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

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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.
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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 arose 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 consequential damages to the product that has been modified or altered.

Static Electricity Precautions

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

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

2. Wear an antistatic wrist strap.

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

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

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

Important:

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

Safety Measures

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

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

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 recommended 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 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)

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

Front View

EC220/EC221-BTA881 Rear View

EC220/EC221-BTAG60 Rear View

EC220/EC221-BT6060 Rear View
# 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  
|                 | • 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 signals  
|                 | : 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 signals  
|                 | : 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  
|                 | - IEC68-2-54 (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 |

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**Note:**  
*Optional and is not supported in standard model. Please contact your sales representative for more information.*
Chapter 1 Introduction

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.
Chapter 1 Introduction

**EC210-BT**

**Front 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.

- **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.
Chapter 1

Rear View

**EC210-BTAG60 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.

**EC210-BTAG81 Rear View**

**EC210-BTAG60 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.
**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**

- **PCI / PCIe x16 (x1 signal) slot**
- **Power**
- **HDD Alert**
- **Speaker-out**
- **Reset**
- **LAN USB VGA COM6 COM5 DC-in**
- **GPIO**
- **COM7 COM8 COM9 COM10**
- **DVI (DVI-D signal)**
- **PCi / PCIe x16 (x1 signal) slot**

**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.
Chapter 1

Chassis Dimension (EC210-BT)

Front View

Left View

Right View

Chassis Dimension (EC220/EC221-BT)

Front View

Left View

Right View

Dimensions:
- EC210-BT:
  - Front View: 275.00 mm
  - Left View: 203.00 mm
  - Right View: 94.00 mm

- EC220/EC221-BT:
  - Front View: 114.00 mm
  - Left View: 110.00 mm
  - Right View: 275.00 mm

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Chapter 1 Introduction

Motherboard Dimension

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 installing 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 provide 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.

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

5. The SODIMM socket and the Mini PCIe slot are readily accessible after removing the chassis cover.
Installing a SODIMM Module

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

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.

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.

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.

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.
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.

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.
Chapter 3 Installing the Devices

Chapter 3 Installing a Mini PCIe Card and/ or mSATA Card

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

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.

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.
Chapter 3 Installing the Devices

Installing the PCI/PCIe Expansion Card

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

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.
Chapter 4 - Jumper Settings

Jumper Settings - System Board

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

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

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 is used to select the power level of SATA DOM.

**Note:** SATA port 0 provides adequate space for SATA DOM.
**COM 1/ COM 2/ COM 3/ COM 4 RS232/422/485 Select**

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.

**Note:**
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
Chapter 4 Jumper Settings

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

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

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

**Mini PCIe/mSATA Signal Select**

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

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

JP14 (for COM 1), JP16 (for COM 2), JP18 (for COM 3) and JP20 (for COM 4) are used to configure these Serial COM ports to pure RS232 or RS232 with power.

JP8 is used to select the Mini PCIe signal: PCIe or mSATA.
**Mini PCIe/ mSATA Power Select**

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

- **1-2 On:** +3V_standby (Mini PCIe)  
  (default)
- **2-3 On:** +3.3V (mSATA)

**SATA 1/ mSATA Signal Select**

JP31 is designed to select the SATA or mSATA signal.

- **1-4-7-10, 2-5-8-11 On:**  
  SATA 1 (default)
- **2-5-8-11, 3-6-9-12 On:**  
  mSATA
Digital I/O Power Select

JP7 is used to select the power of DIO (Digital I/O) signal.

Digital I/O Output State

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.
**PS/2 Keyboard/ Mouse Power Select**

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 (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 On: RS232 (default)
  - 3-4 On: RS422 Full Duplex
  - 5-6 On: RS485

**COM 7/ COM 8/ COM 9/ COM 10**

- **COM 7**
  - Pins 1-2: DCD
  - Pins 3-4: TXD
  - Pins 5-6: RXD
  - Pins 7: GND

- **COM 8**
  - Pins 1-4: DTR
  - Pins 5-6: GND
  - Pins 7: N.C.

