Intel® Workstation Board S5520SC
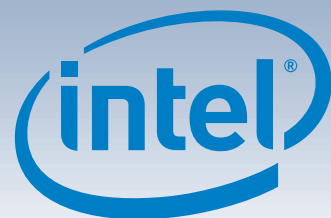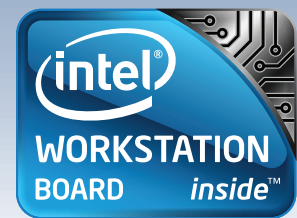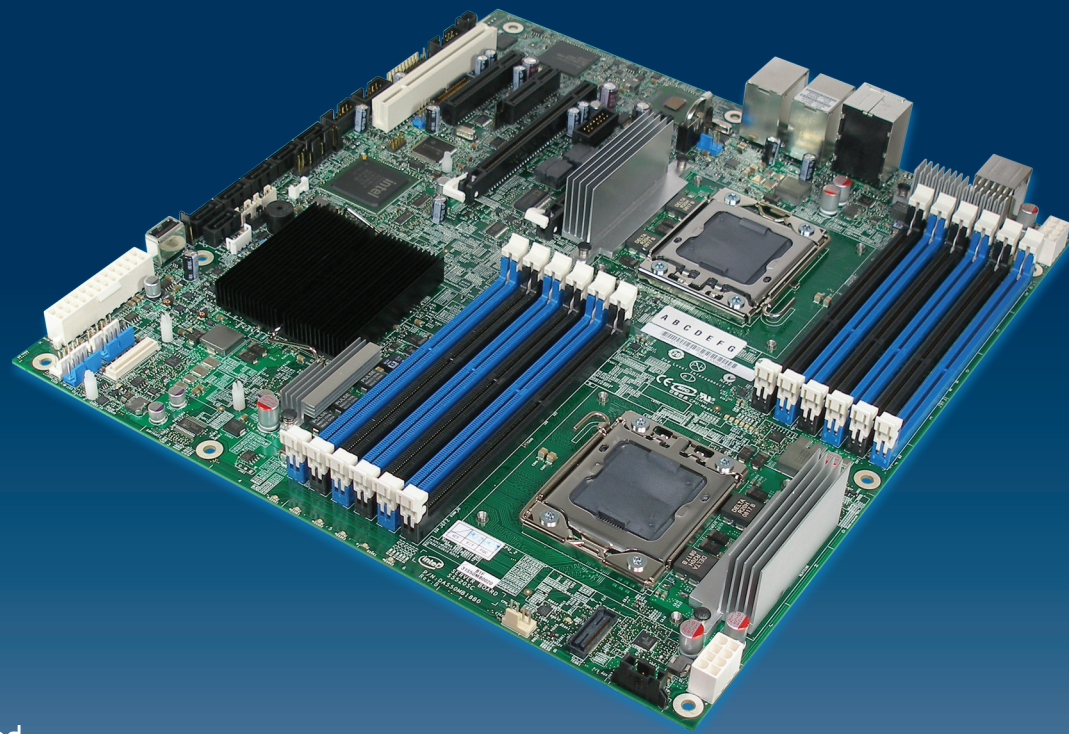# Quick Start User's Guide

Thank you for buying the Intel® Workstation Board S5520SC. The following information will help you integrate your new server board into a server chassis. The Intel® Workstation Board S5520SC is designed for use with the Intel® Server Chassis SC5600Base and the Intel® Server Chassis SC5650WS.

For details on these chassis or to select a third-party chassis, please visit:
http://support.intel.com/support/motherboards/server.

When installing the server board into a reference chassis, refer to the reference chassis instructions.

Service Guides are also available on the CDs that accompanied your Intel® Workstation Board S5520SC.

If you are not familiar with ESD (Electrostatic Discharge) procedures used during system integration, please see the Intel® Workstation Board S5520SC Service Guide, available on the Intel® Server Deployment Toolkit 3.0 CD or at http://support.intel.com/support/motherboards/server/S5520SC/manual.htm

WORKSTATION BOARD inside™

E39546-009

Minimum Hardware Requirements

To avoid integration difficulties and possible board damage, your system must meet the following minimum requirements:

- Processor: Minimum of one Intel® Xeon® Processor 5500 Series or one Intel Xeon Processor 5600 Series.
  - Supports maximum 95 watt processor in the Intel® Server Chassis SC5600Base.
  - Supports maximum 130 watt processor in the Intel® Server Chassis SC5650WS.
- Heat Sink(s): Minimum of one active heat sink for the Intel® Server Chassis SC5600Base and SC5650WS.
- Memory Type: Minimum of one 1 GB, 240-pin, RDIMM or UDIMM, DDR3-800, DDR3-1066, or DDR3-1333.
- AC Power: SSI EPS 12V compliant power supply. Recommended minimum of 670 Watts with 3 A of standby current, or calculate your system power demand with the power budget tool.

For a complete list of compatible processors, heat sinks, and memory, see: http://support.intel.com/support/motherboards/server/s5520SC/

⚠ CAUTION:	In the Intel® Server Chassis SC5600Base	In the Intel® Server Chassis SC5650WS
Supported Processor	Maximum 95 watt processor	Maximum 130 watt processor
Supported Graphics Card	One maximum 150 watt graphics card in PCI Express* Slot 6	ONE maximum 300 watt graphics card in PCI Express* Slot 6 or TWO maximum 150 watt graphics cards. Empty PCI Express* Slot 3 when a graphics card is installed in PCI Express* slot 4.

