

# Intel<sup>®</sup> Server Board X38ML User Guide

A Guide for Technically Qualified Assemblers of Intel<sup>®</sup> Identified Subassemblies/Products

Intel Order Number E17594-004

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# Safety Information

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## 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 2.0 CD* and/or at <http://support.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 2.0 CD* oder unter <http://support.intel.com/support/motherboards/server/sb/cs-010770.htm>.

## Consignes de sécurité

Lisez attentivement 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 2.0 CD* ou bien rendez-vous sur le site <http://support.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 2.0 CD* y/o en <http://support.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/或 <http://support.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.



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# Preface

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## About this Manual

Thank you for purchasing and using the Intel® Server Board X38ML.

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 X38ML. For the latest version of this manual, see <http://support.intel.com/support/motherboards/server/X38ML/>.

## Manual Organization

Chapter 1 provides a brief overview of the Server Board X38ML. 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 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 the battery, among other components.

Chapter 3 provides instructions on using the utilities that are shipped with the board or that may be required to update the system. This includes how to navigate through the BIOS Setup screens, how to perform a BIOS update, and how to 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.

Appendix A 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.

Appendix B provides information on obtaining help with the board.

Appendix C gives an overview of regulatory and compliance information.

## Product Accessories

This server board is compatible with the Intel® Server System SR1520ML.

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

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

For information about which accessories, memory, processors, and third-party hardware have been tested and can be used with your board, and for ordering information for Intel products, see <http://support.intel.com/support/motherboards/server/X38ML/>.

## 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://support.intel.com/support/motherboards/server/X38ML/>.

**Table 1. Additional Information and Software**

<b>For this information or software</b>	<b>Use this Document or Software</b>
For in-depth technical information about this product, including BIOS settings and chipset information	Intel® Server Board X38ML Technical Product Specification
If you just received this product and need to install it	Intel® Server Board X38ML Quick Start User's Guide in the product box
Accessories or other Intel server products	Spares and Configuration Guide
Hardware (peripheral boards, adapter cards) and operating systems that have been tested with this product	Tested Hardware and Operating Systems List
Chassis that have been tested with this product	Reference Chassis List
Processors that have been tested with this product	Supported Processors
DIMMs that have been tested with this product	Tested Memory List

**Table 1. Additional Information and Software**

<b>For this information or software</b>	<b>Use this Document or Software</b>
To make sure your system falls within the allowed power budget	Power Budget Tool
For software to manage your Intel® server	Intel® System Management Software 2.0
For drivers	Search for the word “driver” (for an extensive list of available drivers) Search for “operating system driver” (for operating system drivers)
For firmware and BIOS updates, or for BIOS recovery	Firmware Updates
For diagnostics test software	Diagnostics. See also the <i>Intel® Server Deployment Toolkit 2.0 CD</i> that came with your server board.



# 1 Server Board Features

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This chapter briefly describes the main features of the Intel® Server Board X38ML, and provides a list of the server board features and diagrams, showing the location of important components and connections on the server board.

