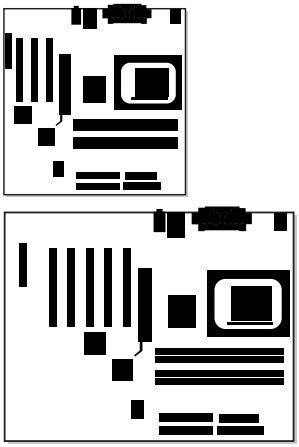

Intel® Desktop Boards D850EMD2 and D850EMV2 Product Guide

Order Number: A85186-003

Revision History

Revision	Revision History	Date
-001	First release of the Intel® Desktop Boards D850EMD2 and D850EMV2 Product Guide.	February 2002
-002	Second release of the Intel Desktop Boards D850EMD2 and D850EMV2 Product Guide.	February 2002
-003	Third release of the Intel Desktop Boards D850EMD2 and D850EMV2 Product Guide	May 2002

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.

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 numerique német pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe B prescrites dans le Réglement sur le broullage radioélectrique édicté par le ministére des Communications du Canada.

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Contact your local Intel sales office or your distributor to obtain the latest specifications and before placing your product order.

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1 Desktop Board Features

NOTE

The Desktop Board D850EMD2 layout was used for illustrations unless otherwise noted.

Table 1 describes the major features of the Desktop Boards D850EMD2 and D850EMV2.

Table 1. Feature Summary

Form Factors	• microATX at 9.6 inches by 9.6 inches (D850EMD2 board) • ATX at 9.6 inches by 12 inches (D850EMV2 board)
Processor	• Support for an Intel® Pentium® 4 processor in an mPGA478 socket • 533 MHz and 400 MHz front side bus (FSB) frequency
Memory	• Four 168-pin Direct Rambus† RIMM† sockets • Support for PC800-40 compliant RDRAM with 533 MHz FSB operation • Support for PC800-40 and PC800-45 compliant RDRAM with 400 MHz FSB operation • Support for up to 2 GB of system memory
Chipset	Intel® 850E chipset, consisting of: • Intel® 82850E Memory Controller Hub (MCH) with Accelerated Hub Architecture (AHA) bus • Intel® 82801BA I/O Controller Hub (ICH2) with AHA bus • 4 Mbit Firmware Hub (FWH)
I/O Control	SMSC LPC47M142-NC I/O controller
LAN	Optional Intel® 82562ET 10/100 Mbit/sec Platform LAN Connect (PLC) device and RJ-45 connector
Graphics	AGP connector supporting 1.5 V 4X or 2X AGP cards
Audio	Analog Devices Inc. AD1885 analog codec (AC '97) featuring SoundMAX† with SPX† software support
Peripheral Interfaces	• Up to five Universal Serial Bus (USB) 2.0 ports — Two ports routed to the back panel — Two ports routed to the front panel USB connector — One port routed to the optional CNR • Two IDE interfaces with Ultra DMA-33 and ATA-66/100 support • One floppy drive interface • One parallel port • Two serial ports • PS/2† keyboard and mouse ports
Expansion Capabilities	D850EMD2 board: • Three PCI bus add-in card connectors • One AGP connector • One optional CNR connector (slot shared with PCI bus connector 3) D850EMV2 board: • Five PCI bus add-in card connectors • One AGP connector • One optional CNR connector

continued

Table 1. Feature Summary (continued)

BIOS	• Intel/AMI BIOS • 4 Mbit symmetrical flash memory • Support for SMBIOS
Power Management	• Support for Advanced Configuration and Power Interface (ACPI 1.0) • Support for Advanced Power Management (APM 1.2) • Support for Plug and Play (PnP)
Management Features	Hardware monitor with: • Two fan sensing inputs used to monitor fan activity • Remote diode temperature sensing • Voltage sensing to detect out of range values
Instantly Available PC	• Support for *PCI Local Bus Specification Revision 2.2* • Suspend to RAM (STR) support • Wake on USB, PCI, CNR, RS-232, PS/2, LAN, and front panel
Other Features	• SCSI hard drive activity LED connector for the front panel • Speaker

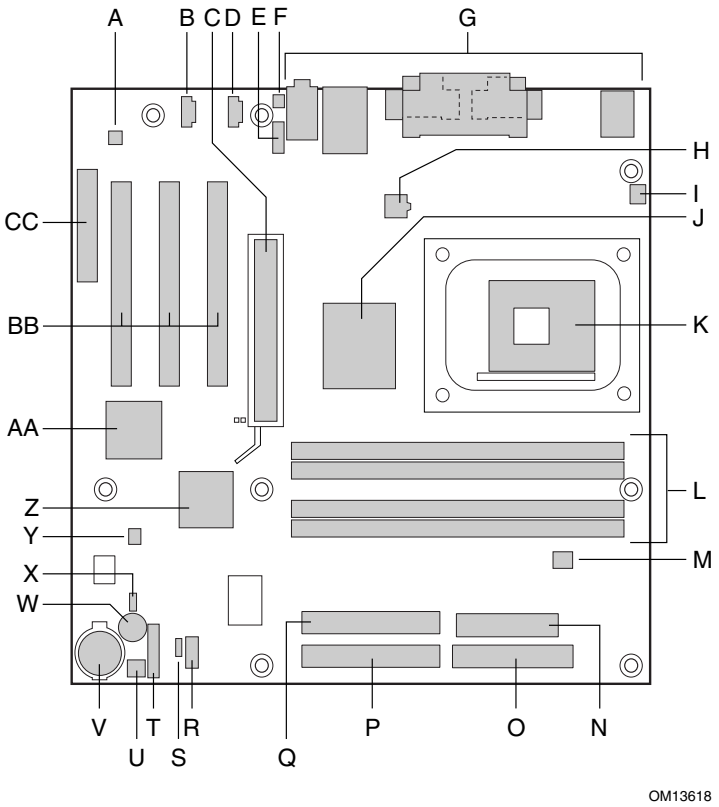
NOTE

For information about Intel® desktop boards, including technical product specifications, BIOS updates, and device drivers, go to the Intel World Wide Web site at:

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

Desktop Board Components

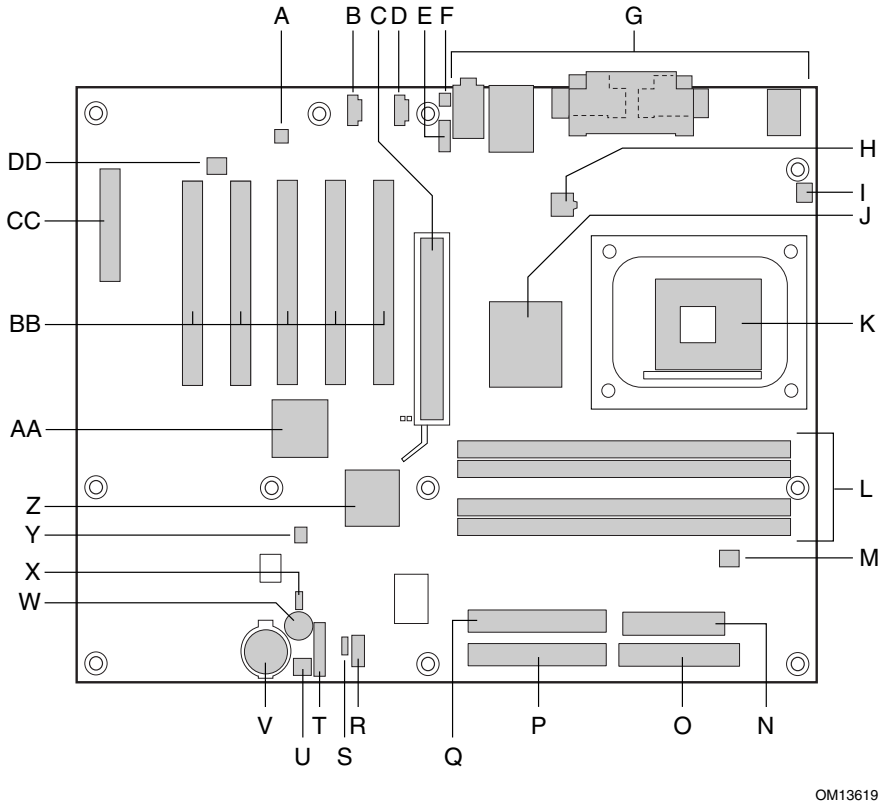
Figure 1 shows the location of the major components on the Desktop Board D850EMD2.



A	ADI AD1885 audio codec	P	Primary IDE connector
B	Auxiliary line-in connector (ATAPI)	Q	Secondary IDE connector
C	AGP connector	R	Front panel USB 2.0 connector
D	CD-ROM connector (ATAPI)	S	Alternate power/sleep LED connector
E	Front panel audio connector	T	Front panel connector
F	Chassis intrusion connector	U	Chassis fan connector (fan 2) (tachometer input)
G	Back panel connectors	V	Battery
H	ATX12V processor core voltage connector	W	Speaker
I	Processor fan connector (CPU fan) (tachometer input)	X	BIOS configuration jumper
J	Intel 82850E Memory Controller Hub (MCH)	Y	SCSI hard drive activity LED connector
K	Processor socket	Z	Intel 82801BA I/O Controller Hub (ICH2)
L	RIMM sockets	AA	NEC† D720100AGM USB 2.0 controller
M	RIMM fan connector (fan 1)	BB	PCI bus add-in card connectors
N	Power connector		
O	Floppy drive connector	CC	Communication and Networking Riser (CNR) (optional)

Figure 1. Desktop Board D850EMD2 Components

Figure 2 shows the location of the major components on the Desktop Board D850EMV2.



A	ADI AD1885 audio codec	Q	Secondary IDE connector
B	Auxiliary line-in connector (ATAPI)	R	Front panel USB 2.0 connector
C	AGP connector	S	Alternate power/sleep LED connector
D	CD-ROM connector (ATAPI)	T	Front panel connector
E	Front panel audio connector	U	Chassis fan connector (fan 2) (tachometer input)
F	Chassis intrusion connector	V	Battery
G	Back panel connectors	W	Speaker
H	ATX12V processor core voltage connector	X	BIOS configuration jumper
I	Processor fan connector (CPU fan) (tachometer input)	Y	SCSI hard drive activity LED connector
J	Intel 82850E Memory Controller Hub (MCH)	Z	Intel 82801BA I/O Controller Hub (ICH2)
K	Processor socket	AA	NEC D720100AGM USB 2.0 controller
L	RIMM sockets	BB	PCI bus add-in card connectors
M	RIMM fan connector (fan 1)	CC	Communication and Networking Riser (CNR) (optional)
N	Power connector	DD	Chassis fan connector (fan 3)
O	Floppy drive connector		
P	Primary IDE connector		

Figure 2. Desktop Board D850EMV2 Components

Processor

⚠ CAUTION

Failure to use an ATX12V power supply, or not connecting the additional power supply lead to the Desktop Board D850EMD2 or D850EMV2 may result in damage to the desktop board and/or power supply.

The desktop boards support a single Intel Pentium 4 processor. Processors are not included with the desktop board and must be purchased separately.

The processor connects to the desktop board through the mPGA 478-pin socket. The Pentium 4 processor may be removed and replaced to accommodate supported higher speed processors.

For instructions on how to install a processor, see Chapter 2 on page 21.

The desktop boards support the processors listed in Table 2.

Table 2. Processors Supported by the Desktop Boards

Type	Designation	Front Side Bus Frequency	L2 Cache
Intel® Pentium 4 processor on .13 micron process in an mPGA478 package	2.53, 2.40 and 2.26 GHz	533 MHz	512 KB
Intel Pentium 4 processor on .13 micron process in an mPGA478 package	2.20, 2A, 1.80A, 1.70A, and 1.60A GHz	400 MHz	512 KB
Intel Pentium 4 processor on .18 micron process in an mPGA478 package	2, 1.90, 1.80, 1.70, 1.60, and 1.50 GHz	400 MHz	256 KB

For the latest information on processor support for the Desktop Boards D850EMD2 and D850EMV2, refer to the Intel desktop board World Wide Web site at:

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

For instructions on installing or upgrading the processor, see Chapter 2 on page 21.

The Desktop Boards D850EMD2 and D850EMV2 require an ATX12V compliant power supply to function according to desktop board specifications. Both desktop boards have two ATX12V compliant power supply connectors that are needed to provide extra power to the Intel 850E chipset and Pentium 4 processor.

Items B and E in Figure 18 on page 60 and items C and F in Figure 19 on page 61 show the two power connector locations.

Main Memory

The desktop boards have four 2.5 V memory module sockets that support RIMMs containing Direct Rambus DRAM (RDRAM) devices.

The desktop boards support the following memory features:

- Maximum of 32 RDRAM devices per channel
- 128 MB (minimum) to 2 GB (maximum) onboard capacity utilizing 128/144 Mbit or 256/288 Mbit technology
- Single- or double-sided RIMM modules
- Support for PC800-40 compliant RDRAM with 533 MHz front side but (FSB) operation
- Support for PC800-40 and PC800-45 compliant RDRAM with 400 MHz FSB operation
- Serial Presence Detect (SPD) memory only
- ECC and non-ECC support

NOTE

For information about vendors that support these memory requirements, refer to the Desktop Board D850EMD2 or D850EMV2 link on this Intel World Wide Web site:
http://support.intel.com/support/motherboards/desktop

For information about installing memory, see Chapter 2 on page 21.

