DFI®

BE170/BE171/BE173

Mini-ITX Industrial Motherboard
User's Manual

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Trademarks

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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 BE170/BE171/BE173 motherboard
- One Serial ATA data cable - BE170
- One Serial ATA data with power cable - BE171/BE173
- One I/O Shield
- One QR (Quick Reference)
- One Cooler

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

- USB port cable
- COM port cable
- Serial ATA data cable - BE170
- Serial ATA data with power cable - BE171/BE173
- I/O Shield
- Power adapter (100W, 12V) - BE171
- Power adapter (120W, 19V) - BE173

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.

- 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	• 2nd Generation AMD® Embedded R-Series APU FP3 BGA
	  AMD® RX-427BB, Quad Core, 4M Cache, 2.7GHz (3.6GHz), 35W
	  AMD® RX-225FB, Dual Core, 1M Cache, 2.2GHz (3.0GHz), 17W
	  (The following specifications will be available upon request. Please contact
	  your sales representative for more information.)
	  425B: AMD® RX-425BB, Quad Core, 4M Cache, 2.5GHz (3.4GHz), 35W
	• 28nm process technology

Chipset	• AMD® A77E Fusion Controller Hub
Super I/O Address	• NCT6106/4Eh
System Memory	• Two 204-pin SODIMM sockets • Supports DDR3/DDR3L 1600/1866/2133MHz • Supports up to 16GB system memory • Supports dual channel memory interface • DRAM device technologies: 1Gb, 2Gb and 4Gb DDR3 DRAM technologies are supported for x8 and x16 devices, unbuffered, non-ECC

Expansion Interfaces	• 1 PCIe x16/x8 Gen 3 slot (PCIe 3.0)
	  - 1 x16 signal (Gen 3) (Quad Core APU)
	  - 1 x8 signal (Gen 3) (Dual Core APU)
	• 1 Mini PCIe slot
	  - Supports USB and PCIe signals
	  - Supports mSATA
	  - Supports half size and/or full size Mini PCIe card

Graphics	• AMD Radeon™ HD 9000 Series Graphics • Display ports: 4 DP (supports DP++) • DP: resolution up to 3840x2160 @ 30Hz • Supports hardware acceleration for DirectX 11.1, OCL 1.2, OGL 4.1/4.1+, H.264, VC-1, MPEG-4, MPEG-2 and WMV
Audio	• Realtek ALC888 7.1-channel High Definition Audio • S/PDIF audio interface
LAN	• 1 Intel® I210 PCI Express Gigabit Ethernet controller • 1 Realtek RTL8111EP Ethernet controller - supports DASH for remote management • Integrated 10/100/1000 transceiver • Fully compliant with IEEE 802.3, IEEE 802.3u, IEEE 802.3ab
Serial ATA	• 4 SATA 3.0 ports with data transfer rate up to 6Gb/s - SATA port 0 provides adequate space for SATA DOM • Integrated Advanced Host Controller Interface (AHCI) controller
Trusted Platform Module - TPM* (optional)	• Provides a Trusted PC for secure transactions • Provides software license protection, enforcement and password protection
Rear Panel I/O Ports	• 1 12V (BE171) or 19~24V (BE173) DC-in jack or 4-pin power connector* (optional) • 4 DP ports • 2 RJ45 LAN ports • 4 USB 3.0 ports • Mic-in, Line-in and Line-out jacks

I/O Connectors	• 2 connectors for 4 external USB 2.0/1.1 ports
	• 1 vertical USB 2.0/1.1 port
	• 4 connectors for 4 external serial ports (2.0mm pitch)
	  - 1 RS232/422/485
	  - 3 RS232
	• 1 8-bit DIO connector
	• 1 Digital I/O power connector
	• 1 front audio connector for line-out and mic-in jacks
	• 1 S/PDIF connector
	• 1 LAN LED connector* (optional)
	• 1 LPC connector
	• 1 SMBus connector
	• 4 Serial ATA connectors
	• 4 Serial ATA power connectors - BE171/BE173
	• 1 24-pin ATX power connector - BE170
	• 1 front panel connector
	• 1 chassis intrusion connector
	• 2 fan connectors

WatchDog Timer	• Watchdog timeout programmable via software from 1 to 255 seconds
BIOS	• AMI BIOS - 64Mbit SPI BIOS

Energy Efficient Design	• Supports ErP Lot6 power saving* (optional)
	• Supports ACPI
	• 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 APU/system temperature and overheat alarm • Monitors APU_VDD/APU_VDDNB/APU_VDDIO_SUS/+12V voltages and failure alarm • Monitors APU/system fan speed and failure alarm • Read back capability that displays temperature, voltage and fan speed

Power Consumption	• BE170-77EN-427B: 38.06W with RX-427BB at 2.7GHz and 2x 4GB DDR3L
	  SODIMM
	• BE171-77EN-427B: 49.66W with RX-427BB at 2.7GHz and 2x 4GB DDR3L
	  SODIMM
	• BE173-77EN-427B: 41.04W with RX-427BB at 2.7GHz and 2x 4GB DDR3L
	  SODIMM

OS Support	• Windows 7 Ultimate x86 & SP1 (32-bit) • Windows 7 Ultimate x64 & SP1 (64-bit) • Windows 8.1 Embedded Pro x64 (64-bit)
Temperature	• Operating: 0°C to 60°C • Storage: -20°C to 85°C
Humidity	• 10% to 95%
Dimensions	• Mini-ITX form factor • 170mm (6.7") x 170mm (6.7")

Note:
*Optional and is not supported in standard model. Please contact your sales representative for more information.

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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 AMD® Radeon™ dual graphics engine delivers an excellent blend of graphics performance and features to meet business needs. It provides excellent video and 3D graphics with outstanding graphics responsiveness. These enhancements deliver the performance and compatibility needed for today's and tomorrow's business applications. Supports 4 DP interfaces for display outputs.

• Serial ATA

Serial ATA is a storage interface that is compliant with SATA 1.0a specification. With speed of up to 6Gb/s (SATA 3.0), it improves hard drive performance faster than the standard parallel ATA whose data transfer rate is 100MB/s.

• Gigabit LAN

One Intel® I210 PCI Express Gigabit Ethernet controller and one Realtek RTL8111EP Ethernet controller support up to 1Gbps data transmission.

• Audio

The Realtek ALC888 audio codec provides 7.1-channel High Definition audio output.

• PCI Express

PCI Express is a high bandwidth I/O infrastructure that possesses the ability to scale speeds by forming multiple lanes. The PCI Express architecture supports high performance graphics infrastructure by enhancing the capability of a PCIe x16 Gen 3 at 16GB/s bandwidth (8GB/s in each direction).

• 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 Management 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 session will resume exactly where you left off the next time you power-on the system.

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- **USB**

The system board supports the new USB 3.0. It is capable of running at a maximum transmission 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.

> **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
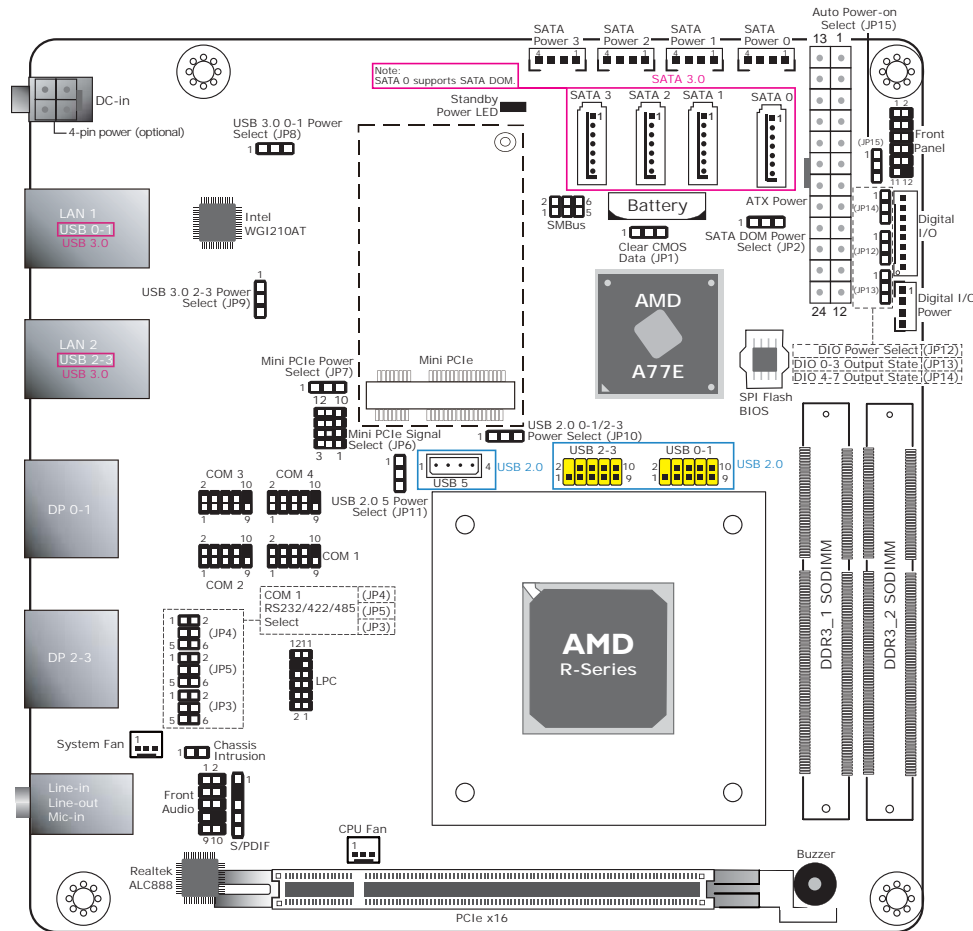
- BE170 is not equipped with DC-in jack.

- BE171: 12V DC-in jack (default) or 4-pin power connector (optional).
  BE173: 19~24V DC-in jack (default) or 4-pin power connector (optional).

- SATA power connectors are populated on BE171 and BE173 only.

- 24-pin ATX power connector is populated on BE170 only.

Important:
Electrostatic discharge (ESD) can damage your board, processor, disk drives, add-in boards, and other components. Perform installation procedures 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.

System Memory

Important:
When the Standby Power LED lights red, it indicates that there is power on the system board. Power-off the PC then unplug the power cord prior to installing any devices. Failure to do so will cause severe damage to the motherboard and components.

Rear I/O	
Onboard I/O	
Storage	
Expansion	
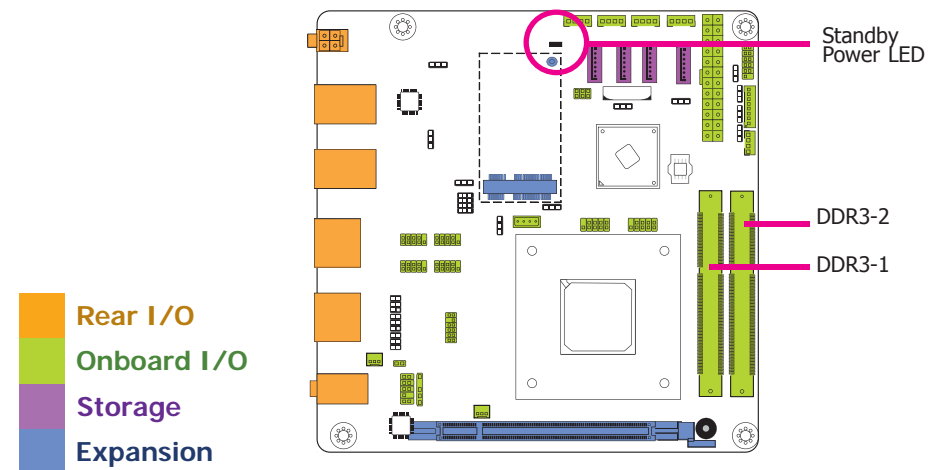
Features

- Two 204-pin DDR3 SODIMM sockets

- Supports 1600/1866/2133MHz

- Supports up to 16GB system memory

- Supports dual channel memory interface

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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 DIMM 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 DIMM socket on the system board.

4. Push the "ejector tabs" which are at the ends of the socket to the side.

Ejector tab   Ejector tab

5. Note how the module is keyed to the socket.

Notch

Key
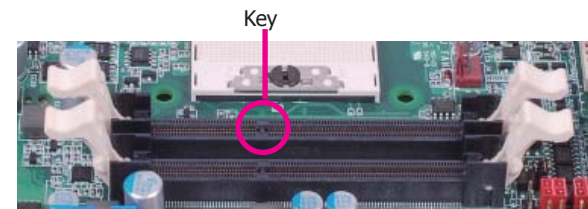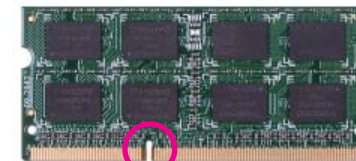
6. Grasping the module by its edges, position the module above the socket with the "notch" in the module aligned with the "key" on the socket. The keying mechanism ensures the module can be plugged into the socket in only one way.

7. Seat the module vertically, pressing it down firmly until it is completely seated in the socket. The ejector tabs at the ends of the socket will automatically snap into the locked position to hold the module in place.

Jumper Settings

Clear CMOS Data

JP1

1 2 3
1-2 On:
Normal (default)

1 2 3
2-3 On:
Clear CMOS Data
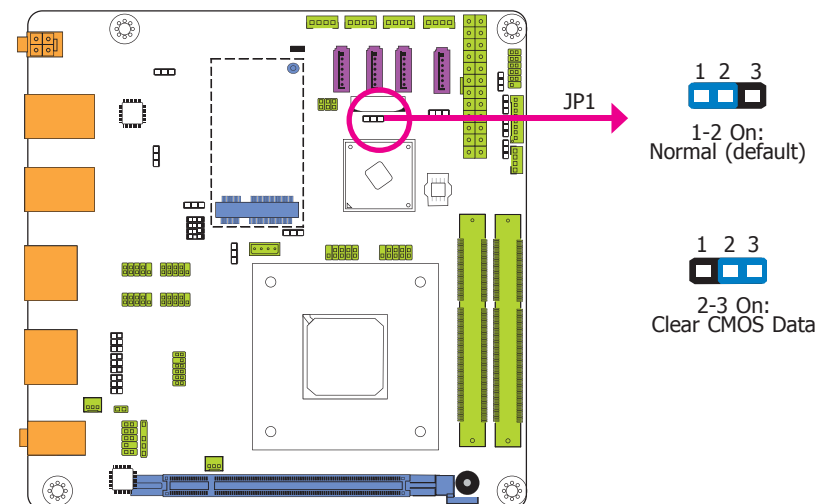
If you encounter the following,

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 JP1 pins 2 and 3 to On. Wait for a few seconds and set JP1 back to its default setting, pins 1 and 2 On.

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

Auto Power-on Select

JP15

1
2
3

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

1
2
3

2-3 On:
Power-on via AC power
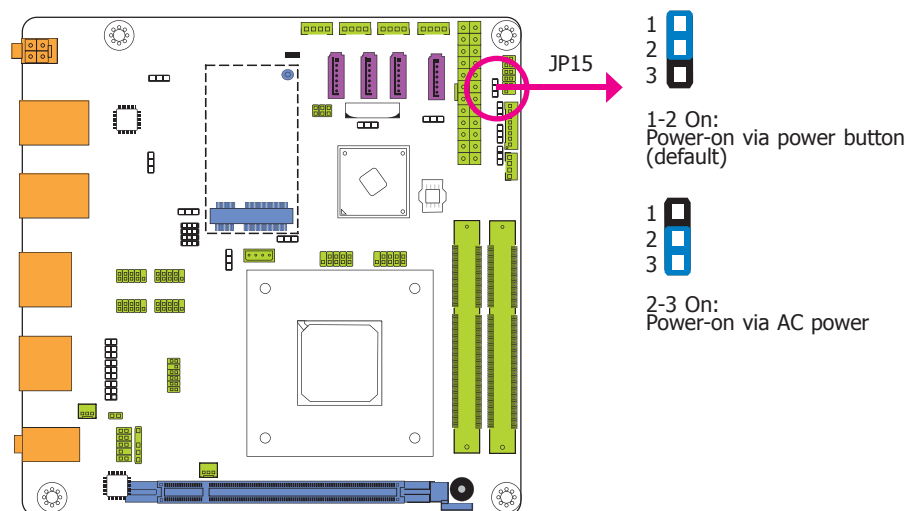
JP15 is used to select the method of powering on the system. If you want the system to power-on whenever AC power comes in, set JP15 pins 2 and 3 to On. If you want to use the power button, set pins 1 and 2 to On.

When using the JP15 "Power On" feature to power the system back on after a power failure occurs, the system may not power on if the power lost is resumed within 5 seconds (power flicker).

