Intel® Server System SR1630GP
Intel® Server System SR1630HGP

Technical Product Specification

Revision 1.2

April, 2010

Enterprise Platforms and Services Division – Marketing

Revision History

Date	Revision Number	Modifications
Feb. 2009	0.3	Initial release.
May 2009	0.5	Corrected some errata.
July 2009	0.9	Added the most diagrams and update POST error code.
Aug. 2009	1.0	Rolled to 1.0.
Mar. 2010	1.1	Added Mini SATA Power Connector P8 description.
Apr. 2010	1.2	Added hard drive Status LEDs normal operation information; Removed CCC Mark.

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1. Introduction

The Intel® Server Systems SR1630GP and SR1630HGP are 1U server systems.

- The Intel® Server System SR1630GP supports one or two fixed Serial ATA (SATA) hard disk drives. The Intel® Server System SR1630GP includes the Intel® Server Board S3420GPLC.

- The Intel® Server System SR1630HGP supports up to three hot-swappable SATA disk drives and includes the Intel® S3420GPLC.

- The server boards and the server systems have features designed to support the high-density server market. This chapter provides a high-level overview of the system features. Subsequent chapters provide greater detail for each major system component or feature.

1.1 Chapter Outline

This document is divided into the following chapters:

- Chapter 1 – Introduction
- Chapter 2 – Product Overview
- Chapter 3 – Power Sub-system
- Chapter 4 – Cooling Sub-system
- Chapter 5 – Peripheral and Drive Support
- Chapter 6 – Front Control Panel
- Chapter 7 – PCI Riser Card and Assembly
- Chapter 8 – Intel® Server System SR1630HGP Passive SAS/SATA Hot-swap Backplane
- Chapter 9 – Supported Intel® Server Boards
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- Appendix B – Integrated BMC Sensor Tables
- Appendix C – POST Code Diagnostic LED Decoder
- Appendix D – Post Error Message and Handling
- Glossary
- Reference Documents

1.2 Server Board Use Disclaimer

Intel Corporation server boards contain a number of high-density VLSI and power delivery components that need adequate airflow to cool. Intel ensures through its own chassis development and testing that when Intel server building blocks are used together, the fully integrated system meets the intended thermal requirements of these components. It is the responsibility of the system integrator who chooses not to use Intel developed server building blocks to consult vendor datasheets and operating parameters to determine the amount of airflow required for their specific application and environmental conditions. Intel Corporation cannot be held responsible if components fail or the server board does not operate correctly when used outside any of their published operating or non-operating limits.

2. Product Overview

The Intel® Server System SR1630GP and SR1630HGP are both of 1U server system designed to support the Intel® Server Board S3420GP. This server board and the systems have features designed to support the entry-level market. This chapter provides a high-level overview of the system features. The following chapters provide greater detail for each major system component or feature.

Table 1. System Feature Set

Feature	Description
Server Board	Intel® Server Board S3420GPLC
Processors	Support for one Intel® Xeon® 3400 Series Processor, Intel® Core™ i3 Series Processor or Intel® Pentium® G6950 in FC-LGA 1156 socket package. • 2.5 GT/s point-to-point DMI interface to PCH
Memory	Two memory channels with support for 1066/1333 MHz Unbuffered (UDIMM) or Registered (RDIMM) (Intel® Xeon® 3400 Series only) DDR3. • – Up to two UDIMMs or three RDIMMs per channel • – 32 GB maximum with x8 ECC RDIMM (2 Gb DRAM) and 16 GB maximum with x8 ECC UDIMM.
Chipset	Support for Intel® 3420 chipset Platform Controller Hub (PCH) ServerEngines* LLC Pilot II BMC controller (Integrated BMC)
I/O	External connections: • DB-15 video connectors • DB-9 serial Port A connector • Four USB 2.0 connectors • One USB 2.0 Connector (front) Internal connections: • Two USB 2x5 pin headers, each supporting two USB 2.0 ports • One 2x5 Serial Port B header • Six SATA II connectors • One Front Panel Connector • One vertical USB floppy connector • One Z-U130 connector
Add-in PCI Card, PCI Express* Card	Slot 6 on the server board supports one riser card which supports one half-length, low profile PCI Express* Gen2 x8 connector with X8 link width (support riser card).
System Fan Support	Three 4-pin fan headers supporting four system fans and one processor.
Video	Onboard ServerEngines* LLC Pilot II BMC Controller • Integrated 2D Video Controller with 8MB Video memory • 64-MB DDR2 667 MHz Memory
LAN	One Gigabit Ethernet device 82574L connect to PCI-E x1 interfaces on the PCH. One Gigabit Ethernet PHY 82578DM connected to PCH through PCI-E x1 interface
Expansion Capabilities	One x8 PCI Express* Gen 2 PCI riser slot capable of supporting a low-profile PCI Express* add-in card which consumes power less than 25 W.

Feature	Description
Hard Drive Options	Fixed mount hard driver system **Intel® Server System SR1630GP:** • Two SATA drives **Intel® Server System SR1630HGP:** • Three SATA drives
Peripherals	Slimline bay for slimline SATA optical drive One PCI Express* x8 Add-in Card slot (Gen 2)
Control Panel	Standard control panel
LEDS and displays	LEDs with standard control panel: • NIC1 Activity • NIC2 Activity • Power/Sleep • System Status • Hard Drive Activity
Power supply	Single 350-W power supply
Fans	Two 97 x 94 x 33mm, non-redundant, variable-speed system blower fans
Server Management	Onboard LLC Pilot II Controller (iBMC) • Integrated Baseboard Management Controller (Integrated BMC), IPMI 2.0 compliant • Integrated 2D video controller on PCI-E x1

2.1   System Views

Figure 2. Intel® Server System SR1630HGP

2.2   Chassis Dimensions

Table 2. Intel® Server System SR1630GP Dimensions

Height	1.67 inches	42.42 mm
Width without rails	16.93 inches	430.02 mm
Depth	20 inches	508.00 mm
Maximum weight	33 pounds	15 kg

Table 3. Intel® Server System SR1630GHP Dimensions

Height	1.67 inches	42.42 mm
Width without rails	16.93 inches	430.02 mm
Depth	25.51 inches (Excluding hard drive carriers, front control panel bezel, rack handles, and front bezel.)	648 mm

2.3   System Components
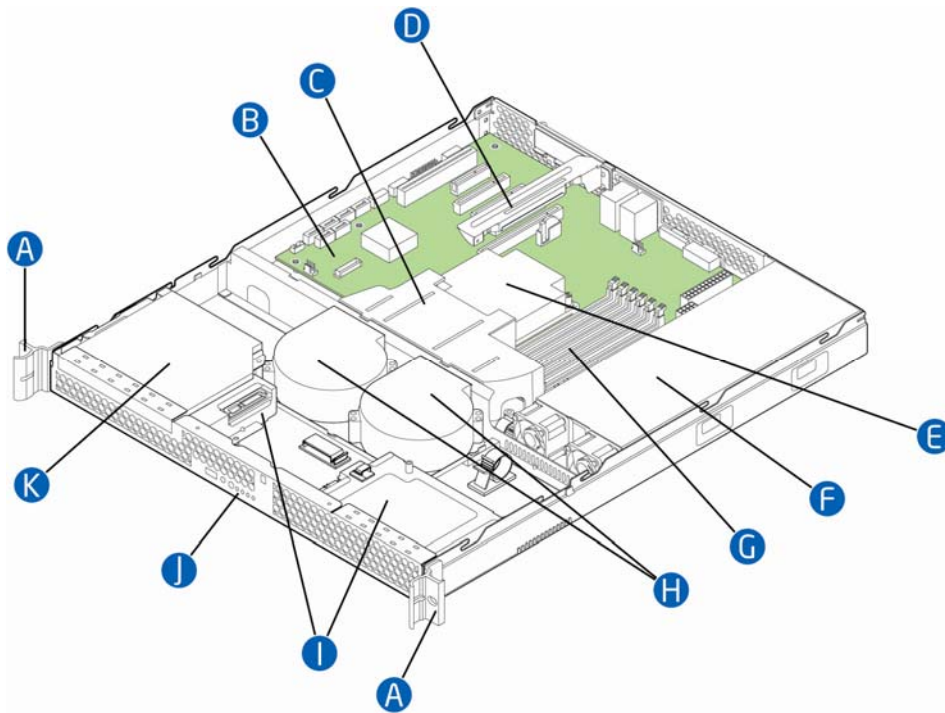
A	Rack handles (two)	G	System Memory DIMM slots
B	Server Board	H	System Blower Fans (two)
C	Processor Air Duct	I	Hard Drive Bays
D	PCIe* Riser Assembly	J	Front Panel
E	Processor and Heatsink	K	Slimline optical drive
F	Power supply		

