

Intel® Desktop Board D5400XS Product Guide

Order Number: E24559-001

Revision History

Revision	Revision History	Date
-001	First release of the Intel® Desktop Board D5400XS Product Guide	January 2008

If an FCC declaration of conformity marking is present on the board, the following statement applies:

FCC Declaration of Conformity

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

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

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

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

Tested to comply with FCC standards for home or office use.

Canadian Department of Communications Compliance Statement

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe B prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

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Preface

This Product Guide gives information about board layout, component installation, BIOS update, and regulatory requirements for Intel® Desktop Board D5400XS.

Intended Audience

The Product Guide is intended for technically qualified personnel. It is not intended for general audiences.

Use Only for Intended Applications

All Intel Desktop Boards are evaluated as Information Technology Equipment (I.T.E.) for use in personal computers (PC) for installation in homes, offices, schools, computer rooms, and similar locations. The suitability of this product for other PC or embedded non-PC applications or other environments, such as medical, industrial, alarm systems, test equipment, etc. may not be supported without further evaluation by Intel.

Document Organization

The chapters in this Product Guide are arranged as follows:

- 1 Desktop Board Features: a summary of product features
- 2 Installing and Replacing Desktop Board Components: instructions on how to install the Desktop Board and other hardware components
- 3 Updating the BIOS: instructions on how to update the BIOS
- 4 Configuring for RAID: information about configuring your system for RAID
- A Error Messages and Indicators: information about BIOS error messages, beep codes, and POST codes
- B Regulatory Compliance: describes the board's adherence to safety standards and EMC regulations and its product certifications

Conventions

The following conventions are used in this manual:



CAUTION

Cautions warn the user about how to prevent damage to hardware or loss of data.



NOTE

Notes call attention to important information.

Terminology

The table below gives descriptions of some common terms used in the product guide.

Term	Description
GB	Gigabyte (1,073,741,824 bytes)
GHz	Gigahertz (one billion hertz)
KB	Kilobyte (1024 bytes)
MB	Megabyte (1,048,576 bytes)
Mb	Megabit (1,048,576 bits)
MHz	Megahertz (one million hertz)

Contents

1 Desktop Board Features

Desktop Board Components.....	11
Processors	13
Main Memory.....	13
Intel® 5400 Chipset.....	14
Audio Subsystem	14
LAN Subsystem	15
USB 2.0 Support.....	16
Hard Disk and Optical Disk Drive Support	16
Enhanced IDE Interface.....	16
Serial ATA	17
Disk Drive Access Indicator.....	18
Legacy I/O.....	18
Expandability.....	19
BIOS.....	19
Serial ATA and IDE Auto Configuration.....	19
PCI and PCI Express* Auto Configuration	19
Security Passwords.....	19
Hardware Management	20
Hardware Monitoring and Fan Speed Control	20
Intel® Precision Cooling Technology	20
Chassis Intrusion.....	20
Power Management.....	21
Software Support	21
ACPI.....	21
Hardware Support	21
Power Connectors	21
Fan Headers	22
LAN Wake Capabilities.....	22
Instantly Available PC Technology.....	23
+5 V Standby Power Indicator.....	23
Wake from USB	25
PME# Signal Wake-up Support.....	25
WAKE# Signal Wake-up Support	25
ENERGY STAR* Capable	25
Onboard Power and Reset Buttons.....	25
Onboard VR and CPU LEDs	27
Speaker.....	28
Battery	28
Real-Time Clock.....	28

2 Installing and Replacing Desktop Board Components

Before You Begin	29
Installation Precautions.....	30
Prevent Power Supply Overload	30
Observe Safety and Regulatory Requirements.....	30
Installing the I/O Shield	31

Installing and Removing the Desktop Board	32
Installing a Processor	33
Installing a Processor	33
Installing a Processor Fan Heat Sink	37
Installing an MCH Heat Sink Fan (Optional).....	38
Installing and Removing Memory.....	39
Installing DIMMs	39
Removing DIMMs.....	40
Installing a DIMM Cooling Fan (Recommended).....	41
Installing and Removing PCI Express x16 Cards	42
Installing a PCI Express x16 Card	42
Removing a PCI Express x16 Card	43
Installing Multiple Graphics Cards	44
Connecting the IDE Cable.....	44
Connecting the SATA Cables	46
Connecting to the Internal Headers and Connectors	47
HD Audio Link Header	48
S/PDIF Connector	48
Front Panel Audio Header	49
IEEE 1394a Header	49
Front Panel Header	49
USB 2.0 Headers	50
Consumer IR (CIR) Headers	50
Chassis Intrusion Header	51
Connecting to the Flexible Audio System	52
Connecting Chassis Fan and Power Supply Cables.....	53
Connecting Chassis Fan Cables	53
Connecting Power Supply Cables	54
Setting the BIOS Configuration Jumper	55
Clearing Passwords	56
Replacing the Battery	57

3 Updating the BIOS

Updating the BIOS with the Intel® Express BIOS Update Utility	63
Updating the BIOS with the ISO Image BIOS Update File or the Iflash Memory Update Utility	64
Obtaining the BIOS Update File	64
Updating the BIOS with the ISO Image BIOS Update File	64
Updating the BIOS with the Iflash Memory Update Utility	65
Recovering the BIOS	66

4 Configuring for RAID

Configuring for RAID Using Intel® Matrix Storage Technology	67
Configuring the BIOS	67
Creating Your RAID Set	67
Loading the Intel Matrix Storage Technology RAID Drivers and Software	68
Setting Up a "RAID Ready" System	68
Configuring for External RAID Using Marvell Storage Technology	68
Configuring the BIOS	68
Creating Your RAID Set	69
Loading the Marvell Storage Technology RAID Drivers and Software	69

A Error Messages and Indicators

BIOS Beep Codes	71
BIOS Error Messages	71
Port 80h POST Codes	72

B Regulatory Compliance

Safety Standards	77
Place Battery Marking	77
European Union Declaration of Conformity Statement	78
Product Ecology Statements	79
Recycling Considerations	79
Lead-free 2LI/Pb-free 2LI Board	82
Restriction of Hazardous Substances (RoHS)	83
EU RoHS	83
China RoHS	84
EMC Regulations	86
Ensure Electromagnetic Compatibility (EMC) Compliance	87
Product Certifications	88
Board-Level Certification Markings	88
Chassis and Component Certifications	89

Figures

1. Desktop Board D5400XS Components	11
2. LAN Status LEDs	15
3. Disk Drive Access Indicator	18
4. Location of the Standby Power Indicator	24
5. Onboard Power and Reset Buttons	26
6. Location of the VR and CPU LEDs	27
7. Installing the I/O Shield	31
8. Desktop Board D5400XS Mounting Screw Hole Locations	32
9. Lift the Socket Lever	33
10. Lift the Load Plate	34
11. Remove the Protective Socket Cover	34
12. Remove the Processor from the Protective Processor Cover	35
13. Install the Processor	35
14. Close the Load Plate	36
15. Processor Fan Heat Sink Headers	37
16. Installing a Typical MCH Heat Sink Fan	38
17. Installing a DIMM	39
18. DIMM Cooling Fan Header	41
19. Installing a PCI Express x16 Card	42
20. Removing a PCI Express x16 Card	43
21. Connecting the IDE Cable	45
22. Connecting Serial ATA Cables	46
23. Internal Headers and Connectors	47
24. Back Panel Audio Connectors	52
25. Location of the Chassis Fan Headers	53
26. Connecting Power Supply Cables	54
27. Location of the BIOS Configuration Jumper Block	55

28. Removing the Battery	62
29. POST Code Indicators.....	72
30. Desktop Board D5400XS China RoHS Material Self Declaration Table	85

Tables

1. Feature Summary.....	9
2. Desktop Board D5400XS Components	12
3. LAN Status LEDs	16
4. HD Audio Link Header Signal Names	48
5. Chassis Intrusion Header Signal Names	48
6. Front Panel Audio Header Signal Names.....	49
7. IEEE 1394a Header Signal Names	49
8. Front Panel Header Signal Names	49
9. USB 2.0 Header Signal Names.....	50
10. Front Panel CIR Receiver (Input) Header Signal Names	51
11. Back Panel CIR Header Emitter (Output) Header Signal Names	51
12. Chassis Intrusion Header Signal Names	51
13. Jumper Settings for the BIOS Setup Program Modes.....	56
14. Beep Codes	71
15. BIOS Error Messages	71
16. Port 80h POST Codes	73
16. Port 80h POST Codes (continued)	74
17. Safety Standards.....	77
18. Lead-Free Second Level Interconnect Marks	83
19. China RoHS Environmentally Friendly Use Period Mark.....	84
20. EMC Regulations.....	86
21. Product Certification Markings	88

1 Desktop Board Features

This chapter briefly describes the features of Intel® Desktop Board D5400XS. Table 1 summarizes the major features of the Desktop Board.

Table 1. Feature Summary

Form Factor	SSI/EATX (330.20 millimeters [13.00 inches] x 304.80 millimeters [12.00 inches])
Processor	Support for up to two identical Intel® processors in the LGA771 package
Main Memory	<ul style="list-style-type: none">• Four 240-pin, DDR2 SDRAM Fully-Buffered Dual Inline Memory Module (FBDIMM) sockets• Support for 800/667 MHz SDRAM• Support for up to 16 GB of system memory
Chipset	Intel® 5400 Chipset consisting of: <ul style="list-style-type: none">• Intel® 5400 Memory Controller Hub (MCH)• Intel® 6321ESB I/O Controller Hub
Graphics	<ul style="list-style-type: none">• Support for multiple PCI Express* graphics cards
Audio	<ul style="list-style-type: none">• Independent multi-streaming 8-channel (7.1) audio and 2-channel audio subsystem, featuring:<ul style="list-style-type: none">— Intel® High Definition Audio interface— IDT* STAC9274 audio codec• HD Audio Link header• HD Audio front panel header• Onboard 3-pin S/PDIF connector• ADAT* optical interface support from a back panel S/PDIF optical port
Expansion Capabilities	<ul style="list-style-type: none">• Four PCI Express x16 connectors• Two PCI* bus connectors
Legacy I/O Support	Legacy I/O Controller that provides Consumer Infrared (CIR) support
Peripheral Interfaces	<ul style="list-style-type: none">• Up to 10 USB 2.0 ports:<ul style="list-style-type: none">— Six ports routed to the back panel— Four ports routed to two onboard USB headers• Up to two IEEE 1394a ports:<ul style="list-style-type: none">— One port routed to a back panel connector— One port routed to an IEEE 1394a header• Six Serial ATA (SATA) ports (3.0 Gb/s) via the Intel 6321ESB I/O Controller Hub• Two external SATA (eSATA) ports via a discrete controller• One IDE interface with ATA-66/100 support (two devices)

continued

Table 1. Feature Summary (continued)

RAID	<ul style="list-style-type: none"> • Intel® Matrix Storage Technology for the six onboard SATA ports • Marvell* Storage Technology for the two eSATA ports
LAN Support	Intel® 82573L Gigabit (10/100/1000 Mb/s) Ethernet LAN controller including an RJ-45 back panel connector with integrated status LEDs
BIOS	<ul style="list-style-type: none"> • Intel® Platform Innovation Framework for extensible firmware interface • 16 Mb Firmware Hub • Support for SMBIOS • Intel® Rapid BIOS Boot • Intel® Express BIOS Update
Power Management	<ul style="list-style-type: none"> • Support for Advanced Configuration and Power Interface (ACPI) • Suspend to RAM (STR) • Wake on USB, PCI, PCI Express, LAN, CIR, and front panel • ENERGY STAR* capable
Hardware Management	Hardware monitor with: <ul style="list-style-type: none"> • Four fan sensing inputs used to monitor fan activity • Intel® Precision Cooling Technology fan speed control • Voltage sensing to detect out of range values
Supported Operating Systems	<ul style="list-style-type: none"> • Microsoft Windows Vista* Ultimate • Microsoft Windows Vista Enterprise • Microsoft Windows Vista Business • Microsoft Windows Vista Home Premium • Microsoft Windows Vista Home Basic • Microsoft Windows Vista Ultimate 64-bit edition • Microsoft Windows Vista Enterprise 64-bit edition • Microsoft Windows Vista Business 64-bit edition • Microsoft Windows Vista Home Premium 64-bit edition • Microsoft Windows Vista Home Basic 64-bit edition • Microsoft Windows* XP Media Center Edition 2005 • Microsoft Windows XP Professional • Microsoft Windows XP Professional x64 Edition • Microsoft Windows XP Home

For more information about this Desktop Board, including the Technical Product Specification, BIOS updates, and device drivers, go to the Desktop Board D5400XS page at <http://www.intel.com/products/motherboard/>

Desktop Board Components

Figure 1 shows the approximate location of the major components on Desktop Board D5400XS.

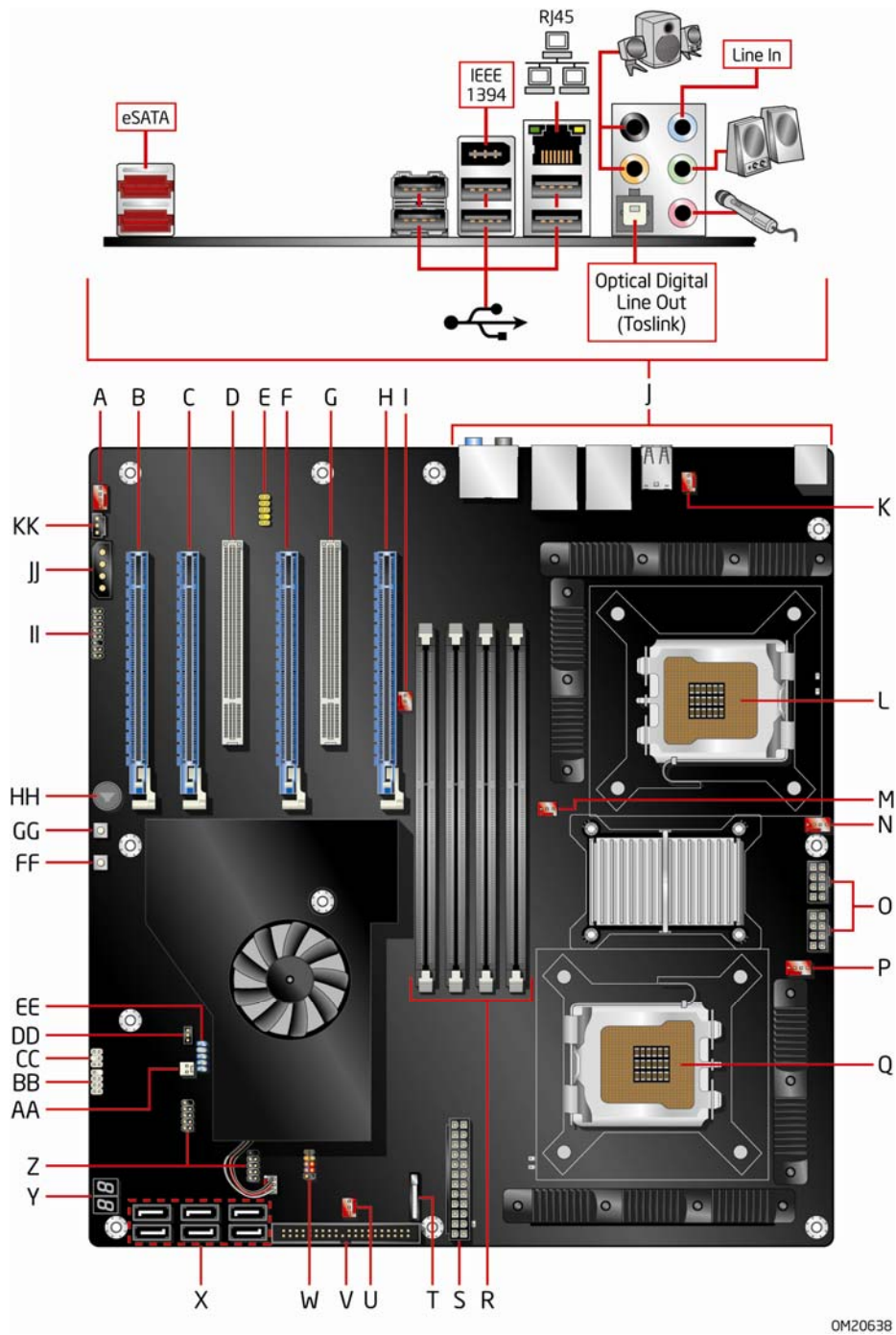


Figure 1. Desktop Board D5400XS Components

Table 2. Desktop Board D5400XS Components

Label	Description
A	Auxiliary chassis fan header (4-pin)
B	PCI Express x16 connector 3
C	PCI Express x16 connector 2
D	PCI bus connector 2
E	Front panel audio header
F	PCI Express x16 connector 1
G	PCI bus connector 1
H	PCI Express x16 connector 0
I	DIMM cooling fan header (3-pin)
J	Back panel connectors
K	Rear chassis fan header (3-pin)
L	Processor (CPU 0) socket
M	MCH fan header (3-pin)
N	Processor (CPU 0) fan header (4-pin)
O	12 V processor core voltage connectors (2 x 4 pin) (2)
P	Processor (CPU 1) fan header
Q	Processor (CPU 1) socket
R	FBDIMM sockets (4)
S	Main power connector (2 x 12 pin)
T	Battery
U	Front chassis fan header (3-pin)
V	IDE connector
W	Front panel header
X	Serial ATA connectors (6)
Y	Port 80h POST code indicator
Z	USB 2.0 headers (2)
AA	Chassis intrusion header
BB	Front panel CIR receiver (input) header
CC	Back panel CIR transmitter (output) header
DD	BIOS configuration jumper block
EE	IEEE 1394a header
FF	Onboard reset button
GG	Onboard power button
HH	Speaker
II	High Definition Audio Link header
JJ	Auxiliary PCI Express graphics power connector (1 x 4 pin)
KK	S/PDIF connector

Processors



CAUTION

Failure to use an appropriate power supply and/or not connecting the 12 V (2 x 4 pin) power connectors to the Desktop Board may result in damage to the board, or the system may not function properly.

Desktop Board D5400XS supports two Intel processors in the LGA771 package. Processors are not included with the Desktop Board and must be purchased separately.

Related Links

Go to the following page or link for more information about:

- Instructions on installing or upgrading the processor, page 33 in Chapter 2
- Supported processors for Desktop Board D5400XS,
<http://www.intel.com/products/motherboard/>

Main Memory



NOTE

To be fully compliant with all applicable Intel® SDRAM memory specifications, the board should be populated with FBDIMMs that support the Serial Presence Detect (SPD) data structure. If your memory modules do not support SPD, you will see a notification to this effect on the screen at power up. The BIOS will attempt to configure the memory controller for normal operation.

