intel®

Intel® Server Platform SR6850HW4

Technical Product Specification

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May, 2005

Enterprise Platforms and Services Division – Marketing

Revision History

Date	Revision Number	Modifications
May 2005	1.0	Initial release.

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1.   Product Overview

This product specification details the features of the Intel® Server Platform SR6850HW4. Reliability, low cost, time to market, modularity, high performance, and management features are primary considerations in the design.

The Server Platform SR6850HW4 supports up to four 64-bit Intel® Xeon™ Processors MP with up to 8MB L3 cache and incorporates features that clearly differentiate it as a high availability server. Building on previous server platforms, the Server Platform SR6850HW4 introduces redundant memory and networking in addition to the enterprise features of hot-swap power, cooling, PCI slots, and hard disk drives. Advanced server management features are also included to remotely monitor and manage the server. Finally, the server has two optional mass storage expansion features.

This document is organized into ten chapters:

Chapter 1:   Introduction
An overview of this document.

Chapter 2:   System Overview
An overview of the system hardware.

Chapter 3:   System Chassis and Sub-Assemblies
An overview of the chassis and major sub-assemblies.

Chapter 4:   Cables and Connectors
Describes the cables and connectors specific to the Server Platform SR6850HW4.

Chapter 5:   Power Supply
Describes the power supplies used in the Server Platform SR6850HW4.

Chapter 6:   Power Distribution Board
Describes the Power Distribution Board used in the Server Platform SR6850HW4 and Intel® Server Platform SR4850HW4.

Chapter 7:   SCSI Backplane Board
Describes the SCSI Backplane Board used in the Server Platform SR6850HW4.

Chapter 8:   Front Panel I/O and Control Boards
Describes the Front Panel I/O Board and Control Boards used in the Server Platform SR6850HW4.

Chapter 9:   SATA-to-IDE Converter Boards
Describes the SATA-to-IDE Converter Board used in the Server Platform SR4850HW4 and Server Platform SR6850HW4.

Chapter 10:   Regulatory Specifications
Describes system compliance to regulatory specifications.

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2.   System Overview

This chapter describes the features of the Intel® Server Platform SR6850HW4.

2.1   System Feature Overview

Table 1 provides a list and brief description of the features of the Server Platform SR6850HW4, which utilizes the Intel® Server Board Set SE8500HW4.

Table 1. Intel® Server Platform SR6850HW4 Feature List

Feature	Description
Compact, high-density system	Rack-mount server with a height of 6U (10.5 inches) and a depth of 28 inches (706mm)
Configuration flexibility	One to four 64-bit Intel® Xeon™ processors MP with up to 8MB L3 cache
	Two Ultra320* SCSI ports
	Two gigabit Ethernet ports
	Ten 1-inch hot-swap Ultra320 SCSI hard disk drives
	Seven PCI adapters (Four PCI Express* hot-plug, one PCI-X* 133MHz hot-plug, two PCI-X 100Mhz)
	64GB Double Data Rate2 (DDR2) 400 MHz Synchronous Dynamic Random Access Memory (SDRAM), ECC Registered
	Customizable bezel
	Optional system-specific 2Gbps Fibre Channel Module
	Optional RAID On Motherboard (ROMB) with DDR2 DIMM for disk cache and optional RAID Smart Battery (RSB) for cache battery backup
	Either button or LCD front panel
	Either Intel® Management Module (IMM) – Professional or Advanced
Serviceability	Tool-less design features
	Front access to hot-swap hard disk drives
	Top access to hot-plug PCI slots, cooling, and Hot-Swap Memory Boards
	Rear access to hot-swap power supplies
	Status and fault indicator LEDs
	Front and rear viewable System ID switches and LEDs
	Top viewable memory configuration and status LEDs
	Processor failure LEDs
	Detailed configuration label on top cover
	Color-coded parts to identify hot-swap and non-hot-swap serviceable components
Availability	Two 1570W power supplies in a redundant (1+1) configuration with separate power cords
	Four Hot-Plug Memory Boards
Manageability	Remote management
	Intelligent Platform Management Interface (IPMI) 2.0 compliant
	Wired For Management (WfM) 2.0 compliant
	Emergency Management Port (EMP) – IPMI over serial or modem
	Extensive system sensors and monitoring
	Remote diagnostics support via serial and LAN ports
	Web management console
	With IMM Advanced:

Feature	Description	
	Dedicated Out-Of-Band management RJ45 port (telnet, embedded web server, DNS, DHCP)	
	KVM console redirection and remote viewer	
	Full SNMP access	
Front panel interface	<u>Switches:</u> Power, Reset, NMI, System ID <u>Ports:</u> Video connector, Three USB 2.0	<u>LEDs:</u> Power, System ID, System status, LAN1 and LAN2 Activity, Hard drives status Optional LCD

2.2   Introduction

The platform supports sockets for up to four 64-bit Intel Xeon processors MP, up to 64GB of memory, ten hot-swap hard disk drives, seven PCI slots, two different server management modules, two different front control panels, and two optional mass storage expansions. The server can be configured for use as either a rack, as shipped, or pedestal, with an optional accessory kit.

Figure 1, Figure 2 and Figure 3 show front and rear views of the platform.
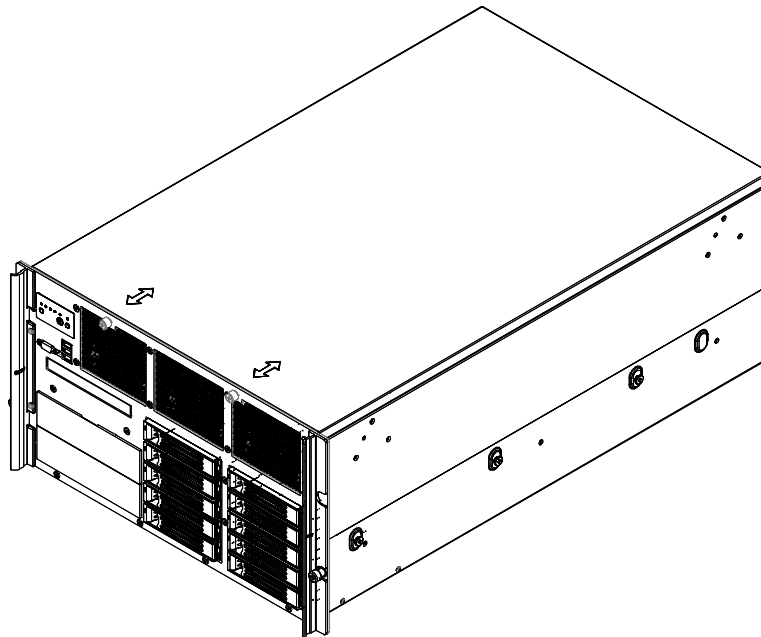
Figure 1. Intel® Server Platform SR6850HW4, Bezel Removed

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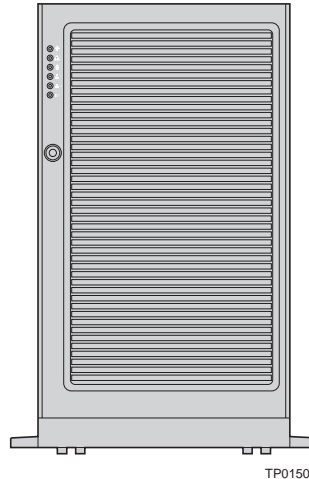
Figure 2. Server Platform SR6850HW4, Bezel and Pedestal Conversion Kit Installed

The Server Platform SR6850HW4 includes the Intel® Server Board Set SE8500HW4 with the E8500 chipset. To provide structural support the Intel Server Board Set SE8500HW4 Mainboard is mounted on a sheet metal tray that is installed at the rear of the chassis, above the power supplies.

Up to four Memory Boards can be installed into the Server Board Set SE8500HW4 Mainboard. The Memory Boards attach perpendicular to the Server Board Set SE8500HW4 Mainboard. These contain four DDR2 400HMz SDRAM DIMM slots each. With four Memory Boards installed, the system supports up to 64GB of memory (using 4GB DIMMs).

The hard drive bay, located at the front of platform, provides a bay for ten hot-swap 1-inch Ultra320* SCSI hard disk drives. SCSI hard disk drives plug into a vertical SCSI Backplane Board at the rear of hard disk drive bay. One Slimline (½-inch high) optical drive bay and one full-height 5¼-inch SCSI tape device bay are also located at the front of the platform.

The cooling subsystem requires six hot-swap system fan modules. Each fan module contains a status LED that illuminates in the event of a fan failure. The fan modules are accessible from the top of the system when the top cover is removed and connected into the SCSI Backplane Board.

The front control panel provides video, USB, buttons, status LEDs, and an optional LCD, that are used for monitoring and managing the platform. The front bezel is an optional cosmetic accessory that is installed with snap-on features. The bezel can be customized to meet integrator-specific industrial design requirements, including color and imprint.
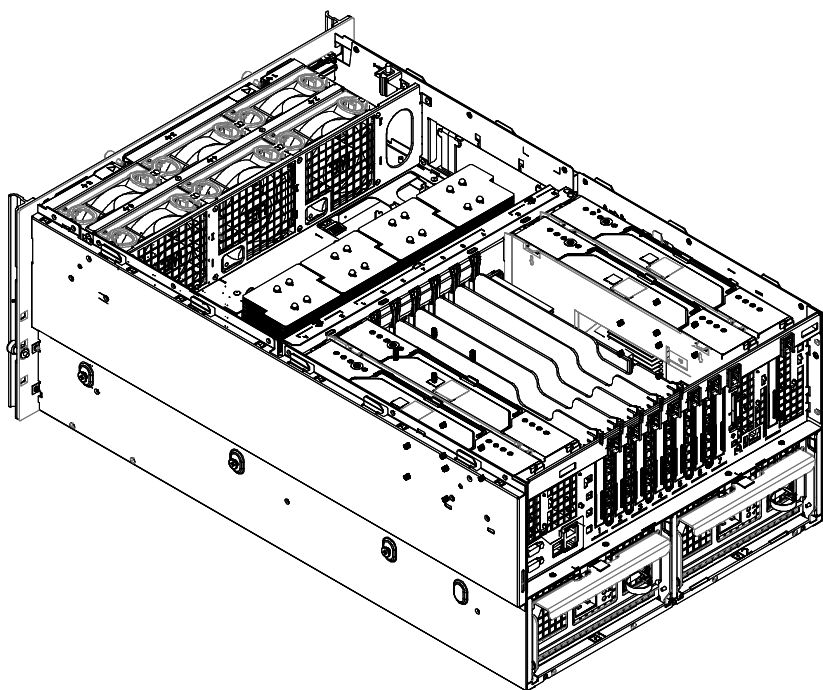
Figure 3. Server Platform SR6850HW4, Rear View with Top Cover Removed

The power supply modules are located at the rear of the system below the Server Board Set SE8500HW4 Mainboard and plug directly into connectors on the horizontally oriented Power Distribution Board. The system supports two hot-swap power supply modules in a 1+1 redundant configuration or one hot-swap power supply and a power bay fan module in a non-redundant state.

Upon removal of the top cover, the user has access to the processors, Memory Boards, PCI adapters, IMM Board and optional mass storage features.
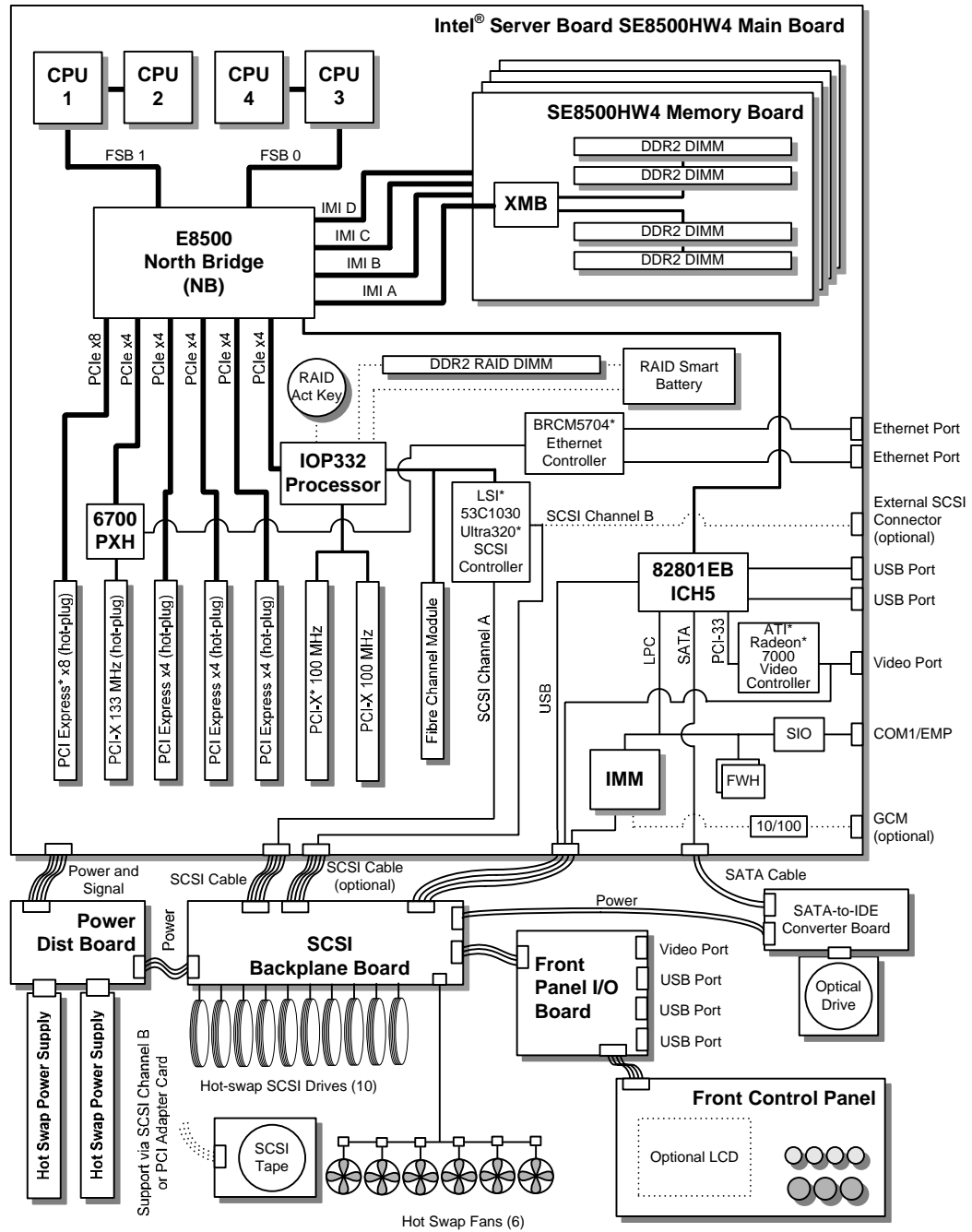
Figure 4.   Server Platform SR6850HW4 Chassis Block Diagram

2.3   External Chassis Features - Front

Table 2 shows the front view of the Server Platform SR6850HW4 with the bezel removed. The front provides access to the following components:

- Buttons and LEDs (with optional LCD)
- Video and USB connectors
- Hard drive bay, optical drive, SCSI tape device
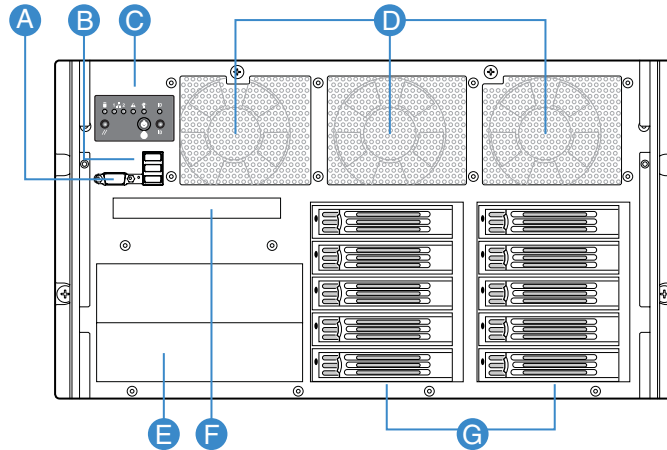
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A	Video connector
B	USB 2.0 ports (three)
C	Front control panel (button control panel shown)
D	Hot-swap fans (six)
E	5 ¼ peripheral bay (full height)
F	Optical drive bay
G	Hot-swap SCSI hard disk drives (ten)

Table 2. Front View of the Server Platform SR6850HW4, Bezel Removed

2.3.1   Front Control Panel

The front control panel contains system control buttons and LED status indicators. It also contains one video connector, three USB 2.0 ports, NMI button, and the system speaker. The front bezel must be removed to access the front control panel switches and connectors. All LEDs are visible with the front bezel installed. See Chapter 8 or a description of the Front Panel Boards.

2.3.2   Hot-swap Hard Disk Drive and Peripheral Device Bays

The hard disk drive and peripheral device bays can accommodate the following devices:

- Ten 1-inch hot-swap Ultra320 SCSI hard disk drives
- One ½-inch optical drive (installed with base system)
- Two half-height or one full-height 5¼-inch SCSI tape device

Note: Cooling and EMI constraints do not allow installation of an IDE hard disk drive in the tape device bay.

The SCSI Backplane Board supports Low Voltage Differential (LVD) SCSI drives only. Single-ended (SE) devices are supported off the secondary external SCSI channel on the Server Board Set SE8500HW4 Mainboard. SE devices are not supported in the hot-swap hard disk drive bays in the front of the system, or validated by Intel.

The optical drive and SCSI tape device(s) are not hot-swap devices. System power must be turned off when installing or removing these drives.

Because hard disk drives have different cooling, power, and vibration characteristics, Intel will validate specific hard disk drive types in the Server Platform SR6850HW4. See the *Intel Server Board Set SE8500HW4 Tested Hardware and Operating System List* for the qualified drives.

The hard disk drive carriers supplied with the system accommodate 3½-inch x 1-inch SCSI hard disk drives. The hard disk drive is attached to the carrier with four Phillips*-head screws. The carrier is retained in the chassis by a locking handle.

The SCSI Backplane Board contains a dual color LED for each hard drive to display status. The LED signal is transmitted to the front of the system via a light pipe integrated in the hard drive carrier.

Due to the required cable length and bus performance, the Server Board Set SE8500HW4 Mainboard contains a Serial ATA (SATA) connecter instead of a Parallel ATA (PATA) connector. The optical drive connects to the SATA-to-IDE Converter Board, which converts the SATA signal to an IDE signal for the 1/2-inch optical drive. The optical drive is installed in a sheet metal bracket and then installed in the Server Platform SR6850HW4.

See Chapter 7 for a description of the SCSI Backplane Board. See Chapter 9 for descriptions of the SATA-to-IDE Converter Board.

2.4   External Chassis Features - Rear

Figure 5 shows the rear view of the Server Platform SR6850HW4. The user-accessible connectors, PCI slots, and power supply modules located at the rear of the system are described in the following sections.
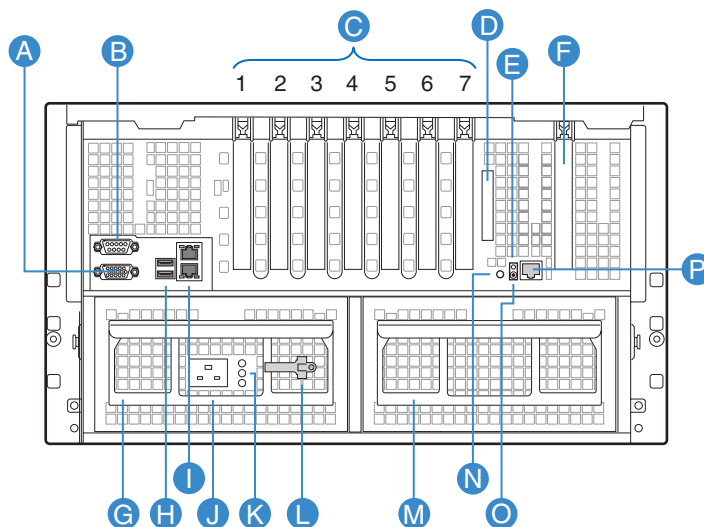
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A	Video connector
B	Serial port connector
C	PCI slots
	Slot 1 PCI Express* x8 (hot-plug)
	Slot 2 PCI-X* 133Mhz, 64-bit (hot-plug)
	Slot 3 PCI Express x4 (hot-plug)
	Slot 4 PCI Express x4 (hot-plug)
	Slot 5 PCI Express x4 (hot-plug)
	Slot 6 PCI-X 100Mhz, 64-bit (not hot-plug)
	Slot 7 PCI-X 100Mhz, 64-bit (not hot-plug)
D	External SCSI connector
E	System ID LED (blue)
F	Fibre Channel Module slot (optional accessory)
G	Power supply unit
H	USB 2.0 ports (two)
I	LAN ports, RJ45 connector (LAN1 on top, LAN2 on bottom)
J	AC input power connector
K	Power supply unit status LEDs
L	Power cord retention featurek
M	Active fan power supply blank
N	System ID button
O	DC jack (not used)
P	Dedicated server management port, RJ45 connector (used with the IMM Advanced)

Figure 5. Rear View of the Server Platform SR6850HW4

2.5   Internal Chassis Features

2.5.1   Server Board Set SE8500HW4 Mainboard

The Server Board Set SE8500HW4 Mainboard supports the following features:

- Four sockets for 64-bit Intel Xeon processors MP with 1MB L2 cache or 64-bit Intel Xeon processors with up to 8MB L3 cache
- Four PCI Express* x16 Memory Board connectors
    - Four independent memory interface buses
    - Supports hot-remove and hot-add operations
- Dual 667 MT/s Front Side Buses (FSB)
- Intel E8500 chipset North Bridge (NB) with two shared 64-bit FSB interfaces configured for symmetric multiprocessing (SMP)
- Intel E8500 chipset eXtended Memory Bridge (XMB) for support of memory hot-plug
- Intel® 6700 PXH 64-bit Hub which acts as the bridge between the NB and PCI-X bus
- Intel® 82801EB I/O Controller Hub 5 (ICH5) which provides USB 2.0 and SATA
- Intel® IOP332 storage I/O Processor for mass storage and PCI-X slots
- LSI Logic* 53C1030 Ultra320* SCSI Controller: provides two independent Ultra320 SCSI interfaces
- Broadcom* BRCM5704 NetXtreme* Gigabit Ethernet controller: provides two ports on the rear of the Mainboard
- ATI* Radeon* 7000 video controller
    - 16MB embedded SDRAM
    - Mirrored to both the rear and front I/O ports by default
- Advanced I/O slots including PCI Express and PCI-X and support circuits:
    - One hot-plug PCI Express x8 slot
    - Three hot-plug PCI Express x4 slots
    - One hot-plug 64-bit PCI-X 133MHz slot
    - Two 64-bit PCI-X 100MHz slots (not hot-plug)
- Buttons and LED indicators for PCI hot-plug slots
- Low Pin Count (LPC) Super I/O* enables the serial port/EMP
- USB 2.0 support
    - Two ports at the rear of chassis
    - Three ports on front of the chassis
- 4MB Flash capacity to support rolling BIOS updates
- Optional ROMB support: provides two channels of RAID 0, 1, 5, 10 or 50
- Optional custom Fibre Channel Module: provides two optical connectors
- Server management support via the Intel Management Module (IMM) connector

See the *Intel Server Board Set SE8500HW4 Technical Product Specification* for a description of this board.

2.5.2 Server Board Set SE8500HW4 Memory Board

Each Memory Board supports the following features:

- PCI Express x16 card edge connector that plugs into the Server Board Set SE8500HW4 Mainboard
- Intel E8500 chipset eXtended Memory Bridge (XMB)
- Four DDR2 400HMz DIMM slots for registered ECC memory
- Support for both single-rank and dual-rank DIMMs
- Two DDR2 400MT/s busses
- Independent Memory Interface (IMI), a high-speed differential bus
- LED error indicators for each DIMM and an attention LED for hot-plug events
- LED indicator for both memory mirroring and RAID configurations
- Memory hot-plug at the card level, based on the PCI hot-plug model
- Field Replaceable Unit (FRU) device
- Two temperature sensors
- Safety mechanism for instant power shut-down to the Memory Board when not properly removed or inserted

See the *Intel Server Board Set SE8500HW4 Technical Product Specification* for descriptions of this board.

2.5.3 Power Distribution Board

The Power Distribution Board is located horizontally, below the Server Board Set SE8500HW4 Mainboard in the middle-rear of the chassis. It has two connectors for the hot-swap power supply modules and provides 12V, standby power and server management signals to the Server Board Set SE8500HW4 Mainboard and SCSI Backplane Board. The power distribution circuitry reports quantity, quality, and location of the installed power supplies through I^2C server management. See Chapter 6 for a description of this board.

2.5.4 SCSI Backplane Board Board

The SCSI Backplane Board mounts vertically in the front of the system and contains ten industry-standard hot-swap Single Connector Attach 2 (SCA-2) connectors (80-pin). Ultra320 (or slower) Low Voltage Differential (LVD) SCSI hard disk drives can be installed in the system. The backplane accepts 15,000-RPM (and slower) hard disk drives. Single-Ended (SE) SCSI devices are not supported in the hot-swap hard disk drive bay.

The SCSI Backplane Board performs the tasks associated with hot-swapping of the hard disk drives and enclosure (chassis) monitoring and management, as specified in the *SCSI Accessed Fault-Tolerant Enclosures (SAF-TE) Specification.* The SAF-TE-specified features supported by the SCSI Backplane Board include, but are not limited to, the following:

- Monitoring the SCSI bus for enclosure services messages, and acting on them appropriately. Examples of such messages include: activate a drive fault indicator; power down a drive that has failed; and report backplane temperature.
- SAF-TE intelligent agent acts as proxy for "dumb" I^2C devices (that have no bus mastering capability) during intrachassis communications.

