DFI®

BW171/173
Mini-ITX Industrial Motherboard
User's Manual

Copyright

This publication contains information that is protected by copyright. No part of it may be reproduced in any form or by any means or used to make any transformation/adaptation without the prior written permission from the copyright holders.

This publication is provided for informational purposes only. The manufacturer makes no representations or warranties with respect to the contents or use of this manual and specifically disclaims any express or implied warranties of merchantability or fitness for any particular purpose. The user will assume the entire risk of the use or the results of the use of this document. Further, the manufacturer reserves the right to revise this publication and make changes to its contents at any time, without obligation to notify any person or entity of such revisions or changes.

Changes after the publication's first release will be based on the product's revision. The website will always provide the most updated information.

Trademarks

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

FCC and DOC Statement on Class B

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

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio TV technician for help.

Notice:

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

Table of Contents

About this Manual

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

Warranty

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

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

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

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

Static Electricity Precautions

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

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

2. Wear an antistatic wrist strap.

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

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

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

> **Important:**
> Electrostatic discharge (ESD) can damage your processor, disk drive and other components. Perform the upgrade instruction procedures described at an ESD workstation only. If such a station is not available, you can provide some ESD protection by wearing an antistatic wrist strap and attaching it to a metal part of the system chassis. If a wrist strap is unavailable, establish and maintain contact with the system chassis throughout any procedures requiring ESD protection.

Safety Measures

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

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

About the Package

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

- 1 BW171/BW173 motherboard
- 1 COM port cable
- 1 Serial ATA data with power cable
- 1 Heat sink

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 2.0 port cable
- USB 3.0 port cable
- COM port cable
- Serial ATA data with power cable
- Power adapter (100W, 12V)
- Power adapter (120W, 19V)
- LPC EXT-RS232 module (4 x RS232 ports)
- LPC EXT-RS485 module (4 x RS485 ports)
- I/O shield
- DT122 Chassis

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, DVD-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

SYSTEM	Processor	Intel® Pentium®/Celeron® Processor N3000 Family, BGA 1170 (*)
		Intel® Atom™ Processor x5-E8000, Quad Core, 2M Cache, 1.04GHz, 5W
		Intel® Pentium® Processor N3710, Quad Core, 2M Cache, 1.6GHz (2.56GHz), 6W
		Intel® Celeron® Processor N3160, Quad Core, 2M Cache, 1.6GHz (2.24GHz), 6W
		Intel® Celeron® Processor N3060, Dual Core, 2M Cache, 1.6GHz (2.48GHz), 6W
		Intel® Celeron® Processor N3010, Dual Core, 2M Cache, 1.04GHz (2.24GHz), 4W
	Memory	Two 204-pin SODIMM up to 8GB Dual Channel DDR3L 1600MHz
	BIOS	Insyde SPI 64Mbit
GRAPHICS	Controller	Intel® HD Graphics
	Feature	OpenGL 4.2, Direct X 11.1, OpenCL 1.2, OGL ES 3.0
		HW Decode: H.264, MPEG2, VC1, VP8, H.265, MPEG4
		HW Encode: H.264, MPEG2, MPEG4
	Display	1 x VGA
		1 x LVDS
		1 x DP++/eDP (eDP available upon request)
		VGA: resolution up to 2560x1600 @ 60Hz
		LVDS: dual channel 48-bit, resolution up to 1920x1200 @ 60Hz
		DP: resolution up to 3840x2160 @ 30Hz or 2560x1600 @ 60Hz
		eDP: resolution up to 2560x1440 @ 60Hz
	Triple Displays	VGA + LVDS + DP++
		VGA + LVDS + eDP (available upon request)
EXPANSION	Interface	1 x PCIe x1 (Gen 2)
		1 x Full-size Mini PCIe (PCIe/USB)
		1 x Full-size mSATA (USB/SATA)
		1 x SIM
AUDIO	Audio Codec	Realtek ALC888 5.1-channel
ETHERNET	Controller	2 x Intel® I211AT PCIe (10/100/1000Mbps)
REAR I/O	Ethernet	2 x GbE (RJ-45)
	USB	2 x USB 3.0
		2 x USB 2.0
	Display	1 x VGA
		1 x DP++
	Audio	1 x Line-out
INTERNAL I/O	Serial	1 x RS-232/422/485 (RS-232 w/ power) (2.0mm pitch)
		3 x RS-232 (2.0mm pitch)
	USB	2 x USB 3.0 (2.0mm pitch)
		2 x USB 2.0 (2.0mm pitch)
		1 x USB 2.0: 2.54mm or type A Vertical USB 2.0 (optional)
	Display	1 x LVDS LCD Panel Connector
		1 x LCD/Inverter Power
		1 x eDP LCD Panel (available upon request)
	Audio	1 x Audio (Line-out/Mic-in)
		1 x S/PDIF
	SATA	2 x SATA 3.0 (up to 6Gb/s) (SATA port 1 multiplexed with mSATA)
		2 x SATA Power
	DIO	1 x 8-bit DIO
	LPC	1 x LPC (supports LPC EXT-RS232/RS485 module)
	SMBus	1 x SMBus

WATCHDOG TIMER	Output & Interval	System Reset, Programmable via Software from 1 to 255 Seconds
SECURITY	TPM	Available Upon Request
POWER	Type	Single 12V +/-10% DC (BW171) Wide Range 15~36V (BW173)
	Connector	DC-in Jack Right Angle Connector (4-pin) (available upon request)
		Vertical Type Connector (4-pin) (available upon request)
	Consumption	BW171
		Typical: N3710:12V @ 0.436A (5.23Watt)
		Max.: N3710:12V @ 0.658A (7.90Watt)
		BW173
		Typical: N3710:19V @ 0.186A (3.53Watt)
		Max.: N3710:19V @ 0.398A (7.56Watt)
	RTC Battery	Lithium 3V (210mAH)
OS SUPPORT	Microsoft	Windows 7 (/WES7) 32/64-bit
		Windows 8.1 (64-bit)
		Windows 10 IoT Enterprise 32/64-bit
	Linux	Debian 8 (with VESA graphic driver)
		CentOS 7 (with VESA graphic driver)
		Ubuntu 15.10 (Intel graphic driver available)
ENVIRONMENT	Temperature	Operating: 0 to 60°C Storage: -40 to 85°C
	Humidity	Operating: 10 to 90% RH Storage: 10 to 90% RH
	MTBF	BW171 : 357,014 hrs @ 25°C; 209,779 hrs @ 45°C ; 132,472 hrs @ 60°C
		BW173 : 353,593 hrs @ 25°C; 207,418 hrs @ 45°C ; 130,956 hrs @ 60°C
		Calculation model: Telcordia Issue 2, Method I Case 3
		Environment: GB, GC – Ground Benign, Controlled
MECHANICAL	Dimensions	Mini-ITX Form Factor 170mm (6.7") x 170mm (6.7")
	Height	PCB: 1.6mm Top Side: TBD, Bottom Side: TBD

*When PXE function is used with the UEFI boot type, the client screen might display partial screen if the PXE server employs a graphical user interface (GUI)-based management interface. This problem is due to resolution compatibility between the server and the client.

6

Features

- **Watchdog Timer**

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

- **DDR3L**

DDR3L is a higher performance DDR3 SDRAM interface providing less voltage and higher speed successor. DDR3L SDRAM modules support 1066/1600MHz for DDR modules. DDR3L delivers increased system bandwidth and improved performance to provide its higher bandwidth and its increase in performance at a lower power.

- **Graphics**

The integrated Intel® HD graphics engine delivers an excellent blend of graphics performance and features to meet business needs. It provides excellent video and 3D graphics with outstanding graphics responsiveness. These enhancements deliver the performance and compatibility needed for today's and tomorrow's business applications. Supports VGA, LVDS and DP++/eDP(eDP available upon request) interfaces for display outputs.

- **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 also supports high performance graphics infrastructure by enhancing the capability of a PCIe x1.

- **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**

Two Intel® I211AT PCI Express Gigabit Ethernet controllers support up to 1Gbps data transmission.

- **Audio**

The Realtek ALC888 audio codec provides 5.1-channel High Definition audio output.

- **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 (optional)**

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.

- **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.

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

7

- **RTC Timer**

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

- **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.

- **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.

8

Chapter 2 - Hardware Installation

Board Layout

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.

Features

- Two 204-pin SODIMM up to 8GB
- Dual Channel DDR3L 1600MHz

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.

> **Important:**
> 1. The DDR3L sockets support no mixed Raw Card.
> 2. For dual channel population, the two channels must be populated the same DRAM density, chip width, number ranks and dimm speed.

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 SODIMM socket on the system board.

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

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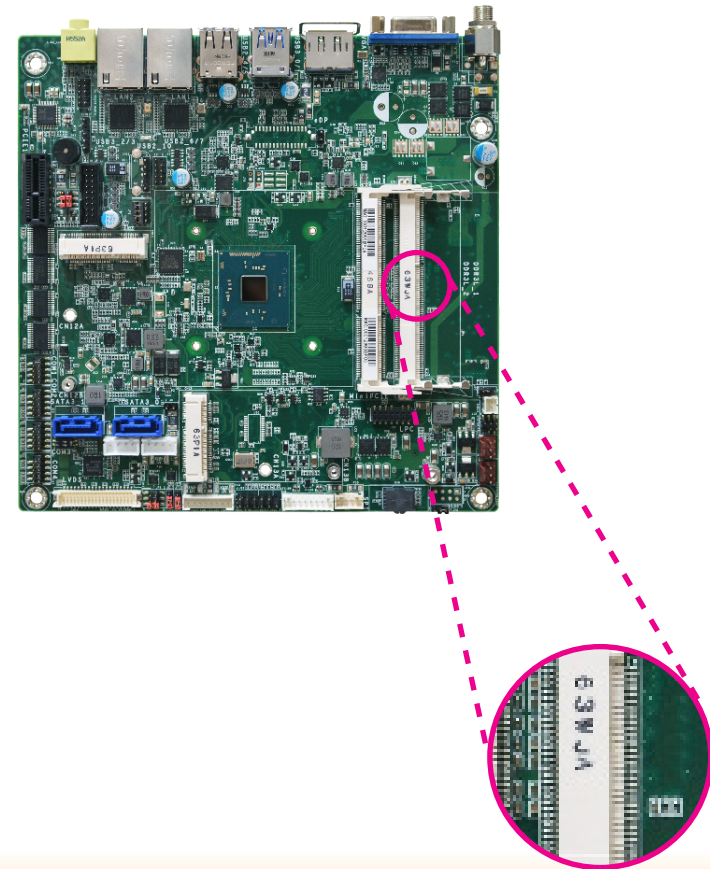
5. Grasping the module by its edges, align the module into the socket at an approximately 30 degrees angle. Apply firm even pressure to each end of the module until it slips down into the socket. The contact fingers on the edge of the module will almost completely disappear inside the socket.

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

Clip   Clip

Important:
When installing one DDR3L SODIMM only, make sure to install it into the SODIMM 1 socket.

Installing the Heat Sink

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

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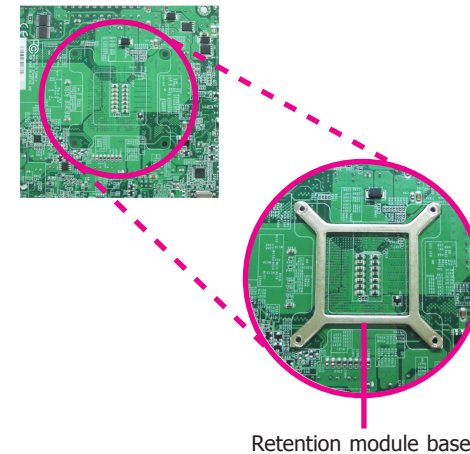
Retention module base

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

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

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

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

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

Mounting holes

Mounting screws
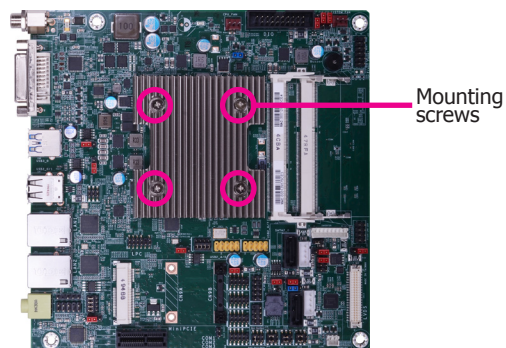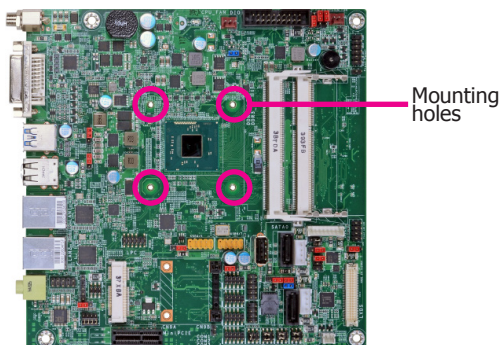
Jumper Settings

Clear CMOS Data

JP7

3
2
1

1-2 On: Normal (default)

3
2
1

2-3 On:
Clear CMOS Data
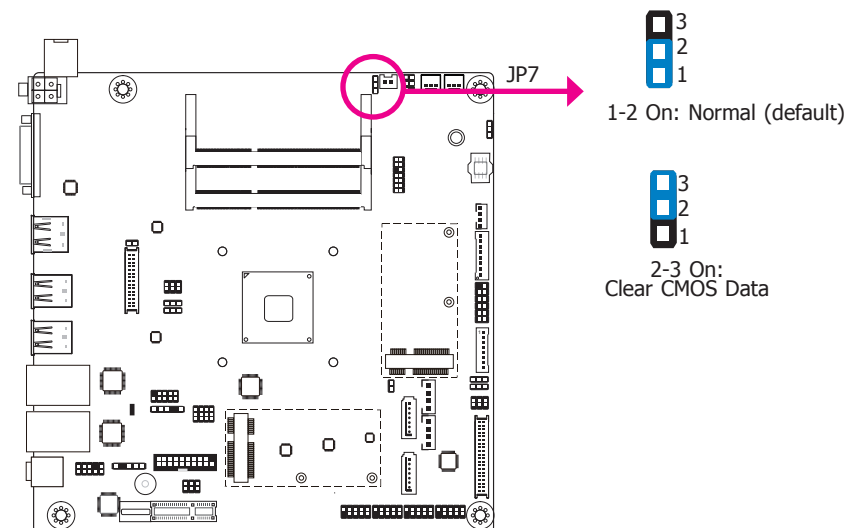
If you encounter that CMOS data becomes corrupted, you can reconfigure the system with the default values stored in the ROM BIOS.

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 JP7 pins 2 and 3 to On. Wait for a few seconds and set JP7 back to its default setting, pins 1 and 2 On.

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

SATA 1/mSATA Signal Select

3 12
1 10

1-4-7-10, 2-5-8-11 On:
SATA 1

JP5

3 12
1 10

2-5-8-11, 3-6-9-12 On:
mSATA (default)
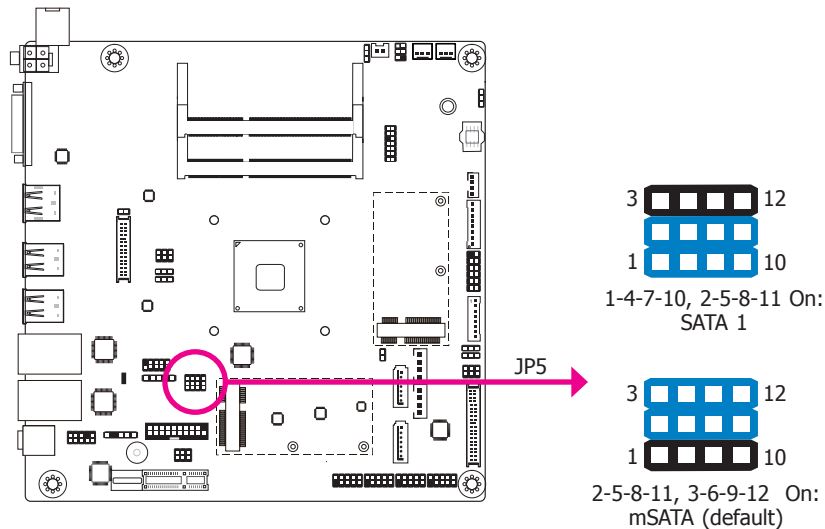
JP5 is designed to select the SATA or mSATA signal.

