CR101-D
Mini-ITX Industrial Motherboard
User's Manual

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Trademarks

Product names or trademarks appearing in this manual are for identification purpose only and are the properties of the respective owners.

FCC and DOC Statement on Class B

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 when the equipment is operated in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, 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 into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio TV technician for help.

Notice:

1. The changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
2. Shielded interface cables must be used in order to comply with the emission limits.

Table of Contents

About this Manual

This manual can be downloaded from the website, or acquired as an electronic file included in the optional CD/DVD. The manual is subject to change and update without notice, and may be based on editions that do not resemble your actual products. Please visit our website or contact our sales representatives for the latest editions.

Warranty

1. Warranty does not cover damages or failures that arised from misuse of the product, inability to use the product, unauthorized replacement or alteration of components and product specifications.

2. The warranty is void if the product has been subjected to physical abuse, improper installation, modification, accidents or unauthorized repair of the product.

3. Unless otherwise instructed in this user's manual, the user may not, under any circumstances, attempt to perform service, adjustments or repairs on the product, whether in or out of warranty. It must be returned to the purchase point, factory or authorized service agency for all such work.

4. We will not be liable for any indirect, special, incidental or consequencial damages to the product that has been modified or altered.

Static Electricity Precautions

It is quite easy to inadvertently damage your PC, system board, components or devices even before installing them in your system unit. Static electrical discharge can damage computer components without causing any signs of physical damage. You must take extra care in handling them to ensure against electrostatic build-up.

1. To prevent electrostatic build-up, leave the system board in its anti-static bag until you are ready to install it.

2. Wear an antistatic wrist strap.

3. Do all preparation work on a static-free surface.

4. Hold the device only by its edges. Be careful not to touch any of the components, contacts or connections.

5. Avoid touching the pins or contacts on all modules and connectors. Hold modules or connectors by their ends.

> **Important:**
> Electrostatic discharge (ESD) can damage your processor, disk drive and other components. Perform the upgrade instruction procedures described at an ESD workstation only. 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 system chassis. If a wrist strap is unavailable, establish and maintain contact with the system chassis throughout any procedures requiring ESD protection.

Safety Measures

To avoid damage to the system:
• Use the correct AC input voltage range.

To reduce the risk of electric shock:
• Unplug the power cord before removing the system chassis cover for installation or servicing. After installation or servicing, cover the system chassis before plugging the power cord.

About the Package

The package contains the following items. If any of these items are missing or damaged, please contact your dealer or sales representative for assistance.

- One CR101-D motherboard
- One Serial ATA data cable
- One Serial ATA power cable
- One I/O shield
- One QR (Quick Reference)

The board and accessories in the package may not come similar to the information listed above. This may differ in accordance to the sales region or models in which it was sold. For more information about the standard package in your region, please contact your dealer or sales representative.

Optional Items

- Serial ATA data cable
- Serial ATA power cable
- USB port cable
- COM port cable
- I/O shield
- Power adapter (100W, 12V)

The board and accessories in the package may not come similar to the information listed above. This may differ in accordance to the sales region or models in which it was sold. For more information about the standard package in your region, please contact your dealer or sales representative.

Before Using the System Board

Before using the system board, prepare basic system components.

If you are installing the system board in a new system, you will need at least the following internal components.

- A CPU
- Memory module
- Storage devices such as hard disk drive, CD-ROM, etc.

You will also need external system peripherals you intend to use which will normally include at least a keyboard, a mouse and a video display monitor.

Chapter 1 - Introduction

Specifications

Processor	• Socket G2 988B for:
	  - 3rd Generation Intel® Core™ processors (22nm process technology)
	    : Intel® Core™ i7-3610QE (6M Cache, up to 3.3 GHz); 45W
	    : Intel® Core™ i5-3610ME (3M Cache, up to 3.3 GHz); 35W
	    : Intel® Core™ i3-3120ME (3M Cache, 2.4 GHz); 35W
	  - 2nd Generation Intel® Core™ processors (32nm process technology)
	    : Intel® Core™ i7-2710QE (6M Cache, up to 3.0 GHz); 45W
	    : Intel® Core™ i5-2510E (3M Cache, up to 3.1 GHz); 35W
	    : Intel® Core™ i3-2330E (3M Cache, 2.2 GHz); 35W
	    : Intel® Celeron® B810 (2M Cache, 1.6 GHz); 35W

Chipset	• Intel® HM76 Express chipset
System Memory	• Two 204-pin DDR3 SODIMM sockets • Supports DDR3 SODIMM

3rd Generation Processors	2nd Generation Processors
DDR3 1066/1333/1600MHz	DDR3 1066/1333MHz (i5/i3/Celeron)
	DDR3 1600MHz (i7)

	• Supports DDR3L SODIMM
	  - 1066/1333MHz when operating at 1.35V
	  - 1066/1333/1600MHz when operating at 1.5V
	• Supports dual channel memory interface
	• Supports up to 16GB system memory
	• DRAM device technologies: 1Gb, 2Gb and 4Gb DDR3 DRAM technologies are
	  supported for x8 and x16 devices, unbuffered, non-ECC

Expansion Slots	• 1 PCIe x16 slot
	  - Supports Gen 3.0 (3rd generation processors)
	  - Supports Gen 2.0 (2nd generation processors)
	  - Configurations (supported only via a riser card):
	    : One x8 (GFX) and two x4 (I/O)
	    : Two x8 (GFX, I/O)
	    : One x16 (GFX, I/O)
	• 1 Mini PCIe slot
	  - Supports USB and PCIe signals
	  - Supports half size card

Graphics	• Intel® HD Graphics 4000
	• Display ports: HDMI, DVI-I, and LVDS
	• Dual independent display
	• HDMI and DVI: resolution up to 1920x1200 @60Hz
	• VGA: resolution up to 2048x1536 @75Hz, 32-bit
	• LVDS: Single Channel - 18/24-bit; Dual Channel: 36/48-bit; resolution up to
	  2048x1536 @60Hz
	• Intel® Clear Video Technology
	• DirectX Video Acceleration (DXVA) for accelerating video processing
	  - Full AVC/VC1/MPEG2 HW Decode
	• Supports DirectX 11/10.1/10/9 and OpenGL 3.0

Audio	• Realtek ALC886 5.1-channel High Definition Audio • Audio outputs: Mic-in/Center+Subwoofer, Line-in/Surround and Line-out • S/PDIF audio interface
LAN	• 2 Realtek RTL8111DL PCI Express Gigabit Ethernet controllers • Integrated 10/100/1000 transceiver • Fully compliant with IEEE 802.3, IEEE 802.3u, IEEE 802.3ab
Power Consumption	• 61.71 W with i7-3610QE at 2.3GHz and 2x 4GB DDR3 SODIMM

Serial ATA	• 4 Serial ATA ports
	  - 2 SATA 3.0 ports with data transfer rate up to 6Gb/s
	  - 2 SATA 2.0 ports with data transfer rate up to 3Gb/s
	• Integrated Advanced Host Controller Interface (AHCI) controller

Rear Panel I/O Ports	• 1 12V DC-in • 1 DB-9 serial port - Supports RS232/422/485 (RS232 and/or Power) • 1 DVI-I port • 1 HDMI port • 2 RJ45 LAN ports • 4 USB 3.0/2.0/1.1 ports • Mic-in/Center+Subwoofer, Line-in/Surround and Line-out jacks
I/O Connectors	• 2 connectors for 4 external USB 2.0/1.1 ports • 1 connector for 1 RS232/422/485 serial port • 1 LVDS LCD panel connector • 1 LCD/inverter power connector • 1 front audio connector for line-out and mic-in jacks • 1 S/PDIF connector • 4 Serial ATA ports • 1 4-pin peripheral power connector • 1 4-pin 12V power connector • 1 chassis intrusion connector • 1 front panel connector • 1 LPC connector • 3 fan connectors
BIOS	• AMI BIOS - 64Mbit SPI BIOS

Energy Efficient Design	• Supports ErP Lot6 power saving (optional)
	• ACPI v3.0 specification
	• System Power Management
	• Wake-On-Events include:
	  - Wake-On-USB KB/Mouse
	  - Wake-On-LAN
	  - RTC timer to power-on the system
	• AC power failure recovery

Damage Free Intelligence	• Monitors CPU/system temperature and overheat alarm • Monitors VCORE/1.05V/DDR/3.3V/5V/12V voltages and failure alarm • Monitors CPU/system fan speed and failure alarm • Read back capability that displays temperature, voltage and fan speed • Watchdog timer function
OS Support	• Windows XP Professional x86 & SP3 (32-bit) • Windows XP Professional x64 & SP2 (64-bit) • Windows 7 Ultimate x86 & SP1 (32-bit) • Windows 7 Ultimate x64 & SP1 (64-bit) • Windows 8 Enterprise x86 (32-bit) • Windows 8 Enterprise x64 (64-bit)
Temperature	• Operating: 0℃ to 60℃ • Storage: -20℃ to 85℃
Humidity	• 10% to 90%

Dimensions	• Mini-ITX form factor
	  - 170mm (6.7") x 170mm (6.7")
	• Heat spreader with heat sink and fan
	  - 62mm x 60mm x 42mm

Certification	• CE • FCC Class B • UL • RoHS

6

Features

• Watchdog Timer

The Watchdog Timer function allows your application to regularly "clear" the system at the set time interval. If the system hangs or fails to function, it will reset at the set time interval so that your system will continue to operate.

• DDR3

DDR3 delivers increased system bandwidth and improved performance. The advantages of DDR3 are its higher bandwidth and its increase in performance at a lower power than DDR2.

• Graphics

The integrated Intel® HD graphics engine delivers an excellent blend of graphics performance and features to meet business needs. It provides excellent video and 3D graphics with out-standing graphics responsiveness. These enhancements deliver the performance and compat-ibility needed for today's and tomorrow's business applications. Supports HDMI, DVI-I and LVDS interfaces for 3 display outputs.

• DVI

DVI (Digital Visual Interface) is a form of video interface technology made to maximize the quality of flat panel LCD monitors and modern video graphics cards. Data is transmitted using the TMDS (Transition Minimized Differential Signaling) protocol, providing a digital signal from the PC's graphics subsystem to the display.

• Serial ATA

Serial ATA is a storage interface that is compliant with SATA 1.0a specification. With speed of up to 3Gb/s (SATA 2.0) and 6Gb/s (SATA 3.0), it improves hard drive performance faster than the standard parallel ATA whose data transfer rate is 100MB/s. The bandwidth of the SATA 3.0 will be limited by carrier board design.

• Gigabit LAN

Two Realtek RTL8111DL Gigabit LAN controllers support up to 1Gbps data transmission.

• Audio

The Realtek ALC886 audio codec provides 5.1-channel High Definition audio output.

• USB

The system board supports the new USB 3.0. It is capable of running at a maximum transmis-sion speed of up to 5 Gbit/s (625 MB/s) and is faster than USB 2.0 (480 Mbit/s, or 60 MB/s) and USB 1.1 (12Mb/s). USB 3.0 reduces the time required for data transmission, reduces power consumption, and is backward compatible with USB 2.0. It is a marked improvement in device transfer speeds between your computer and a wide range of simultaneously accessible external Plug and Play peripherals.

• Wake-On-LAN

This feature allows the network to remotely wake up a Soft Power Down (Soft-Off) PC. It is supported via the onboard LAN port or via a PCI LAN card that uses the PCI PME (Power Management Event) signal. However, if your system is in the Suspend mode, you can power-on the system only through an IRQ or DMA interrupt.

> **Important:**
> The 5V_standby power source of your power supply must support ≥720mA.

• Wake-On-USB

This function allows you to use a USB keyboard or USB mouse to wake up a system from the S3 (STR - Suspend To RAM) state.

> **Important:**
> If you are using the Wake-On-USB Keyboard/Mouse function for 2 USB ports, the 5V_standby power source of your power supply must support ≥1.5A. For 3 or more USB ports, the 5V_standby power source of your power supply must support ≥2A.

• RTC Timer

The RTC installed on the system board allows your system to automatically power-on on the set date and time.

• ACPI STR

The system board is designed to meet the ACPI (Advanced Configuration and Power Interface) specification. ACPI has energy saving features that enables PCs to implement Power Manage-ment and Plug-and-Play with operating systems that support OS Direct Power Management. ACPI when enabled in the Power Management Setup will allow you to use the Suspend to RAM function.

With the Suspend to RAM function enabled, you can power-off the system at once by pressing the power button or selecting "Standby" when you shut down Windows® without having to go through the sometimes tiresome process of closing files, applications and operating system. This is because the system is capable of storing all programs and data files during the entire operating session into RAM (Random Access Memory) when it powers-off. The operating ses-sion will resume exactly where you left off the next time you power-on the system.

Important:
The 5V_standby power source of your power supply must support ≥720mA.

- **Power Failure Recovery**

When power returns after an AC power failure, you may choose to either power-on the system manually or let the system power-on automatically.

Chapter 2 - Hardware Installation

Board Layout

System Memory

Features

- Two 204-pin DDR3 SODIMM sockets
- Supports 1066/1333/1600MHz DDR3 SDRAM
- Dual channel memory interface
- Supports maximum of 16GB system memory

9

The system board supports the following memory interface.

Single Channel (SC)

Data will be accessed in chunks of 64 bits (8B) from the memory channels.

Dual Channel (DC)

Data will be accessed in chunks of 128 bits from the memory channels. Dual channel provides better system performance because it doubles the data transfer rate.

Single Channel	DIMMs are on the same channel. DIMMs in a channel can be identical or completely different. However, we highly recommend using identical DIMMs. Not all slots need to be populated.
Dual Channel	DIMMs of the same memory configuration are on different channels.

Installing the DIM Module

Note:
The system board used in the following illustrations may not resemble the actual board. These illustrations are for reference only.

1. Make sure the PC and all other peripheral devices connected to it has been powered down.

2. Disconnect all power cords and cables.

3. Locate the SODIMM socket on the system board.

4. Note the key on the socket. The key ensures the module can be plugged into the socket in only one direction.

10
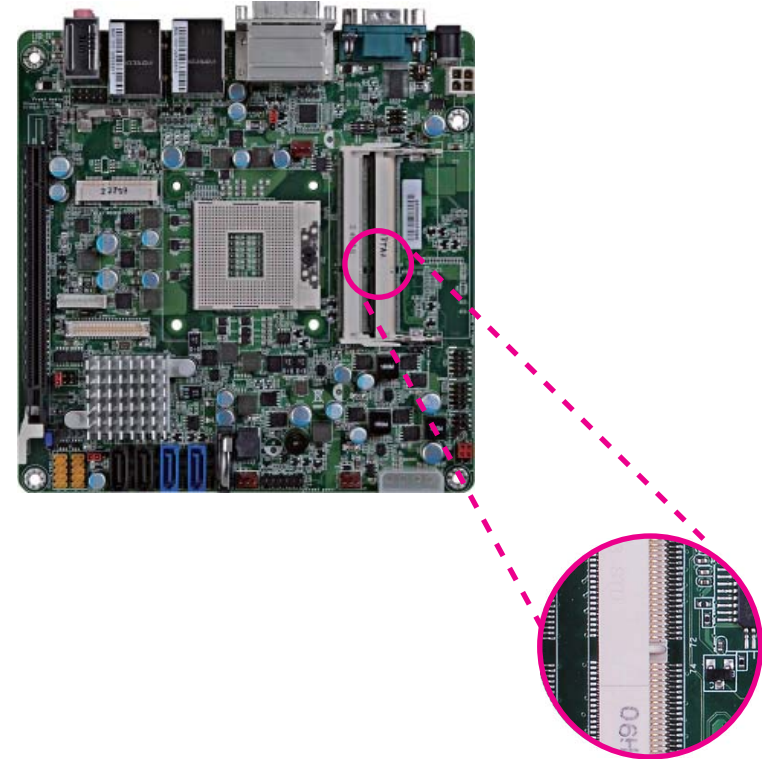
5. Grasping the module by its edges, align the module into the socket at an approximately 30 degrees angle. Apply firm even pressure to each end of the module until it slips down into the socket. The contact fingers on the edge of the module will almost completely disappear inside the socket.

6. Push down the module until the clips at each end of the socket lock into position. You will hear a distinctive "click", indicating the module is correctly locked into position.

Clip   Clip

CPU

Overview

The system board is equipped with a surface mount PGA 988B CPU socket.

Note:
The system board used in the following illustrations may not resemble the actual board. These illustrations are for reference only.

Installing the CPU

1. Make sure the PC and all other peripheral devices connected to it has been powered down.

2. Disconnect all power cords and cables.

3. Locate the PGA 988B socket on the system board.
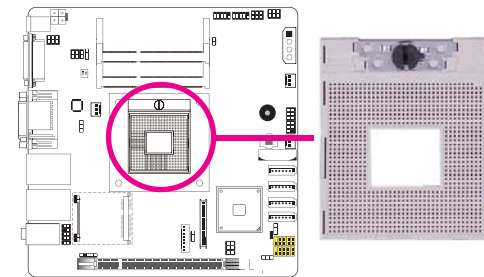
4. Make sure the screw is in its unlock position. If it's not, use a screwdriver to turn the screw to its unlock position.

Lock

Unlock

11
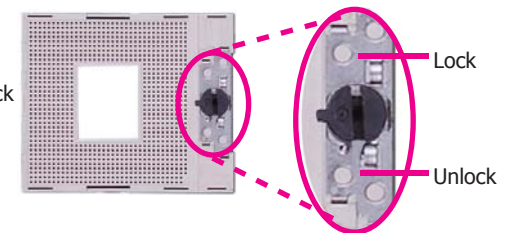
5. Position the CPU above the socket. The gold triangular mark on the CPU must align with pin 1 of the CPU socket.

Pin 1

Gold triangular mark
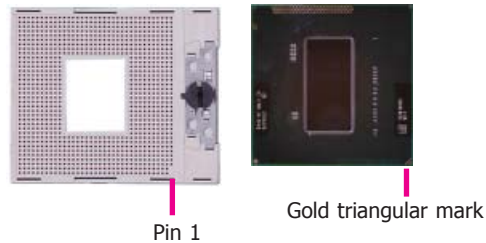
> **Important:**
> Handle the CPU by its edges and avoid touching the pins.

6. Insert the CPU into the socket until it is seated in place. The CPU will fit in only one orientation and can easily be inserted without exerting any force. Use a screwdriver to turn the screw to its lock position.

Screw in locked position
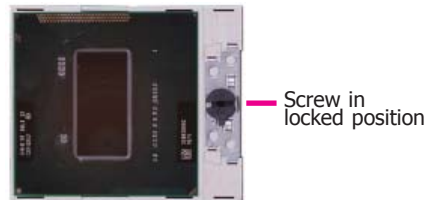
> **Important:**
> Do not force the CPU into the socket. Forcing the CPU into the socket may bend the pins and damage the CPU.

Installing the Fan and Heat Sink

The CPU must be kept cool by using a CPU fan with heat sink. Without sufficient air circulation across the CPU and heat sink, the CPU will overheat damaging both the CPU and system board.

> **Note:**
> • Use only certified fan and heat sink.
> • Your fan and heat sink package usually contains the fan and heat sink assembly, and an installation guide. If the installation procedure in the installation guide differs from the one in this section, please follow the installation guide in the package.

1. On the solder side of the board, match the retention module base to the mounting holes around the CPU socket.
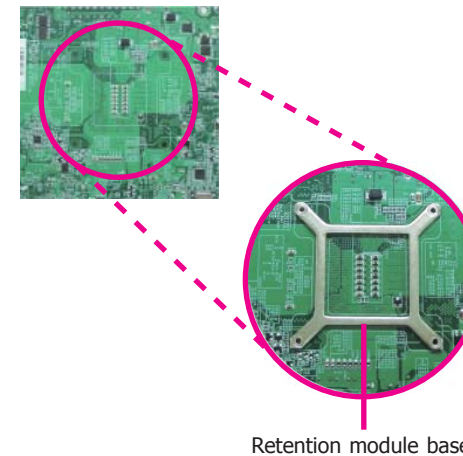
Retention module base

2. Turn to the component side of the board making sure the retention module base is positioned and fitted properly under the board.

3. Apply a thin layer of thermal paste on top of the CPU. Do not spread the paste all over the surface. When you later place the heat sink on top, the compound will disperse evenly.

12

4. Place the fan / heat sink assembly on top of the CPU. The 4 screws around the heat sink must match the screw holes of the retention module base. We strongly recommend using this type of fan / heat sink assembly because it provides adequate cooling to the components of the system board.

    Turn each Phillips head screw half way down first to initially stabilize the heat sink onto the board, then finally tighten each screw.

Important:
Do not turn the first screw all the way down followed by the next and so on. This is to avoid imbalance which might cause cracks or fractures to the CPU and/or heat sink assembly.