The SCSI Backplane Board connects to the Server Board Set SE8500HW4 Mainboard, provides power, and signals to the front of the chassis. See Chapter 7 for a description of this board.

2.5.5   Front Panel I/O Board

The Front Panel I/O Board mounts horizontally in the front left of the system and communicates with the SCSI Backplane Board. The board contains a video connector, three USB ports and an NMI button. See Chapter 8 for a description of this board.

2.5.6   Front Panel Control Board

Two different front panel Control Boards are supported, the standard control panel and the Intel Local Control Panel (LCP). Both mount vertically into the chassis and connect to the Front Panel I/O Board via a cable. Each module houses the system operating buttons, LEDs and the Local Control Panel has an LCD. See Chapter 8 for a description of these boards.

2.5.7   SATA-to-IDE Converter Board

The SATA-to-IDE Converter Board attaches to the optical drive carrier, receives the SATA signal from the Server Board Set SE8500HW4 Mainboard via a SATA cable, and converts it to IDE signals routed to the optical drive. See Chapter 9 for a description of this board.

2.5.8   Intel® Management Module

The Intel Management Module (IMM) mounts onto the Server Board Set SE8500HW4 Mainboard and contains the Baseboard Management Controller (BMC) that provides server management support. There are two versions of the IMM, the Professional and Advanced. The Advanced module adds more support for remote management. The Server Platform SR6850HW4 will not boot without one of these modules installed. See the *Intel Management Module Installation and User's Guide* or the *Intel Management Module Technical Product Specification* for a description of this part.

2.5.9   Fibre Channel Module

The Server Board Set SE8500HW4 Mainboard supports the Intel Fibre Channel Module as a mass storage expansion option. The card is based on the Qlogic* ISP2322 FC PCI-X controller and plugs into a reversed PCI Express x16 slot on the Server Board Set SE8500HW4 Mainboard. See the *Intel Fibre Channel Module Users Guide* for descriptions of this board.

2.5.10   RAID On Motherboard (ROMB)

The Server Board Set SE8500HW4 Mainboard supports a RAID On Motherboard (ROMB) solution via the Intel IOP332 storage I/O Processor in conjunction with the LSI Logic* 53C1030 SCSI controller. To enable this option the Intel RAID Activation Key and a DDR2 400MHz DIMM are required. The optional Intel RAID Smart Battery is also available to maintain the contents of the DIMM in the event of power loss. See the *Intel RAID Smart Battery Technical Product Specification* for a description of the ROMB solution.

2.5.11   Power Supply Module

Two hot-swap power supply modules are installed side by side at the rear of the chassis. Each supply has its own AC input power connector and is rated at 1570W over an input range of 100-240 VAC.

The power subsystem is configured as follows:

- With two power supply modules installed, a fully configured system has (1+1) power redundancy.
- With one supply module installed, the system does not have redundant power but will still run a fully configured system.

Note: When only one power supply module is installed, the active fan module is required in the unpopulated power supply slot for proper system cooling.

One power supply module is capable of handling the maximum power requirements for a fully configured Server Platform SR6850HW4, which includes four processors, 64 GB of memory, seven PCI add-in cards, ten hot-swap hard disk drives, an optical drive, a Fibre Channel Module, ROMB options installed, and a SCSI tape device.

When two power supply modules are installed, the user can replace a failed power supply module without affecting the system functionality. Power supplies have three LEDs to identify failure, power good and AC OK.

The power subsystem receives AC power through two power cords. When two power supply modules and two power cords are installed, the system has (1+1) power cord redundancy and can be powered by two separate AC sources. In this configuration, the system will continue to function without interruption if one of the AC sources fails. See Chapter 5 for more information.

Note: The total power requirement for the Server Platform SR6850HW4 exceeds the 240 VA energy hazard limits that define an operator accessible area. As a result, only

qualified technical individuals should access the processor and non-hot-plug I/O
areas while the system is energized. Power cords should be removed from the
system before accessing non-hot-plug areas.

2.5.11.1   System Power Budget

Table 3 shows a summary of the system power budget. The power budget lists each major
voltage rail in columns and each major subsystem of the product in rows. The worst-case
power per subsystem is listed for each voltage rail. The total power per voltage rail, the
power supply specification, and the margin available are shown at the bottom of the table.

Table 3. System Power Budget

Subsystem	Qty	+3.3V	+5V	+12V (Total)	+3.3V$_{stby}$
Mainboard	1	49W	27W	147W	15W
SCSI Backplane Board Board	1		2.5W	2.5W	
Front Panel I/O Board and front panel	1ea	2W		2W	
Processors	4			448W	
Memory	16	4W		192W	
Fans	6			173W	
Hard disk drives	10		28W	84W	
½inches optical drive	1		1W	6W	
SCSI tape device	1		3W	7W	
PCI-X* slots	3			45W	
PCI Express* slots	4			80W	
Fibre channel module	1			15W	
System Total				**1189.5W**	**15W**
Power subsystem spec				1570W	16.5W
Margin				380.5W	1.5W

Notes:
1. 3.3V and 5V are derived from the 12V single switched output of the power
   supply modules. The 12V column includes the 3.3V and 5V power.
2. 3.3V$_{stby}$ is the standby output of the power supply modules.

2.5.12 Cooling Subsystem

Primary cooling is generated by six fans, located at the top front of the chassis. It connects to the SCSI Backplane Board for power and server management. Air flows in through the front and exhausts out the rear of the chassis. The chassis has several air baffles to duct the air over critical parts, including processors, memory, and peripherals. Processor heat sinks or processor heat sink blanks, and Memory Boards or Memory Board blanks must be installed in each corresponding area to ensure proper airflow.

The system fans are sized to provide cooling for a fully configured system. The cooling system is designed using a worst-case analysis and appropriate fan speeds were chosen to meet acoustic and thermal requirements. Server management controls fan speed based on ambient and component temperatures. To ensure proper cooling, failed fans should be replaced within 1 minute.

2.6 New Platform Features

2.6.1 Advanced Memory Performance and Protection

The Server Board Set SE8500HW4 supports several new memory features that allow flexibility in performance, redundancy and the ability to upgrade. The System BIOS can be configured as follows:

- Maximum performance, where memory is up to four-way interleaved
- Maximum compatibility, where memory can be hot-added
- Memory mirroring, where two or four boards are used to keep a copy of system memory
- Memory RAID, where four boards are used in a RAID4-like mode
- Memory sparing, where a portion of each Memory Board is reserved for failover.

Hot-replace means the user can replace a Memory Board with another Memory Board of identical total size. This operation is supported in maximum compatibility, memory RAID and memory mirroring modes.

Hot-add means the user can add a Memory Board to a previously unoccupied slot. This requires operating system support and is supported in memory compatibility and memory mirroring modes.

Hot-removal means the user can remove a Memory Board. This operation is supported in memory RAID and memory mirroring modes.

Hot upgrade means the user can replace an existing Memory Board with a Memory Board that contains more memory capacity. A hot upgrade is not a unique operation, it is implemented as a hot-remove followed by a hot-add. This requires operating system support and is supported by the memory RAID mode only.

See the *Intel Server Board Set SE8500HW4 Technical Product Specification* for more details on these new features.

2.6.2   Rolling BIOS

The Server Board Set SE8500HW4 Mainboard supports two BIOS images to be stored in Flash. This provides a mechanism for BIOS updates without a system reboot as well as failover to an alternate image in the event of BIOS corruption. The system runs with the current BIOS until a reboot, after which time the updated BIOS is used. See the *Intel Server Board Set SE8500HW4 Technical Product Specification* for more details on this feature.

2.7   Server Management

The management subsystem conforms to the *IPMI v2.0 Specification.* The server management features are implemented using two microcontrollers: the Intel Management Module that plugs into the Server Board Set SE8500HW4 Mainboard, and the SCSI hot-swap controller on the SCSI Backplane Board. The functions of each component are summarized in the following sections.

2.7.1   Intel Management Module (IMM)

The IMM has a Baseboard Management Controller (BMC) microcontroller and associated circuitry. The IMM contains flash memory that holds the operation code and the BMC configuration settings. The IMM monitors platform management events and logs their occurrence on the onboard non-volatile System Event Log (SEL). This includes events such as over-temperature and over-voltage conditions, fan failures, etc. The IMM also provides the interface to this monitored information so system management software can poll and retrieve the present status of the platform.

The IMM also provides the interface to the non-volatile Sensor Data Record (SDR) repository. SDRs provide a set of information that system management software can use to automatically configure itself for the number and type of IPMI sensors (e.g., temperature sensors, voltage sensors, etc.) in the system.

The following is a list of the major functions for the IMM:

- System power control
  - ACPI power control
  - ACPI sleep support
  - Minimum power off time
- System reset control
- System initialization
  - Processor temperature and voltage threshold setting
  - Fault Resilient Booting (FRB)
- Front panel user interface
  - System status (green) LED control
  - System status (amber) LED control
  - System ID LED control
  - Reset button control
  - Power button control
  - SDINT button control

- System ID Button control
- System fan management
- System management watchdog timer
- System Event Log (SEL) interface – up to 3,200 entries
- Sensor Data Record (SDR) repository interface
- SDR/SEL timestamp clock
- FRU inventory device
- Diagnostics and beep code generation
- Event message generation and reception
- Platform Event Paging and Platform Event Filtering (PEP and PEF)
- Dial page alerting
- Alert over LAN and serial/PPP
- Serial over LAN (SOL)
- Terminal Mode (TM)
- Battery monitoring
- Sensor monitoring
  - Temperature
  - Voltage
  - Fan speed
  - Processor status
  - Power supplies
- Processor Information ROM (PIROM) and Scratch Electrically Erasable Programmable ROM (SEEPROM) access
- IPMB communication interface
- Emergency Management Port (EMP) interface - IPMI messaging over Serial/Modem. This feature is also referred to as DPC (Direct Platform Control) over Serial/Modem
- Inter-Chassis Management Bus (ICMB) interface - IPMI messaging between chassis
- Additional features with IMM Advanced installed:
  - Dedicated (Out-Of-Band) LAN interface through the Generic Communication Module (GCM) on the rear of chassis (IMM Advanced)
  - BMC-resident SNMP support for Out-Of-Band access using 3rd party applications such as HP* Openview*
  - Embedded web server to access system health, view the SEL and issue IPMI commands
  - Embedded Command Line Interface (using telnet server running on the BMC) to allow direct access to the BMC
  - Alerting via email
  - Keyboard, Video, Mouse (KVM) console redirection and remote viewer

See the *Management Module Technical Product Specification* for more information.

2.7.2   Hot Swap Controller

Two hot-swap controllers are on the SCSI Backplane Board. The primary function of each hot-swap controller is as follows:

- Implements the SAF-TE command set
- Controls the SCSI hard disk drive power, activity and fault LEDs
- Provides a path for management information via the SCSI bus
- Retrieves hard disk drive fault status, SCSI Backplane Board temperature, and fan failure information via IPMB
- Queries the status of the Power Distribution Board by retrieving information from the IMM via IPMB
- Controls hard disk drive power-on and power-down, facilitating hot-swapping

2.8   Reliability, Availability, Serviceability, Usability, Manageability (RASUM)

The Server Platform SR6850HW4 supports the following reliability, availability, serviceability, usability and manageability (RASUM) features:

- Reliability features
    - Machine check architecture
    - Error Checking Code (ECC) in main memory and processor caches
    - ECC, parity, and protocol checking on the FSB
    - Parity on the Hub Link (HL-1.5) interface
    - Parity checking on PCI buses
    - RAID On Motherboard (ROMB) with the Intel RAID Smart Battery which provides battery back-up to the DDR2 400MHz DIMM for disk cache
    - Voltage and temperature monitoring throughout the system
- Availability features
    - Hot-plug PCI Express and PCI-X
    - Hot-Plug Memory Boards
    - Redundant hot-swap power supplies
    - Redundant power cords
    - Redundant hot-swap system fans
    - Hot-swap SCSI hard drives
    - Teaming and failover Ethernet ports
- Serviceability features
    - Tool-less installation and removal of major sub-assemblies
    - Color-coded parts to identify serviceable components
      Green: Hot-swap or hot-plug components
      Blue: Non-hot-swap components

    - System ID buttons and LEDs
    - LED indicators for system health, configured options, and activity

- Usability features
  - Tool-less design features
  - External access to hot-swap hard disk drives, power supplies, LEDs and switches
  - Front and rear viewable System ID switches and LEDs
  - Detailed configuration label on top cover
  - Color-coded parts to identify hot-swap and non-hot-swap serviceable components
- Manageability features
  - Remote management via serial and LAN
  - IPMI 2.0 and WfM 2.0 compliance
  - Remote diagnostics via serial and LAN
  - Remote management via KVM and dedicated LAN (IMM Advanced)

All boards are connected by a server management I^2C bus to satisfy the system RASUM requirements.

2.9 Expansion Support

Table 4 summarizes the expansion support provided by the platform.

Table 4. Expansion Support

Quantity	Type
4	64-bit Intel® Xeon™ processors MP
7	PCI expansion bus slots
10	Single connector attachment (SCA-2) Ultra320* SCSI hard disk drive bays
1	5 1/4-inch full-height drive bay
1	External SCSI connector
16	DDR2 400HMz SDRAM registered ECC DIMM module sockets (four per memory module)
1	RAID On MotherBoard (ROMB) socket, DDR2 DIMM socket and battery connector
1	Fibre Channel module connector (with two FCAL 2GBps connectors)

2.10 Specifications

2.10.1   Environmental Specifications Summary

The Server Platform SR6850HW4 will be tested to the environmental specifications as indicated in Table 5.

Table 5. Environmental Specifications Summary

Environment	Specification	
Temperature operating	10°C to 35°C	50°F to 95°F
Temperature non-operating	-40°C to 70°C	-40°F to 158°F
Altitude	-30 to 1,500 m	-100 to 5,000 ft
Humidity non-operating	95%, non-condensing at temperatures of 25°C (77°F) to 30°C (86°F)	
Vibration non-operating	2.2 Grms, 10 minutes per axis on each of the three axes	
Shock operating	Half-sine 2 G, 11 ms pulse, 100 pulses in each direction, on each of the three axes	
Shock non-operating	Trapezoidal, 25 G, two drops on each of six faces ∆V : 175 inches/sec on bottom face drop, 90 inches/sec on other 5 faces	
Safety	UL60 950, CSA60 950, AS/NZS 3562, GB4943-1995, EN60 950 *and* 73/23/EEC, IEC 60 950, EMKO-TSE (74-SEC) 207/94, GOST-R 50377-92	
Emissions	Certified to FCC Class A; tested to CISPR 22 Class A, EN 55022 Class A *and* 89/336/EEC, VCCI Class A, AS/NZS 3548 Class A, ICES-003 Class A, GB9254-1998, MIC Notice 1997-42 Class A, GOST-R 29216-91 Class A, BSMI CNS13438	
Immunity	Verified to comply with EN55024, CISPR 24, GB9254-1998, MIC Notice 1997-41, GOST-R 50628-95	
Electrostatic discharge	Tested to ESD levels up to 15 kilovolts (kV) air discharge and up to 8 kV contact discharge without physical damage	
Acoustic	Sound pressure: < 55 dBA at ambient temperature < 23° C measured at bystander, floor standing position Sound power: < 7.0 BA at ambient temperature < 23° C measured using the Dome Method GOST MsanPiN 001-96	

See Chapter 10 for more information on environmental specifications.

2.10.2   Physical Specifications

Table 6 describes the physical specifications of the Server Platform SR6850HW4.

Table 6. Physical Specifications

Specification	Value	
Height – 6U	10.5inches	262 mm
Width	17.6inches	447 mm
Depth	27.8inches	706 mm
Front clearance	3inches	76 mm
Side clearance	1inches	25 mm
Rear clearance	6inches	152 mm
Weight (full config)	130 lbs	60 kg

Note: The system weight is an estimate for a fully configured system and will vary depending on number of peripheral devices and add-in cards, and the number of processors and DIMMs installed in the system.

3.   Server System Chassis and Assemblies

This chapter provides an overview of the chassis and assembly pieces that reside within the platform. This chapter is divided into the following areas:

Section 3.1:   Chassis, Rails and Top Cover

Section 3.2:   Power and Fans

Section 3.3:   Fan Subsystem

Section 3.4:   Mainboard Assembly

Section 3.5:   Peripherals Bay and Front Panel

Section 3.6:   Front Bezel

3.1   Chassis, Rails and Top Cover

3.1.1   Chassis

The Server Platform SR6850HW4 utilizes a standard 19-inch EIA chassis that is 6U high x 28 inches deep. The chassis can be rack-mounted or used as a pedestal system. Rack mounting the platform requires a 6U x 19 inches x 34 inches deep space, with the extra six inches required for cable management. When used in a rack, the chassis can be mounted with an optional rail kit and cable management arm. Pedestal operation requires a pedestal conversion kit that consists of a different bezel, floor supports/wheels and a cosmetic cover.

The 6U height is defined by standard EIA rack units where 1U = 1.75-inches. The 28-inch depth is measured from the front mounting flange to the back of the PCI slots. This measurement does not include cables or the bezel.
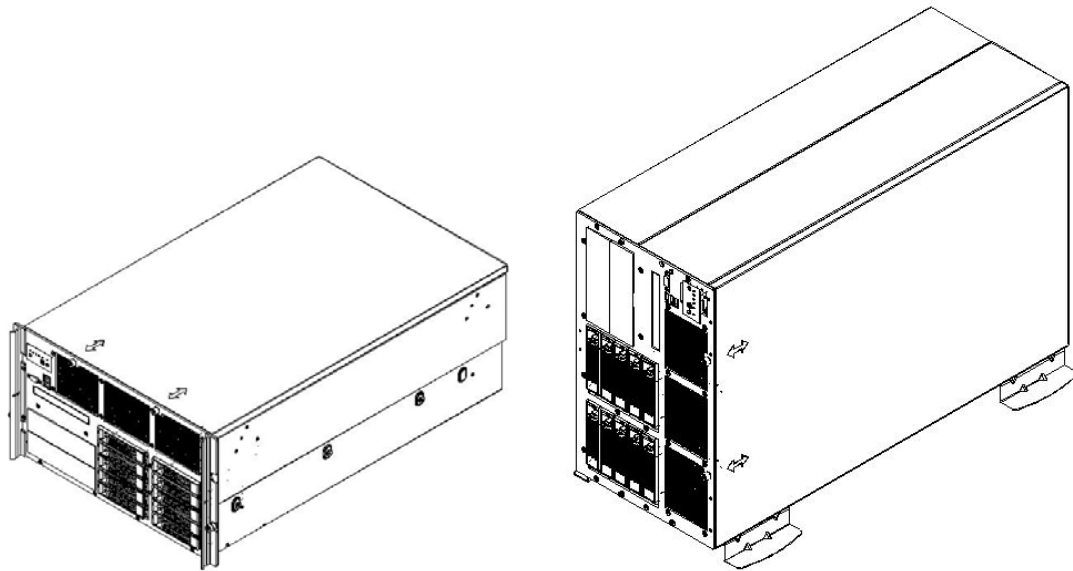
Figure 6. Server Platform SR6850HW4 Rack and Pedestal Configurations

Memory Modules

PCI Adapter Slots

Slide Rail Mount Points
(both sides of chassis)
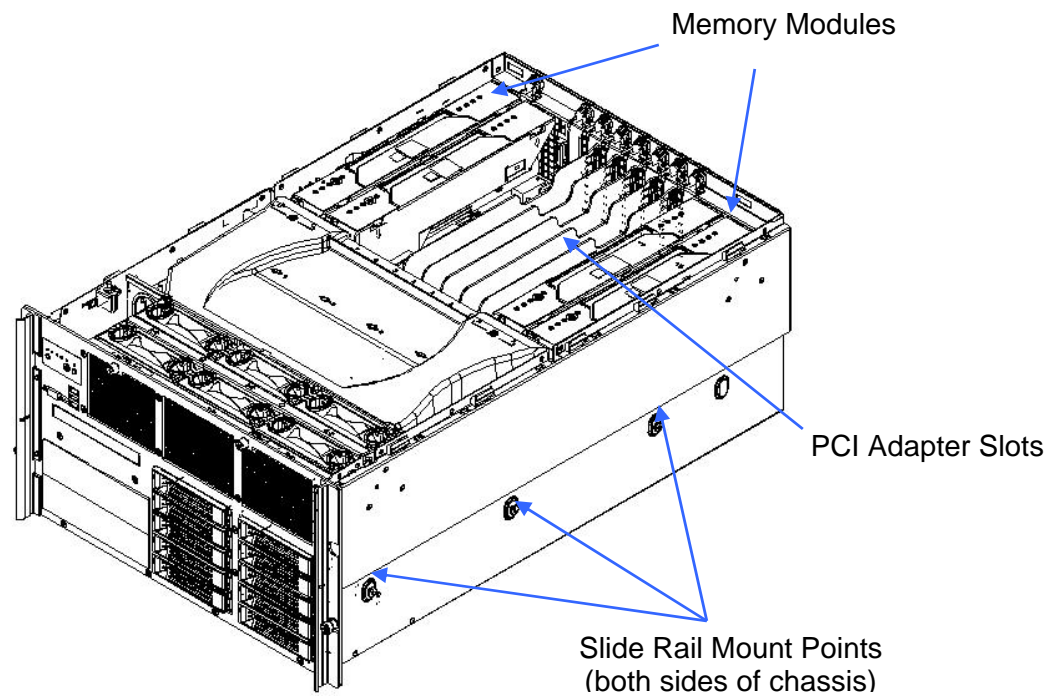
Figure 7.   Server Platform SR6850HW4, Bezel and Top Cover Removed

3.1.2 Slide Rails

The Server Platform SR6850HW4 accommodates slide rails to mount the chassis into a standard 19-inch rack. The slide rails attach to studs on the sides of the chassis using keyhole features on the slide rails. No loose hardware is needed. Intel produces two accessories common to enterprise servers:

- AXXRAIL3U7U, which attach to the provided mounts, or any 3U to 7U server that has mounts in these locations
- AXXCMA3U7U, which attaches to the rail accessory to provide a cable management arm.

3.1.3 Top Cover

The top cover is a one-piece design. It attaches to the chassis with a series of slots in the sides of the chassis that align with tabs in the top cover. To install the top cover, the tabs drop into the slots and the cover slides forward. Two captive non-knurled screws on the faceplate secure the top cover in place. A tool is required to remove or install these screws. In addition, the cover has a label on the bottom side that describes system layout, jumpers and a summary of common tasks.

3.2 Power and Fans

The power bay provides space for two power supply modules/blanks and for the Power Distribution Board. It is an integral member of the chassis structure. Each power supply in the power bay is approximately 7.7-inches (W) x 14.2-inches (D) x 4.1-inches (H). The redundant AC power inputs are external to the system.

The Power Distribution Board distributes the power in two ways. First, a connector on the back edge of the board mates to the power supplies. Second, a cable routes +12V power to the SCSI Backplane Board and +3.3V_{stby},+12V power and signals to the Server Board Set SE8500HW4 Mainboard. The AC power is filtered with a combination 15A power plug integrated with a filter.
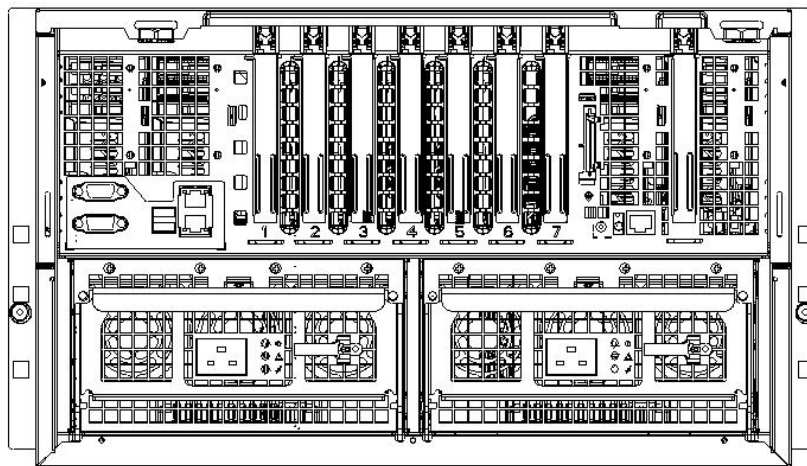
Figure 8. Rear of Server Platform SR6850HW4, Power Supplies Installed

3.3   Fan Subsystem

The six system fans are accessible for hot-swap operations at the top of the chassis. The fan assembly has an integrated amber LED wired to the top of the assembly. This LED lights when the fan is not functioning within specification. The fan connector extends from the bottom of the fan assembly and mates into floating connectors routed to the Server Platform SR6850HW4 SCSI Backplane Board.