Auto Power-on Select

JP6

1
2
3

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

1
2
3

2-3 On:
Power-on via AC power
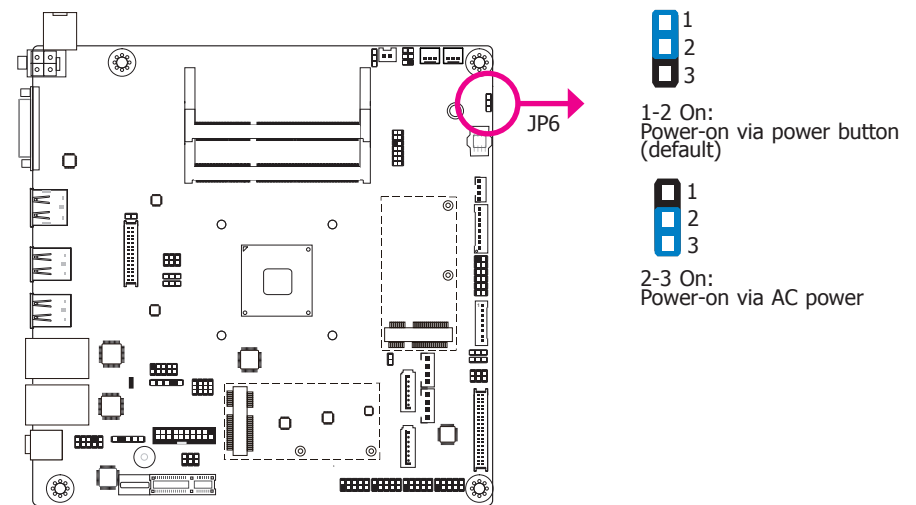
JP6 is used to select the method of powering-on the system. If you want the system to pow-er-on whenever AC power comes in, set JP6 pins 2 and 3 to On. If you want to use the power button, set pins 1 and 2 to On.

When using JP6 "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).

COM 1 RS232/Power Select

COM 1:
RS232/422/485

9
1
2

JP4

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

5 3 1
6 4 2
3-5 (+5V), 4-6 (+12V) On:
RS232 with power
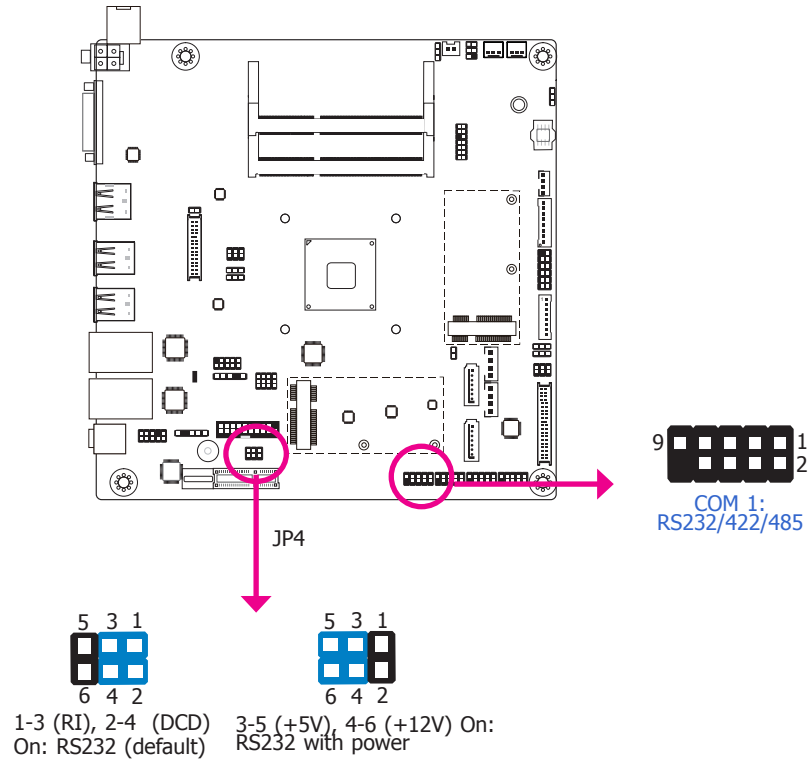
JP4 is used to configure the Serial COM port 1 to pure RS232 or RS232 with power.

LCD/Inverter Power Select

JP9

3 2 1
1-2 On:
+12V (default)

3 2 1
2-3 On: +5V
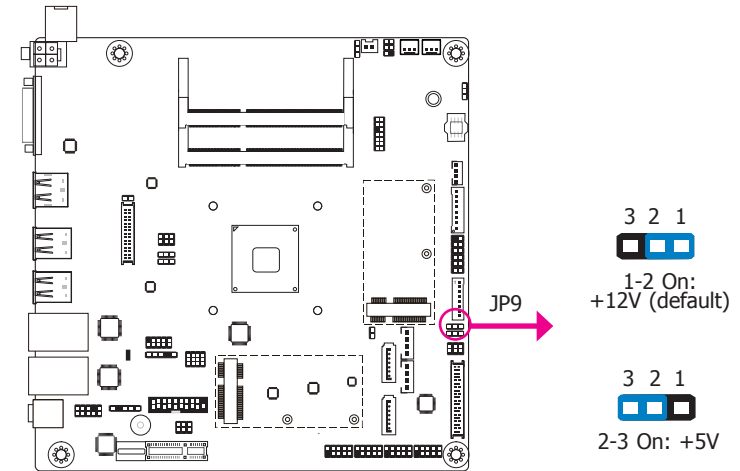
JP9 is used to select the power level of LVDS LCD inverter connector.

Backlight Power Select

3 2 1

1-2 On: +3.3V
(default)

JP10

3 2 1

2-3 On: +5V
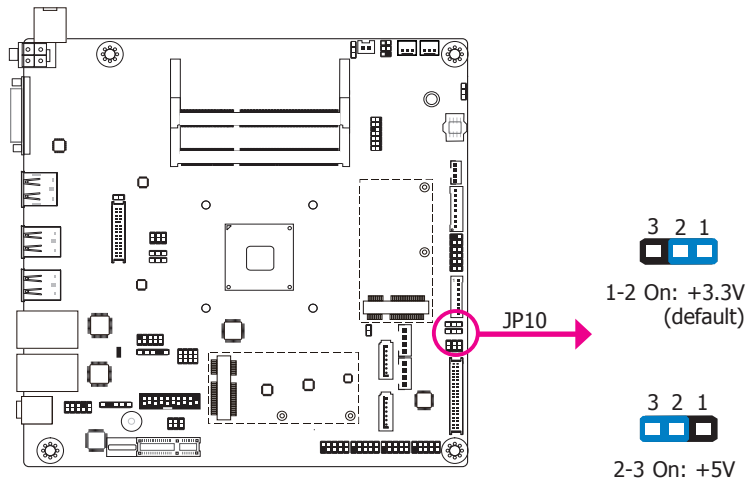
JP10 is used to select the power level of backlight brightness control: +3.3V or +5V.

Panel Power Select

2 4 6

1 3 5

1-2 On: +12V

2 4 6

1 3 5

3-4 On:+5V

JP8

2 4 6

1 3 5

5-6 On: +3.3V
(default)
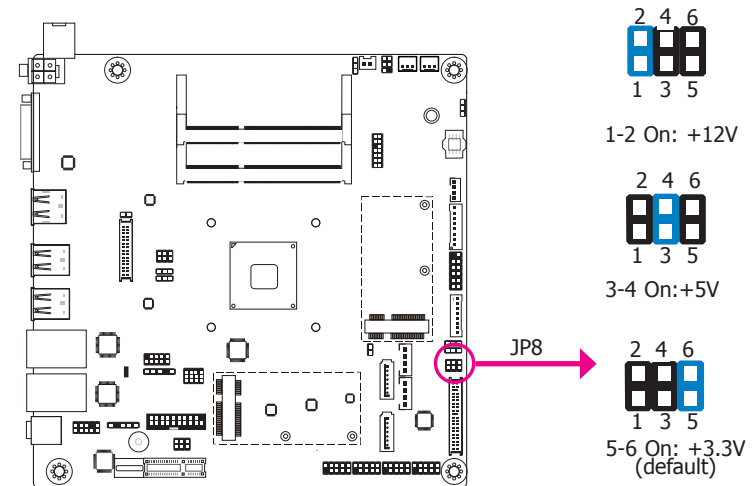
JP8 is used to select the power supplied with the LCD panel.

Important:
Before powering-on the system, make sure that the power settings of JP8 match the LCD panel's specification. Selecting the incorrect voltage will seriously damage the LCD panel.

eDP/Inverter Power Select (Optional)

JP2

3 2 1
1-2 On:
+12V (default)

3 2 1
2-3 On: +5V
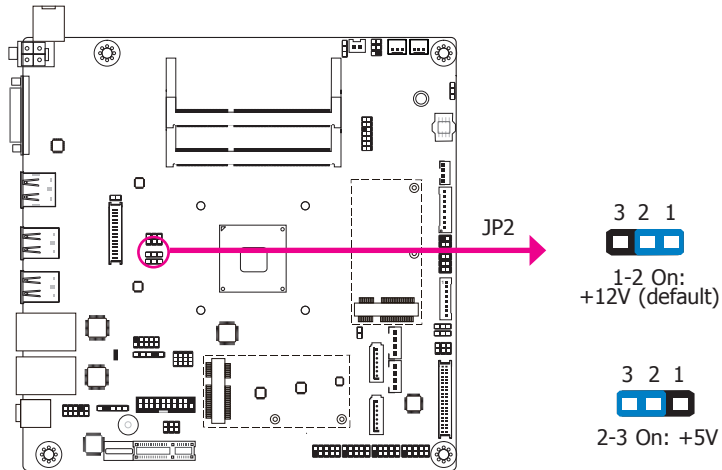
JP2 is used to select the power level of eDP inverter connector.

eDP/Panel Power Select (Optional)

JP1

5 3 1
6 4 2
1-2 On: +12V

5 3 1
6 4 2
3-4 On:+5V

5 3 1
6 4 2
5-6 On: +3.3V
(default)
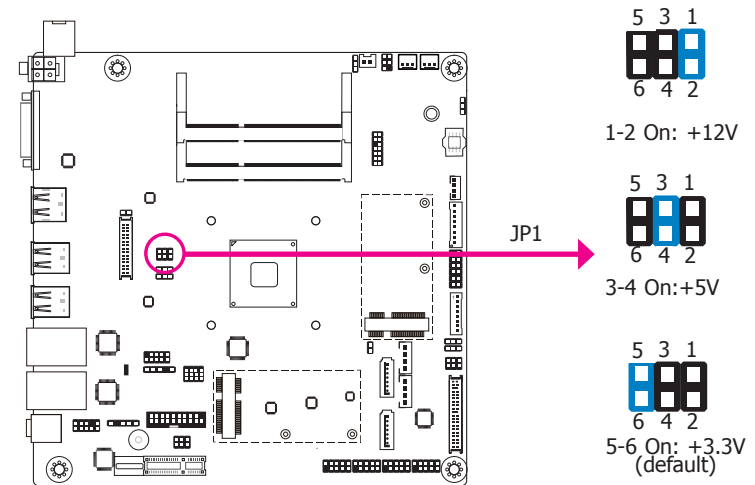
JP1 is used to select the power supplied with the eDP panel.

Important:
Before powering-on the system, make sure that the power settings of JP8 match the LCD panel's specification. Selecting the incorrect voltage will seriously damage the LCD panel.

eDP/Backlight Power Select (Optional)

3 2 1

1-2 On: +3.3V
(default)

3 2 1

2-3 On: +5V
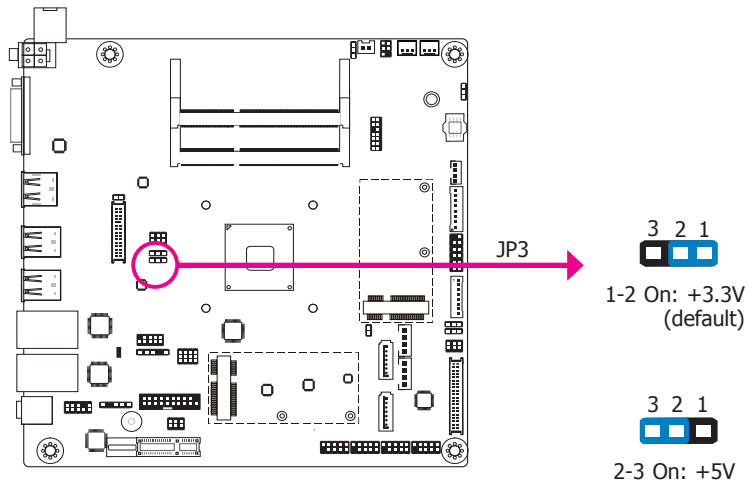
JP3 is used to select the power level of eDP backlight brightness control: +3.3V or +5V.

Rear Panel I/O Ports

DC-in   VGA   DP   USB 3.0   USB 2.0   LAN 1   LAN 2   Line-out
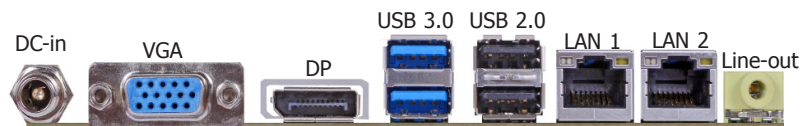
The rear panel I/O ports consist of the following:

• 2 GbE (RJ-45)
• 2 USB 3.0
• 2 USB 2.0
• 1 VGA
• 1 DP++
• 1 Line-out
• 1 DC-in

12V DC-in (BW171)/15~36V (BW173)
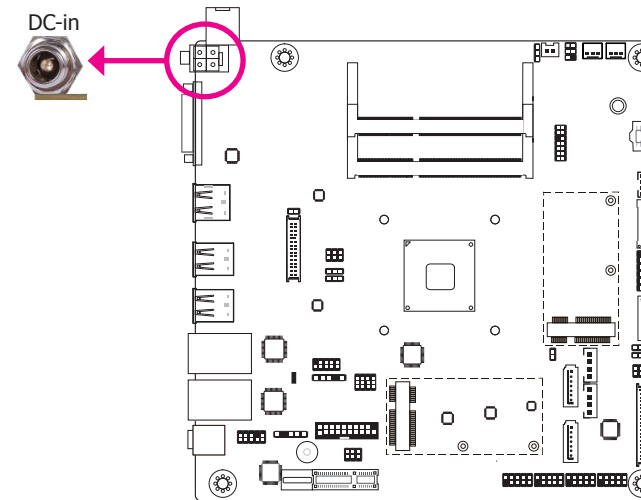
DC-in

This jack is considered a low power solution. Connect a DC power cord to this jack. Using a voltage more than the recommended range may fail to boot the system or cause damage to the system board.

The DC-in jack on the system board co-lays with a 4-pin right angle connector (optional) or 4-pin vertical type connector (optional) as the photo displayed below.