Intel® 850E Chipset

The Intel 850E chipset consists of the following devices:

- Intel 82850E Memory Controller Hub (MCH) with AHA bus
- Intel 82801BA I/O Controller Hub (ICH2) with AHA bus
- Firmware Hub (FWH)

Intel® 82850E Memory Controller Hub (MCH)

The MCH has these features:

- Integrated dual Direct Rambus technology memory channel
- Support for 128 MB to 2 GB main system memory
- Auto-detection of RDRAM memory
- Support for a single AGP device

Intel® 82801BA I/O Controller Hub (ICH2)

The ICH2 has these features:

- Integrated Intel® Ethernet LAN MAC (external PLC required)
- Support for the PCI interface
- Support for the Low Pin Count (LPC) interface
- Integrated IDE controller
- Support for CNR
- General purpose I/O
- Power management logic
- Support for the System Management Bus
- Real-Time Clock
- Support for AC ’97 audio devices and modems

Firmware Hub (FWH)

The FWH has these features:

- System BIOS
- System security and manageability logic that enables protection for storing and updating of platform information

Input/Output (I/O) Controller

The SMSC LPC47M142-NC LPC bus I/O controller features the following:

- Low pin count (LPC) interface
- 3.3 V operation
- Two serial ports
- One parallel port with Extended Capabilities Port (ECP) and Enhanced Parallel Port (EPP) support
- Serial IRQ interface compatible with serialized IRQ support for PCI systems
- PS/2 mouse and keyboard interfaces
- Interface for one 1.2 MB, 1.44 MB, or 2.88 MB diskette drive
- Intelligent power management, including a programmable wake up event interface
- PCI power management support
- Two fan tachometer inputs

Real-Time Clock

The desktop boards have a time-of-day clock and 100-year calendar. A battery on the desktop board keeps the clock current when the computer is turned off.

USB Support

The desktop boards support up to five USB 2.0 ports; two ports routed to the back panel, two to the front panel connector, and one to the optional CNR. You can connect five USB peripheral devices directly to the computer without an external hub. To attach additional devices, connect an external hub to either of the built-in ports. The desktop boards support the standard universal host controller interface (UHCI) and takes advantage of standard software drivers written to be compatible with UHCI.

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.

PCI Enhanced IDE Interface

The ICH2's IDE interface handles the exchange of information between the processor and peripheral devices like hard disks, CD-ROM drives, and Iomega Zip† drives inside the computer. The interface supports:

- Up to four IDE devices (such as hard drives)
- ATAPI devices (such as CD-ROM drives)
- PIO Mode 3 and PIO Mode 4 devices
- Ultra DMA-33 and ATA-66/100 protocol
- Laser servo (LS-120) drives

Expansion Slots

The D850EMD2 board has:

- Three PCI bus add-in card connectors (PCI bus connector 3 slot shared with CNR)
- One AGP connector
- One optional CNR connector (slot shared with PCI bus connector 3)

The D850EMV2 board has:

- Five PCI bus add-in card connectors
- One AGP connector
- One optional CNR connector

AGP Connector

NOTE

The desktop boards are compatible with 1.5 V AGP cards only.

AGP is a high-performance interface for graphics-intensive applications such as 3D graphics. AGP is independent of the PCI bus and is intended for use with graphical display devices. The AGP connector supports 1.5 V AGP 4X and 2X add-in cards.

For information about installing an AGP card, see Chapter 2 on page 21.

Communication and Networking Riser (CNR) (Optional)

The CNR provides an interface that supports various features such as audio, modem, USB, and LAN interfaces of the Intel 850E chipset.

Audio Subsystem

The AC '97 compliant audio subsystem consists of the following:

- Intel 82801BA I/O Controller Hub (ICH2)
- Analog Devices Inc. AD1885 analog codec

NOTE

The audio line out connector, located on the back panel, 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.

Audio drivers and utilities are available from Intel's World Wide Web site:

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

BIOS

The BIOS provides the Power-On Self-Test (POST), the BIOS Setup program, the PCI and IDE auto-configuration utilities, and the video BIOS. The BIOS is stored in the Firmware Hub. The BIOS can be updated by following the instructions in Chapter 3 on page 35.

PCI Auto Configuration

If you install a PCI add-in card in your computer, the PCI 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 add-in card.

IDE Auto Configuration

If you install an IDE device (such as a hard drive) in your computer, the IDE 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 an IDE device. You can override the auto-configuration options by specifying manual configuration in the BIOS Setup program.

To use ATA-66/100 features, the following items are required:

- An ATA-66/100 peripheral device
- An ATA-66/100 compatible cable
- ATA-66/100 operating system device drivers

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 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.

LAN Subsystem (Optional)

The optional Intel 82562ET (in conjunction with the Intel 82801BA ICH2) provides a Fast Ethernet PCI LAN subsystem providing both 10Base-T and 100Base-TX connectivity. Features include:

- 32-bit, 33-MHz direct bus mastering on the PCI bus
- Shared memory structure in the host memory that copies data directly to/from host memory
- A single RJ-45 connector with connection and activity status LEDs
- Jumperless configuration; the LAN subsystem is completely software configurable

LAN Subsystem Software

For Intel 82562ET Fast Ethernet PCI LAN software and drivers, refer to the D850EMD2 and D850EMV2 link on Intel's World Wide Web site at:

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

RJ-45 LAN Connector LEDs

Two LEDs are built into the RJ-45 LAN connector. Table 3 describes the LED states when the board is powered up and the LAN subsystem is operating.

Table 3. RJ-45 LAN Connector LEDs

LED Color	LED State	Indicates
Green	Off	10 Mbit/sec data rate is selected.
	On	100 Mbit/sec data rate is selected.
Yellow	Off	LAN link is not established.
	On (steady state)	LAN link is established.
	On (brighter and pulsing)	The computer is communicating with another computer on the LAN.

Speaker

A 47 Ω inductive speaker is mounted on the desktop board. The speaker provides audible error code (beep code) information during the Power-On Self-Test (POST).

Battery

A battery on the desktop board keeps the values in CMOS RAM and the clock current when the computer is turned off.

See Chapter 2 on page 21 for instructions on how to replace the battery.

Power Management Features

Power management is implemented at several levels, including:

- Software support:
  - — Advanced Configuration and Power Interface (ACPI)
  - — Advanced Power Management (APM)
- Hardware support:
  - — Instantly Available technology
  - — Resume on Ring
  - — Wake from USB
  - — Wake from PS/2 keyboard
  - — PCI card wakeup support

If the desktop board is used with an ACPI-aware operating system, the BIOS can provide ACPI support. Otherwise, it defaults to APM support.

Instantly Available Technology

⚠ CAUTION

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

⚠ CAUTION

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 technology enables the desktop board to enter the ACPI S3 (Suspend-to-RAM) sleep state. While in the S3 sleep state, the computer will appear to be off. When signaled by a wake-up device or event, the system quickly returns to its last known awake state.

The desktop board's standby power indicator, shown in Figure 3 on page 18, is lit when there is standby power to the system. This includes the memory modules and PCI bus connectors even when the computer appears to be off.

If the system has a dual-colored power LED on the front panel, the sleep state is indicated by the LED turning amber.

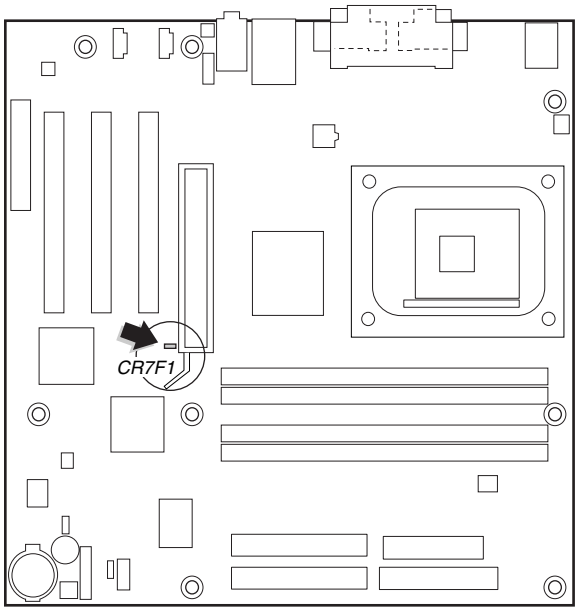


Figure 3. Location of the Standby Power Indicator

Power supplies used with these desktop boards must be able to provide enough standby current to support the standard Instantly Available (ACPI S3 sleep state) configuration as outlined in Table 4. Values are determined by specifications such as PCI 2.2. Actual measurements may vary.

To estimate the total amount of standby current required for a particular system configuration, standby current requirements of all installed components must be added. Refer to the descriptions in Table 4 and follow the steps outlined below:

1. Note the total Desktop Board D850EMD2 or D850EMV2 standby current requirement.
2. Add to that the total PS/2 port standby current requirement if a wake-enabled device is connected.
3. Add, from the PCI 2.2 slots (wake-enabled) row, the total of the number of wake-enabled devices installed (PCI and AGP) multiplied by the standby current requirement.
4. Add, from the PCI 2.2 slots (non-wake-enabled) row, the total of the number of non-wake-enabled devices installed (PCI and AGP) multiplied by the standby current requirement.
5. Add all additional wake-enabled devices' and non-wake-enabled devices' standby current requirements as applicable.
6. Add all the required current totals from steps 1 through 5 to determine the total estimated standby current power supply requirement.

Table 4. Standby Current Requirements

Instantly Available Current Support	Description	Standby Current Requirements (mA)
Estimate for integrated board components	Total for the Desktop Board D850EMD2 or D850EMV2	770*
Estimate for add-on components (Add to integrated board components shown above)	PS/2 ports**	345
	PCI 2.2 slots (wake-enabled)	375
	PCI 2.2 slots (non-wake-enabled)	100
	CNR** (wake enabled)	875
	CNR** (non-wake enabled)	40
	USB ports**	700

* Refer to the *Intel® Desktop Board D850EMV2/D850EMD2 Technical Product Specification* for the exact standby current requirements

** Dependent upon system configuration

NOTE

PCI requirements are calculated by totaling the following:

- *One wake-enabled device @ 375 mA*
- *Five non-wake-enabled devices @ 20 mA each*

PS/2 Ports requirements per the IBM PS/2 Port Specification (Sept 1991):

- *Keyboard @ 275 mA*
- *Mouse @ 70 mA*

USB requirements are calculated by totaling the following:

- *One wake-enabled device @ 500 mA*
- *USB hub @ 100 mA*
- *Three USB non-wake-enabled devices @ 2.5 mA each*
- *The USB ports are limited to a combined total of 700 mA*

Resume on Ring

The operation of Resume on Ring can be summarized as follows:

- Resumes operation from the ACPI S1 state
- Requires only one call to access the computer
- Detects incoming calls similarly for external and internal modems
- Requires modem interrupt be unmasked for correct operation

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 and remove a processor
- Install and remove memory
- Install and remove an AGP card
- Connect the IDE cable
- Set the BIOS jumper
- Clear passwords
- Replace the battery

Before You Begin

⚠ CAUTION

Before you install the desktop board in a chassis, see Appendix B on page 73 for regulatory requirements and precautions.

- 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 number, 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.

⚠ WARNINGS

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.

Installing the I/O Shield

NOTE

Systems based on this desktop board require that the I/O shield be properly installed to comply with Class B emissions requirements.

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.

Install the I/O shield before installing the desktop board in the chassis. Place the shield inside the chassis as shown in the following figure. Press the shield into place so that it fits tightly and securely. If the shield doesn't fit, obtain a properly sized shield from the chassis supplier.

Figure 4 shows how the I/O shield is installed inside the chassis.

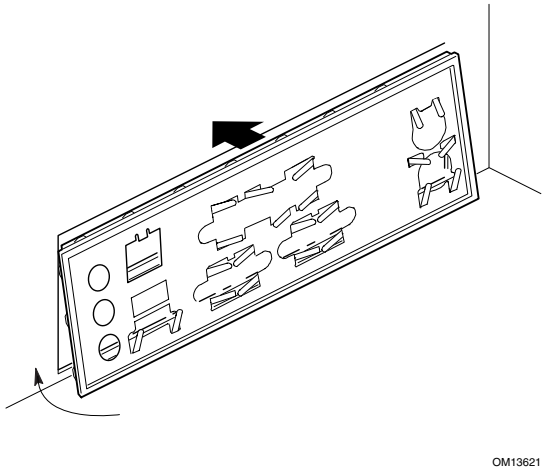


Figure 4. Installing the I/O Shield

Installing and Removing the Desktop Board

Refer to your chassis manual for instructions on installing and removing the board. The Desktop Board D850EMD2 is secured to the chassis by eight screws and the D850EMV2 board by 11 screws. See Figure 5 and Figure 6 for the locations of the mounting screw holes of each desktop board.

WARNING

This procedure should be done only by qualified technical personnel. 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.

NOTES

You will need a Phillips† (#2 bit) screwdriver.

Refer to Appendix B on page 73 for regulatory requirements and installation instructions and precautions.

Figure 5 shows the location of the mounting holes for the Desktop Board D850EMD2.

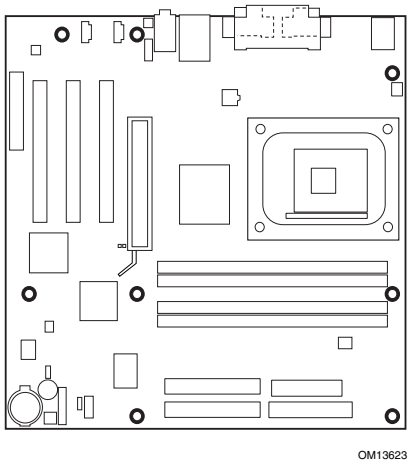


Figure 5. Desktop Board D850EMD2 Mounting Screw Holes

Figure 6 shows the location of the mounting holes for the Desktop Board D850EMV2.

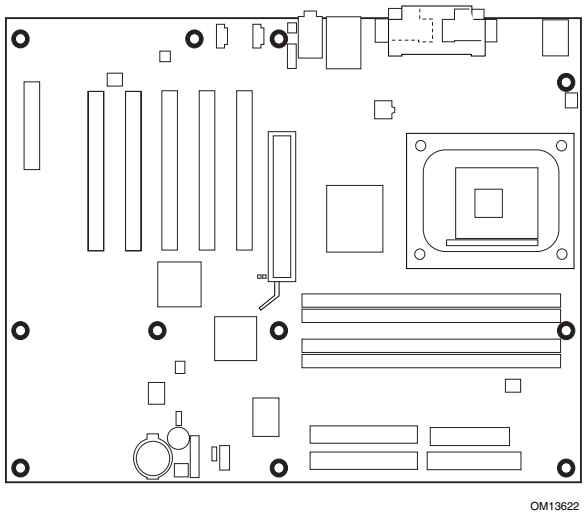


Figure 6. Desktop Board D850EMV2 Mounting Screw Holes

Installing a Processor

⚠ CAUTION

Before installing or removing the processor, make sure that AC power has been removed by unplugging the power cord from the computer; the standby power LED should not be lit (see Figure 3 on page 18). Failure to do so could damage the processor and the desktop board.