Failure LED
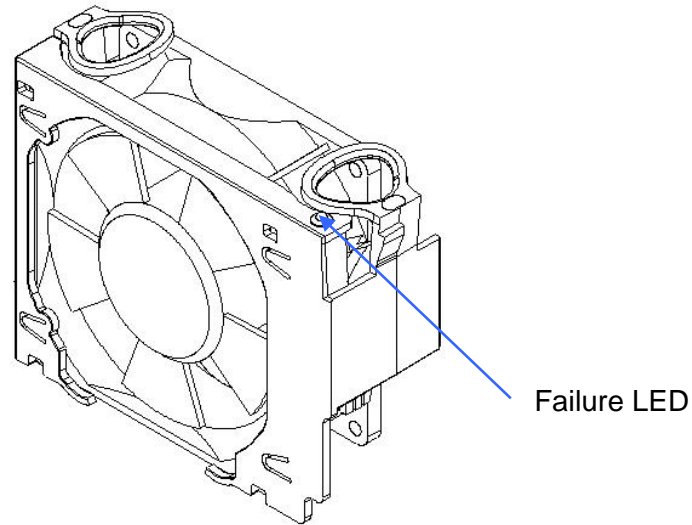
Figure 9. System Fan

3.4   Mainboard Assembly

The Server Board Set SE8500HW4 Mainboard mounts to a sheet metal tray with four metal springs from the Intel Component Enabling Kit (CEK) and four non-captive screws. The Server Board Set SE8500HW4 Mainboard assembly is mounted in the chassis with slot and tab hooks. It is secured into the chassis by a single captive fastener.

Memory Boards mount vertically on the left and right side of the board however, processors and heatsinks mount in the front.

Processors and
Heat Sinks
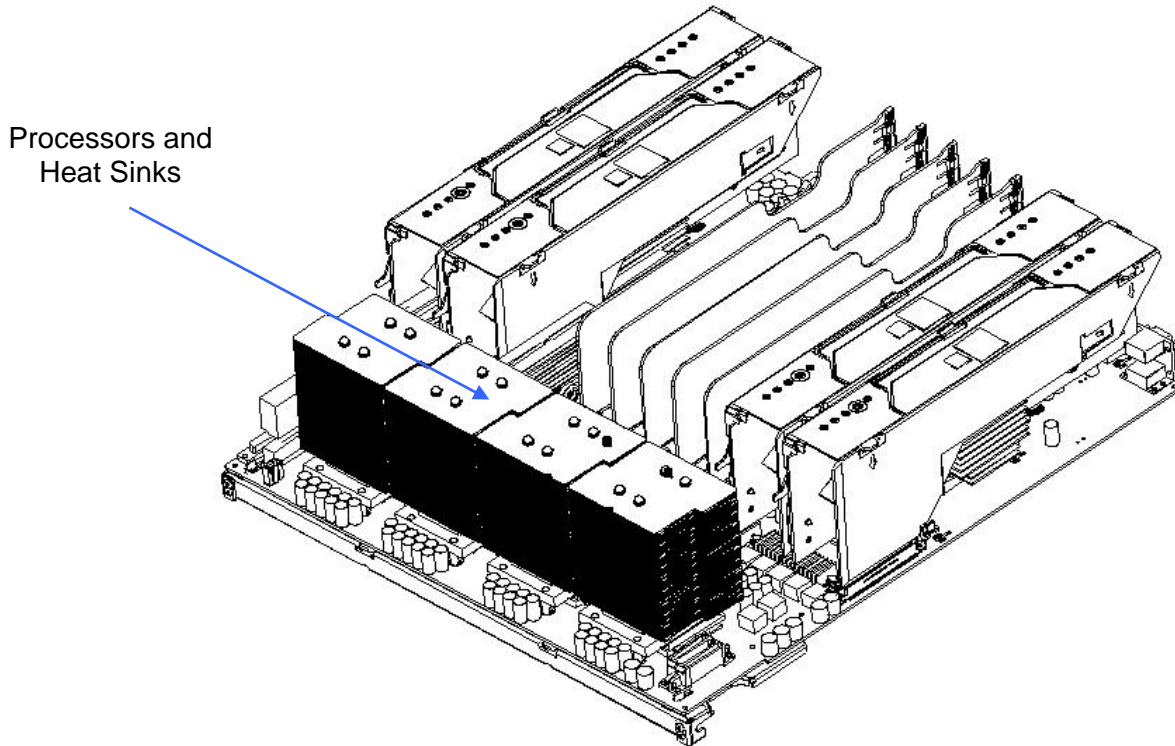
Figure 10. Mainboard and Sheet Metal Tray, Assembly

3.5   Peripheral Bay and Front Panel

The peripheral bay is a sheet metal enclosure with features to mount the hot-swap SCSI hard disk drives, 5¼-inch device, and an optical drive. The SCSI Backplane Board has slots on it that slide into hooks on the peripheral bay. A plunger and captive thumbscrew secure the SCSI Backplane Board and Front Panel I/O Board to the peripheral bay.

3.5.1 Hot-Swap Hard Disk Drive Carrier

The hot-swap hard disk drive carrier is an assembly that provides guides for installing hard disk drives. The carrier has an integrated light pipe to transfer the LED indicator from the SCSI Backplane Board to the front of the drive carrier and an insertion/extraction mechanism. The hard drive bezel can be customized to meet integrator-specific industrial design requirements, by changing the color and imprint.

Latch

LED
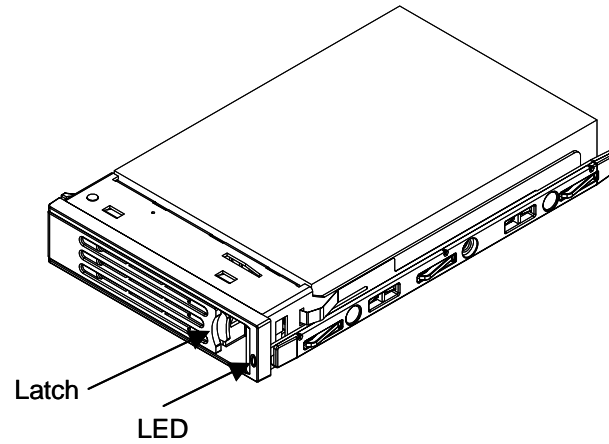
Figure 11. Hot-Swap Hard Drive Carrier

3.5.2   Optical Drive Carrier

The optical drive is installed in a sheet metal bracket. The SATA-to-IDE Converter Board is plugged into the IDE connector at the back of the optical device. This assembly is then installed into the chassis.
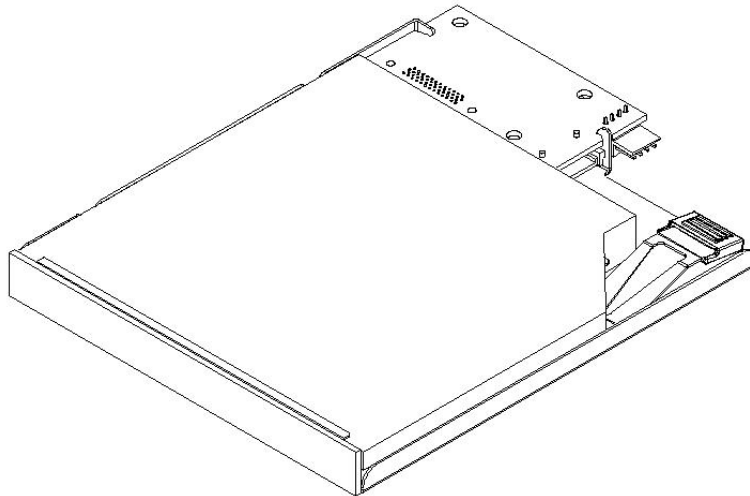
Figure 12. Optical Drive Carrier with SATA-to-IDE Converter Board

3.5.3   Front Panel

The Server Platform SR6850HW4 requires either a Button Control Panel, providing basic functionality, or an Intel® Server Platform Local Control Panel, which adds an LCD for integration with server management features. Both front panels contain switches and LED status indicators. The front panel is retained in the chassis by two clips and connects to the Front Panel I/O Board via a cable.

In the upper left of the chassis front, there is also a video connector, NMI button, and three-port USB 2.0 connector.

See Chapter 8 for more information on the front panel area.
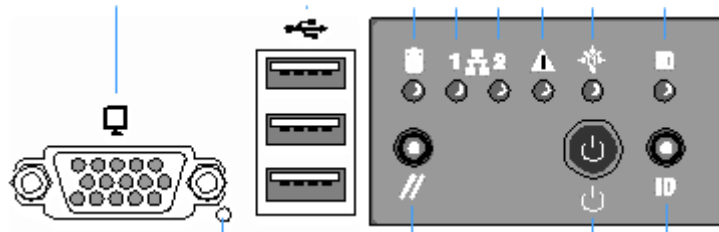
Figure 13. Front Panel with Button Control Panel
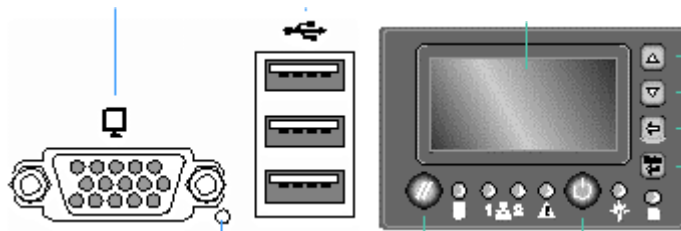
Figure 14. Front Panel with Intel® Local Control Panel

3.6   Front Bezel

The front bezel is an optional one-piece cosmetic accessory that is installed with snap-on features. The bezel can be customized to meet integrator-specific industrial design requirements, by changing the color and imprint. The bezel design allows adequate airflow to cool system components and has light pipes to allow front panel LEDs to be visible from the front of the server. Removing the bezel exposes peripherals, front panel switches and I/O connectors.

Two black plastic pull handles cover the EIA mounting flanges and enable a user to slide the chassis in and out of a rack.

Figure 15. Front Bezels (Rack and Pedestal)

4. Cables and Connectors

This chapter describes cables and connectors specific to the Server Platform SR6850HW4. This chapter includes an overview diagram of the Server Platform SR6850HW4 interconnections, and tables that describe the signals and pinouts for user accessible connectors. Chapters that follow will cover platform-specific board cables and connectors. See the *Server Board Set SE8500HW4 Technical Product Specification* for other connector signal descriptions and pinouts. This chapter is organized as follows:

Section 4.1:   Cable and System Interconnect Descriptions
Provides a list of the connectors and cables in the system.

Section 4.2:   User-accessible I/O Connectors
Describes the form-factor and pinout of user-accessible interconnects.

The block diagram in Figure 16 provides an overview of the cables and their relation to System Boards in the platform.
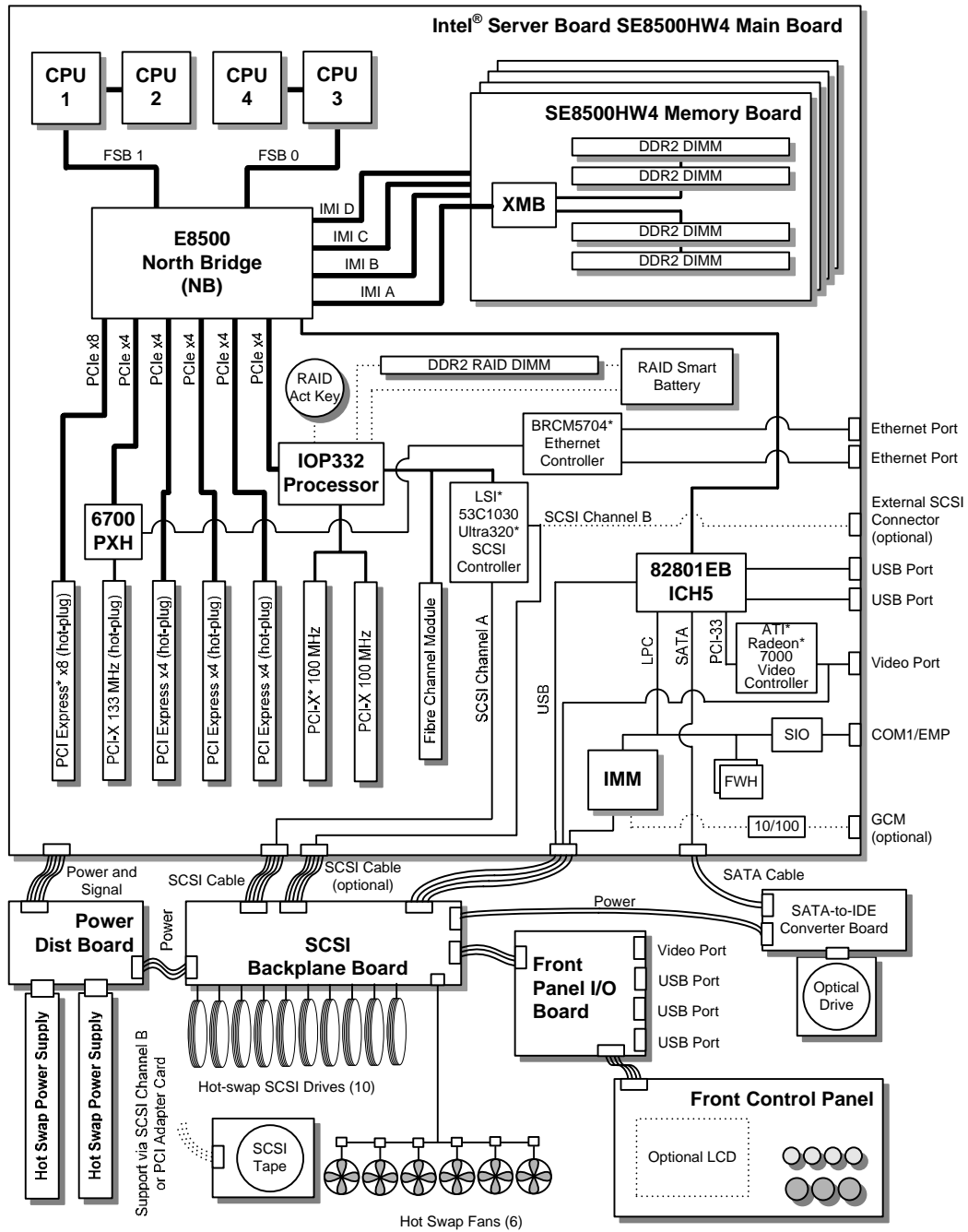
Figure 16.   Server Platform SR6850HW4 Interconnect Diagram

4.1   Cable and System Interconnect Descriptions

Table 7 and Table 8 list cables and connectors used in the assembly of the Server Platform SR6850HW4.

Table 7. Cable Descriptions

Type	Qty	From	To	Cable Description
Signal	1	Mainboard	SCSI Backplane Board Board	100 Pin (multi-signal function)
Signal	1	SCSI Backplane Board Board	Front Panel I/O Board	30 Pin (multi-signal function)
SCSI	2	Mainboard	SCSI Backplane Board Board	68 Pin internal SCSI
SCSI	1	Mainboard	Rear panel	68 Pin VHDCI SCSI (optional)
SATA	1	Mainboard	SATA-to-IDE converter board	7 Pin SATA
DC Power	1	SCSI Backplane Board Board	SATA-to-IDE Converter Board SCSI tape device	4 Pin power (mini connector) 4 Pin power
Signal	1	Front Panel I/O Board	Front panel	50 Pin (multi-signal function)
Switch	1	Mainboard	Chassis intrusion switch	3 Pin switch

Table 8. Connector Descriptions

System Component	Type	Qty	From	To	Interconnect Description
Mainboard	Processors	4	Mainboard	Processor	604 Pin ZIF sockets
	PCI Express*	4	Mainboard	Memory Board connector	164 Pin Card Edge Connectors
	Memory	1	Mainboard	ROMB DIMM	240 Pin Card Edge Connector
	PCI Express	1	Mainboard	Fibre Channel Module	164 Pin Card Edge Connector
	VRM	1	Mainboard	VRM9.1 module	62 Pin Card Edge Connector
	VRM	2	Mainboard	VRM10.2 module	54 Pin power connectors
	PCI-X*	3	Mainboard	PCI-X adapters	188 Pin Card Edge Connectors
	PCI Express	4	Mainboard	PCI Express adapters	98 Pin Card Edge Connectors
	IMM	1	Mainboard	IMM	120 Pin connector
	ICMB	1	Mainboard	Internal interface	1 x 5 Header connector
	IPMB	1	Mainboard	Internal interface	1 x 3 Header connector
	Chassis Intrusion	1	Mainboard	Top cover switch	1 x 3 Header connector
	USB	1	Mainboard	Rear panel	1 x 4 Pin double stacked USB connector
	USB	1	Mainboard	Internal interface	1 x 4 Pin connector
	Video	1	Mainboard	Rear panel, monitor	15 Pin, monitor device

System Component	Type	Qty	From	To	Interconnect Description
	COM1/EMP	1	Mainboard	Rear panel	9 Pin Emergency Management Port (DB9)
	COM2	1	Mainboard	Internal interface	2 x 5 Pin header
	Ethernet	1	Mainboard	Rear panel	Double stacked RJ45 connector ports
	SCSI	2	Mainboard	Internal SCSI channels	68 Pin SCSI connectors
	Signal	1	Mainboard	SCSI Backplane Board Board	100 Pin connector
	Ethernet	1	Mainboard	External interface	RJ45 connector port, GCM
	DC power and signal	1	Mainboard	RAID Smart Battery	2 x 10 Pin header
	SATA signal	1	Mainboard	SATA-to-IDE Converter Board	1 x 7 Pin connector (standard SATA)
	DC power	2	Mainboard	Power Distribution Board	1 x 12 Pin connectors
	DC signal	1	Mainboard	Power Distribution Board	2 x 15 Pin header
Memory Board	Memory	1	Memory Board	Mainboard	164 Pin Card Edge Connector (x16 PCIe)
	Memory	4	Memory Board	DDR2 DIMMs	240 Pin Card Edge Connector (4 per board)
SCSI Backplane Board Board	SCA2	10	SCSI Backplane Board Board	Hot-swap hard disk drive	80 Pin SCA2 connectors
	SCSI	2	SCSI Backplane Board Board	Mainboard	68 pin SCSI connectors
	Signal	1	SCSI Backplane Board Board	Mainboard	100 Pin connector
	DC power and signal	2	SCSI Backplane Board Board	Fans	2 x 14 Pin headers
	DC power	1	SCSI Backplane Board Board	SATA-to-IDE Converter Board, Tape device	1 x 4 Pin header
	Signal	1	SCSI Backplane Board Board	Front Panel I/O Board	34 Pin connector
	DC power	1	SCSI Backplane Board Board	Power Distribution Board	1 x 12 Pin connector
Front Panel I/O Board	Signal	1	Front Panel I/O Board	SCSI Backplane Board Board	30 Pin header
	Video	1	Front Panel I/O Board	Front panel, monitor	15 Pin, monitor device
	USB	1	Front Panel I/O Board	Front panel	1x4 Pin triple stacked USB connector
	Front panel	1	Front Panel I/O Board	Button Control Panel or Local Control Panel	50 Pin header
SATA-to-IDE Converter Board	Signal	1	SATA-to-IDE Converter Board	Optical device	50 Pin JAE (IDE)
	SATA	1	SATA-to-IDE Converter Board	Mainboard	1 x 7 Pin connector (standard SATA)

System Component	Type	Qty	From	To	Interconnect Description
	DC power	1	SATA-to-IDE Converter Board	SCSI Backplane Board Board	1 x 4 Pin header (mini connector)
Fan module	DC power and signal	6	Fan	SCSI Backplane Board Board	2 x 6 Pin header
Button control panel or Local control panel	Signal	1	Button control panel or Local control panel	Front Panel I/O Board	50 Pin header
Power Distribution Board	DC power and signal	2	Power Distribution Board	Power supply	34-blade connector
	DC power	2	Power Distribution Board	Mainboard	1 x 12 Pin connector
	Signal	1	Power Distribution Board	Mainboard	2 x 15 Pin header
	DC power	1	Power Distribution Board	SCSI Backplane Board Board	1 x 12 Pin connector
Power Supply	DC power and signal	1	Power supply	Power Distribution Board	34-blade connector
	AC power	1	Power supply	External interface	IEC filtered 15A receptacle

4.2   User-accessible I/O Connectors

4.2.1   Video Connectors

The Server Board Set SE8500HW4 Mainboard and Server Platform SR6850HW4 Front Panel I/O Board provide a video port interface with a standard VGA-compatible, 15-pin connector.

Table 9. Video Connector Pinout
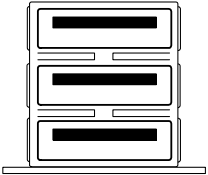
Pin	Signal Name and Description	Video Connector
1	VID_R (analog color signal red)	5 1
2	VID_G (analog color signal green)	
3	VID_B (analog color signal blue)	10 6
4	No connection	
5	GND	15 11
6	GND	
7	GND	
8	GND	
9	No connection	
10	GND	
11	No connection	
12	MONID1 (to support DDCx, Display Data Channel* standard)	
13	VID_HSYNC (horizontal sync)	
14	VID_VSYNC (vertical sync)	

Pin	Signal Name and Description	Video Connector
15	MONID2 (to support DDCx, Display Data Channel standard)	

4.2.2   USB 2.0 Connectors

The Server Board Set SE8500HW4 Mainboard provides a double-stacked USB port at the rear panel and one vertical USB port located in the middle of the Mainboard. The Server Platform SR6850HW4 Front Panel I/O Board provides three stacked USB port connectors via a USB hub controller. These built-in USB ports permit the direct connection of six USB peripherals without an external hub. If more devices are required, an external hub can be connected to any of the built-in ports.

Table 10.   Dual USB Connector Pinout

Pin	Signal	USB Connectors
A1	Fused Voltage Controlled Current (VCC) (+5 V with over-current monitoring)	
A2	USBPxM (differential data line)	
A3	USBPxP (differential data line)	
A4	GND (ground)	
B1	Fused VCC (+5 V with over-current monitoring)	**Dual Stacked USB Connector on Rear Panel**
B2	USBPxM (differential data line)	
B3	USBPxP (differential data line)	
B4	GND (ground)	**Triple Stacked USB Connector on Front Panel**

4.2.3   Etherent Connectors

The Server Board Set SE8500HW4 Mainboard provides a dual-RJ45 connector for Ethernet connection.

Table 11. TaDual Ethernet Stacked Connector

Pin	Signal	Description
LED Signals		
27	DNW_LINKB10_N	Lower (Port 1) green status LED cathode signal indicating Port 1 activity
28	DNW1_ACT_N_R	Lower (Port 1) green status LED anode to 100-ohm pullup to 3.3V Standby
29	DNW_LINKB100_N	Lower (Port 1) green speed LED cathode, yellow LED anode
30	LANB1000_N_R	Lower (Port 1) yellow speed LED cathode, green LED anode
31	DNW_LINKA10_N	Upper (Port 2) green status LED cathode signal indicating Port 2 activity
32	DNW0_ACT_N_R	Upper (Port 2) green status LED anode to 100-ohm pullup to 3.3V Standby
33	DNW_LINKA100_N	Upper (Port 2) green speed LED cathode, yellow LED anode
34	LANA1000_N_R	Upper (Port 2) yellow speed LED cathode, green LED anode
Ethernet Signals		
15	DNW_MDIB_DP<0>	Port 1 transceiver 0 positive of differential pair
21	DNW_MDIB_DN<0>	Port 1 transceiver 0 negative of differential pair
23	DNW_MDIB_DP<1>	Port 1 transceiver 1 positive of differential pair
16	DNW_MDIB_DN<1>	Port 1 transceiver 1 negative of differential pair
18	DNW_MDIB_DP<2>	Port 1 transceiver 2 positive of differential pair
24	DNW_MDIB_DN<2>>	Port 1 transceiver 2 negative of differential pair
26	DNW_MDIB_DP<3>	Port 1 transceiver 3 positive of differential pair
19	DNW_MDIB_DN<3>	Port 1 transceiver 3 negative of differential pair
6	DNW_MDIA_DP<0>	Port 2 transceiver 0 positive of differential pair
13	DNW_MDIA_DN<0>	Port 2 transceiver 0 negative of differential pair
11	DNW_MDIA_DP<1>	Port 2 transceiver 1 positive of differential pair
5	DNW_MDIA_DN<1>	Port 2 transceiver 1 negative of differential pair
3	DNW_MDIA_DP<2>	Port 2 transceiver 2 positive of differential pair
10	DNW_MDIA_DN<2>	Port 2 transceiver 2 negative of differential pair
8	DNW_MDIA_DP<3>	Port 2 transceiver 3 positive of differential pair
2	DNW_MDIA_DN<3>	Port 2 transceiver 3 negative of differential pair
Power Signals		
4, 7, 9, 12, 14, 17, 22, 25	+1.8V Standby	
1, 20, 35, 36, 37, 38	Chassis Ground	Ground
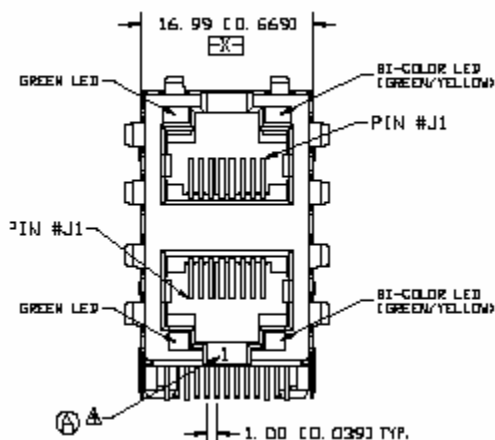
Figure 17. Dual Stacked Ethernet Connector

The Mainboard also provides an RJ45 connector that connects to the IMM Advanced for out-of-band server management features. This out-of-band connector is also referred to as the Generic Communication Module (GCM), or server management Ethernet controller.
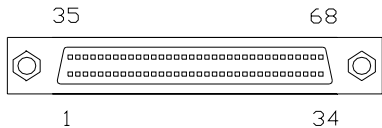
Table 12. Server Management Ethernet Connector

Pin	Signal	Description	Server Management Ethernet Connector
1	GCM_NIC_RDM		
2	GCM_NIC_RDP		
3		Magnetics Tap	
4		Magnetics Tap	
5		Magnetics Tap	
6		Magnetics Tap	
7	GCM_NIC_TDM		
8	GCM_NIC_TDP		
A1	TP_GMC_RJ45_YEL_LED_A	Yellow LED Anode	
C1	TP_GMC_RJ45_YEL_LED_C	Yellow LED Cathode	
A2	GMC_NIC_ACTLED_N	Green LED Anode	
C2	GMC_NIC_ACTLED_R_N	Green LED Cathode	

4.2.4 External 68-pin Ultra320 SCSI VHDCI Connector

As an option, the Server Platform SR6850HW4 can support a shielded external SCSI connection. This SCSI port is controlled by the SCSI controller component located on the Server Board Set SE8500HW4 Mainboard. This interconnect is a VHDCI connector at the rear panel.