- **COM 9**
  - Pins 1-4: RTS
  - Pins 5-6: GND
  - Pins 7: N.C.

- **COM 10**
  - Pins 1-4: N.C.
  - Pins 5-6: N.C.
  - Pins 7: N.C.
Chapter 4

Chapter 4 Jumper Settings

COM 7 to COM 10 RS232/Power Select

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)

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

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

Digital I/O Power Select

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 On: +3.3V (default)

2-3 On: +5V

DIO
Chapter 4 Jumper Settings

USB Power Select

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.

For EC200/EC210/EC220/EC221-BTAG60

COM 7 to COM 10 RS232/RS422/RS485 Select

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.
Chapter 4

**COM 7 to COM 10 RS232/Power Select**

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.

<table>
<thead>
<tr>
<th>JP3 (for COM 7) / JP6 (for COM 8)</th>
<th>JP4 (for COM 9) / JP7 (for COM 10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-3, 2-4 On: RS232 (default)</td>
<td>3-5(+12V), 4-6(+5V) On: RS232 with power</td>
</tr>
</tbody>
</table>

**Digital I/O Power Select**

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.

<table>
<thead>
<tr>
<th>JP9</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 2 1</td>
</tr>
<tr>
<td>1-2 On: +3.3V (default)</td>
</tr>
<tr>
<td>2-3 On: +5V</td>
</tr>
</tbody>
</table>

- DIO1
- DIO2
- DIO3
- DIO4
- DIO5
- DIO6
- DIO7
- DIO8
- GND

**COM 7/ COM 8/ COM 9/ COM 10**

- COM 7
- COM 8
- COM 9
- COM 10
Chapter 5 - Ports and Connectors

Front Panel I/O Ports

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

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.
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 information on the type of USB ports.

**Table 1. OS Selection**

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

**Table 2. The Type of USB Ports**

<table>
<thead>
<tr>
<th>Model Name</th>
<th>BT263</th>
</tr>
</thead>
<tbody>
<tr>
<td>USB 3.0</td>
<td>Native</td>
</tr>
<tr>
<td>USB 0</td>
<td>Native</td>
</tr>
<tr>
<td>USB 1</td>
<td>Native</td>
</tr>
<tr>
<td>USB 2</td>
<td>Native (share with Mini PCIe)</td>
</tr>
<tr>
<td>USB 3</td>
<td>Native (share with PCIe)</td>
</tr>
<tr>
<td>USB 4</td>
<td>HSIC port 0</td>
</tr>
<tr>
<td>USB 5</td>
<td>HSIC port 1</td>
</tr>
<tr>
<td>USB 6</td>
<td>HSIC port 2</td>
</tr>
</tbody>
</table>

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.
### Rear Panel I/O Ports

#### EC200-BT

- **Speaker-out**
- **Reset**
- **LAN**
- **USB**
- **VGA**
- **COM10**
- **COM9**
- **COM8**
- **COM7**
- **Power**
- **HDD**
- **Alert**

**EC200-BTA881 Rear View**

**EC200-BTAG60 Rear View**

**EC200-BT6060 Rear View**

---

**Note:**

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

**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 USB 3.0 (Type A) port
- 1 USB 2.0 (Type A) port
- 1 8-bit GPIO: 9-pole terminal block
- 1 Reset button
- 1 Power LED
- 1 HDD LED
- 1 Alert LED
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**

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.
Chapter 5 Ports and Connectors

**Speaker-out**

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

**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

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.

RJ 45 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.
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 information on the type of USB ports.