To install a processor, follow these instructions:

1. Observe the precautions in "Before You Begin" on page 21.
2. Locate the processor socket and raise the socket lever completely.
3. Install the processor so that the corner with the triangle marking (A) is aligned with the corner of the socket where the lever connects to the socket (see Figure 7).
4. Lower the lever to its original position.

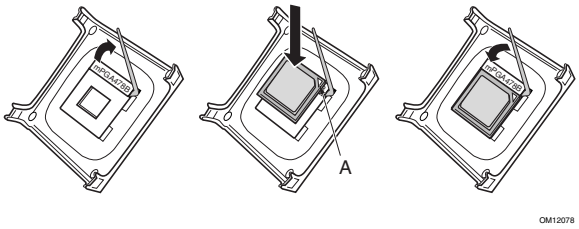


Figure 7. Installing a Processor

5. For instructions on how to install the processor fan heatsink, refer to the boxed processor manual or the Intel World Wide Web site at:

   http://support.intel.com/support/processors/pentium4/intnotes478.htm

6. Connect the processor fan cable to the processor fan connector (see Figure 8).

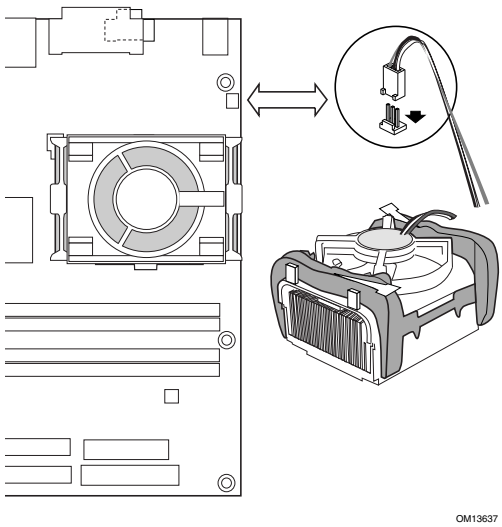


Figure 8. Connecting the Processor Fan Cable to the Processor Fan Connector

Removing the Processor

For instruction on how to remove the processor fan heatsink and the processor, refer to the processor installation manual or the Intel World Wide Web site at:

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

Installing Memory

⚠ CAUTIONS

Before installing or removing RIMM modules, make sure that AC power has been removed by unplugging the power cord from the computer. The standby power indicator LED should not be lit (see Figure 3 on page 18 for the location of the standby power indicator LED location). Failure to do so could damage the memory and the desktop board.

The desktop board supports combinations of no more than 32 RDRAM components per RDRAM channel. If the total number of RDRAM components installed in all RIMM sockets exceeds 64, the computer will not boot.

A Continuity RIMM (CRIMM) module must be installed in any unused memory connector or the desktop board will not boot.

Incorrect insertion of a RIMM module or a CRIMM module in a RIMM connector can damage the Desktop Boards D850EMD2 and D850EMV2.

The desktop board has four memory module sockets arranged as bank 0 and bank 1. The pair of sockets closest to the processor is for bank 0, as shown in Figure 11. The memory module requirements are listed in the Main Memory section on page 12.

When adding memory:

- Install a pair of RIMMs in the sockets in bank 0 first. The RIMMs must be the same speed (PC800), size (64 MB, 128 MB, 256 MB, or 512 MB), and density (single- or double-sided).
- If the desired memory configuration has been achieved in bank 0, install CRIMMs in the sockets in bank 1 (see Figure 9).

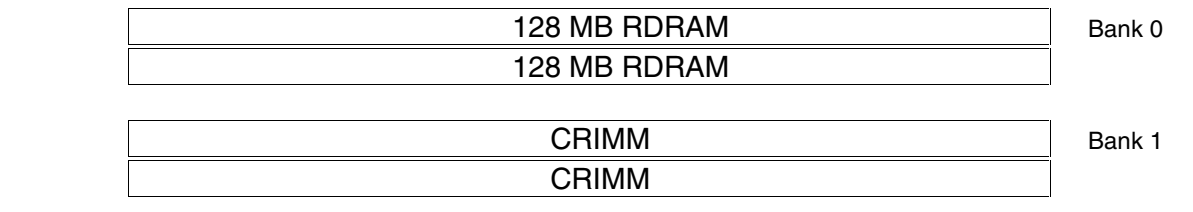


Figure 9. RDRAM and CRIMM Installation

- If memory is to be installed in bank 1, the RIMM modules to be installed must be the same size and density to each other and match the speed of the RIMM modules in bank 0. For example, if bank 0 has two 128 MB RIMMs of PC800 RDRAM, bank 1 would require PC800 RDRAM also, however, any other supported RIMM modules such as 64 MB, 128 MB, 256 MB, or 512 MB could be used (see Figure 10).

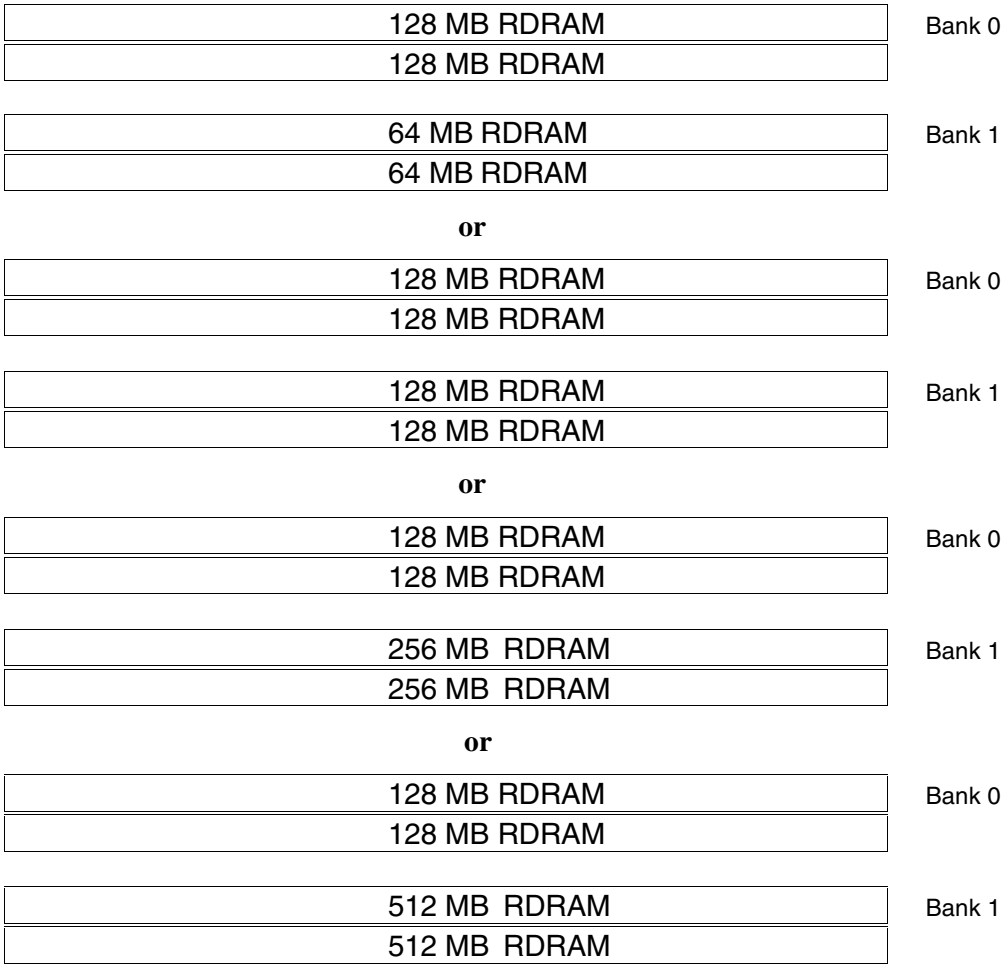


Figure 10. RIMM Installation

- The BIOS detects the size and type of installed memory.

To install the memory modules, follow these steps (see Figure 11):

1. Observe the precautions in “Before You Begin” on page 21.
2. Holding the memory module by the edges, remove it from its antistatic package.
3. Make sure the clips at either end of the socket are pushed away from the socket.
4. Position the module above the socket. Align the two small notches in the bottom edge of the module with the keys in the socket.
5. Insert the bottom edge of the module into the socket.
6. When the module is seated, push down on the top edge of the module until the retaining clips snap into place. Make sure the clips are firmly in place.

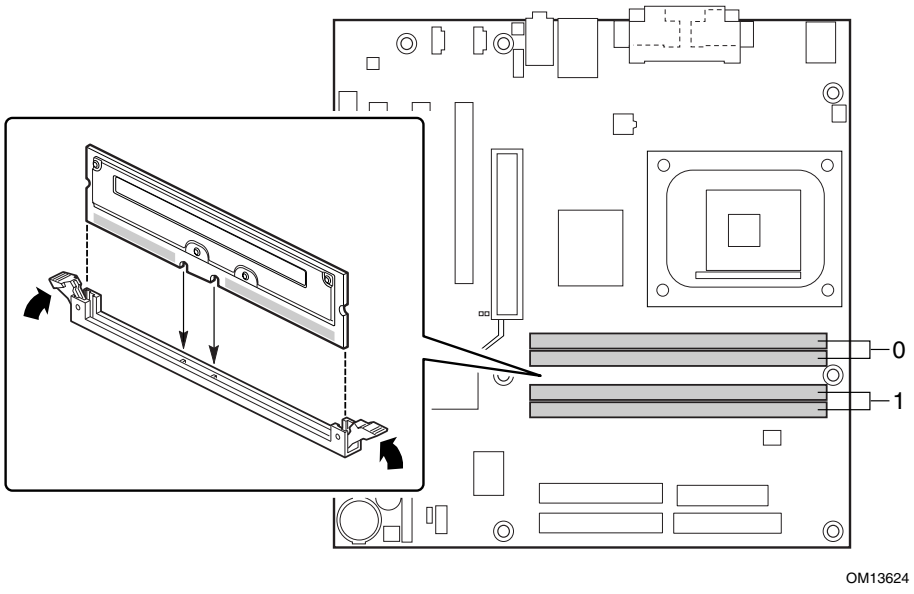


Figure 11. Installing a Memory Module

Removing Memory

To remove a memory module, follow these steps:

1. Observe the precautions in "Before You Begin" on page 21.
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. Gently spread the retaining clips at each end of the socket. The memory pops out of the socket.
5. Hold the memory module by the edges, lift it away from the socket, and store it in an antistatic package.
6. Reinstall and reconnect any parts you removed or disconnected to reach the memory module sockets.

Installing an AGP Card

The AGP connector supports 1.5 V 4X and 2X AGP cards.

The desktop board has an integrated AGP retention mechanism (RM). Follow these instructions to install an AGP card:

1. Place the AGP card in the AGP connector.
2. Press down on the card until it is completely seated in the AGP connector and the card retention notch snaps into place around the AGP card RM pin.
3. Secure the card's metal bracket to the chassis back panel with a screw.

Removing the AGP Card

Follow these instructions to remove the AGP card:

1. Remove the screw (B) that secures the card's metal bracket (A) to the chassis back panel.
2. Push back on the RM lever (D), as shown in Figure 12, until the retention pin (C) completely clears the notch in the card.
3. Pull the card straight up (E).

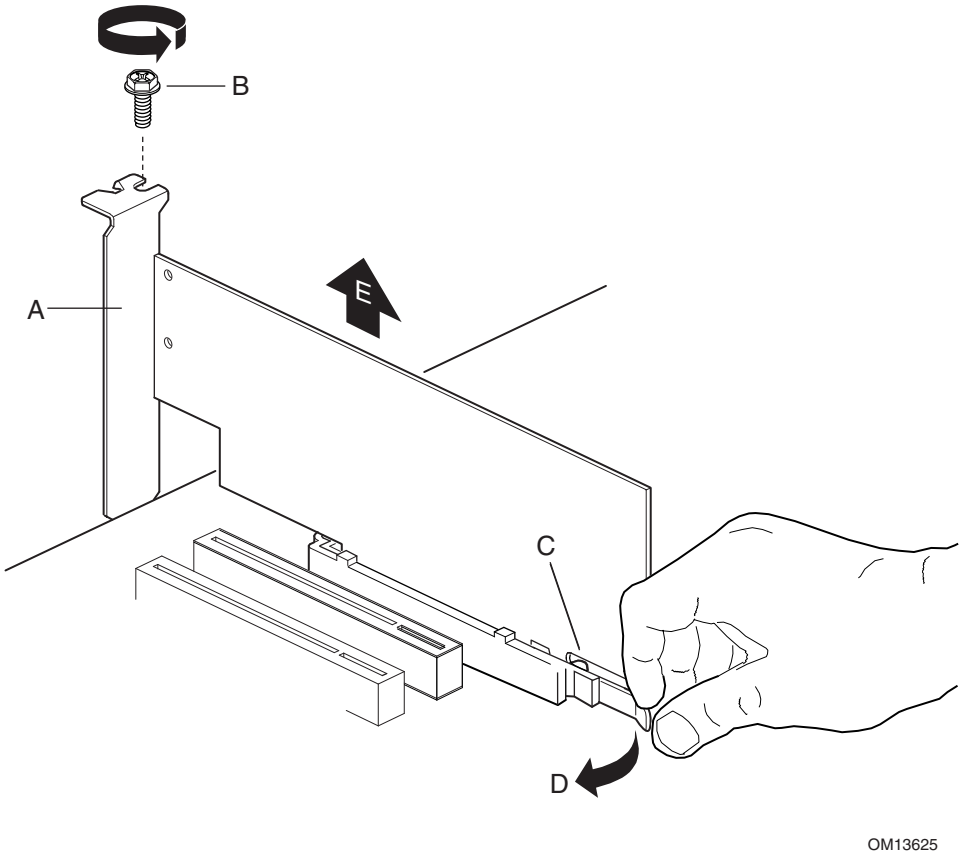


Figure 12. Removing the AGP Card

Connecting the IDE Cable

The Intel® boxed desktop board package includes two IDE cables. Both are capable of connecting two drives to the desktop board. The 40-contact, 40-conductor cable supports the Ultra DMA-33 transfer protocol. The 40-contact, 80-conductor cable supports ATA-66 and ATA-100 transfer protocols and is backward compatible with drives using slower IDE transfer protocols.