4-pin Right Angle (optional)   4-pin Vertical Type (optional)   DC-in (default)
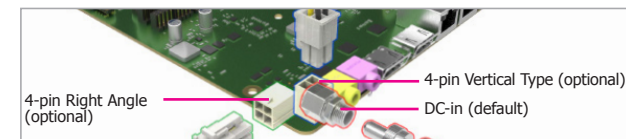
Graphics Interface

The display port consists of the following:

- 1 VGA
- 1 DP++
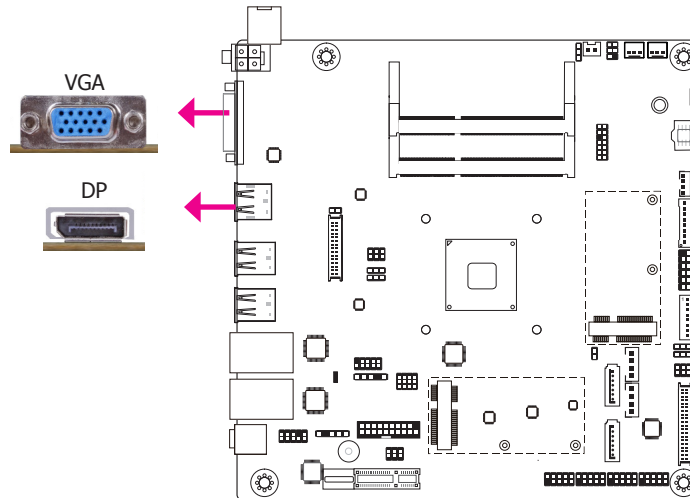
VGA Port

The VGA port is used for connecting a VGA monitor. Connect the monitor's 15-pin D-shell cable connector to the VGA port. After you plug the monitor's cable connector into the VGA port, gently tighten the cable screws to hold the connector in place.

DisplayPort

The DisplayPort 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.

Driver Installation

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

RJ45 LAN Ports
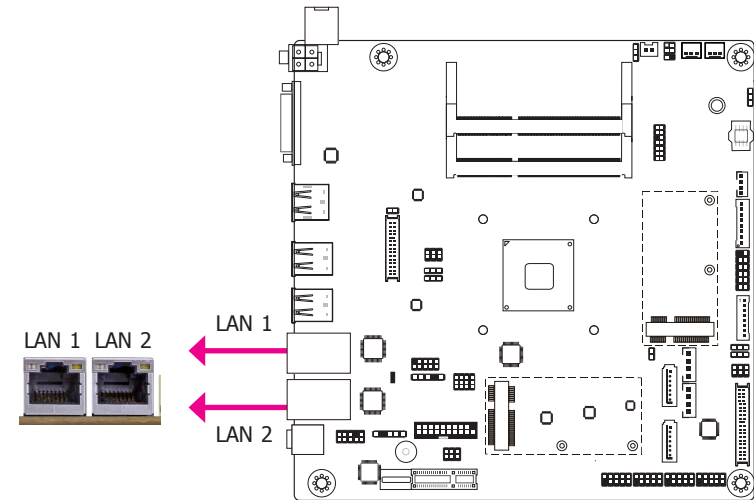
Features

- Two Intel® I211AT PCI Express Gigabit Ethernet controllers

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

BIOS Setting

Configure the onboard LAN ports in the Advanced menu ("ACPI Settings" submenu) of the BIOS. Refer to the chapter 3 for more information.

Driver Installation

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

USB Ports
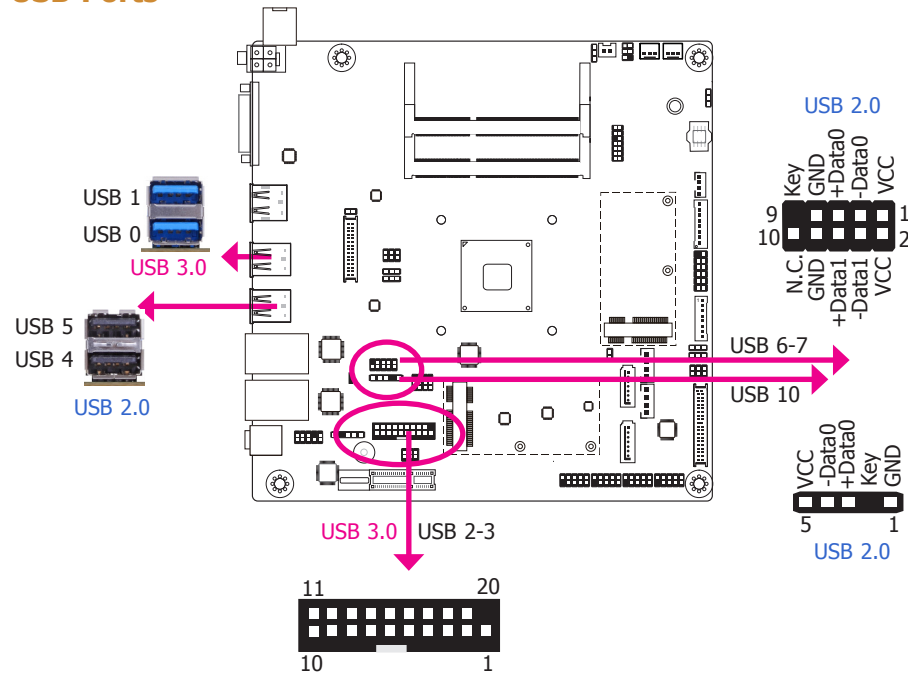
The USB device allows data exchange between your computer and a wide range of simultaneously accessible external Plug and Play peripherals.

The system board is equipped with two onboard USB 3.0 port (USB 0-1) and two onboard USB 2.0 ports (USB 4-5) at the rear panel I/O ports. The 10-pin connectors allow you to connect 2 additional USB 2.0/1.1 ports (USB 6-7). The 20-pin connector is designed to connect 2 additional USB 3.0 ports (USB 2-3). The 5-pin connector allows you to connect 1 additional USB 2.0/1.1 port (USB 10) or co-lays with 1 vertical USB 2.0/1.1 port (type A). 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.

USB 2-3 Port

Pins	Pin Assignment	Pins	Pin Assignment
1	Power	2	USB 3.0 Port 1 RX-
3	USB 3.0 Port 1 RX+	4	GND
5	USB 3.0 Port 1 TX-	6	USB 3.0 Port 1 TX+
7	GND	8	USB 3.0 Port 1 D-
9	USB 3.0 Port 1 D+	10	Over Current Protection
11	USB 3.0 Port 2 D+	12	USB 3.0 Port 2 D-
13	GND	14	USB 3.0 Port 2 TX+
15	USB 3.0 Port 2 TX-	16	GND
17	USB 3.0 Port 2 RX+	18	USB 3.0 Port 2 RX-
19	Power		

BIOS Setting

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

Driver Installation

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

Wake-On-USB Keyboard/Mouse

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

Important:
1. 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.
2. When installing Windows 7, only native USB 2.0 devices (USB port 0 to USB port 3) can operate under DOS mode. Please refer to the following tables for more infomation on the type of USB ports.

Audio

Line-out
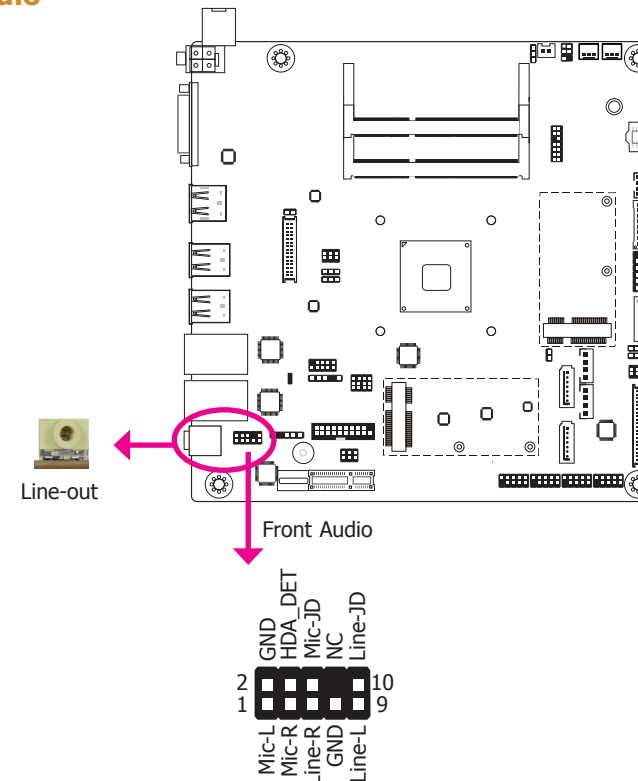
Front Audio

Rear Audio

The system board is equipped with 1 audio jack. This jack is a one-hole connecting interface for inserting a plug.

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

Front Audio

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

BIOS Setting

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

Driver Installation

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

21

I/O Connectors

SATA (Serial ATA) Connectors

SATA 3.0 6Gb/s

SATA 0

SATA 1

GND 1
TXP
TXN
GND
RXN
RXP
GND 7
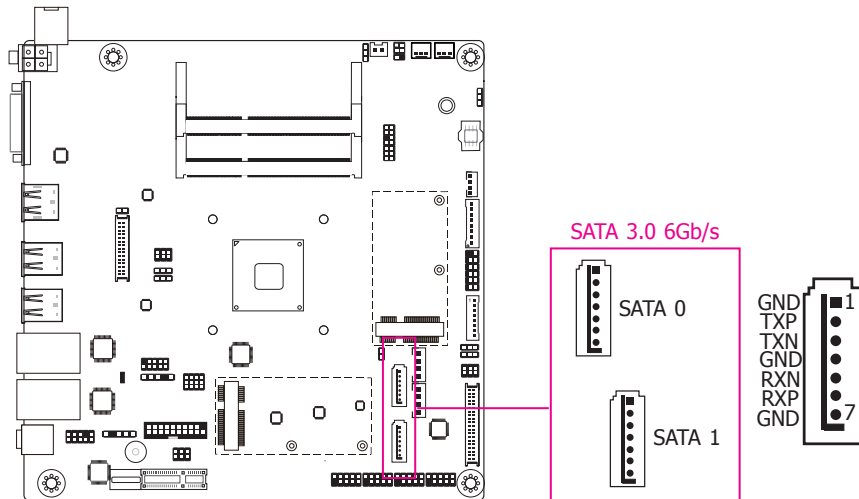
Features

• 2 Serial ATA 3.0 ports with data transfer rate up to 6Gb/s (SATA 0 and SATA 1)

• 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.

BIOS Setting

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

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

SATA (Serial ATA) Power Connectors

SATA Power 0

SATA Power 1

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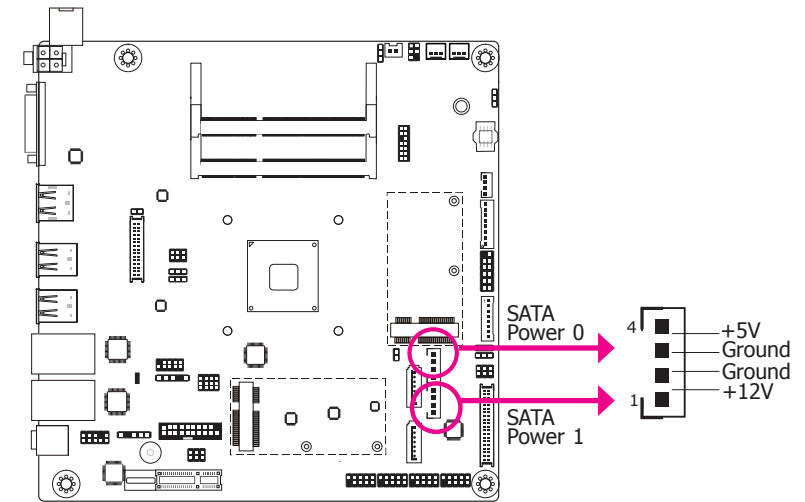
The SATA power connectors supply power to the SATA drive. Connect one end of the provided power cable to the SATA power connector and the other end to your storage device.

S/PDIF Connector

+5V
NC
SPOUT
Ground
SPIN
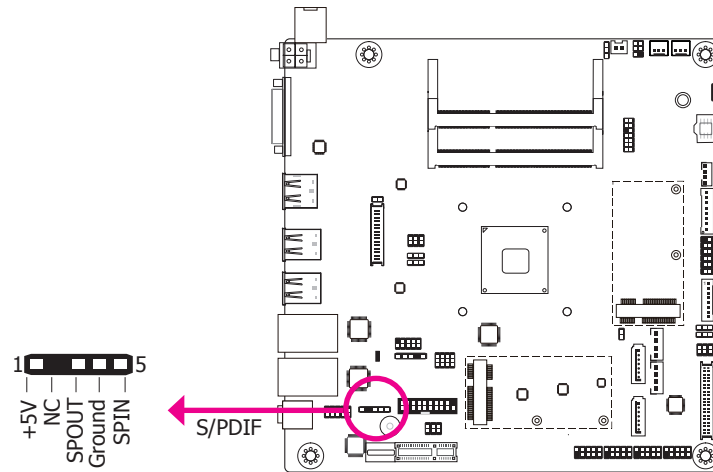
S/PDIF

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.

Digital I/O and/or Power Connector

Digital I/O Power

Digital I/O

+12V
Ground
5VSB
+5V
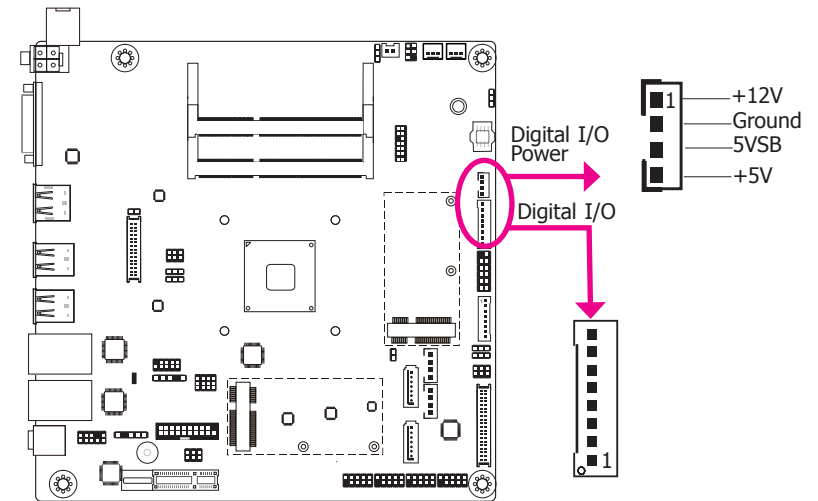
The 8-bit Digital I/O connector provides powering-on function to external devices that are connected to these connectors. The pin functions of the 8-bit digital I/O connector are listed below.

Digital I/O Connector

Pins	Pin Assignment
1	DIO7
2	DIO6
3	DIO5
4	DIO4
5	DIO3
6	DIO2
7	DIO1
8	DIO0

23

Cooling Fan Connectors

System Fan 1   System Fan 2
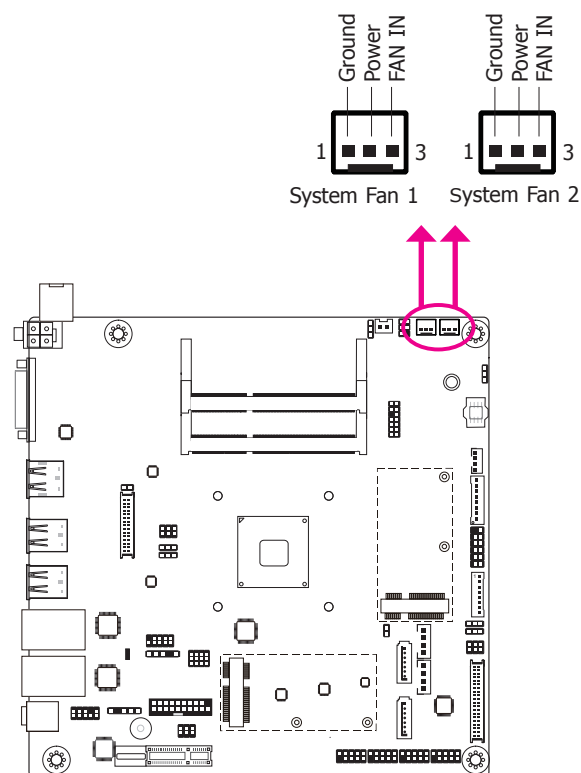
The fan connectors are used to connect cooling fans. The cooling fans will provide adequate airflow throughout the chassis to prevent overheating the CPU and system board components.

