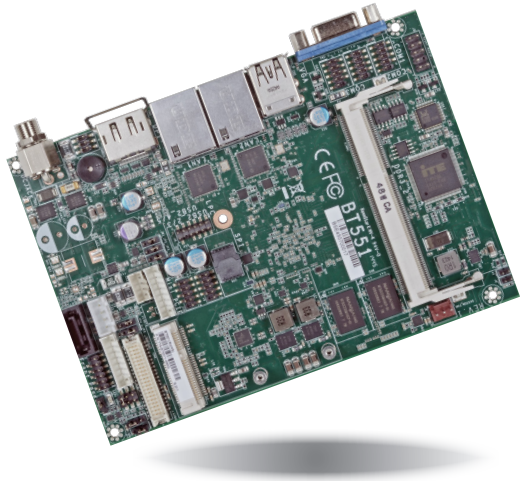
DFI®



BT553

Embedded SBC 3.5”

User’s Manual

A35340952

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FCC and DOC Statement on Class B

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

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

Notice:

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

Table of Contents

Copyright 2

Trademarks 2

FCC and DOC Statement on Class B 2

About this Manual 4

Warranty 4

Static Electricity Precautions 4

Safety Measures 4

About the Package 5

Chapter 1 - Introduction 6

- Specifications 6
- Features 7

Chapter 2 - Hardware Installation 8

- Board Layout 8
- Block Diagram 9
- Mechanical Diagram 9
- System Memory 10
- Jumper Settings 10
  - Clear CMOS Data 10
  - Auto Power-on Select 11
  - Backlight Power Select 11
  - Panel Power Select 12
  - LCD/Inverter Power Select 12
  - Dimming Mode Select 13
  - Digital I/O Power Select 13
  - Digital I/O Output State 14
- Rear Panel I/O Ports 15
  - 15~36V DC-in (BT553) 15
  - Graphics Interfaces 16
  - RJ45 LAN Ports 16
  - USB Ports 17
- I/O Connectors 18
  - Digital I/O Connector 18
  - Digital I/O Power Connector 18
  - Front Audio Connector 18
  - COM (Serial) Ports 19
  - Front Panel Connector 19
  - SATA (Serial ATA) Connector 20
  - SATA (Serial ATA) Power Connector 20
  - LVDS LCD Panel Connector 21
  - LCD/Inverter Power Connector 21
  - Expansion Slot 22
  - Cooling Fan Connector 22
  - SMBus Connector 23
  - Chassis Intrusion Connector 23
  - LPC Connector 24
  - Standby Power LED 24
  - Battery 25

Chapter 3 - BIOS Setup 26

- Overview 26
- Insyde BIOS Setup Utility 27
  - Main 27
  - Advanced 27
  - Security 34
  - Power 35
  - Boot 36
  - Exit 37
- Notice: BIOS SPI ROM 37

Chapter 4 - Supported Software 38

Chapter 5 - Digital I/O Programming Guide 52

Chapter 6 - Install Windows 7 32-bit into eMMC Storage Devices 54

Chapter 7 - Install Windows 7 64-bit into SD and eMMC Storage Devices 57

Appendix A - Watchdog Sample Code 61

Appendix B - System Error Message 62

Appendix C - Troubleshooting 63

About this Manual

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

Warranty

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

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

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

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

Static Electricity Precautions

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

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

2. Wear an antistatic wrist strap.

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

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

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

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

Safety Measures

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

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

About the Package

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

- One BT553 board
- One Serial ATA data with power cable
- One Heat spreader with heat sink

Optional Items

- USB port cable
- COM port cable
- Power adapter (120W, 19V, Level 6)

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

Before Using the System Board

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

- Storage devices such as hard disk drive, DVD-ROM, etc.

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

Chapter 1 - Introduction

Specifications

Processor	• Intel® Atom™/Intel® Celeron® processors E45: Intel® Atom™ E3845, Quad Core, 2M Cache, 1.91GHz, 10W E26: Intel® Atom™ E3826, Dual Core, 1M Cache, 1.46GHz, 7W J00: Intel® Celeron® J1900, Quad Core, 2M Cache, 2GHz (2.41GHz), 10W • BGA 1170 packaging technology • 22nm process technology
Super I/O Address	• NCT6106/4Eh
System Memory	• 2GB/4GB DDR3L memory down • Supports DDR3L 1066/1333MHz • Supports dual channel memory interface
Expansion Interface	• 1 Mini PCIe slot - Supports USB and PCIe signals - Supports full size Mini PCIe card
Graphics	• Intel® HD Graphics • Display ports: 1 VGA, 1 LVDS, 1 DP • VGA: 24-bit, resolution up to 1920x1200 @ 60Hz • LVDS: NXP PTN3460, 24-bit, dual channel, resolution up to 1920x1200 @ 60Hz • DP: supports DP++, resolution up to 2560x1600 @ 60Hz • Supports hardware acceleration for DirectX 11, OCL 1.2, OGL 4.0, H.264, MPEG2, MVC, VC-1, WMV9 and VP8 (supported version dependent on OS)
Audio	• Realtek ALC888 2.1-channel High Definition Audio
LAN	• 2 Intel® I210 PCI Express Gigabit Ethernet controllers • Integrated 10/100/1000 transceiver • Fully compliant with IEEE 802.3, IEEE 802.3u, IEEE 802.3ab
Serial ATA	• 1 SATA 2.0 port with data transfer rate up to 3Gb/s • Integrated Advanced Host Controller Interface (AHCI) controller
eMMC* (optional)	• Supports 8GB, 16GB and 32GB eMMC onboard • Supports Windows 8.1 only
Trusted Platform Module - TPM* (optional)	• Provides a Trusted PC for secure transactions • Provides software license protection, enforcement and password protection
WatchDog Timer	• Watchdog timeout programmable via software from 1 to 255 seconds
Rear Panel I/O Ports	• 1 15~36V (BT553) DC-in jack or 4-pin power connector* (optional) • 1 DP port • 1 VGA port • 2 RJ45 LAN ports • 1 USB 3.0 port • 1 USB 2.0 port
BIOS	• Insyde BIOS - 64Mbit SPI BIOS

I/O Connectors	• 2 connectors for 4 external USB 2.0 ports • 3 connectors for 3 external serial ports (2.0mm pitch) - 1 RS485 - 2 RS232 • 1 LVDS LCD panel connector • 1 LCD/inverter power connector • 1 8-bit DIO connector • 1 DIO power connector • 1 front audio connector for line-out and mic-in jacks • 1 LPC connector • 1 SMBus connector • 1 Serial ATA connector • 1 Serial ATA power connector • 1 front panel connector • 1 chassis intrusion connector • 1 fan connector
Energy Efficient Design	• Supports ACPI • System Power Management • Wake-On-Events include: - Wake-On-USB KB/Mouse* (optional) - Wake-On-LAN - RTC timer to power-on the system • AC power failure recovery
Damage Free Intelligence	• Monitors CPU/system temperature and overheat alarm • Monitors VCORE/12V/5V/DDR voltages and failure alarm • Monitors system fan speed and failure alarm • Read back capability that displays temperature, voltage and fan speed
Power Consumption	• - Idle: E3845 10W: 15V @ 0.413A (6.195W) • - Max: E3845 10W: 15V @ 0.986A (14.790W)
OS Support	• Windows 7 Ultimate x86 & SP1 (32-bit) • Windows 7 Ultimate x64 & SP1 (64-bit) • Windows 8.1 Embedded Pro x86 (32-bit) • Windows 8.1 Embedded Pro x64 (64-bit)
Temperature	• Operating : 0°C to 60°C - Atom, Celeron (Fanless) : -20°C to 70°C - Celeron (Fanless) : -40°C to 85°C - Atom (Fanless) • Storage: -40°C to 85°C
Humidity	• 5°C to 90°C
Dimensions	• 3.5" board • 146mm (5.75") x 102mm (4.02")
Certification	CE, FCC Class B, RoHS

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

Features

• Watchdog Timer

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

• DDR3L

DDR3L is a higher performance DDR3 SDRAM interface providing less voltage and higher speed successor. DDR3L SDRAM supports 1066/1333MHz. DDR3L delivers increased system bandwidth and improved performance to provide its higher bandwidth and its increase in performance at a lower power.

• Graphics

The integrated Intel® HD graphics engine delivers an excellent blend of graphics performance and features to meet business needs. It provides excellent video and 3D graphics with outstanding graphics responsiveness. These enhancements deliver the performance and compatibility needed for today's and tomorrow's business applications. Supports 1VGA, 1 LVDS and 1 DP interfaces for display outputs.

• Serial ATA

Serial ATA is a storage interface that is compliant with SATA 1.0a specification. With speed of up to 3Gb/s (SATA 2.0), it improves hard drive performance faster than the standard parallel ATA whose data transfer rate is 100MB/s.

• Gigabit LAN

Two Intel® I210 PCI Express Gigabit Ethernet controllers support up to 1Gbps data transmission.

• Audio

The Realtek ALC888 audio codec provides 2.1-channel High Definition audio output.

• Power Failure Recovery

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

• USB

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

• Wake-On-LAN

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

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

• Wake-On-USB (Optional)

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

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

• ACPI STR

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

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

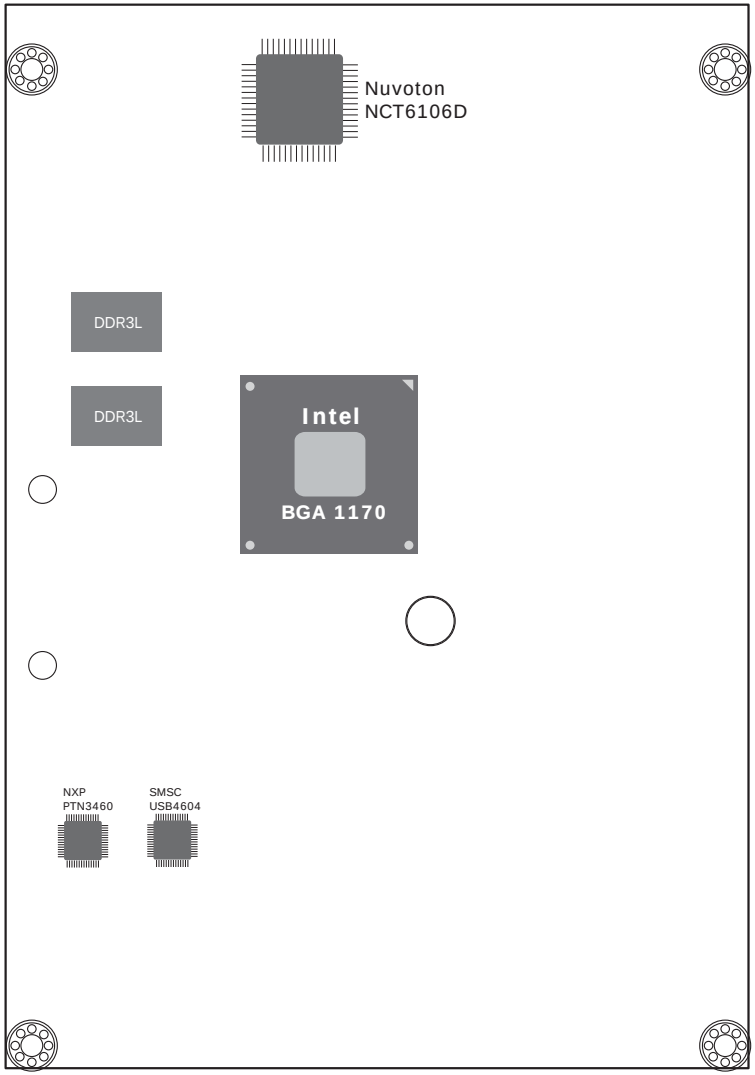
Important:
The 5V_standby power source of your power supply must support ≥720mA.

• RTC Timer

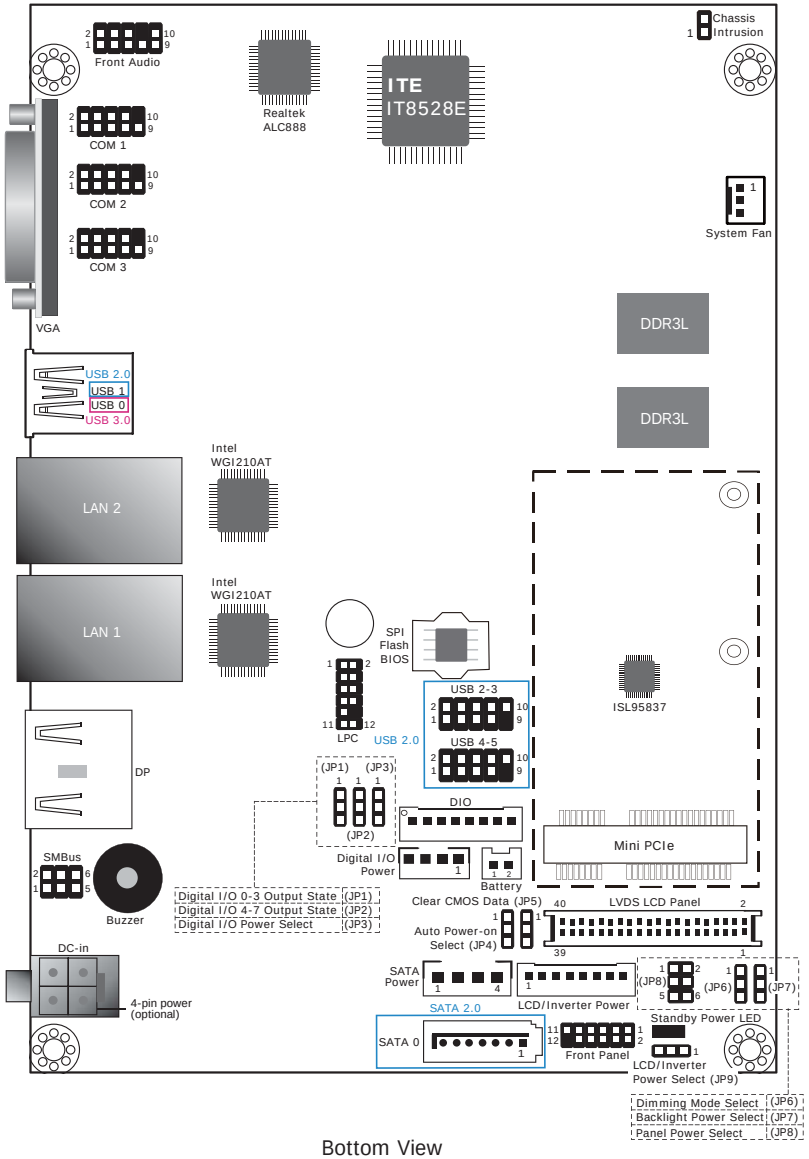
The RTC installed on the system board allows your system to automatically power-on on the set date and time.

