

# Intel® Desktop Board DH61AG Product Guide

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# Revision History

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# Preface

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This Product Guide gives information about board layout, component installation, BIOS updates, and regulatory requirements for Intel® Desktop Board DH61AG.

## 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
- A Error Messages and Indicators: information about BIOS error messages and beep 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.

<b>Term</b>	<b>Description</b>
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)

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**Intel Desktop Board DH61AG Product Guide**



# 1 Desktop Board Features

This chapter briefly describes the features of Intel® Desktop Board DH61AG. Table 1 summarizes the major features of the Desktop Board.

For a detailed description of Intel® Desktop Board DH61AG, refer to the Technical Product Specification at <http://www.intel.com/Products/Desktop/Motherboards/db-dh61ag/DH61AG-technicaldocuments.htm>.

## Feature Summary

**Table 1. Intel Desktop Board DH61AG Features**

<b>Form Factor</b>	Low-profile Mini-ITX (20 millimeters [0.79 inches] x 170.18 millimeters [6.7 inches] x 170.18 millimeters [6.7 inches])
<b>Processor</b>	<ul style="list-style-type: none"><li>• Intel® Core™ i5, Intel® Core™ i3, Intel® Pentium®, Intel® Celeron®, and Intel® Xeon® processors with up to 65 W TDP in an LGA1155 package:<ul style="list-style-type: none"><li>– Integrated graphics processing (processors with Intel® Graphics Technology)</li><li>– Integrated PCI Express* interface controller</li><li>– Integrated memory controller</li></ul></li></ul>
<b>Chipset</b>	Intel® H61 Express Chipset consisting of the Intel® H61 Express Platform Controller Hub (PCH)
<b>Memory</b>	<ul style="list-style-type: none"><li>• Two 204-pin Double Data Rate 3 (DDR3) Small Outline Dual Inline Memory Module (SO-DIMM) sockets with gold-plated contacts</li><li>• Dual Channel DDR3 1333 MHz and DDR3 1066 MHz support</li><li>• Support for 1 Gb, 2 Gb, and 4 Gb memory technology</li><li>• Support for up to 16 GB of system memory with two SO-DIMMs using 4 Gb memory technology</li><li>• Support for non-ECC memory</li><li>• Support for 1.5 V (standard voltage) and 1.35 V (low voltage) JEDEC-compliant memory</li></ul>
<b>Graphics</b>	<ul style="list-style-type: none"><li>• Integrated graphics support for processors with Intel Graphics Technology:<ul style="list-style-type: none"><li>– DVI-I</li><li>– High-Definition Multi-media Interface* (HDMI*)</li><li>– Flat panel display support, including:<ul style="list-style-type: none"><li>Embedded DisplayPort* (eDP*) display panel interface</li><li>LVDS display panel interface</li></ul></li></ul></li><li>• Discrete graphics support for a PCI Express 2.0 x4 or x1 add-in graphics card</li></ul>

continued

**Table 1. Feature Summary (continued)**

<b>Audio</b>	<ul style="list-style-type: none"> <li>• 10-channel (8 + 2) Intel® High Definition Audio (Intel® HD Audio) using a Realtek* ALC892 audio codec supporting:             <ul style="list-style-type: none"> <li>– Digital/analog stereo line-out (2-in-1 digital/analog backpanel jack)</li> <li>– In-chassis stereo speakers support (internal connector)</li> <li>– AV-compliant 7.1 surround support (analog line-level via an internal header)</li> <li>– Secondary S/PDIF digital audio output (internal header)</li> <li>– DMIC digital microphone input (internal header)</li> <li>– Analog line-in (backpanel jack)</li> <li>– Front panel HD Audio/AC'97 headphones/mic support (internal header)</li> </ul> </li> <li>• 8-channel (7.1) Intel HD Audio via the HDMI interface</li> </ul>
<b>Expansion Capabilities</b>	<ul style="list-style-type: none"> <li>• One PCI Express 2.0 x4 add-in card connector</li> <li>• One PCI Express Full-/Half-Mini Card slot (including mini-SATA (mSATA) support)</li> <li>• One PCI Express Half-Mini Card slot</li> </ul>
<b>Peripheral Interfaces</b>	<p>USB Support:</p> <ul style="list-style-type: none"> <li>• Two USB 3.0 ports implemented with stacked back panel connectors (blue)</li> <li>• Seven exposed USB 2.0 ports including:             <ul style="list-style-type: none"> <li>– Two high-current/fast-charging ports implemented with stacked back panel connectors (yellow)</li> <li>– Five front panel ports implemented with two dual-port internal headers and one single-port internal header</li> </ul> </li> </ul> <p>Serial ATA Support:</p> <ul style="list-style-type: none"> <li>• Two internal SATA 3.0 Gb/s ports</li> <li>• One internal mSATA 3.0 Gb/s port (PCI Express Full-Mini Card slot)</li> <li>• One external SATA (eSATA) 3.0 Gb/s port (red)</li> </ul>
<b>Legacy I/O</b>	<p>Legacy I/O Controller (Nuvoton* W83677HG-I) that provides Consumer Infrared (CIR) and hardware management support</p>
<b>LAN Support</b>	<p>Intel® 82579V Gigabit (10/100/1000 Mb/s) Ethernet LAN controller including an RJ-45 back panel connector with integrated status LEDs</p>
<b>BIOS</b>	<ul style="list-style-type: none"> <li>• Intel® BIOS resident in a Serial Peripheral Interface (SPI) Flash device</li> <li>• Support for Advanced Configuration and Power Interface (ACPI), Plug and Play, and System Management BIOS (SMBIOS)</li> <li>• Unified Extensible Firmware Interface (UEFI) to support hard disk drives larger than 2 TB</li> </ul>
<b>Instantly Available PC Technology</b>	<ul style="list-style-type: none"> <li>• Suspend to RAM support</li> <li>• Wake on PCI Express, LAN, front panel, CIR, and USB ports</li> </ul>

continued

**Table 1. Feature Summary (continued)**

<b>Hardware Management</b>	Nuvoton W83677HG-I based subsystem, including: <ul style="list-style-type: none"> <li>• Voltage sense to detect out of range power supply voltages</li> <li>• Thermal sense to detect out of range thermal values</li> <li>• Two fan headers using Pulse Width Modulation (PWM) control</li> <li>• 4-pin headers for processor and chassis fans</li> <li>• 4-wire and 3-wire (linear) fan speed control support for the chassis fans</li> <li>• Support for Platform Environmental Control Interface (PECI)</li> </ul>
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## Supported Operating Systems

The Desktop Board provides full support for the following operating systems:

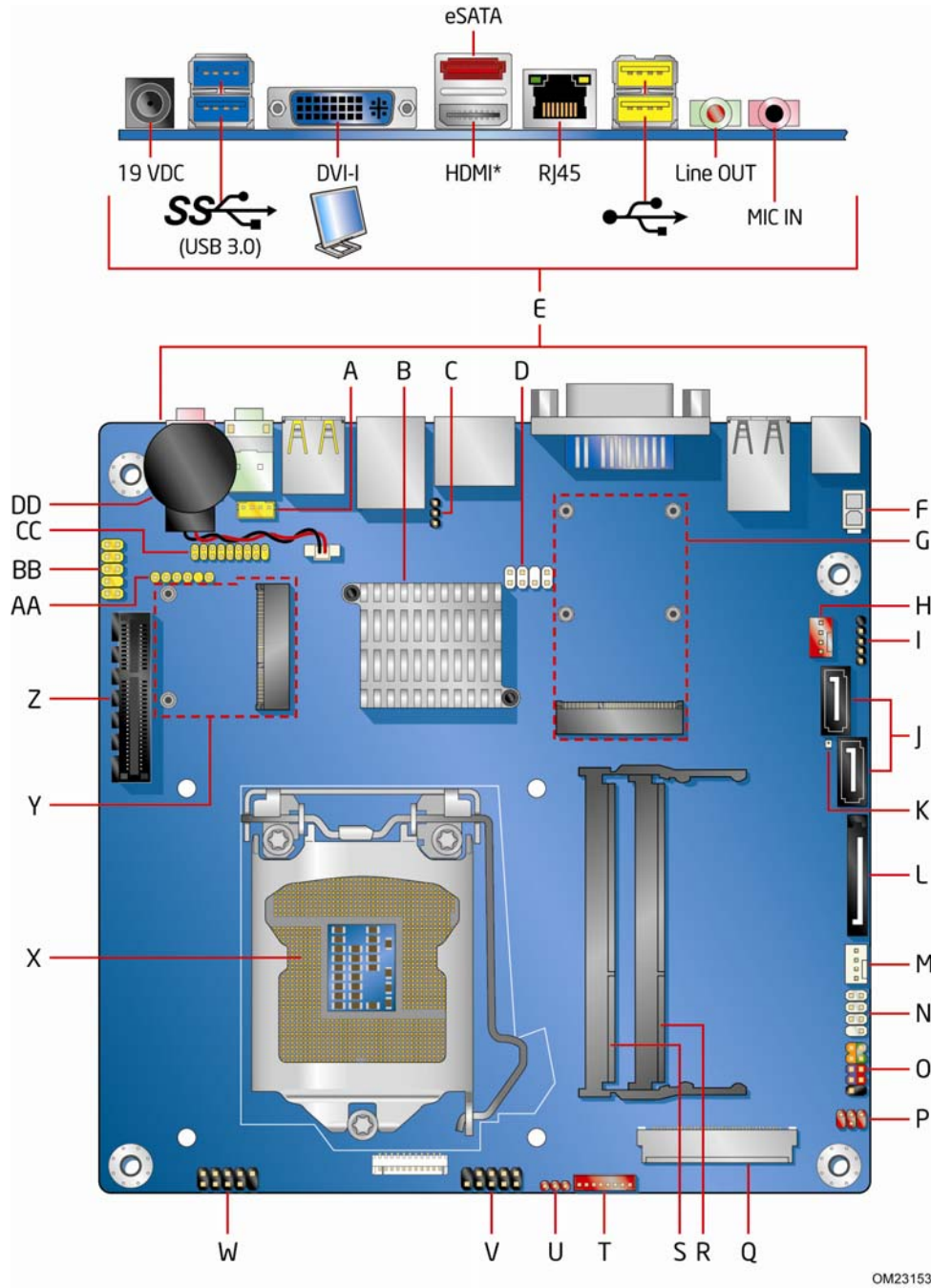
- Microsoft Windows\* 7 Ultimate (64-bit and 32-bit editions)
- Microsoft Windows 7 Professional (64-bit and 32-bit editions)
- Microsoft Windows 7 Home Premium (64-bit and 32-bit editions)
- Microsoft Windows 7 Starter (64-bit and 32-bit editions)
- Microsoft Windows Vista\* Ultimate (64-bit and 32-bit editions)
- Microsoft Windows Vista Business (64-bit and 32-bit editions)
- Microsoft Windows Vista Home Premium (64-bit and 32-bit editions)
- Microsoft Windows Vista Home Basic (64-bit and 32-bit editions)

The Desktop Board provides minimal BIOS and driver support for the following operating systems:

- Microsoft Windows\* XP Home
- Microsoft Windows XP Professional
- Microsoft Windows XP Professional x64 Edition
- Microsoft Windows XP Media Center Edition 2005

## Desktop Board Components

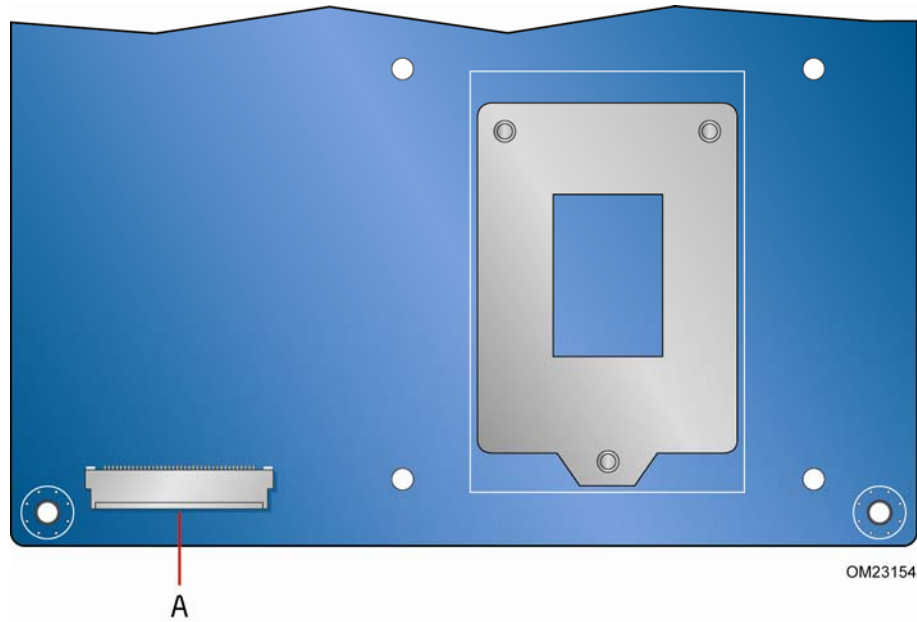
Figure 1 shows the approximate location of the major components on the top side of Intel Desktop Board DH61AG.