Table 13. Ultra320 SCSI VHDCI Connector Pinout

Pin	Signal Name	Ultra320 SCSI VHDCI Connector	Pin	Signal Name
1	+DB(12)		35	-DB(12)
2	+DB(13)	35 68	36	-DB(13)
3	+DB(14)		37	-DB(14)
4	+DB(15)		38	-DB(15)
5	+DB(P1)	1 34	39	-DB(P1)
6	+DB(0)		40	-DB(0)
7	+DB(1)		41	-DB(1)
8	+DB(2)		42	-DB(2)
9	+DB(3)		43	-DB(3)
10	+DB(4)		44	-DB(4)
11	+DB(5)		45	-DB(5)
12	+DB(6)		46	-DB(6)
13	+DB(7)		47	-DB(7)
14	+P_CRCA		48	+P_CRCA
15	GND		49	GND
16	DIFFSENS		50	GND
17	TERMPWR		51	TERMPWR
18	TERMPWR		52	TERMPWR
19	NC		53	NC
20	GND		54	GND
21	+ATN		55	-ATN
22	GND		56	GND
23	+BSY		57	-BSY
24	+ACK		58	-ACK
25	+RST		59	-RST
26	+MSG		60	-MSG
27	+SEL		61	-SEL
28	+C/D		62	-C/D
29	+REQ		63	-REQ
30	+I/O		64	-I/O
31	+DB(8)		65	-DB(8)
32	+DB(9)		66	-DB(9)
33	+DB(10)		67	-DB(10)
34	+DB(11)		68	-DB(11)

4.2.5 Internal 68-pin SCSI Connectors

The Server Mainboard SE8500HW4 has two unshielded 68-pin SCSI connectors for SCSI channel A and B.

SOCKET 34   SOCKET 1

SOCKET 68   68 POSITION DEVICE CONNECTOR   SOCKET 35
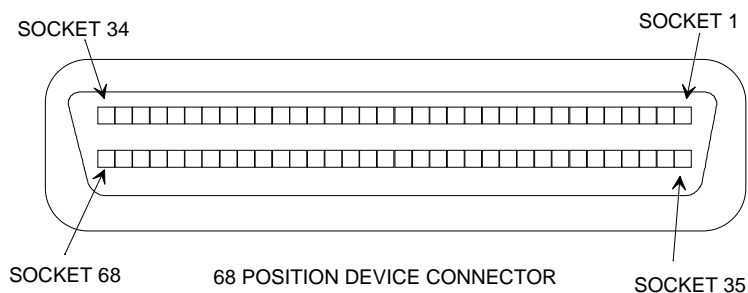
Figure 18. 68-Pin SCSI Connector Non-Shielded

Table 14. 68-Pin SCSI Connector Pinout

Connector Pin	Signal Name	Connector Pin	Signal Name
1	SCSI(A:B)_DB_P12	35	SCSI(A:B)_DB_N12
2	SCSI(A:B)_DB_P13	36	SCSI(A:B)_DB_N13
3	SCSI(A:B)_DB_P14	37	SCSI(A:B)_DB_N14
4	SCSI(A:B)_DB_P15	38	SCSI(A:B)_DB_N15
5	SCSI(A:B)_DB_PP1	39	SCSI(A:B)_DB_NP1
6	SCSI(A:B)_DB_P0	40	SCSI(A:B)_DB_N0
7	SCSI(A:B)_DB_P1	41	SCSI(A:B)_DB_N1
8	SCSI(A:B)_DB_P2	42	SCSI(A:B)_DB_N2
9	SCSI(A:B)_DB_P3	43	SCSI(A:B)_DB_N3
10	SCSI(A:B)_DB_P4	44	SCSI(A:B)_DB_N4
11	SCSI(A:B)_DB_P5	45	SCSI(A:B)_DB_N5
12	SCSI(A:B)_DB_P6	46	SCSI(A:B)_DB_N6
13	SCSI(A:B)_DB_P7	47	SCSI(A:B)_DB_N7
14	SCSI(A:B)_DP0_P	48	SCSI(A:B)_DP0_N
15	GND	49	GND
16	SCSI(A:B)_DIFFSENSE	50	GND
17	SCSI(A:B)_TERMPWR	51	SCSI(A:B)_TERMPWR
18	SCSI(A:B)_TERMPWR	52	SCSI(A:B)_TERMPWR
19	RESERVED (NC)	53	RESERVED
20	GND	54	GND
21	SCSI(A:B)_ATN_P	55	SCSI(A:B)_ATN_N
22	GND	56	GND
23	SCSI(A:B)_BSY_P	57	SCSI(A:B)_BSY_N
24	SCSI(A:B)_ACK_P	58	SCSI(A:B)_ACK_N
25	SCSI(A:B)_RST_P	59	SCSI(A:B)_RST_N

Connector Pin	Signal Name	Connector Pin	Signal Name
26	SCSI(A:B)_MSG_P	60	SCSI(A:B)_MSG_N
27	SCSI(A:B)_SEL_P	61	SCSI(A:B)_SEL_N
28	SCSI(A:B)_CD_P	62	SCSI(A:B)_CD_N
29	SCSI(A:B)_REQ_P	63	SCSI(A:B)_REQ_N
30	SCSI(A:B)_IO_P	64	SCSI(A:B)_IO_N
31	SCSI(A:B)_DB_P8	65	SCSI(A:B)_DB_N8
32	SCSI(A:B)_DB_P9	66	SCSI(A:B)_DB_N9
33	SCSI(A:B)_DB_P10	67	SCSI(A:B)_DB_N10
34	SCSI(A:B)_DB_P11	68	SCSI(A:B)_DB_N11

4.2.6 80-pin SCA2 Hard Disk Drive Connectors

The Server Platform SR6850HW4 SCSI Backplane Board has ten SCA2 connectors.
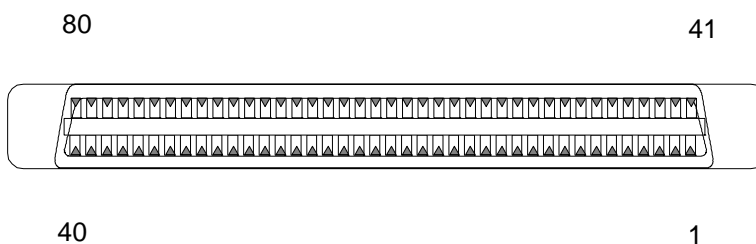
Figure 19. SCA2 80-Pin SCSI Connector

Table 15. SCA2 Drive Connector Pinout

Pin	Signal Name	Pin	Signal Name	Pin	Signal Name	Pin	Signal Name
1	+12V	21	LVD_DB7_N	41	GND	61	LVD_DB7_P
2	+12V	22	LVD_DB6_N	42	GND	62	LVD_DB6_P
3	+12V	23	LVD_DB5_N	43	GND	63	LVD_DB5_P
4	+12V	24	LVD_DB4_N	44	SCSI_MATED	64	LVD_DB4_P
5	NC	25	LVD_DB3_N	45	NC	65	LVD_DB3_P
6	NC	26	LVD_DB2_N	46	DIFFSENSE	66	LVD_DB2_P
7	LVD_DB11_N	27	LVD_DB1_N	47	LVD_DB11_P	67	LVD_DB1_P
8	LVD_DB10_N	28	LVD_DB0_N	48	LVD_DB10_P	68	LVD_DB0_P
9	LVD_DB9_N	29	LVD_DBP1_N	49	LVD_DB9_P	69	LVD_DBP1_P
10	LVD_DB8_N	30	LVD_DB15_N	50	LVD_DB8_P	70	LVD_DB15_P
11	LVD_IO_N	31	LVD_DB14_N	51	LVD_IO_P	71	LVD_DB14_P
12	LVD_REQ_N	32	LVD_DB13_N	52	LVD_REQ_P	72	LVD_DB13_P
13	LVD_CD_N	33	LVD_DB12_N	53	LVD_CD_P	73	LVD_DB12_P
14	LVD_SEL_N	34	+5V	54	LVD_SEL_P	74	SCSI_MATED
15	LVD_MSG_N	35	+5V	55	LVD_MSG_P	75	GND

16	LVD_RST_N	36	+5V	56	LVD_RST_P	76	GND
17	LVD_ACK_N	37	NC	57	LVD_ACK_P	77	SCSI_ACT
18	LVD_BSY_N	38	GND	58	LVD_BSY_P	78	NC
19	LVD_ATN_N	39	SCSI_ID (0)	59	LVD_ATN_P	79	SCSI_ID(1)
20	LVD_DBP_N	40	SCSI_ID (2)	60	LVD_DBP_P	80	SCSI_ID(3)

4.2.7   AC Power Input Connectors

An IEC320 15A receptacle is located on each power supply. An appropriately sized power cord and AC main power source are required. See Chapter 5 for system voltage, frequency, and current draw specifications. An external AC cord retention feature is supported by the chassis but is not supplied by Intel. Please refer to the *Server Platform SR6850HW4 Power Cord Enabling Specification* to assist in the procurement of power cords for the platform.

IEC 320 C19
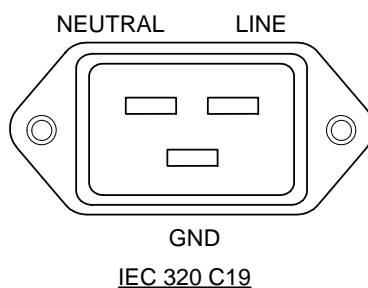
Figure 20. AC Power Input Connector

4.2.8   3-pin Chassis Intrusion Connector

Please, see the table below for 3-pin Chassis Intrusion Connector information.

Table 16. 3-pin Chassis Intrusion Connector

Pin	Signal
1	Intrusion event
2	GND
3	Intrusion button attached

4.2.9   12-pin Power Distribution Board Power Connector

The Server Platform SR4850HW4/SR6850HW4 Power Distribution Board has three power connectors, two for the Server Board Set SE8500HW4 Mainboard and one for the Server Platform SR6850HW4 SCSI Backplane Board.

Table 17. Power Connector Pinout

Pins	Signal
1-6	GND

7-12	+12V

4.2.10   30-pin Power Distribution Board to Mainboard Connector

See the table below for the 30-pin Power Distribution Board to Mainboard Connector information.

Table 18. 30-pin Power Distribution Board to Mainboard Connector

Pins	Signal Description
1,17,25,30	GND
6,7,10,12,14,15,24	3.3V$_{stby}$
2	PS1 present
3	PS2 AC good
4	PS Fan control
5	PS1 AC good
8	PS1 AC range
9	PS on
11	I^{2}C SCL
13	I^{2}C SDA
16	12V Sense return
18	PS 90% utilization
19	PS 74% utilization
20	PS 45% utilization
21	PS 37% utilization
22	Int alert
23	PS2 AC range
26	PS1 AC good
27	12V Sense
28	PS1 power OK
29	PS2 present

4.2.11   30-pin SCSI Backplane Board Board to Front Panel I/O Board Connector

Please, see the table below for the 30-pin SCSI Backplane Board to Front Panel I/O Board connector information.

Table 19. Front Panel I/O Board Connector Signal Description

Pins	Signal Description
1,7,10,26,28	Ground
19,21,23,25	5V
2	USB Hub DPD1
3	USB Hub DMD1

Pins	Signal Description
5	USB Hub DPD2
6	USB Hub DMD2
8	USB Hub DPD3
9	USB Hub DMD3
11	USB1 overcurrent output, active high
12	USB2 overcurrent
13	USB3 overcurrent
14	NMI button, active low
15	Video DCC out SCLCK
16	Video DCC out SDA
17	Video vertical sync
18	Video horizontal sync
20	Video red
22	Video green
24	Video blue
27	Speaker drive, active high
29	Monitor presence, active low
30	Unused, keying pin

4.2.12   100-pin Mainboard to SCSI Backplane Board Board Connector

Please, see the tables below for the 100-pin Mainboard to SCSI Backplane Board connector information.

Table 20. 100-pin Connector Pinout (Unused and Ground)

Pin Numbers	Signal Descriptions
1,3,7,10,14,20,27,42,51,52,54,58,62,65,73,77,79,82,83,85,87,89,91,93,95,100	Ground
4,6,8,12,13,15,17,19,22,24,26,29,31,33,35,37,41,44,46,48,50,53,56,59,61,66,68,70,72	Unused

Table 21. 100-pin Connector Pinout (Signals)

Pin Number	Signal Name	Signal Description
2	GND – RESISTOR	Ground through zero ohm resistor
5	GND – RESISTOR	Ground through zero ohm resistor
9	GND – RESISTOR	Ground through zero ohm resistor
11	GND – RESISTOR	Ground through zero ohm resistor
16	FAN1_TACH	Fan 1 Tachometer signal – edges per revolution
18	FAN2_TACH	Fan 2 Tachometer signal – edges per revolution
21	FAN3_TACH	Fan 3 Tachometer signal – edges per revolution
23	FAN4_TACH	Fan 4 Tachometer signal – edges per revolution
25	RESET_BTN	Front panel reset button signal
28	FAN5_TACH	Fan 5 Tachometer signal – edges per revolution

Pin Number	Signal Name	Signal Description
30	FAN6_TACH	Fan 6 Tachometer signal – edges per revolution
32	FAN_PWM1	Zone 1 Fan PWM control signal
34	5VSTANDBY	5V standby to front panel
36	BP_D2D_EN	Backplane D2D enable
38	5VSTANDBY	5Vstandby to front panel
39	ICH5_PDD8	IDE primary disk data 8
40	HD_ACT_N	SATA Hard Drive Activity
43	BP_PWRGOOD	Backplane power good signal
45	PCI_RST_BP_N	PCI reset to backplane
47	CP_PWR_LED	Control Panel Power LED signal
49	CP_SPKR_OUT_N	Speaker signal to front panel
55	NIC1_LED	NIC 1 activity LED signal
57	ID_LED	ID LED Signal
60	CP_BTN_PWR_ON	Control panel Power Button signal
63	SYS_STATUS_AMB_LED	System Status amber LED signal
64	CD_PRES_N	CD drive presence signal
67	CP_ID_BUTTON_RAW	Control panel ID button signal
69	CP_BTN_NMI	Control panel NMI button
71	NIC2_LED	NIC2 activity LED signal
74	I2C_IPMB_SCL	IPMB I^{2}C bus clock
75	BP_PRES_N	SCSI Backplane Board Board presence signal, indicates System Board interlock is achieved
76	I2C_IPMB_SDA	IPMB I^{2}C bus data
78	SYS_PWRGD4	Mainboard power good signal to SCSI Backplane Board Board
80	USB_FRONT_N	USB port 2 differential negative signal to front bezel
81	USB_FRONT_P	USB port 2 differential positive signal to front bezel
84	VID_RED_FRONT	Video DAC 2 RED signal
86	VID_BLUE_FRONT	Video DAC 2 BLUE signal
88	VID_GREEN_FRONT	Video DAC 2 GREEN signal
90	VID_HS_OUT_FRONT	Video DAC 2 Horizontal Synchronization signal
92	VID_VS_OUT_FRONT	Video DAC 2 Vertical synchronization signal
94	VID_DDC_OUT_SCLK_FRONT	Video Monitor detection I^{2}C bus clock
96	VID_DDC_OUT_SDA_FRONT	Video monitor detection I^{2}C bus data
97	I2C_CP_SDA	Control panel I^{2}C bus data (I$_2$C segment 2)
98	SYS_STATUS_GRN_LED	System status green LED signal
99	I2C_CP_SCL	Control panel I^{2}C bus data (I^{2}C segment 2)

4.2.13 Peripheral Power Connector

The Server Platform SR6850HW4 SCSI Backplane Board provides a standard power connector to drive both the SCSI tape device and optical drive.

Table 22. Peripheral Power Connector

Pins	Signal

1	12V
2,3	GND
4	5V

4.2.14   Fan Connectors

Two fan power connectors on the Server Platform SR6850HW4 SCSI Backplane Board control and supply the power for the six system fans.

Table 23. 12-pin Fan Power and Control

Pins	Signal
7, 10	12V
1, 4, 9, 12	GND
8, 11	FAN_PWM
2	FAN1_TACH
3	FAN1_AMB
5	FAN2_TACH
6	FAN2_AMB

Table 24. 24-pin Fan Power and Control J6E1

Pins	Signal
13, 16, 19, 22	12V
1, 4, 7, 10, 15, 18, 21 ,24	GND
14, 17, 20, 23	FAN_PWM
2	FAN3_TACH
3	FAN3_AMB
5	FAN4_TACH
6	FAN4_AMB
8	FAN5_TACH
9	FAN5_AMB
11	FAN6_TACH
12	FAN6_AMB

4.2.15   50-pin Front Panel Control Module Connector

This connector is used between the Server Platform SR6850HW4 Front Panel I/O Board and standard button control panel or Local Control Panel.

Table 25. Front Panel Control Module Connector Signal Description

PIN	Signal Description	PIN	Signal Description
1	+5V Standby	26	not used
2	+5V Standby	27	LAN1 link
3	+5V	28	LAN1 activity
4	Hard drive activity,	29	GND
5	System status	30	Front panel NMI button, not used
6	not used	31	not used
7	System status	32	not used
8	+5V Standby	33	not used
9	+5V Standby	34	not used
10	Power LED	35	not used
11	Hard drive activity pull up	36	not used
12	I^2C IPMB SDA	37	not used
13	GND	38	not used
14	I^2C IPMB SCL	39	not used
15	System ID LED	40	not used
16	Power button input, active low	41	GND
17	LAN2 link	42	not used
18	Hard drive fault	43	GND
19	LAN2 activity	44	not used
20	Front panel reset button, active low	45	GND
21	not used	46	not used
22	GND	47	GND
23	not used	48	not used
24	Front panel ID button, active low	49	GND
25	not used	50	not used

4.2.16   SATA-to-IDE Converter Board Connector

The Server Platform SR4850HW4/SR6850HW4 SATA-to-IDE Converter Board connects to an optical drive with this connector.

Table 26. SATA-to-IDE Converter Board Connector

Pin	Signal	Signal	Pin
1	Audio L-Ch	Audio R-Ch	2
3	Audio GND	GND	4
5	RESET-	DD8	6
7	DD7	DD9	8
9	DD6	DD10	10
11	DD5	DD11	12
13	DD4	DD12	14
15	DD3	DD13	16
17	DD2	DD14	18
19	DD1	DD15	20
21	DD0	DMARQ	22
23	GND	/DIOR	24
25	DIOW-	GND	26
27	IORDY	/DMACK	28
29	INTRQ	/IOCS16	30
31	DA1	/PDIAG	32
33	DA0	DA2	34
35	/CS1FX	/CS3FX	36
37	/DASP	+5V	38
39	+5V	+5V	40
41	+5V	+5V	42
43	GND	GND	44
45	GND	GND	46
47	CSEL	GND	48
49	RESERVED	RESERVED	50

4.2.17   SATA-to-IDE Converter Board Power Connector

Please, see the table below for the SATA-to-IDE Converter Board Power Connector information.

Table 27. SATA-To-IDE Converter Board Power Connector

Pin	Signal
1	+5 VDC
2	Ground
3	Ground
4	+12V (Not used on adapter)

4.2.18 SATA Connector

The Server Board Set SE8500HW4 Mainboard has a SATA connector that is routed via a cable to the Server Platform SR4850HW4/SR6850HW4 SATA-to-IDE Converter Board.

Table 28. SATA Signal Connector

Pin	Signal
1	Ground
2	A+
3	A-
4	Ground
5	B-
6	B+
7	Ground

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5.   Power Supply

This chapter describes the Server Platform SR6850HW4 power supply. The Server Platform SR6850HW4 power supply is current sharing with auto ranging input. The Server Platform SR6850HW4 power supply is approximately 7.7 inches wide, 14.5 inches deep and 3.5 inches high. The unit mounts into the server with a latch.

The output rating of the power supply is 1570W when operated between 170VAC and 264VAC. The platform can run with a single power supply installed. For redundancy, two power supplies must be installed.

The Server Platform SR6850HW4 power supply is shown in Figure 21.
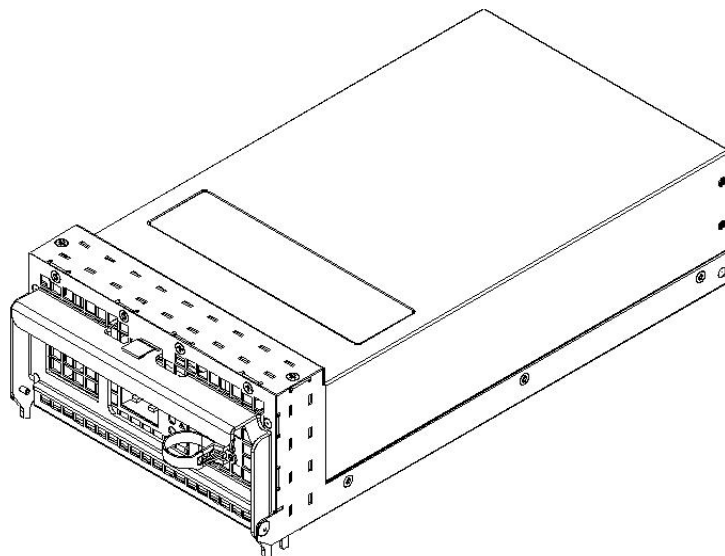
Figure 21. 1570W Power Supply

5.1   Mechanical Outline

The mechanical outline and dimensions are shown on the next page. The dimensions should be used only as a reference.

7.686±.020
[195,22±,50]

14.553±.020
[369,65±,50]

1.891±.020
[48,03±,50]

.353±.010
[8,97±,25]

2X 2.450
[62,23]

4.050±.020
[102,87±,50]

AIR FLOW

3.565±.025
[90,55±,63]

.318±.010 TO AI
[8,08±,25]

PIN AI

RHI

1.500±.010 TO AI
[38,10±,25]

.630±.010
[16,00±,25]

14.802±.020
[375,98±,50]

FCI P/N 51721-10002410AA
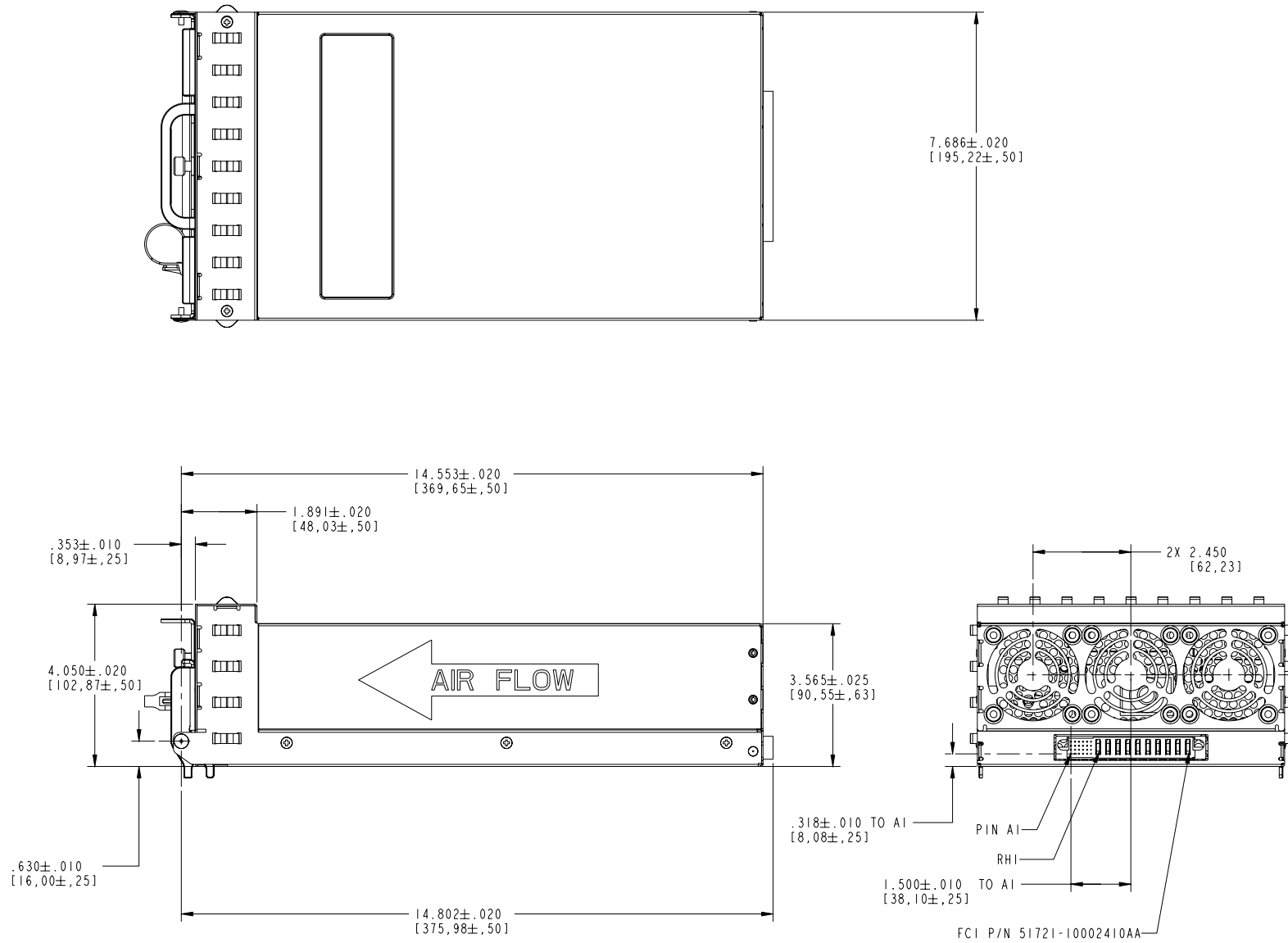
Figure 22. Power Supply Mechanical Specification

5.2 Power Supply Output Interface

5.2.1 Blade Connector

The power supply output power and control signals interface to the system Power Distribution Board through an FCI PowerBlade* right-angle connector.