---

### Table 1. OS Selection

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

---

### Table 2. The Type of USB Ports

<table>
<thead>
<tr>
<th>Model Name</th>
<th>BT263</th>
</tr>
</thead>
<tbody>
<tr>
<td>USB 3.0</td>
<td>Native USB 7</td>
</tr>
<tr>
<td>USB 0</td>
<td>Native USB 8</td>
</tr>
<tr>
<td>USB 1</td>
<td>Native USB 9</td>
</tr>
<tr>
<td>USB 2</td>
<td>Native (share with Mini PCIe) USB 10</td>
</tr>
<tr>
<td>USB 3</td>
<td>Native (share with PCIe) USB 11</td>
</tr>
<tr>
<td>USB 4</td>
<td>HSIC port 0</td>
</tr>
<tr>
<td>USB 5</td>
<td>HSIC port 1</td>
</tr>
<tr>
<td>USB 6</td>
<td>HSIC port 2</td>
</tr>
</tbody>
</table>

---

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.
8-bit GPIO

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

<table>
<thead>
<tr>
<th>Pins</th>
<th>Pin Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>DIO1</td>
</tr>
<tr>
<td>2</td>
<td>DIO2</td>
</tr>
<tr>
<td>3</td>
<td>DIO3</td>
</tr>
<tr>
<td>4</td>
<td>DIO4</td>
</tr>
<tr>
<td>5</td>
<td>DIO5</td>
</tr>
<tr>
<td>6</td>
<td>DIO6</td>
</tr>
<tr>
<td>7</td>
<td>DIO7</td>
</tr>
<tr>
<td>8</td>
<td>DIO8</td>
</tr>
<tr>
<td>G</td>
<td>GND</td>
</tr>
</tbody>
</table>

COM (Serial) Ports

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

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.

<table>
<thead>
<tr>
<th>Pin</th>
<th>Pin Assignment</th>
<th>Pin</th>
<th>Pin Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>HDD Power</td>
<td>2</td>
<td>LED Power</td>
</tr>
<tr>
<td>5</td>
<td>Signal</td>
<td>4</td>
<td>LED Power</td>
</tr>
<tr>
<td>7</td>
<td>Ground</td>
<td>6</td>
<td>Signal</td>
</tr>
<tr>
<td>9</td>
<td>RST Signal</td>
<td>8</td>
<td>Ground</td>
</tr>
<tr>
<td>11</td>
<td>N.C.</td>
<td>10</td>
<td>Signal</td>
</tr>
</tbody>
</table>
PS/2 Keyboard/ Mouse Connector

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.

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

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 information on the type of USB ports.

Table 1. OS Selection

<table>
<thead>
<tr>
<th>Operation Environment for Customers</th>
<th>DOS</th>
<th>Windows 7</th>
<th>Windows 8.x</th>
<th>Linux</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS Selection in the BIOS Advanced Menu</td>
<td>Windows 8.x</td>
<td>Windows 7</td>
<td>Windows 8.x</td>
<td>Windows 8.x</td>
</tr>
<tr>
<td>Available USB ports</td>
<td>All</td>
<td>All</td>
<td>All</td>
<td>All</td>
</tr>
</tbody>
</table>

Table 2. The Type of USB Ports

<table>
<thead>
<tr>
<th>Model Name</th>
<th>BT263</th>
<th>USB 7</th>
<th>USB 8</th>
<th>USB 9</th>
<th>USB 10</th>
<th>USB 11</th>
</tr>
</thead>
<tbody>
<tr>
<td>USB 3.0</td>
<td>Native</td>
<td>HSIC port 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>USB 0</td>
<td>Native</td>
<td>USB 7</td>
<td>USB 8</td>
<td>HSIC port 0_EXC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>USB 1</td>
<td>Native</td>
<td>USB 8</td>
<td>USB 9</td>
<td>HSIC port 1_EXC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>USB 2</td>
<td>Native (share with Mini PCIe)</td>
<td>USB 10</td>
<td>HSIC port 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>USB 3</td>
<td>Native (share with PCIe)</td>
<td>USB 11</td>
<td>HSIC port 3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>USB 4</td>
<td>HSIC port 0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>USB 5</td>
<td>HSIC port 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>USB 6</td>
<td>HSIC port 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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.