Figure 3. Intel® Server System SR1630GP Major System Components
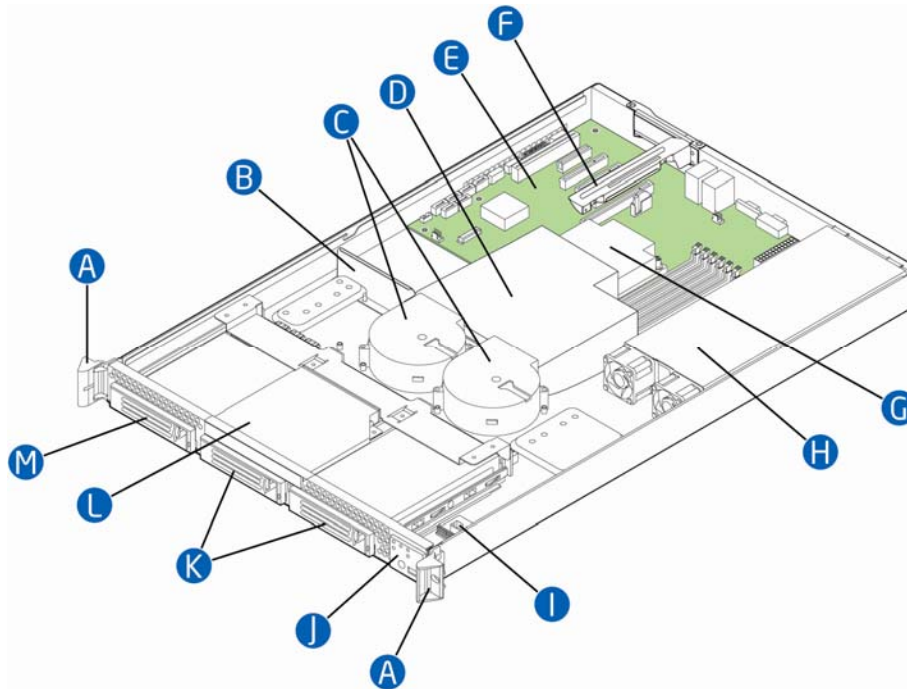
A	Rack handles (two)	H	Power Supply
B	PCI Air Baffle	I	Front Panel Board
C	System blower fan (two)	J	Front Panel
D	Processor Air Duct	K	Hard Drive Carrier (two)
E	Server Board	L	Slim Optical Drive Bay
F	PCIe* Riser Assembly	M	Hard Drive Carrier (one)
G	Processor and Heat sink		

Figure 4. Intel® Server System SR1630HGP Major System Components

The I/O connector locations on the back of the system are pre-cut, so an I/O shield is not required. The EMI gasket is pre-installed to maintain electromagnetic interference (EMI) compliance levels. The layout arrangement is the same for both the fixed and hot-swap systems.
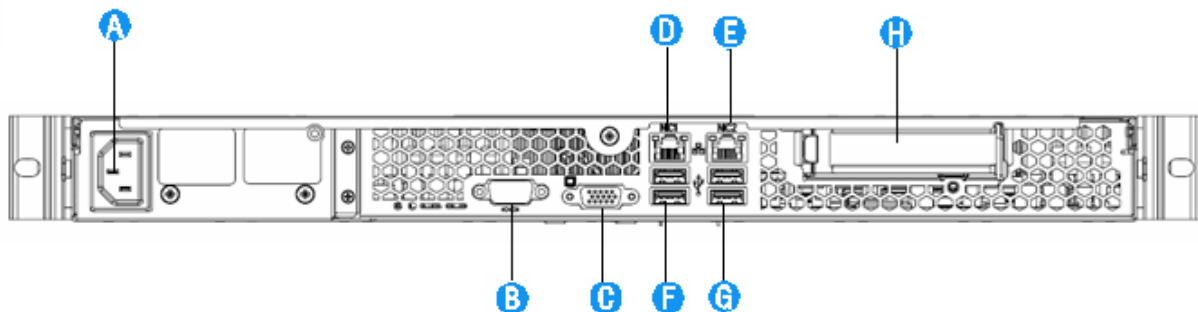
A	AC Power Connector	E	NIC 2 Connector (10 / 100 / 1000 Mb)
B	Serial Port A	F	USB Ports
C	Video Connector	G	USB Ports
D	NIC 1 Connector (10 / 100 / 1000 Mb)	H	PCI Express* Slot

Figure 5. Intel® Server System SR1630GP Back Panel Features
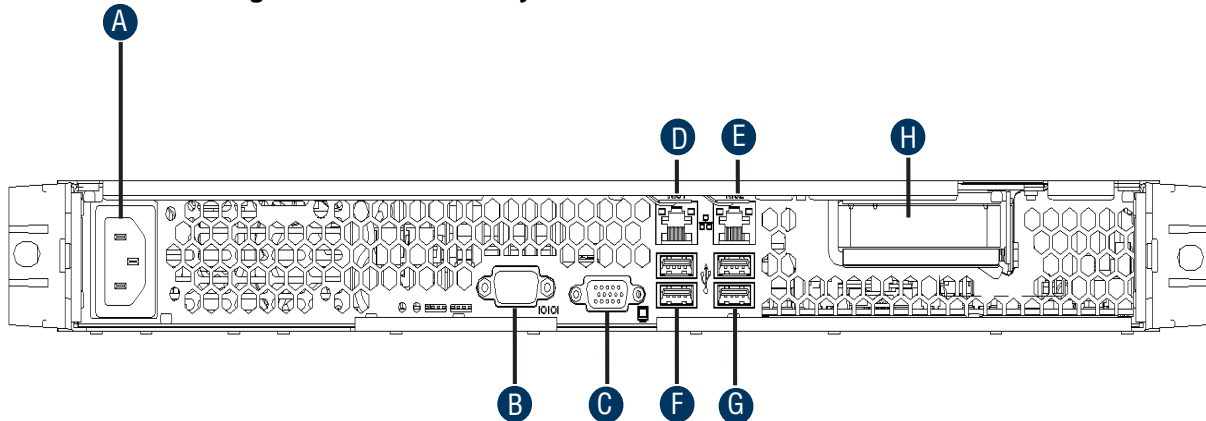
A	AC Power Connector	E	NIC 2 Connector (10 / 100 / 1000 Mb)
B	Serial Port A	F	USB Ports
C	Video Connector	G	USB Ports
D	NIC 1 Connector (10 / 100 / 1000 Mb)	H	PCI Express* Slot

Figure 6. Intel® Server System SR1630HGP Back Panel Features

2.4   System Boards

The Intel® Server Systems SR1630GP and SR1630HGP include system boards used as internal interconnects and provide feature accessibility. The following section provides a brief description for each.

2.4.1   Intel® Server System SR1630GP

The Intel® Server System SR1630GP includes an Intel® Server Board S3420GPLC. This board supports a PCI Express* riser card.

- PCI Express* Riser Card – Supports a single, low-profile x8 PCI Express* riser card.

2.4.2   Intel® Server System SR1630HGP

The Intel® Server System SR1630HGP includes an Intel® Server Board S3420GPLC. This board supports one riser card options. The Intel® Server System SR1630HGP supports a hot-swap SATA back plane with two SATA drives.

- PCI Express* Riser Card – Supports a single, half-length and low-profile PCI Express* x8 add- riser card.

2.5   System Cooling

The Intel® Server System SR1630GP and SR1630HGP provide two, non-redundant blower fans. When external ambient temperatures remain within specified limits, the cooling system provides sufficient air flow for all drive configurations, processors, supported memory, and add-in cards.

2.6   Rack and Cabinet Mounting Options

The server systems were designed to support 19-inches wide by up to 30-inches deep server cabinets. The server systems supports three rack mount options:

- Basic slide rail kit (Product order code – AXXBASICRAIL): Designed to mount the chassis into a standard (19-inch by up to 30-inch deep) EIA-310D compatible server cabinet and is included with the server system.

- Fixed mount relay rack / cabinet mount kit (Product order code - AXXBRACKETS): Can be configured to mount the system into either a 2-post or 4-post rack cabinet.

- Tool-less full extracting slide rail kit (Product order code – AXXHERAIL): Designed to support an optional cable management arm (Product order code – AXXRACKCARM).

3.   Power Subsystem

The power subsystem of the server systems consists of a single, non-redundant 350-W power supply with five outputs: 3.3 V, 5 V, 12 V, and 5 VSB. 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 40 mm fans for self -cooling. The power supply fans also provide additional airflow for parts of the system.

The power supply operates within the following voltage ranges and ratings:

Parameter	Minimum	Rated	Maximum	Start up VAC	Power Off VAC
Voltage (110)	90 Vrms	100-127 Vrms	140 Vrms	85Vac +/-4Vac	75Vac +/-5Vac
Voltage (220)	180 Vrms	200-240 Vrms	264 Vrms		
Frequency	47 Hz	50/60	63 Hz		

The power supply must operate within all specified limits over the following input voltage ranges shown in the table. Harmonic distortion of up to 10% Total Harmonic Distortion (THD) must not cause the power supply to go out of specified limits. The power supply should power off if the AC input is less than 75 VAC +/-5 VAC range. The power supply should start up if the AC input is greater than 85 VAC +/-4 VAC. Application of an input voltage below 85 VAC should not cause damage to the power supply, which includes a fuse blow.

