CDR Drive, or Floppy drive. If both an optical drive and floppy drive are required, an optional kit is available to convert the first 1" hard drive bay to a floppy drive bay. The kit includes the necessary cables and slim-line floppy drive mounting tray.

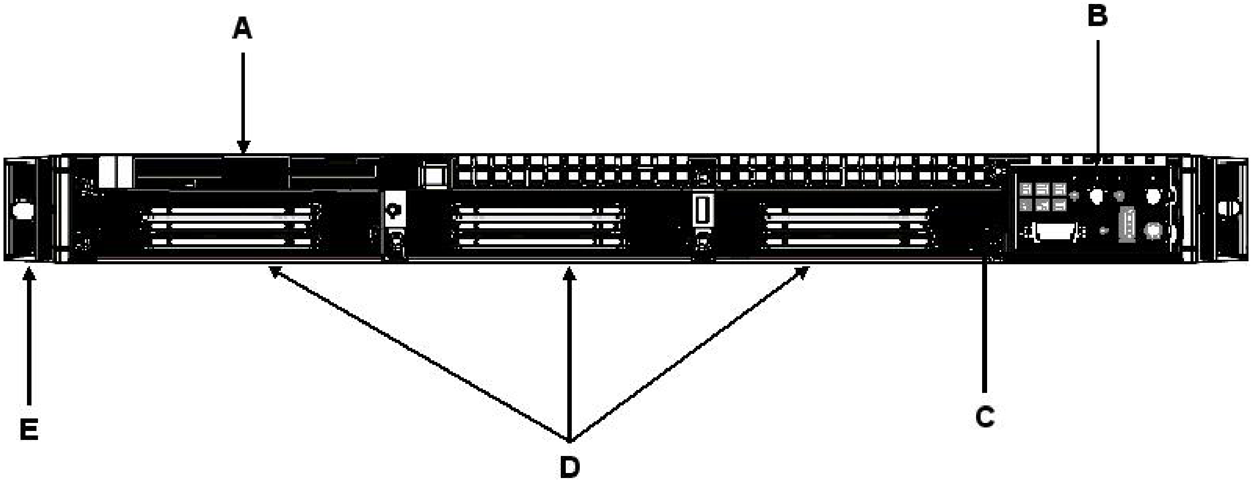


Figure 4. Front Panel Feature Overview

A	Slim-line drive bay (Optical Drive or Floppy)
B	Control Panel (Standard Shown)
C	Hard Drive Fault/Activity LED
D	1" Hard Drive Bays
E	Chassis Handle

1.5 Control Panel Options

The Server Chassis SR1400 can support either of two control panels, the Standard Control Panel and the Intel Local Control Panel with LCD support. The control panel assemblies are pre-assembled and modular in design. The entire module assembly slides into a predefined slot in the front of the chassis.

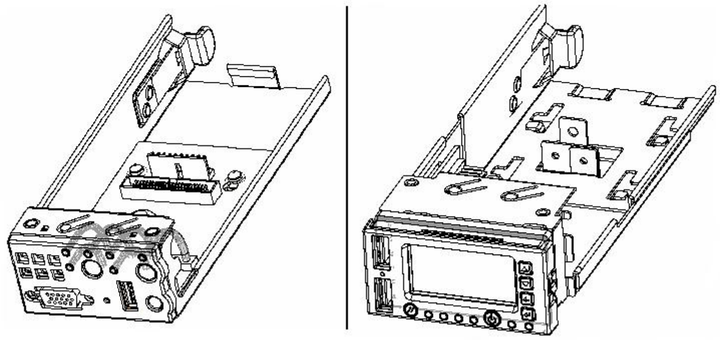


Figure 5. Control Panel Modules

Note: Unless purchased as a fully integrated system, the SR1400 chassis building block does not come configured with a control panel pre-installed. The Standard Control Panel or the Intel Local Control Panel must be ordered separately.

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

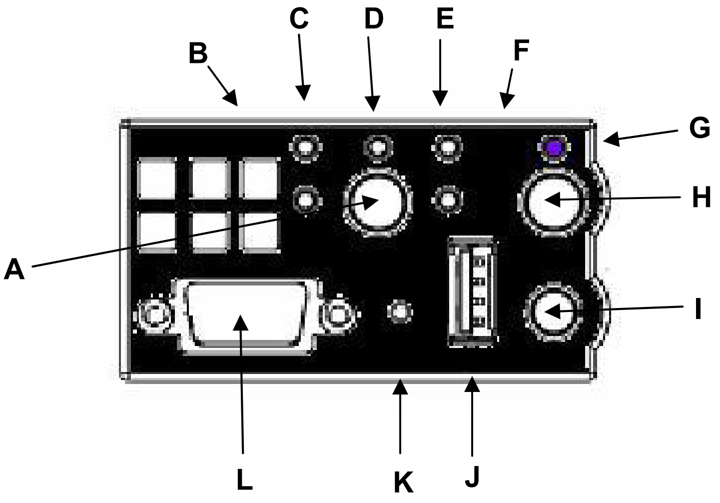


Figure 6. Standard Control Panel Overview

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

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

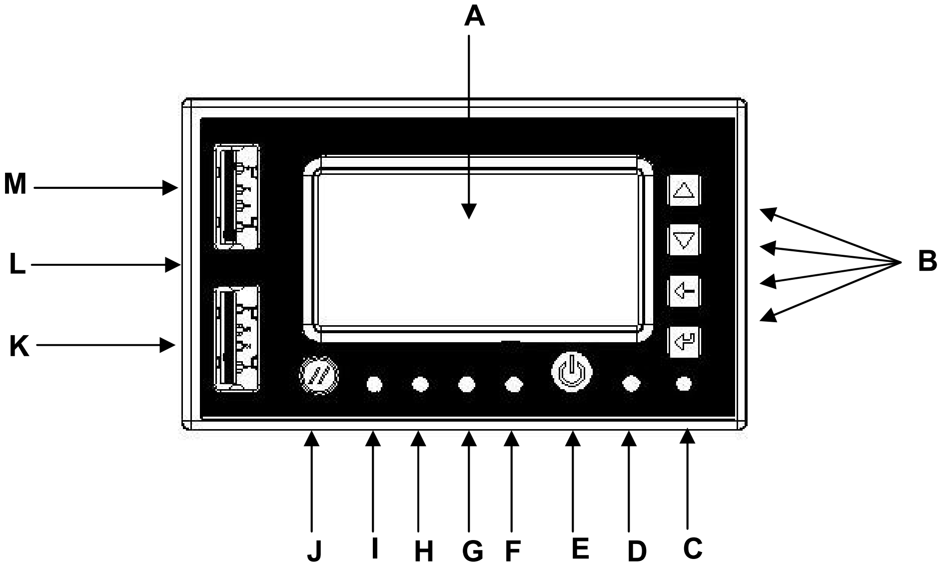


Figure 7. LCD Contol Panel Overview

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

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

1.6 Power Sub-system

The power sub-system of the SR1400 consists of a single non-redundant 500 watt power supply and provides several integrated management features including:

- Status LED
- Over temperature protection circuitry
- Over voltage protection circuitry

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

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

The power supply operates within the following voltage ranges and ratings

100-127VAC (V) ~ at 50/60 Hertz (Hz); 8.2 Ampere (A) maximum (max)

200-240VAC~ at 50/60 Hz; 4.1 A maximum

1.7 System Cooling

The chassis provides a non-redundant multi-system fan module and dual non-redundant power supply fans. When external ambient temperatures remain within specified limits, the cooling system will provide sufficient air flow for cabled and hot-swap drive configurations, processors, memory, and add-in cards.

1.8 Chassis Security

The SR1400 provides support for several platform security features including a lockable front bezel (see figure 9), chassis intrusion switch (see figure 2), and a Kensington style lock attach point.

1.9 Rack and Cabinet Mounting Options

The SR1400 chassis was designed to support 19” wide by up to 30” deep server cabinets. The chassis can be configured to support a relay rack / cabinet mount kit or a tool-less sliding rail kit. The relay rack / cabinet mount kit can be configured to support both 2-post racks and 4-post cabinets. The tool-less sliding rail kit is used to mount the chassis into a standard (19” by up to 30” deep) EIA-310D compatible server cabinet.

1.10 Front Bezels

The optional front bezel is made of molded plastic and uses a snap-on design. When installed, its design allows for maximum airflow. Separate front bezels are available to support systems that use either a Standard Control Panel or Intel Local Control Panel.

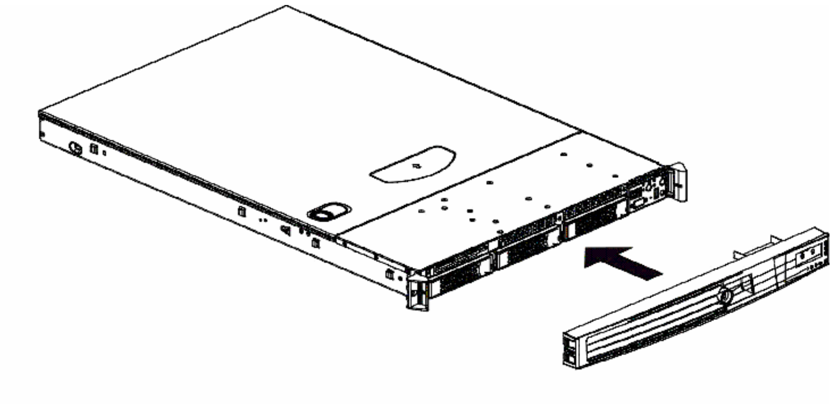


Figure 8. Optional Front Bezel

Light pipes in the front bezel supporting the Standard Control Panel allow the system status LEDs to be monitored with the bezel installed

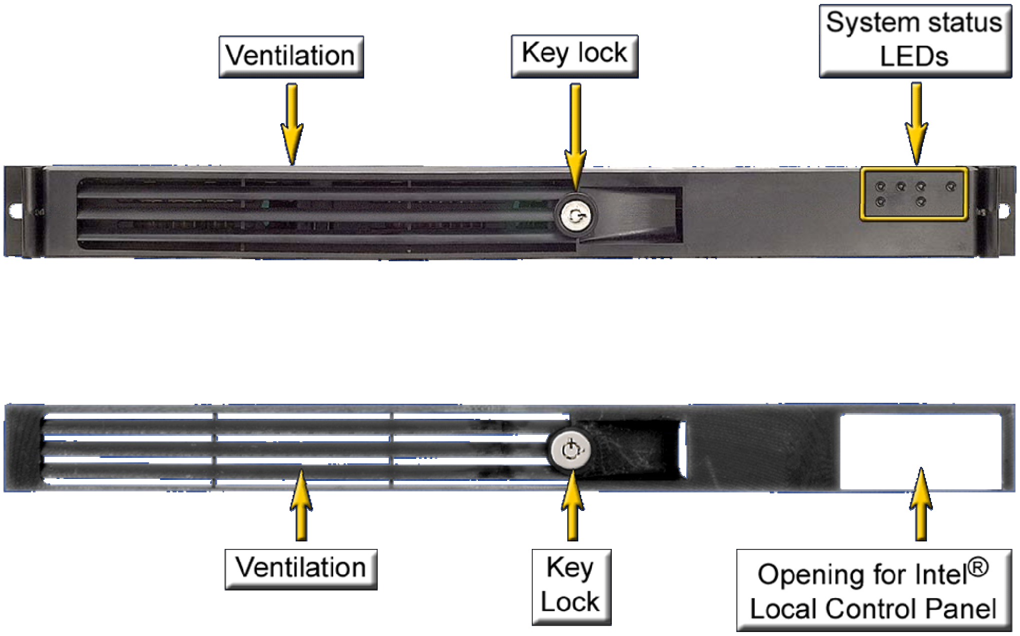


Figure 9. Front Bezel Options

2. Power Sub-system

The power sub-system of the Server Chassis SR1400 consists of a single non-redundant 500W power supply with 7 outputs; 3.3V, 5V, 12V1, 12V2, 12V3, -12V and 5VSB. The form factor fits into a 1U system and provides a wire harness output to the system. An IEC connector is provided on the external face for AC input to the power supply. The power supply provides two non-redundant 40mm fans for self cooling. The power supply fans also contribute to providing additional airflow for parts of the system.

2.1 Mechanical Overview

The power supply housing is specifically designed for use in the server chassis SR1400.

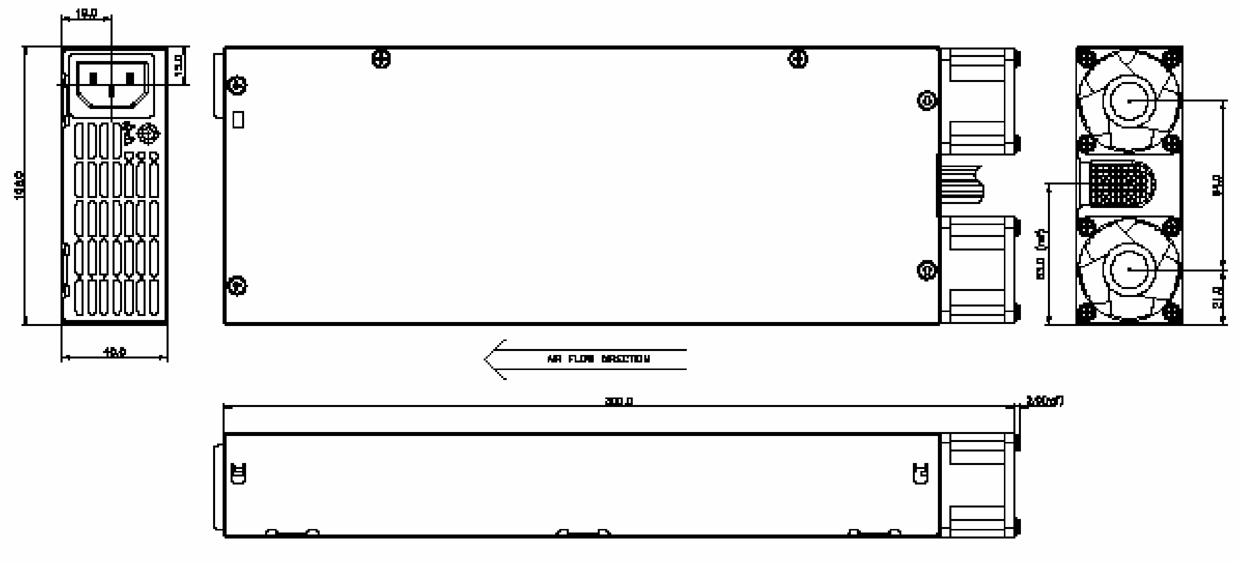


Figure 10. Enclosure Drawing

Notes:

1. All dimensions are in mm.
2. The tolerance of the 40mm height dimension (marked with letter C) pertains to the metal case only.

The chassis is designed to allow for tool-less removal and insertion of the power supply. Stop features on the chassis base and chassis top cover ensure a tight fit and prevent the power supply from moving out of place while the system is in transit or is dropped.

Note: To keep the power supply from moving, the chassis top cover must be locked in place before the system is moved.

2.2 Airflow Requirements

The power supply incorporates two 40mm fans for self cooling and system cooling. The fans will provide no less than 10 CFM airflow through the power supply when installed in the system. Air flowing through the power supply is pre-heated from the system and exhausts out the back.