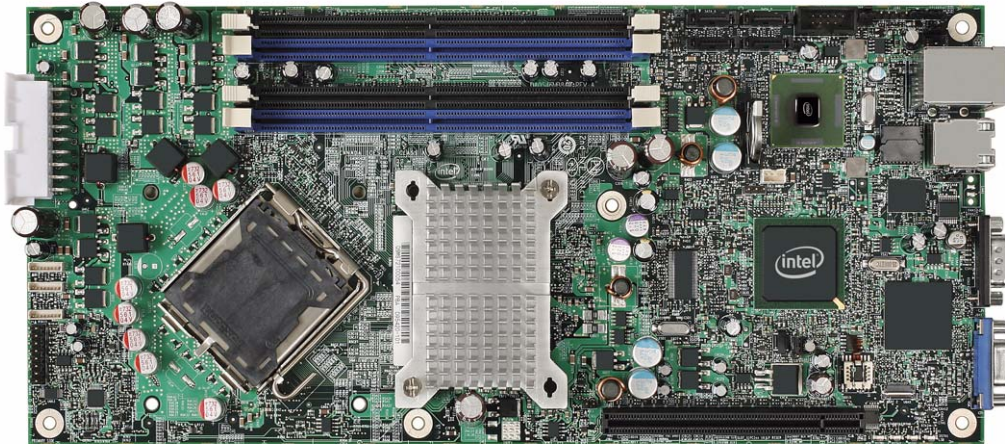


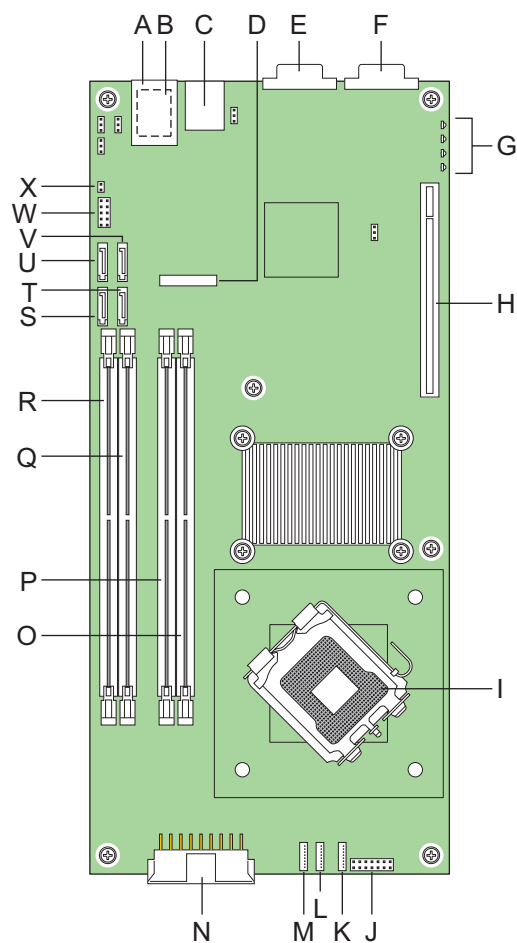
Figure 1. Intel® Server Board X38ML

Table 2 summarizes the features of the server board.

**Table 2. Server Board Features**

Feature	Description
Processor	Processor and Front Side Bus (FSB) support <ul style="list-style-type: none"> <li>• You can install one processor on each server board. For supported Intel processors, see <a href="http://support.intel.com/support/motherboards/server/X38ML">http://support.intel.com/support/motherboards/server/X38ML</a></li> <li>• Supports 800 / 1066 / 1333 MHz FSB</li> </ul>
Memory	<ul style="list-style-type: none"> <li>• Four DIMM sockets per server board supporting stacked DDR2 667 / 800 MHz ECC unbuffered memory or non-ECC memory</li> <li>• Each server board has two memory channels with two DIMM sockets per channel</li> <li>• Support for up to 8 GB of total system memory on each server board</li> </ul>
Intel® X38 chipset	Intel® X38 chipset on each server board, consisting of: <ul style="list-style-type: none"> <li>• Intel® X38 Memory Controller Hub (MCH)</li> <li>• Intel® I/O Controller Hub (ICH9R)</li> </ul>
Expansion capabilities	One low-profile PCI Express* x16 riser card connector on each server board. Each supports one low-profile x1, x4, x8, or x16 adapter.
Video	Each server board has an on-board video controller with 32 MB DDR2 667 video memory
Hard drive	<ul style="list-style-type: none"> <li>• Four SATA 3.0 Gb/s ports per server board.</li> </ul>
USB	<ul style="list-style-type: none"> <li>• Two external USB 2.0 ports on the rear I/O panel</li> <li>• Two internal USB 2.0 headers</li> </ul>
LAN	<ul style="list-style-type: none"> <li>• Dual gigabit Ethernet device that connects to the PCI Express* interface on the ICH9R</li> <li>• Two 10 / 100 / 1000 Base-TX interfaces through RJ45 connectors on the rear I/O panel</li> </ul>
Floppy drive	USB external floppy drive may be attached
CD-ROM / DVD-ROM drive	USB external CD-ROM / DVD-ROM drive may be attached
Server Management	Intel® System Management Software 2.0

