

Intel[®] Server Board S3420GPRX User Guide

A Guide for Technically Qualified Assemblers of Intel[®] Identified Subassemblies/Products

Intel Order Number E90566-002

Disclaimer

Information in this document is provided in connection with Intel® products. No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document. Except as provided in Intel's Terms and Conditions of Sale for such products, Intel assumes no liability whatsoever, and Intel disclaims any express or implied warranty, relating to sale and/or use of Intel products including liability or warranties relating to fitness for a particular purpose, merchantability, or infringement of any patent, copyright or other intellectual property right. Intel products are not designed, intended or authorized for use in any medical, life saving, or life sustaining applications or for any other application in which the failure of the Intel product could create a situation where personal injury or death may occur. Intel may make changes to specifications and product descriptions at any time, without notice.

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

Intel, Intel Pentium, and Intel Xeon are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries.

* Other names and brands may be claimed as the property of others.

Copyright © 2010, Intel Corporation. All Rights Reserved

Safety Information

Important Safety Instructions

Read all caution and safety statements in this document before performing any of the instructions. See also Intel Server Boards and Server Chassis Safety Information on the *Intel® Server Deployment Toolkit CD* and/or at <http://www.intel.com/support/motherboards/server/sb/cs-010770.htm>.

Wichtige Sicherheitshinweise

Lesen Sie zunächst sämtliche Warn- und Sicherheitshinweise in diesem Dokument, bevor Sie eine der Anweisungen ausführen. Beachten Sie hierzu auch die Sicherheitshinweise zu Intel-Serverplatinen und Servergehäusen auf der *Intel® Server Deployment Toolkit CD* oder unter <http://www.intel.com/support/motherboards/server/sb/cs-010770.htm>.

Consignes de sécurité

Lisez attention toutes les consignes de sécurité et les mises en garde indiquées dans ce document avant de suivre toute instruction. Consultez Intel Server Boards and Server Chassis Safety Information sur le *Intel® Server Deployment Toolkit CD* ou bien rendez-vous sur le site <http://www.intel.com/support/motherboards/server/sb/cs-010770.htm>.

Instrucciones de seguridad importantes

Lea todas las declaraciones de seguridad y precaución de este documento antes de realizar cualquiera de las instrucciones. Vea Intel Server Boards and Server Chassis Safety Information en el *Intel® Server Deployment Toolkit CD* y/o en <http://www.intel.com/support/motherboards/server/sb/cs-010770.htm>.

重要安全指导

在执行任何指令之前，请阅读本文档中的所有注意事项及安全声明。和 Intel[®] Server Deployment Toolkit CD 或 <http://www.intel.com/support/motherboards/server/sb/CS-010770.htm> 上的 Intel Server Boards and Server Chassis Safety Information (《Intel 服务器主板与服务器机箱安全信息》)。

Warnings

Heed safety instructions: Before working with your server product, whether you are using this guide or any other resource as a reference, pay close attention to the safety instructions. You must adhere to the assembly instructions in this guide to ensure and maintain compliance with existing product certifications and approvals. Use only the described, regulated components specified in this guide. Use of other products / components will void the UL listing and other regulatory approvals of the product and will most likely result in noncompliance with product regulations in the region(s) in which the product is sold.

System power on/off: The power button DOES NOT turn off the system AC power. To remove power from system, you must unplug the AC power cord from the wall outlet. Make sure the AC power cord is unplugged before you open the chassis, add, or remove any components.

Hazardous conditions, devices and cables: Hazardous electrical conditions may be present on power, telephone, and communication cables. Turn off the server and disconnect the power cord, telecommunications systems, networks, and modems attached to the server before opening it. Otherwise, personal injury or equipment damage can result.

Electrostatic discharge (ESD) and ESD protection: ESD can damage disk drives, boards, and other parts. We recommend that you perform all procedures in this chapter only at an ESD workstation. If one is not available, provide some ESD protection by wearing an antistatic wrist strap attached to chassis ground any unpainted metal surface on your server when handling parts.

ESD and handling boards: Always handle boards carefully. They can be extremely sensitive to ESD. Hold boards only by their edges. After removing a board from its protective wrapper or from the server, place the board component side up on a grounded, static free surface. Use a conductive foam pad if available but not the board wrapper. Do not slide board over any surface.

Installing or removing jumpers: A jumper is a small plastic encased conductor that slips over two jumper pins. Some jumpers have a small tab on top that you can grip with your fingertips or with a pair of fine needle nosed pliers. If your jumpers do not have such a tab, take care when using needle nosed pliers to remove or install a jumper; grip the narrow sides of the jumper with the pliers, never the wide sides. Gripping the wide sides can damage the contacts inside the jumper, causing intermittent problems with the function controlled by that jumper. Take care to grip with, but not squeeze, the pliers or other tool you use to remove a jumper, or you may bend or break the pins on the board.

Preface

About this Manual

Thank you for purchasing and using the Intel® Server Board S3420GPRX.

This manual is written for system technicians who are responsible for troubleshooting, upgrading, and repairing this server board. This document provides a brief overview of the features of the board/chassis, a list of accessories or other components you may need, troubleshooting information, and instructions on how to add and replace components on the Intel® Server Board S3420GPRX User Guide. For the latest version of this manual, see <http://support.intel.com/support/motherboards/server/S3420GP/>.

Manual Organization

Chapter 1 provides a brief overview of the Intel® Server Board S3420GPRX. In this chapter, you will find a list of the server board features, photos of the product, and product diagrams to help you identify components and their locations.

Chapter 2 provides instructions on using the utilities shipped with the board or that may be required to update the system. This includes how to navigate through the BIOS Setup screens, perform a BIOS update, and reset the password or CMOS. Information about the specific BIOS settings and screens is available in the Technical Product Specification. See "[Additional Information and Software](#)" for a link to the Technical Product Specification.

Chapter 3 provides instructions on adding and replacing components. Use this chapter for step-by-step instructions and diagrams for installing or replacing components such as the memory, processor, control panel board, and battery, among other components.

Chapter 4 provides troubleshooting information. In this chapter, you will find BIOS error messages and POST code messages. You will also find suggestions for performing troubleshooting activities to identify the source of a problem.

Product Accessories

This server board is compatible with the following Intel® Server Chassis:

- Intel® Server Chassis SR1630 and SR1630H

You may need or want to purchase one or more of the following accessory items for your server:

Processor, memory DIMMs, hard drive, floppy drive, CD-ROM or DVD-ROM drive, RAID controller, operating system.

For information about which accessories, memory, processors, and third-party hardware were tested and can be used with your board, and for ordering information for Intel products, see <http://www.intel.com/support/motherboards/server/S3420GP/compat.htm>.

Additional Information and Software

If you need more information about this product or information about the accessories that can be used with this server board, use the following resources. These files are available at: <http://www.intel.com/support/motherboards/server/S3420GP/>

Unless otherwise indicated in the following table, once on this Web page, type the document or software name in the search field at the left side of the screen and select the option to search "This Product."

Table 1. Additional Information and Software

For this information or software	Use this Document or Software
For in-depth technical information about this product, including BIOS settings and chipset information	<i>Intel® Server Board S3420GPRX Technical Product Specification</i>
For BIOS settings and chipset information	<i>Intel® Server Board S3420GPRX Technical Product Specification</i>
If you just received this product and need to install it	<i>Intel® Server Board S3420GPRX Quick Start User's Guide</i> in the product box
Accessories or other Intel server products	Spares and Configuration Guide
Hardware (peripheral boards, adapter cards, and so forth) and operating systems that were tested with this product	For the Tested Hardware Operating Systems List, you can go to the Intel® Server Configurator Tool: http://serverconfigurator.intel.com/default.aspx
Chassis that were tested with this product	Reference Chassis List
Processors that were tested with this product	Supported Processors
DIMMs that were tested with this product	Supported Memory

Table 1. Additional Information and Software

For this information or software	Use this Document or Software
To make sure your system falls within the allowed power budget	Power Budget Tool
For software to manage your Intel® server	Intel Server Management System Software http://www.intel.com/go/servermanagement
For drivers, firmware and BIOS updates	Please see: http://www.intel.com/support/motherboards/server/S3420GP under the Software and Drivers section for the most current BIOS, FRU/SDR, firmware, drivers, and utilities.
For diagnostics test software	Diagnostics

See also the *Intel® Server Deployment Toolkit CD* that came with your server board.

Contents

Safety Information	iii
Important Safety Instructions	iii
Wichtige Sicherheitshinweise	iii
Consignes de sécurité	iii
Instrucciones de seguridad importantes	iii
Warnings	v
Preface	vii
About this Manual	vii
Manual Organization	vii
Product Accessories	vii
Additional Information and Software	viii
Chapter 1: Server Board Features	1
Connector and Header Locations	3
Configuration Jumpers	5
Server Board Rear I/O Layout	7
RAID Support	8
Hardware Requirements	8
Processor	9
Memory	9
Power Supply	10
Optional Hardware	10
Intel® SAS Entry RAID Module AXX4SASMOD	10
Intel® Remote Management Module 3 Lite	12
Intel® Local Control Panel	12
Chapter 2: Server Utilities	13
Using the BIOS Setup Utility	13
Starting Setup	13
If You Cannot Access Setup	13
Setup Menus	13
Upgrading the BIOS	15
Preparing for the Upgrade	15
Upgrading the BIOS	16
Recovering the BIOS	16
Recovering the BIOS	17
Clearing the Password	18
Updating the Integrated BMC	19
Chapter 3: Hardware Installations and Upgrades	21

Before You Begin	21
Tools and Supplies Needed	21
Installing and Removing Memory	21
Installing DIMMs	21
Removing DIMMs	22
Installing the Processor	23
Installing the Heatsink(s)	27
Removing a Processor	28
Installing a PCI Card	28
Replacing the Backup Battery	30
Appendix A: LED Decoder	33
Appendix B: Intel® Server Issue Report Form	41
Appendix C: Getting Help	47
Warranty Information	47
Appendix D: Regulatory and Compliance Information	49
Product Regulatory Compliance	49
Product Safety Compliance	49
Certifications / Registrations / Declarations	50
Product Regulatory Compliance Markings	50
Electromagnetic Compatibility Notices	51
FCC (USA)	51
ICES-003 (Canada)	52
Europe (CE Declaration of Conformity)	53
BSMI (Taiwan)	53
KCC (Korea)	53
Restriction of Hazardous Substances (RoHS) Compliance	54
End-of-Life / Product Recycling	54
Appendix E: Troubleshooting	55
System Boot Quiet Time	55
Resetting the System	55
Problems following Initial System Installation	56
First Steps Checklist	56
Hardware Diagnostic Testing	57
Verifying Proper Operation of Key System Lights	57
Confirming Loading of the Operating System	57
Specific Problems and Corrective Actions	58
Power Light Does Not Light	58
No Characters Display on Screen	59
Characters Are Distorted or Incorrect	59
System Cooling Fans Do Not Rotate Properly	60
Drive Activity Light Does Not Light	60

CD-ROM Drive or DVD-ROM Drive Activity Light Does Not Light	60
Cannot Connect to a Server	61
Problems with Network	61
System Boots when Installing PCI Card	62
Problems with Newly Installed Application Software	62
Problems with Application Software that Ran Correctly Earlier	63
Devices are not Recognized under Device Manager (Microsoft Windows* Operating System)	63
Hard Drive(s) are not Recognized	63
Bootable CD-ROM Disk Is Not Detected	64
LED Information	64
BIOS POST Beep Codes	65

List of Figures

Figure 1. Intel® Server Board S3420GPRX.....	1
Figure 2. Server Board Connector and Component Locations	5
Figure 3. Configuration Jumpers Location	7
Figure 4. Server Board Rear I/O Layout.....	7
Figure 5. Intel® SAS Entry RAID Module	11
Figure 6. BIOS Recovery Jumper	17
Figure 7. Password Recovery Jumper	18
Figure 8. CMOS Recovery Jumper	19
Figure 9. BMC Force Update Jumper	19
Figure 10. Installing Memory	22
Figure 11. Lifting the Load Lever.....	24
Figure 12. Open the Load Plate	24
Figure 13. Remove the Socket Protective Cover	25
Figure 14. Remove the Processor Protective Cover	25
Figure 15. Installing the Processor.....	26
Figure 16. Close the Load Plate and Socket Lever.....	26
Figure 17. Installing the Heatsink Assembly	27
Figure 18. Removing the PCI Riser Assembly from the Server System	29
Figure 19. Installing a PCI Card in a Riser Card	29
Figure 20. Replacing the Backup Battery.....	31
Figure 21. POST Code Diagnostic LED Location	33

List of Tables

Table 1. Additional Information and Software	viii
Table 2. Server Board Features	2
Table 3. NIC LED Descriptions	8
Table 4. Channel Slot Configuration	9
Table 5. Setup Menu Key Use	14
Table 6. Diagnostic LED Placement Diagram	33
Table 7. POST Progress Code LED Example	34
Table 8. Diagnostic LED POST Code Decoder	34
Table 9. Product Certification Markings	50
Table 10. Resetting the System	55
Table 11. LED Information	64
Table 12. POST Error Beep Codes	65

1 Server Board Features

This chapter briefly describes the main features of the Intel® Server Board S3420GPRX. This chapter provides a photograph of the product, list of the server board features, and diagrams showing the location of important components and connections on the server board.



