DFI®

EC200/210/220/221-BT
Modular-Designed Embedded System
User's Manual

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FCC and DOC Statement on Class A

This equipment has been tested and found to comply with the limits for a Class A 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

An electronic file of this manual is included in the CD. To view the user's manual in the CD, insert the CD into a CD-ROM drive. The autorun screen (Main Board Utility CD) will appear. Click "User's Manual" on the main menu.

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 con nectors 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.

Battery:
• 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.

Safety Precautions

- Use the correct DC input voltage range.

- 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.

- 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.

- Keep this system away from humidity.

- Place the system on a stable surface. Dropping it or letting it fall may cause damage.

- The openings on the system are for air ventilation to protect the system from overheating. DO NOT COVER THE OPENINGS.

- Place the power cord in such a way that it will not be stepped on. Do not place anything on top of the power cord. Use a power cord that has been approved for use with the system and that it matches the voltage and current marked on the system's electrical range label.

- If the system will not be used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.

- If one of the following occurs, consult a service personnel:

  - The power cord or plug is damaged.

  - Liquid has penetrated the system.

  - The system has been exposed to moisture.

  - The system is not working properly.

  - The system dropped or is damaged.

  - The system has obvious signs of breakage.

- The unit uses a three-wire ground cable which is equipped with a third pin to ground the unit and prevent electric shock. Do not defeat the purpose of this pin. If your outlet does not support this kind of plug, contact your electrician to replace the outlet.

- Disconnect the system from the DC outlet before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.

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 system unit
- 1 HDD drive bay kit
  - 2 Brackets
  - 1 SATA data/power cable
  - 4 Bracket screws
  - 4 HDD screws
- Terminal blocks
- 1 CD disk includes
  - Drivers/Manual
- 1 Quick Installation Guide

Optional Items

- Wall Mount kit
- VESA Mount kit
- Power Cord
- Power Adapter

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

Before powering-on the system, prepare the basic system components.

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

- Storage devices such as CFast card, Mini PCIe and/or mSATA card, 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

Overview (EC200-BT)

Front View

EC200-BTA881 Rear View

EC200-BTAG60 Rear View

EC200-BT6060 Rear View

Overview (EC210-BT)

Front View

EC210-BTA881 Rear View

EC210-BTAG60 Rear View

EC210-BT6060 Rear View

Overview (EC220/EC221-BT)

Front View

EC220/EC221-BTA881 Rear View

EC220/EC221-BTAG60 Rear View

EC220/EC221-BT6060 Rear View

Key Features

Model Name	EC200/EC210/EC220/EC221-BT
Processor	Intel® Atom™ processor
Memory	Two 204-pin DDR3L SODIMM sockets support up to 8GB system memory
LAN	2 LAN ports
COM	up to 10 COM ports
Display	1 VGA, 1 DVI (DVI-D signal)
USB	1 Type A USB 3.0 port and USB 2.0 ports
GPIO	9-pole terminal block

Specifications

Processor System	• Intel® Atom™ E3845, Quad Core, 2M Cache, 1.91GHz, 10W • 22nm process technology
Memory	• Two 204-pin DDR3L SODIMM sockets - up to 8GB system memory - dual channel memory interface • Supports DDR3L 1333MHz
Graphics	• Intel® HD Graphics • Display ports: 1 VGA, 1 DVI (DVI-D signal) • Supports 2 independent displays • VGA: resolution up to 2560x1600 @ 60Hz • DVI: resolution up to 1920x1080 @ 60Hz
Storage	• 2 2.5" SATA drive bays - SATA 2.0 port with data transfer rate up to 3Gb/s - Standard: 1 SATA drive bay - Option: 2 SATA drive bays (Available upon request. Please contact your sales representative for more information.) • Supports 1 mSATA module via the mini PCIe socket
Ethernet	• 2 Intel® WGI210AT PCI Express Gigabit Ethernet controllers • Integrated 10/100/1000 transceiver • Fully compliant with IEEE 802.3, IEEE 802.3u, IEEE 802.3ab

Expansion	• EC200-BT
	 - 1 Mini PCIe slot
	   : Supports USB and PCIe signals
	   : Supports mSATA, Wi-Fi or 3G* (optional)
	   : Supports half size or full size Mini PCIe card
	• EC210-BT
	 - 1 PCI slot
	 - 1 Mini PCIe slot
	   : Supports USB and PCIe signals
	   : Supports mSATA, Wi-Fi or 3G* (optional)
	   : Supports half size or full size Mini PCIe card
	• EC220-BT
	 - 2 PCI slots
	 - 1 Mini PCIe slot
	   : Supports USB and PCIe signal
	   : Supports mSATA, Wi-Fi or 3G* (optional)
	   : Supports half size or full size Mini PCIe card
	• EC221-BT
	 - 1 PCIe x16 slot (x1 signal)
	 - 1 PCI slot
	 - 1 Mini PCIe slot
	   : Supports USB and PCIe signal
	   : Supports mSATA, Wi-Fi or 3G* (optional)
	   : Supports half size or full size Mini PCIe card

Audio	• Realtek® ALC888 High Definition Audio • 2 watt, 4Ω power amplifier
Power	• Power input voltage: 9~36V DC-in

Environment	• Temperature - Operating: 0°C~55°C (SSD/mSATA) - Operating: 0°C~50°C (HDD) - Operating: -10°C~70°C (wide-temp SSD, for EC200-BT6060 only) - Storage: -20°C~85°C • Operating Vibration - IEC68-2-64 (HDD) • Operating Shock - Half sine wave 15G, 11ms, 3 shock per axis
Construction	• Aluminum + SGCC
Mounting	• Wall/VESA mount - Mounting brackets and screws* (optional)
Dimensions	• EC200-BT: 275mm x 59mm x 203mm (W x H x D) • EC210-BT: 275mm x 94mm x 203mm (W x H x D) • EC220/EC221-BT: 275mm x 114mm x 203mm (W x H x D)
Weight	• EC200-BT: 3 kg • EC210-BT: 3.5 kg • EC220/EC221-BT: 4 kg
OS Support	• Windows 7, WES 7, Windows 8.1, WES 8 • Linux (Distribution available upon request)
WatchDog Timer	• Watchdog timeout programmable via software from 1 to 255 seconds
Certification	• CE • FCC Class A • RoHS

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

Getting to Know the EC200/EC210/EC220/EC221-BT

EC200-BT

Front View
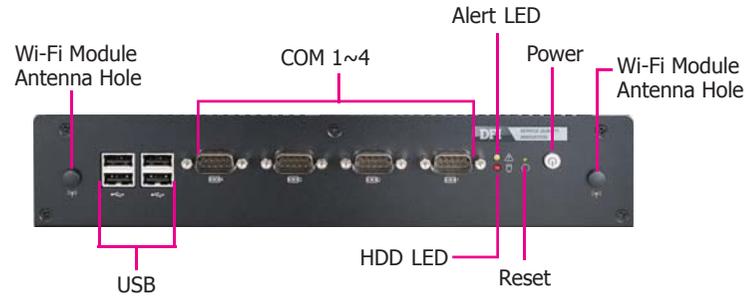
Wi-Fi Module Antenna Hole
Used to connect to a Wi-Fi antenna.

USB Ports
Used to connect USB 2.0/1.1 devices.

COM Ports
Used to connect serial devices.

HDD LED
Indicates the status of the hard drive.

Alert LED
Indicates the status when the CPU is over temperature.

Reset Button
Press to reset the system.

Power Button
Press to power-on or power-off the system.

Rear View

EC200-BTA881 Rear View
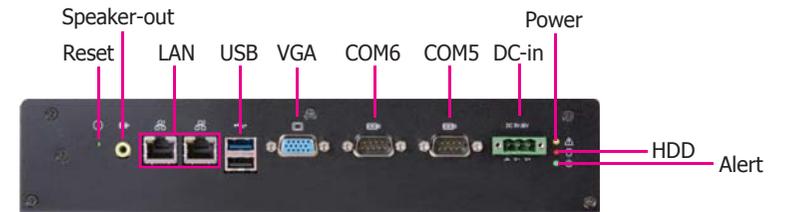
EC200-BTAG60 Rear View

EC200-BT6060 Rear View

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Power LED
Indicates the power status of the system.

HDD LED
Indicates the status of the hard drive.

Alert LED
Indicates the status when the CPU is over temperature.

DC-in
Used to plug a power adapter.

COM Ports
Used to connect serial devices.

DVI Port
Used to connect a DVI device.

VGA Port
Used to connect an analog VGA monitor.

USB Ports
Used to connect USB 2.0 or 3.0 devices.

LAN Ports
Used to connect systems to a local area network.

GPIO
Supports 8-bit digital output and input.

Speaker-out
Used to connect to a speaker.

Reset Button
Indicates the reset status of the system.

EC210-BT

Front View

Wi-Fi Module Antenna Hole
Used to connect to a Wi-Fi antenna.

USB Ports
Used to connect USB 2.0/1.1 devices.

COM Ports
Used to connect serial devices.

HDD LED
Indicates the status of the hard drive.

Alert LED
Indicates the status when the CPU is over temperature.

Reset Button
Press to reset the system.

Power Button
Press to power-on or power-off the system.

Rear View

Speaker-out

Reset   LAN

USB   VGA   COM6   COM5

Power

DC-in

HDD   Alert

GPIO   USB   COM10   COM9   COM8   COM7

PCI Slot

DVI
(DVI-D signal)

EC210-BTA881 Rear View

Speaker-out

Reset   LAN   USB   VGA   COM2   COM5

Power

DC-in

HDD
Alert

GPIO   COM10   COM9   COM8   COM7   GPIO

PCI Slot

EC210-BTAG60 Rear View

Speaker-out

Reset   LAN   USB   VGA   COM2   COM1

Power

DC-in

HDD   Alert

PCI Slot

EC210-BT6060 Rear View

Power LED
Indicates the power status of the system.

HDD LED
Indicates the status of the hard drive.

Alert LED
Indicates the status when the CPU is over temperature.

DC-in
Used to plug a power adapter.

COM Ports
Used to connect serial devices.

DVI Port
Used to connect a DVI device.

VGA Port
Used to connect an analog VGA monitor.

USB Ports
Used to connect USB 2.0 or 3.0 devices.

LAN Ports
Used to connect systems to a local area network.

GPIO
Supports 8-bit digital output and input.

Speaker-out
Used to connect to a speaker.

Reset Button
Indicates the reset status of the system.

PCI slot
Supports to add on riser cards.

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EC220/EC221-BT

Front View

Wi-Fi Module Antenna Hole
Used to connect to a Wi-Fi antenna.

USB Ports
Used to connect USB 2.0/1.1 devices.

COM Ports
Used to connect serial devices.

HDD LED
Indicates the status of the hard drive.

Alert LED
Indicates the status when the CPU is over temperature.

Reset Button
Press to reset the system.

Power Button
Press to power-on or power-off the system.

Rear View

EC220/EC221-BTA881 Rear View

EC220/EC221-BTAG60 Rear View

EC220/EC221-BT6060 Rear View

Power LED
Indicates the power status of the system.

HDD LED
Indicates the status of the hard drive.

Alert LED
Indicates the status when the CPU is over temperature.

DC-in
Used to plug a power adapter.

COM Ports
Used to connect serial devices.

DVI Port
Used to connect a DVI device.

VGA Port
Used to connect an analog VGA monitor.

USB Ports
Used to connect USB 2.0 or 3.0 devices.

LAN Ports
Used to connect systems to a local area network.

GPIO
Supports 8-bit digital output and input.

Speaker-out
Used to connect to a speaker.

Reset Button
Indicates the reset status of the system.

PCI/PCIe slot
Supports to add on riser cards.

Mechanical Dimensions

Chassis Dimension (EC200-BT)

Front View

Left View

203.00

275.00

59.00

55.00

Right View

Chassis Dimension (EC210-BT)

Front View

90.00
94.00

275.00

203.00

Left View

Right View
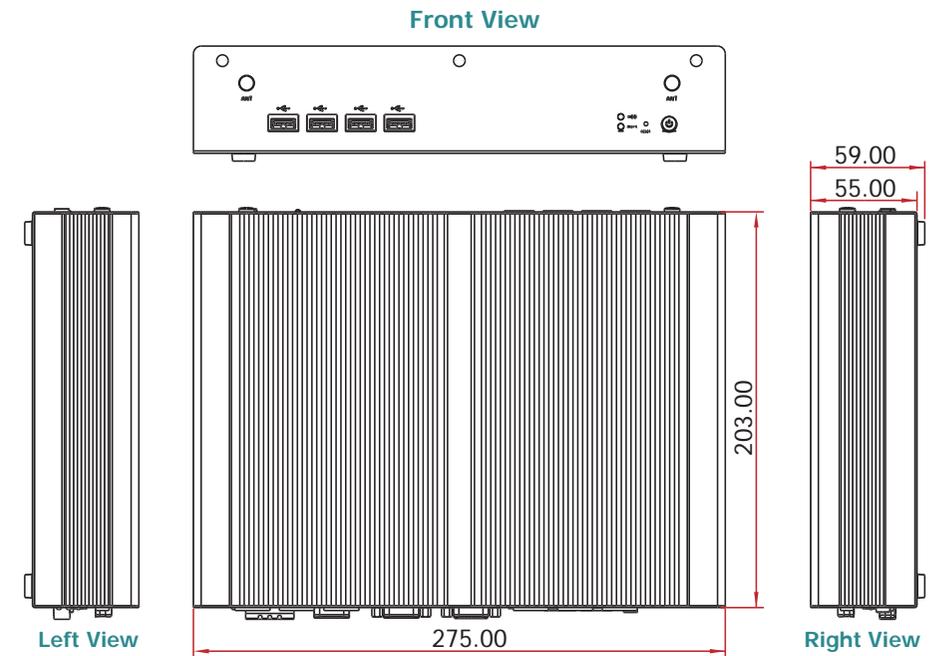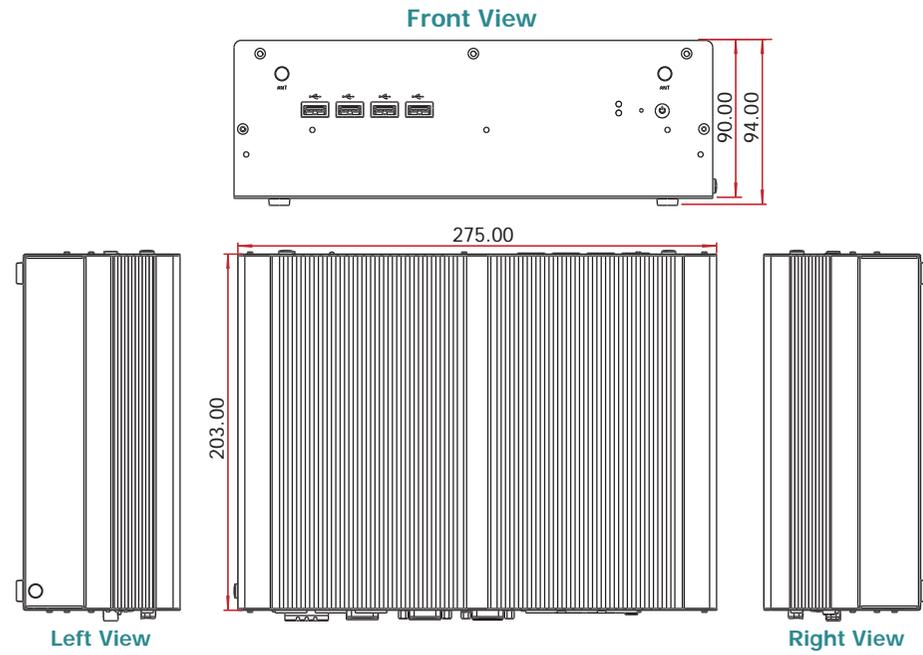
Chassis Dimension (EC220/EC221-BT)

Front View

114.00
110.00

203.00

275.00

Left View

Right View

Motherboard Dimension

173.00
140.14
107.43
58.00
0.00

221.00
209.00
196.00
183.44
175.00
149.86
139.00
121.15
103.00
67.00
40.50
22.50

222.00
210.00
192.50
173.50
154.50
127.27
125.10
114.00
91.50
55.50
23.60
5.00
0.00

107.43
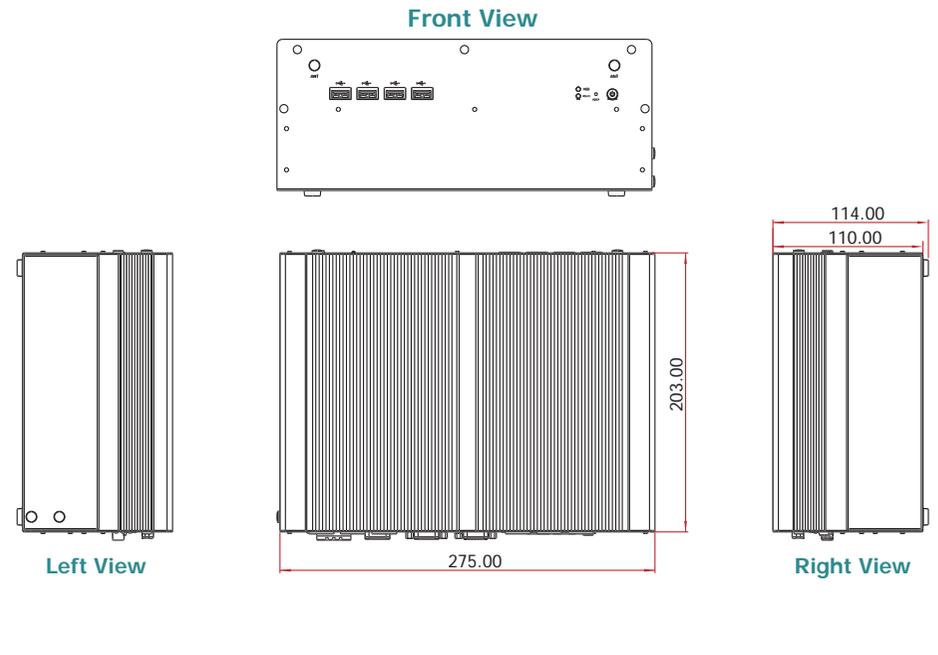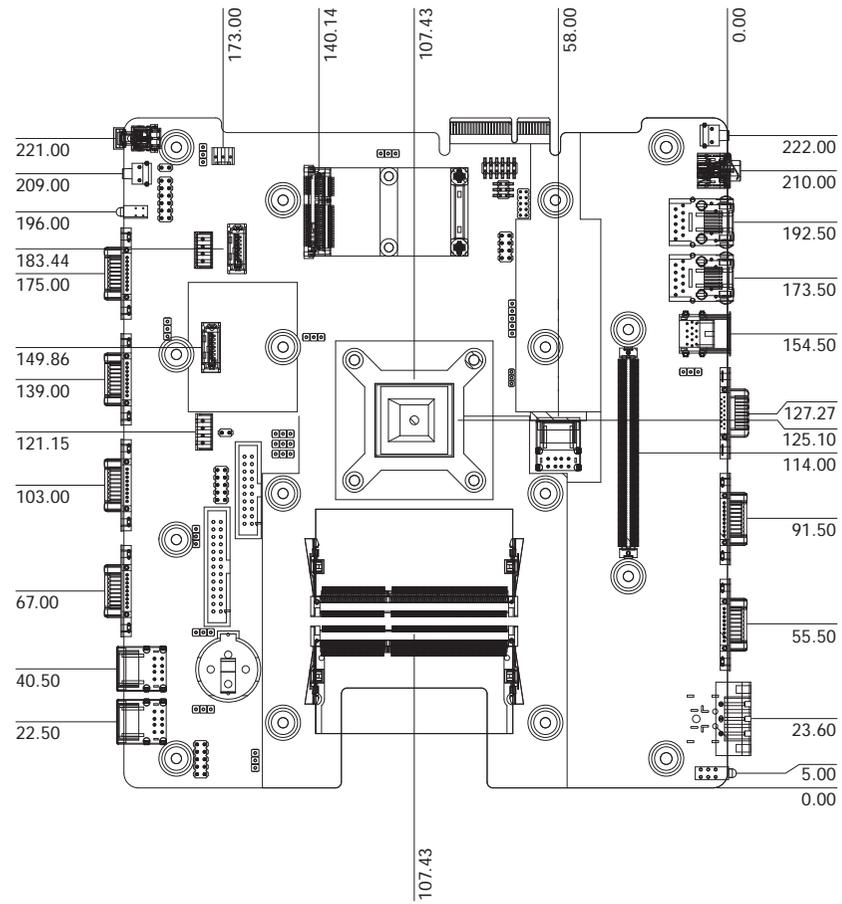
BT263

Chapter 2 - Getting Started

Preparing the System

Before you start using the system, you need the following items:

- SATA hard drive
- AC power adapter
- CD-ROM drive (for installing software/drivers)
- Screwdriver
- Memory module

Installing Devices

The following are devices that can be installed in the system.

- Memory module
- SATA hard drive
- Mini PCIe card

Configuring the BIOS

To get you started, you may need to change configurations such as the date, time and the type of hard disk drive.

1. Power-on the system.
2. After the memory test, the message "Press DEL to run setup" will appear on the screen. Press the Delete key to enter the AMI BIOS setup utility.

Installing the Operating System

Most operating system software are provided in a CD therefore you need to install a CD-ROM drive in order to use the CD.

Make sure a 2.5″ SATA drive is already installed.

1. Refer to the following chapters for information on connecting a CD-ROM drive and install- ing a SATA drive.
2. Refer to your operating system manual for instructions on installing the operating system.

Installing the Drivers

The system package includes a CD disk. The CD includes drivers that must be installed to pro- vide the best system performance. Refer to the Supported Software chapter for instructions on installing the drivers.

Chapter 3 - Installing the Devices

Removing the Chassis Cover

1. Make sure that the system and all other peripheral devices connected to it have been powered-off.

2. Disconnect all power cords and cables.

3. The 6 mounting screws on the bottom side of the system are used to secure the cover to the chassis. Remove these screws and then put them in a safe place for later use.

Mounting Screw

4. After removing the mounting screws, lift the cover up.

Lift the Cover Upward

5. The SODIMM socket and the Mini PCie slot are readily accessible after removing the chassis cover.

Mini PCie slot

SODIMM socket

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Installing a SODIMM Module

1. The SODIMM socket is located on the system board.
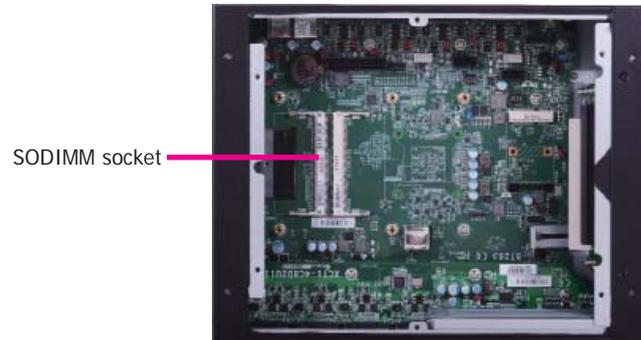
SODIMM socket ———

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

3. 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.
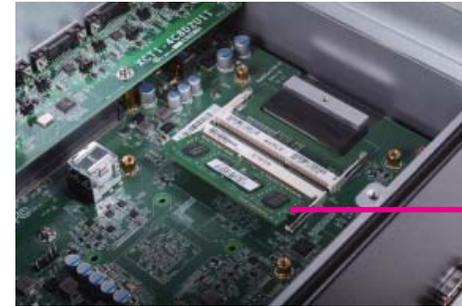
——— SODIMM Module

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

——— Clip

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

Installing a 2.5" SATA Drive

1. First, use the 5 provided mounting screws to secure the protective plate in place on the system board.

Mounting Screws

Protective plate

Heat-dissipating plate

2. Align the mounting holes of the SATA drive with the mounting holes on the HDD brackets and then use the provided mounting screws to secure the drive in place.