**Figure 1. Intel Desktop Board DH61AG Components (Top)**

**Table 2. Intel Desktop Board DH61AG Components (Shown in Figure 1)**

<b>Label</b>	<b>Description</b>
A	Internal stereo speakers connector
B	Intel H61 PCH
C	BIOS configuration jumper block
D	Home Theater PC (HTPC) header
E	Back panel connectors
F	Internal 19 VDC power connector
G	PCI Express Full-/Half-Mini Card slot
H	System fan header
I	Front panel USB 2.0 header (single)
J	SATA 3.0 Gb/s data connectors
K	Standby power indicator LED
L	SATA power connector
M	Processor fan header
N	Front panel CIR receiver (input) header
O	Front panel header
P	Flat Panel voltage selection header
Q	LVDS connector
R	DDR3 SO-DIMM 2 socket
S	DDR3 SO-DIMM 1 socket
T	FPD brightness connector
U	Backlight inverter voltage selection header
V	Front panel USB 2.0 header (dual)
W	Front panel USB 2.0 header (dual)
X	Processor socket
Y	PCI Express Half-Mini Card slot
Z	PCI Express 2.0 x4 add-in card connector
AA	S/PDIF / DMIC header
BB	Front panel audio header
CC	Analog surround audio header
DD	Battery



**Figure 2. Intel Desktop Board DH61AG Components (Bottom)**

**Table 3. Intel Desktop Board DH61AG Components (Shown in Figure 2)**

Label	Description
A	eDP connector

### Online Support

For more information on Intel Desktop Board DH61AG, consult the following online resources:

- Intel Desktop Board DH61AG <http://www.intel.com/products/desktop/motherboard/index.htm>
- Desktop Board Support [http://www.intel.com/p/en\\_US/support?iid=hdr+support](http://www.intel.com/p/en_US/support?iid=hdr+support)
- Available configurations for Intel Desktop Board DH61AG <http://ark.intel.com>
- Compatible processors <http://processormatch.intel.com>
- Processor specifications <http://www.intel.com/products/desktop/processors/index.htm>
- Chipset information <http://www.intel.com/products/desktop/chipsets/index.htm>
- BIOS and driver updates <http://downloadcenter.intel.com/>

# 2 Installing and Replacing Desktop Board Components

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This chapter tells you how to:

- Install the I/O shield
- Install and remove the Desktop Board
- Install and remove a processor
- Install and remove system memory
- Connect to SATA drives
- Install a PCI Express Mini Card
- Connect to the internal headers and connectors
- Connect a system fan
- Connect a power supply
- Set the BIOS configuration jumper
- Clear passwords
- Replace the battery

## Before You Begin



### CAUTION

*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 and test the Intel Desktop Board, observe all warnings and cautions in the installation instructions.

To avoid 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

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 plus enough headroom for desktop board power consumption.

Refer to Section 2.5.1, *Power Supply Considerations*, of the *Intel Desktop Board DH61AG Technical Product Specification* for power budget analysis guidance.

## 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.

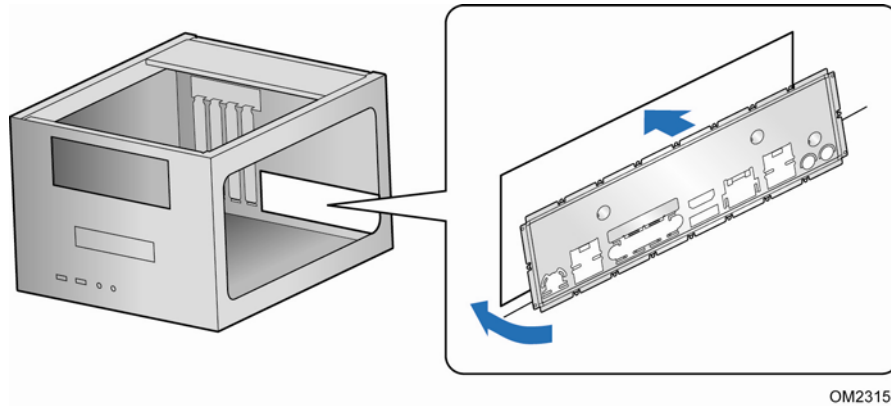
For information about the Desktop Board's regulatory compliance, refer to Appendix B.



## Installing the I/O Shield

This Desktop Board comes with I/O shields. 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.

Select the proper I/O shield for the chassis you have chosen to use. Install the I/O shield before installing the Desktop Board in the chassis. Place the shield inside the chassis as shown in Figure 3. 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.



**Figure 3. Installing an I/O Shield**

## Installing and Removing the Desktop Board

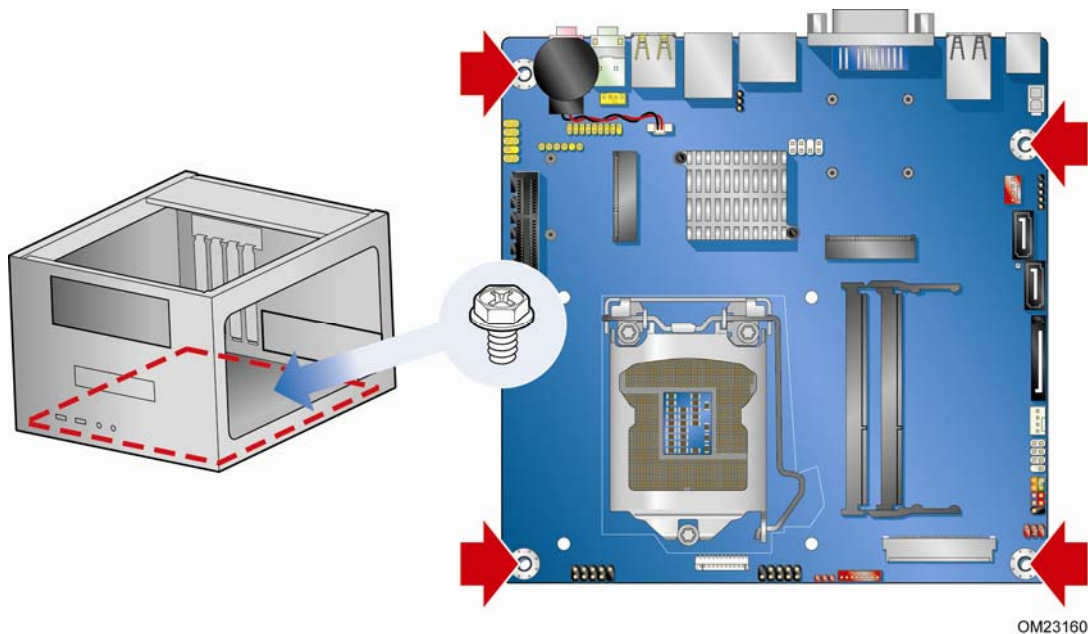


### CAUTION

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.

Figure 4 shows the location of the mounting screw holes for Intel Desktop Board DH61AG.



**Figure 4. Intel Desktop Board DH61AG Mounting Screw Hole Locations**

## Installing and Removing a Processor

Instructions on how to install the processor on the Desktop Board are given below.

### Installing a Processor

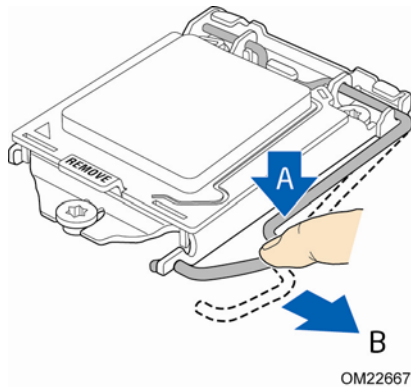


#### CAUTION

*Before installing or removing a processor, make sure the AC power has been removed by unplugging the power cord from the computer. Failure to do so could damage the processor and the board.*

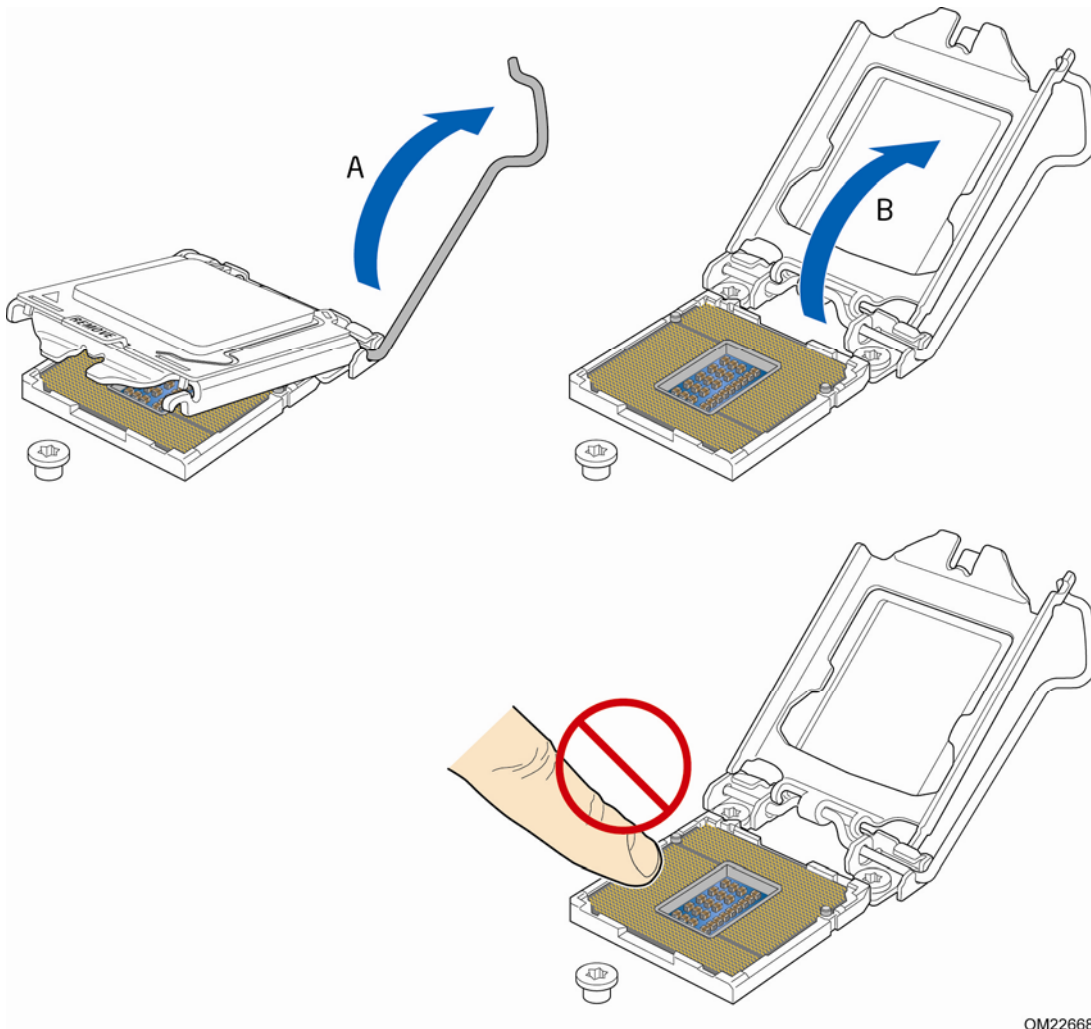
To install a processor, follow these instructions:

1. Observe the precautions in "Before You Begin" on page 15.
2. Unlatch the processor socket lever by pushing it down and away from the socket (Figure 5, A, B).