The Desktop Board features the following:

- Four 240-pin DDR2 SDRAM FBDIMM sockets with gold-plated contacts
- 800/667 MHz DDR2 SDRAM interface
- DIMM cooling fan header

The Desktop Board supports the following memory:

- 800/667 MHz Fully Buffered DDR2 DIMMs only
- Up to 4 GB utilizing 512 Mb or 1 Gb technology
- Up to 16 GB utilizing 1 Gb technology
- Serial Presence Detect (SPD) memory only



NOTE

A DIMM cooling fan is recommended for use on Desktop Board D5400XS. Refer to "Installing a DIMM Cooling Fan" on page 41 in Chapter 2 for more information.

Related Links

Go to the following links or pages for more information about:

- FBDIMMs, <http://www.intel.com/technology/memory/>
- Installing memory, page 39 in Chapter 2
- Recommended memory for Desktop Board D5400XS, <http://www.intel.com/products/motherboard/>

Intel® 5400 Chipset

The Intel 5400 Chipset consists of the following devices:

- Intel 5400 Memory Controller Hub (MCH)
- Intel 6321ESB I/O Controller Hub

The MCH provides interfaces to the processors, memory, and the PCI Express bus and the Intel 6321ESB I/O Controller Hub is a centralized controller for the board's I/O paths.

For more information about the Intel 5400 Chipset, see:

http://developer.intel.com/products/server/chipsets/index.htm?iid=chips_body+serv

Audio Subsystem

The onboard audio subsystem consists of the following components:

- Intel 6321ESB I/O Controller Hub
- IDT STAC9274D audio codec

The subsystem has the following headers and connectors:

- Back panel audio connectors, including an S/PDIF optical port
- High Definition (HD) Audio front panel header that provides mic in and line out signals for front panel audio connectors
- HD Audio Link header used for HDMI video cards
- S/PDIF connector that can be used for HDMI video cards that do not work with the HD Audio Link header

The audio subsystem supports the following features:

- Dolby® Home Theater
- A signal-to-noise (S/N) ratio of 95 dB
- Independent multi-streaming 8-channel (7.1) audio (using the back panel audio connectors) and 2-channel audio (using the Intel High Definition Audio front panel header)
- ADAT optical interface support via the back panel S/PDIF optical port

Related Links

Go to the following link or pages for more information about:

- Audio drivers and utilities, <http://www.intel.com/products/motherboard/>
- The location of the onboard audio headers, Figure 23 on page 47
- The signal names for the Intel High Definition Audio front panel header and the HD Audio Link header, page 48
- The back panel audio connectors, Figure 24 on page 52

LAN Subsystem

The LAN subsystem includes:

- Intel 6321ESB I/O Controller Hub
- Intel 82573L Gigabit (10/100/1000 Mb/s) Ethernet LAN controller
- RJ-45 LAN connector with integrated status LEDs

The subsystem features:

- CSMA/CD protocol engine
- LAN connect interface between the Intel 6321ESB I/O Controller Hub and the LAN controller
- PCI bus power management

Related Links

Go to the following link for information about LAN software and drivers:

<http://www.intel.com/products/motherboard/>

Two LEDs are built into the RJ-45 LAN connector located on the back panel (see Figure 2). These LEDs indicate the status of the LAN.

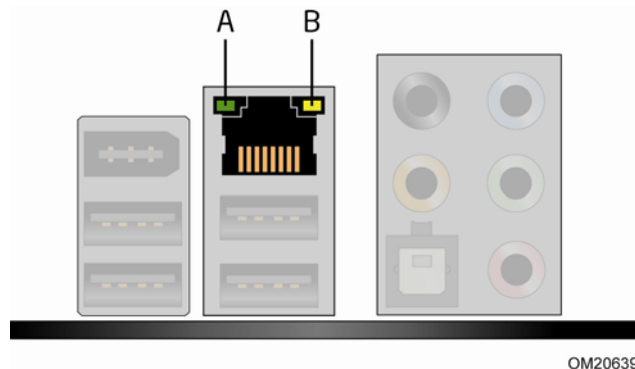


Figure 2. LAN Status LEDs

Table 3 describes the LED states when the board is powered up and the LAN subsystem is operating.

Table 3. LAN Status LEDs

LED	LED Color	LED State	Indicates
A	Green	Off	LAN link is not established
		On	LAN link is established
		Blinking	LAN activity is occurring
B	N/A	Off	10 Mb/s data rate
	Green	On	100 Mb/s data rate
	Yellow	On	1000 Mb/s data rate

USB 2.0 Support

The Desktop Board supports up to 10 USB 2.0 ports (six ports routed to back panel connectors and four ports routed to two onboard headers). USB 2.0 ports are backward compatible with USB 1.1 devices. USB 1.1 devices will function at USB 1.1 speeds.

In addition to USB 2.0 devices, USB 2.0 operation requires an operating system and drivers that fully support USB 2.0 transfer rates. Disabling Hi-Speed USB in the BIOS reverts all USB 2.0 ports to USB 1.1 operation. This may be required to accommodate operating systems that do not support USB 2.0.

Hard Disk and Optical Disk Drive Support

This section describes the Desktop Board's support for hard disk and optical disk drives. The board supports IDE and Serial ATA (SATA) drives.

Enhanced IDE Interface

The board's IDE interface handles the exchange of information between the processor and peripheral devices such as hard disk drives and CD-ROM drives. The interface supports:

- Up to two IDE devices (such as hard drives)
- ATAPI-style devices (such as CD-ROM drives)
- Older PIO Mode devices
- Ultra DMA-33 and ATA-66/100 protocols

Serial ATA

Desktop Board D5400XS supports six onboard Serial ATA (SATA) channels (3.0 Gb/s) via the Intel 6321ESB I/O Controller Hub and two External SATA (eSATA) channels (3.0 Gb/s) via a discrete onboard controller.

The six onboard SATA channels provide support the following RAID (Redundant Array of Independent Drives) levels using Intel® Matrix Storage Technology:

- RAID 0 - data striping
- RAID 1 - data mirroring
- RAID 0+1 (or RAID 10) - data striping and data mirroring
- RAID 5 - distributed parity

The two eSATA channels provide support the following RAID levels using Marvell Storage Technology:

- RAID 0 - data striping
- RAID 1 - data mirroring

For information on configuring your system for RAID, see Chapter 4.

Disk Drive Access Indicator

Desktop Board D5400XS includes a blue LED that lights when either a SATA or an IDE disk drive connected to the board is accessed. Figure 3 shows the location of the indicator.

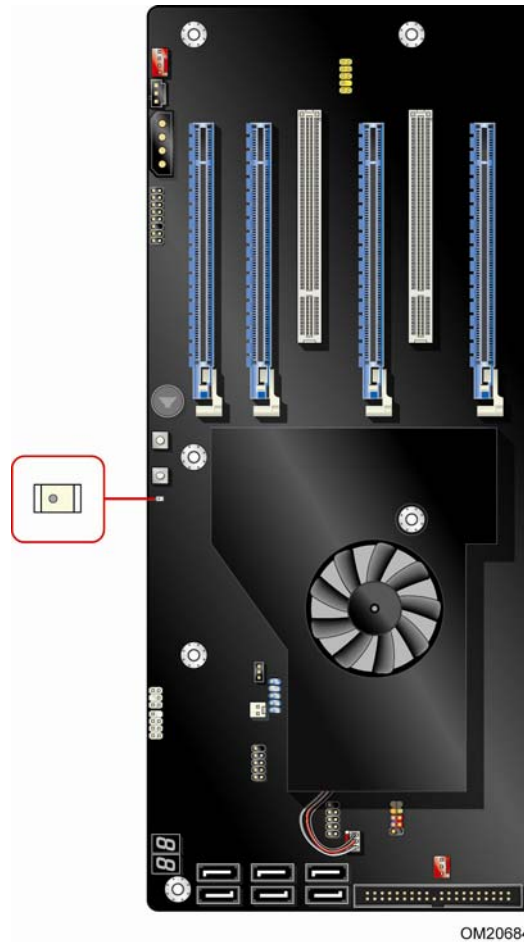


Figure 3. Disk Drive Access Indicator

Legacy I/O

Desktop Board D5400XS includes an I/O controller that provides the following legacy I/O features:

- Consumer Infrared (CIR) support
- Low pin count (LPC) interface
- Intelligent power management, including a programmable wake up event interface
- PCI power management support

Expandability

Desktop Board D5400XS provides the following expansion capability:

- Four PCI Express x16 connectors
- Two PCI bus connectors

BIOS

The BIOS provides the Power-On Self-Test (POST), the BIOS Setup program, and the PCI/PCI Express and IDE auto-configuration utilities. The BIOS is stored in the Serial Peripheral Interface (SPI) Flash device.

The BIOS can be updated by following the instructions on page 63 in Chapter 3.

Serial ATA and IDE Auto Configuration

If you install a Serial ATA or IDE device (such as a hard drive) in your computer, the auto-configuration utility in the BIOS automatically detects and configures the device for your computer. You do not need to run the BIOS Setup program after installing a Serial ATA or IDE device. You can override the auto-configuration options by specifying manual configuration in the BIOS Setup program.

PCI and PCI Express* Auto Configuration

If you install a PCI/PCI Express add-in card in your computer, the PCI/PCI Express auto-configuration utility in the BIOS automatically detects and configures the resources (IRQs, DMA channels, and I/O space) for that add-in card. You do not need to run the BIOS Setup program after you install a PCI/PCI Express add-in card.

Security Passwords

The BIOS includes security features that restrict whether the BIOS Setup program can be accessed and who can boot the computer. A supervisor password and a user password can be set for the BIOS Setup and for booting the computer, with the following restrictions:

- The supervisor password gives unrestricted access to view and change all Setup options. If only the supervisor password is set, pressing <Enter> at the password prompt of Setup gives the user restricted access to Setup.
- If both the supervisor and user passwords are set, you must enter either the supervisor password or the user password to access Setup. Setup options are then available for viewing and changing depending on whether the supervisor or user password was entered.
- Setting a user password restricts who can boot the computer. The password prompt is displayed before the computer is booted. If only the supervisor password is set, the computer boots without asking for a password. If both passwords are set, you can enter either password to boot the computer.

Related Links

For instructions on resetting the password, go to Clearing Passwords on page 56.

Hardware Management

The hardware management features of Desktop Board D5400XS enable the board to be compatible with the Wired for Management (WfM) specification. The board has several hardware management features including the following:

- Fan speed monitoring and control
- Thermal and voltage monitoring
- Chassis intrusion detection

Hardware Monitoring and Fan Speed Control

The features of the hardware monitoring and fan speed control include:

- Monitoring of power supply voltages to detect levels above and below acceptable values
- Intel® Precision Cooling Technology fan speed control, delivering acoustically-optimized thermal management
- Thermal sensors in the processors, MCH, and I/O Controller Hub, plus an onboard remote sensor
- Thermally monitored closed-loop fan control, for all onboard fans, that can adjust fan speed or switch the fans off as needed

Intel® Precision Cooling Technology

Intel Precision Cooling Technology automatically adjusts processor fan speed based on the processor temperature and adjusts chassis fan speeds based on the internal system temperature.

Chassis Intrusion

The board supports a chassis security feature that detects if the chassis cover has been removed. The security feature uses a mechanical switch on the chassis that can be connected to the chassis intrusion header on the Desktop Board. See Figure 23 for the location of the chassis intrusion header.

Power Management

Power management is implemented at several levels, including software support through the Advanced Configuration and Power Interface (ACPI) and the following hardware support:

- Power connectors
- Fan headers
- LAN wake capabilities
- Instantly Available PC technology (Suspend to RAM)
- +5 V standby power indicator LED
- Wake from USB
- Power Management Event (PME#) signal wake-up support
- WAKE# signal wake-up support

Desktop Board D5400XS is also ENERGY STAR capable.

Software Support

ACPI

ACPI gives the operating system direct control over the power management and Plug and Play functions of a computer. The use of ACPI with the Desktop Board requires an operating system that provides full ACPI support.

Hardware Support

Power Connectors

ATX12V-compliant power supplies can turn off the computer power through system control. When an ACPI-enabled computer receives the correct command, the power supply removes all non-standby voltages.

When resuming from an AC power failure, the computer returns to the power state it was in before power was interrupted (either on or off). The computer's response can be set by using the Last Power State feature in the BIOS Setup program's Boot menu.

The Desktop Board has four power connectors. See Figure 26 on page 54 for the location of the power connectors.

Fan Headers

The function/operation of the fans is as follows:

- The fans are on when the computer is in the ACPI S0 state.
- The fans are off when the computer is in the ACPI S3, S4, or S5 state.
- Each fan header is wired to a tachometer input of the hardware monitoring and control device.
- All fan headers support closed-loop fan control that can adjust the fan speed or switch the fan on or off as needed.
- All fan headers have a +12 V DC connection.

The Desktop Board has two 4-pin processor fan headers, one 4-pin and two 3-pin chassis fan headers, one 3-pin MCH fan header, and one 3-pin DIMM cooling fan header.

LAN Wake Capabilities



CAUTION

For LAN wake capabilities, the 5 V standby line for the power supply must be capable of delivering adequate +5 V standby current. Failure to provide adequate standby current when using this feature can damage the power supply.

LAN wakeup capabilities enable remote wake-up of the computer through a network. The LAN subsystem monitors network traffic and upon detecting a Magic Packet* frame, it asserts a wake-up signal that powers up the computer.

Instantly Available PC Technology



CAUTIONS

For Instantly Available PC technology, the 5 V standby line for the power supply must be capable of delivering adequate +5 V standby current. Failure to provide adequate standby current when using this feature can damage the power supply and/or effect ACPI S3 sleep state functionality.

Power supplies used with this Desktop Board must be able to provide enough standby current to support the standard Instantly Available (ACPI S3 sleep state) configuration. If the standby current necessary to support multiple wake events from the PCI and/or USB buses exceeds power supply capacity, the Desktop Board may lose register settings stored in memory.

Instantly Available PC technology enables the board to enter the ACPI S3 (Suspend-to-RAM) sleep state. While in the S3 sleep state, the computer will appear to be off. If the computer has a dual-colored power LED on the front panel, the sleep state is indicated by the LED turning amber. When signaled by a wake-up device or event, the computer quickly returns to its last known awake state.

The Desktop Board supports the *PCI Bus Power Management Interface Specification*. Add-in cards that support this specification can participate in power management and can be used to wake the computer.

+5 V Standby Power Indicator



CAUTION

If the AC power has been switched off and the standby power indicator is still lit, disconnect the power cord before installing or removing any devices connected to the board. Failure to do so could damage the board and any attached devices.

The Desktop Board's standby power indicator, shown in Figure 4, is lit when there is standby power still present on the board even when the computer appears to be off. For example, when this green LED is lit, standby power is still present at the memory module sockets and the PCI bus and PCI Express bus connectors.

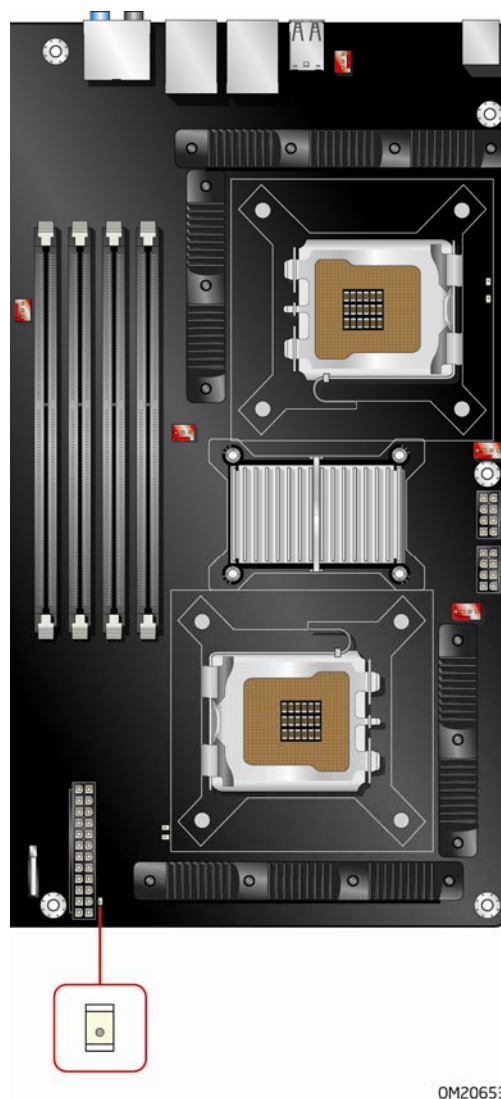


Figure 4. Location of the Standby Power Indicator

Related Links

For more information on standby current requirements for the Desktop Board, refer to the Technical Product Specification on the Desktop Board D5400XS page at <http://www.intel.com/products/motherboard/>.

Wake from USB



NOTE

Wake from USB requires the use of a USB peripheral that supports Wake from USB and an operating system that supports Wake from USB.

USB bus activity wakes the computer from an ACPI S3 state.

PME# Signal Wake-up Support

When the PME# signal on the PCI bus is asserted, the computer wakes from an ACPI S1, S3, S4, or S5 state.

WAKE# Signal Wake-up Support

When the WAKE# signal on the PCI Express bus is asserted, the computer wakes from an ACPI S1, S3, S4, or S5 state.

ENERGY STAR* Capable

In 2007, the US Department of Energy and the US Environmental Protection Agency revised the ENERGY STAR requirements. Intel worked directly with these two governmental agencies to define the new requirements. Currently Intel Desktop Boards are capable of meeting the new ENERGY STAR requirements depending upon system configuration.

Go to the following link for information and recommendations concerning the new ENERGY STAR requirements: <http://www3.intel.com/cd/channel/reseller/asmo-na/eng/337748.htm>.

Onboard Power and Reset Buttons



CAUTION

Electrostatic discharge (ESD) can damage components. Perform the procedure described in this section only at an ESD workstation using an antistatic wrist strap and a conductive foam pad. If such a station is not available, you can provide some ESD protection by wearing an antistatic wrist strap and attaching it to a metal part of the computer chassis.

A power button (Figure 5, A) and a reset button (Figure 5, B) on the Desktop Board can be used to control the board. The power button is intended for use at integration facilities to remove standby power before making changes to the system configuration, or for testing purposes. The reset button can be used to reset the system during testing.

The power and reset buttons on the front panel are recommended for all other instances of power cycling or resetting the computer.