3.1   Mechanical Specifications

The 1U 350 W power supply is designed specifically for use in the Intel® Server Systems SR1630GPand SR1630HGP. The physical size of the power supply enclosure is intended to accommodate power ranges from 350 W. The power supply size is 40 mm x 106 mm x 300 mm and has a wire harness for the DC outputs. The AC input plugs directly into the external face of the power supply; refer to the following figure for more information.
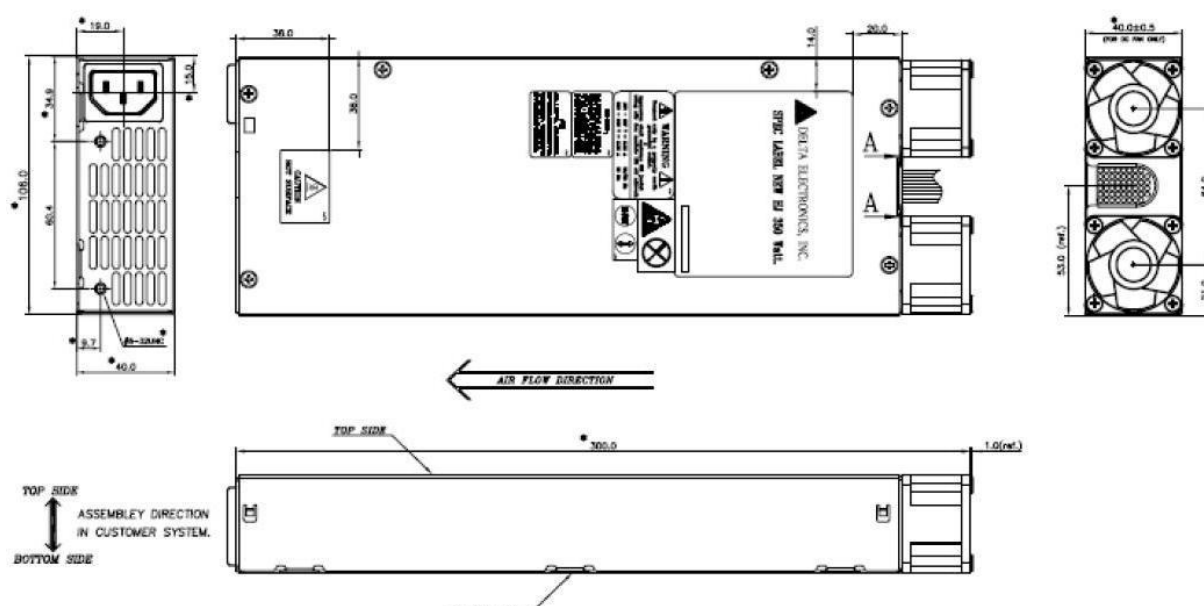
Figure 7. Power Supply Enclosure Drawing

Notes:
1. All dimensions are in mm.

3.2   Output Connectors

Listed or recognized component appliance wiring material (AVLV2), CN, **rated min 80°C**, 300 VDC should be used for all output wiring.

Table 4. Intel® Server Systems SR1630GP / SR1630HGP Cable Lengths

From	Length (mm)	To connector #	Description
Power Supply cover exit hole	400	P1	Baseboard Power Connector
Power Supply cover exit hole	380	P2	Processor Power Connector
Power Supply cover exit hole	220	P7	2 x 4 HSBP power connector
P7	100	P4	SATA Drive Power Connector
P4	145	P5	SATA Drive Power Connector
P5	170	P6	CDROM Power Connector
Power Supply cover exit hole	530	P8	Slim SATA CDROM Power Connector

3.2.1   Baseboard power connector (P1)

Connector housing: 24-Pin Molex* Mini-Fit Jr. 39-01-2200 or equivalent.
Contact: Molex* Mini-Fit, HCS, female, crimp 44476 or Molex* 5556 as the alternative or equivalent approved by Intel.

Table 5. P1 Main Power Connector

Pin	Signal	18 AWG Color	Pin	Signal	18 AWG Color
1*	+3.3VDC	Orange	11	+3.3VDC	Orange
	3.3V RS	Orange/White (24AWG)	12	-12VDC	Blue
2	+3.3VDC	Orange	13	GND	Black
3	GND	Black	14	PSON#	Green (24AWG)
4	+5VDC	Red	15*	GND	Black
5	GND	Black		COMRS	Black (24AWG)
6	+5VDC	Red	16	GND	Black
7	GND	Black	17	GND	Black
8	PWR OK	Gray (24AWG)	18	Reserved	N.C.
9	5 VSB	Purple	19	+5VDC	Red
10*	+12V	Yellow	20*	+5VDC	Red
	12VRS	Yellow/White (24AWG)		5VRS	Red/White (24AWG)

Notes:
1. Remote Sense wire double-crimped.
2. P1 add cable bend requirement at P1.

3.2.2   Processor Power Connector (P2)

Connector housing: 8-Pin Molex* 39-01-2085 or equivalent.
Contact: 44476-1111 or Molex* 5556 as the alternative or equivalent.

Table 6. P2 Processor Power Connector

Pin	Signal	18 AWG color	Pin	Signal	18 AWG Color
1	GND	Black	5	+12V	Yellow
2	GND	Black	6	+12V	Yellow
3	N.C.		7	N.C.	
4	N.C.		8	N.C.	

3.2.3   SATA Hard Drive Power Connectors (P4, P5)

Connector housing: JWT A3811H00-5P (94V2) or equivalent.
Contact: JWT A3811TOP-0D or equivalent.

Table 7. SATA Power Connector

Pin	Signal	18 AWG Color
1	+3.3V	Orange
2	GND	Black
3	+5VDC	Red
4	GND	Black
5	+12V	Yellow

3.2.4   CD-ROM Power Connector (P6)

Connector housing: Molex* 51065-0400 (94V2) or equivalent.
Contact: Molex* 50212-8000 contact or equivalent.

Table 8. CD-ROM Power Connector

PIN	SIGNAL	22 AWG COLOR	PIN	SIGNAL	22 AWG COLOR
1	+5VDC	Red	3	GND	Black
2	GND	Black	4	+12V	Yellow

3.2.5 Intel® Server System SR1630HGP P7 Hot-swap Backplane Power Connector

Connector housing: 8-pin Molex* 39-01-2085 2 x 4 or equivalent.
Contact: Molex* 2x4 mini fit Jr, HCS, 44476-3111 or equivalent.

Table 9. P7 HSBP Power Connector

PIN	SIGNAL	18 AWG COLOR	PIN	SIGNAL	18 AWG COLOR
1	GND	Black	5	12V4	Blue/White Stripe
2	GND	Black	6	NC	
3	+5V	Red	7	NC	
4	NC		8	3.3V	Orange

3.2.6 Slim SATA CD-ROM Power Connector (P8)

Connector housing: Amphenol SSATA-111-1201-1-3.
Terminal: Copper Alloy thickness 0.25mm.

Table 10. P8 Slim SATA Power Connector

PIN	SIGNAL	24 AWG COLOR
1	NC	
2	+5V	Red
3	+5V	Red
4	NC	
5	GND	Black
6	GND	Black

3.3 AC Inlet Connector

The AC input connector should be an *IEC 320 C-14* power inlet. This inlet is rated for 10A / 250 VAC.

3.3.1 AC Power Cord Specification Requirements

The AC power cord must meet the following specification requirements:

Cable Type	SJT
Wire Size	16 AWG
Temperature Rating	105º C

Cable Type	SJT
Amperage Rating	13 A
Voltage Rating	125 V
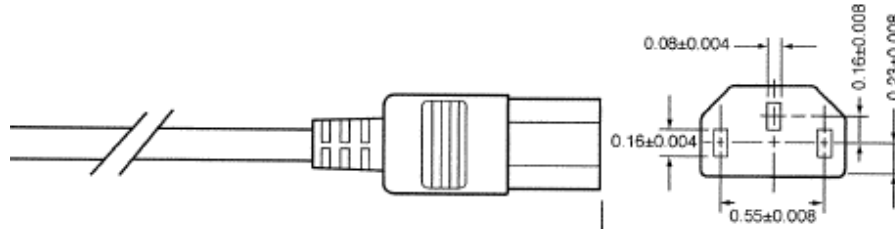
Figure 8. AC Power Cord Specifications

3.4   Marking and Identification

The power supply module marking supports the following requirements: safety agency requirements; government requirements (if required; for example, point of manufacturing); power supply vendor requirements; and Intel manufacturing and field support requirements.

3.5   Efficiency

The power supply should have a recommended efficiency of 70% at maximum load and over the specified AC voltage.

3.6   AC Input Voltage

The power supply must operate within all specified limits over the following input voltage ranges, shown in the following table. Harmonic distortion of up to 10% of the rated line voltage must not cause the power supply to go out of specified limits. The power supply should power off if the AC input is less than 75 VAC +/-5 VAC range. The power supply should start up if the AC input is greater than 85 VAC +/-4 VAC. Application of an input voltage below 85 VAC should not cause damage to the power supply, which includes a fuse blow.

Table 11. AC Input Rating

PARAMETER	MIN	RATED	V_{MAX}	I_{MAX}	Start up VAC	Power Off VAC
Voltage (110)	90 V_{rms}	100-127 V_{rms}	140 V_{rms}	6 A[1, 3]	85VAC +/- 4VAC	75VAC +/- 5VAC
Voltage (220)	180 V_{rms}	200-240 V_{rms}	264 V_{rms}	3 A[2, 3]		
Frequency	47 Hz	50/60	63 Hz			

Notes:
1. Maximum input current at low input voltage range should be measured at 90 VAC at max load.
2. Maximum input current at high input voltage range should be measured at 180 VAC at max load.
3. This requirement is not to be used for determining agency input current markings.

3.7   Output Power / Currents

The following tables define two power and current ratings for this 350-W power supply. The combined output power of all outputs should not exceed the rated output power. The power supply must meet both static and dynamic voltage regulation requirements for the minimum loading conditions.

Table 12. Load Ratings

Voltage	Minimum Continuous Load	Maximum Continuous Load[1, 3]	Peak Load[2, 3]
+3.3 V[4]	0.2 A	14 A	
+5 V[4]	1.0 A	18 A	
+12 V	1.5 A	24 A	28 A
-12 V	0 A	0.3 A	
+5 VSB	0.1 A	2.0 A	2.5 A

Notes:

1. Maximum continuous total DC output power should not exceed **350 W**.
2. Peak total DC output power should not exceed **400 W**.
3. Peak power and peak current loading should be supported for a minimum of **12 seconds**.
4. Combined 3.3V/5V power should not exceed **100 W**.

3.8   Protection Circuits

Protection circuits inside the power supply should cause only the power supply's main outputs to shut down. If the power supply latches off due to a protection circuit tripping, an AC cycle OFF for 15 seconds and a PSON# cycle HIGH for 1 second should be able to reset the power supply.