NOTE: Graphics cards with power greater than 75 W must be self-cooled with exhaust out the back of the chassis.

1 — Preparing the Chassis

Observe normal ESD (Electrostatic Discharge) procedures.

Place your Intel® Server Chassis on a flat anti-static surface to perform the following integration procedures. Observe ESD procedures before reaching inside to make server board connections or install components.

2 — Installing the I/O Shield and Attach I/O Labels

Prepare the I/O shield

Do not remove the three circular knockouts that are at the edge next to the openings for the NIC, USB, Serial A, and 1394 ports. Use caution so you do not deform the shield.

Attach the Labels to the I/O Shield

Note: Make sure you install the labels on the correct side of the I/O shield. Note the orientation of the cutouts in the drawing before attaching your labels.

A. Remove the backing from the I/O shield labels included with your server board.
B. Press each label onto the I/O shield as shown.

Labels on outside face of I/O shield

Install the I/O shield

Shield installs from **inside** of chassis. The labels should be visible from the outside of the chassis.

A. Insert one side edge of shield as shown.
B. Push shield firmly into chassis opening until it clicks into place.

Chassis Back Panel Opening

Intel® Server Chassis SC5650WS shown

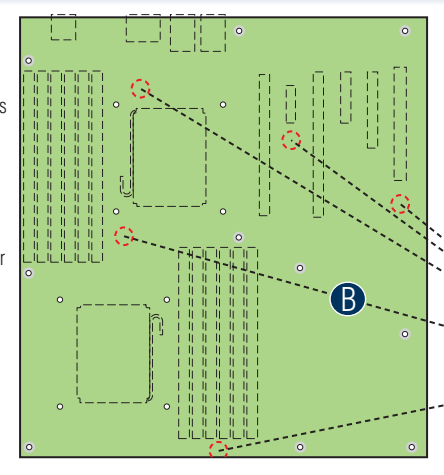## 3 — Install Workstation Board Bumpers

NOTE: If you are using an Intel® Server Chassis you must install the chassis bumpers included with the chassis. Refer to your Intel® Workstation Board and Intel® Server Chassis Quick-Start User's Guide for proper bumper installation guidelines. If you are using a non-Intel server chassis that includes bumpers, refer to the non-Intel server chassis documentation for the correct bumper installation procedure. If the non-Intel server chassis does not include bumpers, then you should consult with the chassis vendor to determine whether bumpers are required or not.

Prepare Workstation Board

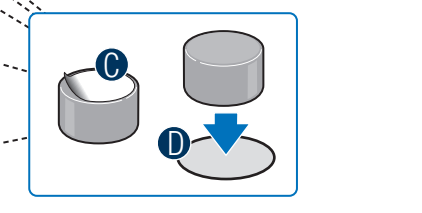A. Rotate board to show underside and hold upright as shown.

⚠ CAUTION: To avoid damage to the board, do not lay flat with the component side down.

B. Locate the five circles as shown.

Attach the Bumpers

C. Remove the backing from each bumper.
D. Press a bumper onto each of the five circles.

Tools Required

#2 Phillips* screwdriver — Anti-static wrist strap

4 — Install the Workstation Board

IMPORTANT NOTE: If you are using a non-Intel server chassis, see your chassis documentation for preparatory steps prior to server board installation.
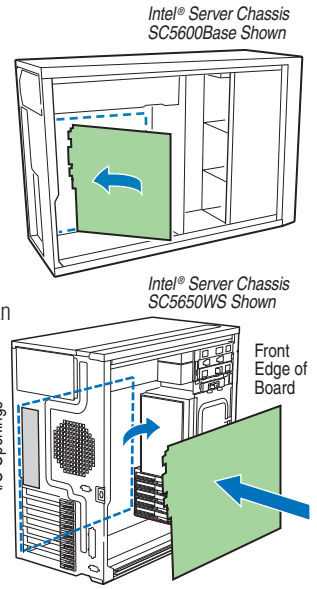
A. Insert Workstation Board

Place the board into the chassis, making sure that back panel I/O openings and chassis standoffs align correctly.

- When using the Intel® Server Chassis SC5600Base, remove the rear chassis fan and then insert the I/O connector side (back) of the board first.
- When using the Intel® Server Chassis SC5650WS, remove the front drive bay and rear chassis fan, and then insert the front of the board first. Slide the board back so the I/O connectors fit through the I/O shield.

Intel® Server Chassis SC5600Base Shown

Intel® Server Chassis SC5650WS Shown

Front Edge of Board

I/O Openings

B. Attach the Workstation Board

The Intel® Server Chassis SC5600Base and the Intel® Server Chassis SC5650WS use different screws to attach the workstation board to the chassis. Use the screws indicated for your chassis. *For a non-Intel server chassis, use the fasteners that came with your chassis.*

- Intel® Server Chassis SC5600Base: Attach the board to the chassis at the nine locations indicated by the solid blue arrows in the figure [◄] and at the one location indicated by the solid red arrow [◄].
- Intel® Server Chassis SC5650WS: Push down firmly to engage the snap-top standoffs at the location indicated by the solid red arrow [◄]. Use screws to attach the board to the chassis at the nine locations indicated by the solid blue arrows [◄].