<table>
<thead>
<tr>
<th>Connector Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SPP (Standard Parallel Port)</strong></td>
<td>Allows normal speed operation but in one direction only.</td>
</tr>
<tr>
<td><strong>ECP (Extended Capabilities Port)</strong></td>
<td>Allows parallel port to operate in bidirectional mode and at a speed faster than the SPP's data transfer rate.</td>
</tr>
<tr>
<td><strong>EPP (Enhanced Parallel Port)</strong></td>
<td>Allows bidirectional parallel port operation at maximum speed.</td>
</tr>
</tbody>
</table>

**Digital I/O and/or Power Connector**

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.

<table>
<thead>
<tr>
<th>Pins</th>
<th>Pin Assignment</th>
<th>Pins</th>
<th>Pin Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GND</td>
<td>2</td>
<td>+12V</td>
</tr>
<tr>
<td>3</td>
<td>DIO7</td>
<td>4</td>
<td>+12V</td>
</tr>
<tr>
<td>5</td>
<td>DIO6</td>
<td>6</td>
<td>GND</td>
</tr>
<tr>
<td>7</td>
<td>DIO5</td>
<td>8</td>
<td>+5V</td>
</tr>
<tr>
<td>9</td>
<td>DIO4</td>
<td>10</td>
<td>+5V</td>
</tr>
<tr>
<td>11</td>
<td>DIO3</td>
<td>12</td>
<td>GND</td>
</tr>
<tr>
<td>13</td>
<td>DIO2</td>
<td>14</td>
<td>+5V Standby</td>
</tr>
<tr>
<td>15</td>
<td>DIO1</td>
<td>16</td>
<td>+5V Standby</td>
</tr>
<tr>
<td>17</td>
<td>DIO0</td>
<td>18</td>
<td>GND</td>
</tr>
<tr>
<td>19</td>
<td>GND</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**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**

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**

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

<table>
<thead>
<tr>
<th>Pins</th>
<th>Pin Assignment</th>
<th>Pins</th>
<th>Pin Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>CLK</td>
<td>2</td>
<td>LAD1</td>
</tr>
<tr>
<td>3</td>
<td>RST#</td>
<td>4</td>
<td>LAD0</td>
</tr>
<tr>
<td>5</td>
<td>FRAME#</td>
<td>6</td>
<td>VCC_+3V</td>
</tr>
<tr>
<td>7</td>
<td>LAD3</td>
<td>8</td>
<td>GND</td>
</tr>
<tr>
<td>9</td>
<td>LAD2</td>
<td>10</td>
<td>x</td>
</tr>
<tr>
<td>11</td>
<td>SERIRQ</td>
<td>12</td>
<td>48MHz</td>
</tr>
</tbody>
</table>