BIOS Setting

The Advanced menu ("SIO NUVOTON6106D" submenu) of the BIOS will display the current speed of the cooling fans. Refer to the chapter 3 for more information.

Front Panel Connector

Front Panel

PWR-BTN — RESET-SW
PWR-LED — HDD-LED

12 11
2 1
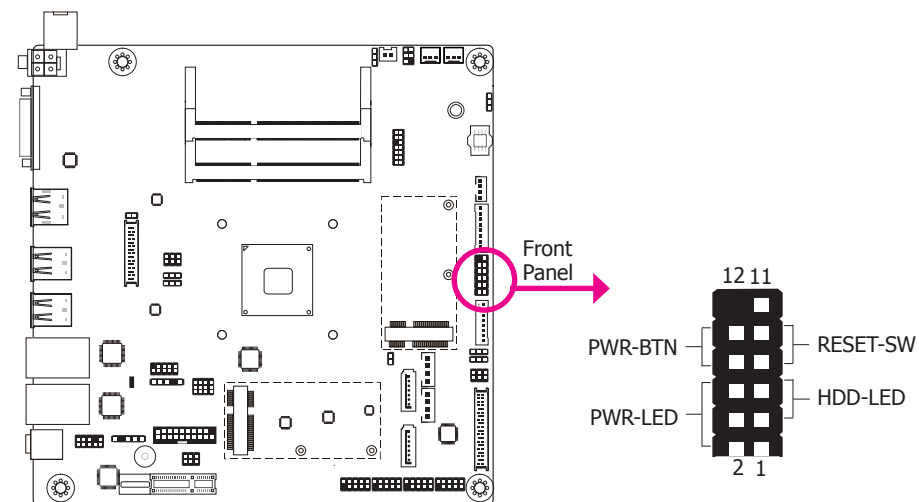
HDD-LED - HDD LED

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	3V3	PWR-LED	2	3V3SB
	5	HDD_LED		4	3V3SB
RESET-SW	7	GND		6	Power_LED
	9	Reset	PWR-BTN	8	GND
	11	NC		10	Power_Button

24

COM (Serial) Ports
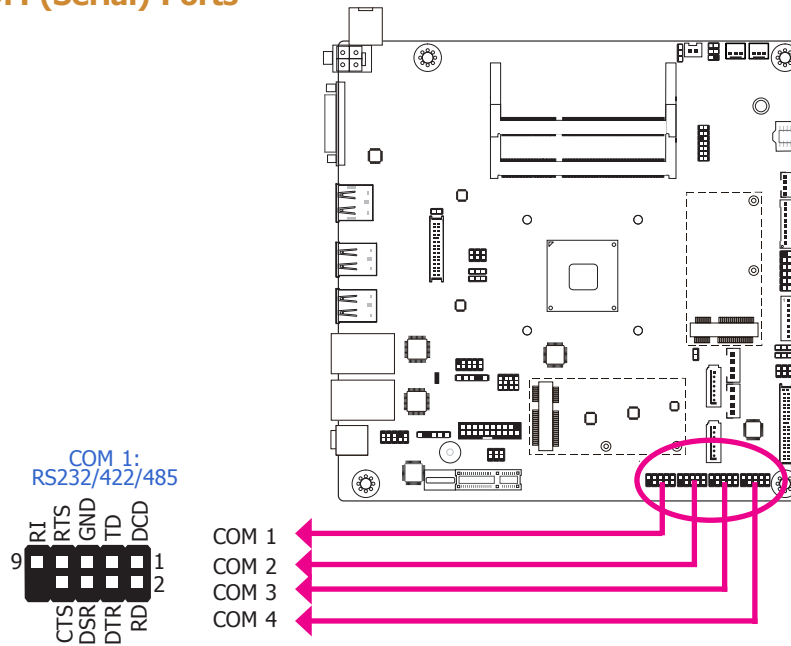
COM 1:
RS232/422/485

COM 2/COM 3/COM 4: RS232

COM 2 to COM 4 are fixed at RS232.

The pin functions of COM port 1 will vary according to JP4's setting. JP4 is used to configure the Serial COM port 1 to pure RS232 or RS232 with power. Refer to "COM 1 RS232/422/485 Select" and "COM 1 RS232/Power Select" in this chapter for more information.

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

Connecting External Serial Ports

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

BIOS Setting

Configure the serial COM ports in the Advanced menu ("SIO NUVOTON6106D" submenu) of the BIOS. Refer to the chapter 3 for more information.

Expansion Slots

PCI Express x1   Mini PCI Express   SIM Slot
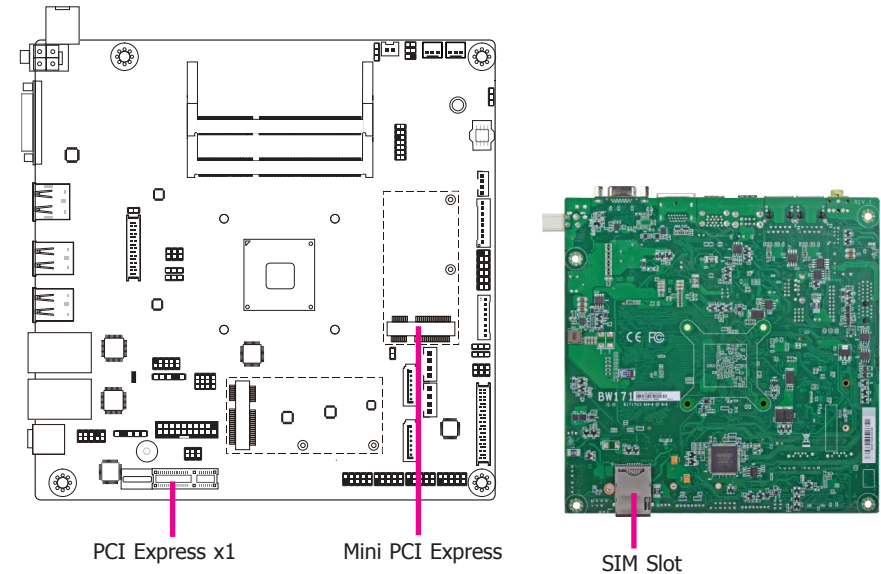
SIM Slot

The SIM slot on the system board is used to insert a SIM card.

PCI Express x1 Slot

Install PCI Express cards such as network cards or other cards that comply to the PCI Express specifications into the PCI Express x1 slot.

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

LVDS LCD Panel Connector

LCD/Inverter Power Connector

LCD/Inverter power
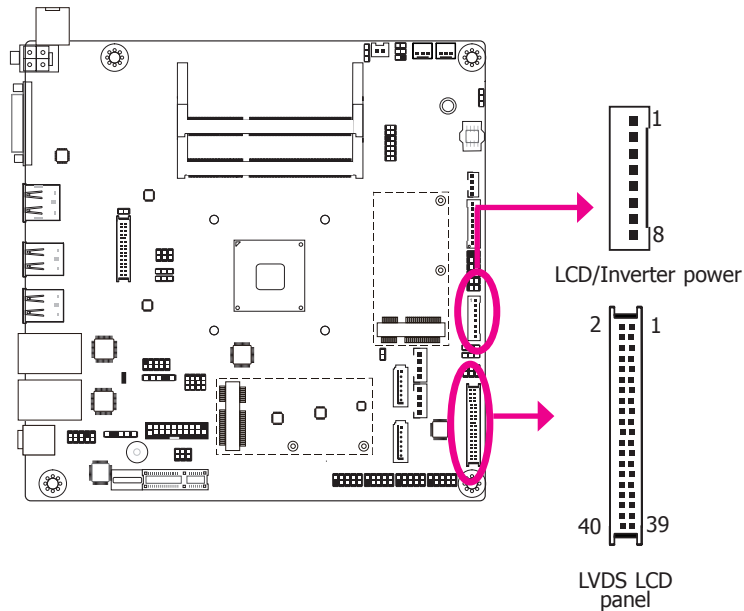
LVDS LCD panel

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

Refer to the right side for the pin functions of these connectors.

Jumper Settings

Refer to the "Jumper Settings" section in this chapter for settings relevant to the LCD panel.

LVDS LCD Panel Connector

Pins	Function	Pins	Function
1	GND	2	GND
3	LVDS_Out3+ (Odd_3+)	4	LVDS_Out7+ (Even_3+)
5	LVDS_Out3- (Odd_3-)	6	LVDS_Out7- (Even_3-)
7	GND	8	GND
9	LVDS_Out2+ (Odd_2+)	10	LVDS_Out6+ (Even_2+)
11	LVDS_Out2- (Odd_2-)	12	LVDS_Out6- (Even_2-)
13	GND	14	GND
15	LVDS_Out1+ (Odd_1+)	16	LVDS_Out5+ (Even_1+)
17	LVDS_Out1- (Odd_1-)	18	LVDS_Out5- (Even_1-)
19	GND	20	GND
21	LVDS_Out0+ (Odd_0+)	22	LVDS_Out4+ (Even_0+)
23	LVDS_Out0- (Odd_0-)	24	LVDS_Out4- (Even_0-)
25	GND	26	GND
27	LVDS_CLK1+ (Odd_CLK+)	28	LVDS_CLK2+ (Even_CLK+)
29	LVDS_CLK1- (Odd_CLK-)	30	LVDS_CLK2- (Even_CLK-)
31	GND	32	GND
33	DDC_CLK	34	NC
35	DDC_DATA	36	3.3V
37	Panel Power	38	Panel Power
39	Panel Power	40	Panel Power

LCD/Inverter Power Connector

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

> **Note:**
> DFI board's LVDS connector: Hirose DF13-40DP-1.25V(91)/40P/1.25mm; cable side connector: Hirose DF13-40DS-1.25C.

SMBus Connector

1 2
3V3SB — GND
SMBUS Clock — SMBus_Data
SMBUS_Alert
5 6
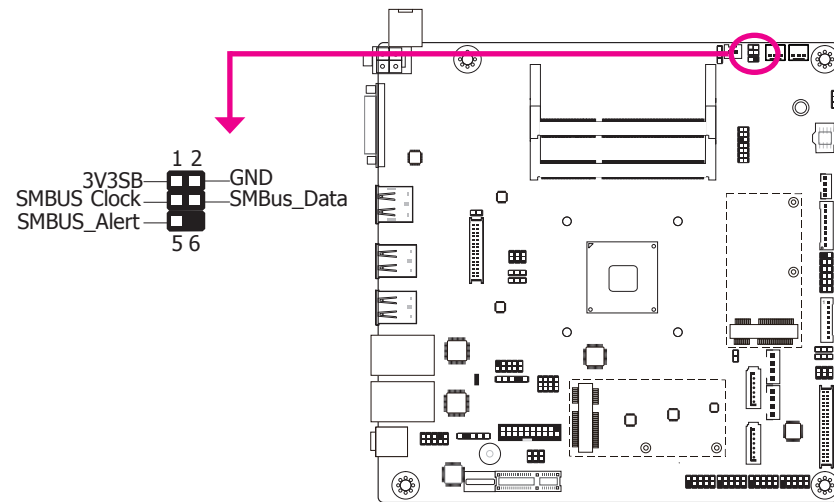
The SMBus (System Management Bus) connector is used to connect SMBus devices. It is a multiple device bus that allows multiple chips to connect to the same bus and enable each one to act as a master by initiating data transfer.

Standby Power LED

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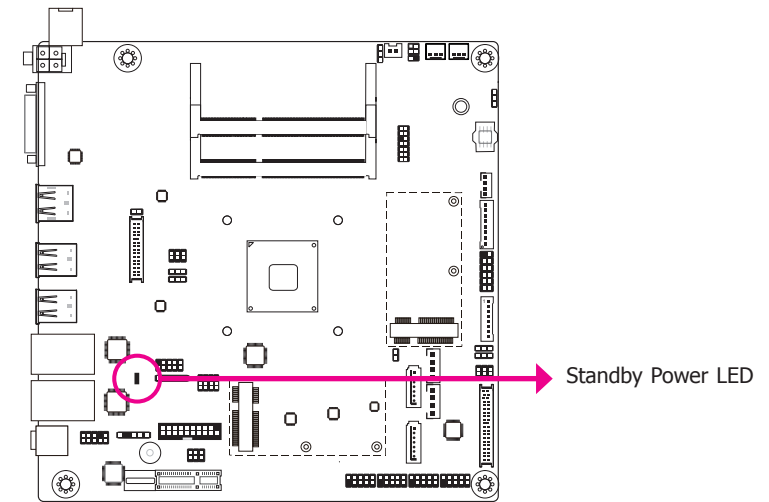
This LED will lit red when the system is in the standby mode. It indicates that there is power on the system board. Power-off the PC and then unplug the power cord prior to installing any devices. Failure to do so will cause severe damage to the motherboard and components.

Chassis Intrusion Connector

1 — Signal
2 — Ground
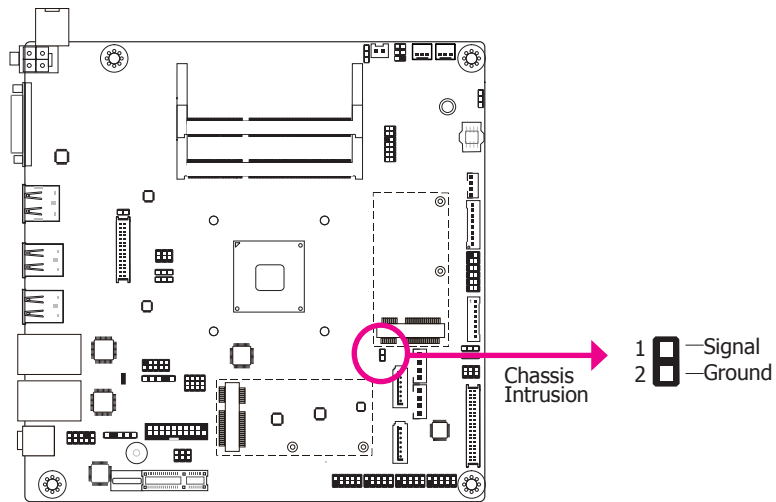
Chassis Intrusion

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

LPC

14 13
2 1
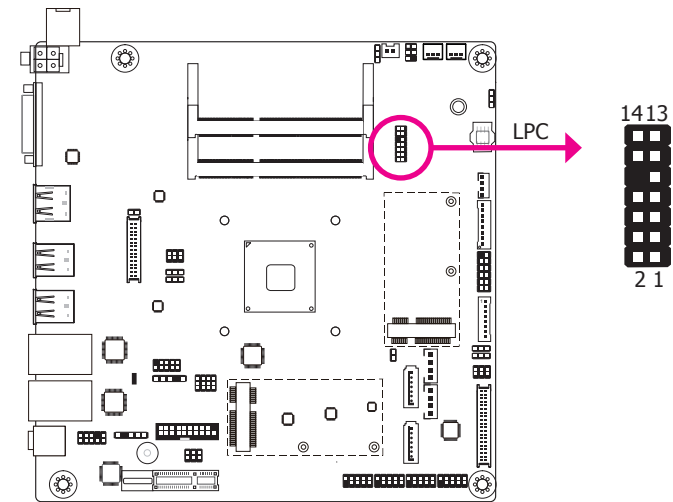
The LPC connector is used for the debug function and its pin functions are listed below.