2.3 Temperature Requirements

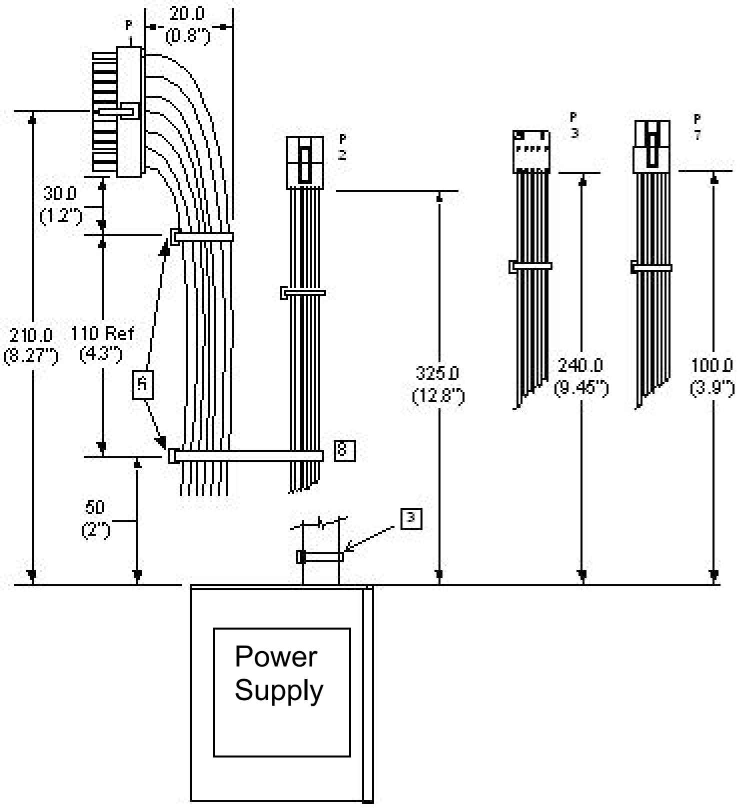
The power supply will operate within all specified limits over the T_{op} temperature range. See Table 58. Environmental Limits Summary. The average air temperature difference (ΔT_{ps}) from the inlet to the outlet of the power supply shall not exceed 20C. The power supply meets UL enclosure requirements for temperature rise limits.

2.4 Output Cable Harness

Listed or recognized component appliance wiring material (AVLV2), CN, rated min 105°C, 300Vdc shall be used for all output wiring.

Table 2. Cable Lengths

From	Length	To	Description
Case	210mm	P1	Main Power Connector
Case	325mm	P2	Processor Power Connector
Case	240mm	P3	Power Signal Connector
Case	100mm	P7	Hard Drive Interface Board Power Connector



NOTES:
1. ALL DIMENSIONS ARE IN MM
2. ALL TOLERANCES ARE +10 MM / -0 MM

Figure 11. Power Supply Harness Detail

2.4.1 P1 – Main 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	SIGNAL	18 AWG COLOR	PIN	SIGNAL	18 AWG COLOR
1	+3.3 VDC	Orange	13	+3.3 VDC	Orange
2	+3.3 VDC	Orange	14	-12 VDC	Blue
3	COM	Black	15	COM	Black
4	+5 VDC*	Red	16	PSON#	Green
5	COM	Black	17	COM	Black
6	+5 VDC	Red	18	COM	Black
7	COM	Black	19	COM	Black
8	PWR OK	Gray	20	Reserved	N.C.
9	5VSB	Purple	21	+5 VDC	Red
10	+12V3	Yellow/Blue Stripe	22	+5 VDC	Red
11	+12V3	Yellow/Blue Stripe	23	+5 VDC	Red
12	+3.3 VDC	Orange	24	COM	Black

Note:
5V Remote Sense Double Crimped into pin 4.
3.3V Locate Sense Double Crimped into pin 2.

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

2.4.3 P3 – Power Signal Connector

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

Table 5. P3 Baseboard Signal Connector

Pin	Signal	24 AWG Color
1	I2C Clock	White/Green Stripe
2	I2C Data	White/Yellow Stripe
3	Alert#	White
4	COM	Black
5	3.3RS	White/Brown Stripe

2.4.4 P7 – Backplane Power Connector

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

Table 6. P7 Hard Drive Power Connector

Pin	Signal	18 AWG Color
1	Ground	Black
2	Ground	Black
3	5V	Red
4	+12V3	Yellow/Blue Stripe
5	+12V3	Yellow/Blue Stripe
6	5VSB	Purple

2.5 AC Input Voltage Specification

The power supply must operate within all limits over the input voltage range specified in the following table. No harmonic distortion of up to 10% THD will cause the power supply to go out of specified limits. The power supply will power off when the AC input is less than 75VAC +/-5VAC range. The power supply will start up when the AC input is greater than 85VAC +/-4VAC. Application of an input voltage below 85VAC will not damage the power supply, including a fuse blow.

Table 7. AC Input Rating

PARAMETER	MIN	RATED	MAX	Max Input Current	Start up VAC	Power Off VAC
Voltage (110)	90 V_{rms}	100-127 V_{rms}	140 V_{rms}	8.2 A_{rms}	85Vac +/-4Vac	75Vac +/-5Vac
Voltage (220)	180 V_{rms}	200-240 V_{rms}	264 V_{rms}	4.1 A_{rms}		
Frequency	47 Hz		63 Hz			

2.5.1 AC Inlet Connector

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

2.5.2 Efficiency

The power supply has a recommended efficiency of 72% at maximum load and over the specified AC voltage.

2.5.3 AC Line Transient Specification

AC line transient conditions are defined as “sag” and “surge” conditions. A “Sag” condition is also commonly referred to as “brown-out”. This condition occurs when the AC line voltage drops below nominal voltage conditions. A “Surge” condition occurs when the AC line voltage rises above nominal voltage.

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

Table 8. AC Line Sag Transient Performance

AC Line Sag				
Duration	**Sag**	**Operating AC Voltage**	**Line Frequency**	**Performance Criteria**
Continuous	10%	Nominal AC Voltage ranges	50/60Hz	No loss of function or performance
0 to 1 AC cycle	100%	Nominal AC Voltage ranges	50/60Hz	No loss of function or performance
> 1 AC cycle	>10%	Nominal AC Voltage ranges	50/60Hz	Loss of function acceptable, self recoverable

Table 9. AC Line Surge Transient Performance

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

2.5.4 AC Line Fast Transient (EFT) Specification

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

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

2.5.5 AC Line Dropout / Holdup

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

2.5.5.1 AC Line 5VSB Holdup

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

2.5.6 Power Recovery

The power supply will recover automatically after an AC power failure. AC power failure is defined to be any loss of AC power that exceeds the dropout criteria.

2.5.6.1 Voltage Brown Out

The power supply complies with the limits defined in EN55024: 1998 using the IEC 61000-4-11:1995 test standard and performance criteria C defined in Annex B of CISPR 24.

A continuous input voltage below the nominal input range shall not damage the power supply or cause overstress to any power supply component. The power supply will return to a normal power up state after a brown out condition. Maximum input current under a continuous brown out shall not blow the fuse. The power supply should tolerate a 3min ramp from 90VAC voltage to 0VAC after the components have reached a steady state condition.

2.5.6.2 Voltage Interruptions

The power supply complies with the limits defined in EN55024: 1998 using the IEC 61000-4-11:1995 test standard and performance criteria C defined in Annex B of CISPR 24.

2.5.7 AC Line Inrush

The AC line inrush current shall not exceed 40A peak for up to one-quarter of the AC cycle, after which, the input current should be no more than the specified maximum input current. The peak inrush current shall be less than the ratings of its critical components (including input fuse, bulk rectifiers, and surge limiting device).

The power supply must meet the inrush requirements for any rated AC voltage, during turn on at any phase of AC voltage, during a single cycle AC dropout condition as well as upon recovery after AC dropout of any duration, and over the specified temperature range (T_{op}). It is acceptable that AC line inrush current may reach up to 60A peak for up to 1 ms.

2.5.8 AC Line Isolation Requirements

The power supply meets all safety agency requirements for dielectric strength. Transformer isolation between primary and secondary windings must comply with the 3000Vac (4242Vdc) dielectric strength criteria. If the working voltage between primary and secondary dictates a higher dielectric strength test voltage the highest test voltage should be used. In addition the insulation system must comply with reinforced insulation per safety standard IEC 950. Separation between the primary and secondary circuits and primary to ground circuits complies with the IEC 950 spacing requirements.

2.5.9 AC Line Leakage Current

The maximum leakage current to ground for each power supply is 3.5mA when tested at 240VAC.

2.5.10 AC Line Fuse

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

2.5.11 Power Factor Correction

The power supply incorporates a Power Factor Correction circuit.

2.6 DC Output Specification

2.6.1 Grounding

The ground of the pins of the power supply output connector provides the power return path. The output connector ground pins shall be connected to safety ground (power supply enclosure). This grounding should be well designed to ensure passing the max allowed Common Mode Noise levels.

The power supply shall be provided with a reliable protective earth ground. All secondary circuits shall be connected to protective earth ground. Resistance of the ground returns to chassis shall not exceed 1.0 mΩ. This path may be used to carry DC current.

2.6.2 Remote Sense

The power supply has remote sense return (ReturnS) to regulate out ground drops for all output voltages; +3.3V, +5V, +12V1, +12V2, +12V3, -12V, and 5VSB. The power supply uses remote sense (3.3VS) to regulate out drops in the system for the +3.3V output. The +5V, +12V1, +12V2, +12V3, –12V and 5VSB outputs only use remote sense referenced to the ReturnS signal. The remote sense input impedance to the power supply must be greater than 200Ω on 3.3VS, 5VS. This is the value of the resistor connecting the remote sense to the output voltage internal to the power supply. Remote sense must be able to regulate out a minimum of 200mV drop on the +3.3V output. The remote sense return (ReturnS) must be able to regulate out a minimum of 200mV drop in the power ground return. The current in any remote sense line shall be less than 5mA to prevent voltage sensing errors. The power supply must operate within specification over the full range of voltage drops from the power supply's output connector to the remote sense points.

2.6.3 Output Power / Currents

The following table defines power and current ratings for this 500W power supply. The combined output power of all outputs shall not exceed the rated output power. The power supply must meet both static and dynamic voltage regulation requirements for the minimum loading conditions.

Table 10. Load Ratings

Voltage	Minimum Continuous Load	Maximum Continuous Load	Peak Load
+3.3V	1.5 A	16 A	
+5V	1.0 A	12 A	
+12V1	2/3 A	12.5 A (note 3)	15.0 A (note 5)
+12V2	2/3 A	12.5 A (note 3)	15.0 A (note 5)
+12V3	2/3 A	14A	18.0A (note 5)
-12V	0 A	0.5 A	
+5VSB	0.1 A	2.0 A	2.5A

1. Maximum continuous total DC output power should not exceed 500 Watts.
2. Peak load on the combined 12V output shall not exceed 39A peak.
3. Maximum continuous load on the combined 12V output shall not exceed 35A.
4. Peak total DC output power should not exceed 550 Watts peak.
5. Peak power and peak current loading shall be supported for a minimum of 12 seconds.
6. Combined 3.3V/5V power shall not exceed 90W.

2.6.3.1 Standby Outputs

The 5VSB output shall be present when an AC input greater than the power supply turn on voltage is applied.

2.6.4 Voltage Regulation

The power supply output voltages must stay within the following voltage limits when operating at steady state and dynamic loading conditions. These limits include the peak-peak ripple/noise. All outputs are measured with reference to the return remote sense signal (ReturnS). The 5V, 12V1, 12V2, +12V3, –12V and 5VSB outputs are measured at the power supply connectors referenced to ReturnS. The +3.3V is measured at it remote sense signal (3.3VS) located at the signal connector.

Table 11. Voltage Regulation Limits

PARAMETER	TOLERANCE	MIN	NOM	MAX	UNITS
+ 3.3V	- 5% / +5%	+3.14	+3.30	+3.46	V_{rms}
+ 5V	- 5% / +5%	+4.75	+5.00	+5.25	V_{rms}
+ 12V1	- 5% / +5%	+11.40	+12.00	+12.60	V_{rms}
+ 12V2	- 5% / +5%	+11.40	+12.00	+12.60	V_{rms}
+ 12V3	- 5% / +5%	+11.40	+12.00	+12.60	V_{rms}
- 12V	- 5% / +9%	-11.40	-12.00	-13.08	V_{rms}
+ 5VSB	- 5% / +5%	+4.75	+5.00	+5.25	V_{rms}

2.6.4.1 Dynamic Loading

The output voltages shall remain within limits specified for the step loading and capacitive loading specified in the table below. The load transient repetition rate shall be tested between 50Hz and 5kHz at duty cycles ranging from 10%-90%. The load transient repetition rate is only a test specification. The Δ step load may occur anywhere within the MIN load to the MAX load conditions.

Table 12. Transient Load Requirements

Output	Δ Step Load Size (See note 2)	Load Slew Rate	Test capacitive Load
+3.3V	5.0A	0.25 A/μsec	250 μF
+5V	4.0A	0.25 A/μsec	400 μF
12V1+12V2+12V3	20.0A	0.25 A/μsec	2200 μF [1,3]
+5VSB	0.5A	0.25 A/μsec	20 μF

Notes:

1. Step loads on each 12V output may happen simultaneously.
2. For Load Range 2 (light system loading), the tested step load size should be 60% of those listed.
3. The +12V should be tested with 1000μF evenly split between the three +12V rails.

2.6.4.2 Capacitive Loading

The power supply shall be stable and meet all requirements with the following capacitive loading ranges.

Table 13. Capacitve Loading Conditions

Output	MIN	MAX	Units
+3.3V	250	6,800	μF
+5V	400	4,700	μF
+12V(1, 2, 3)	500 each	11,000	μF
-12V	1	350	μF
+5VSB	20	350	μF

2.6.5 Closed loop stability

The power supply shall be unconditionally stable under all line/load/transient load conditions including capacitive load ranges. A minimum of: 45 degrees phase margin and -10dB-gain margin is required. The power supply manufacturer shall provide proof of the unit's closed-loop stability with local sensing through the submission of Bode plots. Closed-loop stability must be ensured at the maximum and minimum loads as applicable.

2.6.6 Common Mode Noise

The Common Mode noise on any output shall not exceed 350mV pk-pk over the frequency band of 10Hz to 30MHz.

The measurement shall be made across a 100Ω resistor between each of DC outputs, including ground, at the DC power connector and chassis ground (power subsystem enclosure).

The test set-up shall use a FET probe such as a Tektronix* model P6046 or equivalent.

2.6.7 Ripple / Noise

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

Table 14. Ripple and Noise

+3.3V	+5V	+12V1/2	-12V	+5VSB
50mVp-p	50mVp-p	120mVp-p	120mVp-p	50mVp-p

2.6.8 Soft Starting

The power supply shall contain a control circuit which provides monotonic soft start for its outputs without overstress of the AC line or any power supply components at any specified AC line or load conditions. There is no requirement for rise time on the 5Vstby but the turn on/off shall be monotonic.