Figure 1. Intel® Server Board S3420GPRX

Table 2 summarizes the features of the server board.

Table 2. Server Board Features

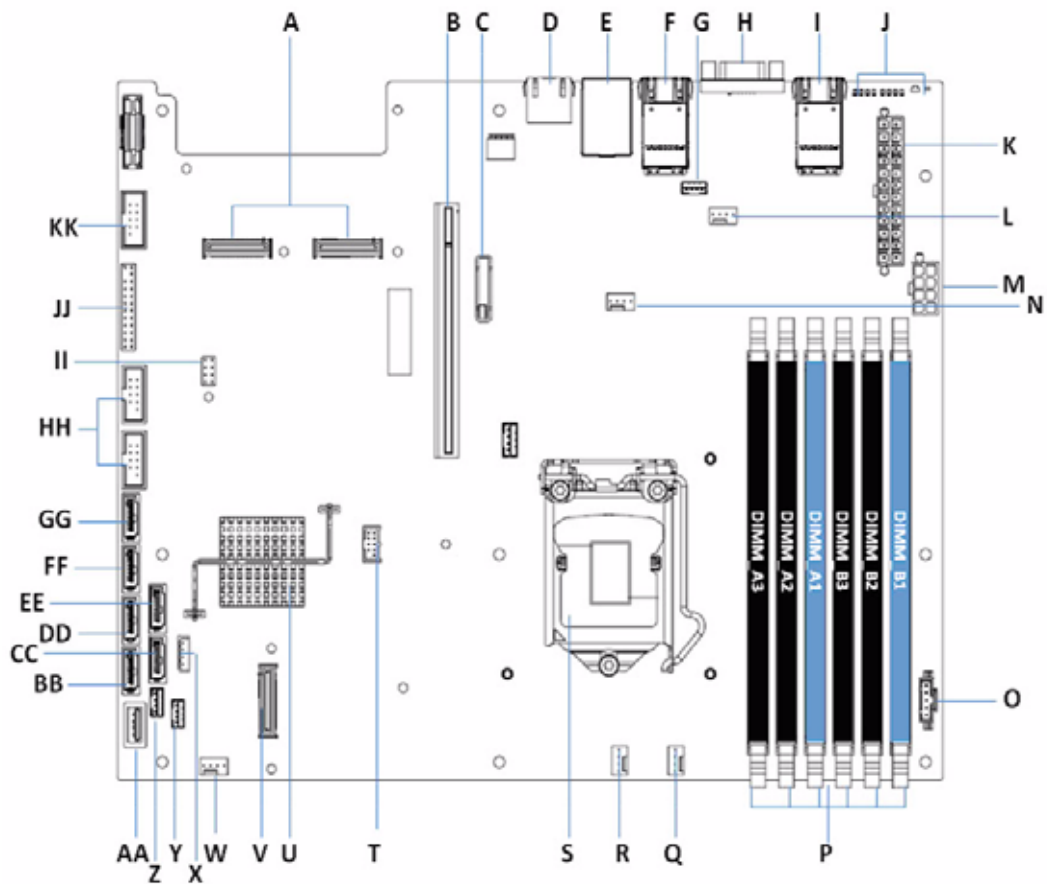
Feature	Description
Processor	Support for one Intel® Xeon® 3400 Series Processor in FC-LGA 1156 socket package <ul style="list-style-type: none"> • 2.5 GT/s point-to-point DMI interface to PCH • LGA 1156 pin socket Support for one Intel® i3 Processor <ul style="list-style-type: none"> • 2.0 GT/s point-to-point DMI interface to PCH • LGA 1156 pin socket
Memory	Two memory channels with support for 1066/1333 MHz Unbuffered (UDIMM) or ECC Registered (RDIMM) DDR3. <ul style="list-style-type: none"> • Up to two UDIMMs or three RDIMMs per channel • 32 GB maximum with x8 ECC RDIMM (2 Gb DRAM) and 16 GB maximum with x8 ECC UDIMM (2 Gb DRAM) NOTE: Intel® i3 Processor supports only UDIMMs
Chipset	<ul style="list-style-type: none"> • Support for Intel® 3420 Chipset Platform Controller Hub (PCH) • PCI Express* switch - 89HI0524G2PS
I/O Control	External connections: <ul style="list-style-type: none"> • DB-15 video connectors • RJ45 type serial Port A connector • 2 USB 2.0 Ports • Five 10/100/1000 Base-TX RJ45 LAN connector Internal connections: <ul style="list-style-type: none"> • Two USB 2x5 pin headers, each supporting two USB 2.0 ports • One USB 2x5 pin header for Intel® USB SSD • One USB 2.0 internal vertical connector • One 2x5 Serial Port B header • Six SATA II connectors • One Intel® SAS Entry RAID Module connector • Two Intel® I/O Expansion Module Slots • One slot for optional Intel® Remote Management Module 3 Lite
Add-in Card Slot	One PCI Express* Gen2 x16 (x8 throughput) connector.
System Fan Support	Five 4-pin fan head (four system fans and one processor fan).
Video	On-board ServerEngines* LLC Pilot II BMC Controller <ul style="list-style-type: none"> • Integrated 2D Video Controller • 64 MB DDR2 667 MHz Memory

Table 2. Server Board Features

Feature	Description
Hard Drive and Optical Drive Support	<ul style="list-style-type: none"> • Support for six Serial ATA II hard drives through six on-board SATA II connectors with SW RAID 0, 1, 5, and 10. • Optical devices are supported • Up to four SAS hard drives through optional Intel® SAS Entry RAID Module card
RAID Support	<ul style="list-style-type: none"> • Intel® Embedded Server RAID Technology II through onboard SATA connectors provides SATA RAID 0, 1, and 10. • Intel® Rapid Storage RAID through onboard SATA connectors provides SATA RAID 0, 1, 5 and 10. • Intel® Embedded Server RAID Technology II through optional Intel® SAS Entry RAID Module AXX4SASMOD provides SAS RAID 0, 1, and 10 with optional RAID 5 support provided by the Intel® RAID Activation Key AXXRAKSW5 • IT/IR RAID through optional Intel® SAS Entry RAID Module AXX4SASMOD provides entry level hardware RAID 0, 1, 10, and native SAS pass through mode • 4 ports full featured SAS/SATA hardware RAID through optional Intel® Integrated RAID Module SROMBSASMR (AXXROMBSASMR), provides RAID 0, 1, 5, 6 and striping capability for spans 10, 50, 60.
LAN	<p>One Gigabit Ethernet device 82574L connect to PCI-E x1 interfaces on the PCH.</p> <p>Two Gigabit Ethernet devices 82576 connected to PCI-E switch through PCI-E x4 interface.</p>
Server Management	<p>On-board LLC Pilot II BMC Controller (iBMC)</p> <ul style="list-style-type: none"> • Integrated Baseboard Management Controller (Integrated BMC), IPMI 2.0 compliant • Intel® Remote Management Module III (RMM3) Lite • Intel® Light-Guided Diagnostics on field replaceable units • Support for Intel® System Management Software 3.6.1 and beyond • Support for Intel® Deployment Assistant 3.5.2 and beyond
Form Factor	ATX, 12" x 9.6", 1U thermal optimized

Connector and Header Locations

The following figure shows the board layout of the server board. Each connector and major component is identified by a number or letter. The table provides the description.



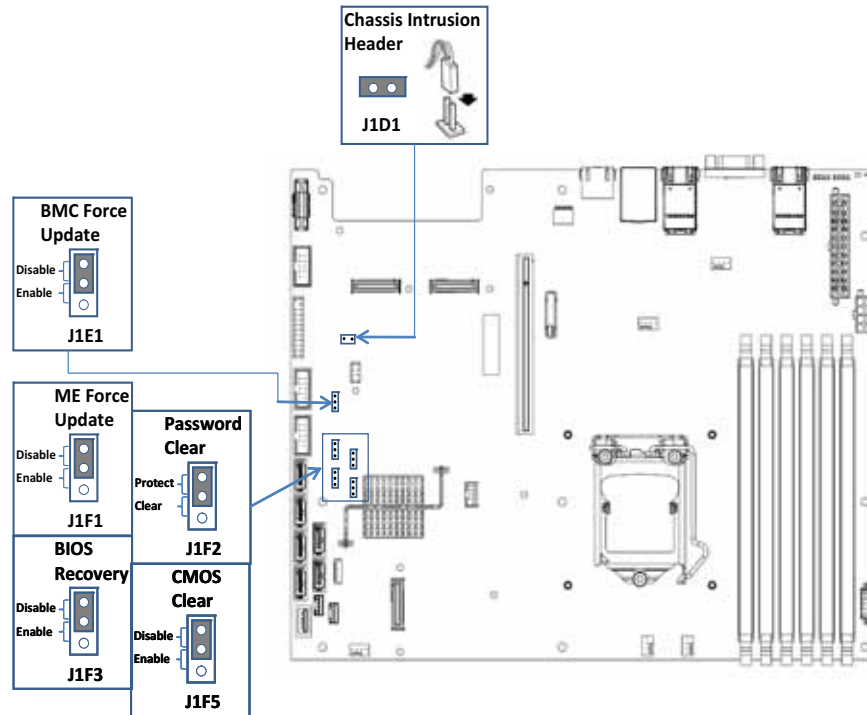
A. Dual Intel® I/O Expansion Module Connectors	T. USB SSD Connector
B. PCI Express x16 Gen2	U. PCH Chipset
C. CMOS Battery	V. SAS Module Connector
D. RJ-45 Serial port Connector	W. System FAN 1
E. RJ-45 GbE(NIC5) and Dual USB combo connector	X. IPMB Connector
F. Dual port RJ-45 GbE LAN Connector (NIC3 and NIC4)	Y. SATA SGPIO Connector
G. SATA RAID key	Z. HSBP Connector
H. DB15 Video port	AA. USB Floppy

I. Dual port RJ-45 GbE LAN Connector (NIC1 and NIC2)	BB. SATA 0
J. Diagnostic/ID/Status LED	CC. SATA 3
K. Main Power Connector	DD. SATA 1
L. System FAN 4	EE. SATA 4
M. CPU Power Connector	FF. SATA 2
N. CPU Fan	GG. SATA 5
O. Power Supply AUX Connector	HH. Internal USB connector
P. DIMM Slots	II. Intel® RMM3 Lite
Q. System FAN 3	JJ. Front Panel Connector
R. System FAN 2	KK. Internal Serial Port
S. CPU Socket	

Figure 2. Server Board Connector and Component Locations

Configuration Jumpers

The server board has several jumper blocks that can be used to configure, protect, or recover specific features of the server board.

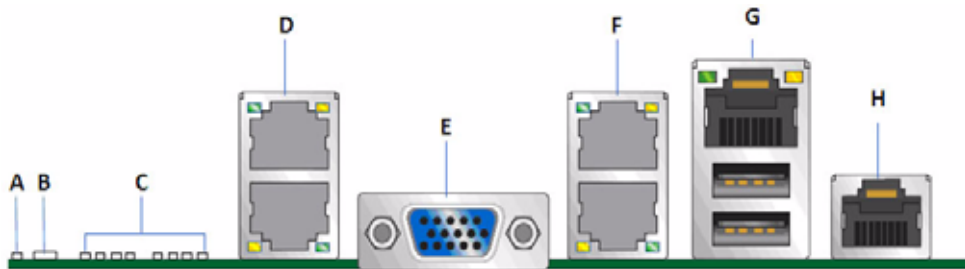


Jumper Name	Pins	What will occur during a system reset..
J1F5: CMOS Clear	1-2	These pins should have a jumper in place for normal system operation. (Default)
	2-3	If these pins 2-3 are connected with AC power plugged, the CMOS settings are cleared within five seconds. These pins should not be connected for normal operation.
J1F1: ME Force Update	1-2	ME Firmware Force Update Mode – Disabled (Default)
	2-3	ME Firmware Force Update Mode – Enabled
J1F2: Password Clear	1-2	These pins should have a jumper in place for normal system operation. (Default)
	2-3	To clear administrator and user passwords, power on server with pins 2-3 connected. The password are cleared within 5-10 seconds. These pins should not be connected for normal operation.
J1F3: BIOS Recovery	1-2	These pins should have a jumper in place for normal system operation. (Default)
	2-3	The main system BIOS will not boot with these pins connected, system can only boot from EFI-bootable recovery media with the recovery BIOS image.
J1E1: BMC Force Update	1-2	Integrated BMC Firmware Force Update Mode – Disabled (Default)
	2-3	Integrated BMC Firmware Force Update Mode – Enabled

Jumper Name	Pins	What will occur during a system reset..
J1D1: Chassis Intrusion	1-2	<ul style="list-style-type: none"> The two pins are connected is normal state. The two pins are disconnected is Chassis Intrusion state.