Intel® Server Chassis SC5600Base — Intel® Server Chassis SC5650WS
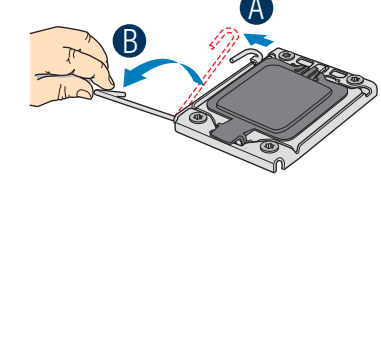
5a — Install the Processor(s)

Cautions:

⚠ 1. When opening a socket, DO NOT TOUCH the gold socket wires.

⚠ 2. When unpacking a processor, hold by the edges only to avoid touching the gold contact wires.
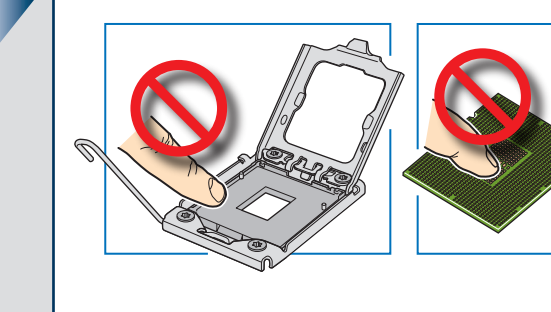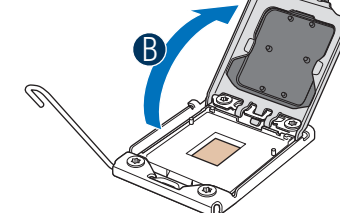
A. Open the Socket Lever

A. Push the lever handle down and away from the socket to release it.
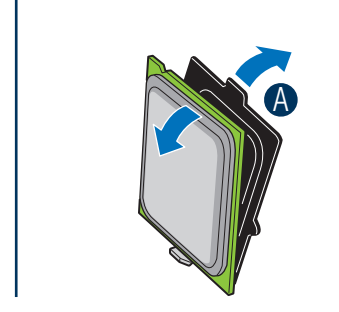B. Rotate the lever open all the way.

B. Open the Load Plate

A. Push the rear tab with your finger tip to bring the front end of the load plate up slightly.
B. Open the load plate as shown.

C. Remove the Processor Protective Cover

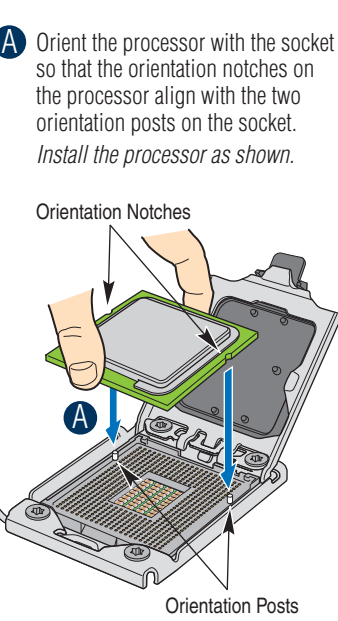A. Take the processor out of the box and remove the protective shipping cover.

## 5b — Install the Processor(s) … *continued*

D. Install the Processor

⚠ CAUTION: The underside of the processor has components that may damage the socket wires if installed improperly.

Orientation Notches

Components

Processor must align correctly with the socket opening before installation.

DO NOT DROP processor into the socket!

A. Orient the processor with the socket so that the orientation notches on the processor align with the two orientation posts on the socket. *Install the processor as shown.*

Orientation Posts

E. Close Load Plate and Socket Lever

A. Close the load plate all the way as shown.
B. Close the socket lever.
C. Remove the protective cover after it been automatically disengaged from the load plate.
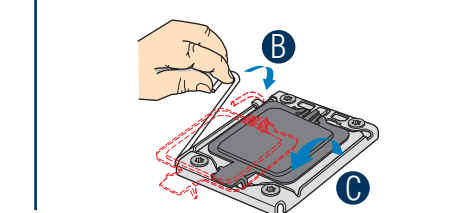
6 — Make Workstation Board Power Connections

A. Attach auxiliary power signal connector to the workstation board.
B. Attach the CPU 1 power connector to the workstation board.
C. Attach the CPU 2 power connector to the workstation board.
D. Attach the main power connector to the workstation board.

⚠ CAUTION: Note the location of the latch on each power cable connector and align it with the matching tab on each workstation board socket.

IMPORTANT NOTE: If you are using a non-Intel server chassis with an ATX power supply, see the documentation that came with your chassis for installation information.