3.9   Over-Current Limit (OCP)

The power supply should have current limits 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 will shut down and latch off. You can clear the latch by toggling the PSON# signal or performing an AC power interruption. The power supply should not be damaged from repeated power cycling in this condition. -12 V and 5 VSB should be protected under over-current or shorted conditions so no damage can occur to the power supply. After removing the OCP limit, 5 Vsb is auto-recovered.

Table 13. Over Current Protection (OCP)

VOLTAGE	OVER CURRENT LIMIT	
	MIN	MAX
+3.3 V	15 A	21 A
+5 V	20 A	27 A
+12 V	30 A	40 A
-12 V	0.625 A	2 A
5 VSB	N/A	4 A

3.10 Over-Voltage Protection (OVP)

The power supply over-voltage protection should be locally sensed. After an over-voltage condition occurs, the power supply will shut down and latch off. You can clear this latch by toggling the PSON# signal or performing an AC power interruption. The following table contains the over-voltage limits. The values are measured at the output of the power supply's pins. The voltage should never exceed the maximum levels when measured at the power pins of the power supply connector during any single point of fail. The voltage should never trip any lower than the minimum levels when measured at the power pins of the power supply connector. After removing the OVP limit, 5 Vsb is auto-recovered.

Exception: +5VSB rail should be able recover after its over-voltage condition occurs.

Table 14. Over-Voltage Protection (OVP) Limits

Output Voltage	MIN (V)	MAX (V)
+3.3 V	3.9	4.5
+5 V	5.7	6.5
+12 V	13.3	14.5
-12 V	-13.3	-16
+5 VSB	5.7	6.5

3.11 Over-Temperature Protection (OTP)

The power supply is protected against over-temperature conditions caused by loss of fan cooling or excessive ambient temperature. In an Over-Temperature Protection (OTP) condition, the power supply will shut down. When the power supply temperature drops to within specified limits, the power supply should restore power automatically, while the 5 VSB remains always on. The OTP circuit must have built-in hysteresis such that the power supply will not oscillate on and off due to temperature recovering condition. The OTP trip level should have a minimum of 4° C of ambient temperature hysteresis.

4. Cooling Subsystem

The Intel® Server System SR1630HGP and SR1630GP cooling subsystem consists of two 97 x 94 x 33 blower fans, CPU air duct, and PS / electronics bay isolation air baffle. These components provide the necessary cooling and airflow to the system. A fan on the processor heatsink is not needed.

To maintain the necessary airflow within the system, the air duct and the top cover must be properly installed.

Note: The Intel® Server Systems SR1630GP and SR1630HGP do not support redundant cooling. If a fan blower fails, the system should be powered down as soon as possible to replace the failed fan blower. The system fans are not hot-swappable.
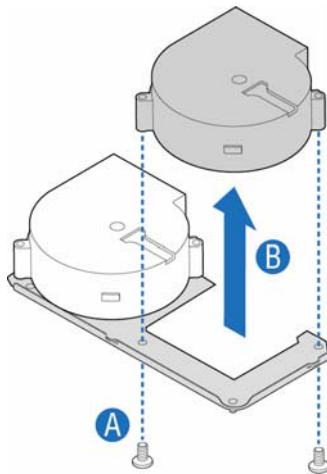
Figure 9. Intel® Server System SR1630GP Fan Module Assembly
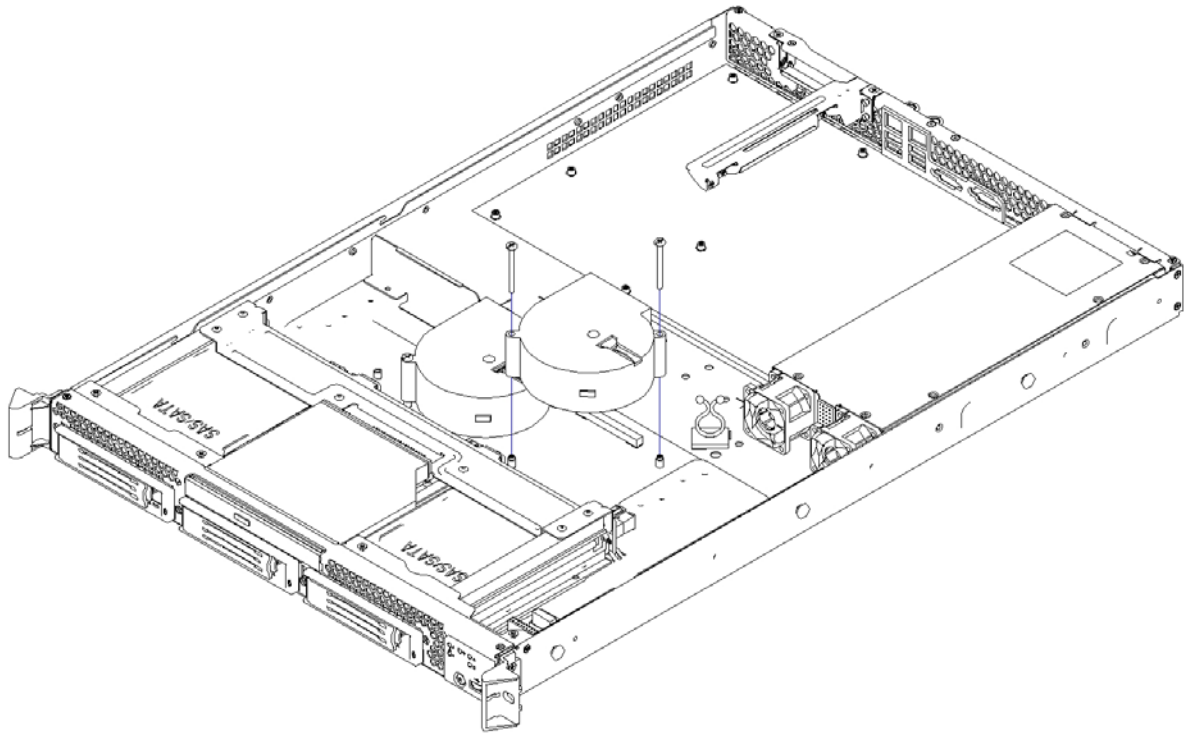
Figure 10. Intel$^®$ Server System SR1630HGP Fan Module Assembly

4.1   Power Supply Fans

The power supply supports two, non-redundant 40 mm fans. They are responsible for the cooling of the power supply and the second hard drive bay.

4.2   CPU Air Duct

The chassis requires the use of a CPU air duct to direct airflow through the processor's heatsink and memory area.
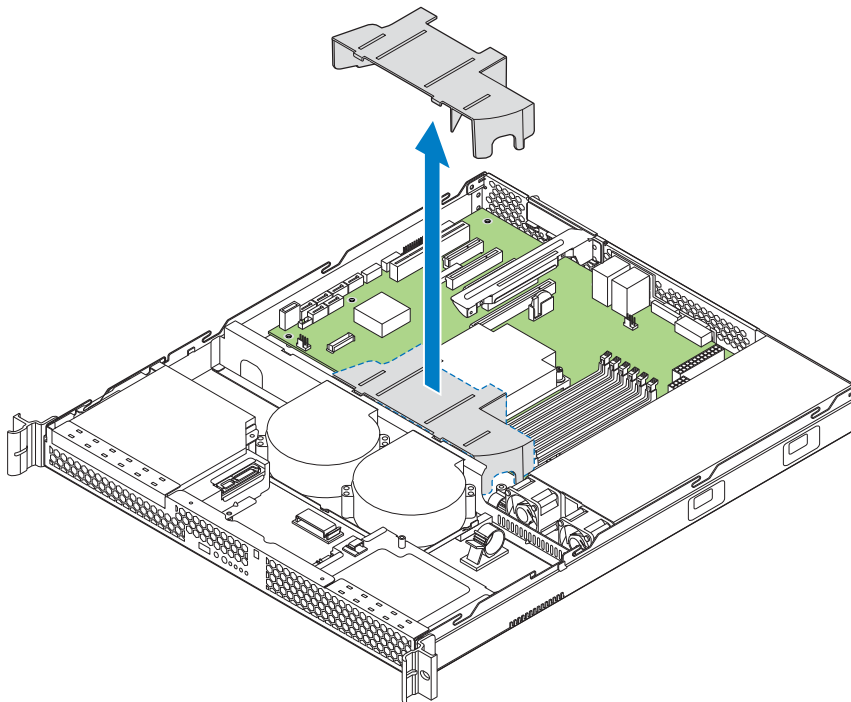
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Figure 11. Intel® Server System SR1630GP Air Duct
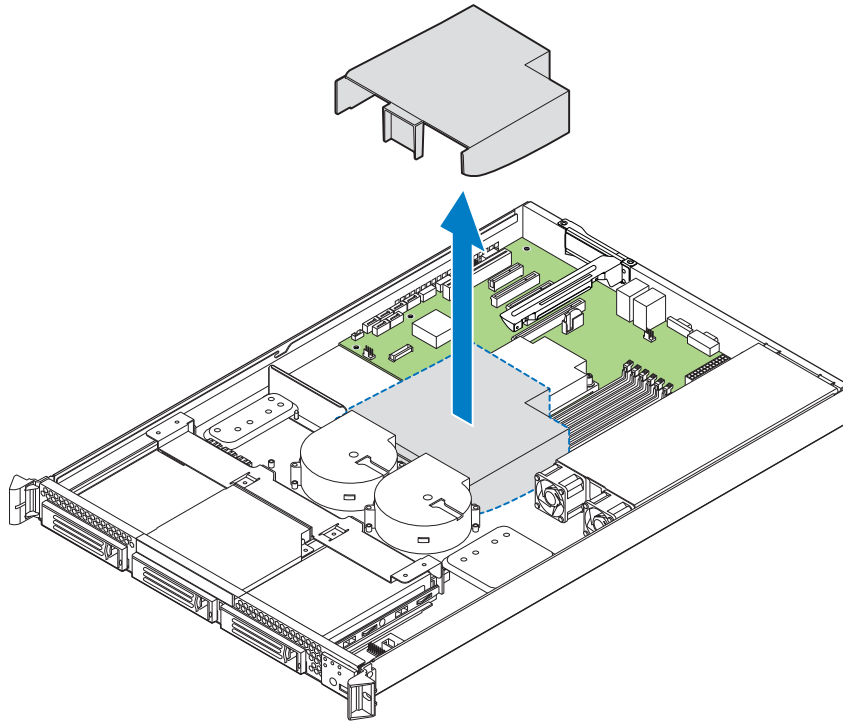
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Figure 12. Intel® Server System SR1630HGP Air Duct