Figure 3. Configuration Jumpers Location

Server Board Rear I/O Layout



A. System Status LED	E. DB15 Video Port
B. ID LED	F. Dual port RJ-45 GbE LAN Connector (NIC3 and NIC4)
C. Diagnostics LEDs	G. RJ-45 GbE(NIC5) and Dual USB combo connector
D. Dual port RJ-45 GbE LAN Connector (NIC1 and NIC2)	H. RJ-45 Serial Port

Figure 4. Server Board Rear I/O Layout

The NIC LEDs on the NIC connector are marked as A and B. The following table provides the LED information.

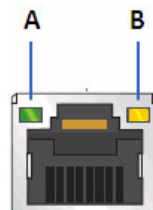


Table 3. NIC LED Decriptions

NIC LEDs	Color	LED State	Description
A	Green	Off	LAN link is not established.
		On	LAN link is established.
		Blinking	LAN activity is occurring.
B	N/A	Off	10 Mbit/sec data rate is selected.
	Green	On	100 Mbit/sec data rate is selected.
	Yellow	On	1000 Mbit/sec data rate is selected.

RAID Support

The Intel® Server Board S3420GPRX provides an embedded SATA controller that supports 3.0 Gbps data transfer rates.

The BIOS Setup Utility provides drive configuration options on the Advanced | Mass Storage Controller Configuration setup page, some of which affect the ability to configure RAID. The on-board SATA Controller option is enabled by default and when enabled, you can set the SATA Mode option to either one of the following four modes:

- Enhanced: Enhanced Mode supports up to six SATA ports with IDE native Mode.
- Compatibility: Supports up to four SATA ports [0/1/2/3] with IDE Legacy mode and two SATA ports [4/5] with IDE Native Mode.
- AHCI: Supports all SATA ports using the Advanced Host Controller Interface (AHCI).
- Intel® ESRT2 – Intel® Embedded Server RAID Technology II supports RAID 0/1/10.
- Intel® Matrix RAID – Intel® Matrix Storage Technology RAID supports RAID 0/1/5/10.

Note: For help with navigating the BIOS Setup utility, see the Intel® Server Board S3420GPRX Technical Product Specification.

For information on how to configure RAID, refer to the RAID software user's guide at: <http://www.intel.com/support/motherboards/server/S3420GPRX/howto.htm>

Hardware Requirements

To avoid integration difficulties and possible board damage, your system must meet the following requirements outlined. For a list of qualified components, see the links under “Additional Information and Software”.

Processor

The Intel® Server Board S3420GPRX supports one Intel® Xeon® 3400 series with up to 95W Thermal Design Power (TDP) with 2.5 GT/s or one Intel® i3® series with up to 73W Thermal Design Power (TDP) with 2.0GT/s. For a complete list of supported processors, see the links under [“Additional Information and Software”](#).

Memory

The Intel® Server Board S3420GPRX supports a DDR3-based memory subsystem. The server board supports up to three DIMM sockets per channel.

Refer to the following table for channel slot configuration. The minimal memory population is one DIMM in memory slot DIMM_A1. For a complete list of supported memory, see the links under [“Additional Information and Software”](#).

Table 4. Channel Slot Configuration

	Channel A			Channel B		
	A1	A2	A3	B1	B2	B3
RDIMM	X					
	X	X				
	X	X	X			
	X			X		
	X	X		X		
	X	X	X	X		
	X	X		X	X	
	X	X	X	X	X	
	X	X	X	X	X	X
UDIMM		X				
		X	X			
		X			X	
		X	X		X	
		X	X		X	X

The Independent Channel Mode is the default Maximum Performance Mode preferred for Intel® Xeon® processor 3400 series based platforms. All two channels may be populated in any order and have no matching requirements. All channels must run at the same interface frequency, but individual channels may run at different DIMM timings (RAS latency, CAS latency, and so forth).

Power Supply

A minimum of 350 W is required. Your supply must provide a minimum of 3 A of 5-V standby current or the board will not boot.

Optional Hardware

Intel® SAS Entry RAID Module AXX4SASMOD

The Intel® Server Board S3420GPRX provides a SAS module slot (J2H1) for the installation of an optional Intel® SAS Entry RAID Module AXX4SASMOD. Once the optional Intel® SAS Entry RAID Module AXX4SASMOD is present, the x4 PCI Express* links from PCI Express* x2 switch to the SAS module slot.

The optional Intel® SAS Entry RAID Module AXX4SASMOD includes a SAS1064e controller that supports x4 PCI Express* link widths and is a single-function PCI Express* end-point device. The SAS controller supports the SAS protocol as described in the Serial Attached SCSI (SAS) Standard, version 1.0, and also supports SAS 1.1 features. A 32-bit external memory bus off the SAS1064e controller provides an interface for Flash ROM and NVSRAM (Nonvolatile Static Random Access Memory) devices.

The optional Intel® SAS Entry RAID Module AXX4SASMOD provides four SAS connectors that support up to four hard drives with a non-expander backplane or up to eight hard drives with an expander backplane.

The optional Intel® SAS Entry RAID Module AXX4SASMOD also provides a SGPIO (Serial General Purpose Input / Output) connector and a SCSI Enclosure Services (SES) connector for backplane drive LED control.

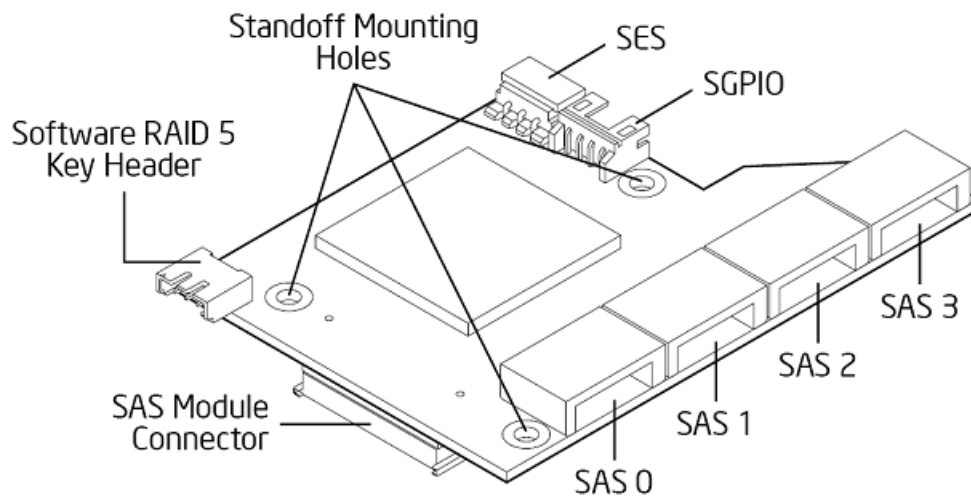


Figure 5. Intel® SAS Entry RAID Module

SAS RAID Support

The BIOS Setup Utility provides drive configuration options on the Advanced | Mass Storage Controller Configuration setup page for the Intel® SAS Entry RAID Module AXX4SASMOD, some of which affect the ability to configure RAID.

The Intel® SAS Entry RAID Module option is enabled by default once the Intel® SAS Entry RAID Module

AXX4SASMOD is present. When enabled, you can set the Configure Intel® SAS Entry RAID Module to either LSI* Integrated RAID or Intel® ESRTII mode.

IT/IR RAID Mode

Supports entry hardware RAID 0, RAID 1, and RAID10/10E and native SAS pass through mode.

Intel® ESRTII Mode

The Intel® Embedded Server RAID Technology II (Intel® ESRTII) feature provides RAID modes 0, 1, and 10. If RAID 5 is needed with Intel® ESRTII, you must install the optional Intel® RAID Activation Key AXXRAKSW5 accessory. This activation key is placed on the SAS Software RAID 5 connector located on the Intel® SAS Entry RAID Module AXX4SASMOD. For installation instructions, see the documentation included with the SAS Module AXX4SASMOD and the activation key.

When Intel® Embedded Server RAID Technology II is enabled with the SAS Module AXX4SASMOD, enclosure management is provided through the SAS_SGPIO or SES connector on the SAS Module AXX4SASMOD when a cable is attached between this connector and the backplane or I2C interface.

Note: For help with navigating the BIOS Setup utility, refer to the Intel® Server Board S3420GPRX Technical Product Specification.

For information on how to configure RAID, see the RAID software user's guide at: <http://www.intel.com/support/motherboards/server/S3420GPRX/howto.htm>

For information about configure IT/IR RAID, see the IT/IR RAID software user's guide at: <http://www.intel.com/support/motherboards/server/S3420GPRX/howto.htm>

Intel® Remote Management Module 3 Lite

The Intel® Remote Management Module 3 Lite plugs into connectors on the Intel® Server Board S3420GPRX, acting as components of the server board—not as separate products. You must install these two components together.

These components provide a way to view and operate the server remotely in real time. Keyboard, video, and mouse control (KVM) is redirected to a managing system; this provides remote control of the server. USB media redirection allows you to use a USB device anywhere on the network as if it was installed on the managed server. For example, you can insert a CD-ROM disk in a workstation CD-ROM drive and the managed server views it as its own local CD-ROM drive.

Note:

- RMM3 Lite has no physical dedicated network interface, but BMC FW still contains corresponding logical BMC channel 3. The user cannot access BMC channel 3
- RMM3 Lite connector (J2D1) is NOT compatible with RMM3.
- RMM3 Lite functionality is the same as RMM3. The user can refer the *RMM3 User Guide* for instructions.

Intel® Local Control Panel

The Intel® Local Control Panel provides enhanced system control by using a LCD display, which provides additional controls and indicators beyond the standard control panel.

Note: Use of this feature requires the installation of either the Intel® Management Module - Advanced or Professional.

2 Server Utilities

Using the BIOS Setup Utility

This section describes the BIOS Setup Utility options, which is used to change server configuration defaults. You can run BIOS Setup with or without an operating system being present. See [“Additional Information and Software”](#) for a link to the Technical Product Specification where you will find details about specific BIOS setup screens.

Starting Setup

You can enter and start BIOS Setup under several conditions:

- When you turn on the server, after POST completes the memory test.
- When you have moved the CMOS jumper on the server board to the "Clear CMOS" position (enabled).

In the two conditions listed above, during the Power On Self Test (POST), you will see this prompt:

```
Press <F2> to enter SETUP
```

In a third condition, when CMOS/NVRAM is corrupted, you will see other prompts but not the <F2> prompt:

```
Warning: CMOS checksum invalid  
Warning: CMOS time and date not set
```

In this condition, the BIOS will load default values for CMOS and attempt to boot.

If You Cannot Access Setup

If you cannot access the BIOS Setup, you might need to clear the CMOS memory. For instructions on clearing the CMOS, see [“Clearing the CMOS”](#).

Setup Menus

Each BIOS Setup menu page contains a number of features. Except for those features that are provided only to display automatically configured information, each feature is associated with a value field that contains user-selectable parameters. A user must have adequate security rights to change these parameters. If a value cannot be changed for any reason, the feature's value field is inaccessible.

“Setup Menu Key Use” describes the keyboard commands you can use in the BIOS Setup menus.

Table 5. Setup Menu Key Use

Key to Press	Description
<F1>	Pressing <F1> on any menu invokes the general help window.
Left and right arrows	The left and right arrow keys are used to move between the major menu pages. The keys have no effect if a submenu or pick list is displayed.
Up arrow	Select Item up - The up arrow is used to select the previous value in a menu item's option list, or a value field pick list. Pressing the <Enter> key activates the selected item.
Down arrow	Select Item down - The down arrow is used to select the next value in a menu item's option list, or a value field pick list. Pressing the <Enter> key activates the selected item.
<F5> or <->	Change Value - The minus key or the <F5> function key is used to change the value of the current item to the previous value. This key scrolls through the values in the associated pick list without displaying the full list.
<F6> or <+>	Change Value - The plus key or the <F6> function key is used to change the value of the current menu item to the next value. This key scrolls through the values in the associated pick list without displaying the full list. On 106-key Japanese keyboards, the plus key has a different scan code than the plus key on the other keyboard, but it has the same effect.
<Enter>	Execute Command - The <Enter> key is used to activate submenus when the selected feature is a submenu, or to display a pick list if a selected feature has a value field, or to select a sub-field for multi-valued features like time and date. If a pick list is displayed, the <Enter> key will undo the pick list, and allow another selection in the parent menu.
<Esc>	Exit - The <Esc> key provides a mechanism for backing out of any field. This key will undo the pressing of the <Enter> key. When the <Esc> key is pressed while editing any field or selecting features of a menu, the parent menu is re-entered. When the <Esc> key is pressed in any submenu, the parent menu is re-entered. When the <Esc> key is pressed in any major menu, the exit confirmation window is displayed and the user is asked whether changes can be discarded.
<F9>	<p>Setup Defaults - Pressing <F9> causes the following to display:</p> <pre style="text-align: center;"> Setup Confirmation Load default configuration now? [Yes] [No] </pre> <p>If "Yes" is selected and the <Enter> key is pressed, all Setup fields are set to their default values. If "No" is selected and the <Enter> key is pressed, or if the <Esc> key is pressed, the user is returned to where they were before <F9> was pressed without affecting any existing field values.</p>

Table 5. Setup Menu Key Use

Key to Press	Description
<F10>	<p>Save and Exit - Pressing <F10> causes the following message to display:</p> <pre> Setup Confirmation Save Configuration changes and exit now? [Yes] [No]</pre> <p>If "Yes" is selected and the <Enter> key is pressed, all changes are saved and Setup is exited. If "No" is selected and the <Enter> key is pressed, or the <Esc> key is pressed, the user is returned to where they were before <F10> was pressed without affecting any existing values.</p>

Upgrading the BIOS

The upgrade utility allows you to upgrade the BIOS in flash memory. The code and data in the upgrade file include the following:

- On-board system BIOS, including the recovery code, BIOS Setup Utility, and strings.
- On-board video BIOS and other option ROMs for devices embedded on the server board.
- OEM binary area
- Microcode

Preparing for the Upgrade

The following steps explain how to prepare to upgrade the BIOS, including how to record the current BIOS settings and how to obtain the upgrade utility.