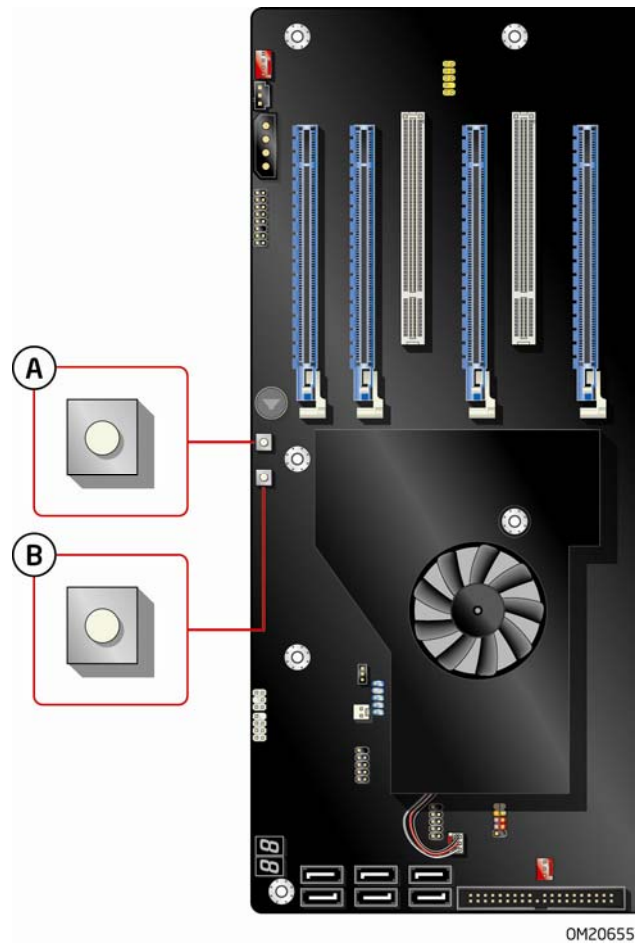


Figure 5. Onboard Power and Reset Buttons

Onboard VR and CPU LEDs

The Desktop board contains a red VR LED and a red CPU LED for each processor as shown in Figure 6). These LEDs indicate the following conditions:

- When lit, the VR LEDs (Figure 6, A and D) indicate an elevated temperature in the processor voltage regulator circuit that could affect performance.
- When lit, the CPU LEDs (Figure 6, B and C) indicate an elevated temperature on the processor that could affect performance.

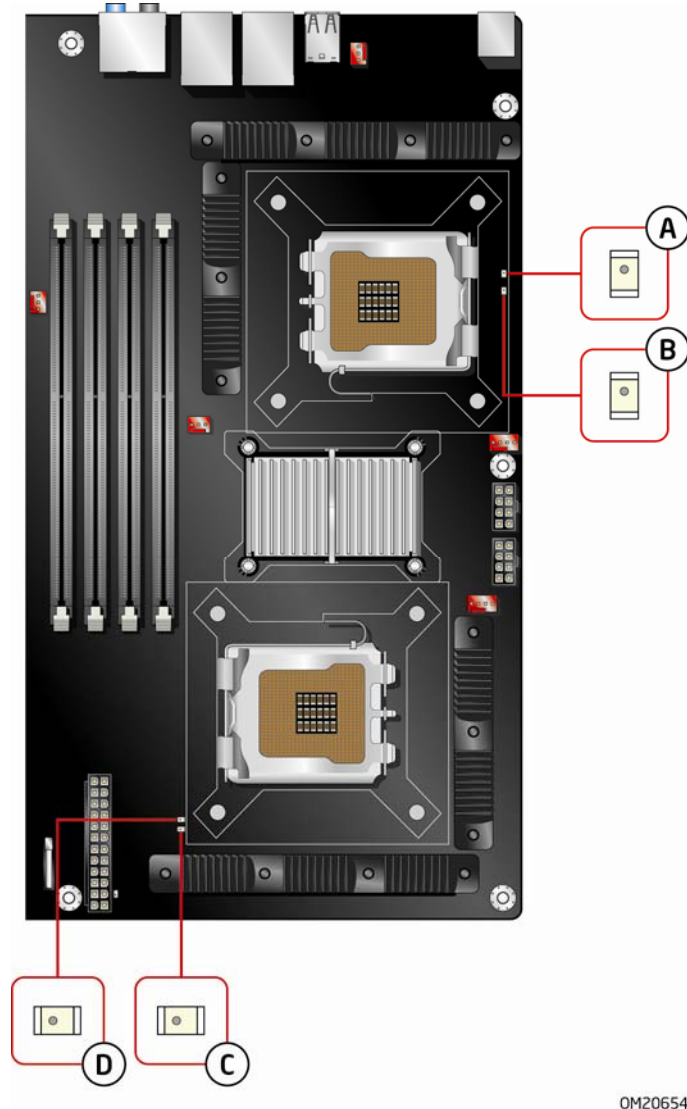


Figure 6. Location of the VR and CPU LEDs

Speaker

A speaker mounted on the Desktop Board provides audible error code (beep code) information during the Power-On Self-Test (POST). Refer to Appendix A for a description of the board's beep codes.

Battery

A battery on the Desktop Board keeps the values in CMOS RAM and the clock current when the computer is turned off. Go to page 57 for instructions on how to replace the battery.

Real-Time Clock

The Desktop Board has a time-of-day clock and 100-year calendar. The battery on the Desktop Board keeps the clock current when the computer is turned off.

2 Installing and Replacing Desktop Board Components

This chapter tells you how to:

- Install the I/O shield
- Install and remove the Desktop Board
- Install a processor
- Install an MCH heat sink fan
- Install and remove memory
- Install and remove a PCI Express x16 card
- Connect the IDE and Serial ATA cables
- Connect to the internal headers and connectors
- Connect to the audio system
- Connect chassis fan and power supply cables
- Set the BIOS configuration jumper
- Clear passwords
- Replace the battery

Before You Begin



CAUTIONS

The procedures in this chapter assume familiarity with the general terminology associated with personal computers and with the safety practices and regulatory compliance required for using and modifying electronic equipment.

Disconnect the computer from its power source and from any telecommunications links, networks, or modems before performing any of the procedures described in this chapter. Failure to disconnect power, telecommunications links, networks, or modems before you open the computer or perform any procedures can result in personal injury or equipment damage. Some circuitry on the board can continue to operate even though the front panel power button is off.

Follow these guidelines before you begin:

- Always follow the steps in each procedure in the correct order.
- Set up a log to record information about your computer, such as model, serial numbers, installed options, and configuration information.
- Electrostatic discharge (ESD) can damage components. Perform the procedures described in this chapter only at an ESD workstation using an antistatic wrist strap and a conductive foam pad. If such a station is not available, you can provide some ESD protection by wearing an antistatic wrist strap and attaching it to a metal part of the computer chassis.

Installation Precautions

When you install or test the Intel Desktop Board, observe all warnings and cautions in the installation instructions.

To avoid personal injury, be careful of:

- Sharp pins on connectors
- Sharp pins on printed circuit assemblies
- Rough edges and sharp corners on the chassis
- Hot components (such as processors, voltage regulators, and heat sinks)
- Damage to wires that could cause a short circuit

Make sure that the green standby power indicator (see Figure 4) is not lit before installing or removing any devices connected to the board.

Observe all warnings and cautions that instruct you to refer computer servicing to qualified technical personnel.

Prevent Power Supply Overload

Do not overload the power supply output. To avoid overloading the power supply, make sure that the calculated total current loads of all the modules within the computer is less than the output current rating of each of the power supplies output circuits.

Observe Safety and Regulatory Requirements

Read and follow the instructions in this section and the instructions supplied with the chassis and associated modules. If you do not follow these instructions and the instructions provided by the chassis and module suppliers, you increase your safety risk and the possibility of noncompliance with regional laws and regulations. If the instructions for the chassis are inconsistent with these instructions or the instructions for associated modules, contact the supplier to find out how you can ensure that your computer meets safety and regulatory requirements.

Related Links

For information about the Desktop Board's regulatory compliance, go to Appendix B on page 77.

Installing the I/O Shield

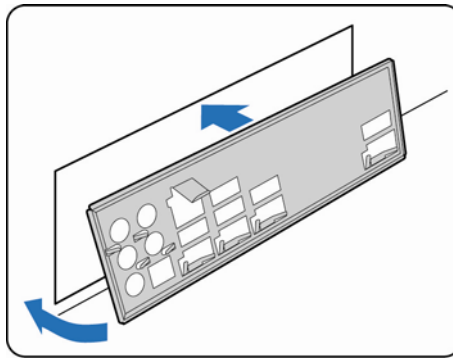
The Desktop Board comes with an I/O shield. When installed in the chassis, the shield blocks radio frequency transmissions, protects internal components from dust and foreign objects, and promotes correct airflow within the chassis.



NOTE

Desktop Board D5400XS requires a chassis that meets the SSI/EATX Chassis specification (see <http://ssiforum.oaktree.com/pdfs/SSI%20EEB%20v3-61.pdf>). For a list of recommended chassis and power supplies for this Desktop Board, refer to the Intel Desktop Board D5400XS page at <http://support.intel.com/support/motherboards/desktop/>.

Install the I/O shield before installing the Desktop Board in the chassis. Place the shield inside the chassis as shown in Figure 7. Press the shield into place so that it fits tightly and securely. If the shield does not fit, obtain a properly sized shield from the chassis supplier.



OM20641

Figure 7. Installing the I/O Shield

Installing and Removing the Desktop Board



CAUTION

Only qualified technical personnel should perform this procedure. Disconnect the computer from its power source before performing the procedures described here. Failure to disconnect the power before you open the computer can result in personal injury or equipment damage.

Refer to your chassis manual for instructions on installing and removing the Desktop Board.



CAUTION

To ensure that you do not inadvertently short out the board during installation, use the enclosed Board Mounting Template to determine the appropriate location of chassis mounting standoffs.

Be sure to remove the Board Mounting Template from the chassis before installing the board. Failure to do so can result in equipment damage.

Figure 8 shows the location of the mounting screw holes for Desktop Board D5400XS.



Figure 8. Desktop Board D5400XS Mounting Screw Hole Locations

Installing a Processor

Instructions on how to install processors on the Desktop Board are given in the following section.

Installing a Processor

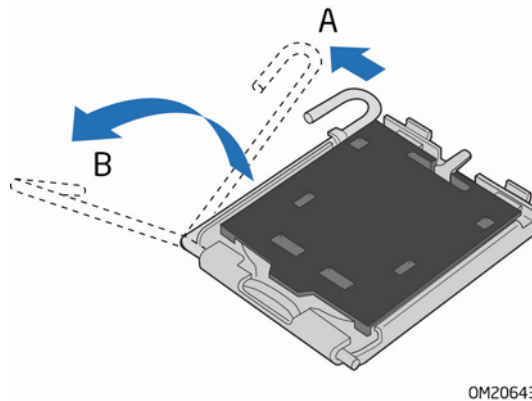


CAUTION

Before installing or removing a processor, make sure AC power has been removed by unplugging the power cord from the computer. The standby power indicator should not be lit (see Figure 4 on page 24). Failure to follow these precautions could result in damage to the processor and the board.

To install a processor, follow these instructions:

1. Observe the precautions in "Before You Begin" on page 29.
2. Open the socket lever by pushing the lever down and away from the socket (Figure 9, A and B).



OM20643

Figure 9. Lift the Socket Lever

3. Lift the load plate (Figure 10, A). Do not touch the socket contacts (Figure 10, B).

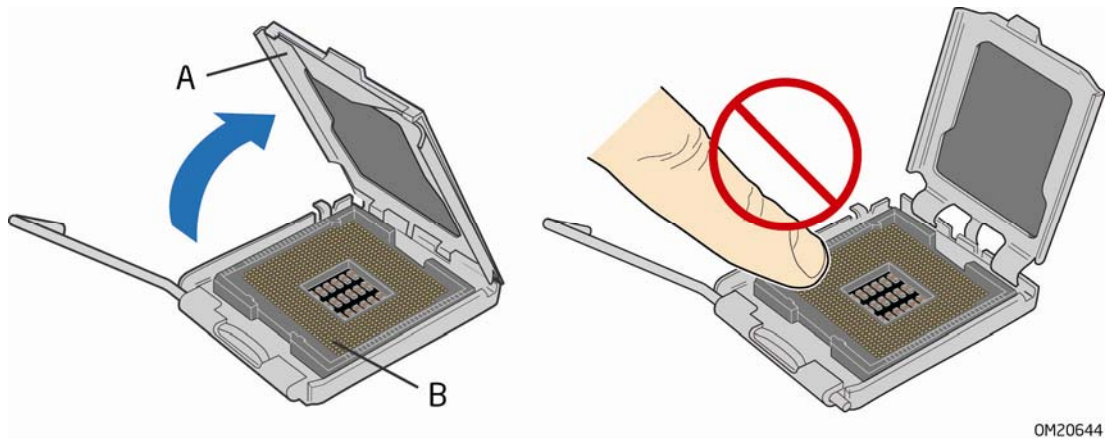


Figure 10. Lift the Load Plate

4. Remove the plastic protective socket cover from the load plate (Figure 11). Do not discard the protective socket cover. Always replace the socket cover if the processor is removed from the socket.

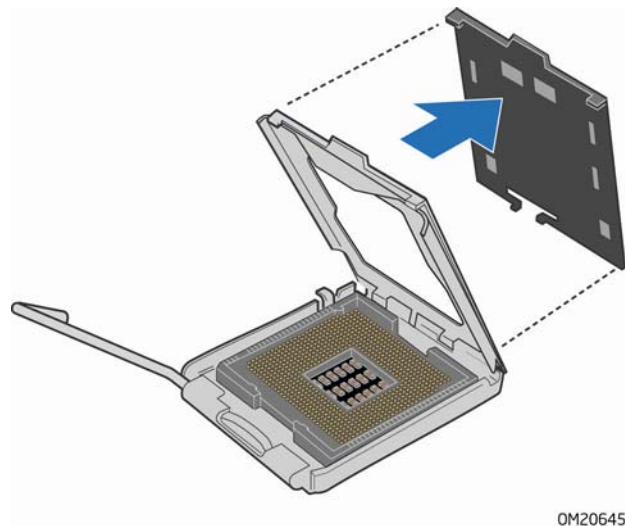


Figure 11. Remove the Protective Socket Cover

5. Remove the processor from the protective processor cover. Hold the processor only at the edges, being careful not to touch the bottom of the processor (see Figure 12). Do not discard the protective processor cover. Always replace the processor cover if the processor is removed from the socket.

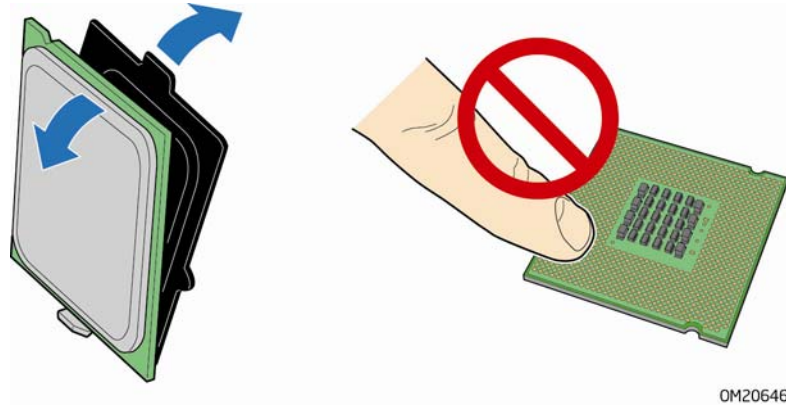


Figure 12. Remove the Processor from the Protective Processor Cover

6. Hold the processor with your thumb and index fingers oriented as shown in Figure 13. Make sure your fingers align to the socket cutouts (Figure 13, A). Align the notch (Figure 13, B) with the socket (Figure 13, C). Lower the processor straight down without tilting or sliding it in the socket.

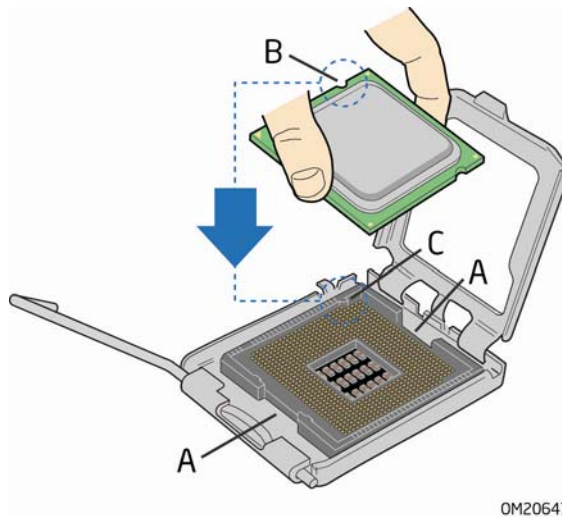


Figure 13. Install the Processor

7. Pressing down on the load plate (Figure 14, A), close and engage the socket lever (Figure 14, B).

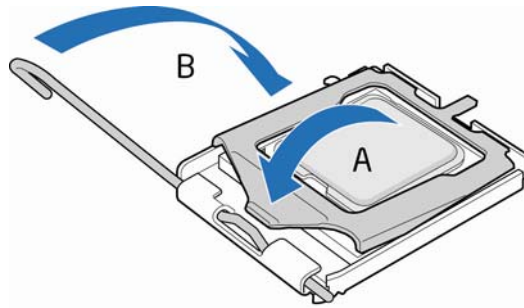


Figure 14. Close the Load Plate

Installing a Processor Fan Heat Sink

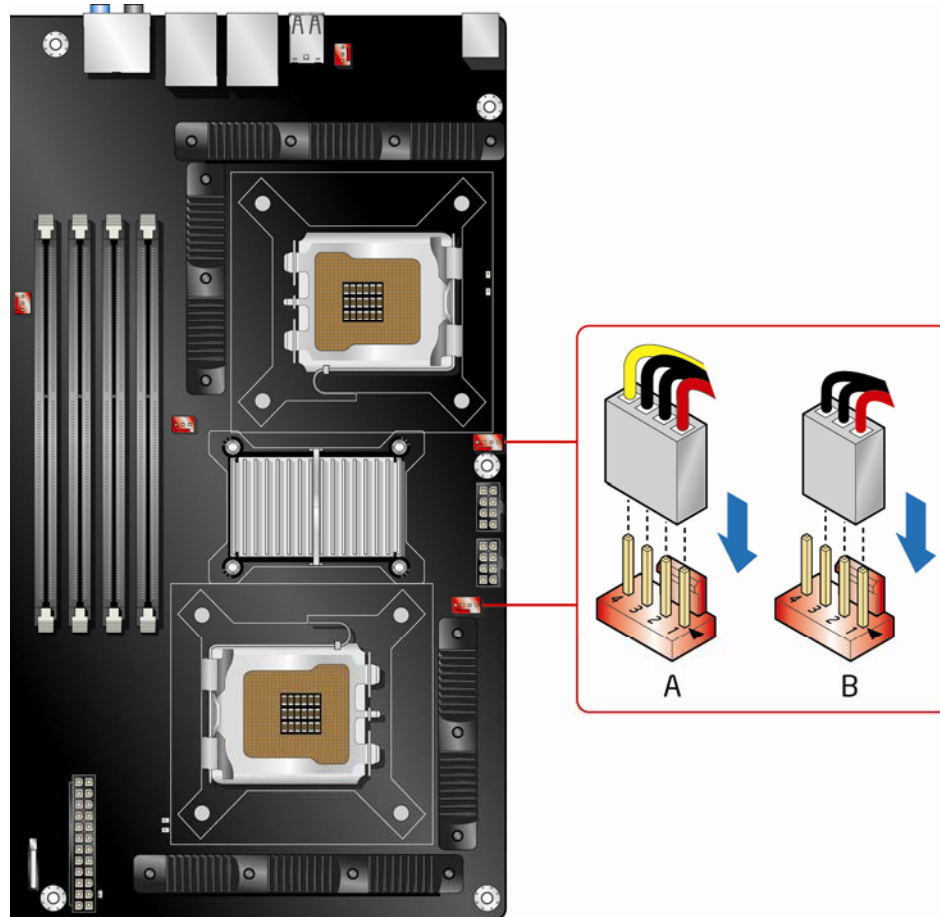
Desktop Board D5400XS has mounting holes for fan heat sinks for each processor. The mounting holes are designed to accommodate standard LGA775 heat sinks even though this board has LGA771 processor sockets.