Mounting screw

5. Connect the CPU fan's cable connector to the CPU fan connector on the system board.

CPU fan cable

Jumper Settings

Clear CMOS Data

JP10

1 2 3

1-2 On: Normal (default)

1 2 3

2-3 On:
Clear CMOS Data
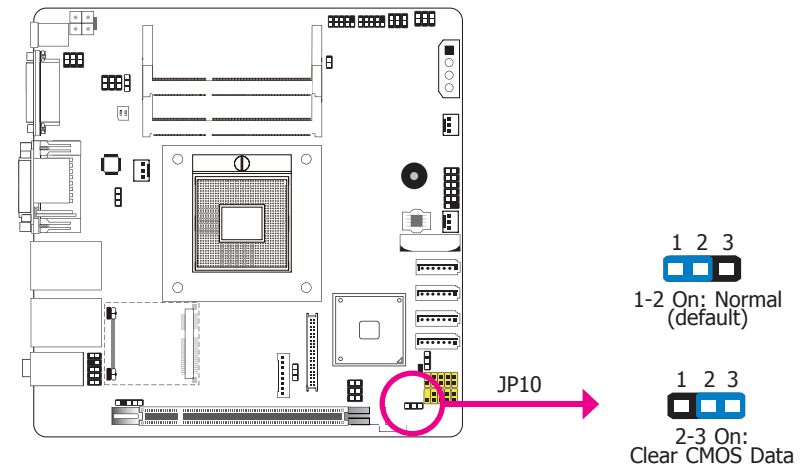
If you encounter the following,

a) CMOS data becomes corrupted.
b) You forgot the supervisor or user password.

you can reconfigure the system with the default values stored in the ROM BIOS.

To load the default values stored in the ROM BIOS, please follow the steps below.

1. Power-off the system and unplug the power cord.

2. Set JP10 pins 2 and 3 to On. Wait for a few seconds and set JP10 back to its default setting, pins 1 and 2 On.

3. Now plug the power cord and power-on the system.

USB Power Select

USB 0-3 (JP6)

1-2 On: +5V (default)

2-3 On: +5V_standby

USB 4-7 (JP7)

1-2 On: +5V (default)
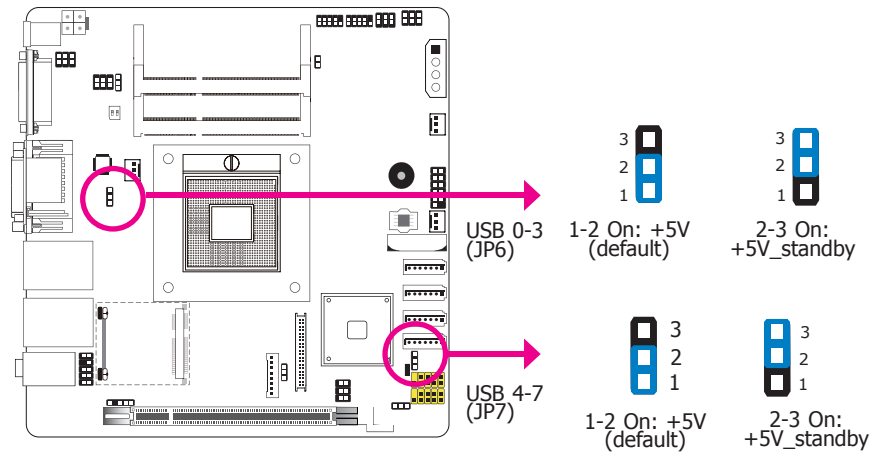
2-3 On: +5V_standby

This jumper is used to select the power of the USB ports. Selecting +5V_standby will allow you to use a USB device to wake up the system.

Important:
If you are using the Wake-On-USB Keyboard/Mouse function for 2 USB ports, the +5V_standby power source of your power supply must support ≥1.5A. For 3 or more USB ports, the +5V_standby power source of your power supply must support ≥2A.

Panel Power Select

JP9

1-2 On: +12V   3-4 On: +5V   5-6 On: +3.3V (default)
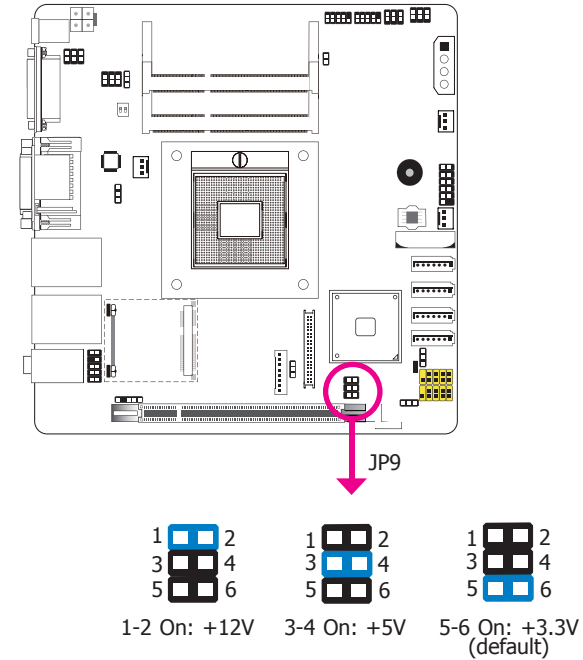
JP9 is used to select the power supplied to the LCD panel.

Important:
Before powering-on the system, make sure JP9's setting matches the LCD panel's specification. Selecting the incorrect voltage will seriously damage the LCD panel.

14

COM1/COM2 RS232/RS422/RS485 Select

JP4
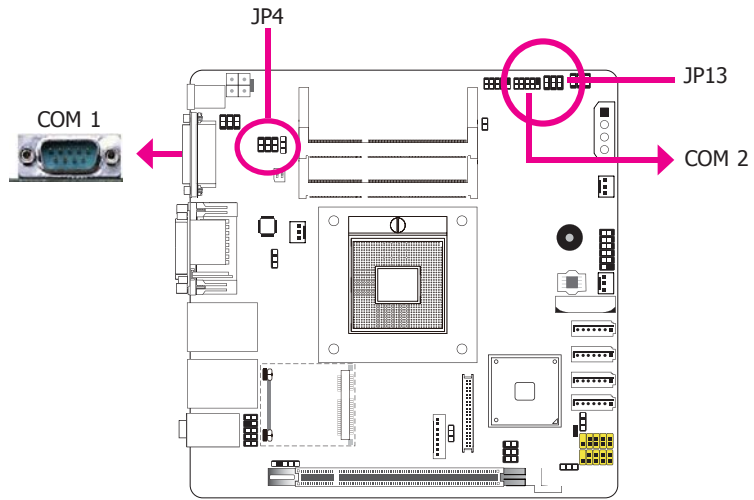
COM 1

JP13

COM 2

JP4 (for COM1) and JP13 (for COM2) are used to configure the COM ports to RS232, RS422 (Full Duplex) or RS485.

The pin function of the COM ports will vary according to the jumper's setting.

JP4/JP13		
2 4 6 1 3 5 1-2 On: RS232 (default)	2 4 6 1 3 5 3-4 On: RS422 Full Duplex	2 4 6 1 3 5 5-6 On: RS485
COM 1		
DCD- RD TD DTR- GND 1 2 3 4 5 6 7 8 9 DSR- RTS- CTS- RI- RS232	RXD+ RXD- TXD+ TXD- N.C. 1 2 3 4 5 6 7 8 9 N.C. N.C. N.C. N.C. RS422 Full Duplex	DATA+ DATA- N.C. N.C. N.C. 1 2 3 4 5 6 7 8 9 N.C. N.C. N.C. N.C. RS485
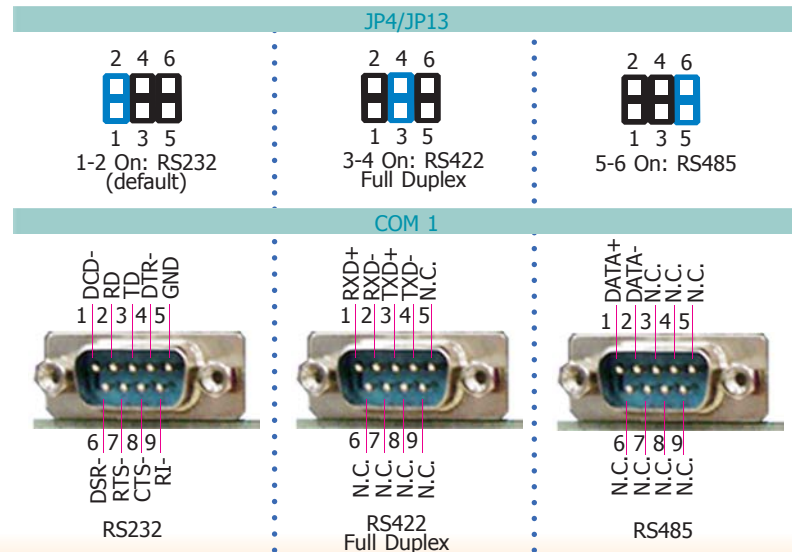
COM1/COM2 RS232 Power Select

JP14

2 4 6
1 3 5
1-3, 2-4 On: RS232
(default)

2 4 6
1 3 5
3-5 (+12V), 4-6 (+5V)
On: RS232 with power

JP1

2 4 6
1 3 5
1-3, 2-4 On: RS232
(default)

2 4 6
1 3 5
3-5 (+12V), 4-6 (+5V)
On: RS232 with power

15

Power-on Select

JP12

3
2
1

1-2 On:
Power-on via power button (default)

3
2
1

2-3 On:
Power-on via AC power; or
Power-on via WOL after G3
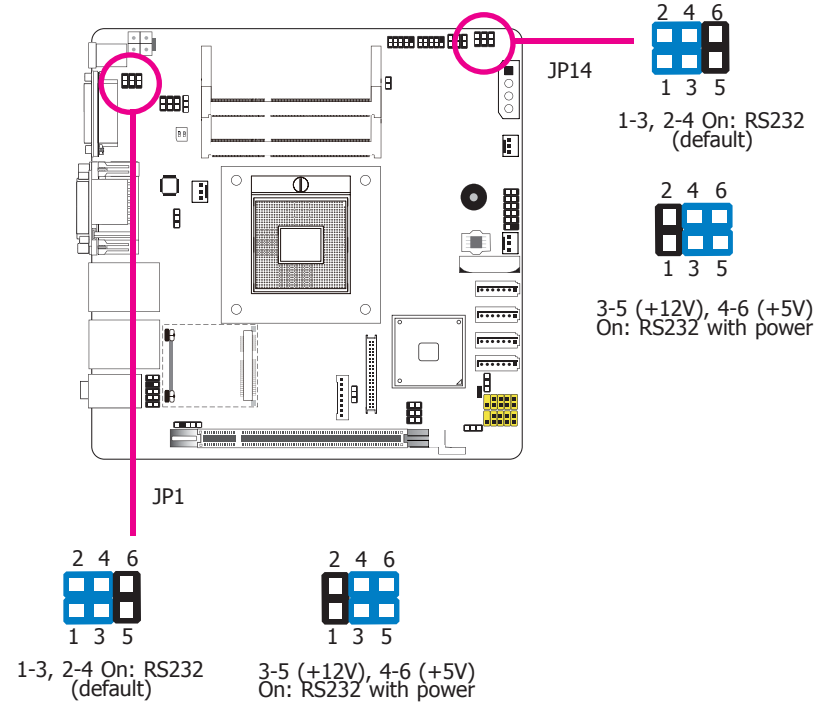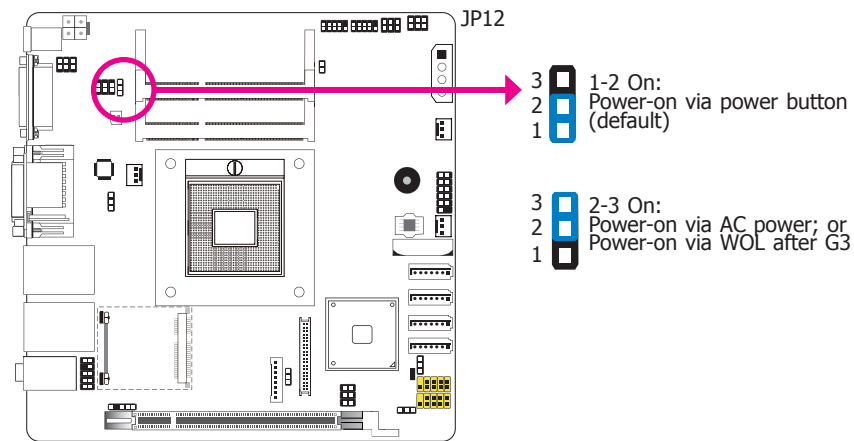
To power-on via WOL after G3:

1. Set JP12 pins 2 and 3 to On.

2. Set the "After G3" field to **Power Off/WOL**.

3. Set the "GbE Wake Up From S5" to **Enabled**.

The BIOS fields are in the "South Bridge Configuration" submenu (Chipset menu) of the AMI BIOS utility.

To power-on via AC Power:

1. Set JP12 pins 2 and 3 to On.

2. Set the "After G3" field to **Power On**.

Backlight Level Select

3
2
1

1-2 On: +5V (default)

3
2
1

JP 11

2-3 On: +3.3V
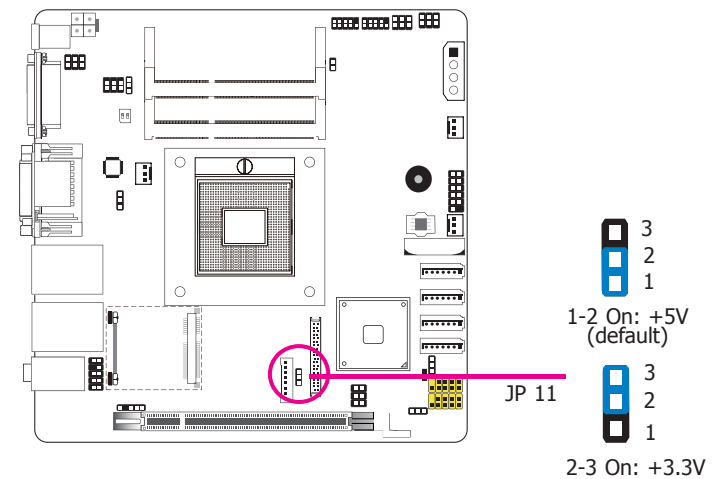
JP 11 is used to select the backlight level +5V or +3.3V.

Switch

ON
□□
1 2

1-2 Off:
One PCIe x16(default)

ON
□□
1 2

1 On, 2 Off:
Two PCIe x8

ON
□□
1 2

1-2 On:
One PCIe x8, Two PCIe x4

SW1
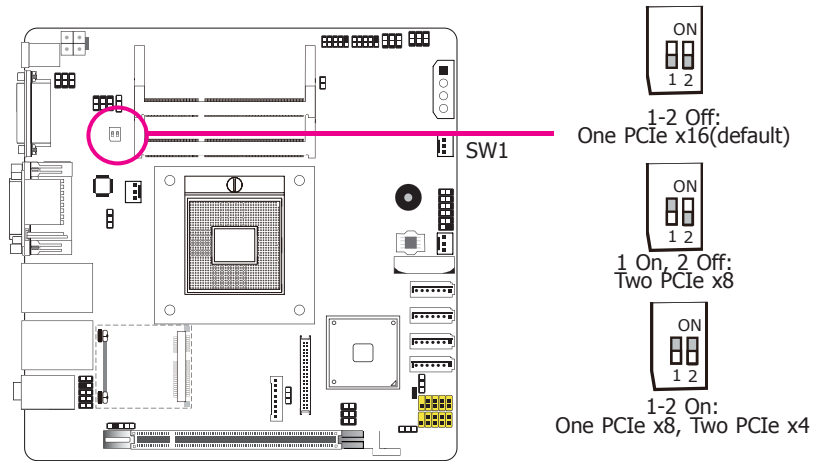
SW1 is used to configure the PCIe x16 slot.

Rear Panel I/O Ports

DVI-I   LAN 1   LAN 2

COM 1   Mic-in

DC-in   Line-in

Line-out

HDMI   USB 3.0   USB 3.0
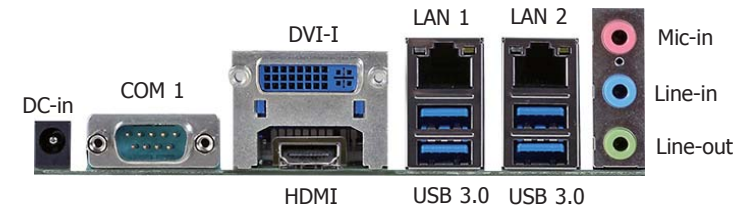
The rear panel I/O ports consist of the following:

• 12V DC-in
• COM port
• DVI-I port
• HDMI port
• 2 LAN ports
• 4 USB ports
• Line-out jack
• Line-in jack
• Mic-in jack

12V DC-in
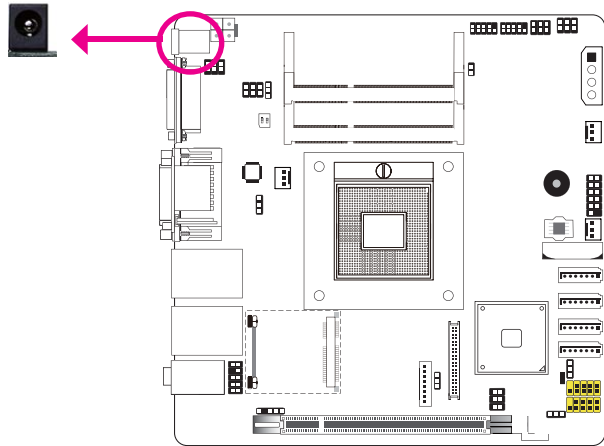
This jack provides maximum of 60W power and is considered a low power solution. Connect a DC power cord to this jack. Use a power adapter with 12V DC output voltage. Using a voltage higher than the recommended one may fail to boot the system or cause damage to the system board.

COM (Serial) Ports

COM 1

COM 1:
RS232/422/485

COM 2

COM 2:
RS232/422/485

RD
DTR-
DSR-
CTS-

DCD-
TD
GND
RTS-
RI-

2
1
9
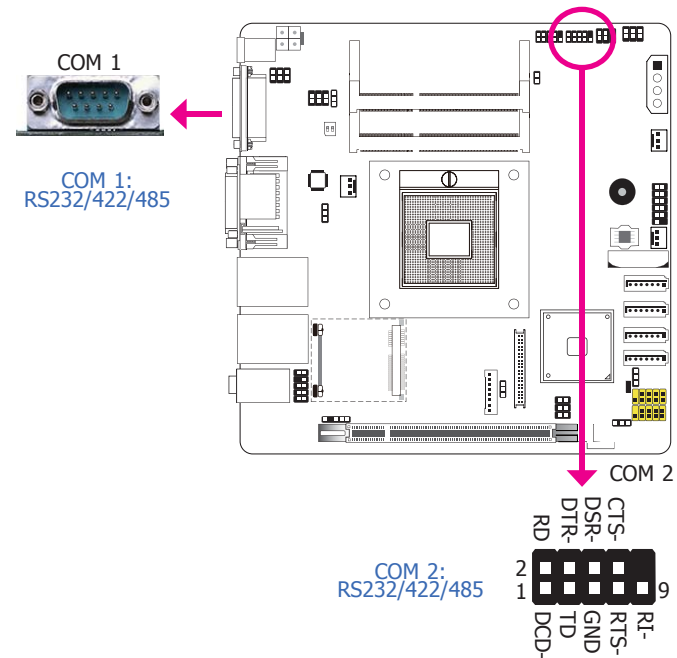
The pin function of COM 1 and COM 2 ports will vary according to JP4/JP13's setting. Refer to "COM1/COM2 RS232/RS422/RS485 Select" in this chapter for more information.

The serial ports are asynchronous communication ports with 16C550A-compatible UARTs that can be used with modems, serial printers, remote display terminals, and other serial devices.

Connecting External Serial Ports

Your COM port may come mounted on a card-edge bracket. Install the card-edge bracket to an available slot at the rear of the system chassis then insert the serial port cable to the COM connector. Make sure the colored stripe on the ribbon cable is aligned with pin 1 of the COM connector.

BIOS Setting

Configure the serial ports in the Advanced menu ("Super IO Configuration" submenu) of the BIOS. Refer to chapter 3 for more information.