Main Power Connector Detail

CPU Power Connector Detail — Latch — Tab

Auxiliary Signal Power Detail
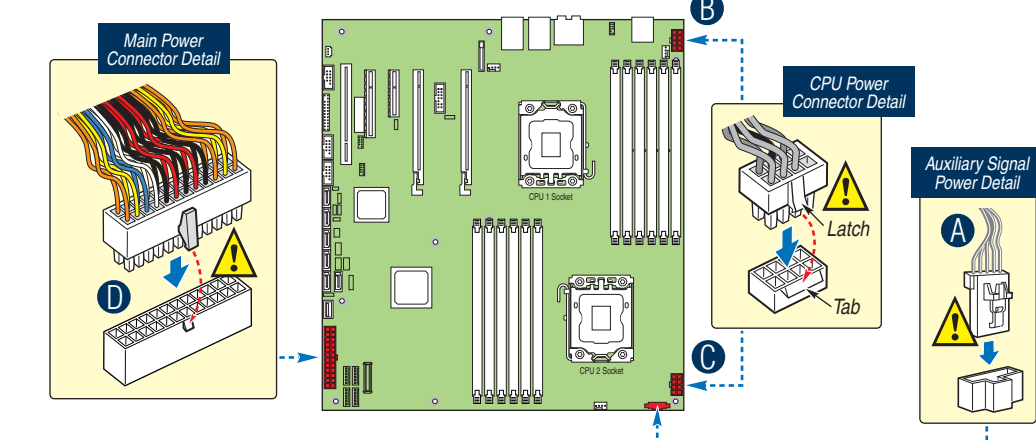
7 Install DIMM Memory Modules

DDR3 DIMM Memory Identification:

⚠ The Intel® Workstation Board S5520SC supports up to 12 DDR3-800/1066/1333 RDIMMS orUDIMMS.

Mixing of RDIMMs and UDIMMs is not supported.

DIMM notch and socket bump must align as shown.

DDR3

Memory Configurations and Population Order:
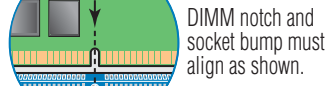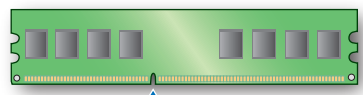
- Minimum of one 1 GB DDR3-800/1066/1333 RDIMM or UDIMM.
- Install from first slot of each channel (A1, B1, C1, D1, E1, or F1).
- Install Quad-Rank DIMM from first slot of each channel.
- Channel D, E, and F are not available when CPU 2 socket is empty.
- Mixing memory type, size, speed and/or rank on this platform has not been validated and is not supported.
- Mixing memory vendors is not supported on this platform by Intel®.
- Non-ECC memory is not supported and has not been validated in a server environment.

DIMM A2
DIMM A1
DIMM B2
DIMM B1
DIMM C2
DIMM C1
DIMM D2
DIMM D1
DIMM E2
DIMM E1
DIMM F2
DIMM F1
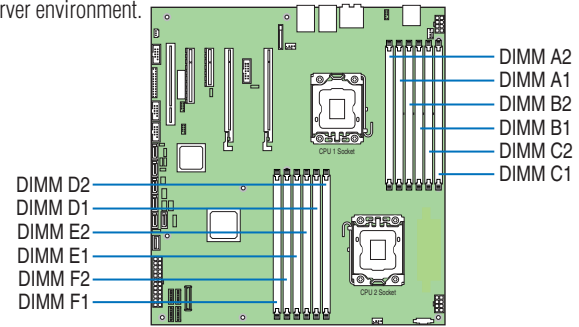
To Install DIMMs:

⚠ CAUTION: Avoid touching contacts when handling or installing DIMMs.

A. Open both DIMM socket levers.
B. Note location of alignment notch.
C. Insert DIMM making sure the connector edge of the DIMM aligns correctly with the slot.
D. Push down firmly on the DIMM until it snaps into place and both levers close.
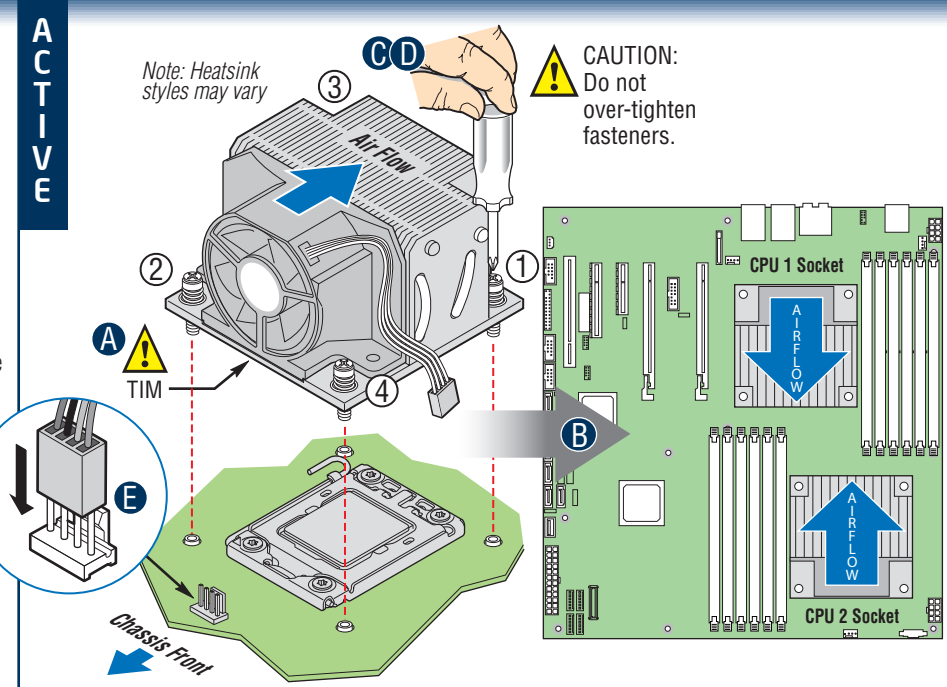E. IMPORTANT! Visually check that each latch is fully closed and correctly engaged with each DIMM edge slot.
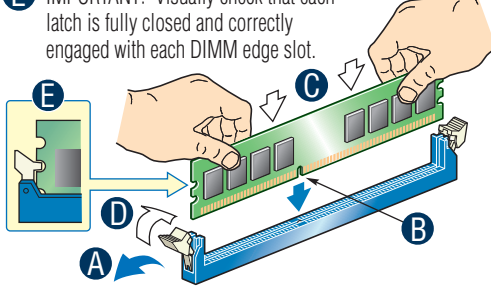
8 Install Heat Sink(s)