Table 29. PowerBlade Pin Assignment

P1	Pin	Signal Name	Amps per pin
FCI Powerblade* 51721-10002410AA or approved equivalent Mates to FCI 51741-10002410CC on Power Distribution Board	PB RH1	+12V return	26
	PB RH2	+12V return	26
	PB RH3	+12V return	26
	PB RH4	+12V return	26
	PB RH5	+12V return	26
	PB RH6	+12V	26
	PB RH7	+12V	26
	PB RH8	+12V	26
	PB RH9	+12V	26
	PB RH10	+12V	26
	A1	PS_KILL	
	A2	+12V current share	
	A3	Return	
	A4	+3.3V$_{stby}$	
	A5	PS A0	
	A6	+3.3V$_{stby}$	
	B1	Return	
	B2	Not used	
	B3	Return	
	B4	+3.3V$_{stby}$	
	B5	SDA	
	B6	-PS_ON	
	C1	Return	
	C2	Not used	
	C3	Return	
	C4	+3.3V$_{stby}$	
	C5	SCL	
	C6	VIN_GOOD	
	D1	-PS_Present	
	D2	+12V_Sense	
	D3	+12V_Rtn_Sense	
	D4	+3.3V$_{stby}$	
	D5	S_INT(Alert)	
	D6	POK	

5.3   AC Input Requirement

5.3.1   AC Input Voltage Specification

The power supply operates over the range and limits shown in Table 30.

Table 30. AC Input Rating

Parameter	Minimum	Nominal	Maximum	Unit
Vin (voltage)	85	100/240	264	VACrms
Vin (frequency)	47	50/60	63	Hz
Iin (90VAC)			16.7	Arms
Iin (100VAC)			15.0	Arms
Iin (115VAC)			16.0	Arms
Iin (180VAC)			11.25	Arms
Vin (turn-on)	80		85	VACrms
Vin (turn-off)	75		80	VACrms

The main outputs of the power supply will turn off per Vin (turn-off). Any standby outputs may continue to operate at input AC voltages below Vin (turn-off).

5.3.2   Efficiency

The power supply has a minimum efficiency of 78% when operated under the maximum loading conditions of 90VAC-264VAC, and environmental conditions. The minimum efficiency is 77% when operated between 85-90VAC.

For loads less than maximum, the internal power dissipation cannot exceed 453W.

5.3.3   Input Over-Current Protection

The power supply has internal primary over-current protection. A normal-blow (fast blow), high-breaking-capacity fuse is placed in the input circuit.

5.3.4   Inrush Current

When input power is applied to the power supply, any initial current surge or spike of 10ms or less will not exceed 55A peak. Any additional inrush current surges or spikes in the form of AC cycles or multiple AC cycles greater than 10ms, and less than 150ms, will not exceed 25A peak.

For any conditions during turn-on, the inrush current will not open the primary input fuse or damage any other components.

5.3.5   Auto Restart

Although the power supply may power off under the conditions mentioned in Sections 5.3.3 and 5.3.4 it is capable of restarting, either automatically or under program control after the disturbance. In addition, the power supply will not be in a latched state such that any of the operator buttons/buttons do not operate correctly after the disturbance. At no time will the AC power cord have to be removed to clear an error condition.

Auto restart conditions are tested from -40% to -100% AC under-voltage conditions for time intervals ranging from 25ms to 2sec. For each time interval, all of the under-voltage conditions listed below will be tested. These tests are performed at both the lowest and highest nominal operating voltages of the power supply.

Time intervals: 25ms, 40ms, 60ms, 90ms, 130ms, 200ms, 280ms, 400ms, 600ms, 900ms, 1.3sec, and 2.0sec

Under-voltage deviation from nominal AC voltage: -40%, -50%, -60%, -70%, -80%, -90%, -100%

5.3.6   Power Factor Correction (PFC)

The Power Factor Correction (PFC) is 0.97, or greater, for all specified AC input voltages with output loads greater than 90%.

The PFC is 0.75, or greater, for all specified AC input voltages with output loads greater than 50%.

5.3.7   AC Input Connector

The AC input receptacle is an IEC-320 16A rated for 250VAC minimum.

5.4   DC Output Requirements

The DC output voltages will remain within the regulation ranges shown in the Table 31 when measured at the load end of the connector.

Table 31. DC Output Voltage Regulation Limits

Output Level	Minimum (V)	Nominal (V)	Maximum (V)
+12V	11.64	12.00	12.60
+3.3V$_{stby}$	3.17	3.30	3.47

5.4.1   Hot Swap Functionality

Hot swapping is the process of inserting and extracting a power supply from an operating power bay. During this process, the output voltages will remain within the limits specified in Table 31, and the system will continue to operate normally.

5.4.2   Output Current Rating

The combined continuous output power for all outputs will not exceed 1570W. Each output has a maximum and minimum current rating shown in Table 32.

Table 32. 1570W Load Ratings

Output Level	Minimum (A)[1]	Maximum (A)[1]	Peak (A)[1]
+12V[3]	1.0	91.66	95.67[2]
+12V[4]	1.0	112.5	117.00[2]
+12V[5]	1.0	130.8	135.55[2]
+3.3V$_{stby}$	0.0	5.0	

1. Values are at the system level. For 1+1 redundant systems the load each supply provides is based on its current-sharing accuracy.
2. Peak +12V output power not to exceed 15 seconds in duration. Maximum duty cycle is 5%.
3. For 85-121VAC operation (100/110VAC rated).
4. For 103.5-139VAC operation (115/120/127VAC rated).
5. For 170VAC, and higher, operation (200/208/220/230/240VAC rated).

5.4.3   Over- and Under-Voltage Protection

The power supply provides latch mode over and under voltage protection as defined in the following table. A fault on any output will cause the rest of the outputs to latch off. See note 3 below the table.

Table 33. Over- and Under-voltage Limits

Output Level	Under-Voltage		Over Voltage	
	Minimum (V)	Maximum (V)	Minimum (V)	Maximum (V)
+12V	10.5	11.0	13.5	15.0
+3.3V$_{stby}$[1,2,3]	2.77	3.00	3.76	4.3

1. In standby mode, the power supply does not latch off due to an under-voltage condition.
2. In standby mode, the power supply may or may not latch off due to an over-voltage condition.
3. A fault on any output other than +3.3V$_{stby}$ will not cause the +3.3V$_{stby}$ to turn off. A fault on +3.3V Standby causes the other outputs to turn off.

5.4.4 Over-current Protection

Over-current is a fault condition defined as a 10A/s current ramp starting from full load applied to the output under test. A fault on any output causes the rest of the outputs to latch off. See note 3 below the following table.

Table 34. Over-current Protection Limits

Output Level	Minimum (A)[2,4]	Maximum (A)[2,4]
+3.3V Standby [1,3,5]	5.3	6.2
+12V[6]	122	141
+12V[7]	142	163

1. Output is Level III SELV and non-energy hazard complaint
2. The above current limits will be satisfied throughout the entire operating temperature range
3. A fault on any output other than +3.3V$_{stby}$ will not cause the +3.3V$_{stby}$ to turn off. A fault on +3.3V$_{stby}$ will cause the other outputs to turn off.
4. Dynamic loading must not cause a false over current when 2 supplies are in parallel.
5. The +3.3V$_{stby}$ output will not latch off. It must return to normal operation once the fault is removed. Current foldback method is preferred.
6. +12V OC limits change base on the state of AC_RANGE. This helps protect the power supply from over-loading the PFC stage. AC_RANGE low.
7. +12V OC limits change base on the state of AC_RANGE. This helps protect the power supply from over-loading the PFC stage. AC_RANGE high.

5.4.5 Short Circuit Protection

A short circuit, which is defined as an impedance of 0.1Ω, or less, applied to any output during start-up or while running will not cause any damage to the power supply (connectors, components, PCB traces, etc.).

When the +3.3V$_{stby}$ is shorted the output may go into "hiccup mode". When the +3.3V$_{stby}$ attempts to restart the maximum peak current from the output must be less than 8.0A. The maximum average current, taking into account the "hiccup" duty cycle, must be less than 4.0A.

5.4.6 Reset After Shutdown

If the power supply latches into a shutdown state due to a fault condition on any output, the power supply will return to normal operation only after the fault has been removed and the power supply has been power-cycled. Power cycling is defined as either:

- Removing AC input power, waiting for +3.3V$_{stby}$ to drop below 1.0V, then reapplying AC power. The time it takes for +3.3V$_{stby}$ to drop below 1.0V shall not exceed 15 seconds.
- Cycling the state of PS_ON from on to off to on. The minimum cycle time is 1ms.

5.4.7   Current Sharing

Outputs of two supplies that are connected in parallel must meet the regulation requirements of a single supply. Under normal operation with two supplies running in parallel, the outputs must share the load current. If one of the supplies fails, the remaining supply must pick up the entire load without any of the outputs dropping out of regulation. A defective supply that is connected to the output voltage bus has no adverse effect on the operation of the remaining functional supply.

Table 35. Output Current Sharing

Output Level	Output Sharing
+3.3V$_{stby}$	Not required
+12V	Active

5.4.8   I^{2}C Devices

All I^{2}C devices are powered from the cathode side of the +3.3V$_{stby}$ OR'ing diode. This allows the status and FRU data to be read from a power supply that is not powered on or has some other fault. Protection is provided so if a power supply fault occurs it does not take down the +3.3V$_{stby}$ bus.

Address locations will be determined by external settings through P1, pin A5. The 0xA1 and 0xA2 address will be wired high on the power supply. (NE1617A does not have an 0xA2 address). The alert signal from (only) the I/O port will be through P1, pin D5.

5.4.8.1   FRU Data

The power supply contains a serial EEPROM. The address is either 0xAC or 0xAE, depending on address bit 0xA0.

5.4.8.2   I/O Port Expander

The power supply contains a serial I/O port expander, Philips* PCF8575 or approved equivalent. The address is either 0x4C or 0x4E, depending on address bit 0xA0.

Table 36. I/O Port Expander Signals

Signal Name	I/O Port
-OC +12V	P0
-Fan_Fault	P1
-UV	P2
-OV	P3
VIN_GOOD	P4
P_GOOD	P5
-PS_STATUS	P6
AC_PRFAIL	P7
-PFC_OTP	P10
POWER_LEVEL_1	P11
POWER_LEVEL_1	P12
POWER_LEVEL_1	P13
POWER_LEVEL_1	P14
High	P15,P16,P17

Table 37. I/O Port Expander Codes

Signal Name	Normal Off	Normal On	+12V OC	AC Dropout	Low AC	No AC
-OC +12V	1	1	0	1	1	1
Not Used	1	1	1	1	1	1
-UV	1	1	1 or 0	1	1	1
-OV	1	1	1	1	1	1
VIN_GOOD	1	1	1	1 or 0	0	0
P_GOOD	0	1	0	0	0	0
-PS_STATUS	1	0	1	1	1	1
-AC_PRFAIL	1	1	1	0	1	1

Note: The No AC column refers to the status of the I/O port when only the external +3.3$_{stby}$ bus voltage is available.

5.4.8.3   Temperature Sensors

A Philips* NE1617A or equivalent temperature sensor is located near the air inlet of the supply. The address is either 0x34 or 0x9C depending on address bit 0xA0. A second sensor is near the exhaust outlet.

5.4.9 Fan Speed Control

The power supply provides forced air-cooling through three DC fans that have intake through the circular grill. The cooling fans are 60mm in diameter and 38mm in depth. The fans are mounted to the front (output connector), and exhaust through the rear (AC Inlet connector) of the PS case.

The power supply uses a fan speed controller that is based on the input Fan_Cntl. The input is an analog signal from 0.0V to 3.0V. Control of the fan is linear in relation to the Fan_Cntl signal.

Table 38. Power Supply Fan Voltage

Fan_Cntl Voltage	Minimum Fan Voltage	Maximum Fan Voltage
0.00V	7.00V	7.50V
1.50V	9.55V	10.05V
3.00V	11.50V	12.60V

A fan fault is defined as a fan RPM below 1,000 ±200 RPM during normal operation. This fault is inhibited for 15 ±5 seconds when the power supply outputs are first powered on. This allows time for the fan to come up to speed and the fan detects circuitry to stabilize.

A fault on two fans turns off the power supply. See Section 5.2.

Note: Fan speed control must operate even if no AC is applied to the power supply. Fan power comes from the 12V bus after the OR'ing diode. The control circuit power comes from either the 12V bus and/or the $3.3V_{stby}$ bus.

5.4.10 Power Supply Module LED indicators

There are three LEDs on the rear of the power supply, next to the AC input power connector.

5.4.10.1 Power Supply Fail

The amber power supply fail LED is driven by internal circuitry. It lights when a power rail has failed. The LED is not lit if the supply turns off due to PS_KILL. The LED illuminates even if the power supply is in a latched state. The only time during a fault when it does not illuminate is if the $+3.3V_{stby}$ is lost.

5.4.10.2 Power Good

The green power good LED is driven by internal circuitry. It lights whenever PWRGD is asserted.

5.4.10.3 AC OK

The green AC OK LED is driven by internal circuitry. It lights whenever VIN_GOOD is asserted.

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6.   Power Distribution Board

This chapter describes the Server Platform SR4850HW4/SR6850HW4 Power Distribution Board and is organized as follows:

Section 6.1:   Introduction
An overview of the Server Platform SR4850HW4/SR6850HW4 Power Distribution Board and board layout.

Section 0:   Signal Descriptions and Pinouts
Summarizes the Server Platform SR4850HW4/SR6850HW4 Power Distribution Board internal signals and connector signals, and the connector signal pin names and the signal descriptions.

6.1   Introduction

The Server Platform SR4850HW4/SR6850HW4 Power Distribution Board provides docking connectors for the hot-swap power supply modules. It distributes power to the Server Platform SR4850HW4 SCSI Backplane Board and Server Board Set SE8500HW4 Mainboard as well as power consumption information to the Server Board Set SE8500HW4 Mainboard via a group of comparators. The board contains EEPROM FRU information storage but has no logic on it; it is a pass-through board. The signals shared between the two power supplies are shown in the diagram below.
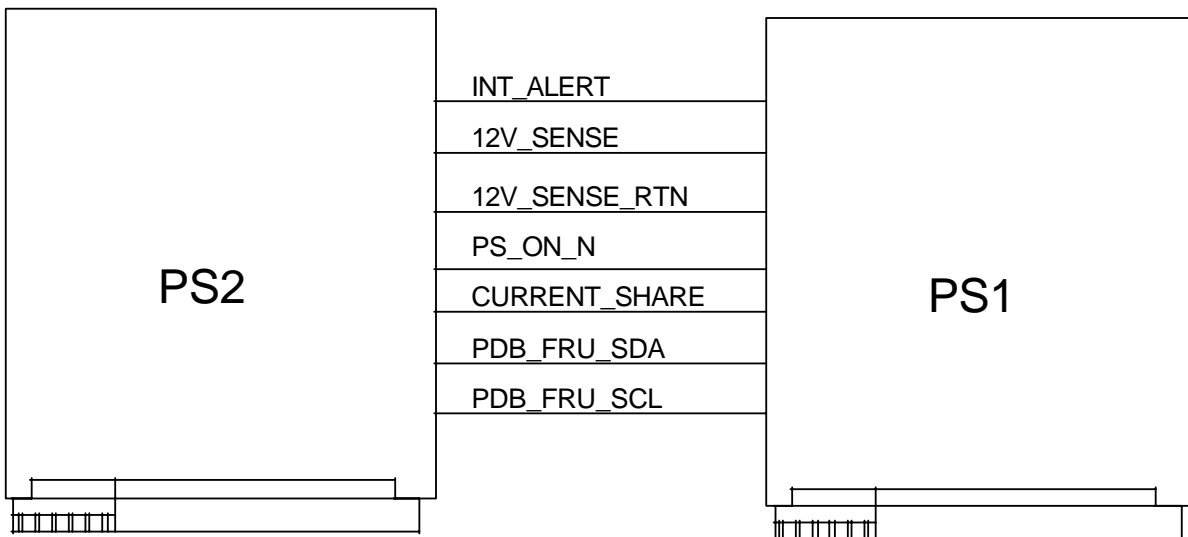
Figure 23. Power Supply Signal Sharing
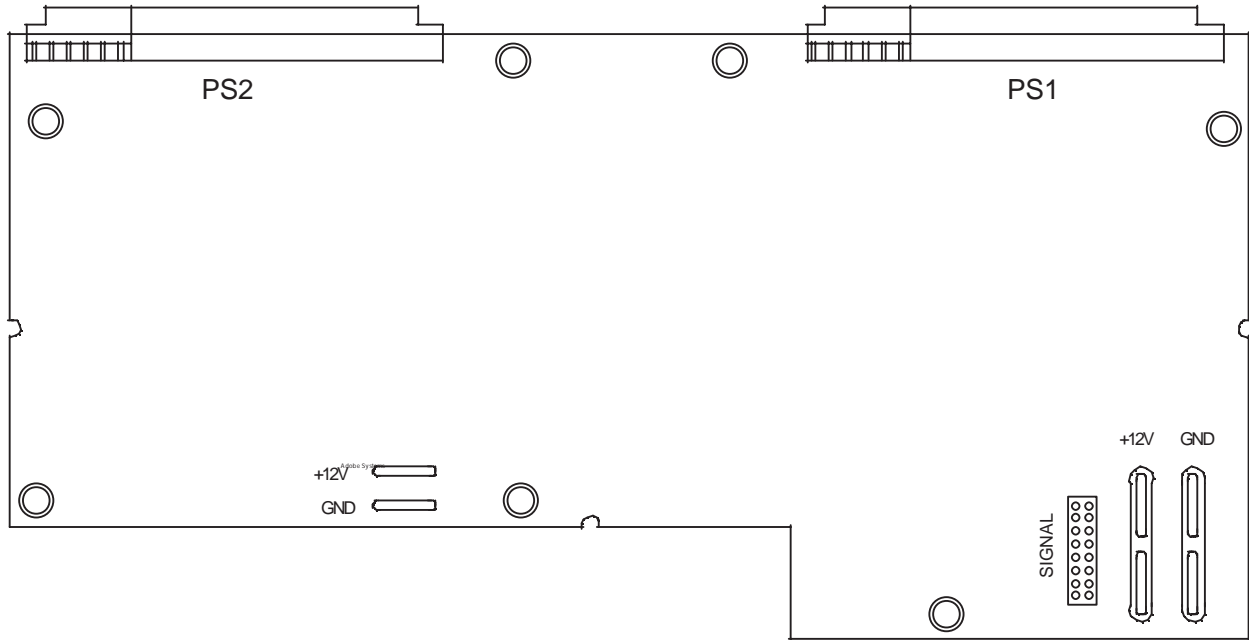
Figure 24. Power Distribution Board Layout

6.2　Signal Descriptions and Pinouts
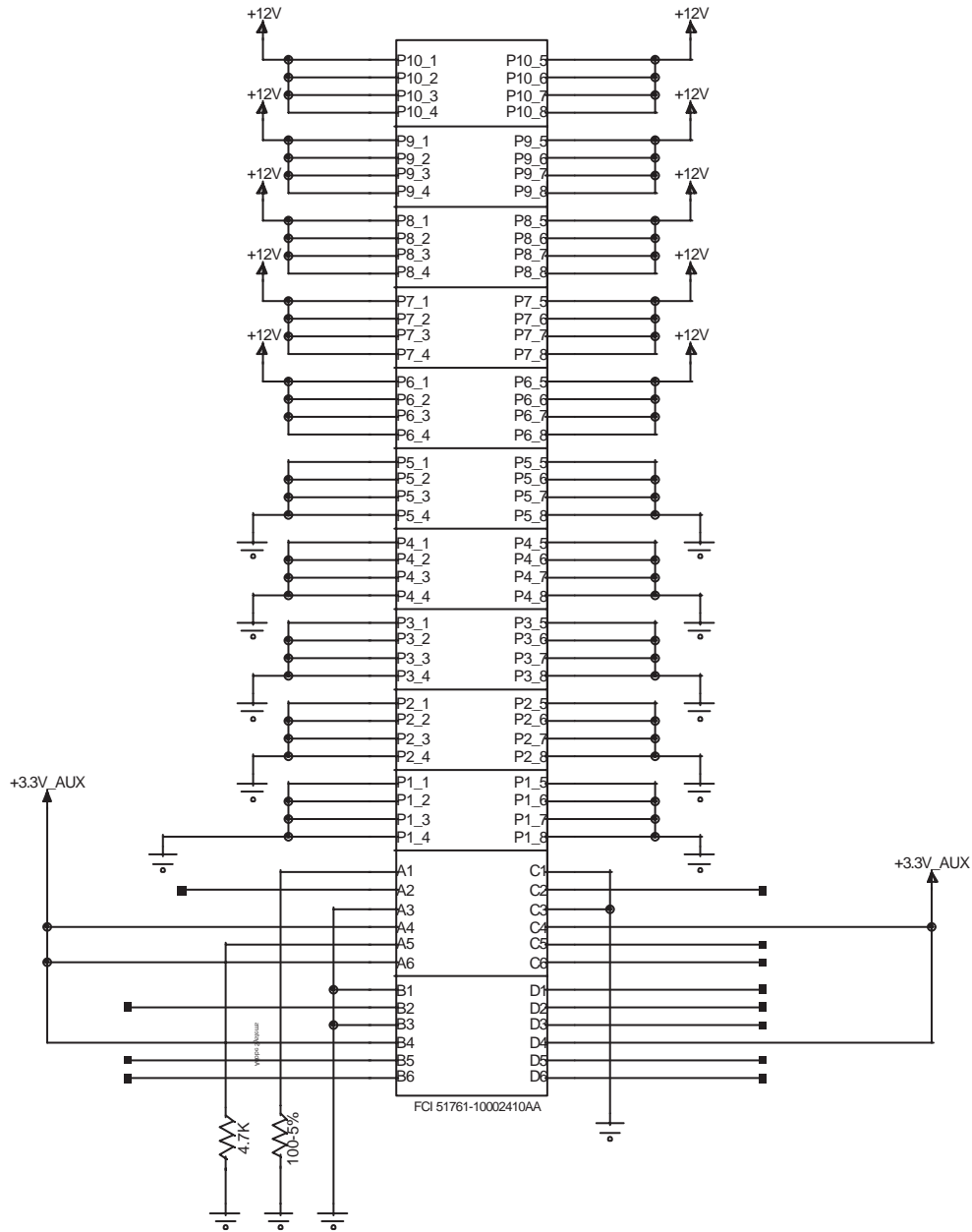
Figure 25. Power Distribution Board to Power Supply Module Docking Connector Signals
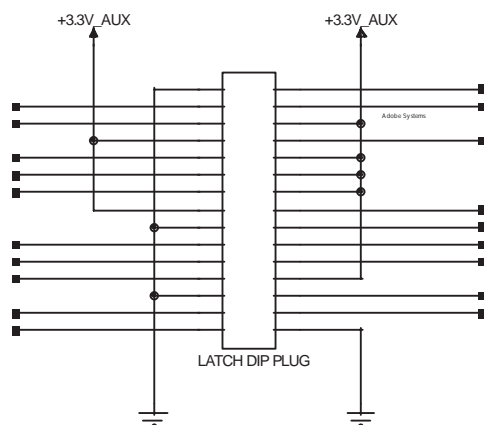
Figure 26. Mainboard Connector Signals

6.2.1   Remote On/Off (-PS_ON)

The power supply DC outputs are enabled when this signal is pulled low, below 0.8V. In the low state the input will not source more than 1mA of current. The DC outputs are disabled when the input is driven higher than 2.4V, or open circuited.

Provisions for de-bouncing are included in the –PS_ON circuitry. This prevents the power supply from oscillating on and off at startup.

6.2.2   Power Good Signal (POK or P_GOOD)

A power good signal is asserted or driven high by the power supply to indicate that all outputs are valid. If any of the outputs fails, this output is driven low.

If AC main power is lost, or if a fan has failed, this signal must be driven low at least 1ms before any of the outputs go out of regulation.

The output is an open collector/drain. It is capable of driving the output below 0.4V with a load of 4mA. The output has an internal pull-up resistor of 1KΩ between the output and +3.3V$_{stby}$. The pull-up is connected to the anode side of the +3.3V$_{stby}$ OR'ing diode.

This output also goes to I^{2}C port P5.

6.2.3   VIN_GOOD

This signal is asserted, driven high, by the power supply to indicate that the input voltage meets the minimum requirements of the input voltage range. Within 12ms after falling outside the input voltage requirements, the output must be driven low.