Graphics Interfaces

The display ports consist of the following:

- HDMI
- DVI-I port
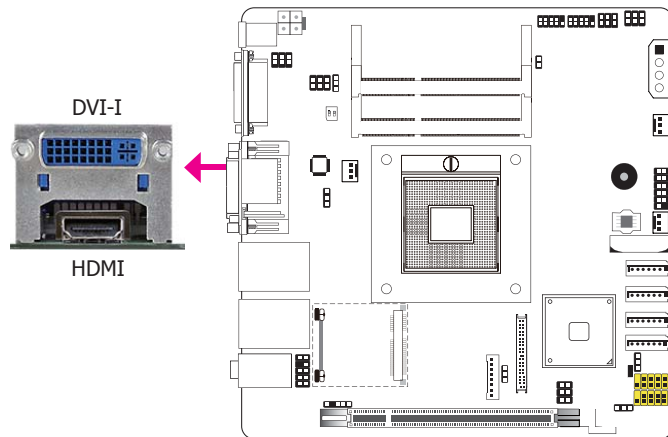
HDMI Port

The HDMI port which carries both digital audio and video signals is used to connect a LCD monitor or digital TV that has the HDMI port.

DVI-I Port

The DVI-I port is used to connect an LCD monitor.

Connect the display device's cable connector to the DVI-I port. After you plug the cable connector into the port, gently tighten the cable screws to hold the connector in place.

BIOS Setting

Configure the display device in the Chipset menu ("North Bridge Configuration" submenu) of the BIOS. Refer to chapter 3 for more information.

RJ45 LAN Ports
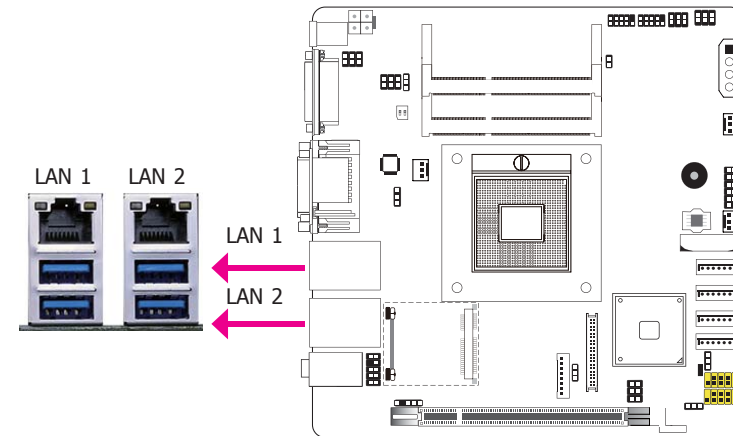
Features

- Realtek 8111DL PCI Express Gigabit LAN controller

The LAN ports allow the system board to connect to a local area network by means of a network hub.

BIOS Setting

Configure the onboard LAN in the Chipset menu ("South Bridge Configuration" submenu) of the BIOS. Refer to chapter 3 for more information.

Driver Installation

Install the LAN drivers. Refer to chapter 4 for more information.

USB Ports

USB 1
USB 0
USB 3.0

USB 3
USB 2
USB 3.0

USB 6-7
USB 4-5
USB 2.0

Key
GND
+Data
-Data
VCC
9
10
1
2
N. C.
GND
+Data
-Data
VCC
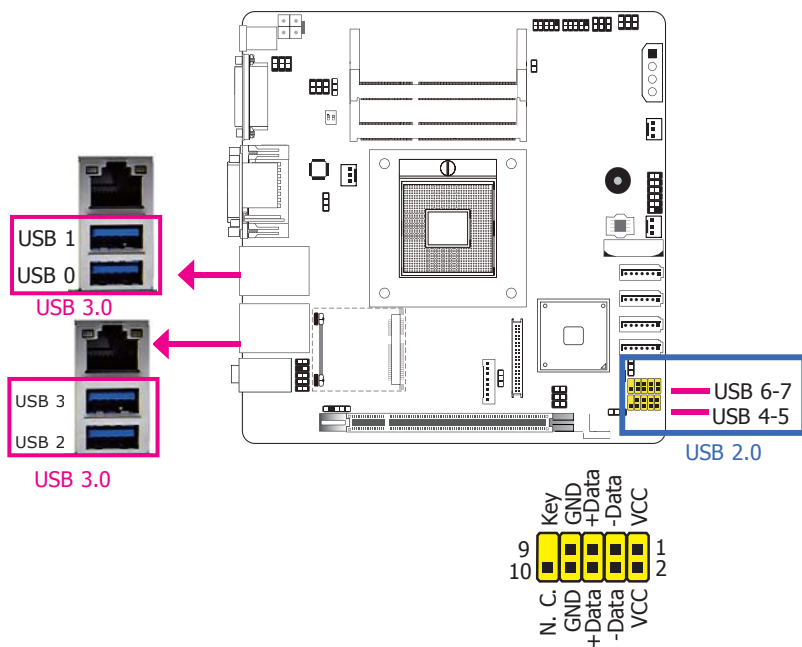
USB allows data exchange between your computer and a wide range of simultaneously accessible external Plug and Play peripherals.

The system board is equipped with four onboard USB 3.0/2.0/1.1 ports (USB 0-3). The two 10-pin connectors allow you to connect 4 additional USB 2.0/1.1 ports (USB 4-7). The additional USB ports may be mounted on a card-edge bracket. Install the card-edge bracket to an available slot at the rear of the system chassis and then insert the USB port cables to a connector.

BIOS Setting

Configure the onboard USB in the Advanced menu ("USB Configuration" submenu) of the BIOS. Refer to chapter 3 for more information.

Driver Installation

You may need to install the proper drivers in your operating system to use the USB device. Refer to your operating system's manual or documentation for more information.

Wake-On-USB Keyboard/Mouse

The Wake-On-USB Keyboard/Mouse function allows you to use a USB keyboard or USB mouse to wake up a system from the S3 (STR - Suspend To RAM) state. To use this function:

• **Jumper Setting**

JP6 must be set to "2-3 On: +5V_standby". Refer to "USB Power Select" in this chapter for more information.

Important:
If you are using the Wake-On-USB Keyboard/Mouse function for 2 USB ports, the +5V_standby power source of your power supply must support ≥1.5A. For 3 or more USB ports, the +5V_standby power source of your power supply must support ≥2A.

Audio

Rear audio

Mic-in
Line-in
Line-out

10 9
Line2-JD   Line2-L
Key   Front_IO_Sense
Mic2-JD   Line2-R
Presence Signal   Mic2-R
GND   Mic2-L
2 1

Front audio
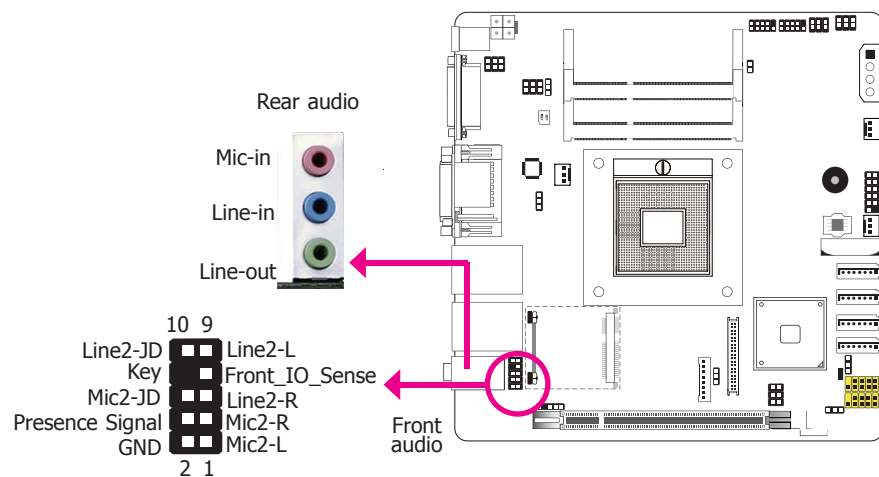
Rear Audio

The system board is equipped with 3 audio jacks. A jack is a one-hole connecting interface for inserting a plug.

• Mic-in Jack (Pink)
  This jack is used to connect an external microphone.

• Line-in Jack (Light Blue)
  This jack is used to connect any audio devices such as Hi-fi set, CD player, tape player, AM/FM radio tuner, synthesizer, etc.

• Line-out Jack (Lime)
  This jack is used to connect a headphone or external speakers.

Front Audio

The front audio connector allows you to connect to the second line-out and mic-in jacks that are at the front panel of your system.

BIOS Setting

Configure the onboard audio in the Chipset menu ("South Bridge" submenu) of the BIOS. Refer to chapter 3 for more information.

Driver Installation

Install the audio driver. Refer to chapter 4 for more information.

I/O Connectors

S/PDIF Connector

SPDIF out
Key   Ground
+5V   SPDIF in
1   5
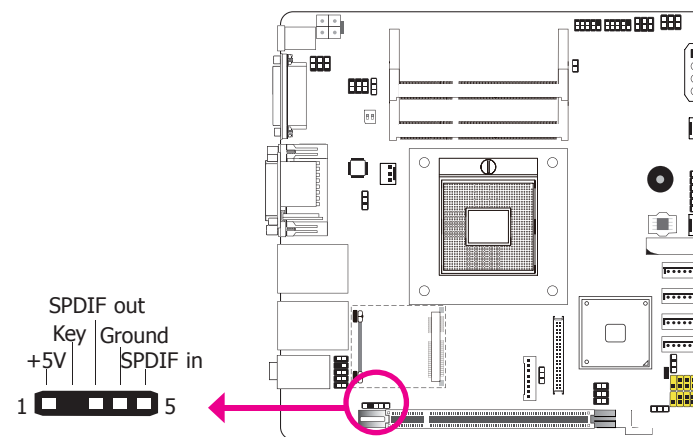
The S/PDIF connector is used to connect an external S/PDIF port. Your S/PDIF port may be mounted on a card-edge bracket. Install the card-edge bracket to an available slot at the rear of the system chassis then connect the audio cable to the S/PDIF connector. Make sure pin 1 of the audio cable is aligned with pin 1 of the S/PDIF connector.

21

LVDS LCD Panel Connector

LCD/Inverter Power Connector

LCD/Inverter
power

2 1

1

40 39
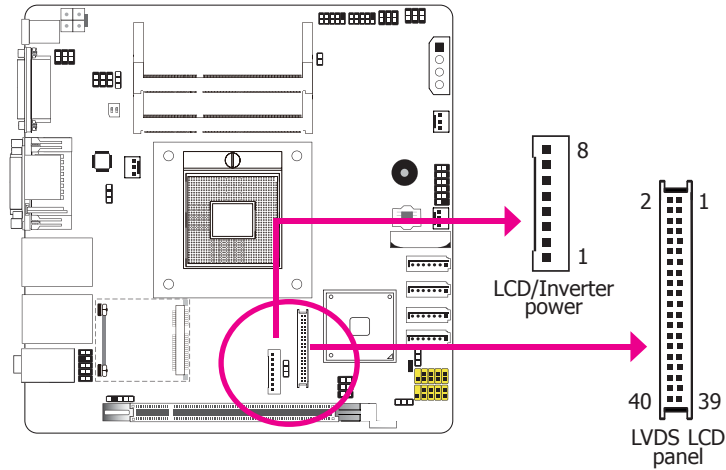
LVDS LCD
panel

The system board allows you to connect a LCD Display Panel by means of the LVDS LCD panel connector and the LCD/Inverter power connector. These connectors transmit video signals and power from the system board to the LCD Display Panel.

Refer to the next page for the pin functions of these connectors.

BIOS Setting

Configure the LCD panel in the Advanced Chipset Features submenu of the BIOS. Refer to chapter 3 for more information.

LVDS LCD Panel Connector

Pins	Function	Pins	Function
1	GND	2	GND
3	LVDS_Out3+	4	LVDS_Out7+
5	LVDS_Out3-	6	LVDS_Out7-
7	GND	8	GND
9	LVDS_Out2+	10	LVDS_Out6+
11	LVDS_Out2-	12	LVDS_Out6-
13	GND	14	GND
15	LVDS_Out1+	16	LVDS_Out5+
17	LVDS_Out1-	18	LVDS_Out5-
19	GND	20	GND
21	LVDS_Out0+	22	LVDS_Out4+
23	LVDS_Out0-	24	LVDS_Out4-
25	GND	26	GND
27	LVDS_CLK1+	28	LVDS_CLK2+
29	LVDS_CLK1-	30	LVDS_CLK2-
31	GND	32	GND
33	LVDS_DDCCLK	34	N.C.
35	LVDS_DDCDAA	36	N.C.
37	Panel Power	38	Panel Power
39	Panel Power	40	Panel Power

LCD/Inverter Power Connector

Pins	Function
1	GND
2	GND
3	Panel Inverter Brightness Voltage Control
4	Panel Power
5	+3.3V
6	Panel Backlight On/Off Control
7	+12V
8	+12V

22

SATA (Serial ATA) Connectors

SATA 3.0 6Gb/s
SATA 0
SATA 1

SATA 2.0 3Gb/s
SATA 4
SATA 5

7   1
GND
RXP
RXN
GND
TXN
TXP
GND
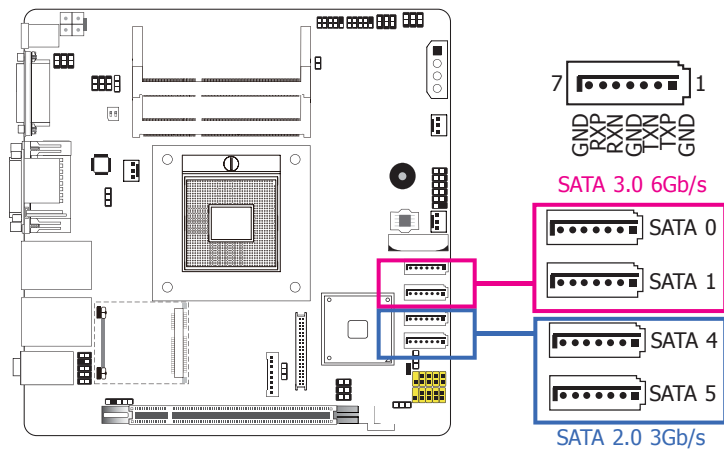
Features

- • 4 Serial ATA ports
  - 2 SATA2 ports with data transfer rate up to 3Gb/s
  - 2 SATA3 ports with data transfer rate up to 6Gb/s

- • Integrated Advanced Host Controller Interface (AHCI) controller

The Serial ATA connectors are used to connect Serial ATA devices. Connect one end of the Serial ATA cable to a SATA connector and the other end to your Serial ATA device.

BIOS Setting

Configure the Serial ATA drives in the Advanced menu ("IDE Configuration" submenu) of the BIOS. Refer to chapter 3 for more information.

Cooling Fan Connectors

3   Sense
     Power
1   Ground
CPU fan

1   Ground
     Power
3   Sense
System fan
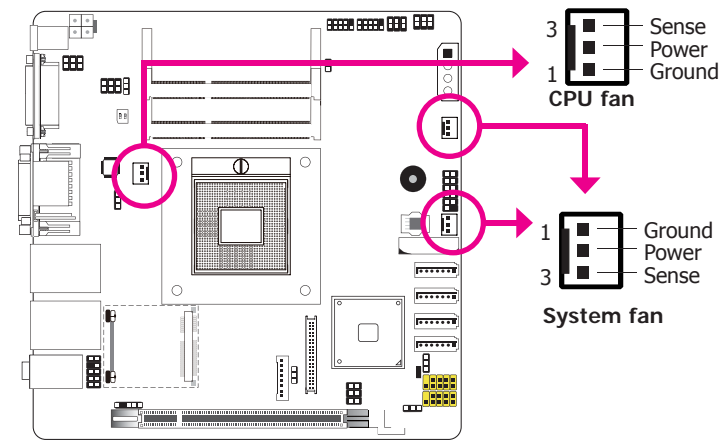
The fan connectors are used to connect cooling fans. The cooling fans will provide adequate airflow throughout the chassis to prevent overheating the CPU and system board components.

BIOS Setting

The Advanced menu ("Hardware Health Configuration" submenu) of the BIOS will display the current speed of the cooling fans. Refer to chapter 3 for more information.

23

Chassis Intrusion Connector

2 — Ground
1 — Signal
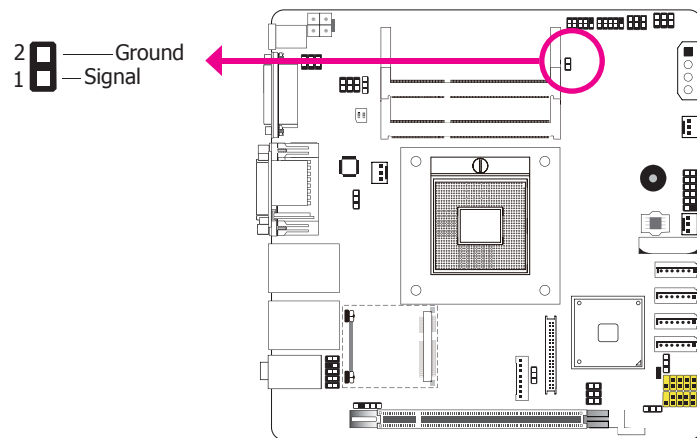
The board supports the chassis intrusion detection function. Connect the chassis intrusion sensor cable from the chassis to this connector. When the system's power is on and a chassis intrusion occurred, an alarm will sound. When the system's power is off and a chassis intrusion occurred, the alarm will sound only when the system restarts.

MyGuard Hardware Monitor

Install the "MyGuard Hardware Monitor" utility. By default, the chassis intrusion detection function is disabled. When enabled, a warning message will appear when the chassis is open. The utility can also be configured so that a beeping alarm will sound when the chassis is open. Refer to the "MyGuard Hardware Monitor" section in chapter 4 for more information.

Power Connectors

1 3
Ground — +12V
Ground — +12V
2 4
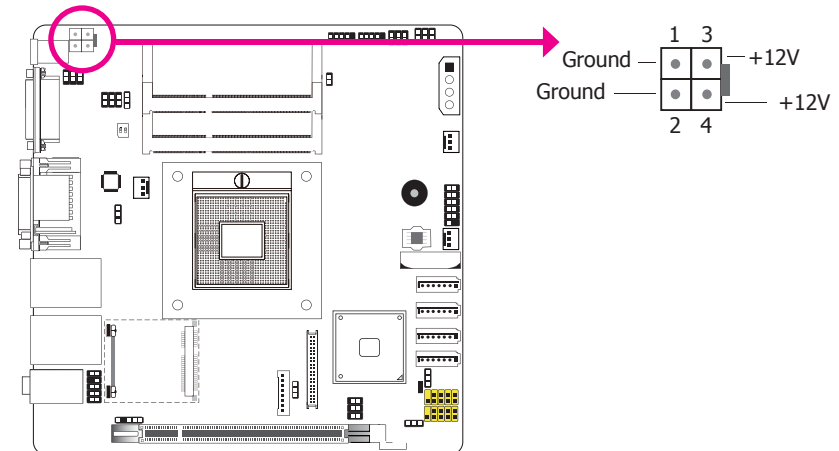
Use a power supply that complies with the ATX12V Power Supply Design Guide Version 1.1. An ATX12V power supply unit has a standard 4-pin ATX main power connector that must be inserted into the 4-pin connector.

The power connector from the power supply unit are designed to fit the 4-pin connector in only one orientation. Make sure to find the proper orientation before plugging the connectors.

The system board requires a minimum of 300 Watt power supply to operate. Your system configuration (CPU power, amount of memory, add-in cards, peripherals, etc.) may exceed the minimum power requirement. To ensure that adequate power is provided, we strongly recommend that you use a minimum of 400 Watt (or greater) power supply.

> **Important:**
> Insufficient power supplied to the system may result in instability or the add-in boards and peripherals not functioning properly. Calculating the system's approximate power usage is important to ensure that the power supply meets the system's consumption requirements.

Standby Power LED

Standby Power LED
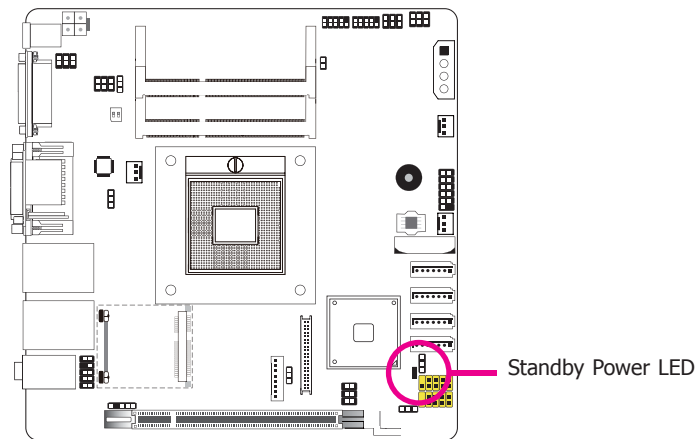
This LED will lit red when the system is in the standby mode. It indicates that there is power on the system board. Power-off the PC and then unplug the power cord prior to installing any devices. Failure to do so will cause severe damage to the motherboard and components.