SATA drive

HDD bracket

Mounting screw

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3. Place the SATA drive (with HDD brackets) into the system. Align the mounting holes on the HDD brackets with the mounting holes on the heat-dissipating plate and then use the provided mounting screws to secure the drive in place.

Mounting hole

HDD bracket
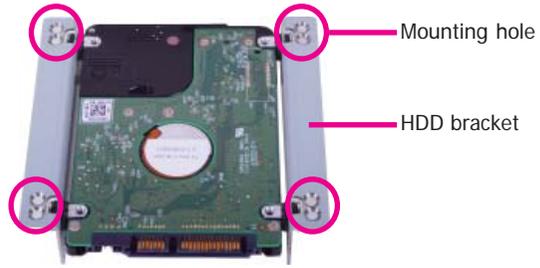
Mounting screw
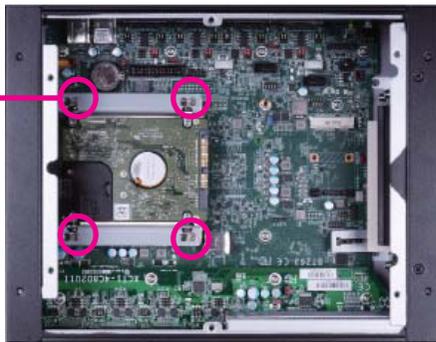
4. Connect A to the SATA data/power connector on the SATA drive, B and C to the SATA power connector and the SATA data connector respectively on the system board.

SATA data/power connector (A)

SATA power connector (B)

SATA data connector (C)

SATA data/power connector (A)
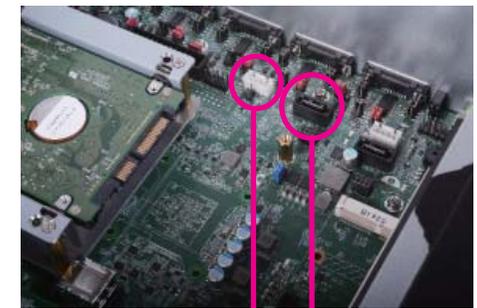
SATA power connector (B)

SATA data connector (C)

SATA power connector

SATA data connector

SATA data/power connector

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Installing a Mini PCIe Card and/or mSATA Card

1. The Mini PCIe slot is located on the system board.
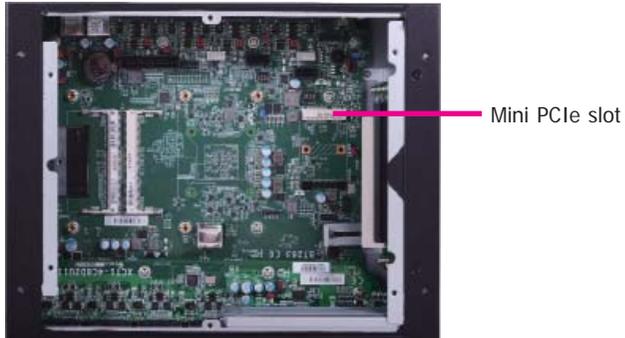
Mini PCIe slot

2. The system board is equipped with 1 Mini PCIe slot. The Mini PCIe slot supports a half length or a full length Mini PCIe card. Note the key on the slot. The key ensures the Mini PCIe card can be plugged into the slot in one direction only.
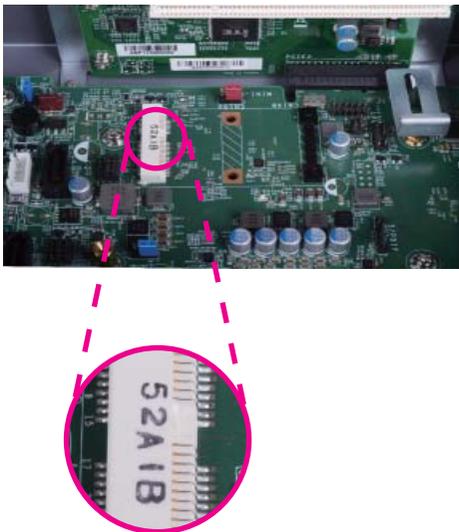
3. Grasping the Mini PCIe card by its edges, align the card into the slot at an approximately 30 degrees angle. Apply firm even pressure to each end of the card until it slips down into the slot. The contact fingers on the edge of the card will almost completely disappear inside the slot.
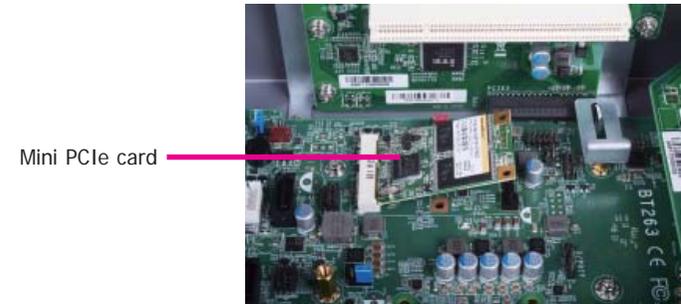
Mini PCIe card

4. Push the Mini PCIe card down until the clips at each end of the latch lock into position. You will hear a distinctive "click", indicating that the card is correctly locked into position.

Clip

Clip

21
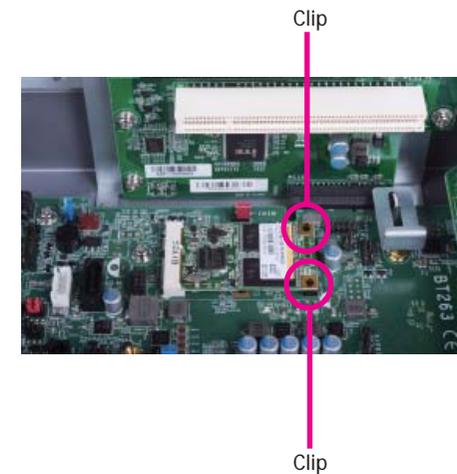
Installing the PCI/PCIe Expansion Card

PCI Expansion Card
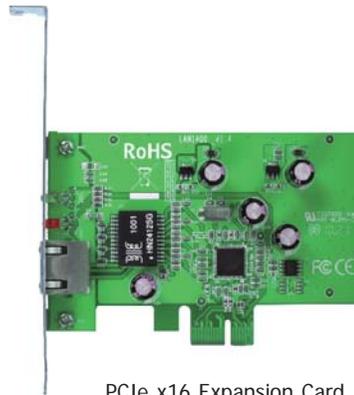
PCIe x16 Expansion Card
(PCIe x1 signal)
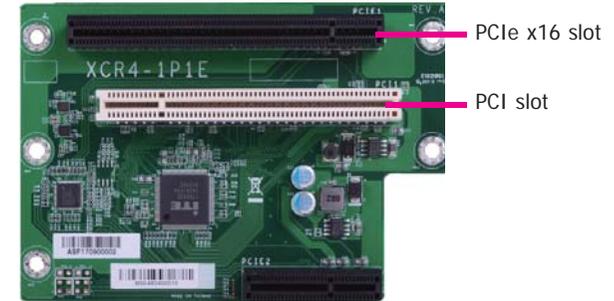
PCIe x16 slot

PCI slot

1. The PCI slot and the PCIe x16 slot on the riser card are used to install the expansion cards. To install the expansion cards, you need to remove the mounting screws that secure the brackets to the chassis and then remove the brackets.

2. To remove the mounting screws and the brackets, you need to remove the hole plugs and insert the screwdriver through the holes to access the mounting screws.

Bracket

PCIe x16 slot

PCI slot

Mounting Screw

Bracket

Mounting Screw

Hole plug

22
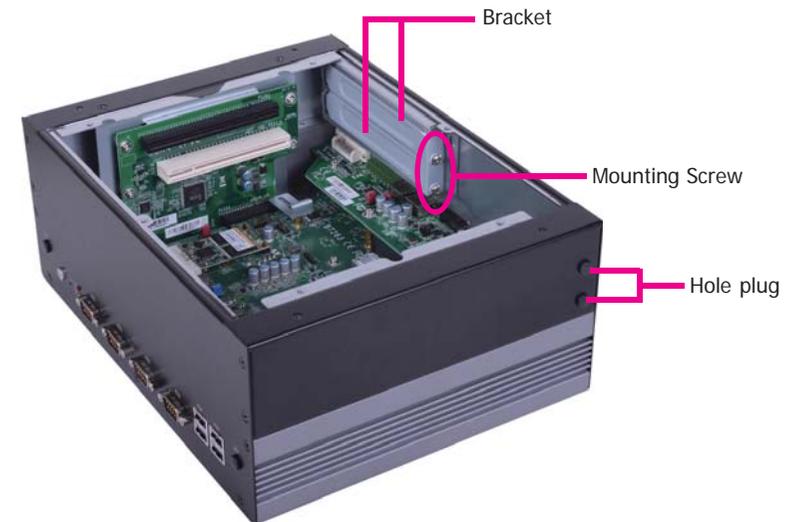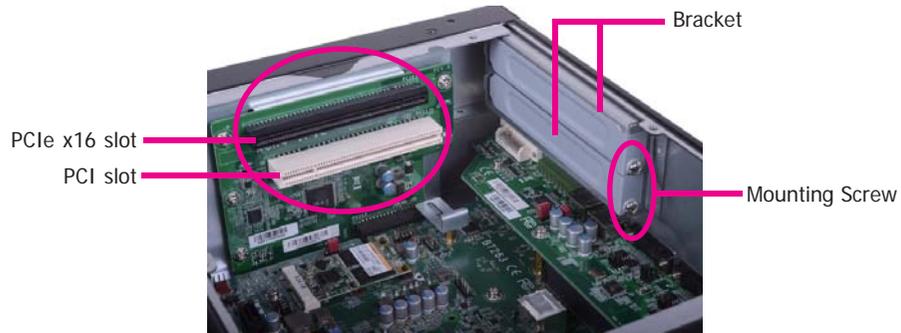
3. Remove these mounting screws and brackets, and then put them in a safe place for later use.

Screwdriver

4. Insert one expansion card with a bracket into the PCI slot and the PCIe x16 slot respectively that are on the riser card and secure the bracket in place.

PCIe x16 slot

Rear View

Expansion card

PCI slot

Rear View

Expansion card
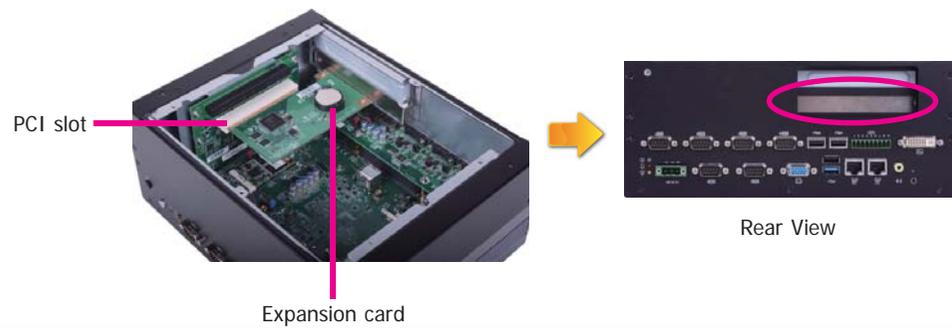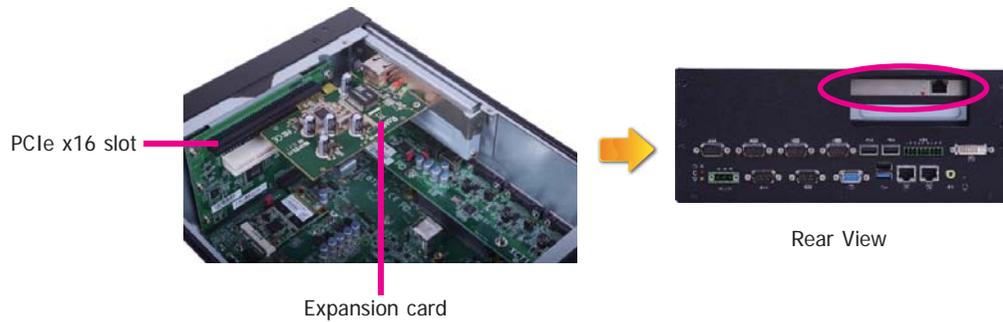
Chapter 4 - Jumper Settings

Jumper Settings - System Board

Clear CMOS Data

JP4

3 2 1

1-2 On:
Normal (default)

3 2 1

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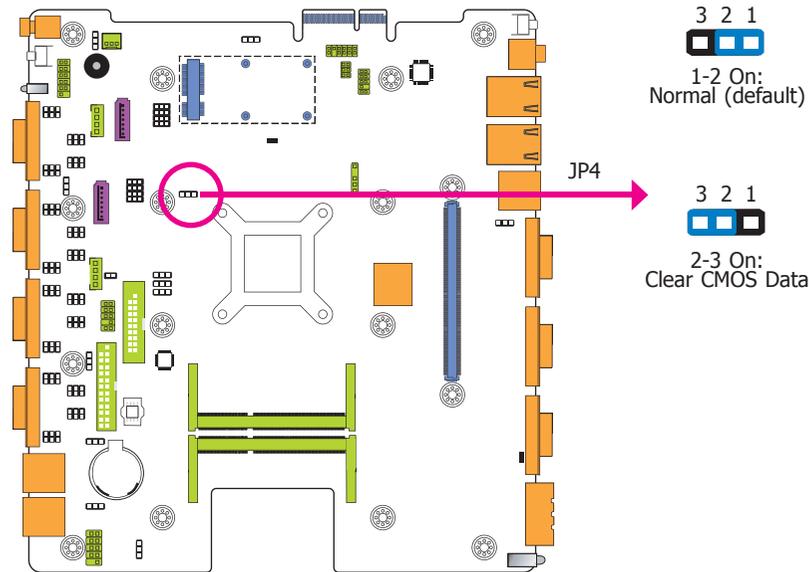
If you encounter that CMOS data becomes corrupted, you can reconfigure the system with the default values stored in the ROM BIOS.

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 JP4 pins 2 and 3 to On. Wait for a few seconds and set JP4 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

1
2
3

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

JP12

1
2
3

2-3 On:
Power-on via AC power
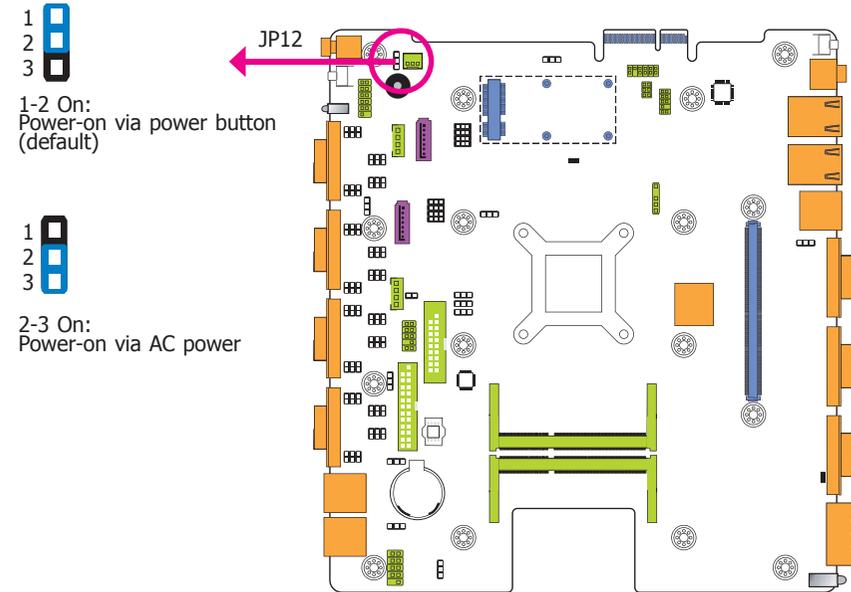
JP12 is used to select the method of powering on the system. If you want the system to power-on whenever AC power comes in, set JP12 pins 2 and 3 to On. If you want to use the power button, set pins 1 and 2 to On.

When using the JP12 "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).

> **Note:**
> In order to ensure that power is resumed after a power failure that recovers within a 5 second period, set JP12 to 2-3 On and the "Restore AC Power Loss" in CMOS is set to "Power On".

USB Power Select

USB 0-1
(JP1)

3 2 1

1-2 On: +5V

USB 4-5
(JP10)

3 2 1

2-3 On:
+5V_standby
(default)

USB 6-7
(JP11)

USB 10-11
(JP9)

1
2
3

1-2 On: +5V

1
2
3

2-3 On:
+5V_standby
(default)
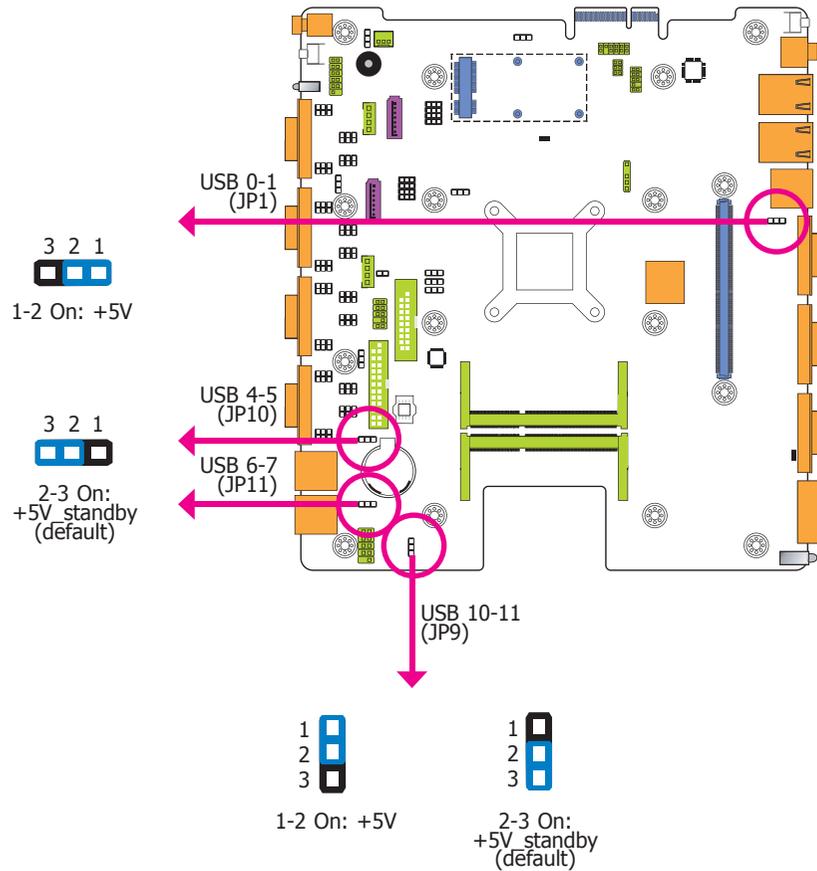
JP1, JP9, JP10 and JP11 are used to select the power of the USB ports. Selecting +5V_standby will allow you to use a USB device to wake up the system.

> **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.

SATA DOM Power Select

JP22

SATA 0

3
2
1

1-2 On: +5V (default)

3
2
1

2-3 On: GND
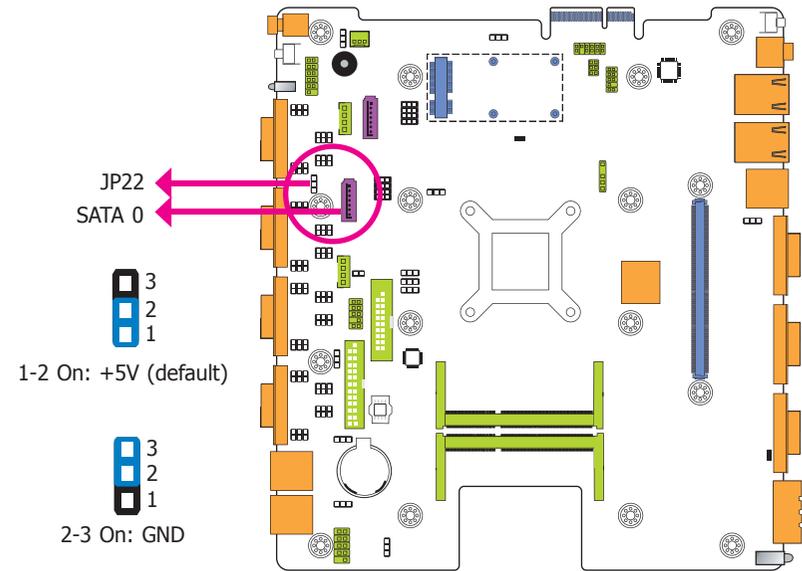
JP22 is used to select the power level of SATA DOM.