Note: *In the unlikely event a BIOS error occurs during the BIOS update process, you may need to follow a recovery process to return the system to service. Refer to “[Additional Information and Software](#)” for a link to necessary software and instructions.*

Recording the Current BIOS Settings

1. Boot the computer and press <F2> when you see the message:
Press <F2> Key if you want to run SETUP
2. Write down the current settings in the BIOS Setup program.

Note: *Do not skip step 2. You need these settings to configure your computer at the end of the procedure.*

Obtaining the Upgrade

Download the BIOS image file to a temporary folder on your hard drive. Refer to [“Additional Information and Software”](#) for a link to the update software.

Note: *Before attempting a BIOS upgrade, review the instructions and release notes provided in the readme file distributed with the BIOS image file. The release notes contain critical information regarding jumper settings, specific fixes, or other information to complete the upgrade.*

Upgrading the BIOS

Follow the instructions in the readme file that came with the BIOS upgrade. When the update completes, remove the bootable media from which you performed the upgrade.

Caution: *Do not power down the system during the BIOS update process! The system resets automatically when the BIOS update process is completed.*

Note: *You may encounter a CMOS Checksum error or other problem after reboot. If this happens, shut down the system and reboot. CMOS checksum errors require that you enter Setup, check your settings, save your settings, and exit Setup.*

Recovering the BIOS

If an update to the system BIOS is not successful or if the system fails to complete POST and the BIOS is unable to boot an operating system, it may be necessary to run the BIOS recovery procedure.

To place the baseboard into recovery mode, move the boot option jumper (located on the baseboard) to the recovery position. The BIOS can then execute the recovery BIOS (also known as the boot block) instead of the normal BIOS. The recovery BIOS is a self-contained image that exists solely as a fail-safe mechanism for installing a new BIOS image.

Note: *During the recovery mode, video is not initialized. One high-pitched beep announces the start of the recovery process. The entire process takes two to four minutes. A successful update ends with two high-pitched beeps. Failure is indicated by a long series of short beeps.*

Recovering the BIOS

The following steps boot the recovery BIOS and flashes the normal BIOS:

1. Power down and unplug the system from the AC power source.
2. Move the recovery jumper at J1F3 from the spare location at pins 2 and 3 to cover pins 1 and 2. Refer to the following figure.

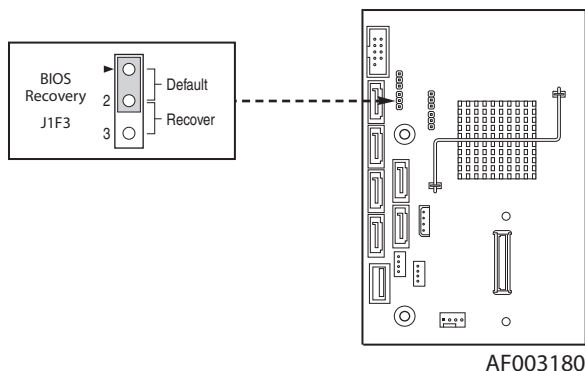


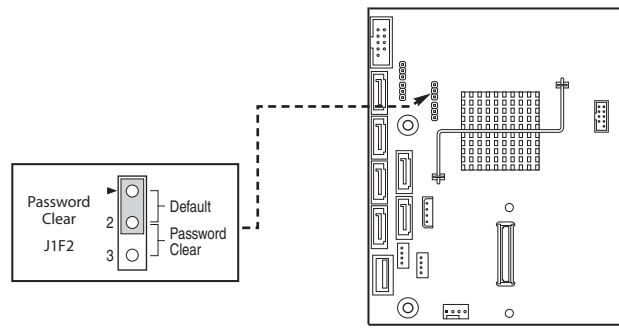
Figure 6. BIOS Recovery Jumper

3. Insert the bootable BIOS Recovery media containing the new BIOS image files. A BIOS recovery can be accomplished from SATA CD and USB Mass Storage device. Please note this platform does not support recovery from a USB floppy. The recovery media must contain the following files under the root directory:
 - FVMAIN.FV
 - UEFI iFlash32
 - *Rec.CAP
 - Startup.nsh (update accordingly to use proper *Rec.CAP file)
4. Plug the system into the AC power source and power it on.
5. The BIOS POST screen will appear displaying the progress, and the system will automatically boot to the EFI SHELL.
6. Remove the recovery media.
7. Power down and unplug the system from the AC power source.
8. Move the BIOS recovery jumper at J1F3 back to the original position, covering storage pins 1 and 2.
9. Plug the system into the AC power source and power it up to confirm the recovery was successful.
10. Do NOT interrupt the BIOS POST during the first boot.

Clearing the Password

If the user or administrator password(s) is lost or forgotten, moving the password clear jumper into the “clear” position clears both passwords. Before a new password(s) is set, you must restore the password clear jumper to its original position. The password clear jumper is located on jumper block J1F2.

1. Power down the system and disconnect the AC power.
2. Open the server chassis.
3. Move the jumper from the normal operation position, Password Clear Protect, at pins 1 and 2 to the Password Clear Erase position, covering pins 2 and 3 as indicated in the following diagram.



AF003181

Figure 7. Password Recovery Jumper

4. Reconnect the AC power, power up the system.
5. Power down the system and disconnect the AC power.
6. Return the Password Clear jumper to the Password Clear Protect position, covering pins 1 and 2.
7. Reconnect the AC power and power up the server.
8. Close the server chassis. The password is cleared and can be reset by going into the BIOS setup.

Clearing the CMOS

If you cannot access the BIOS setup screens, you must use the CMOS Clear jumper to reset the configuration RAM. The CMOS Clear jumper is located on jumper block J1F5 on the server board.

1. Power down the system and disconnect the AC power.
2. Open the server chassis. For instructions, see your server chassis documentation.

3. Move the jumper from the default operating position (covering pins 1 and 2) to the reset / clear position (covering pins 2 and 3).

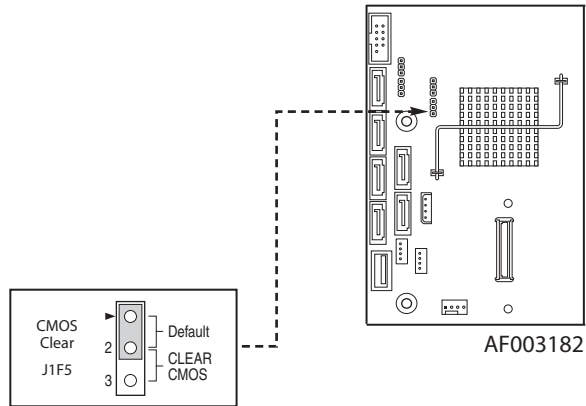


Figure 8. CMOS Recovery Jumper

4. Wait five seconds.
5. Move the jumper back to default position, covering pins 1 and 2.
6. Close the server chassis.
7. Reconnect the AC power and power up the system. The CMOS is cleared and can be reset by going into the BIOS setup.

Updating the Integrated BMC

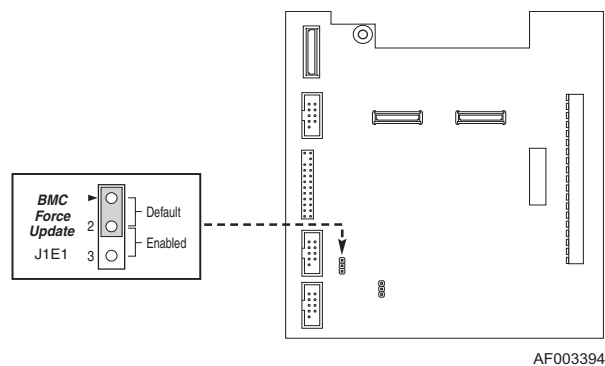


Figure 9. BMC Force Update Jumper

When performing the standard Integrated BMC firmware update procedure, the update utility places the Integrated BMC into an update mode, allowing the firmware to load safely onto the flash device. In the unlikely event the Integrated BMC firmware update

process fails (due to the Integrated BMC not being in the proper update state), the server board provides an Integrated BMC Force Update jumper, which forces the Integrated BMC into the proper update state. You should complete the following procedure in the event the standard Integrated BMC firmware update process fails.

Note: *Normal Integrated BMC functionality is disabled with the Force Integrated BMC Update jumper set to the enabled position. The server should never be run with the Integrated BMC Force Update jumper set in this position. This jumper setting should only be used when the standard firmware update process fails. This jumper should remain in the default / disabled position when the server is running normally.*

1. Power down and remove the AC power cord.
2. Open the server chassis. For instructions, refer to your server chassis documentation.
3. Move the jumper from the default operating position (covering pins 1 and 2) to the enabled position (covering pins 2 and 3).
4. Close the server chassis.
5. Reconnect the AC cord and power up the server.
6. Perform the Integrated BMC firmware update procedure as documented in the README.TXT file included in the given Integrated BMC firmware update package. After successful completion of the firmware update process, the firmware update utility may generate an error stating the Integrated BMC is still in update mode.
7. Power down and remove the AC power cord.
8. Open the server chassis.
9. Move jumper from the enabled position (covering pins 2 and 3) to the disabled position (covering pins 1 and 2).
10. Close the server chassis.
11. Reconnect the AC cord and power up the server.

3 Hardware Installations and Upgrades

Before You Begin

Before working with your server product, pay close attention to the “[Safety Information](#)” at the beginning of this manual.

Tools and Supplies Needed

- Phillips* (cross head) screwdriver (#1 bit and #2 bit)
- Needle nosed pliers
- A ruler
- Pen or pencil
- Antistatic wrist strap and conductive foam pad (recommended)

Installing and Removing Memory

The silkscreen on the board for the DIMMs displays DIMM_A1, DIMM_A2, DIMM_A3; DIMM_B1, DIMM_B2, DIMM_B3 starting from the center of the board. DIMM_A1 is one of two blue sockets which is close to the processor. For three slots per channel configurations, the server board requires DDR3 DIMMs within a channel to be populated.

Installing DIMMs

To install DIMMs, follow these steps:

1. Observe the safety and ESD precautions in “[Safety Information](#)”.
2. Turn off all peripheral devices connected to the server.
3. Turn off the server.
4. Disconnect the AC power cord from the server.
5. Remove the server's cover and locate the DIMM sockets (see letters “A” to “E” [Figure 10](#)).

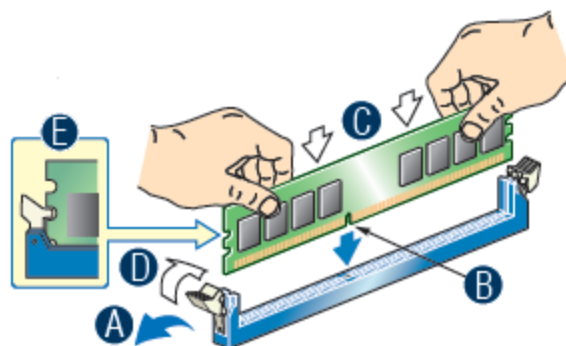


Figure 10. Installing Memory

6. Make sure the clips at either end of the DIMM socket(s) are pushed outward to the open position (see letter “A” in Figure 10).
7. Holding the DIMM by the edges, remove it from its anti-static package.
8. Position the DIMM above the socket. Align the two small notches in the bottom edge of the DIMM with the keys in the socket (letter “B” in Figure 10).
9. Insert the bottom edge of the DIMM into the socket (letter “C” in Figure 10).
10. When the DIMM is inserted, push down on the top edge of the DIMM until the retaining clips snap into place ((letter “D” in Figure 10). Make sure the clips are firmly in place (letter “E” in Figure 10).
11. Replace the server's cover and reconnect the AC power cord. Refer to the documentation that came with your server chassis for instructions on installing the server's cover.

Removing DIMMs

To remove a DIMM, follow these steps:

1. Observe the safety and ESD precautions in “Safety Information”.
2. Turn off all peripheral devices connected to the server.
3. Turn off the server.
4. Remove the AC power cord from the server.
5. Remove the server's cover. See the documentation that came with your server chassis for instructions on removing the server's cover.
6. Gently spread the retaining clips at each end of the socket. The DIMM will lift from the socket.
7. Holding the DIMM by the edges, lift it from the socket, and store it in an anti-static package.

8. Reinstall and reconnect any parts you removed or disconnected to reach the DIMM sockets.
9. Replace the server's cover and reconnect the AC power cord. Refer to the documentation that came with your server chassis for instructions on installing the server's cover.