NOTE

For a list of recommended heat sinks for Desktop Board D5400XS, refer to the Desktop Board D5400XS page at <http://www.intel.com/products/motherboard/>.

After you install the fan heat sinks, connect the fan power connectors to the 4-pin processor fan headers (see Figure 15). A fan with a 4-pin connector as shown in Figure 15, A is recommended; however, a fan with a 3-pin connector (Figure 15, B) can be used. Since the fan with a 3-pin connector cannot use the onboard fan control, the fan will always operate at full speed.



OM20657

Figure 15. Processor Fan Heat Sink Headers

Installing an MCH Heat Sink Fan (Optional)

If your system application requires more MCH cooling than is provided by the MCH passive heat sink, you can add a cooling fan to the MCH passive heat sink by using the included MCH heat sink fan mounting bracket. This fan mounting bracket is designed to accommodate a 40 mm x 10 mm or 40 mm x 20 mm, 12 V dc fan. Use the board's 3-pin MCH fan header to supply power to the MCH fan.

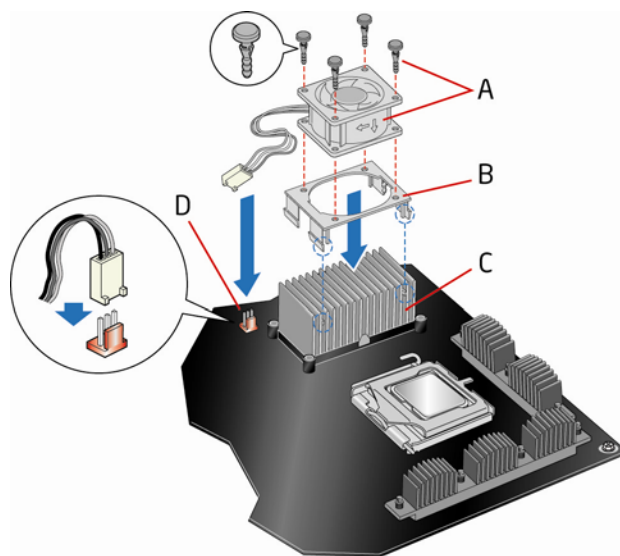


NOTE

An MCH heat sink fan is not included with Desktop Board D5400XS and must be purchased separately.

To install an MCH heat sink fan, follow these instructions:

1. Observe the precautions in "Before You Begin" on page 29.
2. Attach the fan (Figure 16, A) to the fan mounting bracket (Figure 16, B) using the fasteners (Figure 16, A) supplied with the fan. Slide the four legs of the bracket over the heat sink fins (Figure 16, C) and push down until the bracket "clicks" into place.
3. Attach the fan power connector to the MCH fan header (Figure 16, D).



0M20652

Figure 16. Installing a Typical MCH Heat Sink Fan

Installing and Removing Memory

Desktop board D5400XS has four 240-pin FBDIMM sockets providing quad-channel memory support with one DIMM per channel. The sockets are keyed so that they will accept only FBDIMMs.

Installing DIMMs

To install a DIMM, follow these steps:

1. Observe the precautions in "Before You Begin" on page 29.
2. Turn off all peripheral devices connected to the computer. Turn off the computer and disconnect the AC power cord.
3. Remove the computer's cover and locate the DIMM sockets (see Figure 17).

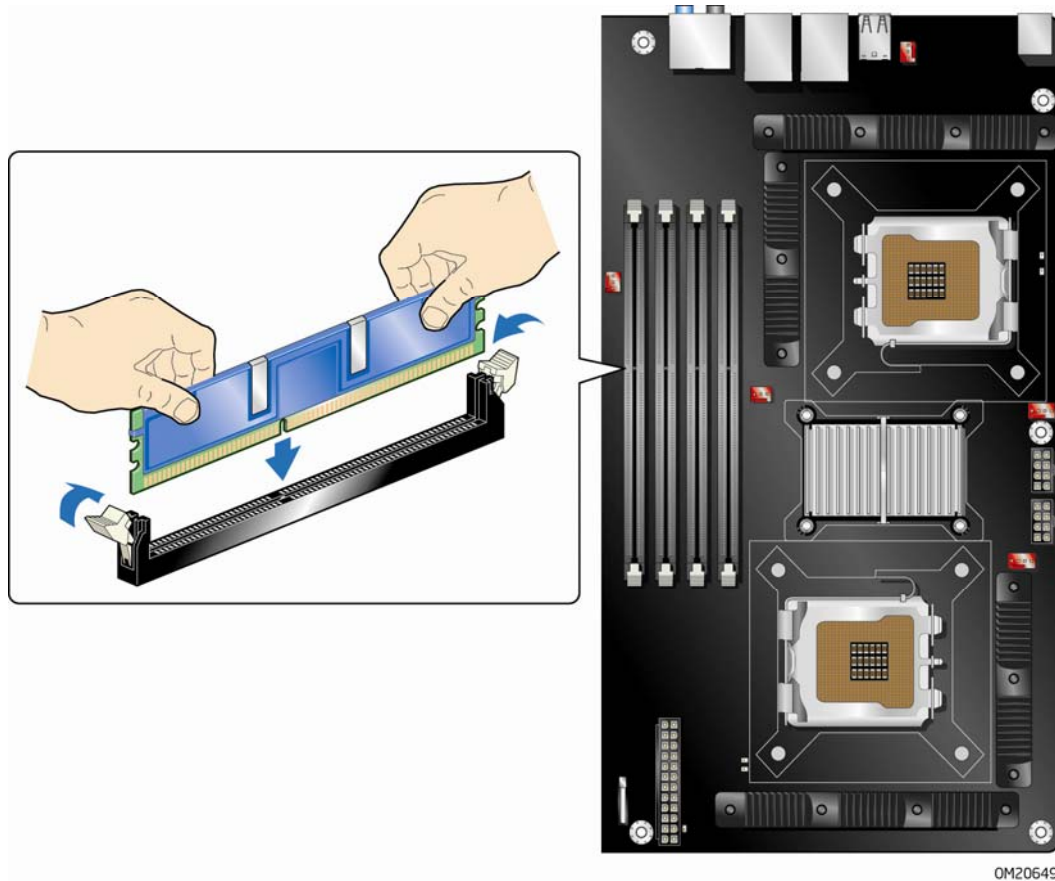


Figure 17. Installing a DIMM

4. Make sure the clips at either end of the DIMM socket(s) are pushed outward to the open position.
5. Holding the DIMM by the edges, remove it from its anti-static package.

6. Position the DIMM above the socket. Align the small notch at the bottom edge of the DIMM with the key in the socket (see inset in Figure 17).
7. Insert the bottom edge of the DIMM into the socket.
8. When the DIMM is inserted, push down on the top edge of the DIMM until the retaining clips snap into place. Make sure the clips are firmly in place.
9. Replace the computer's cover and reconnect the AC power cord.

Removing DIMMs

To remove a DIMM, follow these steps:

1. Observe the precautions in "Before You Begin" on page 29.
2. Turn off all peripheral devices connected to the computer. Turn off the computer.
3. Remove the AC power cord from the computer.
4. Remove the computer's cover.
5. Gently spread the retaining clips at each end of the DIMM socket. The DIMM pops out of the socket.
6. Hold the DIMM by the edges, lift it away from the socket, and store it in an anti-static package.
7. Reinstall and reconnect any parts you removed or disconnected to reach the DIMM sockets.
8. Replace the computer's cover and reconnect the AC power cord.

Installing a DIMM Cooling Fan (Recommended)

It is recommended that a DIMM cooling fan be installed on Desktop Board D5400XS to ensure proper memory operation.

Use the board's 3-pin DIMM fan header (Figure 18) to supply power to the fan.



NOTE

A DIMM cooling fan is not included with Desktop Board D5400XS and must be purchased separately. A list of compatible clip-on fans is available on the Desktop Board D5400XS page at <http://www.intel.com/products/motherboard/>.

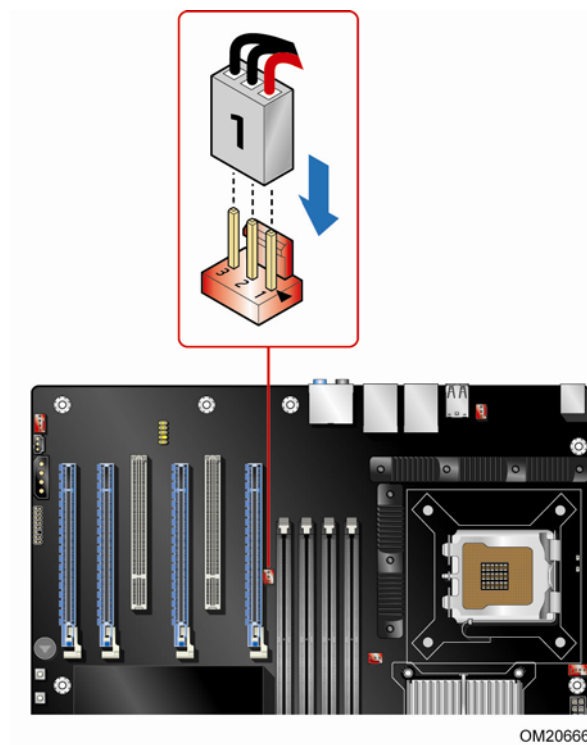


Figure 18. DIMM Cooling Fan Header

Installing and Removing PCI Express x16 Cards



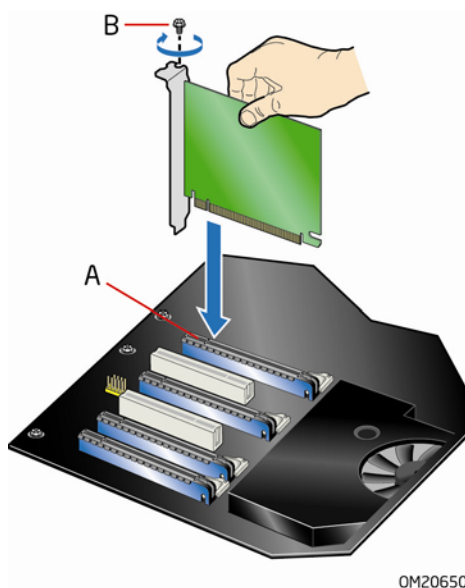
CAUTION

When installing a PCI Express card on the Desktop Board, ensure that the card is fully seated in the PCI Express connector before you power on the system. If the card is not fully seated in the connector, an electrical short may result across the connector pins. Depending on the over-current protection of the power supply, certain Desktop Board components and/or traces may be damaged.

Installing a PCI Express x16 Card

Follow these instructions to install a PCI Express x16 card:

1. Observe the precautions in "Before You Begin" on page 29.
2. Place the card in a PCI Express x16 connector (Figure 19, A) and press down on the card until it is completely seated in the connector and the card retention notch on the card snaps into place around the retention mechanism pin on the connector.
3. Secure the card's metal bracket to the chassis back panel with a screw (Figure 19, B).



OM20650

Figure 19. Installing a PCI Express x16 Card

Removing a PCI Express x16 Card

Follow these instructions to remove a PCI Express x16 card from a connector:

1. Observe the precautions in "Before You Begin" on page 29.
2. Remove the screw (Figure 20, A) that secures the card's metal bracket to the chassis back panel.
3. Push the card ejector lever down using the tip of a pencil or similar tool (Figure 20, B) in the notch. This will release the card from the connector (C).
4. Pull the card straight up.

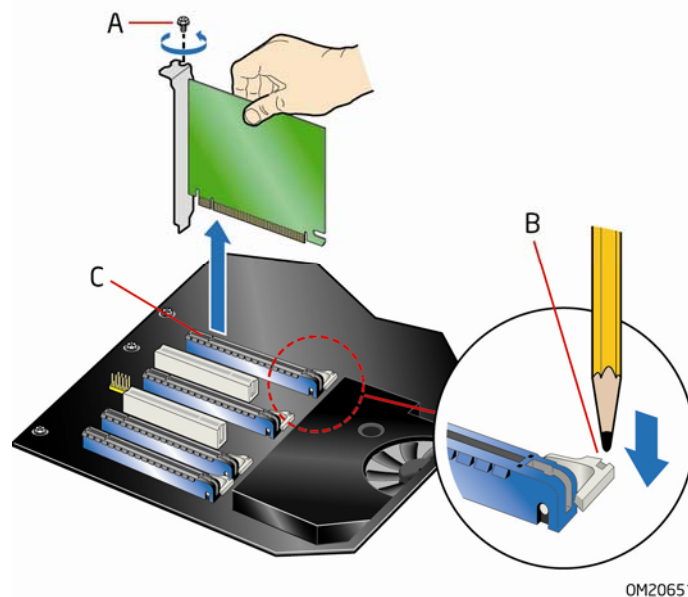


Figure 20. Removing a PCI Express x16 Card

Installing Multiple Graphics Cards

The Desktop Board supports technology that allows you to install linked PCI Express x16 graphics cards.

When installing multiple graphics cards in the PCI Express x16 connectors, refer to the card manufacturer's instructions to determine correct card placement and interconnection. Use the connectors or cables included with the Desktop Board to connect the two graphics cards together.

For more complete installation and configuration information refer to the documentation supplied by the graphics card manufacturer or visit their website.

For a list of compatible graphics cards, go to the Desktop Board D5400XS page at <http://www.intel.com/products/motherboard/>.

Connecting the IDE Cable

The included IDE cable can be used to connect two IDE drives to the Desktop Board using the IDE connector. The cable supports the ATA-66/100 transfer protocol. Figure 21 shows the correct installation of the cable.



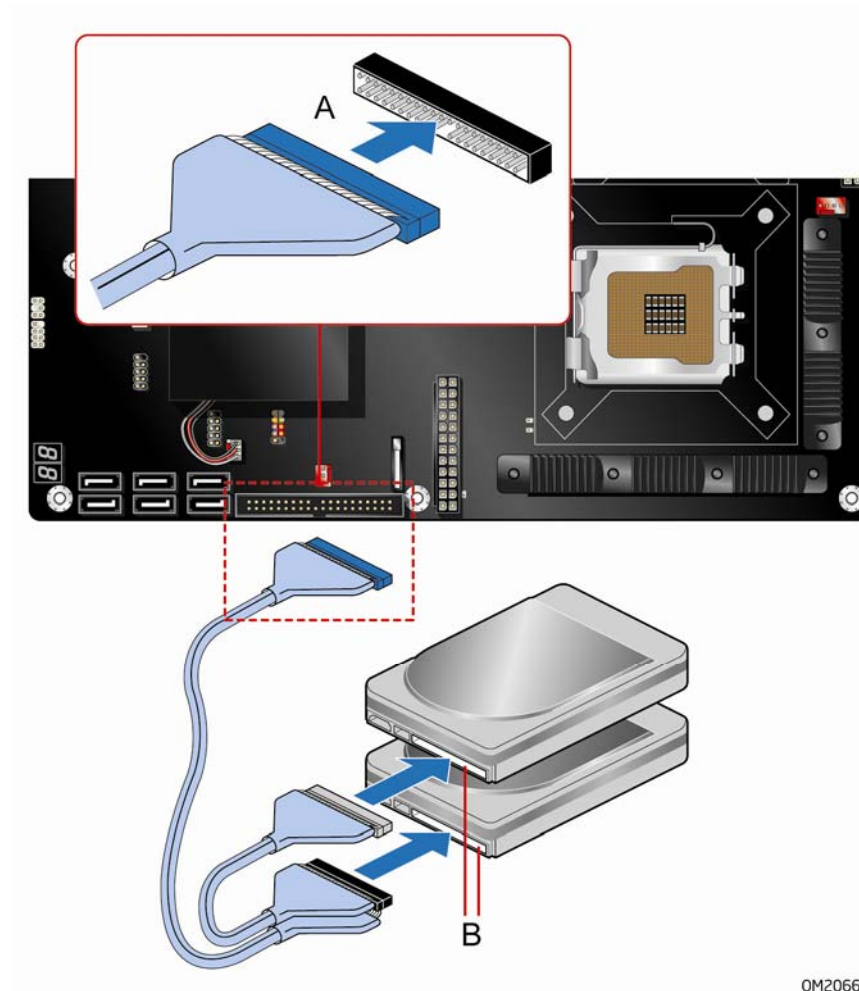
NOTES

ATA-66/100 compatible cables are backward compatible with drives using slower IDE transfer protocols. If an ATA-66/100 disk drive and a disk drive using any other IDE transfer protocol are attached to the same cable, the maximum transfer rate between the drives may be reduced to that of the slowest drive.

Do not connect an ATA device as a slave on the same IDE cable as an ATAPI master device. For example, do not connect an ATA hard drive as a slave to an ATAPI CD-ROM drive.

For correct function of the cable:

- Observe the precautions in "Before You Begin" on page 29.
- Attach the cable end with the single connector (blue) to the Intel Desktop Board (Figure 21, A).
- Attach the cable end with the two closely spaced connectors (gray and black) to the drives (Figure 21, B).