Chapter 2 - Hardware Installation

Board Layout

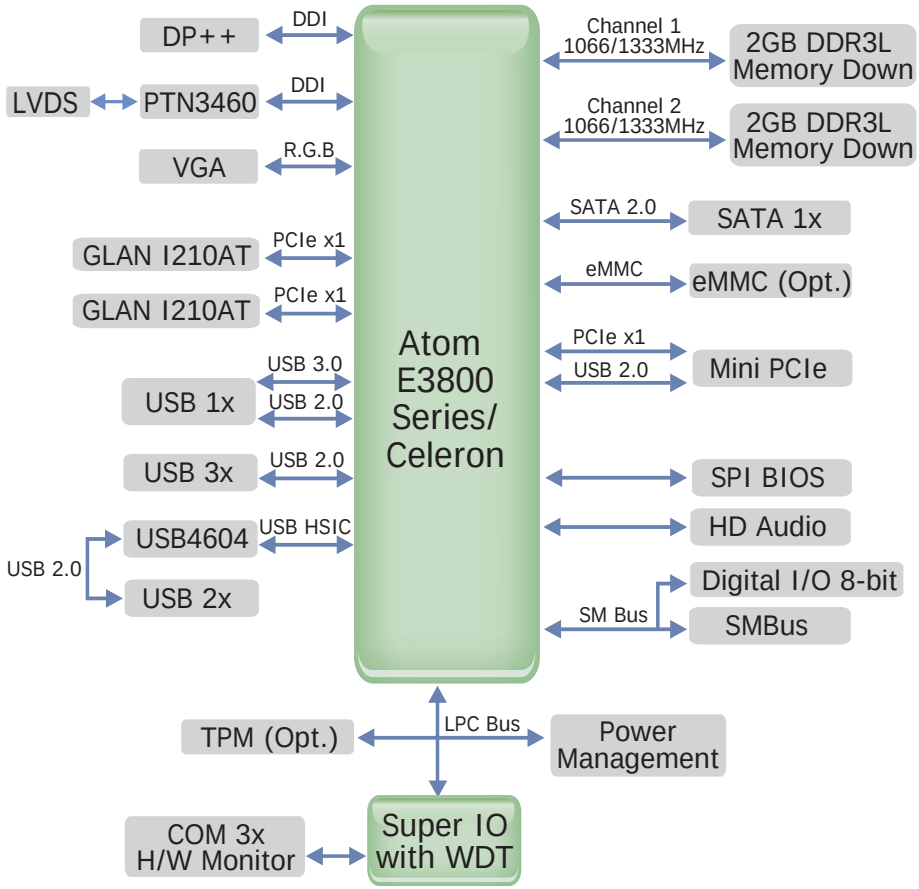


Top View

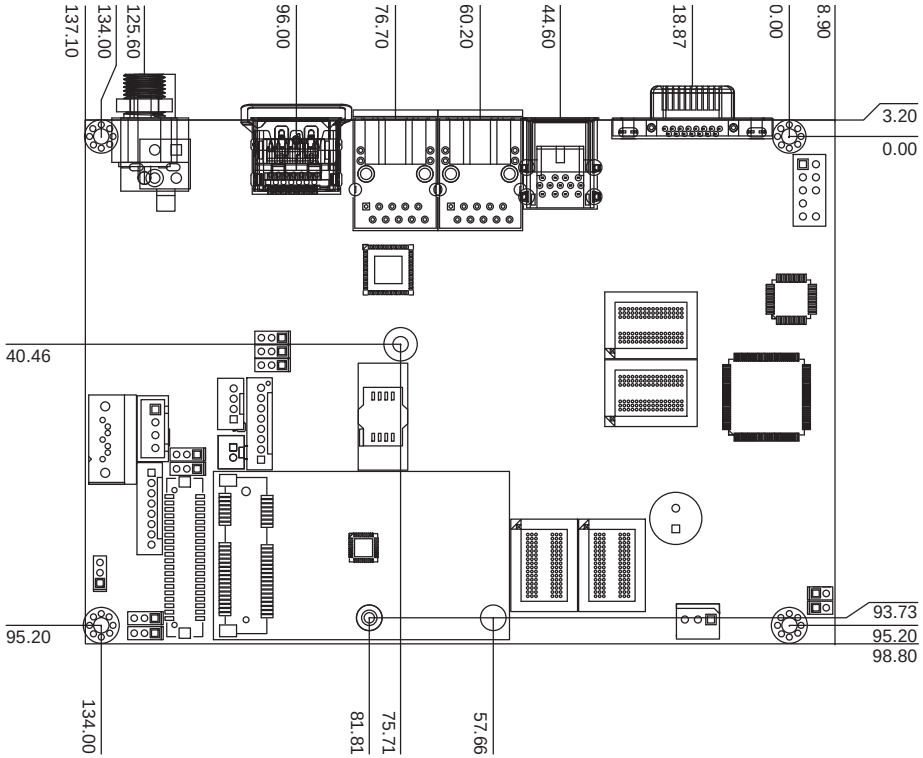


Bottom View

Block Diagram



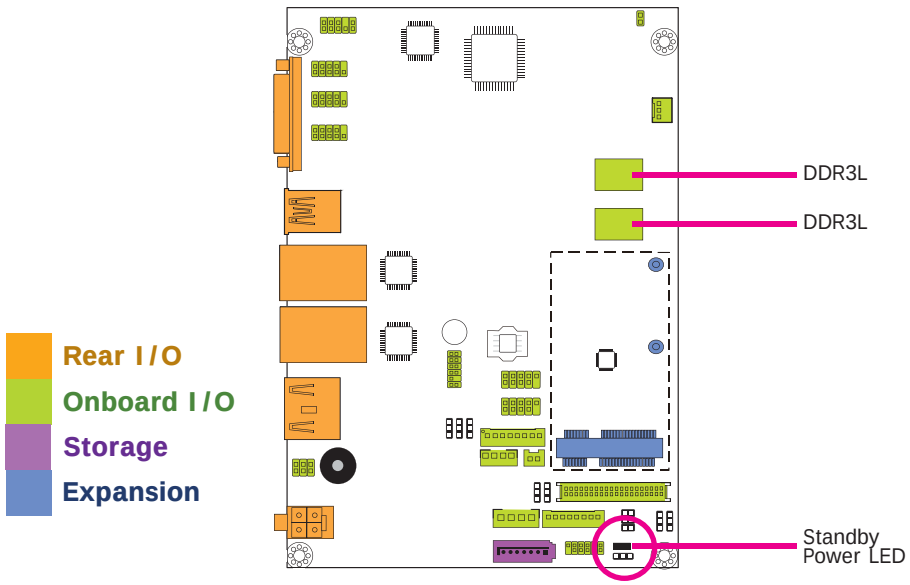
Mechanical Diagram



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

System Memory

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

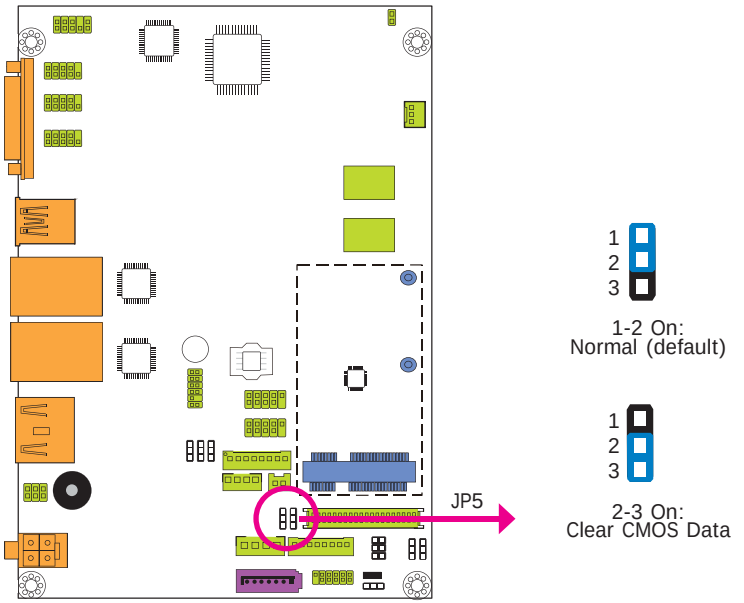


Features

- 2GB/4GB DDR3L memory down
- Supports 1066/1333MHz DDR3L SDRAM
- Supports dual channel memory interface

Jumper Settings

Clear CMOS Data



If you encounter the following,

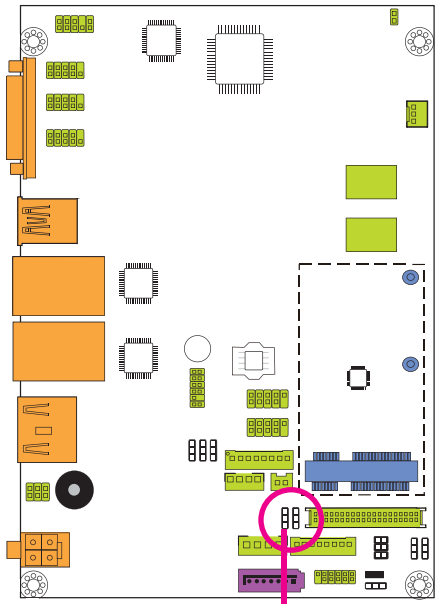
a) CMOS data becomes corrupted.
b) You forgot the supervisor or user password.

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

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

1. Power-off the system and unplug the power cord.
2. Set JP5 pins 2 and 3 to On. Wait for a few seconds and set JP5 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



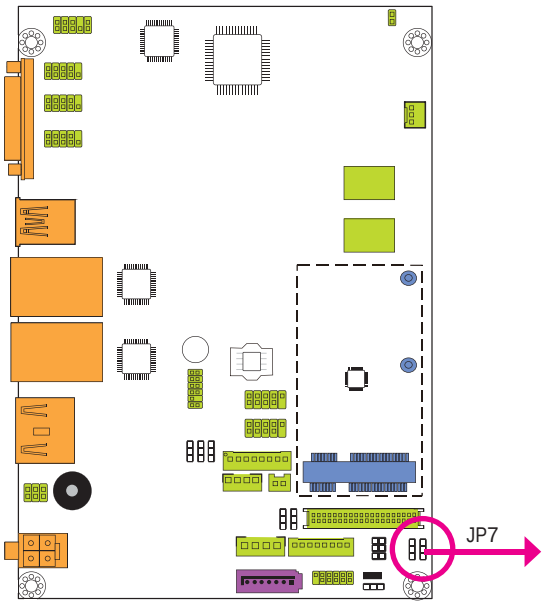
1-2 On:
Power-on via power button
(default)

2-3 On:
Power-on via AC power

JP4 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 JP4 pins 2 and 3 to On. If you want to use the power button, set pins 1 and 2 to On.

When using the JP4 "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).

Backlight Power Select



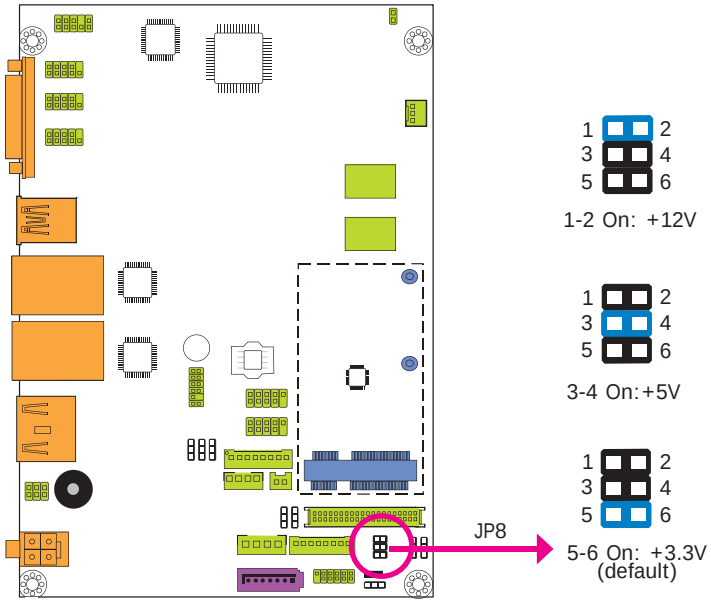
1-2 On: +3.3V
(default)

2-3 On: +5V

JP7 is used to select the power level of backlight brightness control: +3.3V or +5V.

Important:
Before powering-on the system, make sure that the power settings of JP7 match the power specification of backlight control. Selecting the incorrect voltage will seriously damage the backlight.

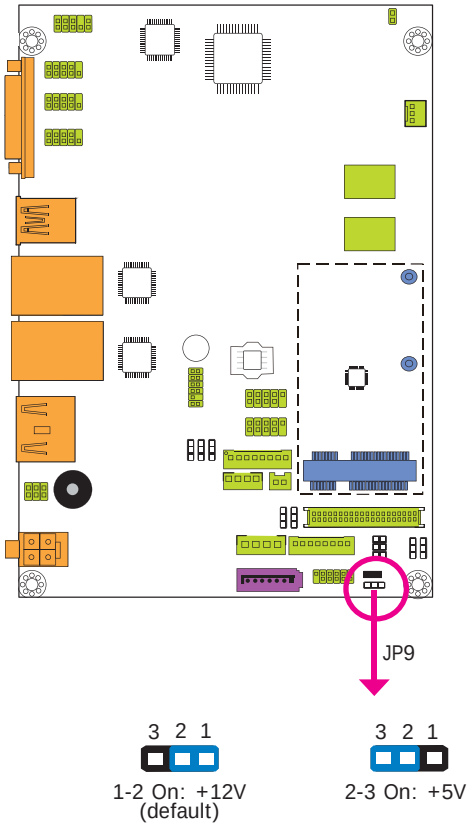
Panel Power Select



JP8 is used to select the power supplied with the LCD panel.

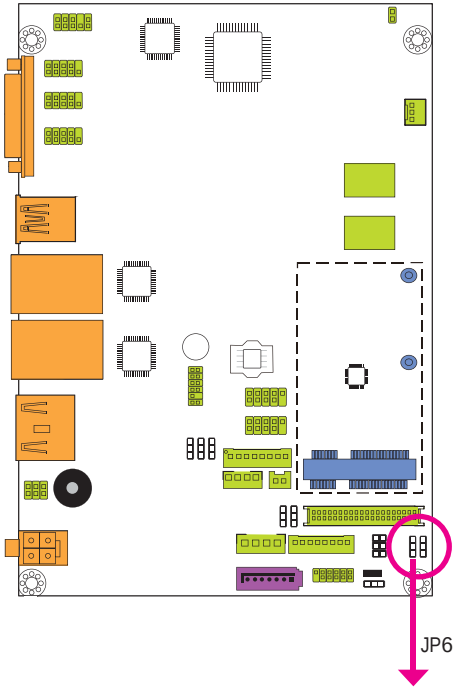
Important:
Before powering-on the system, make sure that the power settings of JP8 match the LCD panel's specification. Selecting the incorrect voltage will seriously damage the LCD panel.

LCD / Inverter Power Select



JP9 is used to select the power level of LVDS LCD inverter connector.

Dimming Mode Select



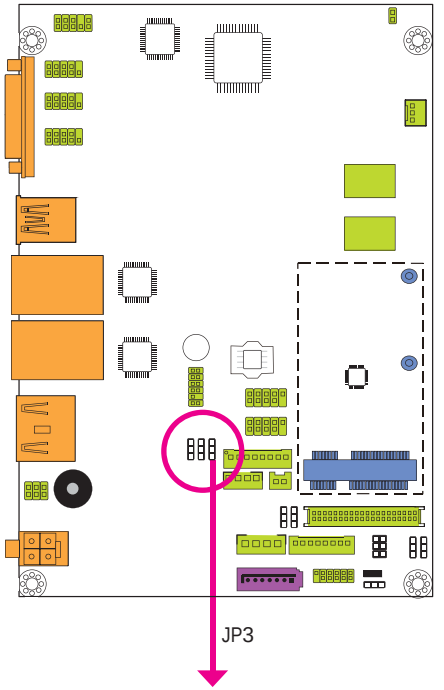
1-2 On: PWM Mode (default)

2-3 On: Voltage Mode

JP6 allows you to select the mode for the lightness control of the LVDS panel.

Important:
You need to refer to your panel's user guide to determine the type of mode (PWM or Voltage) most appropriate for your panel.

Digital I/O Power Select

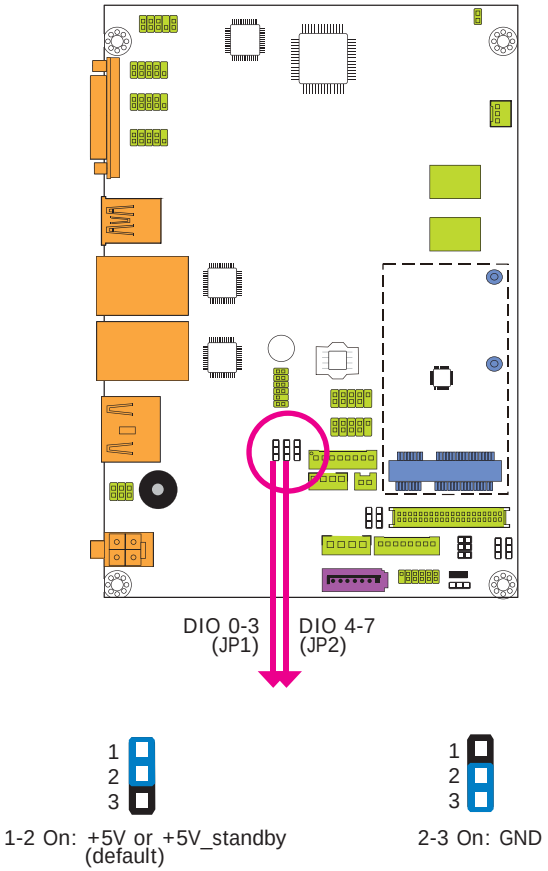


1-2 On: +5V_standby (default)

2-3 On: +5V

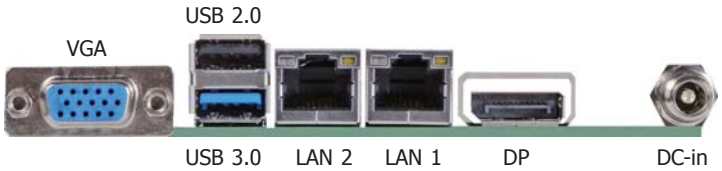
JP3 is used to select the power of DIO (Digital I/O) signal.