2.6.9 Zero Load Stability Requirements

When the power subsystem operates in a no load condition, it does not need to meet the output regulation specification, but it must operate without any tripping of over-voltage or other fault circuitry. When the power subsystem is subsequently loaded, it must begin to regulate and source current without fault. Each output voltage may not be internally diode isolated. At the same time failure in the primary side of one power supply doesn't cause the other to shut down.

2.6.10 Timing Requirements

These are the timing requirements for the power supply operation. The output voltages must rise from 10% to within regulation limits (T_{vout_rise}) within 5 to 70ms, except for 5VSB - it is allowed to rise from 1.0 to 70ms. The +3.3V, +5V and +12V output voltages should start to rise approximately at the same time. All outputs must rise monotonically. The +5V output needs to be greater than the +3.3V output during any point of the voltage rise. The +5V output must never be greater than the +3.3V output by more than 2.25V. Each output voltage shall reach regulation within 50ms (T_{vout_on}) of each other during turn on of the power supply. Each output voltage shall fall out of regulation within 400msec (T_{vout_off}) of each other during turn off. The following diagrams show timing requirements for the power supply being turned on and off via the AC input, with PSON held low and the PSON signal, with the AC input applied.

Table 15. Output Voltage Timing

Item	Description	MIN	MAX	UNITS
T_{vout_rise}	Output voltage rise time from each main output.	5.0 *	70 *	msec
T_{vout_on}	All main outputs must be within regulation of each other within this time.		50	msec
T_{vout_off}	All main outputs must leave regulation within this time.		400	msec

- The 5VSB output voltage rise time shall be from 1.0ms to 25.0ms

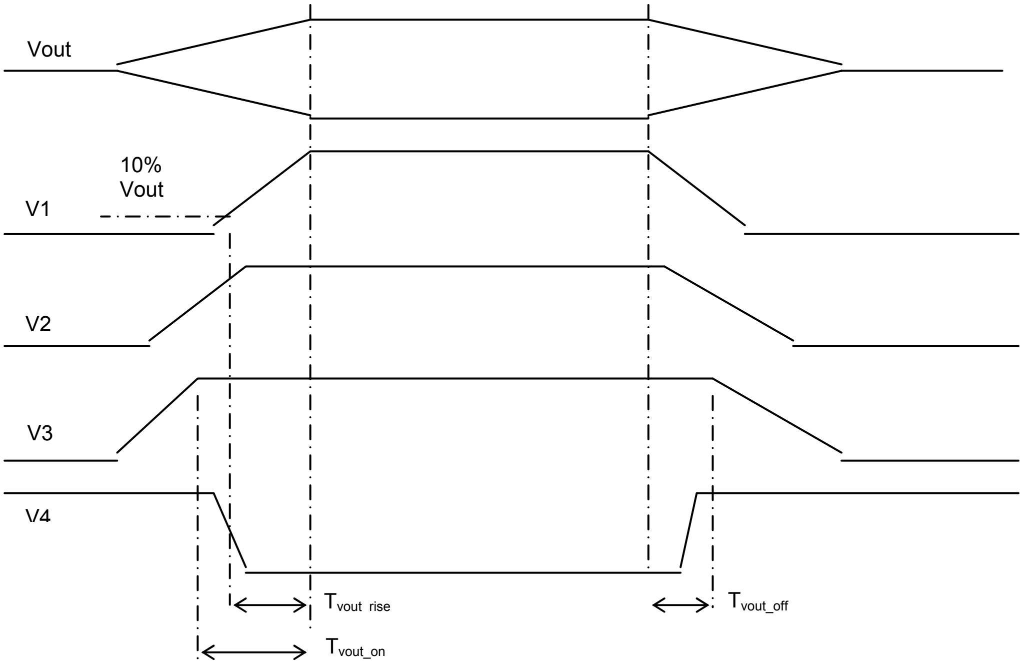


Figure 12. Output Voltage Timing

Table 16. Turn On/Off Timing

Item	Description	MIN	MAX	UNITS
$T_{sb\_on\_delay}$	Delay from AC being applied to 5VSB being within regulation.		1500	msec
$T_{ac\_on\_delay}$	Delay from AC being applied to all output voltages being within regulation.		2500	msec
T_{vout_holdup}	Time all output voltages stay within regulation after loss of AC.	21		msec
T_{pwok_holdup}	Delay from loss of AC to de-assertion of PWOK	20		msec
$T_{pson\_on\_delay}$	Delay from PSON# active to output voltages within regulation limits.	5	400	msec
T_{pson_pwok}	Delay from PSON# deactive to PWOK being de-asserted.		50	msec
T_{pwok_on}	Delay from output voltages within regulation limits to PWOK asserted at turn on.	100	1000	msec
T_{pwok_off}	Delay from PWOK de-asserted to output voltages (3.3V, 5V, 12V, -12V) dropping out of regulation limits.	1		msec
T_{pwok_low}	Duration of PWOK being in the de-asserted state during an off/on cycle using AC or the PSON signal.	100		msec
T_{sb_vout}	Delay from 5VSB being in regulation to O/Ps being in regulation at AC turn on.	50	1000	msec
T_{5VSB_holdup}	Time the 5VSB output voltage stays within regulation after loss of AC.	70		msec

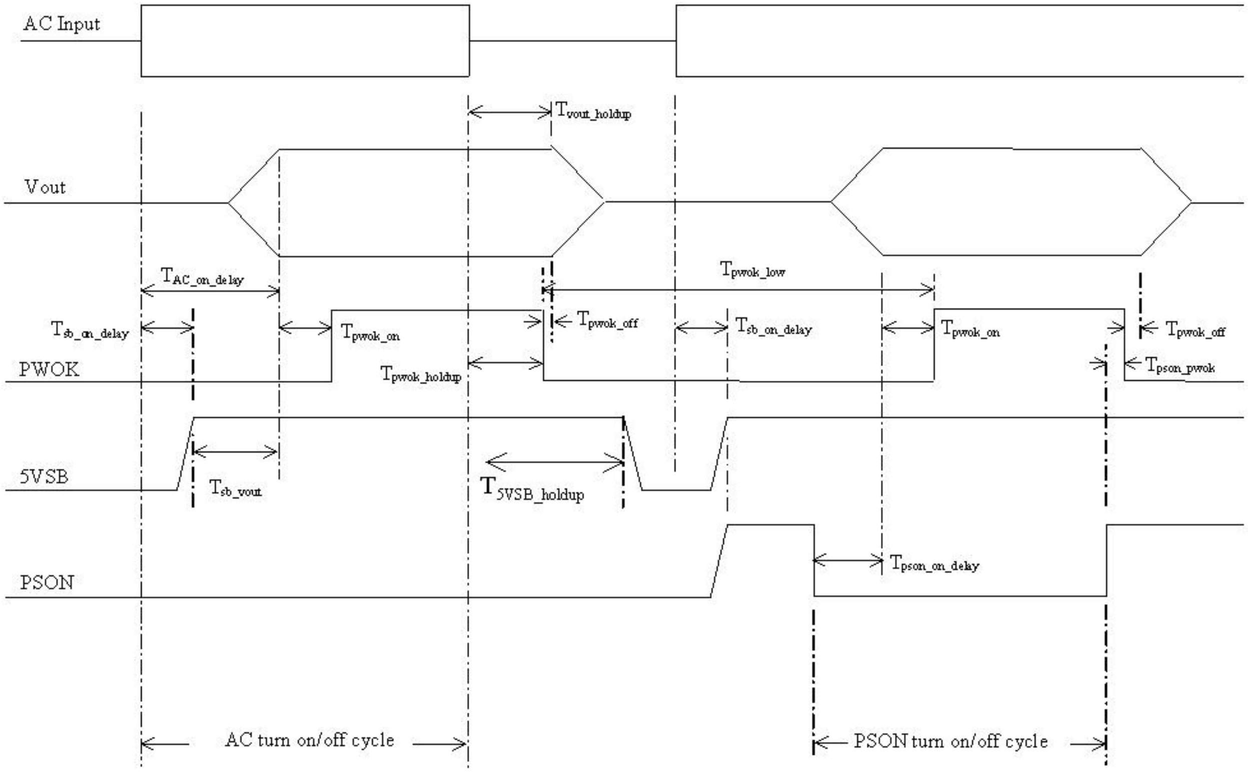


Figure 13. Turn On/Off Timing (Power Supply Signals)

2.6.11 Residual Voltage Immunity in Standby mode

The power supply should be immune to any residual voltage placed on its outputs (Typically a leakage voltage through the system from standby output) up to 500mV. There shall be no additional heat generated, nor stress of any internal components with this voltage applied to any individual output, and all outputs simultaneously. It also should not trip the protection circuits during turn on.

The residual voltage at the power supply outputs for no load condition shall not exceed 100mV when AC voltage is applied.

2.7 Protection Circuits

Protection circuits inside the power supply shall cause only the power supply's main outputs to shutdown. If the power supply latches off due to a protection circuit tripping, an AC cycle OFF for 15sec and a PSON$^{\#}$ cycle HIGH for 1sec shall be able to reset the power supply.

2.7.1 Current Limit (OCP)

The power supply shall have a current limit to prevent the +3.3V, +5V, and +12V outputs from exceeding the values shown in the following table. If the current limits are exceeded, the power supply shall shutdown and latch off. The latch will be cleared by toggling the PSON$^{\#}$ signal or by an AC power interruption. The power supply shall not be damaged from repeated power cycling in this condition. -12V and 5VSB 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 5VSB rail.

Table 17. Over Current Protection (OCP)

VOLTAGE	OVER CURRENT LIMIT (Iout limit)
+3.3V	110% minimum (= 17.6A) ; 150% maximum (= 24.0A)
+5V	110% min (= 13.1A); 150% max (= 18.0A)
+12V1	15A min; 20A max
+12V2	15A min; 20A max
+12V3	18A min; 20A max
-12V	0.625A min; 2.0A max
5VSB	4.0A max

2.7.2 Over Voltage Protection (OVP)

The power supply over voltage protection shall be locally sensed. The power supply 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 contains the over voltage limits. The values are measured at the output of the power supply's connectors. The voltage shall never exceed the maximum levels when measured at the power pins of the power supply connector during any single point of fail. The voltage shall never trip any lower than the minimum levels when measured at the power pins of the power supply connector.

Exception: The +5VSB rail should recover after its over voltage condition occurs.

Table 18. Over Voltage Protection (OVP) Limits

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

2.7.3 Over Temperature Protection (OTP)

The power supply will be protected against over temperature conditions caused by loss of fan cooling or excessive ambient temperature. In an OTP condition the PSU will shutdown. When the power supply temperature drops to within specified limits, the power supply shall restore power automatically, while the 5VSB remains always on. The OTP 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 SMBus Monitoring Interface

The power supply provides a monitoring interface to the system over a server management bus to the system. This shall provide power monitoring, failure conditions, warning conditions, and FRU data. Two pins have been reserved on the connector to provide this information. One pin is the Serial Clock (PSM Clock). The second pin is used for Serial Data (PSM Data). Both pins are bi-directional and are used to form a serial bus. The circuits inside the power supply shall be powered from the 5VSB bus and grounded to ReturnS (remote sense return). No pull-up resistors shall be on SCL or SDA inside the power supply. These pull-up resistors should be located external to the power supply. The EEPROM for FRU data in the power supply shall be hard wired to allow writing data to the device.

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

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

- Intelligent Mode: A system management controller or BIOS agent exists that can read and clear status. In this mode, the LEDs and registers should latch when a warning event occurs so that the system and user can read their status before it changes during transient events.

Critical events, defined in table 19, will cause the power supply to shutdown and latch the LED and SMB_Alert signal no matter what mode the power supply is in; “default” or Intelligent”.

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

If the power supply fails due to over temperature shutdown, over current shutdown, over power shutdown, or fan failure; the LED, SMB_Alert signal, and critical event registers, shall still operate correctly. If the supply fails due to loss of AC or open fuse, then the LED and signals will have no power and therefore will not operate.

2.8.1 LED Control

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

Table 19. LED Indicators

Power Supply Condition	LED
No AC power to power supply	OFF
Power supply critical event causing a shutdown; failure, OCP, OVP, Fan Fail	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

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

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

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

2.9 FRU Data

The FRU data format shall be compliant with the IPMI ver.1.0 (per rev.1.1 from Sept.25, 1999) specification. The current version of these specifications is available at http:\\developer.intel.com/design/servers/ipmi/spec.htm.

3. Cooling Sub-System

The cooling sub-system is compromised of four 40x40x56mm dual rotor fans, one 40x40x28mm single rotor fan, two 40x40x28mm power supply fans, CPU air duct, and PS / Electronics Bay Isolation Air Baffle. These components are used to provide the necessary cooling and airflow to the system. A fan on the processor heat sink is not necessary in this chassis.

In order to maintain the necessary airflow within the system, the air baffle, CPU air duct, and the top cover need to be properly installed.

Note: The Server Chassis SR1400 does not support redundant cooling. Should a fan fail, the system should be brought down as soon as possible to replace the failed fan.

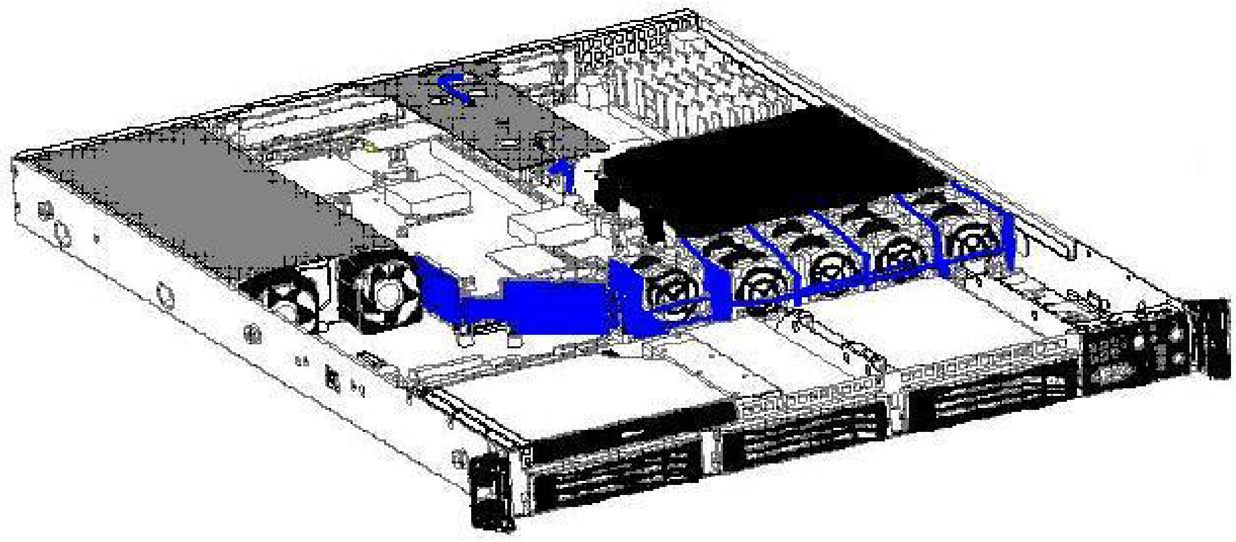


Figure 14. Cooling Sub-System Components

3.1 Five-Fan Module

A fan module consisting of four 40x40x56mm dual rotor and one 40x40x28mm single rotor multi-speed fans, provides the primary airflow for the system. The four dual rotor fans provide the primary cooling for the processors, memory, the second and third hard drive bays,and components in the low profile PCI zone,. The single rotor fan provides the primary cooling for the components in the full height PCI zone.