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

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

JP23

JP24 ────────────────────────────► JP15

JP25

JP26 ────────────────────────────► JP17

JP27

JP28 ────────────────────────────► JP19

JP29

JP30 ────────────────────────────► JP21
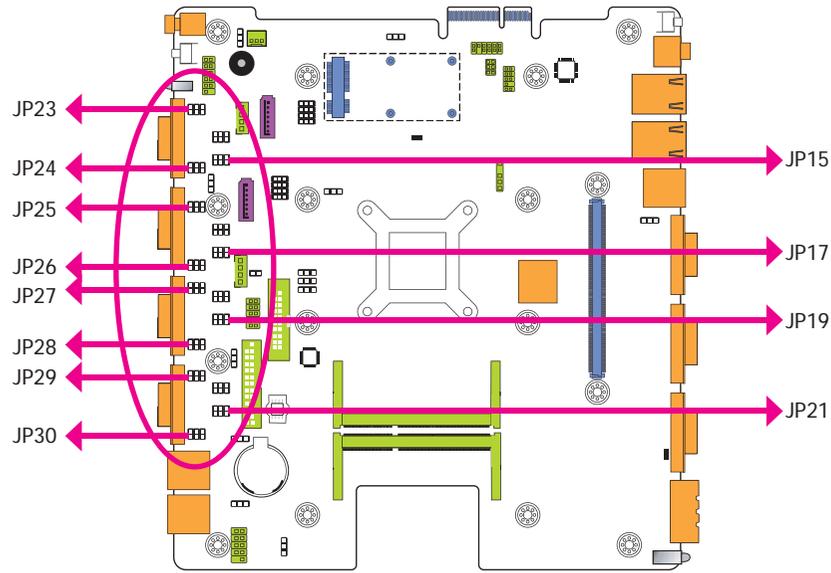
COM 1 to COM 4:
RS232/422/485

All these jumpers on the system board are used to configure the COM 1 (JP15, JP23 and JP24)/COM 2 (JP17, JP25 and JP26)/COM 3 (JP19, JP27 and JP28)/COM 4 (JP21, JP29 and JP30) port to RS232, RS422 (Full Duplex) or RS485. The pin functions of the COM 1/COM 2/COM 3/COM 4 port will vary according to these jumpers' setting.
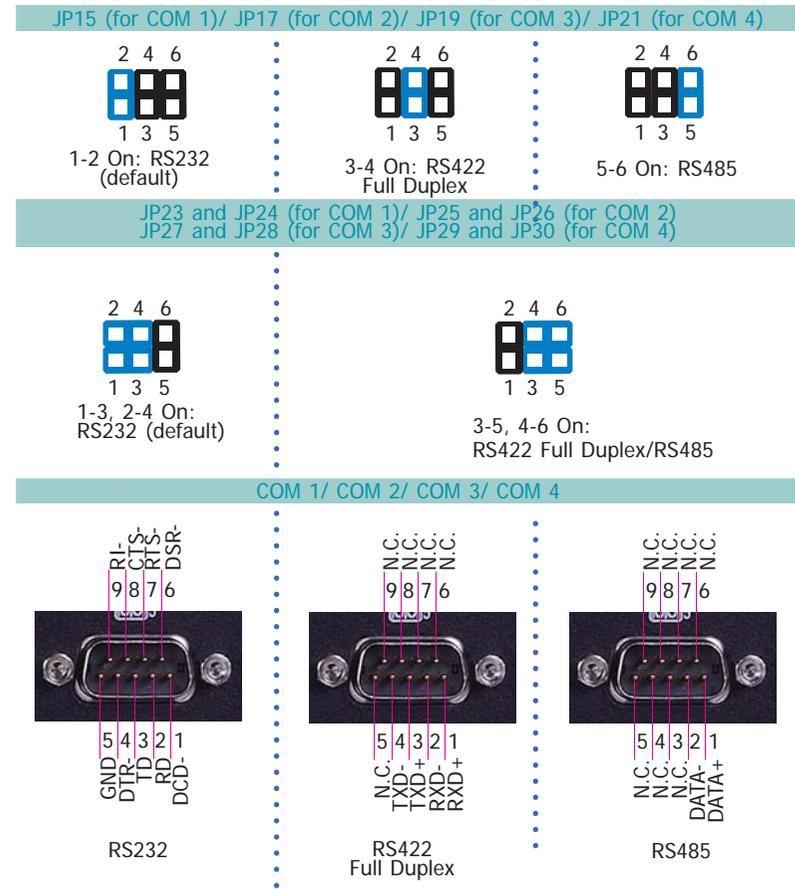
JP15 (for COM 1)/ JP17 (for COM 2)/ JP19 (for COM 3)/ JP21 (for COM 4)		
2 4 6 1 3 5 1-2 On: RS232 (default)	2 4 6 1 3 5 3-4 On: RS422 Full Duplex	2 4 6 1 3 5 5-6 On: RS485

JP23 and JP24 (for COM 1)/ JP25 and JP26 (for COM 2) JP27 and JP28 (for COM 3)/ JP29 and JP30 (for COM 4)	
2 4 6 1 3 5 1-3, 2-4 On: RS232 (default)	2 4 6 1 3 5 3-5, 4-6 On: RS422 Full Duplex/RS485

COM 1/ COM 2/ COM 3/ COM 4

RI- CTS- RTS- DSR-
9 8 7 6
5 4 3 2 1
GND DTR- TD- RD- DCD-
RS232

N.C. N.C. N.C. N.C.
9 8 7 6
5 4 3 2 1
N.C. TXD- TXD+ RXD- RXD+
RS422
Full Duplex

N.C. N.C. N.C. N.C.
9 8 7 6
5 4 3 2 1
N.C. N.C. N.C. DATA- DATA+
RS485

Note:
1. When COM 1 RS232/422/485 is selected, JP23 and JP24 must be set in accordance to JP15.
2. When COM 2 RS232/422/485 is selected, JP25 and JP26 must be set in accordance to JP17.
3. When COM 3 RS232/422/485 is selected, JP27 and JP28 must be set in accordance to JP19.
4. When COM 4 RS232/422/485 is selected, JP29 and JP30 must be set in accordance to JP21.
5. To make the RS485 auto flow control function work on COM 1 to COM 4, please set either 8 data bits + 1 stop bit or one of the following settings:
   (1) 8 data bits + 1 parity bit + 1 stop bit
   (2) 8 data bits + 1 parity bit + 2 stop bits
   (3) 8 data bits + 2 stop bits

COM 1/COM 2/COM 3/COM 4 RS232/Power Select

2 4 6

1 3 5

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

JP14

JP16

JP18

JP20

2 4 6

1 3 5

3-5 (+5V), 4-6 (+12V) On:
RS232 with power
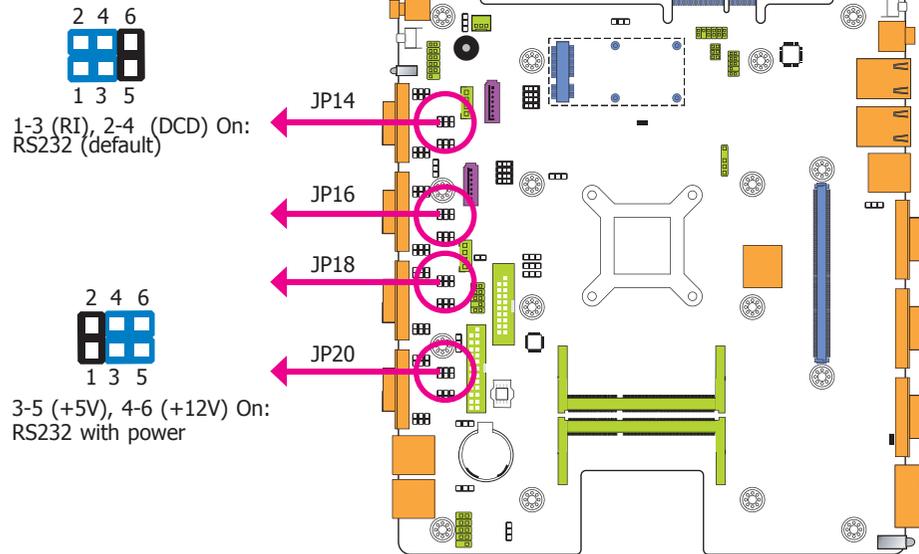
JP14 (for COM 1), JP16 (for COM 2), JP18 (for COM 3) and JP20 (for COM 4) are used to con-figure these Serial COM ports to pure RS232 or RS232 with power.

Mini PCIe/mSATA Signal Select

JP8

10   12

1   3

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

10   12

1   3

2-5-8-11, 3-6-9-12 On:
mSATA
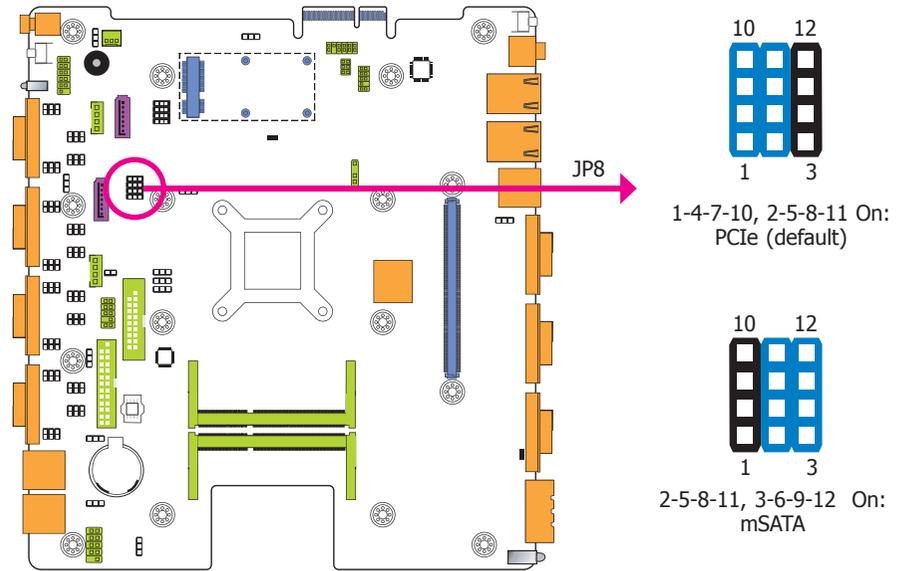
JP8 is used to select the Mini PCIe signal: PCIe or mSATA.

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Mini PCIe/mSATA Power Select

3 2 1

3 2 1

1-2 On: +3V_standby (Mini PCIe)
(default)

2-3 On: +3.3V (mSATA)

JP3
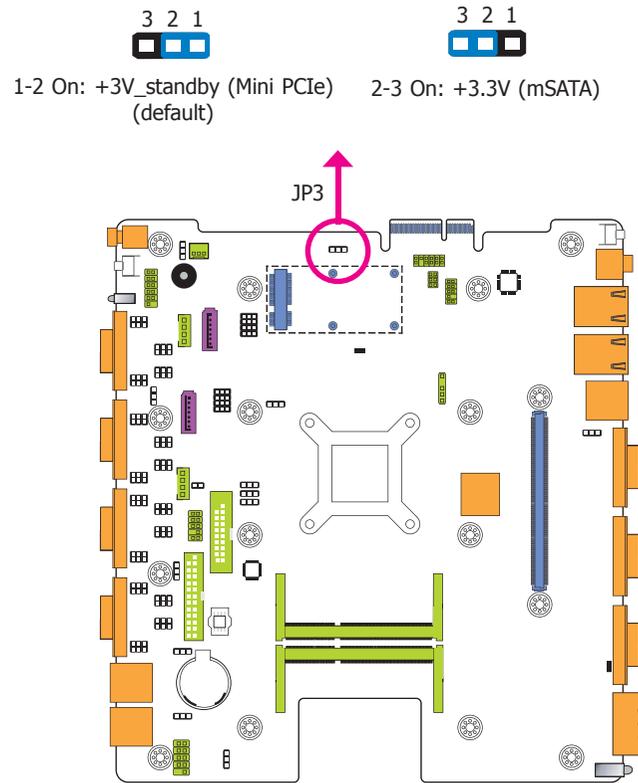
JP3 allows you to select the power rail for the Mini PCIe or mSATA device.

SATA 1/mSATA Signal Select

JP31

12   10

3   1

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

12   10

3   1

2-5-8-11, 3-6-9-12 On:
mSATA
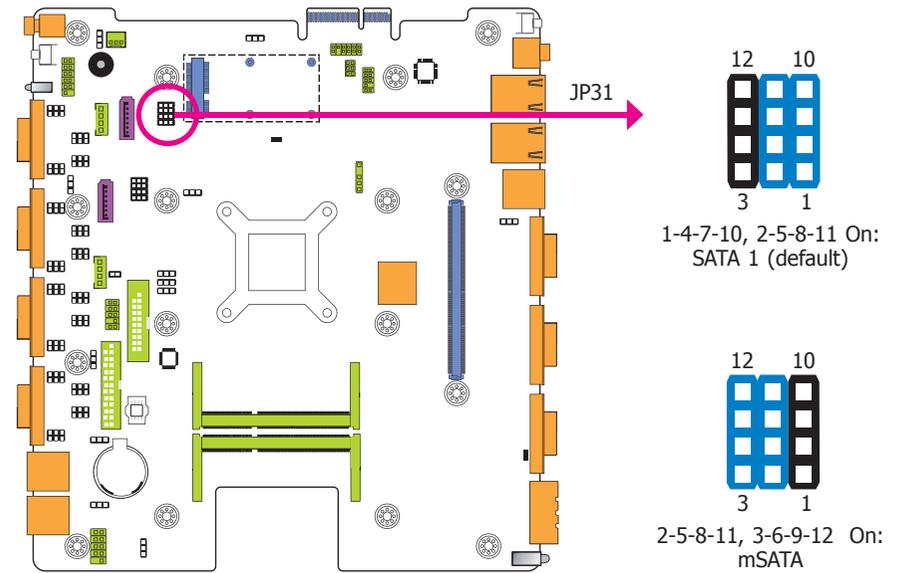
JP31 is designed to select the SATA or mSATA signal.

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Digital I/O Power Select

3 2 1

1-2 On: +5V_standby

JP7

3 2 1

2-3 On: +5V (default)
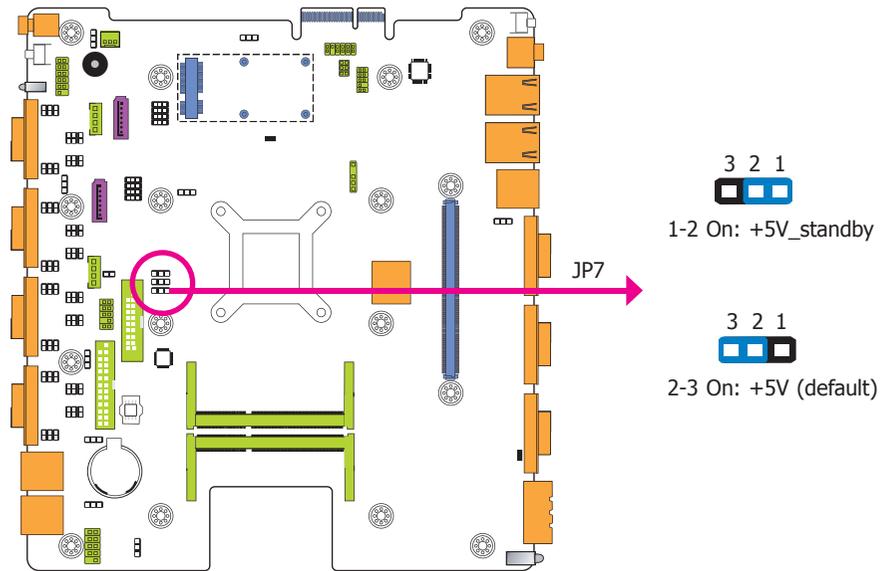
JP7 is used to select the power of DIO (Digital I/O) signal.

Digital I/O Output State

DIO 11/13/15/17 (JP5)

DIO 3/5/7/9 (JP6)

3 2 1

1-2 On: +5V or +5V_standby

3 2 1

2-3 On: GND (default)
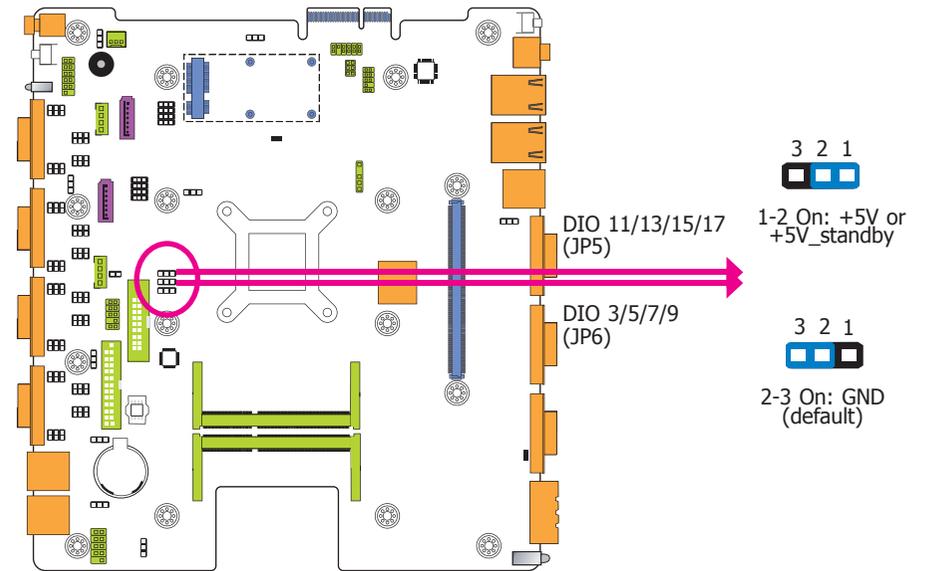
Based on the power level of DIO (Digital I/O) selected on JP7, JP5 (DIO pin 11/13/15/17) and JP6 (DIO pin 3/5/7/9) are used to select the state of DIO output: pull high or pull low. When selecting pull high, the power selection will be the same as JP7's setting.

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PS/2 Keyboard/Mouse Power Select

1
2
3

1-2 On: +5V
(default)

JP13

1
2
3

2-3 On:
+5V_standby
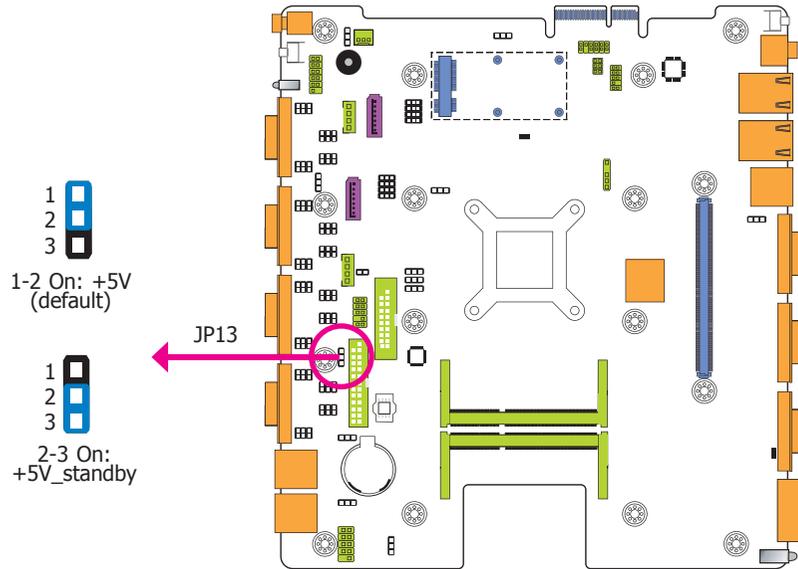
JP13 is used to select the power of the PS/2 keyboard/mouse port. Selecting +5V_standby will allow you to use the PS/2 keyboard or PS/2 mouse to wake up the system.

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

Jumper Settings - I/O Board

For EC200/EC210/EC220/EC221-BTA881

COM 7 to COM 10 RS232/RS422/RS485 Select
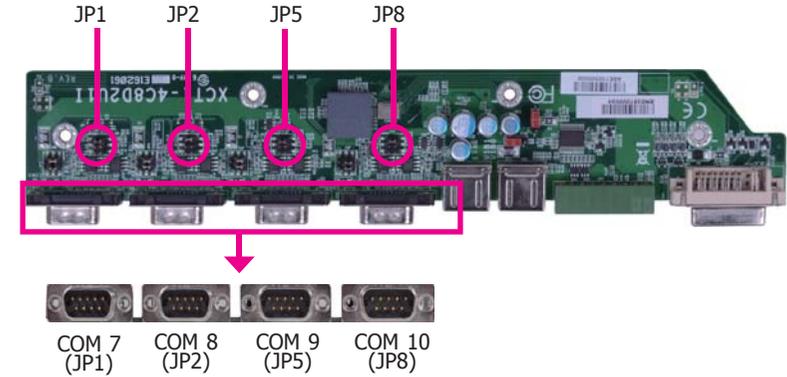
JP1   JP2   JP5   JP8

| COM 7 (JP1) | COM 8 (JP2) | COM 9 (JP5) | COM 10 (JP8) |

JP1 (for COM 7), JP2 (for COM 8), JP5 (for COM 9) and JP8 (for COM 10) are used to configure the COM ports to RS232, RS422 (Full Duplex) or RS485.

The pin function of the COM ports will vary according to these jumpers' settings respectively.

JP1 (for COM 7)/ JP2 (for COM 8)/ JP5 (for COM 9)/ JP8 (for COM 10)		
1 2 / 3 4 / 5 6	1 2 / 3 4 / 5 6	1 2 / 3 4 / 5 6
1-2 On: RS232 (default)	3-4 On: RS422 Full Duplex	5-6 On: RS485

COM 7/ COM 8/ COM 9/ COM 10		
DCD RXD TXD DTR GND 1 2 3 4 5 / 6 7 8 9 DSR RTS CTS RI	RX+ RX- TX+ TX- GND 1 2 3 4 5 / 6 7 8 9 N.C. N.C. N.C. N.C.	DATA+ DATA- N.C. N.C. GND 1 2 3 4 5 / 6 7 8 9 N.C. N.C. N.C. N.C.

COM 7 to COM 10 RS232/Power Select

JP3   JP6   JP4   JP7

COM 7 (JP3)   COM 8 (JP6)   COM 9 (JP4)   COM 10 (JP7)
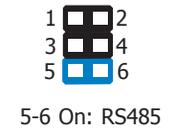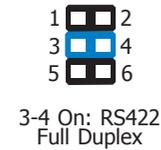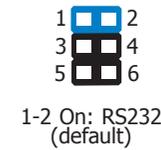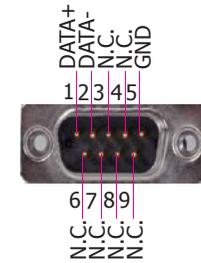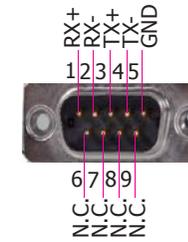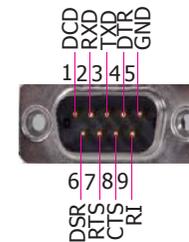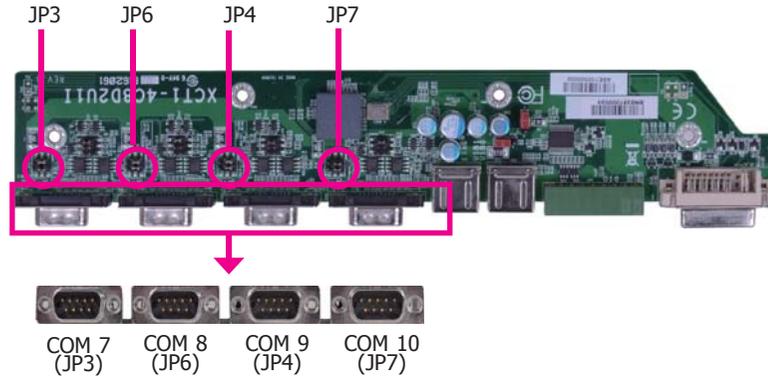
JP3, JP4, JP6 and JP7 are used to configure COM 7 to COM 10 to pure RS232 or RS232 with power.

The pin function of COM 7 to COM 10 will vary according to JP3's, JP4's, JP6's and JP7's setting respectively.

JP3 (for COM 7) / JP6 (for COM 8) JP4 (for COM 9) / JP7 (for COM 10)	
5 3 1 / 6 4 2	5 3 1 / 6 4 2
1-3, 2-4 On: RS232 (default)	3-5(+12V), 4-6(+5V) On: RS232 with power

COM 3/ COM 4/ COM 5/ COM 6	
DCD RXD TXD DTR GND / 1 2 3 4 5 / 6 7 8 9 / DSR RTS CTS RI	+5V RD TD DTR- GND / 1 2 3 4 5 / 6 7 8 9 / DSR- RTS- CTS- +12V

Digital I/O Power Select

JP9

DIO

JP9 is used to configure DIO to signal voltage select.

The pin function of DIO port will vary according to the jumper's setting.

JP9	
1 2 3 / 1-2 On: +3.3V (default)	1 2 3 / 2-3 On: +5V

DIO	
DIO1 DIO3 DIO5 DIO7 GND / 1 3 5 7 / 2 4 6 8 / DIO2 DIO4 DIO6 DIO8	
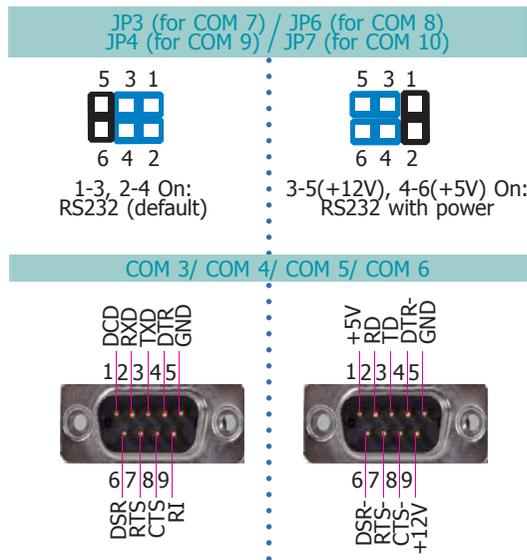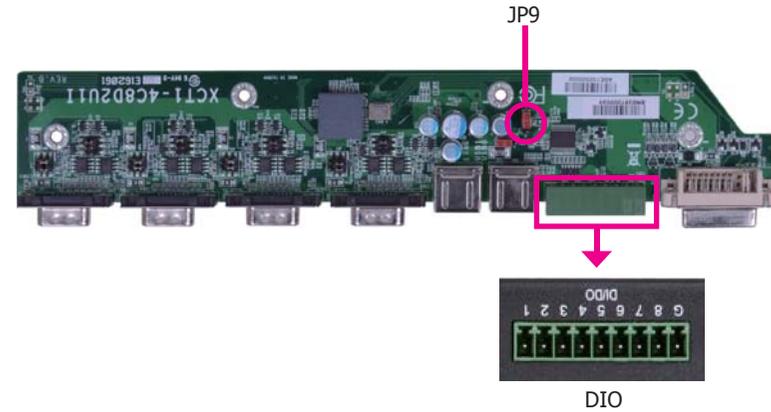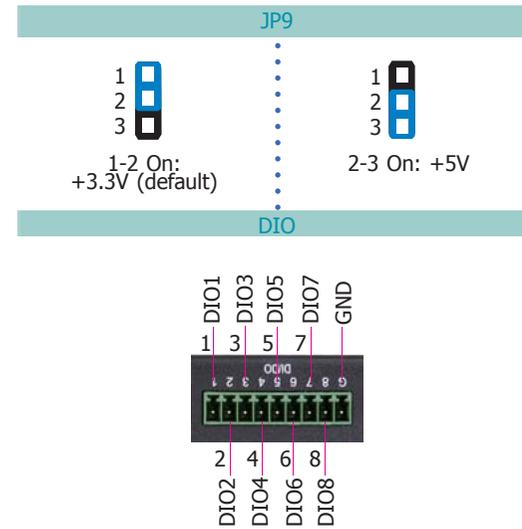
USB Power Select

JP10

USB 1   USB 0
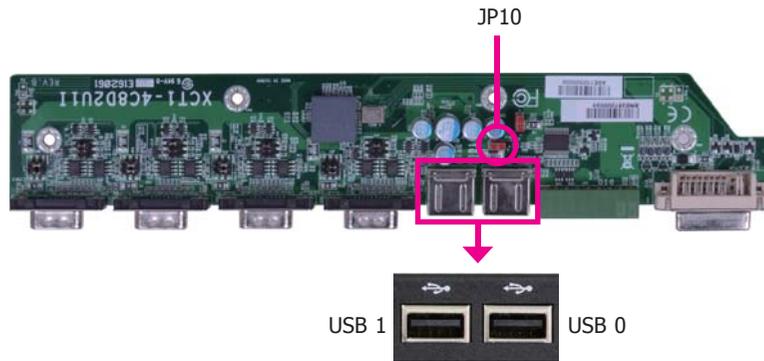
JP10 (for USB 0-1) is used to select the power of the USB ports. Selecting +5V_standby will allow you to use a USB device to wake up the system.