The output is an open collector/drain. It is capable of driving the output below 0.4V with a load of 4mA. The output has an internal pull-up resistor of 1KΩ between the output and +3.3V$_{stby}$. The pull-up is connected to the anode side of the +3.3V$_{stby}$ OR'ing diode.

This output also goes to I^{2}C port P4.

7.   SCSI Backplane Board

This chapter describes the Server Platform SR6850HW4 SCSI Backplane Board and is organized as follows:

Section 1:   Introduction
        Provides an overview of the Server Platform SR6850HW4 SCSI Backplane Board, showing functional blocks and the board layout.

Section 2:   Functional Architecture
        Describes the Server Platform SR6850HW4 SCSI Backplane Board functional blocks.

Section 3:   Signal Descriptions
        Summary of the Server Platform SR6850HW4 SCSI Backplane Board internal signals and connector signals, and the connector signal pin names and the signal descriptions.

Section 4:   Electrical, Environmental, and Mechanical Specifications
        Specifies operational parameters and considerations, and connector pinouts.

7.1   Introduction

The Server Platform SR6850HW4 SCSI Backplane Board supports up to ten hot-swap Ultra320 SCSI hard disk drives mounted into the chassis. The board provides drive status information and allows adding, removing and replacing hard disk drives without powering down the system. The following block diagram, architectural overview, and placement diagram provide an overview of the Server Platform SR6850HW4 SCSI Backplane Board.

7.1.1   Block Diagram

The block diagram divides SCSI Backplane Board into physical and functional blocks. Arrows represent buses and signals. Blocks represent the physical and functional blocks.
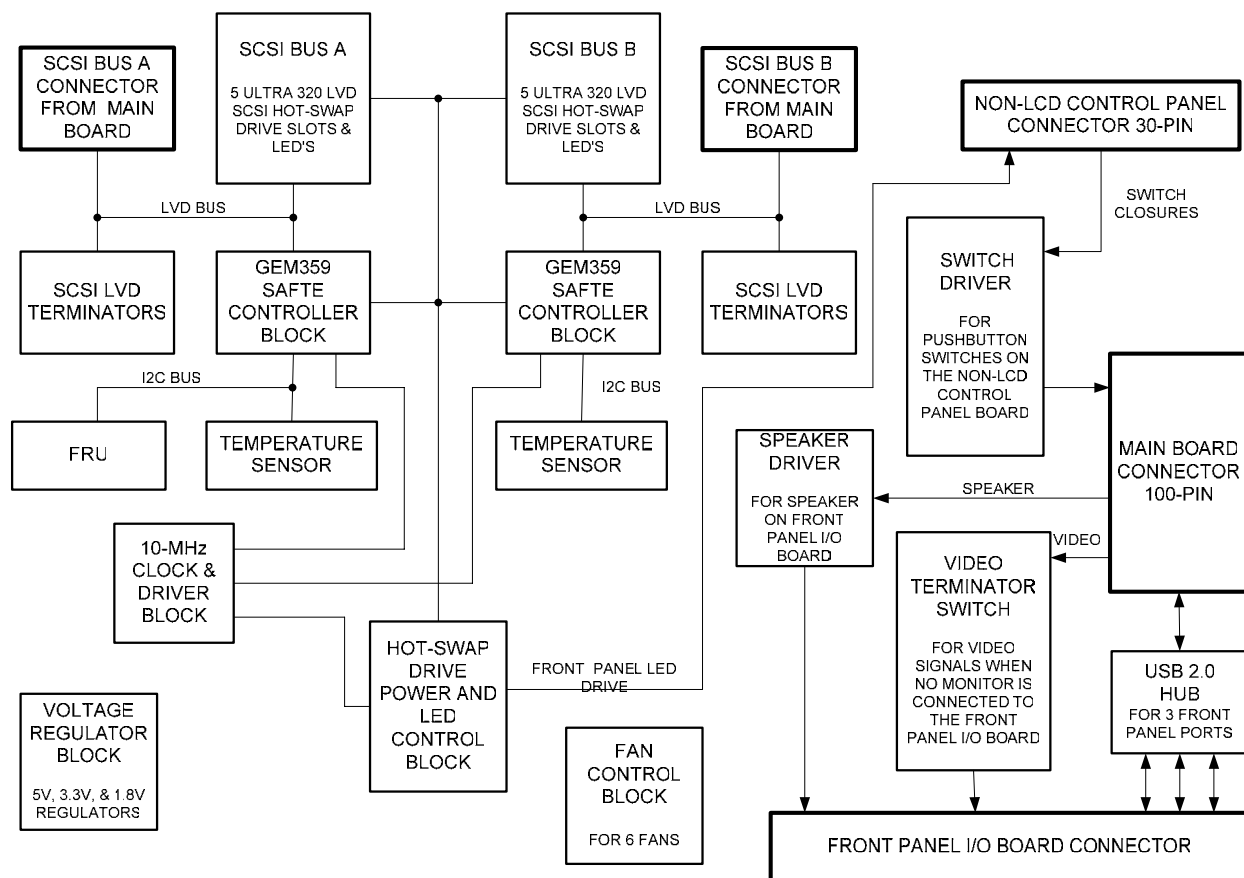
Figure 27.   Server Platform SR6850HW4 SCSI Backplane Board Board Block Diagram

7.1.2 Architectural Overview

The SCSI Backplane Board provides the following functions for the platform.

- Ultra320 SCSI bus passes SCSI signals between the hot-swap hard disk drives and the Server Board Set SE8500HW4 Mainboard
  - Two standard 68-pin SCSI connector provides connection to the Server Board Set SE8500HW4 Mainboard
  - Ten 80-pin SCA-2 blind-mate connectors connect to SCSI hard disk drives
- Fault tolerant enclosure management
  - SAF-TE
  - SCSI power control
  - LED control logic
- Server management
  - I^{2}C interface
  - I^{2}C Serial CMOS EEPROM (FRU)
  - Temperature sensors (primary ambient for system)

- Voltage regulators
  - 12VDC to 5VDC
  - 5VDC to 3.3VDC
  - 5VDC to 1.8VDC
- System fan control
- USB 2.0 Hub
- Driver circuit for the Server Platform SR6850HW4 Front Panel I/O Board speaker
- Buffering for the buttons on the Button Control Panel

7.1.3 Mechanical Specifcations

The board outline dimensions are 16.5inches x 6.380inches. The board thickness is 0.093inches +.008/-.005inches. All dimensions are in inches.
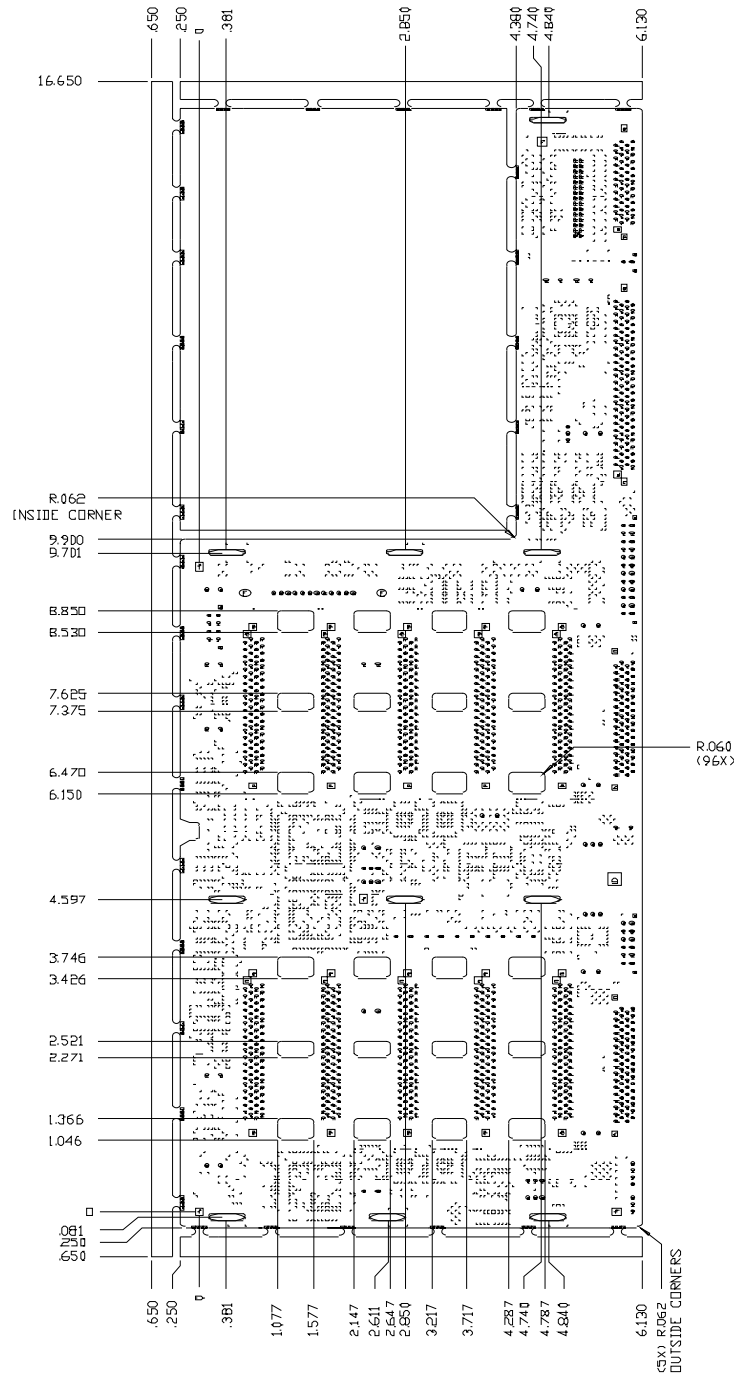
Figure 28. SCSI Backplane Board Board Component Placement (Primary Side)

7.1.4 Component Location

Figure 29 and shows the placement of the major components and connectors on the SCSI Backplane Board.
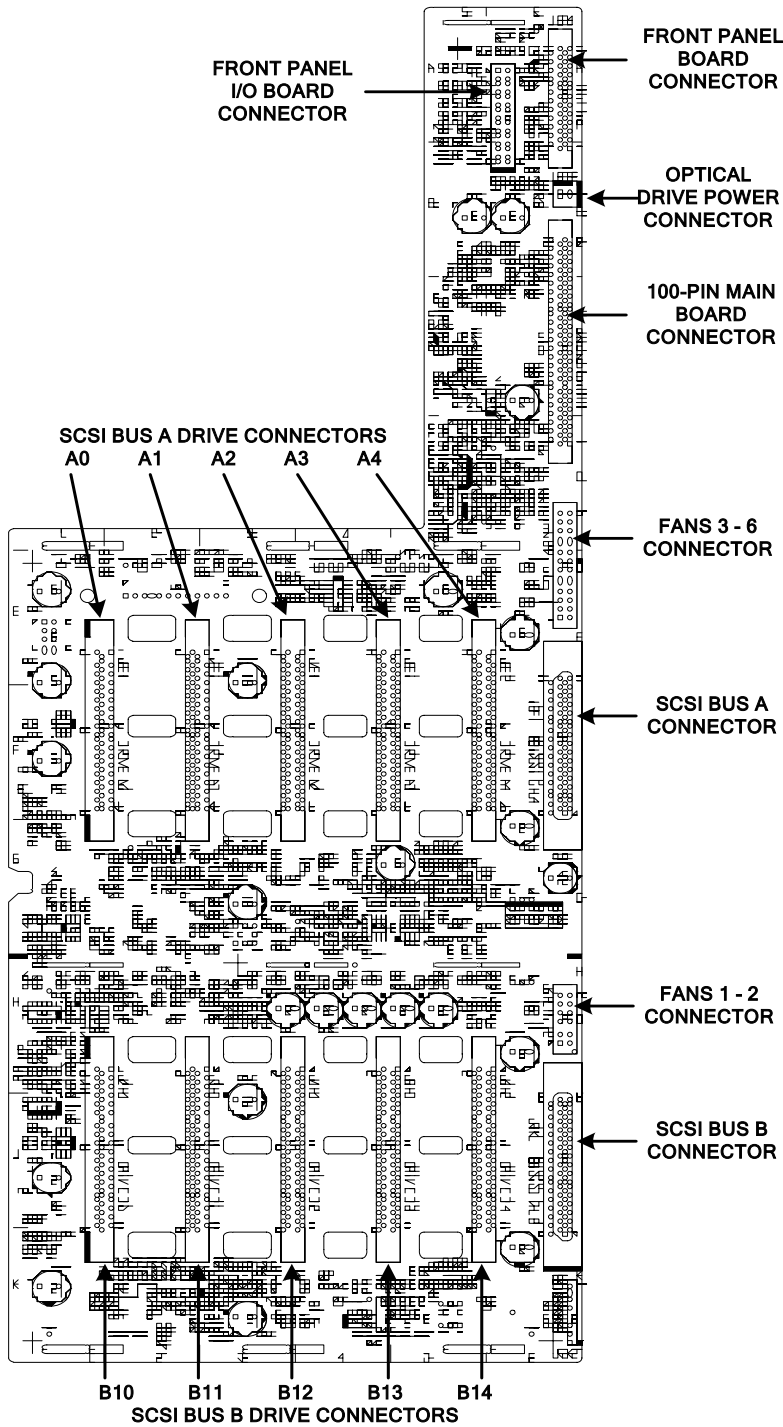
Figure 29. SCSI Backplane Board Board Component Placement (Primary Side)
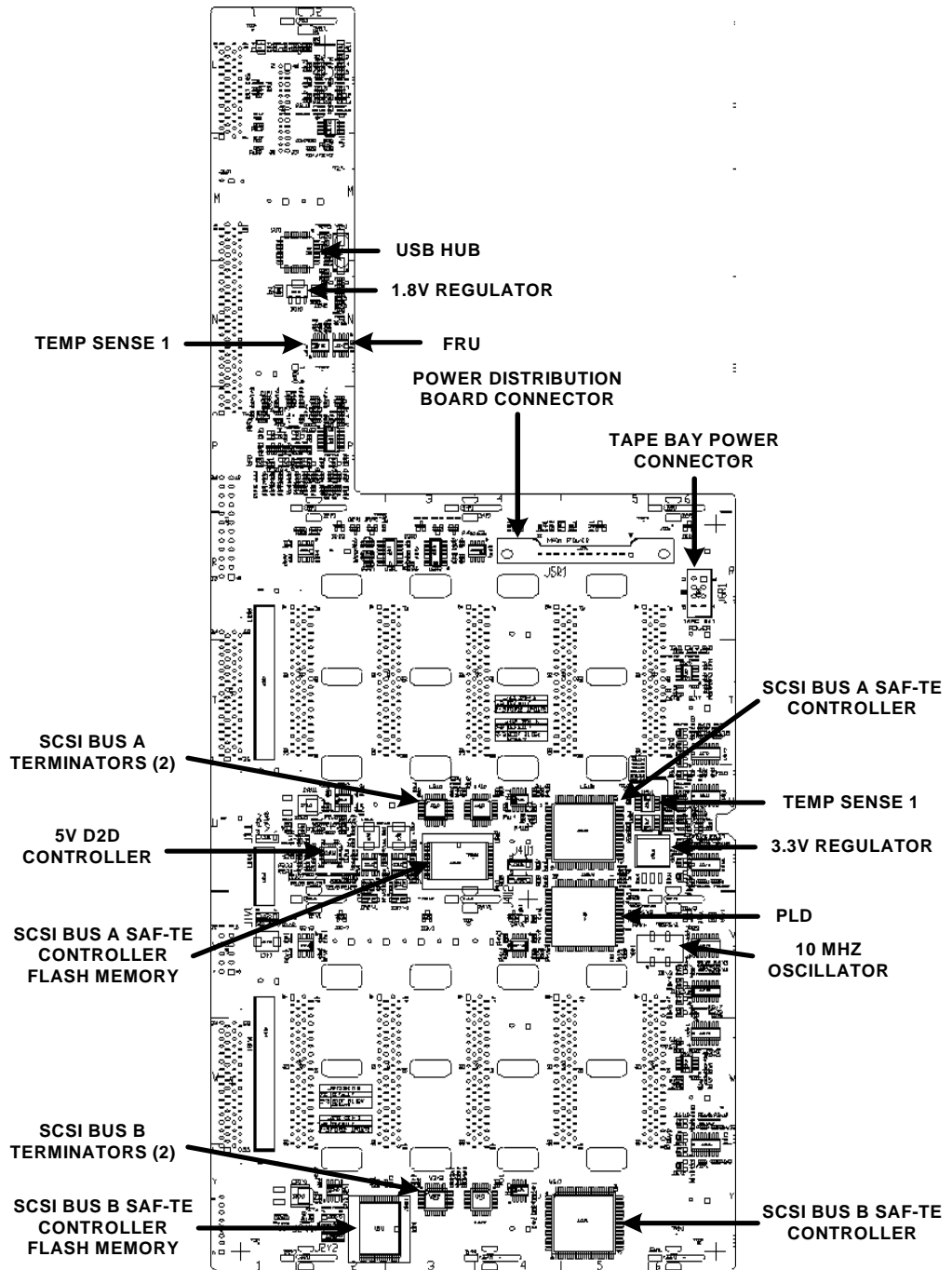
Figure 30. SCSI Backplane Board Board Component Placement (Secondary Side)

7.2   Functional Architecture

This section provides an architectural description of the Server Platform SR6850HW4 SCSI Backplane Board functional blocks.

7.2.1 SCSI Buses

The SCSI Backplane Board passes the SCSI bus from the Server Board Set SE8500HW4 Mainboard to the internal hot-swap SCSI hard disk drives. Each bus is Ultra320 SCSI low-voltage differential (LVD) capable. Single-ended (SE) drives are not supported in the hot-swap disk drive bay. Do not install an internal SE drive because the behavior of the drives is unpredictable and data corruption could result. This bus is comprised of 68 signals, operating at an 80MHz clock rate. The SCSI bus is capable of a 320MB data rate, from double transition (DT) data transfers on a two-byte wide bus. The bus attaches to the Server Board Set SE8500HW4 Mainboard with a standard 68-pin SCSI connector.

> 320 MB/s = 2 byte bus * 80 MHz clock * double transitions.

Note: Drives and the SCSI controller on the Server Board Set SE8500HW4 Mainboard negotiate the actual SCSI bus data rate.

7.2.2 SCSI Drive Power Control

SCSI power control is provided under control of the Programmable Logic Device (PLD). SCSI power control includes drive power switching, initial power-on charge pumping, over-current protection, system status notification, and drive status LEDs.

The system is notified when a hot-swap SCSI hard disk drive is detected. The SCSI Backplane Board applies power to the designated hot-swap SCSI hard disk drive and illuminates the status LED to provide visual indication of the event.

7.2.2.1   Internal SCSI Drive Power Switching

Each SCSI drive is supplied with +12V and +5V. Separate MOSFET switches are used to apply and remove +12V and +5V to each hot-swap SCSI hard disk drive.

7.2.2.2   Initial Power-on Charge Pumping

An initial current surge (up to 20A) is applied when power is first applied to a hot-swap SCSI hard disk drive. To reduce this initial current surge the SCSI Backplane Board charge pumps the drives for ~700µs. Charge pumping the hard disk drives keeps the average power-on current to approximately 3A.

7.2.2.3 Over-current Protection (OCP)

If either power rail for a drive exceeds 6A on 12V or 4.5A on 5V, the MOSFET switch for the out-of-spec rail is turned off. Removing power protects the MOSFET and the platform from damage if a short occurs on one of the power rails. After one-third of a second, the MOSFET is turned on to see if the short has been removed. It will continue turning on and checking for a short every one-third of a second until the system instructs the SCSI Backplane Board to remove power or until the fault disappears.

When the MOSFET is first enabled, the over current condition is not detected during the power-up period. This no-OCP period allows the initial current surge produced by many hot-swap SCSI hard disk drives. The power-up period is short enough to prevent damage to occur to the MOSFETS or the platform.

7.2.2.4 Power Control Interlock

The power control interlock prevents drives from powering on at the same time. Since only one hot-swap SCSI hard disk drive can power on at once, the board power requirements can be kept lower. Drives power on at one-third second intervals.

7.2.2.5 System Status Notification

Hot-swap SCSI hard disk drive status information is collected by the Qlogic* GEM359 SAF-TE controller for each bus. The controller passes the information to the server management via the global I^2C bus and enclosure management information via the SCSI bus.

7.2.2.6 SCSI Status LEDs

The status LEDs give the user a visual indication of the status of each hot-swap SCSI hard disk drive. A single bi-color (amber and green) LED is present for each drive. The LEDs use a combination of color and blinking frequency to indicate multiple conditions.

The hot-swap SCSI hard disk drive status LEDs are located on the SCSI Backplane Board and projected out the front system by light pipes on the drive carrier. The states of the LEDs are described in Table 39.

Table 39. Hot-swap SCSI Hard Disk Drive LED Details

LED State	Description
Green on	Drive is being initialized
Green blinking	Drive is active
Amber on	Drive/slot failure
Amber slow blinking (~1Hz)	Predictive drive/slot failure or array rebuild is in process
Amber fast blinking (~2.5Hz)	Array rebuild interrupted, rebuild on empty slot, or identify slot

7.2.3   SCSI Enclosure Management

SCSI enclosure management allows the SCSI Backplane Board to report hot-swap SCSI hard disk drive status via the SCSI bus. This information is normally consumed by a RAID controller that supports enclosure management; the optional ROMB accessory supports this feature. The SCSI enclosure management subsystem consists of a Qlogic GEM359 controller, flash, and PLD.
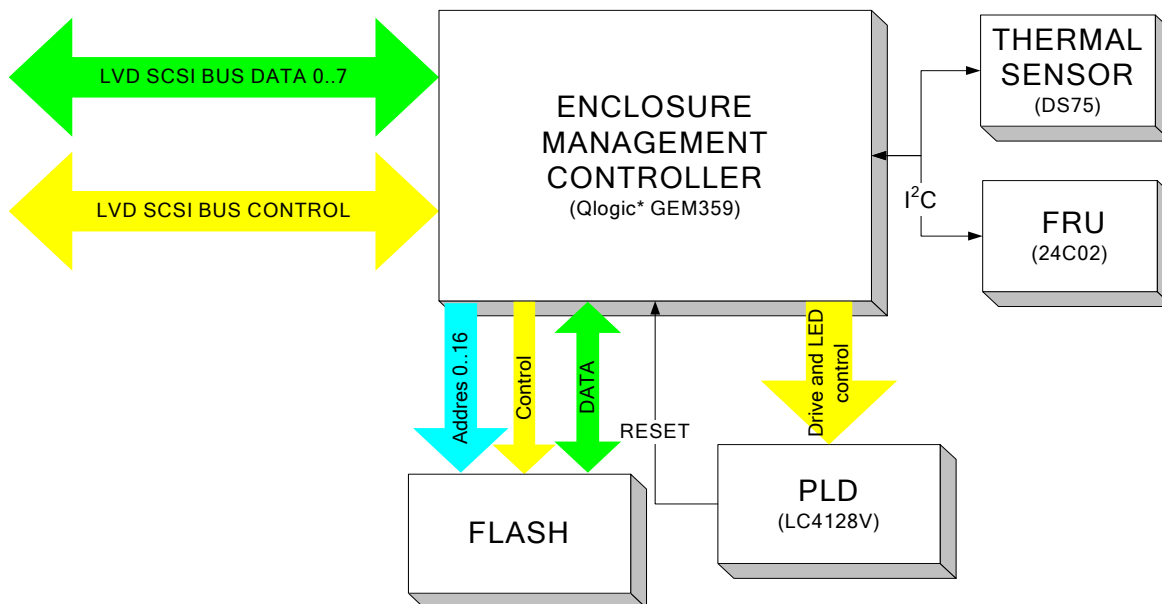
Figure 31. Enclosure Management Signal Flow Diagram

7.2.3.1   Qlogic GEM359 Enclosure Management Controller

The GEM359s send board and drive information to both the SCSI and IPMB bus. The GEM359s also act on requests from both the SCSI bus and global I^2C bus. GEM359s GPIOs send LED information to the PLD.

7.2.3.2   4-Mb Flash

The GEM359s code is stored in a 4-Megabit FLASH (512K x 8). The FLASH boot block is in the top 16k of the block. The boot block is write-protected. Non-protected FLASH can be updated through the IPMB bus.

7.2.3.3   PLD

The PLD governs the SCSI power control circuit and controls the LEDs. The PLD is an In-System Programmable (ISP) with an 8-pin header connector.

7.2.4 Server Management Interface

The SCSI Backplane Board supports the following server management features:

- Local I2C Interface
  - Field Replaceable Unit (FRU)
  - Temperature sensor
  - Microcontroller interface (Hot Swap Controller)
- System I2C Interface
  - Micro-controller IPMB interface
  - I^2C/SM Bus (for fan monitoring)

7.2.4.1 Local I^2C Bus

The Bus A local I^2C bus connects the DS75 (or equivalent) thermal sensor and Atmel* AT24C02N (or equivalent) serial EEPROM (with FRU data) to the microcontroller. This thermal sensor is used by the BMC for the ambient temperature of the system.

7.2.4.2 Isolated Global I^2C Bus (IPMB)

The global I^2C bus connects the controllers to the system. The global I^2C bus is isolated from the system until the system PWRGRD reaches the SCSI Backplane Board.

7.2.4.3 I^2C I/O Bus

The I^2C I/O bus connects the Server Board Set SE8500HW4 Mainboard microcontroller to the Server Platform SR6850HW4 Front Panel I/O Board, fan control and the USB hub.