NOTE

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.

NOTE

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:

- Attach the cable end with the single connector to the desktop board (see Figure 13, A).
- Attach the cable end with the two closely spaced connectors to the drives (see Figure 13, B).

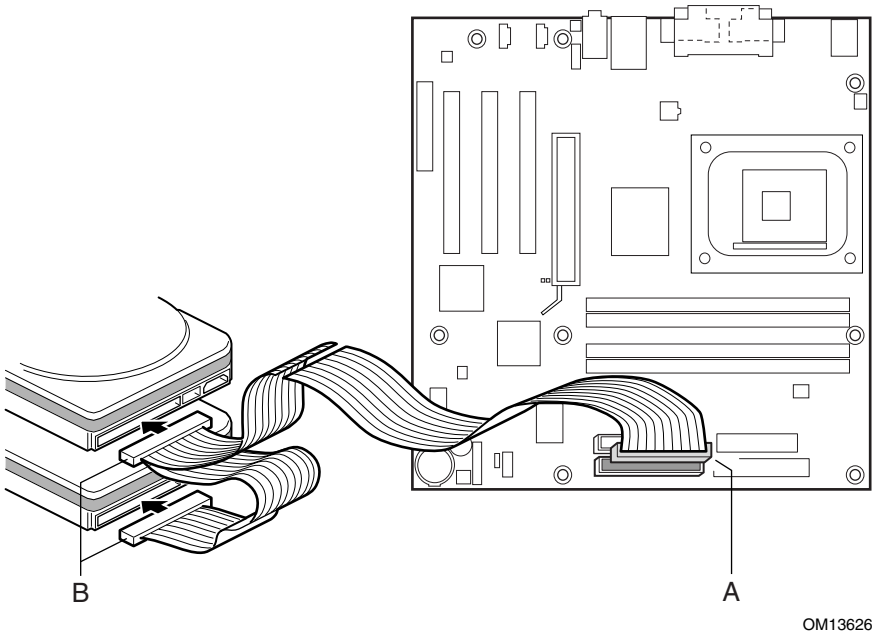


Figure 13. Connecting the IDE Cable

Setting the BIOS Configuration Jumper

CAUTION

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

The location of the board's BIOS configuration jumper (J9H2) is shown in Figure 14.

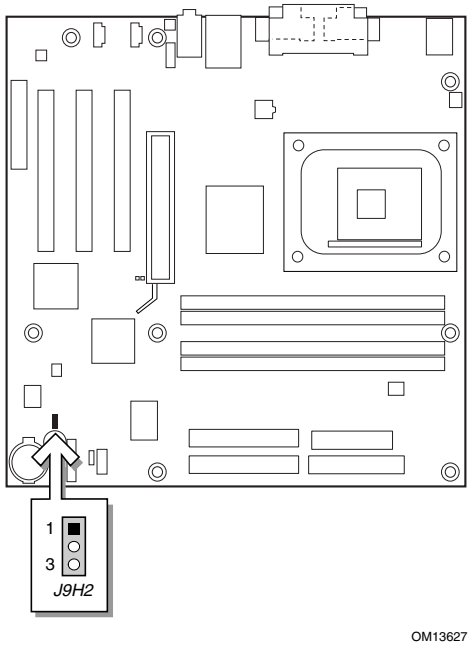


Figure 14. Location of the BIOS Configuration Jumper

The three-pin BIOS jumper enables the board configuration to be done in BIOS Setup. Table 5 shows the jumper settings for the Setup program modes.

Table 5. Jumper Settings for the BIOS Setup Program Modes (J9H2)

Function / Mode	Jumper Setting	Configuration
Normal	1-2	The BIOS uses current configuration information and passwords for booting.
Configure	2-3	After the POST runs, the BIOS displays the maintenance menu. Use this menu to clear passwords.
Recovery	None	The BIOS attempts to recover the BIOS configuration. A recovery diskette is required.

Clearing Passwords

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

1. Observe the precautions in "Before You Begin" on page 21.
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 (see Figure 14).
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 ºC with 3.3 VSB applied.

Figure 15 on page 34 shows the location of the battery.

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.

⚠ **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.
(French)

⚠ **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.
(Danish)

⚠ **OBS!**

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

⚠ **VIKTIGT!**

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

⚠ **VARO**

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

⚠ 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.

(German)

⚠ 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.

(Italian)

⚠ 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.

(Spanish)

⚠ 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.

(Dutch)

⚠ 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.

(Brazilian Portuguese)

To replace the battery, follow these steps:

1. Observe the precautions in "Before You Begin" on page 21.
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 desktop board (see Figure 15).
5. With a medium flat-bladed screwdriver, gently pry the battery free from its connector. 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.

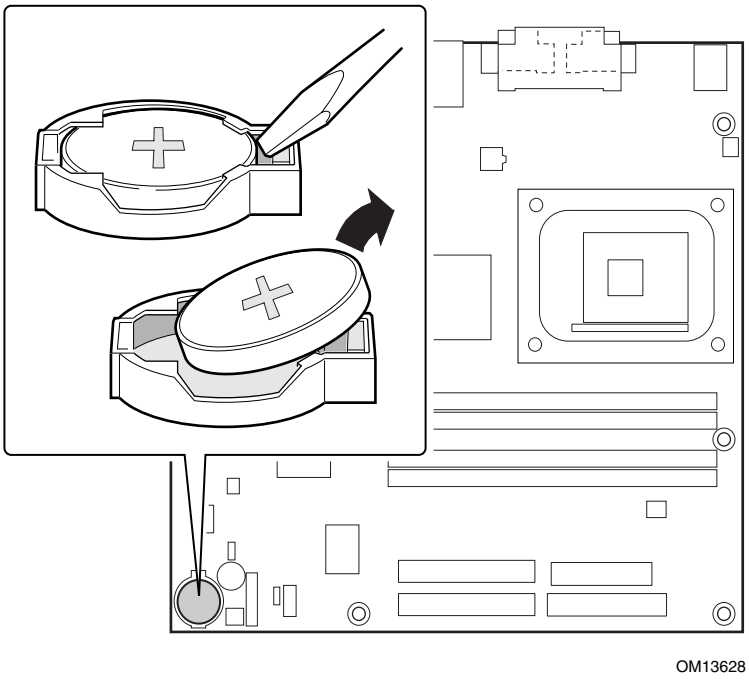


Figure 15. Removing the Battery

3 Updating the BIOS

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:
   http://support.intel.com/support/motherboards/desktop
2. Navigate to the D850EMV2 or D850EMD2 page and click the Express BIOS Update utility file for the Desktop Boards D850EMV2 or D850EMD2 BIOS.
3. Download the file to your hard drive. (You can also save this file to a diskette. 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 Intel® Flash Memory Update Utility

With the Intel Flash Memory Update Utility you can update the system BIOS from a floppy disk or other bootable media. The utility available from the Web provides a simple method for creating a bootable flash memory update floppy that will automatically update your BIOS.

Obtaining the BIOS Update File

You can update to a new version of the BIOS by using the BIOS update file. The BIOS update file is a compressed self-extracting archive that contains all the files you need to update the BIOS. The BIOS update file contains:

- New BIOS files
- BIOS recovery files
- Intel Flash Memory Update Utility

You can obtain the BIOS update file through your computer supplier or by navigating to the D850EMD2 or D850EMV2 page on the Intel World Wide Web site:

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

NOTE

Please review the instructions distributed with the update utility before attempting a BIOS update.

The Intel Flash Memory Update Utility allows you to:

- Update the BIOS in flash memory
- Update the language section of the BIOS

Updating the BIOS

CAUTION

The AUTOEXEC.BAT file provided with the update files updates the BIOS. Do not interrupt the process or the system may not function.

1. Boot the computer with the BIOS update diskette in drive A. During system boot, the AUTOEXEC.BAT file provided with the update files will automatically run the BIOS update process.
2. When the update process is complete, the monitor will display a message telling you to remove the diskette and to reboot the system.
3. As the computer boots, check the BIOS identifier (version number) to make sure the update was successful. If a logo appears, press <Esc> to view the POST messages.

Recovering the BIOS

It is unlikely that anything will interrupt the BIOS update; however, if an interruption occurs, the BIOS could be damaged. The following steps explain how to recover the BIOS if an update fails. The following procedure uses recovery mode for the Setup program. See page 30 for more information on Setup modes.

NOTE

Because of the small amount of code available in the boot block area, there is no video support. You will not see anything on the screen during this procedure. Monitor the procedure by listening to the speaker and looking at the diskette drive LED.

1. Turn off the computer, disconnect the computer's power cord, and disconnect all external peripherals.
2. Remove the computer cover and locate the configuration jumper labeled J9H2 (see Figure 14).
3. Remove the jumper from all pins as shown below to set recovery mode for Setup.

4. Insert the bootable BIOS update diskette into diskette drive A.

5. Replace the computer cover, connect the power cord, turn on the computer, and allow it to boot. The recovery process will take a few minutes.
6. Listen to the speaker:
   - Upon applying power, drive A will begin to show activity. In about a minute, two beeps are heard and drive A activity ceases (temporarily) indicating the successful recovery of the BIOS core. Drive A activity will begin again followed by two more beeps indicating the successful recovery of the boot block. This sequence of events indicates a successful BIOS recovery.
   - A series of continuous beeps indicates a failed BIOS recovery.
7. If recovery fails, return to step 1 and repeat the recovery process.
8. If recovery is successful, turn off the computer, and disconnect its power cord.
9. Remove the computer cover and continue with the following steps.
10. Reinstall the jumper back on pins 1-2 as shown below to set normal mode for Setup.

11. Leave the update diskette in drive A, replace the computer cover, and connect the computer's power cord.
12. Turn on the computer and continue with the BIOS update (see page 36).

4 Using the Setup Program

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

NOTE

The BIOS Setup menus described in this section may not show the latest settings. For the latest BIOS settings, refer to the Intel Desktop Board D850EMD2/D850EMV2 Technical Product Specification or the Intel World Wide Web site:

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

NOTE

For reference purposes, you should write down the current Setup settings. When you make changes to the settings, update this record.

NOTE

The Setup menus described in this section apply to the desktop boards with BIOS identifier MV85010A.86A. Boards with other BIOS identifiers might have differences in some of the Setup menu screens.

The Setup screen menu bar is shown below.

Maintenance	Main	Advanced	Security	Power	Boot	Exit

Table 6 shows the BIOS Setup program menu bar.

Table 6. BIOS Setup Program Menu Bar

Maintenance	Main	Advanced	Security	Power	Boot	Exit
Clears passwords and Boot Integrity Service (BIS)* credentials, and configures extended configuration memory settings	Allocates resources for hardware components	Configures advanced features available through the chipset	Sets passwords and security features	Configures power management features	Selects boot options and power supply controls	Saves or discards changes to set program options

* For information about the BIS, refer to the Intel World Wide Web site at:

http://developer.intel.com/design/security/index1.htm

Table 7 shows the function keys available for menu screens.

Table 7. BIOS Setup Program Function Keys

BIOS Setup Program Function Key	Description
<←> or <→>	Selects a different menu screen
<↑> or <↓>	Moves cursor up or down
<Tab>	Moves cursor to the next field
<Enter>	Executes command or selects the submenu
<F9>	Load the default configuration values for the current menu
<F10>	Save the current values and exits the BIOS Setup program
<Esc>	Exits the menu

Maintenance Menu

Maintenance	Main	Advanced	Security	Power	Boot	Exit

The menu shown in Table 8 is used to clear the Setup passwords and enable extended configuration mode. Setup only displays this menu in configure mode. See page 30 for information about setting configure mode.

Table 8. Maintenance Menu

Feature	Options	Description
Processor Speed	Processor dependent	Displays the processor speed.
Clear All Passwords	• **Yes (default)** • No	Clears the user and administrative passwords.
Clear BIS* Credentials	• **Yes (default)** • No	Clears the Wired for Management Boot Integrity Service (BIS) credentials.
Extended Configuration	• **Default (default)** • User-Defined	Invokes the Extended Configuration submenu.
CPU Information	No options	Displays processor information.
CPU Stepping Signature	No options	Displays the processor's stepping signature.
CPU Microcode Update Revision	No options	Displays the processor's microcode update revision.

* For information about the BIS, refer to the Intel World Wide Web site at:

http://developer.intel.com/design/security/index1.htm

Extended Configuration Submenu

Maintenance	Main	Advanced	Security	Power	Boot	Exit
Extended Configuration						

The submenu shown in Table 9 is used to set system control and video memory cache mode. This submenu becomes available when User Defined is selected under Extended Configuration.

Table 9. Extended Configuration Submenu

Feature	Options	Description
Extended Configuration	• **Default (default)** • User-Defined	*User-Defined* allows setting memory control and video memory cache mode. If selected here, will also display in the Advanced Menu as "Extended Menu: *Used*."
Video Memory Cache Mode	• USWC	Selects Uncacheable Speculative Write-Combining (USWC) video memory cache mode. Full 32 byte contents of the Write Combining buffer are written to memory as required. Cache lookups are not performed. Both the video driver and the application must support Write Combining.
	• **UC (default)**	Selects Uncacheable (UC) video memory cache mode. This setting identifies the video memory range as uncacheable by the processor. Memory writes are performed in program order. Cache lookups are not performed. Well suited for applications not supporting Write Combining.