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

JP10	
1 2 3	1 2 3
1-2 On: +5V	2-3 On: +5V_standby (default)
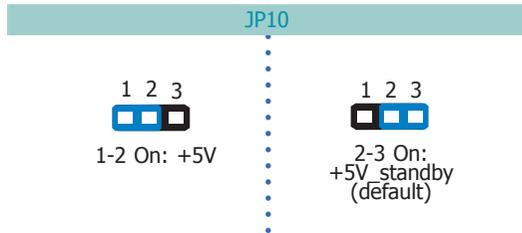
For EC200/EC210/EC220/EC221-BTAG60

COM 7 to COM 10 RS232/RS422/RS485 Select

JP1   JP2   JP5   JP8

COM 7 (JP1)   COM 8 (JP2)   COM 9 (JP5)   COM 10 (JP8)

JP1 (for COM 7), JP2 (for COM 8), JP5 (for COM 9) and JP8 (for COM 10) are used to configure the COM ports to RS232, RS422 (Full Duplex) or RS485.

The pin function of the COM ports will vary according to these jumpers' settings respectively.

JP1 (for COM 7)/ JP2 (for COM 8)/ JP5 (for COM 9)/ JP8 (for COM 10)		
1 2 / 3 4 / 5 6	1 2 / 3 4 / 5 6	1 2 / 3 4 / 5 6
1-2 On: RS232 (default)	3-4 On: RS422 Full Duplex	5-6 On: RS485

COM 7/ COM 8/ COM 9/ COM 10		
DCD RXD TXD DTR GND / 1 2 3 4 5 / 6 7 8 9 / DSR RTS CTS RJ	RX+ RX- TX+ TX- GND / 1 2 3 4 5 / 6 7 8 9 / N.C. N.C. N.C. N.C.	DATA+ DATA- N.C. N.C. GND / 1 2 3 4 5 / 6 7 8 9 / N.C. N.C. N.C. N.C.

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COM 7 to COM 10 RS232/Power Select

JP3   JP6   JP4   JP7

COM 7 (JP3)   COM 8 (JP6)   COM 9 (JP4)   COM 10 (JP7)

JP3, JP4, JP6 and JP7 are used to configure COM 7 to COM 10 to to pure RS232 or RS232 with power.

The pin function of COM 7 to COM 10 will vary according to JP3's, JP4's, JP6's and JP7's setting respectively.

JP3 (for COM 7) / JP6 (for COM 8) JP4 (for COM 9) / JP7 (for COM 10)	
1 2 3 4 5 6	1 2 3 4 5 6
1-3, 2-4 On: RS232 (default)	3-5(+12V), 4-6(+5V) On: RS232 with power

COM 7/ COM 8/ COM 9/ COM 10	
DCD RXD TXD DTR GND 1 2 3 4 5	+5V RD TD DTR- GND 1 2 3 4 5
6 7 8 9 DSR RTS CTS RI	6 7 8 9 DSR- RTS- CTS- +12V

Digital I/O Power Select

JP9

DIO1   DIO2

JP9 is used to configure DIO to signal voltage select.
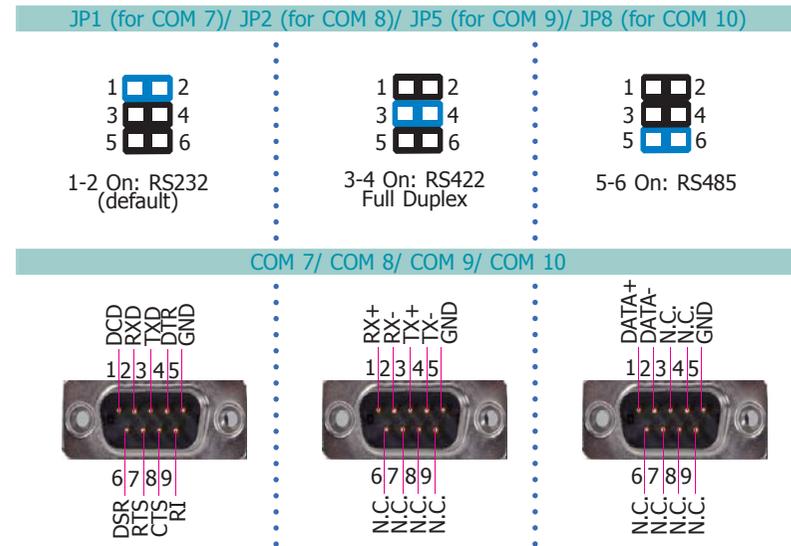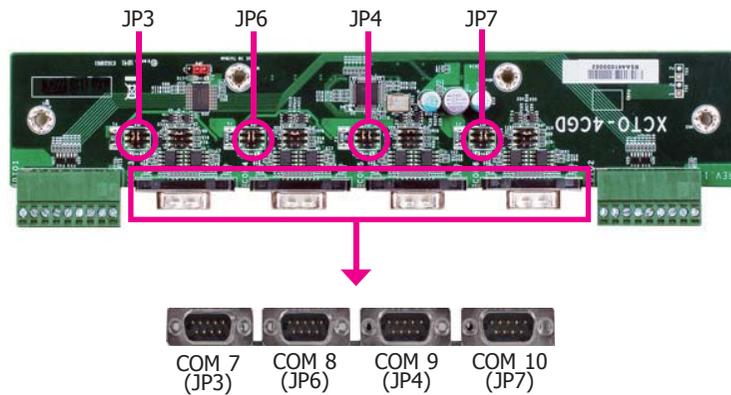
The pin function of DIO port will vary according to the jumper's setting respectively.

JP9	
3 2 1	3 2 1
1-2 On: +3.3V (default)	2-3 On: +5V

DIO	
DIO1 DIO3 DIO5 DIO7 GND	
1 3 5 7	
2 4 6 8	
DIO2 DIO4 DIO6 DIO8	

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Chapter 5 - Ports and Connectors

Front Panel I/O Ports

Wi-Fi Module Antenna Hole
COM 1~4
Alert LED
Power
Wi-Fi Module Antenna Hole
USB
HDD LED
Reset
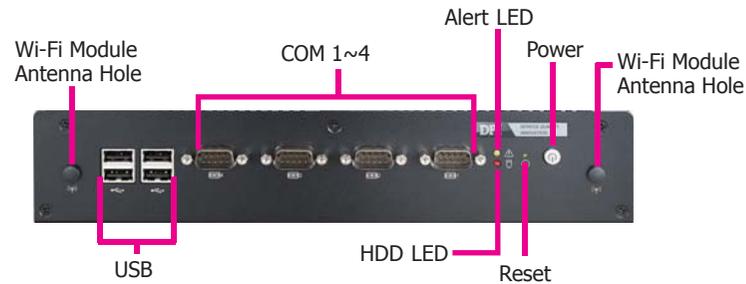
The front panel I/O ports consist of the followings:

• 4 RS232/422/485 COM ports
• 4 USB 2.0 (Type A) ports
• 2 Wi-Fi module antenna holes
• 1 Alert LED
• 1 HDD LED
• 1 reset button
• 1 power button

USB Ports
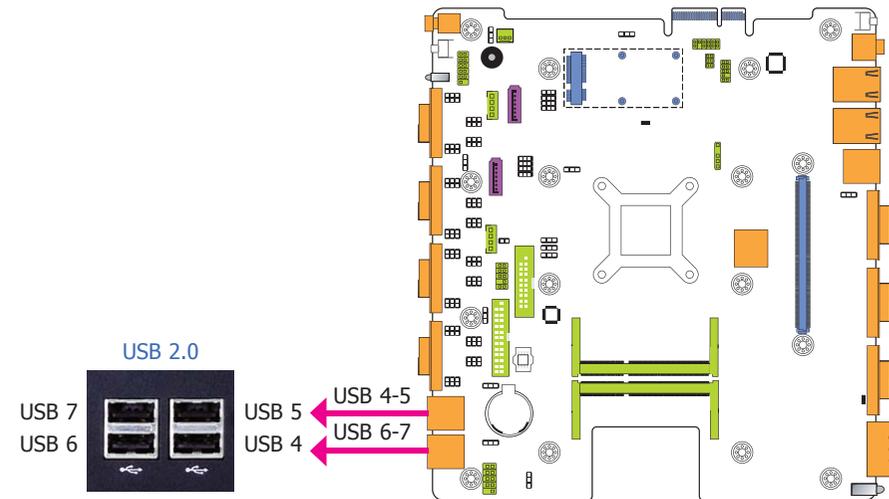
USB 2.0

USB 7   USB 5   USB 4-5
USB 6   USB 4   USB 6-7

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 four onboard USB 2.0 ports (USB 4-5/6-7) at the front panel I/O ports of the system chassis and then insert the USB port cables to a connector.

BIOS Setting

Configure the onboard USB in the Advanced menu ("USB Configuration" submenu) of the BIOS. Refer to chapter 7 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.

> **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.

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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**

JP10 (for USB 4-5) and JP11 (for USB 6-7) must be set to "2-3 On: +5V_standby". Refer to "USB Power Select" in chapter 4 for more information.

> ⚠ **Important**:
> 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.

Table 1. OS Selection

| Operation Environment for Customers	DOS	Windows 7	Windows 8.x	Linux
OS Selection in the BIOS Advanced Menu	Windows			Linux
Available USB ports	All	When installing Windows 7 first time, only native USB 2.0 ports can work. Please refer to the USB type in table 2 below.	All	All

Table 2. The Type of USB Ports

Model Name	BT263		
USB 3.0	Native	USB 7	HSIC port 3
USB 0	Native	USB 8	HSIC port 0_EXC
USB 1	Native	USB 9	HSIC port 1_EXC
USB 2	Native (share with Mini PCIe)	USB 10	HSIC port 2
USB 3	Native (share with PCIe)	USB 11	HSIC port 3
USB 4	HSIC port 0		
USB 5	HSIC port 1		
USB 6	HSIC port 2		

COM (Serial) Ports

COM 4   COM 3   COM 2   COM 1

COM 1 to COM 4:
RS232/422/485
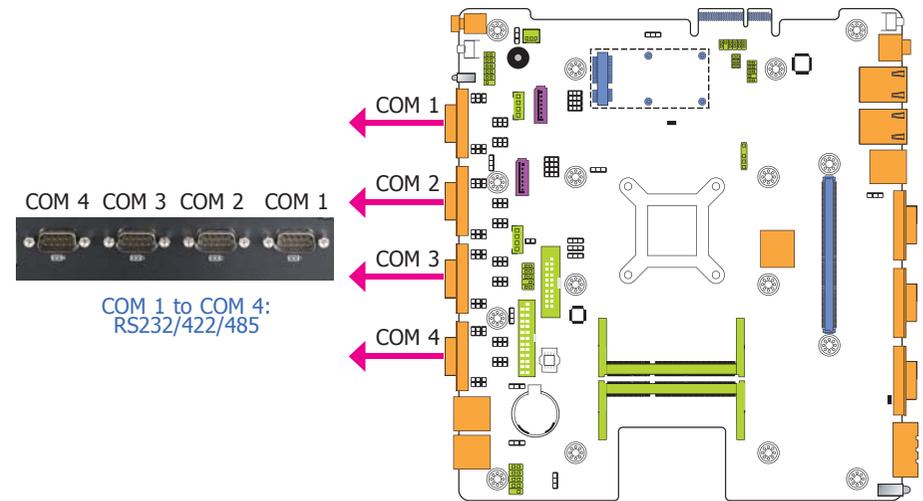
The pin functions of COM port 1 to COM port 4 will vary according to jumpers' setting. These jumpers allow you to configure the Serial COM ports to RS232, RS422 (Full Duplex) or RS485. Refer to "COM 1/COM 2/COM 3/COM 4 RS232/422/485 Select" and "COM 1/COM 2/COM 3/COM 4 RS232/Power Select" in chapter 4 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 7 for more information.

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Note:
1. When COM 1 RS232/422/485 is selected, JP23 and JP24 must be set in accordance to JP15.
2. When COM 2 RS232/422/485 is selected, JP25 and JP26 must be set in accordance to JP17.
3. When COM 3 RS232/422/485 is selected, JP27 and JP28 must be set in accordance to JP19.
4. When COM 4 RS232/422/485 is selected, JP29 and JP30 must be set in accordance to JP21.
5. To make the RS485 auto flow control function work on COM 1 to COM 4, please set either 8 data bits + 1 stop bit or one of the following settings:
   (1) 8 data bits + 1 parity bit + 1 stop bit
   (2) 8 data bits + 1 parity bit + 2 stop bits
   (3) 8 data bits + 2 stop bits

Rear Panel I/O Ports

EC200-BT
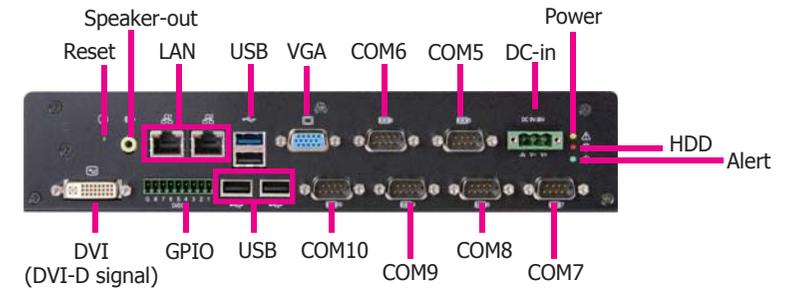
EC200-BTA881 Rear View
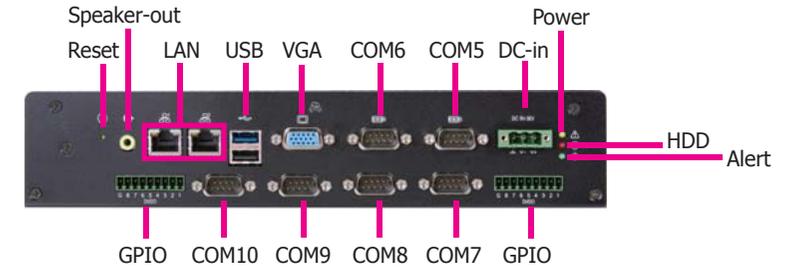
EC200-BTAG60 Rear View

EC200-BT6060 Rear View

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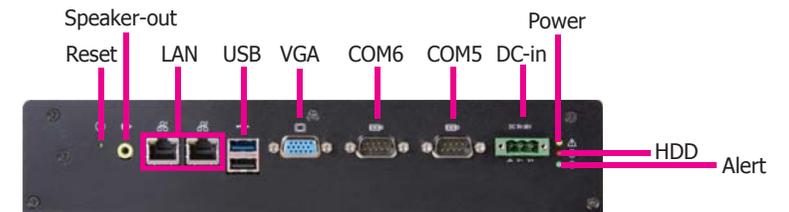
The rear panel I/O ports consist of the followings:

EC200 - BTA881

- 1 DC-in power jack: 3-pole terminal block
- 1 Speaker-out: 2W 3.5mm audio jack
- 1 DVI (DVI-D signal)
- 1 VGA: DB-15 D-sub
- 2 RJ45 LAN ports
- 2 RS232 Serial COM ports
- 4 RS232/422/485 Serial COM ports
- 1 USB 3.0 (Type A) port
- 3 USB 2.0 (Type A) ports
- 1 8-bit GPIO: 9-pole terminal block
- 1 Reset button
- 1 Power LED
- 1 HDD LED
- 1 Alert LED

EC200 - BTAG60

- 1 DC-in power jack: 3-pole terminal block
- 1 Speaker-out: 2W 3.5mm audio jack
- 1 VGA: DB-15 D-sub
- 2 RJ45 LAN ports
- 2 RS232 Serial COM ports
- 4 RS232/422/485 Serial COM ports
- 1 USB 3.0 (Type A) port
- 1 USB 2.0 (Type A) port
- 2 8-bit GPIO: 9-pole terminal block
- 1 Reset button
- 1 Power LED
- 1 HDD LED
- 1 Alert LED

EC200 - BT6060

- 1 DC-in power jack: 3-pole terminal block
- 1 Speaker-out: 2W 3.5mm audio jack
- 1 VGA: DB-15 D-sub
- 2 RJ45 LAN ports
- 2 RS232 Serial COM ports
- 1 USB 3.0 (Type A) port
- 1 USB 2.0 (Type A) port
- 1 Reset button
- 1 Power LED
- 1 HDD LED
- 1 Alert LED

EC210-BT

EC210-BTA881 Rear View

EC210-BTAG60 Rear View

EC210-BT6060 Rear View

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The rear panel I/O ports consist of the followings:

EC210 - BTA881

- 1 DC-in power jack: 3-pole terminal block
- 1 Speaker-out: 2W 3.5mm audio jack
- 1 DVI (DVI-D signal)
- 1 VGA: DB-15 D-sub
- 2 RJ45 LAN ports
- 2 RS232 Serial COM ports
- 4 RS232/422/485 Serial COM ports
- 1 USB 3.0 (Type A) port
- 3 USB 2.0 (Type A) ports
- 1 8-bit GPIO: 9-pole terminal block
- 1 Reset button
- 1 Power LED
- 1 HDD LED
- 1 Alert LED

EC210 - BTAG60

- 1 DC-in power jack: 3-pole terminal block
- 1 Speaker-out: 2W 3.5mm audio jack
- 1 VGA: DB-15 D-sub
- 2 RJ45 LAN ports
- 2 RS232 Serial COM ports
- 4 RS232/422/485 Serial COM ports
- 1 USB 3.0 (Type A) port
- 1 USB 2.0 (Type A) port
- 2 8-bit GPIO: 9-pole terminal block
- 1 Reset button
- 1 Power LED
- 1 HDD LED
- 1 Alert LED

EC210 - BT6060

- 1 DC-in power jack: 3-pole terminal block
- 1 Speaker-out: 2W 3.5mm audio jack
- 1 VGA: DB-15 D-sub
- 2 RJ45 LAN ports
- 2 RS232 Serial COM ports
- 1 USB 3.0 (Type A) port
- 1 USB 2.0 (Type A) port
- 1 Reset button
- 1 Power LED
- 1 HDD LED
- 1 Alert LED
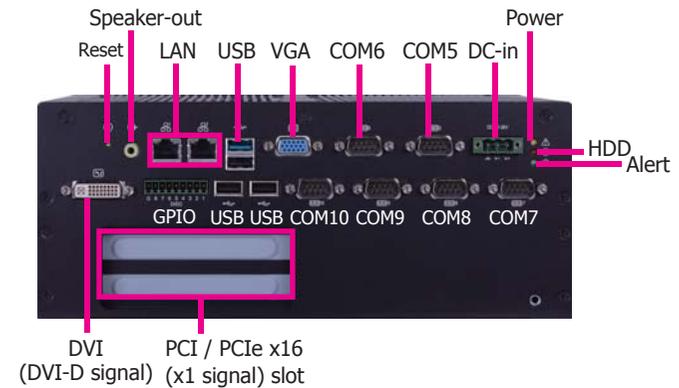
EC220/EC221-BT

EC220/EC221-BTA881 Rear View
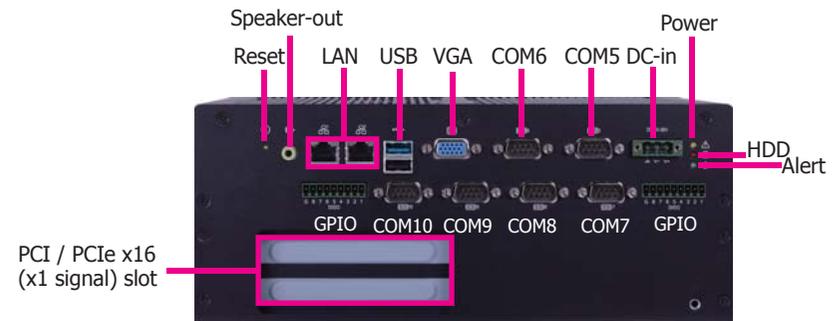
EC220/EC221-BTAG60 Rear View
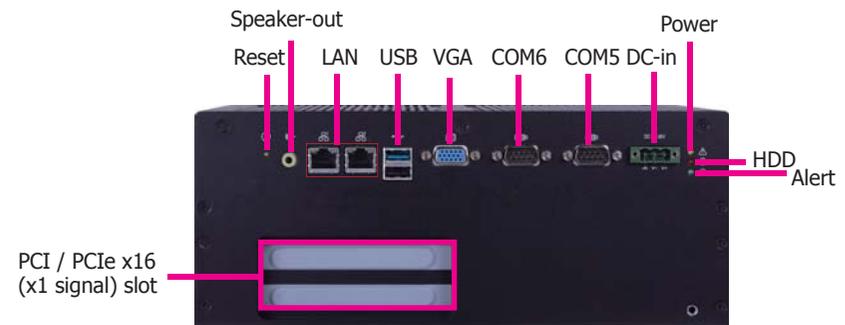
EC220/EC221-BT6060 Rear View

The rear panel I/O ports consist of the followings:

EC220/EC221 - BTA881

- 1 DC-in power jack: 3-pole terminal block
- 1 Speaker-out: 2W 3.5mm audio jack
- 1 DVI (DVI-D signal)
- 1 VGA: DB-15 D-sub
- 2 RJ45 LAN ports
- 2 RS232 Serial COM ports
- 4 RS232/422/485 Serial COM ports
- 1 USB 3.0 (Type A) port
- 3 USB 2.0 (Type A) ports
- 1 8-bit GPIO: 9-pole terminal block
- 1 Reset button
- 1 Power LED
- 1 HDD LED
- 1 Alert LED

EC220/EC221 - BTAG60

- 1 DC-in power jack: 3-pole terminal block
- 1 Speaker-out: 2W 3.5mm audio jack
- 1 VGA: DB-15 D-sub
- 2 RJ45 LAN ports
- 2 RS232 Serial COM ports
- 4 RS232/422/485 Serial COM ports
- 1 USB 3.0 (Type A) port
- 1 USB 2.0 (Type A) port
- 2 8-bit GPIO: 9-pole terminal block
- 1 Reset button
- 1 Power LED
- 1 HDD LED
- 1 Alert LED

EC220/EC221 - BT6060

- 1 DC-in power jack: 3-pole terminal block
- 1 Speaker-out: 2W 3.5mm audio jack
- 1 VGA: DB-15 D-sub
- 2 RJ45 LAN ports
- 2 RS232 Serial COM ports
- 1 USB 3.0 (Type A) port
- 1 USB 2.0 (Type A) port
- 1 Reset button
- 1 Power LED
- 1 HDD LED
- 1 Alert LED

9~36V DC-in

DC-in
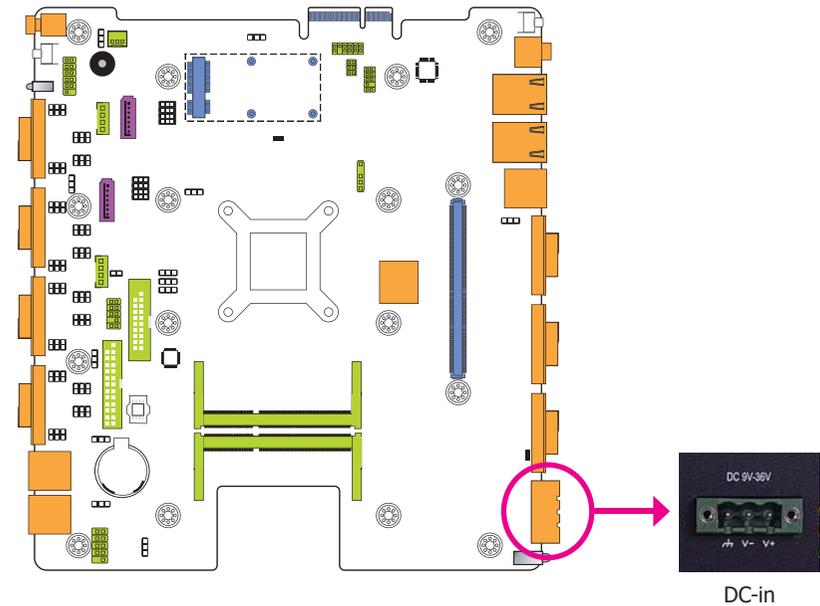
This jack provides maximum of 60W power and is considered a low power solution. Connect a DC power cord to this jack. Use a power adapter within 9~36V DC output voltage. Using a voltage out of the range 9~36V may fail to boot the system or cause damage to the system board.