ACTIVE

Active processor heat sink(s) is required in the Intel® Server Chassic SC5600Base and SC5650WS.

*For a non-Intel chassis, see the documentation accompanying your chassis.*

⚠ CAUTION: The heat sink has thermal interface material (TIM) on the underside of it. Use caution so that you do not damage the thermal interface material. *Use gloves to avoid sharp edges.* A second heat sink is required for a second processor.

A. If a protective film covers the thermal interface material (TIM) on the underside of the heatsink, remove the protective film.
B. Align active heat sinks in the Intel® Server Chassis SC5600Base and SC5650WS to let air flow go through to the center of the board.
C. Using a #2 Phillips* screwdriver, finger-tighten each fastener diagonally, according to the white-circled numbers.
D. Securely re-tighten each fastener again in the same order as performed in Step C.
E. Attach active heatsink fan power cable to server board as shown.

Note: Heatsink styles may vary

⚠ CAUTION: Do not over-tighten fasteners.

TIM
Air Flow
AIRFLOW
AIRFLOW
CPU 1 Socket
CPU 2 Socket
Chassis Front

## 9 Install Optical Drive and Hard Drive(s)

See the documentation that came with your server chassis for drive installation.
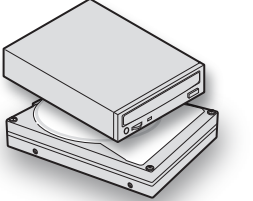
10 Install (Optional) RAID 5 Activation Key/Connect (Optional) SGPIO Cable/Connect Hard Drives/Optical Drive to Workstation Board
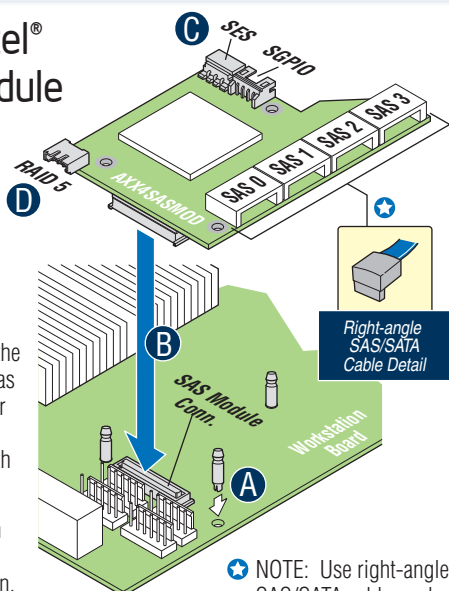
A. (Optional) Install optional RAID 5 activation key (AXXRAKSW5) on on-board RAID 5 key connector as shown.
B. (Optional) Connect the SGPIO cable to the workstation board SGPIO connector as shown. Connect the other end of the SGPIO cable to the hot-swap hard disk backplane if installed.
C. Connect SATA data cables to the workstation board as shown.
✿ Begin cable connections at the SATA 0 location.

Workstation Board
RAID 5 Key
SGPIO
SATA Data Cable Connector
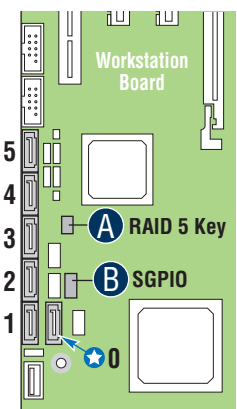
11 (Optional) Install Intel® SAS Entry RAID Module AXX4SASMOD

A. Insert the three snap-standoffs into the matching holes in the workstation board.
B. Attach the AXX4SASMOD module to the workstation board SAS module connector. *Press firmly to engage the snap standoffs.*
C. (Optional) Connect SES or SGPIO cable to the matching connector on the AXX4SASMOD as shown. Connect the other end of the SES or SGPIO cable to the hot-swap hard disk backplane if installed. DO NOT connect both cables to the AXX4SASMOD SAS module.
D. (Optional) Install optional RAID 5 Activation Key (AXXRAKSW5) to the AXX4SASMOD SAS module RAID 5 key connector as shown.