Main Menu

Maintenance	**Main**	Advanced	Security	Power	Boot	Exit

Table 10 describes the Main Menu. This menu reports processor and memory information and is used to configure the system date and system time.

Table 10. Main Menu

Feature	Options	Description
BIOS Version	No options	Displays the version of the BIOS.
Processor Type	No options	Displays processor type.
Processor Speed	No options	Displays processor operating frequency.
System Bus Speed	No options	Displays the system bus frequency.
Cache RAM	No options	Displays the size of second-level cache and whether it is ECC-capable.
Total Memory	No options	Displays the total amount of RAM.
RIMM 1 RIMM 2 RIMM 3 RIMM 4	No options	Displays the amount and type of RAM installed in the memory banks.
Language	• **English (default)** • Espanol • Deutsche • Italiano • Français	Selects the default language used by the BIOS.
Memory Configuration	• Non-ECC • **ECC (default)**	Allows the user to enable error reporting if the system and all installed memory supports ECC. If non-ECC memory is installed, BIOS will detect and change setting to non-ECC.
System Time	Hour, minute, and second	Specifies the current time.
System Date	Day of the week, month, day, and year	Specifies the current date.

Advanced Menu

Maintenance	Main	**Advanced**	Security	Power	Boot	Exit

Table 11 describes the Advanced Menu. This menu is used to set advanced features that are available through the chipset.

Table 11. Advanced Menu

Feature	Options	Description
Extended Configuration	No options	If *Used* is highlighted, *User-Defined* has been selected in Extended Configuration under the Maintenance Menu.
PCI Configuration	No options	Configures individual PCI slot's IRQ priority. When selected, displays the PCI Configuration submenu.
Boot Configuration	No options	Configures Plug & Play and the Numlock key, and resets configuration data. When selected, displays the Boot Configuration submenu.
Peripheral Configuration	No options	Configures peripheral ports and devices. When selected, displays the Peripheral Configuration submenu.
IDE Configuration	No options	Specifies type of connected IDE device.
Diskette Configuration	No options	When selected, displays the Diskette Configuration submenu.
Event Log Configuration	No options	Configures Event Logging. When selected, displays the Event Log Configuration submenu.
Video Configuration	No options	Configures video features. When selected, displays the Video Configuration submenu.

PCI Configuration Submenu

Maintenance	Main	**Advanced**	Security	Power	Boot	Exit

PCI Configuration
Boot Configuration
Peripheral Configuration
IDE Configuration
Diskette Configuration
Event Log Configuration
Video Configuration

The submenu shown in Table 12 is used to configure the IRQ priority of PCI slots individually.

Table 12. PCI Configuration Submenu

Feature	Options	Description
PCI Slot 1 IRQ Priority	• **Auto (default)** • 3 • 5 • 9 • 10 • 11	Allows selection of IRQ priority.
PCI Slot 2 IRQ Priority	• **Auto (default)** • 3 • 5 • 9 • 10 • 11	Allows selection of IRQ priority.
PCI Slot 3 IRQ Priority	• **Auto (default)** • 3 • 5 • 9 • 10 • 11	Allows selection of IRQ priority. IRQ Priority selections for PCI slots 3 and 5 are linked. Selections made to PCI Slot 3 IRQ Priority are repeated in PCI Slot 5 IRQ Priority.
PCI Slot 4 IRQ Priority	• **Auto (default)** • 3 • 5 • 9 • 10 • 11	Allows selection of IRQ priority (D850EMV2 only).
PCI Slot 5 IRQ Priority	No options	Always set to Auto (D850EMV2 only).

Boot Configuration Submenu

Maintenance	Main	**Advanced**	Security	Power	Boot	Exit

PCI Configuration
Boot Configuration
Peripheral Configuration
IDE Configuration
Diskette Configuration
Event Log Configuration
Video Configuration

The submenu shown in Table 13 is used to set the Plug & Play options, reset configuration data, and the power-on state of the Numlock key.

Table 13. Boot Configuration Submenu

Feature	Options	Description
Plug & Play O/S	• **No (default)** • Yes	Specifies if manual configuration is desired. *No* lets the BIOS configure all devices. This setting is appropriate when using a Plug & Play operating system. *Yes* lets the operating system configure Plug & Play devices not required to boot the system. This option is available for use during lab testing.
Reset Config Data	• **No (default)** • Yes	*No* does not clear the PCI/PnP configuration data stored in flash memory on the next boot. *Yes* clears the PCI/PnP configuration data stored in flash memory on the next boot.
Numlock	• Off • **On (default)**	Specifies the power-on state of the Numlock feature on the numeric keypad of the keyboard.

Peripheral Configuration Submenu

Maintenance	Main	**Advanced**	Security	Power	Boot	Exit

PCI Configuration
Boot Configuration
Peripheral Configuration
IDE Configuration
Diskette Configuration
Event Log Configuration
Video Configuration

This submenu shown in Table 14 is used to enable onboard devices and USB legacy support.

Table 14. Peripheral Configuration Submenu

Feature	Options	Description
Serial Port A	• Disabled • Enabled • **Auto (default)**	Configures serial port A. *Auto* assigns the first free COM port, normally COM 1, the address 3F8h, and the interrupt IRQ4. An * (asterisk) displayed next to an address indicates a conflict with another device.
Base I/O address (This feature is displayed only if Serial Port A is set to *Enabled*.)	• **3F8 (default)** • 2F8 • 3E8 • 2E8	Specifies the base I/O address for serial port A, if serial port A is set to *Enabled*.
Interrupt (This feature is displayed only if Serial Port A is set to *Enabled*.)	• IRQ 3 • **IRQ 4 (default)**	Specifies the interrupt for serial port A, if serial port A is set to *Enabled*.
Serial Port B	• Disabled • Enabled • **Auto (default)**	Configures serial port B. *Auto* assigns the first free COM port, normally COM 2, the address 3F8h, and the interrupt IRQ4. An * (asterisk) displayed next to an address indicates a conflict with another device.
Base I/O address (This feature is displayed only if Serial Port B is set to *Enabled*.)	• 3F8 • **2F8 (default)** • 3E8 • 2E8	Specifies the base I/O address for serial port B, if serial port B is set to *Enabled*.
Interrupt (This feature is displayed only if Serial Port A is set to *Enabled*.)	• **IRQ 3 (default)** • IRQ 4	Specifies the interrupt for serial port B, if serial port B is set to *Enabled*.

continued

Table 14. Peripheral Configuration Submenu (continued)

Feature	Options	Description
Parallel port	• Disabled • Enabled • **Auto (default)**	Configures the parallel port. *Auto* assigns LPT1 the address 378h and the interrupt IRQ7. An * (asterisk) displayed next to an address indicates a conflict with another device.
Mode	• Output Only • **Bi-directional (default)** • EPP • ECP	Selects the mode for the parallel port. Not available if the parallel port is disabled. *Output Only* operates in AT† -compatible mode. *Bi-directional* operates in PS/2-compatible mode. *EPP* is Extended Parallel Port mode, a high-speed bi-directional mode. *ECP* is Enhanced Capabilities Port mode, a high-speed bi-directional mode.
Base I/O address (This feature is displayed only if Parallel Port is set to *Enabled*.)	• **378 (default)** • 278	Specifies the base I/O address for the parallel port.
Interrupt (This feature is displayed only if Parallel Port is set to *Enabled*.)	• IRQ 5 • **IRQ 7 (default)**	Specifies the interrupt for the parallel port.
Audio Device	• Disabled • **Enabled (default)**	Enables or disables the onboard audio subsystem.
High Speed USB	• Disabled • **Enabled (default)**	Enables or disables USB 2.0 support.
LAN Device	• Disabled • **Enabled (default)**	Enables or disables the LAN device.
Legacy USB Support	• Disabled • **Enabled (default)**	Enables or disables USB legacy support.

IDE Configuration Submenu

Maintenance	Main	**Advanced**	Security	Power	Boot	Exit

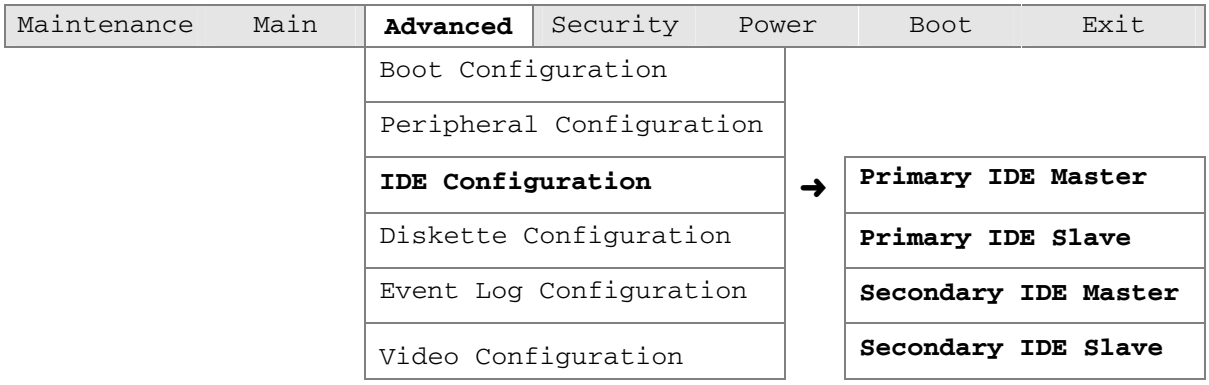
PCI Configuration
Boot Configuration
Peripheral Configuration
IDE Configuration
Diskette Configuration
Event Log Configuration
Video Configuration

This submenu shown in Table 15 is used to configure IDE device options.

Table 15. IDE Configuration Submenu

Feature	Options	Description
IDE Controller	• Disabled • Primary • Secondary • **Both (default)**	Specifies the integrated IDE controller. *Primary* enables only the primary IDE controller. *Secondary* enables only the secondary IDE controller. *Both* enables both IDE controllers.
PCI IDE Bus Master	• Disabled • **Enabled (default)**	Enables or disables bus mastering capability for IDE hard disk I/O functions.
Hard Disk Pre-Delay	• **Disabled (default)** • 3 Seconds • 6 Seconds • 9 Seconds • 12 Seconds • 15 Seconds • 21 Seconds • 30 Seconds	Specifies the hard disk drive pre-delay.
Primary IDE Master	No options	Reports type of connected IDE device. When selected, displays the Primary IDE Master submenu.
Primary IDE Slave	No options	Reports type of connected IDE device. When selected, displays the Primary IDE Slave submenu.
Secondary IDE Master	No options	Reports type of connected IDE device. When selected, displays the Secondary IDE Master submenu.
Secondary IDE Slave	No options	Reports type of connected IDE device. When selected, displays the Secondary IDE Slave submenu.

Primary/Secondary IDE Master/Slave Submenus



There are four IDE submenus: Primary master, primary slave, secondary master, and secondary slave. Table 16 shows the format of these IDE submenus. For brevity, only one example is shown.

Table 16. Primary/Secondary IDE Master/Slave Submenus

Feature	Options	Description
Drive Installed	None	Displays the type of drive installed.
Type	• None • User • **Auto (default)** • CD-ROM • ATAPI Removable • Other ATAPI • IDE Removable	Specifies the IDE configuration mode for IDE devices. *User* allows capabilities to be changed. *Auto* fills-in capabilities from ATA/ATAPI device.
Maximum Capacity	None	Displays the capacity of the drive.
LBA Mode Control	• Disabled • **Enabled (default)**	Enables or disables LBA mode control.
Multi-sector Transfers	• Disabled • 2 Sectors • 4 Sectors • 8 Sectors • **16 Sectors (default)**	Specifies the number of sectors per block for transfers from the hard disk drive to memory. Check the hard disk drive's specifications for optimum setting.
PIO Mode	None	Specifies the PIO mode (these configuration options appear only if an IDE device is installed). • 0 • 1 • 2 • 3 • 4

continued

Table 16. Primary/Secondary IDE Master/Slave Submenus (continued)

Feature	Options	Description
Ultra DMA	None	Specifies the Ultra DMA mode for the drive. • Mode 0 • Mode 1 • Mode 2 • Mode 3 • Mode 4 • Mode 5
Cable Detected	None	Displays the type of cable connected to the IDE interface: 40-conductor or 80-conductor (for Ultra ATA-100 devices).

Diskette Configuration Submenu

Maintenance	Main	**Advanced**	Security	Power	Boot	Exit

PCI Configuration
Boot Configuration
Peripheral Configuration
IDE Configuration
Diskette Configuration
Event Log Configuration
Video Configuration

This submenu shown in Table 17 is used to configure the diskette drive.

Table 17. Diskette Configuration Submenu

Feature	Options	Description
Diskette Controller	• Disabled • **Enabled (default)**	Disables or enables the integrated diskette controller.
Floppy A	• Not Installed • 360 KB 5¼ inches • 1.2 MB 5¼ inches • 720 KB 3½ inches • **1.44/1.25 MB 3½ inches (default)** • 2.88 MB 3½ inches	Specifies the capacity and physical size of diskette drive A.
Diskette Write-Protect	• **Disabled (default)** • Enabled	Disables or enables write-protect for the diskette drive.

Event Log Configuration Submenu

Maintenance	Main	**Advanced**	Security	Power	Boot	Exit

PCI Configuration
Boot Configuration
Peripheral Configuration
IDE Configuration
Diskette Configuration
Event Log Configuration
Video Configuration

The submenu shown in Table 18 is used to configure the event logging features.

Table 18. Event Log Configuration Submenu

Feature	Options	Description
Event Log	No options	Indicates if there is space available in the event log.
Event Log Validity	No options	Indicates if the contents of the event log are valid.
View Event Log	[Enter]	Displays the event log.
Clear All Event Logs	• **No (default)** • Yes	Clears the event log after rebooting.
Event Logging	• Disabled • **Enabled (default)**	Enables logging of events.
ECC Event Logging	• Disabled • **Enabled (default)**	Enables logging of ECC events.
Mark Events as Read	[Enter]	Marks all events as read.