Speaker-out
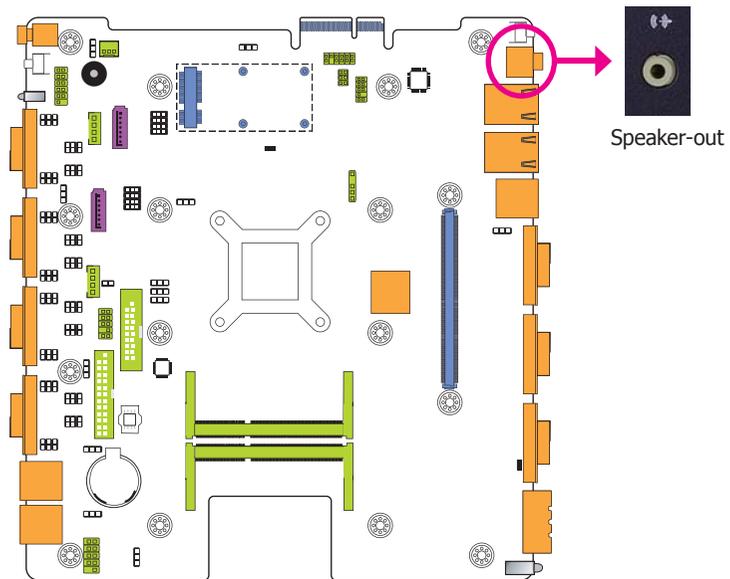
Speaker-out

This speaker-out jack is used to connect a headphone or external speakers.

VGA Port

VGA
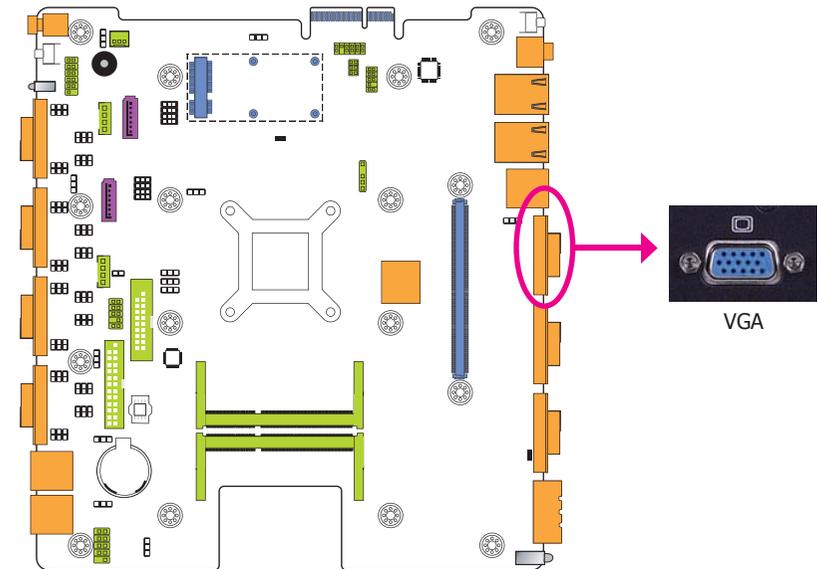
VGA Port

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.

BIOS Setting

Configure the display devices in the Advanced menu ("Video Configuration" submenu) of the BIOS. Refer to the chapter 7 for more information.

Driver Installation

Install the graphics driver. Refer to the chapter 8 for more information.

DVI Port

DVI Port

The DVI port is used to connect an LCD monitor. This port supports DVI-D signal only.
Connect the display device's cable to the DVI port. After plugging the cable connector into the port, gently tighten the cable screws to hold the connector in place.

BIOS Setting

Configure the display devices in the Advanced menu ("Video Configuration" submenu) of the BIOS. Refer to the chapter 7 for more information.

Driver Installation

Install the graphics driver. Refer to the chapter 8 for more information.

RJ45 LAN Ports
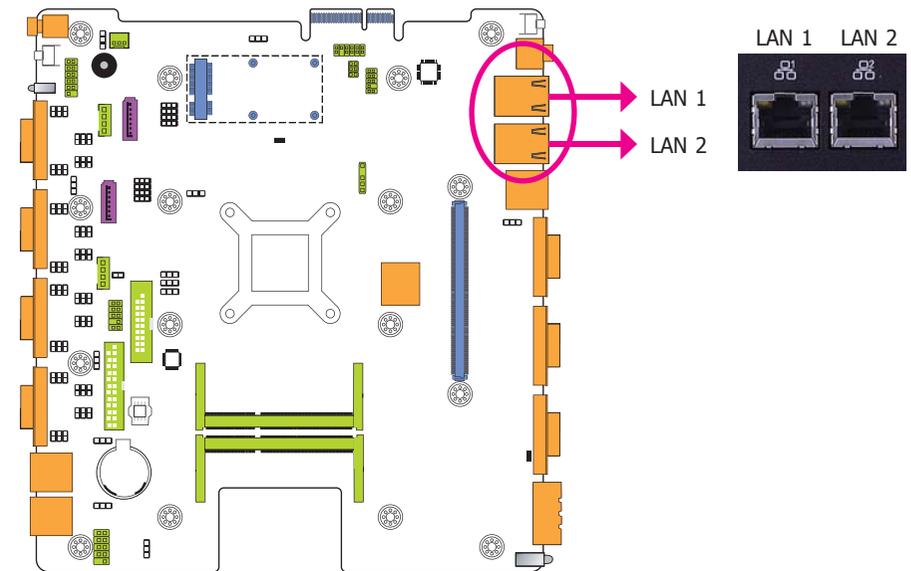
Features

• 2 Intel® WGI210AT PCI Express Gigabit Ethernet controllers

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

Driver Installation

Install the LAN drivers. Refer to the chapter 8 for more information.
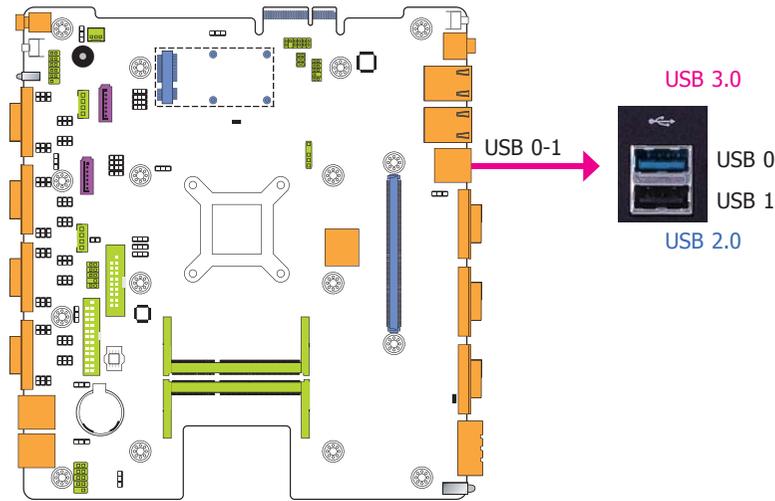
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USB Ports

USB 0-1 →

USB 3.0

USB 0

USB 1

USB 2.0

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 one onboard USB 3.0 port (USB 0) and one onboard USB 2.0 port (USB 1) at the rear panel I/O ports of the system chassis and then insert the USB port cables to a connector.

BIOS Setting

Configure the onboard USB in the Advanced menu ("USB Configuration" submenu) of the BIOS. Refer to chapter 7 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.

> **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.

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**

JP1 (for USB 0-1) must be set to "2-3 On: +5V_standby". Refer to "USB Power Select" in chapter 4 for more information.

> **Important:**
> 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.

Table 1. OS Selection

Operation Environment for Customers	DOS	Windows 7	Windows 8.x	Linux
OS Selection in the BIOS Advanced Menu	Windows 8.x	Windows 7	Windows 8.x	Windows 8.x
Available USB ports	All	When installing Windows 7 first time, only native USB 2.0 ports can work. Please refer to the USB type in table 2 below.	All	All

Table 2. The Type of USB Ports

Model Name	BT263		
USB 3.0	Native	USB 7	HSIC port 3
USB 0	Native	USB 8	HSIC port 0_EXC
USB 1	Native	USB 9	HSIC port 1_EXC
USB 2	Native (share with Mini PCIe)	USB 10	HSIC port 2
USB 3	Native (share with PCIe)	USB 11	HSIC port 3
USB 4	HSIC port 0		
USB 5	HSIC port 1		
USB 6	HSIC port 2		

8-bit GPIO

The Digital I/O connector provides powering-on function to an external device that is connected to this connector.

Pins	Pin Assignment
1	DIO1
2	DIO2
3	DIO3
4	DIO4
5	DIO5
6	DIO6
7	DIO7
8	DIO8
G	GND

COM (Serial) Ports
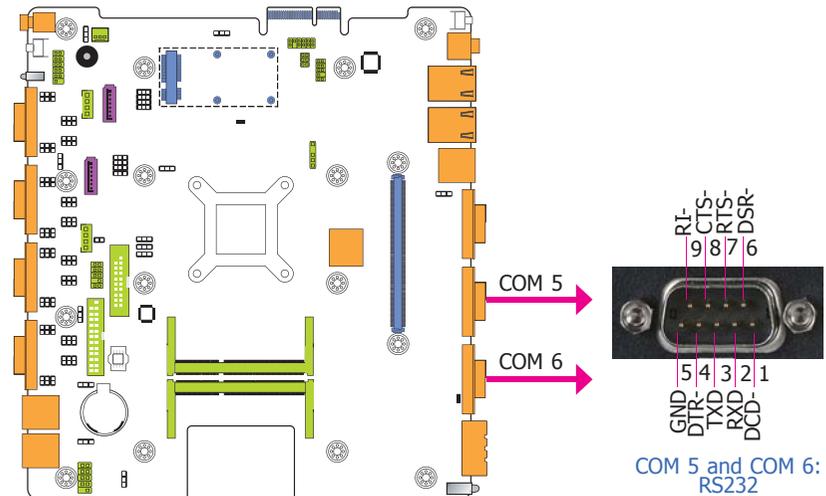
COM 5 and COM 6: RS232

COM 5 and COM 6 are fixed at RS232.

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 7 for more information.

I/O Connectors

Serial ATA Connectors

Serial ATA Power Connectors

SATA 2.0 3Gb/s
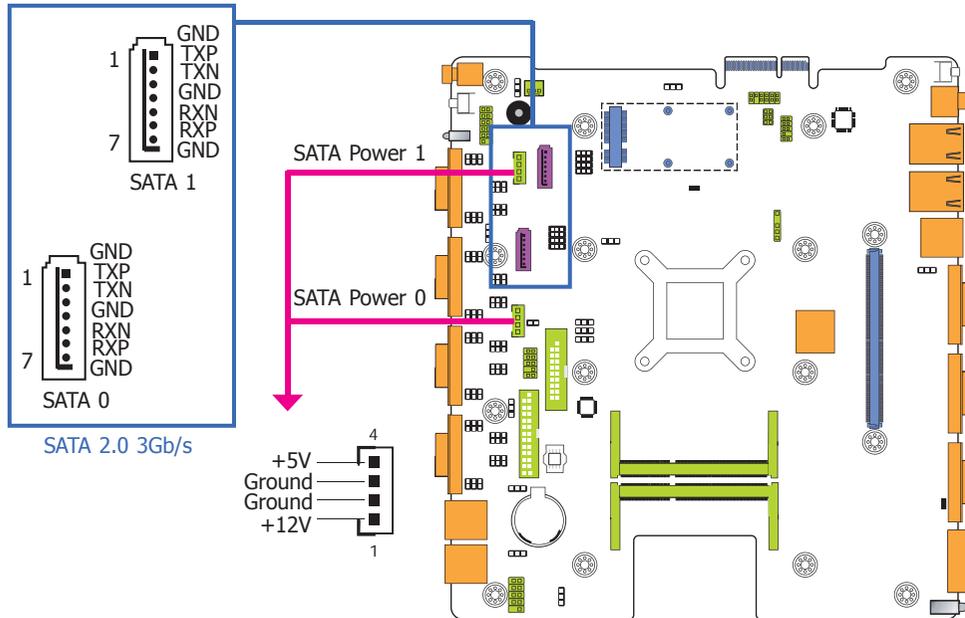
Features

- 2 Serial ATA 2.0 ports with data transfer rate up to 3Gb/s

- Integrated Advanced Host Controller Interface (AHCI) controller

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

The SATA power connector supplies 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.

BIOS Setting

Configure the Serial ATA drives in the Advanced menu ("SATA Configuration" submenu) of the BIOS. Refer to chapter 7 for more information.

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

Front Panel Connector
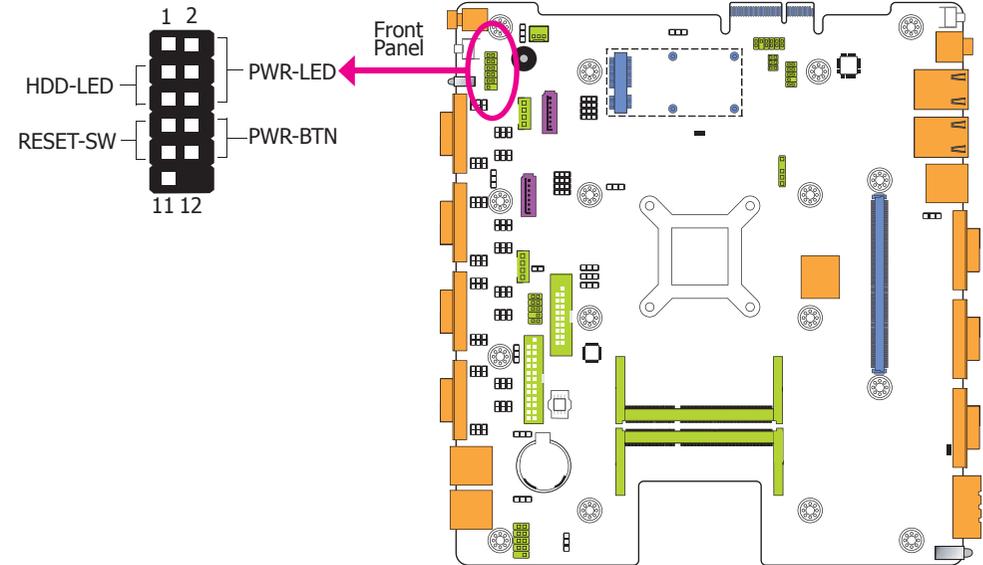
HDD-LED - HDD LED

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

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PS/2 Keyboard/Mouse Connector

KB CLK — 1 2 — MS CLK
KB DATA — MS DATA
GND — GND
NC — CHASSIS GND
+5V_STB — 9 10 — +5V_STB

PS/2 KB/MS
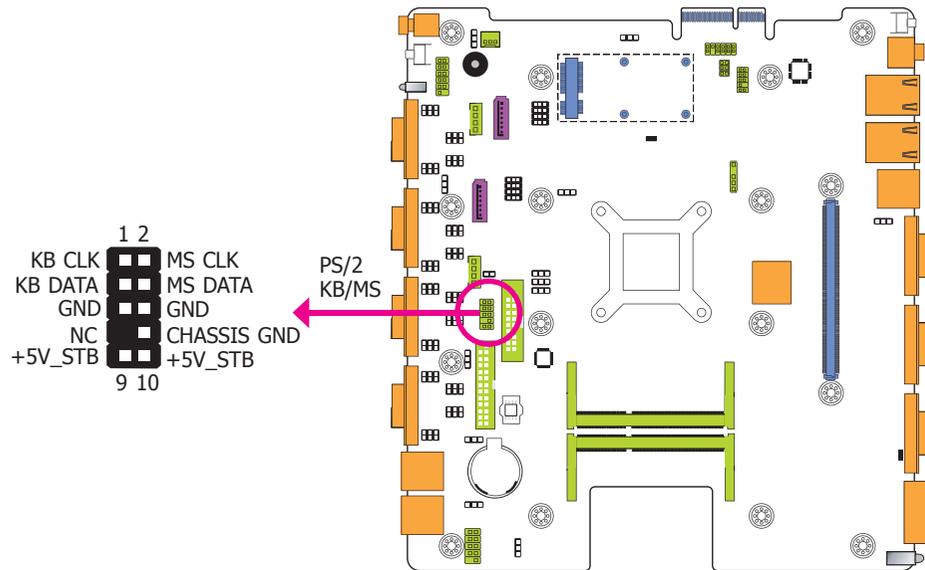
The Keyboard/Mouse connector is used to connect PS/2 keyboard and PS/2 mouse by means of a PS/2 cable. Connect one end of the cable to the Keyboard/Mouse connector. The other ends are used to connect a PS/2 keyboard and a PS/2 mouse.

PS/2 mouse port

PS/2 keyboard port

Connect to the board's Keyboard/Mouse connector
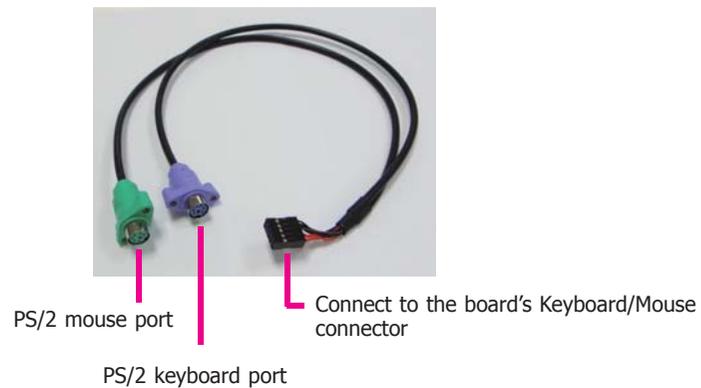
Wake-On-PS/2 Keyboard/Mouse

The Wake-On-PS/2 Keyboard/Mouse function allows you to use the PS/2 keyboard or PS/2 mouse to power-on the system. To use this function:

• **Jumper Setting**

JP13 must be set to "2-3 On: 5V_standby". Refer to "PS/2 Keyboard/Mouse Power Select" in this chapter for more information.

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

USB Connectors
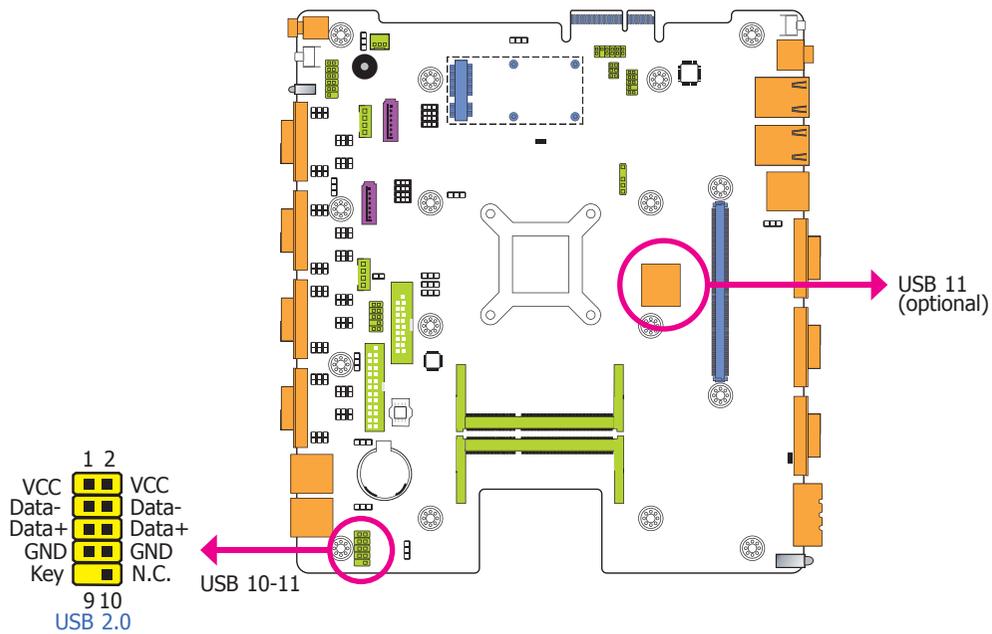

```
      1  2
VCC  [::]  VCC
Data- [::] Data-
Data+ [::] Data+
GND  [::]  GND
Key  [::]  N.C.
      9  10
     USB 2.0
```

USB 11
(optional)

USB 10-11

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 one connector for two USB 2.0 ports (USB 10-11) and one optional USB 2.0 port (USB 11). The 10-pin connector allows you to connect 2 additional USB 2.0/1.1 ports (USB 10-11). The additional USB ports may be mounted on a card-edge bracket. Install the card-edge bracket to an available slot at the rear of the system chassis and then insert the USB port cables to a connector.

BIOS Setting

Configure the onboard USB in the Advanced menu ("USB Configuration" submenu) of the BIOS. Refer to chapter 7 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:

• **Jumper Setting**

JP9 (for USB 10-11) must be set to "2-3 On: +5V_standby". Refer to "USB Power Select" in chapter 4 for more information.

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.

Table 1. OS Selection

Operation Environment for Customers	DOS	Windows 7	Windows 8.x	Linux
OS Selection in the BIOS Advanced Menu	Windows 8.x	Windows 7	Windows 8.x	Windows 8.x
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Table 2. The Type of USB Ports

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USB 2	Native (share with Mini PCIe)	USB 10	HSIC port 2
USB 3	Native (share with PCIe)	USB 11	HSIC port 3
USB 4	HSIC port 0		
USB 5	HSIC port 1		
USB 6	HSIC port 2		

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Parallel Connector

26 25

Parallel

2 1

The 25-pin connector is used to connect an external parallel port. The parallel port connects your PC to a parallel printer. It supports SPP, ECP and EPP.