5.　Peripheral and Hard Drive Support

The Intel® Server Systems SR1630GP provides support for two fixed hard drive bays and one slimline peripheral drive bay at the front of the chassis. The fixed hard drive bays are designed to support SATA drives only.
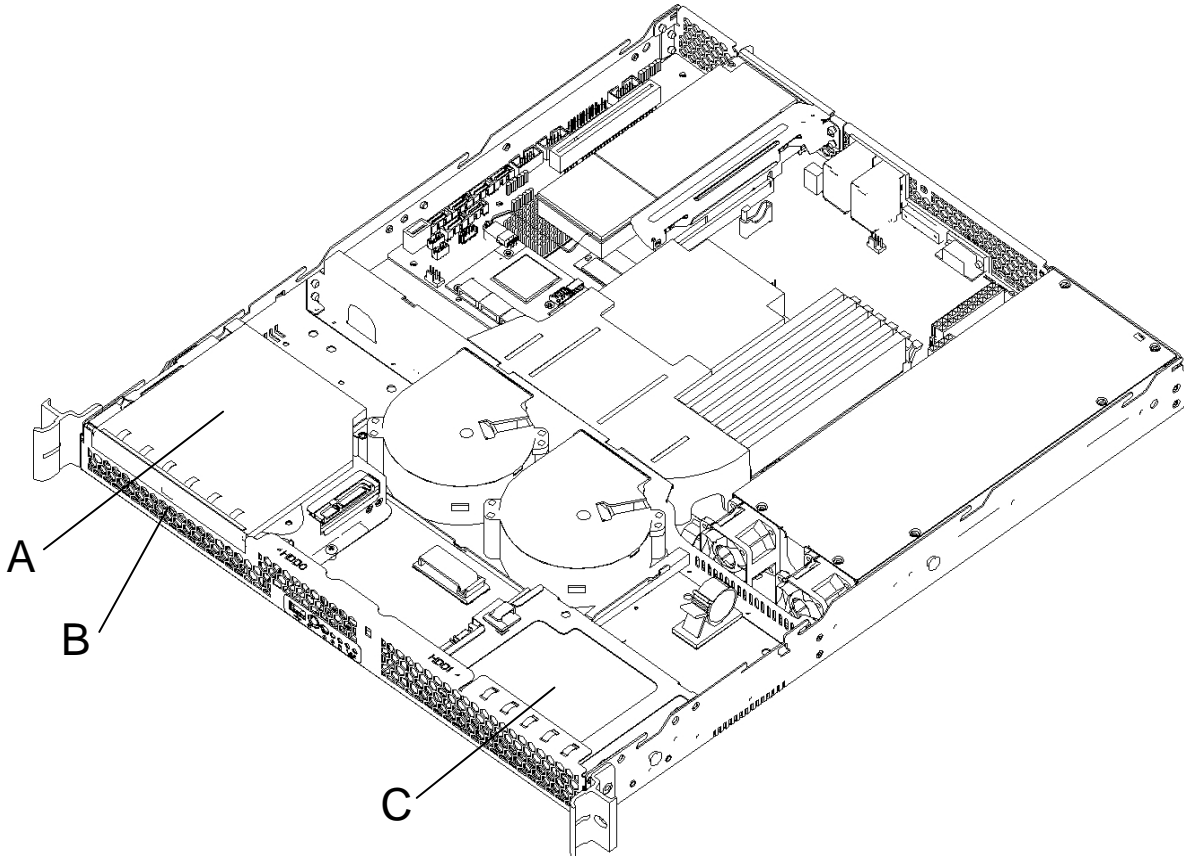
A	Slimline optical drive bay
B	Hard drive bay HDD0 (located under the slimline optical drive bay)
C	Hard drive bay HDD1

Figure 13. Intel® Server Systems SR1630GP Drive Bays

The Intel® Server System SR1630HGP provides support for three hot-swap hard drive bays and one slimline peripheral drive bay at the front of the system. The hot-swap drive bays are designed to support SATA drives only.

A	Slimline optical drive bay
B	Hot-swap Drive Bays
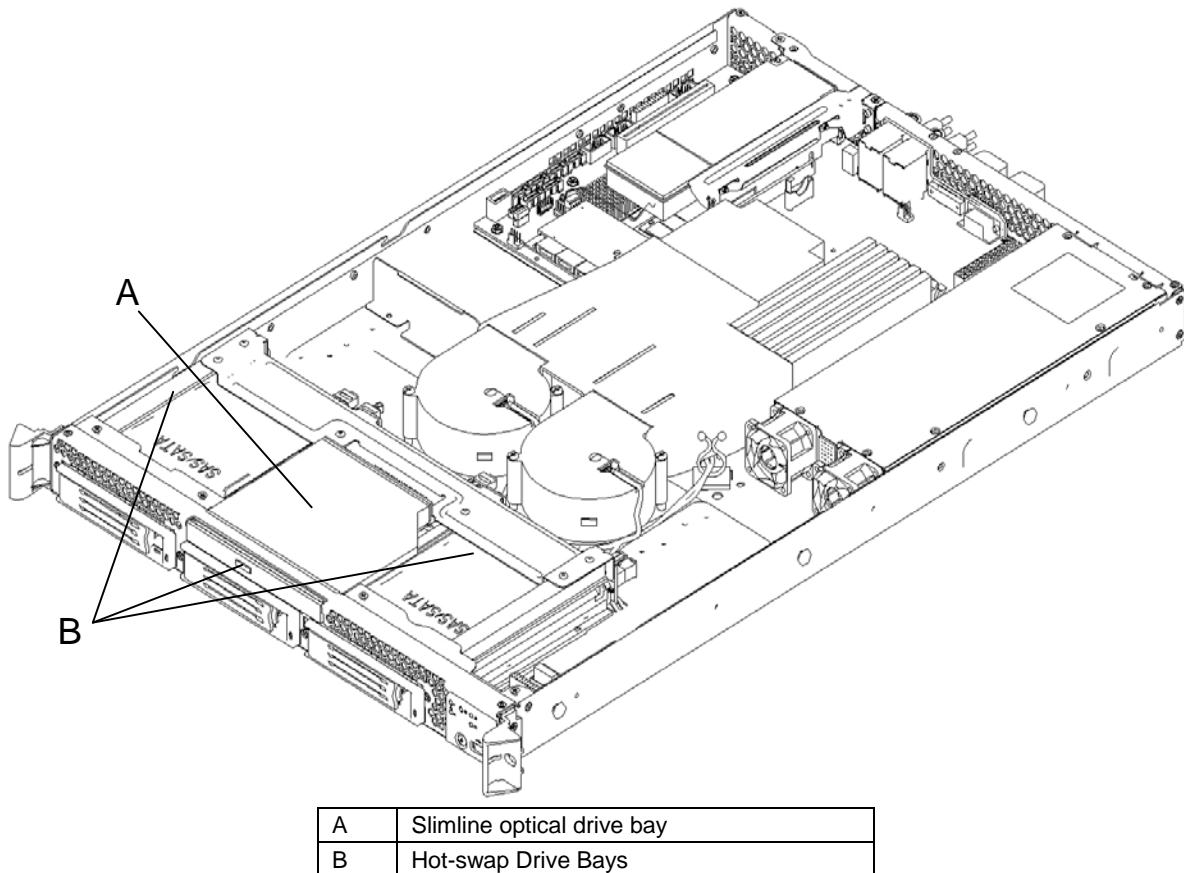
Figure 14. Intel® Server Systems SR1630HGP Drive Bays

5.1 Optical Drive Support

Both the fixed and hot-swap systems provide a slimline drive bay that you can configure for an SATA optical CD-ROM or DVD/CDR drive. The slimline devices are not hot-swappable.

5.1.1 Optical Drive Support

The server systems support a slimline SATA optical drive. The Intel® Server System SR1630GP is mounted with two, side-mount rail accessories and connected to an interposer card attached to the drive. The drive assembly is then installed in to the slimline drive bay. The Intel® Server System SR1630HGP is mounted with one side-mount rail accessories and is connected to an interposer card attached to the drive. The drive assembly is then installed into the slimline drive bay.

5.2 Hard Disk Drive Support

The Intel® Server System SR1630GP supports up to two, 3.5-inch by 1-inch fixed SATA hard disk drives. The drives are mounted inside the chassis and are not hot-swappable. The Intel® Server System SR1630HGP supports up to three SATA hard disk drives mounted in hot-swappable drive carriers.

5.3   System Fan Connectors

The Intel® Server Systems SR1630GP and SR1630HGP support two system fan blowers. The following table provides the pin-out for each connector.