Peripheral Power

Peripheral Power

1
+12V
Ground
Ground
+5V
4
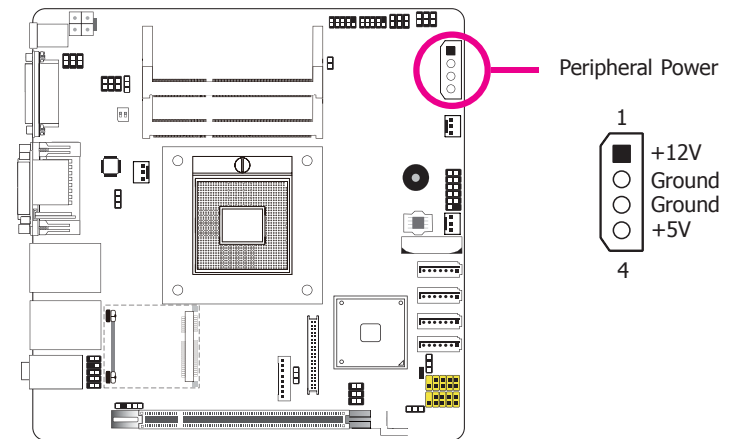
The peripheral power connector supplies power to the SATA drive and IDE hard disk drive. Connect one end of the provided power cable to the peripheral power connector and the other ends to your storage devices.

Connect to the peripheral power connector

Connect to storage devices

25
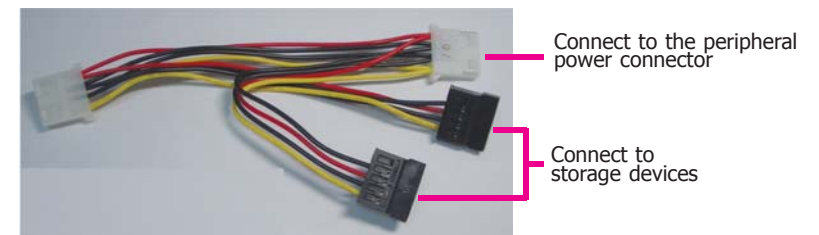
Front Panel Connectors

HDD-LED
RESET-SW
1 2
PWR-LED
PWR-BTN
11 12
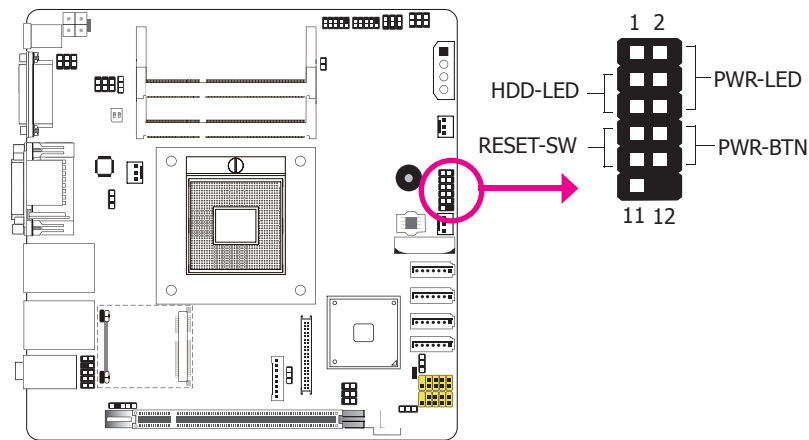
HDD-LED - HDD LED

This LED will light when the hard drive is being accessed.

RESET SW - Reset Switch

This switch allows you to reboot without having to power off the system.

PWR-BTN - Power Switch

This switch is used to power on or off the system.

PWR-LED - Power/Standby LED

When the system's power is on, this LED will light. When the system is in the S1 (POS - Power On Suspend) state, it will blink every second. When the system is in the S3 (STR - Suspend To RAM) state, it will blink every 4 seconds.

	Pin	Pin Assignment		Pin	Pin Assignment
HDD-LED	3	HDD Power		2	LED Power
	5	Signal	PWR-LED	4	LED Power
RESET SW	7	Ground		6	Signal
	9	RST Signal	PWR-BTN	8	Ground
	11	N.C.		10	Signal

Expansion Slots

Mini PCI Express
PCI Express x16
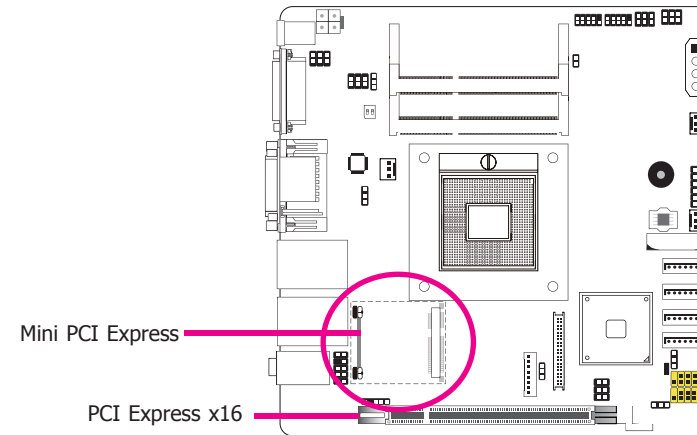
PCI Express x16 Slot

Install PCI Express x16 graphics card, that comply to the PCI Express specifications, into the PCI Express x16 slot. To install a graphics card into the x16 slot, align the graphics card above the slot then press it down firmly until it is completely seated in the slot. The retaining clip of the slot will automatically hold the graphics card in place.

Mini PCIe Slot

The Mini PCIe socket is used to install a Mini PCIe card. Mini PCIe card is a small form factor PCI card with the same signal protocol, electrical definitions, and configuration definitions as the conventional PCI.

26

LPC

LPC

LAD0
LAD1 | VCC3
GND

2 ___ 10
1 ___ 9

CLK
RST# | LDA2
FRAME# | LAD3
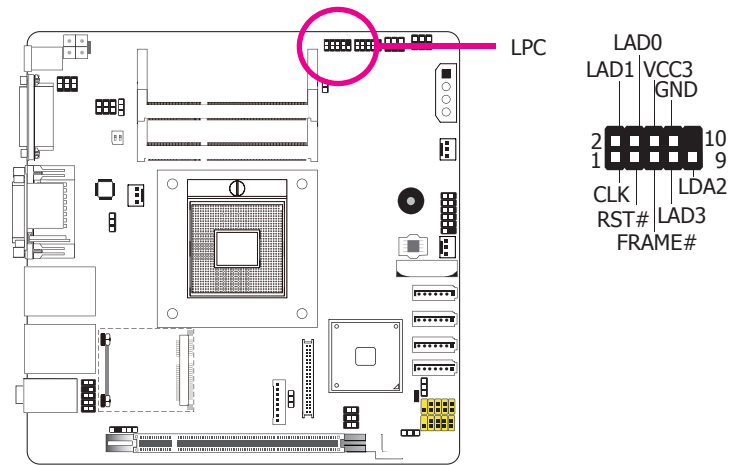
The Low Pin Count Interface was defined by Intel® Corporation to facilitate the industry's transition towards legacy free systems. It allows the integration of low-bandwidth legacy I/O components within the system, which are typically provided by a Super I/O controller. Furthermore, it can be used to interface firmware hubs, and embedded controller solutions. Data transfer on the LPC bus is implemented over a 4 bit serialized data interface, which uses a 33MHz LPC bus clock. For more information about LPC bus refer to the Intel® Low Pin Count Interface Specification Revision 1.1'.

Battery
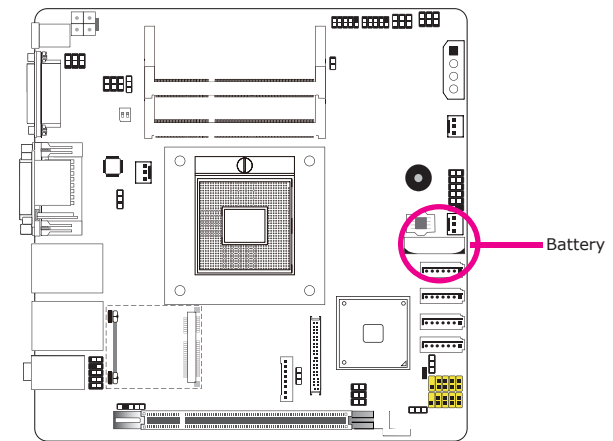
Battery

The lithium ion battery powers the real-time clock and CMOS memory. It is an auxiliary source of power when the main power is shut off.

Safety Measures

• Danger of explosion if battery incorrectly replaced.

• Replace only with the same or equivalent type recommend by the manufacturer.

• Dispose of used batteries according to local ordinance.

27

Chapter 3 - BIOS Setup

Overview

The BIOS is a program that takes care of the basic level of communication between the CPU and peripherals. It contains codes for various advanced features found in this system board. The BIOS allows you to configure the system and save the configuration in a battery-backed CMOS so that the data retains even when the power is off. In general, the information stored in the CMOS RAM of the EEPROM will stay unchanged unless a configuration change has been made such as a hard drive replaced or a device added.

It is possible that the CMOS battery will fail causing CMOS data loss. If this happens, you need to install a new CMOS battery and reconfigure the BIOS settings.

> **Note:**
> The BIOS is constantly updated to improve the performance of the system board; therefore the BIOS screens in this chapter may not appear the same as the actual one. These screens are for reference purpose only.

Default Configuration

Most of the configuration settings are either predefined according to the Load Optimal Defaults settings which are stored in the BIOS or are automatically detected and configured without requiring any actions. There are a few settings that you may need to change depending on your system configuration.

Entering the BIOS Setup Utility

The BIOS Setup Utility can only be operated from the keyboard and all commands are key-board commands. The commands are available at the right side of each setup screen.

The BIOS Setup Utility does not require an operating system to run. After you power up the system, the BIOS message appears on the screen and the memory count begins. After the memory test, the message "Press DEL to run setup" will appear on the screen. If the message disappears before you respond, restart the system or press the "Reset" button. You may also restart the system by pressing the <Ctrl> <Alt> and <Del> keys simultaneously.

Legends

Keys	Function
Right and Left arrows	Moves the highlight left or right to select a menu.
Up and Down arrows	Moves the hightlight up or down between submenu or fields.
<Esc>	Exit to the BIOS Setup Utility.
+ (plus key)	Scrolls forward through the values or options of the highlighted field.
- (minus key)	Scrolls backward through the values or options of the highlighted field.
Tab	Select a field.
<F1>	Displays General Help
<Enter>	Press <Enter> to enter the highlighted submenu.

Scroll Bar

When a scroll bar appears to the right of the setup screen, it indicates that there are more available fields not shown on the screen. Use the up and down arrow keys to scroll through all the available fields.

Submenu

When "▶" appears on the left of a particular field, it indicates that a submenu which contains additional options are available for that field. To display the submenu, move the highlight to that field and press <Enter>.

AMI BIOS Setup Utility

Main

The Main menu is the first screen that you will see when you enter the BIOS Setup Utility.

```
            Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
   Main    Advanced   Chipset   Boot   Security   Save & Exit

   BIOS Information                                      Choose the system default
   BIOS Vendor              American Megatrends          language
   Core Version             4.6.5.3
   Compliency               UEFI 2.3; PI 1.2
   Project Version          1APTJ 0.18 x64
   Build Date and Time      07/27/2012  16:01:07

   System Language          [English]

   System Date              [Mon 07/30/2012]
   System Time              [11:10:44]                   → ←:  Select Screen
                                                         ↑↓:   Select Item
   Access Level             Administraor                 Enter: Select
                                                         +/-:  Change Opt.
                                                         F1:   General Help
                                                         F2:   Previous Values
                                                         F3:   Optimized Defaults
                                                         ESC:  Exit

            Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

System Date

The date format is <day>, <month>, <date>, <year>. Day displays a day, from Sunday to Saturday. Month displays the month, from January to December. Date displays the date, from 1 to 31. Year displays the year, from 1980 to 2099.

System Time

The time format is <hour>, <minute>, <second>. The time is based on the 24-hour military-time clock. For example, 1 p.m. is 13:00:00. Hour displays hours from 00 to 23. Minute displays minutes from 00 to 59. Second displays seconds from 00 to 59.

Advanced

The Advanced menu allows you to configure your system for basic operation. Some entries are defaults required by the system board, while others, if enabled, will improve the performance of your system or let you set some features according to your preference.

Important:
Setting incorrect field values may cause the system to malfunction.

```
            Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
   Main    Advanced   Chipset   Boot   Security   Save & Exit

   ▶ ACPI Setting                                        System ACPI parameters
   ▶ PC Health Status
   ▶ CPU Configuration
   ▶ SATA Configuration
   ▶ Intel(R) Anti-Theft Technology Configuration
   ▶ USB Configuration
   ▶ PCH-FW Configuration
   ▶ F71879 Super IO Configuration
   ▶ Network Stack
   ▶ CPU PPM Configuration
                                                         → ←:  Select Screen
                                                         ↑↓:   Select Item
                                                         Enter: Select
                                                         +/-:  Change Opt.
                                                         F1:   General Help
                                                         F2:   Previous Values
                                                         F3:   Optimized Defaults
                                                         ESC:  Exit

            Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

ACPI Power Management Configuration

This section is used to configure the ACPI Power Management.

```
         Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
    Advanced

 ACPI Settings                                               Enables or Disables BIOS
                                                             ACPI Auto Configuration.
 Enable ACPI Auto Configuration        [Disable]

 ACPI Sleep State                      [S3 (Suspend to RAM) ]

 Resume by PME                         [Disabled]
 Resume by RTC Alarm                   [Disabled]




                                                             → ←:  Select Screen
                                                             ↑↓:    Select Item
                                                             Enter: Select
                                                             +/-:    Change Opt.
                                                             F1:    General Help
                                                             F2:    Previous Values
                                                             F3:    Optimized Defaults
                                                             ESC:  Exit


         Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

ACPI Sleep State

Selects the highest ACPI sleep state the system will enter when the Suspend button is pressed.

S1(POS)   Enables the Power On Suspend function.

S3(STR)   Enables the Suspend to RAM function.

Resume by PME

Enable this field to use the PME signal to wake up the system.

Resume by RTC Alarm

When Enabled, the system uses the RTC to generate a wakeup event.

PC Health Status

This section displays the SIO hardware health monitor.

```
         Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
    Advanced

 ▶ Smart Fan Function                                        Smart Fan Function
   Case Open Beep                      [Disabled]

   CPU Temperature                     : +39 C
   System Temperature                  : +36 C
   CPU FAN Speed                       : 3649 RPM
   System FAN1 Speed                   : N/A
   System FAN2 Speed                   : N/A
   VCore                               : +0.864 V
   1V05                                : +1.048V
   DDR                                 : +1.512V
   +3.3V                               : +3.264 V
   +5.0V                               : +4.960 V
   +12V                                : +11.616 V            → ←:  Select Screen
                                                             ↑↓:    Select Item
                                                             Enter: Select
                                                             +/-:    Change Opt.
                                                             F1:    General Help
                                                             F2:    Previous Values
                                                             F3:    Optimized Defaults
                                                             ESC:  Exit

         Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

Smart Fan Function

```
         Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
    Advanced

 Smart Fan Function                                          Enable CPU SmartFan
 CPU Smart Fan Control                 [Automatic]
 Boundary 1                            70
 Boundary 2                            60
 Boundary 3                            50
 Boundary 4                            40
 Speed Count 1                         100
 Speed Count 2                         75
 Speed Count 3                         50
 Speed Count 4                         25
 Speed Count 5                         10
                                                             → ←:  Select Screen
                                                             ↑↓:    Select Item
                                                             Enter: Select
                                                             +/-:    Change Opt.
                                                             F1:    General Help
                                                             F2:    Previous Values
                                                             F3:    Optimized Defaults
                                                             ESC:  Exit

         Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

CPU Smart Fan Control

When this feature is set to Automatic, the CPU's fan speed will rotate according to the CPU's temperature. The higher the temperature, the faster the speed of rotation.

Boundary 1 to Boundary 4

The range is from 0-127.

Speed Count 1 to Speed Count 5

The range is from 1-100.

Case Open Beep

Set this field to Enabled to allow the system to alert you of a chassis intrusion event.

CPU Configuration

This section is used to configure the CPU. It will also display the detected CPU information.

```
          Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
   Advanced

   CPU Configuration                                              Enabled for Windows XP
                                                                  and Linux (OS optimized
   Intel (R)  Core (TM)  i7-3610QE  CPU @ 2.30GHz                 for Hyper-Threading
   CPU Signature                 306a8                            Technology) and Disabled
   Microcode Patch               c                                for other OS (OS not
   Max CPU Speed                 2300 MHz                          optimized for
   Min CPU Speed                 1200 MHz                          Hyper-Threading
   CPU Speed                     2300 MHz                          Technology). When
   Processor Cores               4                                Disabled only one thread
   Intel HT Technology           Supported                        per enabled core is
   Intel VT-x Technology         Supported                        enabled.
   Intel SMX Technology          Supported
   64-bit                        Supported                        → ←:  Select Screen
                                                                  ↑↓:    Select Item
   L1 Data Cache                 32 kB x 4                         Enter: Select
   L1 Code Cache                 32 kB x 4                         +/-:   Change Opt.
   L2 Cache                      256kB x 4                         F1:    General Help
   L3 Cache                      6144 kB                           F2:    Previous Values
                                                                  F3:    Optimized Defaults
   Hyper-threading               [Enabled]                        ESC:  Exit
   Active Processor Cores        [All]
   Limit CPUID Maximum           [Disabled]
   Intel Virtualization Technology  [Disabled]

          Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

Hyper-threading

Enable this field for Windows XP and Linux which are optimized for Hyper-Threading technology. Select disabled for other OSes not optimized for Hyper-Threading technology. When disabled, only one thread per enabled core is enabled.

Active Processor Cores

Number of cores to enable in each processor package.

Limit CPUID Maximum

The CPUID instruction of some newer CPUs will return a value greater than 3. The default is Disabled because this problem does not exist in the Windows series operating systems. If you are using an operating system other than Windows, this problem may occur. To avoid this problem, enable this field to limit the return value to 3 or less than 3.

Intel Virtualization Technology

When this field is set to Enabled, the VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.

31

SATA Configuration

This section is used to configure SATA functions.

```
            Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
  Advanced

  SATA Controller(s)          [Enabled]              Enable or disable SATA
  SATA Mode Selection         [IDE]                  Device.
  SATA Test Mode              [Enabled]


  Serial ATA Port 0           Empty
    Software Preserve         Unknown
  Serial ATA Port 1           Empty
    Software Preserve         Unknown
  Serial ATA Port 2           Empty
    Software Preserve         Unknown
  Serial ATA Port 3           Empty               →←:  Select Screen
    Software Preserve         Unknown             ↑↓:   Select Item
                                                  Enter: Select
                                                  +/-:   Change Opt.
                                                  F1:    General Help
                                                  F2:    Previous Values
                                                  F3:    Optimized Defaults
                                                  ESC:  Exit

            Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

SATA Controller(s)

This field is used to enable or disable the Serial ATA channels.

SATA Mode Selection

IDE Mode

This option configures the Serial ATA drives as Parallel ATA storage devices.

AHCI Mode

This option allows the Serial ATA devices to use AHCI (Advanced Host Controller Interface).

SATA Test Mode

This field is used to enable or disable the Serial ATA test mode.

If AHCI is selected in the SATA Mode Selection, it will display the following information:

```
            Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
  Advanced

  SATA Controller(s)          [Enabled]              Determines how SATA
  SATA Mode Selection         [AHCI]                 controller(s) operate.
  SATA Test Mode              [Disabled]
  Agressive LPM Support       [Enabled]


  Serial ATA Port 0           Empty
    Software Preserve         Unknown
    Port 0                    [Enabled]
    Hot Plug                  [Disabled]
    External SATA             [Disabled]
    SATA Device Type          [Hard Disk Driver]
    Spin Up Device            [Disabled]          →←:  Select Screen
  Serial ATA Port 1           Empty               ↑↓:   Select Item
    Software Preserve         Unknown             Enter: Select
    Port 1                    [Enabled]           +/-:   Change Opt.
    Hot Plug                  [Disabled]          F1:    General Help
    External SATA             [Disabled]          F2:    Previous Values
    SATA Device Type          [Hard Disk Driver]  F3:    Optimized Defaults
    Spin Up Device            [Disabled]          ESC:  Exit
  Serial ATA Port 2           Empty
    Software Preserve         Unknown
    Port 2                    [Enabled]
    Hot Plug                  [Disabled]                                 ds, Inc.
    External SATA             [Disabled]
    Spin Up Device            [Disabled]
  Serial ATA Port 3           Empty
    Software Preserve         Unknown
    Port 3                    [Enabled]
    Hot Plug                  [Disabled]
    External SATA             [Disabled]
    Spin Up Device            [Disabled]
```

Serial ATA Port 0 to Serial ATA Port 3

These fields are used to configure the connected SATA devices.

Aggressive LPM Support

Enter PCH to aggressively enter link power state.

32

Intel Anti-Theft Configuration

This section is used to disable the PC at the hardware level in the event of loss or theft.