Removal and insertion of the fan module is tool-less and provides for ease of installation and serviceability. The fan module supports a fan distribution board that facilitates individual fan replacement. Neither the fan module nor the individual fans within it are hot swappable. The server must be turned off before any of the fans can be replaced.

Each dual rotor fan has an 8-pin wire harness which connects to the fan distribution board. Each fan hardness provides power and tach lines allowing the fans to be monitored independently by server management software. The fan distribution board has a 20-pin connector which provides the power and communication signal path from the baseboard.

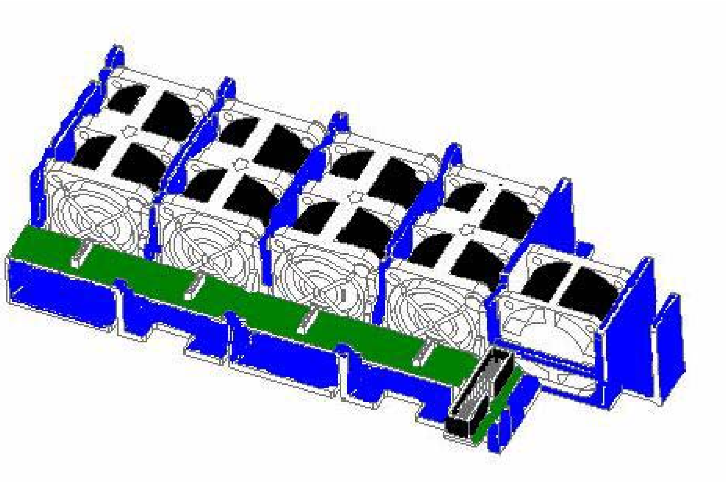


Figure 15. Fan Module Assembly

The following table provides the pinout for each fan harness.

Table 20. Individual Fan Assy Pinout (J1, J2, J3, J4)

Pin	Signal Name	Description
1	FAN_SPEED_CNTL2	Control the fan speed
2	FAN_FAIL	FAN_TACH signal
3	GND	Power Supply Ground
4	Reserved	Reserved
5	GND	Power Supply Ground
6	GND	Power Supply Ground
7	FAN_FAIL	FAN_TACH signal
8	Fan speed control	Variable Speed Fan Power

The following table provides the pinout of the 20-pin fan control connector on the fan distribution board.

Table 21. Fan Distribution connector pinout (J5)

Signal Name	Pin	Pin	Signal Name
FAN_SPEED_CNTL2	1	11	FAN_SPEED_CNTL2
FAN_SPEED_CNTL2	2	12	Reserved
GND	3	13	GND
GND	4	14	GND
FAN_FAIL5	5	15	FAN_FAIL1
FAN_FAIL6	6	16	FAN_FAIL2
FAN_FAIL7	7	17	FAN_FAIL3
FAN_FAIL8	8	18	FAN_FAIL4
Reserved	9	19	Reserved
Reserved	10	20	Reserved

The single rotor fan has a standard 3 pin SSI cable harness that connects directly to a fan header on the baseboard.

Each fan within the module is capable of supporting multiple speeds. If the internal ambient temperature of the system exceeds the value programmed into the thermal sensor data record (SDR), the Baseboard Management Controller (BMC) firmware will increase the rotational speed for all the fans within fan module.

Note: There is no fan redundancy. Should a fan fail, the system should be shut down as soon as possible to have the fan replaced. The system fans are not hot-swapable.

3.2 Power Supply Fans

The power supply supports two non-redundant 40mm fans. They are responsible for the cooling of the power supply, first hard drive bay, and slim-line drive bay (see reference “L” in Figure 2)

3.3 CPU Air Duct and Air Baffle

The chassis requires the use of a CPU air duct and power supply / electronics bay isolation air baffle to direct airflow and sustain appropriate air pressure.

An air baffle is used to isolate airflow of the two power supply fans from that of the system fan module. The baffle is mounted into three stand-offs with one end fitting under the back edge of the hard drive bay

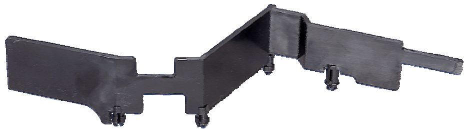


Figure 16. Air Baffle

The CPU air duct must be properly installed to direct airflow through the processor heatsink(s) to the low profile PCI and memory area of the system. The CPU air duct is designed to support either a single or dual processor configuration. For single processor configurations the pre-installed air damn must be left in place in order to maintain necessary air pressure and air flow through the processor heat sink. For dual processor configurations, the air damn must be snapped off of the CPU air duct. The CPU air duct cannot be installed if the air damn is in place and two processors are installed.

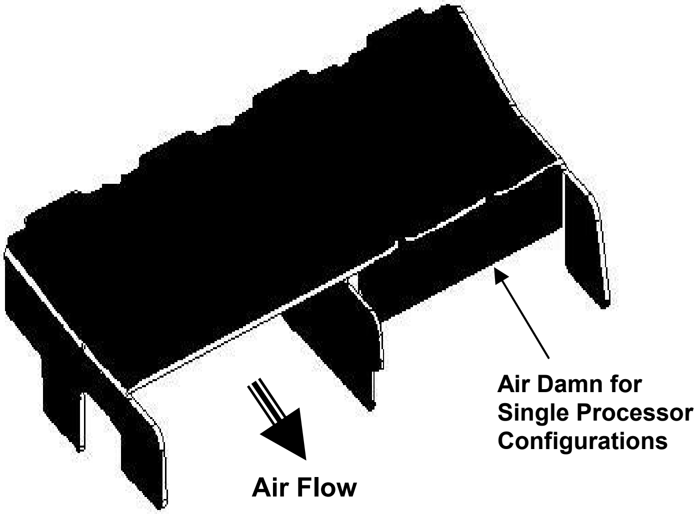


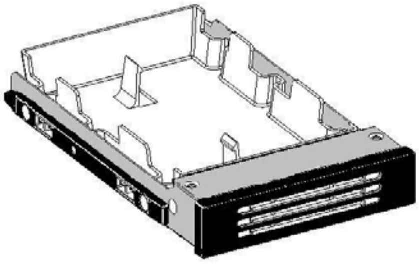
Figure 17. CPU Air Duct

Note: For single processor configurations, if the air damn is removed, the system will not meet the thermal cooling requirements of the processor, which will most likely result in a thermal shutdown of the system.

Note: Once the air damn is removed from the CPU air duct, it cannot be reinstalled.

3.4 Hard Drive Bays

Hard drive bays must be populated in order to maintain system thermals. Hard drive trays, both hot-swap and cabled drive, must ether have a hard drive or drive blank installed in them.



4. Peripheral and Hard Drive Support

The server chassis SR1400 provides three hard drive bays and one slim-line peripheral drive bay at the front of the chassis. The hard drive bays are designed to support both SCSI and SATA hot-swap backplanes or can support cabled SATA drive configurations.

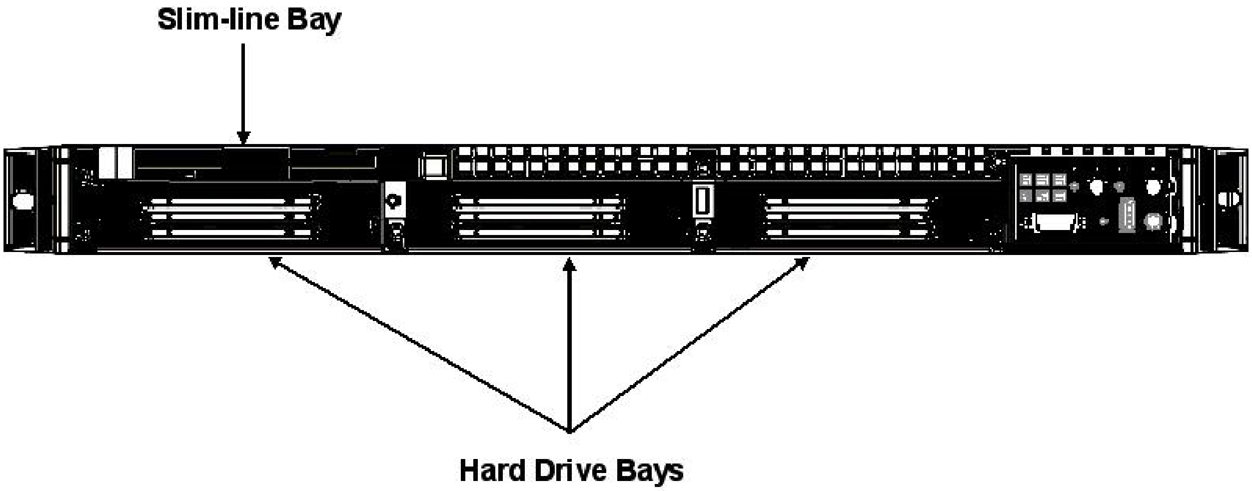


Figure 18. SR1400 Peripheral Bay Configuration Options

4.1 Slimline Drive Bay

The chassis provides a slim-line drive bay that can be configured for either CDROM, DVD/CDR, or Floppy drives with or without the presence of a backplane. Drives are mounted on a tool-less tray which allows for easy installation into and removal from the chassis. The slim-line devices are not hot-swappable.

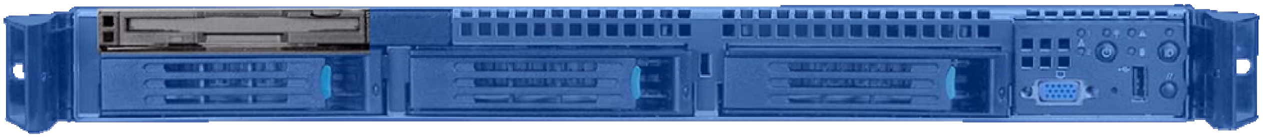


Figure 19. View of Slim-Line Drive Bay

4.1.1 Floppy Drive Support

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

4.1.1.1 Floppy Drive Use with Installed Backplane

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

Table 22. 28-pin floppy connector Pinout (J4)

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

4.1.1.2 Floppy Drive Use with No Backplane Present

When no backplane is present, an interposer card is attached to the back of the floppy drive which provides the power and IO interconnects between the drive, power supply and baseboard. The interposer card has three connectors; on one side of the interposer is a 28 pin connector which plugs directly into the back of the drive. The pinout for this connector is defined in the previous table. On the opposite side of the interposer is a 4 pin connector that and is cabled to the 2x3 pin power lead from the power supply. This connector has the following pinout.

Table 23. 4-pin floppy power connector Pinout (J3)

Pin	Name
1	P12V
2	GND
3	GND
4	P5V

The power cable is included in the Cabled SATA drive accessory kit. The third connector has 34 pins and is cabled to the legacy floppy connector on the baseboard. This connector has the following pinout.

Table 24. 34-pin floppy connector Pinout (J2)

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

4.1.1.3 Optional Floppy Drive Configuration

An optional conversion kit is available for system configurations that require both an optical drive and floppy drive, where use of the USB interface is either not desired or supported. The kit consists of a drive tray and face plate. When assembled with a slim-line floppy drive, the assembly is inserted into the hard drive bay directly beneath the slim-line bay.

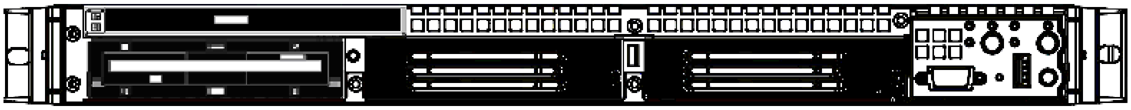


Figure 20. Optional Floppy Drive Configuration

4.1.2 Optical Drive Support

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

4.1.2.1 Optical Drive Use with Installed Backplane

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

Table 25. 50-pin CD-ROM connector Pinout (J6)

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

The second connector located on the opposite side of the PCB from the first, has 44 pins and is cabled directly to a matching connector on the backplane. The interposer card used in backplane configurations is included as part of the backplane accessory kits. The pinout for this connector is defined in the following table.

Table 26. 44-pin internal CD-ROM connector Pinout (J6)

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

4.1.2.2 Optical Drive Use with No Backplane Present

When no backplane is present, an interposer card is plugged into the back of the optical drive. The interposer card provides the power and IO interconnects between the drive, power supply and baseboard. The interposer card has three connectors; the first has 50 pins and is plugged directly into the back of the drive. The pinout for this 50 pin connector is defined in the previous sub-section. The second connector has 4 pins and is cabled to the 2x3 pin power lead from the power supply. This connector has the following pinout.

Table 27. 4-pin CD-ROM power connector Pinout (J5)

Pin	Name
1	P12V
2	GND
3	GND
4	P5V

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

Table 28. 40-pin CD-ROM connector Pinout (J1)

Name	Pin	Pin	Name
RST_IDE_S_L	1	2	GND
IDE_SDD<7>	3	4	IDE_SDD<8>

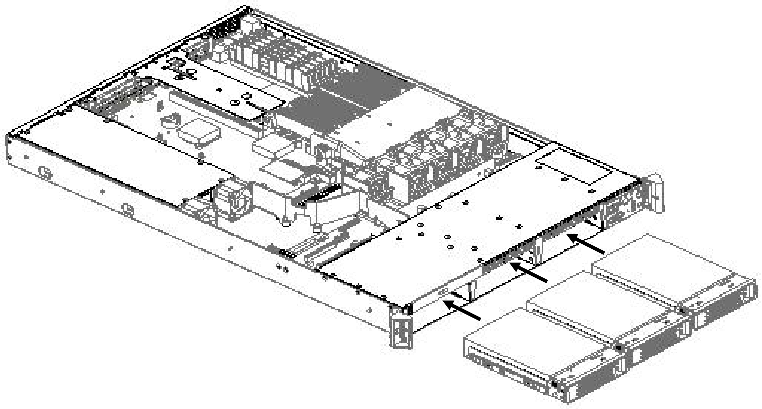
Name	Pin	Pin	Name
IDE_SDD<6>	5	6	IDE_SDD<9>
IDE_SDD<5>	7	8	IDE_SDD<10>
IDE_SDD<4>	9	10	IDE_SDD<11>
IDE_SDD<3>	11	12	IDE_SDD<12>
IDE_SDD<2>	13	14	IDE_SDD<13>
IDE_SDD<1>	15	16	IDE_SDD<14>
IDE_SDD<0>	17	18	IDE_SDD<15>
GND	19	20	Unused
IDE_SDDREQ	21	22	GND
IDE_SDIOW_L	23	24	GND
IDE_SDIOR_L	25	26	GND
IDE_SIORDY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

The interposer card and associated cables are included as part of the SATA Cabled Drive Accessory Kit..

4.2 Hard Disk Drive Bays

The server chassis SR1400 can be configured to support either hot swap SCSI or SATA hard disk drives or cabled SATA drive configurations. For hot swap drive configurations, 3.5" x 1" hard disk drives are mounted to hot swap drive trays for easy insertion to or extraction from the drive bay. For cabled drive configurations, SATA drives are mounted to non-hot swappable drive trays. Cabled hard drives can only be removed by unlatching the drives from inside the chassis.