SES SGPIO
SAS 0 SAS 1 SAS 2 SAS 3
RAID 5
AXX4SASMOD
SAS Module Connector
Workstation Board
Right-angle SAS/SATA Cable Detail

✿ NOTE: Use right-angle SAS/SATA cables only

12 Attach Intrusion Switch Cable Accompanying Your Chassis (for Non-Intel Chassis)

Note: For a non-Intel chassis, see your chassis documentation for intrusion switch requirements.
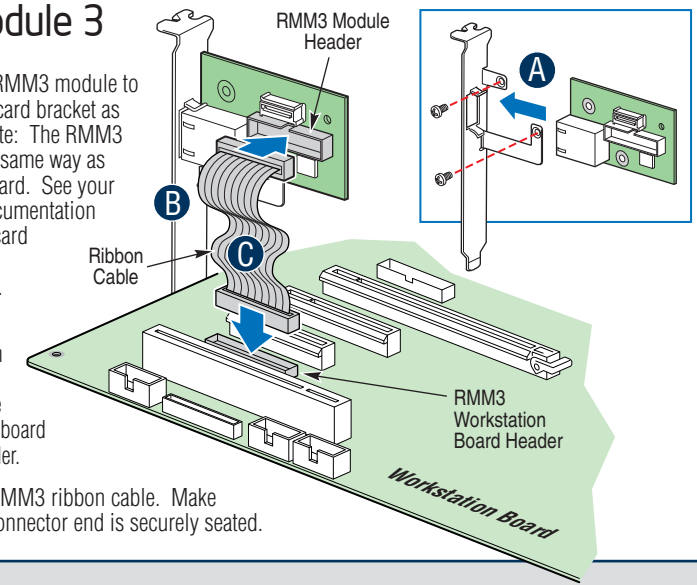
Workstation Board
Intrusion
Intrusion Switch Connector
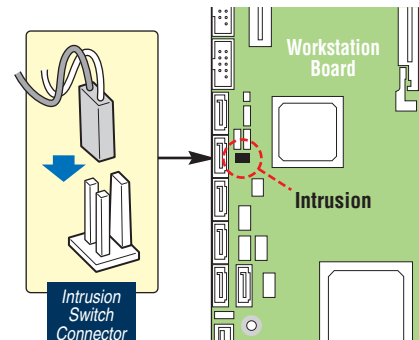
13 Attach Front Panel, Serial, and USB Connections

Note: For a non-Intel chassis, see your chassis documentation for intrusion switch requirements.

Workstation Board
Serial B
Front Panel
USB
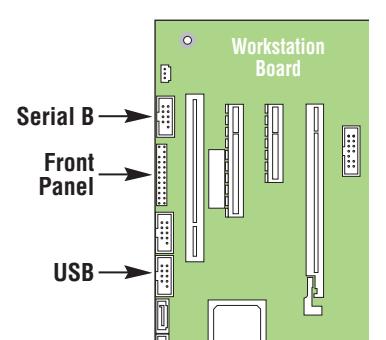
14 (Optional) Install Intel® Remote Management Module 3

A. Attach the RMM3 module to the add-in card bracket as shown. Note: The RMM3 installs the same way as an add-in card. See your chassis documentation for add-in card installation procedures.
B. Install the RMM3 in an add-in card slot near the workstation board RMM3 header.
C. Attach the RMM3 ribbon cable. Make sure each connector end is securely seated.

RMM3 Module Header
Ribbon Cable
RMM3 Workstation Board Header
Workstation Board

IMPORTANT NOTE: Return to your Intel® Server Chassis Quick Start User's Guide, or your non-Intel chassis documentation to finish installation and configuration of your Intel® Workstation Board S5520SC.

Return to this document to finish up, including software, BIOS, drivers and operating system installation.

15 Chassis Fan Connections

See the documentation accompanying your chassis for specific chassis fan connection requirements. For a non-Intel server chassis, see "Making Connections ... Quick Reference" below and see the Intel® Workstation Board S5520SC Service Guide.

Attach system fans with 3, 4, or 6-pin connectors here.

CPU 1 Socket
CPU 2 Socket
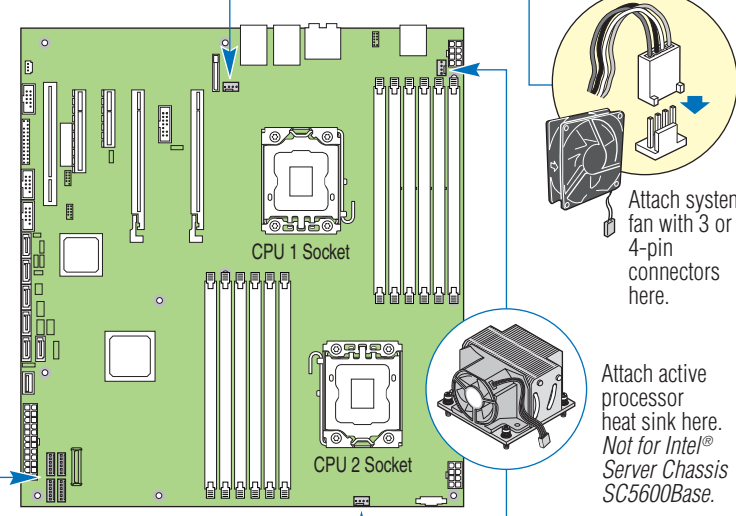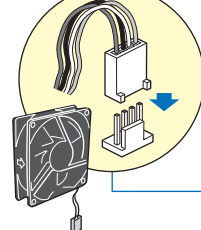
Attach system fan with 3 or 4-pin connectors here.