USB Power Select

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

1 2 3
2-3 On:
+5V_standby

USB 3.0 0-1
(JP8)

USB 2.0 0-1/2-3
(JP10)

USB 3.0 2-3
(JP9)

USB 2.0 5
(JP11)

1
2
3

1-2 On: +5V
(default)

1
2
3

2-3 On:
+5V_standby
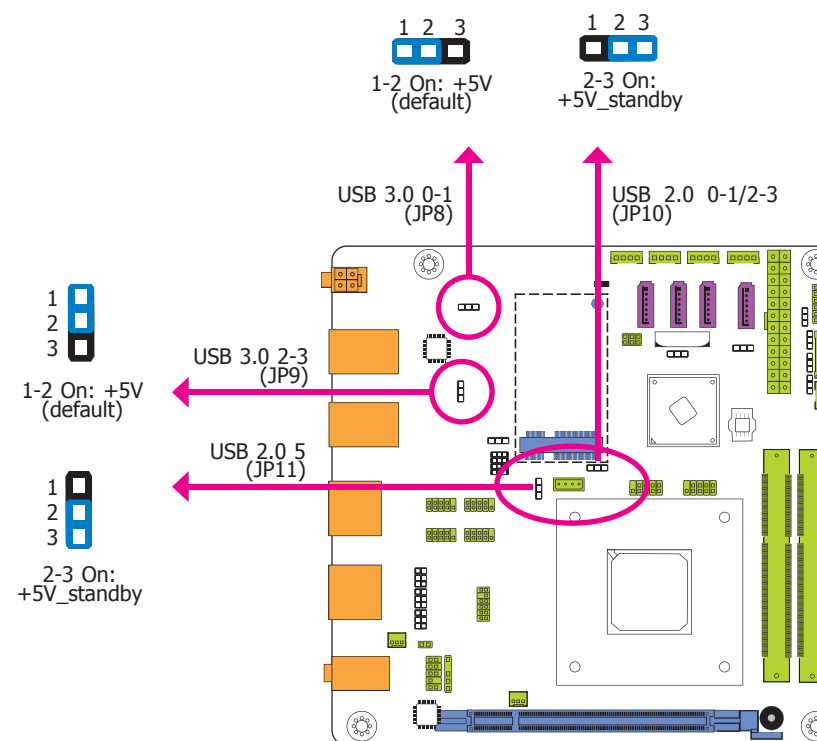
JP8, JP9, JP10 and JP11 are used to select the power of the USB ports. Selecting +5V_standby will allow you to use a USB device to wake up the system.

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.

COM 1 RS232/422/485 Select

COM 1: RS232/422/485

JP4
JP5
JP3
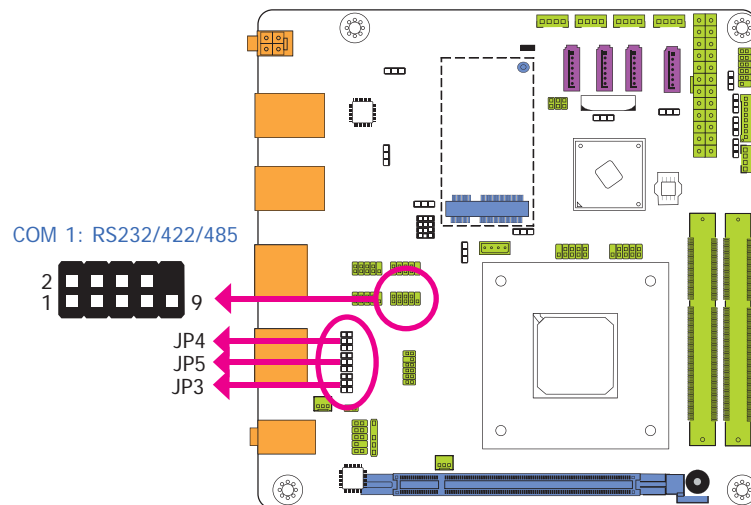
JP3, JP4 and JP5 allow you to configure the Serial COM port 1 to RS232, RS422 (Full Duplex) or RS485. The pin functions of Serial COM port 1 will vary according to these jumpers' setting.

COM 1

RS232

RS422
Full Duplex

RS485

JP3

1-2 On: RS232
(default)

3-4 On: RS422
Full Duplex

5-6 On: RS485

JP4 and JP5

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

3-5, 4-6 On:
RS422 Full Duplex/RS485
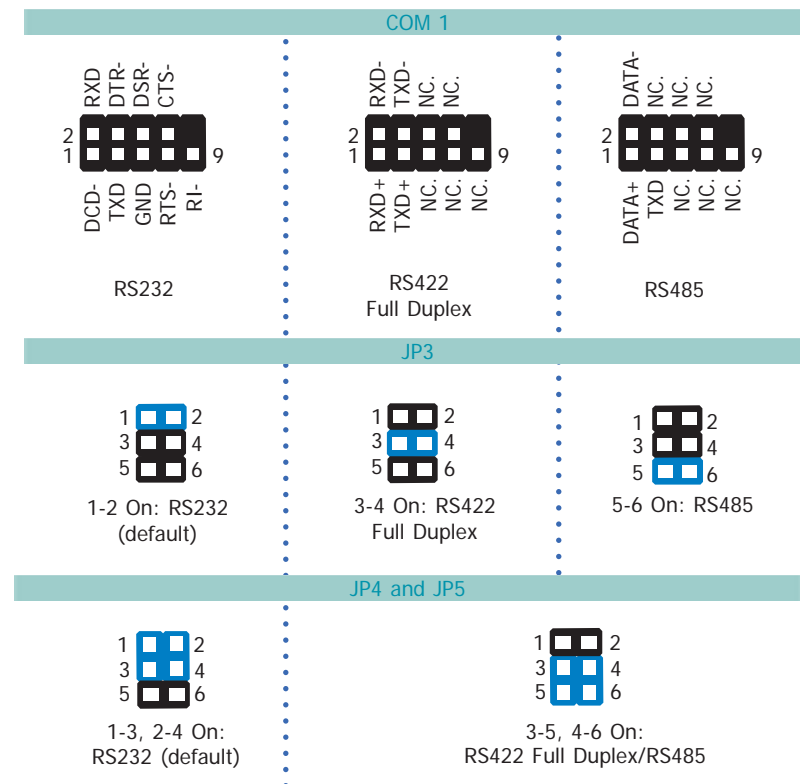
Note:
When COM 1 RS232/422/485 is selected, JP4 and JP5 must be set in accordance to JP3.

SATA DOM Power Select

SATA 0

JP2

1 2 3

1-2 On: GND (default)

1 2 3

2-3 On: +5V
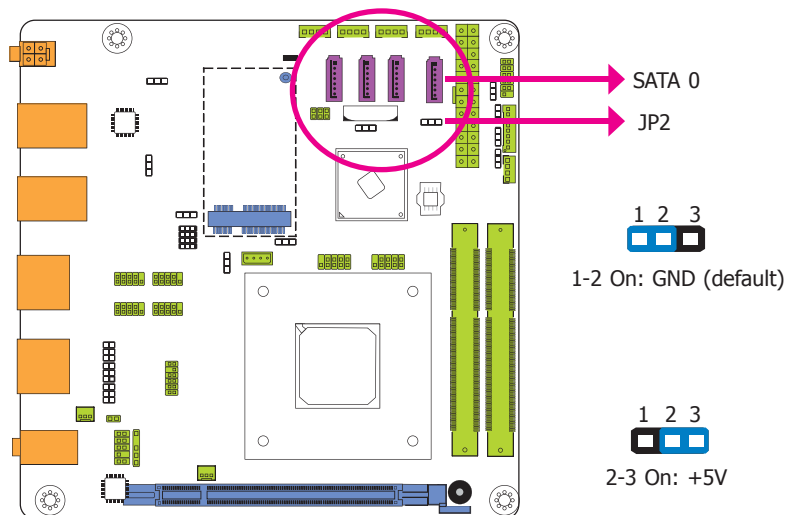
JP2 is used to select the power level of SATA DOM.

Note:
SATA port 0 provides adequate space for SATA DOM.

Digital I/O Power Select

JP12

1
2
3

1-2 On: +5V_standby (default)

1
2
3

2-3 On: +5V
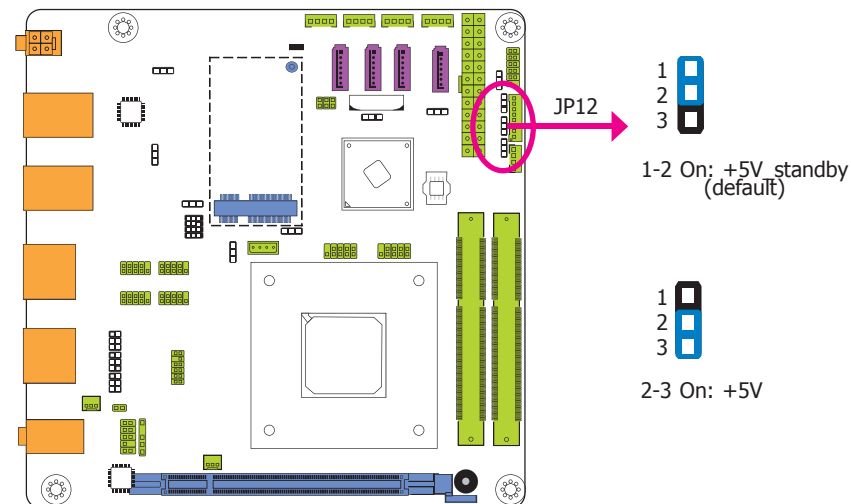
JP12 is used to select the power of DIO (Digital I/O) signal.

Chapter 2

Digital I/O Output State

DIO 4-7
(JP14)

DIO 0-3
(JP13)

1
2
3

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

1
2
3

2-3 On: GND

Mini PCIe Signal Select

12   10

3   1

1-4-7-10, 2-5-8-11 On:
PCIe (default)

12   10

3   1

2-5-8-11, 3-6-9-12 On:
mSATA

JP6
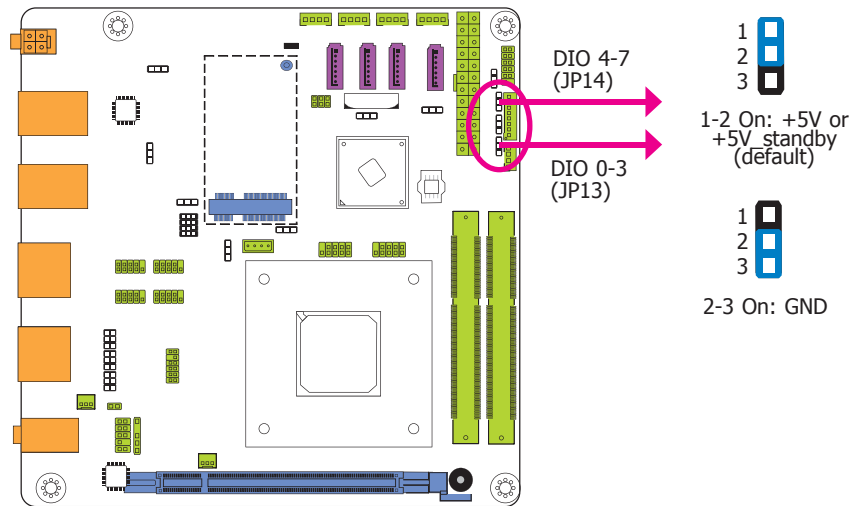
Based on the power level of DIO (Digital I/O) selected on JP12, JP13 (DIO pin 0-3) and JP14 (DIO pin 4-7) are used to select the state of DIO output: pull high or pull low. When selecting pull high, the power selection will be the same as JP12's setting.
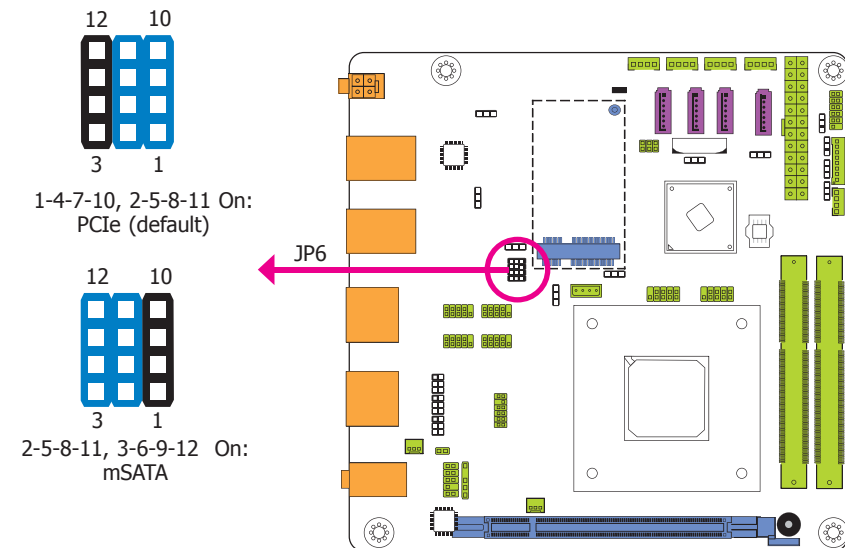
JP6 is used to select the Mini PCIe signal: PCIe or mSATA.

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Mini PCIe Power Select

1 2 3

1-2 On: +3.3V_standby (Mini PCIe) (default)

JP7

1 2 3

2-3 On: +3.3V (mSATA)
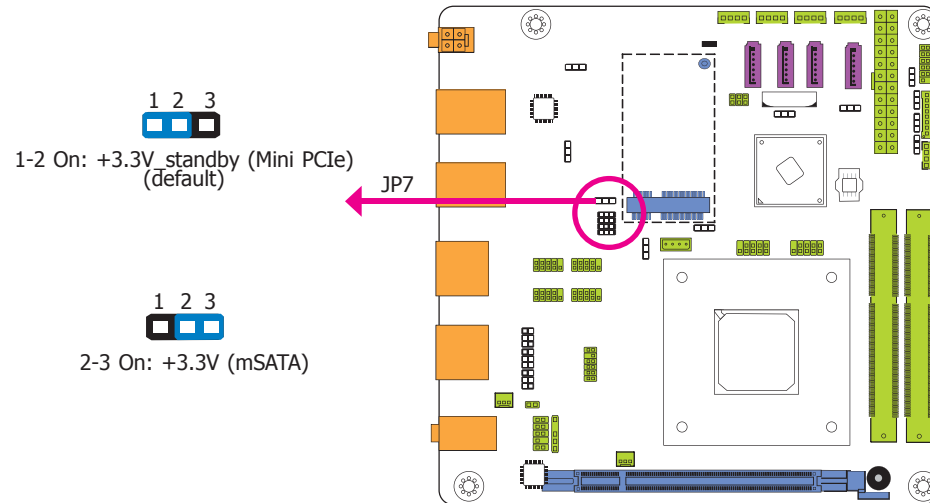
JP7 is used to select the power supplied with the Mini PCIe.

Rear Panel I/O Ports
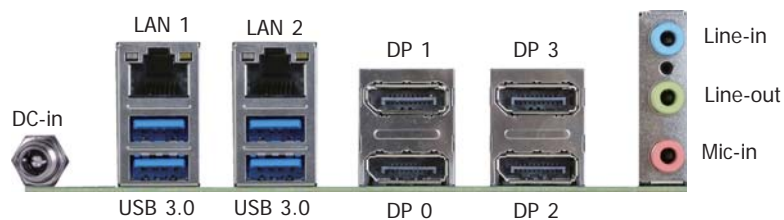
The rear panel I/O ports consist of the following:

- 1 12V (BE171) or 19~24V (BE173) DC-in jack or 4-pin power connector* (optional)
- 4 DP ports
- 2 RJ45 LAN ports
- 4 USB 3.0 ports
- Line-in jack
- Line-out jack
- Mic-in jack

12V DC-in (BE171)/19~24V DC-in (BE173)
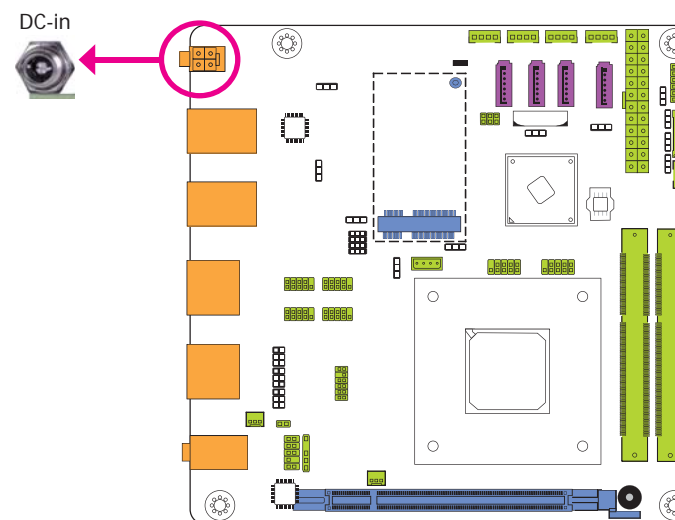
This jack provides maximum of 100W/120W power and is considered a low power solution. Connect a DC power cord to this jack. Use a power adapter with 12V (for BE171) or 19~24V (for BE173) DC output voltage. Using a voltage higher than the recommended one may fail to boot the system or cause damage to the system board.