Installing or Replacing the Processor

Note: Use the following instructions to install or replace a processor instead of using the instructions that came with the processor.

Caution: Processor must be appropriate: You may damage the server board if you install a processor that is inappropriate for your server. See [“Additional Information and Software”](#) for a link to the list of compatible processor(s).

Caution: ESD and handling processors: Reduce the risk of electrostatic discharge (ESD) damage to the processor by doing the following: (1) Touch the metal chassis before touching the processor or server board. Keep part of your body in contact with the metal chassis to dissipate the static charge while handling the processor. (2) Avoid moving around unnecessarily.

Installing the Processor

To install a processor, follow these instructions:

1. Observe the safety and ESD precautions in [“Safety Information”](#).
2. Turn off all peripheral devices connected to the server. Turn off the server.
3. Disconnect the AC power cord from the server.
4. Remove the server's cover. See the documentation that came with your server chassis for instructions on removing the server's cover.

5. Locate the processor socket and open the socket lever (see [Figure 11](#)).

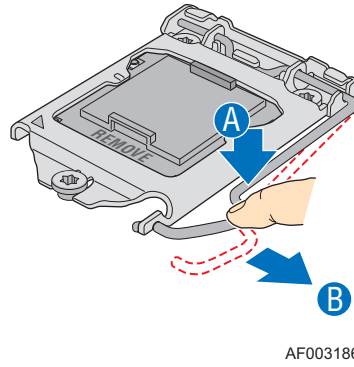


Figure 11. Lifting the Load Lever

6. Open the load plate (see letter “A” and “B” in [Figure 12](#)).

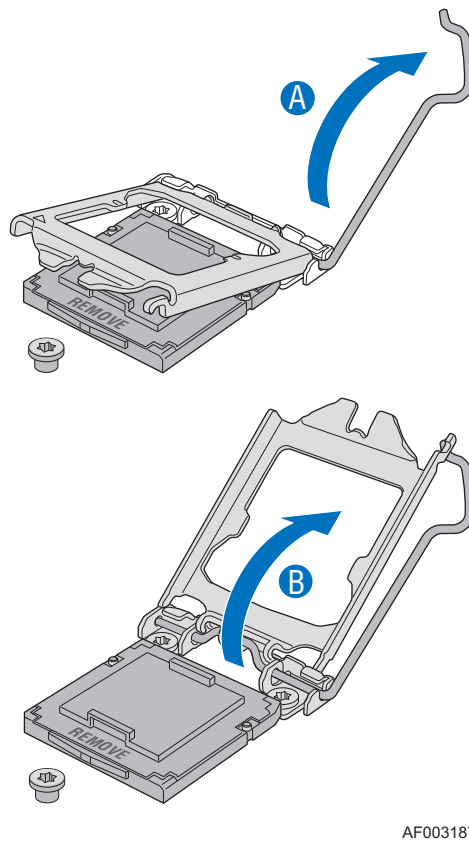
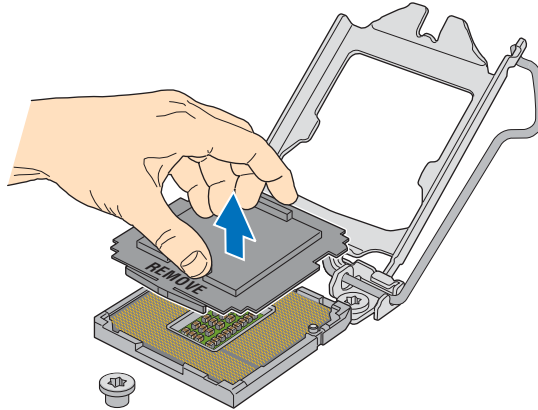


Figure 12. Open the Load Plate

7. Remove the socket protective cover (Figure 13).



AF003188

Figure 13. Remove the Socket Protective Cover

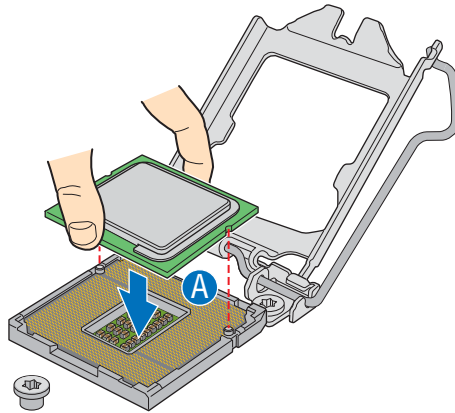
8. Take the processor out of the box and remove the protective shipping cover (Figure 14).



AF003189

Figure 14. Remove the Processor Protective Cover

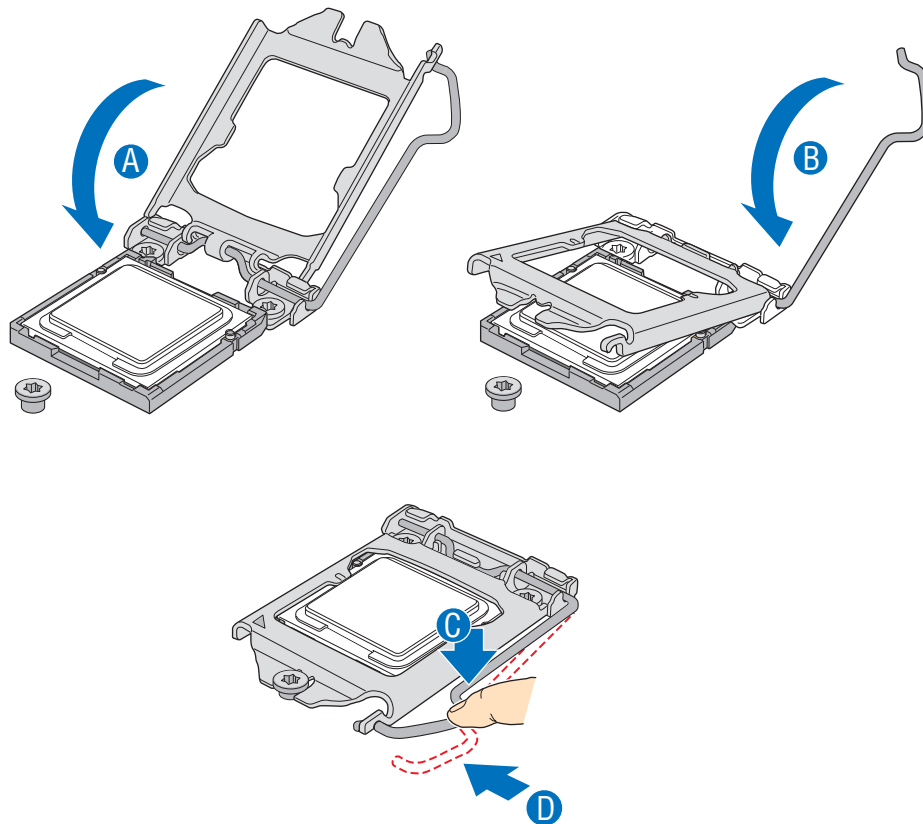
9. Align the processor cutouts to match the two socket pins, and insert the processor into the socket as shown in Figure 15.



AF003190

Figure 15. Installing the Processor

10. Close the load plate (see letter “A” in Figure 16), close the socket lever, and ensure the load plate tab engages under the socket lever when fully closed (see letter “B” and “C” in Figure 16).



AF003191

Figure 16. Close the Load Plate and Socket Lever

Note: Make sure the alignment triangle mark and the alignment triangle cutout align correctly. To assist in package orientation and alignment with the socket:

Installing the Heatsink(s)

Before installing the heat sink, you must install your processor. For instructions, see “Installing the Processor” on page -23.

Caution: The heat sink has Thermal Interface Material (TIM) located on the bottom of it. Use caution when you unpack the heat sink so you do not damage the TIM.

1. Remove the protective cover from the TIM on the underside of the heat sink. Do not touch the TIM.
2. Orient the heat sink over the processor as shown in Figure 17. You must position the fins as shown to provide correct airflow through the system.
3. Set the heat sink over the processor, lining up the four captive screws with the four posts surrounding the processor.
4. Loosely screw in the captive screws on the heat sink corners in a diagonal manner as shown by the four circled numbers in Figure 16. Do not fully tighten one screw before tightening another.
5. Gradually and equally tighten each captive screw in the same order until each is firmly tightened.

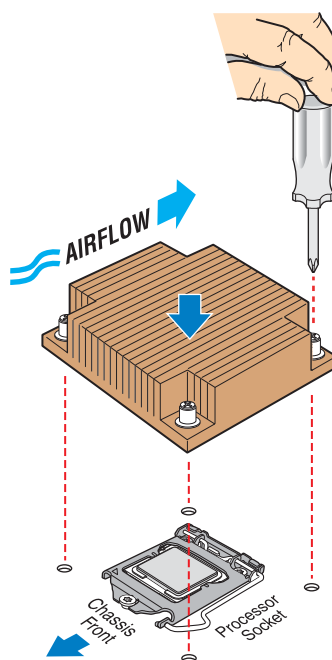


Figure 17. Installing the Heatsink Assembly

Removing a Processor

1. Observe the safety and ESD precautions in [“Safety Information”](#).
2. Turn off all peripheral devices connected to the server.
3. Turn off the server.
4. Remove the AC power cord from the server.
5. Remove the server's cover. See the documentation that came with your server chassis for instructions on removing the server's cover.
6. Loosen the four captive screws on the corners of the heatsink.
7. Twist the heatsink slightly to break the seal between the heatsink and the processor.
8. Lift the heatsink from the processor. If it does not pull up easily, twist the heatsink again. Do not force the heatsink from the processor. Doing so could damage the processor.
9. Lift the processor lever.
10. Raise the CPU load plate.
11. Remove the processor.
12. If installing a replacement processor, see [“Installing the Processor”](#). Otherwise, install the protective socket cover over the empty processor socket and reinstall the chassis cover.

Installing a PCI Card

This system does not include peripherals and add-in cards; you must purchase them separately. The riser card at PCI slot 6 of the board supports a low-profile, half-length PCI Express* add-in card. Refer to the *SR1630GPRX/SR1630HGPRX System Service Guide* for more detailed information on how to install a PCI card.

Note: *You must attach add-in cards to a riser card when the riser card is removed from the chassis.*

1. Remove the screw that attaches the PCI bracket shield to the rear of the chassis to remove the shield. Retain the screw.

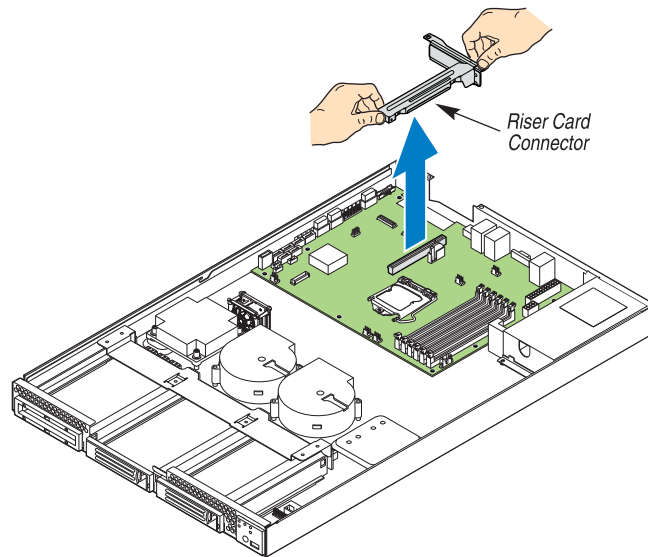


Figure 18. Removing the PCI Riser Assembly from the Server System

2. Insert the PCI card edge connector in the slot on the PCI riser.

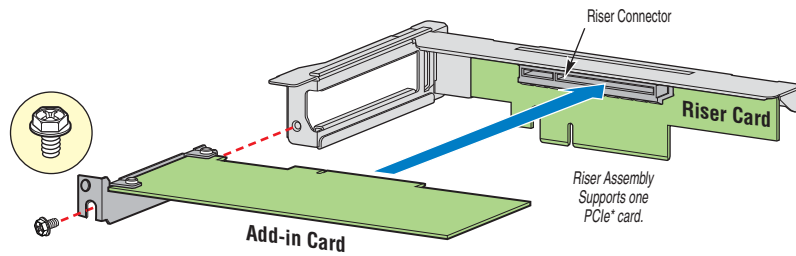


Figure 19. Installing a PCI Card in a Riser Card

3. Insert the riser card with the attached PCI card into the PCI slot on the server board. Press firmly on the riser card until it is fully seated. Press down on the riser card—do NOT press down on the PCI card.

Caution: Press the riser card straight down into the slot. Tipping it in the slot while installing it may damage the riser card or slot on the server board.

4. Use the screw removed in Step 1 to secure the riser card assembly to the chassis.

Replacing the Backup Battery

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

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

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

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

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

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

1. Observe the safety and ESD precautions in [“Safety Information”](#).
2. Turn off all peripheral devices connected to the server. Turn off the server.
3. Disconnect the AC power cord from the server.
4. Remove the server's cover and locate the battery. See the documentation that came with your server chassis for instructions on removing the server's cover.
5. Insert the tip of a small flat bladed screwdriver, or an equivalent, under the tab in the plastic retainer. Gently push down on the screwdriver to lift the battery.
6. Remove the battery from its socket.