OM20662

Figure 21. Connecting the IDE Cable

Connecting the SATA Cables

The included SATA cables support the SATA protocol. Each cable can be used to connect one internal SATA drive to the Desktop Board. For correct cable function:

1. Observe the precautions in "Before You Begin" on page 29.
2. Attach one end of the SATA cable to one of the SATA connectors on the board (Figure 22, A) and attach the other end of the cable to the SATA drive (Figure 22, B).

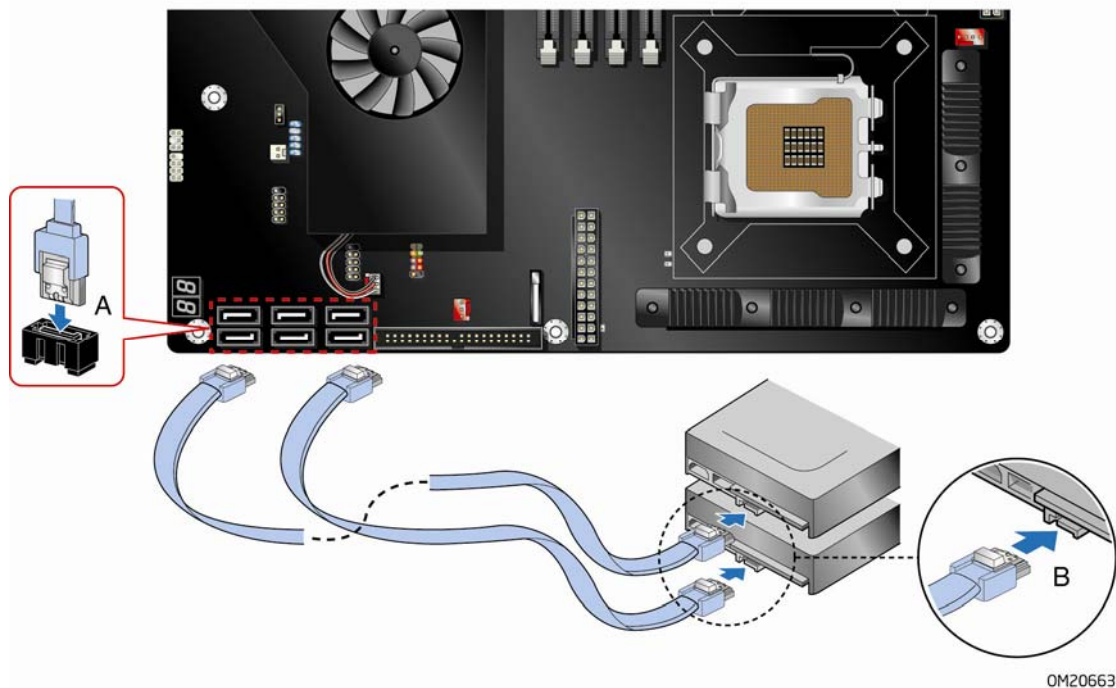
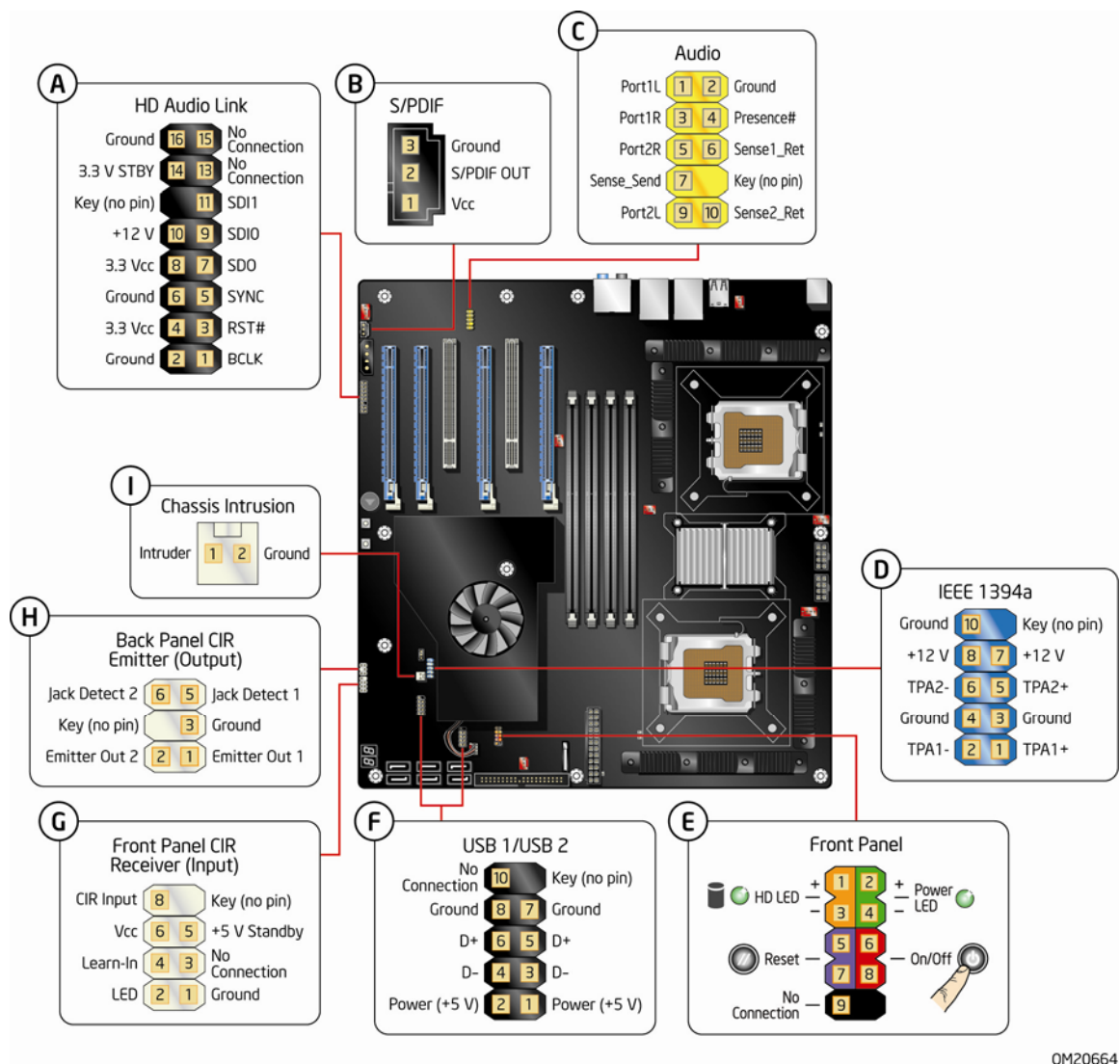


Figure 22. Connecting Serial ATA Cables

Connecting to the Internal Headers and Connectors

Before connecting cables to any of the internal headers, observe the precautions in “Before You Begin” on page 29. Figure 23 shows the location of the internal headers and connectors on Intel Desktop Board D5400XS.



OM20664

Item	Description	Item	Description
A	HD Audio Link	F	USB 2.0 (2)
B	S/PDIF	G	Front panel CIR receiver (input)
C	Front panel audio	H	Back panel CIR emitter (output)
D	IEEE 1394a	I	Chassis intrusion
E	Front panel		

Figure 23. Internal Headers and Connectors

HD Audio Link Header

Figure 23, A shows the location of the HD Audio Link header. Table 4 shows the pin assignments and signal names for the HD Audio Link header.

Table 4. HD Audio Link Header Signal Names

Pin	Signal Name	Pin	Signal Name
1	BCLK	2	Ground
3	RST#	4	3.3 Vcc
5	SYNC	6	Ground
7	SDO	8	3.3 Vcc
9	SDI0	10	+12 V
11	SDI1	12	Key
13	No Connection	14	3.3 V STBY
15	No Connection	16	Ground

S/PDIF Connector

Figure 23, B shows the location of the S/PDIF connector. This connector can be used with HDMI video cards that do not work with the HD Audio Link header (see Figure 23, A). Table 5 shows the pin assignments and signal names for the S/PDIF connector.

Table 5. Chassis Intrusion Header Signal Names

Pin	Description
1	Vcc
2	S/PDIF Out
3	Ground

Front Panel Audio Header

Figure 23, C shows the location of the front panel audio header. Table 6 shows the pin assignments and signal names for the front panel audio header.

Table 6. Front Panel Audio Header Signal Names

Pin	Signal Name	Pin	Signal Name
1	PORT 1L	2	GND
3	PORT 1R	4	PRESENCE#
5	PORT 2R	6	SENSE1_RETURN
7	SENSE_SEND	8	KEY (no pin)
9	PORT 2L	10	SENSE2_RETURN

IEEE 1394a Header

Figure 23, D shows the location of the IEEE 1394a header. Table 7 shows the pin assignments and signal names for the IEEE 1394a header.

Table 7. IEEE 1394a Header Signal Names

Pin	Signal Name	Pin	Signal Name
1	TPA1+	2	TPA1-
3	Ground	4	Ground
5	TPA2+	6	TPA2-
7	+12 V	8	+12 V
9	Key (no pin)	10	Ground

Front Panel Header

Figure 23, E shows the location of the front panel header. Table 8 shows the pin assignments and signal names for the front panel header.

Table 8. Front Panel Header Signal Names

Pin	Description	In/Out	Pin	Description	In/Out
Hard Drive Activity LED			Power LED		
1	Hard disk LED pull-up to +5 V	Out	2	Front panel green LED	Out
3	Hard disk active LED	Out	4	Front panel yellow LED	Out
Reset Switch			On/Off Switch		
5	Ground		6	Power switch	In
7	Reset switch	In	8	Ground	
Power			Not Connected		
9	Power	Out	10	No pin	

USB 2.0 Headers

Figure 23, F shows the location of the USB 2.0 headers. Table 9 shows the pin assignments and signal names for each USB 2.0 header. Each USB header can be used to connect two USB devices.

Table 9. USB 2.0 Header Signal Names

USB Port A		USB Port B	
Pin	Signal Name	Pin	Signal Name
1	Power (+5 V)	2	Power (+5 V)
3	D-	4	D-
5	D+	6	D+
7	Ground	8	Ground
9	Key	10	No Connection

Note: USB ports may be assigned as needed.



NOTE

Computer systems that have an unshielded cable attached to a USB port might not meet FCC Class B requirements, even if no device or a low-speed USB device is attached to the cable. Use a shielded cable that meets the requirements for a full-speed USB device.

Consumer IR (CIR) Headers

The Desktop Board has two CIR headers: the input or receiver header (Figure 23, G) and the output or emitter header (Figure 23, H). The receiver header consists of a filtered translated infrared input compliant with Microsoft CIR specifications and a "learning" infrared input. The learning input is a high-pass input which the computer can use to "learn" to speak the infrared communication language of other user remotes. The emitter header consists of two output ports which the computer can use to emulate "learned" infrared commands in order to control external electronic hardware.



NOTE

The Consumer IR option must be enabled in the system BIOS before it can function. Press <F2> at boot to enter the system BIOS, and go to Advanced > Peripheral Configuration > Enhanced Consumer IR, and set this option to Enabled.

Table 10 shows the pin assignments and signal names for the front panel CIR receiver (input) header and Table 11 shows the pin assignments and signal names for the back panel CIR emitter (output) header.

Table 10. Front Panel CIR Receiver (Input) Header Signal Names

Pin	Signal Name	Pin	Signal Name
1	Ground	2	LED
3	No Connection	4	Learn-In
5	+5 V Standby	6	Vcc
7	Key (no pin)	8	CIR Input

Table 11. Back Panel CIR Header Emitter (Output) Header Signal Names

Pin	Signal Name	Pin	Signal Name
1	Emitter Out 1	2	Emitter Out 2
3	Ground	4	Key (no pin)
5	Jack Detect 1	6	Jack Detect 2

Chassis Intrusion Header

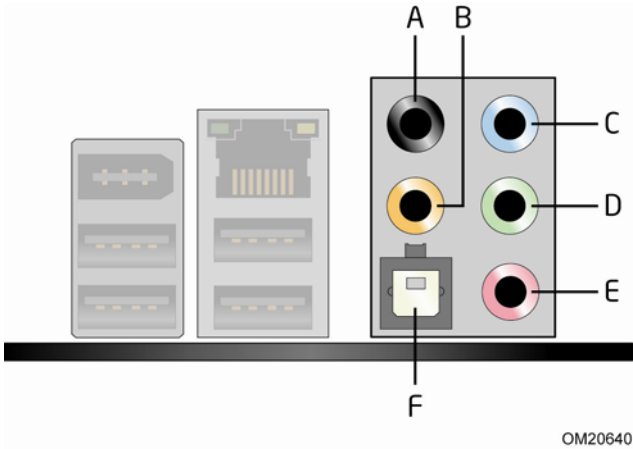
Figure 23, I shows the location of the chassis intrusion header. This header can be connected to a mechanical switch on the chassis to detect if the chassis cover is removed. Table 12 shows the pin assignments and signal names for the chassis intrusion header.

Table 12. Chassis Intrusion Header Signal Names

Pin	Description
1	Intruder
2	Ground

Connecting to the Flexible Audio System

After installing the IDT* audio driver from the Intel® Express Installer DVD-ROM, the multi-channel audio feature can be enabled. Figure 24 shows the back panel audio connectors. The default connector assignments are shown in the table.



Item	Description
A	Surround Left and Right
B	Center Channel and LFE (Subwoofer)
C	Side Surround Left and Right/Line In/Retasking Jack
D	Line Out
E	Mic In
F	S/PDIF Digital Audio Out (Optical)

Figure 24. Back Panel Audio Connectors



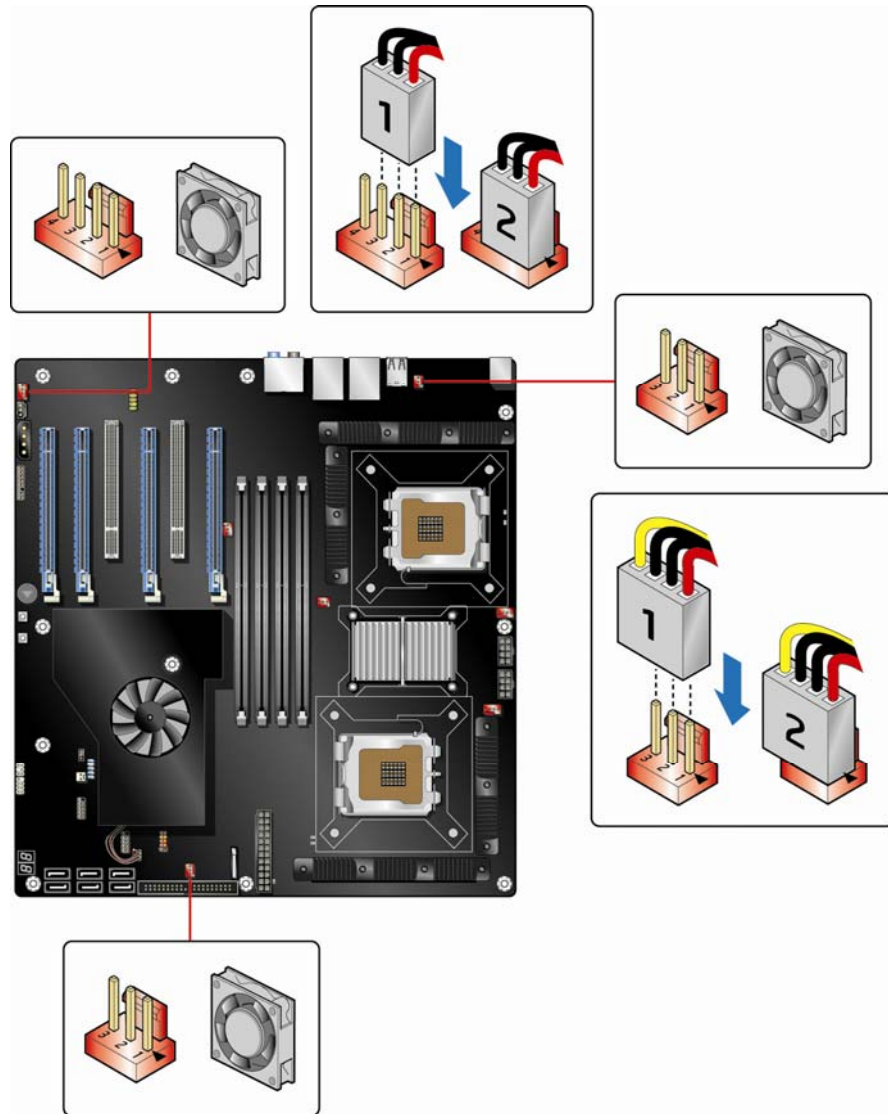
NOTE

The back panel line out connector is designed to power either headphones or amplified speakers only. Poor audio quality may occur if passive (non-amplified) speakers are connected to this output.

Connecting Chassis Fan and Power Supply Cables

Connecting Chassis Fan Cables

Connect chassis fan cables to the 3-pin and 4-pin chassis fan headers on the Desktop Board. Figure 25 shows the location of the chassis fan headers.