The 12V (for BE171) or 19~24V (for BE173) DC-in jack on the system board co-lays with a 4-pin power connector (optional) as the figure displayed below.
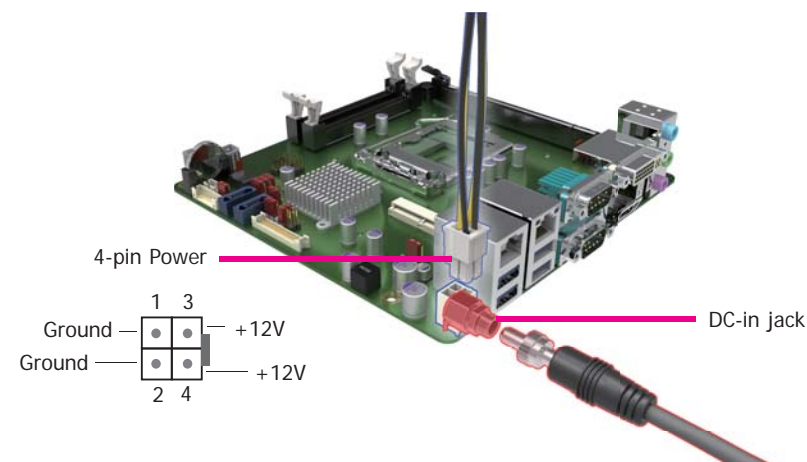
Graphics Interfaces

The display ports consist of the followings:

• 4 DP ports

DP 1   DP 3

DP 0-1

DP 2-3

DP 0   DP 2
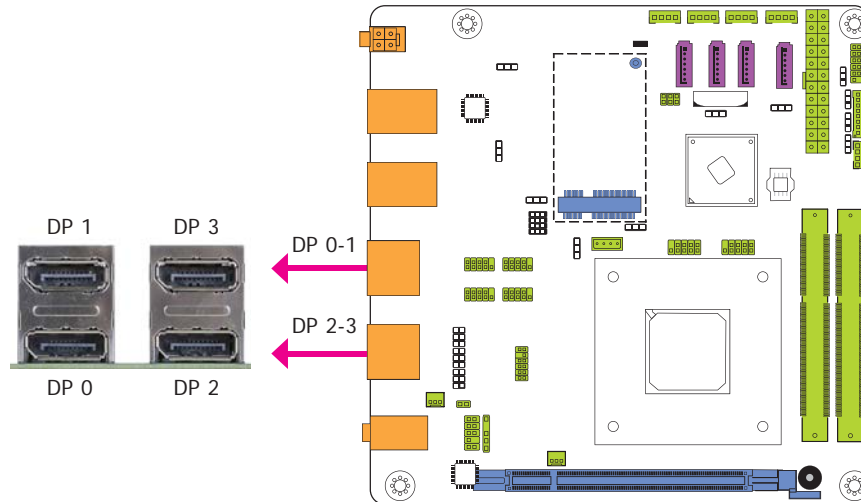
DP Port

The DP port is a digital display interface used to connect a display device such as a computer monitor. It is used to transmit audio and video simultaneously. The interface, which is developed by VESA, delivers higher performance features than any other digital interface.

RJ45 LAN Ports

LAN 1   LAN 2

LAN 1

LAN 2
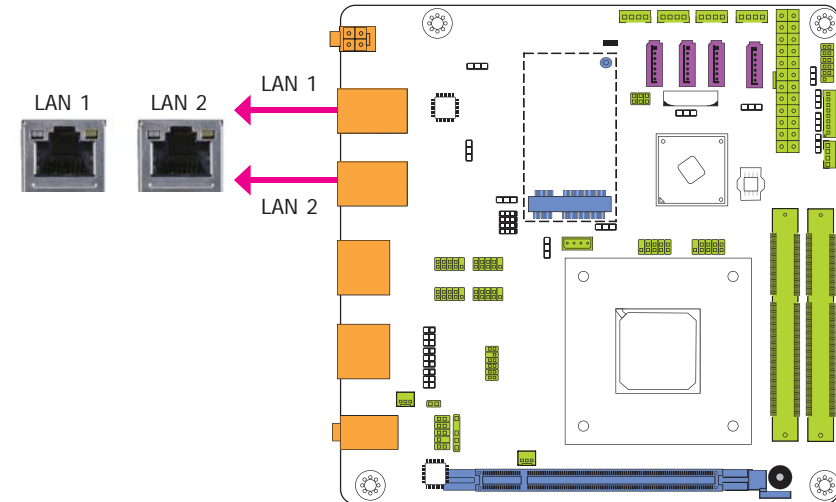
Features

• 1 Intel® I210 PCI Express Gigabit Ethernet controller

• 1 Realtek RTL8111EP Ethernet controller
  - supports DASH for remote management

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

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USB Ports

USB 1
USB 0
USB 3.0

USB 3
USB 2
USB 3.0

USB 5

GND
-Data
+Data
VCC

1   4

USB 2.0

USB 2-3   USB 0-1

Key
GND
+Data
-Data
VCC

USB 2.0 2   10
             1   9

N.C.
GND
+Data
-Data
VCC
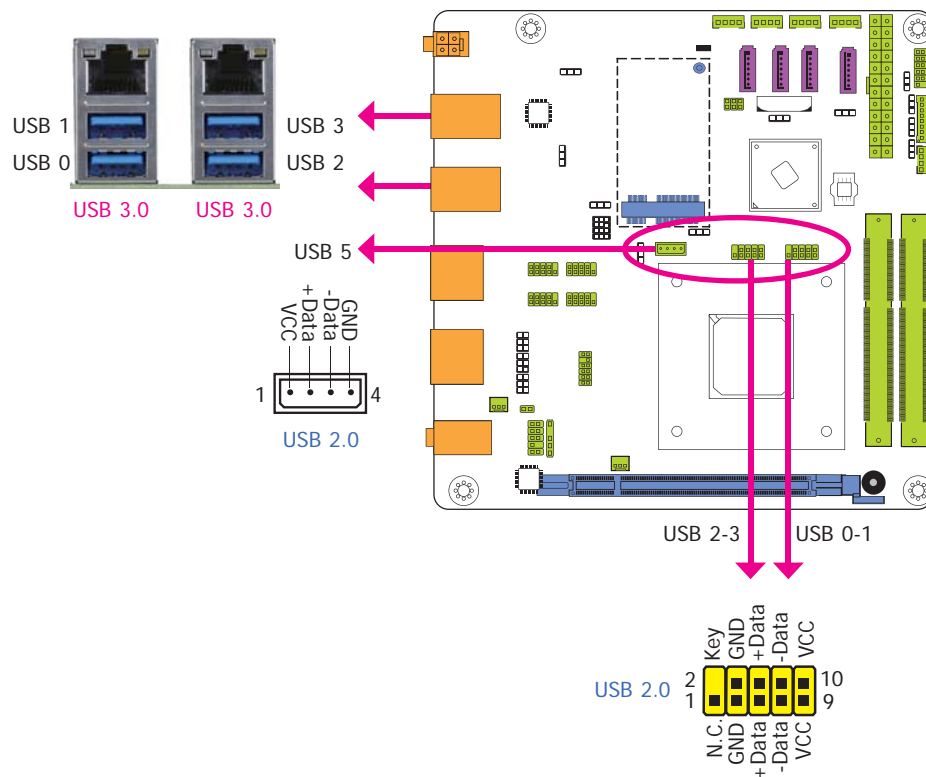
The USB device allows data exchange between your computer and a wide range of simultane-ously accessible external Plug and Play peripherals.

The system board is equipped with four onboard USB 3.0 ports (USB 0-1/2-3) and one vertical USB 2.0 port (USB 5) for security drive. The 10-pin connectors allow you to connect 4 addi-tional USB 2.0 ports (USB 0-1/2-3). 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.

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**

JP8, JP9, JP10 and JP11 must be set to "2-3 On: +5V_standby". Refer to "USB Power Select" in this chapter for more information.

Audio

Rear audio

Line-in

Line-out

Mic-in

Front Audio

```
        1  2
Mic2-L  ■■  GND
Mic2-R  ■■  NC
Line2-R ■■  Mic2-JD
GND     ■■  Key
Line2-L ■■  Line2-JD
        9 10
```
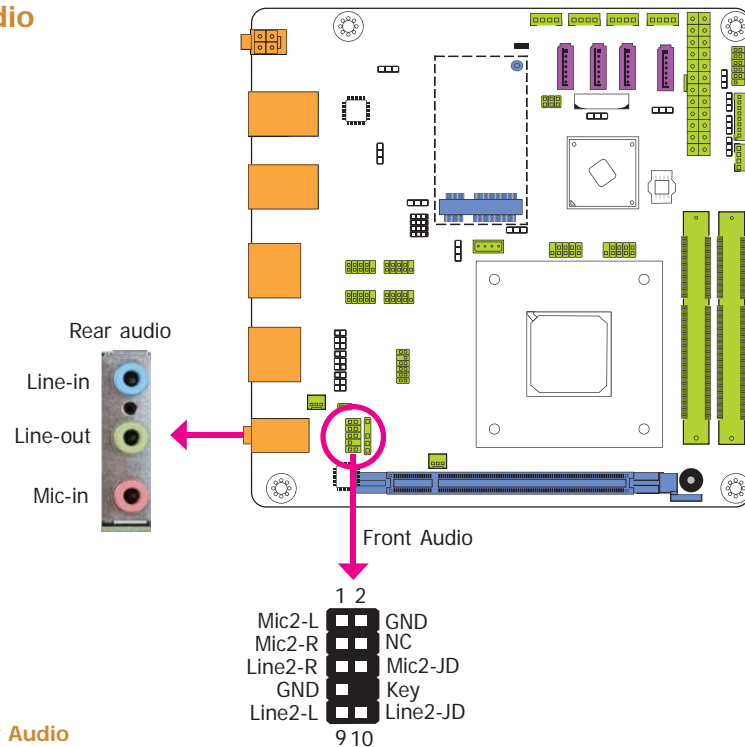
Rear Audio

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

• 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.

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

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.

I/O Connectors

SATA (Serial ATA) Connectors

SATA 3   SATA 2   SATA 1   SATA 0

SATA 2.0 3Gb/s

```
GND  1
TXP
TXN
GND
RXN
RXP
GND  7
```
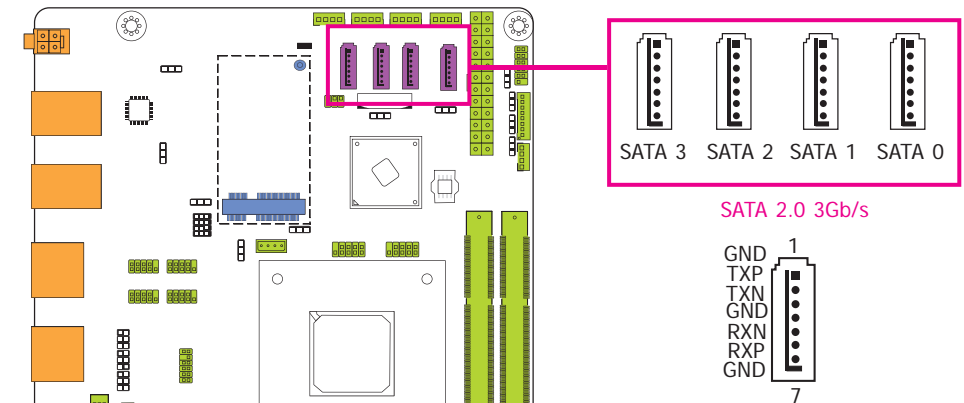
Features

• 4 Serial ATA 3.0 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 data cable to a SATA connector and the other end to your Serial ATA device.

> **Note:**
> SATA port 0 provides adequate space for SATA DOM.

20

SATA (Serial ATA) Power Connectors -BE171/BE173

SATA Power 2 SATA Power 1
SATA Power 3 SATA Power 0

4 1
+5V
Ground
Ground
+12V
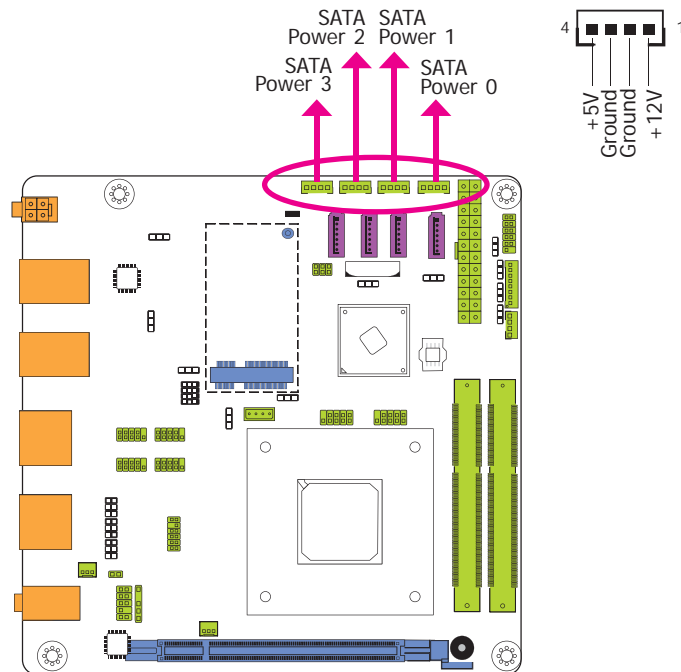
The SATA power connectors supply power to the SATA drive. Connect one end of the provided power cable to the SATA power connector and the other end to your storage device.

Digital I/O Connector

Digital I/O Power Connector

Digital I/O

Digital I/O power

1 +12V
   Ground
   +5V_standby
4 +5V
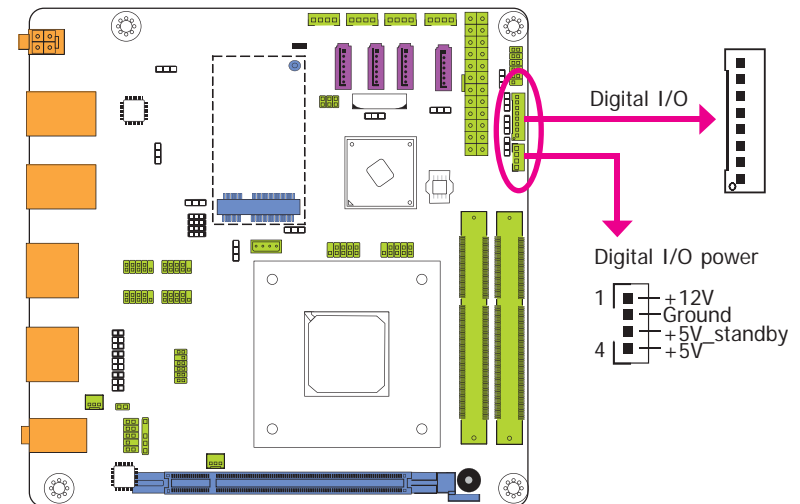
The 8-bit Digital I/O connector provides powering-on function to external devices that are connected to these connectors.

Digital I/O Connector

Pins	Function
0	DIO7
1	DIO6
2	DIO5
3	DIO4
4	DIO3
5	DIO2
6	DIO1
7	DIO0

21

Cooling Fan Connectors

System Fan

Ground
Power
Sense

1 3

CPU Fan

Ground
Power
Sense

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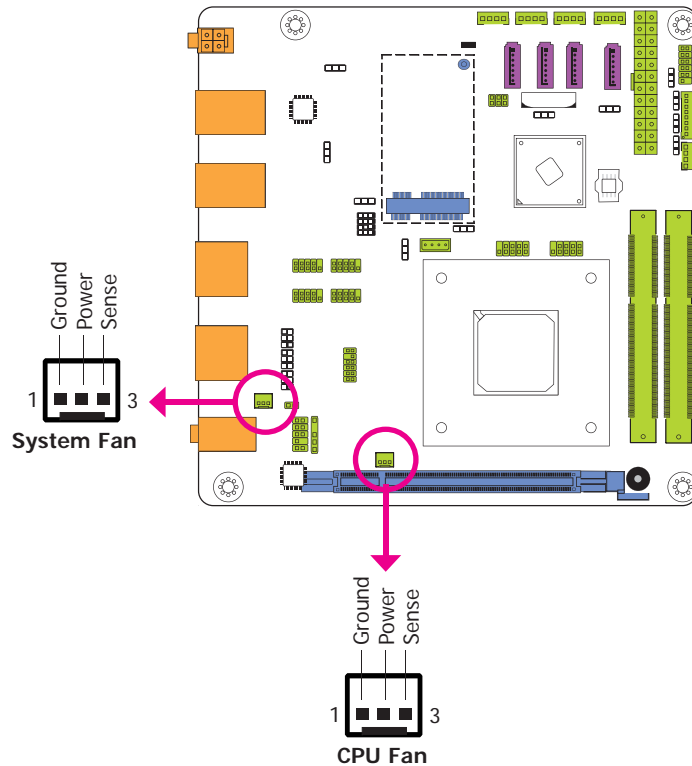
The fan connectors are used to connect cooling fans. The cooling fans will provide adequate airflow throughout the chassis to prevent overheating the CPU and system board components.