Note: All hard drive bays must be populated to maintain system thermals. Drive trays should either have a hard drive or drive blank inserted.



4.2.1 Hot Swap Hard Disk Drive Trays

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

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

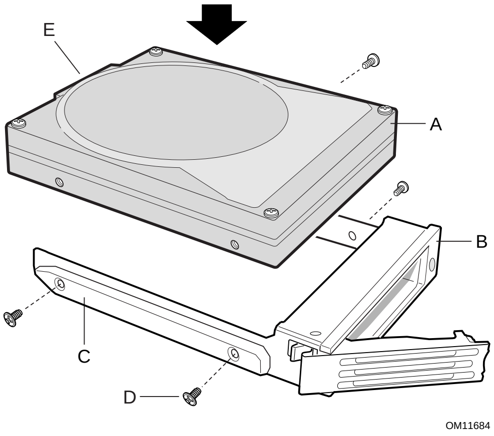


Figure 21. Hard Drive Tray Assembly

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

4.2.2 Cabled Drive Trays

For systems configured to support cabled SATA drives, each hard drive must be mounted to a non-hot swap drive tray. The tray is designed to slide into the drive bay and lock into place. To remove the drive, the chassis must be opened to disengage the drive tray latch from the bay.

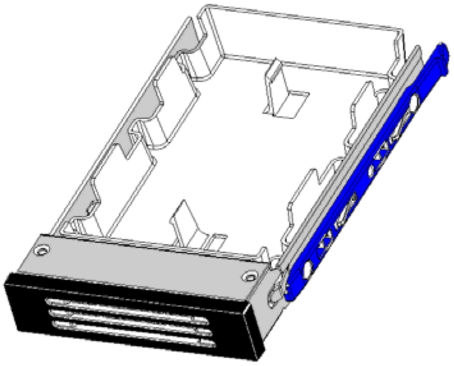


Figure 22. Cabled Drive Tray

4.2.3 Drive Blanks

Drive blanks must be used when no drive is used in a hard drive bay. Drive blanks simulate the spatial volume of a hard disk which is required to maintain proper air pressure limits necessary to cool the system.

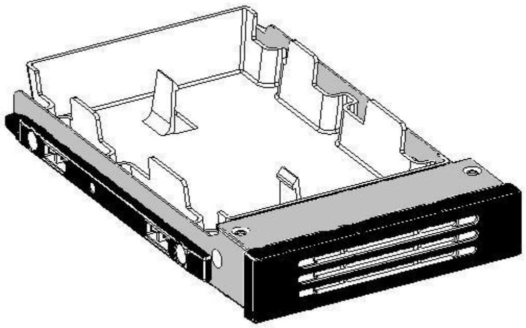


Figure 23. Drive Tray with Drive Blank

4.3 Hot-Swap SCSI Backplane

The SR1400 SCSI hot-swap backplane (HSBP) supports the following feature set:

- QLogic® GEM359 enclosure management controller
  - External non-volatile Flash ROM
  - Two I^2C interfaces
  - Low Voltage Differential (LVD) SCSI Interface
  - SCSI-3 compatible
  - Compliance with SCSI Accessed Fault Tolerant Enclosures (SAF-TE) specification, version 1.00 and addendum
  - Compliance with Intelligent Platform Management Interface (IPMI)
- Support for up to three U320 LVD SCSI Drives
  - Onboard LVD SCSI Termination – SPI-4 compatible
- Temperature Sensor
- Hard Drive Status LEDs
- FRU EEPROM
- One 2x3-pin Power Connector
- IDE Connector provided for Slim-line CDROM or DVD support
- Floppy Connector provided for Slim-line floppy support
- Control Panel Connector

4.3.1 Hot-Swap SCSI Backplane Board Layout

The following diagram shows the layout of major components and connectors of the board.

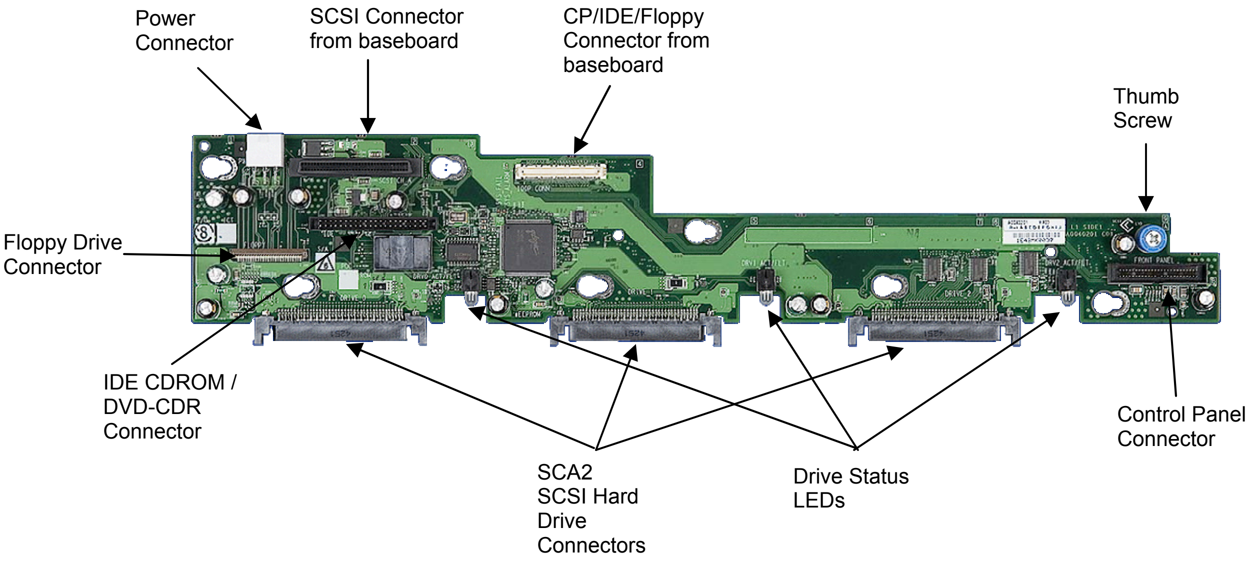


Figure 24. Hot-Swap SCSI Backplane Layout

4.3.2 SCSI Backplane Functional Architecture

This section provides a high-level description of the functionality distributed between the architectural blocks of the SR1400 1U SCSI hot swappable backplane. The following figure shows the functional blocks of the hot-swap SCSI backplane.

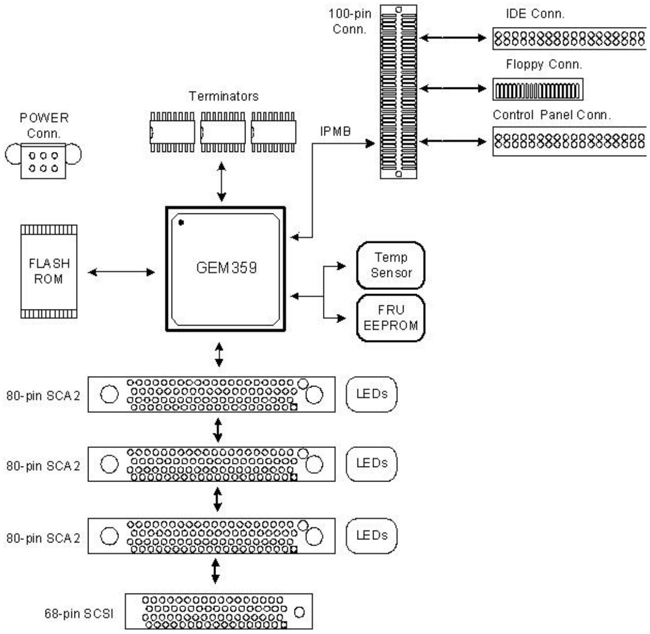


Figure 25. Hot-Swap SCSI Backplane Functional Diagram

4.3.2.1 Enclosure Management Controller

The SCSI backplane utilizes the features of the QLogic® GEM359 for enclosure management which monitors various aspects of a storage enclosure. The chip provides in-band SAF-TE and SES management through the SCSI interface. Also supported is the IPMI specification by providing management data to the baseboard management controller via the 100-pin connector to the baseboard.

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

4.3.2.1.1 SCSI Interface

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

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

The GEM359 supports the following SAF-TE Command Set:

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

4.3.2.1.2 I2C Serial Bus Interface

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

The figure below provides a block diagram of I^2C bus connection implemented on the SR1400 1U SCSI hot swappable backplane.

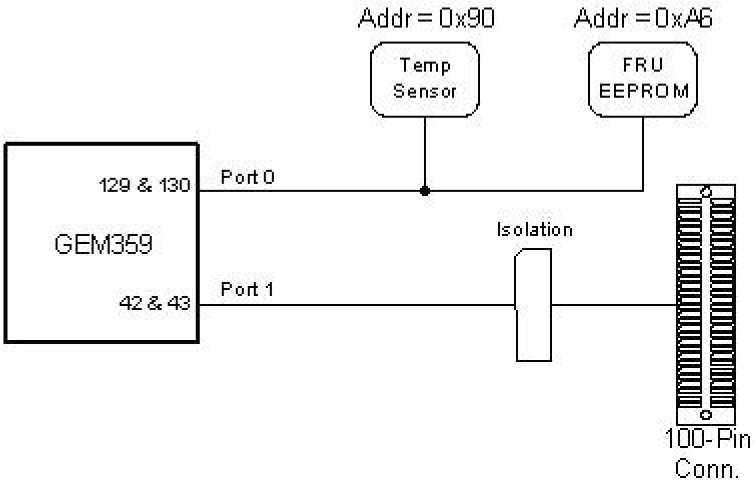


Figure 26. SR1400 1U SCSI HSBP I2C Bus Connection Diagram

4.3.2.1.3 Temperature Sensor

SR1400 1U SCSI hot swappable backplane provides a National® LM75 or equivalent temperature sensor with over-temperature detector. The host can query the LM75 at any time to read the temperature. The host can program both the temperature alarm threshold and the temperature at which the alarm condition goes away.

4.3.2.1.4 Serial EEPPROM

SR1400 1U SCSI HSBP provides an Atmel® 24C02 or equivalent serial EEPROM for storing the FRU information. The 24C02 provides 2048 bits of serial electrically erasable and programmable read-only

4.3.2.1.5 External Memory Device

SR1400 1U SCSI hot swappable backplane contains a non-volatile 16K Top Boot Block, 4Mbit Flash memory device that stores the configuration data and operating firmware executed by the GEM359's internal CPU.

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

4.3.2.1.6 LED Support

SR1400 1U SCSI HSBP contains a green ACTIVITY LED and a yellow FAULT LED for each of the six drive connectors. The SCSI hard drive itself drives the ACTIVITY LED whenever the drive gets accessed. The GEM359 controller drives the FAULT LED whenever an error condition gets detected.

4.3.3 SCSI Backplane Connector Definitions

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

4.3.3.1 Power Connector (Backplane to Power Supply Harness)

The SCSI backplane provides power to the three drive bays supporting up to three hard disk drives and the slim-line drive bay supporting one floppy drive or CD-ROM drive. A 6-pin power cable is routed from the power distribution board and plugs into a 2 x 3 shrouded plastic PC power connector on the SCSI backplane. The following table shows the power connector pinout.

Table 29. SCSI Backplane Power Connector Pinout (J1)

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

4.3.3.2 SCSI Connector (Backplane to Baseboard)

A 68-pin SCSI cable is used to interface the SCSI backplane with either the on-board SCSI channel of the server board SE7520JR2, or an add-in PCI SCSI controller installed on the PCI riser card.

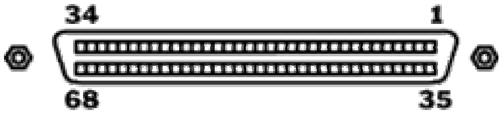


Figure 27. 68-Pin SCSI Cable Connector

Table 30. UltraWide (SE) and Ultra2 (LVD) Ultra320 SCSI Connector Pinout (J8)

Name	Pin	Pin	Name
BP_SCSI_D12P	A1	B1	BP_SCSI_D12N
BP_SCSI_D13P	A2	B2	BP_SCSI_D13N
BP_SCSI_D14P	A3	B3	BP_SCSI_D14N
BP_SCSI_D15P	A4	B4	BP_SCSI_D15N
BP_SCSI_DP1P	A5	B5	BP_SCSI_DP1N
BP_SCSI_D0P	A6	B6	BP_SCSI_D0N
BP_SCSI_D1P	A7	B7	BP_SCSI_D1N
BP_SCSI_D2P	A8	B8	BP_SCSI_D2N
BP_SCSI_D3P	A9	B9	BP_SCSI_D3N
BP_SCSI_D4P	A10	B10	BP_SCSI_D4N
BP_SCSI_D5P	A11	B11	BP_SCSI_D5N
BP_SCSI_D6P	A12	B12	BP_SCSI_D6N
BP_SCSI_D7P	A13	B13	BP_SCSI_D7N
BP_SCSI_DP0P	A14	B14	BP_SCSI_DP0N
GND	A15	B15	GND
BP_SCSI_DIFSNS	A16	B16	GND
TERMI_PWR	A17	B17	TERMI_PWR
TERMI_PWR	A18	B18	TERMI_PWR
Unused	A19	B19	Unused
GND	A20	B20	GND
BP_SCSI_ATNP	A21	B21	BP_SCSI_ATNN
GND	A22	B22	GND
BP_SCSI_BSYP	A23	B23	BP_SCSI_BSYN
BP_SCSI_ACKP	A24	B24	BP_SCSI_ACKN
BP_SCSI_RSTP	A25	B25	BP_SCSI_RSTN

Name	Pin	Pin	Name
BP_SCSI_MSGP	A26	B26	BP_SCSI_MSGN
BP_SCSI_SELP	A27	B27	BP_SCSI_SELN
BP_SCSI_CDP	A28	B28	BP_SCSI_CDN
BP_SCSI_REQP	A29	B29	BP_SCSI_REQN
BP_SCSI_IOP	A30	B30	BP_SCSI_ION
BP_SCSI_D8P	A31	B31	BP_SCSI_D8N
BP_SCSI_D9P	A32	B32	BP_SCSI_D9N
BP_SCSI_D10P	A33	B33	BP_SCSI_D10N
BP_SCSI_D11P	A34	B34	BP_SCSI_D11N

4.3.3.3 Floppy / Control Panel / CD-ROM Interface (Backplane to Baseboard)

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

Table 31. Floppy/FP/CD-ROM/Video Connector Pinout (J6)

Pin	Name	Pin	Name
A1	GND	B1	V_IO_VSYNC_BUFF_FP_L
A2	V_IO_RED_CONN_FP	B2	V_IO_HSYNC_BUFF_FP_L
A3	V_IO_GREEN_CONN_FP	B3	1_WIRE_BUS
A4	V_IO_BLUE_CONN_FP	B4	EMP_DCD2_L
A5	VIDEO_IN_USE	B5	EMP_CTS2_L
A6	EMP_DTR2_L	B6	EMP_SOUT2
A7	EMP_RTS2_L	B7	EMP_IN_USE
A8	EMP_SIN2	B8	NIC2_ACT_LED_L
A9	EMP_DSR2_L	B9	NIC2_LINK_LED_R_L
A10	FP_NMI_BTN_L	B10	FP_CHASSIS_INTRU
A11	GND	B11	PB1_I2C_5VSB_SCL
A12	FP_ID_SW_L	B12	PB1_I2C_5VSB_SDA
A13	FAULT_LED_5VSB_P	B13	NIC1_ACT_LED_L
A14	FP_RST_BTN_L	B14	NIC1_LINK_LED_R_L
A15	HDD_FAULT_LED_R_L	B15	FP_ID_LED_R_L
A16	FP_PWR_BTN_L	B16	IPMB_I2C_5VSB_SCL
A17	HDD_LED_ACT_R_L	B17	P5V_STBY
A18	HDD_LED_5V_A	B18	FP_SYS_FLT_LED2_R_L
A19	IMPB_I2C_5VSB_SDA	B19	FP_SYS_FLT_LED_R_L
A20	GND	B20	FP_PWR_LED_R_L
A21	FP_PWR_LED_5VSB	B21	RST_IDE_S_L
A22	RST_P6_PWRGOOD	B22	FD_HDSEL_L
A23	FD_DSKCHG_L	B23	FD_RDATA_L
A24	FD_WPD_L	B24	FD_WDATA_L
A25	FD_TRK0_L	B25	FD_STEP_L
A26	FD_WGATE_L	B26	FD_MTR0_L
A27	FD_DIR_L	B27	FD_DENSEL0
A28	FD_DS0_L	B28	FD_INDEX_L

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

4.3.3.4 Control Panel Interface Connector (Backplane to Control Panel)

The SCSI backplane provides a pathway for control panel signals from the 100-pin Floppy/Control Panel/CD-ROM connector to the Control Panel interface connector. The pin-out for the Control Panel connector is shown in the following table.