SPP **(Standard Parallel Port)**	Allows normal speed operation but in one direction only.
ECP **(Extended Capabilities Port)**	Allows parallel port to operate in bidirectional mode and at a speed faster than the SPP's data transfer rate.
EPP **(Enhanced Parallel Port)**	Allows bidirectional parallel port operation at maximum speed.

Digital I/O and/or Power Connector

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Digital I/O

2 1
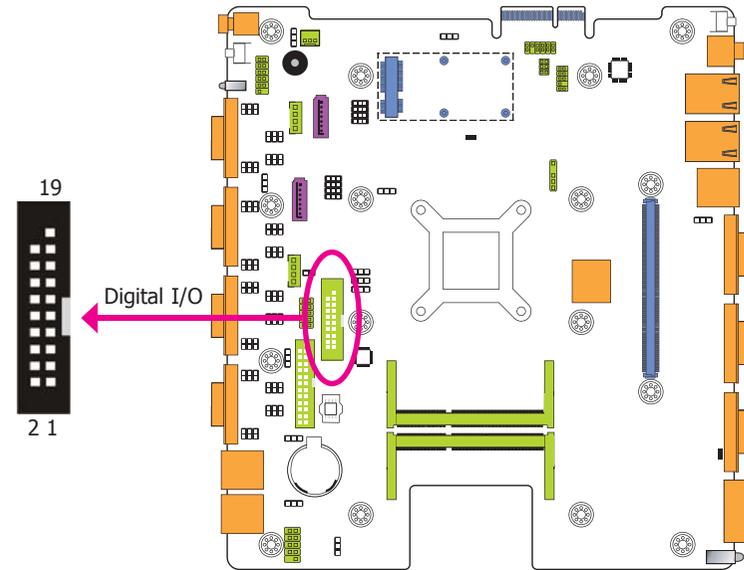
The 8-bit Digital I/O connector provides powering-on function to external devices that are connected to the connector. The pin functions of the 8-bit digital I/O connector are listed below.

Pins	Pin Assignment	Pins	Pin Assignment
1	GND	2	+12V
3	DIO7	4	+12V
5	DIO6	6	GND
7	DIO5	8	+5V
9	DIO4	10	+5V
11	DIO3	12	GND
13	DIO2	14	+5V_Standby
15	DIO1	16	+5V_Standby
17	DIO0	18	GND
19	GND		

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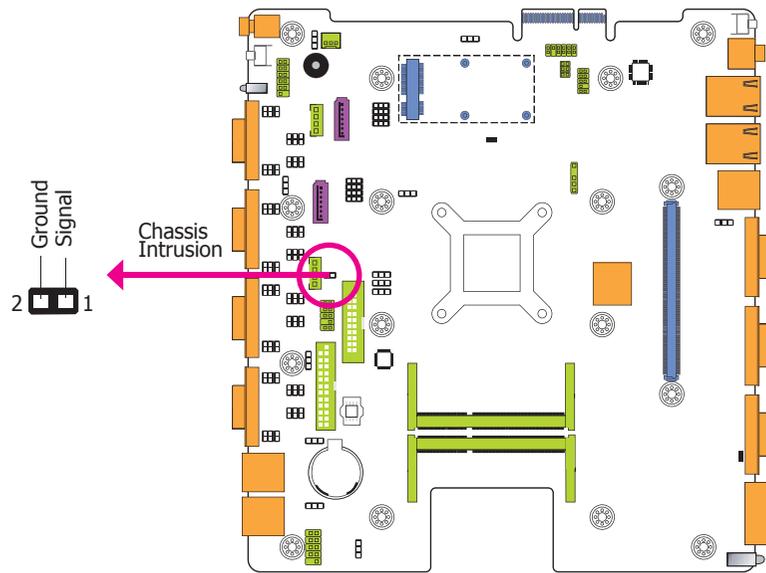
The board supports the chassis intrusion detection function. Connect the chassis intrusion sensor cable from the chassis to this connector. When the system's power is on and a chassis intrusion occurred, an alarm will sound. When the system's power is off and a chassis intrusion occurred, the alarm will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

Front Audio Connector
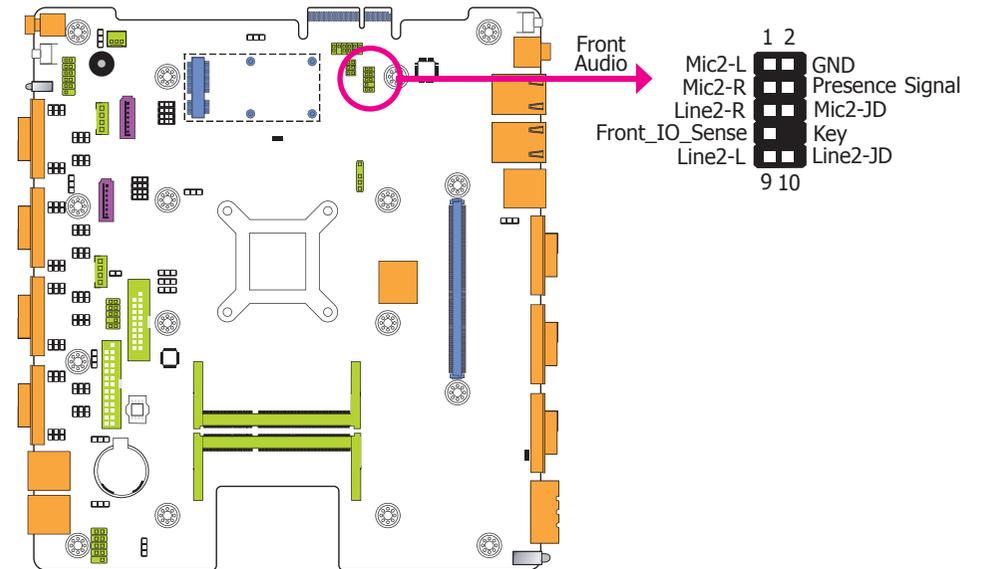
The front audio connector allows you to connect to the second line-out jack that is at the front panel of your system.

Driver Installation

Install the audio driver. Refer to the chapter 8 for more information.

S/PDIF Connector

S/PDIF

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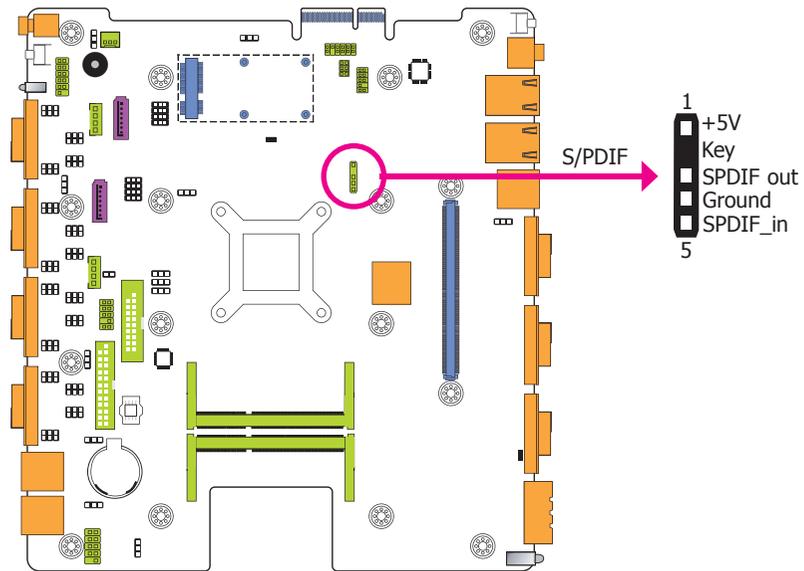
The S/PDIF connector is used to connect an external S/PDIF port. Your S/PDIF port may be mounted on a card-edge bracket. Install the card-edge bracket to an available slot at the rear of the system chassis then connect the audio cable to the S/PDIF connector. Make sure pin 1 of the audio cable is aligned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

Cooling Fan Connector

Ground
Power
Sense
CPU Fan
1
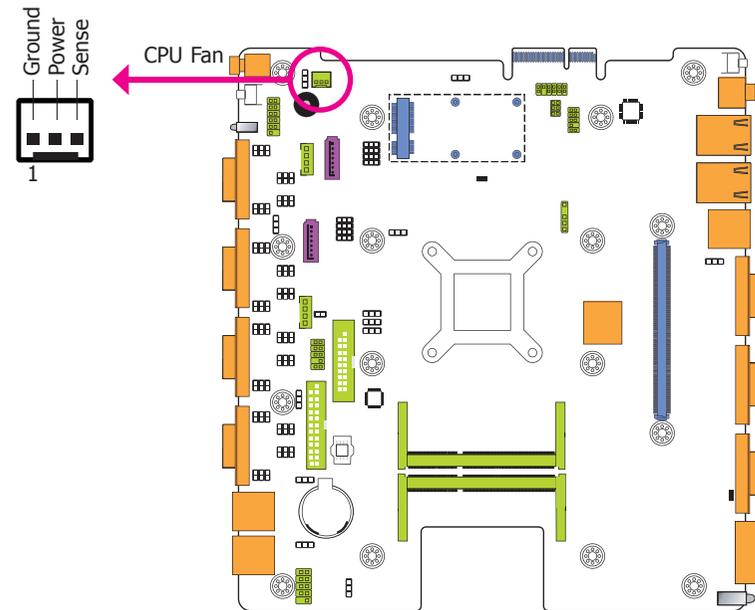
The fan connector is used to connect the cooling fan. The cooling fan will provide adequate airflow throughout the chassis to prevent overheating the CPU and system board components.

BIOS Setting

The Advanced menu ("SIO NUVOTON6106D" submenu) of the BIOS will display the current speed of the cooling fans. Refer to chapter 7 for more information.

LPC Connector

```
11 ▢▢▢▢▢ 1
12 ▢▢▢▢▢ 2
```

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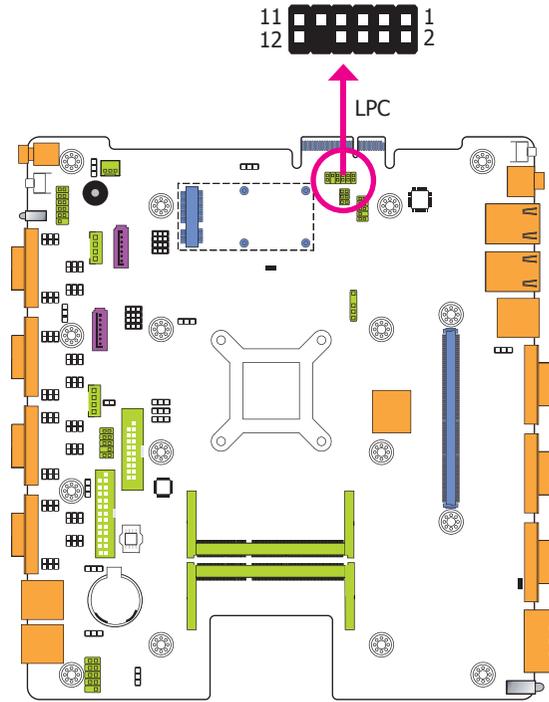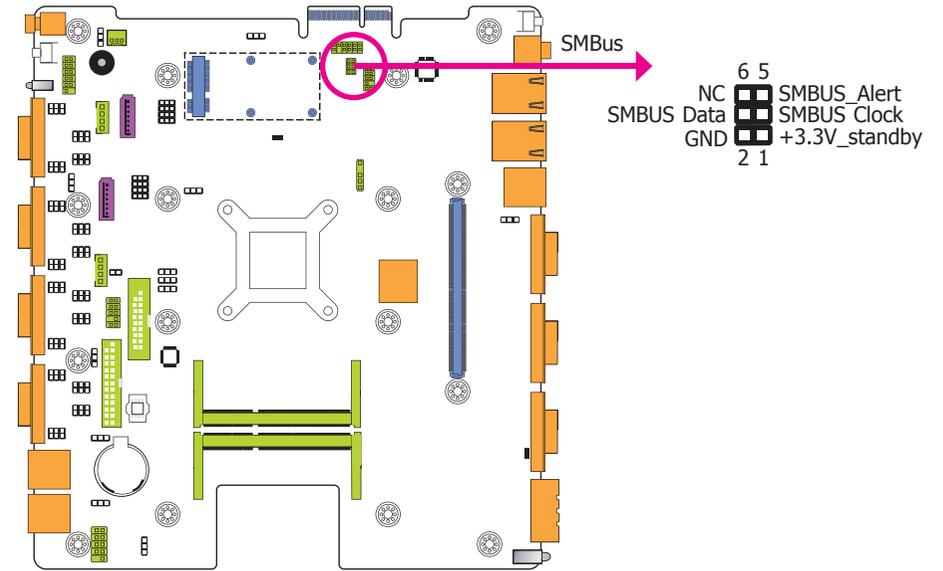
The LPC connector is used for the debug function and its pin functions are listed below.

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

SMBus Connector

SMBus

```
         6 5
    NC ▢▢ SMBUS_Alert
SMBUS Data ▢▢ SMBUS Clock
   GND ▢▢ +3.3V_standby
         2 1
```

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.

Expansion Slots

DFI Proprietary Extension Bus

Mini PCIe

EXC

DFI Proprietary Extension Bus			
Pins	Pin Assignment	Pins	Pin Assignment
A1	GND	B1	+12V
A2	+12V	B2	+12V
A3	+12V	B3	+12V
A4	GND	B4	GND
A5	+5V	B5	SMB_CLK
A6	+5V	B6	SMB_DATA
A7	+5V	B7	GND
A8	+5V	B8	+3V3
A9	+3V3	B9	NC
A10	+3V3	B10	+3VDU
A11	RESET-	B11	PCIE_WAKE-
A12	GND	B12	PME-
A13	CLK+	B13	GND
A14	CLK-	B14	TX+
A15	GND	B15	TX-
A16	RX+	B16	GND
A17	RX-	B17	NC
A18	GND	B18	GND
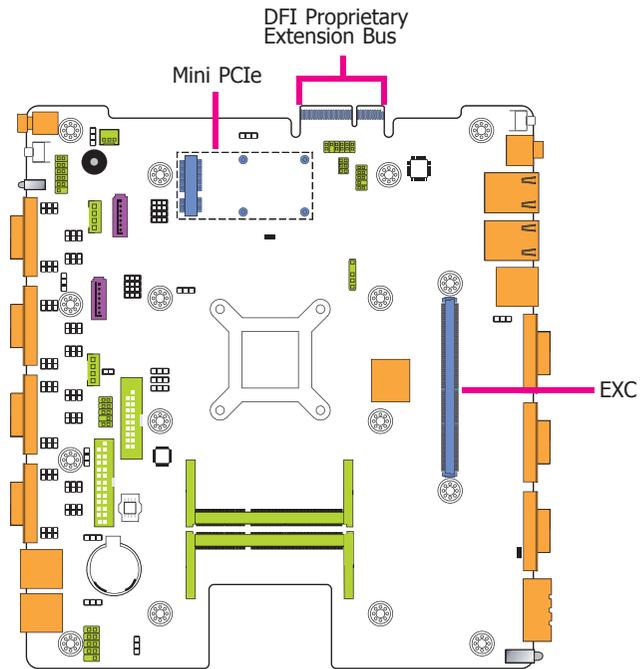
EXC Slot

The EXC interface is used to install an EXC card for I/O expansion.

Mini PCI Express Slot

The Mini PCI Express slot on the system board is used to install one half and/or full size Mini PCIe card such as network cards or other cards that comply to the mini PCI Express specifications into the mini PCI Express slot.

DFI Proprietary Extension Bus

The DFI Proprietary Extension Bus gold finger is used for customized expansion (PCI or Mini PCIe) via a riser card.

Standby Power LED

Standby Power LED

Standby Power LED

This LED will blink 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
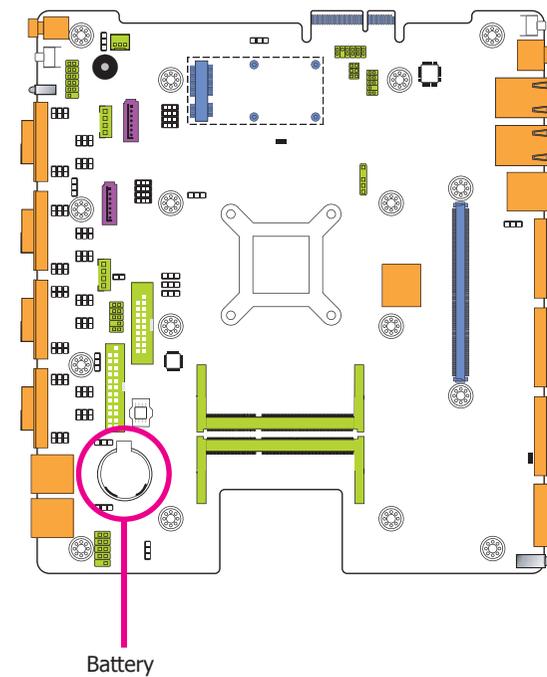
Battery

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 6 - Mounting Option

Wall Mount

The wall mount kit includes the following:

- 2 Wall mount brackets
- 4 Bracket screws

1. The wall mounting holes are located on the bottom side of the system unit.

Mounting hole

2. Use the provided mounting screws to secure the wall mount brackets on each side of the system unit.

Mounting screw

Wall mount bracket

Wall mount bracket

291.60
120.00
80.00
40.00
R2.00
R2.50
Ø8.50
Ø3.60
16.00
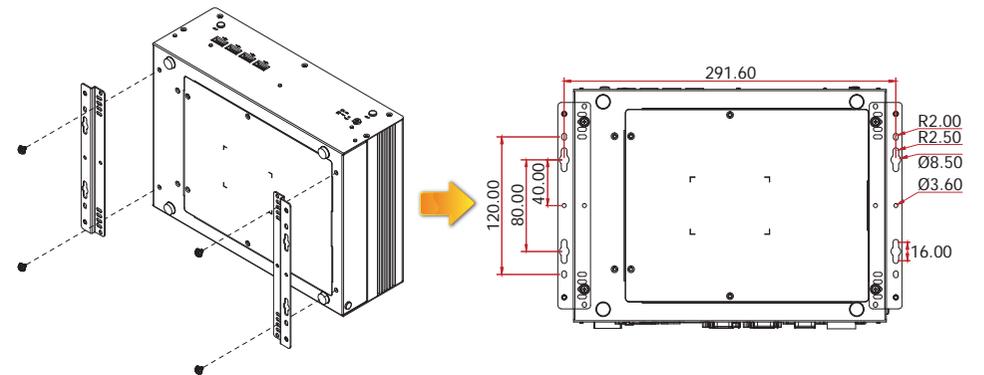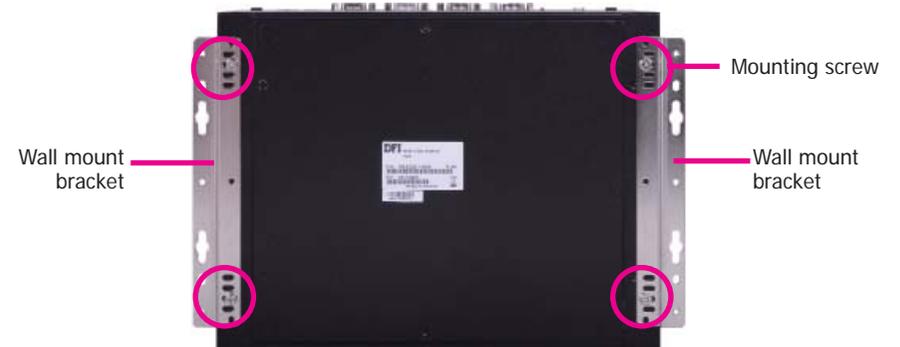
Chapter 7 - BIOS Setup

Overview

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

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

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

Default Configuration

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

Entering the BIOS Setup Utility

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

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

Legends

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

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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    Power    Boot    Exit

    Project Name               BT263                        This is the help for the
    BIOS Version               53.200                       hour, minute, second
                                                            field. Valid range is from
    Processor Type             Intel(R) Atom(TM) CPU E3845 @1.91GHz    0 to 23, 0 to 59, 0 to 59.
    System Memory Speed        1333 MHz                     INCREASE/REDUCE:
    Cache RAM                  2048 KB                      +/-.
    Total Memory               4096 MB
    Channel A - SODIMM 0       4096 MB
    Channel B - SODIMM 0       [No Installed]
    System Time                [20:03:32]
    System Date                [02/24/2015]




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

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.

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.

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    Power    Boot    Exit

    ▶  PCI Express Configuration                           PCI Express Configuration
    ▶  USB Configuration                                   Settings
    ▶  Audio Configuration
    ▶  Miscellaneous Configuration
    ▶  Security Configuration
    ▶  Video Configuration
    ▶  SATA Configuration
    ▶  SIO NUVOTON6106D
    ▶  SIO F81216




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

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
   ▶ PCI Express Root Port 1                               Root Port.
   ▶ 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 Menu      Enter Select ▶ SubMenu F10 Save and Exit
```
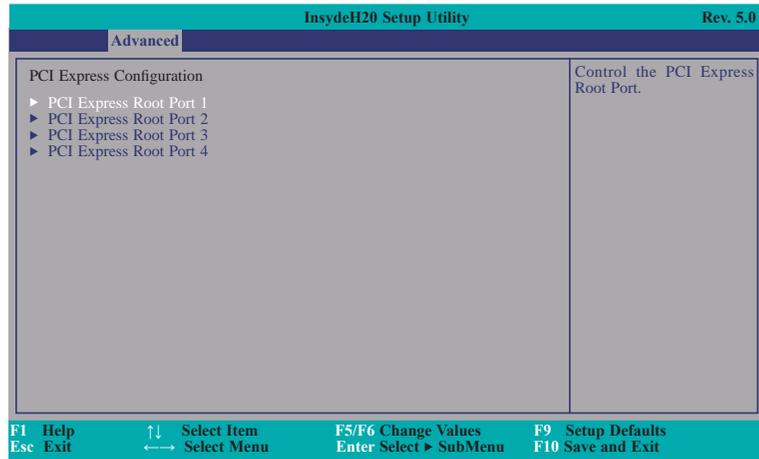
PCI Express Root Port 1 to PCI Express Root Port 4

This field controls the function of the PCI Express Root Port.