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**

**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.

<table>
<thead>
<tr>
<th>Pins</th>
<th>Pin Assignment</th>
<th>Pins</th>
<th>Pin Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>GND</td>
<td>B1</td>
<td>+12V</td>
</tr>
<tr>
<td>A2</td>
<td>+12V</td>
<td>B2</td>
<td>+12V</td>
</tr>
<tr>
<td>A3</td>
<td>+12V</td>
<td>B3</td>
<td>+12V</td>
</tr>
<tr>
<td>A4</td>
<td>GND</td>
<td>B4</td>
<td>GND</td>
</tr>
<tr>
<td>A5</td>
<td>+5V</td>
<td>B5</td>
<td>SMB_CLK</td>
</tr>
<tr>
<td>A6</td>
<td>+5V</td>
<td>B6</td>
<td>SMB_DATA</td>
</tr>
<tr>
<td>A7</td>
<td>+5V</td>
<td>B7</td>
<td>GND</td>
</tr>
<tr>
<td>A8</td>
<td>+3V3</td>
<td>B8</td>
<td>+3V3</td>
</tr>
<tr>
<td>A9</td>
<td>+3V3</td>
<td>B9</td>
<td>NC</td>
</tr>
<tr>
<td>A10</td>
<td>+3V3</td>
<td>B10</td>
<td>+3VDD</td>
</tr>
<tr>
<td>A11</td>
<td>RESET-</td>
<td>B11</td>
<td>PCIE_WAKE-</td>
</tr>
<tr>
<td>A12</td>
<td>GND</td>
<td>B12</td>
<td>PME-</td>
</tr>
<tr>
<td>A13</td>
<td>CLK+</td>
<td>B13</td>
<td>GND</td>
</tr>
<tr>
<td>A14</td>
<td>CLK-</td>
<td>B14</td>
<td>TX+</td>
</tr>
<tr>
<td>A15</td>
<td>GND</td>
<td>B15</td>
<td>TX-</td>
</tr>
<tr>
<td>A16</td>
<td>RX+</td>
<td>B16</td>
<td>GND</td>
</tr>
<tr>
<td>A17</td>
<td>RX-</td>
<td>B17</td>
<td>NC</td>
</tr>
<tr>
<td>A18</td>
<td>GND</td>
<td>B18</td>
<td>GND</td>
</tr>
</tbody>
</table>
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

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.
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.

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

Default Configuration

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

Entering the BIOS Setup Utility

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

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

Legends

<table>
<thead>
<tr>
<th>Keys</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right and Left arrows</td>
<td>Moves the highlight left or right to select a menu.</td>
</tr>
<tr>
<td>Up and Down arrows</td>
<td>Moves the highlight up or down between submenu or fields.</td>
</tr>
<tr>
<td>&lt;Esc&gt;</td>
<td>Exit to the BIOS Setup Utility.</td>
</tr>
<tr>
<td>+ (plus key)</td>
<td>Scrolls forward through the values or options of the highlighted field.</td>
</tr>
<tr>
<td>- (minus key)</td>
<td>Scrolls backward through the values or options of the highlighted field.</td>
</tr>
<tr>
<td>Tab</td>
<td>Select a field.</td>
</tr>
<tr>
<td>&lt;Enter&gt;</td>
<td>Press &lt;Enter&gt; to enter the highlighted submenu.</td>
</tr>
</tbody>
</table>

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>.
Insyde BIOS Setup Utility

Main

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

### 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.
# Chapter 7 - BIOS Setup

## PCI Express Configuration

This section configures settings relevant to PCI Express root ports.

<table>
<thead>
<tr>
<th>PCI Express Configuration</th>
<th>Rev. 5.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control the PCI Express Root Port.</td>
<td></td>
</tr>
</tbody>
</table>

**PCI Express Root Port 1 to PCI Express Root Port 4**

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

<table>
<thead>
<tr>
<th>PCI Express Root Port</th>
<th>PCI Express Root Port PCIE Port Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;Enabled&gt;</td>
<td>&lt;Auto&gt;</td>
</tr>
</tbody>
</table>

**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.
USB Configuration

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

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.

Table 1. OS Selection

<table>
<thead>
<tr>
<th>Operation Environment for Customers</th>
<th>DOS</th>
<th>Windows 7</th>
<th>Windows 8.x</th>
<th>Linux</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS Selection in the BIOS Advanced Menu</td>
<td>Windows</td>
<td>All</td>
<td>All</td>
<td>All</td>
</tr>
</tbody>
</table>

Table 2. The Type of USB Ports

<table>
<thead>
<tr>
<th>Model Name</th>
<th>BT263</th>
</tr>
</thead>
<tbody>
<tr>
<td>USB 3.0</td>
<td>Native</td>
</tr>
<tr>
<td>USB 0</td>
<td>Native</td>
</tr>
<tr>
<td>USB 1</td>
<td>Native</td>
</tr>
<tr>
<td>USB 2</td>
<td>Native (share with Mini PCIe)</td>
</tr>
<tr>
<td>USB 3</td>
<td>Native (share with PCIe)</td>
</tr>
<tr>
<td>USB 4</td>
<td>HSI C port 0</td>
</tr>
<tr>
<td>USB 5</td>
<td>HSI C port 1</td>
</tr>
<tr>
<td>USB 6</td>
<td>HSI C port 2</td>
</tr>
</tbody>
</table>
Chapter 7 BIOS Setup

Audio Configuration

This section is used to configure the audio settings.