Video Configuration Submenu

Maintenance	Main	**Advanced**	Security	Power	Boot	Exit

PCI Configuration
Boot Configuration
Peripheral Configuration
IDE Configuration
Diskette Configuration
Event Log Configuration
Video Configuration

The submenu shown in Table 19 is used to configure video features.

Table 19. Video Configuration Submenu

Feature	Options	Description
AGP Aperture Size	• **64 MB (default)** • 128 MB • 256 MB	Specifies the aperture size for the AGP video controller.
Primary Video Adapter	• **AGP (default)** • PCI	Selects primary video adapter to be used during boot.

Security Menu

Maintenance	Main	Advanced	**Security**	Power	Boot	Exit

The menu shown in Table 20 is used to set passwords and security features.

Table 20. Security Menu

If no password was entered previously:		
Feature	**Options**	**Description**
Supervisor Password Is	No options	Reports if there is a supervisor password set.
User Password Is	No options	Reports if there is a user password set.
Set Supervisor Password	Password can be up to seven alphanumeric characters.	Specifies the supervisor password.
Set User Password	Password can be up to seven alphanumeric characters.	Specifies the user password.
Clear User Password (Note 1)	• **Yes (default)** • No	Clears the user password.
User Access Level (Note 2)	• Limited • No access • View Only • **Full (default)**	Sets BIOS Setup Utility access rights for user level.
Unattended Start (Note 1)	• Enabled • **Disabled (default)**	*Enabled* allows system to complete the boot process without a password. The keyboard remains locked until a password is entered. A password is required to boot from a diskette.

Notes:

1. This feature appears only if a user password has been set.

2. This feature appears only if a supervisor password has been set.

Power Menu

Maintenance	Main	Advanced	Security	**Power**	Boot	Exit
				APM		
				ACPI		

The menu shown in Table 21 is used to set power management features.

Table 21. Power Menu

Feature	Options	Description
APM	No Options	When selected, displays the APM submenu.
ACPI	No Options	When selected, displays the ACPI submenu.
After Power Failure	• Stay Off • **Last State (default)** • Power On	Determines the mode of operation if a power loss occurs. *Stays Off* keeps the power off until the power button is pressed. *Last State* restores the previous power state before power loss occurred. *Power On* restores power to the computer.
Wake on LAN†	• **Stay Off (default)** • Power On	Determines how the system responds to a LAN wake up event.
Wake on PME	• **Stay Off (default)** • Power On	Determines how the system responds to a PCI-PME wake up event.
Wake on Modem Ring	• **Stay Off (default)** • Power On	Specifies how the computer responds to a Modem Ring wake up event on an installed modem.

NOTE

When an ACPI-capable operating system is configured for ACPI, only the ACPI Suspend State option affects power management. The ACPI Suspend State is not supported if the system is configured for APM.

APM Submenu

To access this menu, select Power on the menu bar, then APM.

Maintenance	Main	Advanced	Security	**Power**	Boot	Exit
				APM		
				ACPI		

The menu shown in Table 22 shows the setting options for the APM features.

Table 22. APM Submenu

Feature	Options	Description
Power Management	• Disabled • **Enabled (default)**	Enables or disables the APM feature.
Inactivity Timer	• Off • 1 Minute • 5 Minutes • 10 Minutes • **20 Minutes (default)** • 30 Minutes • 60 Minutes • 120 Minutes	Specifies the amount of time before the computer enters APM standby mode.
Hard Drive	• Disabled • **Enabled (default)**	Enables power management for hard disks during APM standby mode.

ACPI Submenu

Maintenance	Main	Advanced	Security	**Power**	Boot	Exit
				APM		
				ACPI		

The submenu represented in Table 23 shows the setting options for ACPI.

Table 23. ACPI Submenu

Feature	Options	Description
ACPI Suspend State	• **S1 State (default)** • S3 State	Specifies the ACPI sleep state.
Wake on LAN from S5	• **Stay Off (default)** • Power On	In ACPI soft-off mode only, determines how the system responds to a LAN wake up event when the system is in the ACPI soft-off mode.

Boot Menu

Maintenance	Main	Advanced	Security	Power	**Boot**	Exit

The menu shown in Table 24 is used to set the boot features and the boot sequence.

Table 24. Boot Menu

Feature	Options	Description
Quiet Boot	• Disabled • **Enabled (default)**	*Disabled* displays normal POST messages. *Enabled* displays OEM graphic instead of POST messages.
Intel® Rapid BIOS Boot	• Disabled • **Enabled (default)**	Enables the computer to boot without running certain POST tests.
Scan User Flash Area	• **Disabled (default)** • Enabled	Enables the BIOS to scan the flash memory for user binary files that are executed at boot time.
USB Boot	• Disabled • **Enabled (default)**	Disables or enables booting to USB boot devices.
PXE Remote Boot	• **Disabled (default)** • Enabled	Disables or enables PXE remote boot.
Boot Device Priority	No options	Specifies the boot sequence from the available types of boot devices.
Hard Disk Drives	No options	Specifies the boot sequence from the available hard disk drives.
Removable Devices	No options	Specifies the boot sequence from the available removable devices.

Boot Device Priority

Maintenance	Main	Advanced	Security	Power	**Boot**	Exit
					Boot Device Priority	

The menu shown in Table 25 shows the setting options for Boot Device Priority.

Table 25. Boot Device Priority

Feature	Options	Description
1st Boot Device 2nd Boot Device 3rd Boot Device 4th Boot Device	• Removable Device • Hard Drive • ATAPI CD-ROM • Intel Boot A • Disabled	Specifies the boot sequence from the available devices. Select the boot device with the Up-Arrow or Down-Arrow key. Press the Enter key to set the selection as the intended boot device.

Exit Menu

Maintenance	Main	Advanced	Security	Power	Boot	**Exit**

The menu shown in Table 26 is used to exit the BIOS Setup program, saving changes, and loading and saving defaults.

Table 26. Exit Menu

Feature	Description
Exit Saving Changes	Exits and saves the changes made in the BIOS Setup program.
Exit Discarding Changes	Exits without saving any changes made in the BIOS Setup program.
Load Setup Defaults	Loads the factory default values for all the Setup options.
Load Custom Defaults	Loads the custom defaults for Setup options.
Save Custom Defaults	Saves the current values as custom defaults. Normally, the BIOS reads the Setup values from flash memory. If this memory is corrupted, the BIOS reads the custom defaults. If no custom defaults are set, the BIOS reads the factory defaults.
Discard Changes	Discards changes without exiting Setup. The option values present when the computer was turned on are used.

5 Technical Reference

Board Connectors

The board connectors can be divided into three groups:

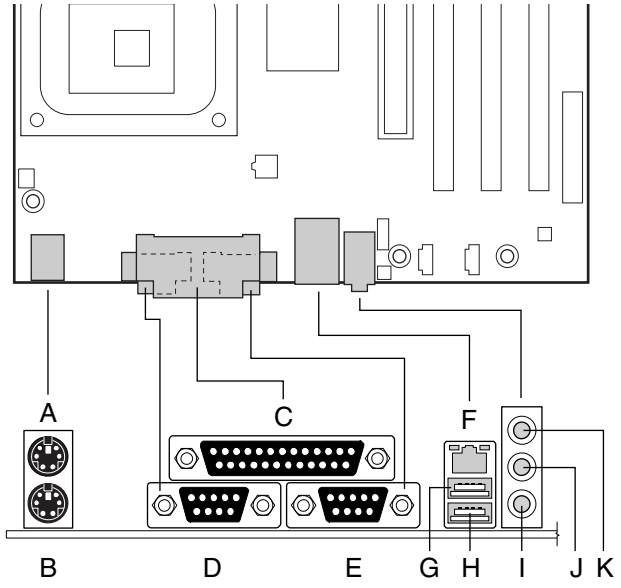
- Back panel connectors
- Midboard connectors
  - Audio connectors
  - Power and hardware connectors
  - Add-in board and peripheral interface connectors
- Front panel connectors

⚠ CAUTION

Many of the midboard and front panel connectors provide operating voltage (+5 V DC and +12 V DC, for example) to devices inside the computer chassis, such as fans and internal peripherals. These connectors are not overcurrent protected. Do not use these connectors for powering devices external to the computer chassis. A fault in the load presented by the external devices could cause damage to the computer, the interconnecting cable, and the external devices themselves.

Back Panel Connectors

Figure 16 shows the back panel connectors on the desktop boards.



Item	Description	Color
A	PS/2 mouse port	Green
B	PS/2 keyboard port	Purple
C	Parallel port	Burgundy
D	Serial port	Teal
E	Serial port	Teal
F	RJ-45 (optional)	Black
G	USB 2.0 port	Black
H	USB 2.0 port	Black
I	Mic in	Pink
J	Audio line out	Lime green
K	Audio line in	Light blue

Figure 16. Back Panel Connectors

NOTE

The audio line out connector, located on the back panel, 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.

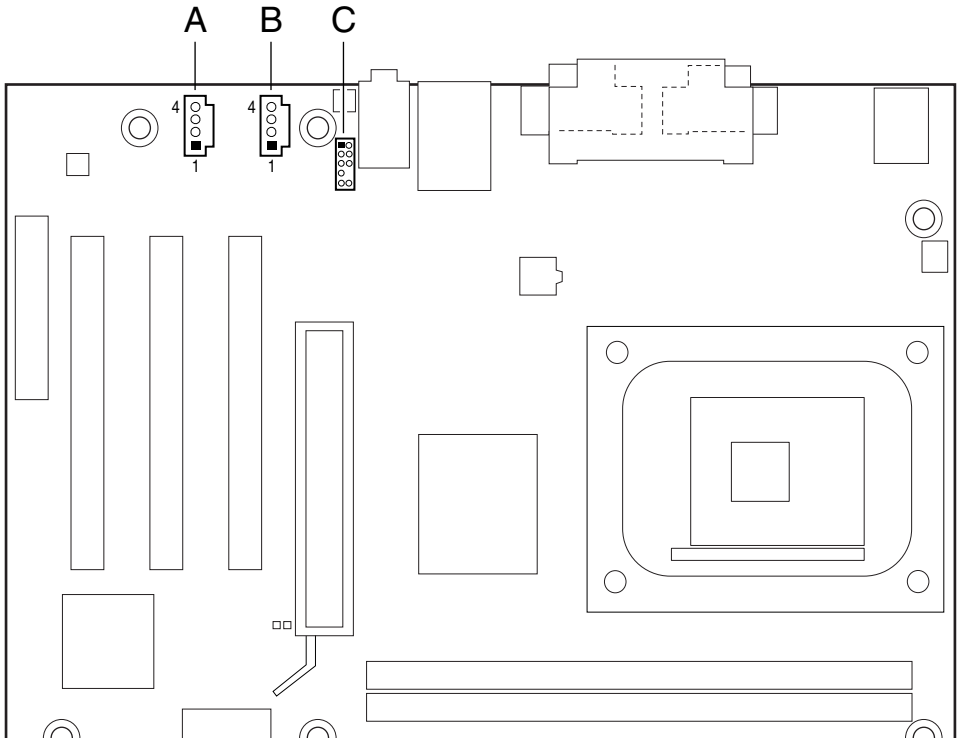
Midboard Connectors

The midboard connectors are grouped as follows:

- Audio connectors
- Power and hardware connectors
- Add-in card and peripheral interface connectors

Audio Connectors

Figure 17 shows the location of the audio connectors on the desktop boards.



Item	Description	Color
A	Auxiliary line in (ATAPI)	White
B	CD-ROM (ATAPI)	Black
C	Front panel audio	Black

Figure 17. Audio Connectors

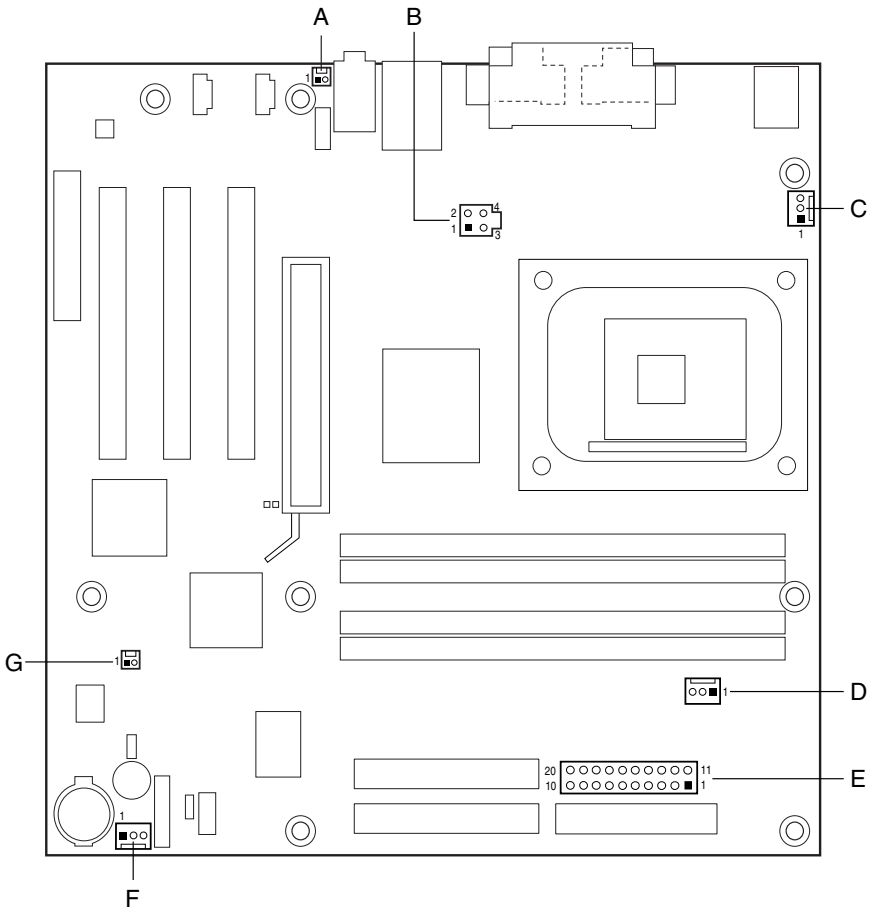
Power and Hardware Connectors

CAUTION

Failure to use an ATX12V power supply, or not connecting the additional power supply lead to the Desktop Board D850EMD2 or D850EMV2 may result in damage to the desktop board.