Table 32. SCSI Backplane Control Panel Connector Pinout

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

Description	Pin #	Pin #	Description
FP_PWR_LED_5VSB	43	44	FP_SYS_FLT_LED2_R_L
RST_P6_PWRGOOD	45	46	FP_SYS_FLT_LED_R_L
HDD_LED_ACT_R_L	47	48	Unused
PWR_LCD_5VSB	49	50	PWR_LCD_5VSB

4.3.3.5 SCA2 Hot-Swap SCSI Drive Connectors

The SCSI backplane provides three hot-swap SCA2 connectors, which provide power and SCSI signals using a single connector. Each SCA drive attaches to the backplane using one of these connectors.

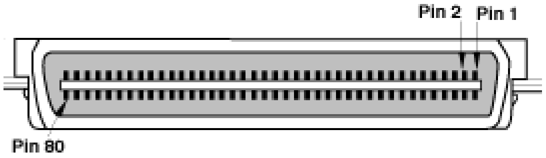


Figure 28. 80-pin SCA2 SCSI Interface

Table 33. 80-pin SCA2 SCSI Interface Pinout (J9, J2, J10)

Signal Name	Pin	Pin	Signal Name
GND	41	1	P12V
GND	42	2	P12V
GND	43	3	P12V
SCSI_MATED	44	4	P12V
NC_3V_CHG	45	5	NC_3V_1
BP_SCSI_DIFSNS	46	6	NC_3V_2
BP_SCSI_D11P	47	7	BP_SCSI_D11N
BP_SCSI_D10P	48	8	BP_SCSI_D10N
BP_SCSI_D9P	49	9	BP_SCSI_D9N
BP_SCSI_D8P	50	10	BP_SCSI_D8N
BP_SCSI_IOP	51	11	BP_SCSI_ION
BP_SCSI_REQP	52	12	BP_SCSI_REQN
BP_SCSI_CDP	53	13	BP_SCSI_CDN
BP_SCSI_SELP	54	14	BP_SCSI_SELN
BP_SCSI_MSGP	55	15	BP_SCSI_MSGN
BP_SCSI_RSTP	56	16	BP_SCSI_RSTN
BP_SCSI_ACKP	57	17	BP_SCSI_ACKN
BP_SCSI_BSYP	58	18	BP_SCSI_BSYN
BP_SCSI_ATNP	59	19	BP_SCSI_ATNN
BP_SCSI_DP0P	60	20	BP_SCSI_DP0N
BP_SCSI_D7P	61	21	BP_SCSI_D7N
BP_SCSI_D6P	62	22	BP_SCSI_D6N
BP_SCSI_D5P	63	23	BP_SCSI_D5N
BP_SCSI_D4P	64	24	BP_SCSI_D4N
BP_SCSI_D3P	65	25	BP_SCSI_D3N
BP_SCSI_D2P	66	26	BP_SCSI_D2N
BP_SCSI_D1P	67	27	BP_SCSI_D1N
BP_SCSI_D0P	68	28	BP_SCSI_D0N

Signal Name	Pin	Pin	Signal Name
BP_SCSI_DP1P	69	29	BP_SCSI_DP1N
BP_SCSI_D15P	70	30	BP_SCSI_D15N
BP_SCSI_D14P	71	31	BP_SCSI_D14N
BP_SCSI_D13P	72	32	BP_SCSI_D13N
BP_SCSI_D12P	73	33	BP_SCSI_D12N
SCSI_MATED	74	34	P5V
GND	75	35	P5V
GND	76	36	P5V
HD_ACT_LED_L	77	37	Unused
Unused	78	38	GND
Unused	79	39	Unused
Unused	80	40	Unused
GND	B2	B1	GND

4.3.3.6 Floppy Drive Connector

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

Table 34. 28-pin floppy connector Pinout (J15)

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

4.3.3.7 CDROM Drive Connector

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

Table 35. 44-pin internal CD-ROM connector Pinout (J3)

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

4.4 SATA Hot-Swap Backplane (HSBP)

The SR1400 1U SATA HSBP supports the following feature set:

- QLogic® GEM424 enclosure management controller
  - External non-volatile SEEPROMs
  - Three I^2C interfaces
  - SATA and SATA-II extension compatible
  - Compliance with SATA Accessed Fault Tolerant Enclosures (SAF-TE) specification, version 1.00 and addendum
  - Compliance with Intelligent Platform Management Interface 1.5 (IPMI)
- Support for up to three SATA Drives
- Hot Swap Drive support
- Temperature Sensor
- FRU EEPROM
- One 2 x 3-pin Power Connector
- IDE Connector provided for slim-line CDROM or DVD support
- Floppy Connector provided for slim-line floppy support
- Control Panel Connector
- Drive Status LEDs

4.4.1 SATA Backplane Layout

The SATA backplane is located on the backside of the hot-swap drive bays on the inside of the chassis. Stand-offs on the chassis and a single thumb screw make for easy tool-less installation. The following diagram shows the layout of major components and connectors of the board.

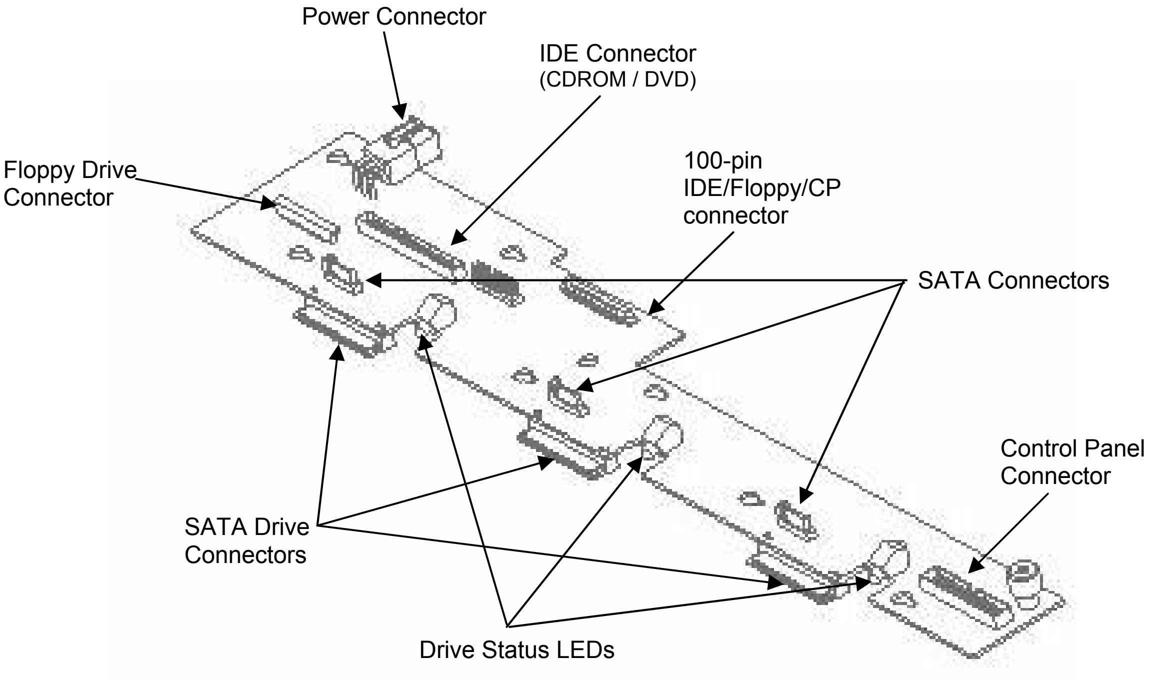


Figure 29. SATA Backplane Layout

4.4.2 SATA Backplane Functional Architecture

This section provides a high-level description of the functionality distributed between the architectural blocks of the SR1400 1U SATA HSBP. The figure below shows the functional blocks of the SATA backplane.

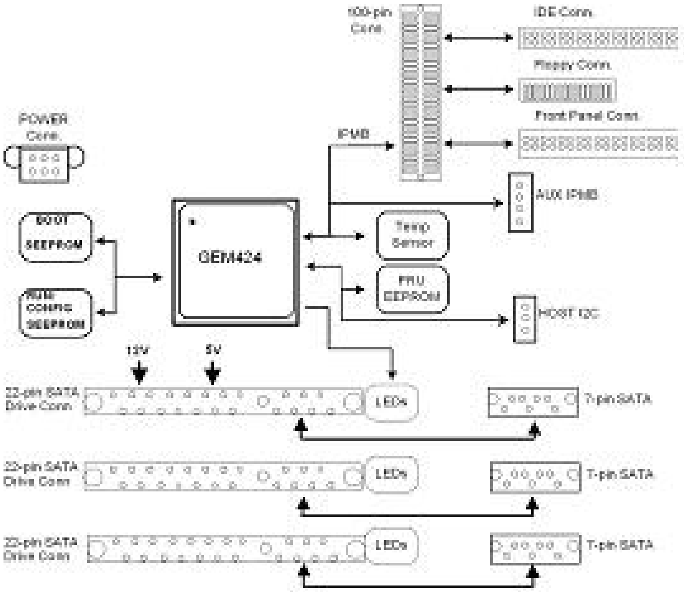


Figure 30. SATA Backplane Functional Block Diagram

4.4.2.1 Enclosure Management Controller

The SR1400 SATA backplane utilizes the features and functionality of the QLogic® GEM424 enclosure management controller, which is capable of monitoring various aspects of a storage enclosure. The chip provides in-band SAF-TE management through the SATA Host I^2C interface. It also supports the IPMI specification by providing management data to a baseboard management controller through the Intelligent Platform Management Bus (IPMB) via the 100-pin connector to the baseboard.

The GEM424 comes in a 80-pin Thin Quad Flat Pack (TQFP) package and operates from 3.3-5V and input clock frequency of 20MHz. It has general input and output pins that are used for hardware drive detection and driving FAULT and ACTIVITY LEDs.

4.4.2.1.1 SATA Interface

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

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

4.4.2.1.2 I^2C Serial Bus Interface

The GEM424 supports two independent I^2C interface ports with bus speeds of up to 400Kbits. The I^2C core incorporates 8-bit FIFOs for data transfer buffering. The I^2C bus supports National®

LM75 or equivalent I^2C -based temperature sensors. This enables actual temperature value readings to be returned to the host. The Intelligent Platform Management Bus (IPMB) is supported through I^2C port 0.

The figure below provides a block diagram of I^2C bus connection implemented on the SR1400 1U SATA HSBP.

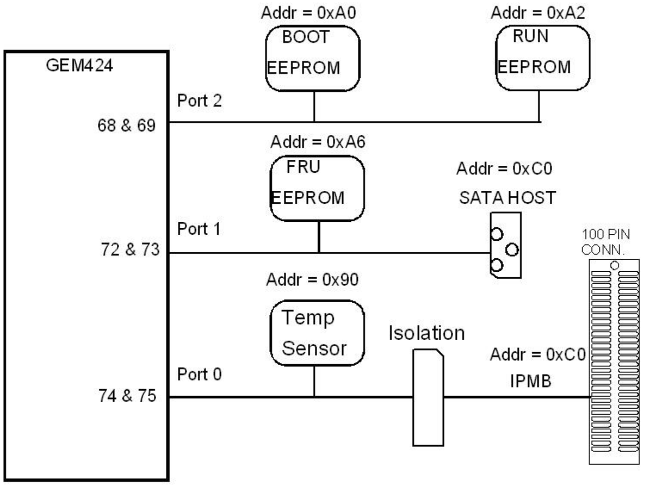


Figure 31. SR1400 1U SATA HSBP I^2C Bus Connection Diagram

4.4.2.1.3 Temperature Sensor

SR1400 1U SATA HSBP provides National® LM75 or equivalent temperature sensor with over-temperature detector. The host can query the LM75 at any time to read the temperature.

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

4.4.2.1.4 Serial EEPROM

The SR1400 1U SATA HSBP provides an Atmel® 24C02 or equivalent serial EEPROM for storing the FRU information. The 24C02 provides 2048 bits of serial electrically erasable and programmable read-only

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

4.4.2.1.5 External Memory Device

SR1400 1U SATA HSBP contains non-volatile 32K and 64K Serial EEPROM devices for Boot and Run-Time/Configuration code storage respectively. These devices reside on the GEM424’s private I^2C bus.

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

4.4.2.1.6 LED Support

SR1400 1U SATA HSBP contains a green ACTIVITY LED and an amber FAULT LED for each of the three drive connectors. The ACTIVITY LED is driven by the GEM424 or, for drives that support the feature, by the SATA hard drive itself whenever the drive gets accessed. The FAULT LED is driven by the GEM424 controller whenever an error condition is detected, as defined by the firmware.

Activity and Fault LED functions are only available when a SATA host controller that supports the SAF-TE protocol over I^2C is connected to the SR1400 1U SATA HSBP via the SATA Host I^2C connector, J2A3.

Table 36. LED Function

Status LED	Definition
GREEN ON	HDD Activity
AMBER ON	HDD Fail
AMBER Blinking	Rebuild in progress

4.4.3 SATA Backplane Connector Definitions

4.4.3.1 Power Connector

The SATA backplane provides power for up to three ATA drives, and one floppy drive or CD-ROM drive. A 6-pin power cable from the power supply harness is routed to the backplane and plugs into a 2x3 shrouded plastic PC power connector. The following table provides the connector pinout.