```
                        InsydeH20 Setup Utility                    Rev. 5.0
        Advanced
 PCI Express Root Port                                     Control the PCI Express
                                                           Root Port.
 PCI Express Root Port            <Enabled>
 PCIE Port Speed                  <Auto>




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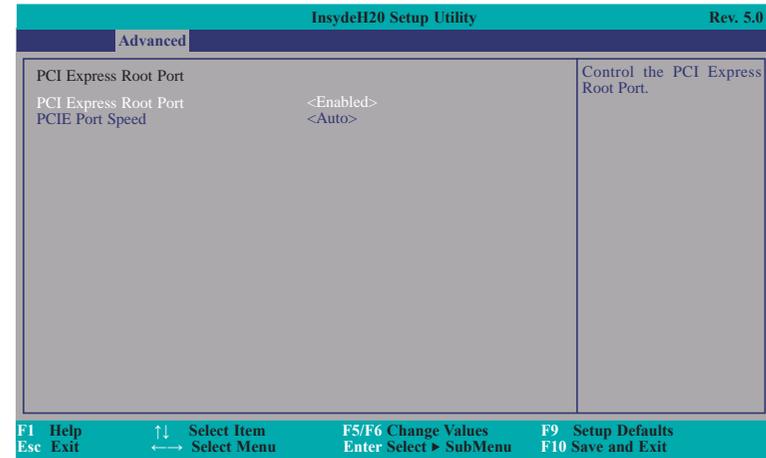
PCI Express Root Port

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

PCIE Port Speed

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

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USB Configuration

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

```
                     InsydeH20 Setup Utility                    Rev. 5.0
    Advanced

 USB Configuration                                USB keyboard/mouse/stor-
                                                  age support under UEFI
 USB BIOS Support          <Enabled>              and DOS environment. It
 xHCI Mode                 <Smart Auto>           will supporting UEFI en-
                                                  vironment only if set to
                                                  UEFI Only.




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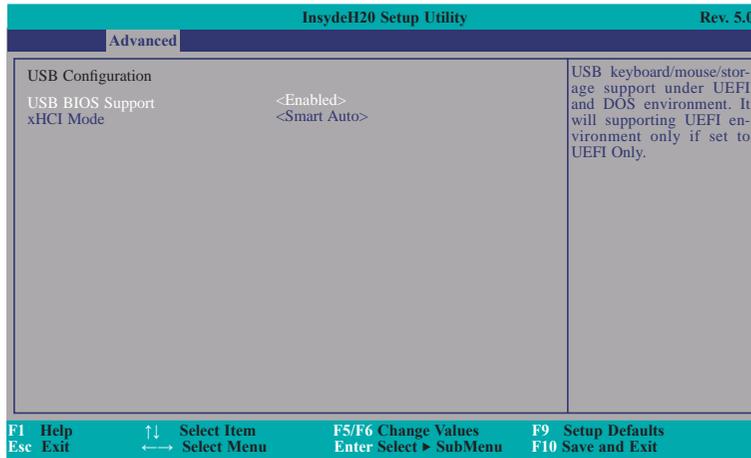
USB BIOS Support

This field enables or disables the USB keyboard/mouse/storage support under the UEFI and DOS environment. It will support the UEFI environment only when it is set to UEFI Only.

xHCI Mode

This field is used to select the operation mode of xHCI controller.

Important:
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.

Table 1. OS Selection

Operation Environment for Customers	DOS	Windows 7	Windows 8.x	Linux
OS Selection in the BIOS Advanced Menu	Windows	Windows	Windows	Linux
Available USB ports	All	When installing Windows 7 first time, only native USB 2.0 ports can work. Please refer to the USB type in table 2 below.	All	All

Table 2. The Type of USB Ports

Model Name	BT263		
USB 3.0	Native	USB 7	HSIC port 3
USB 0	Native	USB 8	HSIC port 0_EXC
USB 1	Native	USB 9	HSIC port 1_EXC
USB 2	Native (share with Mini PCIe)	USB 10	HSIC port 2
USB 3	Native (share with PCIe)	USB 11	HSIC port 3
USB 4	HSIC port 0		
USB 5	HSIC port 1		
USB 6	HSIC port 2		

Audio Configuration

This section is used to configure the audio settings.

```
                        InsydeH20 Setup Utility                    Rev. 5.0
         Advanced
 Audio Configuration                                    Enable/Disable Internal
                                                        HDMI codec for Azalia.
   Azalia HDMI Codec            <Enabled>




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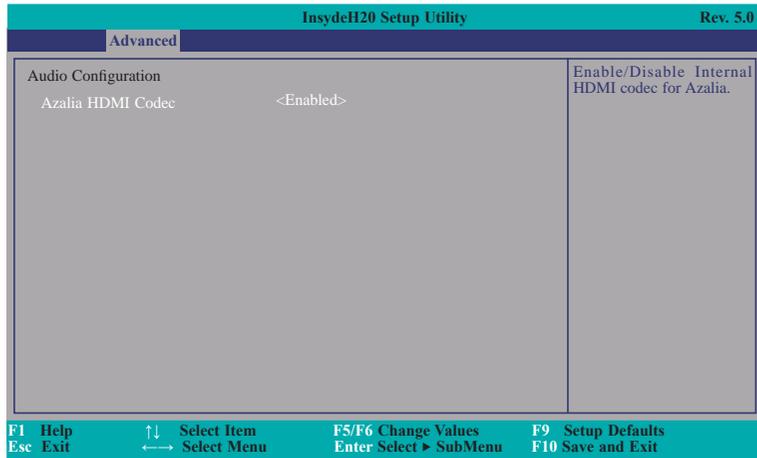
Azalia HDMI Codec

Enables or disables the internal HDMI codec for Azalia.

Miscellaneous Configuration

This section enables or disables Misc. features.

```
                        InsydeH20 Setup Utility                    Rev. 5.0
         Advanced
 Miscellaneous Configuration                            High Performance Event
 HPET - HPET Support            <Enabled>               Timer Support in Windows
 OS Selection                   <Windows>               XP. Enabled this feature,
 State After G3                 <Always Power off>       the HPET table will be
                                                        add-into ACPI Tables.




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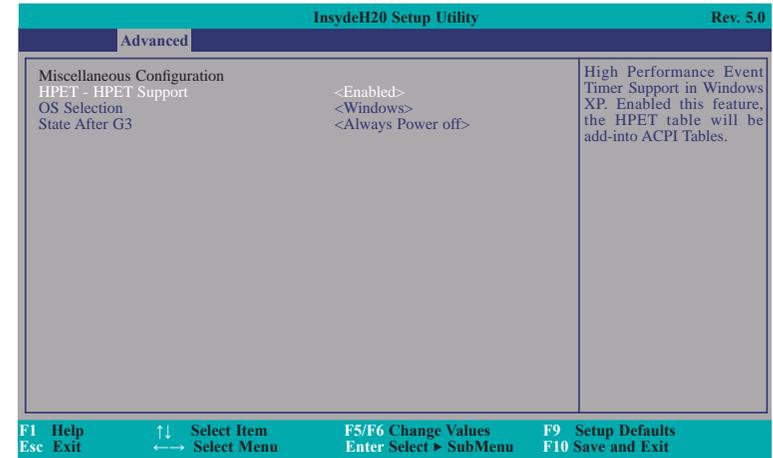
HPET - HPET Support

Enable or disable the high performance event timer support in Windows XP. When enabling this feature, the HPET table will be added into ACPI tables.

OS Selection

Select the OS support: Linux or Windows.

State After G3

Specify what state to go when the power is reapplied after a power failure. (G3 state).

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Security Configuration

This section only displays the security condition.

```
                          InsydeH20 Setup Utility                    Rev. 5.0
        Advanced

    TXE Configuration
    TXE FW Version           1.0.2.1067
    TXE FW Capabilities      A0001040
    TXE FW Features          A0001040
    TXE FW OEM Tag           00000000
    TXE Firmware Mode        Normal




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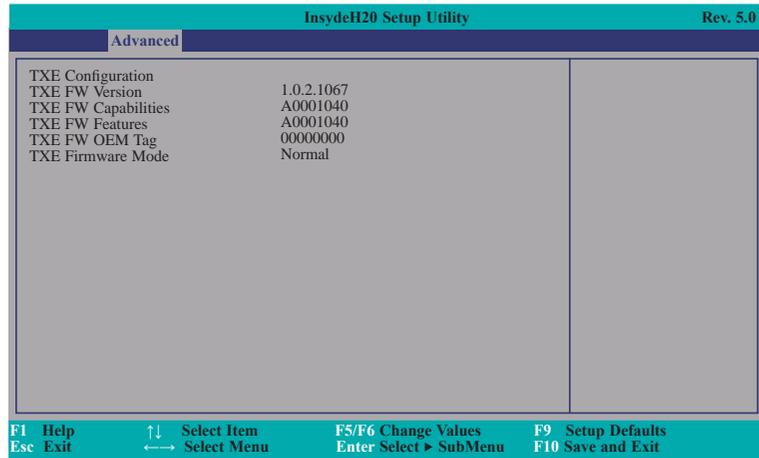
Video Configuration

This section configures the video settings.

```
                          InsydeH20 Setup Utility                    Rev. 5.0
        Advanced

    IGD Configuration                                          Enable: Enable Integrated
    Integrated Graphics Device     <Enabled>                   Graphics Device (IGD)
    Primary Display                <Auto>                      when selected as the Pri-
                                                               mary Video Adapter. Dis-
                                                               able: Always disable IGD.




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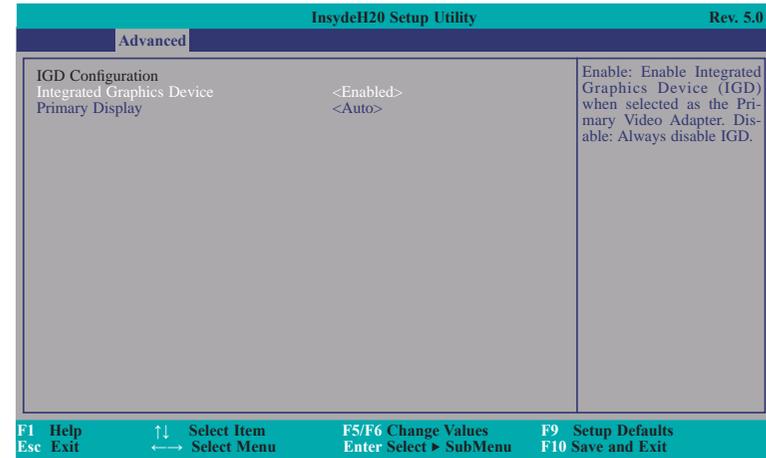
Integrated Graphics Device

Enable or disable the function of integrated graphics device.

Primary Display

Select the primary display device: IGD or PCI graphics device.

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 Controller                    <Enabled>            DISABLED: Disables
   Chipset SATA Mode                  <AHCI>               SATA controller.
   SATA Speed                         <Gen2>               ENABLED: Enables SATA
                                                           conroller.
   ▶  Serial ATA Port 0              [ST500DM002-1BD142]
   ▶  Serial ATA Port 1              [Not Installed]




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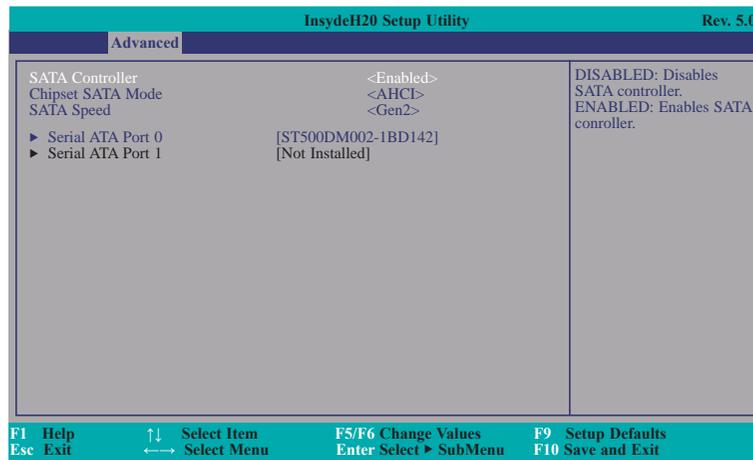
SATA Controller

Enable or disable the Serial ATA Port.

Chipset SATA Mode

Select the SATA mode. The item is fixed at the AHCI mode.

SATA Speed

Select the SATA speed: Gen 1 or Gen 2.

Serial ATA Port 0

This field configures the function of the Serial ATA Port 0.

```
                         InsydeH20 Setup Utility                    Rev. 5.0
             Advanced

   Serial ATA Port 0    [ST500DM002-1BD142]

   Security Mode:       Uninstall




   F1   Help           ↑↓   Select Item      F5/F6 Change Values    F9   Setup Defaults
   Esc  Exit           ←→   Select Menu      Enter Select ▶ SubMenu F10 Save and Exit
```
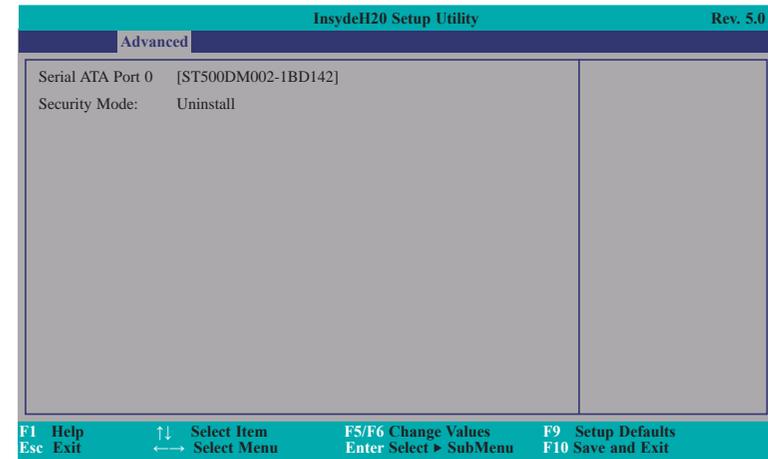
SIO NUVOTON6106D

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

```
                      InsydeH20 Setup Utility              Rev. 5.0
        Advanced
                                                    Enable/Disable Smart Fan.
   SIO NUVOTON6106D
   ▶  Smart Fan Control

   Serial Port 1                        <Enable>
      Base I/O Address                  <3F8>
      Interrupt                         <IRQ10>
      RS485 Auto Flow Control           <Disable>
   Serial Port 2                        <Enable>
      Base I/O Address                  <2F8>
      Interrupt                         <IRQ11>
      RS485 Auto Flow Control           <Disable>
   Serial Port 3                        <Enable>
      Base I/O Address                  <3E8>
      Interrupt                         <IRQ10>
      RS485 Auto Flow Control           <Disable>
   Serial Port 4                        <Enable>
      Base I/O Address                  <2E8>
      Interrupt                         <IRQ11>
      RS485 Auto Flow Control           <Disable>
   Serial Port 5                        <Enable>
      Base I/O Address                  <338>
      Interrupt                         <IRQ10>
      RS485 Auto Flow Control           <Disable>
   Serial Port 6                        <Enable>
      Base I/O Address                  <228>
      Interrupt                         <IRQ11>
      RS485 Auto Flow Control           <Disable>

   LPT Port A                           <Enable>
      Base I/O Address                  <378>
      Interrupt                         <IRQ10>

   WDT                                  <Enable>
   WDT Mode                             <SECOND>
   COUNTER                              [0]

   Case Open                            <Disable>

   ▶  Hardware Monitor


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

Serial Port 1 to Serial Port 6

Configure the options to use the serial port.

Disable No configuration

Enable User configuration

Auto EFI/OS chooses configuration

LPT Port A

Configure the options to use the LPT port.

Disable No configuration

Enable User configuration

Auto EFI/OS chooses configuration

RS485 Auto Flow Control

Enable or disable the RS485 auto flow control.

WDT Mode

Select the count mode: minute or second.

Counter

Enter the value for the counter. The time-out counter ranges from 1 to 255 minutes in the minute mode and from 1 to 255 seconds in the second mode.

Case Open

Enable or disable the case open.

Note:
To make the RS485 auto flow control function work on COM 1 to COM 4, please set either 8 data bits + 1 stop bit or one of the following settings:
(1) 8 data bits + 1 parity bit + 1 stop bit
(2) 8 data bits + 1 parity bit + 2 stop bits
(3) 8 data bits + 2 stop bits

Smart Fan Control

This field enables or disables the smart fan control.

```
                          InsydeH20 Setup Utility                    Rev. 5.0
        Advanced
 CPU Smart Fan Control          <Enable>                    Enable CPU Smart Fan.
      CPU Fan Mode              <SMART FAN IV>
      Boundary 1                [30]
      Boundary 2                [40]
      Boundary 3                [50]
      Boundary 4                [60]
      Fan Speed Count 1         [30]
      Fan Speed Count 2         [40]
      Fan Speed Count 3         [50]
      Fan Speed Count 4         [75]




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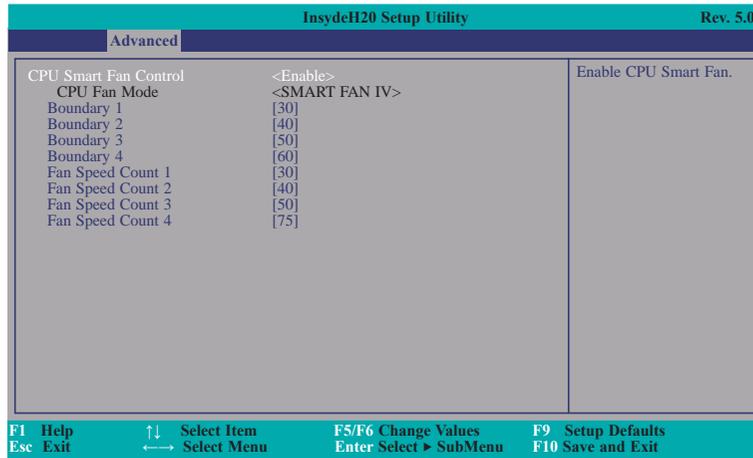
CPU Smart Fan Control

Enable or disable the CPU smart fan.

Boundary 1 to Boundary 4

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

Fan Speed Count 1 to Fan Speed Count 4

Set the fan speed. The range is from 0-100%.

Hardware Monitor

This field only displays the hardware monitor status.

```
                          InsydeH20 Setup Utility                    Rev. 5.0
          Advanced
 Hardware Monitor

 Voltage
   VCORE                        0.960 V
   VDDQ                         1.348 V
   +12V                         12.096 V
   5V                           5.120 V

 Temperature
   System (ºC/ºF)               30ºC/86ºF
   CPU (ºC/ºF)                  29ºC/84ºF

 Fan Speed
   CPU FAN                      0 RPM




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

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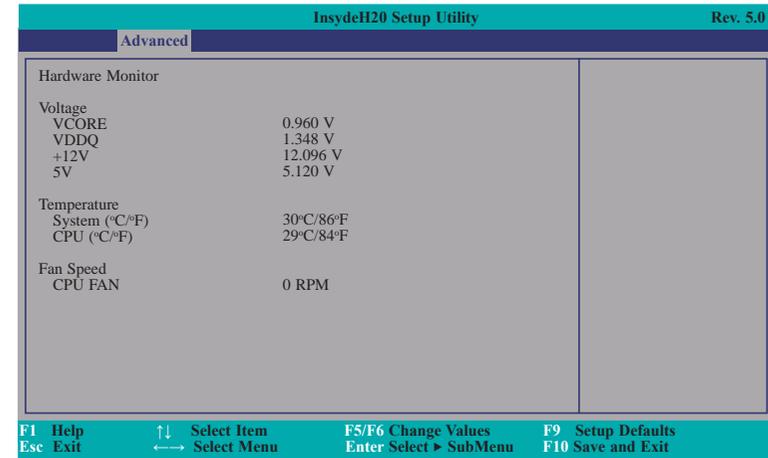
SIO F81216