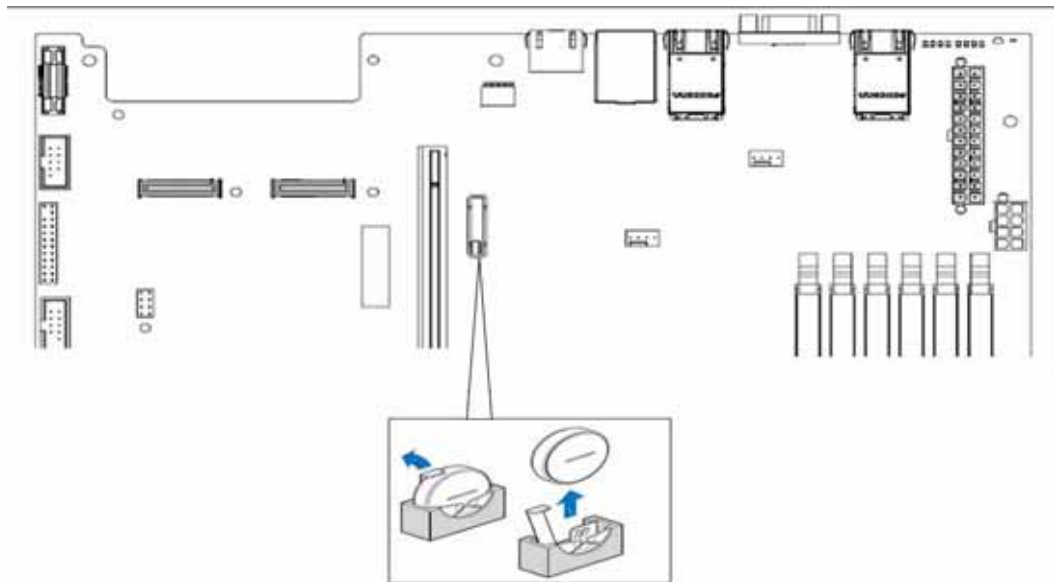


Figure 20. Replacing the Backup Battery

7. Dispose of the battery according to local ordinance.
8. Remove the new lithium battery from its package, and, being careful to observe the correct polarity, insert it in the battery socket.
9. Close the chassis.
10. Run Setup to restore the configuration settings to the RTC.

Appendix A: LED Decoder

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

Each POST code is represented by the eight amber Diagnostic LEDs. The POST codes are divided into two nibbles: an upper nibble and a lower nibble. The upper nibble bits are represented by Diagnostic LEDs #4, #5, #6, and #7. The lower nibble bits are represented by Diagnostics LEDs #0, #1, #2, and #3. Given the bit is set in the upper and lower nibbles, the corresponding LED is lit. If the bit is clear, corresponding LED is off.

The Diagnostic LED #7 is labeled as MSB, and the Diagnostic LED #0 is labeled with LSB.

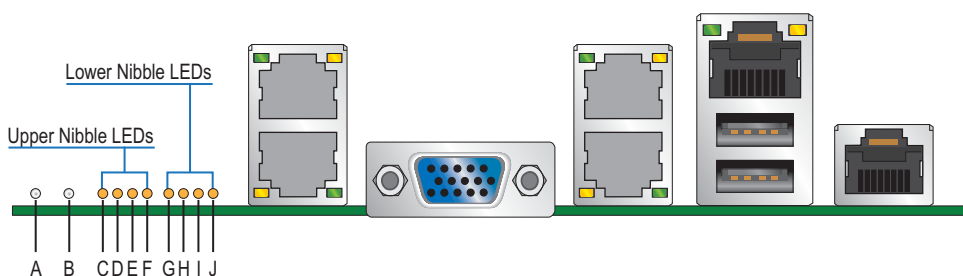


Figure 21. POST Code Diagnostic LED Location

A. ID LED	B. Status LED (Intel® Server Board S3420GPRX)
C. Diagnostic LED #7 (MSB LED)	D. Diagnostic LED #6
E. Diagnostic LED #5	F. Diagnostic LED #4
G. Diagnostic LED #3	H. Diagnostic LED #2
I. Diagnostic LED #1	J. Diagnostic LED #0 (LSB LED)

Table 6. Diagnostic LED Placement Diagram

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

Table 7. POST Progress Code LED Example

LEDs	Upper Nibble LEDs				Lower Nibble LEDs			
LEDs	MSB							
	LED #7	LED #6	LED #5	LED #4	LED #3	LED #2	LED #1	LED #0
	8h	4h	2h	1h	8h	4h	2h	1h
Status	ON	OFF	ON	OFF	ON	ON	OFF	OFF
Results	1	0	1	0	1	1	0	0
	Ah				Ch			

- Upper nibble bits = 1010b = Ah; Lower nibble bits = 1100b = Ch; the two are concatenated as ACh.

Table 8. Diagnostic LED POST Code Decoder

Diagnostic LED Decoder									
Checkpoint	O = On, X = Off								Description
	Upper Nibble				Lower Nibble				
	MSB							LSB	
	8h	4h	2h	1h	8h	4h	2h	1h	
LED	#7	#6	#5	#4	#3	#2	#1	#0	
Host Processor									
0x10h	X	X	X	O	X	X	X	X	Power-on initialization of the host processor (bootstrap processor)
0x11h	X	X	X	O	X	X	X	O	Host processor cache initialization (including AP)
0x12h	X	X	X	O	X	X	O	X	Starting application processor initialization
0x13h	X	X	X	O	X	X	O	O	SMM initialization
Chipset									
0x21h	X	X	O	X	X	X	X	O	Initializing a chipset component
Memory									

Table 8. Diagnostic LED POST Code Decoder

0x22h	X	X	O	X	X	X	O	X	Reading configuration data from memory (SPD on FBDIMM)
0x23h	X	X	O	X	X	X	O	O	Detecting presence of memory
0x24h	X	X	O	X	X	O	X	X	Programming timing parameters in the memory controller
0x25h	X	X	O	X	X	O	X	O	Configuring memory parameters in the memory controller
0x26h	X	X	O	X	X	O	O	X	Optimizing memory controller settings
0x27h	X	X	O	X	X	O	O	O	Initializing memory, such as ECC init
0x28h	X	X	O	X	X	X	X	X	Testing memory

Table 8. Diagnostic LED POST Code Decoder

PCI Bus									
0x50h	X	O	X	O	X	X	X	X	Enumerating PCI buses
0x51h	X	O	X	O	X	X	X	O	Allocating resources to PCI buses
0x52h	X	O	X	O	X	X	O	X	Hot Plug PCI controller initialization
0x53h	X	O	X	O	X	X	O	O	Reserved for PCI bus
0x54h	X	O	X	O	X	O	X	X	Reserved for PCI bus
0x55h	X	O	X	O	X	O	X	O	Reserved for PCI bus
0x56h	X	O	X	O	X	O	O	X	Reserved for PCI bus
0x57h	X	O	X	O	X	O	O	O	Reserved for PCI bus
USB									
0x58h	X	O	X	O	O	X	X	X	Resetting USB bus
0x59h	X	O	X	O	O	X	X	O	Reserved for USB devices
ATA / ATAPI / SATA									
0x5A	X	O	X	O	O	X	O	X	Resetting SATA bus and all devices
0x5B	X	O	X	O	O	X	O	O	Reserved for ATA
0x5C	X	O	X	O	O	O	X	X	Enable Smart if supported by ATA device
0x5D	X	O	X	O	O	O	X	O	Reserved for ATA
SMBUS									
0x5E	X	O	X	O	O	O	O	X	Resetting SMBUS
0x5F	X	O	X	O	O	O	O	O	Reserved for SMBUS
Local Console									
0x70h	X	O	O	O	X	X	X	X	Resetting the video controller (VGA)
0x71h	X	O	O	O	X	X	X	O	Disabling the video controller (VGA)
0x72h	X	O	O	O	X	X	O	X	Enabling the video controller (VGA)
Remote Console									
0x78	X	O	O	O	O	X	X	X	Resetting the console controller
0x79	X	O	O	O	O	X	X	O	Disabling the console controller

Table 8. Diagnostic LED POST Code Decoder

0x7A	X	O	O	O	O	X	O	X	Enabling the console controller
Keyboard (only USB) / Keyboard (PS/2 or USB)									
0x90	O	X	X	O	X	X	X	X	Resetting the keyboard
0x91	O	X	X	O	X	X	X	O	Disabling the keyboard
0x92	O	X	X	O	X	X	O	X	Detecting the presence of the keyboard
0x93	O	X	X	O	X	X	O	O	Enabling the keyboard
0x94	O	X	X	O	X	O	X	X	Clearing keyboard input buffer
0x95	O	X	X	O	X	O	X	O	Instructing keyboard to run Self Test (PS/2 only)
Mouse (only USB) / Mouse (PS/2 or USB)									
0x98	O	X	X	O	O	X	X	X	Resetting the mouse
0x99	O	X	X	O	O	X	X	O	Detecting the mouse
0x9A	O	X	X	O	O	X	O	X	Detecting the presence of mouse
0x9B	O	X	X	O	O	X	O	O	Enabling the mouse
Fixed Media									
0xB0	O	X	O	O	X	X	X	X	Resetting fixed media device
0xB1	O	X	O	O	X	X	X	O	Disabling fixed media device
0xB2	O	X	O	O	X	X	O	X	Detecting the presence of a fixed media device (hard drive detection, and so on)
0xB3	O	X	O	O	X	X	O	O	Enabling / configuring a fixed media device
Removable Media									
0xB8	O	X	O	O	O	X	X	X	Resetting the removable media device
0xB9	O	X	O	O	O	X	X	O	Disabling the removable media device
0xBA	O	X	O	O	O	X	O	X	Detecting the presence of a removable media device (CD-ROM detection, etc.)
0xBC	O	X	O	O	O	O	X	X	Enabling / configuring a removable media device

Table 8. Diagnostic LED POST Code Decoder

Boot Device Selection (BDS)									
0xD0	O	O	X	O	X	X	X	X	Trying boot selection
0xD1	O	O	X	O	X	X	X	O	Trying boot selection
0xD2	O	O	X	O	X	X	O	X	Trying boot selection
0xD3	O	O	X	O	X	X	O	O	Trying boot selection
0xD4	O	O	X	O	X	O	X	X	Trying boot selection
0xD5	O	O	X	O	X	O	X	O	Trying boot selection
0xD6	O	O	X	O	X	O	O	X	Trying boot selection
0xD7	O	O	X	O	X	O	O	O	Trying boot selection
0xD8	O	O	X	O	O	X	X	X	Trying boot selection
0xD9	O	O	X	O	O	X	X	O	Trying boot selection
0xDA	O	O	X	O	O	X	O	X	Trying boot selection
0xDB	O	O	X	O	O	X	O	O	Trying boot selection
0xDC	O	O	X	O	O	O	X	X	Trying boot selection
0xDD	O	O	X	O	O	O	X	O	Trying boot selection
0xDE	O	O	X	O	O	O	O	X	Trying boot selection
0xDF	O	O	X	O	O	O	O	O	Trying boot selection
Pre-EFI Initialization (PEI) Core									
0xE0	O	O	O	X	O	X	X	X	Started dispatching early initialization modules (PEIM)
0xE1	O	O	O	X	X	X	X	O	Reserved for initialization module uses (PEIM)
0xE2	O	O	O	X	X	X	O	X	Initial memory found, configured, and installed correctly
0xE3	O	O	O	X	X	X	O	O	Reserved for initialization module uses (PEIM)
Driver Execution Environment (DXE) Core (not accompanied by a beep code)									
0xE4	O	O	O	X	O	X	X	X	Entered EFI driver execution phase (DXE)
0xE5	O	O	O	X	O	X	X	O	Started dispatching drivers
0xE6	O	O	O	X	O	X	O	X	Started connecting drivers
DXE Drivers (not accompanied by a beep code)									

Table 8. Diagnostic LED POST Code Decoder

0xE7	0	0	0	X	X	0	0	0	Waiting for user input
0xE8	0	0	0	X	0	X	X	X	Checking password
0xE9	0	0	0	X	0	X	X	0	Entering BIOS setup
0xEA	0	0	0	X	0	X	0	X	Flash Update
0xEE	0	0	0	X	0	0	0	X	Calling Int 19. One beep unless silent boot is enabled.
0xEF	0	0	0	X	0	0	0	0	Unrecoverable boot failure
Runtime Phase / EFI Operating System Boot									
0xF2	0	0	0	0	X	X	0	X	Signal that the operating system has switched to virtual memory mode.
0xF4	0	0	0	0	X	0	X	X	Entering Sleep state
0xF5	0	0	0	0	X	0	X	0	Exiting Sleep state
0xF8	0	0	0	0	0	X	X	X	Operating system has requested EFI to close boot services (ExitBootServices () has been called)
0xF9	0	0	0	0	0	X	X	0	Operating system has switched to virtual address mode (SetVirtualAddressMap () has been called)
0xFAh\	0	0	0	0	0	X	0	X	Operating system has requested the system to reset (ResetSystem () has been called)
Pre-EFI Initialization Module (PEIM) / Recovery									
0x30	X	X	0	0	X	X	X	X	Crisis recovery has been initiated because of a user request
0x31	X	X	0	0	X	X	X	0	Crisis recovery has been initiated by software (corrupt flash)
0x34	X	X	0	0	X	0	X	X	Loading crisis recovery capsule
0x35	X	X	0	0	X	0	X	0	Handing off control to the crisis recovery capsule
0x3F	X	X	0	0	0	0	0	0	Unable to complete crisis recovery

Table 8. Diagnostic LED POST Code Decoder

Memory Error Codes (Accompanied by a beep code)									
0xE8h	O	O	O	X	O	X	X	X	No Usable Memory Error: No memory in the system, or SPD data bad so no memory could be detected.
0xEBh	O	O	O	X	O	X	O	O	Memory Test Error: Memory failed Hardware BIST.
0xEDh	O	O	O	X	O	O	X	O	Population Error: RDIMMs and UDIMMs cannot be mixed in the system.
0xEEh	O	O	O	X	O	O	O	X	Mismatch Error: More than two Quad-Ranked DIMMS in a channel.