**Figure 5. Unlatch the Socket Lever**

3. Rotate the socket lever to lift the load plate away from the socket (Figure 6, A). Make sure that the load plate is in the fully open position (Figure 6, B) while being careful not to damage adjacent components. Do not touch the socket contacts.



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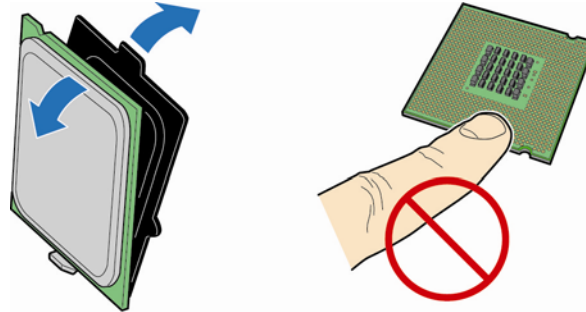
**Figure 6. Lift the Load Plate**

4. Remove the processor from its protective cover. Hold the processor only at the edges, being careful not to touch the bottom of the processor (see Figure 7).



### NOTE

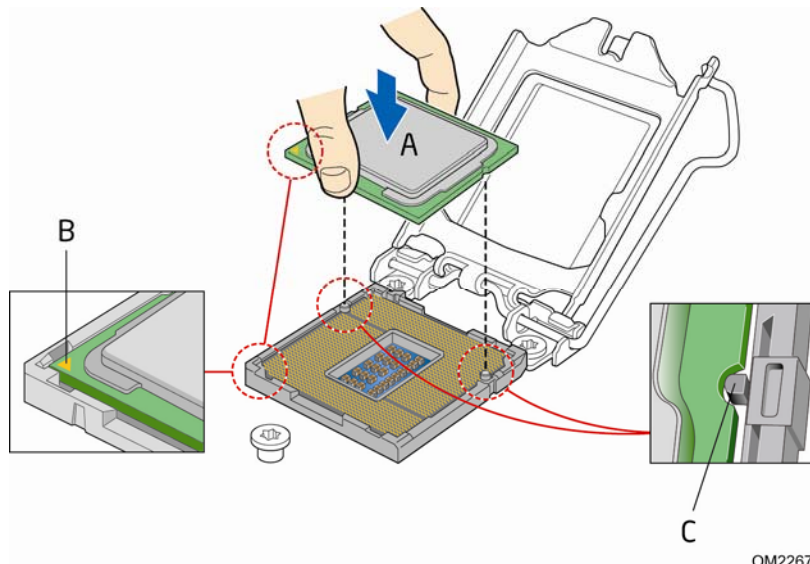
*Do not discard the processor cover. Always replace the processor cover if you remove the processor from the socket.*



OM22669

**Figure 7. Remove the Processor from the Protective Cover**

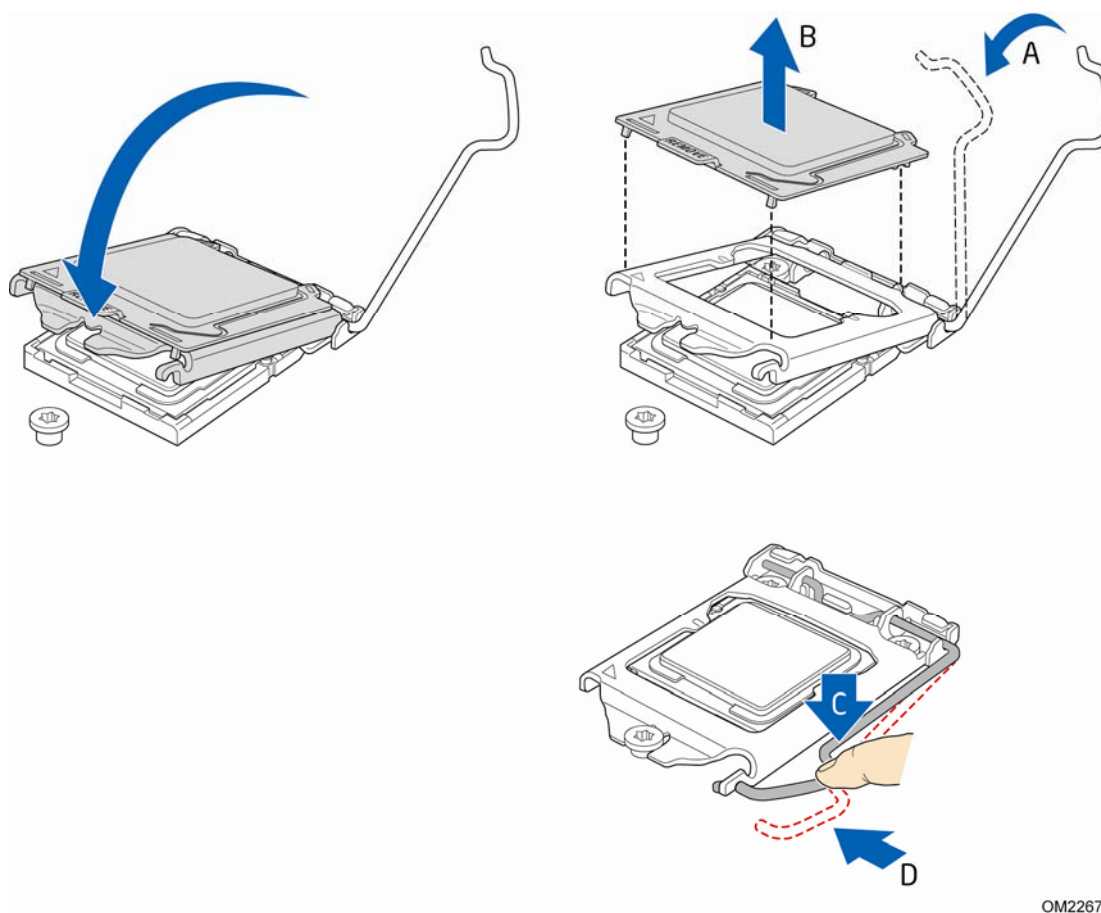
5. Hold the processor with your thumb and index finger oriented as shown in Figure 8 to align your fingers with the socket finger cutouts. Make sure that the processor Pin 1 indicator (gold triangle) is aligned with the Pin 1 chamfer on the socket (Figure 8, B) and that the notches on the processor align with the posts on the socket (Figure 8, C). Lower the processor straight down without tilting or sliding it in the socket (Figure 8, A).



OM22670

**Figure 8. Install the Processor**

- Carefully lower the socket lever (Figure 9, A) while making sure that the front edge of the load plate slides under the shoulder screw cap as the lever is lowered. Latch the socket lever under the load plate tab (Figure 9, C, D). The socket cover (Figure 9, B) will pop off as shown.



OM22671

**Figure 9. Secure the Load Plate in Place**

- Pick up the socket cover and remove it from the desktop board.



**NOTE**

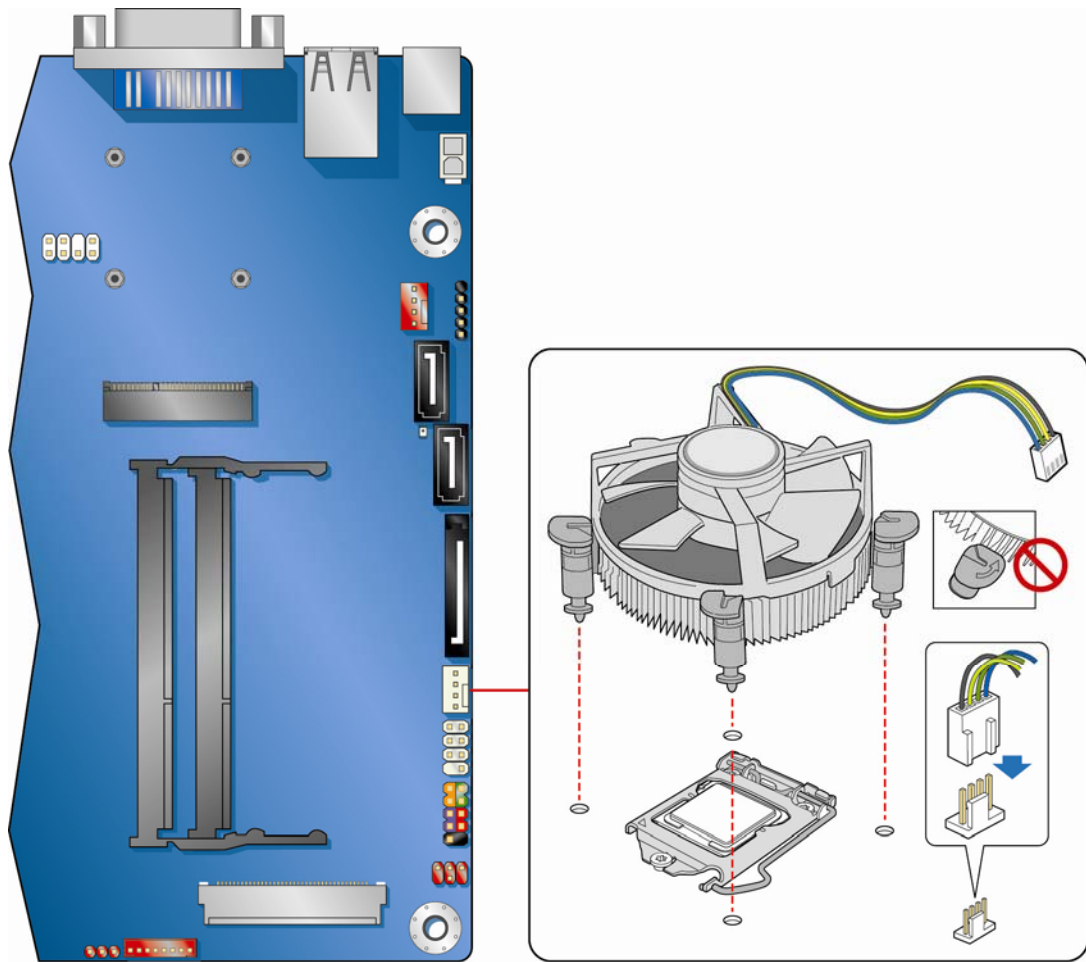
*Do not discard the socket cover; save it for possible future use. Always replace the socket cover if you remove the processor from the socket.*

## Installing a Processor Fan Heat Sink

Intel Desktop Board DH61AG has mounting holes for a processor fan heat sink. For instructions on how to attach the processor fan heat sink to the Desktop Board, refer to the boxed processor manual or thermal solution manual.