## Connector and Header Locations

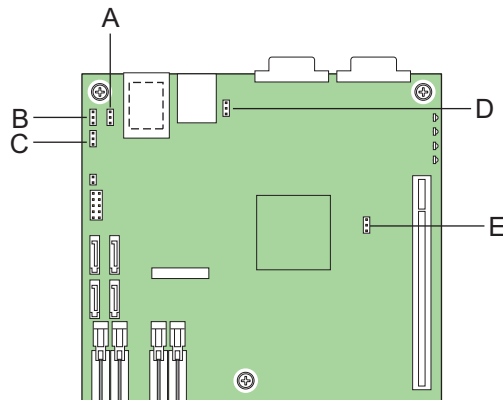


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A. NIC1 RJ45 connector (top)	I. Processor socket	Q. DIMM socket B1
B. USB port 0 (bottom) USB port 1 (center)	J. Front panel connector	R. DIMM socket B2
C. NIC2 RJ45 connector	K. System fan 3	S. SATA port 0
D. CMOS battery	L. System fan 2	T. SATA port 1
E. Serial A DB9 connector	M. System fan 1	U. SATA port 2
F. VGA connector	N. Main power connector	V. SATA port 3
G. POST LEDs	O. DIMM socket A1	W. USB header for USB 2 and 3
H. PCI Express* x16 riser slot	P. DIMM socket A2	X. Chassis intrusion header

**Figure 2. Server Board Connector and Header Locations**

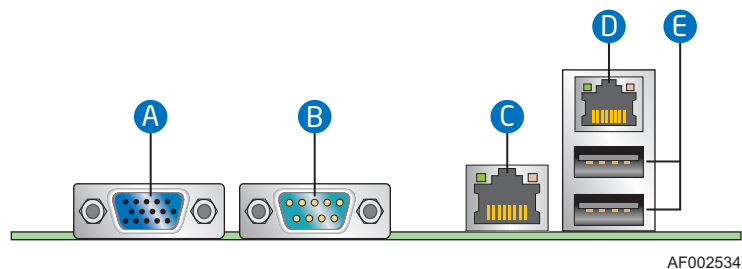
# Configuration Jumpers



Callout	Location	Jumper Name	Jumper Purpose
A	J1A4	iBMC Boot Block Write Protect	When pins 2-3 are jumpered, the iBMC boot block is write enabled. When pins 1-2 are jumpered, the iBMC boot block is write protected. Pins 1-2 should be jumpered for normal operation.
B	J1A2	BIOS Recovery Mode	When pins 2-3 are jumpered, the BIOS will be recovered on the next boot. Pins 1-2 should be jumpered for normal operation.
C	J1A3	CMOS Clear	When pins 2-3 are jumpered, the CMOS settings will be cleared on the next boot. Pins 1-2 should be jumpered for normal operation.
D	J3A1	iBMC Force Update Mode	When pins 2-3 are jumpered, the iBMC firmware will be updated on the next boot. Pins 1-2 should be jumpered for normal operation.
E	J6B1	Password Clear	When pins 2-3 are jumpered, the administrator and user passwords will be reset on the next boot. Pins 1-2 should be jumpered for normal operation.

**Figure 3. Configuration Jumpers**

# Back Panel Connectors



A. Video connector	D. NIC 1 (10 / 100 / 1000 Mb)
B. Serial port	E. USB ports 0-1
C. NIC 2 (10 / 100 / 1000 Mb)	

**Figure 4. Back Panel Connectors**

The NIC LEDs at the right and left of each NIC provide the following information.