Table 15. System Four-pin Fan Headers Pin-outs (J7J1, J1J4, J6B1, and J6J2)

Pin	Signal Name	Type	Description
1	Ground	Power	GROUND is the power supply ground.
2	Fan Power	Power	Fan Power
3	Fan Tach	Out	FAN_TACH signal is connected to the Heceta* to monitor the FAN speed.
4	PWM	Control	Pulse Width Modulation – Fan Speed Control signal

6. Front Control Panel

The standard control panel supports a power button, status LED, hard drive activity LED, and NIC 1 and NIC 2 activity LEDs. The control panel assembly comes pre-assembled into the chassis. The control panel assembly module slides into a predefined slot on the front of the chassis. Once installed, communication to the server board is achieved through a standard 24-pin cable connected directly to the server board.

Note: The status LED is not used on the Intel® Server Systems SR1630GP or SR1630HGP.
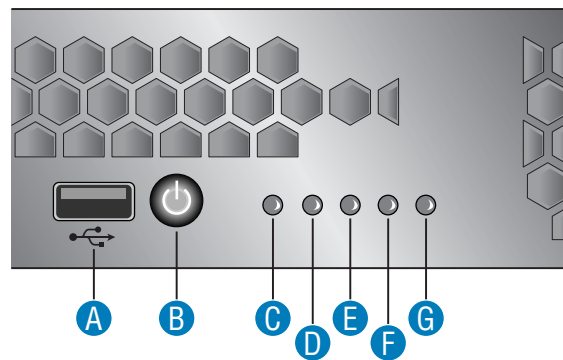
AF001000

Item	Feature
A	USB port
B	Power button. This button also functions as a sleep button if enabled by an ACPI-compliant operating system.
C	Status LED
D	System power LED
E	Hard drive activity LED
F	NIC 1 LED
G	NIC 2 LED

Figure 15. Intel® Server Systems SR1630GP Front Control Panel

AF001610
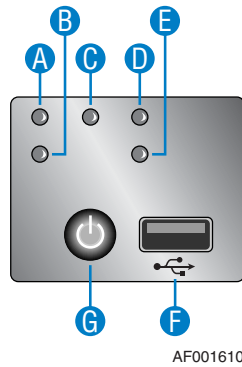
Item	Feature
A	NIC 1 LED
B	NIC 2 LED
C	System power LED
D	Status LED
E	Hard drive activity LED
F	USB port
G	Power button. This button also functions as a sleep button if enabled by an ACPI-compliant operating system.

Figure 16. Intel® Server System SR1630HGP Front Control Panel

Table 16. Control Panel LED Functions

LED	Color	State	Description
NIC1 / NIC2	Green	On	NIC Link/no access
Activity	Green	Blink	LAN access
Power / Sleep (on standby power)	Green	On	Power on
		Blink	Sleep / ACPI S1 state
	Off	Off	Power Off / ACPI S4 state
System Status (on standby power)	N/A	N/A	N/A
Disk Activity	Green	Random blink	HDD access
	Off	Off	No hard disk activity

6.1.1   Power / Sleep LED

Table 17. 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, and the operating system has saved context to the hard disk.

State	Power Mode	LED	Description
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.

Note:
- The blink rate is ~ 1 Hz at 50% duty cycle.

6.1.2   System Status LED

The system status LED is available on the Intel® Server Systems SR1630GP and SR1630HGP.

6.1.3   Drive Activity LED

The drive activity LED on the front panel indicates drive activity from the onboard hard disk controllers. The Intel® Server Board S3420GPLC also provides a header giving access to this LED for add-in controllers.

7. PCI Riser Cards and Assembly

The Intel® Server Board S3420GP provides one PCI Express* x8 slot which supports one riser card with one riser card slot. The riser card supports one low-profile PCI Express* x8 add-in card that consumes power less than 15 W.
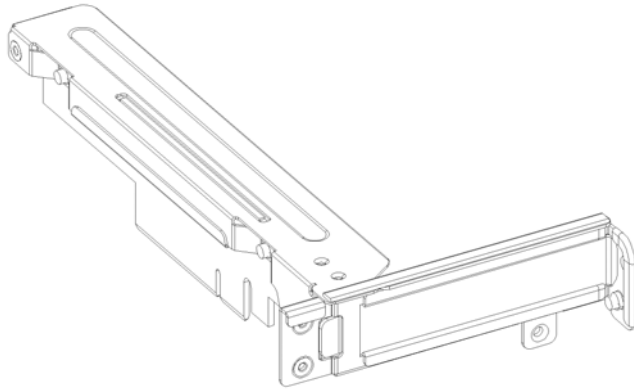
Figure 17. PCI–E Riser Card Assembly For Intel® Server Board SR1630GP
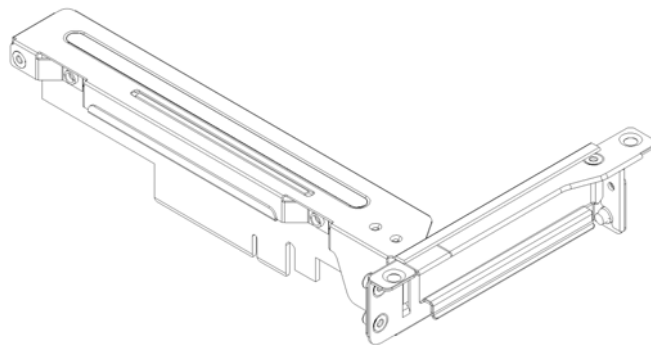
Figure 18. PCI–E Riser Card Assembly For Intel® Server Board SR1630HGP

8. Intel® Server System SR1630HGP Passive SAS/SATA Hot-swap Backplane

The Intel® Server System SR1630HGP supports a passive backplane designed to be compatible with the Intel® Server Board S3420GPLC. The Intel® Server Board S3420GPLC is connected directly to the SATA backplane (default) or you can connect the backplane to an add-in SAS or SATA adapter.

The system supports a multi-functional SATA/SAS backplane with the following features:

- Three SATA/SAS compatible hot-swap hard drive connectors
- Three SATA/SAS connectors to the baseboard
- Hard Drive Activity LED for each hard drive connector
- One 2x4-pin power connector

The Intel® Server Board S3420GPLC on-board SATA controller supports the following RAID arrays:

- Intel® Embedded Server RAID Technology II – RAID 0, 1, and 10.
- Intel® Matrix Storage Technology - RAID 0, 1, 10, or 5 (Microsoft Windows* only)

This system support drive status LEDs, You can determine a failed drive and drive rebuild activity by observing the drive activity LED.

Figure 19. Intel® Server System SR1630HGP Hot-swap Backplane

Note: The hard drive Status LEDs may not indicate drive failure or RAID status on the Intel® Server System SR1630HGP or SR1630HGPRX, when RAID is enabled and SATA cables are plugged into ports 0, 1, and 2. To correctly show activity, use SATA ports 3, 4, and 5.

Table 18. Hot-swap Backplane hard drive Status LEDs Normal Operation

Status LED	Definition
Green	HDD Activity
Amber	HDD Failure (failing, rebuilding)

Table 19. Passive SATA/SAS Backplane Power Connector Pin-out (J7)

Pin #	Signal Name
1	Ground
2	Ground
3	P5V
4	P5V
5	P12V
6	P12V
7	No Connection
8	P3V3

Table 20. Passive SATA/SAS Backplane Connector to Hard Drive Pin-out (J1, J2, J3)

Pin #	Signal Name
S1	Ground
S2	SAS_DRVxA_RX_P
S3	SAS_DRVxA_RX_N
S4	Ground
S5	SAS_DRVxA_TX_N
S6	SAS_DRVxA_TX_P
S7	Ground
P1	TP
P2	TP
P3	TP
P4	Ground
P5	Ground
P6	Ground
P7	P5V_DRVx_PRECHG
P8	P5V
P9	P5V
P10	Ground
P11	LED_DRVx_READY_N
P12	Ground
P13	P12V_DRVx_PRECHG
P14	P12V
P15	P12V

Table 21. Passive SATA/SAS Backplane I/O Connector to Baseboard Pin-out (J4, J5, and J6)

Pin #	Signal Name
1	Ground
2	SASx_EP_RX_P
3	SASX_EP_RX_N
4	Ground
5	SASx_EP_TX_N
6	SASx_EP_TX_P
7	Ground

8.1.1   Hot-swap Drive Trays

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

TP02106
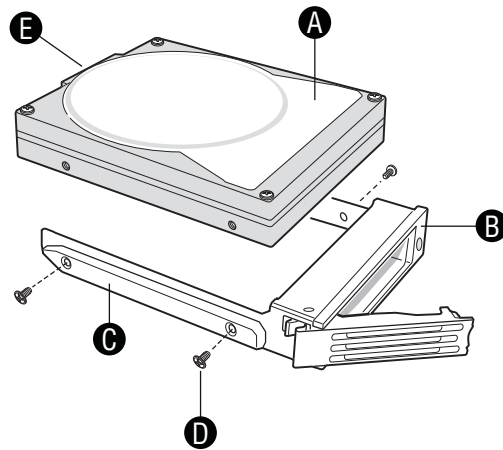
Figure 20. Hard Drive Tray Assembly

Item	Description
A	Hard Drive
B	Drive Carrier
C	Slide Rail
D	Mounting Screw
E	Hard Drive Connector

9.   Supported Intel® Server Boards

The Intel® Server Systems SR1630GP, SR1630HGP are mechanically and functionally
designed to support the Intel® Server Board S3420GPLC. For detailed server board information,
refer to the *Intel® Server Board S3420GP Technical Product Specification*.

10. Environmental and Regulatory Specifications

10.1 System Level Environmental Limits

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

Table 22. System Environmental Limits Summary

Parameter	Limits
Operating Temperature	+10° C to +30° 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 at 35° C
Acoustic noise	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	+/-12kV for air discharge and 8K for contact
System Cooling Requirement in BTU/Hr	1660 BTU/hour

10.2 Product Regulatory Compliance

Intended Application –This product is to be evaluated and certified as Information Technology Equipment (ITE), which may be installed in offices, schools, computer rooms, and similar commercial type locations. The suitability of this product for other product certification categories and/or environments (such as: medical, industrial, telecommunications, NEBS, residential, alarm systems, test equipment, etc.), other than an ITE application, will require further evaluation and may require additional regulatory approvals.