## Connecting the Processor Fan Heat Sink Cable

Connect the processor fan heat sink power cable to the 4-pin processor fan header (see Figure 10). A fan with a 4-pin connector as shown in Figure 10 is recommended.



OM23162

**Figure 10. Connecting the Processor Fan Heat Sink Power Cable to the Processor Fan Header**

## Removing the Processor

For instructions on how to remove the processor fan heat sink and processor, refer to the processor installation manual.

## Installing System Memory



### NOTE

*To be fully compliant with all applicable Intel SDRAM memory specifications, the board requires SO-DIMMs that support the Serial Presence Detect (SPD) data structure.*

The desktop board has two 204-pin DDR3 SO-DIMM sockets providing Channel A and Channel B. For dual-channel performance, install a matched pair of SO-DIMMs equal in speed and size.

To install an SO-DIMM, follow these steps:

1. Observe the precautions in "Before You Begin" on page 15.
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 11).
4. Install the bottom SO-DIMM (Figure 11, A) first. Hold the SO-DIMM with the back edge tilted slightly upwards, insert it into the socket, aligning the notch in the SO-DIMM with the tab (Figure 11, B) in the socket. Gently push the back edge of the SO-DIMM down until it snaps into the retention arms (Figure 11, C).
5. If you are installing a second SO-DIMM, repeat Step 4 for the second SO-DIMM (Figure 11, D).
6. Replace the computer's cover and reconnect the AC power cord.



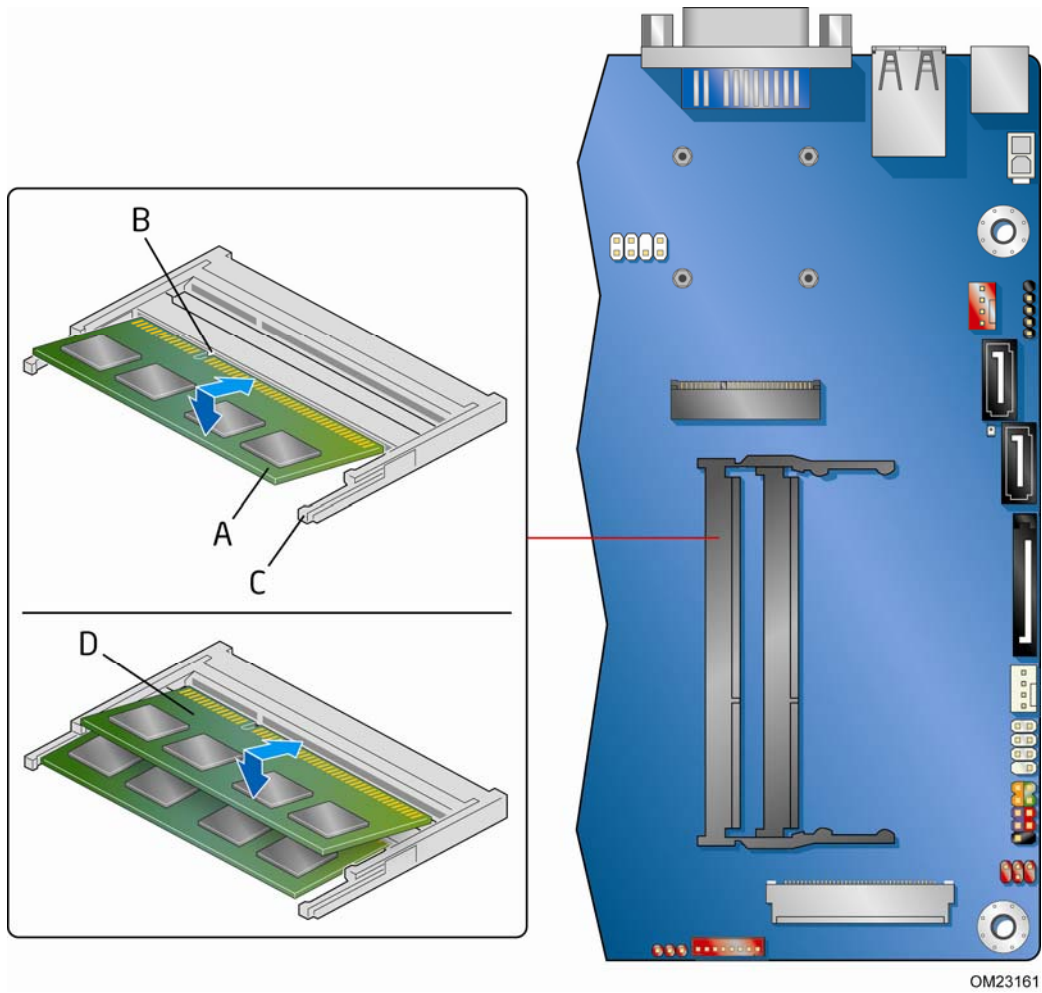


Figure 11. Installing an SO-DIMM

To remove an SO-DIMM from the socket, gently spread the socket's retention arms as shown in Figure 12 to disengage them from the SO-DIMM.

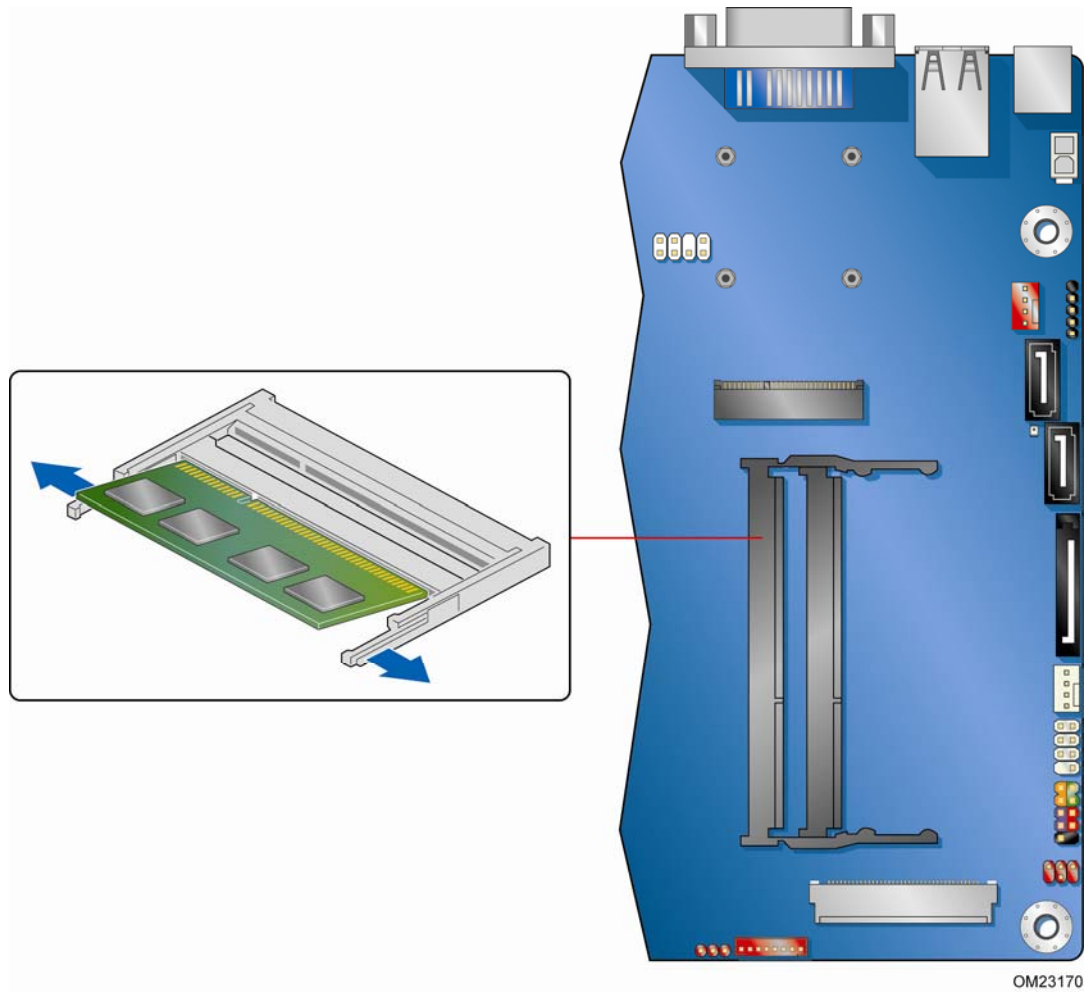


Figure 12. Removing an SO-DIMM

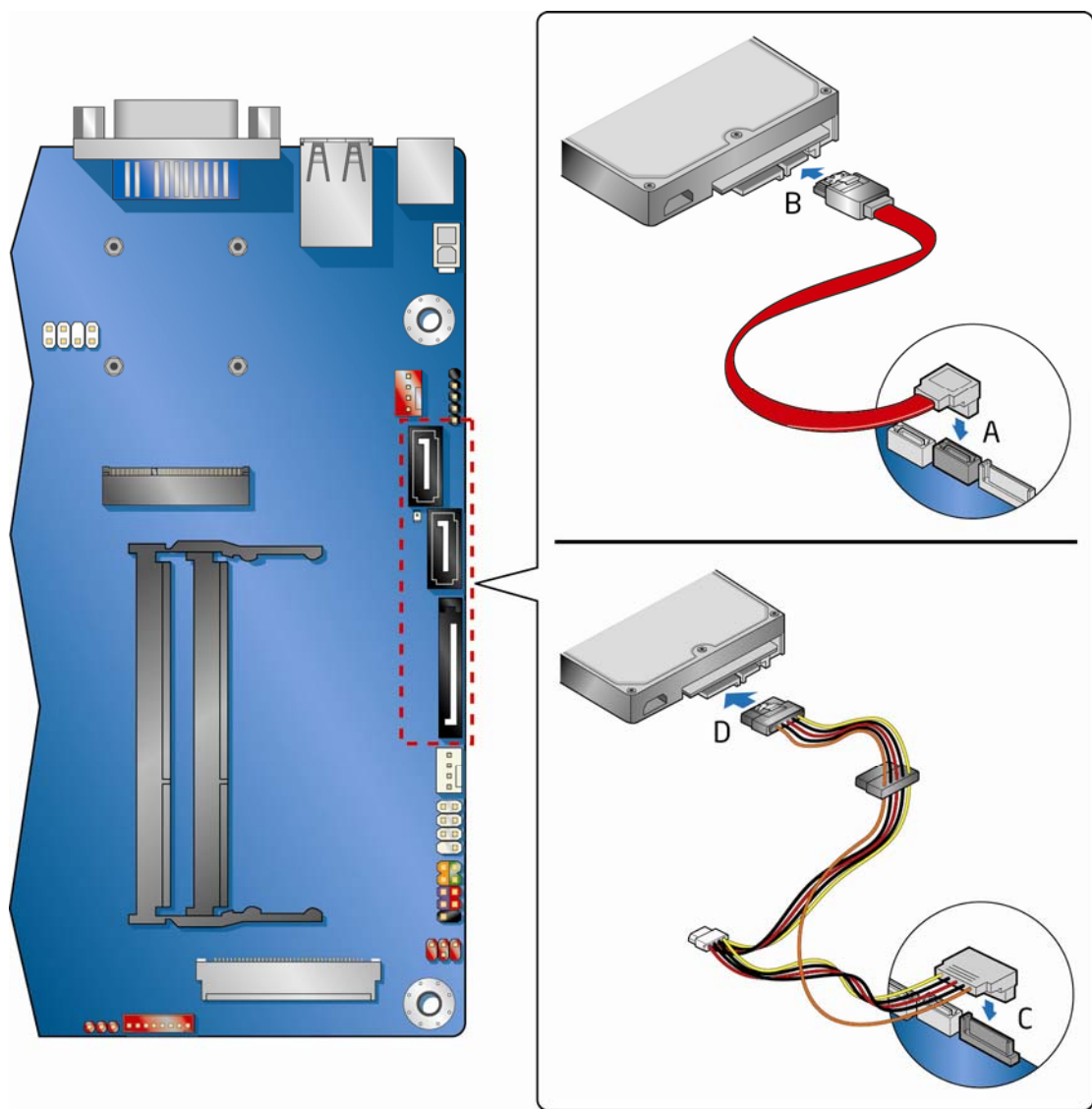
## Connecting to SATA Drives

Intel Desktop Board DH61AG supports two SATA drives with two data connectors and one power connector. To enable low-profile connectivity, the board ships with two SATA data cables with right-angled connectors and an in-line power cable that provides:

- a right-angled female-gender 15-pin SATA power connector for low-profile board connectivity
- a female-gender 1 x 4 Molex-type power connector for system component power flexibility
- a 15-pin female-gender SATA power connector for SATA drive power
- a vertical 15-pin female-gender SATA power connector for SATA drive power

To connect a SATA drive to the Desktop Board:

1. Observe the precautions in "Before You Begin" on page 15.
2. Attach the right angled connector on the SATA data cable to one of the SATA connectors on the board (Figure 13, A).
3. Attach the other end of the SATA data cable to the SATA drive (Figure 13, B).
4. Attach the right-angled 15-pin SATA power connector on the power cable to the 15-pin SATA power connector on the Desktop Board (Figure 13, C).
5. Attach the 15-pin SATA power connector (Figure 13, D) on the end of the power cable to the mating connector on a SATA drive.



OM23163

**Figure 13. Connecting the SATA Data and Power Cables**

## Installing a PCI Express Mini Card in the PCI Express Full-/Half-Mini Card Slot

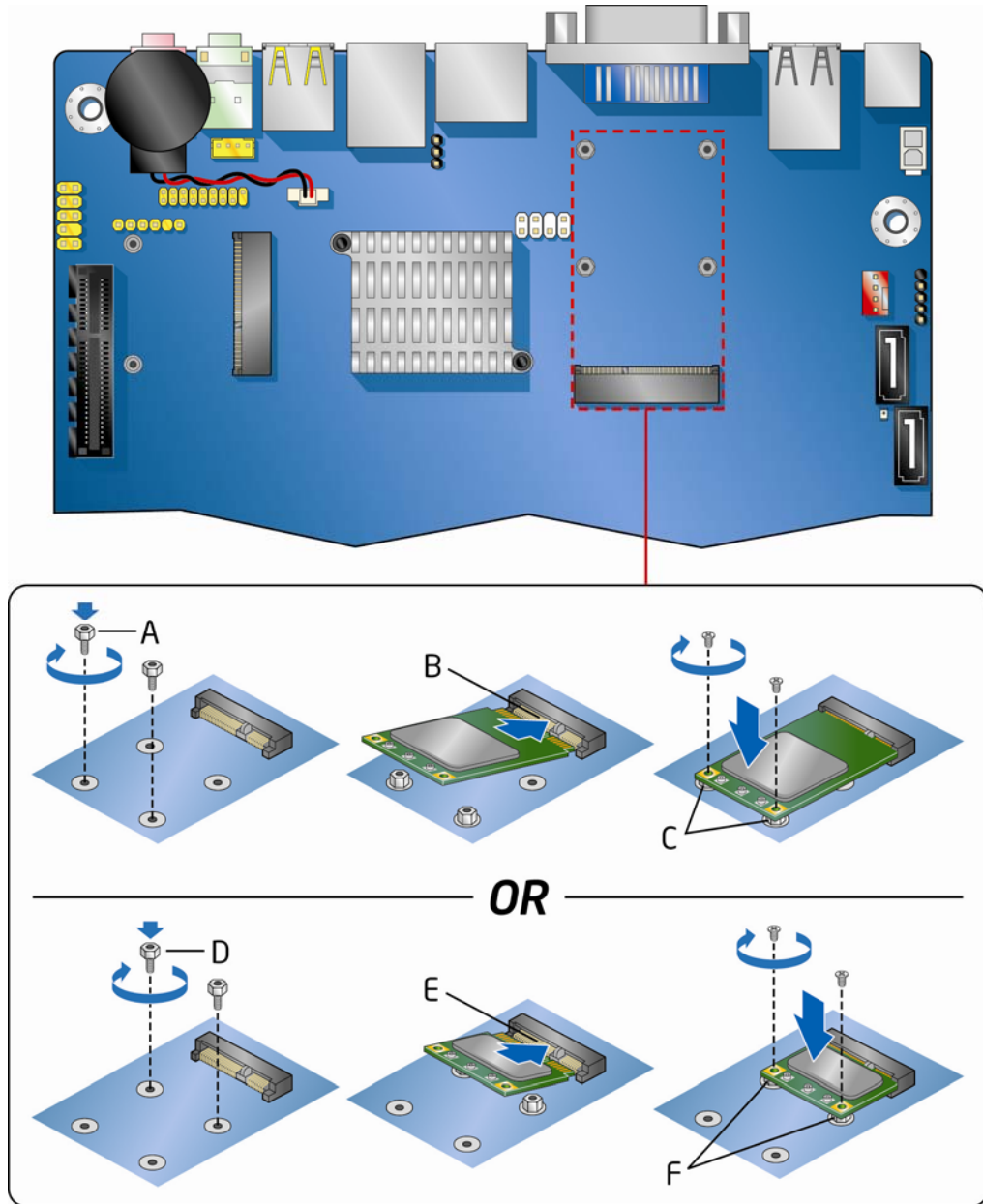
A PCI Express Full-Mini or Half-Mini Card can be installed in the Desktop Board's PCI Express Full-/Half-Mini Card slot.

To install a PCI Express Full-Mini Card in this slot, see Figure 14 and follow these steps:

1. Observe the precautions in "Before You Begin" on page 15.
2. Locate the PCI Express Full-/Half-Mini Card slot (Figure 1, G).
3. If necessary, move the mounting standoffs to the location shown in Figure 14, A.
4. Insert the card into the PCI Express Mini Card connector (Figure 14, B) at a slightly upward angle.
5. Align the mounting holes and secure the card in place (Figure 14, C).

To install a PCI Express Half-Mini Card in this slot, see Figure 14 and follow these steps:

1. Observe the precautions in "Before You Begin" on page 15.
2. Locate the PCI Express Full-/Half-Mini Card slot (Figure 1, G).
3. If necessary, move the mounting standoffs to the location shown in Figure 14, D.
4. Insert the card into the PCI Express Mini Card connector (Figure 14, E) at a slightly upward angle.
5. Align the mounting holes and secure the card in place (Figure 14, F).



OM23166

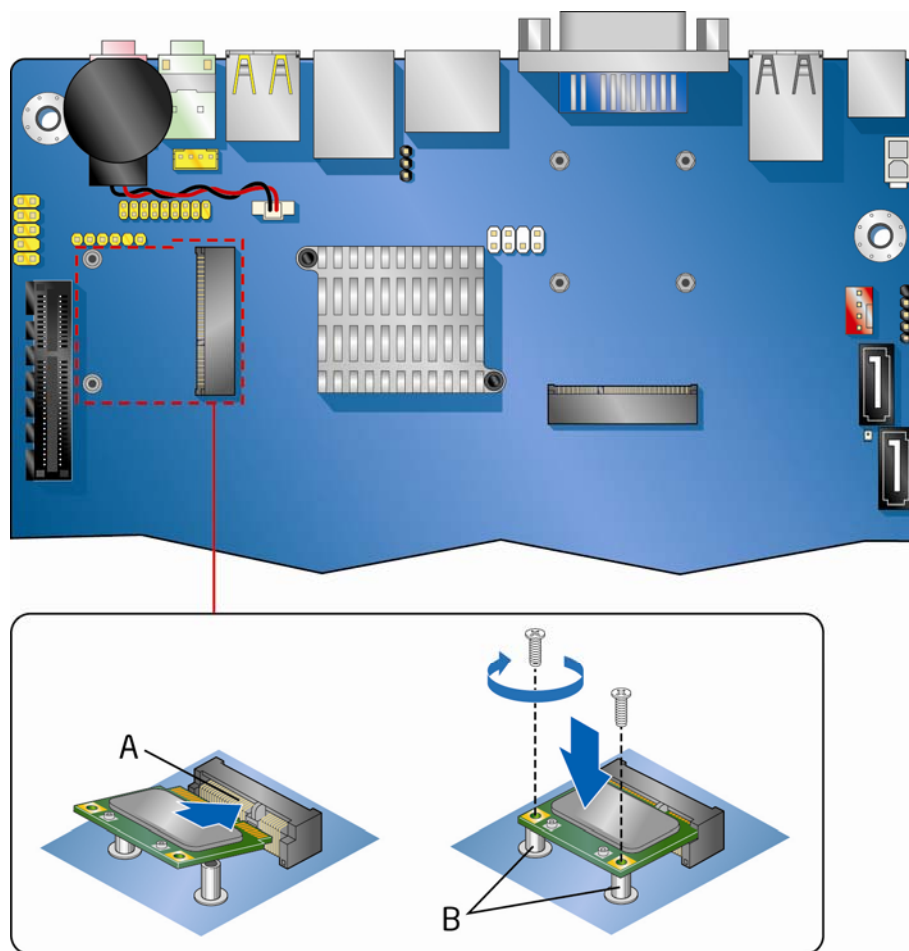
**Figure 14. Installing a PCI Express Mini Card in the Full-/Half-Mini Card Slot**

## Installing a PCI Express Mini Card in the PCI Express Half-Mini Card Slot

A PCI Express Half-Mini Card can be installed in the Desktop Board's PCI Express Half-Mini Card slot.

To install a PCI Express card in this slot, see Figure 15 and follow these steps:

1. Observe the precautions in "Before You Begin" on page 15.
2. Locate the PCI Express Half-Mini Card slot (Figure 1, Y).
3. Insert the card into the PCI Express Mini Card connector (Figure 15, A) at a slightly upward angle.
4. Align the mounting holes and secure the card in place (Figure 15, B).