7.2.4.4 I^2C Addresses

Four I^2C devices and their addresses are listed in Table 40 and Table 41. The following I^2C devices can be addressed on or through the SCSI Backplane Board:

- Hot Swap microcontroller (HSC)
- FRU EEPROM
- Temperature sensor
- Fan controller

Table 40. I^2C Local Bus Addresses

Device	Address	Bus/Location	Description
AT24C02	0xA0	Legacy I²C/SCSI Backplane Board Board	Private SCSI Backplane Board Board FRU EEPROM
DS75	0x90	Legacy I²C /SCSI Backplane Board Board	Private SCSI Backplane Board Board temperature sensor

Table 41. Global I²C Bus Addresses (IPMB Bus)

Device	Address	Bus/Location	Description
Bus A GEM359	0xC0	Legacy I²C/SCSI Backplane Board Board	Microcontroller public IPMB bus
Bus B GEM359	0xC2	Legacy I²C/SCSI Backplane Board Board	Microcontroller public IPMB bus

Table 42. I²C IO Bus Address

Device	Address	Bus/Location	Description
PCA9555	0x42	Legacy I²C/SCSI Backplane Board Board	Microcontroller public I/O bus

7.2.5   Resets

The PCI_RST_BP_N signal from the Server Board Set SE8500HW4 Mainboard via the 100-pin connector provides the principal reset for the logic on the SCSI Backplane Board. The signal resets the USB hub and SCSI drive power sequencing timing in the PLD. The PLD resets the GEM359s and their flash chips.

The PCA9555 device used to control the fans has an internal power-on reset that configures all its I/O pins as inputs.

7.2.6 Connector Interlocks

7.2.6.1   Mainboard Cable Connector

The SCSI Backplane Board has an interlock on the 100-pin connector so the Server Board Set SE8500HW4 Mainboard can detect its presence.

7.2.6.2   SCA-2 Connector

The SCSI Backplane Board uses an interlock to determine if a hot-swap SCSI hard disk drive is present. This interlock is defined by the SCSI_MATED# signals. Drive presence is used by enclosure management.

7.2.7 Clock Generation

The SCSI Backplane Board has a single, 10.0MHz, local clock. It supplies a 5V-rail clock input to the GEM359s and PLD. The clock is separately buffered by a 74LVT244.

The SMSC* USB20H04 USB hub has its own built-in 24MHz crystal oscillator that uses an external crystal.

7.2.8 Programmed Devices

Four programmed devices are on the SCSI Backplane Board:

- FLASH: Flash contains program code to be run by the onboard microcontroller, the HSC. Memory configuration: 512 K x 8.
- Field Replaceable Unit (FRU): The FRU is programmed at the factory. Memory Configuration: 256 x 8 serial.
- USB hub circuit: The USB hub circuit has a serial EEPROM programmed with configuration data for the USB hub controller. Memory Configuration: 256 x 8 serial.
- Programmable Logic Device (PLD): The PLD governs the SCSI power control circuit, controls LEDs, and provides a deglitching function for the Flash chips. The PLD is independently In-System-Programmable (ISP) with an 8-pin header connector.

7.3 Signal Descriptions

The following notations are used to describe the signal type, from the perspective of the Server Platform SR6850HW4 SCSI Backplane Board:

- I   Input pin to the Server Platform SR6850HW4 SCSI Backplane Board
- O   Output pin from the Server Platform SR6850HW4 SCSI Backplane Board
- I/O   Bi-directional (input/output) pin
- PWR   Power supply pin

The signal description also includes the type of buffer used for the particular signal:

- LVD   Low Voltage Differential SCSI
- SE   Standard Single Ended SCSI
- TTL   5V TTL signals
- CMOS   5V CMOS signals
- Analog   Typically a voltage reference or specialty power supply
- hs   This suffix is added to indicate high-speed requirements that make modifications subject to review

7.3.1   Power from the Power Distribution Board

The SCSI Backplane Board receives only +12V from the Power Distribution Board through a 12-pin connector. These pins are tied together and Table 43 provides a summary of the power connector pins.

Table 43. Power Interface Signals

Signal	Type	Driver	Name and Description
+12V	I	PWR	+12 Volt supply from Power Distribution Board

7.3.2 Front Panel Power Connector

Table 44 is a summary of the Server Platform SR6850HW4 Front Panel I/O Board power connector pins.

Table 44. Front Panel I/O Board Power Interface Signals

Signal	Type	Driver	Name and Description
+3.3V$_{stby}$	I	PWR	+3.3 Volt standby supply from Front Panel I/O Board
+3.3V	O	PWR	+3.3 Volt supply to Front Panel I/O Board
+5V	O	PWR	+5 Volt supply to Front Panel I/O Board

7.3.3 Front Panel I/O Board Ribbon Cable Connector

The 30-pin Server Platform SR6850HW4 Front Panel I/O Board ribbon cable connector carries signals to and from the SCSI Backplane Board. Table 45 provides a description of the Front Panel I/O Board ribbon cable connector. See Chapter 4 for pinouts.

Table 45. Front Panel I/O Board Ribbon Connector Signal Description

Signal	Type	Driver	Name and Description
FP_ID_BTN_N	I	Switch	ID button, ground when pressed
FP_PWR_BTN_N	I	Switch	Power button, ground when pressed
FP_RST_BTN_N	I	Switch	Reset button, ground when pressed
SYS_STATUS_GRN_LED_R_N	O		Drives the front control panel system status green LED under Mainboard control
SYS_STATUS_AMB_LED_R_N	O		Drives the front control panel system status amber LED under Mainboard control
FP_ID_LED_R_N	O		Drives the front control panel ID blue LED under Mainboard control
FP_PWR_LED_R_N	O		Drives the front control panel power green LED under Mainboard control

HDD_LED_ACT_R_N	O		Drives the front control panel drive active green LED when either a SCSI drive or an SATA drive is active
HDD_LED_FLT_R_N	O		Drives the front control panel drive fault amber LED to indicate a SCSI drive fault
NIC1_LINK_LED_R_N	O		Drives the front control panel LAN1 green LED to indicate status of LAN1 on the Mainboard
NIC2_LINK_LED_R_N	O		Drives the front control panel LAN22 green LED to indicate status of LAN2 on the Mainboard
I2C_IPMB_SCL	I/O		This pin supplies an isolated version of the global IPMB Bus clock to the front control panel.
I2C_IPMB_SDA	I/O		This pin supplies an isolated version of the global IPMB Bus data to the front control panel.
+5V	O		Power for the front control panel
+5V STBY	O		Power for the blue LED on the front control panel
GND	O		Ground, signal common

7.3.4 LVD SCSI 68-pin Connector

Each 68-pin LVD SCSI connector carries SCSI signals between the SCSI Backplane Board. The Server Board Set SE8500HW4 Mainboard is unshielded. Table 46 provides a description of the LVD SCSI connector.

Table 46. LVD SCSI Connector Signal Description

Signal	Type	Driver	Name and Description
LVD_DB[15..0]_[P, N]	I/O	LVD hs	SCSI data bus. The data bits for the differential SCSI bus.
LVD_DBP_[P, N] LVD_DBP1_[P, N]	I/O	LVD hs	SCSI data parity. Support parity on the SCSI bus. DB_P0[P/N] supports parity for data [7..0]. DB_P1[P/N] supports parity for data [15..8].
DIFFSENSE	I	Analog	Differential sense. The voltage level determines the operating mode of the target devices on the SCSI bus. If the voltage on the DIFFSENSE signal is from –0.35 V to +0.5 V the mode will be SE. If it is from +0.7 V to 1.9 V the mode will be LVD.
LVD_ATN_[P, N]	I/O	LVD hs	SCSI bus attention. Asserted by a SCSI device in initiator mode to alert the target that the initiator has a message to transfer.
LVD_BSY_[P, N]	I/O	LVD hs	SCSI bus busy. Indicate that the SCSI bus is being used. Can be driven by both the initiator and the target device.
LVD_ACK_[P, N]	I/O	LVD hs	SCSI bus acknowledge. Driven by an initiator, indicating an acknowledgement for a SCSI data transfer.
LVD_RST_[P, N]	I/O	LVD hs	SCSI bus reset. Indicate a SCSI bus reset condition.
LVD_MSG_[P, N]	I/O	LVD hs	SCSI bus message phase. Driven by a SCSI target to indicate it is in the Message Phase.
LVD_SEL_[P, N]	I/O	LVD hs	SCSI bus select. Used by an initiator to select a target or by a target to reselect an initiator.
LVD_CD_[P, N]	I/O	LVD hs	SCSI bus control/data phase. Driven by a target, these pins indicate that control or data information is being transferred over the SCSI bus.
LVD_REQ_[P, N]	I/O	LVD hs	SCSI bus request. Driven by a target, these pins indicate a request for a SCSI data-transfer handshake.

Signal	Type	Driver	Name and Description
LVD_IO_[P, N]	I/O	LVD hs	SCSI bus I/O phase. Driven by the target, these pins control the direction of data transfer on the SCSI bus. When asserted, this signal indicates input to the initiator. When not asserted, this signal indicates output from the initiator.
GND	I/O	PWR	Ground. Provide secondary ground reference.

7.3.5 SCA2 80-pin Drive Connectors

The SCA2 connector carries power and signal between the SCSI Backplane Boardboard and hot-swap SCSI hard disk drives. The LVD SCSI bus signals are driven by either the Server Board Set SE8500HW4 Mainboard SCSI controller, the LVD transceiver, or the hot-swap SCSI hard disk drives. Table 47 provides a description of each signal on the SCSI connectors.

Table 47. .LVD SCSI Bus Signals

Signal	Type	Driver	Name and Description
LVD_DB[15..0]_[P, N]	I/O	LVD hs	SCSI data bus. Along with the DBP[1/0][P/N] pins they form the bi-directional SCSI data bus.
LVD_DBP_[P, N] LVD_DBP1_[P, N]	I/O	LVD hs	SCSI data parity. Support parity on the SCSI bus. DBP[P/N] supports parity for data [7..0] DBP1[P/N] supports parity for data [15..8]
DIFFSENSE	I	Analog	Differential sense. Monitor the DIFFSENSE signal from the terminator. The voltage level determines the operating mode of the target devices on the SCSI bus. If the voltage on the DIFFSENSE signal is from –0.35V to +0.5V the mode will be SE. If it is from +0.7V to 1.9V the mode will be LVD.
LVD_ATN_[P, N]	I/O	LVD hs	SCSI bus attention. Asserted by a SCSI device in initiator mode to alert the target that the initiator has a message to transfer.
LVD_BSY_[P, N]	I/O	LVD hs	SCSI bus busy. In SE mode, these pins are bi-directional and are asserted to gain use of the SCSI bus and to indicate that that SCSI bus is in use.
LVD_ACK_[P, N]	I/O	LVD hs	SCSI bus acknowledge. Asserted by a SCSI device in initiator mode to acknowledge the target's request for a data transfer.
LVD_RST_[P, N]	I/O	LVD hs	SCSI bus reset. In SE mode, these pins are bi-directional and are asserted when all the SCSI devices attached to the SCSI bus need to be reset.
LVD_MSG_[P, N]	I/O	LVD hs	SCSI bus message phase. Asserted by a SCSI device in target mode to indicate the Message In or Message Out phase.
LVD_SEL_[P, N]	I/O	LVD hs	SCSI bus select. In SE mode, these pins are bi-directional and are asserted by the controller when attempting to select or reselect a SCSI device.
LVD_CD_[P, N]	I/O	LVD hs	SCSI bus control/data phase. Asserted or de-asserted by a SCSI device in target mode to indicate that control or data information is being transferred over the SCSI bus
LVD_REQ_[P, N]	I/O	LVD hs	SCSI bus request. Asserted by a SCSI device in target mode to indicate that the target is requesting a data transfer over the SCSI bus.
LVD_IO_[P, N]	I/O	LVD hs	SCSI bus I/O phase. Asserted by a SCSI device in target mode to indicate the direction of data movement on the SCSI bus between the target and the initiator.

Signal	Type	Driver	Name and Description
SCSI_ID	O	GND/OPEN	SCSI ID. Sets internal SCSI ID depending on slot. Drive 1 has SCSI address 0. Drive 2 has SCSI address 1 and so on.
SCSI_MATED_L [1-5]	I/O	TTL	SCSI MATED. Determine if SCSI is present and has proper contact.
GND	I/O	PWR	Ground. Provide secondary ground reference.
+12V	O	PWR	+12 Volt supply. Max 1A of continuous current/6A peak current.
+5V	O	PWR	+5 Volt supply. Max 1.4A of continuous current/6A peak current.

7.3.6   Fans

Each fan has an integral amber LED with a grounded cathode. This provides a small current to a transistor that drives the FAN[10..1]_PRES signal. This signal is read by server management through U2P1, and the PCA9555 I^{2}C Port. Server management can also use U2P1 to turn on a FAN[10..1]_LED signal. FET drivers boost the current through the LED to brighten it.

The FAN_PWM signal from the Mainboard controls the fan speed. The FAN[10..1]_TACH signal is shaped by an FET buffer and driven to the Mainboard as FAN[10..1]_TACH_BUFF for determination of fan speed.

7.3.7 Internal Logic Signals

Table 48 is a summary of the signals that route between logic on the SCSI Backplane Board.

Table 48. Internal Logic Signals

	Signal	Type	Driver	Name and Description
Clks	CLK_10MHz	O	CMOS	10-MHz clock that is used by the GEM359 and PLD.
GEM359 Logic Control	ADDR<16..0>	O	CMOS	Address/bus. Address bus for the FLASH.
	PROM_VPP_L	O	CMOS	FLASH PROGRAM VOLTAGE ENABLE. Driven by the GEM359 to all FLASH to be programmed.
	PROM_OE_L	O	CMOS	FLASH output enable. Driven by the GEM359 to enable the FLASH for writing data on the bus.
	PROM_CE_L	O	CMOS	FLASH output enable. Driven by the PLD to enable the FLASH.
	PROM_WE_L	I	CMOS	FLASH chip enable. Driven by the GEM359 to enable writing to the FLASH.
SCSI Power Control	KCK_5V_L [1-10]	O	Analog	5 Volt kick start. Primes 5 Volt FET to start delivering power to a drive.
	KCK_12V_L [1-10]	O	Analog	12 Volt kick start. Primes 12 Volt FET, to start delivering power to a drive.
	FLT_5V_L [1-10]	I	CMOS	5 Volt hot-swap fault. Indicates greater than 5A of current drawn from 5V rail.
	FLT_12V_L [1-10]	I	CMOS	12 Volt hot-swap fault. Indicates greater than 5A of current drawn from 12V rail.
	STP_5V_L[1-10]	I	Analog	5 Volt stop. Stops 5 Volt FET from delivering power to a drive.
	STP_12V_L[1-10]	I	Analog	12 Volt stop. Stops 12 Volt FET from delivering power to a drive.

	Signal	Type	Driver	Name and Description
	PWR_TIMER	O	Analog	Power timer. Starts one second timer for FET reset.
	TMR_DONE	I	Analog	Timer done. One second reset timer complete.
Fan Control	FAN_PRES[1-6]	I	Analog	Fan is present on system
	FAN_LED[1-6]	I	Analog	LED signal when fan was off line
	FAN_TACH[1-6]	I	Analog	Fan speed

7.4   Electrical, Environmental, and Mechanical Specifications

This section specifies the operational parameters and physical characteristics for the Server Platform SR6850HW4 SCSI Backplane Board. Further topics in this section specify normal operating conditions, mechanical specifications and connector interfaces to the board.

7.4.1   Electrical Specifications

The power budget for the SCSI Backplane Board and pinouts of the external interface connectors are defined in the following table.

Table 49. Electrical Specifications

Feature	Absolute Maximum Rating
Voltage of any signal with respect to ground	-0.3V to Vcc^1 to Vcc^1+0.3V
+3.3V$_{stby}$ supply with respect to ground	-0.3V to +3.465V
+3 .3V supply with respect to ground	-0.3V to +3.465V
+5V supply with respect to ground	-0.3V to +5.25V
+12V supply with respect to ground	-0.3V to +12.6V

Note: [1]. Vcc refers to the supply voltage for the device.

7.4.1.1   Power Consumption

Table 50 shows the power consumed on each supply line for the SCSI Backplane Board.

Table 50. Maximum Power Consumption

Devices	Power Dissipation	Ext/Int
12V	180W	Ext
5V	100W	Int
3.3V	0.5W	Int
3.3V$_{stby}$	0.5W	Ext
1.8V	0.2W	Int

Note: The numbers in the table are provided only to show design limits. Power consumption will vary, depending on the exact configuration.

7.4.1.2 Hot-Swap SCSI Hard Disk Drive Supplied Power

Hot-swap SCSI hard disk drives must fall within the power limits shown in Table 51. The SCSI Backplane Board works with drives that meet the following requirements.

Table 51. SCSI Backplane Board Board Power Limits per Drive

Device constraint	+5 V	+12 V
Peak start current	0.73A	1.5A
Max operating current	0.81A	1.15A
Average idle	0.68A	0.61A

7.4.1.3 Power Supply Requirements

The external and internal power supply must meet the following requirements:

- Rise time of less than 50ms (for all voltages).
- Delay of 5ms (minimum) from valid power to power good.

See Table 52 for voltage regulation requirements.

Table 52. DC Voltage Regulation

DC Voltage	Acceptable Tolerance
+5V	± 5%
+12V	± 5%
+3.3V	± 5%
+3.3V$_{stby}$	± 5%
+1.8V	± 5%

8.   Front Panel I/O and Control Boards

This chapter describes the Server Platform SR6850HW4 Front Panel I/O Board and is organized as follows:

Section 8.1:   Introduction
Provides an overview of the Server Platform SR6850HW4 Front Panel I/O Board, showing functional blocks and board layout.

Section 8.2:   Functional Architecture
Describes the Server Platform SR6850HW4 Front Panel I/O Board functional blocks.

Section 8.3:   Signal Descriptions
Summary of the internal and connector signals, and the connector signal pin names and descriptions. Signal mnemonics appear throughout this chapter.

Section 8.4:   Electrical, Environmental and Mechanical Specifications
Specifies operational parameters and considerations, and connector pinouts.

Section 8.5:   Front Panel Control Module
Describes the two different front panel control modules available in the Server Platform SR6850HW4.

8.1   Introduction

The Server Platform SR6850HW4 Front Panel I/O Board provides access to the video and USB interfaces. It also interfaces to the front panel control module that contains the front control panel buttons, LEDs and optional LCD window. Circuitry on the Server Platform SR6850HW4 Front Panel I/O Board consists of video filters, USB filters, USB port power bulk capacitors with fusing, and a speaker.

8.1.1   Block Diagram

The following block diagram divides the Front Panel I/O Board into physical and functional blocks. Arrows represent buses and signals. Blocks represent the physical and functional circuits. Figure 32 illustrates the general architecture of the front panel.
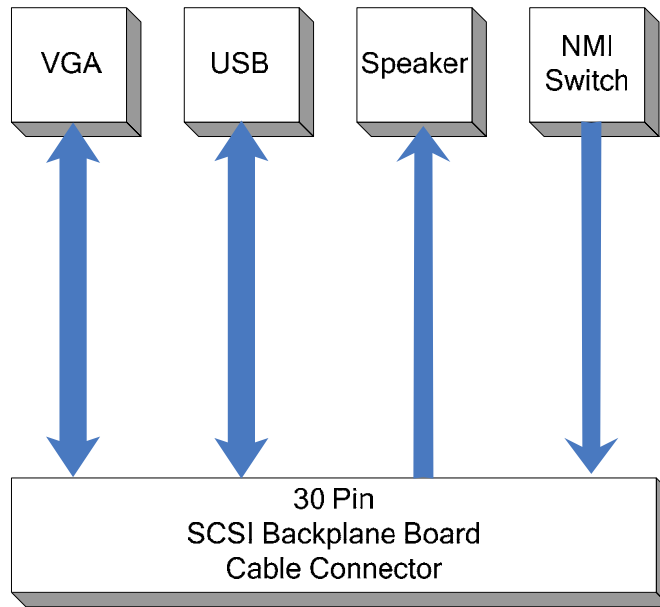
Figure 32. Front Panel I/O Board Block Diagram

8.1.2   Architectural Overview

The Front Panel I/O Board provides three main functions for the platform. The first function is to provide filtered video and USB signals to the front panel connector. The second is to provide a speaker. The third is to provide a system NMI button.

Functional blocks are as follows:

- USB ports
    - External front control panel connector for three USB 2.0 ports
    - Filtering for the USB signals
    - Bulk capacitance and fused power for USB ports
- Video connector
    - External front control panel 15-pin VGA connector
    - Required safety fusing and EMI filtering
- Speaker
    - Audible beep-code and alarm speaker
- NMI button

8.1.3   Component Location

The following figure shows the placement of the major components and connectors on the Front Panel I/O Board. Figure 34 provides a three-dimensional view of the board.
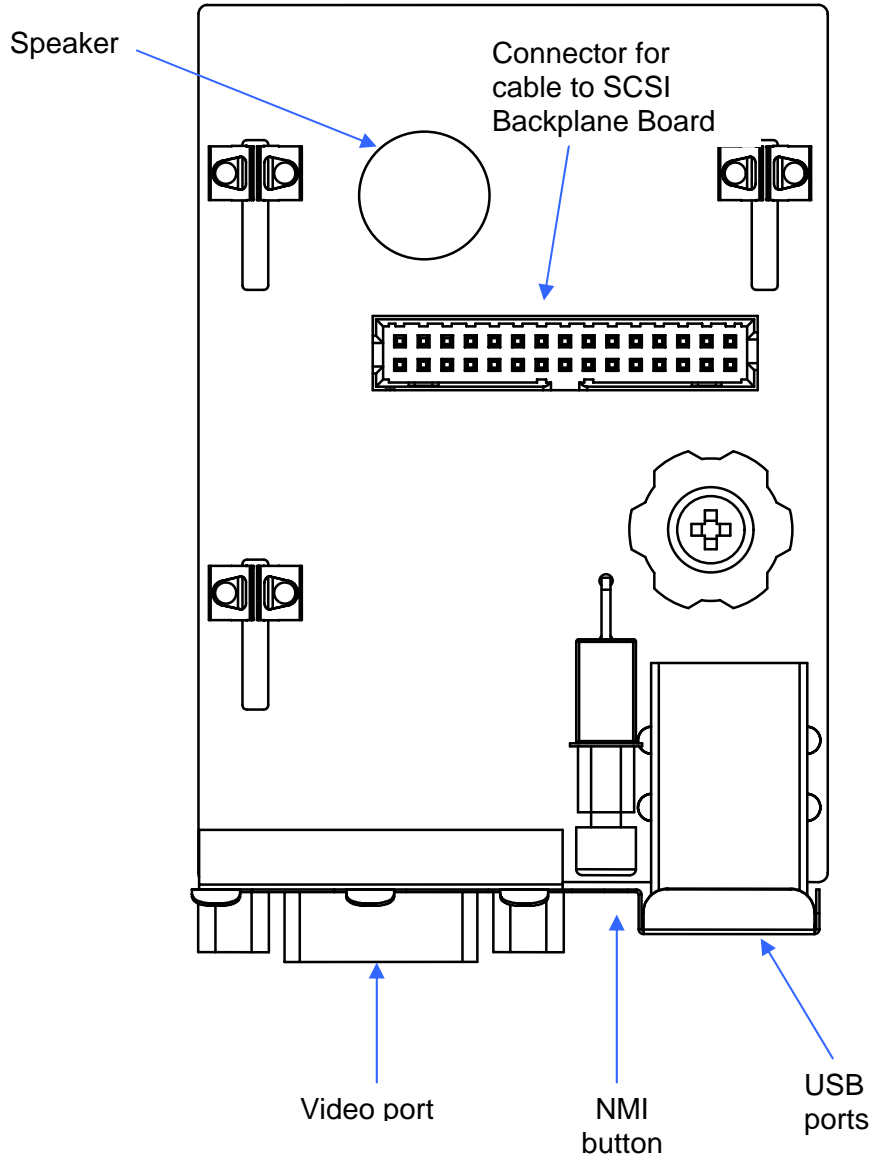

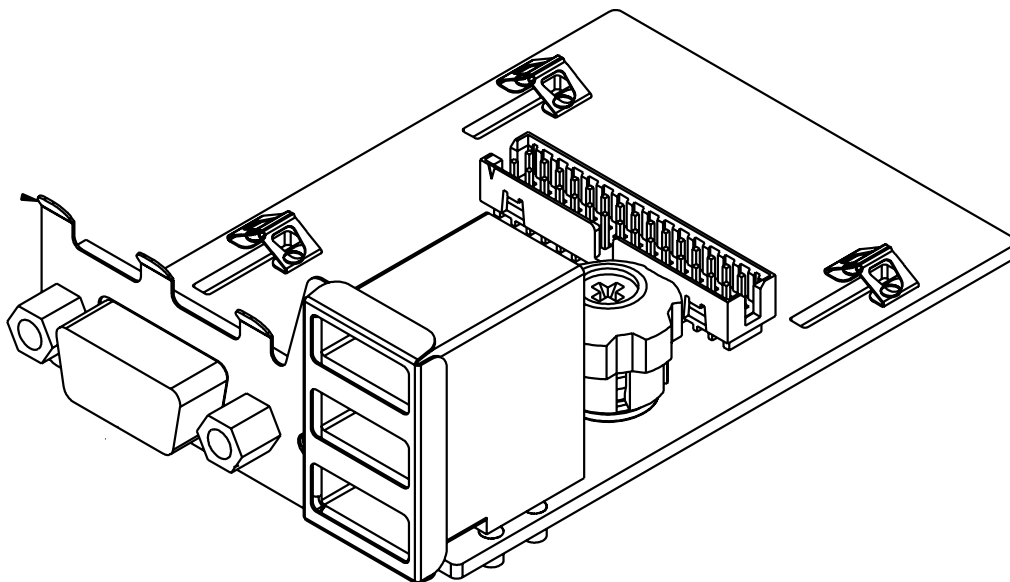**Figure 33. Front Panel I/O Board Placement Diagram**

Figure 34. Front Panel I/O Board

8.2   Functional Architecture

This section provides an architectural description of the Server Platform SR6850HW4 Front Panel I/O Board functional blocks.