**Table 3. NIC LEDs**

LED	LED State	Description
Left	Off	No network connection
	Solid Green	Network connection in place
	Blinking Green	Transmit/receive activity
Right	Off	10 Mbps connection (if <b>left</b> LED is on or blinking)
	Solid Green	100 Mbps connection
	Solid Amber	1000 Mbps connection

## Hardware Requirements

To avoid integration difficulties and possible board damage, your system must meet the requirements outlined below. For a list of qualified components, see the links under "[Additional Information and Software.](#)"

## Processor

Each server board must have one processor installed. Each board can use a different processor. For a list of supported Intel processors, see <http://support.intel.com/support/motherboards/server/X38ML>.

## Memory

Each server board supports four DDR2 667 / 800 MHz unbuffered ECC or non-ECC DIMMs. The maximum memory capacity is 8 GB memory. The minimum is one 256 MB DIMM. The four slots are partitioned into Channel A and Channel B. Channel A consists of DIMM A1 and DIMM A2. Channel B consists DIMM B1 and DIMM B2. DIMM A1 is the closest to the MCH.

DIMMs must meet the following requirements:

- If dual-channel operation is desired, Channel A and Channel B must be populated identically (i.e., same capacity).
- Use DDR2 667 / 800 only.
- The speed used on all the channels is the slowest DIMM in the system.
- Use ECC or non-ECC DIMMs.
- You can mix different memory technologies (size and density).
- For single-channel mode, either channel may be used and DIMM sockets within the same channel can be populated in any order.
- For dual-channel interleaved mode, DIMM sockets may be populated in any order as long as the total memory in each channel is the same.
- For dual-channel asymmetric mode, DIMM sockets may be populated in any order.

For a complete list of supported memory DIMMs, see <http://support.intel.com/support/motherboards/server/X38ML>.

## Power Supply

A minimum of 270 Watts is required. The power supply must provide a minimum of 1.5A of 5V standby current or the board will not boot.

# 2 Hardware Installations and Upgrades

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**Caution:** *No components on the Intel® Server Board X38ML are hot swappable. Before removing or installing any component referenced in this document, you must first take the server out of service, turn off all peripheral devices connected to the system, turn off the system by pressing the power button(s), and unplug the AC power cord from the system or wall outlet.*

## 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
- Antistatic wrist strap and conductive foam pad (recommended)

## Installing and Removing Memory

The silkscreen on the board for the DIMMs displays DIMMB2, DIMMB1, DIMMA2, DIMMA1 starting from the edge of the board. DIMMA1 is the socket closest to the processor socket. See “[Memory](#)” on page 6 for a discussion of the memory requirements and options. See “[Additional Information and Software](#)” for a link to the list of tested DIMMs.

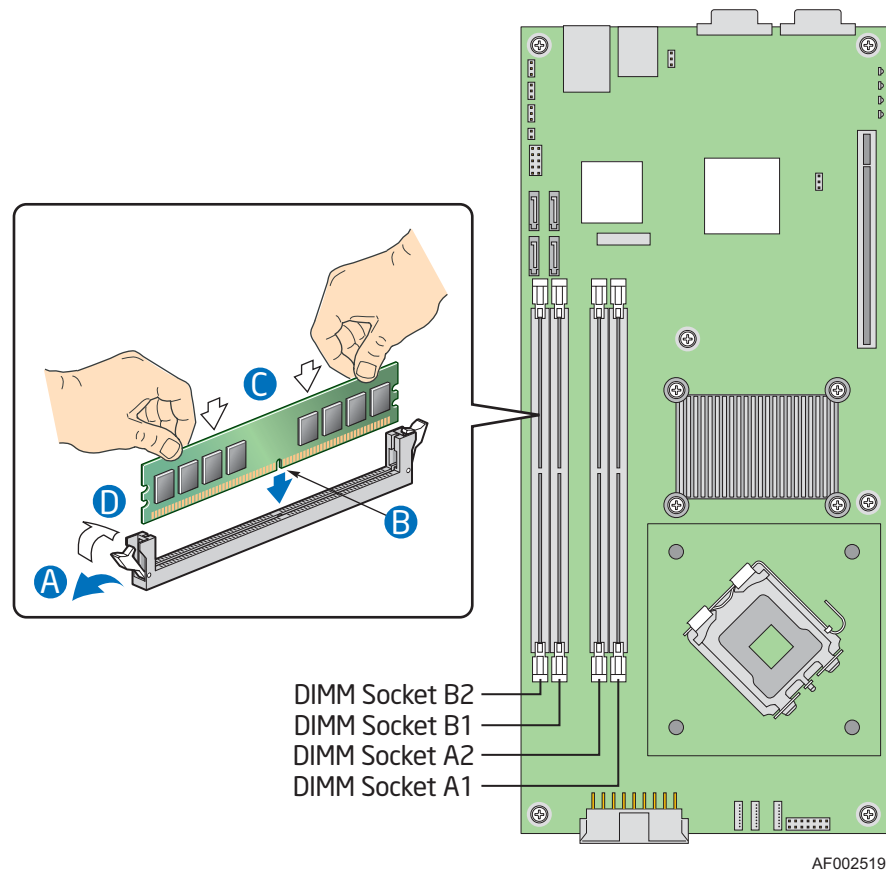
**Note:** *The DIMMs being installed match the correct version of the server board. DDR DIMMs will not physically fit into a server board designed to support DDR2 DIMMs. DDR2 DIMMs will not physically fit into a server board designed to support DDR DIMMs.*