OM23167

**Figure 15. Installing a PCI Express Mini Card in the Half-Mini Card Slot**

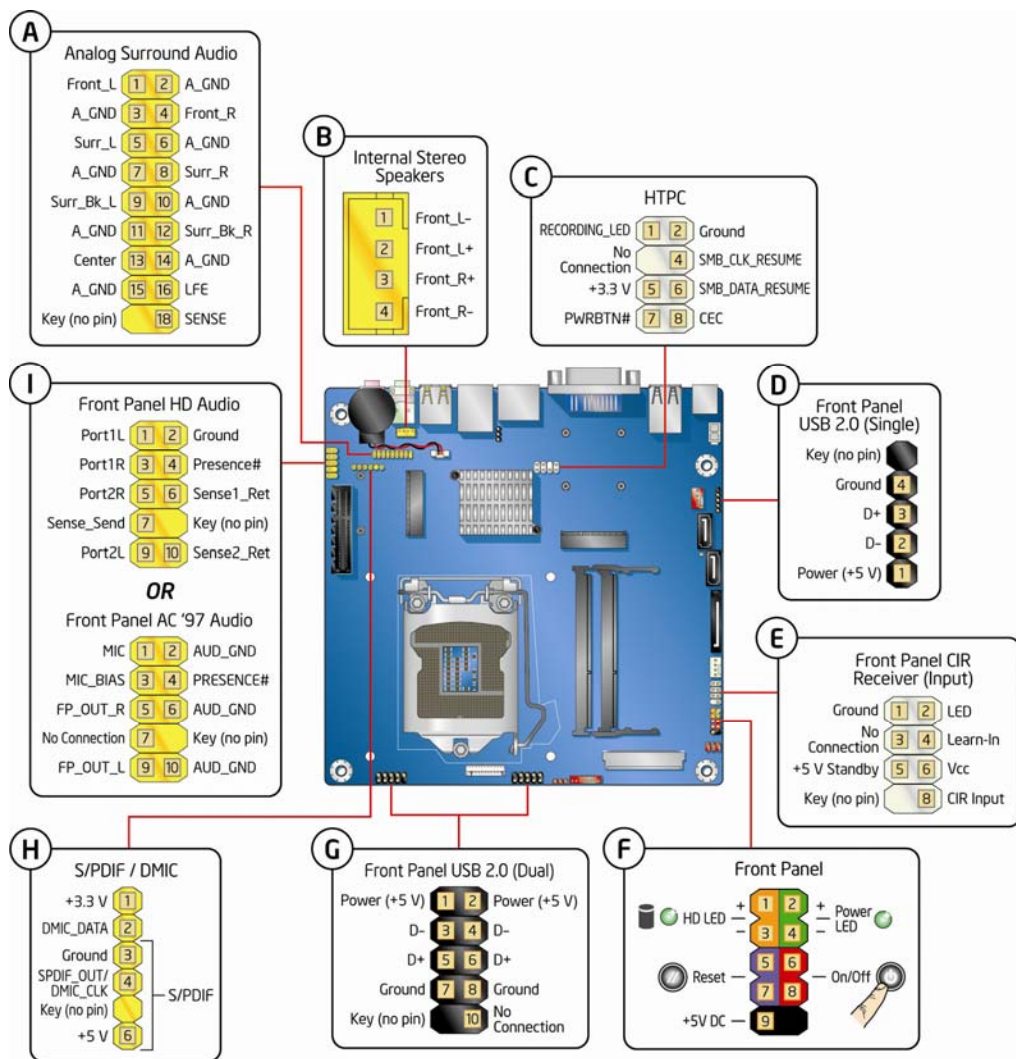


**NOTE**

If you install a wireless card in the PCI Express Half-Mini Card slot, the external antenna(s) can be connected through the standard-size I/O shield by removing the cut-outs above the shield's back panel I/O section.

## Connecting to the Internal Headers and Connectors

Before connecting cables to any of the internal headers and connectors, observe the precautions in "Before You Begin" on page 15. Figure 16 shows the location of the internal headers and connectors on Intel Desktop Board DH61AG.



OM23165

**Figure 16. Internal Headers and Connectors**



## Analog Surround Audio Header

Figure 16, A shows the location of the analog surround audio header and Table 4 shows the pin assignments and signal names.

**Table 4. Analog Surround Audio Header Signal Names**

Pin	Signal Name	Pin	Signal Name
1	Front_L	2	A_GND
3	A_GND	4	Front_R
5	Surr_L	6	A_GND
7	A_GND	8	Surr_R
9	Surr_Bk_L	10	A_GND
11	A_GND	12	Surr_Bk_R
13	Center	14	A_GND
15	A_GND	16	LFE
17	KEY	18	SENSE

## Internal Stereo Speakers Connector

Figure 16, B shows the location of the internal stereo speakers connector and Table 5 shows the pin assignments and signal names.

**Table 5. Internal Stereo Speakers Connector Signal Names**

Pin	Signal Name
1	Front_L-
2	Front_L+
3	Front_R+
4	Front_R-

## Home Theater PC (HTPC) Header

Figure 16, C shows the location of the HTPC header and Table 6 shows the pin assignments and signal names.

**Table 6. HTPC Header Signal Names**

Pin	Signal Name	Pin	Signal Name
1	RECORDING_LED	2	Ground
3	No Connection	4	SMB_CLK_RESUME
5	+3.3 V	6	SMB_DATA_RESUME
7	PWRBTN#	8	CEC

## Front Panel Single-Port USB 2.0 Header

Figure 16, D shows the location of the front panel single-port USB 2.0 header and Table 7 shows the pin assignments and signal names.

**Table 7. Front Panel Single-Port USB 2.0 Header Signal Names**

Pin	Signal Name
1	Power (+5 V)
2	D-
3	D+
4	Ground
5	Key



### 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) Receiver Header

The Desktop Board has a CIR receiver header (Figure 16, E). This 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 user remotes.



### NOTE

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

Table 8 shows the pin assignments and signal names for the front panel CIR receiver (input) header.

**Table 8. Front Panel CIR Receiver 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

## Front Panel Header

Figure 16, F shows the location of the front panel header. Table 9 shows the pin assignments and signal names for the front panel header.

**Table 9. Front Panel Header Signal Names**

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



### NOTE

*When connecting individual wires from your chassis front panel to the front panel header, be sure to observe the connection polarity. Positive wires are usually solid color and negative wires are usually white or striped.*

## Front Panel Dual-Port USB 2.0 Headers

Figure 16, G shows the location of the front panel dual-port USB 2.0 headers and Table 10 shows their pin assignments and signal names.

**Table 10. Front Panel Dual-Port USB 2.0 Headers Signal Names**

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

*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.*

## S/PDIF / DMIC Header

Figure 16, H shows the location of the S/PDIF / DMIC output header. Table 11 shows the pin assignments and signal names for the S/PDIF / DMIC output header.

**Table 11. S/PDIF / DMIC Header Signal Names**

Pin	Description
1	3.3 V
2	DMIC_DATA
3	Ground
4	SPDIF_OUT/DMIC_CLK
5	Key (no pin)
6	5 V

## Front Panel Audio Header

The front panel audio header shown in Figure 16, I supports both Intel High Definition (HD) Audio and AC '97 Audio.

Table 12 shows the pin assignments and signal names for HD Audio and Table 13 shows the pin assignments and signal names for AC '97 Audio.

**Table 12. Front Panel Audio Signal Names for Intel HD Audio**

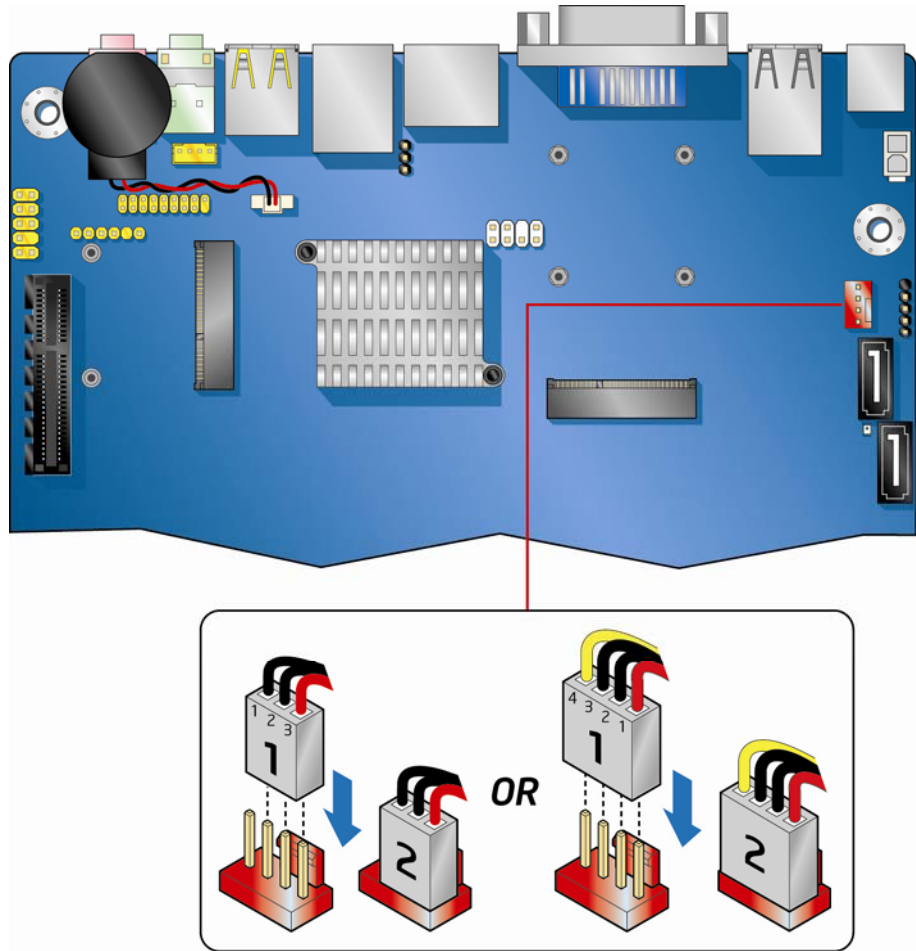
Pin	Signal Name	Pin	Signal Name
1	PORT 1L (Microphone)	2	GND
3	PORT 1R (Microphone)	4	PRESENCE#
5	PORT 2R (Headphone)	6	SENSE1_RETURN
7	SENSE_SEND	8	KEY (no pin)
9	PORT 2L (Headphone)	10	SENSE2_RETURN

**Table 13. Front Panel Audio Header Signal Names for AC '97 Audio**

Pin	Signal Name	Pin	Signal Name
1	MIC	2	AUD_GND
3	MIC_BIAS	4	PRESENCE#
5	FP_OUT_R	6	AUD_GND
7	No Connection	8	KEY (no pin)
9	FP_OUT_L	10	AUD_GND

## Connecting a System Fan

You can connect a 4-pin or 3-pin system fan cable to the system fan header on the Desktop Board as shown in Figure 17.



OM23164

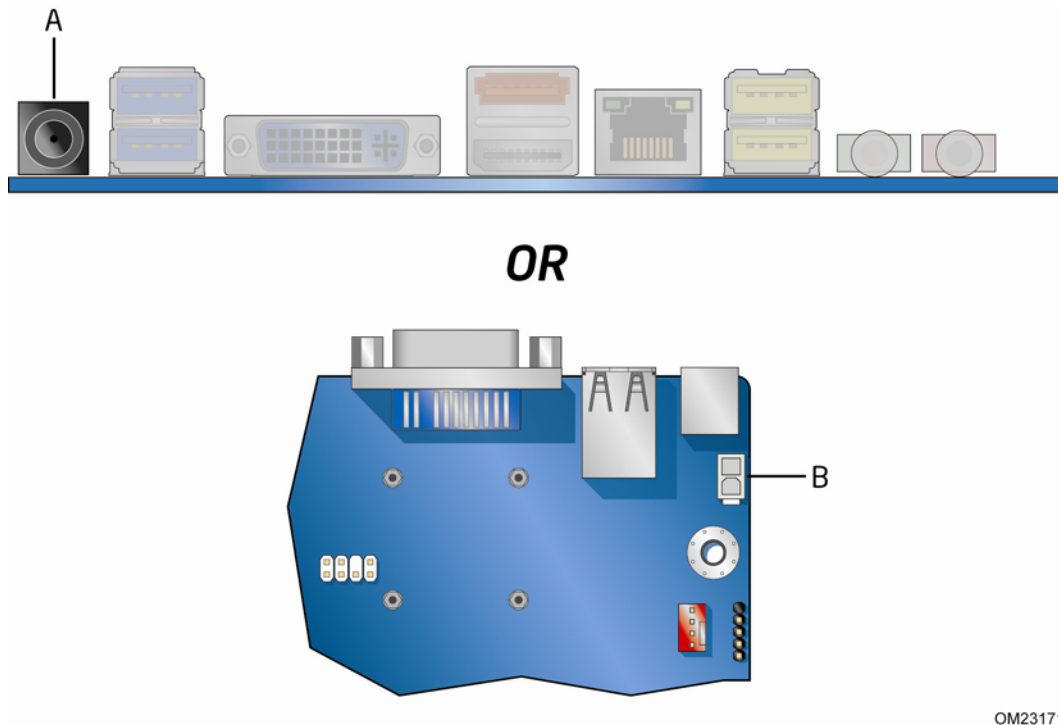
**Figure 17. Location of the Chassis Fan Header**

## Connecting to a Power Supply

The board can use the following power supplies:

- **External Power Supply** – the board can be powered with a 19 VDC external power supply through the 19 VDC connector (Figure 18, A) on the back panel. The back panel connector accepts plugs with an inner diameter (ID) of 5.1 mm and an outer diameter (OD) of 7.4 mm, where the inner contact is 19 (±5%) VDC and the shell is GND.
- **Internal Power Supply** – the board can alternatively be powered via the onboard 19 VDC 1 x 2 power connector (Figure 18, B). The signal names for the onboard power connector are shown in Table 14.