Appendix B: Intel® Server Issue Report Form

Issue Report Form (Rev 3.6)

Note: Filling out this form completely is required for any escalation.

=====

Customer Contact Information:

Customer Support Case #:

=====

Intel® Server Board or System:

(Example: S3420GPRX or SR1630GPRX/SR1630HGPRX)

=====

Server Chassis:

(Example: SR1630GPRX/SR1630HGPRX. If third-party chassis used, indicate make and model.)

=====

Baseboard Information: (some information maybe found by accessing BIOS & going through the Server Management menu -> System Information)

Baseboard PBA/TA/AA # (Example: 123456-789):

- can be found on the white sticker label on the baseboard

System BIOS Version:

Intel® Remote Management Module Firmware Version (if applicable):

Intel® Management Module BMC Revision (if applicable):

BMC/mBMC Version:

FRU/SDR Version:

HSC Version:

Has the latest BIOS been tried? (Yes/No):

Has the latest BMC/mBMC been tried? (Yes/No):

Has the latest IMM BMC been tried? (Yes/No):

Has the latest RMM Firmware been tried? (Yes/No):

Has the latest FRU/SDR been tried? (Yes/No):

Has the latest HSC been tried? (Yes/No):

=====

Processor information:

	Type	Speed	sSpec	Thermal Solution
Processor 1				
Processor 2				
Processor 3				
Processor 4				

Thermal solution (Heatsink) examples:

(1U, Passive w/air ducting, Active w/fan, etc.)

=====

Memory:

Manufacturer	Part Number	DRAM Part Number	On Intel tested list?

Add-in adapters (Example: NICs, Management Adapters, Serial Expansion Cards, PCI-Express* Adapters, RAID Controllers, SCSI Controllers, etc.):

Type	Slot	Manufacturer	Model	Firmware

Third party hardware (Example: KVM, Chassis, etc.):

Description/Use	Manufacturer	Model	Firmware

Storage Devices (Example: SCSI, SATA, SAS, USB, Tape, etc.):

Manufacturer	Model	Type	Size	Firmware	In Hot-Swap Bay?

=====
Operating System Information (Example: RedHat* Enterprise Linux, Microsoft* Windows* Server 2003, Service pack 1, OEM CD):

Manufacturer:

Version:

Language version (English, Arabic, Chinese (Simplified)):

Service Pack Level or Kernel Revision:

Distribution (OEM/Retail):
 =====

Intel® RAID Controller: (Example SRCU42E)

RAID controller part number (PBA number):

RAID controller firmware version:

Has the latest RAID firmware been tried? (Yes/No):

RAID driver version:

Has the latest RAID driver been tried? (Yes/No):

RAID volumes configuration (disks & RAID level):

RAID volume use (Boot device/Data Volume):

Is BBU (Battery Backup Unit) installed? (Yes/No):

BBU part number:

Detailed description of issue:

Troubleshooting tried:

Steps to replicate the issue:

=====
Issue impact statements:

Do you have any potential Intel system, or component purchases that this issue is holding up? If yes, please provide a brief description below.

Do you have systems already purchased that are not being delivered to your customers because of this issue? If yes, please provide a brief description below.

Have you returned systems or components to your place of purchase because of this issue? If yes, please provide a brief description below.

*All other brands and names are property of their respective owners.

Appendix C: Getting Help

If you encounter an issue with your server system, follow these steps to obtain support:

1. Visit the following Intel support web page:
<http://support.intel.com/support/motherboards/server>
This web page provides 24x7 support when you need it to get the latest and most complete technical support information on all Intel Enterprise Server and Storage Platforms. Information available at the support site includes:
 - Latest BIOS, firmware, drivers and utilities
 - Product documentation, installation and quick start guides
 - Full product specifications, technical advisories and errata
 - Compatibility documentation for memory, hardware add-in cards, chassis support matrix and operating systems
 - Server and chassis accessory parts list for ordering upgrades or spare parts
 - A searchable knowledgebase to search for product information throughout the support site
2. If you are still unable to obtain a solution to your issue, send an email to Intel's technical support center using the online form available at <http://supportmail.intel.com/scripts-emf/welcome.aspx>
3. Lastly, you can contact an Intel support representative using one of the support phone numbers available at <http://support.intel.com/support/9089.htm> (charges may apply). Intel customer support suggests filling out the issue report form available at “[Intel® Server Issue Report Form](#)” on page 41 to better service the issue.
Intel also offers Channel Program members around-the-clock 24x7 technical phone support on Intel® server boards, server chassis, server RAID controller cards, and Intel® Server Management at <http://www.intel.com/reseller/>.

Note: You will need to log in to the Reseller site to obtain the 24x7 number.

Warranty Information

To obtain warranty information, visit the following Intel web site:

<http://www.intel.com/support/motherboards/server/sb/CS-010807.htm>

Appendix D: Regulatory and Compliance Information

Product Regulatory Compliance

Product Safety Compliance

The Intel® Server Board S3420GPRX complies with the following safety requirements:

- UL60950-1 - CSA 60950-1 (USA / Canada)
- EN60950-1 (Europe)
- IEC60950-1 (International)
- CB Certificate & Report, IEC60950-1 (report to include all country national deviations)
- CE-Low Voltage Directive 2006/95/EC (Europe)
- BSMI Declaration of Conformity (Taiwan)

Product EMC Compliance - Class A Compliance

Note: *Legally this product is required to comply with Class A emission requirements because it is intended for a commercial type market place. Intel targets 10db margin to Class A Limits.*

The Intel® Server Board S3420GPRX has been tested and verified to comply with the following electromagnetic compatibility (EMC) regulations when installed a compatible Intel® host system. For information on compatible host system(s) see Intel's Server Builder Web site or contact your local Intel representative.

- FCC / ICES-003 - Emissions (USA/Canada) Verification
- CISPR 22 - Emissions (International)
- EN55022 - Emissions (Europe)
- EN55024 - Immunity (Europe)
- CE - EMC Directive 2004
- AS/NZS CISPR 22 Emissions (Australia / New Zealand)
- BSMI CNS13438 Emissions (Taiwan)
- CC MIC Notice No. 1997-41 (EMC) & 1997-42 (EMI) (Korea)

Certifications / Registrations / Declarations

- CB Certification (International)
- UL Certification (US/Canada)
- CE Declaration of Conformity (CENELEC Europe)
- FCC/ICES-003 Class A Attestation (USA/Canada)
- C-Tick Declaration of Conformity (Australia/New Zealand)
- BSMI Declaration of Conformity (Taiwan)
- KCC Certification (Korea)
- Ecology Declaration (International)






Product Regulatory Compliance Markings

This product is marked with the following Product Certification Markings:

Table 9. Product Certification Markings

Regulatory Compliance	Region	Marking
UL Mark	USA/Canada	
CE Mark	Europe	
EMC Marking (Class A)	Canada	CANADA ICES-003 CLASS A
BSMI Marking (Class A)	Taiwan	 D33025 <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>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</p> </div>

Table 9. Product Certification Markings

Regulatory Compliance	Region	Marking
Ctick Marking	Australia / New Zealand	 N232
RLL MIC Mark	Korea	 See the regulatory information document for additional information.
Recycling Package Mark	China	
Recycling Package Mark	Other than China	
RoHS	China	

Electromagnetic Compatibility Notices

FCC (USA)

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

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

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

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

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

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

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

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

ICES-003 (Canada)

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

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

Europe (CE Declaration of Conformity)

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

BSMI (Taiwan)

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

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

KCC (Korea)



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

English translation of the notice above:

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

Restriction of Hazardous Substances (RoHS) Compliance

Intel has a system in place to restrict the use of banned substances in accordance with world wide product ecology regulatory requirements. Suppliers Declarations of Conformity to the banned substances must be obtained from all suppliers; and a Material Declaration Data Sheet (MDDS) must be produced to illustrate compliance. Due verification of random materials is required as a screening / audit to verify suppliers declarations.

- All materials, parts and subassemblies must not contain restricted materials as defined in Intel's Environmental Product Content Specification of Suppliers and Outsourced Manufacturers – <http://supplier.intel.com/ehs/environmental.htm>
- Europe - European Directive 2002/95/EC
 - Restriction of Hazardous Substances (RoHS)
 - Threshold limits and banned substances are noted below.
 - ◇ Quantity limit of 0.1% by mass (1000 PPM) for:
Lead, Mercury, Hexavalent Chromium, Polybrominated Biphenyls Diphenyl Ethers (PBB/PBDE)
 - ◇ Quantity limit of 0.01% by mass (100 PPM) for Cadmium
- China RoHS (MII Measure 39)
Product marked with the Environmental Friendly Usage Period (EFUP) label of 20yrs, substance table in Simplified Chinese either placed with the product documentation or separate insert.
- WEEE Directive (2002/96/EC)
- All plastic parts that weigh >25gm shall be marked with the ISO11469 requirements for recycling. Example >PC/ABS<
- EU Packaging Directive (94/62/EC)
- CA. Lithium Perchlorate insert
 - Perchlorate Material: Special handling may apply.
See www.dtsc.ca.gov/hazardouswaste/perchlorate

This notice is required by California Code of Regulations, Title 22, Division 4.5, Chapter 33: Best Management Practices for Perchlorate Materials. This product/part includes a battery which contains Perchlorate material.

End-of-Life / Product Recycling

Product recycling and end-of-life take-back systems and requirements vary by country. Contact the retailer or distributor of this product for information about product recycling and / or take-back.

Appendix E: Troubleshooting

This chapter helps you identify and solve problems that might occur while you are using the system.

For any issue, first ensure you are using the latest firmware and files. Firmware upgrades include updates for BIOS, the baseboard management controller (BMC), and the hot-swap controller (HSC). See [“Additional Information and Software”](#) for a link to the software updates. In addition to the server firmware and files, also update any drivers used for components you installed in your system, such as video drivers, network drivers, and SCSI drivers.

Intel provides a package called the "Platform Confidence Test" that may help with your diagnostics. See [“Additional Information and Software”](#) for a link to this software.

If you cannot resolve your server problems on your own, see [“Getting Help”](#) for assistance.

System Boot Quiet Time

The power-on self test (POST) process includes a quiet time, during which the system may appear to be hung. This may last as long as 20 seconds. Do not power off or reboot the system during this time. The POST LEDs will indicate activity—they may alternate blinking between amber and green. When the quiet time completes, the status LED will change to solid green.

Resetting the System

Before going through in-depth troubleshooting, attempt first to perform reset your system using one of the methods below.

Table 10. Resetting the System

To do this	Press
Soft boot reset to clear the system memory and reload the operating system	<Ctrl+Alt+Del>
Clear system memory, restart POST, and reload the operating system	Reset button
Cold boot reset. Turn the system power off and then on. This clears system memory, restarts POST, reloads the operating system, and halts power to all peripherals	Power off/on button

Problems following Initial System Installation

Problems that occur at initial system startup are usually caused by an incorrect installation or configuration. Hardware failure is a less frequent cause. If the problem you are experiencing is with a specific software application, see [“Problems with Newly Installed Application Software”](#).

First Steps Checklist

- Is AC power available at the wall outlet?
- Are the power supplies plugged in? Check the AC cable(s) on the back of the chassis and at the AC source.
- Are all cables correctly connected and secured?
- Are the processors fully seated in their sockets on the server board?
- Are all standoffs in the proper location and not touching any components, causing a potential short?
- Are all add-in PCI boards fully seated in their slots on the server board?
- Are all jumper settings on the server board correct?
- Are all jumper and switch settings on add-in boards and peripheral devices correct? To check these settings, refer to the manufacturer's documentation that comes with them. If applicable, ensure that there are no conflicts—for example, two add-in boards sharing the same interrupt.
- Are all peripheral devices installed correctly?
- If the system has a hard disk drive, is it properly formatted or configured?
- Are all device drivers properly installed?
- Are the configuration settings made in Setup correct?
- Is the operating system properly loaded? See the operating system documentation.
- Did you press the system power on/off switch on the front panel to turn the server on (power on light should be lit)?
- Is the system power cord properly connected to the system and plugged into a NEMA 5 15R outlet for 100-120 V or a NEMA 6-15R outlet for 200-240 V?
- Are all integrated components from the tested components lists? Check the tested memory, and chassis lists, as well as the supported hardware and operating system list. See [“Additional Information and Software”](#) for links to the tested component lists.