```
              Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
     Advanced

  Intel (R) Anti-Theft Technology Configuration                          Enable/Disable Intel(R) AT
                                                                         in BIOS for testing only.
  Intel (R) Anti-Theft Technology              [Disabled]
  Intel (R) Anti-Theft Technology Rec          3
  Enter Intel (R) AT Suspend Mode              [Disabled]




                                                                         →←:  Select Screen
                                                                         ↑↓:    Select Item
                                                                         Enter: Select
                                                                         +/-:   Change Opt.
                                                                         F1:    General Help
                                                                         F2:    Previous Values
                                                                         F3:    Optimized Defaults
                                                                         ESC:  Exit


              Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

Intel Anti-Theft Technology

The options are Enabled and Disabled.

Enter Intel AT Suspend Mode

The options are Enabled and Disabled.

USB Configuration

This section is used to configure USB.

```
              Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
     Advanced

  USB Configuration                                                      Enables Legacy USB
                                                                         support. AUTO option
  USB Devices:                                                           disables legacy support if
        1 Keyboard, 1 mouse, 2 Hubs                                      no USB devices are
                                                                         connected. DISABLE
  Legacy USB Support                  [Enabled]                          option will keep USB
  EHCI Hand-off                       [Disabled]                         devices available only for
                                                                         EFI applications.
  USB hardware delays and time-outs:
  USB transfer time-out               [20 sec]
  Device reset time-out               [20 sec]                           →←:  Select Screen
  Device power-up delay               [Auto]                             ↑↓:    Select Item
                                                                         Enter: Select
                                                                         +/-:   Change Opt.
                                                                         F1:    General Help
                                                                         F2:    Previous Values
                                                                         F3:    Optimized Defaults
                                                                         ESC:  Exit


              Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```
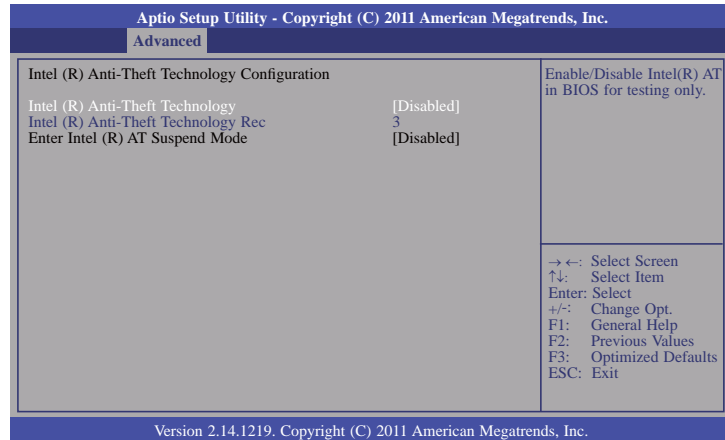
Legacy USB Support

Enabled

Enables legacy USB.

Auto

Disables support for legacy when no USB devices are connected.

Disabled

Keeps USB devices available only for EFI applications.

EHCI Hand-off

This is a workaround for OSes that does not support EHCI hand-off. The EHCI ownership change should be claimed by the EHCI driver.

33

USB transfer time-out

The time-out value for Bulk and Interrupt transfers.

Device reset time-out

Selects the USB mass storage device start unit command timeout.

Device power-up delay

Maximum time the device will take before it properly reports itself to the Host Controller. "Auto" uses default value: for a Root port it is 100 ms, for a Hub port the delay is taken from Hub descriptor.

PCH-FW Configuration

```
         Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
  Advanced

  ME FW Version           8.0.2.1410                       MEBx Type
  ME Firmware Mode        Normal Mode
  ME Firmware Type        Full Sku Firmware
  ME Firmware SKU         1.5MB

  ▶ Firmware Update Configuration

                                                    → ←:  Select Screen
                                                    ↑↓:   Select Item
                                                    Enter: Select
                                                    +/-:   Change Opt.
                                                    F1:    General Help
                                                    F2:    Previous Values
                                                    F3:    Optimized Defaults
                                                    ESC:   Exit

         Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```
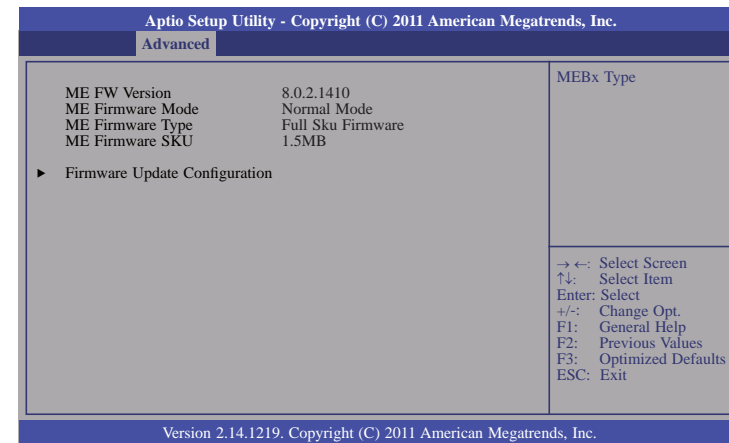
F71879 Super IO Configuration

This section is used to configure the I/O functions supported by the onboard   Super I/O chip.

```
              Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
   Advanced

   F71879 Super IO Configuration                          Restore AC Power Loss
                                                          help.
   F71879 Super IO Chip            Fintek F71879
   Restore AC Power Loss           [Power Off]
   Watchdog Timer                  [Disabled]
     Super IO Watchdog Timer       10
 ▶ Serial Port 1 Configuration
 ▶ Serial Port 2 Configuration

                                                          → ←:  Select Screen
                                                          ↑↓:    Select Item
                                                          Enter: Select
                                                          +/-:   Change Opt.
                                                          F1:    General Help
                                                          F2:    Previous Values
                                                          F3:    Optimized Defaults
                                                          ESC:  Exit

              Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

Restore AC Power Loss

Off

When power returns after an AC power failure, the system's power is off. You must press the Power button to power-on the system.

On

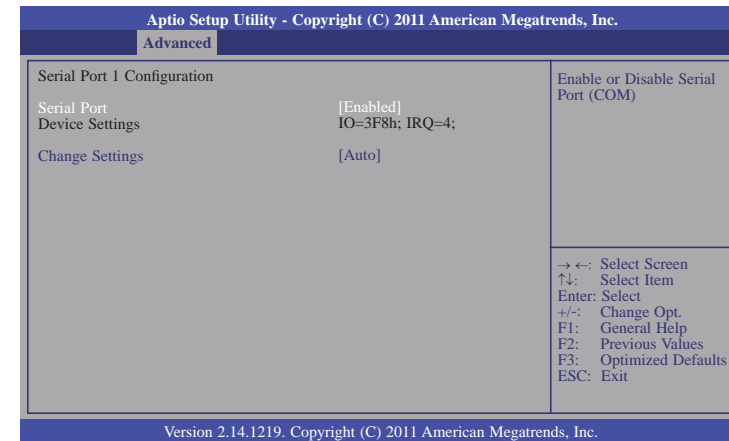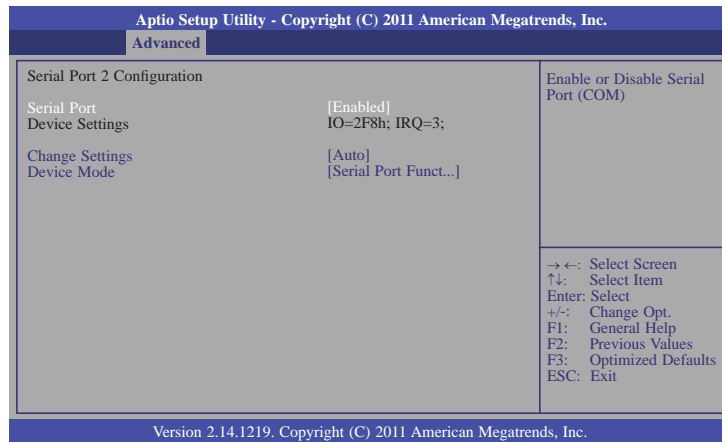When power returns after an AC power failure, the system will automatically power-on.

Last State

When power returns after an AC power failure, the system will return to the state where you left off before power failure occurs. If the system's power is off when AC power failure occurs, it will remain off when power returns. If the system's power is on when AC power failure occurs, the system will power-on when power returns.

Watchdog Timer

Enable or disable Super I/O watchdog timer.

Serial Port 1 Configuration to Serial Port 2 Configuration

```
              Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
   Advanced

   Serial Port 1 Configuration                            Enable or Disable Serial
                                                          Port (COM)
   Serial Port                     [Enabled]
   Device Settings                 IO=3F8h; IRQ=4;

   Change Settings                 [Auto]

                                                          → ←:  Select Screen
                                                          ↑↓:    Select Item
                                                          Enter: Select
                                                          +/-:   Change Opt.
                                                          F1:    General Help
                                                          F2:    Previous Values
                                                          F3:    Optimized Defaults
                                                          ESC:  Exit

              Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

35

```
Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
Advanced

Serial Port 2 Configuration              Enable or Disable Serial
                                         Port (COM)
Serial Port                  [Enabled]
Device Settings              IO=2F8h; IRQ=3;

Change Settings              [Auto]
Device Mode                  [Serial Port Funct...]


                                         → ←:  Select Screen
                                         ↑↓:   Select Item
                                         Enter: Select
                                         +/-:   Change Opt.
                                         F1:    General Help
                                         F2:    Previous Values
                                         F3:    Optimized Defaults
                                         ESC:  Exit

Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

Serial Port

Enables or disables the serial port.

Change Settings

Selects the IO/IRQ setting of the I/O device.

Device Mode

Enable or disable serial port (COM)

Network Stack

```
Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
Advanced

Network Stack                [Disable Link]          Enable or disable UEFI
                                                      network stack.


                                         → ←:  Select Screen
                                         ↑↓:   Select Item
                                         Enter: Select
                                         +/-:   Change Opt.
                                         F1:    General Help
                                         F2:    Previous Values
                                         F3:    Optimized Defaults
                                         ESC:  Exit

Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

36

CPU PPM Configuration

```
              Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
   Advanced

 Sandybridge PPM Configuration                          Enable/Disable Intel
                                                        SpeedStep
   EIST                          [Enabled]
   Turbo Mode                    [Enabled]
   CPU C3 Report                 [Enabled]
   CPU C6 Report                 [Enabled]
   Config Top Lock               [Disabled]
   Long Duration Power Limit     0
   Long Duration Maintained      1
   Short Duration Power Limit    0
   ACPI T State                  [Disabled]

                                                        → ←: Select Screen
                                                        ↑↓:  Select Item
                                                        Enter: Select
                                                        +/-:  Change Opt.
                                                        F1:   General Help
                                                        F2:   Previous Values
                                                        F3:   Optimized Defaults
                                                        ESC:  Exit

              Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

EIST

This field is used to enable or disable the Intel Enhanced SpeedStep Technology.

Turbo Mode

The options are Enabled and Disabled.

CPU C3 Report and CPU C6 Report

Enables or disables CPU C3 (ACPI C2), C6 report to OS.

Config Top Lock

Lock the Config TDP control register.

Long Duration Power Limit

Long duration power limit in Watts, 0 means use factory default.

Long Duration Maintained

Time window which the long duration power is maintained.

Short Duration Power Limit

Short duration power limit in Watts, 0 means use factory default.

ACPI T State

Enable or disable ACPI T state support.

Chipset

Configures relevant chipset functions.

```
              Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
   Main   Advanced   Chipset   Boot   Security   Save & Exit

 ► PCH-IO Configuration                                 PCH Parameters
 ► System Agent (SA) Configuration

                                                        ← →: Select Screen
                                                        ↑↓:  Select Item
                                                        Enter: Select
                                                        +/-:  Change Opt.
                                                        F1:   General Help
                                                        F2:   Previous Values
                                                        F3:   Optimized Defaults
                                                        ESC:  Exit

              Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

37

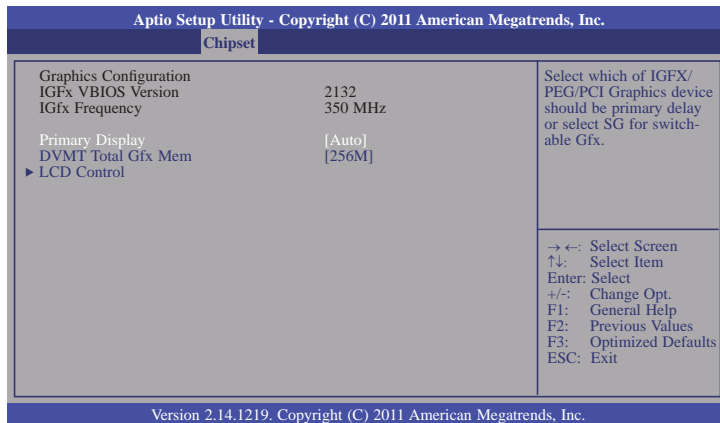## PCH-IO Configuration

```
                Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
                                    Chipset

Intel PCH RC Version              1.1.0.0              PCI Express Coniguration
Intel PCH SKU Name                HM76                 settings.
Intel PCH Rev ID                  04/C1

▶ PCI Express Configuration
▶ USB Configuration
▶ PCH Azalia Configuration

  Wake on LAN                     [Enabled]

  After G3                        [Power on]
                                                       → ←:  Select Screen
                                                       ↑↓:    Select Item
                                                       Enter: Select
                                                       +/-:   Change Opt.
                                                       F1:    General Help
                                                       F2:    Previous Values
                                                       F3:    Optimized Defaults
                                                       ESC:  Exit

                Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

Wake on LAN

Set this field to Enabled to wake up the system via the onboard LAN or via a LAN card that supports the remote wake up function.

After G3

Power Off / WOL

Power-on the system via WOL after G3.

Power On

Power-on the system after G3.

PCI Express Configuration

```
                Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
                                    Chipset

  PCI Express Configuration                            Enable or disable PCI
                                                       Express Clock Gating for
  PCI Express Clock Gating          [Enabled]          each root port.

▶ PCI Express Root Port 1
▶ PCI Express Root Port 2
▶ PCI Express Root Port 3


                                                       → ←:  Select Screen
                                                       ↑↓:    Select Item
                                                       Enter: Select
                                                       +/-:   Change Opt.
                                                       F1:    General Help
                                                       F2:    Previous Values
                                                       F3:    Optimized Defaults
                                                       ESC:  Exit

                Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

PCI Express Clock Gating

Enables or disables PCI Express Clock Gating for each root port.

PCI Express Root Port 1 to PCI Express Root Port 3

Controls the PCI Express Root Port.

38

USB Configuration

```
             Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
                                          Chipset

 USB Configuration                                          Enable or disable XHCI
                                                            pre-boot driver support.
 XHCI Pre-Boot Driver            [Enabled]
 xHCI Mode                       [Auto]
    HS Port #1 Switchable        [Enabled]
    HS Port #2 Switchable        [Enabled]
    HS Port #3 Switchable        [Enabled]
    HS Port #4 Switchable        [Enabled]
    xHCI Streams                 [Enabled]

 EHCI1                           [Enabled]                  → ←:  Select Screen
                                                            ↑↓:   Select Item
 EHCI2                           [Enabled]                  Enter: Select
                                                            +/-:   Change Opt.
                                                            F1:    General Help
                                                            F2:    Previous Values
                                                            F3:    Optimized Defaults
                                                            ESC:  Exit

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```

xHCI Mode

Mode of operation of xHCI controller. Options are Smart Auto, Auto, Enabled, Disabled.

EHCI1 and EHCI2

These fields are used to enable or disable USB 2.0.

PCH Azalia Configuration

```
             Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
                                          Chipset

 PCH Azalia Configuration                                   Control detection of the
                                                            Azalia device.
 Azalia                          [Auto]                     Disable= Azalia will be
    Azalia Internal HDMI Codec   [Enabled]                  unconditionally disabled
                                                            Enabled= Azalia will be
                                                            unconditionally enabled
                                                            Auto=Azalia will be ena-
                                                            bled if present, disabled
                                                            otherwise.

                                                            → ←:  Select Screen
                                                            ↑↓:   Select Item
                                                            Enter: Select
                                                            +/-:   Change Opt.
                                                            F1:    General Help
                                                            F2:    Previous Values
                                                            F3:    Optimized Defaults
                                                            ESC:  Exit

              Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

Azalia internal HDMI codec

Enables or disable the Azalia internal HDMI codec.

39

System Agent (SA) Configuration

```
Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
                                    Chipset

System Agent Bridge Name              IvyBridge          Config Graphics Settings.

 ► Graphics Configuration
 ► NB PCIe Configuration
 ► Memory Configuration




                                                         →←:  Select Screen
                                                         ↑↓:   Select Item
                                                         Enter: Select
                                                         +/-:   Change Opt.
                                                         F1:    General Help
                                                         F2:    Previous Values
                                                         F3:    Optimized Defaults
                                                         ESC:  Exit

         Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

Graphics Configuration

```
Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
                                    Chipset

Graphics Configuration                                   Select which of IGFX/
IGFx VBIOS Version          2132                         PEG/PCI Graphics device
IGfx Frequency              350 MHz                      should be primary delay
                                                         or select SG for switch-
Primary Display             [Auto]                       able Gfx.
DVMT Total Gfx Mem          [256M]
 ► LCD Control



                                                         →←:  Select Screen
                                                         ↑↓:   Select Item
                                                         Enter: Select
                                                         +/-:   Change Opt.
                                                         F1:    General Help
                                                         F2:    Previous Values
                                                         F3:    Optimized Defaults
                                                         ESC:  Exit

         Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

Primary Display

Auto	When the system boots, it will auto detects the display device.
IGFX	When the system boots, it will first initialize the onboard VGA.
PEG	When the system boots, it will first initialize the PCI Express x16 graphics card.

DVMT Total Gfx Mem

This field is used to select the graphics memory size used by DVMT mode.

LCD Control

```
Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
                                    Chipset

LCD Control                                              Select the Video Device
                                                         which will be activated
Primary IGFX Boot Display     [VBIOS Default]            during POST. This has no
LCD Panel Type                [Type 2-800x600]           effect if external graphics
                                                         present.
                                                         Secondary boot display
                                                         selection will appear based
                                                         on your selection.
                                                         VGA modes will be sup-
                                                         ported only on primary
                                                         display.

                                                         →←:  Select Screen
                                                         ↑↓:   Select Item
                                                         Enter: Select
                                                         +/-:   Change Opt.
                                                         F1:    General Help
                                                         F2:    Previous Values
                                                         F3:    Optimized Defaults
                                                         ESC:  Exit

         Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

Primary IGFX Boot Display and Secondary IGFX Boot Display

The options are VBIOS Default, CRT, HDMI, LVDS, DVI-I and DVI-D.

LCD Panel Type

This field is used to select the type of LCD panel used by the internal graphics device.

NB PCIe Configuration

```
Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
                                    Chipset

NB PCIe Configuration                                    Configure PEG0
PEG0                          Not Present                B0:D1:F0 Gen1-Gen3.
PEG0 – Gen X                  [Auto]
Enable PEG                    [Enabled]




                                                         →←:  Select Screen
                                                         ↑↓:   Select Item
                                                         Enter: Select
                                                         +/-:   Change Opt.
                                                         F1:    General Help
                                                         F2:    Previous Values
                                                         F3:    Optimized Defaults
                                                         ESC:  Exit

         Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```
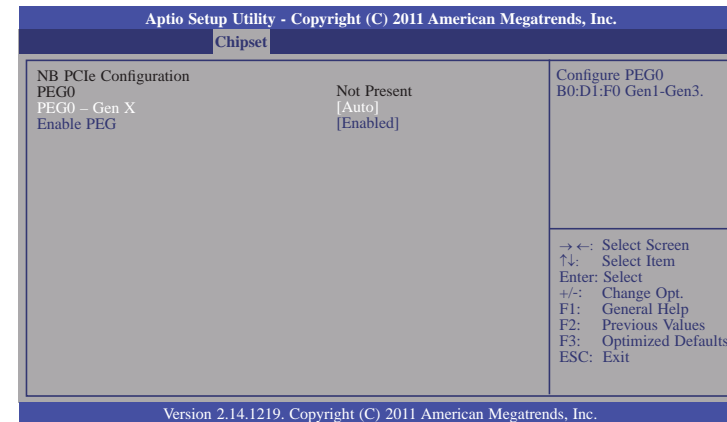
Enabled PEG

To enable or disable the PEG.