Front Panel Connector

Front Panel

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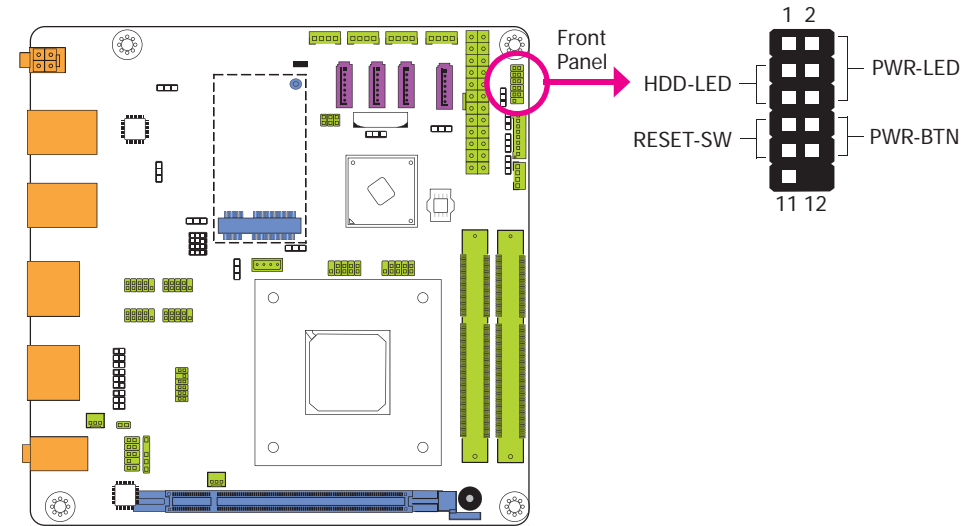
HDD-LED - HDD LED

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

COM (Serial) Ports

COM 2/COM 3/COM 4: RS232

COM 4
COM 3
COM 2
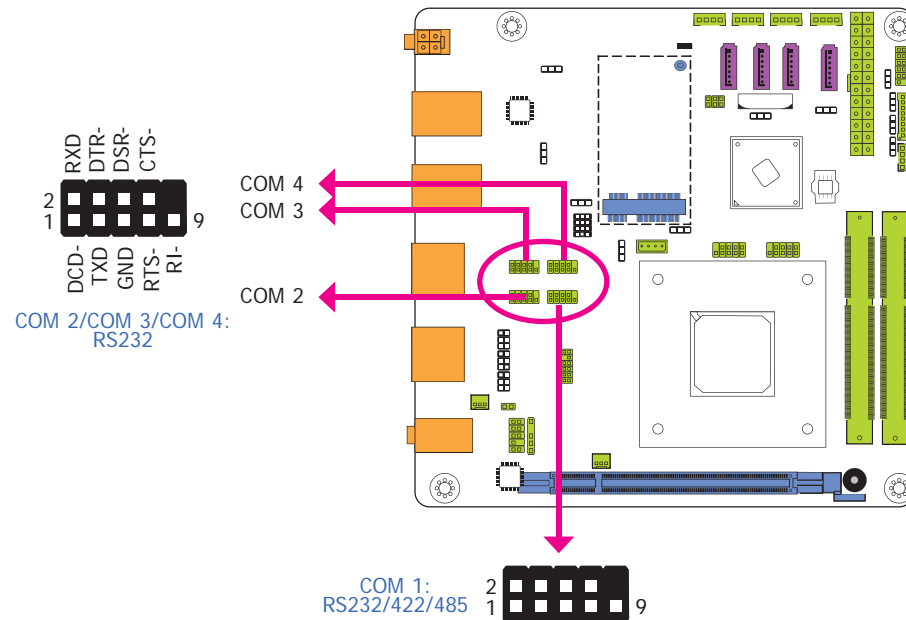
COM 1: RS232/422/485

Important:
When COM 1 RS232/422/485 is selected, JP4 and JP5 must be set in accordance to JP3.

COM 2 to COM 4 are fixed at RS232.

The pin functions of COM port 1 will vary according to JP3's, JP4's and JP5's setting. They are used to configure the Serial COM port 1 to pure RS232, RS422 Full Duplex or RS485. Refer to "COM 1 RS232/422/485 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.

SMBus Connector

SMBUS Data

GND   NC

2   6
1   5

+3.3V_standby   SMBUS_Alert

SMBUS Clock

SMBus

ATX Power Connector

13   1

+3.3V			+3.3V
-12V			+3.3V
GND			GND
PS_ON#			+5V
GND			GND
GND			+5V
GND			GND
NC			PWR_OK
+5V			+5VSB
+5V			+12V
+5V			+12V
GND			+3.3V

24   12
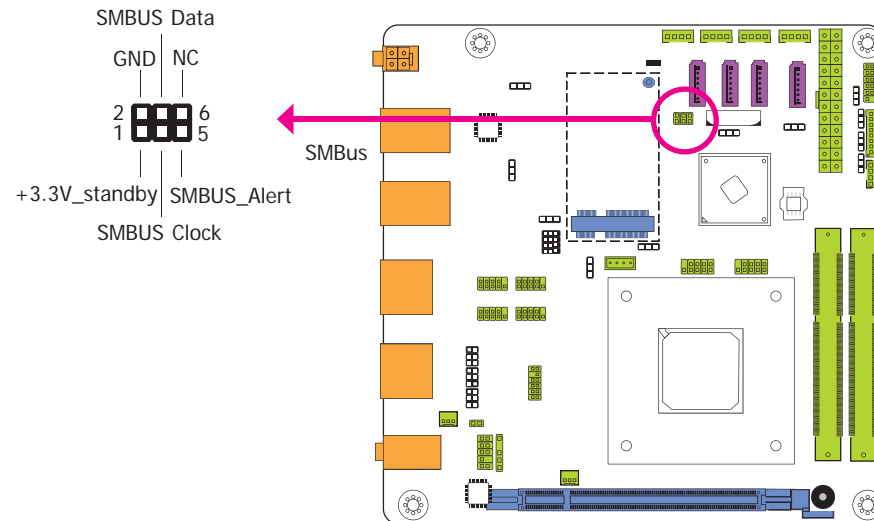
ATX power

The SMBus (System Management Bus) connector is used to connect SMBus devices. It is a multiple device bus that allows multiple chips to connect to the same bus and enable each one to act as a master by initiating data transfer.
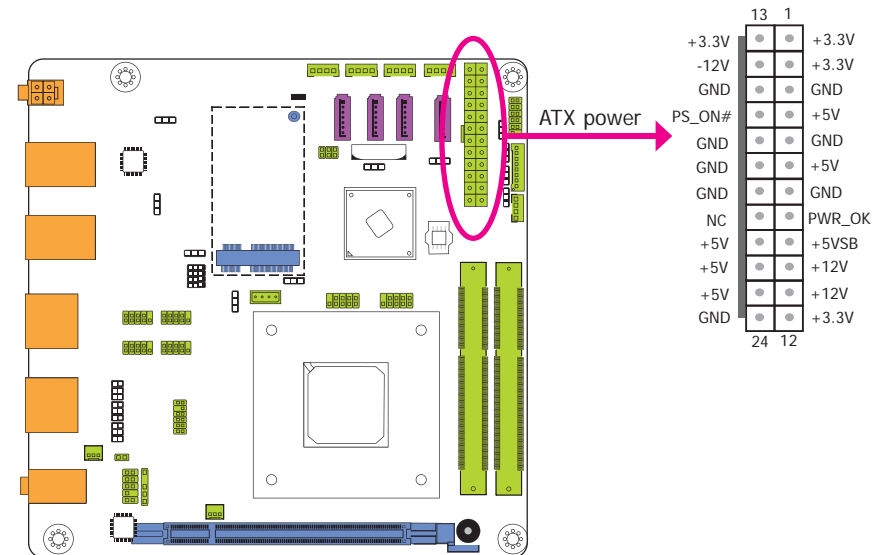
Use a power supply that complies with the ATX12V Power Supply Design Guide Version 1.1. An ATX12V power supply unit has a standard 24-pin ATX main power connector that must be inserted into the 24-pin connector.

The power connector from the power supply unit is designed to fit the 24-pin connector in only one orientation. Make sure to find the proper orientation before plugging the connector.

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.

24

S/PDIF Connector

S/PDIF

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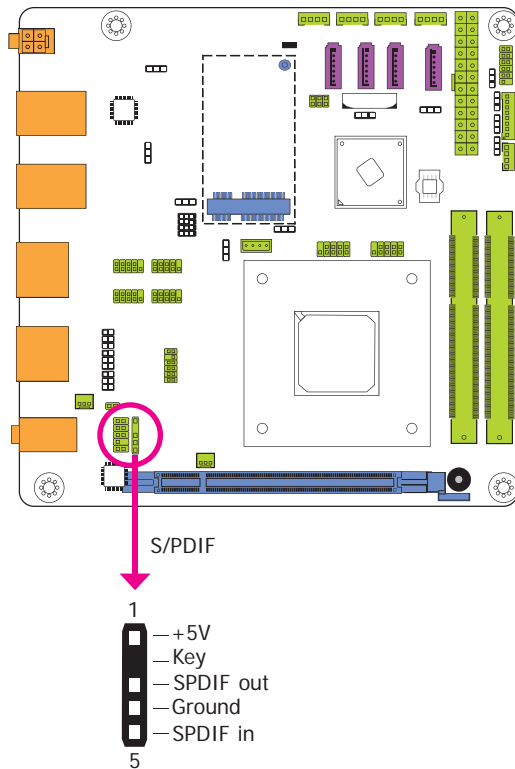
The S/PDIF connector is used to connect an external S/PDIF port. Your S/PDIF port may be mounted on a card-edge bracket. Install the card-edge bracket to an available slot at the rear of the system chassis then connect the audio cable to the S/PDIF connector. Make sure pin 1 of the audio cable is aligned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

Expansion Slots

Mini PCI Express
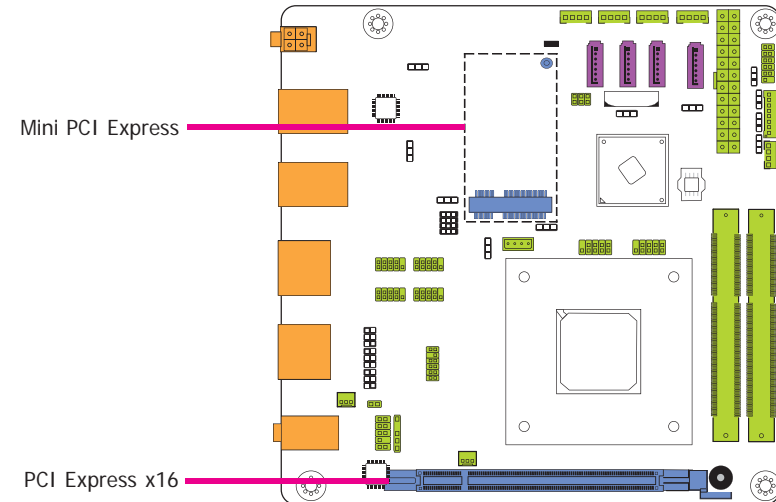
PCI Express x16

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 PCI Express 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.

25

Chassis Intrusion Connector

1 2

Chassis
Intrusion

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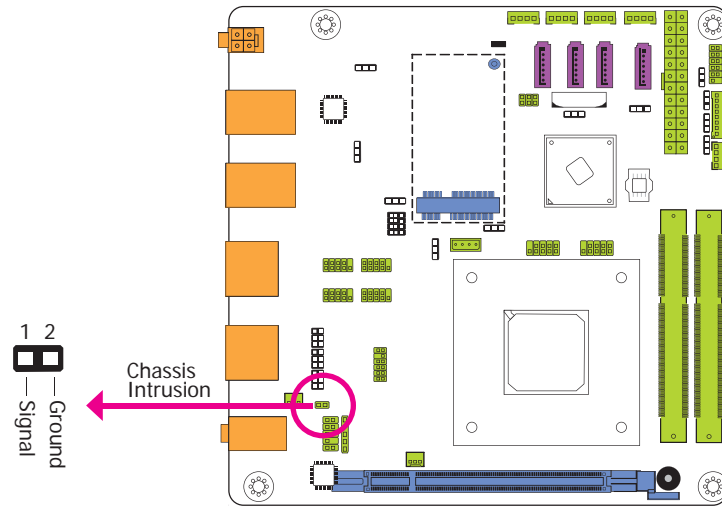
The board supports the chassis intrusion detection function. Connect the chassis intrusion sensor cable from the chassis to this connector. When the system's power is on and a chassis intrusion occurred, an alarm will sound. When the system's power is off and a chassis intrusion occurred, the alarm will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

LPC Connector

12 11

LPC

2 1
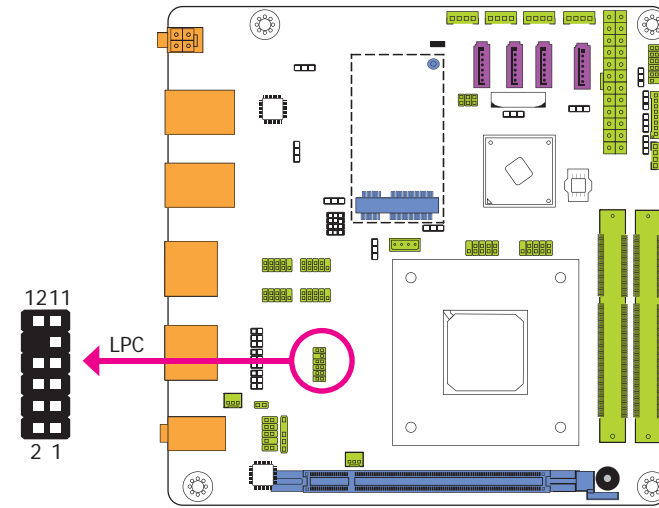
The LPC connector is used for the debug function and its pin functions are listed below.

Pins	Pin Assignment	Pins	Pin Assignment
1	CLK	2	LAD1
3	RST#	4	LAD0
5	FRAME#	6	VCC_+3V
7	LAD3	8	GND
9	LAD2	10	x
11	SERIRQ	12	48MHz

26

Standby Power LED

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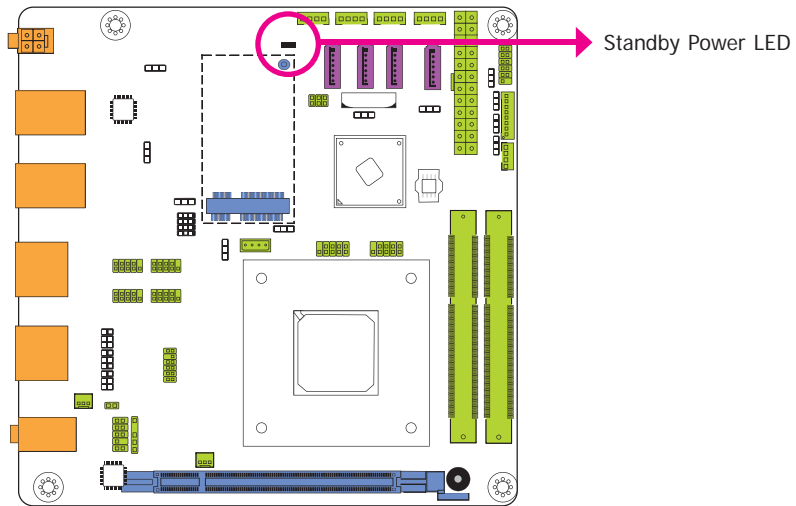
This LED will lit red when the system is in the standby mode. It indicates that there is power on the system board. Power-off the PC and then unplug the power cord prior to installing any devices. Failure to do so will cause severe damage to the motherboard and components.

Battery
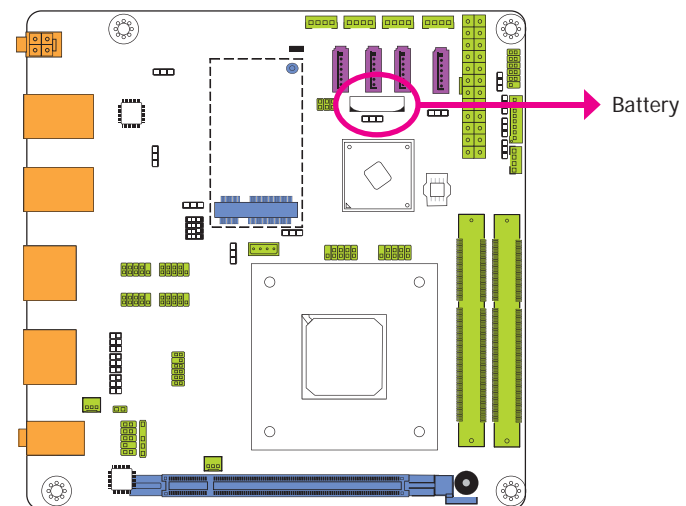
Battery

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.