0M20661

Figure 25. Location of the Chassis Fan Headers

Connecting Power Supply Cables



CAUTION

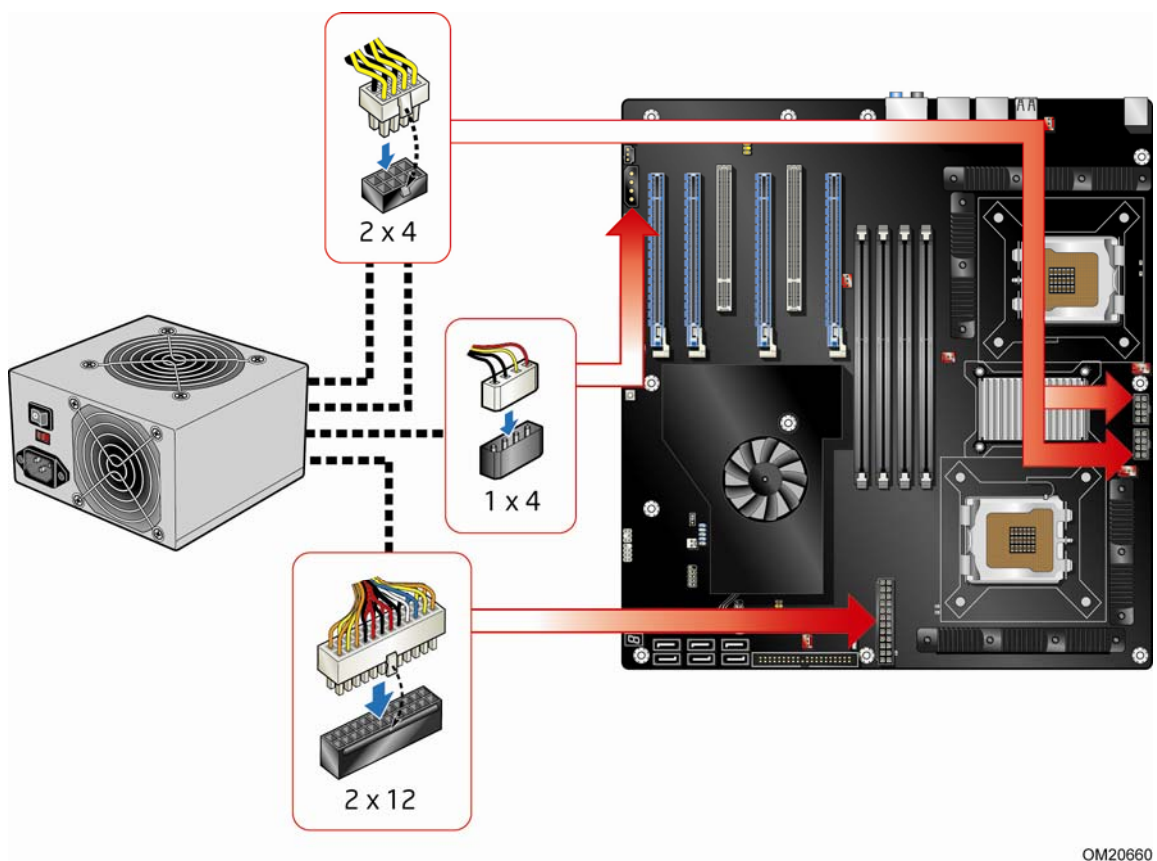
Failure to use an appropriate power supply and/or not connecting the 12 V (2 x 4 pin) power connectors to the Desktop Board may result in damage to the board or the system may not function properly.



CAUTION

Use of the 1 x 4 power connector is required with ATX12V power supplies when using PCI Express add-in cards that can consume 75 W or greater. Failure to do so may cause damage to the Desktop Board and the add-in cards.

Figure 26 shows the location of the power connectors.



OM20660

Figure 26. Connecting Power Supply Cables

1. Observe the precautions in "Before You Begin" on page 29.
2. Connect the 12 V processor core voltage power supply cables to the 2 x 4 pin connectors. Make sure to connect one supply cable for each installed processor.
3. If necessary, connect the 1 x 4 power supply cable to the 1 x 4 connector.
4. Connect the main power supply cable to the 2 x 12 pin connector.

Setting the BIOS Configuration Jumper



NOTE

Always turn off the power and unplug the power cord from the computer before moving the jumper. Moving the jumper with the power on may result in unreliable computer operation.

Figure 27 shows the location of the Desktop Board's BIOS configuration jumper block.

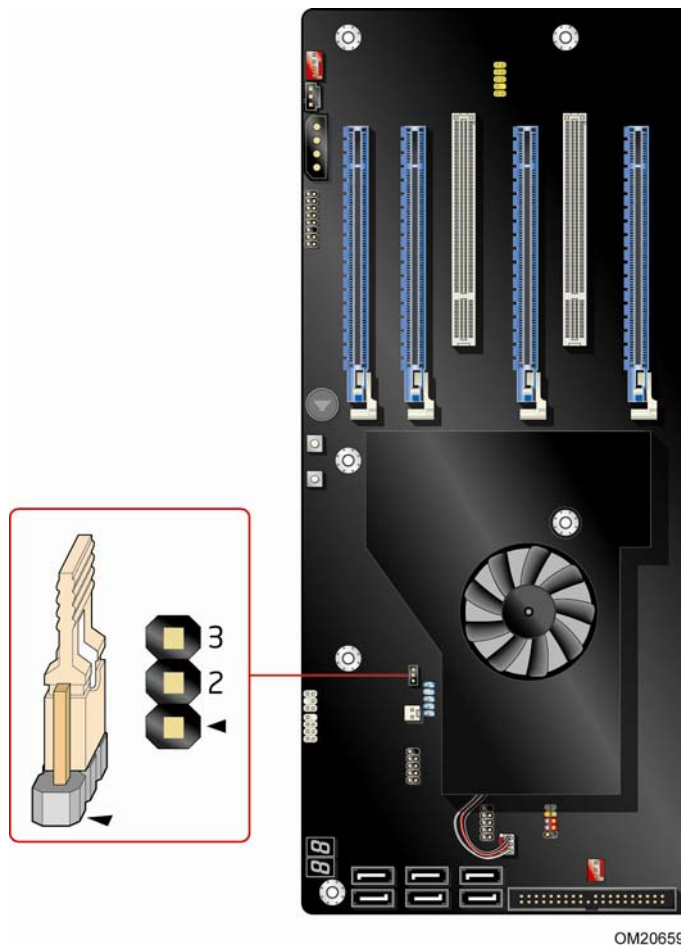
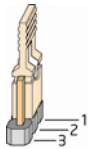
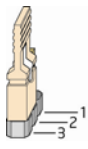
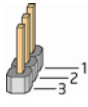


Figure 27. Location of the BIOS Configuration Jumper Block

The three-pin BIOS jumper block enables all board configurations to be done in the BIOS Setup program. Table 13 shows the jumper settings for the BIOS Setup program modes.

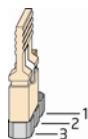
Table 13. Jumper Settings for the BIOS Setup Program Modes

Jumper Setting	Mode	Description
	Normal (default) (1-2)	The BIOS uses the current configuration and passwords for booting.
	Configure (2-3)	After the Power-On Self-Test (POST) runs, the BIOS displays the Maintenance Menu. Use this menu to clear passwords.
	Recovery (None)	The BIOS recovers data in the event of a failed BIOS update.

Clearing Passwords

This procedure assumes that the board is installed in the computer and the configuration jumper block is set to normal mode.

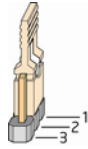
1. Observe the precautions in "Before You Begin" on page 29.
2. Turn off all peripheral devices connected to the computer. Turn off the computer. Disconnect the computer's power cord from the AC power source (wall outlet or power adapter).
3. Remove the computer cover.
4. Find the configuration jumper block (see Figure 27).
5. Place the jumper on pins 2-3 as shown below.



6. Replace the cover, plug in the computer, turn on the computer, and allow it to boot.
7. The computer starts the Setup program. Setup displays the Maintenance menu.
8. Use the arrow keys to select Clear Passwords. Press <Enter> and Setup displays a pop-up screen requesting that you confirm clearing the password. Select Yes and press <Enter>. Setup displays the maintenance menu again.
9. Press <F10> to save the current values and exit Setup.
10. Turn off the computer. Disconnect the computer's power cord from the AC power source.

11. Remove the computer cover.

12. To restore normal operation, place the jumper on pins 1-2 as shown below.



13. Replace the cover, plug in the computer, and turn on the computer.

Replacing the Battery

A coin-cell battery (CR2032) powers the real-time clock and CMOS memory. When the computer is not plugged into a wall socket, the battery has an estimated life of three years. When the computer is plugged in, the standby current from the power supply extends the life of the battery. The clock is accurate to ± 13 minutes/year at 25 °C with 3.3 VSB applied.

When the voltage drops below a certain level, the BIOS Setup program settings stored in CMOS RAM (for example, the date and time) might not be accurate. Replace the battery with an equivalent one. Figure 28 on page 62 shows the location of the battery.



CAUTION

Risk of explosion if the battery is replaced with an incorrect type. Batteries should be recycled where possible. Disposal of used batteries must be in accordance with local environmental regulations.



PRECAUTION

Risque d'explosion si la pile usagée est remplacée par une pile de type incorrect. Les piles usagées doivent être recyclées dans la mesure du possible. La mise au rebut des piles usagées doit respecter les réglementations locales en vigueur en matière de protection de l'environnement.



FORHOLDSREGEL

Eksplussionsfare, hvis batteriet erstattes med et batteri af en forkert type. Batterier bør om muligt genbruges. Bortskaffelse af brugte batterier bør foregå i overensstemmelse med gældende miljølovgivning.



OBS!

Det kan oppstå eksplosjonsfare hvis batteriet skiftes ut med feil type. Brukte batterier bør kastes i henhold til gjeldende miljølovgivning.



VIKTIGT!

Risk för explosion om batteriet ersätts med felaktig batterityp. Batterier ska kasseras enligt de lokala miljövårdsbestämmelserna.



VARO

Räjähdysvaara, jos pariston tyyppi on väärä. Paristot on kierrätettävä, jos se on mahdollista. Käytetyt paristot on hävitettävä paikallisten ympäristömääräysten mukaisesti.



VORSICHT

Bei falschem Einsetzen einer neuen Batterie besteht Explosionsgefahr. Die Batterie darf nur durch denselben oder einen entsprechenden, vom Hersteller empfohlenen Batterietyp ersetzt werden. Entsorgen Sie verbrauchte Batterien den Anweisungen des Herstellers entsprechend.



AVVERTIMENTO

Esiste il pericolo di un esplosione se la pila non viene sostituita in modo corretto. Utilizzare solo pile uguali o di tipo equivalente a quelle consigliate dal produttore. Per disfarsi delle pile usate, seguire le istruzioni del produttore.



PRECAUCIÓN

Existe peligro de explosión si la pila no se cambia de forma adecuada. Utilice solamente pilas iguales o del mismo tipo que las recomendadas por el fabricante del equipo. Para deshacerse de las pilas usadas, siga igualmente las instrucciones del fabricante.



WAARSCHUWING

Er bestaat ontploffingsgevaar als de batterij wordt vervangen door een onjuist type batterij. Batterijen moeten zoveel mogelijk worden gerecycled. Houd u bij het weggooien van gebruikte batterijen aan de plaatselijke milieuwetgeving.



ATENÇÃO

Haverá risco de explosão se a bateria for substituída por um tipo de bateria incorreto. As baterias devem ser recicladas nos locais apropriados. A eliminação de baterias usadas deve ser feita de acordo com as regulamentações ambientais da região.



AŚCIAROŻNAŚĆ

Існуе рызыка выбуху, калі заменены акумулятар непраўльнага тыпу. Акумулятары павінны, па магчымасці, перепрацоўвацца. Пазбаўляцца ад старых акумулятараў патрэбна згодна з мясцовым заканадаўствам па экалогіі.



UPOZORNĚNÍ

V případě výměny baterie za nesprávný druh může dojít k výbuchu. Je-li to možné, baterie by měly být recyklovány. Baterie je třeba zlikvidovat v souladu s místními předpisy o životním prostředí.



Προσοχή

Υπάρχει κίνδυνος για έκρηξη σε περίπτωση που η μπαταρία αντικατασταθεί από μία λανθασμένου τύπου. Οι μπαταρίες θα πρέπει να ανακυκλώνονται όταν κάτι τέτοιο είναι δυνατό. Η απόρριψη των χρησιμοποιημένων μπαταριών πρέπει να γίνεται σύμφωνα με τους κατά τόπο περιβαλλοντικούς κανονισμούς.



VIGYÁZAT

Ha a telepet nem a megfelelő típusú telepre cseréli, az felrobbanhat. A telepeket lehetőség szerint újra kell hasznosítani. A használt telepeket a helyi környezetvédelmi előírásoknak megfelelően kell kiselejtezni.



注意

異なる種類の電池を使用すると、爆発の危険があります。リサイクルが可能な地域であれば、電池をリサイクルしてください。使用後の電池を破棄する際には、地域の環境規制に従ってください。



AWAS

Risiko letupan wujud jika bateri digantikan dengan jenis yang tidak betul. Bateri sepatutnya dikitar semula jika boleh. Pelupusan bateri terpakai mestilah mematuhi peraturan alam sekitar tempatan.



OSTRZEŻENIE

Istnieje niebezpieczeństwo wybuchu w przypadku zastosowania niewłaściwego typu baterii. Zużyte baterie należy w miarę możliwości utylizować zgodnie z odpowiednimi przepisami ochrony środowiska.



PRECAUȚIE

Risc de explozie, dacă bateria este înlocuită cu un tip de baterie necorespunzător. Bateriile trebuie reciclate, dacă este posibil. Depozitarea bateriilor uzate trebuie să respecte reglementările locale privind protecția mediului.



ВНИМАНИЕ

При использовании батареи несоответствующего типа существует риск ее взрыва. Батареи должны быть утилизированы по возможности. Утилизация батарей должна проводиться по правилам, соответствующим местным требованиям.



UPOZORNENIE

Ak batériu vymeníte za nesprávny typ, hrozí nebezpečenstvo jej výbuchu. Batérie by sa mali podľa možnosti vždy recyklovať. Likvidácia použitých batérií sa musí vykonávať v súlade s miestnymi predpismi na ochranu životného prostredia.



POZOR

Zamenjava baterije z baterijo drugačnega tipa lahko povzroči eksplozijo. Če je mogoče, baterije reciklirajte. Rabljene baterije zavržite v skladu z lokalnimi okoljevarstvenimi predpisi.



คำเตือน

ระวังการระเบิดที่เกิดจากเปลี่ยนแบตเตอรี่ผิดประเภท หากเป็นไปได้ ควรนำแบตเตอรี่ไปรีไซเคิล การทิ้งแบตเตอรี่ใช้แล้วต้องเป็นไปตามกฎข้อบังคับด้านสิ่งแวดล้อมของท้องถิ่น.



UYARI

Yanlış türde pil takıldığında patlama riski vardır. Piller mümkün olduğunda geri dönüştürülmelidir. Kullanılmış piller, yerel çevre yasalarına uygun olarak atılmalıdır.



ОСТОРОГА

Використовуйте батареї правильного типу, інакше існуватиме ризик вибуху. Якщо можливо, використані батареї слід утилізувати. Утилізація використаних батарей має бути виконана згідно місцевих норм, що регулюють охорону довкілля.



UPOZORNĚNÍ

V případě výměny baterie za nesprávný druh může dojít k výbuchu. Je-li to možné, baterie by měly být recyklovány. Baterie je třeba zlikvidovat v souladu s místními předpisy o životním prostředí.



ETTEVAATUST

Kui patarei asendatakse uue ebasobivat tüüpi patareiga, võib tekkida plahvatusoht. Tühjad patareid tuleb võimaluse korral viia vastavasse kogumispunkti. Tühjade patareide äraviskamisel tuleb järgida kohalikke keskkonnakaitse alaseid reegleid.



FIGYELMEZTETÉS

Ha az elemet nem a megfelelő típusúra cseréli, felrobbanhat. Az elemeket lehetőség szerint újra kell hasznítani. A használt elemeket a helyi környezetvédelmi előírásoknak megfelelően kell kiselejtezni.



UZMANĪBU

Pastāv eksplozijas risks, ja baterijas tiek nomainītas ar nepareiza veida baterijām. Ja iespējams, baterijas vajadzētu nodot attiecīgos pieņemšanas punktos. Bateriju izmešanai atkritumos jānotiek saskaņā ar vietējiem vides aizsardzības noteikumiem.



DĒMESIO

Naudojant netinkamo tipo baterijas įrenginys gali sprogti. Kai tik įmanoma, baterijas reikia naudoti pakartotinai. Panaudotas baterijas išmesti būtina pagal vietinius aplinkos apsaugos nuostatus.



ATTENZIONE

Riskju ta' splużjoni jekk il-batterija tinbidel b'tip ta' batterija mhux korrett. Il-batteriji għandhom jiġu riċiklati fejn hu possibbli. Ir-rimi ta' batteriji użati għandu jsir skond ir-regolamenti ambjentali lokali.

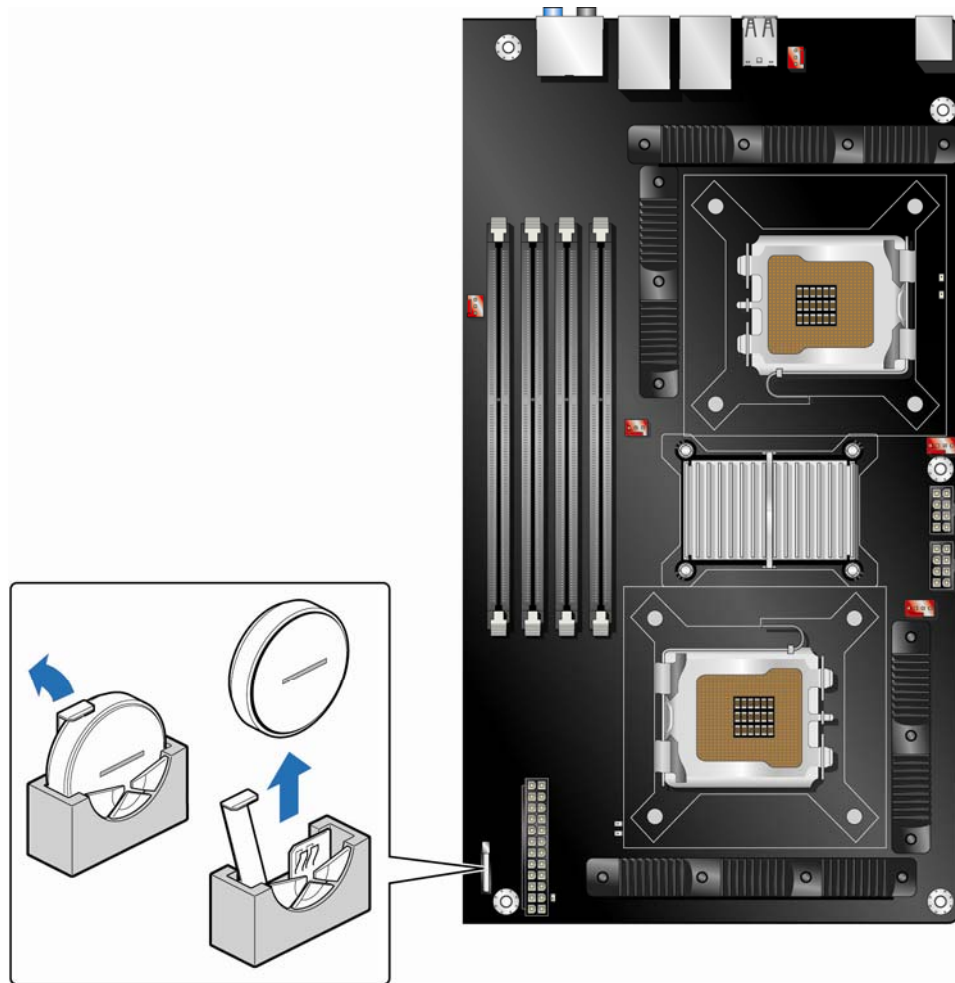


OSTRZEŻENIE

Ryzyko wybuchu w przypadku wymiany na baterie niewłaściwego typu. W miarę możliwości baterie należy poddać recyklingowi. Zużytych baterii należy pozbywać się zgodnie z lokalnie obowiązującymi przepisami w zakresie ochrony środowiska.