Note: The use and/or integration of telecommunication devices such as modems and/or wireless devices have not been planned for with respect to these systems. If there is any change of plan to use such devices, then telecommunication type certifications will require additional planning. If NEBS compliance is required for system level products, additional certification planning and design will be required.

10.2.1 Product Safety Compliance
- IRAM Certification (Argentina)
- CSA 60950-1 Certification (Canada)
- CE Declaration to EU Low Voltage Directive 2006/95/EC (Europe – EN60950-1)
- GS Certification (Germany – EN60950-1)
- IEC60950-1 (International) CB Certificate & Report

- GOST R 50377-92 Certification (Russia)
- Ukraine Certification (Ukraine)
- BSMI RPC Certification (Taiwan)
- UL 60950-1 Listing (USA)

10.2.2 Product EMC Compliance

Note: This product requires complying with Class A EMC requirements. However, Intel targets a 10 db margin to support customer enablement.

- AS/NZS CISPR 22 Emissions (Australia / New Zealand)
- ICES-003 – (Canada)
- EN55022 - Emissions (Europe)
- EN55024 - Immunity (Europe)
- EN61000-3-2 - Harmonics (Europe)
- EN61000-3-3 - Voltage Flicker (Europe)
- CISPR 22 – Emissions (International)
- VCCI Emissions (Japan)
- KCC MIC Notice No. 1997-41 (EMC) & 1997-42 (EMI) (Korea)
- GOST R 29216-91 Emissions (Russia)
- GOST R 50628-95 Immunity (Russia)
- BSMI CNS13438 Emissions (Taiwan)
- Ukraine Certification (Ukraine)
- FCC – Part 15 Emissions (USA) Verification

10.2.3 Certifications / Registrations / Declarations
- UL Certification (US/Canada)
- CE Declaration of Conformity (CENELEC Europe)
- FCC/ICES-003 Class A Attestation (USA/Canada)
- C-Tick Declaration of Conformity (Australia)
- MED Declaration of Conformity (New Zealand)
- BSMI Declaration (Taiwan)
- RRL Certification (Korea)
- GOST – Listed on one System License (Russia)
- Belarus – Listed on one System License (Belarus)
- Ecology Declaration (International)

10.2.4 Product Ecology Requirements

Intel has a system in place to restrict the use of banned substances in accordance with world wide product ecology regulatory requirements. Suppliers Declarations of Conformity to the banned substances must be obtained from all suppliers; and a Material Declaration Data Sheet

(MDDS) must be produced to illustrate compliance. Due verification of random materials is required as a screening / audit to verify suppliers declarations.

The server board complies with the following ecology regulatory requirements:

- All materials, parts and subassemblies must not contain restricted materials as defined in Intel's Environmental Product Content Specification of Suppliers and Outsourced Manufacturers – http://supplier.intel.com/ehs/environmental.htm.
- Europe - European Directive 2002/95/EC - Restriction of Hazardous Substances (RoHS) Threshold limits and banned substances are noted below.

    Quantity limit of 0.1% by mass (1000 PPM) for Lead, Mercury, Hexavalent Chromium, Polybrominated Biphenyls Diphenyl Ethers (PBB/PBDE)

    Quantity limit of 0.01% by mass (100 PPM) for Cadmium
- China RoHS (MII Measure 39)

    Product marked with the Environmental Friendly Usage Period (EFUP) label of 20yrs, substance table in Simplified Chinese either placed with the product documentation or separate insert.
- WEEE Directive (2002/96/EC)
- All plastic parts that weigh >25gm shall be marked with the ISO11469 requirements for recycling. Example >PC/ABS<
- EU Packaging Directive (94/62/EC)
- CA. Lithium Perchlorate insert Perchlorate Material – Special handling may apply. Refer to http://www.dtsc.ca.gov/hazardouswaste/perchlorate.
    This notice is required by California Code of Regulations, Title 22, Division 4.5, Chapter 33: Best Management Practices for Perchlorate Materials. This product / part includes a battery which contains Perchlorate material.

10.3 Product Regulatory Compliance Markings

The server board is provided with the following regulatory marks.

Regulatory Compliance	Region	Marking
IRAM Mark	Argentina	
Ctick Mark	Australia / NZ	N232
CE Mark	Europe	
EMC Marking (Class A)	Canada	**CANADA ICES-003 CLASS A**
GS Mark	Germany	

Regulatory Compliance	Region	Marking
VCCI Mark	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
KCC Mark	Korea	인증번호: CPU-SR1630 (A)
GOST Mark	Russia	**ME06**
UL Mark	USA / Canada	I.T.E. E139761 C UL US LISTED
BSMI Marking (Class A)	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
FCC Mark	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 interference receive, including interference that may cause undesired operation
Country of Origin Mark	Multiple	Made in China
Nordic Ground Marking	Multiple	Line1 : "WARNING:" Swedish on line2: "Apparaten skall anslutas till jordat uttag, när den ansluts till ett nätverk." Finnish on line 3: "Laite on liitettävä suojamaadoituskoskettimilla varustettuun pistorasiaan." English on line 4: "Connect only to a properly earth grounded outlet."
Multiple Power Cord	Multiple	English: This unit has more than one power supply cord. To reduce the risk of electrical shock, disconnect (2) two power supply cords before servicing. Simplified Chinese: 注意：

Regulatory Compliance	Region	Marking
		本设备包括多条电源系统电缆。为避免遭受电击，在进行维修之前应断开两（2）条电源系统电缆。 Traditional Chinese: 注意： 本設備包括多條電源系統電纜。爲避免遭受電擊，在進行維修之前應斷開兩（2）條電源系統電纜。 German: Dieses Geräte hat mehr als ein Stromkabel. Um eine Gefahr des elektrischen Schlages zu verringern trennen sie beide (2) Stromkabeln bevor Instandhaltung.
WEEE Marking	WEEE Marking	
RoHS	China	
Recycling Package Marks	China	 Will be added on Package label
Other Recycling Package Marks	Others	 Will be added on Package label
CA. Lithium Perchlorate insert	Others	Perchlorate Material – Special handling may apply. See www.dtsc.ca.gov/hazardouswaste/perchlorate This notice is required by California Code of

Regulatory Compliance	Region	Marking
		Regulations, Title 22, Division 4.5, Chapter 33: Best Management Practices for Perchlorate Materials. This product / part includes a battery which contains Perchlorate material.

10.4 Electromagnetic Compatibility Notices

10.4.1 FCC Verification Statement (USA)

This device complies with Part 15 of the FCC Rules. Operation is subject to 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.

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

This equipment has been tested and found to comply with the limits for a Class B 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 these measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that 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.

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

10.4.2 ICES-003 (Canada)

Cet appareil numérique respecte les limites bruits radioélectriques applicables aux appareils numériques de Classe B 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 B limits for radio noise emissions from digital apparatus set out in the interference-causing equipment standard entitled "Digital Apparatus," ICES-003 of the Canadian Department of Communications.

10.4.3 Europe (CE Declaration of Conformity)

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

10.4.4 VCCI (Japan)

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Ｂ情報技術装置です。この装置は、家庭環境で使用することを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると、受信障害を引き起こすことがあります。
　取扱説明書に従って正しい取り扱いをして下さい。

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

10.4.5 BSMI (Taiwan)

The BSMI Certification Marking and EMC warning is located on the outside rear area of the product.

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

10.4.6 RRL (Korea)

Following is the RRL certification information for Korea.

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

.

Appendix A: Integration and Usage Tips

This section provides a list of useful information unique to the Intel® Server Chassis SR1630, which you should keep in mind when integrating and configuring your Intel® Server Board S3420GPLC.

- Only low-profile (1.2 inch or 30.48 mm) DIMMs can be used in the server chassis.
- Processor fans are not needed and not supported. 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 the Intel® System Management Software to incorrectly monitor the system fans.
- You must use the air duct to maintain system thermals.
- System fans are not hot-swappable.
- A screw on the front edge of the top cover is required when the unit is installed in a user-accessible environment.

Appendix B: POST Code Diagnostic LED Decoder

During the system boot process, the BIOS executes a number of platform configuration processes, each of which is assigned a specific hex POST code number. As each configuration routine is started, the BIOS displays the given POST code to the POST Code Diagnostic LEDs found on the back edge of the server board. To assist in troubleshooting a system hang during the POST process, *the diagnostic LEDs can be used to identify the last POST process to be executed.*

Each POST code is represented by a combination of colors from the four LEDs. The LEDs can display three colors: green, red, and amber. The POST codes are divided into two nibbles: an upper nibble and a lower nibble. Each bit in the upper nibble is represented by a red LED and each bit in the lower nibble is represented by a green LED. If both bits are set in the upper and lower nibbles then both red and green LEDs are lit, resulting in an amber color. If both bits are clear, then the LED is off.

In the following example, the BIOS sends a value of ACh to the diagnostic LED decoder. The LEDs are decoded as follows:

   red bits = 1010b = Ah

   green bits = 1100b = Ch

Since the red bits correspond to the upper nibble and the green bits correspond to the lower nibble, the two are concatenated to be ACh.