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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 keyboard 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) 2015 American Megatrends, Inc.
  Main    Advanced   Chipset   Boot   Security   Save & Exit

  BIOS Information                                    Choose the system default
  Project Name                  BE17x                 language
  BIOS Version                  56.16A

  Memory Information
  Total Memory                  4080 MB (DDR3)

  System Language               [English]

  System Date                   [Tue 07/28/2015]
  System Time                   [09:39:23]            → ←:  Select Screen
                                                      ↑↓:    Select Item
  Access Level                  Administrator         Enter: Select
                                                      +/-:    Change Opt.
                                                      F1:     General Help
                                                      F2:     Previous Values
                                                      F3:     Optimized Defaults
                                                      F4:    Save Changes and
                                                             Reset
                                                      ESC:  Exit

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```

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) 2015 American Megatrends, Inc.
  Main    Advanced   Chipset   Boot   Security   Save & Exit

  ▶ ACPI Settings                                   System ACPI Parameters.
  ▶ Trusted Computing
  ▶ DFI Wakeup Configuration
  ▶ CPU Configuration
  ▶ DDR3 Voltage Setting
  ▶ IDE Configuration
  ▶ MCTP Configuration
  ▶ USB Computing
  ▶ NCT6106D Super IO Configuration
  ▶ NCT6106D HW Monitor
  ▶ NCT6106D Super IO Features
  ▶ Serial Port Console Redirection               → ←:  Select Screen
  ▶ Network Stack Configuration                    ↑↓:    Select Item
                                                   Enter: Select
                                                   +/-:    Change Opt.
                                                   F1:     General Help
                                                   F2:     Previous Values
                                                   F3:     Optimized Defaults
                                                   F4:    Save Changes and
                                                          Reset
                                                   ESC:  Exit

          Version 2.17.1246. Copyright (C) 2015 American Megatrends, Inc.
```

Chapter 3

ACPI Settings

This section is used to configure the ACPI Settings.

```
            Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
   Advanced

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

   Enable Hibernation                  [Enable]
   ACPI Sleep State                    [S3 only (Suspend to ...) ]

                                                        →←:  Select Screen
                                                        ↑↓:    Select Item
                                                        Enter: Select
                                                        +/-:   Change Opt.
                                                        F1:    General Help
                                                        F2:    Previous Values
                                                        F3:    Optimized Defaults
                                                        F4:    Save Changes and
                                                               Reset
                                                        ESC:  Exit

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```

Enable ACPI Auto Configuration

Enable or disable BIOS ACPI auto configuration.

Enable Hibernation

Enable or disable System ability to Hibernate (OS/S4 Sleep State). This option may be not effective with some OS.

ACPI Sleep State

Select the ACPI sleep state that the system will enter when the Suspend button is pressed.

S3(STR) Enable the Suspend to RAM function.

Trusted Computing

This section is used to configure the Trusted Computing Settings.

```
            Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
   Advanced

   Configuration                                        Enables or Disables
     Security Device Support           [Disable]        BIOS support for security
                                                        device. O.S. will not show
   Current Status Information                           Security Device. TCG
     SUPPORT TURNED OFF                                 EFI protocol and INT1A
                                                        interface will not be
                                                        available.

                                                        →←:  Select Screen
                                                        ↑↓:    Select Item
                                                        Enter: Select
                                                        +/-:   Change Opt.
                                                        F1:    General Help
                                                        F2:    Previous Values
                                                        F3:    Optimized Defaults
                                                        F4:    Save Changes and
                                                               Reset
                                                        ESC:  Exit

            Version 2.17.1246. Copyright (C) 2015 American Megatrends, Inc.
```

Security Device Support

This field is used to enable or disable BIOS supporting for the security device. O.S will not show the security device. TCG EFI protocol and INT1A interface will not be available.

DFI Wakeup Configuration

This section configures the DFI Wakeup ACPI Power Managemnet Coniguration.

```
              Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
        Advanced

 DFI Wakeup ACPI Power Management Configuration          About Resume by PME
                                                         (PCI, PCIE, LAN).

 Resume by PME                    [Disabled]
 Resume by USB                    [Disabled]




                                                         → ←:  Select Screen
                                                         ↑↓:    Select Item
                                                         Enter: Select
                                                         +/-:   Change Opt.
                                                         F1:    General Help
                                                         F2:    Previous Values
                                                         F3:    Optimized Defaults
                                                         F4:    Save Changes and
                                                                Reset
                                                         ESC:  Exit

              Version 2.17.1246. Copyright (C) 2015 American Megatrends, Inc.
```
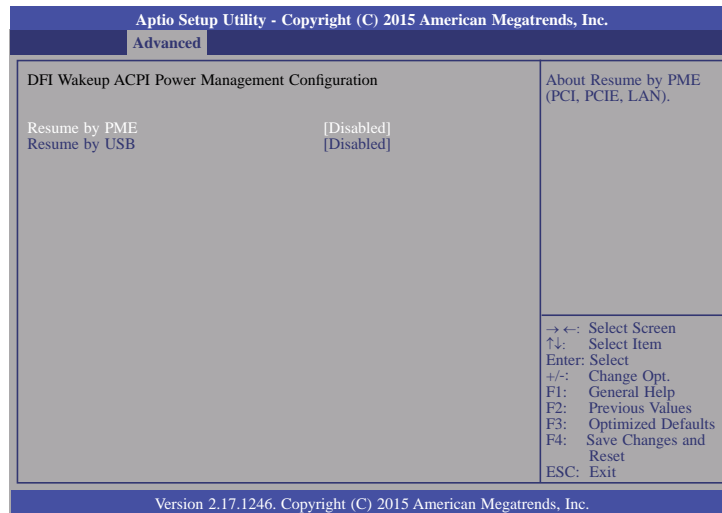
Resume by PME

Enable this field to use the PME signal to wake up the system (via PCI, PCIE and LAN).

Resume by USB

When Enabled, this system uses the USB signal to carry out a wakeup event.

CPU Configuration

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

```
              Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
        Advanced

 CPU Configuration                                       Enabled/Disable No-
                                                         execute page protection
 NX Mode                          [Enabled]              Function.
 SVM Mode                         [Enabled]
 ► Node 0 Information




                                                         → ←:  Select Screen
                                                         ↑↓:    Select Item
                                                         Enter: Select
                                                         +/-:   Change Opt.
                                                         F1:    General Help
                                                         F2:    Previous Values
                                                         F3:    Optimized Defaults
                                                         F4:    Save Changes and
                                                                Reset
                                                         ESC:  Exit

              Version 2.17.1246. Copyright (C) 2015 American Megatrends, Inc.
```

NX Mode

Enable or disable No-execute page protection function.

SVM Mode

Enable or disable the CPU vertualization.

Node 0 Information

View the memory information related to Node 0.

```
              Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
        Advanced

 Socket 0: AMD RX-225FB with AMD Radeon(tm) R4 Graphics
 Dual Core Running @ 2231 MHz 1050 mV
 Processor Family: 15h
 Processor Model: 30h~30Fh
 Max Speed: 2200 MHz   Intended Speed: 2200 MHz
 Min Speed: 1100 MHz
 Microcode Patch Level: 6003106


 ---------- Cache per Core -----------
 L1 Instruction Cache: 48 KB/-way
      L1 Data Cache: 16 KB/4-way              → ←:  Select Screen
           L2 Cache: 512 KB/16-way            ↑↓:    Select Item
 No L3 Cache Present                          Enter: Select
                                              +/-:   Change Opt.
                                              F1:    General Help
                                              F2:    Previous Values
                                              F3:    Optimized Defaults
                                              F4:    Save Changes and
                                                     Reset
                                              ESC:  Exit

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```

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DDR3 Voltage Setting

This section is used to configure the DDR3 Voltage Setting.

```
                Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
   Advanced

                                                      DDR3 Voltage Setting.
   DDR3 Voltage Setting              [Auto]




                                                      →←:  Select Screen
                                                      ↑↓:    Select Item
                                                      Enter: Select
                                                      +/-:   Change Opt.
                                                      F1:    General Help
                                                      F2:    Previous Values
                                                      F3:    Optimized Defaults
                                                      F4:    Save Changes and
                                                             Reset
                                                      ESC:  Exit

                 Version 2.17.1246. Copyright (C) 2015 American Megatrends, Inc.
```
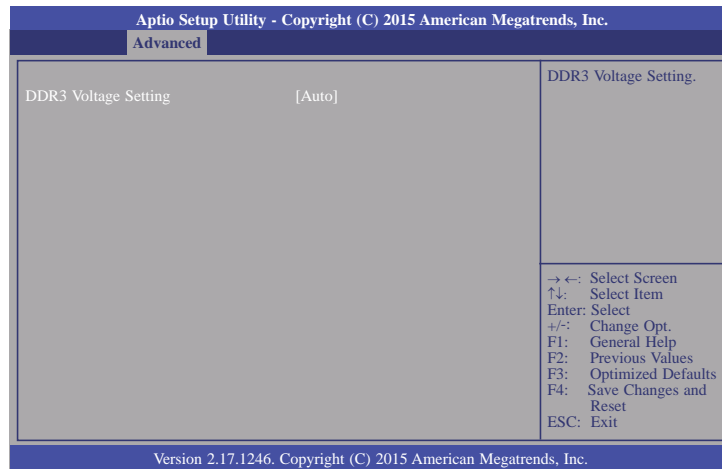
DDR3 Voltage Setting

Select the DDR3 Voltage Setting. The options are Auto, 1.5V, 1.35V and 1.25V.

IDE Configuration

This section is used to configure the IDE device.

```
                Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
   Advanced

   IDE Configuration

   SATA Port0               Not present
   SATA Port1               Not present
   SATA Port2               Not present
   SATA Port3               Not present
   SATA Port4               Not present



                                                      →←:  Select Screen
                                                      ↑↓:    Select Item
                                                      Enter: Select
                                                      +/-:   Change Opt.
                                                      F1:    General Help
                                                      F2:    Previous Values
                                                      F3:    Optimized Defaults
                                                      F4:    Save Changes and
                                                             Reset
                                                      ESC:  Exit

                 Version 2.17.1246. Copyright (C) 2015 American Megatrends, Inc.
```

MCTP Configuration

This section is used to configure the Management Component Transport Protocol (MCTP).

```
            Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
        Advanced

Management Component Transport Protocol (MCTP) Configuration    Realtek LAN card DASH
                                                               function Enable/Disable
Realtek LAN card DASH function          [Disabled]

MCTP Support                            Disabled

                                                               → ←:  Select Screen
                                                               ↑↓:   Select Item
                                                               Enter: Select
                                                               +/-:   Change Opt.
                                                               F1:    General Help
                                                               F2:    Previous Values
                                                               F3:    Optimized Defaults
                                                               F4:    Save Changes and
                                                                      Reset
                                                               ESC:  Exit
            Version 2.17.1246. Copyright (C) 2015 American Megatrends, Inc.
```

Realtek LAN card DASH function

Enable or disable the Realtek LAN card DASH function.

When the Realtek LAN card DASH function is enabled, you will enable or disable the MCTP support.

```
            Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
        Advanced

Management Component Transport Protocol (MCTP) Configuration    Realtek LAN card DASH
                                                               function Enable/Disable
Realtek LAN card DASH function          [Enabled]

MCTP Support                            [Disabled]

                                                               → ←:  Select Screen
                                                               ↑↓:   Select Item
                                                               Enter: Select
                                                               +/-:   Change Opt.
                                                               F1:    General Help
                                                               F2:    Previous Values
                                                               F3:    Optimized Defaults
                                                               F4:    Save Changes and
                                                                      Reset
                                                               ESC:  Exit
            Version 2.17.1246. Copyright (C) 2015 American Megatrends, Inc.
```

MCTP Support

Enable or disable the MCTP support.

```
            Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
        Advanced

Management Component Transport Protocol (MCTP) Configuration    Realtek LAN card DASH
                                                               function Enable/Disable
Realtek LAN card DASH function          [Enabled]

MCTP Support                            [Enabled]
PLDM for SMBIOS                         [Enabled]
PLDM for BIOS Control and Configure     [Enabled]
PLDM for Platform Monitoring            [Enabled]

                                                               → ←:  Select Screen
                                                               ↑↓:   Select Item
                                                               Enter: Select
                                                               +/-:   Change Opt.
                                                               F1:    General Help
                                                               F2:    Previous Values
                                                               F3:    Optimized Defaults
                                                               F4:    Save Changes and
                                                                      Reset
                                                               ESC:  Exit
            Version 2.17.1246. Copyright (C) 2015 American Megatrends, Inc.
```

PLDM for SMBIOS

Enable or disable the PLDM support for SMBIOS.

PLDM for BIOS Control and Configure

Enable or disable the PLDM support for BIOS control and configuration.

PLDM for Platform Monitoring

Enable or disable the PLDM support for platform monitoring.

USB Configuration

This section is used to configure USB parameters.

```
                   Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
    Advanced

 USB Configuration                                          Enables Legacy USB
                                                            support. AUTO option
 USB Devices:                                               disables legacy support if
        1 Keyboard, 1 Mouse                                 no USB devices are
                                                            connected. DISABLE
 Legacy USB Support                 [Enabled]               option will keep USB
 USB Mass Storage Driver Support    [Enabled]               devices available only for
 Port 60/64 Emulaiton               [Enabled]               EFI applications.


                                                            →←:  Select Screen
                                                            ↑↓:     Select Item
                                                            Enter: Select
                                                            +/-:    Change Opt.
                                                            F1:     General Help
                                                            F2:     Previous Values
                                                            F3:     Optimized Defaults
                                                            F4:     Save Changes and
                                                                    Reset
                                                            ESC:  Exit

             Version 2.17.1246. Copyright (C) 2015 American Megatrends, Inc.
```

Legacy USB Support

Enabled

Enable legacy USB.

Auto

Disable support for legacy when no USB devices are connected.

Disabled

Keeps USB devices available only for EFI applications.

USB Mass Storage Driver Support

Enable or disable the USB mass storage driver support.

Port 60/64 Emulation

Enable I/O port 60h/64h emulation support. This should be enabled for the complete USB keyboard legacy support for non-USB aware OSes.

NCT6106D Super IO Configuration

This section is used to set the serial port functions.

```
                   Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
    Advanced

 NCT6106D Super IO Configuration                            Set Parameters of Serial
                                                            Port 1 (COMA).
   NCT6106D Super IO Chip           NCT6106D
 ► Serial Port 1 Configuration
 ► Serial Port 2 Configuration
 ► Serial Port 3 Configuration
 ► Serial Port 4 Configuration


                                                            →←:  Select Screen
                                                            ↑↓:     Select Item
                                                            Enter: Select
                                                            +/-:    Change Opt.
                                                            F1:     General Help
                                                            F2:     Previous Values
                                                            F3:     Optimized Defaults
                                                            F4:     Save Changes and
                                                                    Reset
                                                            ESC:  Exit

             Version 2.17.1246. Copyright (C) 2015 American Megatrends, Inc.
```

Serial Port 1 Configuration to Serial Port 4 Configuration

```
                   Aptio Setup Utility - Copyright (C) 2015 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]
 RS485 Auto Flow Support            [Disable]



                                                            →←:  Select Screen
                                                            ↑↓:     Select Item
                                                            Enter: Select
                                                            +/-:    Change Opt.
                                                            F1:     General Help
                                                            F2:     Previous Values
                                                            F3:     Optimized Defaults
                                                            F4:     Save Changes and
                                                                    Reset
                                                            ESC:  Exit

             Version 2.17.1246. Copyright (C) 2015 American Megatrends, Inc.
```

```
              Aptio Setup Utility - Copyright (C) 2015 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]




                                                                   → ←:  Select Screen
                                                                   ↑↓:   Select Item
                                                                   Enter: Select
                                                                   +/-:   Change Opt.
                                                                   F1:    General Help
                                                                   F2:    Previous Values
                                                                   F3:    Optimized Defaults
                                                                   F4:    Save Changes and
                                                                          Reset
                                                                   ESC:  Exit
              Version 2.17.1246. Copyright (C) 2015 American Megatrends, Inc.
```

```
              Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
  Advanced

  Serial Port 3 Configuration                                      Enable or Disable Serial
                                                                   Port (COM).
  Serial Port                        [Enabled]
  Device Settings                    IO=3E8h; IRQ=10;

  Change Settings                    [Auto]




                                                                   → ←:  Select Screen
                                                                   ↑↓:   Select Item
                                                                   Enter: Select
                                                                   +/-:   Change Opt.
                                                                   F1:    General Help
                                                                   F2:    Previous Values
                                                                   F3:    Optimized Defaults
                                                                   F4:    Save Changes and
                                                                          Reset
                                                                   ESC:  Exit
              Version 2.17.1246. Copyright (C) 2015 American Megatrends, Inc.
```

```
              Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
  Advanced

  Serial Port 4 Configuration                                      Enable or Disable Serial
                                                                   Port (COM).
  Serial Port                        [Enabled]
  Device Settings                    IO=2E8h; IRQ=11;

  Change Settings                    [Auto]




                                                                   → ←:  Select Screen
                                                                   ↑↓:   Select Item
                                                                   Enter: Select
                                                                   +/-:   Change Opt.
                                                                   F1:    General Help
                                                                   F2:    Previous Values
                                                                   F3:    Optimized Defaults
                                                                   F4:    Save Changes and
                                                                          Reset
                                                                   ESC:  Exit
              Version 2.17.1246. Copyright (C) 2015 American Megatrends, Inc.
```

Serial Port

Enable or disable the serial port (COM).

Change Settings

Select an optimal setting for the super I/O device.

RS485 Auto Flow Support

Enable or disable the RS485 auto flow support.

Chapter 3

NCT6106D HW Monitor

This section monitors the hardware status.