Attach active processor heat sink here. Not for Intel® Server Chassis SC5600Base.

16 Install Add-in Cards

See the documentation that came with your server chassis for add-in card installation.

For the Intel® Server Chassis SC5600 and the SC5650, see the Quick Start User's Guide accompanying the chassis.
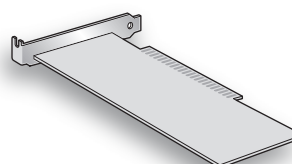
17 Finishing Up

Before installing your operating system, you must finish your chassis installation, make I/O connections and plug in AC power.

Network
NIC1 10/100/1000 Mb
NIC2 10/100/1000 Mb
1394
Serial A
Audio
USB
USB
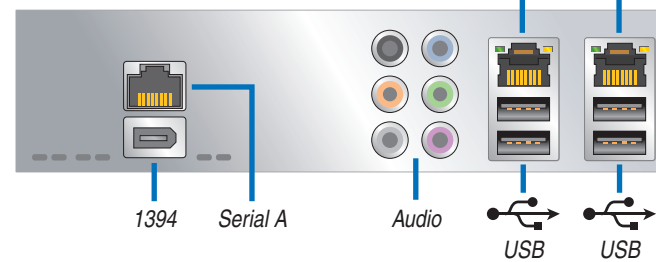
⚠ CAUTION: See your chassis documentation for AC power and grounding requirements.

18 Software • BIOS, Firmware, Drivers, and Operating System Installation

A. Confirm BIOS Version: Confirm BIOS, BMC, and FRUSDR Versions. Look on the Server/System Management screen in the BIOS Setup Utility to determine the installed BIOS, BMC firmware, and FRUSDR version. Compare these to the versions at: http://support.intel.com/support/motherboards/server/S5520SC/

If new versions are available, see the Intel® Workstation Board S5520SC Week Technical Update to update the BIOS, BMC, and FRUSDR on your server.

B. Configure your RAID Controller: Use the instructions provided with the RAID controller.

C. Install your Operating System: Use the instructions provided with the RAID controller and with the operating system.

D. Install Operating System Drivers: With the operating system running, insert the Intel® Server Deployment Toolkit 3.0 CD, which comes with the production version of the Intel® Workstation Board S5520SC. If using a Microsoft Windows* operating system, the Intel® Deployment Assistant (in the Deployment Toolkit 3.0 CD) will autorun and allow you to select the appropriate drivers to install. On other operating systems, browse the CD folders to locate and install the driver files.

Common Problems and Solutions

For a list of hardware components that have been tested with this system, see: http://support.intel.com/support/motherboards/server/s5520sc/

The system does not boot or show video at power-on:
- Check that all processor power connectors are plugged-in. Without these connections, the server cannot boot.
- Beep code 3 means you have bad memory; replace the faulty DDR3 DIMM(s).
- Remember, all DIMMs must be:
  - DDR3 800/1066/1333-compliant, 240-pin DIMMs.
  - No mixing of DDR3 RDIMMs and UDIMMs.
  - Installed beginning with first slot of each channel.
  - Install Quad-Rank DIMM from first slot of each channel.

The system sometimes works, but is exhibiting erratic behavior.
- This is probably the result of using an underrated power supply.

Making Connections to the Workstation Board
Quick Reference
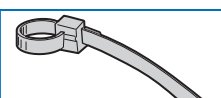
IMPORTANT Note: Cables should be tied for better airflow. Use cable-ties as necessary.
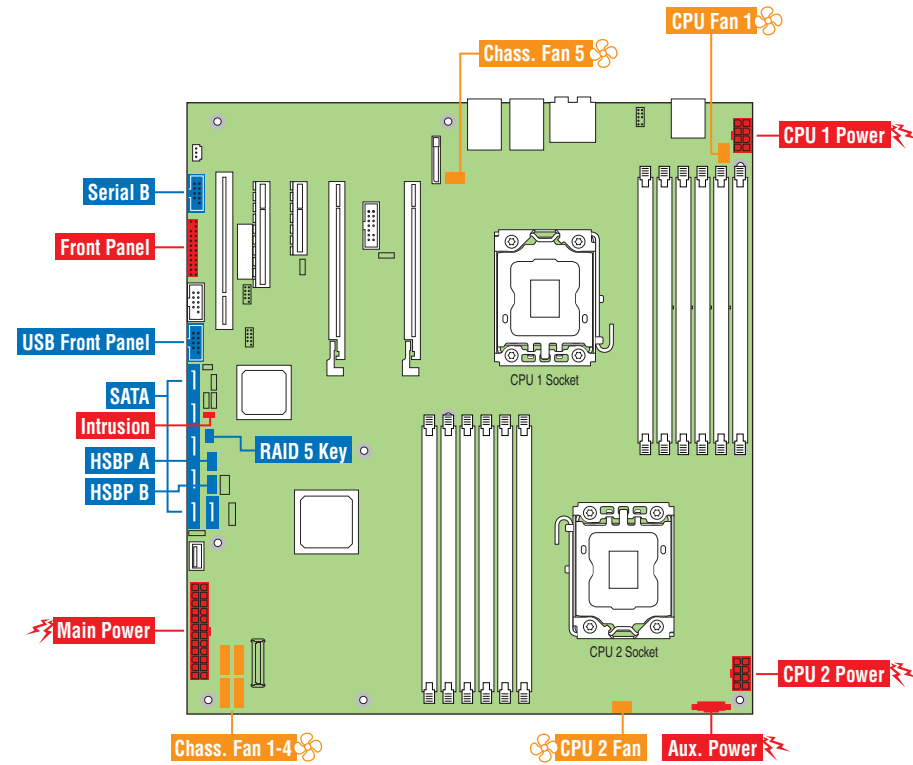
Note: Not all optional connections are shown in this diagram. Refer to the Reference section of this Quick Start User's Guide, your Intel® Workstation Board S5520SC Service Guide, and your server chassis documentation for additional connection information.