Pins	Pin Assignment	Pins	Pin Assignment
1	L_CLK	2	L_AD1
3	L_RST#	4	L_AD0
5	L_FRAME#	6	3V3
7	L_AD3	8	GND
9	L_AD2	10	Kev
11	INT_SERIRQ	12	GND
13	5VSB	14	5V

Battery

Battery

GND
+3.3V

1 | | 2

Battery

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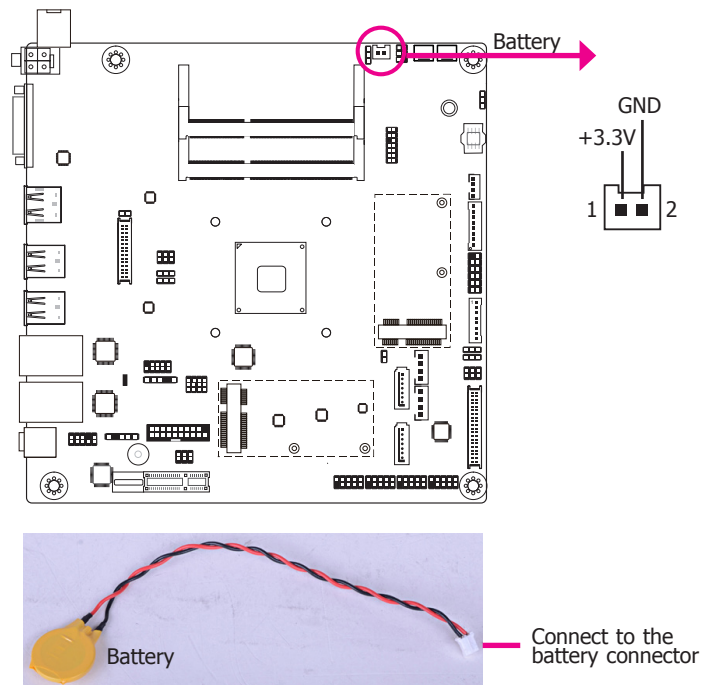
The lithium ion battery powers the real-time clock and CMOS memory. It is an auxiliary source of power when the main power is shut off.

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.

29

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.
<F1>	Help
<F5>	Change values
<F6>	Change values
<F9>	Setup Defaults
<F10>	Save and Exit
<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>.

30

Insyde BIOS Setup Utility

Main

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

```
                    InsydeH20 Setup Utility                    Rev. 5.0
   Main   Advanced   Security   Boot      Exit

   Project Name            BW17x X64                   This is the help for the
   BIOS Version            67.06A                      hour, minute, second
                                                       field.  Valid range is from
   Processor Type          Intel(R) Celeron(R) CPU N3060 @ 1.60GHz  0 to 23, 0 to 59, 0 to 59.
   CPU Speed:              1600 MHz                    INCREASE/REDUCE:
   CPU ID:                 000406C4h                   +/-.
   L1 Data Cache:          24 KB
   L1 Instruction Cache:   32 KB
   L2 RAM:                 1024 KB
   L3 Cache:               0 KB
   Number of Processors:   Core 2
   Microcode Revision:     40A

   Total Memory            4096 MB
   System Memory Speed     1600 MHz
   SODIMM 0                4096 MB
   SODIMM 1                [Not Installed]

   TXE FW Version          2.0.2.2092

   System Time             [02:07:19]
   System Date             [01/12/2015]



   F1   Help        ↑/↓    Select Item      F5/F6  Change Values    F9   Setup Defaults
   Esc  Exit        ←/→    Select Item      Enter  Select ▶ SubMenu  F10  Save and Exit
```

System Date

The date format is <month>, <date>, <year>. 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.

```
                    InsydeH20 Setup Utility                    Rev. 5.0
   Main   Advanced   Security   Boot      Exit

   ▶ ACPI Configuration                              Configures ACPI Tables/
   ▶ CPU Configuration                               Features setting
   ▶ Video Configuration
   ▶ Audio Configuration
   ▶ SATA Configuration
   ▶ USB Configuration
   ▶ PCI Express Configuration
   ▶ SIO NUVOTON6106D




   F1   Help        ↑/↓    Select Item      F5/F6  Change Values    F9   Setup Defaults
   Esc  Exit        ←/→    Select Item      Enter  Select ▶ SubMenu  F10  Save and Exit
```

31

ACPI Settings

This section is used to configure the system ACPI parameters.

```
                          InsydeH20 Setup Utility                    Rev. 5.0
         Advanced

   ACPI Configuration                                  Enable/Disable Wake on
                                                       LAN capability
   Wake on LAN                   <Enabled>
   After G3                      <Always on>




   F1   Help          ↑/↓   Select Item    F5/F6 Change Values       F9   Setup Defaults
   Esc  Exit          ←/→   Select Item    Enter Select ▶ SubMenu    F10  Save and Exit
```
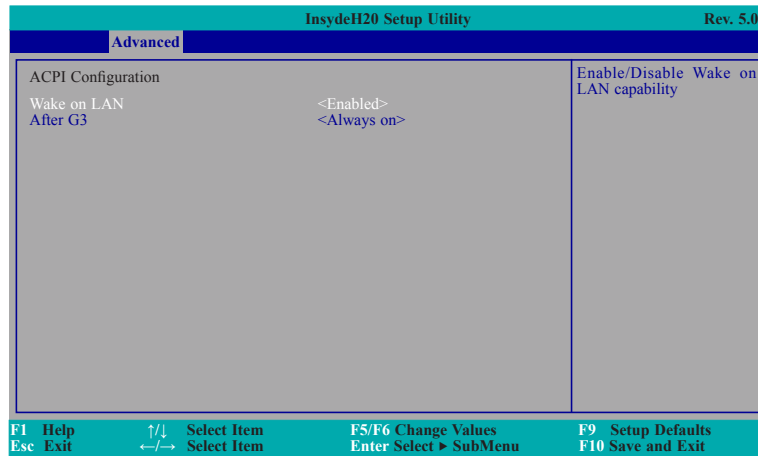
Wake on LAN

Enable or Disable this field to use the LAN signal to wake up the system.

After G3

This field is to specify what state to go when power is re-applied after a power failue (G3 state).

Always on   The system working state.

Always off   The system shutdown state, except for trickle current to devices such as the power button.

CPU Configuration

This section is used to configure the CPU.

```
                          InsydeH20 Setup Utility                    Rev. 5.0
         Advanced

   CPU Configuration                                   Intel Speed Step Technol-
                                                       ogy Enable/Disable
   Intel Speed Step              <Enabled>
   Turbo Mode                    <Enabled>




   F1   Help          ↑/↓   Select Item    F5/F6 Change Values       F9   Setup Defaults
   Esc  Exit          ←/→   Select Item    Enter Select ▶ SubMenu    F10  Save and Exit
```
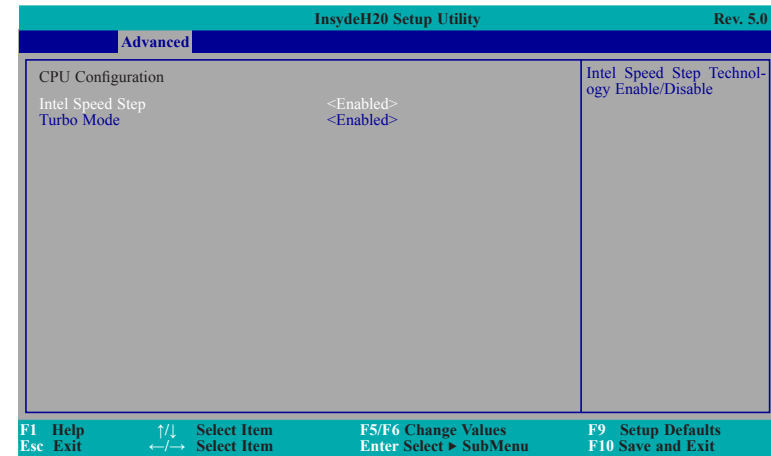
Intel®SpeedStep™

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

Turbo Mode

Enable or disable the turbo mode.

32

Video Configuration

This section configures the video settings.

```
                        InsydeH20 Setup Utility                          Rev. 5.0
           Advanced

      Video Configuration                                      Select which of IGD/PCI
                                                               Graphics device should be
      Primary Display                    <Auto>                Primary Dispay
      Integrated Graphics Device         <Enabled>
      Boot display                       <CRT+LCD>
      LCD Panel Type                     <1024x768>
      LCD Panel  Color Depth             <24 Bit>
      Dimming Control                    <PWM Mode>




      F1   Help          ↑/↓   Select Item    F5/F6 Change Values        F9   Setup Defaults
      Esc  Exit          ←/→   Select Item    Enter Select ▶ SubMenu     F10 Save and Exit
```

Primary Display

Select which of IGD/PCI Graphics device should be Primary Display.

Integrated Graphics Device

Keep IGD enabled or disabled based on the setup options.

Boot display

Set the display device combination.

```
                        InsydeH20 Setup Utility                          Rev. 5.0
           Advanced

      Video Configuration                                      Boot Display

      Primary Display                    <Auto>
      Integrated Graphics Device         <Enabled>
      Boot display                       <CRT+LCD>
      LCD Panel Type                     <1024x768>
      LCD Panel  Color Depth             <24 Bit>
      Dimming Control                    <PWM Mode>

                                 ┌─ Boot display ─┐
                                 │  LCD+CRT        │
                                 │  LCD+DP         │
                                 │  DP+LCD         │
                                 │  DP+CRT         │
                                 │  CRT+LCD        │
                                 │  CRT+DP         │
                                 └─────────────────┘

      F1   Help          ↑/↓   Select Item    F5/F6 Change Values        F9   Setup Defaults
      Esc  Exit          ←/→   Select Item    Enter Select ▶ SubMenu     F10 Save and Exit
```
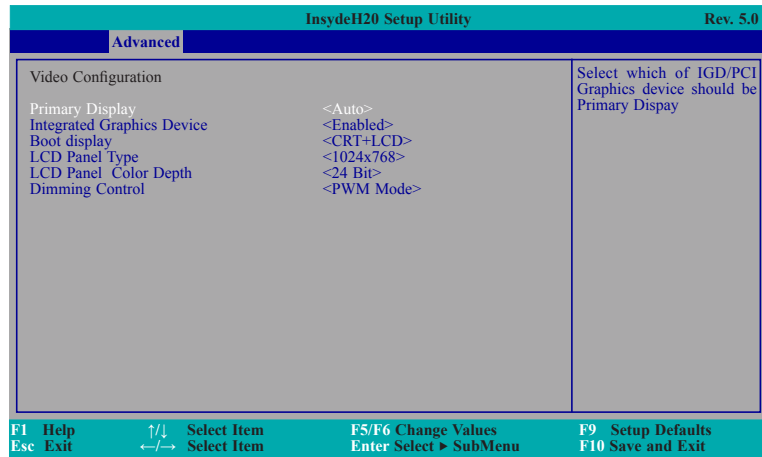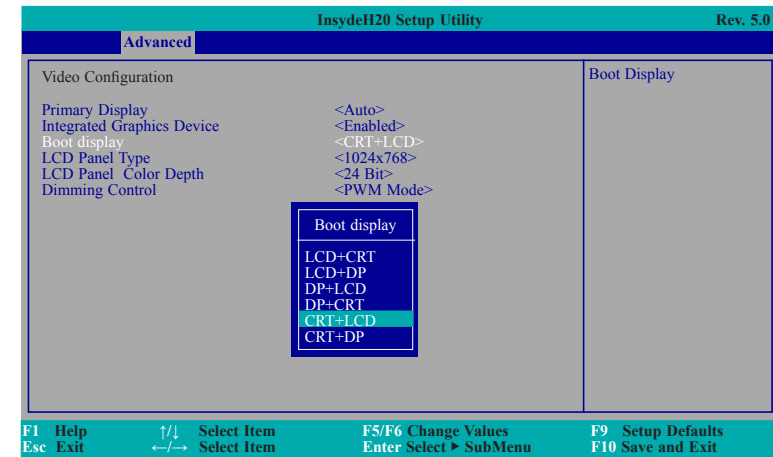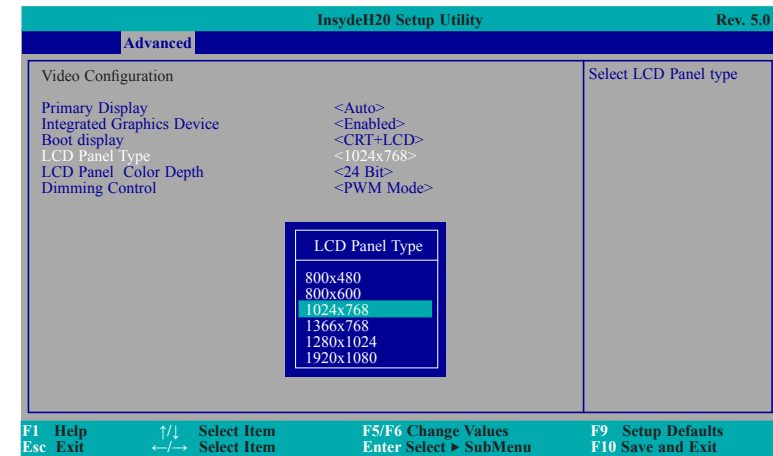
LCD Panel Type

Select the LCD panel type.

```
                        InsydeH20 Setup Utility                          Rev. 5.0
           Advanced

      Video Configuration                                      Select LCD Panel type

      Primary Display                    <Auto>
      Integrated Graphics Device         <Enabled>
      Boot display                       <CRT+LCD>
      LCD Panel Type                     <1024x768>
      LCD Panel  Color Depth             <24 Bit>
      Dimming Control                    <PWM Mode>

                                 ┌─ LCD Panel Type ─┐
                                 │  800x480          │
                                 │  800x600          │
                                 │  1024x768         │
                                 │  1366x768         │
                                 │  1280x1024        │
                                 │  1920x1080        │
                                 └───────────────────┘

      F1   Help          ↑/↓   Select Item    F5/F6 Change Values        F9   Setup Defaults
      Esc  Exit          ←/→   Select Item    Enter Select ▶ SubMenu     F10 Save and Exit
```
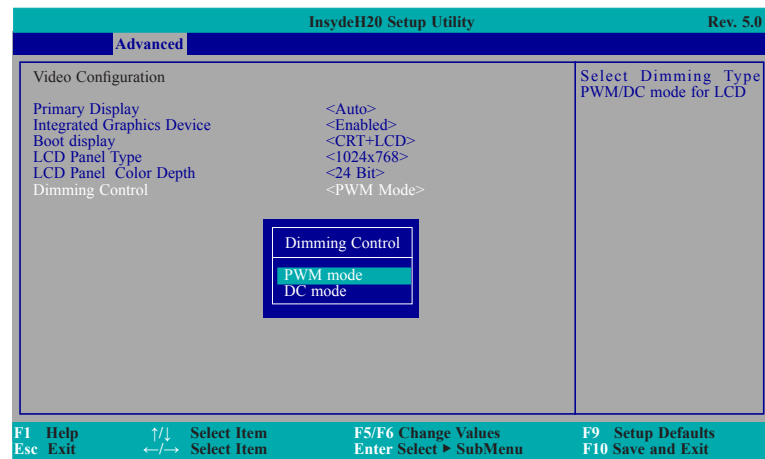
LCD Panel Color Depth

Select the LCD panel color depth: 18 bit, 24 bit, 36 bit, and 48 bit.