- **Azalia HDMI Codec**
  Enables or disables the internal HDMI codec for Azalia.

Miscellaneous Configuration

This section enables or disables Misc. features.

- **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).
Chapter 7 BIOS Setup

Security Configuration

This section only displays the security condition.

<table>
<thead>
<tr>
<th>TXE Configuration</th>
<th>TXE FW Version</th>
<th>TXE FW Capabilities</th>
<th>TXE FW Features</th>
<th>TXE FW OEM Tag</th>
<th>TXE Firmware Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1.0.2.1087</td>
<td>A0001040</td>
<td>A0001040</td>
<td>00000000</td>
<td>Normal</td>
</tr>
</tbody>
</table>

Video Configuration

This section configures the video settings.

**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 installed in your system unit.

**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.
### SIO NUVOTON6106D

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

<table>
<thead>
<tr>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smart Fan Control</td>
<td>Configure the options to use the serial port.</td>
</tr>
<tr>
<td>Serial Port 1</td>
<td>Configure the options to use the LPT port.</td>
</tr>
<tr>
<td>RS485 Auto Flow Control</td>
<td>Configure the options to use the LPT port.</td>
</tr>
<tr>
<td>RS485 Auto Flow Control</td>
<td>Enable or disable the RS485 auto flow control.</td>
</tr>
<tr>
<td>Serial Port 2</td>
<td>Enable or disable the RS485 auto flow control.</td>
</tr>
<tr>
<td>Serial Port 3</td>
<td>Enable or disable the RS485 auto flow control.</td>
</tr>
<tr>
<td>Serial Port 4</td>
<td>Select the count mode: minute or second.</td>
</tr>
<tr>
<td>Serial Port 5</td>
<td>Select the count mode: minute or second.</td>
</tr>
<tr>
<td>Serial Port 6</td>
<td>Enable or disable the case open.</td>
</tr>
</tbody>
</table>

**Serial Port 1 to Serial Port 6**

Configure the options to use the serial port.

- **Enable** 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.

<table>
<thead>
<tr>
<th>CPU Smart Fan Control</th>
<th>Enable CPU Smart Fan.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Fan Mode</td>
<td>&lt;SMART FAN IV&gt;</td>
</tr>
<tr>
<td>Boundary 1</td>
<td>30</td>
</tr>
<tr>
<td>Boundary 2</td>
<td>40</td>
</tr>
<tr>
<td>Boundary 3</td>
<td>50</td>
</tr>
<tr>
<td>Boundary 4</td>
<td>60</td>
</tr>
<tr>
<td>Fan Speed Count 1</td>
<td>30</td>
</tr>
<tr>
<td>Fan Speed Count 2</td>
<td>40</td>
</tr>
<tr>
<td>Fan Speed Count 3</td>
<td>50</td>
</tr>
<tr>
<td>Fan Speed Count 4</td>
<td>75</td>
</tr>
</tbody>
</table>

**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.

<table>
<thead>
<tr>
<th>Hardware Monitor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
</tr>
<tr>
<td>VCORE</td>
</tr>
<tr>
<td>VDDQ</td>
</tr>
<tr>
<td>+12V</td>
</tr>
<tr>
<td>5V</td>
</tr>
<tr>
<td>Temperature</td>
</tr>
<tr>
<td>System (°C/°F)</td>
</tr>
<tr>
<td>CPU (°C/°F)</td>
</tr>
<tr>
<td>Fan Speed</td>
</tr>
<tr>
<td>CPU FAN</td>
</tr>
</tbody>
</table>
Chapter 7 BIOS Setup

**SIO F81216**

This section configures the system I/O chip parameters.