Required Connections	Intel® Server Chassis **SC5600Base**	Intel® Server Chassis **SC5650WS**
CPU 1 Power Connector	■	■
CPU 2 Power Connector	■	■
Main Power Connector	■	■
Auxiliary Power Connector	■	■
Front Panel Connector	■	■

CPU/System Fan Connections	Intel® Server Chassis **SC5600Base**	Intel® Server Chassis **SC5650WS**
CPU Fan 1 Connector	■	■
CPU Fan 2 Connector	■	■
Chassis Fan 1 Connector	■	■
Chassis Fan 2 Connector	■	■
Chassis Fan 3 Connector	■	■
Chassis Fan 4 Connector	■	■
Chassis Fan 5 Connector	■	■

Optional Connections	Intel® Server Chassis **SC5600Base**	Intel® Server Chassis **SC5650WS**
HSBP_A	■	■
HSBP_B	■	■
USB_Front Panel	■	■
SATA Connectors	■	■
SATA Software RAID 5 Key	■	■
SAS Module SAS Connectors *(optional)*		
Serial B	■	■
SATA SGPIO	■	■
SAS Module SES *(optional)*	■ Either SAS SES or SGPIO	■ Either SAS SES or SGPIO
SAS Module SGPIO *(optional)*	■ Either SAS SES or SGPIO	■ Either SAS SES or SGPIO
SAS Software RAID 5 Key *(optional)*	■	

Note: For a non-Intel chassis, see your chassis documentation for workstation board connection information.

CPU Fan 1
Chass. Fan 5
CPU 1 Power
Serial B
Front Panel
USB Front Panel
SATA
Intrusion
HSBP A
HSBP B
RAID 5 Key
CPU 1 Socket
CPU 2 Socket
Main Power
Chass. Fan 1-4
CPU 2 Fan
CPU 2 Power
Aux. Power

Intel® Workstation Board S5520SC Component Layout

Note: Refer to the Technical Product Specification for Diagnostic LED decoder list.

S/PDIF Header
Serial B Header
Front Panel Header
CMOS Clear
ME Force Update
Password Clear
Intrusion
BMC Force Update
Main Power
Sys Fan 3
Sys Fan 1
Sys Fan 2
Sys Fan 4

Slot 1 (32bit/33MHz PCI, 5V)
PCI Express* Gen2 x16 (slot 4, 6)
NIC 2 USB 0 USB 1
NIC 1 USB 2 USB 3
Audio
Serial A
1394
Battery
Sys Fan 5
ID LED
Status LED
Diagnostic LEDs
MSB
ICH10
Internal Video
HDD Activity LED
USB SSD
BIOS Recover
SATA RAID 5 Key
SATA 4
SATA 5
SATA 3
SATA 2
HSBP B
SATA 1
SATA 0
HSBP A
SATA
LCP/IPMB
IOH
SAS Module Slot
CPU 1 Fan
CPU 1 Socket
CPU 2 Socket
CPU 2 Fan
CPU 2 Power
Aux Pwr Signal

See your Intel® Workstation Board S5520SC Service Guide for expanded component and connection information.

Accessories and Order Codes

Intel® Remote Management Module 3	AXXRMM3
Intel® SAS Entry RAID Module	AXX4SASMOD
Intel® RAID Activation Key (SATA / SAS Software RAID 5)	AXXRAKSW5
Intel® Server Chassis SC5600Base	SC5600Base
Intel® Server Chassis SC5650WS	SC5650WS
Video Cable Kit for Intel® Workstation Board S5520SC on-board Video	FXXSCVDCBL

A complete list of accessories and spares can be found in the Intel® Workstation Board S5520SC Configuration Guide.

Available Documents

Document Type	Content
Technical Product Specification	In-depth technical information
Spares and Configuration Guide	Supported accessories and spares list
Server Configurator Tool	Tested peripherals and operating systems list, Tested memory list, Supported processors list
Software and Drivers	Up-to-date firmware, driver and utility information

Additional Reference documents available at: http://support.intel.com/support/motherboards/server/S5520SC/