```
              Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
    Advanced

      PC Health Status                                      Enable or Disable Smart
                                                            Fan.
      Smart Fan Function               [Enabled]
    ▶ Smart Fan Mode Configuration

      SYS Temperature                  : +40.5 C
      CPU Temperature                  : +39.0 C
      SysFan Speed                     : N/A
      CPUFan Speed                     : 8385 RPM
      VCore                            : +0.920 V
      APU VDDNB                        : +1.064 V
      DDR3 Voltage                     : +1.520 V
      +12V                             : +11.968 V
                                                            → ←:  Select Screen
                                                            ↑↓:    Select Item
                                                            Enter: Select
                                                            +/-:    Change Opt.
                                                            F1:     General Help
                                                            F2:     Previous Values
                                                            F3:     Optimized Defaults
                                                            F4:     Save Changes and
                                                                    Reset
                                                            ESC:  Exit

              Version 2.17.1246. Copyright (C) 2015 American Megatrends, Inc.
```

Smart Fan Mode Configuration

```
              Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
    Advanced

      Smart Fan Mode Configuration                          Smart Fan Moe Select.

      System Fan Mode                  [Thermal CruiseTM Mode]
      SysFan Temp Target               55
      SysFan Temp Tolerance            3

      CPU Fan Mode                     [Thermal CruiseTM Mode]
      CpuFan Temp Target               55
      CpuFan Temp Tolerance            3


                                                            → ←:  Select Screen
                                                            ↑↓:    Select Item
                                                            Enter: Select
                                                            +/-:    Change Opt.
                                                            F1:     General Help
                                                            F2:     Previous Values
                                                            F3:     Optimized Defaults
                                                            F4:     Save Changes and
                                                                    Reset
                                                            ESC:  Exit

              Version 2.17.1246. Copyright (C) 2015 American Megatrends, Inc.
```

System/CPU Fan Mode

Select the smart fan mode.

SysFan Temp Target

Enter the value for the system fan target temperature.

SysFan Temp Tolerance

Enter the value for the system fan tolerance temperature.

CpuFan Temp Target

Enter the value for the CPU fan target temperature.

CpuFan Temp Tolerance

Enter the value for the CPU fan tolerance temperature.

NCT6106D Super IO Features

This section is used to configure some control functions.

```
              Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
    Advanced

    NCT6106D Super IO Features                          Control the status when
                                                        power loss occurs.
    Power-Loss State              [Always off]
    Case Open Warning             [Disabled]
    WatchDog Count Mode           [Second]
    WatchDog TimeOut Value        0




                                                      → ←: Select Screen
                                                      ↑↓:   Select Item
                                                      Enter: Select
                                                      +/-:   Change Opt.
                                                      F1:    General Help
                                                      F2:    Previous Values
                                                      F3:    Optimized Defaults
                                                      F4:    Save Changes and
                                                             Reset
                                                      ESC:  Exit
              Version 2.17.1246. Copyright (C) 2015 American Megatrends, Inc.
```

Power-Loss State

Control the status when the power loss occurs.

Power 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.

Power 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.

Case Open Warning

Enable or disable the function of the case open warning.

WatchDog Count Mode

Select the watchdog count mode: second or minute.

WatchDog TimeOut Value

Enter the value to fill the watchdog timeout value. 0 means Disabled.

Serial Port Console Redirection

This section is used to configure the console redirection of serial COM port 1.

```
              Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
    Advanced

    COM 1                                              Console Redirection En-
    Console Redirection              [Disabled]        able or Disable.
  ▶ Console Redirection Settings

    RTL8111EP LAN (PCI Bus1, Dev2, Func0)
    Console Redirection              [Disabled]
  ▶ Console Redirection Settings



                                                      → ←: Select Screen
                                                      ↑↓:   Select Item
                                                      Enter: Select
                                                      +/-:   Change Opt.
                                                      F1:    General Help
                                                      F2:    Previous Values
                                                      F3:    Optimized Defaults
                                                      F4:    Save Changes and
                                                             Reset
                                                      ESC:  Exit
              Version 2.17.1246. Copyright (C) 2015 American Megatrends, Inc.
```

Console Redirection

Enable or disable the function of console redirection. When the console redirection is enabled, you will be able to configure the console redirection settings.

Console Redirection Settings

The settings specify how the host computer and the remote computer (which the user is using) will exchange data. Both computers should have the same or compatible settings.

```
              Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
    Advanced

    COM 1/RTL8111EP LAN (PCI Bus1, Dev2, Func0)        Emulation: ANSI:
                                                       Extended ASCII char set.
    Console Redirection Settings                       VT100: ASCII char set.
                                                       VT100+: Extends VT100
    Terminal Type                 [ANSI]               to support color, function
    Bits per second               [115200]            keys, ect. VT-UTFB: uses
    Data Bits                     [8]                  UTFB encoding to map
    Parity                        [None]               unicode chars onto 1 or
    Stop Bits                     [1]                  more bytes.
    Flow Control                  [None]
    VT-UTFB Combo Key Support     [Enabled]
    Recorder Mode                 [Disabled]
    Resolution 100x31             [Disabled]           → ←: Select Screen
    Legacy OS Redirection Resolution [80x25]           ↑↓:   Select Item
    Putty KeyPad                  [VT100]              Enter: Select
    Redirection After BIOS POST   [Always Enable]      +/-:   Change Opt.
                                                       F1:    General Help
                                                       F2:    Previous Values
                                                       F3:    Optimized Defaults
                                                       F4:    Save Changes and
                                                              Reset
                                                       ESC:  Exit
              Version 2.17.1246. Copyright (C) 2015 American Megatrends, Inc.
```

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Terminal Type

Select the terminal types.

VT100
ASCII char set

VT100+
Extend VT100+ to support color, function keys, etc.

VT-UTFB
Use UTFB encoding to map the unicode chars onto 1 or more bytes.

ANSI
Extend ASCII char set

Bits per second

Select the transmission speed of the serial port. The speed must be matched on the other side. Long or noisy lines may require lower speeds.

Data Bits

Enter the value for data bits.

Parity

A parity bit can be sent with the data bits to detect some transmission errors.

Even
Parity bit is 0 if the num of 1's in the data bits is even.

Odd
Parity bit is 0 if the num of 1's in the data bits is odd.

Mark
Parity bit is always 1.

Space
Parity bit is always 0.

Mark and Space parity do not allow for error detection.

Stop Bits

Stop bits indicate the end of a serial data packet. (A start bit indicates the beginning.) The standard setting is 1 stop bit. Communication with slow devices may require more than 1 stop bit.

Flow Control

Flow control can prevent the data losss from the buffer overflow. When sending data, if the receiving buffers are full, a "stop" signal can be sent to stop the data flow. Once the buffers are empty, a "start" signal can be sent to re-start the flow. The hardware flow control uses two wires to send start/stop signals.

VT-UTFB Combo Key Support

Enable or disable the support of VT-UTFB combination key for ANSI/VT100 terminals.

Recorder Mode

Text will be sent on the Enabled mode to capture the terminal data.

Resolution 100x31

Enable or disable the extended terminal resolution.

Legacy OS Redirection Resolution

On the Legacy OS, the number of Rows and Columns supported redirection.
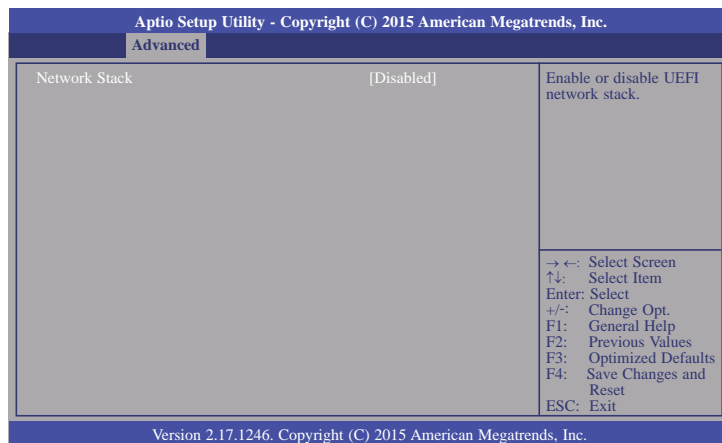
Putty KeyPad

Select the function key and key pad on Putty.

Redirection After BIOS POST

The settings specify if BootLoader is selected than Legacy console redirection which is disabled before booting to the Legacy OS. Default value is Always Enable which means that Legacy Console Redirection is enabled for the Legacy OS.
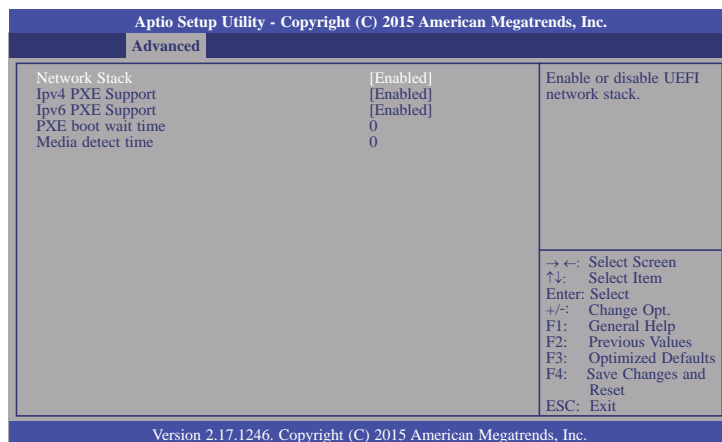
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Network Stack

This section configures settings relevant to the network stack.

```
Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
 Advanced
 Network Stack                    [Disabled]          Enable or disable UEFI
                                                      network stack.




                                                      → ←:  Select Screen
                                                      ↑↓:   Select Item
                                                      Enter: Select
                                                      +/-:   Change Opt.
                                                      F1:    General Help
                                                      F2:    Previous Values
                                                      F3:    Optimized Defaults
                                                      F4:    Save Changes and
                                                             Reset
                                                      ESC:  Exit
       Version 2.17.1246. Copyright (C) 2015 American Megatrends, Inc.
```

Network Stack

Enable or disable UEFI network stack.

```
Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
 Advanced
 Network Stack                    [Enabled]           Enable or disable UEFI
 Ipv4 PXE Support                 [Enabled]           network stack.
 Ipv6 PXE Support                 [Enabled]
 PXE boot wait time               0
 Media detect time                0




                                                      → ←:  Select Screen
                                                      ↑↓:   Select Item
                                                      Enter: Select
                                                      +/-:   Change Opt.
                                                      F1:    General Help
                                                      F2:    Previous Values
                                                      F3:    Optimized Defaults
                                                      F4:    Save Changes and
                                                             Reset
                                                      ESC:  Exit
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```

Network Stack

Enable or disable UEFI network stack.

Ipv4 PXE Support

When enabled, Ipv4 PXE boot supports. When disabled, Ipv4 PXE boot option will not be created.

Ipv6 PXE Support

When enabled, Ipv6 PXE boot supports. When disabled, Ipv6 PXE boot option will not be created.
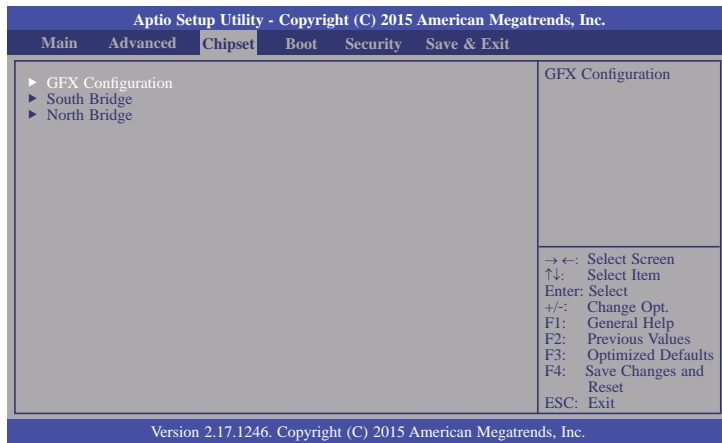
PXE boot wait Time

Enter the value for the wait time to press <ESC> key to abort the PXE boot.
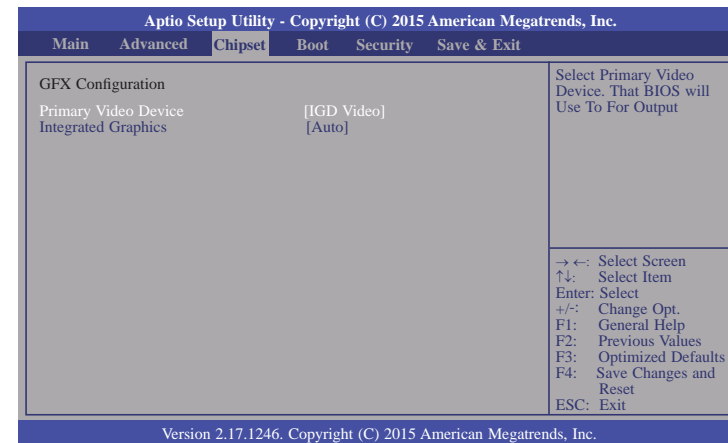
Media detect Time

Enter the value for the wait time in second to detect the PXE media.

Chipset

This section configures relevant chipset functions.

```
                    Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
     Main    Advanced    Chipset    Boot    Security    Save & Exit

 ▶  GFX Configuration                                      GFX Configuration
 ▶  South Bridge
 ▶  North Bridge




                                                          →←:  Select Screen
                                                          ↑↓:    Select Item
                                                          Enter: Select
                                                          +/-:   Change Opt.
                                                          F1:    General Help
                                                          F2:    Previous Values
                                                          F3:    Optimized Defaults
                                                          F4:    Save Changes and
                                                                 Reset
                                                          ESC:  Exit

                    Version 2.17.1246. Copyright (C) 2015 American Megatrends, Inc.
```
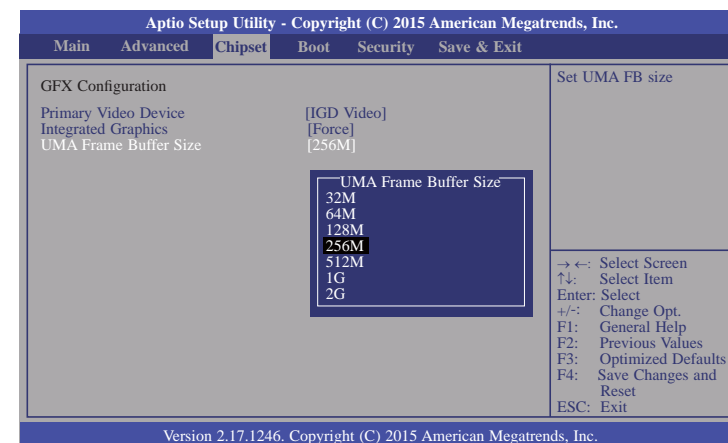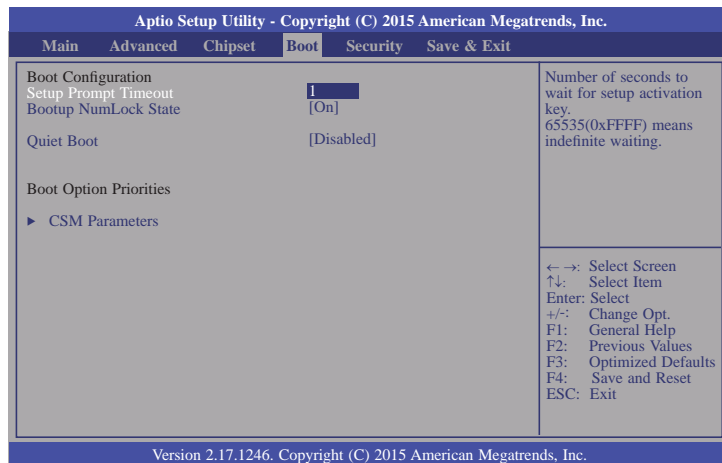
GFX Configuration

```
                    Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
     Main    Advanced    Chipset    Boot    Security    Save & Exit

 GFX Configuration                                        Select Primary Video
                                                          Device. That BIOS will
 Primary Video Device              [IGD Video]            Use To For Output
 Integrated Graphics               [Auto]



                                                          →←:  Select Screen
                                                          ↑↓:    Select Item
                                                          Enter: Select
                                                          +/-:   Change Opt.
                                                          F1:    General Help
                                                          F2:    Previous Values
                                                          F3:    Optimized Defaults
                                                          F4:    Save Changes and
                                                                 Reset
                                                          ESC:  Exit

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```

Primary Video Device

Select the primary video device: IGD Video or NB PCIe Slot Video. That BIOS will be used for display output.

Integrated Graphics

Enable the integrated graphics controller: Disabled, Auto or Force. When the integrated graphics controller is forced, you will be able to choose the UMA Frame Buffer Size.