Dimming Control

Select Dimming type PWM/DC mode for LCD.

```
                    InsydeH20 Setup Utility                     Rev. 5.0
        Advanced
 Video Configuration                                    Select  Dimming  Type
                                                        PWM/DC mode for LCD
 Primary Display                    <Auto>
 Integrated Graphics Device         <Enabled>
 Boot display                       <CRT+LCD>
 LCD Panel Type                     <1024x768>
 LCD Panel  Color Depth             <24 Bit>
 Dimming Control                    <PWM Mode>

                          Dimming Control
                          PWM mode
                          DC mode


 F1   Help       ↑/↓   Select Item      F5/F6 Change Values        F9   Setup Defaults
 Esc  Exit       ←/→   Select Item      Enter Select ► SubMenu     F10 Save and Exit
```

Audio Configuration

This section is used to configure the audio settings.

```
                    InsydeH20 Setup Utility                     Rev. 5.0
        Advanced
 Audio Configuration                                    Control  Detection  of  the
                                                        Azalia device.
 Audio Controller                   <Enabled>
                                                        Disabled = Azalia  will  be
                                                        unconditionally disabled

                                                        Enabled = Azalia  will  be
                                                        unconditionally enabled


 F1   Help       ↑/↓   Select Item      F5/F6 Change Values        F9   Setup Defaults
 Esc  Exit       ←/→   Select Item      Enter Select ► SubMenu     F10 Save and Exit
```
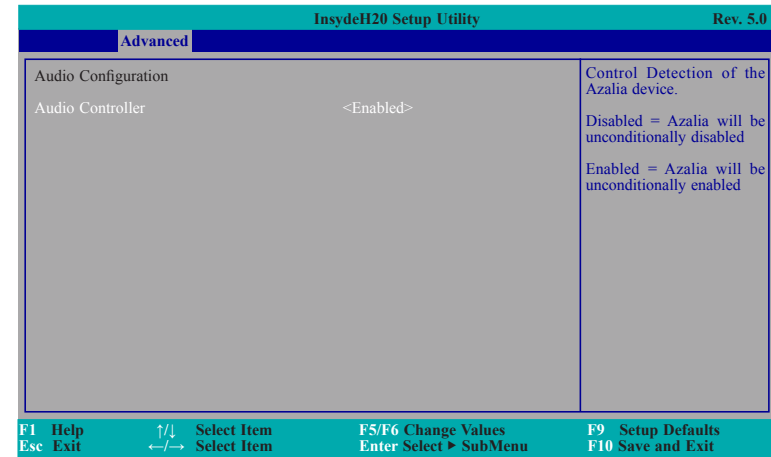
Audio Controller

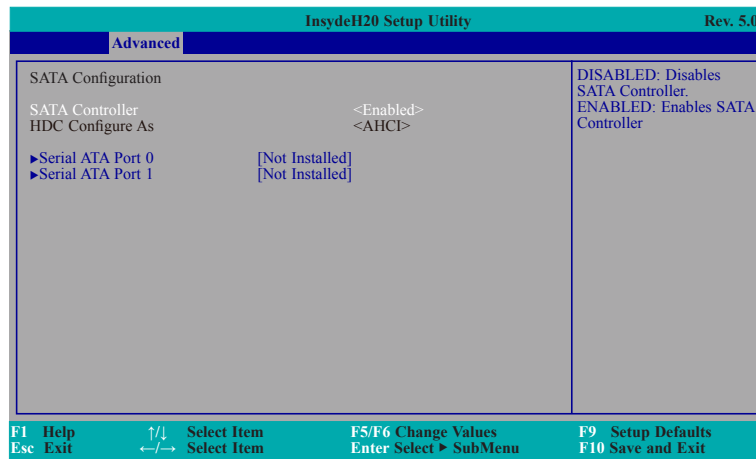Control the detection of the Azalia device.

Disabled
Azalia will be unconditionally disabled.
Enabled
Azalia will be unconditionally enabled.

SATA Configuration

This section is designed to select the SATA controller and the type of hard disk drive which are insalled in your system unit.

```
                          InsydeH20 Setup Utility                          Rev. 5.0
      Advanced
  SATA Configuration                                        DISABLED: Disables
                                                            SATA Controller.
  SATA Controller                    <Enabled>              ENABLED: Enables SATA
  HDC Configure As                   <AHCI>                 Controller

  ▶Serial ATA Port 0           [Not Installed]
  ▶Serial ATA Port 1           [Not Installed]




  F1  Help        ↑/↓  Select Item    F5/F6 Change Values     F9  Setup Defaults
  Esc Exit        ←/→  Select Item    Enter Select ▶ SubMenu  F10 Save and Exit
```

SATA Controller

This field is used to enable or disable Serial ATA devices.

HDC Configure As

The mode selection determines how the SATA controller(s) operates.

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

Serial ATA Port 0, and 1

This field is used to enable or disable the serial ATA port.

USB Configuration

This section is used to configure the parameters of the USB device.

```
                          InsydeH20 Setup Utility                          Rev. 5.0
      Advanced
  USB Configuration                                         Enable/Disable the USB
                                                            XHCI PreBoot Support.
  USB3.0 Support                     <Enabled>




  F1  Help        ↑/↓  Select Item    F5/F6 Change Values     F9  Setup Defaults
  Esc Exit        ←/→  Select Item    Enter Select ▶ SubMenu  F10 Save and Exit
```
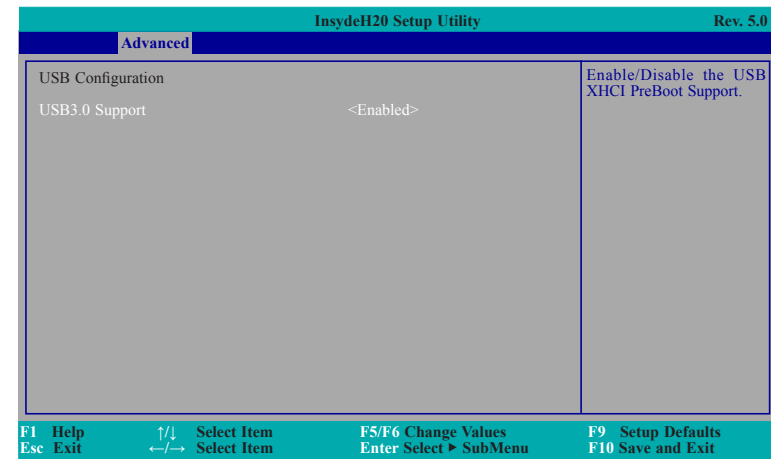
USB3.0 Support

Disabled
Disable the USB XHCI PreBoot Support.

Enabled
Enable the USB XHCI PreBoot Support.

35

PCI Express Configuration

This section configures settings relevant to PCI Express root ports.
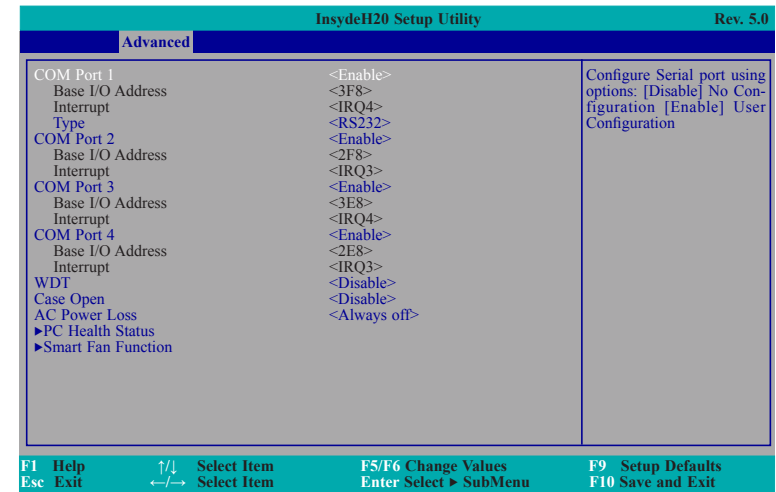
```
                    InsydeH20 Setup Utility                    Rev. 5.0
      Advanced

PCI Express Configuration                          Control the PCI Express
                                                   Root Port
  ►  PCI Express Root Port 1
  ►  PCI Express Root Port 2
  ►  PCI Express Root Port 3
  ►  PCI Express Root Port 4




F1  Help        ↑/↓   Select Item      F5/F6 Change Values    F9   Setup Defaults
Esc Exit        ←/→   Select Item      Enter Select ► SubMenu F10 Save and Exit
```

```
                    InsydeH20 Setup Utility                    Rev. 5.0
      Advanced

PCI Express Root Port 1          <Enabled>          Control the PCI Express
PCIe Speed                       <Gen2>             Root Port.




F1  Help        ↑/↓   Select Item      F5/F6 Change Values    F9   Setup Defaults
Esc Exit        ←/→   Select Item      Enter Select ► SubMenu F10 Save and Exit
```

PCI Express Root Port

This field is used to enable or disable the PCI Express Root Port.

PCIe Speed

Select the speed of the PCI Express Root Port: Gen1 or Gen2.

SIO NUVOTON6106D

This section configures the system super I/O chip parameters.

```
                    InsydeH20 Setup Utility                    Rev. 5.0
      Advanced

COM Port 1                       <Enable>           Configure Serial port using
   Base I/O Address              <3F8>              options: [Disable] No Con-
   Interrupt                     <IRQ4>             figuration [Enable] User
   Type                          <RS232>            Configuration
COM Port 2                       <Enable>
   Base I/O Address              <2F8>
   Interrupt                     <IRQ3>
COM Port 3                       <Enable>
   Base I/O Address              <3E8>
   Interrupt                     <IRQ4>
COM Port 4                       <Enable>
   Base I/O Address              <2E8>
   Interrupt                     <IRQ3>
WDT                              <Disable>
Case Open                        <Disable>
AC Power Loss                    <Always off>
►PC Health Status
►Smart Fan Function

F1  Help        ↑/↓   Select Item      F5/F6 Change Values    F9   Setup Defaults
Esc Exit        ←/→   Select Item      Enter Select ► SubMenu F10 Save and Exit
```

COM Port 1 to Serial Port 4

Configure the settings to use the serial port.

Disable No configuration
Enable   User configuration

Type

Choose RS232/RS422/RS485 (Peer-to-Peer) for the serial port type.

WDT

Enable or disable the watchdog function.

Case Open

Enable or disable the case open.

AC Power Loss

Set the AC power loss always off/on.

PC Health Status

This field displays the PC health status.

```
                    InsydeH20 Setup Utility                    Rev. 5.0
          Advanced

    PC Health Status

    Voltage
      VCORE                       0.832  V
      VBAT                        3.040  V
      1V35_SM                     1.344  V
      3VSB                        3.408  V
      5V                          5.056  V
      +12V                       12.144  V

    Temperature
      CPU (ºC/ºF)                35 C/ 95 F
      System (ºC/ºF)             33 C/ 91 F

    Fan Speed
      SYS FAN1                    0 RPM
      SYS FAN2                    0 RPM


 F1  Help          ↑/↓   Select Item      F5/F6 Change Values       F9   Setup Defaults
 Esc Exit          ←/→   Select Item      Enter Select ▶ SubMenu    F10 Save and Exit
```

Smart Fan Function

This field displays the Smart Fan Function

```
                    InsydeH20 Setup Utility                    Rev. 5.0
          Advanced

    COM Port 1                      <Enable>          Configure Serial port using
      Base I/O Address              <3F8>             options: [Disable] No Con-
      Interrupt                     <IRQ4>            figuration [Enable] User
      Type                          <RS232>           Configuration
    COM Port 2                      <Enable>
      Base I/O Address              <2F8>
      Interrupt                     <IRQ3>
    COM Port 3                      <Enable>
      Base I/O Address              <3E8>
      Interrupt                     <IRQ4>
    COM Port 4                      <Enable>
      Base I/O Address              <2E8>
      Interrupt                     <IRQ3>
    WDT                             <Disable>
    Case Open                       <Disable>
    AC Power Loss                   <Always off>
    ▶PC Health Status
    ▶Smart Fan Function




 F1  Help          ↑/↓   Select Item      F5/F6 Change Values       F9   Setup Defaults
 Esc Exit          ←/→   Select Item      Enter Select ▶ SubMenu    F10 Save and Exit
```

```
                    InsydeH20 Setup Utility                    Rev. 5.0
          Advanced

    Smart Fan Function                                 Enable/Disable Smart Fan

    SYS Smart Fan1 Control          <Enable>
      Boundary 1                    [40]
      Boundary 2                    [50]
      Boundary 3                    [60]
      Boundary 4                    [70]
      Fan Speed Count 1             [10]
      Fan Speed Count 2             [15]
      Fan Speed Count 3             [25]
      Fan Speed Count 4             [255]
    SYS Smart Fan2 Control          <Enable>
      Boundary 1                    [40]
      Boundary 2                    [50]
      Boundary 3                    [60]
      Boundary 4                    [70]
      Fan Speed Count 1             [10]
      Fan Speed Count 2             [15]
      Fan Speed Count 3             [25]
      Fan Speed Count 4             [255]

 F1  Help          ↑/↓   Select Item      F5/F6 Change Values       F9   Setup Defaults
 Esc Exit          ←/→   Select Item      Enter Select ▶ SubMenu    F10 Save and Exit
```

SYS1/SYS2 Smart Fan Control

Enable or disable the system smart fan control.

Boundary 1 to Boundary 4

Set the boundary temperature. The range is from 0-127ºC.

Fan Speed Count 1 to Fan Speed Count 4

Set the fan speed. The range is from 0 (no operation) to 255 (full speed). The fans will operate according to the specified boundary temperatures above.

Security

```
                              InsydeH20 Setup Utility                    Rev. 5.0
    Main   Advanced   Security   Boot   Exit
                                                          When Hidden, don't ex-
    Current TPM Device          <TPM 2.0 (FTPM)>          poses TPM to 0
    TPM State                   Enabled, UnOwned
    TPM Availability            <Available>
    TPM Operation               <No  Operation>
    Clear TPM                   [ ]
    Supervisor Password         Not installed

    Set Supervisor Password




F1  Help          ↑/↓   Select Item      F5/F6 Change Values        F9   Setup Defaults
Esc Exit          ←/→   Select Item      Enter Select ▶ SubMenu     F10 Save and Exit
```

TPM Availability

When Hidden, don't expose TPM configuration.

TPM Operation

Enable: Enable storage and endorsement hierarchy.

Disable: Disable storage and endorsement hierarchy.

Clear TPM

Removes all TPM context associated with a specific owner.

Set Supervisor Password

Set the supervisor's password and the length of the password must be greater than one character.

Boot

```
                              InsydeH20 Setup Utility                    Rev. 5.0
    Main      Advanced    Security   Boot   Exit
                                                          OS Selection
    OS Selection                <Windows>
    Numlock                     <On>
    Boot Type                   <Legacy Boot Type>
    PXE Boot to LAN             <Disabled>
    USB Boot                    <Enabled>




F1  Help          ↑/↓   Select Item      F5/F6 Change Values        F9   Setup Defaults
Esc Exit          ←/→   Select Item      Enter Select ▶ SubMenu     F10 Save and Exit
```
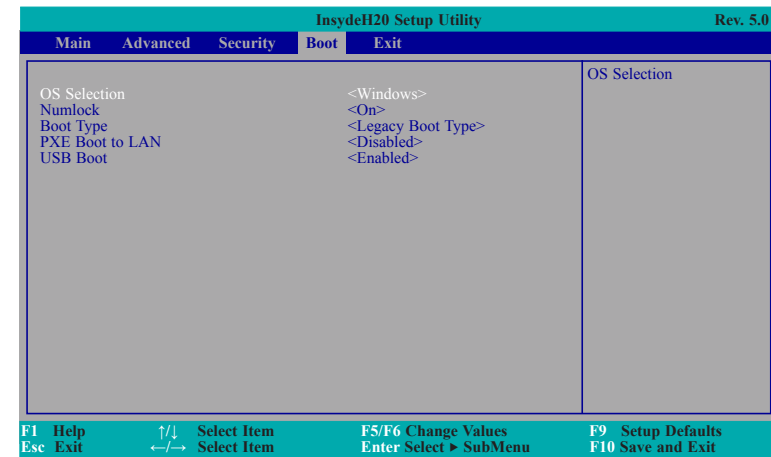
OS Selection

Select Windows/Linux/DOS for OS Selection.