Table 37. SATA Backplane Power Connector Pinout

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

4.4.3.2 SATA Connectors (Backplane to Baseboard)

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

Table 38. 7-Pin SATA Connector Pinout (J2, J3, J4, J5, J6)

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

4.4.3.3 Hot-Swap SATA Drive Connectors

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

Table 39. 22-Pin SATA Connector Pinout

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

4.4.3.4 Floppy / Control Panel / CD-ROM Interface (Backplane to Baseboard)

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

Table 40. Floppy/Control Panel/CD-ROM Connector Pinout (J14)

Pin	Name	Pin	Name
A1	GND	B1	V_IO_VSYNC_BUFF_FP_L
A2	V_IO_RED_CONN_FP	B2	V_IO_HSYNC_BUFF_FP_L
A3	V_IO_GREEN_CONN_FP	B3	1_WIRE_BUS
A4	V_IO_BLUE_CONN_FP	B4	EMP_DCD2_L
A5	VIDEO_IN_USE	B5	EMP_CTS2_L
A6	EMP_DTR2_L	B6	EMP_SOUT2
A7	EMP_RTS2_L	B7	EMP_IN_USE
A8	EMP_SIN2	B8	NIC2_ACT_LED_L
A9	EMP_DSR2_L	B9	NIC2_LINK_LED_R_L
A10	FP_NMI_BTN_L	B10	FP_CHASSIS_INTRU
A11	GND	B11	PB1_I2C_5VSB_SCL
A12	FP_ID_SW_L	B12	PB1_I2C_5VSB_SDA
A13	FAULT_LED_5VSB_P	B13	NIC1_ACT_LED_L
A14	FP_RST_BTN_L	B14	NIC1_LINK_LED_R_L
A15	HDD_FAULT_LED_R_L	B15	FP_ID_LED_R_L
A16	FP_PWR_BTN_L	B16	IPMB_I2C_5VSB_SCL
A17	HDD_LED_ACT_R_L	B17	P5V_STBY
A18	HDD_LED_5V_A	B18	FP_SYS_FLT_LED2_R_L
A19	IMPB_I2C_5VSB_SDA	B19	FP_SYS_FLT_LED_R_L
A20	GND	B20	FP_PWR_LED_R_L
A21	FP_PWR_LED_5VSB	B21	RST_IDE_S_L
A22	RST_P6_PWRGOOD	B22	FD_HDSEL_L
A23	FD_DSKCHG_L	B23	FD_RDATA_L
A24	FD_WPD_L	B24	FD_WDATA_L
A25	FD_TRK0_L	B25	FD_STEP_L
A26	FD_WGATE_L	B26	FD_MTR0_L
A27	FD_DIR_L	B27	FD_DENSEL0
A28	FD_DS0_L	B28	FD_INDEX_L
A29	GND	B29	IDE_SDD<8>
A30	IDE_SDD<7>	B30	IDE_SDD<9>
A31	IDE_SDD<6>	B31	IDE_SDD<10>
A32	IDE_SDD<5>	B32	IDE_SDD<11>

Pin	Name	Pin	Name
A33	IDE_SDD<4>	B33	IDE_SDD<12>
A34	IDE_SDD<3>	B34	IDE_SDD<13>
A35	IDE_SDD<2>	B35	IDE_SDD<14>
A36	IDE_SDD<1>	B36	IDE_SDD<15>
A37	IDE_SDD<0>	B37	IDE_SDDREQ
A38	GND	B38	IDE_SDIOW_L
A39	IDE_SDDACK_L	B39	IDE_SDIOR_L
A40	IDE_SDA<1>	B40	IDE_SIORDY
A41	IDE_SDA<0>	B41	IRQ_IDE_S
A42	IDE_SDCS0_L	B42	IDE_SDA<2>
A43	IDE_SEC_HD_ACT_L	B43	IDE_SDCS1_L
A44	GND	B44	FAN_PWM1
A45	FAN5_TACH	B45	R_FAN_PRESENT
A46	FAN6_TACH	B46	FAN5_ERR_LED
A47	FAN7_TACH	B47	FAN6_ERR_LED
A48	FAN8_TACH	B48	FAN7_ERR_LED
A49	FAN_PWM2	B49	FAN8_ERR_LED
A50	P5V_STBY	B50	GND

4.4.3.5 Control Panel Interface Connector (Backplane to Control Panel)

The SATA backplane provides a pathway for control panel signals from the 100-pin Floppy/Control Panel/CD-ROM connector to the control panel connector. The pinout for this connector is shown in the following table.

Table 41. SATA Backplane Control Panel Connector Pinout (J13)

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

4.4.3.6 Slim-line Floppy Drive Connector

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

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

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

4.4.3.7 Slim-line CDROM / DVD Interface Assembly

When a CDROM or DVD drive is installed into the slim-line peripheral bay, the drive cable is routed from a connector on the drive interposer card, to a 44-pin connector on the backplane. This connector houses pins for both power and IO signals. The following table provides the connector pinout.

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

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

5. Standard Control Panel

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

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

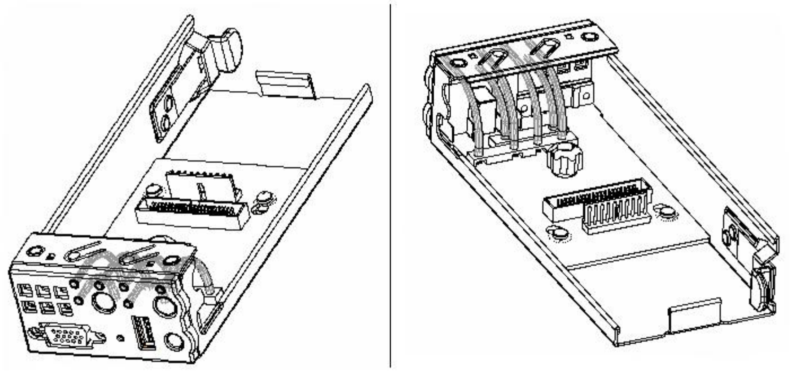


Figure 32. Standard Control Panel Assembly Module

5.1 Control Panel Buttons

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

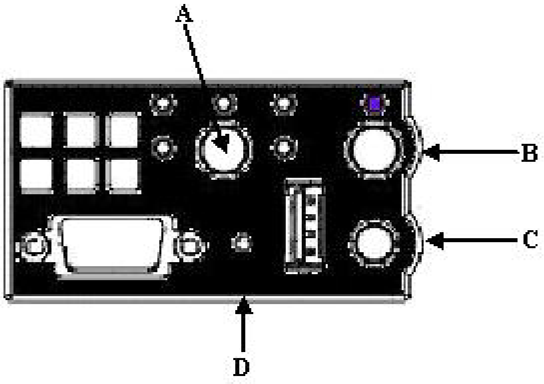


Figure 33. Control Panel Buttons

Table 44. 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.

5.2 Control Panel LED Indicators

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

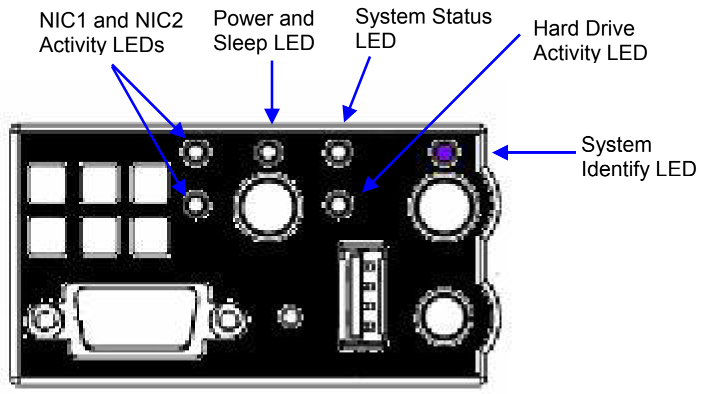


Figure 34. Control Panel LEDs

The following table identifies each LED and describes their functionality.

Table 45. Control Panel LED Functions

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

Notes:

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

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

5.2.1 Power / Sleep LED

Table 46. 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.

5.2.2 System Status LED

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

5.2.2.1 Critical Conditions

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

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

5.2.2.2 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.

5.2.2.3 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.

5.2.3 Drive Activity LED

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

5.2.4 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.

5.3 Control Panel Connectors

The control panel has two external I/O connectors:

- One USB port
- One VGA video port

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

Table 47. External USB Connectors (J1B1)

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

Table 48. Video Connector (J1A1)

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

If a monitor is connected to the front panel video connector, the rear video port on the server board will be disabled and the front 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.

5.4 Internal Control Panel Assembly Headers

The Control Panel interface board has two internal headers:

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

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

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

Table 49. 50-pin Control Panel Connector (J6B1)

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

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

Table 50. Internal USB Header (J2B1)

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

6. Intel® Local Control Panel

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

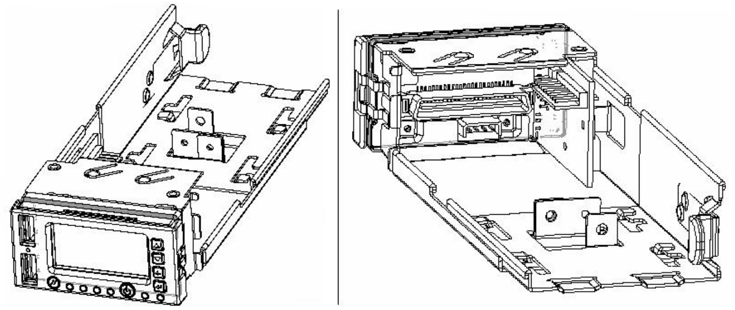


Figure 35. Intel Local Control Panel Assembly Module

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

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

Figure 36. Intel Local Contol Panel Overview

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

6.1 LED Functionality

The following table identifies each LED and describes their functionality.

Table 51. Control Panel LED Functions

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

Notes:

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

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

6.1.1 Power / Sleep LED

Table 52. 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.

6.1.2 System Status LED

6.1.2.1 Critical Conditions

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

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

6.1.2.2 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.

6.1.2.3 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.

6.1.3 Drive Activity LED

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

6.1.4 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.

6.2 Internal Control Panel Headers

The Control Panel interface board has four internal headers:

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

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

- A 4-pin IPMI Header (Not used).

- A 4-pin NMI/Temp Sensor Header.

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

Table 53. 50-pin Control Panel Connector

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

Table 54. Internal USB Header

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

Table 55. IPMI Header

Pin #	Description
1	IPMB_5VSB_SDA
2	GND
3	IPMB_5VSB_SCL
4	P5V_STBY

Table 56. Internal NMI/Temp Sensor Header

Pin #	Description
1	TBD
2	TBD
3	TBD
4	TBD

7. PCI Riser Cards and Assembly

The SE7520JR2 server board provides two PCI riser slots, one supporting only low profile add-in card risers, 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-X 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 SR1400 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.

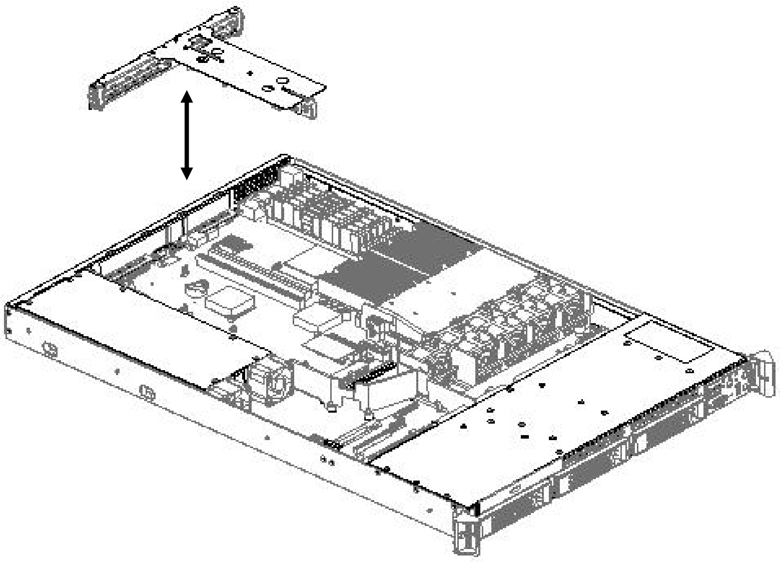


Figure 37. PCI Riser Card Module Diagram

7.1 Riser Card Options

There are 3 different riser card options offered for use in the Server Chassis SR1400. Which riser and bus speeds its supports is dependent on the baseboard used.

- low profile PCI-X – capable of supporting a single 66/100 MHz PCI-X add-in card
- full length PCI-X – capable of supporting a single PCI-X 66/100/133 MHz card;
- full length PCI-Express – capable of supporting a single X8 PCI-Express add-in card.