```
                    Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
     Main    Advanced    Chipset    Boot    Security    Save & Exit

 GFX Configuration                                        Set UMA FB size

 Primary Video Device              [IGD Video]
 Integrated Graphics               [Force]
 UMA Frame Buffer Size             [256M]

                 ┌────── UMA Frame Buffer Size ──────┐
                 │  32M                               │
                 │  64M                               │
                 │  128M                              │
                 │  256M                              │
                 │  512M                              │        →←:  Select Screen
                 │  1G                                │        ↑↓:    Select Item
                 │  2G                                │        Enter: Select
                 └────────────────────────────────────┘       +/-:   Change Opt.
                                                          F1:    General Help
                                                          F2:    Previous Values
                                                          F3:    Optimized Defaults
                                                          F4:    Save Changes and
                                                                 Reset
                                                          ESC:  Exit

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```

South Bridge

```
              Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
    Main     Advanced    Chipset    Boot    Security    Save & Exit

                                                    Options for SATA
 ▶  SB SATA Configuration                           Configuration.
 ▶  SB USB Configuration
 ▶  SB HD Azalia Configuration




                                                    → ←:  Select Screen
                                                    ↑↓:    Select Item
                                                    Enter: Select
                                                    +/-:    Change Opt.
                                                    F1:     General Help
                                                    F2:     Previous Values
                                                    F3:     Optimized Defaults
                                                    F4:     Save Changes and
                                                            Reset
                                                    ESC:  Exit

         Version 2.17.1246. Copyright (C) 2015 American Megatrends, Inc.
```

SB SATA Configuration

```
              Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
    Main     Advanced    Chipset    Boot    Security    Save & Exit

 OnChip SATA Channel            [Enabled]
 OnChip SATA Type               [Native IDE]




                                                    → ←:  Select Screen
                                                    ↑↓:    Select Item
                                                    Enter: Select
                                                    +/-:    Change Opt.
                                                    F1:     General Help
                                                    F2:     Previous Values
                                                    F3:     Optimized Defaults
                                                    F4:     Save Changes and
                                                            Reset
                                                    ESC:  Exit

         Version 2.17.1246. Copyright (C) 2015 American Megatrends, Inc.
```

OnChip SATA Channel

This field is used to enable or disable the SATA function.

OnChip SATA Type

This field is used to configure the SATA drives in the Native IDE or AHCI mode.

SB USB Configuration

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Chipset		

```
USB3.0 Port 0            [Enabled]
USB3.0 Port 1            [Enabled]
USB3.0 Port 2            [Enabled]
USB3.0 Port 3            [Enabled]

USB2.0 Port 0            [Enabled]
USB2.0 Port 1            [Enabled]
USB2.0 Port 2            [Enabled]
USB2.0 Port 3            [Enabled]

                                         →←:  Select Screen
                                         ↑↓:    Select Item
                                         Enter: Select
                                         +/-:   Change Opt.
                                         F1:    General Help
                                         F2:    Previous Values
                                         F3:    Optimized Defaults
                                         F4:    Save Changes and
                                                Reset
                                         ESC:  Exit
```

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North Bridge

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Main	Advanced	Chipset	Boot	Security	Save & Exit

```
North Bridge Configuration              View Information related
                                        to Socket 0.
Memory Information

Total Memory: 4080MB (DDR3)
► Socket 0 Information

                                         →←:  Select Screen
                                         ↑↓:    Select Item
                                         Enter: Select
                                         +/-:   Change Opt.
                                         F1:    General Help
                                         F2:    Previous Values
                                         F3:    Optimized Defaults
                                         F4:    Save Changes and
                                                Reset
                                         ESC:  Exit
```

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SB HD Azalia Configuration

Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.					
Main	Advanced	Chipset	Boot	Security	Save & Exit

```
HD Audio Azalia Device        [Enabled]




                                         →←:  Select Screen
                                         ↑↓:    Select Item
                                         Enter: Select
                                         +/-:   Change Opt.
                                         F1:    General Help
                                         F2:    Previous Values
                                         F3:    Optimized Defaults
                                         F4:    Save Changes and
                                                Reset
                                         ESC:  Exit
```

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Socket 0 Information

Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.					
Main	Advanced	Chipset	Boot	Security	Save & Exit

```
Socket 0 Information

  Starting Address: 0 KB
   Ending Address: 4194303 KB

DDR3_1: size=4096 MB; Dimm speed=1333 MHz, conf speed=1333 MHz
DDR3_2: Not Present

                                         →←:  Select Screen
                                         ↑↓:    Select Item
                                         Enter: Select
                                         +/-:   Change Opt.
                                         F1:    General Help
                                         F2:    Previous Values
                                         F3:    Optimized Defaults
                                         F4:    Save Changes and
                                                Reset
                                         ESC:  Exit
```

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Boot

Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.					
Main	Advanced	Chipset	Boot	Security	Save & Exit

```
Boot Configuration
Setup Prompt Timeout            1
Bootup NumLock State            [On]

Quiet Boot                      [Disabled]


Boot Option Priorities

▶  CSM Parameters
```

Number of seconds to wait for setup activation key.
65535(0xFFFF) means indefinite waiting.

```
← →:  Select Screen
↑↓:    Select Item
Enter: Select
+/-:    Change Opt.
F1:     General Help
F2:     Previous Values
F3:     Optimized Defaults
F4:      Save and Reset
ESC:  Exit
```

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Setup Prompt Timeout

Select 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

Enable or disable the quiet boot function.

CSM Parameters

Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.					
Main	Advanced	Chipset	Boot	Security	Save & Exit

```
Launch CSM                      [Enabled]
Boot Option Filter              [UEFI and Legacy]
Launch PXE OpROM policy         [Do not launch]
Launch Storage OpROM policy     [Legacy only]
Launch Video OpROM policy       [Legacy only]
```

This option controls if CSM will be launched.

```
→ ←:  Select Screen
↑↓:    Select Item
Enter: Select
+/-:    Change Opt.
F1:     General Help
F2:     Previous Values
F3:     Optimized Defaults
F4:     Save Changes and
        Reset
ESC:  Exit
```

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Boot Option Filter

This option controls what devices system can boot to.

Launch PXE OpROM policy

Controls the execution of UEFI and Legacy PXE OpROM.

Launch Storage OpROM policy

Controls the execution of UEFI and Legacy storage OpROM.

Launch Video OpROM policy

Controls the execution of UEFI and Legacy video OpROM.

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Security


```
                Aptio Setup Utility - Copyright (C) 2015 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

   Administrator Password
   User Password                                           → ←:  Select Screen
                                                           ↑↓:   Select Item
                                                           Enter: Select
                                                           +/-:  Change Opt.
                                                           F1:   General Help
                                                           F2:   Previous Values
                                                           F3:   Optimized Defaults
                                                           F4:   Save Changes and
                                                                 Reset
                                                           ESC:  Exit

                Version 2.17.1246. Copyright (C) 2015 American Megatrends, Inc.
```

Administrator Password

Sets the administrator password.

User Password

Sets the user password.

Save & Exit


```
                Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
   Main      Advanced    Chipset    Boot    Security    Save & Exit

   Save Changes and Reset                                  Reset the system after sav-
   Discard Changes and Reset                               ing the changes.

   Save Options
   Save Changes
   Discard Changes

   Restore Defaults
   Save as User Defaults
   Restore User Defaults

   Boot Override                                           → ←:  Select Screen
                                                           ↑↓:   Select Item
                                                           Enter: Select
                                                           +/-:  Change Opt.
                                                           F1:   General Help
                                                           F2:   Previous Values
                                                           F3:   Optimized Defaults
                                                           F4:   Save Changes and
                                                                 Reset
                                                           ESC:  Exit

                Version 2.17.1246. Copyright (C) 2015 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.

Save Changes

Save the changes done so far to any of the setup options.

Discard Changes

Discard changes done so far to any of the setup options.

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.

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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)2011 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>
```

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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.
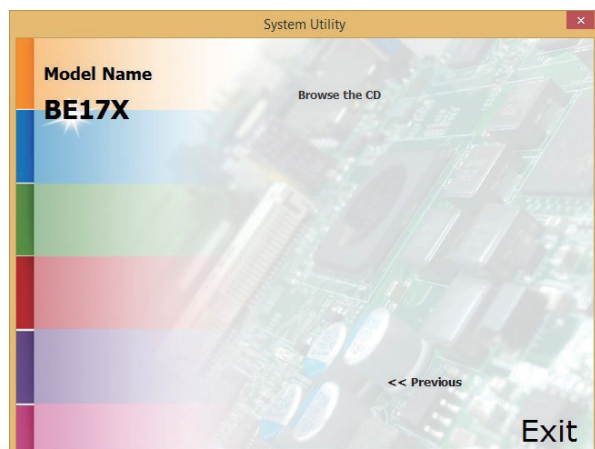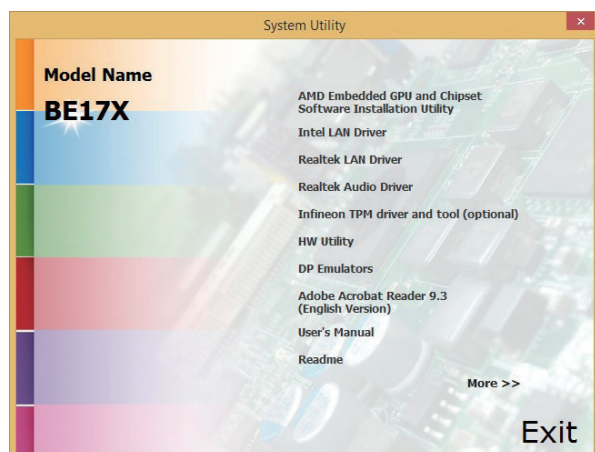
For Windows 8.1

For Windows 7
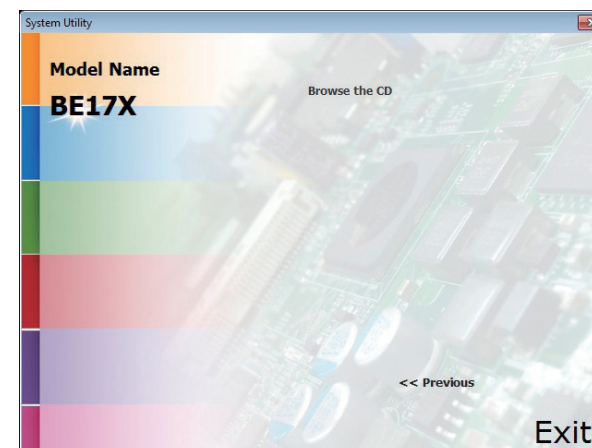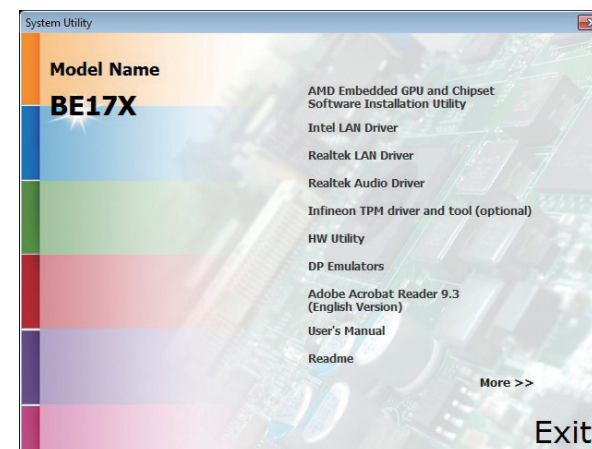
Note:

This step can be ignored if the applications are standalone files.

AMD Embedded GPU and Chipset Software Installation Utility

To install the driver, click "AMD Embedded GPU and Chipset Software Installation Utility" on the main menu.

1. Select the language you would like the installation to display and then click Next.

2. Click Express and then click Next.

3. After completing installation, click Finish.

Intel LAN Driver

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

1. Setup is now ready to install the LAN driver. Click Next.
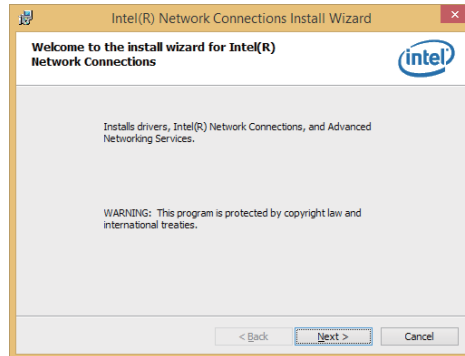
2. Click "I accept the terms in the license agreement" then click Next.

3. Select the program features you want to install then click Next.
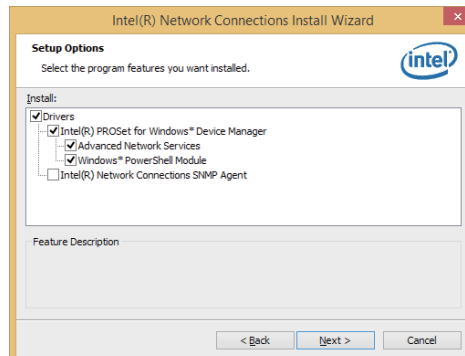
4. Click Install to begin the installation.

5. After completing installation, click Finish.

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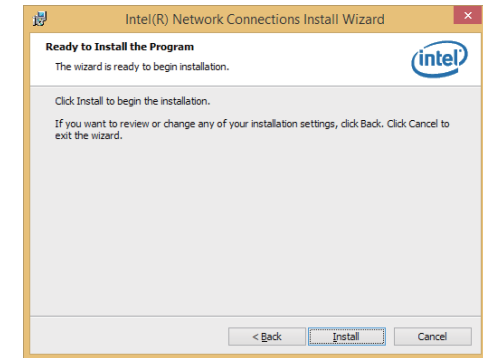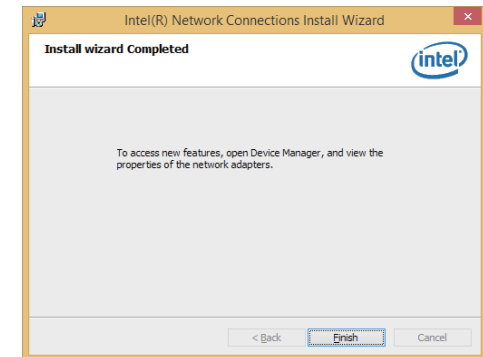
Realtek LAN Drivers

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

1. Setup is ready to install the driver. Click Next.
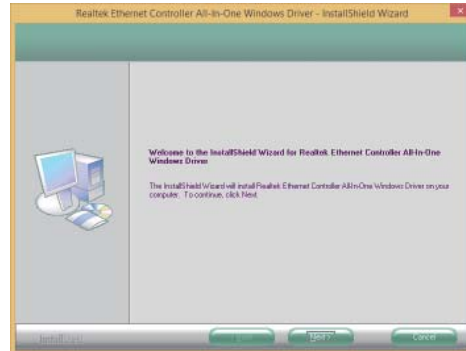
3. Select the program features you want to install then click Next.
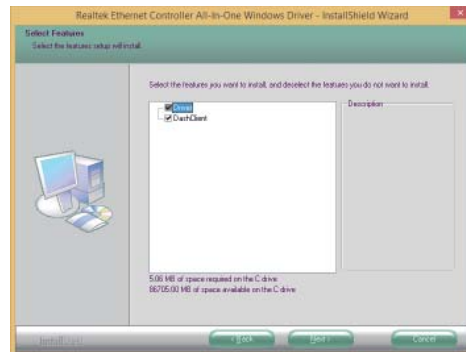
3. Click Install to begin the instal-lation.
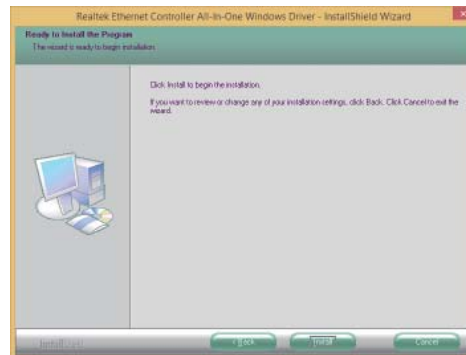
4. After completing installation, click Finish.