Numlock

Select the power-on state for numlock.

Boot Type

Select the boot type. The options are Dual Boot Type, Legacy Boot Type or UEFI Boot Type.

PXE Boot to LAN

Disables or enables PXE boot to LAN.

USB Boot

Enable or disable the booting for USB boot devices.

Exit

```
                          InsydeH20 Setup Utility              Rev. 5.0
        Main    Advanced    Security    Boot    Exit

                                                    Exit system setup and save
                                                    your changes.
        Exit Saving Changes
        Load Optimal Defaults
        Discard Changes












   F1  Help          ↑/↓   Select Item     F5/F6 Change Values    F9  Setup Defaults
   Esc Exit          ←/→   Select Item     Enter Select ▶ SubMenu  F10 Save and Exit
```
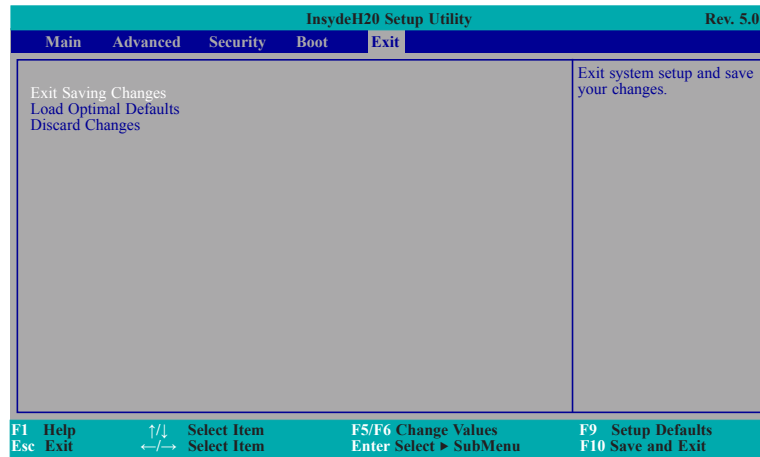
Exit Saving Changes

Select this field and then press <Enter> to exit the system setup and save your changes.

Load Optimal Defaults

Select this field and then press <Enter> to load optimal defaults.

Discard Changes

Select this field and then press <Enter>to exit the system setup without saving your changes.

Updating the BIOS

To update the BIOS, you will need the new BIOS file and a flash utility. Please contact techni-cal support or your sales representative for the files and specific instructions about how to update BIOS with the flash utility.

When you download the given BIOS file, you may find a BIOS flash utility attached with the BIOS file. This is the utility for performing BIOS updating procedure. For your convenience, we will also provide you with an auto-execution file in the BIOS file downloaded. This auto-execu-tion file will bring you directly to the flash utility menu soon after system boots up and finishes running the boot files in your boot disk.

```
Read file successfully.   (path= "platform.ini")

                              Information
                    Please do not remove the AC power


          Insyde H20FFT (Flash Firmware Tool) Version (SEG) 100.00.08.10
          Copyright(c) 2012 - 2016, Insyde Software Corp. All Rights Reserved.

                  Initializing
          Current BIOS Model name: BW171/173
          New   BIOS Model name: BW171/173

          Current BIOS version: 65.05A
          New BIOS version: 65.05A

                  Updating Block at FFFFF000h
          0%        25%        50%        75%        100%
C:\BW171/173>_                                              100%
```

Notice: BIOS SPI ROM

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

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

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

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

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.
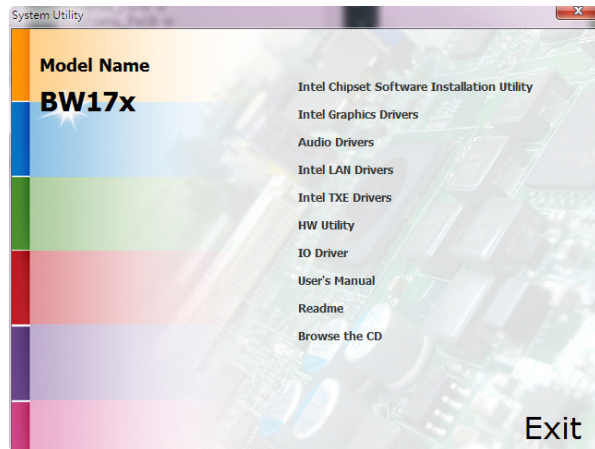
For Windows 10

For Windows 8.1
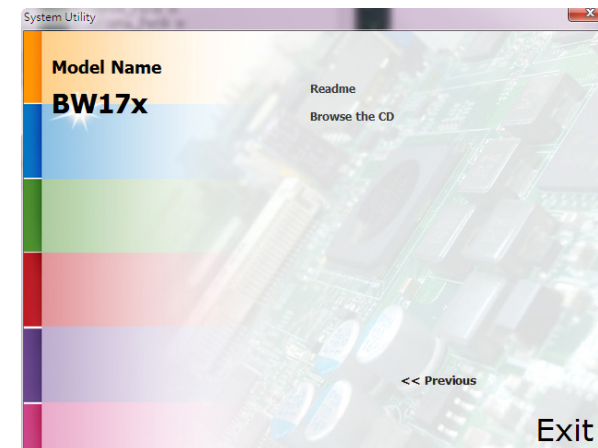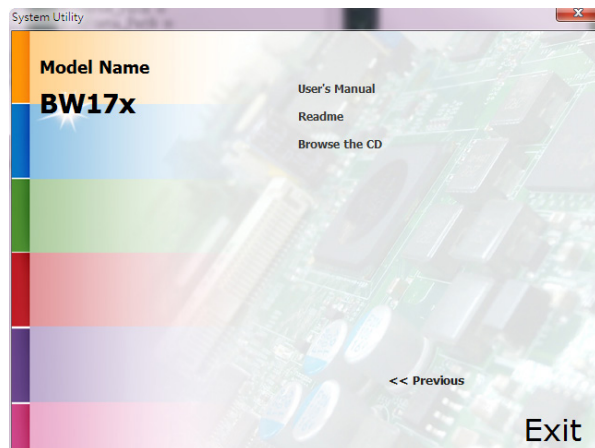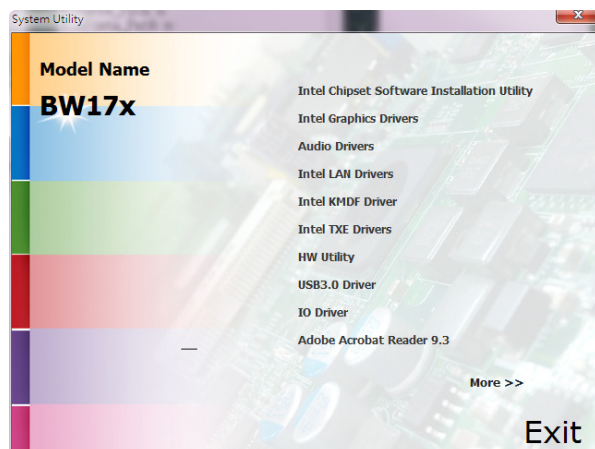
41

For Windows 7

Intel Chipset Software Installation Utility

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

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

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

2. Read the license agreement then click Yes.

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

4. After completing installation, click "Finish" to exit setup.

Intel Graphics Drivers

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

1. Setup is now ready to install the graphics driver. Click Next.
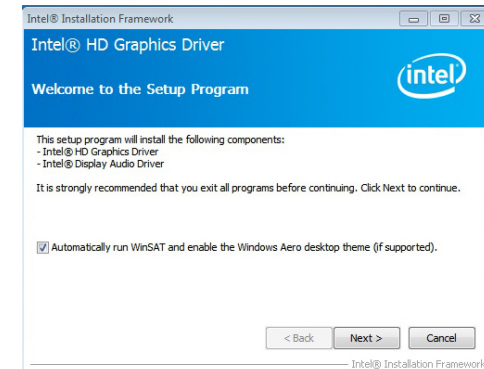
By default, the "Automatically run WinSAT and enable the Windows Aero desktop theme" is enabled. With this enabled, after installing the graphics driver and the system rebooted, the screen will turn blank for 1 to 2 minutes (while WinSAT is running) before the Windows 7/ Windows 8.1/ Windows 10 desktop appears. The "blank screen" period is the time Windows is testing the graphics performance.

We recommend that you skip this process by disabling this function then click "Next".

2. Read the license agreement then click Yes.

43
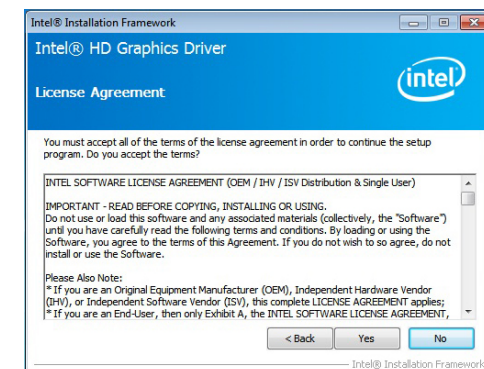
3. Go through the readme document for system requirements and installation tips then click Next.
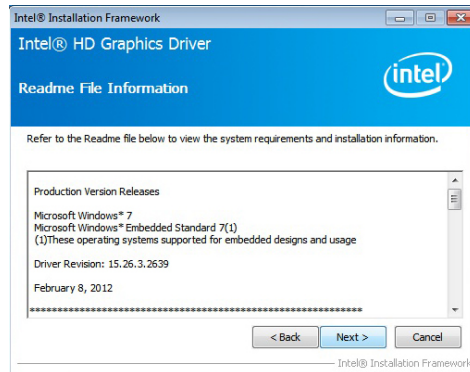
4. Setup is now installing the driver. Click Next to continue.
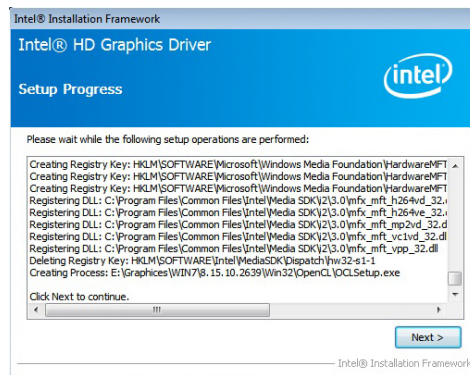
5. Click "Yes, I want to restart this computer now" then click Finish.

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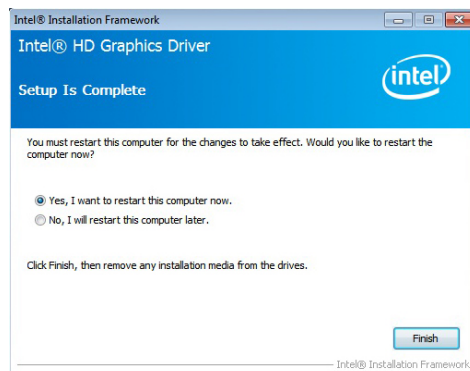
Audio Drivers

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

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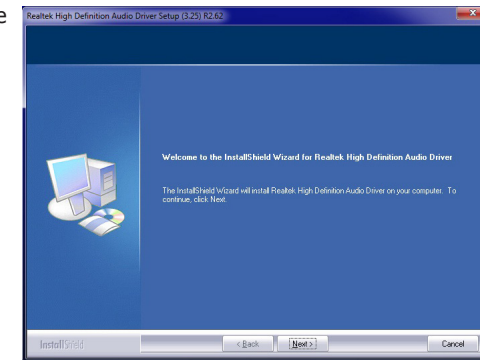
2. Click "Yes, I want to restart my computer now" then click Finish.

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

44
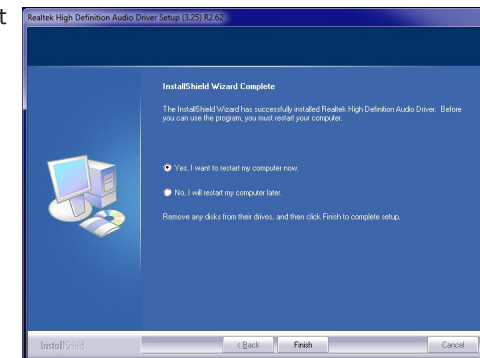
Intel LAN Drivers

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

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

2. Click "I accept the terms in the license agreement" then click "Next".
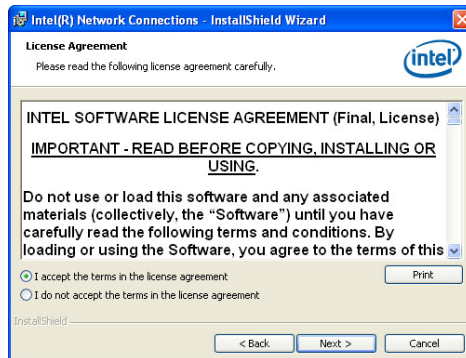
3. Select the program featuers you want installed then click Next.
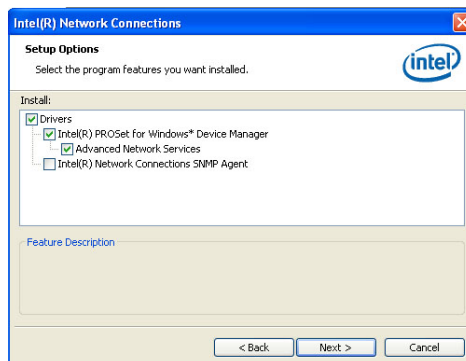
4. Click Install to begin the installation.

5. After completing installa-tion, click Finish.

45
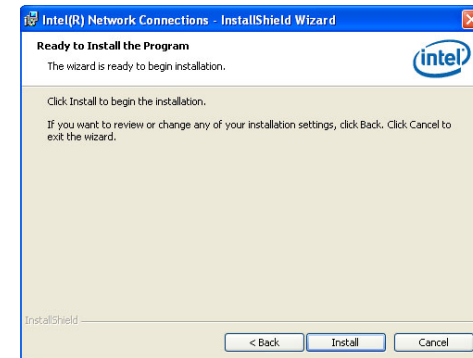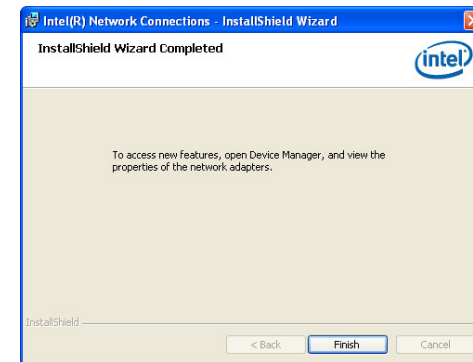
Kernel Mode Driver Framework (For Windows 7 only)

To install the driver, click "Kernel Mode Driver Framework" on the main menu.

1. Click "Yes" to install the update.
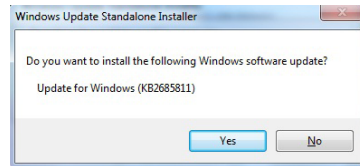
2. The update is installed now.
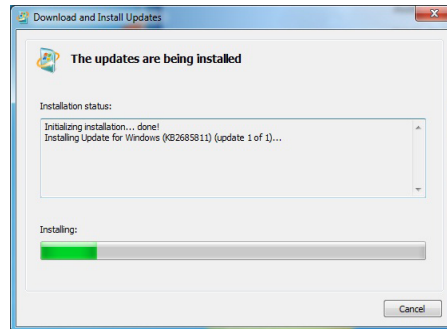
3. Click "Restart Now" to restart your computer when the installation is complete.
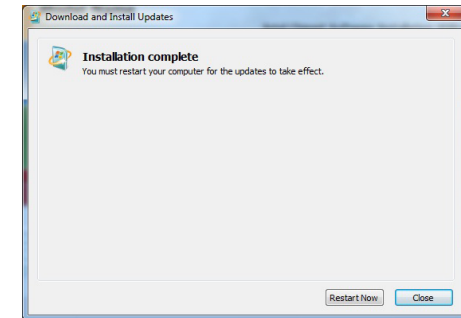
Intel Trusted Execution Engine Driver

To install the driver, click "Intel Trusted Execution Engine Driver" on the main menu.