Digital I/O Output State



Based on the power level of DIO (Digital I/O) selected on JP3, JP1 (DIO pin 0-3) and JP2 (DIO pin 4-7) are used to select the output state of Digital I/O: pull high or pull low. When selecting pull high, the power selection will be the same as the JP3's setting.

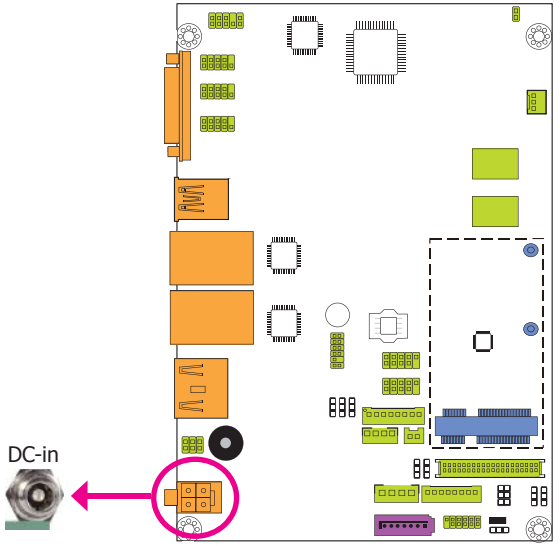
Rear Panel I/O Ports



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

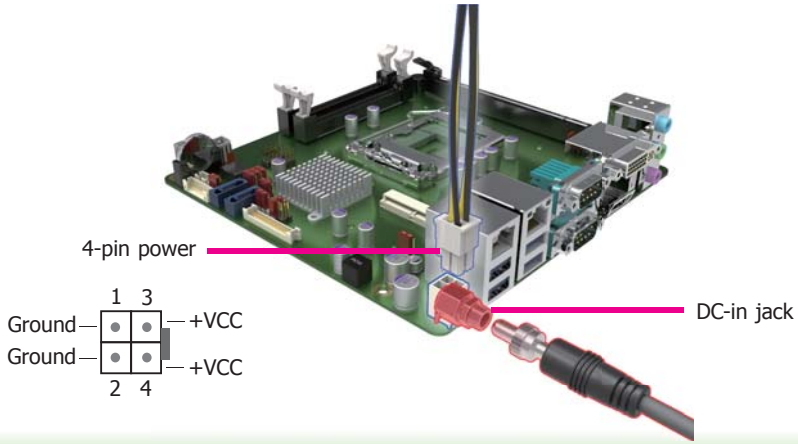
- 1 15~36V (BT553) DC-in jack or 4-pin power connector* (optional)
- 1 DP port
- 1 VGA port
- 2 RJ45 LAN ports
- 1 USB 3.0 port
- 1 USB 2.0 port

15~36V DC-in (BT553)



This jack provides maximum of 100W/120W power and is considered a low power solution. Connect a DC power cord to this jack. Using a voltage more than the recommended range may fail to boot the system or cause damage to the system board.

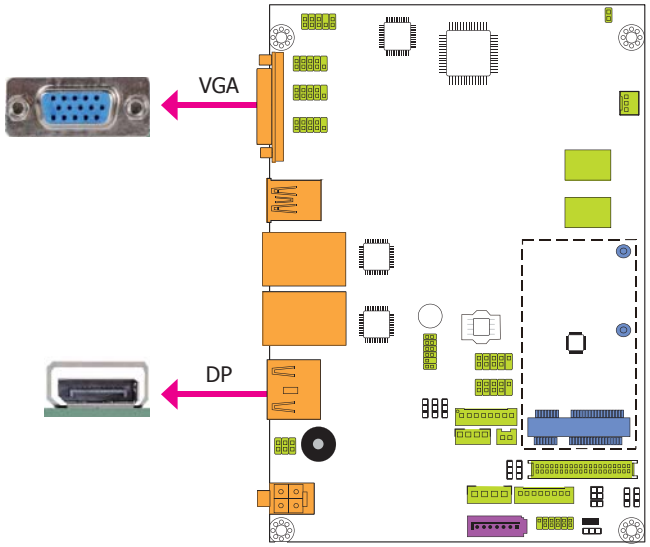
The DC-in jack on the system board co-lays with a 4-pin power connector (optional) as the photo displayed below.



Graphics Interfaces

The display ports consist of the following:

- 1 DP port
- 1 VGA port



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.

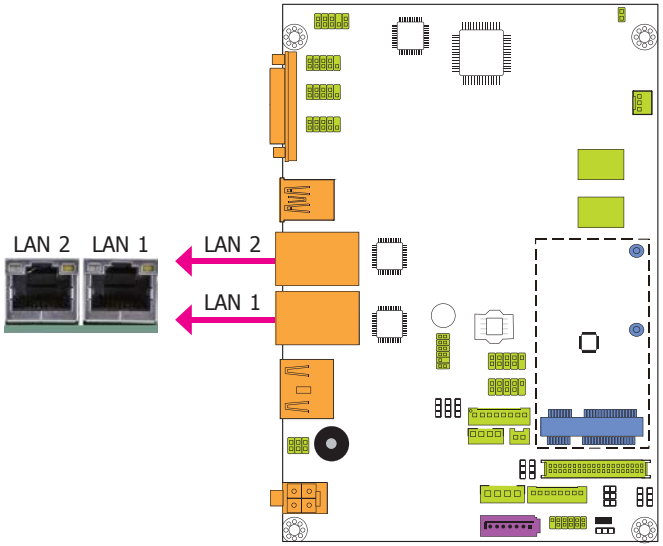
DP Port

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

Driver Installation

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

RJ45 LAN Ports



Features

- 2 Intel® I210 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.

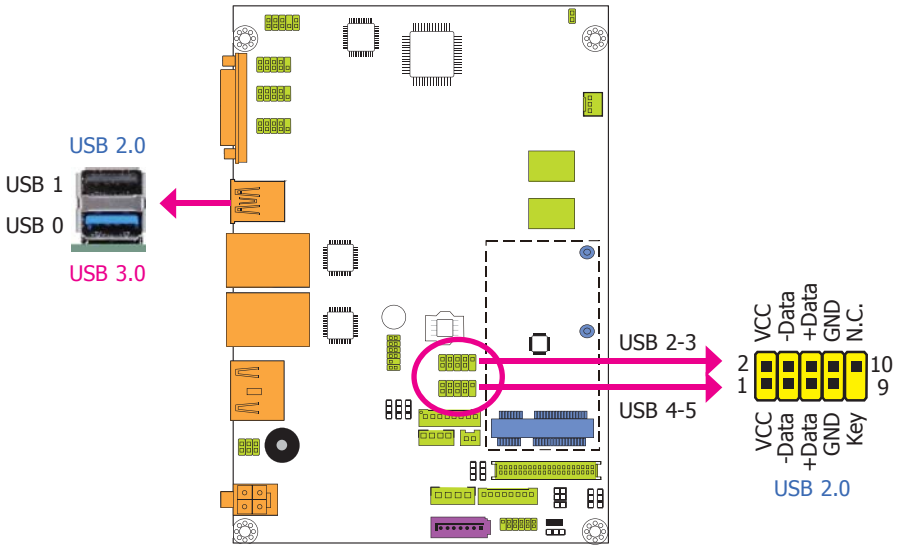
BIOS Setting

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

Driver Installation

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

USB Ports



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 USB 2.0 port (USB 1). The 10-pin connectors allow you to connect 4 additional USB 2.0 ports (USB 2-3/4-5). The additional USB ports may be mounted on a card-edge bracket. Install the card-edge bracket to an available slot at the rear of the system chassis and then insert the USB port cables to a connector.

BIOS Setting

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

Driver Installation

You may need to install the proper drivers in your operating system to use the USB device. Refer to chapter 4 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.

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
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

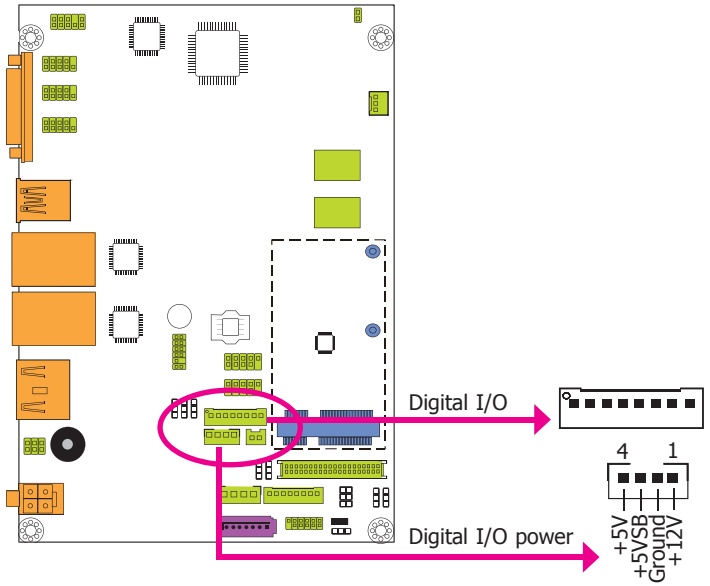
Table 2. The Type of USB Ports

Model Name	BT553
USB 3.0	Native
USB 0	Native (share with USB 3.0 port)
USB 1	Native
USB 2	Native
USB 3	Native
USB 4	HSIC port 0
USB 5	HSIC port 1
USB 6	HSIC port 2

I/O Connectors

Digital I/O Connector

Digital I/O Power Connector

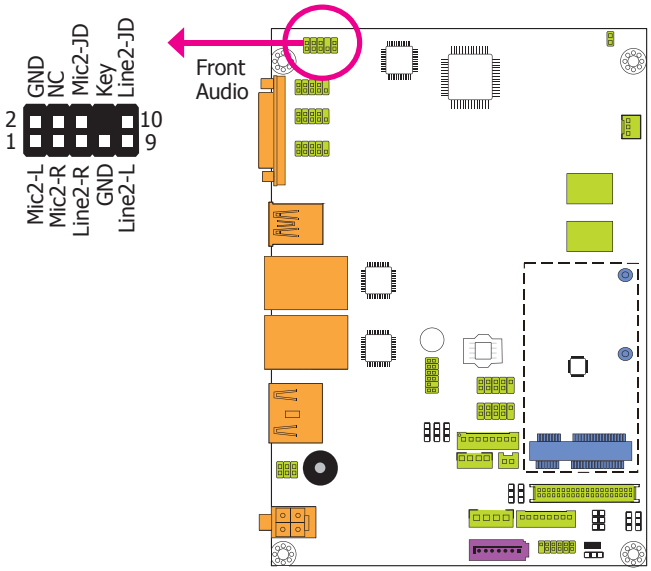


The 8-bit Digital I/O connector provides powering-on function to external devices that are connected to the connector.

Digital I/O Connector

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

Front Audio Connector



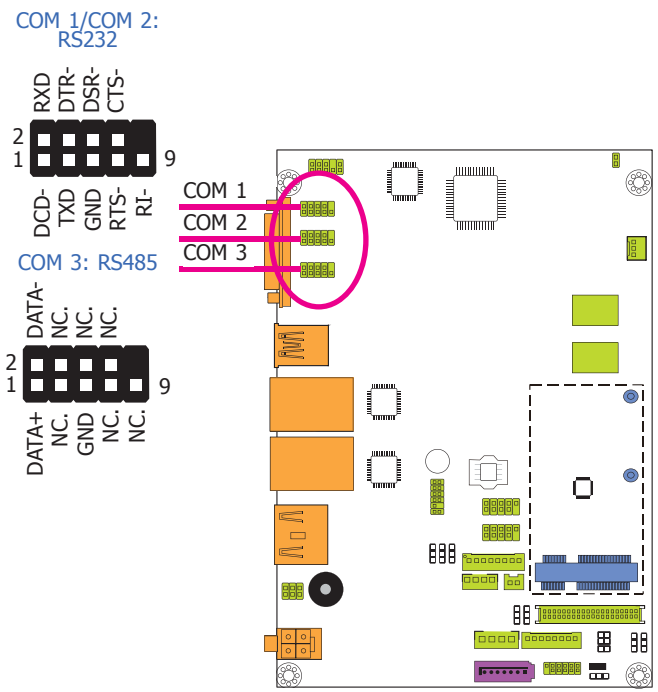
Front Audio

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

Driver Installation

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

COM (Serial) Ports



COM 1 and COM 2 are fixed at RS232. COM 3 is fixed at RS485.

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.

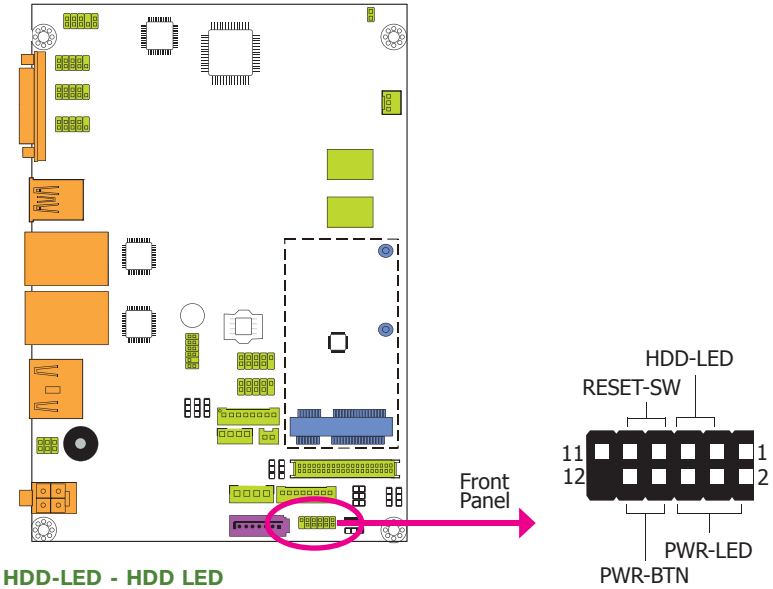
Connecting External Serial Ports

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 ("Super IO Configuration" submenu) of the BIOS. Refer to the chapter 3 for more information.

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

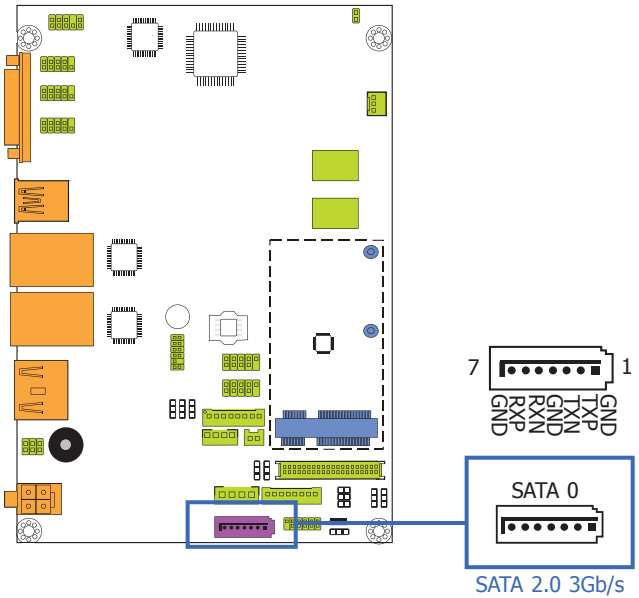
This switch is used to power on or off the system.

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

SATA (Serial ATA) Connector



Features

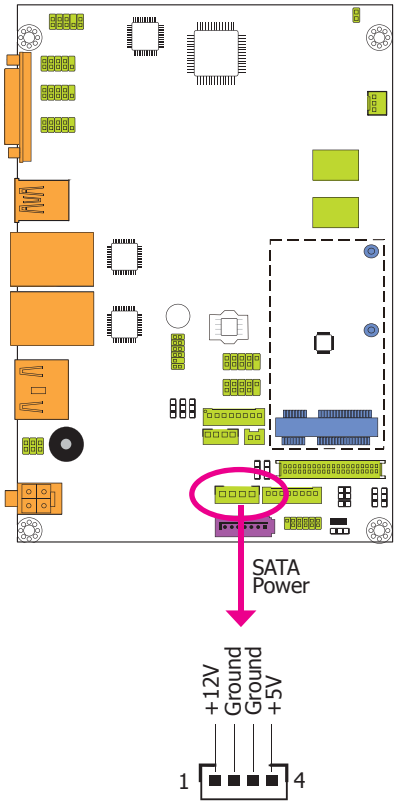
- 1 Serial ATA 2.0 port with data transfer rate up to 3Gb/s
- Integrated Advanced Host Controller Interface (AHCI) controller

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.