Hardware Diagnostic Testing

This section provides a more detailed approach to identifying a hardware problem and locating its source.

Caution: *Turn off devices before disconnecting cables: Before disconnecting any peripheral cables from the system, turn off the system and any external peripheral devices. Failure to do so can cause permanent damage to the system and/or the peripheral devices.*

1. Turn off the system and all external peripheral devices. Disconnect each device from the system, except for the keyboard and the video monitor.
2. Make sure the system power cord is plugged into a properly grounded AC outlet.
3. Make sure your video display monitor and keyboard are correctly connected to the system. Turn on the video monitor. Set its brightness and contrast controls to at least two thirds of their maximum ranges (refer to the documentation supplied with your video display monitor).
4. If the operating system normally loads from the hard disk drive, make sure there is no diskette in drive A and no CD-ROM disk in the CD-ROM drive.
5. If the power LED does light, attempt to boot from a floppy diskette or from a CD-ROM disk.
6. Turn on the system. If the power LED does not light, see [“Power Light Does Not Light”](#).

Verifying Proper Operation of Key System Lights

As POST determines the system configuration, it tests for the presence of each mass storage device installed in the system. As each device is checked, its activity light should turn on briefly. Check for the following:

- Does the diskette drive activity light turn on briefly? If not, see [“Drive Activity Light Does Not Light”](#).
- If system LEDs are illuminated, see [“Make sure the BIOS is configured to allow the CD-ROM to be the first bootable device.”](#) for a description of the light and steps to take to correct the problem.

Confirming Loading of the Operating System

Once the system boots up, the operating system prompt displays on the screen. The prompt varies according to the operating system. If the operating system prompt does not display, see [“No Characters Display on Screen”](#).

Specific Problems and Corrective Actions

This section provides possible solutions for these specific problems:

- Power light does not light.
- No characters appear on screen.
- Characters on the screen appear distorted or incorrect.
- System cooling fans do not rotate.
- Hard disk drive activity light does not light.
- Optical drive activity light does not light.
- There are problems with application software.
- The bootable CD-ROM is not detected.

Try the following solutions in the order given. If you cannot correct the problem, contact your service representative or authorized dealer for help.

Power Light Does Not Light

Check the following:

- Did you press the power-on button?
- Is the system operating normally? If so, the power LED might be defective or the cable from the control panel to the server board might be loose.
- Have you securely plugged the server AC power cord into the power supply?
- Some ATX power supplies have a power switch on the back of the power supply, next to the fan. If your system has one, is it turned on?
- Remove all add-in cards and see if the system boots. If successful, add the cards back in one at a time with a reboot between each addition.
- Make sure the memory DIMMs comply with the system requirements.
- Make sure the memory DIMMs were populated according to the system requirements.
- Remove the memory DIMMs and re-seat them.
- Make sure the processor(s) comply with the system requirements.
- Make sure the processor(s) were populated according to the system requirements.
- Remove the processor(s) and re-seat them.
- Make sure the chassis standoffs are installed only below mounting holes. Misplaced standoffs can contact the pins on the bottom of the server board and cause a short.

No Characters Display on Screen

Check the following:

- Is the keyboard functioning? Test it by turning the “Num Lock” function on and off to make sure the Num Lock light is functioning.
- Is the video monitor plugged in and turned on? If you are using a switch box, is it switched to the correct system?
- Are the brightness and contrast controls on the video monitor properly adjusted?
- Is the video monitor signal cable properly installed?
- Does this video monitor work correctly if plugged into a different system?
- Is the onboard video controller enabled in the BIOS?
- Remove all add-in cards and see if the video returns. If successful, add the cards back in one at a time with a reboot between each addition.
- Make sure the memory DIMMs comply with the system requirements.
- Make sure the memory DIMMs were populated according to the system requirements.
- Remove the memory DIMMs and re-seat them.
- Make sure the processor(s) comply with the system requirements.
- Make sure the processor(s) were populated according to the system requirements.
- Remove the processor(s) and re-seat them.

If you are using an add-in video controller board, do the following:

1. Verify that the video works using the onboard video controller.
2. Verify that the video controller board is fully seated in the server board connector.
3. Reboot the system for changes to take effect.
4. If there are still no characters on the screen after you reboot the system and POST emits a beep code, write down the beep code you hear. This information is useful for your service representative.
5. If you do not receive a beep code and characters do not appear, the video display monitor or video controller may have failed. Contact your service representative or authorized dealer for help.

Characters Are Distorted or Incorrect

Check the following:

- Are the brightness and contrast controls properly adjusted on the video monitor? See the manufacturer's documentation.
- Are the video monitor's signal and power cables properly installed?
- Does this video monitor work correctly if plugged into a different system?

System Cooling Fans Do Not Rotate Properly

If the system cooling fans are not operating properly, it is an indication of possible system component failure.

Check the following:

- Is the power-on light lit? If not, see “[Power Light Does Not Light](#)”.
- If your system has LED lights for the fans, is one or more of these LEDs lit?
- Are any other control panel LEDs lit?
- Have any of the fan motors stopped? Use the server management subsystem to check the fan status.
- Have your fans speeded up in response to an overheating situation?
- Have your fans speeded up in response to a fan that has failed?
- Are the fan power connectors properly connected to the server board?
- Is the cable from the control panel board connected to the both the control panel board and to the server board?
- Are the power supply cables properly connected to the server board?
- Are there any shorted wires caused by pinched-cables or have power connector plugs been forced into power connector sockets the wrong way?

Drive Activity Light Does Not Light

Check the following:

- Are the diskette drive's power and signal cables properly installed?
- Are all relevant switches and jumpers on the diskette drive set correctly?
- Is the diskette drive properly configured?
- Is the diskette drive activity light always on? If so, the signal cable may be plugged in incorrectly.

If you are using the onboard diskette controller, use the BIOS setup to make sure that “Onboard Floppy” is set to “Enabled.” If you are using an add-in diskette controller, make sure that “Onboard Floppy” is set to “Disabled”.

CD-ROM Drive or DVD-ROM Drive Activity Light Does Not Light

Check the following:

- Are the CD-ROM/DVD-ROM drive's power and signal cables properly installed?
- Are all relevant switches and jumpers on the drive set correctly?
- Is the drive properly configured?

Cannot Connect to a Server

- Make sure the network cable is securely attached to the correct connector at the system back panel.
- Try a different network cable.
- Make sure you are using the correct and the current drivers. See [“Additional Information and Software”](#) for a link to the current drivers.
- Make sure the driver is loaded and the protocols are bound.
- Make sure the hub port is configured for the same duplex mode as the network controller.
- Make sure the correct networking software is installed.
- If you are directly connecting two servers (without a hub), you will need a crossover cable.
- Check the network controller LEDs next to the NIC connectors.

Problems with Network

The server hangs when the drivers are loaded

- Certain drivers may require interrupts that are not shared with other PCI drivers. For these drivers, it may be necessary to alter settings so that interrupts are not shared. See the documentation that came with your PCI card(s) for information on changing interrupts.

Diagnostics pass but the connection fails

- Make sure the network cable is securely attached.
- Make sure you specify the correct frame type in your NET.CFG file.
- The controller stopped working when an add-in adapter was installed.
- Make sure the cable is connected to the port from the onboard network controller.
- Make sure your BIOS is current. See [“Additional Information and Software”](#) for a link to the current version.
- Make sure the other adapter supports shared interrupts. Make sure your operating system supports shared interrupts.
- Try reseating the add-in adapter.

The controller stopped working when an add-in adapter was installed

- Make sure the cable is connected to the port from the on-board network controller.
- Make sure your BIOS is current. Refer to the [“Additional Information and Software”](#) for a link to the current version.

- Make sure the other adapter supports shared interrupts. Make sure your operating system supports shared interrupts.
- Try reseating the add-in adapter.

The add-in adapter stopped working without apparent cause

- Try reseating the adapter first; then try a different slot if necessary.
- The network driver files may be corrupt or deleted. Delete and then reinstall the drivers.
- Run the diagnostics.

System Boots when Installing PCI Card

System Server Management features require full-time “standby” power. This means some parts of the system have power going to them whenever the power cord is plugged in, even if you have turned the system power off with the power button on the front panel. If you install a PCI card with the AC power cord plugged in, a signal may be sent to command the system to boot. Before installing a PCI card, you should always:

- Turn off the server power by using the power button on the front of the system.
- Unplug the AC power cord(s) from the server.

Problems with Newly Installed Application Software

Problems that occur when you run new application software are usually related to the software, not the server hardware. Faulty equipment is unlikely, especially if other software runs correctly.

Check the following:

- Make sure the system meets the minimum hardware requirements for the software. See the software documentation.
- Make sure the software is properly installed and configured for the system. See the software documentation.
- Use only an authorized copy. Unauthorized copies often do not work.
- If you are running the software from a floppy disk, CD-ROM or DVD-ROM, try a different disk.
- Make sure the correct device drivers installed.

If the problems persist, contact the software vendor's customer service representative.

Problems with Application Software that Ran Correctly Earlier

Problems that occur after the system hardware and software have been running correctly sometimes indicate equipment failure. However, they can also be caused by file corruption or changes to the software configuration.

Check the following:

- If you are running the software from a floppy disk, CD-ROM or DVD-ROM, try a different disk.
- Check your system for a virus infection.
- Uninstall and reinstall the software. Make sure all necessary files are installed.
- If the problems are intermittent, there may be a loose cable, dirt in the keyboard (if keyboard input is incorrect), a marginal power supply, or other random component failures.
- If you suspect that a transient voltage spike, power outage, or brownout might have occurred, reload the software and try running it again. Symptoms of voltage spikes include a flickering video display, unexpected system reboots, and the system not responding to user commands.

Note: *Random errors in data files: If you are getting random errors in your data files, they may be getting corrupted by voltage spikes on your power line. If you are experiencing any of the above symptoms that might indicate voltage spikes on the power line, you may want to install a surge suppressor between the power outlet and the system power cord.*

Devices are not Recognized under Device Manager (Microsoft Windows* Operating System)

The Microsoft Windows* operating systems do not include all of the drivers for the Intel® chipsets, onboard NICs, and other components. See [“Additional Information and Software”](#) for a link to the current drivers and chipset files.

Hard Drive(s) are not Recognized

Check the following:

- Make sure the drive is not disabled in the BIOS Setup.
- Make sure the drive is connected correctly and that is plugged into the power supply.
- Make sure the drive is compatible. See [“Additional Information and Software”](#) for a link to the tested drives.
- Make sure you have not exceeded the power budget for the server. See [“Additional Information and Software”](#) for a link to software to check your power budget.
- If using SCSI drives, verify that each SCSI ID number is unique on the SCSI bus. Refer to your drive documentation for details on setting the SCSI ID for your drives.

- If using ATA drives, verify the master/slave settings are set correctly. Refer to your drive documentation for details on setting the master/slave settings.
- If using a RAID configuration with SCSI or SATA drives, make sure the RAID card is installed correctly.

Bootable CD-ROM Disk Is Not Detected

Check the following:

- Make sure the BIOS is configured to allow the CD-ROM to be the first bootable device.

LED Information

The Intel® Server Board S3420GP includes LEDs that can aid in troubleshooting your system. The following table lists these LEDs and provides a description of their use.

Table 11. LED Information

LED Name	Function	Location	LED Color	Notes
ID	Aid in server identification from the back panel	Front panel and board rear left corner	Blue	Press ID LED button or use Server Management software to turn the LED on and off.
System Fault	Visible fault warning	Front panel and board rear left corner	Green or Amber	<ul style="list-style-type: none"> • On = No Fault • Green Blink = degraded • Amber = non-critical
Disk Activity	Front panel	Front panel and board left side	Green	Blinking = Activity. No action required.
POST Code 1-8	Display boot 80 POST code	Left rear of board	Each LED can be Off, Green, Amber, or Red	See the POST code table.
5-V Standby	Identify 5-V standby power on state	Front left board	Amber	On = 5-V standby power on
Power LED	Identify the power state of the system	Front panel	Green	<ul style="list-style-type: none"> • Off = Power is off (off or S5) • On = Power on or S0) • Slow Blink = Low power state (S1 - S3)

BIOS POST Beep Codes

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

Table 12. POST Error Beep Codes

Number of Beeps	Reason for Beeps and Action to Take
3	System halted because a fatal error related to the memory was detected.

In the case of POST error(s) that are listed as Major, the BIOS enters the error manager and waits for the user to press an appropriate key before booting the operating system or entering the BIOS Setup.

The user can override this option by setting the POST Error Pause option as disabled on the BIOS setup Main screen. If this option is disabled, the system boots the operating system without user intervention. The default is disabled.