Memory Information

```
            Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
                              Chipset

Memory Information                                      DDR3 or DDR3L
                                                        Selection
Memory RC Version                 1.1.0.0
Memory Frequency                  1333 Mhz
Total Memory                      16384 MB (DDR3)
DIMM#2                            8192 MB (DDR3)
DIMM#1                            8192 MB (DDR3)
CAS Latency (tCL)                 9
Minimum delay time
     CAS to RAS (tRCDmin)         9
     Row Precharge (tRPmin)       9               → ←:  Select Screen
     Active to Precharge (tRASmin) 24             ↑↓:   Select Item
DDR Selection                     [DDR3]          Enter: Select
                                                  +/-:   Change Opt.
                                                  F1:    General Help
                                                  F2:    Previous Values
                                                  F3:    Optimized Defaults
                                                  ESC:   Exit

              Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

Boot

```
            Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
  Main    Advanced   Chipset    Boot   Security   Save & Exit

Boot Configuration                                      Number of seconds to
Setup Prompt Timeout              1                     wait for setup activation
Bootup NumLock State              [On]                  key.
                                                        65535(0xFFFF) means
Quiet Boot                        [Disabled]            indefinite waiting.
Fast Boot                         [Disabled]

CSM16 Module Version              07.69

GateA20 Active                    [Upon Request]
Option ROM Messages               [Force BIOS]
Interrupt 19 Capture              [Immediate]           ← →:  Select Screen
                                                        ↑↓:   Select Item
Boot Option Priorities                                  Enter: Select
Boot Option #1                    [SATA SM: ATAPI ...]  +/-:   Change Opt.
Boot Option #2                    [SATA PM: ST316031...] F1:   General Help
                                                        F2:    Previous Values
  CD/ DVD ROM Driver BBS Priorities                     F3:    Optimized Defaults
  Hard Driver BBS Priorities                            ESC:   Exit
▶  CSM Parameters

              Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

Setup Prompt Timeout

Selects the number of seconds to wait for the setup activation key. 65535(0xFFFF) denotes indefinite waiting.

Bootup NumLock State

This allows you to determine the default state of the numeric keypad. By default, the system boots up with NumLock on wherein the function of the numeric keypad is the number keys. When set to Off, the function of the numeric keypad is the arrow keys.

Quiet Boot

Enables or disables the quiet boot function.

Fast Boot

Enables or disables boot with initialization of a minimal set of devices required to launch active boot option. Has no effect for BBS boot options.

GateA20 Active

Upon Request- GA20 can be disabled using BIOS services.

Alwasy- Do not allow disabling GA20; this option is useful when any RT code is executed above 1MB.

Option ROM Messages

Set display mode for option ROM.

Interrupt 19 Capture

When enabled, it allows the optional ROM to trap Int 19.

CSM Parameters

Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.

| Main | Advanced | Chipset | Boot | Security | Save & Exit |

Launch PXE OpROM policy   [Do not launch]
Launch Storage OpROM policy   [Legacy only]

Controls the execution of UEFI and Legacy PXE OpROM.

← →: Select Screen
↑↓:   Select Item
Enter: Select
+/-:   Change Opt.
F1:   General Help
F2:   Previous Values
F3:   Optimized Defaults
ESC: Exit

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Launch Storage OpROM policy

Controls the execution of UEFI and legacy storage OpROM.

Security

```
Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
 Main    Advanced    Chipset    Boot    Security    Save & Exit

 Password Description                            Set Administrator
                                                 Password.
 If ONLY the Administrator's password is set,
 then this only limits access to Setup and is only
 asked for when entering Setup.
 If ONLY the User's password is set, then this
 is a power on password and must be entered to
 boot or enter Setup. In Setup the User will have
 Administrator rights.
 The password length must be
 in the following range:
 Minimum length                    3
 Maximum length                    20         → ←:  Select Screen
                                              ↑↓:   Select Item
 Administrator Password                       Enter: Select
 User Password                                +/-:  Change Opt.
                                              F1:   General Help
                                              F2:   Previous Values
                                              F3:   Optimized Defaults
                                              ESC:  Exit

        Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

Administrator Password

Sets the administrator password.

User Password

Sets the user password.

Save & Exit

```
Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
 Main    Advanced    Chipset    Boot    Security    Save & Exit

 Save Changes and Reset                          Reset the system after
 Discard Changes and Reset                       saving the changes.

 Restore Defaults
 Save as User Defaults
 Restore User Defaults

 Boot Override
 SATA SM: ATAPI   iHAS324   B
 SATA PM: ST3160316AS

 Launch EFI Shell from filesystem device         ← →:  Select Screen
                                                 ↑↓:   Select Item
                                                 Enter: Select
                                                 +/-:  Change Opt.
                                                 F1:   General Help
                                                 F2:   Previous Values
                                                 F3:   Optimized Defaults
                                                 ESC:  Exit

        Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

Save Changes and Reset

To save the changes, select this field and then press <Enter>. A dialog box will appear. Select Yes to reset the system after saving all changes made.

Discard Changes and Reset

To discard the changes, select this field and then press <Enter>. A dialog box will appear. Select Yes to reset the system setup without saving any changes.

Restore Defaults

To restore and load the optimized default values, select this field and then press <Enter>. A dialog box will appear. Select Yes to restore the default values of all the setup options.

Save as User Defaults

To save changes done so far as user default, select this field and then press <Enter>. A dialog box will appear. Select Yes to save values as user default.

Restore User Defaults

To restore user default to all the setup options, select this field and then press <Enter>. A dialog box will appear. Select Yes to restore user default.

Updating the BIOS

To update the BIOS, you will need the new BIOS file and a flash utility, AFUDOS. EXE. Please contact technical support or your sales representative for the files.

To execute the utility, type:

A:> AFUDOS BIOS_File_Name /b /p /n

then press <Enter>.

```
C:\AFU\AFUDOS>afudos filename /B /P /N

 +----------------------------------------------------------------------+
 |                AMI Firmware Update Utility(APTIO) v2.25               |
 |        Copyright (C)2008 American Megatrends Inc. All Rights Reserved.|
 +----------------------------------------------------------------------+

    Reading file ..............    done
    Erasing flash .............    done
    Writing flash .............    done
    Verifying flash ...........    done
    Erasing BootBlock .....       done
    Writing BootBlock ....        done
    Verifying BootBlock .....     done

C:\AFU\AFUDOS>
```

Notice: BIOS SPI ROM

1. The Intel® Management Engine has already been integrated into this system board. Due to the safety concerns, the BIOS (SPI ROM) chip cannot be removed from this system board and used on another system board of the same model.

2. The BIOS (SPI ROM) on this system board must be the original equipment from the factory and cannot be used to replace one which has been utilized on other system boards.

3. If you do not follow the methods above, the Intel® Management Engine will not be updated and will cease to be effective.

Note:
a. You can take advantage of flash tools to update the default configuration of the BIOS (SPI ROM) to the latest version anytime.
b. When the BIOS IC needs to be replaced, you have to populate it properly onto the system board after the EEPROM programmer has been burned and follow the technical person's instructions to confirm that the MAC address should be burned or not.

44

Chapter 4 - Supported Software

Install drivers, utilities and software applications that are required to facilitate and enhance the performance of the system board. You may acquire the software from your sales representatives, from an optional DVD included in the shipment, or from the website download page at https://www.dfi.com/DownloadCenter.
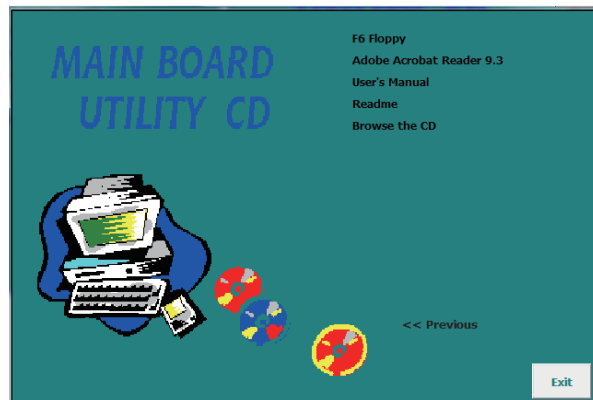
Auto Run Pages (for Windows 7)
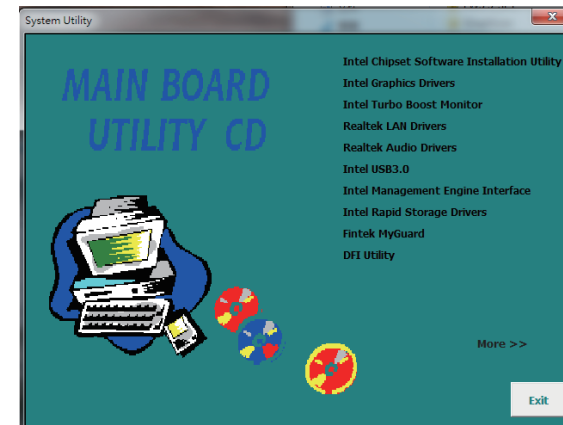
> **Note:**
>
> This step can be ignored if the applications are standalone files.

45

Microsoft .NET Framework 3.5 (SP1)

(for Windows XP only)

Note:
Before installing Microsoft .NET Framework 3.5, make sure you have updated your Windows XP operating system to Service Pack 3.

To install the driver, click "Microsoft .NET Framework 3.5" on the main menu.

1. Read the license agreement carefully.

   Click "I have read and accept the terms of the License Agreement" then click Install.
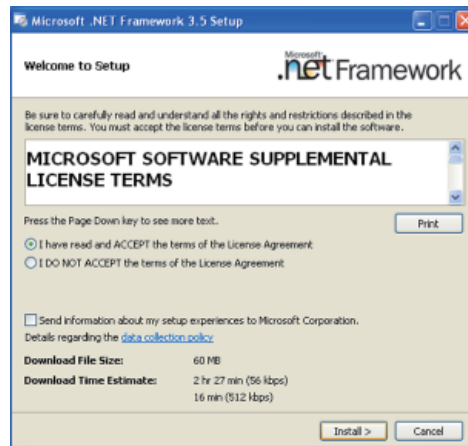
2. Setup is now installing the driver.
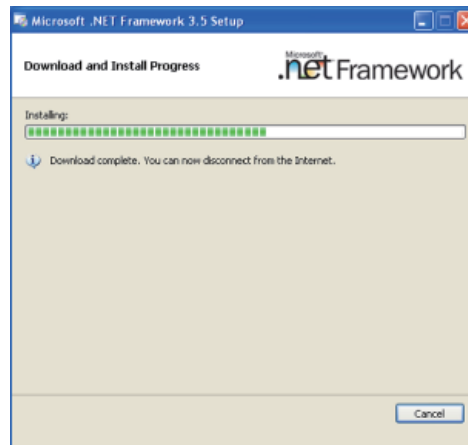
3. Click Exit.
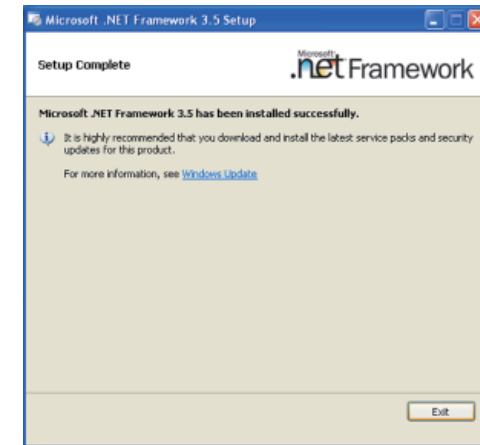
Intel Chipset Software Installation Utility

The Intel Chipset Software Installation Utility is used for updating Windows® INF files so that the Intel chipset can be recognized and configured properly in the system.

To install the utility, click "Intel Chipset Software Installation Utility" on the main menu.

1. Setup is ready to install the utility. Click Next.

2. Read the license agreement then click Yes.

3. Go through the readme document for more installation tips then click Next.

4. Click Finish to exit setup.

47

Intel Graphics Drivers

To install the driver, click "Intel Graphics Drivers" on the main menu.

1. Setup is now ready to install the graphics driver. Click Next.
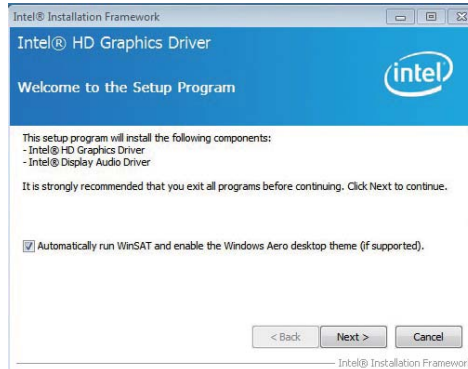
By default, the "Automatically run WinSAT and enable the Windows Aero desktop theme" is enabled. With this enabled, after installing the graphics driver and the system rebooted, the screen will turn blank for 1 to 2 minutes (while WinSAT is running) before the Windows Vista desktop appears. The "blank screen" period is the time Windows is testing the graphics performance.

2. Read the license agreement then click Yes.
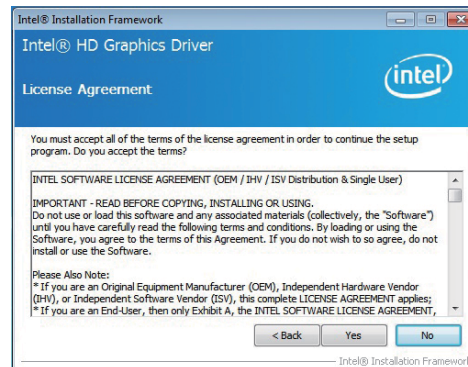
3. Go through the readme document for system requirements and installation tips then click Next.
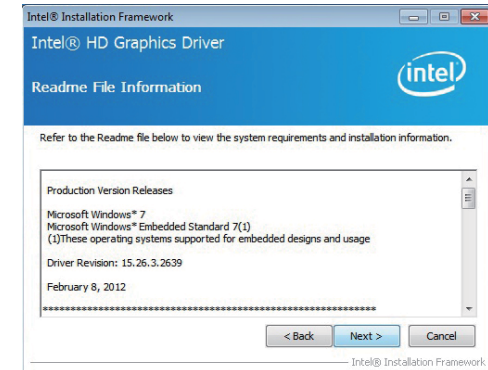
4. Setup is now installing the driver. Click Next to continue.
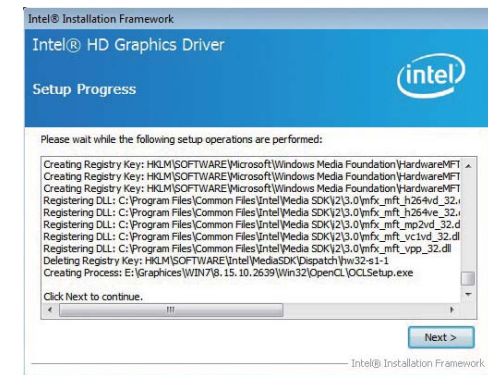
5. Click "Yes, I want to restart this computer now" then click Finish.

   Restarting the system will allow the new software installation to take effect.

48

Intel Turbo Boost Monitor (for Windows 7)

To install the driver, click "Intel Turbo Boost Monitor" on the main menu.

1. Setup is now ready to install the utility. Click Next.
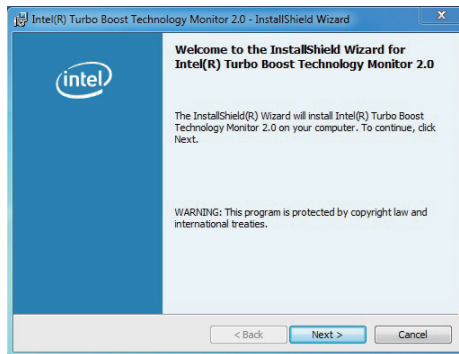
2. Read the license agreement and then click "I accept the terms in the license agreement". Click Next.
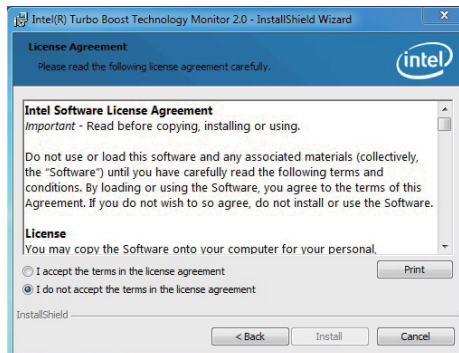
3. The setup program is currently installing the software.
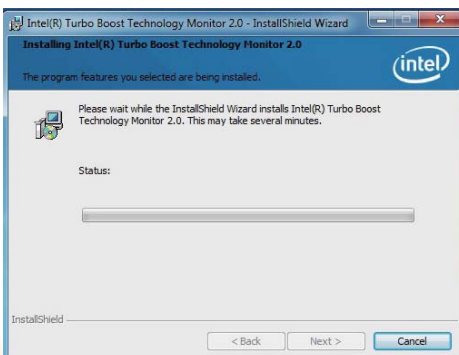
4. Click Finish.
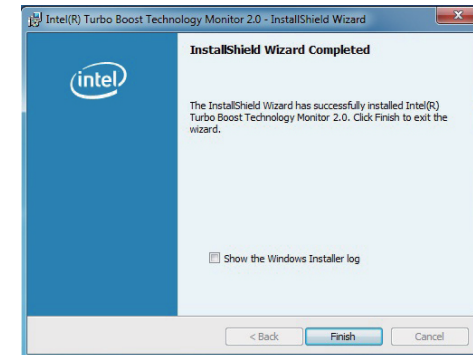
Realtek LAN Drivers

To install the driver, click "Realtek LAN Drivers" on the main menu.

1. Setup is ready to install the driver. Click Next.
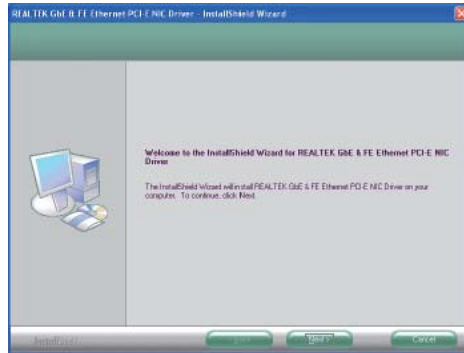
2. Click Install to begin the installation.
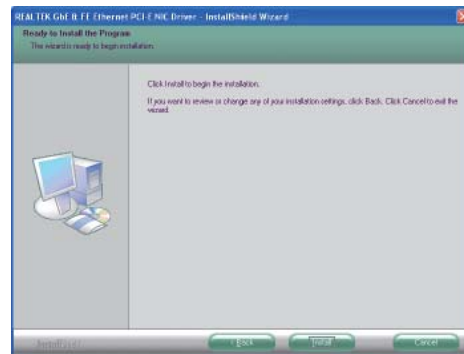
3. After completing installation, click Finish.
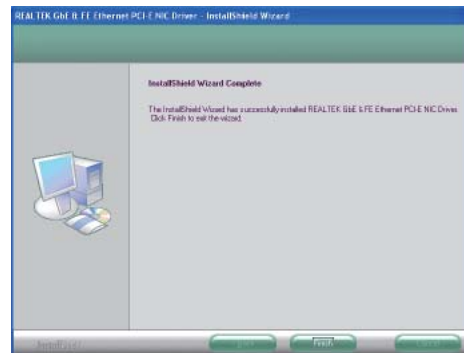
Audio Drivers

To install the driver, click "Audio Drivers" on the main menu.

1. Setup is ready to install the driver. Click Next.
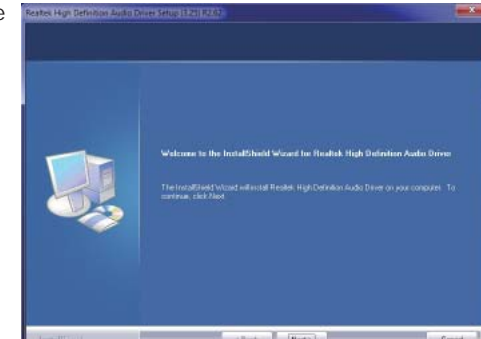
2. Click "Yes, I want to restart my computer now" then click Finish.

   Restarting the system will allow the new software installation to take effect.

50
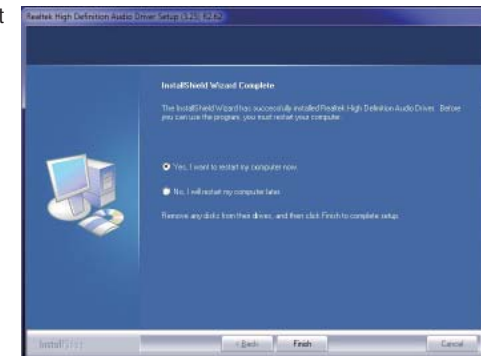
Intel USB 3.0 (for Windows 7)

To install the driver, click "Intel USB 3.0" on the main menu.