BIOS Setting

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

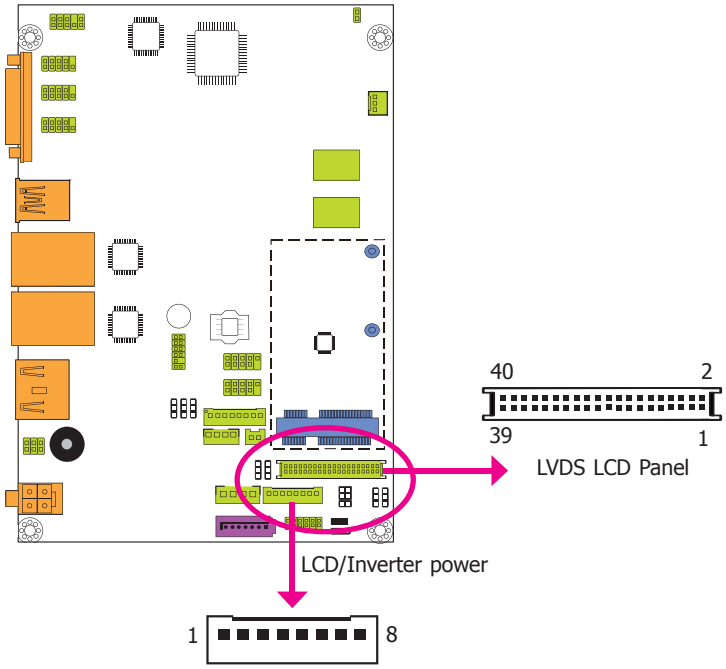
SATA (Serial ATA) Power Connector



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.

LVDS LCD Panel Connector

LCD / Inverter Power Connector



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

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

BIOS Setting

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

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

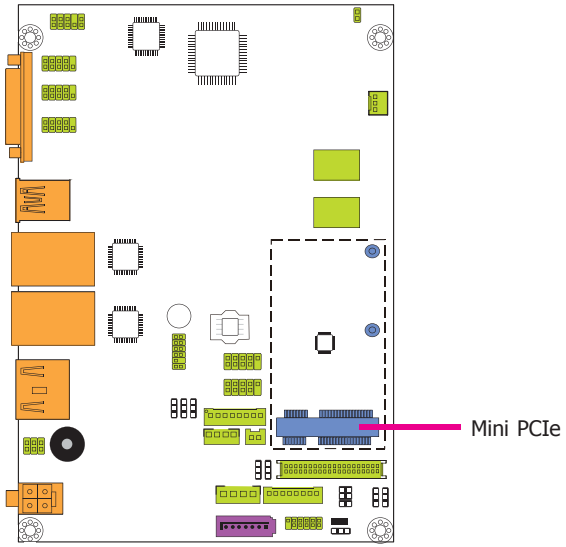
LVDS LCD Panel Connector

Pins	Function	Pins	Function
1	GND	2	GND
3	LVDS_Out3+	4	LVDS_Out7+
5	LVDS_Out3-	6	LVDS_Out7-
7	GND	8	GND
9	LVDS_Out2+	10	LVDS_Out6+
11	LVDS_Out2-	12	LVDS_Out6-
13	GND	14	GND
15	LVDS_Out1+	16	LVDS_Out5+
17	LVDS_Out1-	18	LVDS_Out5-
19	GND	20	GND
21	LVDS_Out0+	22	LVDS_Out4+
23	LVDS_Out0-	24	LVDS_Out4-
25	GND	26	GND
27	LVDS_CLK1+	28	LVDS_CLK2+
29	LVDS_CLK1-	30	LVDS_CLK2-
31	GND	32	GND
33	LVDS_DDCCLK	34	N.C.
35	LVDS_DDCDTA	36	+3.3V
37	Panel Power	38	Panel Power
39	Panel Power	40	Panel Power

LCD / Inverter Power Connector

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

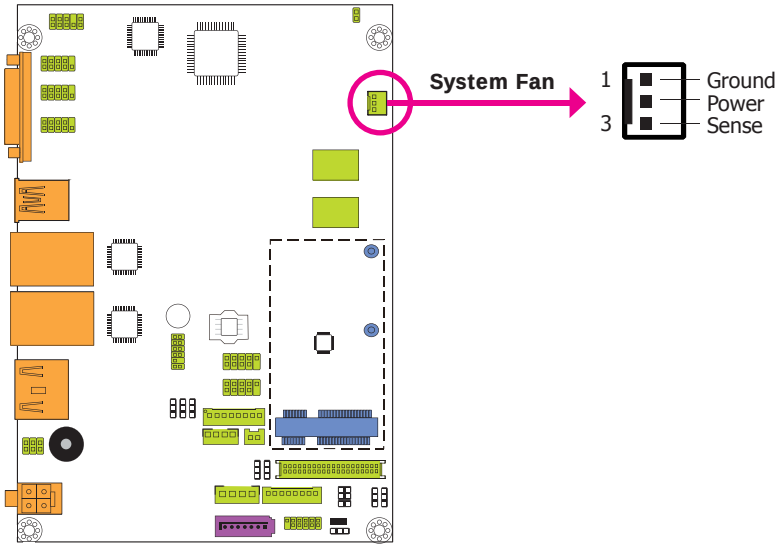
Expansion Slot



Mini PCI Express Slot

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

Cooling Fan Connector

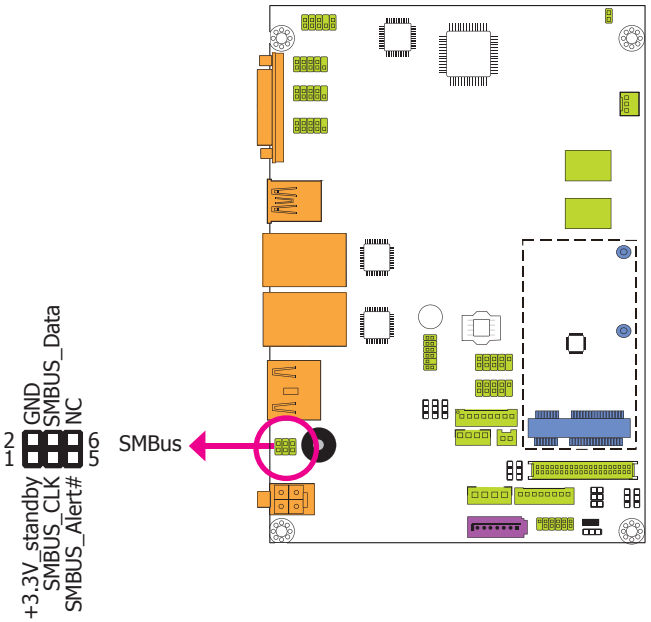


The fan connector is used to connect the cooling fan. The cooling fan will provide adequate airflow throughout the chassis to prevent overheating the CPU and system board components.

BIOS Setting

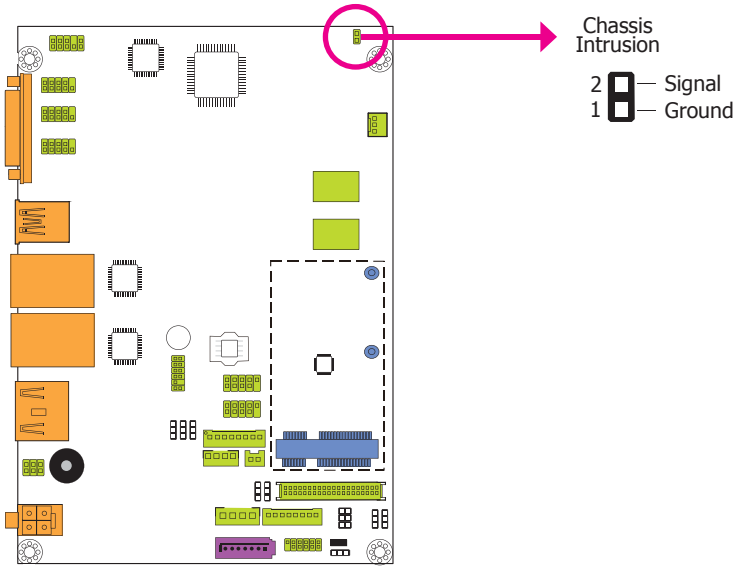
The Advanced menu ("NCT6106D HW Monitor" submenu) of the BIOS will display the current speed of the cooling fans. Refer to chapter 3 for more information.

SMBus Connector



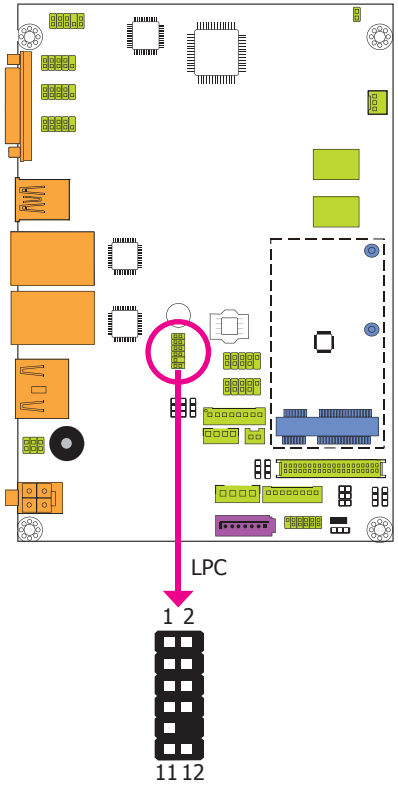
The SMBus (System Management Bus) connector is used to connect SMBus devices. It is a multiple device bus that allows multiple chips to connect to the same bus and enable each one to act as a master by initiating data transfer.

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.

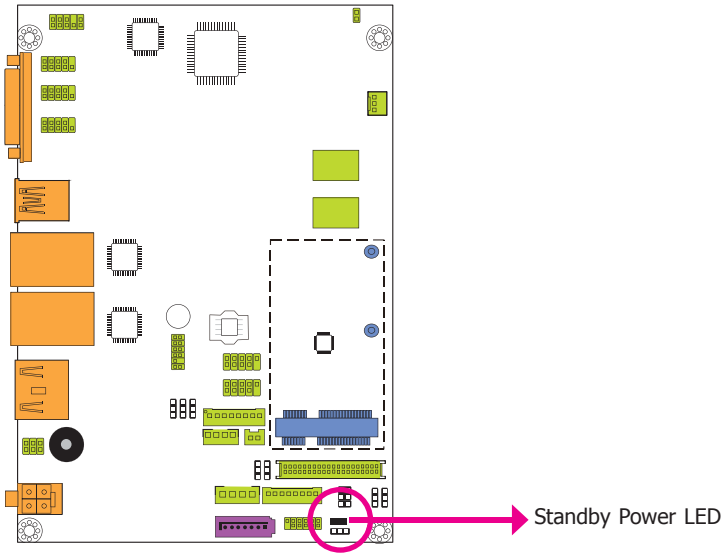
LPC Connector



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

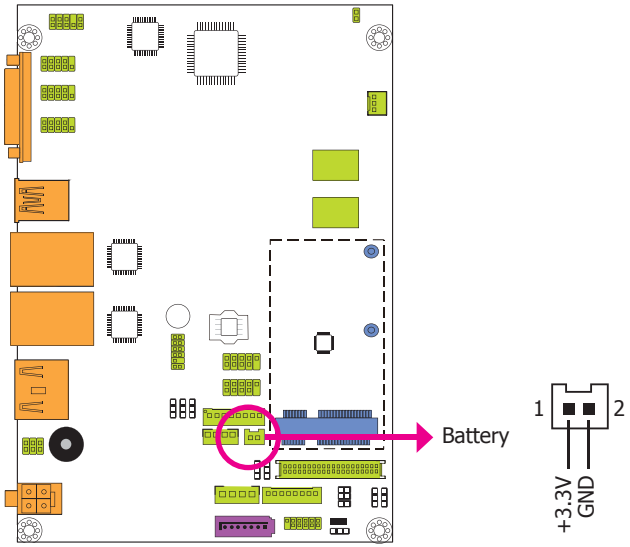
Pins	Pin Assignment	Pins	Pin Assignment
1	CLK	2	LAD1
3	RST#	4	LAD0
5	FRAME#	6	VCC_+3V
7	LAD3	8	GND
9	LAD2	10	x
11	SERIRQ	12	48MHz

Standby Power LED



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

Battery



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 3 - BIOS Setup

Overview

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

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

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

Default Configuration

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

Entering the BIOS Setup Utility

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

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

Legends

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

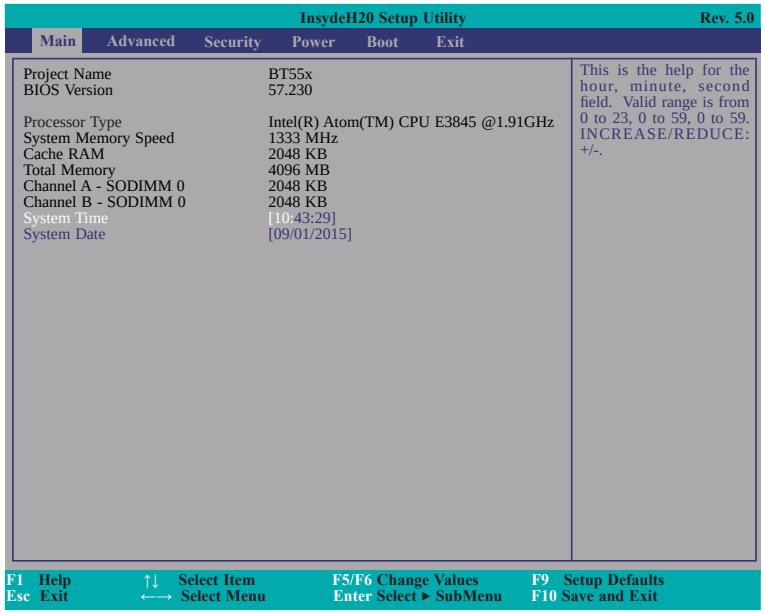
Submenu

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>.

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.

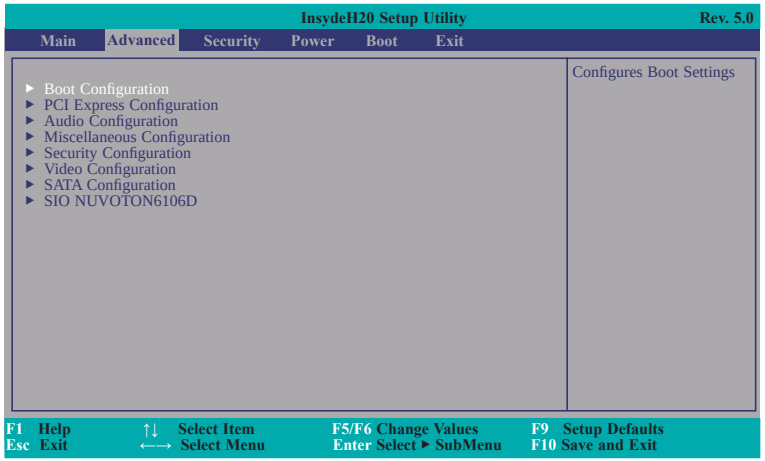
System Date

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

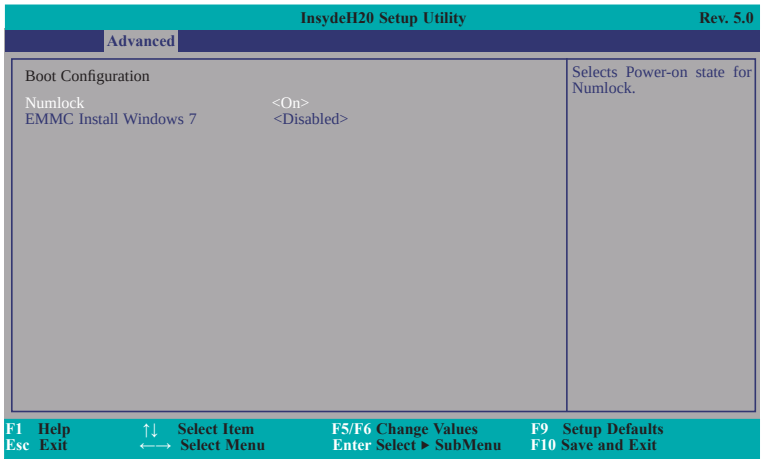
The Advanced menu allows you to configure your system for basic operation. Some entries are defaults required by the system board, while others, if enabled, will improve the performance of your system or let you set some features according to your preference.

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



Boot Configuration

This section configures boot settings.