## 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. Turn off the server.

3. Disconnect the AC power cord from the server.
4. Remove the server's cover and locate the DIMM sockets. See the documentation that came with your server chassis for instructions on removing the server's cover and accessing the DIMM sockets.
5. Make sure the clips at both ends of the DIMM socket(s) are pushed outward to the open position. See letter "A" in [Figure 5](#).
6. Holding the DIMM by the edges, remove it from its anti-static package.
7. Position the DIMM above the socket. Align the notch on the bottom edge of the DIMM with the key in the DIMM socket. See letter "B" in the figure.
8. Insert the bottom edge of the DIMM into the socket. See letter "C" in the figure.
9. When the DIMM is correctly positioned, push down on the top edge until the retaining clips snap into place. See letter "D" in the figure.
10. Close the clips and make sure they are firmly in place. See letter "D" in the figure.



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**Figure 5. Installing DIMMs**

11. Replace the server cover and reconnect the AC power cord. See the server chassis documentation for instructions on installing the 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. Turn off the server.
3. Remove the AC power cord from the server.
4. Remove the server's cover and locate the DIMM sockets. See the documentation that came with your server chassis for instructions on removing the server's cover and accessing the DIMM sockets.
5. Gently open the retaining clips at each end of the socket. See letter “A” in the following figure.
6. Holding the DIMM by the edges, lift it from the socket and store it in an anti-static package. See letter “B” in the figure.
7. Close the DIMM socket clips at each edge of the socket. See letter “C”.