1. Setup is ready to install the graphics driver. Click Next.
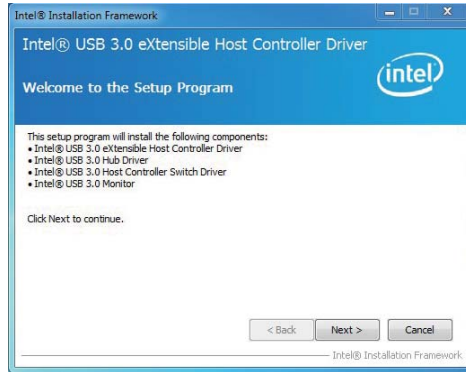
2. Read the license agreement then click Yes.
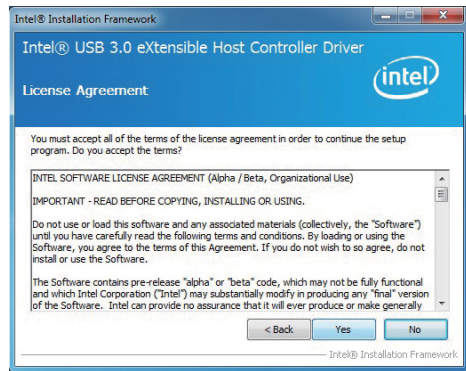
3. Go through the readme document for more installation tips then click Next.
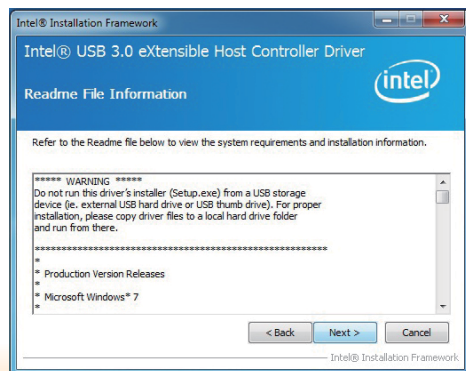
4. Setup is currently installing the driver. After installation has completed, click Next.

5. After completing installation, click Finish.

51
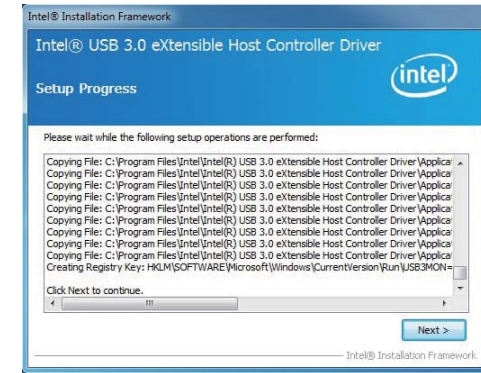
Intel Management Engine Drivers

To install the driver, click "Intel Management Engine Drivers" on the main menu.

1. Setup is ready to install the driver. Click Next.

2. Read the license agreement then click Yes.
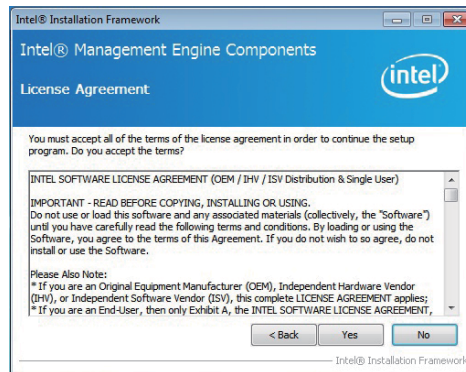
3. Setup is currently installing the driver. After installation has completed, click Next.
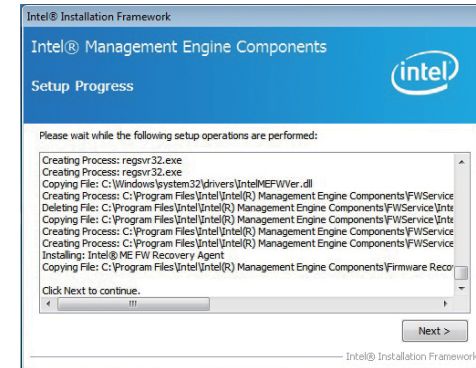
4. After completing installation, click Finish.
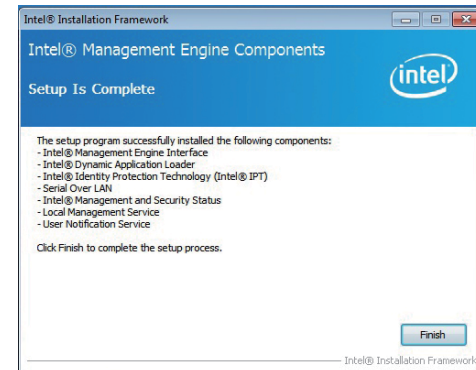
Intel Rapid Storage Drivers

To install the driver, click "Intel Rapid Storage Drivers" on the main menu.

1. Setup is ready to install the driver. Click Next.

2. Read the license agreement then click Yes.
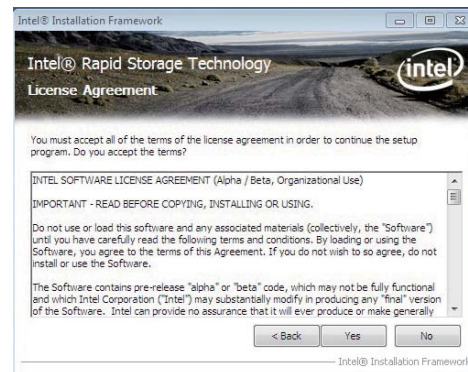
3. Go through the readme document for more installation tips then click Next.
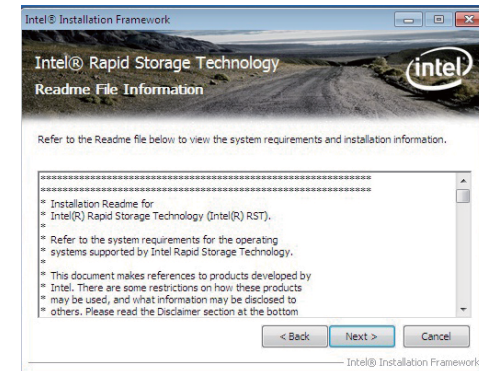
4. Setup is currently installing the driver. After installation has completed, click Next.

5. Click "Yes, I want to restart this computer now." then click Finish.

   Restarting the system will allow the new software installlation to take effect.

53
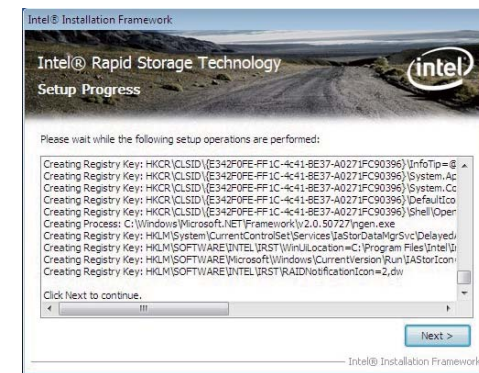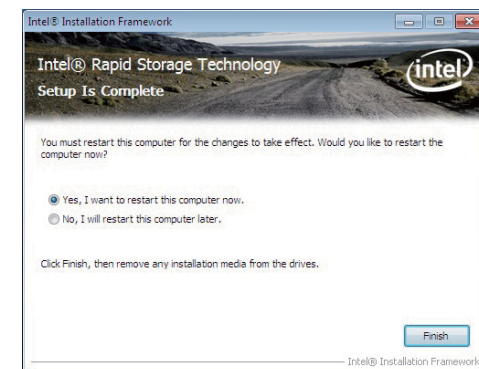
Fintek MyGuard

Fintek HWMonitor Manager provides information about the Temperature, Fan, Voltage, and Others information. To access the utility, click "Fintek HWMonitor Manager" on the main menu.

1. Under the Language Support section, select the language you would like the installation to display and then click Next.
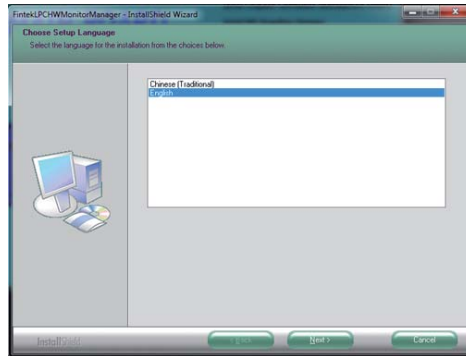
2. Setup is ready to install the driver. Click Next.
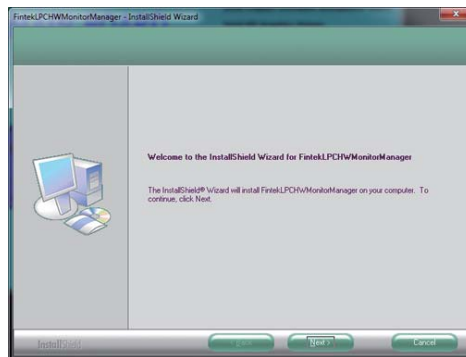
3. Click "Install" to begin the installation.
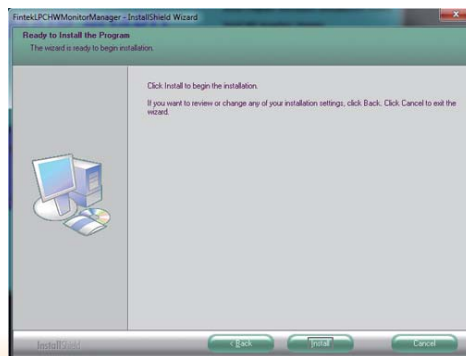
4. After completing installation, click Finish.
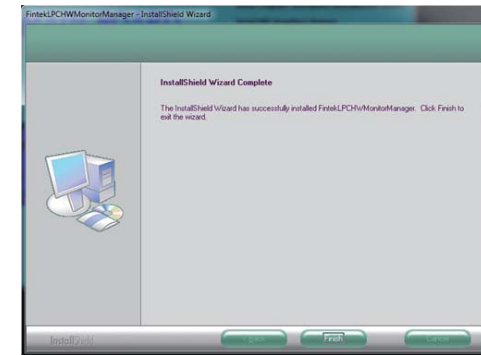
To run the Fintek Hardware Monitor utility, click the Start button and then select FitHwMonitor > FintekLPCHWMonitorManager > Fintek_LPC_HW_MonitorManager.

54

DFI Utility

DFI Utility provides information about the board, Watchdog, DIO, and Backlight.
To access the utility, click "DFI Utility" on the main menu.

> **Note:**
> If you are using Windows 7, you need to access the operating system as an administrator to be able to install the utility.

1. Setup is ready to instal the DFI Utility driver Click "Next".
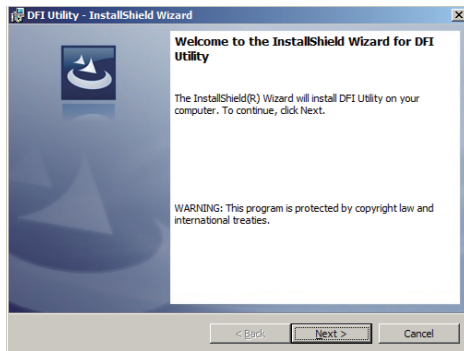
2. Click "I accept the terms in the license agreement" then click "Next".
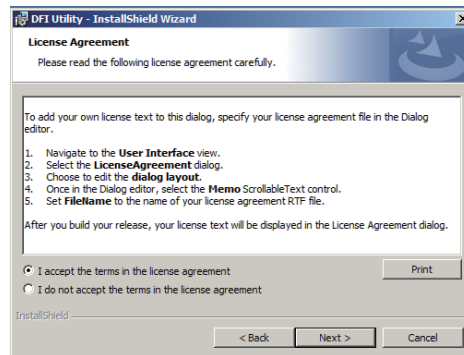
3. Enter "User name" and "Organization" information then click "Next".
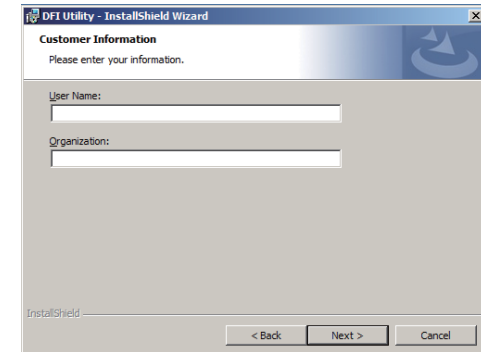
4. Click "Install" to begin the installation.

5. After completing installa tion, click "Finish".

55
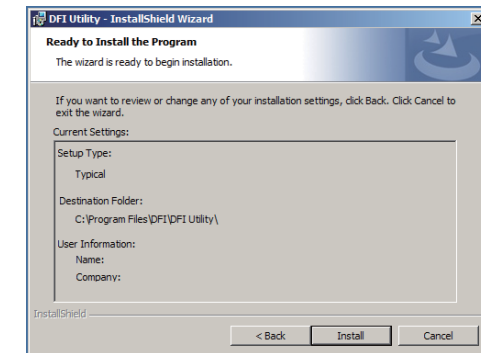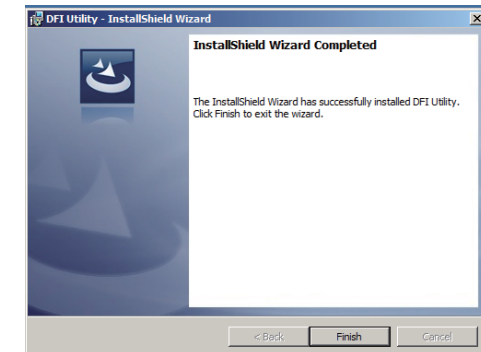
The DFI Utility icon will appear on the desktop. Double-click the icon to open the utility.
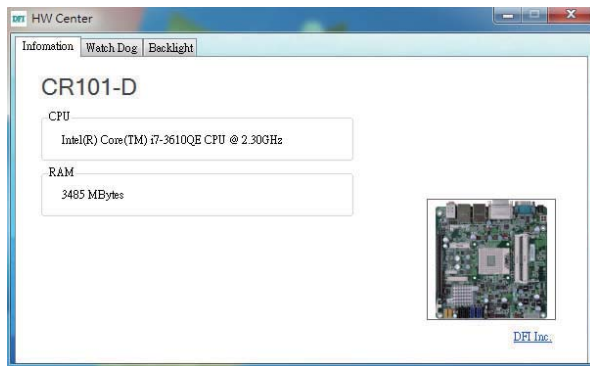
Microsoft DirectX 9.0C (for Windows XP only)

To install the driver, click "Microsoft DirectX 9.0C" on the main menu.

1. Click "**I** accept the agree-ment" then click Next.
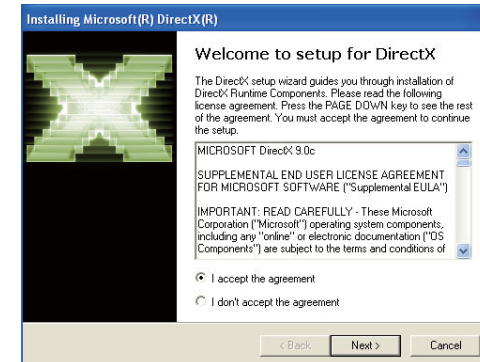
2. To start installation, click Next.
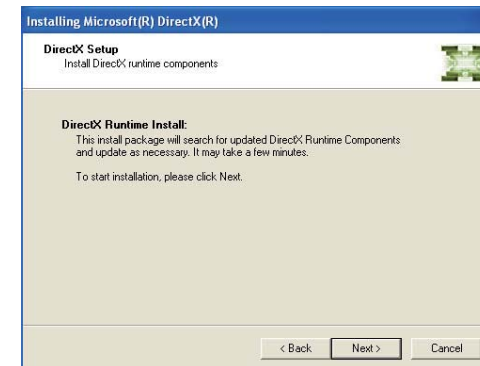
3. Click Finish. Reboot the system for DirectX to take effect.

56
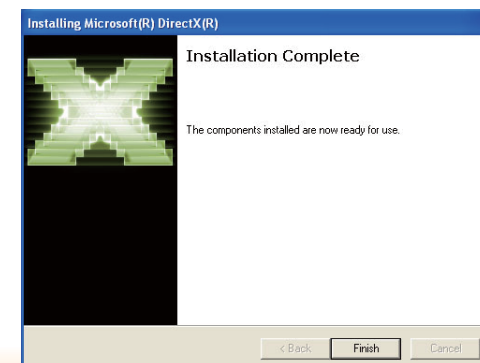
F6 Floppy

This is used to create a floppy driver diskette needed when you install Windows® XP using the F6 installation method. This will allow you to install the operating system onto a hard drive when in AHCI mode.

1. Insert a blank floppy diskette.

2. Locate for the drivers in the CD then copy them to the floppy diskette. The CD includes drivers for both 32-bit and 64-bit operating systems. The path to the drivers are shown below.

    32-bit
    CD Drive:\AHCI_RAID\F6FLOPPY\f6flpy32

    64-bit
    CD Drive:\AHCI_RAID\F6FLOPPY\f6flpy64

Adobe Acrobat Reader 9.3

To install the reader, click "Adobe Acrobat Reader 9.3" on the main menu.

1. Click Next to install or click Change Destination Folder to select another folder.
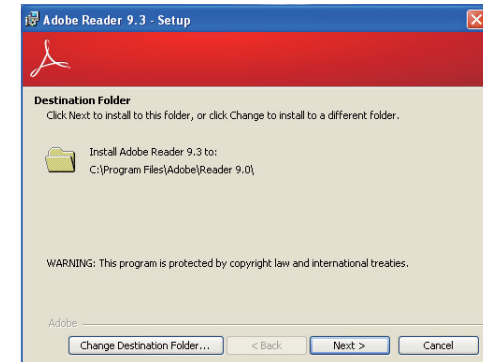
2. Click Install to begin installation.
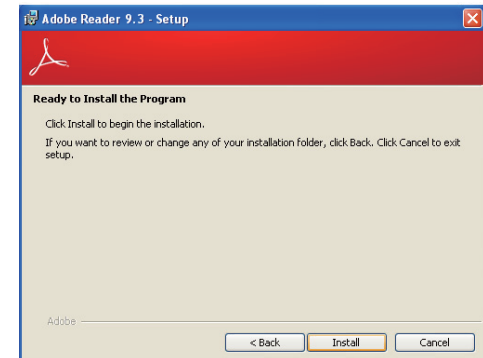
3. Click Finish to exit installation.

57
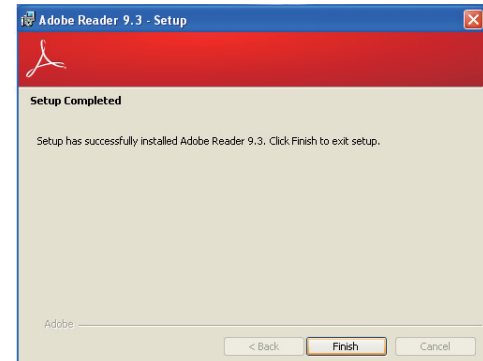
Appendix A - NLITE and AHCI Installation Guide

nLite

nLite is an application program that allows you to customize your XP installation disc by integrating the RAID/AHCI drivers into the disc. By using nLite, the F6 function key usually required during installation is no longer needed.

> **Note:**
> The installation steps below are based on nLite version 1.4.9. Installation procedures may slightly vary if you're using another version of the program.

1. Download the program from nLite's offical website.

   http://www.nliteos.com/download.html

2. Install nLite.

> **Important:**
> Due to it's coding with Visual.Net, you may need to first install .NET Framework prior to installing nLite.

3. Download relevant RAID/AHCI driver files from Intel's website. The drivers you choose will depend on the operating system and chipset used by your computer.

   The downloaded driver files should include iaahci.cat, iaAHCI.inf, iastor.cat, iaStor.inf, IaStor.sys, license.txt and TXTSETUP.OEM.
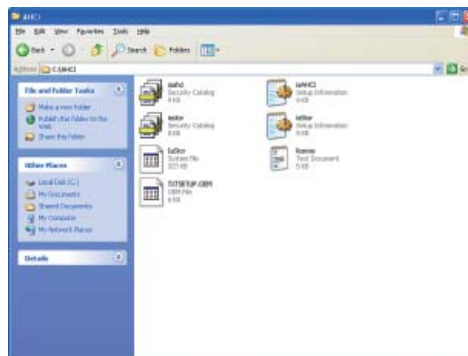
4. Insert the XP installation disc into an optical drive.