To replace the battery, follow these steps:

1. Observe the precautions in "Before You Begin" (see page 29).
2. Turn off all peripheral devices connected to the computer. Disconnect the computer's power cord from the AC power source (wall outlet or power adapter).
3. Remove the computer cover.
4. Locate the battery on the board (see Figure 28).
5. Push the battery retention clip aside and remove the battery from the connector as shown in Figure 28. Note the orientation of the "+" and "-" on the battery.
6. Install the new battery in the connector, orienting the "+" and "-" correctly.
7. Replace the computer cover.



OM20658

Figure 28. Removing the Battery

3 Updating the BIOS

The BIOS Setup program can be used to view and change the BIOS settings for the computer. You can access the BIOS Setup program by pressing the <F2> key after the Power-On Self-Test (POST) memory test begins and before the operating system boot begins.

This chapter tells you how to update the BIOS by either using the Intel Express BIOS Update utility or the Iflash Memory Update utility, and how to recover the BIOS if an update fails.

Updating the BIOS with the Intel® Express BIOS Update Utility

With the Intel Express BIOS Update utility you can update the system BIOS while in the Windows environment. The BIOS file is included in an automated update utility that combines the functionality of the Intel® Flash Memory Update Utility and the ease of use of Windows-based installation wizards.

To update the BIOS with the Intel Express BIOS Update utility:

1. Go to the Intel World Wide Web site:
<http://support.intel.com/support/motherboards/desktop/>
2. Navigate to the D5400XS page, click "[view] Latest BIOS updates," and select the Express BIOS Update utility file.
3. Download the file to your hard drive. (You can also save this file to a removable USB device. This is useful if you are updating the BIOS for multiple identical systems.)
4. Close all other applications. This step is required. Your system will be rebooted at the last Express BIOS Update window.
5. Double-click the executable file from the location on your hard drive where it was saved. This runs the update program.
6. Follow the instructions provided in the dialog boxes to complete the BIOS update.

Updating the BIOS with the ISO Image BIOS Update File or the Iflash Memory Update Utility

You can use the information in this section to update the BIOS using either the Iflash Memory Update Utility or the ISO Image BIOS update file.

Obtaining the BIOS Update File

You can update to a new version of the BIOS by using the ISO Image BIOS update file (recommended), or Iflash BIOS update file.

The ISO Image BIOS update file is a standardized image of a bootable CD-ROM that can be used to create a bootable CD that will update the BIOS.

The Iflash BIOS update file is a compressed file that contains the files you need to update the BIOS. The Iflash BIOS update file contains:

- New BIOS file (including the Intel® Management Engine Firmware Image)
- Intel® Integrator Toolkit Configuration File (optional)
- Intel Flash Memory Update Utility

You can obtain either of these files through your computer supplier or by navigating to the Desktop Board D5400XS page on the Intel World Wide Web site at

<http://support.intel.com/support/motherboards/desktop>.

Navigate to the D5400XS page, click "[view] Latest BIOS updates," and select the ISO Image BIOS Update or Iflash BIOS Update utility file.

Updating the BIOS with the ISO Image BIOS Update File

The ISO Image BIOS update allows for the update of an Intel® Desktop Board BIOS to the latest production release regardless of the operating system installed on the computer's hard drive and without the need to remove the BIOS configuration jumper. It requires a blank CD-R, a read/writeable CD drive, and software capable of uncompressing and writing the ISO image file to CD.

The image uses ISOLINUX* bootloader and automatically launches a script to upgrade the BIOS via the Iflash utility.

**CAUTION**

Do not interrupt the process or the system may not function properly.

Follow these instructions to upgrade the BIOS using the ISO Image BIOS file:

1. Download the ISO Image BIOS file.
2. Using software capable of uncompressing and writing an ISO image file to CD, burn the data to a blank CD.

**NOTE**

Copying the ISO Image BIOS file to CD will not work. The completed CD should contain multiple files and a directory.

3. Insert the CD that was created in the CD-ROM drive of the computer to be upgraded and boot the system.
4. When the "Press ENTER to continue booting from CD-ROM" prompt appears, press the Enter key. The system will boot from the hard drive if no key is pressed within 15 seconds.
5. At the "Welcome to the Intel Desktop Board BIOS Upgrade CD-ROM" page, press any key to confirm the BIOS upgrade operation.
6. Wait for the BIOS upgrade process to complete.

**CAUTION**

DO NOT POWER DOWN YOUR COMPUTER before the update is complete. The update may take up to 5 minutes.

Updating the BIOS with the Iflash Memory Update Utility

With the Iflash Memory update utility you can update the system BIOS from a bootable CD-ROM, bootable USB flash drive, or other bootable USB media. The utility available on the Intel World Wide Web site provides a simple method for creating a bootable CD-ROM that will automatically update your BIOS. The Iflash BIOS update files can also be extracted locally to your hard drive and copied to a bootable USB flash drive or other bootable USB media.

The Iflash Memory update utility allows you to:

- Update the BIOS and Intel Management Engine in flash memory
- Update the language section of the BIOS

**NOTE**

Review the instructions distributed with the update utility before attempting a BIOS update.



CAUTION

Do not interrupt the process or the system may not function properly.

1. Uncompress the BIOS update file and copy the .BIO file, IFLASH.EXE, and .ITK file (optional) to a bootable USB flash drive or other bootable USB media.
2. Configure the BIOS or use the F10 option during POST to boot to the USB device.
3. Manually run the IFLASH.EXE file from the USB device and manually update the BIOS.

Recovering the BIOS

It is unlikely that anything will interrupt the BIOS update; however, if an interruption occurs, the BIOS could be damaged. Due to BIOS size and recovery requirements, a CD-R with the .BIO file in the root directory will be required.

Related Links

For more information about updating the Intel Desktop Board BIOS or recovering from a BIOS update failure, go to

<http://support.intel.com/support/motherboards/desktop/sb/CS-022312.htm>.

4 Configuring for RAID

Configuring for RAID Using Intel® Matrix Storage Technology



NOTE

Intel Matrix Storage Technology requires the Microsoft Windows Vista or Microsoft Windows XP operating system and SATA hard drives.

Configuring the BIOS

1. Assemble your system and attach two or more SATA hard drives to the SATA connectors.
2. Enter system BIOS Setup by pressing <F2> after the Power-On-Self-Test (POST) memory tests begin.
3. Go to **Advanced** → **Drive Configuration** → **Configure SATA as**; ensure that **RAID** is selected.
4. Then save your settings by pressing <F10>.

Creating Your RAID Set

1. Upon re-boot, you will see the following Intel Matrix Storage Manager option ROM status message on the screen: Press <Ctrl-I> to enter the RAID Configuration Utility. Press <Ctrl-I> and enter the RAID Configuration Utility.
2. In the Intel Matrix Storage Manager option ROM Main Menu, select option #1: Create RAID Volume. Enter a volume name (using English alphanumeric ASCII characters) and press <Enter>.
3. Use the arrow keys to select RAID 0 or RAID 1 (if only two SATA drives are available), RAID 5 and RAID 10 (these options will only appear if three or four SATA drives are installed). Press <Enter> once you have selected the RAID LEVEL.
4. Select the drives to be used in the RAID array (only if there are more than two drives available) and press <Enter>.
5. Select the strip size, if necessary, and press <Enter>.
6. Enter the size of the volume (if you enter less than the maximum volume size, you can then create a second RAID array on the remaining portion of your volume) and press <Enter>.
7. Finally, press <Enter> to **Create Volume**.
8. Exit the Option ROM user interface by pressing <Esc> or going to the EXIT option in the MAIN MENU.

Loading the Intel Matrix Storage Technology RAID Drivers and Software

1. Begin Windows Setup by booting from the Windows installation CD.
2. At the beginning of Windows Setup, press <F6> to install a third-party SCSI or RAID driver. When prompted, insert the diskette that contains the Intel Matrix Storage Technology RAID Driver in a USB floppy disk drive. Refer to <http://support.microsoft.com/kb/916196/en-us> for information on selecting a compatible USB floppy disk drive. Install the Intel® SATA RAID Controller driver.
3. Finish the Windows installation and install all necessary drivers.
4. Install the Intel Matrix Storage Console software via the Intel Express Installer CD included with your Desktop Board or after downloading it from the Desktop Board D5400XS page at <http://www.intel.com/products/motherboard/>. The Intel Matrix Storage Console software can be used to manage the RAID configuration.

Setting Up a “RAID Ready” System

The Intel Matrix Storage Technology Console software offers the flexibility to upgrade from a single Serial ATA drive to RAID without reinstalling the operating system, when a second SATA hard drive is added to the system.

Follow the steps described above in "Configuring the BIOS for Intel Matrix Storage Technology" and "Loading the Intel Matrix Storage Technology RAID Drivers and Software."

Once additional SATA drives have been added to the system, open the Intel Matrix Storage Technology Console Software and follow the directions to update to a RAID setup.

Configuring for External RAID Using Marvell Storage Technology

Configuring the BIOS

1. Assemble your system and attach two eSATA hard drives to the Desktop Board's two back panel eSATA connectors.
2. Enter system BIOS Setup by pressing the <F2> key after the Power-On-Self-Test (POST) memory tests begin.
3. Go to **Advanced → Peripheral Configuration → Secondary SATA Controller**; ensure that **RAID** is selected.
4. Then save your settings by pressing <F10>.

Creating Your RAID Set

1. Upon re-boot, you will see the following Marvell Storage Manager option ROM status message on the screen: Press <Ctrl-M> to enter the RAID Configuration Utility. Press <Ctrl-M> and enter the RAID Configuration Utility.
 2. In the Marvell Storage Manager option ROM Main Menu, select: Create RAID Volume. Enter a volume name and press <Enter>.
- NOTE:** The RAID Volume name must be in English alphanumeric ASCII characters.
3. Use the arrow keys to select RAID 0 or RAID 1. Press <Enter> once you have selected the RAID LEVEL.
 4. Select the strip size, if necessary, and press <Enter>.
 5. Enter the size of the volume (if you enter less than the maximum volume size, you can then create a second RAID array on the remaining portion of your volume) and press <Enter>.
 6. Finally, press <Enter> to **Create Volume**.
 7. Exit the Option ROM user interface by pressing <Esc> or going to the EXIT option in the MAIN MENU.

Loading the Marvell Storage Technology RAID Drivers and Software

1. Begin Windows Setup by booting from the Windows installation CD.
2. At the beginning of Windows Setup, press <F6> to install a third-party SCSI or RAID driver. When prompted, insert the diskette that contains the Marvell Storage Technology RAID Driver in a USB floppy disk drive. Refer to <http://support.microsoft.com/kb/916196/en-us> for information on selecting a compatible USB floppy disk drive. Install the Marvell 88SE61XX SATA RAID Controller driver.
3. Finish the Windows installation and install all necessary drivers.

A Error Messages and Indicators

Desktop Board D5400XS reports POST errors in three ways:

- By sounding a beep code
- By displaying an error message on the monitor
- By displaying diagnostic progress codes (POST codes)

BIOS Beep Codes

The BIOS also issues a beep code (one long tone followed by two short tones) during POST if the video configuration fails (a faulty video card or no card installed) or if an external ROM module does not properly checksum to zero. Table 14 lists the BIOS codes.

Table 14. Beep Codes

Beep	Description
3	No memory
Siren	Processor overheat (on reboot)

BIOS Error Messages

When a recoverable error occurs during the POST, the BIOS displays an error message describing the problem. Table 15 gives an explanation of the BIOS error messages.

Table 15. BIOS Error Messages

Error Message	Explanation
PROCESSOR_THERMAL_TRIP_ERROR	Processor was previously shutdown due to a thermal event (overheating).
MULTI_BIT_ECC_ERROR	The firmware has detected that a Multi-Bit ECC Error occurred.
SINGLE_BIT_ECC_ERROR	The firmware has detected that a Single-Bit ECC Error occurred.
CMOS_BATTERY_ERROR	The firmware has detected that a CMOS battery failure occurred.
CMOS_CHECKSUM_ERROR	The firmware has detected that a CMOS Checksum Error occurred.
CMOS_TIMER_ERROR	The firmware has detected that the system date/time has not been set.
MEMORY_SIZE_DECREASE_ERROR	The firmware has detected that the system memory has decreased.
INTRUDER_DETECTION_ERROR	The system chassis was opened.

Port 80h POST Codes

During the POST, the BIOS generates diagnostic progress codes (POST codes) to I/O port 80h. If the POST fails, execution stops and the last POST code generated is left at port 80h and displayed on the Desktop Board's seven-segment LED display shown in Figure 29. This code is useful for determining the point where an error occurred during the POST.

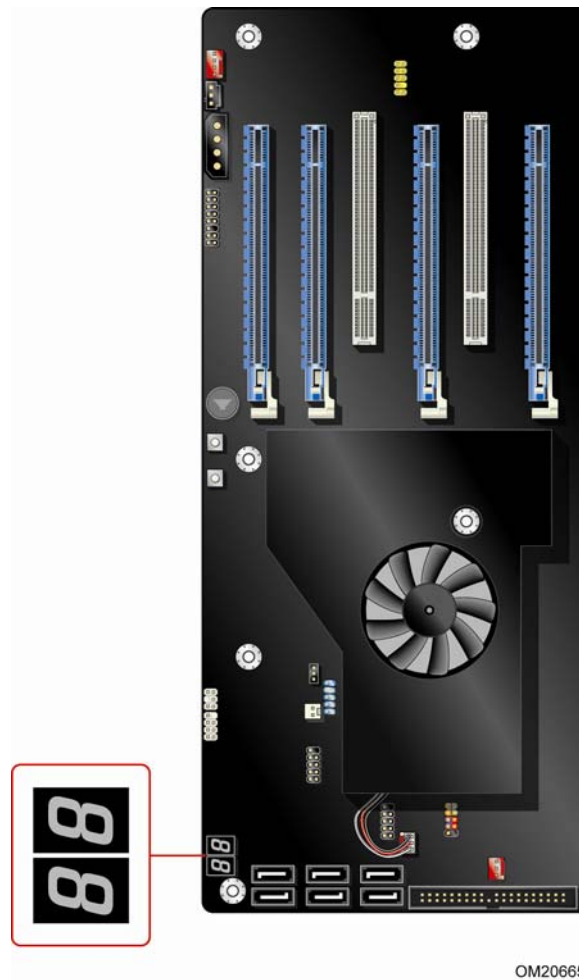


Figure 29. POST Code Indicators

Table 16 lists the Port 80h POST codes in hexadecimal notation.

Table 16. Port 80h POST Codes

POST Code	Description of POST Operation
Host Processor	
10	Power-on initialization of the host processor (Boot Strap Processor)
11	Host processor cache initialization (including APs)
12	Starting Application processor initialization
13	SMM initialization
Chipset	
21	Initializing a chipset component
Memory	
22	Reading SPD from memory DIMMs
23	Detecting presence of memory DIMMs
24	Programming timing parameters in the memory controller and the DIMMs
25	Configuring memory
26	Optimizing memory settings
27	Initializing memory, such as ECC init
29	Memory testing completed
PCI Bus	
50	Enumerating PCI buses
51	Allocating resources to the PCI bus
52	Hot Plug PCI controller initialization
53 – 57	Reserved for the PCI bus
USB	
58	Resetting the USB bus
59	Reserved for the USB bus
ATA/ATAPI/SATA	
5A	Resetting the PATA/SATA bus and all devices
5B	Reserved for ATA
SMBus	
5C	Resetting the SMBus
5D	Reserved for the SMBus
Local Console	
70	Resetting the VGA controller
71	Disabling the VGA controller
72	Enabling the VGA controller
Remote Console	
78	Resetting the console controller
79	Disabling the console controller
7A	Enabling the console controller

continued

Table 16. Port 80h POST Codes (continued)

POST Code	Description of POST Operation
Keyboard (USB)	
90	Resetting the keyboard
91	Disabling the keyboard
92	Detecting presence of a keyboard
93	Enabling the keyboard
94	Clearing the keyboard input buffer
95	Instructing the keyboard controller to run Self Test (PS/2 only)
Mouse (USB)	
98	Resetting the mouse
99	Disabling the mouse
9A	Detecting presence of a mouse
9B	Enabling the mouse
Fixed Media	
B0	Resetting fixed media
B1	Disabling fixed media
B2	Detecting presence of fixed media (IDE hard drive detection, etc)
B3	Enabling/configuring fixed media
Removable Media	
B8	Resetting removable media
B9	Disabling removable media
BA	Detecting presence of removable media (IDE, CD-ROM detection, etc)
BC	Enabling/configuring removable media
BDS	
Dy	Trying boot selection y (y=0 to 15)
PEI Core	
E0	Started dispatching PEIMs (emitted on first report of EFI_SW_PC_INIT_BEGIN EFI_SW_PEI_PC_HANDOFF_TO_NEXT)
E2	Permanent memory found
E1, E3	Reserved for PEI/PEIMs
DXE Core	
E4	Entered DXE phase
E5	Started dispatching drivers
E6	Started connecting drivers

continued

Table 16. Port 80h POST Codes (continued)

POST Code	Description of POST Operation
DXE Drivers	
E7	Waiting for user input
E8	Checking the password
E9	Entering BIOS setup
EB	Calling Legacy Option ROMs
Runtime Phase/EFI Operating System Boot	
F4	Entering Sleep state
F5	Exiting Sleep state
F8	EFI boot service ExitBootServices() has been called
F9	EFI runtime service SetVirtualAddressMap() has been called
FA	EFI runtime service ResetSystem() has been called
PEIMs/Recovery/Wake	
30	Wake from S3
31	Crisis Recovery has initiated by software (corrupt Flash memory)
34	Loading the recovery capsule
35	Handing off control to the recovery capsule
3F	Unable to recover
40	Wake from S4

B Regulatory Compliance

This appendix contains the following regulatory compliance information for Desktop Board D5400XS:

- Safety standards
- European Union Declaration of Conformity statement
- Product Ecology statements
- Electromagnetic Compatibility (EMC) regulations
- Product certifications

Safety Standards

Desktop Board D5400XS complies with the safety standards stated in Table 17 when correctly installed in a compatible host system.