Numlock

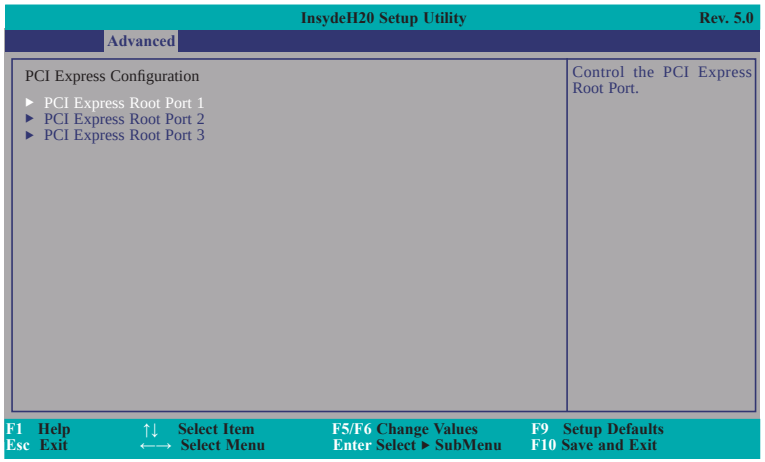
Select the power-on state for Numlock: On or Off.

EMMC Install Windows 7

Enable or disable to install Windows 7 into eMMC Storage Devices.

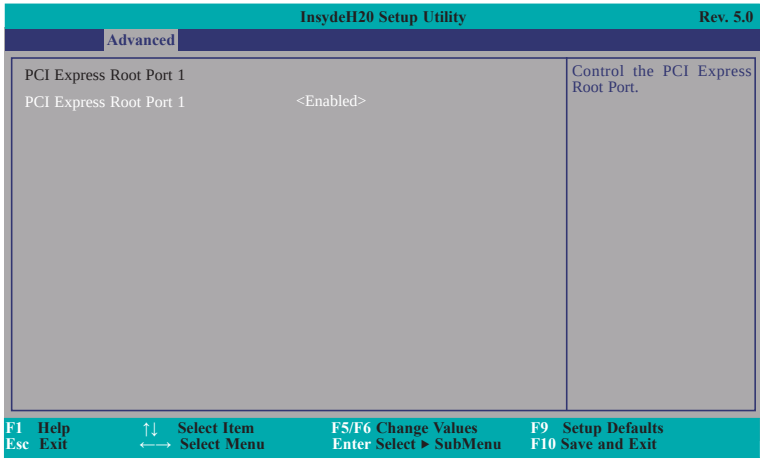
PCI Express Configuration

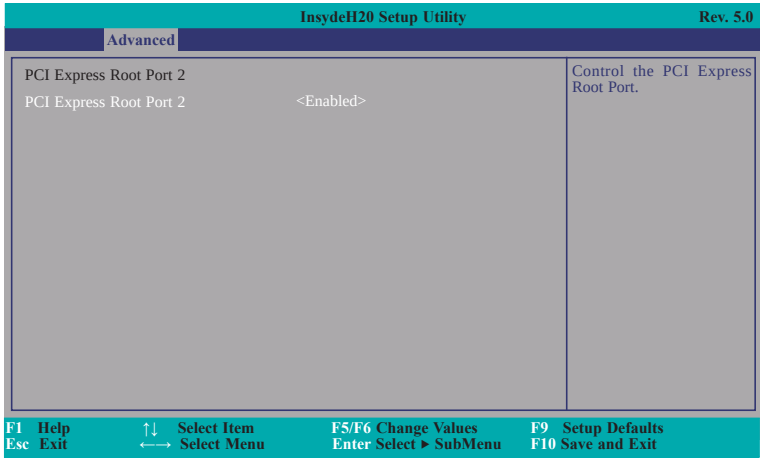
This section configures settings relevant to PCI Express root ports.

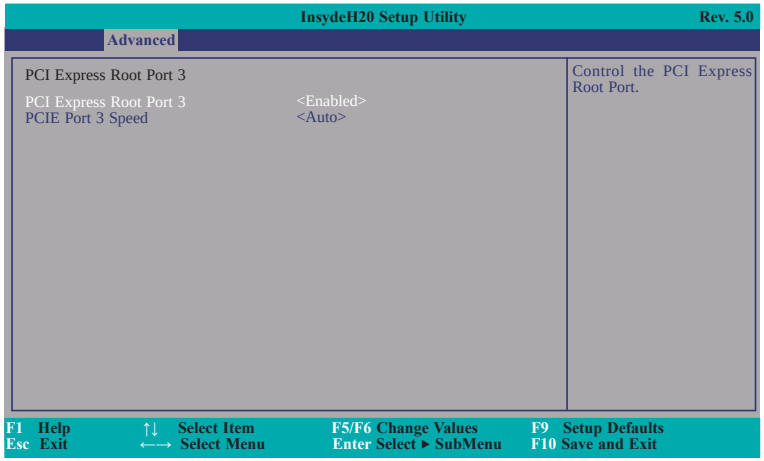


PCI Express Root Port 1 to PCI Express Root Port 3

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







PCI Express Root Port

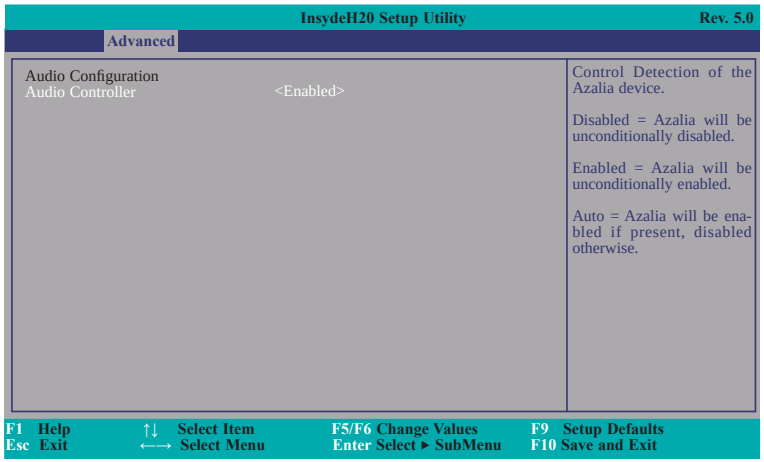
This field is used to enable or disable the PCI Express Root Port.

PCIE Port Speed

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

Audio Configuration

This section is used to configure the audio settings.



Audio Controller

Control the detection of the Azalia device.

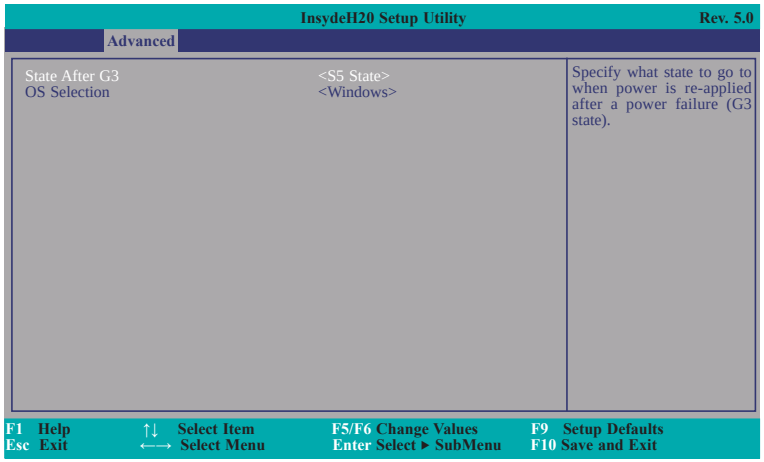
Disabled
Azalia will be unconditionally disabled.

Enabled
Azalia will be unconditionally enabled.

Auto
Azalia will be enabled if present, disabled otherwise.

Miscellaneous Configuration

This section enables or disables Misc. features.



State After G3

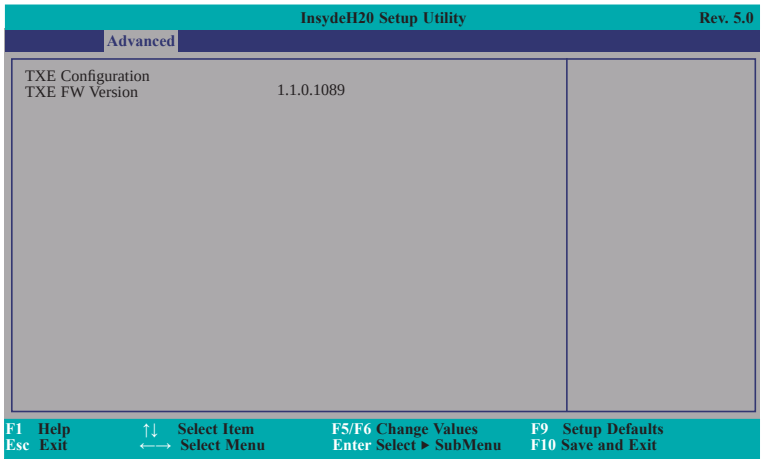
Specify what state to go when the power is reapplied after a power failure. (G3 state).

OS Selection

Select the OS support: Linux or Windows.

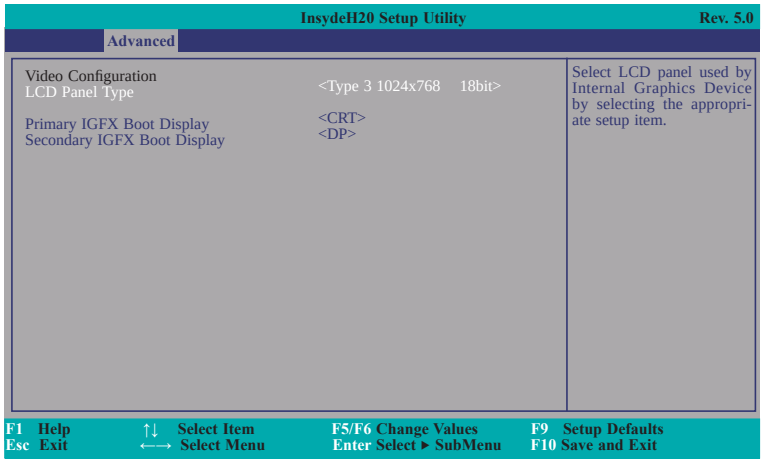
Security Configuration

This section only displays the security condition.



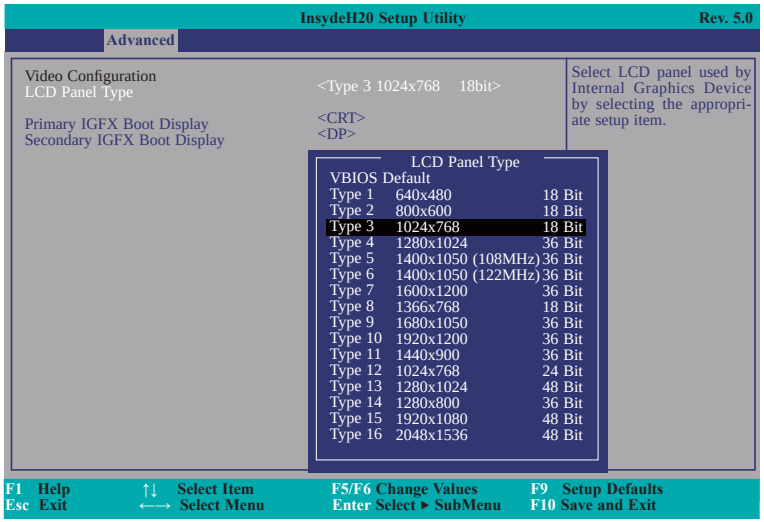
Video Configuration

This section configures the video settings.



LCD Panel Type

Select the LCD panel used by Internal Graphics Device by selecting the appropriate setup item. Please refer to the screen shown below.



Primary IGFX Boot Display

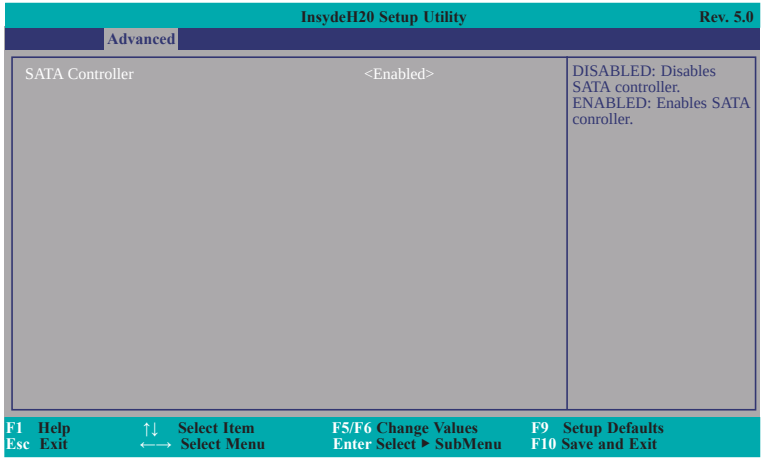
Select the Video Device which will be activated during POST. This has no effect if the external graphics presents. The selection of secondary boot display will appear based on your selection. VGA modes will be supported only on primary display.

Secondary IGFX Boot Display

Select the secondary display device: CRT, DDI-0 or DDI-1. DDI-0 is the default setting.

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.

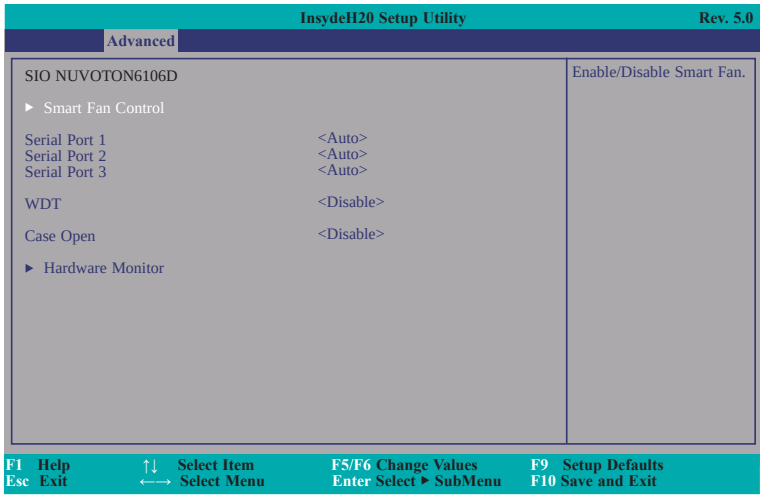


SATA Controller

Enable or disable the Serial ATA Port.

SIO NUVOTON6106D

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



Serial Port 1 to Serial Port 3

Configure the settings to use the serial port.

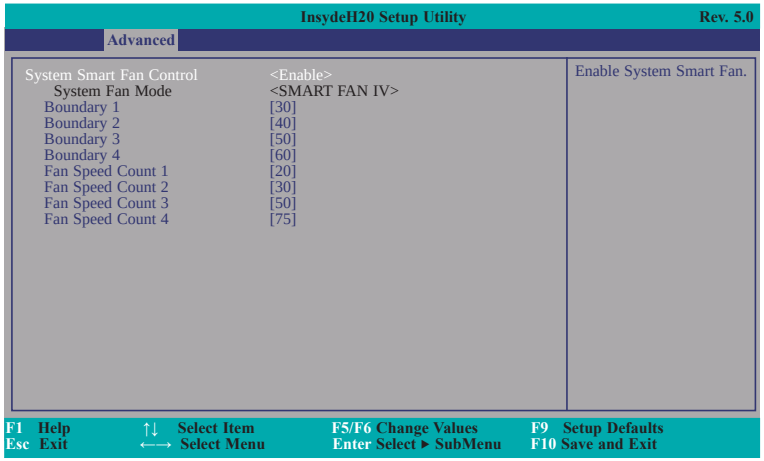
Disable No configuration
Enable User configuration
Auto EFI/OS chooses configuration

Case Open

Enable or disable the case open.

Smart Fan Control

This field enables or disables the smart fan control.



System Smart Fan Control

Enable or disable the system smart fan.

Boundary 1 to Boundary 4

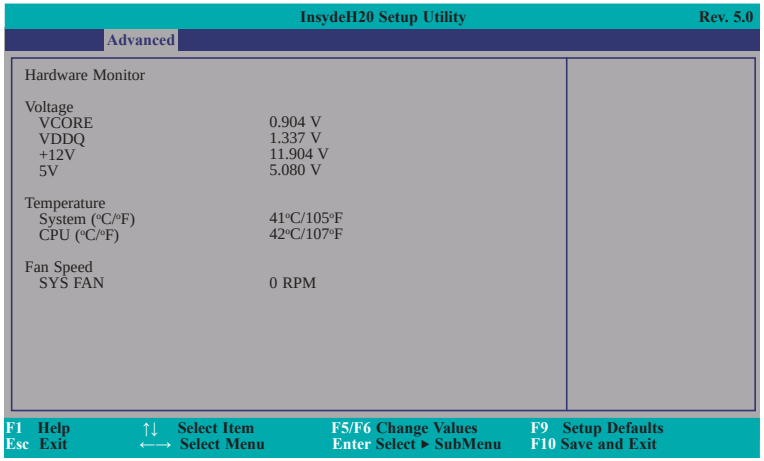
Set the boundary temperature. The range is from 0-127ºC.