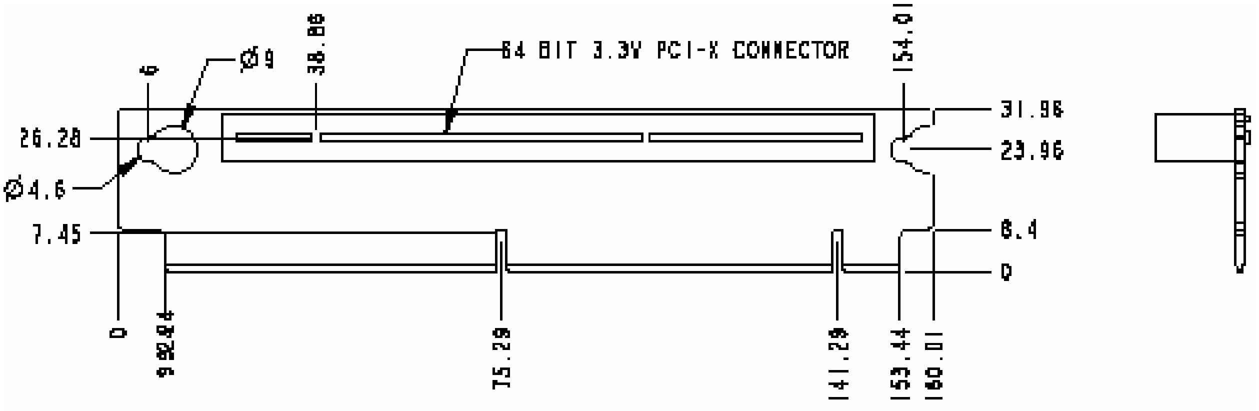


Figure 38. 1U Full Height PCI-X Riser Card Mechanical Drawing

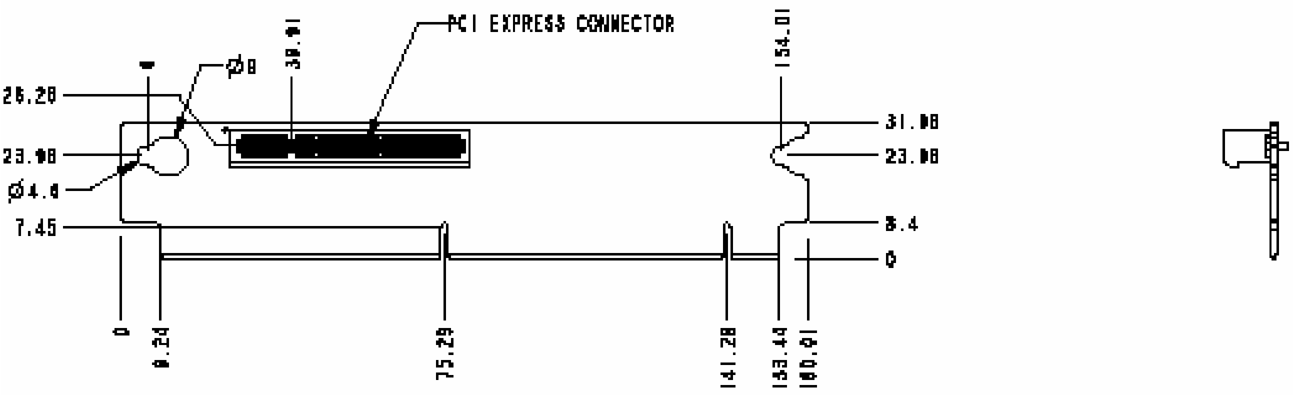


Figure 39. 1U Full Height PCI-Express Riser Card Mechanical Drawing

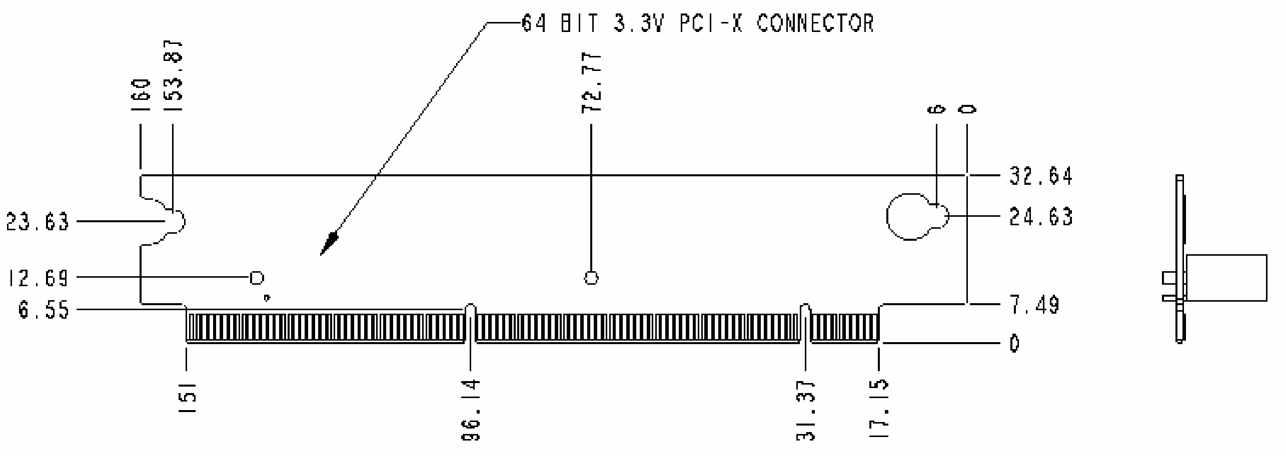


Figure 40. 1U Low Profile PCI-X Riser Card Mechanical Drawing

8. Supported Intel® Server Boards

The Server Chassis SR1400 is mechanically and functionally designed to support all four SKUs of the Intel® Server Board SE7520JR2.

8.1 Server Board SE7520JR2 SKU Availability

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

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

8.2 Server Board SE7520JR2 Feature Set

- Dual processor slots supporting 800MHz Front Side Bus (FSB) Intel® Xeon™ processors
- Intel E7520 Chipset (MCH, PXH, ICH-5R)
- Two PCI riser slots
    - Riser Slot 1: Supports low profile PCI-X 66/100MHz PCI-X cards
    - Riser Slot 2: Using Intel® adaptive slot technology and different riser cards, this slot is capable of supporting full height PCI-X 66/100/133 or PCI-Express cards.
- Six DIMM slots supporting DDR2 – 400MHz memory or DDR – 266/333 MHz[1]
- Dual channel LSI* 53C1030 Ultra320 SCSI Controller with integrated RAID 0/1 support
- Dual Intel® 82546GB 10/100/1000 Network Interface Controllers (NICs)
- On board ATI* Rage XL video controller with 8MB SDRAM
- On-board platform instrumentation using a National* PC87431M mini-BMC
- External IO connectors
- Stacked PS2 ports for keyboard and mouse
- RJ45 Serial B Port
    - Two RJ45 NIC connectors
    - 15-pin video connector
    - Two USB 2.0 ports
    - U320 High density SCSI connector (Channel B)
- Internal IO Connectors / Headers

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

  - Two onboard USB port headers. Each header is capable of supporting two USB 2.0 ports.
  - One 10-pin DH10 Serial A Header
  - One Ultra320 68-pin SCSI Connector (Channel A)
  - Two SATA connectors with integrated chipset RAID 0/1 support
  - One ATA100 connector
  - One floppy connector
  - SSI-compliant and custom control panel headers
  - SSI-compliant 24-pin main power connector. This supports ATX-12V standard in the first 20 pins
  - Intel® Management Module (IMM) connector

Intel® Light-Guided Diagnostics on all FRU devices (processors, memory, power)

Port-80 Diagnostic LEDs displaying POST codes

The following image shows the board layout of the Server Board SE7520JR2. Each connector and major component is identified by number and is identified in Table 57.

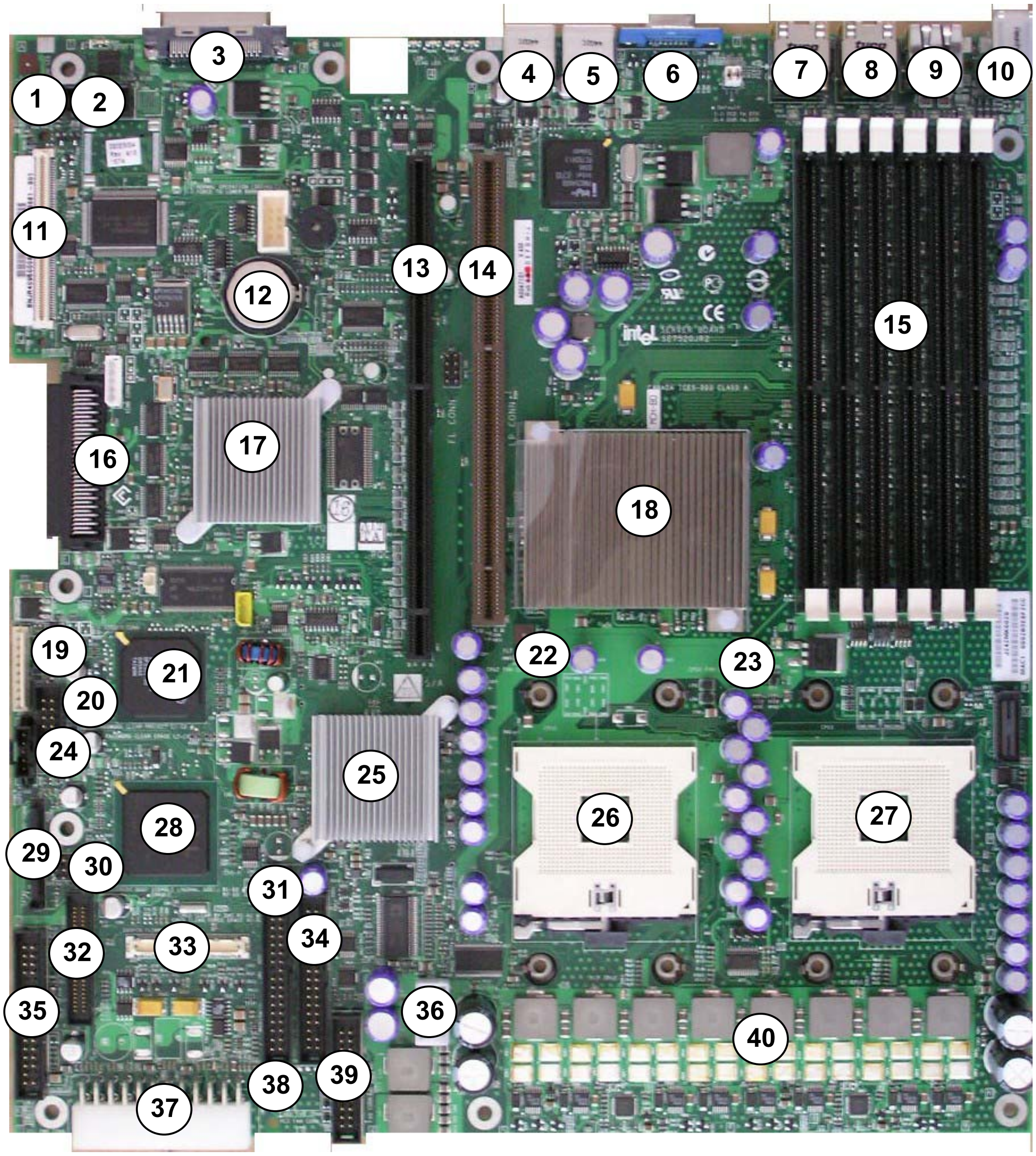


Figure 41. SE7520JR2 Board Layout

Table 57: Baseboard Layout Reference

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

9. Regulatory, Environmentals, and Specifications

9.1 Product Regulatory Compliance

9.1.1 Product Safety Compliance

The SR1400 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)

9.1.2 Product EMC Compliance

The SR1400 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 /ICES-003 - Emissions (USA/Canada) Verification
- 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)

9.1.3 Product Regulatory Compliance Markings

This product is provided with the following Product Certification Markings.

Regulatory Compliance	Country	Marking
cULus Listing Marks	USA/Canada	c UL ® US
GS Mark	Germany	Nemko GS geprufte Sicherheit TÜV Rheinland Product Safety GS geprüfte Sicherheit
CE Mark	Europe	CE
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	PCT
RRL MIC Mark	Korea	MIC
China Compulsory Certification Mark	China	CCC S&E

9.2 Electromagnetic Compatibility Notices

9.2.1 USA

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

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

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

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

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

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

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

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

9.2.2 FCC Verification Statement

Product Type: SR1400; SE7520JR2
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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

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

9.2.3 ICES-003 (Canada)

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

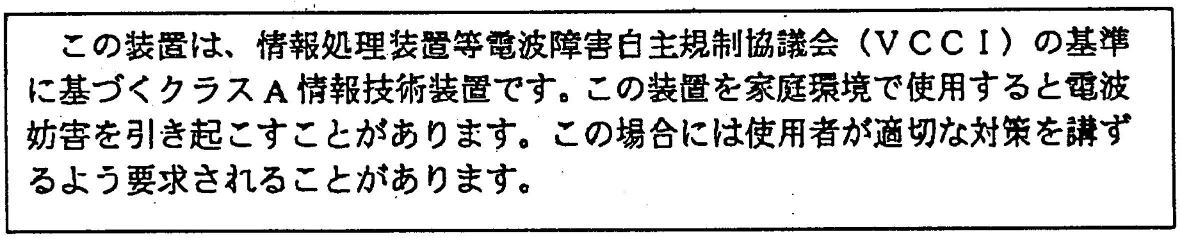
(English translation of the notice above) This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the interference-causing equipment standard entitled “Digital Apparatus,” ICES-003 of the Canadian Department of Communications.

9.2.4 Europe (CE Declaration of Conformity)

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

9.2.5 Japan EMC Compatibility

Electromagnetic Compatibility Notices (International)

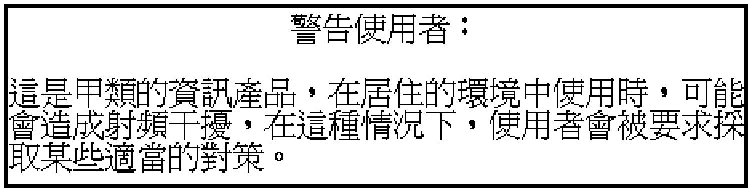


この装置は、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に基づくクラスＡ情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

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

9.2.6 BSMI (Taiwan)

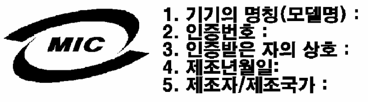
The BSMI Certification number and the following warning is located on the product safety label which is located on the bottom side (pedestal orientation) or side (rack mount configuration).



警告使用者：

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

9.2.7 Korean RRL Compliance



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

9.3 Replacing the Back up Battery

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

⚠ **WARNING**

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

⚠ **ADVARSEL!**

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

⚠ **ADVARSEL**

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

⚠ **VARNING**

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

⚠ **VAROITUS**

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

9.4 System Level Environmental Limits

The table below defines the system level operating and non-operating environmental limits (Office or Computer room Environment)

Table 58. 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

9.5 Serviceability

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.

Table 59. Mean Time To Repair Estimate

Activity	Time Estimate
Remove cover	10 sec
Remove and replace hard disk drive	3 min[2]
Remove and replace power supply module	2 min
Remove and replace system fan	2 min
Remove and replace backplane board	5 min
Remove and replace front panel board	5 min
Remove and replace baseboard	10 min

9.6 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.

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[2] Includes swapping drive from drive ray

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: SR1400 Integration and Usage Tips

This section provides a list of useful information that is unique to the server chassis SR1400 and should be kept in mind while integrating and configuring your server board SE7520JR2.

- Only low-profile (1.2 in or 30.48 mm) DIMMs can be used in the SR1400 server chassis.
- Processor fans are not supported and are not needed in the server chassis SR1400. The system fan module and power supply fans provide the necessary cooling needed for the system. Using a processor fan in this chassis may cause server management to incorrectly monitor the system fans.
- The CPU Air duct and Air Baffle must be used to maintain system thermals.
- The air damn on the CPU air duct must be in place for single processor configurations. Once the air damn is removed, it cannot be re-installed.
- To maintain system thermals, all hard drive bay must be populated with either a hard drive or drive blank.
- System fans are not hot swappable
- The Intel Local Control Panel can only be used with systems configured with an Intel Management Module.
- Use of the shipping screw found on the front edge of the top cover is optional.
- To improve system EMI levels, shielded LAN cables must be used.
- A conversion kit is available to have concurrent support for both a slim-line optical drive and slim-line floppy drive. The kit allows a slim-line floppy drive assembly to be inserted in the hard drive bay directly beneath the slim-line bay. The conversion kit has the following product order code: AXXFLOPHDDTRAY
- The FRUSDR utility must be run to load the proper Sensor Data Records for the Server Chassis SR1400 onto the server board.
- Make sure the latest system software is loaded on the server. This includes System BIOS, FRUSDR, BMC Firmware, and Hot Swap Controller Firmware. The latest system software can be downloaded from

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

Glossary

Word / Acronym	Definition
ACA	Australian Communication Authority
ANSI	American National Standards Institute
BMC	Baseboard Management Controller
CMOS	Complementary Metal Oxide Silicon
D2D	DC-to-DC
EMP	Emergency Management Port
FP	Front Panel
FRB	Fault Resilient Boot
FRU	Field Replaceable Unit
LCD	Liquid Crystal Display
LPC	Low-Pin Count
MTBF	Mean Time Between Failure
MTTR	Mean Time to Repair
OTP	Over Temperature Protection
OVP	Over Voltage Protection
PFC	Power Factor Correction
PSU	Power Supply Unit
RI	Ring Indicate
SCA	Single Connector Attachment
SDR	Sensor Data Record
SE	Single-Ended
UART	Universal Asynchronous Receiver Transmitter
USB	Universal Serial Bus
VCCI	Voluntary Control Council for Interference