Table 17. Safety Standards

Regulation	Title
CSA/UL 60950-1, First Edition	Information Technology Equipment – Safety - Part 1: General Requirements (USA and Canada)
EN 60950-1:2006, Second Edition	Information Technology Equipment – Safety - Part 1: General Requirements (European Union)
IEC 60950-1:2005, Second Edition	Information Technology Equipment – Safety - Part 1: General Requirements (International)

Place Battery Marking

There is insufficient space on this Desktop Board to provide instructions for replacing and disposing of the Lithium ion coin cell battery. For system safety certification, the statement below or an equivalent statement is required to be permanently and legibly marked on the chassis near the battery.



CAUTION

Risk of explosion if the battery is replaced with an incorrect type. Batteries should be recycled where possible. Disposal of used batteries must be in accordance with local environmental regulations.

A suitable caution label is included with Desktop Board D5400XS.

Related Links

For information about replacing the battery, go to page 57.

European Union Declaration of Conformity Statement

We, Intel Corporation, declare under our sole responsibility that the product Intel® Desktop Board D5400XS is in conformity with all applicable essential requirements necessary for CE marking, following the provisions of the European Council Directives 2004/108/EC (EMC Directive) and 2006/95/EC (Low Voltage Directive).

The product is properly CE marked demonstrating this conformity and is for distribution within all member states of the EU with no restrictions.



This product follows the provisions of the European Directives 2004/108/EC and 2006/95/EC.

Čeština Tento výrobek odpovídá požadavkům evropských směrnic 2004/108/EC a 2006/95/EC.

Dansk Dette produkt er i overensstemmelse med det europæiske direktiv 2004/108/EC & 2006/95/EC.

Dutch Dit product is in navolging van de bepalingen van Europees Directief 2004/108/EC & 2006/95/EC.

Eesti Antud toode vastab Euroopa direktiivides 2004/108/EC ja 2006/95/EC kehtestatud nõuetele.

Suomi Tämä tuote noudattaa EU-direktiivin 2004/108/EC & 2006/95/EC määräyksiä.

Français Ce produit est conforme aux exigences de la Directive Européenne 2004/108/EC & 2006/95/EC.

Deutsch Dieses Produkt entspricht den Bestimmungen der Europäischen Richtlinie 2004/108/EC & 2006/95/EC.

Ελληνικά Το παρόν προϊόν ακολουθεί τις διατάξεις των Ευρωπαϊκών Οδηγιών 2004/108/EC και 2006/95/EC.

Magyar E termék megfelel a 2004/108/EC és 2006/95/EC Európai Irányelv előírásainak.

Icelandic Þessi vara stenst reglugerð Evrópska Efnahags Bandalagsins númer 2004/108/EC & 2006/95/EC.

Italiano Questo prodotto è conforme alla Direttiva Europea 2004/108/EC & 2006/95/EC.

Latviešu Šis produkts atbilst Eiropas Direktīvu 2004/108/EC un 2006/95/EC noteikumiem.

Lietuvių Šis produktas atitinka Europos direktyvų 2004/108/EC ir 2006/95/EC nuostatas.

Malti Dan il-prodott hu konformi mal-provvedimenti tad-Direttivi Ewropej 2004/108/EC u 2006/95/EC.

Norsk Dette produktet er i henhold til bestemmelsene i det europeiske direktivet 2004/108/EC & 2006/95/EC.

Polski Niniejszy produkt jest zgodny z postanowieniami Dyrektyw Unii Europejskiej 2004/108/EC i 2006/95/EC.

Portuguese Este produto cumpre com as normas da Diretiva Europeia 2004/108/EC & 2006/95/EC.

Español Este producto cumple con las normas del Directivo Europeo 2004/108/EC & 2006/95/EC.

Slovensky Tento produkt je v súlade s ustanoveniami európskych direktív 2004/108/EC a 2006/95/EC.

Slovenščina Izdelek je skladen z določbami evropskih direktiv 2004/108/EC in 2006/95/EC.

Svenska Denna produkt har tillverkats i enlighet med EG-direktiv 2004/108/EC & 2006/95/EC.

Türkçe Bu ürün, Avrupa Birliği'nin 2004/108/EC ve 2006/95/EC yönergelerine uyar.

Product Ecology Statements

The following information is provided to address worldwide product ecology concerns and regulations.

Recycling Considerations

As part of its commitment to environmental responsibility, Intel has implemented the Intel® Product Recycling Program to allow retail consumers of Intel's branded products to return used products to selected locations for proper recycling.

Please consult http://www.intel.com/intel/other/ehs/product_ecology for the details of this program, including the scope of covered products, available locations, shipping instructions, terms and conditions, etc.

中文

作为其对环境责任之承诺的部分，英特尔已实施 Intel Product Recycling Program（英特尔产品回收计划），以允许英特尔品牌产品的零售消费者将使用过的产品退还至指定地点作恰当的重复使用处理。

请参考http://www.intel.com/intel/other/ehs/product_ecology了解此计划的详情，包括涉及产品之范围、回收地点、运送指导、条款和条件等。

Deutsch

Als Teil von Intels Engagement für den Umweltschutz hat das Unternehmen das Intel Produkt-Recyclingprogramm implementiert, das Einzelhandelskunden von Intel Markenprodukten ermöglicht, gebrauchte Produkte an ausgewählte Standorte für ordnungsgemäßes Recycling zurückzugeben.

Details zu diesem Programm, einschließlich der darin eingeschlossenen Produkte, verfügbaren Standorte, Versandanweisungen, Bedingungen usw., finden Sie auf der http://www.intel.com/intel/other/ehs/product_ecology

Español

Como parte de su compromiso de responsabilidad medioambiental, Intel ha implantado el programa de reciclaje de productos Intel, que permite que los consumidores al detalle de los productos Intel devuelvan los productos usados en los lugares seleccionados para su correspondiente reciclado.

Consulte la http://www.intel.com/intel/other/ehs/product_ecology para ver los detalles del programa, que incluye los productos que abarca, los lugares disponibles, instrucciones de envío, términos y condiciones, etc.

Français

Dans le cadre de son engagement pour la protection de l'environnement, Intel a mis en œuvre le programme Intel Product Recycling Program (Programme de recyclage des produits Intel) pour permettre aux consommateurs de produits Intel de recycler les produits usés en les retournant à des adresses spécifiées.

Visitez la page Web http://www.intel.com/intel/other/ehs/product_ecology pour en savoir plus sur ce programme, à savoir les produits concernés, les adresses disponibles, les instructions d'expédition, les conditions générales, etc.

日本語

インテルでは、環境保護活動の一環として、使い終わったインテルブランド製品を指定の場所へ返送していただき、リサイクルを適切に行えるよう、インテル製品リサイクルプログラムを発足させました。

対象製品、返送先、返送方法、ご利用規約など、このプログラムの詳細情報は、http://www.intel.com/intel/other/ehs/product_ecology (英語)をご覧ください。

Malay

Sebagai sebahagian daripada komitmennya terhadap tanggungjawab persekitaran, Intel telah melaksanakan Program Kitar Semula Produk untuk membenarkan pengguna-pengguna runcit produk jenama Intel memulangkan produk terguna ke lokasi-lokasi terpilih untuk dikitarkan semula dengan betul.

Sila rujuk http://www.intel.com/intel/other/ehs/product_ecology untuk mendapatkan butir-butir program ini, termasuklah skop produk yang dirangkumi, lokasi-lokasi tersedia, arahan penghantaran, terma & syarat, dsb.

Portuguese

Como parte deste compromisso com o respeito ao ambiente, a Intel implementou o Programa de Reciclagem de Produtos para que os consumidores finais possam enviar produtos Intel usados para locais selecionados, onde esses produtos são reciclados de maneira adequada.

Consulte o site http://www.intel.com/intel/other/ehs/product_ecology (em Inglês) para obter os detalhes sobre este programa, inclusive o escopo dos produtos cobertos, os locais disponíveis, as instruções de envio, os termos e condições, etc.

Russian

В качестве части своих обязательств к окружающей среде, в Intel создана программа утилизации продукции Intel (Product Recycling Program) для предоставления конечным пользователям марок продукции Intel возможности возврата используемой продукции в специализированные пункты для должной утилизации.

Пожалуйста, обратитесь на веб-сайт http://www.intel.com/intel/other/ehs/product_ecology за информацией об этой программе, принимаемых продуктах, местах приема, инструкциях об отправке, положениях и условиях и т.д.

Türkçe

Intel, çevre sorumluluğuna bağlılığının bir parçası olarak, perakende tüketicilerin Intel markalı kullanılmış ürünlerini belirlenmiş merkezlere iade edip uygun şekilde geri dönüştürmesini amaçlayan Intel Ürünleri Geri Dönüşüm Programı'nı uygulamaya koymuştur.

Bu programın ürün kapsamı, ürün iade merkezleri, nakliye talimatları, kayıtlar ve şartlar v.s dahil bütün ayrıntılarını öğrenmek için lütfen http://www.intel.com/intel/other/ehs/product_ecology web sayfasına gidin.

Lead-free 2LI/Pb-free 2LI Board

The electronics industry is transitioning to European Union (EU) Restriction of Hazardous Substances (RoHS)-compliant products. The RoHS legislation restricts the use of six materials. One of these restricted materials is lead. Lead is the most common and problematic of the RoHS restricted materials.

There are exemptions in RoHS that allow the use of lead in some very limited locations in electronic products. Maximum lead concentration values have been established for RoHS-compliant electronic products that allow up to 1000 ppm of lead.


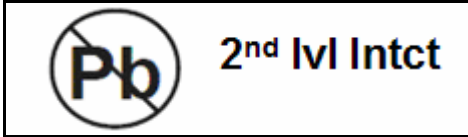
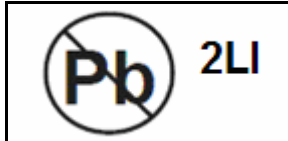
Lead-free/Pb-free is a nickname that is often used (or misused) for RoHS-compliant products. In this case, the term "Lead-free/Pb-free" means that lead has been removed where required by the RoHS legislation but still may exist as an impurity below 1000 ppm.

The term "Lead-free 2LI/Pb-free 2LI" means lead-free second level interconnect (2LI). The balls, leads, or pads used to connect a component to a printed circuit board are lead-free, but the first level interconnect (FLI) is not lead-free. The use of lead in the FLI is acceptable because of the RoHS "flip chip" or "die bump" interconnect exemption.

Desktop Board D5400XS is a lead-free second level interconnect product. Table 18 shows the lead-free second level interconnect marks as they appear on the board and accompanying collateral. These marks are based on IPC/JEDEC standard J-STD-609, *Marking and Labeling of Components, PCBs and PCBAs to Identify Lead, Lead Free and Other Attributes*.

For more information concerning Intel's lead-free initiatives, refer to:
<http://www.intel.com/technology/silicon/leadfree.htm>.

Table 18. Lead-Free Second Level Interconnect Marks

Description	Mark
<p>This symbol is used to identify electrical and electronic assemblies and components in which the Pb concentration level in the Desktop Board substrate and the solder connections from the board to the components (second-level interconnect) is not greater than 0.1% by weight (1000 ppm).</p>	<div data-bbox="678 300 1386 436">  </div> <p data-bbox="1019 470 1045 491">or</p> <div data-bbox="800 525 1265 661">  </div> <p data-bbox="1019 695 1045 716">or</p> <div data-bbox="889 749 1174 888">  </div>

Restriction of Hazardous Substances (RoHS)

EU RoHS

EU RoHS Directive 2002/95/EC restricts the use of the following six materials in various types of electronic and electrical equipment:

- Lead
- Mercury
- Cadmium
- Hexavalent chromium
- Polybrominated biphenyls (PBB)
- Polybrominated diphenyl ether (PBDE)

The maximum concentrations allowed are 0.1% or 1000 ppm (except for cadmium, which is limited to 0.01% or 100 ppm) by weight of homogeneous material.

Desktop Board D5400XS complies with these restrictions.

China RoHS

“China RoHS” is the term used by industry generally to describe legislation implemented by the Ministry of Information Industry (MII) in the People's Republic of China for the control of pollution by electronic information products (EIP). The official title of the China RoHS regulation is *Management Methods for Controlling Pollution by Electronic Information Products*.


China RoHS bans the same substances and has the same limits as EU RoHS. However, the China RoHS regulation requires specific product marking and a self-declaration of the controlled substances contained in each product.

Desktop Board D5400XS is a China RoHS-compliant product.

The required China RoHS mark indicates the product’s Environmental Friendly Usage Period (EFUP). The EFUP is defined as the number of years for which listed controlled substances will not leak or chemically deteriorate while in the product. The EFUP for Intel Desktop Boards has been determined to be 10 years.

The China RoHS EFUP mark for Desktop Board D5400XS is shown in Table 19.

Table 19. China RoHS Environmentally Friendly Use Period Mark

Description	Mark
This is an example of the symbol used on Intel Desktop Boards and associated collateral. The color of the mark may vary depending upon the application. The Environmental Friendly Usage Period (EFUP) for Intel Desktop Boards has been determined to be 10 years.	

The China MII also stipulates that a material Self Declaration Table (SDT) must be included in a product’s user documentation. The SDT for Desktop Board D5400XS is shown in Figure 30.

关于符合中国《电子信息产品污染控制管理办法》的声明

**Management Methods on Control of Pollution from
Electronic Information Products
(China RoHS declaration)**

产品中有毒有害物质的名称及含量

部件名称 (Parts)	有毒有害物质或元素					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr6+)	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
主板组件 Motherboard Assembly	×	○	○	○	○	○
<p>○：表示该有毒有害物质在该部件所有均质材料中的含量均在 SJ/T 11363-2006 标准规定的限量要求以下。</p> <p>○：Indicates that this hazardous substance contained in all homogeneous materials of this part is below the limit requirement in SJ/T 11363-2006.</p> <p>×：表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 SJ/T 11363-2006 标准规定的限量要求。</p> <p>×：Indicates that this hazardous substance contained in at least one of the homogeneous materials of this part is above the limit requirement in SJ/T 11363-2006.</p> <p>对销售之日的所售产品,本表显示我公司供应链的电子信息产品可能包含这些物质。注意：在所售产品中可能会也可能不会含有所有所列的部件。</p> <p>This table shows where these substances may be found in the supply chain of our electronic information products, as of the date of sale of the enclosed product. Note that some of the component types listed above may or may not be a part of the enclosed product.</p>						

**Figure 30. Desktop Board D5400XS China RoHS Material
Self Declaration Table**

EMC Regulations

Desktop Board D5400XS complies with the EMC regulations stated in Table 20 when correctly installed in a compatible host system.

Table 20. EMC Regulations

Regulation (Class B)	Title
FCC 47 CFR Part 15, Subpart B	Title 47 of the Code of Federal Regulations, Part 15, Subpart B, Radio Frequency Devices. (USA)
ICES-003 Issue 4	Interference-Causing Equipment Standard, Digital Apparatus. (Canada)
EN55022:2006	Limits and methods of measurement of Radio Interference Characteristics of Information Technology Equipment. (European Union)
EN55024:1998	Information Technology Equipment – Immunity Characteristics Limits and methods of measurement. (European Union)
EN55022:2006	Australian Communications Authority, Standard for Electromagnetic Compatibility. (Australia and New Zealand)
CISPR 22:2005 +A1:2005 +A2:2006	Limits and methods of measurement of Radio Disturbance Characteristics of Information Technology Equipment. (International)
CISPR 24:1997 +A1:2001 +A2:2002	Information Technology Equipment – Immunity Characteristics – Limits and Methods of Measurement. (International)
VCCI V-3/2007.04, V-4/2007.04	Voluntary Control for Interference by Information Technology Equipment (Japan)

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

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラスB 情報技術装置です。この装置は、家庭環境で使用することを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると、受信障害を引き起こすことがあります。
取扱説明書に従って正しい取り扱いをして下さい。

Korean Class B statement translation: This is household equipment that is certified to comply with EMC requirements. You may use this equipment in residential environments and other non-residential environments.

이 기기는 가정용으로 전자파적합등록을 한 기기로서
주거지역에서는 물론 모든 지역에서 사용할 수 있습니다.

Ensure Electromagnetic Compatibility (EMC) Compliance

Before computer integration, make sure that the power supply and other modules or peripherals, as applicable, have passed Class B EMC testing and are marked accordingly.

Pay close attention to the following when reading the installation instructions for the host chassis, power supply, and other modules:

- Product certifications or lack of certifications
- External I/O cable shielding and filtering
- Mounting, grounding, and bonding requirements
- Keying connectors when mating the wrong connectors could be hazardous








If the power supply and other modules or peripherals, as applicable, are not Class B EMC compliant before integration, then EMC testing may be required on a representative sample of the newly completed computer.

Product Certifications

Board-Level Certification Markings

Desktop Board D5400XS has the product certification markings shown in Table 21.

Table 21. Product Certification Markings

Description	Mark
UL joint US/Canada Recognized Component mark. Includes adjacent UL file number for Intel Desktop Boards: E210882.	
FCC Declaration of Conformity logo mark for Class B equipment. Includes Intel name and D5400XS model designation.	
CE mark. Declaring compliance to European Union (EU) EMC directive and Low Voltage directive.	
Australian Communications Authority (ACA) and New Zealand Radio Spectrum Management (NZ RSM) C-tick mark. Includes adjacent Intel supplier code number, N-232.	
Japan VCCI (Voluntary Control Council for Interference) mark.	
S. Korea MIC (Ministry of Information and Communication) mark. Includes adjacent MIC certification number: CPU-D5400XS (B).	
Taiwan BSMI (Bureau of Standards, Metrology and Inspections) mark. Includes adjacent Intel company number, D33025.	
Printed wiring board manufacturer's recognition mark. Consists of a unique UL recognized manufacturer's logo, along with a flammability rating (solder side).	V-0

Chassis and Component Certifications

Ensure that the chassis and certain components; such as the power supply, peripheral drives, wiring, and cables; are components certified for the country or market where used. Agency certification marks on the product are proof of certification. Typical product certifications include:

In Europe

The CE marking signifies compliance with all applicable European requirements. If the chassis and other components are not properly CE marked, a supplier's Declaration of Conformity statement to the European EMC directive and Low Voltage directive (as applicable), should be obtained. Additionally, other directives, such as the Radio and Telecommunications Terminal Equipment (R&TTE) directive may also apply depending on product features.

In the United States

A certification mark by a Nationally Recognized Testing Laboratory (NRTL) such as UL, CSA, or ETL signifies compliance with safety requirements. Wiring and cables must also be UL listed or recognized and suitable for the intended use. The FCC Class B logo for home or office use signifies compliance with electromagnetic interference (EMI) requirements.

In Canada

A nationally recognized certification mark such as CSA or cUL signifies compliance with safety requirements. The Industry Canada statement at the front of this product guide demonstrates compliance with Canadian EMC regulations.