Fan Speed Count 1 to Fan Speed Count 4

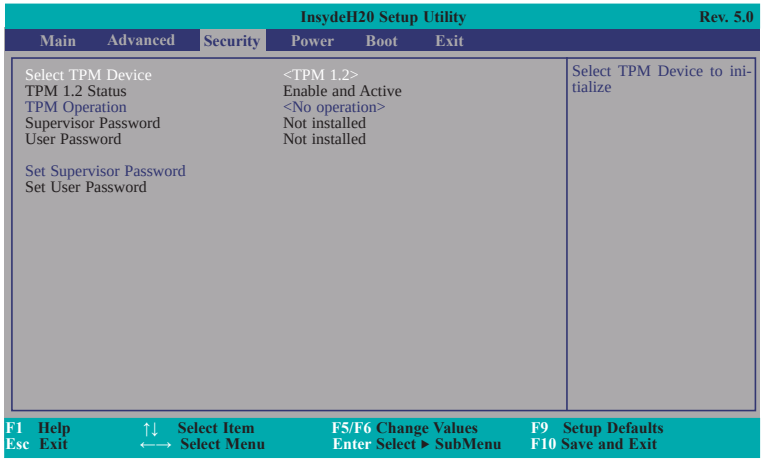
Set the fan speed. The range is from 0-100%.

Hardware Monitor

This field only displays the hardware monitor status.



Security



Select TPM Device

Initialize the selected TPM device..

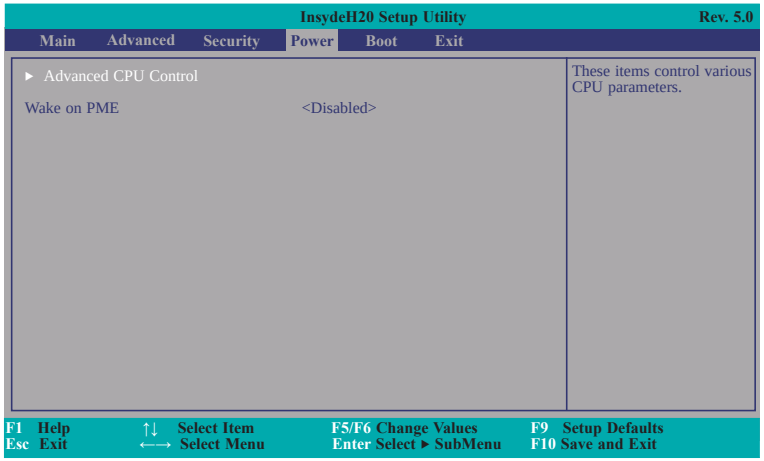
TPM Operation

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

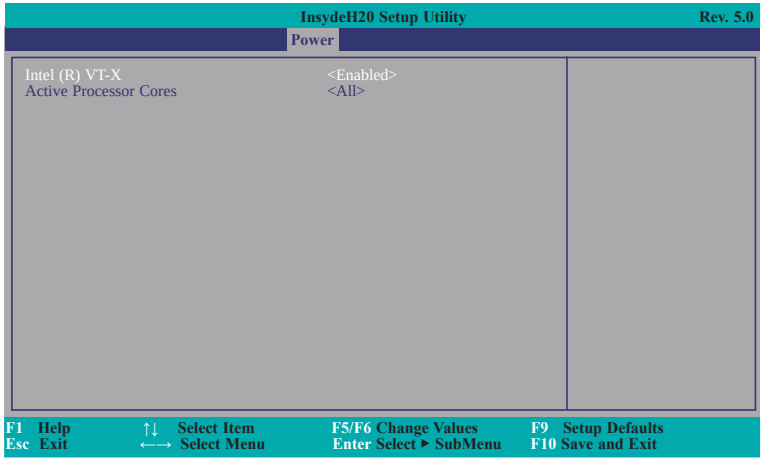


Wake on PME

Determines the action works when the system power is off and the PCI power management is enabled on a wake up event.

Advanced CPU Control

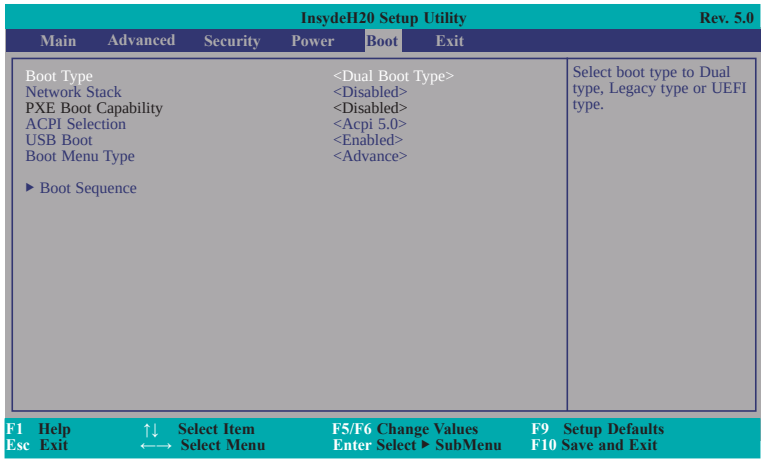
This section controls various CPU parameters.



Active Processor Cores

Number of cores to enable in each processor package.

Boot



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

ACPI Selection

Select the ACPI booting.

USB Boot

Enable or disable the booting for USB boot devices.

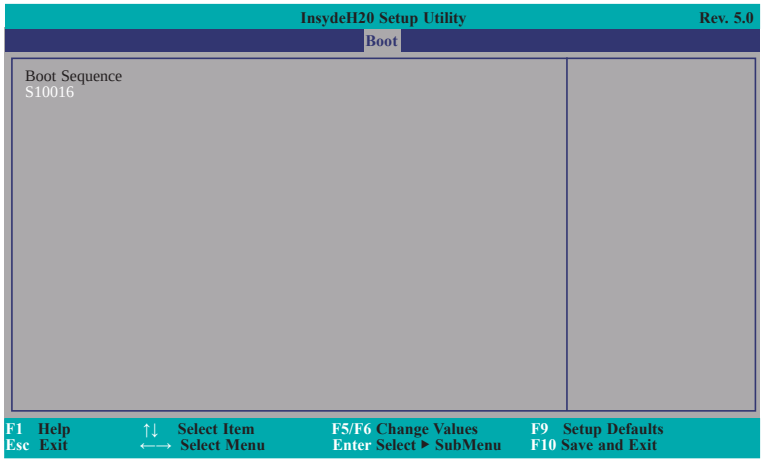
Boot Menu Type

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

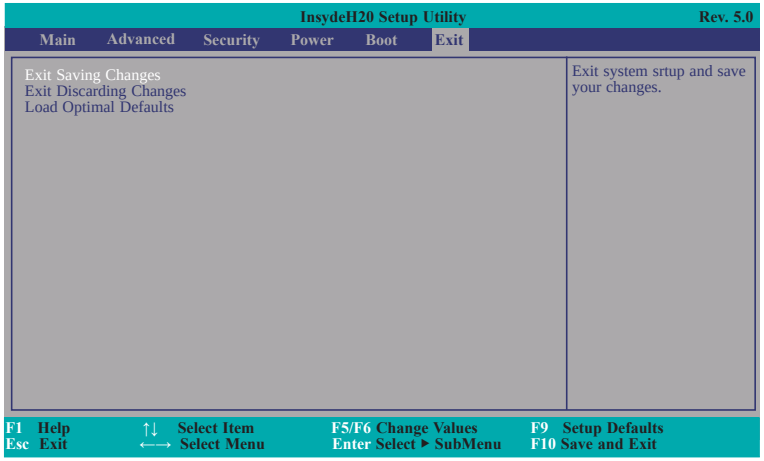
Advance
All boot devices follow the user's selection sequence.

Boot Sequence

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



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.

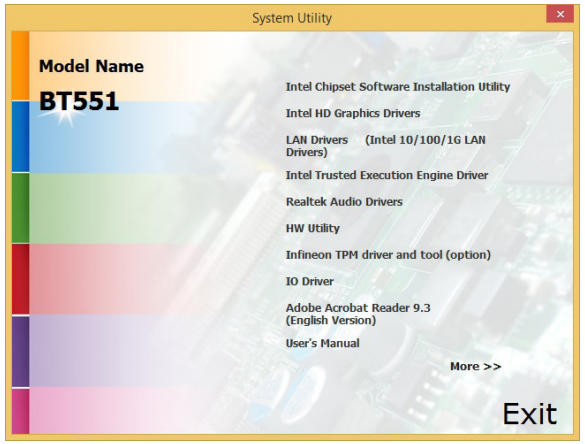
3. If you do not follow the methods above, the Intel® Management Engine will not be updated and will cease to be effective.

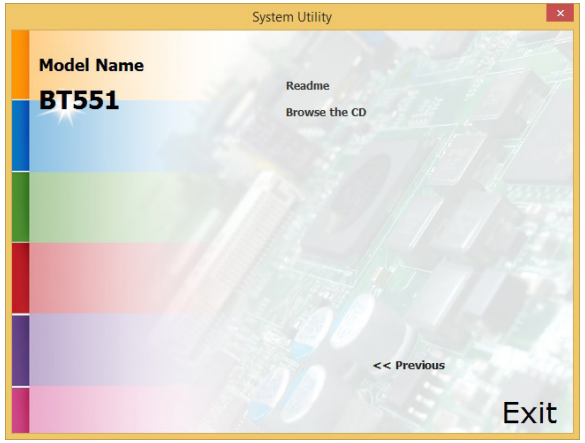
Note:
a. You can take advantage of flash tools to update the default configuration of the BIOS (SPI ROM) to the latest version anytime.
b. When the BIOS IC needs to be replaced, you have to populate it properly onto the system board after the EEPROM programmer has been burned and follow the technical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

Chapter 4 - Supported Software

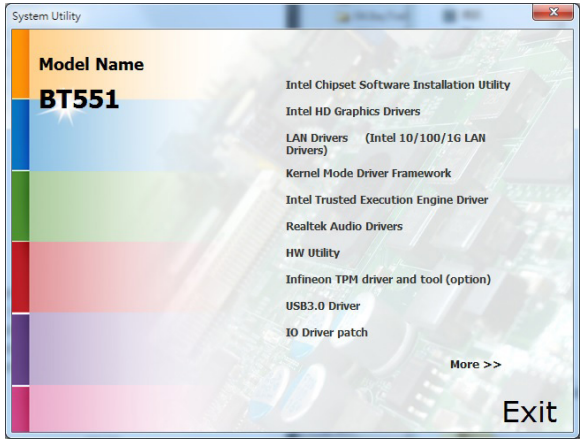
Install drivers, utilities and software applications that are required to facilitate and enhance the performance of the system board. You may acquire the software from your sales representatives, from an optional DVD included in the shipment, or from the website download page at https://www.dfi.com/DownloadCenter.

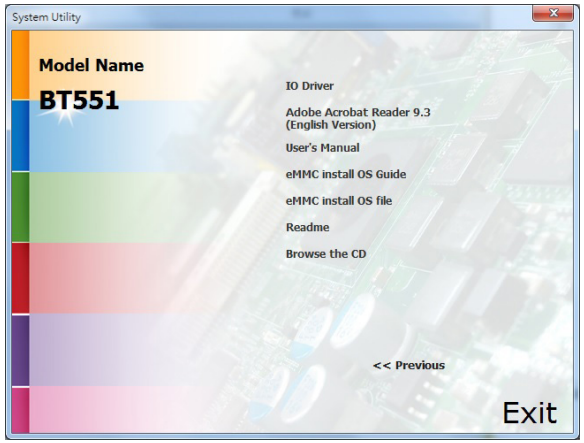
Auto Run Page (For Windows 8.1)





Auto Run Page (For Windows 7)





Note:

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

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.

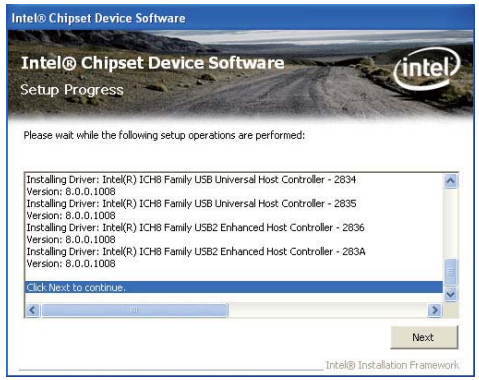
To install the utility, click “Intel Chipset Software Installation Utility” on the main menu.

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.



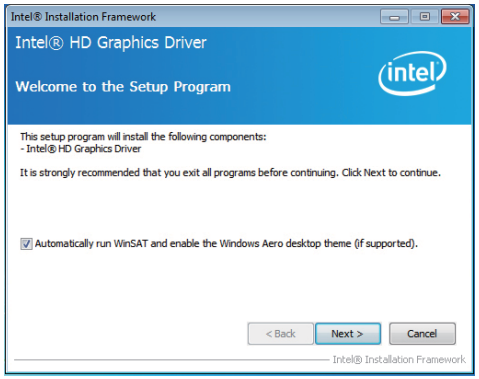
5. Click “Yes, I want to restart this computer now” then click Finish.

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.

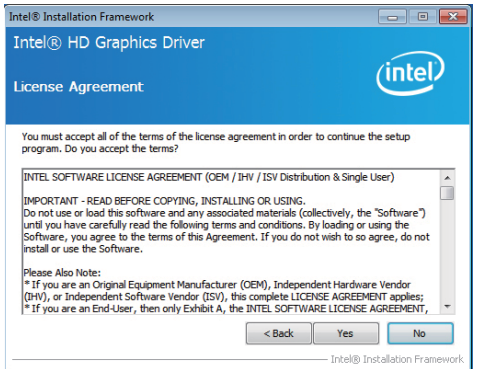
1. Setup is now ready to install the graphics driver. Click Next.



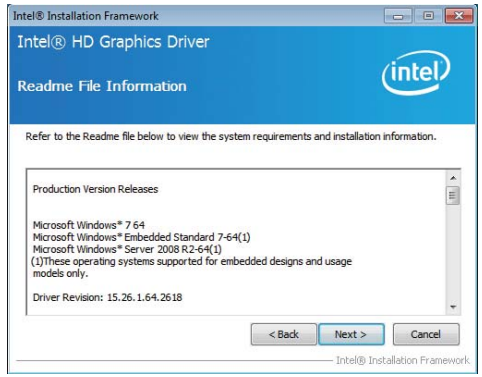
By default, the “Automatically run WinSAT and enable the Windows Aero desktop theme” is enabled. With this enabled, after installing the graphics driver and the system rebooted, the screen will turn blank for 1 to 2 minutes (while WinSAT is running) before the Windows 7/ Windows 8 desktop appears. The “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.

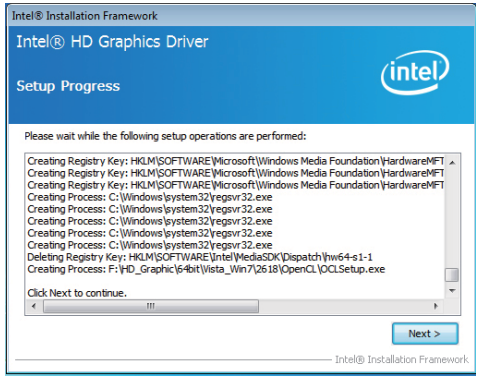
2. Read the license agreement then click Yes.



3. Go through the readme document for system requirements and installation tips then click Next.

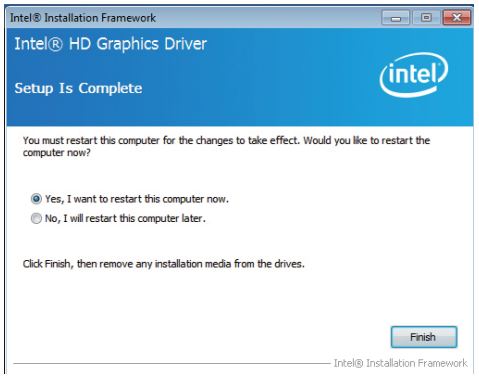


4. Setup is now installing the driver. Click Next to continue.



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

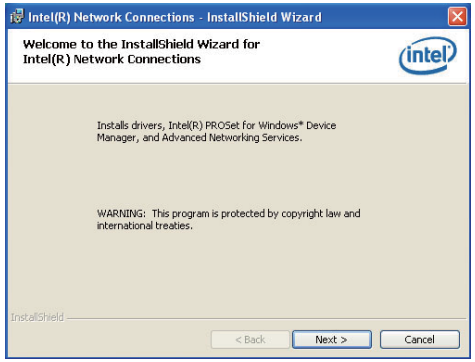
Restarting the system will allow the new software installation to take effect.