Use of an external 19 VDC power supply is preferred. Total power consumption will depend on the system configuration selected by the integrator. Refer to Section 2.5.1, Power Supply Considerations, of the Intel Desktop Board DH61AG *Technical Product Specification* for further guidance.



OM23171

**Figure 18. Power Supply Connections**

**Table 14. 19 VDC Power Connector**

Pin	Signal Name
1	Ground
2	+19 VDC



**CAUTION**

*The external 19 VDC jack is the primary power input connector of Intel Desktop Board DH61AG. However, the Desktop Board also provides an internal 1 x 2 power connector that can be used with a target system that already has an internal power supply.*

*There is no isolation circuitry between the external 19 VDC jack and the internal 1 x 2 power connector. It is the system integrator's responsibility to ensure that no more than one power supply unit is or can be attached to the board at any time and to ensure that the external 19 VDC jack is covered if the internal 1 x 2 power connector is to be used. A plastic cover is included with the Desktop Board for this purpose.*

*Simultaneous connection of both external and internal power supply units may result in damage to the desktop board, power supplies, or other hardware.*



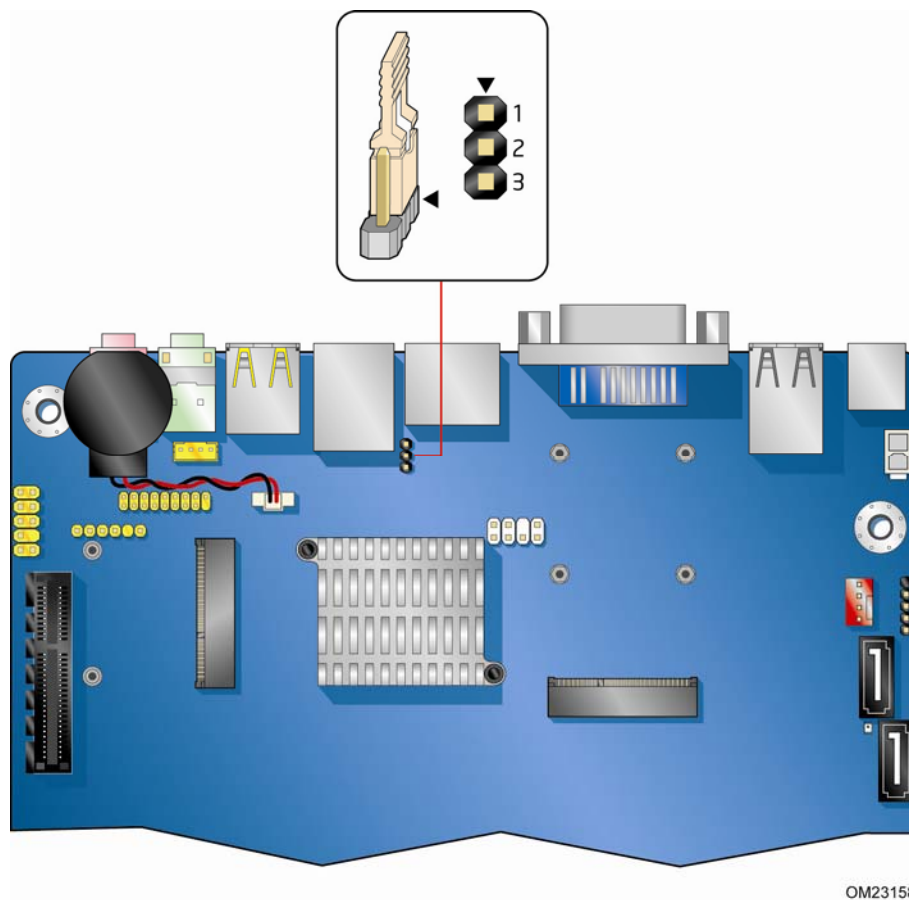
## Setting the BIOS Configuration Jumper



### 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 19 shows the location of the Desktop Board's BIOS configuration jumper block.



OM23158

**Figure 19. Location of the BIOS Configuration Jumper Block**

The three-pin BIOS jumper block enables board configuration to be done in the BIOS Setup program. Table 15 shows the jumper settings for the BIOS Setup program modes.

**Table 15. Jumper Settings for the BIOS Setup Program Modes**

<b>Jumper Setting</b>	<b>Mode</b>	<b>Description</b>
1-2	Normal (default)	The BIOS uses the current configuration and passwords for booting.
2-3	Configure	After the Power-On Self-Test (POST) runs, the BIOS displays the Maintenance Menu. Use this menu to clear passwords.
None	Recovery	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 15.
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 19).
5. Place the jumper on pins 2-3.
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 the Enter key and Setup displays a pop-up screen requesting that you confirm clearing the password. Select Yes and press the Enter key. Setup displays the maintenance menu again.
9. Press the F10 key 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.
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  $\pm 13$  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 20 on page 48 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.*



### PRÉCAUTION

*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

*Eksplosionsfare, 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

*Räjähdyksvaara, 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 weggoien 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.*



### AŠCIAROŽNAŚĆ

*Існуе рызыка выбуху, калі заменены акумулятар непраўльнага тыпу. Акумулятары павінны, па магчымасці, перепрацоўвацца. Пазбаўляцца ад старых акумулятараў патрэбна згодна з мясцовымі 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 hasznosítani. 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 punktus. 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.*



### ATTENZJONI

*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.*

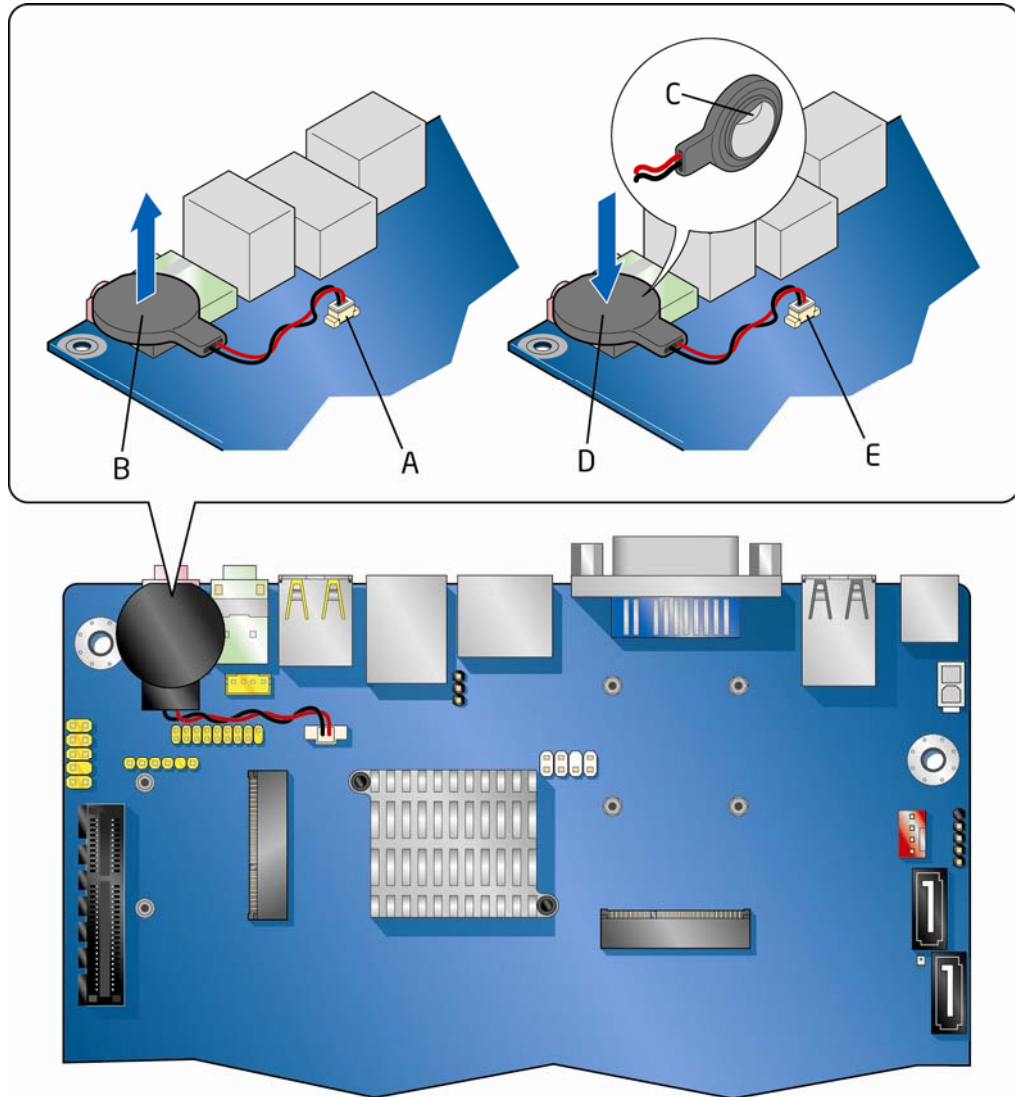


### OSTRZEŻENIE

*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 15).
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 20).
5. Disconnect the battery cable from the Desktop Board battery connector (Figure 20, A).
6. Lift up on the battery (Figure 20, B) and carefully remove it from the board. It is attached to the board by a non-permanent adhesive pad.
7. To install a new battery, connect the battery cable to the Desktop Board battery connector (Figure 20, E), remove the protective covering (Figure 20, C) from the adhesive pad on the back of the new battery, and reattach the battery to the board (Figure 20, D) or the inside of the system chassis.
8. Replace the computer cover.



OM23168

**Figure 20. Removing and Replacing the Battery**



## 3 Updating the BIOS

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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 Intel® Flash 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 Download Center at <http://downloadcenter.intel.com/>
2. Navigate to the DH61AG page. Click on the "BIOS Update" link and then select the Express BIOS Update 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 Using the F7 Function Key

To use this BIOS update method:

1. Download and save the Recovery BIOS (.BIO) file to a temporary directory.
2. Copy the .BIO file to a USB thumb drive.
3. Plug the thumb drive into a USB port of the target computer.
4. Shut down the target computer.
5. Enable the F7 prompt display:
  - a. Power the computer on.
  - b. Enter the BIOS Setup by pressing the F2 key during boot.
  - c. Go to the Advanced > Boot Configuration menu.
  - d. Enable Display F7 to Update BIOS
  - e. Press the F10 key to save and exit.
6. During boot, when the F7 prompt is displayed, press the F7 key to enter the BIOS Flash Update tool.
7. Select the USB thumb drive and press Enter.
8. Select the .BIO file and press Enter
9. Confirm you want to update the BIOS by pressing Enter.
10. Wait 2-5 minutes for the update to complete.
11. Remove the thumb drive.
12. Restart the computer.