1. Tick "I accept the terms in the License Agreement" and then click "Next."
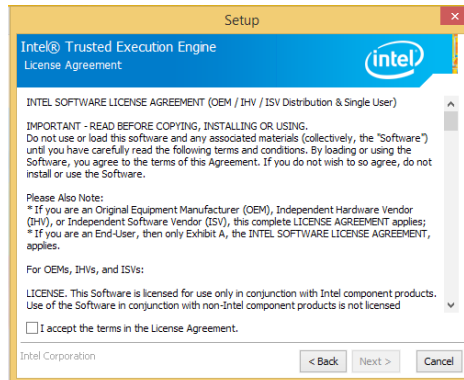
3. The step displays the installing status in the progress.
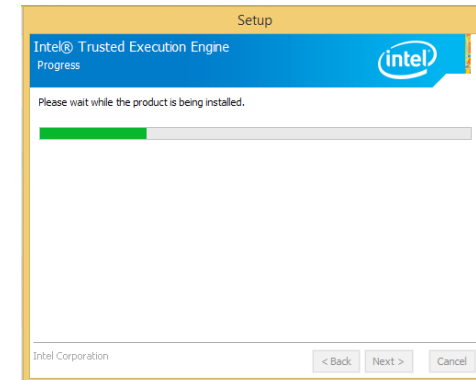
2. The step shows the components which will be installed. Then, Click Next.
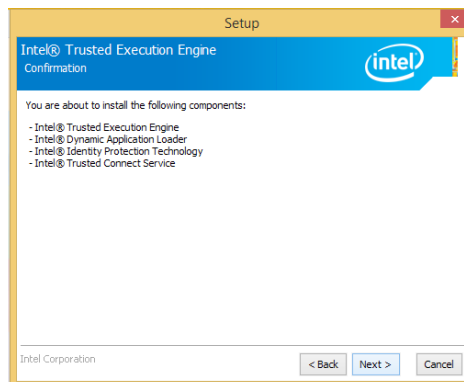
4. Click "Finish" when the installation is complete.

47
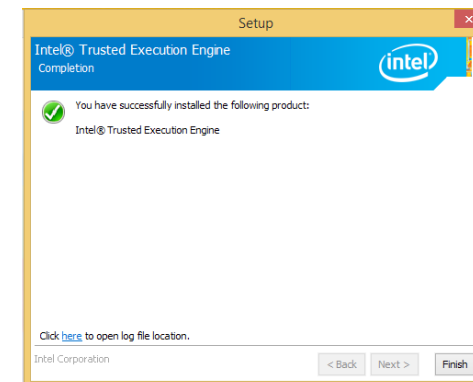
HW Utility

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

> **Note:**
> If you are using Windows 7 or later versions, you need to access the operating system as an administrator to be able to install the utility.
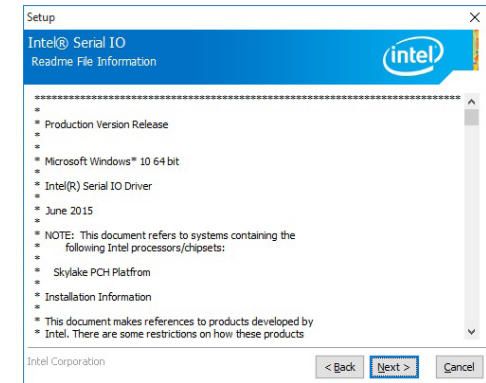
1. Setup is ready to install the driver.
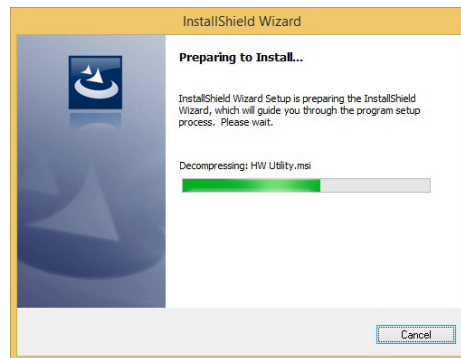
2. Click "Next" to continue.
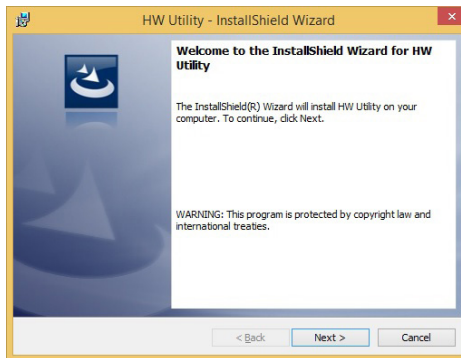
3. Read the license agreement then click "I accept the terms in the license agreement". Click "Next".
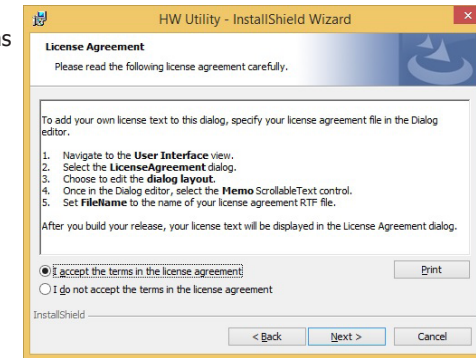
4. The wizard is ready to begin installation. Click "Install".
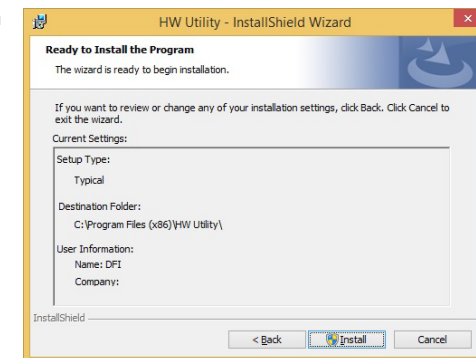
5. Please wait while the program features are being installed.
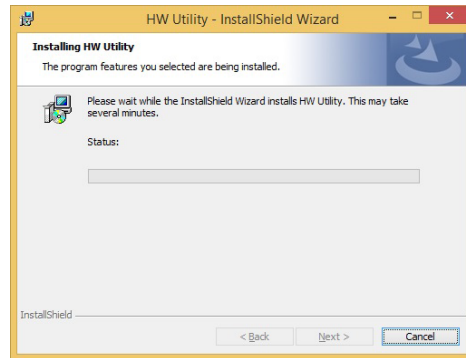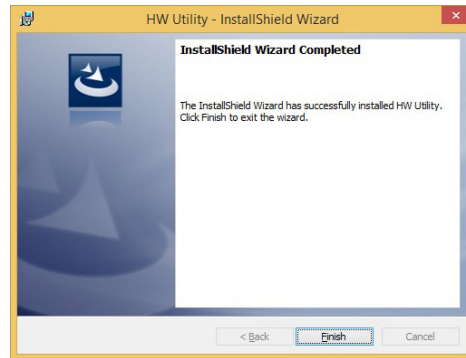
The HW Utility icon will appear on the desktop. Double-click the icon to open the utility.

6. After completing installation, click "Finish".
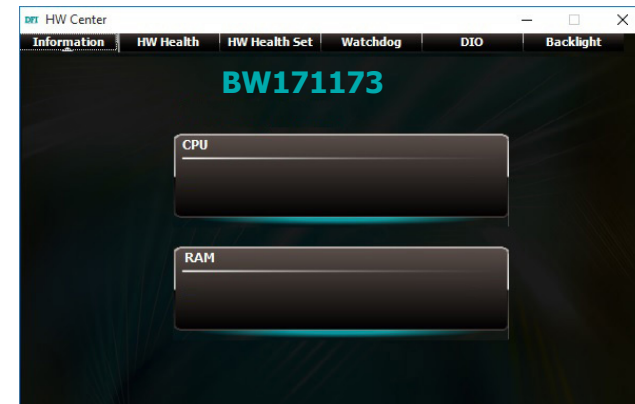
Note:
Note: The screenshot displayed above is for illustrative purpose only, and may not resemble the actual screen.

The BW171/173 HW Utility features the following tabs: Information, HW Health, HW Healthset, Watchdog, and DIO. Click on the tabs to access information about the board.

Intel USB 3.0 Drivers (For Windows 7 and Windows 8.1)

To install the driver, click "Intel USB 3.0 Driver" on the main menu.
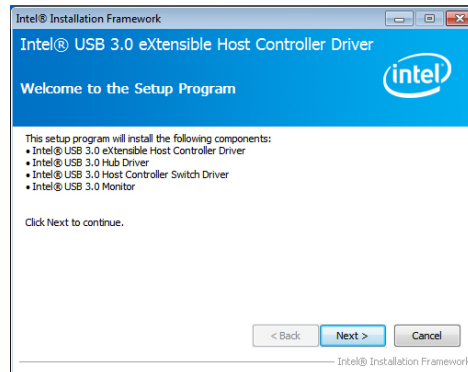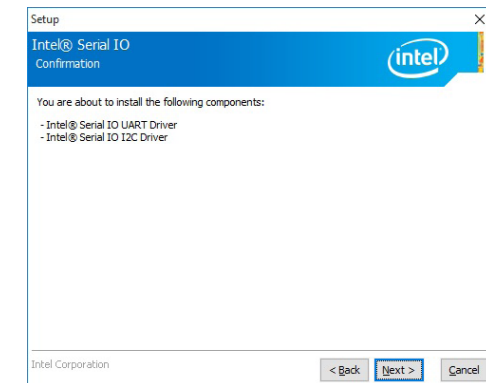
1. Setup is ready to install the driver. Click Next.

2. Read the license agreement then click Yes.

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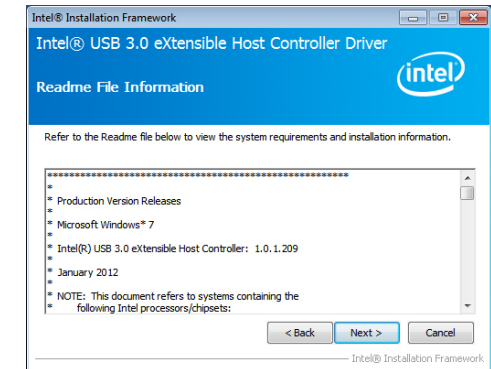
4. Setup is currently installing the driver. After installation has completed, click Next.

5. After completing installation, click Finish.

50
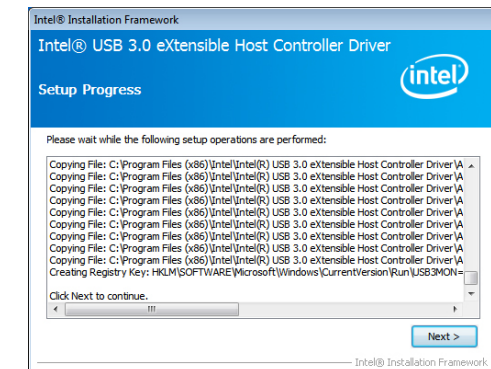
IO Driver

To install the driver, click "Intel Serial IO Driver" on the main menu

1. Setup is ready to install the driver.
   Click Next.
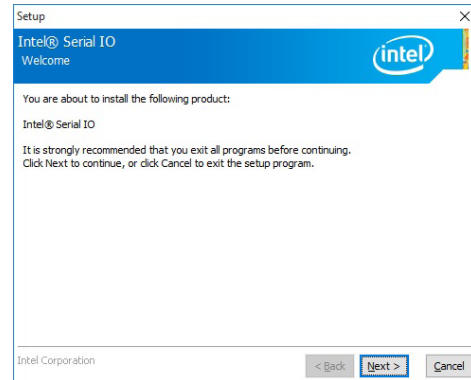
2. Read the license agreement carefully.

   Click "I accept the terms in the License Agreement" then click Next.
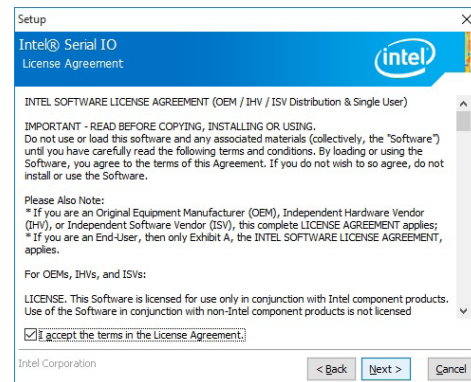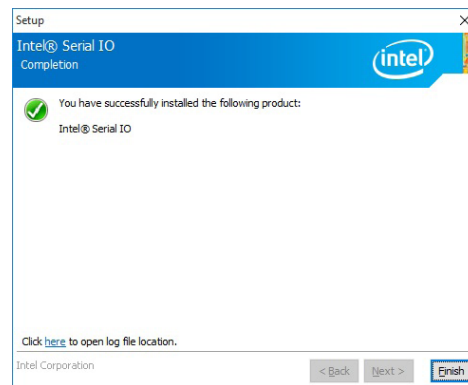

3. Read the file information then click Next.

4. Setup is ready to install the driver. Click Next.
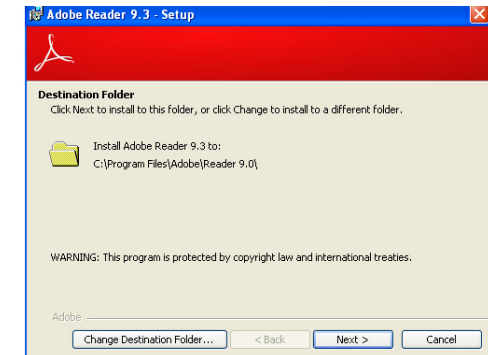
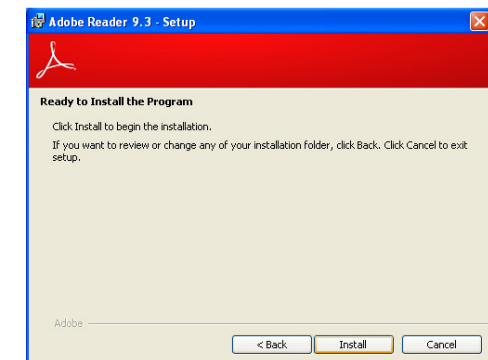5. Setup is now installing the driver.
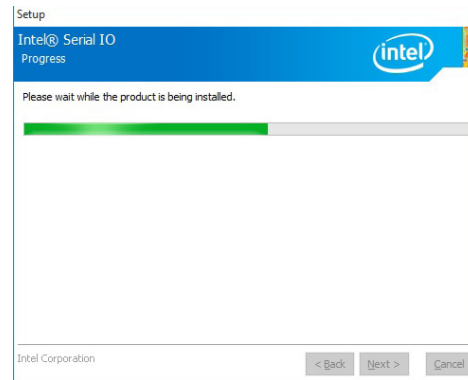
6. Click Finish.

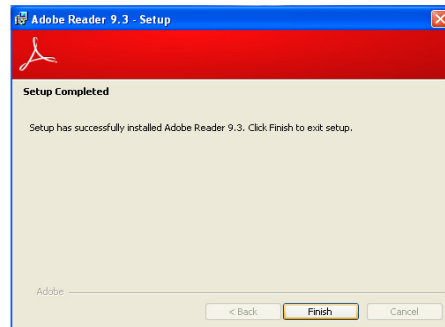**Adobe Acrobat Reader 9.3 (For Windows 7 and Windows 8.1)**

1. Click Next to install or click Change Destination Folder to select another folder.

2. Click Install to begin installation.

52

3. Click Finish to exit installation.

Appendix A - 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.

54

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.