**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**

**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.
Chapter 7 BIOS Setup

Power

Advanced CPU Control

This section controls various CPU parameters.

<table>
<thead>
<tr>
<th>Advanced CPU Control</th>
<th>Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active Processor Cores</td>
<td>&lt;ALL&gt;</td>
</tr>
<tr>
<td>Turbo Mode</td>
<td>&lt;Auto&gt;</td>
</tr>
</tbody>
</table>

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.
Chapter 7 Boot

Boot

Set the system boot order.

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.

Boot Sequence

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

Boot Type

Select boot type to Dual type, Legacy type or UEFI type.

Network Stack

PXE Boot Capability

USB Boot

Boot Menu Type

Set the system boot order.
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:
- You can take advantage of flash tools to update the default configuration of the BIOS (SPI ROM) to the latest version anytime.
- 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.

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.
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)
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.
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.
Chapter 8 Supported Software

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 features 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.
Chapter 8 Support Software

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 driver. 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.
The HW Utility icon will appear on the desktop. Double-click the icon to open the utility.
Chapter 8 Supported Software

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”.

DIO

DIO 2
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 Microsoft 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.
Chapter 8 Supported Software

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

4. Setup is currently installing the driver. After installation has completed, click Next.

5. After completing installation, click Finish.

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

<table>
<thead>
<tr>
<th>BIT</th>
<th>I-7</th>
<th>I-6</th>
<th>I-5</th>
<th>I-4</th>
<th>I-3</th>
<th>I-2</th>
<th>I-1</th>
<th>I-0</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEFAULT</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

The Output 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. Instead, reads from this register reflect the value that is in the flip-flop controlling the output selection, not the actual pin value.

<table>
<thead>
<tr>
<th>BIT</th>
<th>O-7</th>
<th>O-6</th>
<th>O-5</th>
<th>O-4</th>
<th>O-3</th>
<th>O-2</th>
<th>O-1</th>
<th>O-0</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEFAULT</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>BIT</th>
<th>N-7</th>
<th>N-6</th>
<th>N-5</th>
<th>N-4</th>
<th>N-3</th>
<th>N-2</th>
<th>N-1</th>
<th>N-0</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEFAULT</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

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-impedance output driver. If a bit in this register is cleared to 0, the corresponding port is enabled as an input.

<table>
<thead>
<tr>
<th>BIT</th>
<th>C-7</th>
<th>C-6</th>
<th>C-5</th>
<th>C-4</th>
<th>C-3</th>
<th>C-2</th>
<th>C-1</th>
<th>C-0</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEFAULT</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>
Function Description

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

I2C.ReadByte(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

```c
#define SLAVE_ADDR      0x42
#define INPUT_PORT      0x00
#define OUTPUT_PORT     0x01
#define INVERSION_PORT  0x02
#define CONFIG_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);
    else                ClrBit(&Data, TempPinNum);
    I2C_WriteByte(SLAVE_ADDR, CONFIG_PORT, Data);
    return 1;
}
```

GPIO Output Process

```c
#define SLAVE_ADDR      0x42
#define INPUT_PORT      0x00
#define OUTPUT_PORT     0x01
#define INVERSION_PORT  0x02
#define CONFIG_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 Input Process

```c
#define SLAVE_ADDR      0x42
#define INPUT_PORT      0x00
#define OUTPUT_PORT     0x01
#define INVERSION_PORT  0x02
#define CONFIG_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,0FH ; 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,0FH ; 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 Award BIOSes:

**CMOS BATTERY HAS FAILED**
The CMOS battery is no longer functional. It should be replaced.

**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.

**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 MB 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.
Appendix C Troubleshooting Checklist

**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/bootsable 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.