The Desktop Boards D850EMD2 and D850EMV2 require an ATX12V compliant power supply to function according to desktop board specifications. Both boards have two ATX12V compliant power supply connectors that are needed to provide extra power to the Intel 850E chipset and Pentium 4 processor.

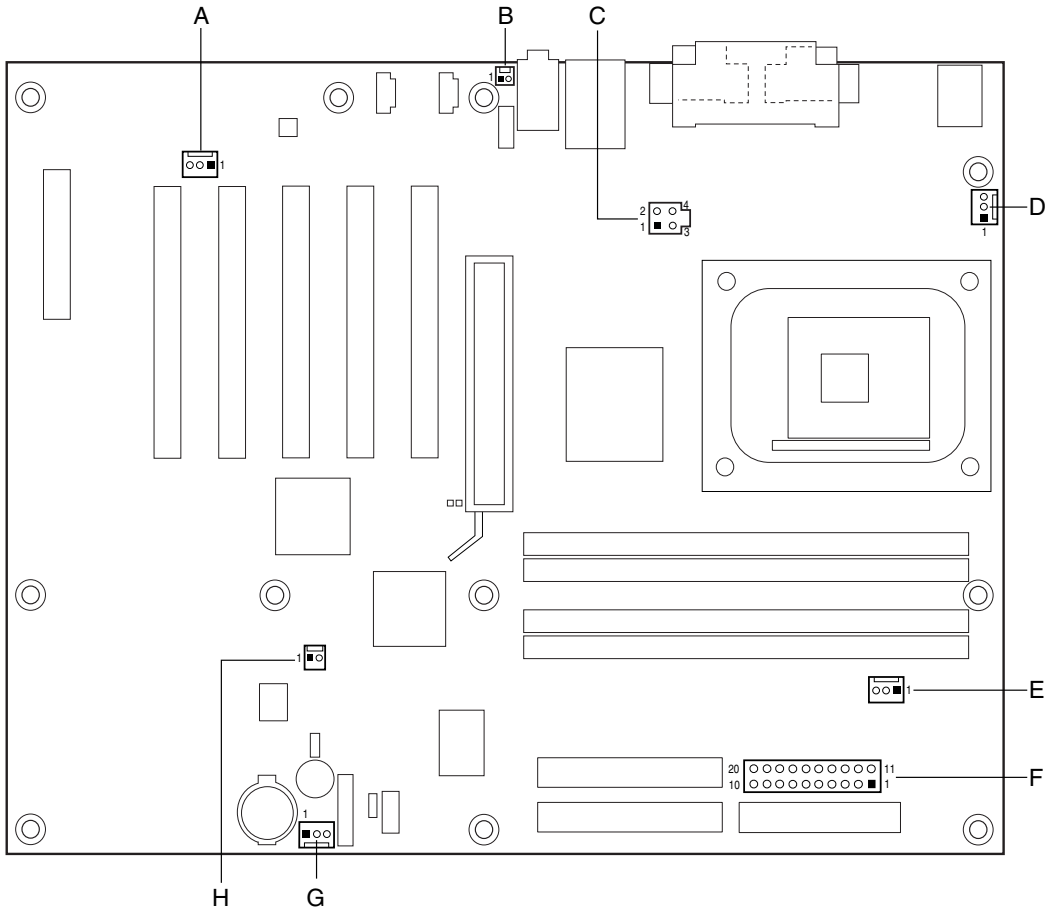
Figure 18 shows the power and hardware connectors for the Desktop Board D850EMD2.



Item	Description	Item	Description
A	Chassis intrusion	E	Main power
B	ATX12V power connector	F	Chassis fan (fan 2) (tach input)
C	Processor fan (CPU fan) (tach input)	G	SCSI hard drive activity LED
D	RIMM fan (fan 1)		

Figure 18. Desktop Board D850EMD2 Power and Hardware Control Connectors

Figure 19 shows the power and hardware connectors for the Desktop Board D850EMV2.

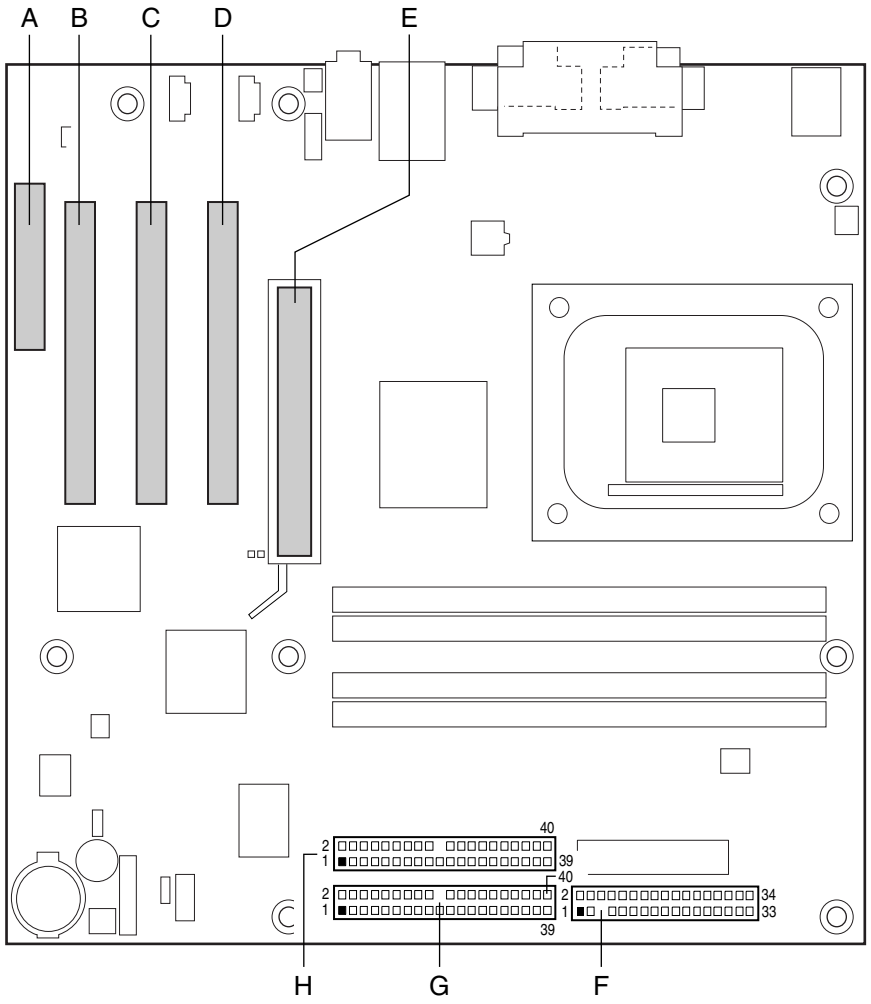


Item	Description	Item	Description
A	Chassis fan (fan 3)	E	RIMM fan (fan 1) (tach input)
B	Chassis intrusion	F	Main power
C	ATX12V power	G	Chassis fan (fan 2)
D	Processor fan (CPU fan) (tach input)	H	SCSI hard drive activity LED

Figure 19. Desktop Board D850EMV2 Power and Hardware Control Connectors

Add-In Card and Peripheral Interface Connectors

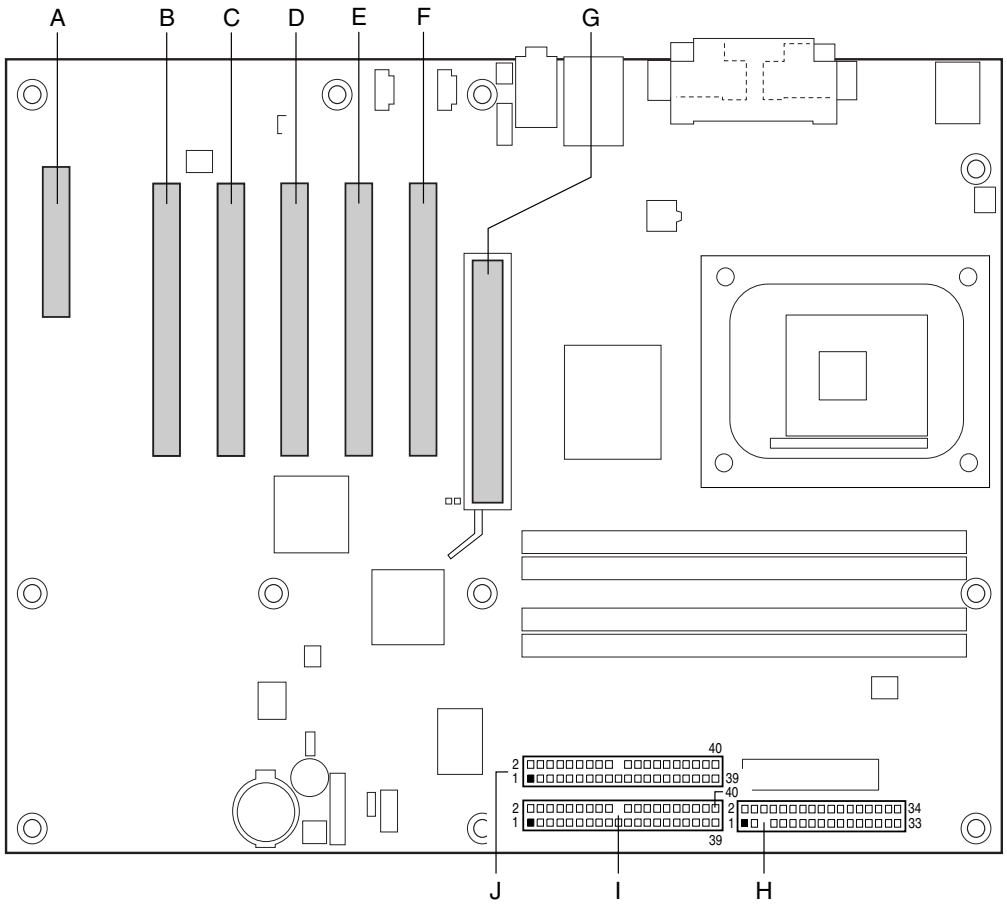
Figure 20 shows the add-in card and peripheral interface connectors for Desktop Board D850EMD2.



Item	Description	Item	Description
A	CNR (optional)	E	AGP
B	PCI bus connector 3	F	Diskette drive
C	PCI bus connector 2	G	Primary IDE
D	PCI bus connector 1	H	Secondary IDE

Figure 20. Desktop Board D850EMD2 Add-in Card and Peripheral Interface Connectors

Figure 21 shows the add-in card and peripheral interface connectors for Desktop Board D850EMV2.

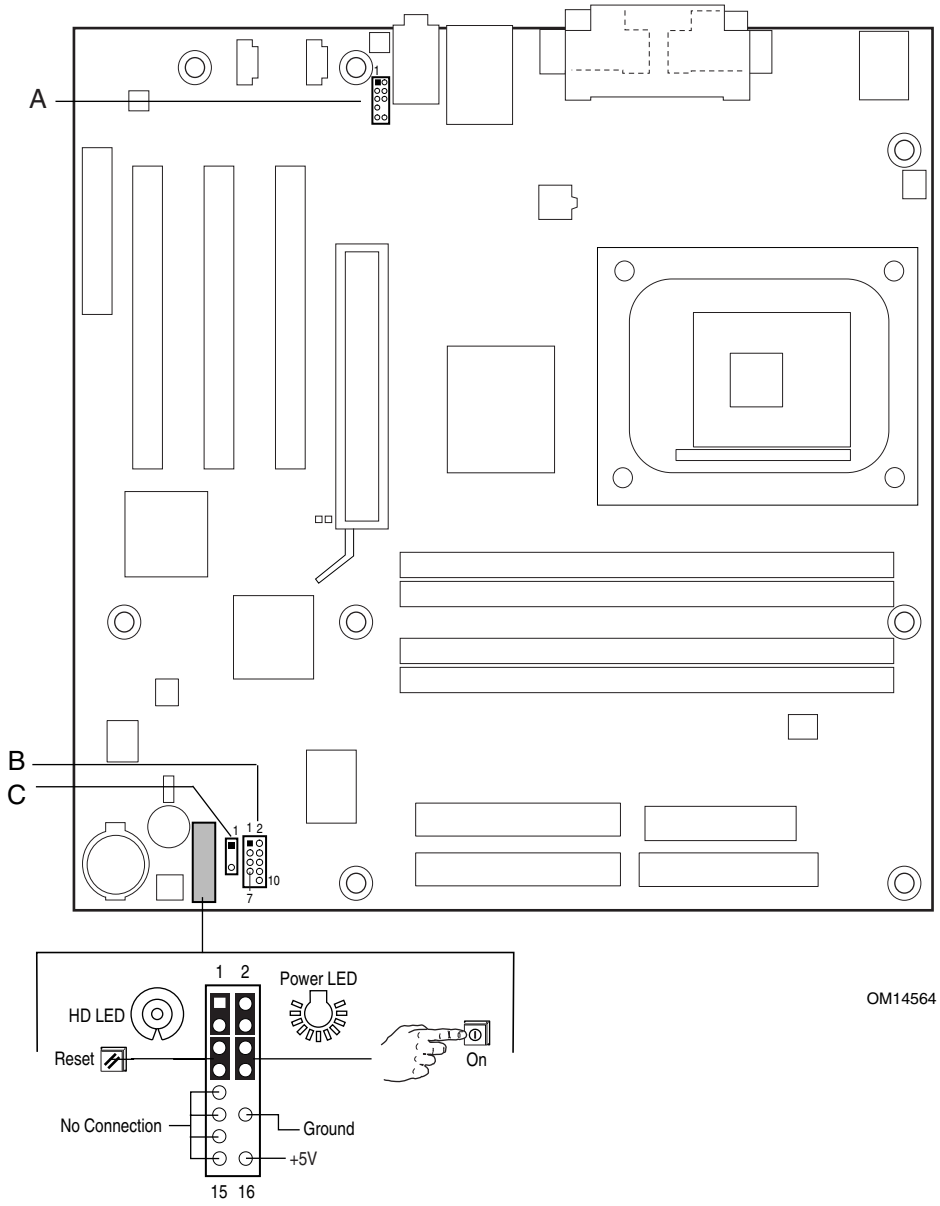


Item	Description	Item	Description
A	CNR (optional)	F	PCI bus connector 1
B	PCI bus connector 5	G	AGP
C	PCI bus connector 4	H	Diskette drive
D	PCI bus connector 3	I	Primary IDE
E	PCI bus connector 2	J	Secondary IDE

Figure 21. Desktop Board D850EMV2 Add-in Card and Peripheral Interface Connectors

Front Panel Connectors

Figure 22 shows the location of the front panel connectors on the desktop boards.