Note: The following example is for illustrative purposes only; the diagram does not match the back edge of the server board in the Intel® Server Systems SR1630GP and SR1630HGP

Table 23. POST Progress Code LED Example

LEDs	8h		4h		2h		1h	
	Red	**Green**	**Red**	**Green**	**Red**	**Green**	**Red**	**Green**
ACh	1	1	0	1	1	0	0	0
Result	Amber		Green		Red		Off	
	MSB						LSB	

<TBD>

Figure 21. Diagnostic LED Placement Diagram Example

Table 24. Diagnostic LED POST Code Decoder

Checkpoint	Upper Nibble 8h #7	4h #6	2h #5	1h #4	Lower Nibble 8h #3	4h #2	2h #1	1h #0	Description
Host Processor									
0x04h	X	X	X	X	X	O	X	X	Early processor initialization (flat32.asm) where system BSP is selected
0x10h	X	X	X	O	X	X	X	X	Power-on initialization of the host processor (Boot Strap Processor)
0x11h	X	X	X	O	X	X	X	O	Host processor cache initialization (including AP)
0x12h	X	X	X	O	X	X	O	X	Starting application processor initialization
0x13h	X	X	X	O	X	X	O	O	SMM initialization
Chipset									
0x21h	X	X	O	X	X	X	X	O	Initializing a chipset component
Memory									
0x22h	X	X	O	X	X	X	O	X	Reading configuration data from memory (SPD on FBDIMM)
0x23h	X	X	O	X	X	X	O	O	Detecting presence of memory
0x24h	X	X	O	X	X	O	X	X	Programming timing parameters in the memory controller
0x25h	X	X	O	X	X	O	X	O	Configuring memory parameters in the memory controller
0x26h	X	X	O	X	X	O	O	X	Optimizing memory controller settings
0x27h	X	X	O	X	X	O	O	O	Initializing memory, such as ECC init
0x28h	X	X	O	X	O	X	X	X	Testing memory
PCI Bus									
0x50h	X	O	X	O	X	X	X	X	Enumerating PCI buses
0x51h	X	O	X	O	X	X	X	O	Allocating resources to PCI buses
0x52h	X	O	X	O	X	X	O	X	Hot Plug PCI controller initialization
0x53h	X	O	X	O	X	X	O	O	Reserved for PCI bus
0x54h	X	O	X	O	X	O	X	X	Reserved for PCI bus
0x55h	X	O	X	O	X	O	X	O	Reserved for PCI bus
0x56h	X	O	X	O	X	O	O	X	Reserved for PCI bus
0x57h	X	O	X	O	X	O	O	O	Reserved for PCI bus
USB									
0x58h	X	O	X	O	O	X	X	X	Resetting USB bus
0x59h	X	O	X	O	O	X	X	O	Reserved for USB devices
ATA/ATAPI/SATA									
0x5Ah	X	O	X	O	O	X	O	X	Resetting SATA bus and all devices
0x5Bh	X	O	X	O	O	X	O	O	Detecting the presence of ATA device
0x5Ch	X	O	X	O	O	O	X	X	Enable SMART if supported by ATA device
0x5Dh	X	O	X	O	O	O	X	O	Reserved for ATA
SMBUS									
0x5Eh	X	O	X	O	O	O	O	X	Resetting SMBUS
0x5Fh	X	O	X	O	O	O	O	O	Reserved for SMBUS
Local Console									
0x70h	X	O	O	O	X	X	X	X	Resetting the video controller (VGA)

Checkpoint	Diagnostic LED Decoder O = On, X=Off								Description
	Upper Nibble				Lower Nibble				
	MSB 8h #7	4h #6	2h #5	1h #4	8h #3	4h #2	2h #1	LSB 1h #0	
0x71h	X	O	O	O	X	X	X	O	Disabling the video controller (VGA)
0x72h	X	O	O	O	X	X	O	X	Enabling the video controller (VGA)
Remote Console									
0x78h	X	O	O	O	O	X	X	X	Resetting the console controller
0x79h	X	O	O	O	O	X	X	O	Disabling the console controller
0x7Ah	X	O	O	O	O	X	O	X	Enabling the console controller
Keyboard (only USB)									
0x90h	O	X	X	O	X	X	X	X	Resetting the keyboard
0x91h	O	X	X	O	X	X	X	O	Disabling the keyboard
0x92h	O	X	X	O	X	X	O	X	Detecting the presence of the keyboard
0x93h	O	X	X	O	X	X	O	O	Enabling the keyboard
0x94h	O	X	X	O	X	O	X	X	Clearing keyboard input buffer
0x95h	O	X	X	O	X	O	X	O	Reserved for keyboard
Mouse (only USB)									
0x98h	O	X	X	O	X	X	O	X	Resetting the mouse
0x99h	O	X	X	O	X	X	O	O	Detecting the mouse
0x9Ah	O	X	X	O	X	O	O	X	Detecting the presence of mouse
0x9Bh	O	X	X	O	X	O	O	O	Enabling the mouse
Fixed Media									
0xB0h	O	X	O	O	X	X	X	X	Resetting fixed media device
0xB1h	O	X	O	O	X	X	X	O	Disabling fixed media device
0xB2h	O	X	O	O	X	X	O	X	Detecting presence of a fixed media device (SATA hard drive detection, etc.)
0xB3h	O	X	O	O	X	X	O	O	Enabling / configuring a fixed media device
Removable Media									
0xB8h	O	X	O	O	O	X	X	X	Resetting removable media device
0xB9h	O	X	O	O	O	X	X	O	Disabling removable media device
0xBAh	O	X	O	O	O	X	O	X	Detecting presence of a removable media device (SATA CDROM detection, etc.)
0xBCh	O	X	O	O	O	O	X	X	Enabling / configuring a removable media device
Boot Device Selection (BDS)									
0xD0	O	O	X	O	X	X	X	X	Entered the Boot Device Selection phase (BDS)
0xD1	O	O	X	O	X	X	X	O	Return to last good boot device
0xD2	O	O	X	O	X	X	O	X	Setup boot device selection policy
0xD3	O	O	X	O	X	X	O	O	Connect boot device controller
0xD4	O	O	X	O	X	O	X	X	Attempt flash update boot mode
0xD5	O	O	X	O	X	O	X	O	Transfer control to EFI boot
0xD6	O	O	X	O	X	O	O	X	Trying to boot device selection
0xDF	O	O	X	O	O	O	O	O	Reserved for boot device selection
Pre-EFI Initialization (PEI) Core									
0xE0h	O	O	O	X	X	X	X	X	Entered Pre-EFI Initialization phase (PEI)
0xE1h	O	O	O	X	X	X	X	O	Started dispatching early initialization modules (PEIM)
0xE2h	O	O	O	X	X	X	O	X	Initial memory found, configured, and installed correctly
0xE3h	O	O	O	X	X	X	O	O	Transfer control to the DXE Core

Checkpoint	Diagnostic LED Decoder O = On, X=Off								Description
	Upper Nibble				Lower Nibble				
	MSB							LSB	
	8h	4h	2h	1h	8h	4h	2h	1h	
LED	#7	#6	#5	#4	#3	#2	#1	#0	
Driver eXecution Environment (DXE) Core									
0xE4h	O	O	O	X	X	O	X	X	Entered EFI driver execution phase (DXE)
0xE5h	O	O	O	X	X	O	X	O	Started dispatching drivers
0xE6h	O	O	O	X	X	O	O	X	Started connecting drivers
DXE Drivers									
0xE7h	O	O	O	X	O	O	X	O	Waiting for user input
0xE8h	O	O	O	X	O	X	X	X	Checking password
0xE9h	O	O	O	X	O	X	X	O	Entering BIOS setup
0xEAh	O	O	O	X	O	O	X	X	Flash Update
0xEEh	O	O	O	X	O	O	X	X	Calling Int 19. One beep unless silent boot is enabled.
0xEFh	O	O	O	X	O	O	X	O	Unrecoverable boot failure
Pre-EFI Initialization Module (PEIM) / Recovery									
0x30h	X	X	O	O	X	X	X	X	Crisis recovery has been initiated because of a user request
0x31h	X	X	O	O	X	X	X	O	Crisis recovery has been initiated by software (corrupt flash)
0x34h	X	X	O	O	X	O	X	X	Loading crisis recovery capsule
0x35h	X	X	O	O	X	O	X	O	Handing off control to the crisis recovery capsule
0x3Fh	X	X	O	O	O	O	O	O	Crisis recovery capsule failed integrity check of capsule descriptors
Runtime Phase / EFI Operating System Boot									
0XF2h	O	O	O	O	X	X	O	X	Signal that the OS has switched to virtual memory mode
0XF4h	O	O	O	O	X	O	X	X	Entering the sleep state
0XF5h	O	O	O	O	X	O	X	O	Exiting the sleep state
0XF8h	O	O	O	O	O	X	X	X	Operating system has requested EFI to close boot services has been cancelled.
Progress Code									
0XF9h	O	X	X	O	X	X	X	X	Resetting the keyboard
0xFAh	O	X	X	O	X	X	X	O	Disabling the keyboard

Appendix C: POST Error Beep Codes

The following table lists POST error beep codes. Prior to system video initialization, the BIOS uses these beep codes to inform users of error conditions. The beep code is followed by a user-visible code on POST Progress LEDs.

Table 25. POST Error Beep Codes

Beeps	Error Message	POST Progress Code	Description
3	Memory error	Multiple	System halted because a fatal error related to the memory was detected.

Glossary

This section contains important terms used in the preceding chapters. For ease of use, numeric entries are listed first (for example, "82460GX") with alpha entries following (for example, "AGP 4x"). Acronyms are then entered in their respective place, with non-acronyms following.

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

Reference Documents

Refer to the following documents for additional information:

- *Intel® Server Board S3420GP Technical Product Specification*
- *Intel® 3420 Series Chipsets Server Board Family Datasheet*
- *Intel® Server Chassis SR1630 AC Power Supply Module Specification*
- *Intel® Spares/Parts List and Configuration Guide*