## Updating the BIOS with the Intel® Flash Memory Update Utility

You can use the information in this section to update the BIOS using the Intel® Flash Memory Update Utility. With the Intel Flash Memory Update Utility you can update the system BIOS from a bootable CD-ROM, bootable USB flash drive, or other bootable USB media.

You can update to a new version of the BIOS by using the Intel Flash Memory BIOS update file. The Intel Flash Memory BIOS update file is a compressed file that contains the files you need to update the BIOS. The BIOS update file contains:

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

You can obtain this file through your computer supplier or by navigating to the Intel Desktop Board DH61AG page on the Intel World Wide Web site Download Center at <http://downloadcenter.intel.com>.

On the DH61AG page, click on the "BIOS Update" link and then select the Iflash BIOS Update file.

**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 key 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.

**CAUTION**

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

## 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.

You can obtain the Recovery BIOS Update file through your computer supplier or by navigating to the Intel Desktop Board DH61AG page on the Intel World Wide Web site Download Center at <http://downloadcenter.intel.com>.

On the DH61AG page, click on the "BIOS Update" link and then select the Recovery BIOS Update file.

**NOTE**

*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>.*



# A Error Messages and Indicators

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This appendix describes error messages generated by the Desktop Board's BIOS. The BIOS indicates these error messages with LED blink codes, speaker beep codes, and by text displayed on the PC monitor.

## Front-panel Power LED Blink and Speaker Beep Codes

Whenever a recoverable error occurs during POST, the BIOS provides basic status and error messages through front-panel power LED blink codes (Table 16) as well as through audible beep codes (Table 17).

**Table 16. BIOS Front-panel Power LED Blink Codes**

Type	Pattern	Note
F2 Setup/F10 Boot Menu Prompt	None	
BIOS update in progress	Off when the update begins, then on for 0.5 second, then off for 0.5 second. The pattern repeats until the BIOS update is complete.	
Video error (no add-in graphics card installed)	On-off (0.5 second each) two times, then a 3.0-second pause (off), the entire pattern repeats (blink and pause) until the system is powered off.	For processors requiring an add-in graphics card
Memory error	On-off (0.5 second each) three times, then a 3.0-second pause (off), the entire pattern repeats (blinks and pause) until the system is powered off.	
Thermal trip warning	Each beep will be accompanied by the following blink pattern: .25 seconds on, .25 seconds off, .25 seconds on, .25 seconds off. This results in a total of 32 blinks.	

**Table 17. BIOS Speaker Beep Codes**

Type	Pattern	Frequency/Comments
F2 Setup/F10 Boot Menu Prompt	One 0.5 second beep when the BIOS is ready to accept keyboard input	932 Hz
BIOS update in progress	None	
Video error (no add-in graphics card installed)	On-off (1.0 second each) two times, then a 2.5-second pause (off), the entire pattern repeats (beeps and pause) once and the BIOS will continue to boot.	932 Hz For processors requiring an add-in graphics card
Memory error	On-off (1.0 second each) three times, then a 2.5-second pause (off), the entire pattern repeats (beeps and pause) until the system is powered off.	932 Hz
Thermal trip warning	Alternate high and low beeps (1.0 second each) for eight beeps followed by system shut down.	High beep 2000 Hz Low beep 1500 Hz

## BIOS Error Messages

The BIOS may also display an error message on the PC monitor when certain recoverable error occurs during POST. Table 18 gives an explanation of the BIOS error messages.

**Table 18. BIOS Error Messages**

Error Message	Explanation
CMOS Battery Low	The battery may be losing power. Replace the battery soon.
CMOS Checksum Bad	The CMOS checksum is incorrect. CMOS memory may have been corrupted. Run Setup to reset values.
Memory Size Decreased	Memory size has decreased since the last boot. If no memory was removed, then memory may be bad.
No Boot Device Available	System did not find a device to boot.

# B Regulatory Compliance

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This appendix contains the following regulatory compliance information for Intel Desktop Board DH61AG:

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

## Safety Standards

Intel Desktop Board DH61AG complies with the safety standards stated in Table 19 when correctly installed in a compatible host system.

**Table 19. Safety Standards**

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

## Battery Caution

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.

A suitable caution label is included with Intel Desktop Board DH61AG.



### **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.*

For information about replacing the battery, go to page 43.

## European Union Declaration of Conformity Statement

We, Intel Corporation, declare under our sole responsibility that the product Intel® Desktop Board DH61AG 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), 2006/95/EC (Low Voltage Directive), and 2002/95/EC (ROHS 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, 2006/95/EC and 2002/95/EC.

**Čeština** Tento výrobek odpovídá požadavkům evropských směrnic 2004/108/EC, 2006/95/EC a 2002/95/EC.

**Dansk** Dette produkt er i overensstemmelse med det europæiske direktiv 2004/108/EC, 2006/95/EC & 2002/95/EC.

**Dutch** Dit product is in navolging van de bepalingen van Europees Directief 2004/108/EC, 2006/95/EC & 2002/95/EC.

**Eesti** Antud toode vastab Euroopa direktiivides 2004/108/EC, ja 2006/95/EC ja 2002/95/EC kehtestatud nõuetele.

**Suomi** Tämä tuote noudattaa EU-direktiivin 2004/108/EC, 2006/95/EC & 2002/95/EC määräyksiä.

**Français** Ce produit est conforme aux exigences de la Directive Européenne 2004/108/EC, 2006/95/EC & 2002/95/EC.

**Deutsch** Dieses Produkt entspricht den Bestimmungen der Europäischen Richtlinie 2004/108/EC, 2006/95/EC & 2002/95/EC.

**Ελληνικά** Το παρόν προϊόν ακολουθεί τις διατάξεις των Ευρωπαϊκών Οδηγιών 2004/108/EC, 2006/95/EC και 2002/95/EC.

**Magyar** E termék megfelel a 2004/108/EC, 2006/95/EC és 2002/95/EC Európai Irányelv előírásainak.

**Icelandic** Þessi vara stenst reglugerð Evrópska Efnahags Bandalagsins númer 2004/108/EC, 2006/95/EC, & 2002/95/EC.

**Italiano** Questo prodotto è conforme alla Direttiva Europea 2004/108/EC, 2006/95/EC & 2002/95/EC.

**Latviešu** Šis produkts atbilst Eiropas Direktīvu 2004/108/EC, 2006/95/EC un 2002/95/EC noteikumiem.

**Lietuvių** Šis produktas atitinka Europos direktyvų 2004/108/EC, 2006/95/EC, ir 2002/95/EC nuostatas.

**Malti** Dan il-prodott hu konformi mal-provvedimenti tad-Direttivi Ewropej 2004/108/EC, 2006/95/EC u 2002/95/EC.

**Norsk** Dette produktet er i henhold til bestemmelsene i det europeiske direktivet 2004/108/EC, 2006/95/EC & 2002/95/EC.



**Polski** Niniejszy produkt jest zgodny z postanowieniami Dyrektyw Unii Europejskiej 2004/108/EC, 2006/95/EC i 2002/95/EC.

**Portuguese** Este produto cumpre com as normas da Diretiva Europeia 2004/108/EC, 2006/95/EC & 2002/95/EC.

**Español** Este producto cumple con las normas del Directivo Europeo 2004/108/EC, 2006/95/EC & 2002/95/EC.

**Slovensky** Tento produkt je v súlade s ustanoveniami európskych direktív 2004/108/EC, 2006/95/EC a 2002/95/EC.

**Slovenščina** Izdelek je skladen z določbami evropskih direktiv 2004/108/EC, 2006/95/EC in 2002/95/EC.

**Svenska** Denna produkt har tillverkats i enlighet med EG-direktiv 2004/108/EC, 2006/95/EC & 2002/95/EC.

**Türkçe** Bu ürün, Avrupa Birliği'nin 2004/108/EC, 2006/95/EC ve 2002/95/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://intel.com/intel/other/ehs/product\\_ecology](http://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重复使用处理。

请参考[http://intel.com/intel/other/ehs/product\\_ecology](http://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://intel.com/intel/other/ehs/product\\_ecology](http://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://intel.com/intel/other/ehs/product\\_ecology](http://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://intel.com/intel/other/ehs/product\\_ecology](http://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://intel.com/intel/other/ehs/product\\_ecology](http://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 dikitar semula dengan betul.

Sila rujuk [http://intel.com/intel/other/ehs/product\\_ecology](http://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://intel.com/intel/other/ehs/product\\_ecology](http://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://intel.com/intel/other/ehs/product\\_ecology](http://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://intel.com/intel/other/ehs/product\\_ecology](http://intel.com/intel/other/ehs/product_ecology) web sayfasına gidin.

## China RoHS

Intel Desktop Board DH61AG is a China RoHS-compliant product.

The China Ministry of Information Industry (MII) stipulates that a material Self Declaration Table (SDT) must be included in a product's user documentation. The SDT for Intel Desktop Board DH61AG is shown in Figure 21.

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 21. Intel Desktop Board DH61AG China RoHS Material Self Declaration Table**

## EMC Regulations

Intel Desktop Board DH61AG complies with the EMC regulations stated in Table 20 when correctly installed in a compatible host system.

**Table 20. EMC Regulations**

Regulation	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	Interference-Causing Equipment Standard, Digital Apparatus. (Canada)
EN55022	Limits and methods of measurement of Radio Interference Characteristics of Information Technology Equipment. (European Union)
EN55024	Information Technology Equipment – Immunity Characteristics Limits and methods of measurement. (European Union)
EN55022	Australian Communications Authority, Standard for Electromagnetic Compatibility. (Australia and New Zealand)
CISPR 22	Limits and methods of measurement of Radio Disturbance Characteristics of Information Technology Equipment. (International)
CISPR 24	Information Technology Equipment – Immunity Characteristics – Limits and Methods of Measurement. (International)
VCCI V-3, V-4	Voluntary Control for Interference by Information Technology Equipment. (Japan)
KN-22, KN-24	Korean Communications Commission – Framework Act on Telecommunications and Radio Waves Act. (South Korea)
CNS 13438	Bureau of Standards, Metrology and Inspection. (Taiwan)

## 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.

## Japan VCCI Statement

Japan 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。

## Korea Class B Statement

Korea Class B Statement translation: This equipment is for home use, and has acquired electromagnetic conformity registration, so it can be used not only in residential areas, but also other areas.

이 기기는 가정용(B급) 전자파적합기기로서 주로 가정에서 사용하는 것을 목적으로 하며, 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 Certifications

Intel Desktop Board DH61AG has the regulatory compliance marks shown in Table 21.

**Table 21. Regulatory Compliance Marks**

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.	
CE mark. Declaring compliance to European Union (EU) EMC directive, Low Voltage directive, and RoHS 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.	
Korea Certification mark. Includes an adjacent KCC (Korean Communications Commission) certification number: KCC-REM-CPU-DH61AG.	
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
China RoHS/Environmentally Friendly Use Period Logo: 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.	



## Chassis- and Component-Level 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 mark indicates 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, Low Voltage directive (as applicable), and ROHS directive, 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.

## ENERGY STAR\*, e-Standby, and ErP Compliance

The US Department of Energy and the US Environmental Protection Agency have continually revised the ENERGY STAR requirements. Intel has worked directly with these two governmental agencies in the definition of the new requirements. This Desktop Board meets the ENERGY STAR Program for Computers: Version 5.0 Category A requirements.

For information about ENERGY STAR requirements and recommended configurations, go to <http://www.intel.com/go/energystar>.

The Desktop Board also meets the following international requirements:

- Republic of Korea e-Standby program
- European Union Energy using Products (ErP) Lot 6 directive



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