Item	Description
A	Front panel audio
B	Front panel USB 2.0
C	Alternate power/sleep LED

Figure 22. Front Panel Connectors

Desktop Board Resources

Memory Map

Table 27. System Memory Map

Address Range (decimal)	Address Range (hex)	Size	Description
1024 K - 2097152 K	100000 - 7FFFFFFF	2047 MB	Extended Memory
960 K - 1024 K	F0000 - FFFFF	64 KB	Runtime BIOS
896 K - 960 K	E0000 - EFFFF	64 KB	Reserved
800 K - 896 K	C8000 - DFFFF	96 KB	Available high DOS memory (open to the PCI bus)
640 K - 800 K	A0000 - C7FFF	160 KB	Video memory and BIOS
639 K - 640 K	9FC00 - 9FFFF	1 KB	Extended BIOS data (movable by memory manager software)
512 K - 639 K	80000 - 9FBFF	127 KB	Extended conventional memory
0 K - 512 K	00000 - 7FFFF	512 KB	Conventional memory

DMA Channels

Table 28. DMA Channels

DMA Channel Number	Data Width	System Resource
0	8 or 16 bits	Memory refresh
1	8 or 16 bits	Parallel port
2	8 or 16 bits	Diskette drive
3	8 or 16 bits	Parallel port (for ECP or EPP)
4	8 or 16 bits	DMA controller
5	16 bits	Open
6	16 bits	Open
7	16 bits	Open

I/O Map

Table 29. I/O Map

Address (hex)	Size	Description
0000 - 000F	16 bytes	DMA controller
0020 - 0021	2 bytes	Programmable Interrupt Control (PIC)
0040 - 0043	4 bytes	System timer
0060	1 byte	Keyboard controller byte—reset IRQ
0061	1 byte	System speaker
0064	1 byte	Keyboard controller, CMD / STAT byte
0070 - 0071	2 bytes	System CMOS / Real Time Clock
0072 - 0073	2 bytes	System CMOS
0080 - 008F	16 bytes	DMA controller
0092	1 byte	Fast A20 and PIC
00A0 - 00A1	2 bytes	PIC
00B2 - 00B3	2 bytes	APM control
00C0 - 00DF	32 bytes	DMA
00F0	1 byte	Numeric data processor
0170 - 0177	8 bytes	Secondary IDE channel
01F0 - 01F7	8 bytes	Primary IDE channel
0228 - 022F*	8 bytes	LPT3
0278 - 027F*	8 bytes	LPT2
02E8 - 02EF*	8 bytes	COM4 / video (8514A)
02F8 - 02FF*	8 bytes	COM2
0376	1 byte	Secondary IDE channel command port
0377, bits 6:0	7 bits	Secondary IDE channel status port
0378 - 037F	8 bytes	LPT1
03B0 - 03BB	12 bytes	Video (VGA)
03C0 - 03DF	32 bytes	Video (VGA)
03E8 - 03EF	8 bytes	COM3
03F0 - 03F5	6 bytes	Diskette channel 1
03F6	1 byte	Primary IDE channel command port
03F8 - 03FF	8 bytes	COM1
04D0 - 04D1	2 bytes	Edge / level triggered PIC
LPTn + 400	8 bytes	ECP port, LPTn base address + 400h
0CF8 - 0CFB**	4 bytes	PCI configuration address register
0CF9***	1 byte	Turbo and reset control register
0CFC - 0CFF	4 bytes	PCI configuration data register
FFA0 - FFA7	8 bytes	Primary bus master IDE registers
FFA8 - FFAF	8 bytes	Secondary bus master IDE registers

continued

Table 29. I/O Map (continued)

Address (hex)	Description
96 contiguous bytes starting on a 128-byte divisible boundary	ICH2 (ACPI + TCO)
64 contiguous bytes starting on a 64-byte divisible boundary	D850EMD2 and D850EMV2 board resource
32 contiguous bytes starting on a 32-byte divisible boundary	ICH2 (USB controller #1)
16 contiguous bytes starting on a 16-byte divisible boundary	ICH2 (SMBus)
4096 contiguous bytes starting on a 4096-byte divisible boundary	Intel 82801BA PCI bridge
256 contiguous bytes starting on a 256-byte divisible boundary	ICH2 audio mixer
64 contiguous bytes starting on a 64-byte divisible boundary	ICH2 audio bus mixer
32 contiguous bytes starting on a 32-byte divisible boundary	ICH2 (USB controller #2)
64 contiguous bytes starting on a 64-byte divisible boundary	ICH2/Intel 82562ET (optional)
96 contiguous bytes starting on a 128-byte divisible boundary	LPC47M142

* Default, but can be changed to another address range.

** Dword access only.

*** Byte access only.

Interrupts

Table 30. Interrupts

IRQ	System Resource
NMI	I/O channel check
0	Reserved, interval timer
1	Reserved, keyboard buffer full
2	Reserved, cascade interrupt from slave PIC
3	COM2*
4	COM1*
5	LPT2 (Plug and Play option) / **
6	Diskette drive controller
7	LPT1*
8	Real time clock
9	**
10	**
11	**
12	Onboard mouse port (if present, else user available)
13	Reserved, math coprocessor
14	Primary IDE (if present, else user available)
15	Secondary IDE (if present, else user available)

* Default, but can be changed to another IRQ.

** Dynamically allocated for all PCI/AGP devices and slots.

A Error Messages and Indicators

The Desktop Boards D850EMD2 and D850EMV2 report POST errors in two ways:

- By sounding a beep code
- By displaying an error message on the monitor

BIOS Beep Codes

The BIOS beep codes are listed in Table 31. 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 31. Beep Codes

Number of Beeps	Description
1	Refresh failure
2	Parity cannot be reset
3	First 64 K memory failure
4	Timer not operational
5	Processor failure (Reserved; not used)
6	8042 GateA20 cannot be toggled (memory failure or not present)
7	Exception interrupt error
8	Display memory R/W error
9	(Reserved; not used)
10	CMOS Shutdown register test error
11	Invalid BIOS (such as, POST module not found)

BIOS Error Messages

When a recoverable error occurs during the POST, the BIOS displays an error message describing the problem.

Table 32. BIOS Error Messages

Error Message	Explanation
GA20 Error	An error occurred with GateA20 when switching to protected mode during the memory test.
Pri Master HDD Error Pri Slave HDD Error Sec Master HDD Error Sec Slave HDD Error	Could not read sector from corresponding drive.
Pri Master Drive - ATAPI Incompatible Pri Slave Drive - ATAPI Incompatible Sec Master Drive - ATAPI Incompatible Sec Slave Drive - ATAPI Incompatible	Corresponding drive is not an ATAPI device. Run Setup to make sure device is selected correctly.
A: Drive Error B: Drive Error	No response from diskette drive.
CMOS Battery Low	The battery may be losing power. Replace the battery soon.
CMOS Display Type Wrong	The display type is different than what has been stored in CMOS. Check Setup to make sure type is correct.
CMOS Checksum Bad	The CMOS checksum is incorrect. CMOS memory may have been corrupted. Run Setup to reset values.
CMOS Settings Wrong	CMOS values are not the same as the last boot. These values have either been corrupted or the battery has failed.
CMOS Date/Time Not Set	The time and/or date values stored in CMOS are invalid. Run Setup to set correct values.
DMA Error	Error during read/write test of DMA controller.
FDC Failure	Error occurred trying to access diskette drive controller.
HDC Failure	Error occurred trying to access hard disk controller.
Checking NVRAM.....	NVRAM is being checked to see if it is valid.
Update OK!	NVRAM was invalid and has been updated.
Updated Failed	NVRAM was invalid but was unable to be updated.
Keyboard Is Locked	The system keyboard lock is engaged. The system must be unlocked to continue to boot.
Keyboard Error	Error in the keyboard connection. Make sure keyboard is connected properly.
KB/Interface Error	Keyboard interface test failed.
Memory Size Decreased	Memory size has decreased since the last boot. If no memory was removed, then memory may be bad.

continued

Table 32. BIOS Error Messages (continued)

Error Message	Explanation
Memory Size Increased	Memory size has increased since the last boot. If no memory was added, there may be a problem with the system.
Memory Size Changed	Memory size has changed since the last boot. If no memory was added or removed, then memory may be bad.
No Boot Device Available	System did not find a device to boot.
Off Board Parity Error	A parity error occurred on an offboard card. This error is followed by an address.
On Board Parity Error	A parity error occurred in onboard memory. This error is followed by an address.
Parity Error	A parity error occurred in onboard memory at an unknown address.
NVRAM / CMOS / PASSWORD cleared by Jumper	NVRAM, CMOS, and passwords have been cleared. The system should be powered down and the jumper removed.
<CTRL_N> Pressed	CMOS is ignored and NVRAM is cleared. User must enter Setup.

B Regulatory Compliance

This appendix contains:

- Safety standards, electromagnetic compatibility (EMC) regulations, and product certification markings for Desktop Boards D850EMD2 and D850EMV2
- Instructions and precautions for integrators who are installing this desktop board in a chassis

Safety Regulations

These desktop boards comply with the safety regulations stated in Table 33 when correctly installed in a compatible host system.

Table 33. Safety Regulations

Regulation	Title
CSA C22.2 No. 60950/ UL 60950, 3rd Edition, 2000	Bi-National Standard for Safety of Information Technology Equipment including Electrical Business Equipment. (USA and Canada)
EN 60950, 2nd Edition, 1992 (with Amendments 1, 2, 3, and 4)	The Standard for Safety of Information Technology Equipment including Electrical Business Equipment. (European Union)
IEC 60950, 2nd Edition, 1991 (with Amendments 1, 2, 3, and 4)	The Standard for Safety of Information Technology Equipment including Electrical Business Equipment. (International)
EMKO-TSE (74-SEC) 207/94	Summary of Nordic deviations to EN 60950. (Norway, Sweden, Denmark, and Finland)

EMC Regulations

The desktop boards comply with the EMC regulations stated in Table 34 when correctly installed in a compatible host system.

Table 34. EMC Regulations

Regulation	Title
FCC Class B	Title 47 of the Code of Federal Regulations, Parts 2 and 15, Subpart B, Radio Frequency Devices. (USA)
ICES-003 (Class B)	Interference-Causing Equipment Standard, Digital Apparatus. (Canada)
EN55022: 1998 (Class B)	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)
AS/NZS 3548 (Class B)	Australian Communications Authority, Standard for Electromagnetic Compatibility. (Australia and New Zealand)
CISPR 22, 3rd Edition, (Class B)	Limits and methods of measurement of Radio Disturbance Characteristics of Information Technology Equipment. (International)
CISPR 24: 1997	Information Technology Equipment – Immunity Characteristics – Limits and Methods of Measurement. (International)

Product Certification Markings

The desktop boards have the following product certification markings:

- UL joint US/Canada Recognized Component mark: consists of small c followed by a stylized backward UR and followed by a small US. Includes adjacent UL file number for Intel desktop boards: E210882 (component side).
- FCC Declaration of Conformity logo mark for Class B equipment; includes Intel name and model designation (solder side).
- CE mark: declaring compliance to European Union (EU) EMC directive (89/336/EEC) and Low Voltage directive (73/23/EEC) (component side).
- Australian Communications Authority (ACA) C-Tick mark: consists of a stylized C overlaid with a check (tick) mark (component side), followed by Intel supplier code number, N-232.
- Printed wiring board manufacturer's recognition mark: consists of a unique UL recognized manufacturer's logo, along with a flammability rating (94V-0) (solder side).
- PB part number: Intel bare circuit board part number (solder side):
  1. A49682-005 (Desktop Board D850EMD2)
  2. A56437-004 (Desktop Board D850EMV2)

  Also includes SKU number starting with AA followed by additional alphanumeric characters.
- Battery "+ Side Up" marking: located on the component side of the board in close proximity to the battery holder.
- Korean MIC logo mark: denotes Korean EMC certification (component side). Additional certification information is provided below:
  1. Product Name (model)
  2. Certificate ID
  3. Applicant: Intel Korea Ltd.
  4. Date of manufacture as separate marking on product
  5. Manufacturer (country of origin)

Korean MIC logo mark for Desktop Board D850EMD2

Korean MIC logo mark for Desktop Board D850EMV2

Installation Precautions

When you install and test the 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 (like 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.

Installation Instructions

⚠ CAUTION

Follow these guidelines to meet safety and regulatory requirements when installing this board assembly.

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

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.

In the installation instructions for the host chassis, power supply, and other modules pay close attention to the following:

- 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 is required on a representative sample of the newly completed computer.

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. Industry Canada recognizes and accepts FCC certification as denoting compliance with national electromagnetic interference (emissions) requirements.

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.

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 following statement or equivalent statement is required to be permanently and legibly marked on the chassis near the battery.

⚠ CAUTION

Risk of explosion if battery is incorrectly replaced.

Replace with only the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

Use Only for Intended Applications

All Intel desktop processor boards are evaluated as Information Technology Equipment (I.T.E.) for use in personal computers for installation in homes, offices, schools, computer rooms, and similar locations. The suitability of this product for other applications or environments, such as medical, industrial, alarm systems, test equipment, etc. may require further evaluation.