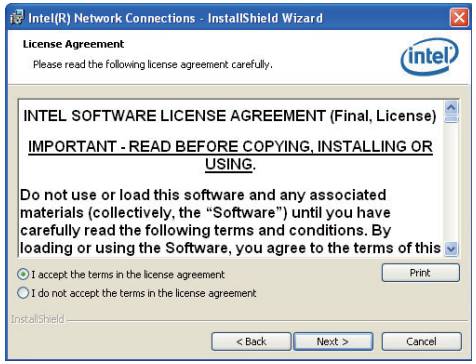
Intel LAN Drivers

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

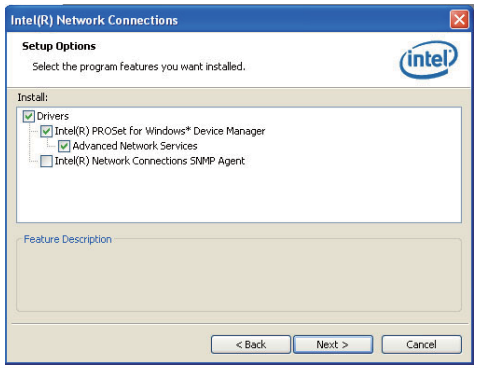
1. Setup is ready to install the driver. Click Next.



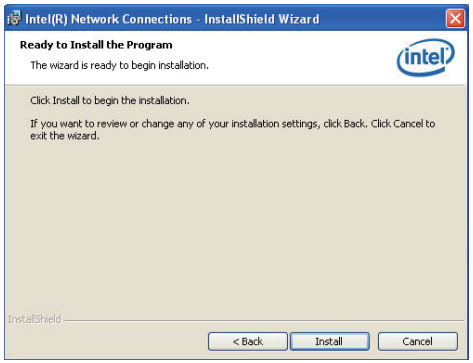
2. Click “I accept the terms in the license agreement” then click “Next”.



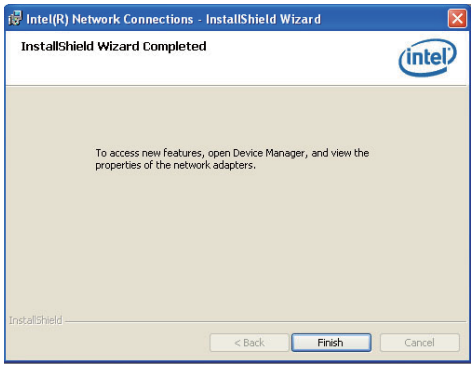
3. Select the program featuers you want installed then click Next.



4. Click Install to begin the installation.



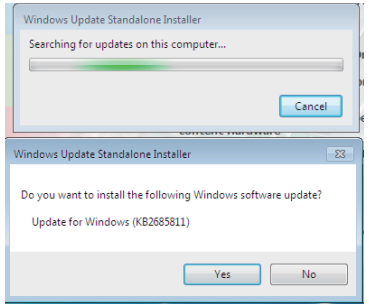
5. After completing installation, click Finish.



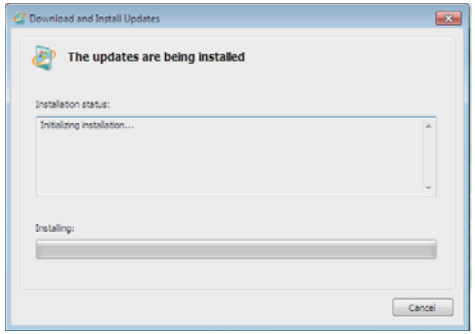
Kernel Mode Driver Framework (For Windows 7 only)

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

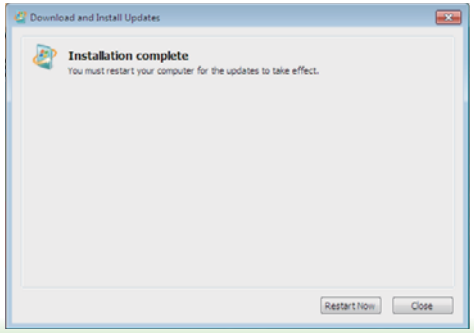
1. Click “Yes“ to install the update.



2. The update is installed now.



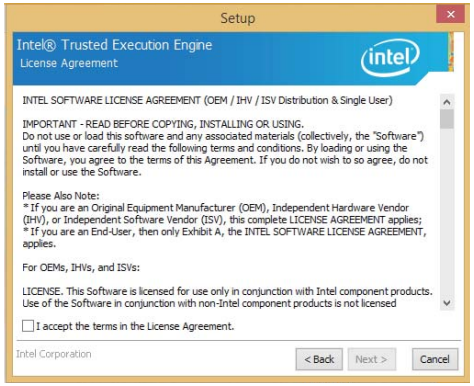
3. Click “Restart Now“ to restart your computer when the installation is complete.



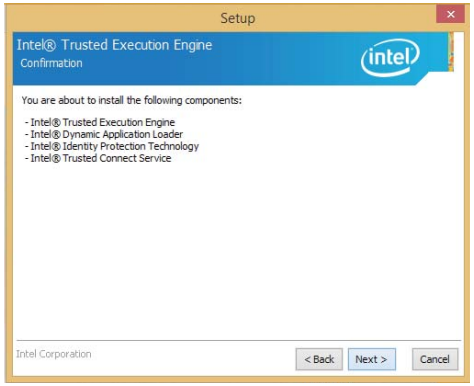
Intel Trusted Execution Engine Driver

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

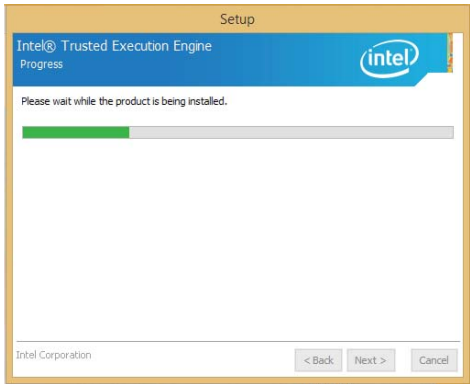
1. Tick “I accept the terms in the License Agreement“ and then click “Next.”



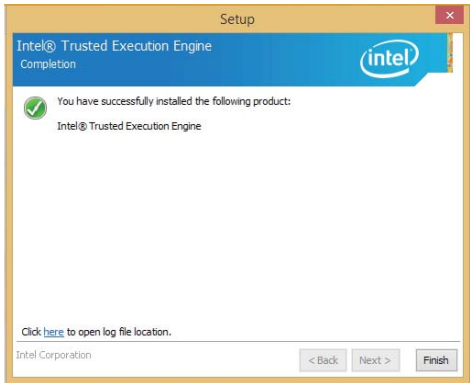
2. The step shows the components which will be installed. Then, Click Next.



3. The step displays the installing status in the progress.



4. Click “Finish“ when the installation is complete.



Realtek Audio Drivers

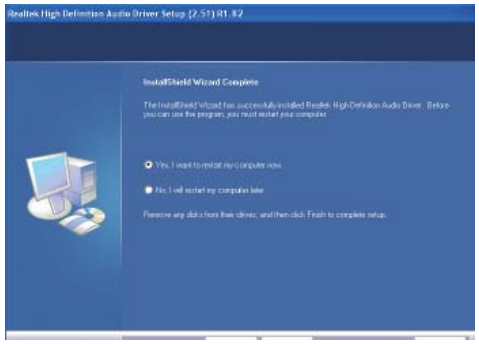
To install the driver, click “Realtek Audio Drivers” on the main menu.

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.

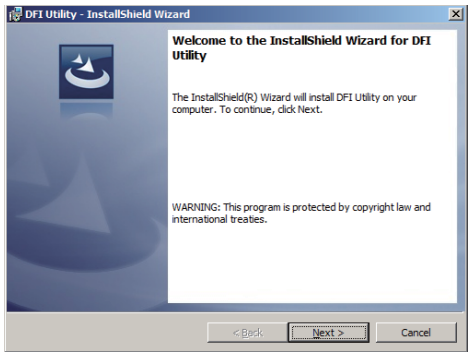


HW Utility

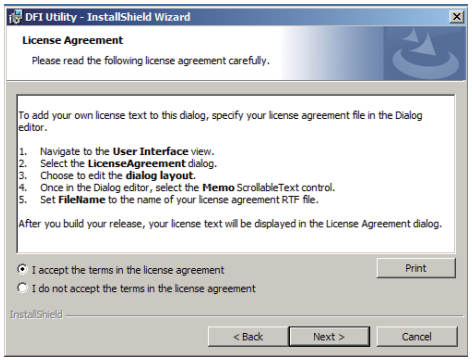
HW Utility provides information about the board, HW Health, Watchdog, DIO, and Backlight. To access the utility, click “HW Utility” on the main menu.

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

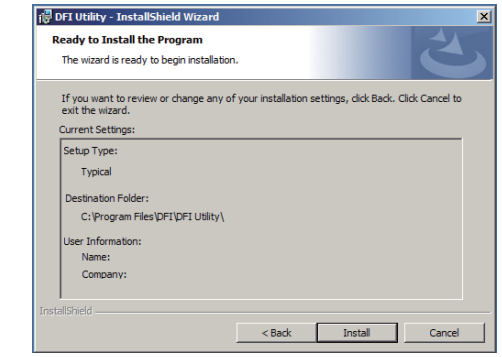
1. Setup is ready to install the HW Utility drifer. Click Next.



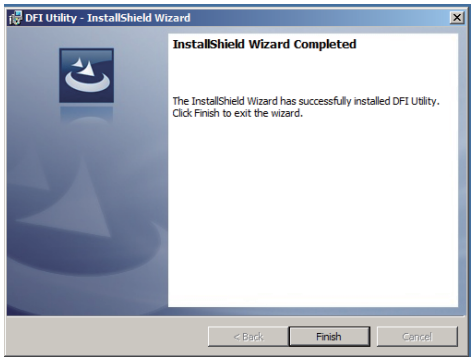
2. Click “I accept the terms in the license agreement” and then click Next.



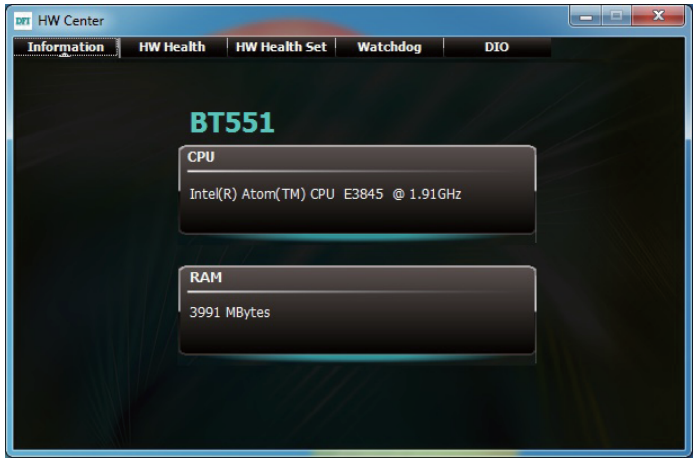
3. Click Install to begin the installation.



4. After completing installation, click Finish.



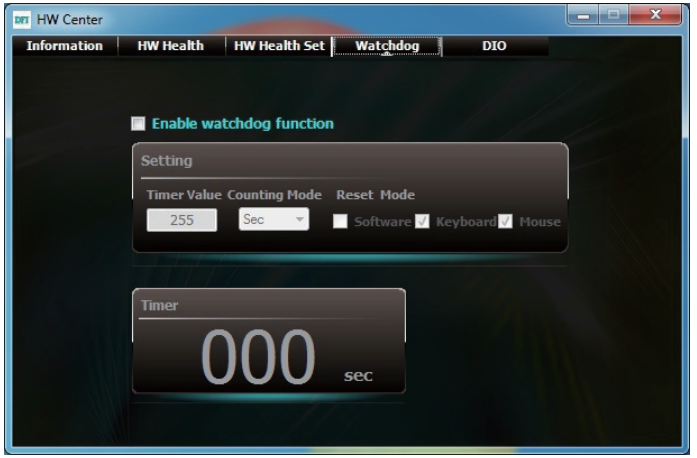
The HW Utility icon will appear on the desktop. Double-click the icon to open the utility.



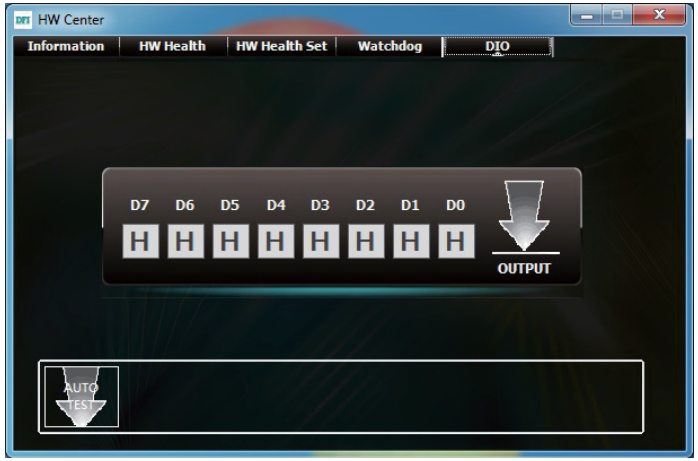
Information

HW Health Set

HW Health



WatchDog

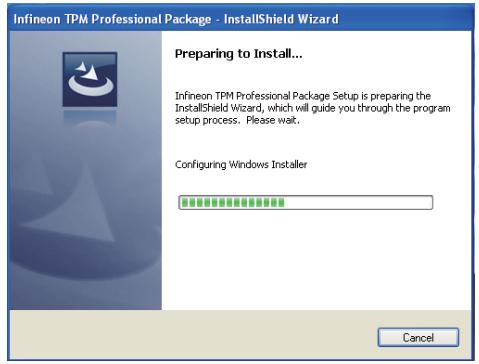


DIO

Infineon TPM Driver and Tool (option)

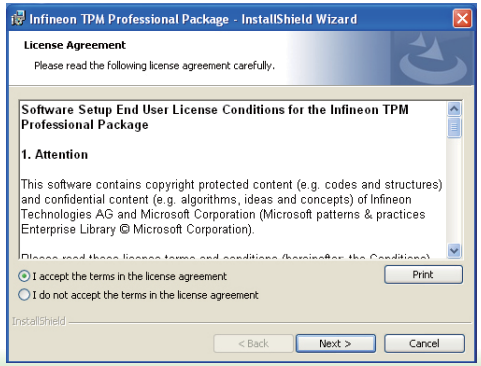
To install the driver, click “Infineon TPM driver and tool (option)” on the main menu.

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

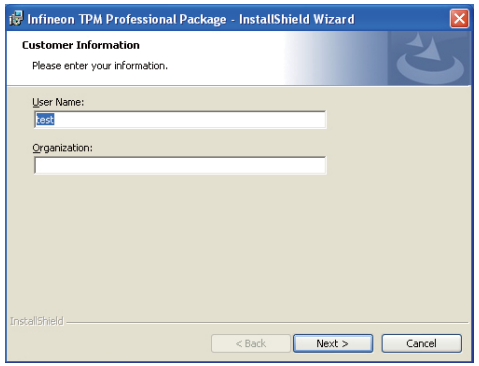


2. The setup program is now ready to install the utility. Click Next.

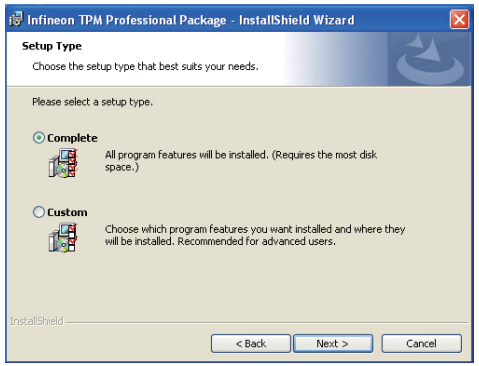
3. Click “I accept the terms in the license agreement” and then click “Next”.



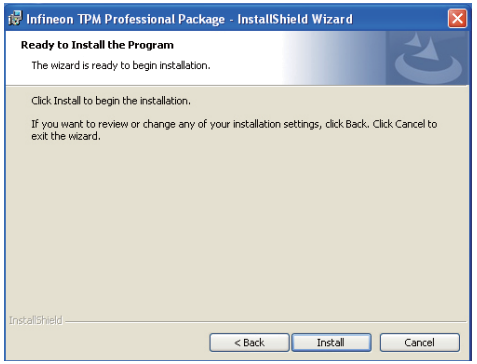
4. Enter the necessary information and then click Next.