8.2.1   VGA

The Front Panel I/O Board passes the VGA video signals from the Server Platform SR6850HW4 SCSI Backplane Board connector to the Front Panel I/O Board. The video signals originate on the Server Platform E8500HW4 Mainboard and route to the Server Platform SR6850HW4 SCSI Backplane Board through a 100-pin cable.

Using the default operating system video driver options, the VGA signal is mirrored between the rear panel and the front panel of the platform. This design consideration was made to facilitate user debug of an operating system hard failure. When the system is in a failure state, a portable monitor could be attached to the front of the system to determine root cause. Since this is an enterprise server, Intel is not validating the video driver configured with the Front Panel I/O Board VGA connector in a non-mirrored, extended desktop state.

8.2.2   USB

The Front Panel I/O Board passes the high-speed USB 2.0 signals from the Server Platform SR6850HW4 SCSI Backplane Board to the three USB ports on the front of the system.

8.2.3   NMI Button

The Front Panel I/O Board has an NMI button; this signal is routed to the 30-pin Server Platform SR6850HW4 SCSI Backplane Board connector.

8.3   Signal Descriptions

The following notations are used to describe the signal type, from the perspective of the Server Platform SR6850HW4 Front Panel I/O Board:

- I   Input pin to the Server Platform SR6850HW4 Front Panel I/O Board
- O   Output pin from the Server Platform SR6850HW4 Front Panel I/O Board
- I/O   Bi-directional (input/output) pin
- PWR   Power supply pin

The signal description also includes the type of buffer used for the particular signal:

- TTL   5V TTL signals
- CMOS   5V CMOS signals
- 3.3V CMOS   3.3V CMOS signals
- Analog   Typically a voltage reference or specialty power supply
- hs   This suffix is added to indicate high-speed requirements that would make modifications subject to review

8.3.1   USB Connector

Table 53 provides a summary of power connector pins, including the signal mnemonic, the name, and a brief description.

Table 53. USB Connector

	Signal	Type	Driver	Name and Description
USB port 1(J6K1)	USB_FB_OC1			Connector, TOP
	USB_P1_CONN_M	I/O		
	USB_P1_CONN_P	I/O		
	USB_P1_CABLE_GND			
USB port 2(J5K1)	USB_FB_OC2			Connector, CENTER
	USB_P2_CONN_M	I/O		
	USB_P2_CONN_P	I/O		
	USB_P2_CABLE_GND			
USB port 3(J6K1)	USB_FB_OC3			Connector, BOTTOM
	USB_P3_CONN_M	I/O		
	USB_P3_CONN_P	I/O		
	USB_P3_CABLE_GND			

8.3.2   Front Panel VGA Connector

The Front Panel I/O Board provides a video port interface with a standard VGA-compatible, 15-pin connector. Onboard video is supplied by the ATI Radeon 7000 component, with 16MB of on-chip memory. The signal is mirrored between the Front Panel I/O Board and the rear panel of the Server Board Set SE8500HW4 Mainboard. See Chapter 4 for pinouts.

Table 54. VGA Connector Signal Description

	Signal	Type
RGB VGA	RED	O
	GREEN	O
	BLUE	O
	HSYNC	O
	VSYNC	O
i²C	VID_SCL	O
	VID_SDA	I/O
	V_PRES_L	I
	VIDPWR	O

8.4   Electrical, Environmental, and Mechanical Specifications

This section specifies the board-level operational parameters and physical characteristics for the Server Platform SR6850HW4 Front Panel I/O Board. Further topics in this section specify normal operating conditions for the front panel, mechanical specifications, and connector interfaces to the board.

8.4.1   Electrical Specifications

The power budget for the Front Panel I/O Board are defined in Table 55.

Table 55. Electrical Specifications

Feature	Absolute Maximum Rating
Voltage of any signal with respect to ground	-0.3V to Vcc[1] to Vcc[1]+0.3V
+5V supply with respect to ground	-0.3V to +5.25V

Note: 1. Vcc means supply voltage for the device.

8.4.1.1   Power Consumption

The Front Panel I/O Board consumes no power. The +5 volt power consumption is for the three USB ports and is shown in Table 56.

Note: The numbers in the table are provided only to show design limits. Power consumption will vary depending on the exact configuration.

Table 56. Maximum Power Consumption

Devices	Power Dissipation
+5V	1.5W

8.4.1.2   Power Supply Requirements

The power supply must meet the following requirements:

- Rise time of less than 50ms (for all voltages).
- Delay of 5ms (minimum) from valid power to power good.
- See the following table for voltage regulation requirements.

Table 57. DC Voltage Regulation

DC Voltage	Acceptable Tolerance
+5V	± 5%

8.4.2   Connector Specifications

Table 58 shows the reference designators, quantity, manufacturer, and part numbers for connectors on the Front Panel I/O Board. See manufacturer's documentation for information.

Table 58.   Server Platform SR6850HW4 Front Panel I/O Board Connector Specifications

Item	Reference Designator(s)	Quantity	Manufacturer and Part Number (or equivalent)	Description
1	J3	1	Foxconn UB11123-M1	USB Three Ports
2	J2	1	Foxconn DZ11A91-G5	VGA DB-15 connector
3	J1	1	Foxconn HL54157-E3	30-pin SCSI Backplane Board Board

8.4.3   Cooling Requirements

The Front Panel I/O Board does not dissipate significant heat. Cooling is not required to maintain ambient temperatures.

8.5   Front Panel Control Module

The Server Platform SR6850HW4 supports either the standard Button Control Panel, providing basic functionality, or a Local Control Panel, which adds an LCD and more server management features. Both front panels contain switches and LED status indicators. Both front panels are retained in the chassis sheetmetal by two clips and connect to the Server Platform SR6850HW4 Front Panel I/O Board via a 30-pin flat cable.

8.5.1 Button Control Panel

Button Control Panel features are shown in Figure 35 and described in Table 59. Please refer to the *Intel Button Control Panel Technical Product Specification* for more information.
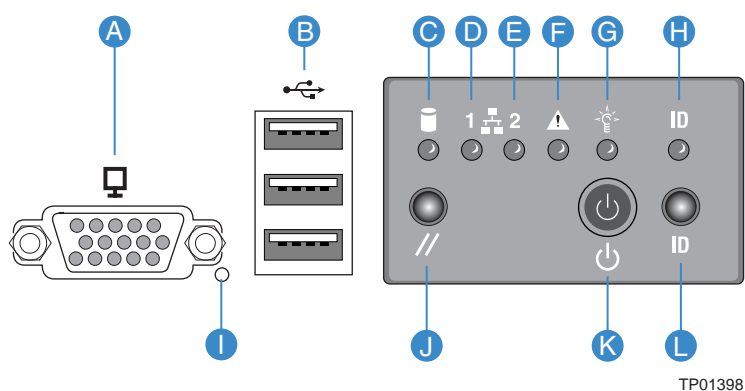

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Figure 35. Button Control Panel Features

Table 59. Button Control Panel Details

Item	Feature	Description		
C	Hard Drive Activity LED (green/amber)	Indicates hard drive activity and fault status.		
		LED	**State**	**Description**
		Green, on		A hard drive is being initialized.
		Green, blinking		A hard drive is active.
		Amber, on		Hard drive/slot failure.
		Amber, slow blinking (~1Hz)		A predictive hard drive/slot failure or rebuild in process.
		Amber, fast blinking (~2.5Hz)		Hard drive rebuild interrupted or rebuild on empty slot.
D, E	LAN1, LAN2 Status LEDs (green)	Indicates LAN activity status.		
		LED	**State**	**Description**

Item	Feature	Description		
		Off	Idle	
		On	Inactive	No access
		Blinking	Active	Access
F	System Status/Fault LED (green/amber)	Indicates system status.		
		LED	**State**	**Description**
		Off	Not ready	AC Power Off, POST error
		Green, on	Ready	System booted and ready
		Green, blinking	Degraded	Processor or DIMM disabled
		Amber, on	Critical Alarm	Critical power supply, blower, voltage, or temperature failure.
		Amber, blinking	Non-Critical Alarm	Redundant power supply or blower failure. non-critical blower, voltage, and temperature failure.
G	System Power LED (green)	Indicates system power status.		
		LED	**State**	**ACPI**
		Off	Power off	No
		On	Power on	No
		Off	S5	Yes
		Blinking	S1	Yes
		On	S0	Yes
H	System ID LED (blue)	Identifies the system via server management or locally.		
		Off	Not active	
		On	Active via switch	Cannot be turned off by Server Management
		Blinking	Active via Server Management	Cannot be turned off by switch
I	NMI button	Asserts NMI.		
J	System reset button	Press to reset the system.		
K	System power button	Press to turn the system power on or off.		
L	System ID button	Press to turn the system ID LED on or off.		

8.5.2　　Intel® Local Control Panel

Intel® Local Control Panel features are shown in Figure 36 and described in the table below. Please refer to the *Intel Local Control Panel Technical Product Specification* for more information.
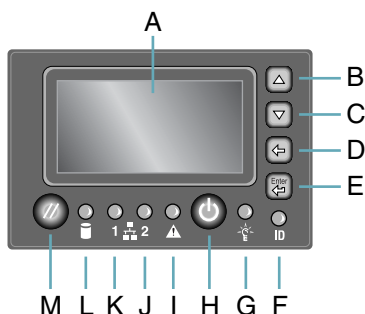
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A	LCD	Display of text		
B	Scroll up button	Press to scroll up on the LCD		
C	Scroll down button	Press to scroll down on the LCD		
D	Back button	Press to move to the previous LCD screen		
E	Select button	Press to enter a command or select an option on the LCD		
F	System ID LED (Blue)	Helps identify the system via server management or locally		
		Off	Not active	
		On	Active via switch	Cannot be turned off by Server Management
		Blinking	Active via Server Management	Cannot be turned off by switch
G	System Power LED (green)	Indicates system power status.		
		Off	Power off	ACPI: No
		On	Power on	ACPI: No
		Off	S4 / S5	ACPI: Yes
		Blinking	S1	ACPI: Yes
		On	S0	Yes
H	System Power button	Toggles system power		
I	System Status/Fault LED (green/amber)	Indicates system status		
		Off	Not ready	AC power off, POST error
		Green, on	Ready	System booted and ready
		Green, blinking	Degraded	Processor or DIMM disabled
		Amber, on	Critical Alarm	Critical power supply, blower, voltage, or temperature failure

		Amber, blinking	Non-Critical Alarm	Redundant power supply or blower failure.
				Non-critical blower, voltage, or temperature failure.
J, K	LAN1, LAN2 Status LEDs (green)	Indicates LAN activity status		
		Off	Idle	
		On	Inactive	No access
		Blinking	Active	Access
L	Hard Drive Status LED (green/amber)	Indicates hard drive activity and fault status.		
		Green	On	A hard drive is being initialized
		Green	Blinking	A hard drive is active
		Amber	On	Hard drive/slot failure
		Amber	Slow blinking (~1 Hz)	A predictive hard drive/slot failure or rebuild in process
		Amber	Fast blinking (~2.5 Hz)	Hard drive rebuild interrupted or rebuild on empty slot
M	System Reset button	Resets the system		

Figure 36. Local Control Panel Features

8.5.3 System ID Buttons and LEDs

The system contains two system ID buttons and two blue system ID LEDs. The LEDs are used to easily identify a platform. It is useful when several platforms are racked or installed near each other and a specific system needs to be serviced. One button/LED pair is located on the front control panel and a second button/LED pair is located at the rear of the platform.

The system ID LEDs can be turned on and off either by the system ID buttons or remotely through server management software. If the LEDs are activated by the system LED button, they must be turned off with the button; they cannot be turned off remotely through software. If the LEDs are activated through software, they must be turned off through software, not by pressing the system LED button.

Table 60. System ID LED Details

LED State	Description
Off	System ID inactive.
On	System ID active via button.
Blinking	System ID active via remote command.

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9.   SATA-to-IDE Converter Board

This chapter describes the Server Platform SR4850HW4/SR6850HW4 SATA-to-IDE Converter Board to support an optical drive. This board connects a JAE Slimline peripheral 50-pin Slimline Form Factor (SFF) IDE connector on an optical drive to a 7-position SATA signal connector. The power for the optical drive and the Converter Board is delivered through a 4-pin mini-power connector. The SATA-to-IDE Converter Board will be removed when a SATA optical device has been qualified for the system.

Please refer to the *Tested Hardware Operating System List (THOL)* for more information on the specific optical drives Intel has validated in the platform. DVD-ROM drives will be qualified for the platform, but since this is an enterprise server, DVD video playback will not be validated.

9.1   Mechanical Outline

The following figures show mechanical outline drawings of the Server Platform SR4850HW4/SR6850HW4 SATA-to-IDE Converter Board and an optical drive.
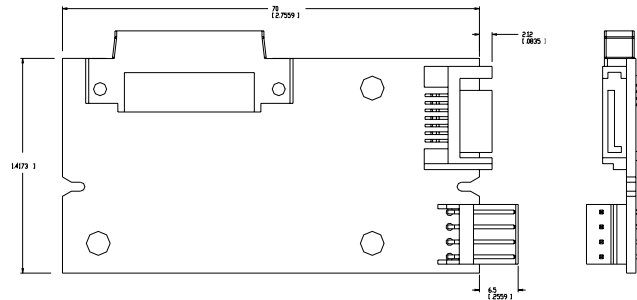
Figure 37. SATA-to-IDE Converter Board Mechanical Outline
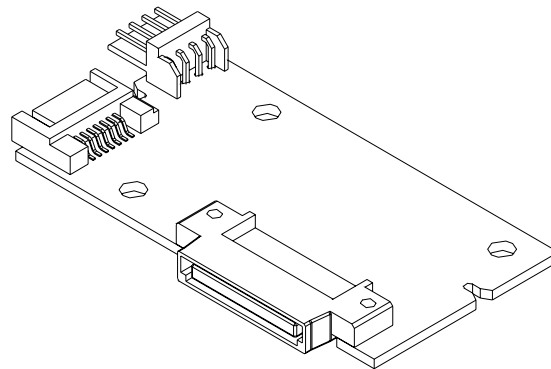
Figure 38. SATA-to-IDE Converter Board
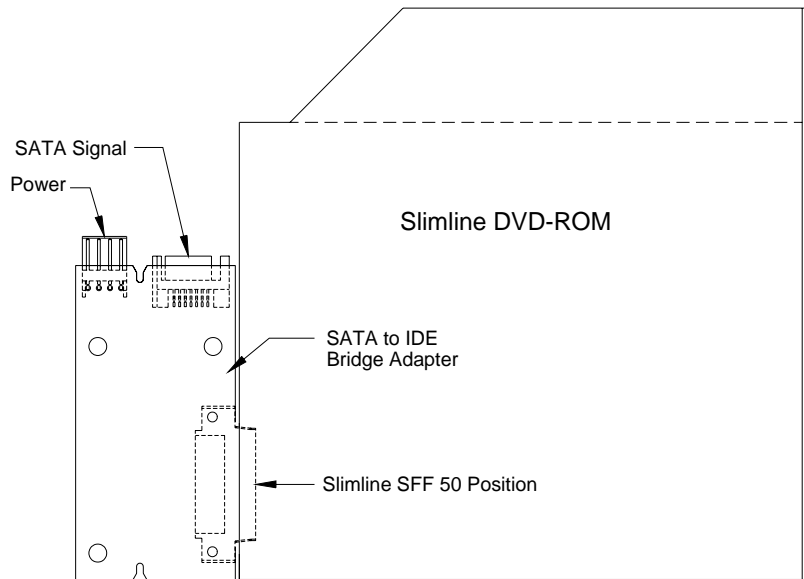
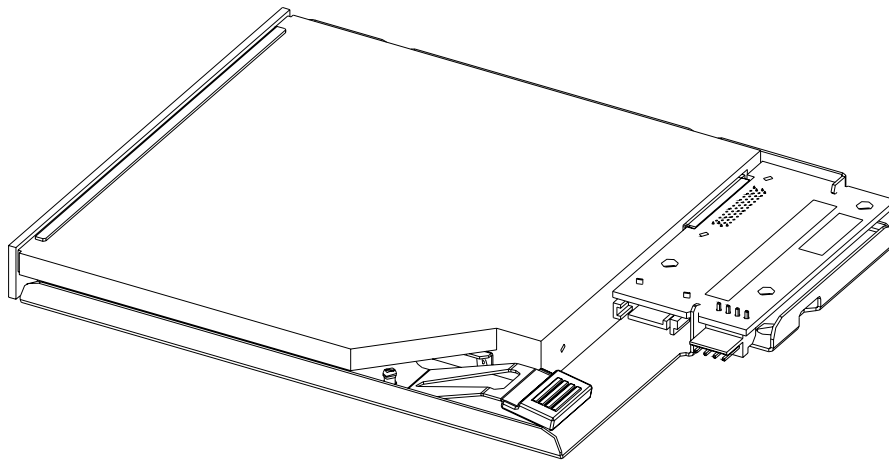**Figure 39. SATA-to-IDE Converter Board with Attached Optical Drive**

Figure 40. SATA-to-IDE Converter Board with Attached Optical Drive

10. Regulatory Specifications

This server platform meets the specifications and regulations for safety and EMC defined in this chapter.

10.1 Important Safety Information

Only a technically qualified person shall access, integrate, configure, and service this product.

10.2 Intended Application Uses

This product was evaluated 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 Categories and Environments (such as medical, industrial, alarm systems, and test equipment), other than an ITE application, may require further evaluation.

10.3 Product Safety

- UL60950 – CSA 60950(USA / Canada)
- EN60950 (CENELEC Europe)
- IEC60950 (International)
- CB Certificate and 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 (CENELEC Europe)
- IRAM Certification (Argentina)
- GB4943 – CNCA Certification (China)

10.4 Electromagnetic Compatibility (EMC) – Emissions and Immunity

- FCC /ICES-003, Class A Emissions (USA/Canada) Verification
- CISPR 22 - Class A Emissions (International)
- EN55022 - Class A Emissions (CENELEC Europe)
- EN55024 - Immunity (CENELEC Europe)
- EN61000-3-2 - Harmonics (CENELEC Europe)
- EN61000-3-3 - Voltage Flicker (CENELEC Europe)
- CE – EMC Directive 89/336/EEC (CENELEC Europe)
- VCCI Class A Emissions (Japan)
- AS/NZS 3548 Class A Emissions (Australia/New Zealand)
- BSMI CNS13438 Class A Emissions (Taiwan)
- GOST R 29216-91 Class A Emissions (Russia)
- GOST R 50628-95 Immunity (Russia)
- Ukraine License (Ukraine)

- RRL MIC Notice No. 1997-41 (EMC) and 1997-42 (EMI) (Korea)
- GB 9254 - CNCA Certification (China)
- GB 17625 - (Harmonics) CNCA Certification (China)

10.5 Certifications / Registrations / Declarations

- UL Certification (US/Canada)
- CE Declaration of Conformity (CENELEC Europe)
- FCC/ICES-003 Class A Attestation (USA/Canada)
- VCCI Certification (Japan)
- C-Tick Declaration of Conformity (Australia)
- MED Declaration of Conformity (New Zealand)
- BSMI Certification (Taiwan)
- GOST R Certification/License (Russia)
- Belarus Certification/License (Belarus)
- RRL Certification (Korea)
- IRAM Certification (Argentina)
- CNCA Certification (China)
- Ecology Declaration (International)

Note: The use 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.

10.6 Regulatory Compliance Markings

Table 61. Product Regulatory Compliance Markings

Country	Markings on Product or Packaging	Marking Description
Australia/New Zealand		EMC Compliance Mark. Note: As shown indicates that the compliance folder is held in Australia
China		CCC EMC and Safety Compliance Marking
	声明 此为 A 级产品，在生活环境中，该产品可能会造成无线电干扰。在这種情況下，可能需要用户对其干扰采取可行的措施。	EMC Class A Warning
Canada		System Compliance Safety Mark (same for USA)
	CANADA ICES-003 CLASS A	EMC Compliance Mark
European Union / Nordics		Declaration of Conformity Mark
Germany		System Safety Compliance 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	EMC Compliance Mark – Class A
Korea		EMC Compliance Mark
Russia		Safety and EMC Compliance Mark
Taiwan	R33025	BSMI Certification Number, RPC Marking
	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	BSMI EMC Warning for Class A Devices
USA		System Compliance Safety Mark (same for Canada)
	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 Compliance Marking Statement – Class A Products

10.7 Regional EMC Compliance Notices/Information

Table 62. Regional EMC Compliance Information

Country	Compliance Information
USA	FCC Verification Notice (Class A) 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 NOT 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.
CANADA	INDUSTRY CANADA (Class A) This Class A digital apparatus complies with Canadian ICES-003. Cet appereil numérique de la classe A est conforme à la norme NMB-003 du Canada.
CHINA	声明 此为 A 级产品，在生活环境中，该产品可 能会造成无线电干扰。 在这種情况下，可 能需要用戶对其干扰采取可行的措施。
EUROPE	CE Declaration of Conformity This product has been tested in accordance to, and complies with the European Low Voltage Directive (73/23/EEC) and European EMC Directive (89/336/EEC). The product has been marked with the CE Mark to illustrate its compliance.
JAPAN	VCCI (Class A) 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 is as follow: 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.

Country	Compliance Information
TAIWAN	BSMI Certification Information The following BSMI Certification information is marked on the product R33025 BSMI EMC Class A Warning 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
KOREA	RRL Certification Information The English translation for the above is as follows: 1. Type of Equipment (Model Name): 2. Certification No.: Contact Intel representative. 3. Name of Certification Recipient: Intel Corporation. 4. Date of Manufacturer: See date code on product. 5. Manufacturer/Nation: Intel/See manufacturing label on product.

Glossary

This appendix contains important terms used in the preceding chapters. Acronyms are then entered in their respective place, with non-acronyms following.

Word / Acronym	Definition
ACPI	Advanced configuration and power interface
BIOS	Basic Input / Output System
BMC	Baseboard management controller
CE	Community European
CISPR	International Special Committee on Radio Interference
CMOS	Complementary metal-oxide semiconductor
CSA	Canadian Standards Organization
DB	Data bus
dBA	Deciel acoustic
DDR2	Double data rate
DIMM	Dual in-Line memory module
DMA	Direct memory access
ECC	Error checking and correcting
EEPROM	Electrically erasable programmable ROM
EMI	Electromagnetic interference
EMP	Emergency Management Port
EPS	External Product Specification
ESD	Electro static discharge
FCC	Federal Communications Commission
FRB	Fault resilient booting
FRU	Field replaceable unit
FSB	Front side bus
FWH	Firmware hub
GND	Ground
GUI	Graphical user interface
HDD	Hard disk drive
HL	Hub-link
HSC	Hot swap controller
I/O	Input / Output
ICMB	Intelligent Chassis Management Bus
IDE	Integrated device electronics
IEC	International Electrotechnical Commission
IMB	Intelligent management bus
IPMB	Intelligent platform management bus
IPMI	Intelligent platform management interface
ISP	In-system programmable
ITE	Information technology equipment
ITP	In-target probe
JTAG	Joint Test Action Group

Word / Acronym	Definition
LAN	Local area network
LED	Light emitting diode
LPC	Low pin count
LVDS	Low voltage differential SCSI
NIC	Network interface card
OEM	Original equipment manufacturer
OS	Operating system
OTP	Over-temperature protection
PCI	Peripheral component interconnect
PDB	Power Distribution Board
PEF	Platform event filtering
PEP	Platform event paging
PFC	Power factor correction
PIROM	Processor information ROM
PLD	Programmable logic device
PWM	Pulse width modulator
RAID	Redundant array of independent disks
RAS	Reliability, availability, and serviceability
RPM	Revolutions per minute
SAF-TE	SCSI accessed fault-tolerant enclosure
SCA	Single connector attachment
SCL	Serial clock
SCSI	Small computer systems interface
SDA	Serial data
SDINT	System diagnostic interrupt
SDR	Sensor data record
SDRAM	Synchronous dynamic RAM
SE	Single-ended
SEEPROM	Serial dlectrically erasable programmable read-only memory
SEL	System event log
SMP	Symmetric multiprocessing
TTL	Transistor-transistor logic
USB	Universal serial bus
UV	Under-voltage
VAC	Alternating current (AC) voltage
VCC	Voltage controlled current
VCCI	Voluntary Control Council for Interference by Information Technology Equipment
VGA	Video graphics array
VID	Voltage ID
VRM	Voltage regulator module
VSB	Voltage standby
WfM	Wired for management

Reference Documents

See the following documents for additional information:

- *Intel® Server Board Set SE8500HW4 Technical Product Specification*

- *Intel® Server Platform SR6850HW4 Power Cord Enabling Specification*

- *SCSI Accessed Fault-Tolerant Enclosures Interface Specification (SAF-TE)*

- *Intel® Server Board SE8500HW4 Tested Hardware and Operating System List (THOL)*

- *Intel® Local Control Panel Technical Product Specification*

- *Intel® Button Control Panel Technical Product Specification*

- *Intel® Management Module Installation and User's Guide*

- *IPMI Specification, Version 2.0*