This section configures the system I/O chip parameters.

```
                        InsydeH20 Setup Utility                    Rev. 5.0
        Advanced
  SIO F81216                                          Configure Serial port using
                                                      options: [Disable] No Con-
  Serial Port 7                    <Enable>           figuration [Enable] User
     Base I/O Address              <240>              Configuration [Auto] EFI/
     Interrupt                     <IRQ3>             OS chooses configuration.
     RS485 Auto Flow Control       <Disable>
  Serial Port 8                    <Enable>
     Base I/O Address              <248>
     Interrupt                     <IRQ4>
     RS485 Auto Flow Control       <Disable>
  Serial Port 9                    <Enable>
     Base I/O Address              <250>
     Interrupt                     <IRQ5>
     RS485 Auto Flow Control       <Disable>
  Serial Port 10                   <Enable>
     Base I/O Address              <258>
     Interrupt                     <IRQ7>
     RS485 Auto Flow Control       <Disable>

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

Serial Port 7 to Serial Port 10

Configure the options to use the serial port.

Disable No configuration

Enable   User configuration

Auto   EFI/OS chooses configuration

RS485 Auto Flow Control

Enable or disable the RS485 auto flow control.

Security

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

  TPM 1.2 Status              Enable and Active      Enable/Disable TPM Func-
  TPM Operation               <No operation>         tion. This option will au-
  Supervisor Password         Not installed          tomatically return to No-
                                                     Operation.
  Set Supervisor Password




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

TPM Operation

Enable or disable the TPM function. This option will automatically return to
No-Operation.

Set Supervisor Password

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

Power
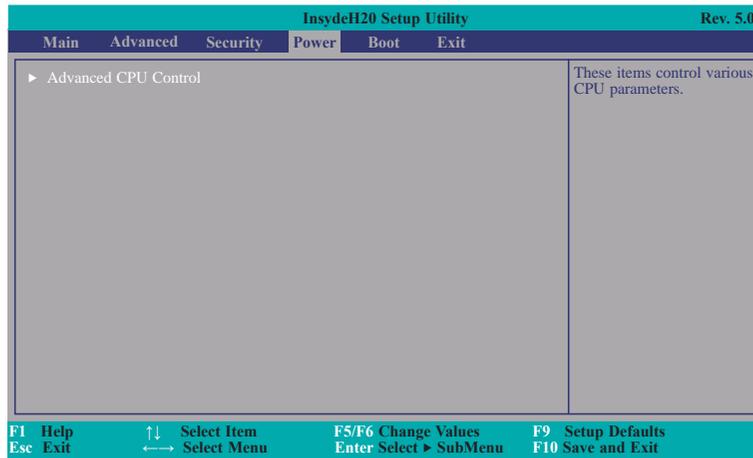
Advanced CPU Control

This section controls various CPU parameters.
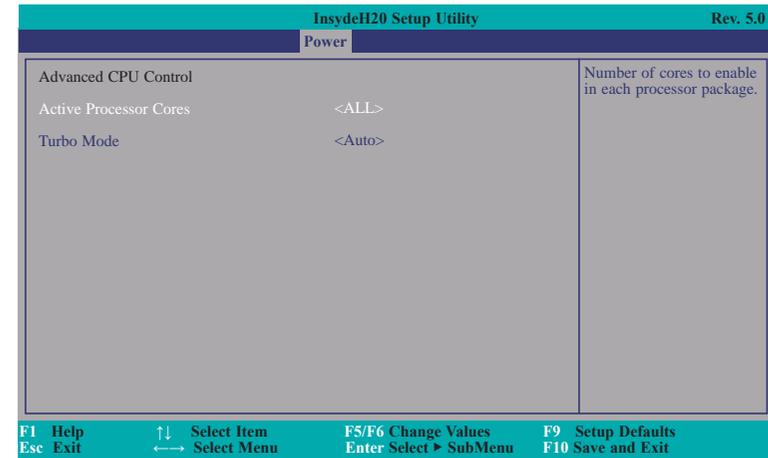
Active Processor Cores

Number of cores to enable in each processor package.

Turbo Mode

Select the processor turbo mode.

Auto
Enable the processor to support the turbo mode.

Disabled
Always disable the processor turbo mode.

Boot

Boot Sequence

This sequence is used when the system is powered up normally.
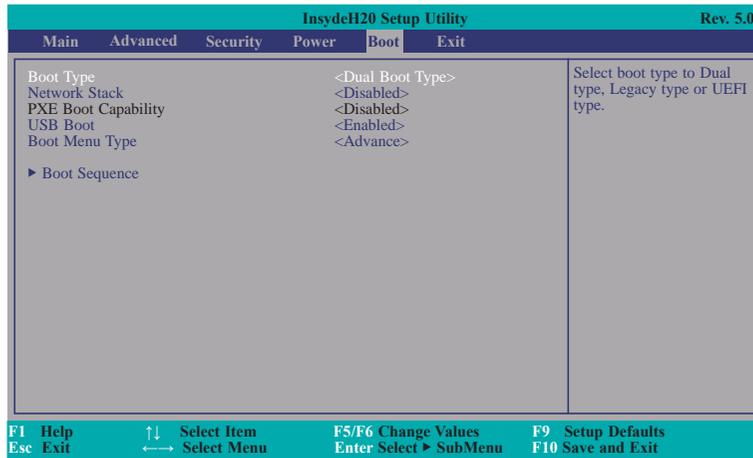
Boot Type

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

Network Stack

Network stack support:
Windows 8 BitLocker Unlock.
UEFI IPv4 PXE
Legacy PXE OpROM

USB Boot

Enable or disable the booting for USB boot devices.

Boot Menu Type

Normal
Based on the boot normal priority, it determines the EFI device first or the legacy device first.

Advance
All boot devices follow the user's selection sequence.

Exit

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

  Exit Saving Changes                              Exit system srtup and save
  Exit Discarding Changes                          your changes.
  Load Optimal Defaults




  F1  Help          ↑↓   Select Item      F5/F6 Change Values    F9  Setup Defaults
  Esc Exit          ←→   Select Menu      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.

Exit Discarding Changes

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

Load Optimal Defaults

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

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 8 - Supported Software

The CD that came with the system board contains drivers, utilities and software applications required to enhance the performance of the system board.

Insert the CD into a CD-ROM drive. The autorun screen (Mainboard Utility CD) will appear. If after inserting the CD, "Autorun" did not automatically start (which is, the Mainboard Utility CD screen did not appear), please go directly to the root directory of the CD and double-click "Setup".

Auto Run Page (For Windows 8.1)
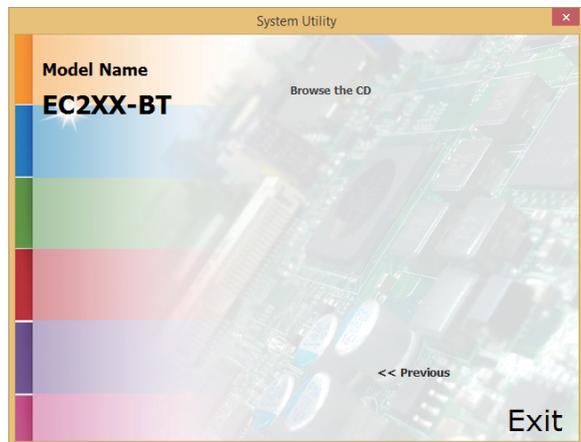
Auto Run Page (For Windows 7)
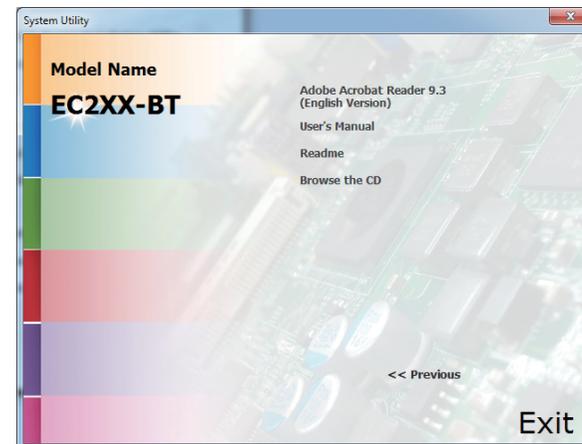
Intel Chipset Software Installation Utility

The Intel Chipset Device Software 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.
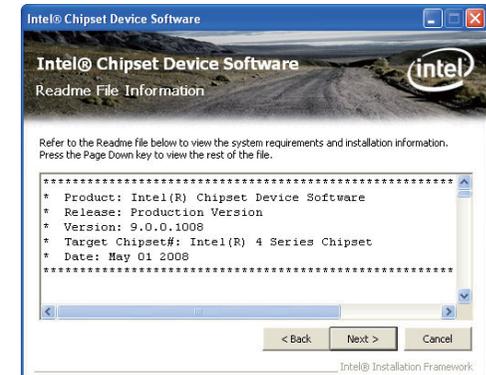
4. After all setup operations are done, click Next.

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.

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Intel HD Graphics Drivers

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

1. Setup is now ready to install the graphics driver. Click Next.
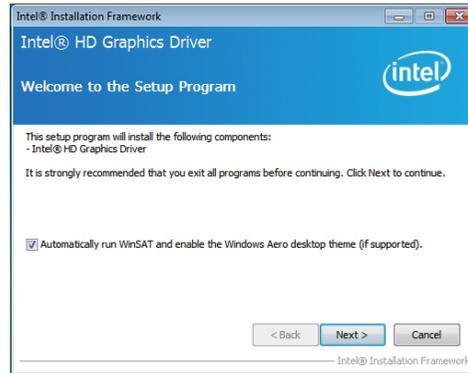
By default, the "Automatically run WinSAT and enable the Windows Aero desktop theme" is enabled. With this enabled, after installing the graphics driver and the system rebooted, the screen will turn blank for 1 to 2 minutes (while WinSAT is running) before the Windows 7/ Windows 8 desktop appears. The "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.
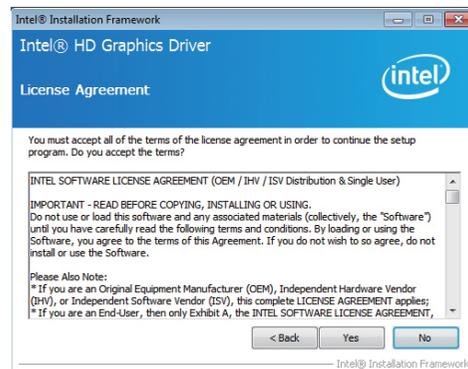
3. Go through the readme document for system requirements and installation tips then click Next.
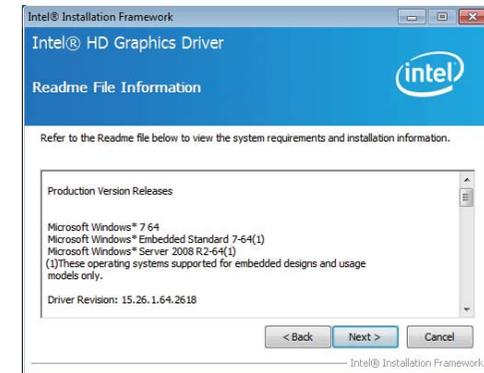
4. Setup is now installing the driver. Click Next to continue.
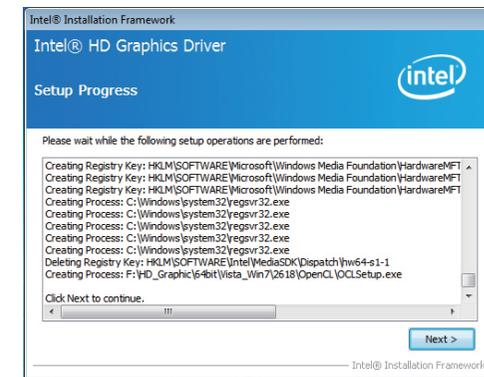
5. Click "Yes, I want to restart this computer now" then click Finish.

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

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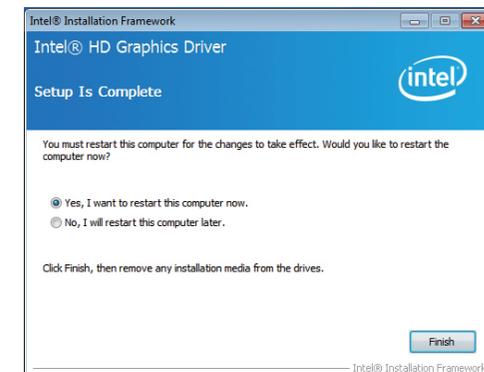
Intel LAN Drivers

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.
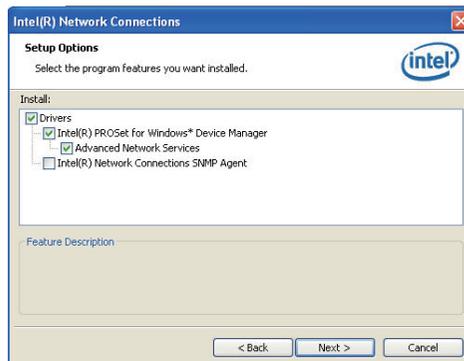
4. Click Install to begin the installation.
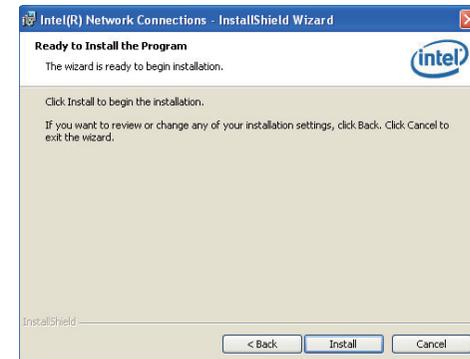
5. After completing installation, click Finish.

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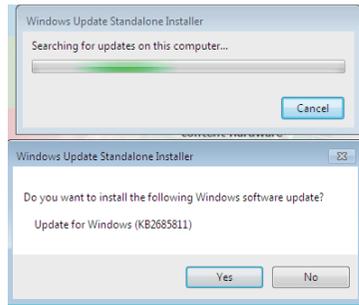
2. The update is installed now.
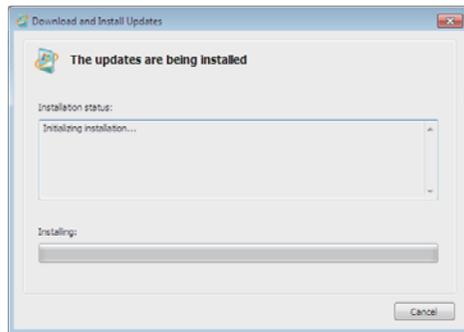
3. Click "Restart Now" to restart your computer when the installation is complete.
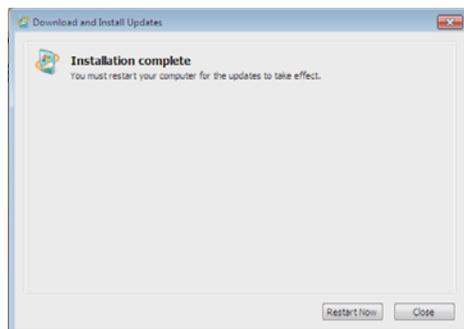
Intel Trusted Execution Engine Driver

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."
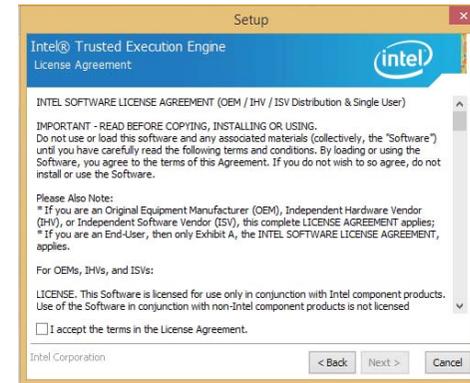
2. The step shows the components which will be installed. Then, Click Next.

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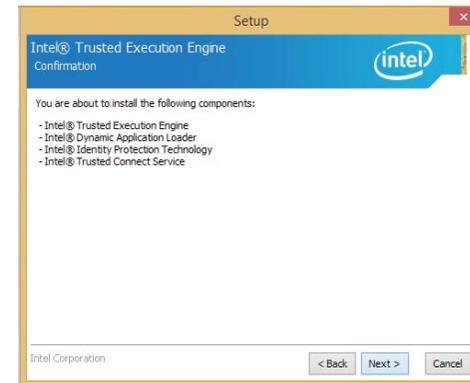
3. The step displays the installing status in the progress.
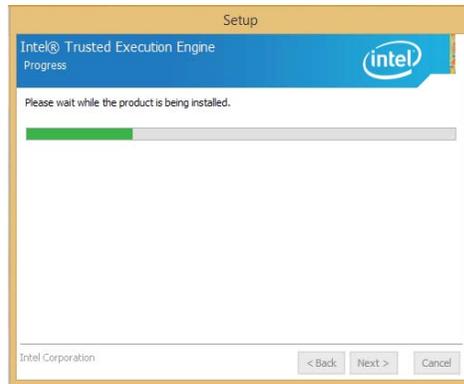
4. Click "Finish" when the installation is complete.
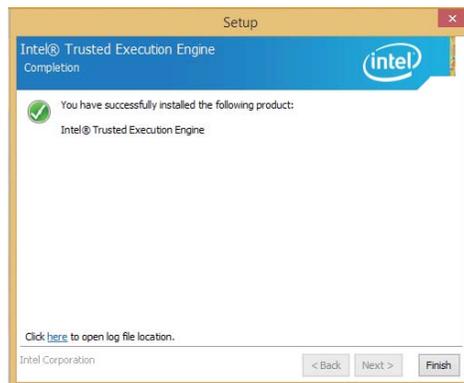
Realtek Audio Drivers

To install the driver, click "Realtek Audio Drivers" 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.
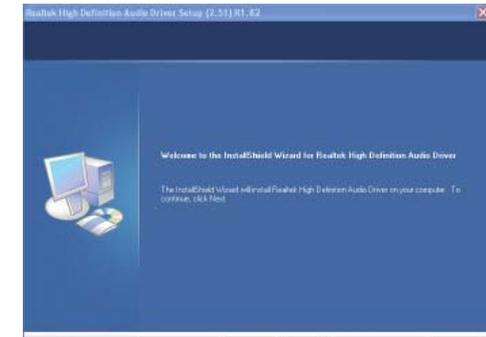
3. Click "Yes, I want to restart my computer now" then click Finish.

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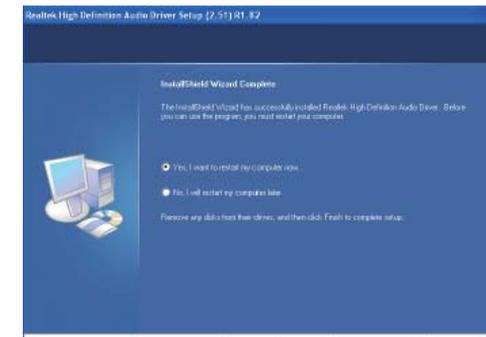
HW Utility

HW Utility provides information about the board, HW Health, Watchdog, DIO, and Backlight. 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.
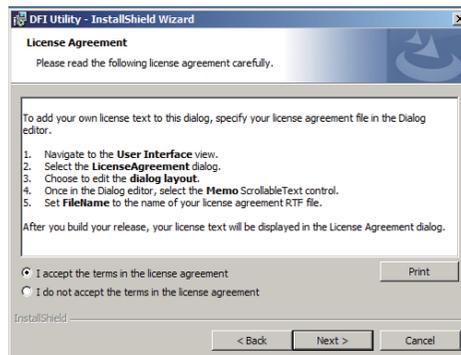
3. Click Install to begin the installation.

4. After completing installation, click Finish.

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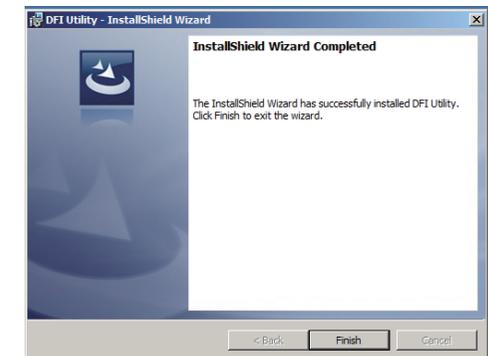
The HW Utility icon will appear on the desktop. Double-click the icon to open the utility.

Information

HW Health Set

HW Health

WatchDog

DIO


DIO 2

Infineon TPM Driver and Tool (option)

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

1. The setup program is preparing to install the driver.

2. The setup program is now ready to install the utility. Click Next.
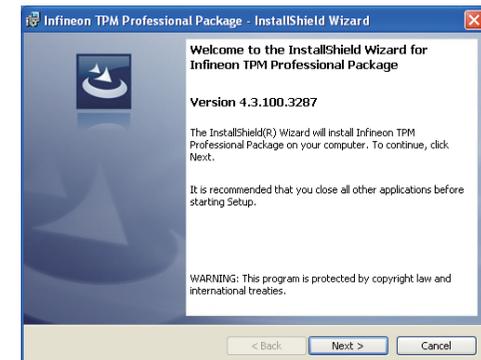
3. Click "I accept the terms in the license agreement" and then click "Next".


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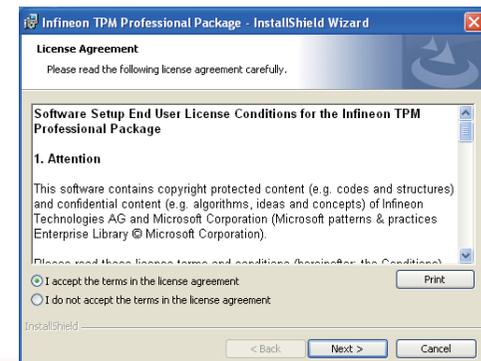
4. Enter the necessary information and then click Next.
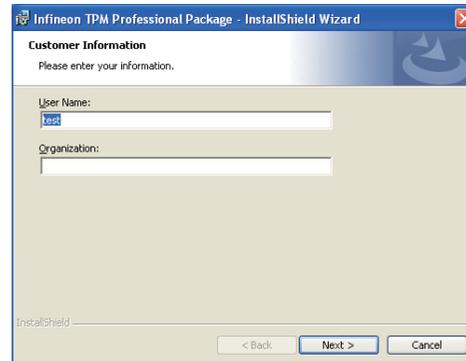
5. Select a setup type and then click Next.
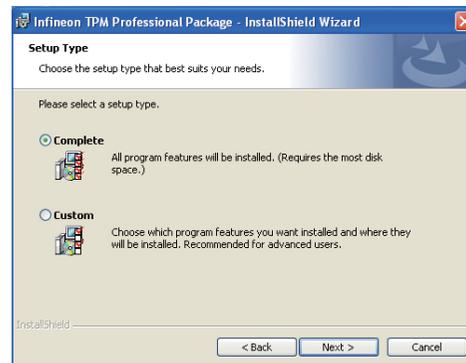
6. Click Install.
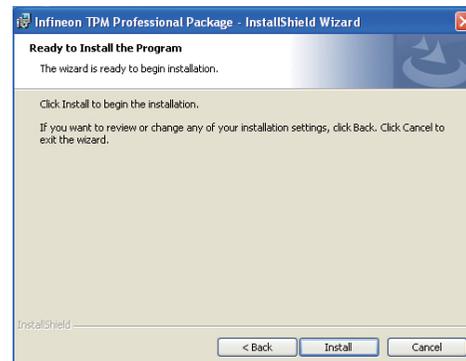
7. TPM requires installing the Micro-soft Visual C++ package prior to installing the utility. Click Install.
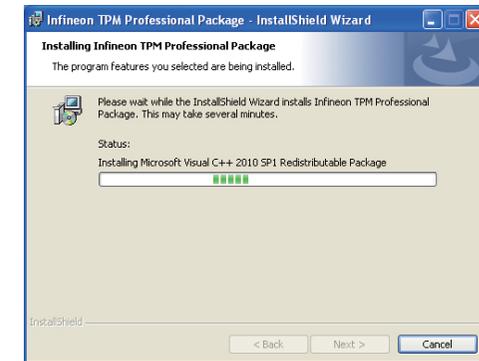
8. The setup program is currently installing the Microsoft Visual C++ package.
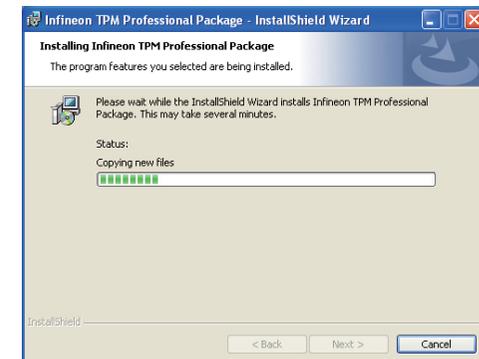
9. Click Finish.

10. Click "Yes" to restart your system.
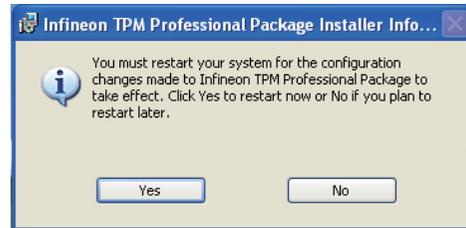
Intel USB 3.0 Drivers (For Windows 7 Only)

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

1. Setup is ready to install the driver. Click Next.
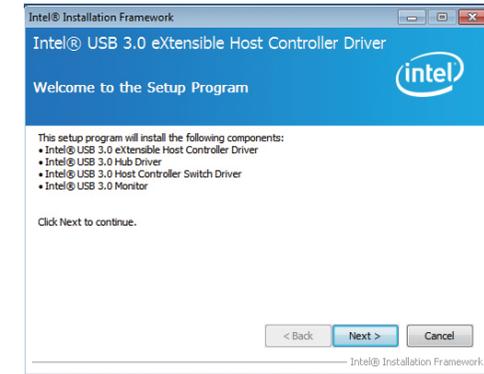
2. Read the license agreement then click Yes.
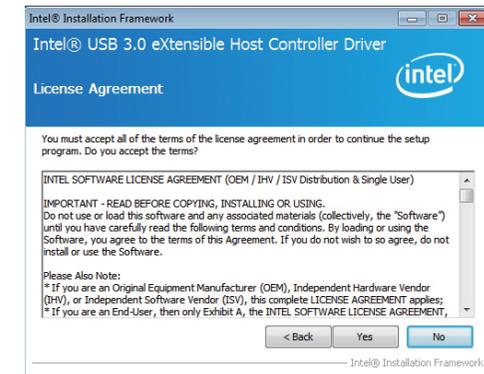
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3. Go through the readme docu-
ment for more installation tips
then click Next.
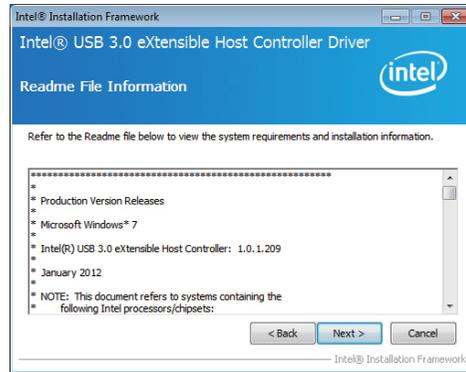
4. Setup is currently installing the
driver. After installation has com-
pleted, click Next.
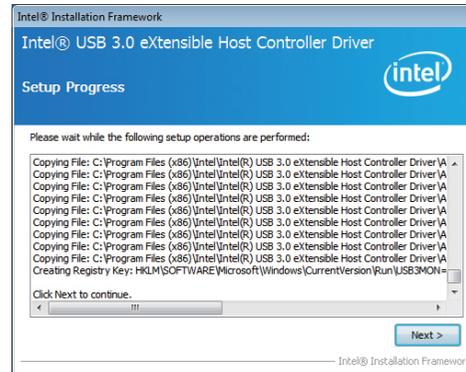
5. After completing installation, click
Finish.

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.
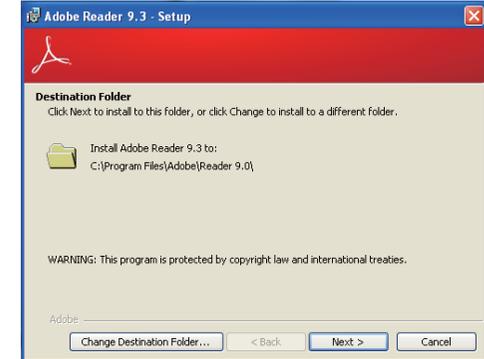
2. Click Install to begin installation.
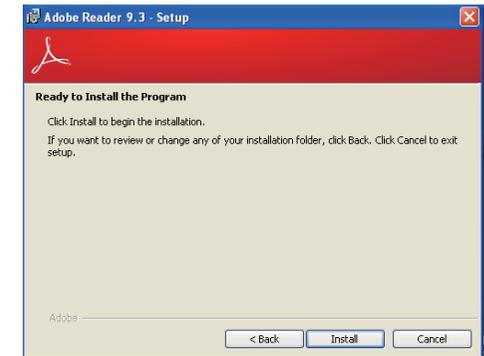
3. Click Finish to exit installation.
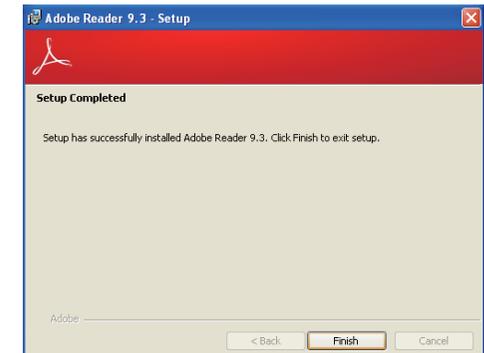
# Chapter 9 - Digital I/O Programming Guide

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,2EH
MOV        AL,87H
OUT        DX,AL
OUT        DX,AL


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

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

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

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

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

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

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

Appendix 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.

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.