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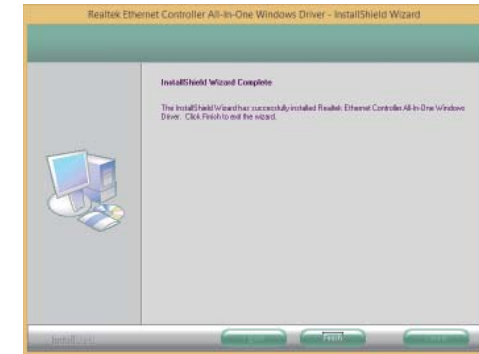
Realtek Audio Driver

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

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

2. Follow the remainder of the steps on the screen; clicking "Next" each time you finish a step.

3. Click "Yes, I want to restart my computer now" then click Finish.

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

TPM Driver and Tool (optional)

To install the driver, click "Infineon TPM driver and tool (optional)" on the main menu.

1. Read the message and click Yes.
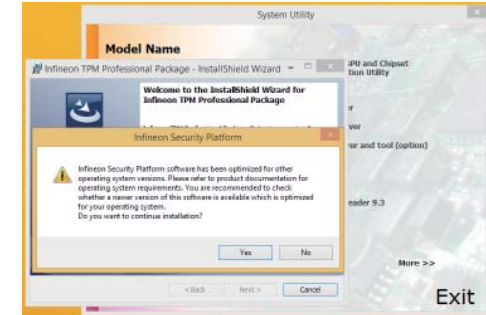
2. The setup program is preparing to install the driver.
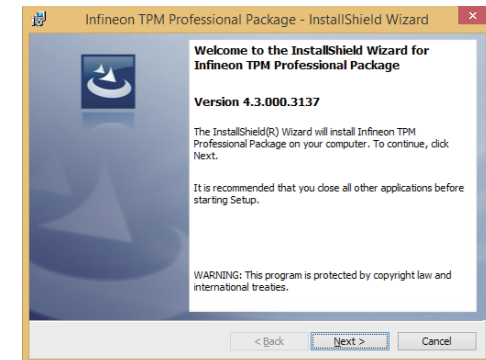
3. Click "I accept the terms in the license agreement" and then click "Next".

50
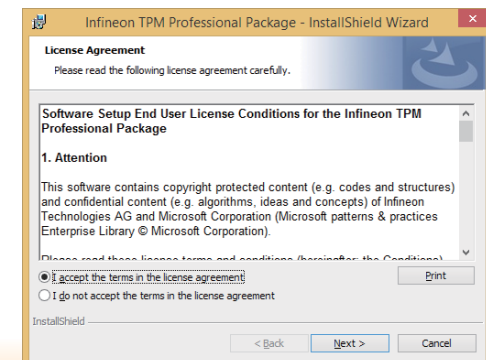
4. Enter the necessary information and then click Next.

5. Select a setup type and then click Next.

6. Click Install to begin the installation.

8. The installation is completed and click Finish.

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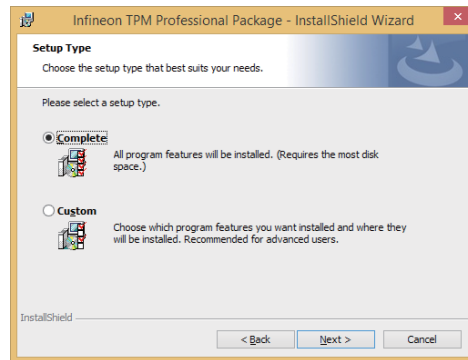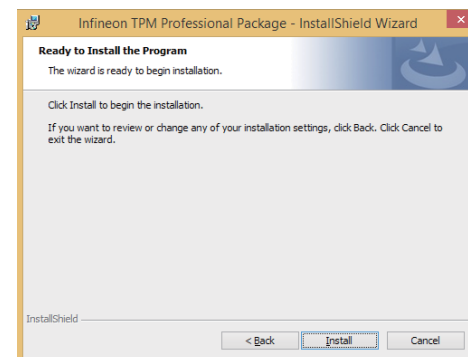
HW Utility

HW Utility provides information about the board, HW Health, Watchdog, and DIO. To access the utility, click "HW 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 install the HW Utility drifer. Click Next.

2. Click "I accept the terms in the license agreement" and then click Next.
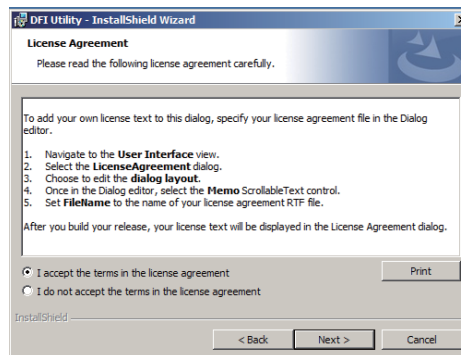
3. Enter "User Name" and "Organization" information and then click Next.
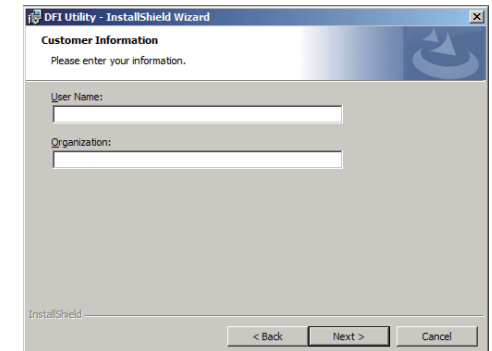
4. Click Install to begin the installation.
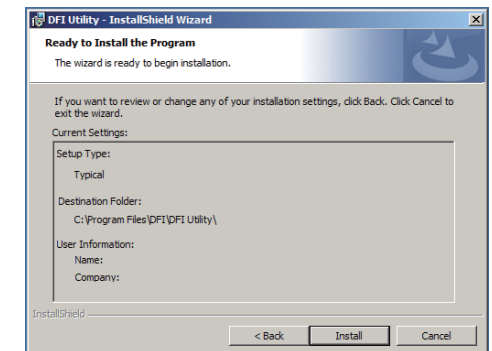
5. After completing installation, click Finish.
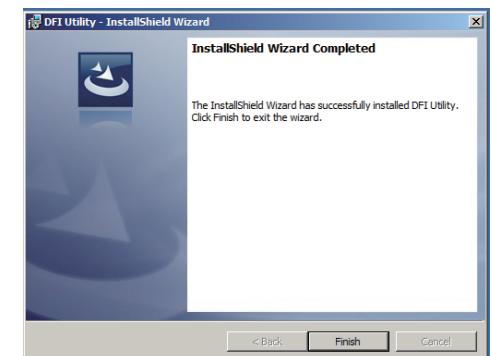
The DFI Utility icon will appear on the desktop. Double-click the icon to open the utility.

Information

HW Health Set

HW Health

WatchDog

DIO

DP Emulators

1. Introduction
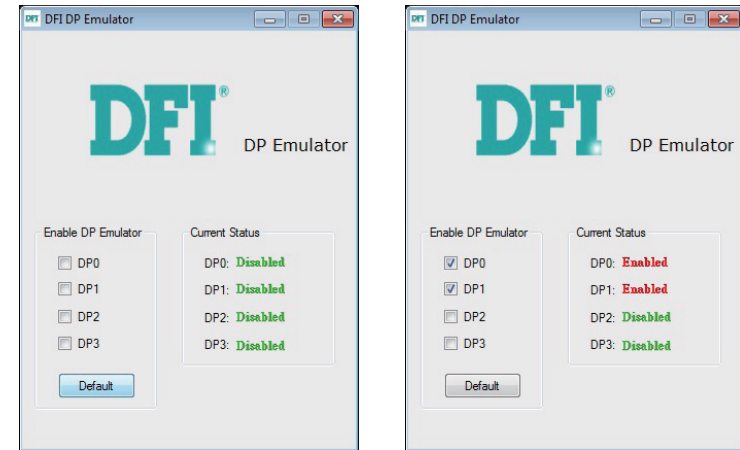
DP Emulator carries out the simulation on four DP ports of BE170/BE171/BE173 respectively. Current Status indicates that the simulation on all DP ports is enabled or disabled.

Disable: means the simulation does not work. All DP ports will not be simulated and stay on the usual status.
Enable: means the simulation works. The signal of the specific DP port will be simulated.

I. When the simulation works on the specific DP port, the signal will be simulated. Even though the DP port is disconnected to the screen, the system still detects the connection between them.

II. If you use more than one DP port and enable the DP Emulator on the specific DP port, even though the cable connected the DP port to the screen is removed, the system still detects the connection between the DP port and the screen and will not rearrange the order of all DP ports.

III.Customers' settings will be memorized when the DP Emulator is disabled. While restarting the system or shutting down and restarting the system, this tool will automatically carry out the memorized settings.

2. Status
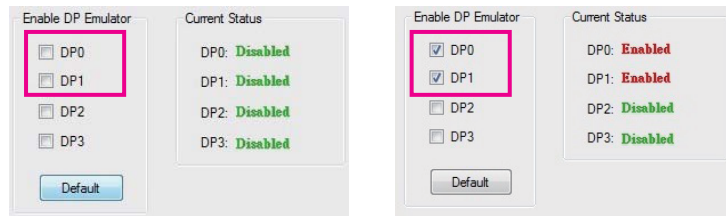
I. The block of Enable DP Emulator is used to set the present status of the specific DP port. Checked means the simulation on the DP port is enabled; unchecked means disabled.
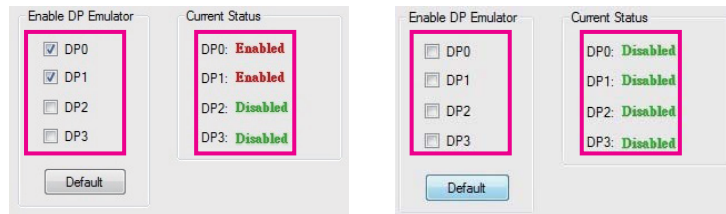
II. When you click the "Default" button, all DP ports will be set to **Disabled**.

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.
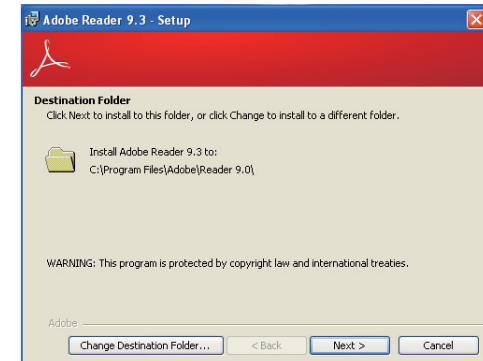
2. Click Install to begin installation.
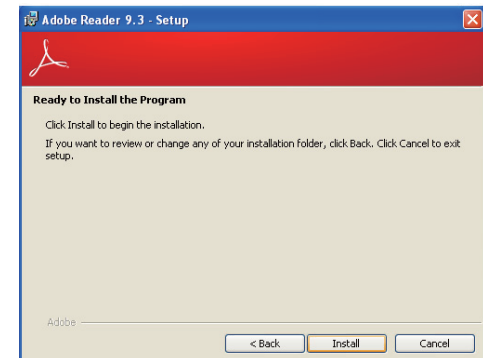
3. Click Finish to exit installation.

55
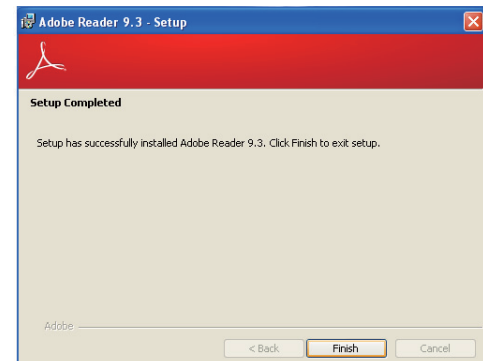
Chapter 5 - Digital I/O Programming Guide

Register Description

The Input Port Register (register 0) reflects the incoming logic levels of the pins, regardless of whether the pin if defined as an input or output by the Configuration Register. They act only on the red operation. Writes to this register have no effect. The default value (X) is determined by the externally applied logic level. Before a red operation, a write transmission is sent with the command byte to indicate to the I²C device that the Input Port Regiser will be accessed next.

Register 0 (Input Port Register)

BIT	I-7	I-6	I-5	I-4	I-3	I-2	I-1	I-0
DEFAULT	X	X	X	X	X	X	X	X

The Onput Port Register (register 1) shows the outgoing logic levels of the pins defined as outputs by the Configuration Register. Bit values in this register have no effect on pins defined as inputs. In turns, reads from this register reflect the value that is in the flip-flop contolling the output selection, not the actual pin value.

Register 1 (Onput Port Register)

BIT	O-7	O-6	O-5	O-4	O-3	O-2	O-1	O-0
DEFAULT	1	1	1	1	1	1	1	1

The Polarity Inversion Register (register 2) allows polarity inversion of the pins defined as inputs by the Configuration Register. If a bit in this register is set (written with 1), the corresponding port pin's polarity is inverted. If a bit in this register is clear (written with a 0), the corresponding port pin's original polarity is retained.

Register 2 (Polarity Inversion Register)

BIT	N-7	N-6	N-5	N-4	N-3	N-2	N-1	N-0
DEFAULT	0	0	0	0	0	0	0	0

The Configuration Register (register 3) configures the direction of the I/O pins. If a bit in this register is set to 1, the corresponding port pin is enabled as an input with a high-impedence output driver. If a bit in this register is cleared to 0, the corresponding port is enabled as an input.

Register 3 (Configuration Register)

BIT	C-7	C-6	C-5	C-4	C-3	C-2	C-1	C-0
DEFAULT	1	1	1	1	1	1	1	1

Function Description

I2CWriteByte(SlaveAddr, SubAddr, Data):
Write a Byte data to a specified I2C Device.

I2CReadByte(SlaveAddr, SubAddr, *Data):
Read a Byte data from a specified I2C Device.

SetBit(*Data, Bit) :
Set Data bit n as "1".

ClrBit(*Data, Bit) :
Set Data bit n as "0".

GetBit(Data, Bit) :
Return the value of data bit n.

Sample Code

GPIO Configuration

```
#define SLAVE_ADDR          0x42
#define INPUT_PORT          0x00
#define OUTPUT_PORT         0x01
#define INVERSION_PORT      0x02
#define COMFIG_PORT         0x03

GpioConfig(int PinNum, int Mode)
{
    BYTE Data;
    BYTE TempPinNum = PinNum%8;

    //Pin0-7 Input/Output Configuration
    I2C_ReadByte(SLAVE_ADDR, CONFIG_PORT, &Data);
    if(Mode == 1){SetBit(&Data, TempPinNum);} //Input
    else          {ClrBit(&Data, TempPinNum);} //Output
    I2C_WriteByte(SLAVE_ADDR, CONFIG_PORT, Data);

    return 1;
```

GPIO Output Process

```
#define SLAVE_ADDR          0x42
#define INPUT_PORT          0x00
#define OUTPUT_PORT         0x01
#define INVERSION_PORT      0x02
#define COMFIG_PORT         0x03

GpioOut(int PinNum, int Level)
{
    BYTE Data;
    BYTE TempPinNum = PinNum%8;

    //Pin0-7
    I2C_ReadByte(SLAVE_ADDR, OUTPUT_PORT, &Data);
    if(Level == 0){ClrBit(&Data, TempPinNum);}
    else          {SetBit(&Data, TempPinNum);}
    I2C_WriteByte(SLAVE_ADDR, OUTPUT_PORT, Data);

    return 1;
```

GPIO Iutput Process

```
#define SLAVE_ADDR          0x42
#define INPUT_PORT          0x00
#define OUTPUT_PORT         0x01
#define INVERSION_PORT      0x02
#define COMFIG_PORT         0x03

GpioIn(int PinNum, int *Status)
{
    BYTE Data;
    BYTE Group = PinNum/8;
    BYTE TempPinNum = PinNum%8;

    //Pin0-7
    I2C_ReadByte(SLAVE_ADDR, INPUT_PORT, &Data);
    *Status = GetBit(Data, TempPinNum);

    return 1;
```

Appendix A - Watchdog Sample Code

```
;Software programming example:

;-------------------------------------------
;(1) Enter Super IO Configuration mode
;-------------------------------------------
MOV        DX,4EH
MOV        AL,87H
OUT        DX,AL
OUT        DX,AL


;-----------------------------------------------------------------------------------
;(2) Configuration Logical Device 8, register CRF0/CRF1 (WDT Control/WDT
timer)
;-----------------------------------------------------------------------------------
MOV        DX,4EH
MOV        AL,07H          ;Ready to Program Logical Device
OUT        DX,AL

MOV        DX,4FH
MOV        AL,08H          ;Select Logical Device 8
OUT        DX,AL

MOV        DX,4EH
MOV        AL, F1H         ;Select watchdog timer register
OUT        DX,AL

MOV        DX,4FH
MOV        AL,10H          ;Set watchdog timer value
OUT        DX,AL

MOV        DX,4EH
MOV        AL, F0H         ;Select watchdog Control Register
OUT        DX,AL

MOV        DX,4FH
MOV        AL,02H          ;Set Watchdog Control Value
OUT        DX,AL

;-----------------------------------------------------------
;(1) Exit extended function mode
;-----------------------------------------------------------
MOV        DX,4EH
MOV        AL,AAH
OUT        DX,AL
```

Appendix B - 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 C - 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.

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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.