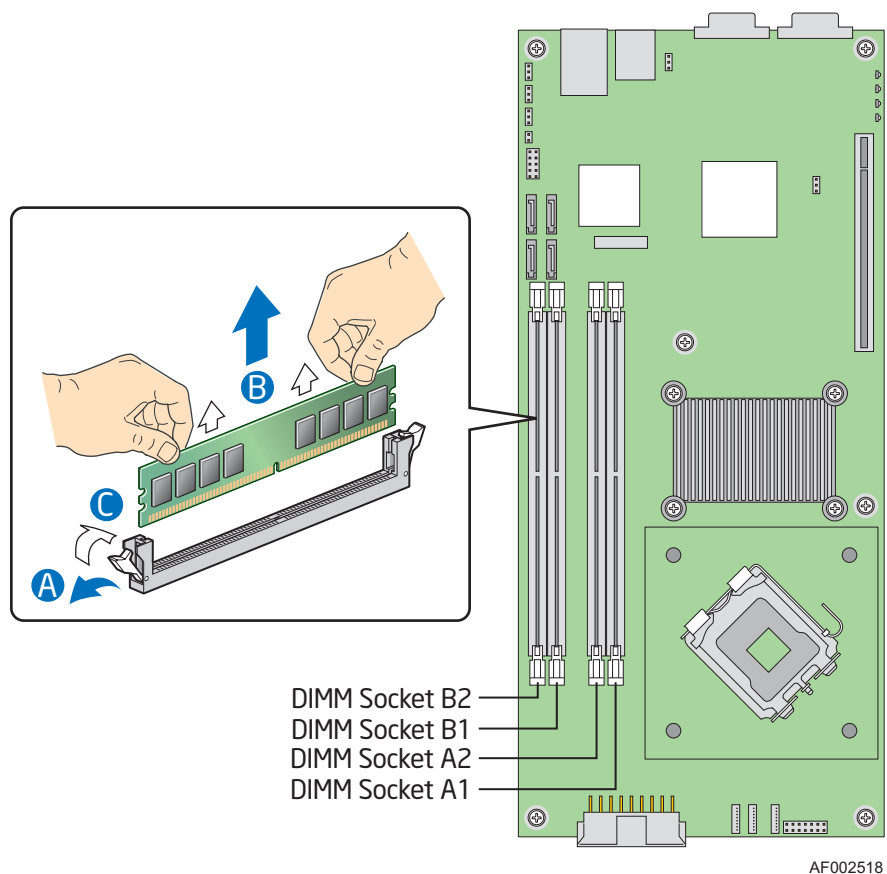


Figure 6. Removing DIMMs

8. Reinstall and reconnect any parts you removed or disconnected to reach the DIMM sockets. See your server system documentation for instructions.
9. Replace the server cover and reconnect the AC power cord. See the server chassis documentation for instructions on installing the cover.

## Replacing the Processor

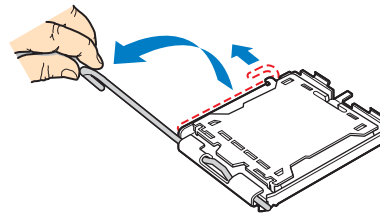
**Note:** *This manual assumes a processor is already installed and you are referring to these steps to replace your processor. If you are setting up this system for the first time, see the Quick Start User's Guide that was included in the product box.*

**Caution:** *Use only processors that have been validated to work with this server board. See “Additional Information and Software” on page xiv 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.*

## Removing the Heat Sink and Processor

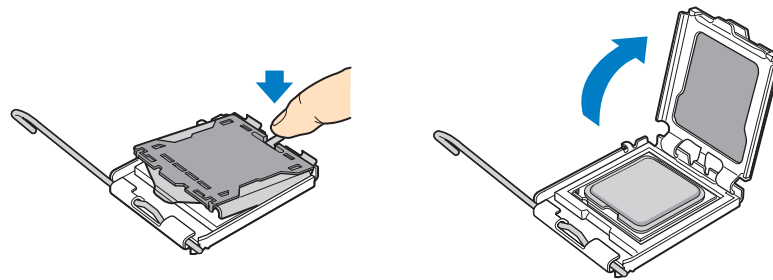
1. Observe the safety and ESD precautions at the beginning of this book. See “Safety Information” on page iii.
2. Turn off all peripheral devices connected to the server. Turn off the server.
3. Remove the AC power cord from the server.
4. Remove the server's cover and locate the DIMM sockets. See the documentation that came with your server chassis for instructions on removing the server's cover and accessing the processor socket.
5. Loosen the four captive screws on the corners of the heat sink.
6. Twist the heat sink slightly to break the seal between the heat sink and the processor.
7. Lift the heat sink from the processor. If it does not pull up easily, twist the heat sink again. Do not force the heat sink from the processor. Doing so could damage the processor.
8. Raise the processor socket handle completely. See the following figure.



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**Figure 7. Opening the Processor Socket Handle**

9. Push the rear tab with your finger to slightly lift the front of the load plate. Raise the load plate completely. Raise the CPU load plate. See the following figure.



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**Figure 8. Opening the Load Plate**

**Caution:** Do not touch the socket pins; they are very sensitive and easily damaged.

10. Lift the processor from the socket.





































