5. Launch nLite. The Welcome screen will appear. Click **Next**.
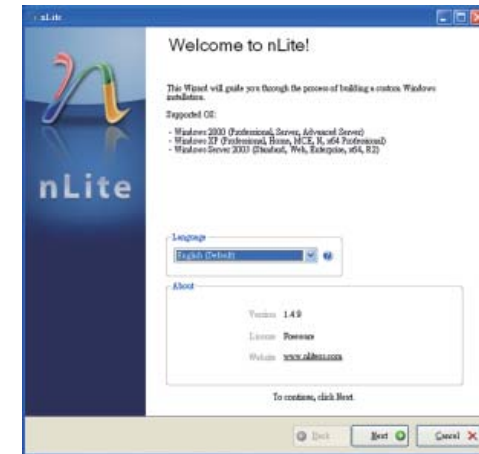
6. Click **Next** to temporarily save the Windows installation files to the designated default folder.

   If you want to save them in another folder, click **Browse**, select the folder and then click **Next**.

58
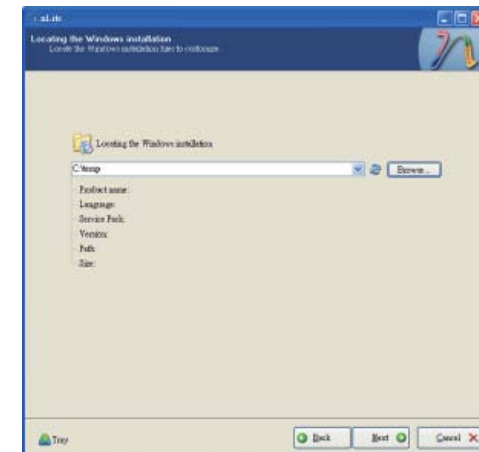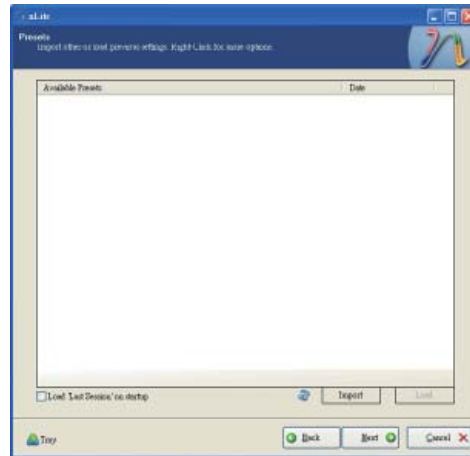
7. Click **Next**.

8. In the Task Selection dialog box, click **Drivers** and **Bootable ISO**. Click **Next**.

9. Click **Insert** and then select **Multiple driver folder** to select the drivers you will integrate. Click **Next**.
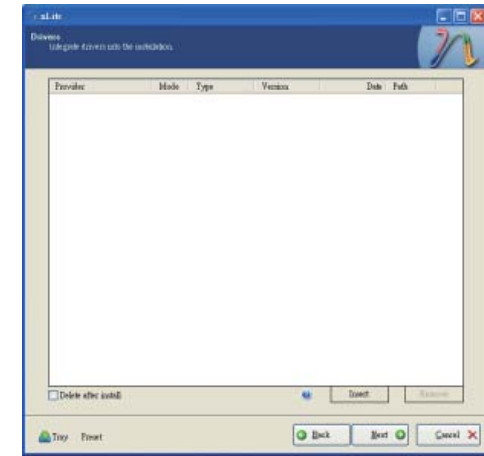
10. Select only the drivers appropriate for the Windows version that you are using and then click **OK**.

Integrating 64-bit drivers into 32-bit Windows or vice versa will cause file load errors and failed installation.

11. If you are uncertain of the southbridge chip used on your motherboard, select all RAID/AHCI controllers and then click **OK**.

12. Click **Next**.

13. The program is currently integrating the drivers and applying changes to the installation.

14. When the program is finished applying the changes, click **Next**.

60
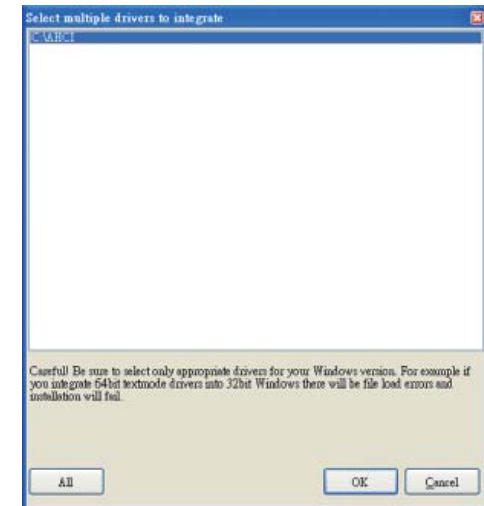
15. To create an image, select the **Create Image** mode under the General section and then click **Next**.
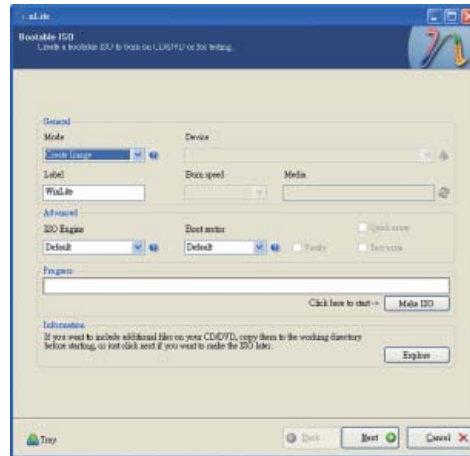
16. Or you can choose to burn it directly to a disc by selecting the **Direct Burn** mode under the General section.

    Select the optical device and all other necessary settings and then click **Next**.
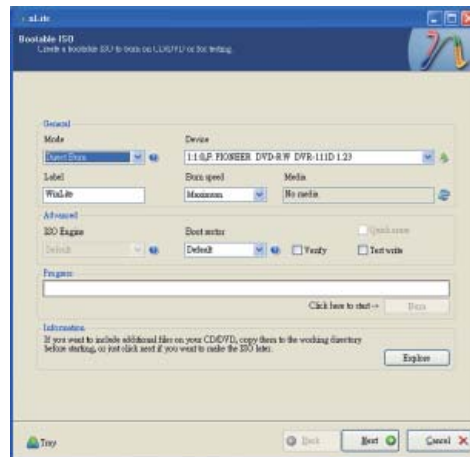
17. You have finished customizing the Windows XP installation disc. Click **Finish**.

    Enter the BIOS utility to configure the SATA controller to RAID/AHCI. You can now install Windows XP.

61
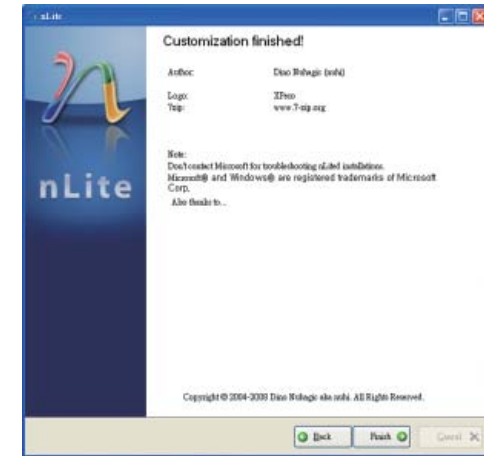
AHCI

The installation steps below will guide you in configuring your SATA drive to AHCI mode.

1. Enter the BIOS utility and configure the SATA controller to IDE mode.

2. Install Windows XP but do not press F6.

3. Download relevant RAID/AHCI driver files supported by the motherboard chipset from Intel's website.

   Transfer the downloaded driver files to C:\AHCI.
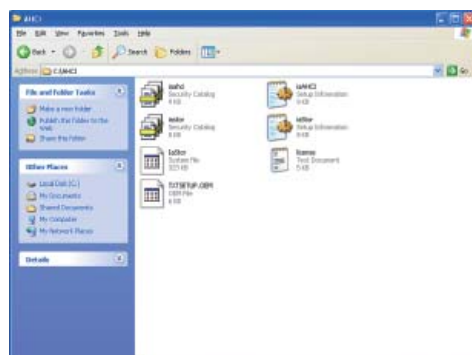
4. Open Device Manager and right click on one of the Intel Serial ATA Storage Controllers, then select **Update Driver**.

   If the controller you selected did not work, try selecting another one.
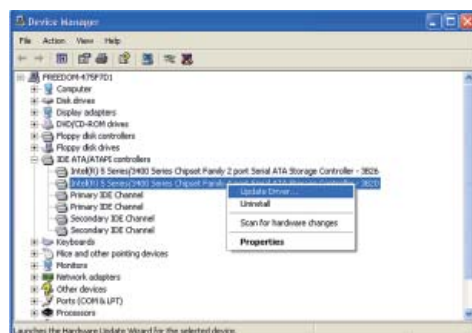
5. In the Hardware Update Wizard dialog box, select **"No, not this time"** then click **Next**.

6. Select **"Install from a list or specific location (Advanced)"** and then click **Next**.
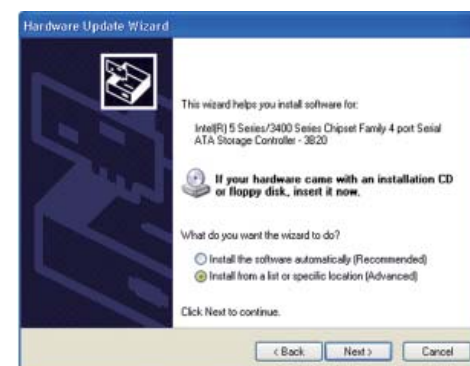
7. Select **"Don't search. I will choose the driver to install"** and then click **Next**.

62
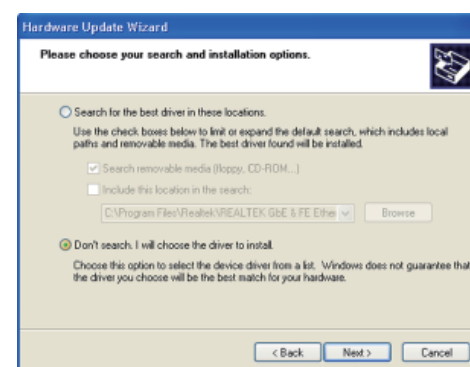
8. Click **"Have Disk"**.
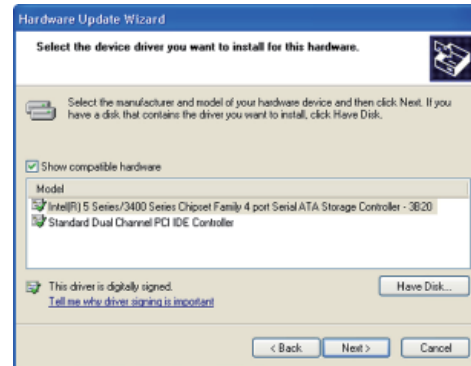
9. Select C:\AHCI\iaAHCI.inf and then click **Open**.
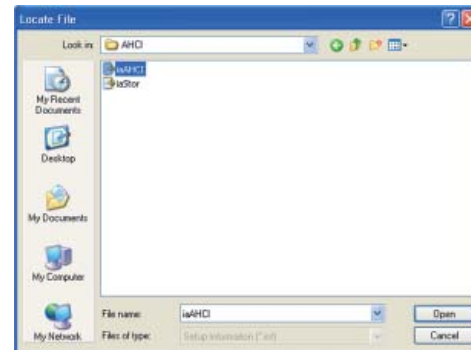
10. Select the appropriate AHCI Controller of your hardware device and then click **Next**.
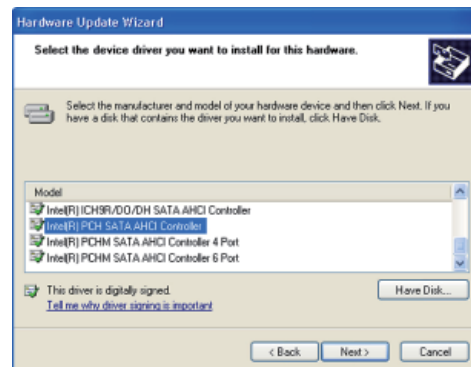
11. A warning message appeared because the selected SATA controller did not match your hardware device.
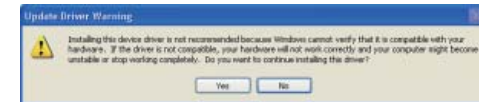
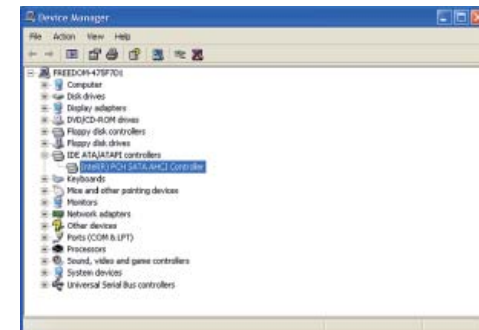   Ignore the warning and click **Yes** to proceed.

12. Click **Finish**.
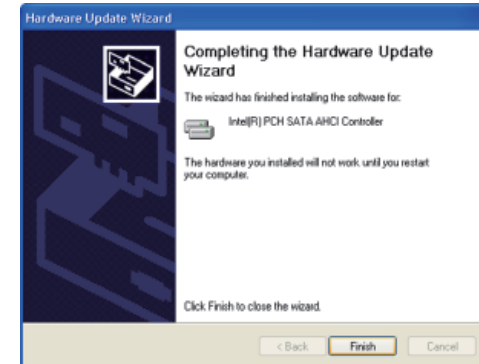
13. The system's settings have been changed. Windows XP requires that you restart the computer. Click **Yes**.

14. Enter the BIOS utility and modify the SATA controller from IDE to AHCI. By doing so, Windows will work normally with the SATA controller that is in AHCI mode.

63

Appendix B - Watchdog Sample Code

```
;Software programming example:

;-------------------------------------------
;(1) Enter Super IO Configuration mode
;-------------------------------------------
MOV         DX,2EH
MOV         AL,87H
OUT         DX,AL
OUT         DX,AL


;------------------------------------------------------------------------------------
;(2) Configuration Logical Device 7, register CRF5/CRF6 (WDT Control /WDT
timer)
;------------------------------------------------------------------------------------
MOV         DX,2EH
MOV         AL,07H              ;Ready to Program Logical Device
OUT         DX,AL

MOV         DX,2FH
MOV         AL,07H              ;Select Logical Device 7
OUT         DX,AL

MOV         DX,2EH
MOV         AL, F6H             ;Select watchdog timer register
OUT         DX,AL

MOV         DX,2FH
MOV         AL,10H              ;Set watchdog timer value
OUT         DX,AL

MOV         DX,2EH
MOV         AL, F5H             ;Select watchdog Control Register
OUT         DX,AL

MOV         DX,2FH
MOV         AL,61H              ;Set Watchdog Control Value
OUT         DX,AL

;-----------------------------------------------------------
;(1) Exit extended function mode
;-----------------------------------------------------------
MOV         DX,2EH
MOV         AL,AAH
OUT         DX,AL
```

Appendix C - System Error Message

When the BIOS encounters an error that requires the user to correct something, either a beep code will sound or a message will be displayed in a box in the middle of the screen and the message, PRESS F1 TO CONTINUE, CTRL-ALT-ESC or DEL TO ENTER SETUP, will be shown in the information box at the bottom. Enter Setup to correct the error.

Error Messages

One or more of the following messages may be displayed if the BIOS detects an error during the POST. This list indicates the error messages for all Awards BIOSes:

CMOS BATTERY HAS FAILED

The CMOS battery is no longer functional. It should be replaced.

> **Important:**
> Danger of explosion if battery incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the battery manufacturer's instructions.

CMOS CHECKSUM ERROR

Checksum of CMOS is incorrect. This can indicate that CMOS has become corrupt. This error may have been caused by a weak battery. Check the battery and replace if necessary.

DISPLAY SWITCH IS SET INCORRECTLY

The display switch on the motherboard can be set to either monochrome or color. This indicates the switch is set to a different setting than indicated in Setup. Determine which setting is correct, either turn off the system and change the jumper or enter Setup and change the VIDEO selection.

FLOPPY DISK(S) fail (80)

Unable to reset floppy subsystem.

FLOPPY DISK(S) fail (40)

Floppy type mismatch.

Hard Disk(s) fail (80)

HDD reset failed.

Hard Disk(s) fail (40)

HDD controller diagnostics failed.

Hard Disk(s) fail (20)

HDD initialization error.

Hard Disk(s) fail (10)

Unable to recalibrate fixed disk.

Hard Disk(s) fail (08)

Sector Verify failed.

Keyboard is locked out - Unlock the key

The BIOS detects that the keyboard is locked. Keyboard controller is pulled low.

Keyboard error or no keyboard present

Cannot initialize the keyboard. Make sure the keyboard is attached correctly and no keys are being pressed during the boot.

Manufacturing POST loop

System will repeat POST procedure infinitely while the keyboard controller is pull low. This is also used for the M/B burn in test at the factory.

BIOS ROM checksum error - System halted

The checksum of ROM address F0000H-FFFFFH is bad.

Memory test fail

The BIOS reports memory test fail if the memory has error(s).

Appendix D - Troubleshooting Checklist

Troubleshooting Checklist

This chapter of the manual is designed to help you with problems that you may encounter with your personal computer. To efficiently troubleshoot your system, treat each problem individually. This is to ensure an accurate diagnosis of the problem in case a problem has multiple causes.

Some of the most common things to check when you encounter problems while using your system are listed below.

1. The power switch of each peripheral device is turned on.

2. All cables and power cords are tightly connected.

3. The electrical outlet to which your peripheral devices are connected is working. Test the outlet by plugging in a lamp or other electrical device.

4. The monitor is turned on.

5. The display's brightness and contrast controls are adjusted properly.

6. All add-in boards in the expansion slots are seated securely.

7. Any add-in board you have installed is designed for your system and is set up correctly.

Monitor/Display

If the display screen remains dark after the system is turned on:

1. Make sure that the monitor's power switch is on.

2. Check that one end of the monitor's power cord is properly attached to the monitor and the other end is plugged into a working AC outlet. If necessary, try another outlet.

3. Check that the video input cable is properly attached to the monitor and the system's display adapter.

4. Adjust the brightness of the display by turning the monitor's brightness control knob.

The picture seems to be constantly moving.

1. The monitor has lost its vertical sync. Adjust the monitor's vertical sync.

2. Move away any objects, such as another monitor or fan, that may be creating a magnetic field around the display.

3. Make sure your video card's output frequencies are supported by this monitor.

The screen seems to be constantly wavering.

1. If the monitor is close to another monitor, the adjacent monitor may need to be turned off. Fluorescent lights adjacent to the monitor may also cause screen wavering.

Power Supply

When the computer is turned on, nothing happens.

1. Check that one end of the AC power cord is plugged into a live outlet and the other end properly plugged into the back of the system.

2. Make sure that the voltage selection switch on the back panel is set for the correct type of voltage you are using.

3. The power cord may have a "short" or "open". Inspect the cord and install a new one if necessary.

Floppy Drive

The computer cannot access the floppy drive.

1. The floppy diskette may not be formatted. Format the diskette and try again.

2. The diskette may be write-protected. Use a diskette that is not write-protected.

3. You may be writing to the wrong drive. Check the path statement to make sure you are writing to the targeted drive.

4. There is not enough space left on the diskette. Use another diskette with adequate storage space.

Hard Drive

Hard disk failure.

1. Make sure the correct drive type for the hard disk drive has been entered in the BIOS.

2. If the system is configured with two hard drives, make sure the bootable (first) hard drive is configured as Master and the second hard drive is configured as Slave. The master hard drive must have an active/bootable partition.

Excessively long formatting period.

If your hard drive takes an excessively long period of time to format, it is likely a cable connection problem. However, if your hard drive has a large capacity, it will take a longer time to format.

Serial Port

The serial device (modem, printer) doesn't output anything or is outputting garbled

characters.

1. Make sure that the serial device's power is turned on and that the device is on-line.

2. Verify that the device is plugged into the correct serial port on the rear of the computer.

3. Verify that the attached serial device works by attaching it to a serial port that is working and configured correctly. If the serial device does not work, either the cable or the serial device has a problem. If the serial device works, the problem may be due to the onboard I/O or the address setting.

4. Make sure the COM settings and I/O address are configured correctly.

Keyboard

Nothing happens when a key on the keyboard was pressed.

1. Make sure the keyboard is properly connected.

2. Make sure there are no objects resting on the keyboard and that no keys are pressed during the booting process.

System Board

1. Make sure the add-in card is seated securely in the expansion slot. If the add-in card is loose, power off the system, re-install the card and power up the system.

2. Check the jumper settings to ensure that the jumpers are properly set.

3. Verify that all memory modules are seated securely into the memory sockets.

4. Make sure the memory modules are in the correct locations.

5. If the board fails to function, place the board on a flat surface and seat all socketed components. Gently press each component into the socket.

6. If you made changes to the BIOS settings, re-enter setup and load the BIOS defaults.