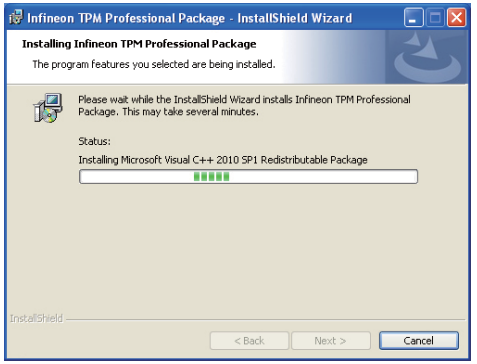
5. Select a setup type and then click Next.



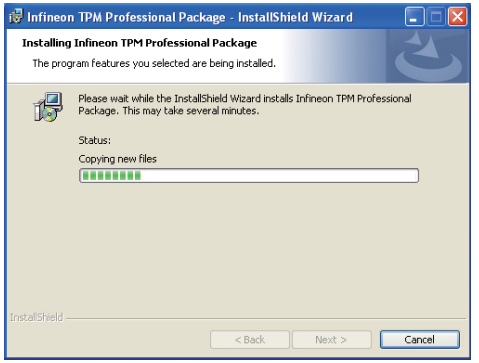
6. Click Install.



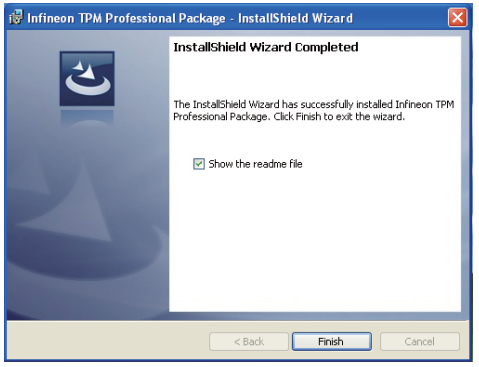
7. TPM requires installing the Microsoft Visual C++ package prior to installing the utility. Click Install.



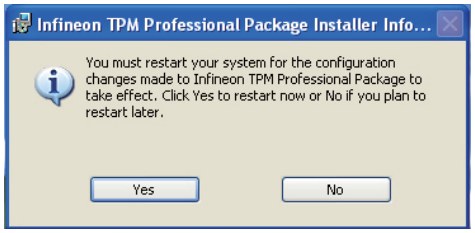
8. The setup program is currently installing the Microsoft Visual C++ package.



9. Click Finish.



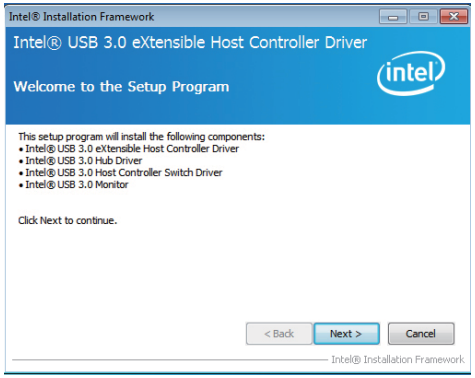
10. Click “Yes“ to restart your system.



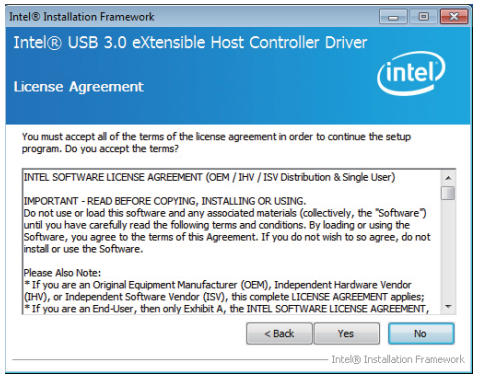
Intel USB 3.0 Drivers (For Windows 7 Only)

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

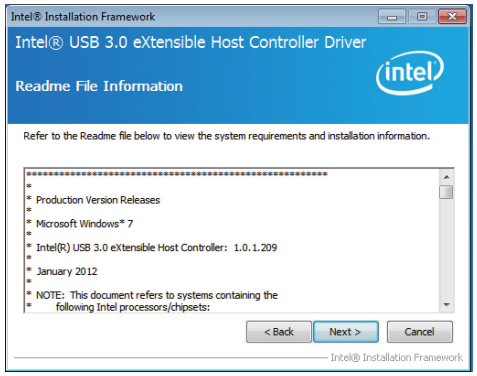
1. Setup is ready to install the driver. Click Next.



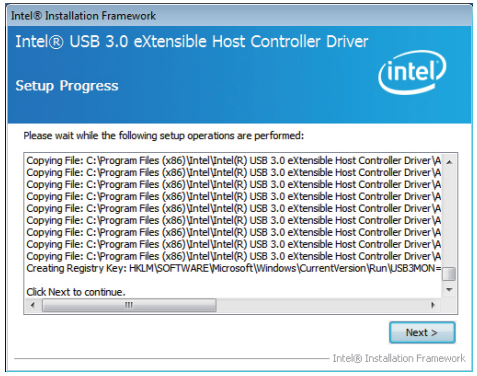
2. Read the license agreement then click Yes.



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.



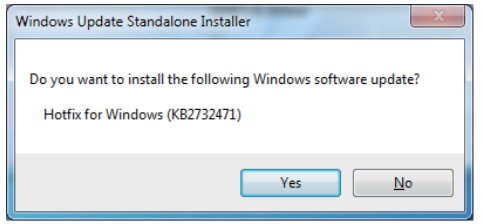
5. After completing installation, click Finish.

IO Driver Patch (For Windows 7 - 64bit Only)

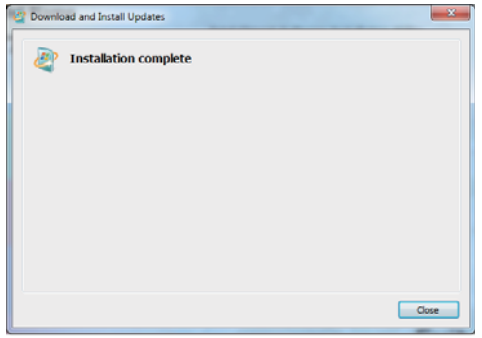
To install the driver, click “IO Driver Patch” on the main menu.

Note:
When you have problems in using the IO Driver on Windows 7 - 64bit, you need to follow the setps to install the IO Driver Patch.

1. Click “Yes” to install the driver update.



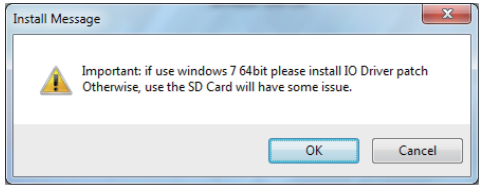
2. After the installation is complete, click “Close“.



IO Driver

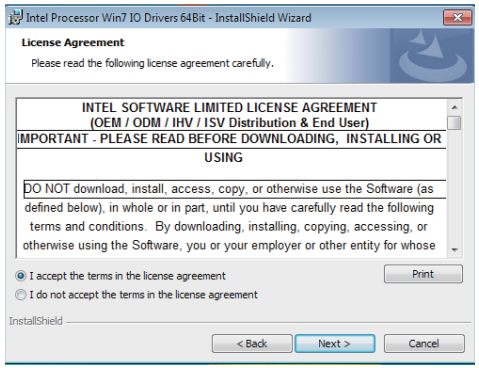
To install the driver, click “IO Driver” on the main menu.

Before you install the IO Driver, read the install message and then click “OK”.

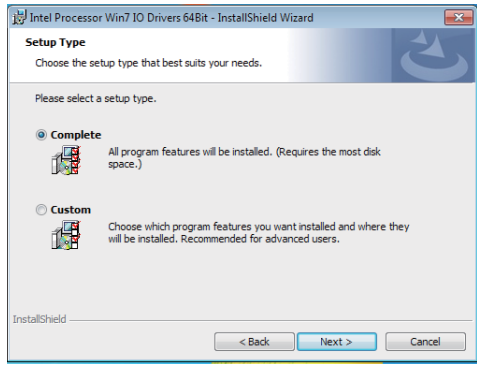


1. The setup program is preparing to install the driver. Click “Next.”

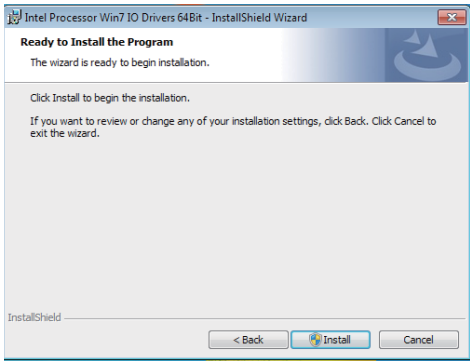
2. Read the license agreement. Click “I accept the terms in the license agreement” and then click “Next”.



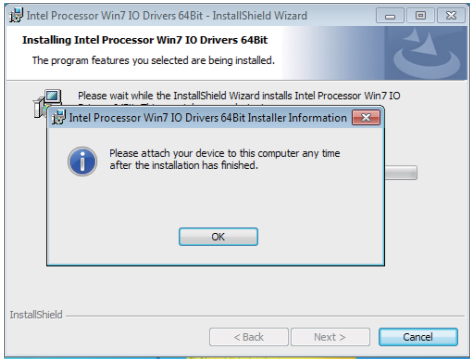
3. Choose the setup type and then click “Next”.



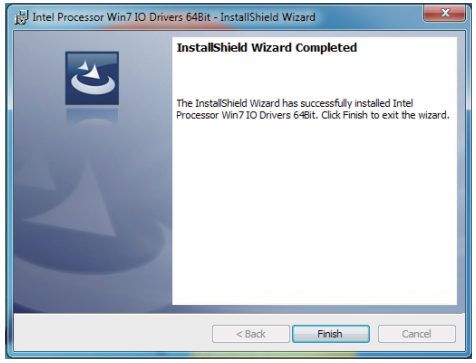
4. Click “Install“ to start the installation.



5. A notice for this installation.



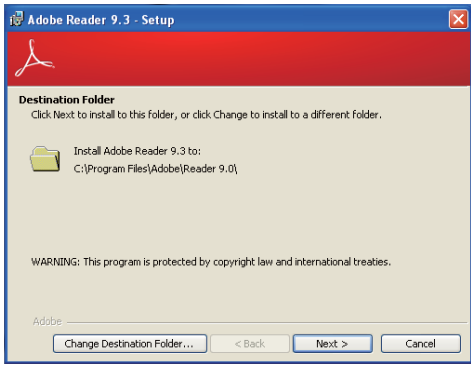
5. The installation has been completed successfully. Click “Finish“ to exit the wizard.



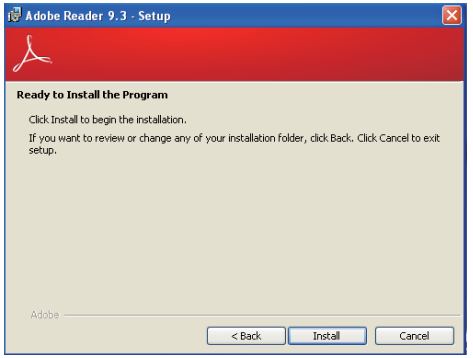
Adobe Acrobat Reader 9.3

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

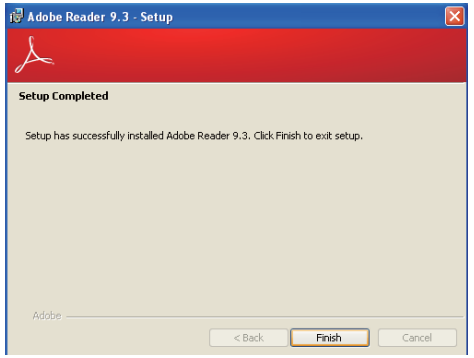
1. Click Next to install or click Change Destination Folder to select another folder.



2. Click Install to begin installation.



3. Click Finish to exit installation.



Chapter 5 - Digital I/O Programming Guide

Register Description

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

Register 0 (Input Port Register)

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

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

Register 1 (Onput Port Register)

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

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

Register 2 (Polarity Inversion Register)

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

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

Register 3 (Configuration Register)

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

Function Description

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

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

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

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

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

Sample Code

GPIO Configuration

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

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

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

   return 1;
```

GPIO Output Process

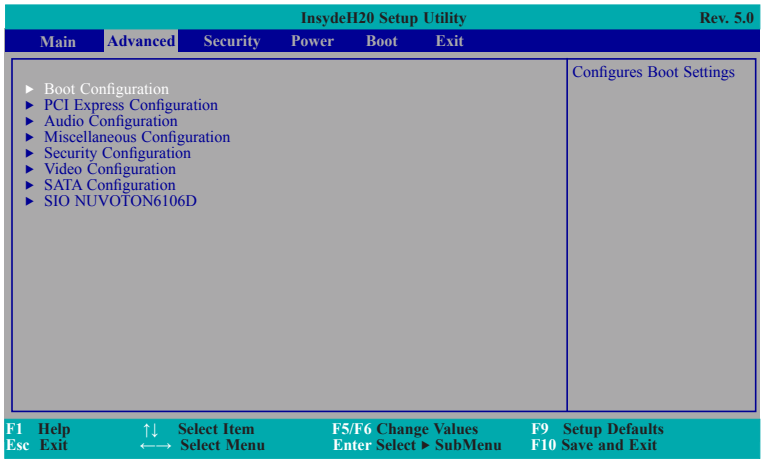
```
#define SLAVE_ADDR              0x42
#define INPUT_PORT              0x00
#define OUTPUT_PORT             0x01
#define INVERSION_PORT          0x02
#define COMFIG_PORT             0x03

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

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

    return 1;
```

GPIO Iutput Process

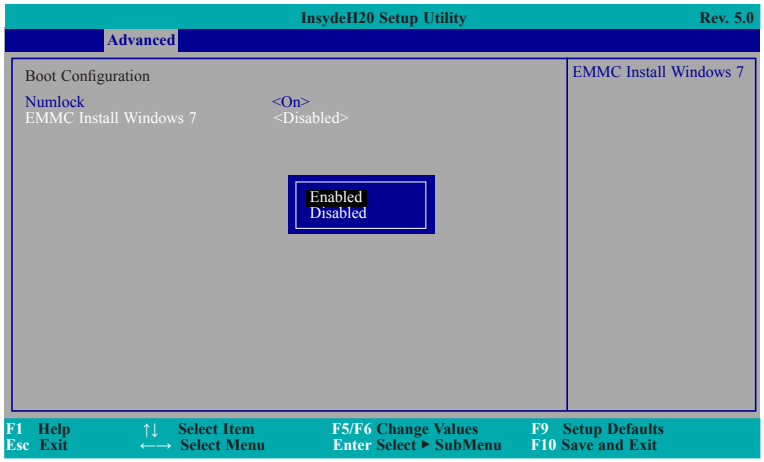
```
#define SLAVE_ADDR              0x42
#define INPUT_PORT              0x00
#define OUTPUT_PORT             0x01
#define INVERSION_PORT          0x02
#define COMFIG_PORT             0x03

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

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

    return 1;
```

Chapter 6 - Install Windows 7 32-bit into eMMC Storage Devices

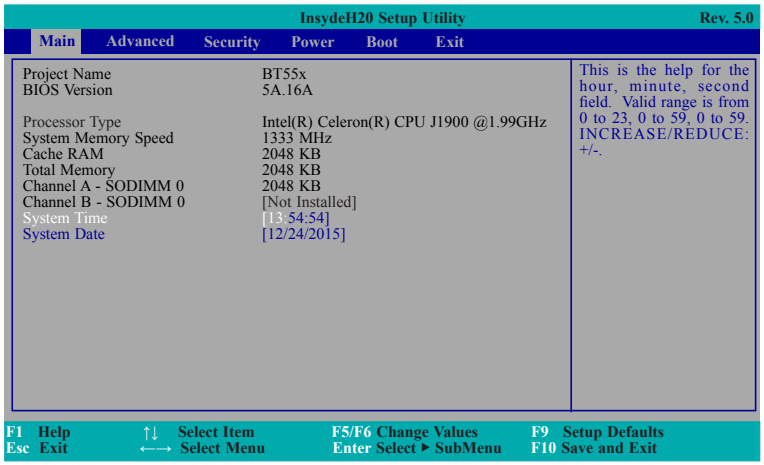
1. Enter the **Advance** menu and select **Boot Configuration**.



2. Select **EMMC Install Windows 7** and change the setting to **Enabled**. Then, save the change.



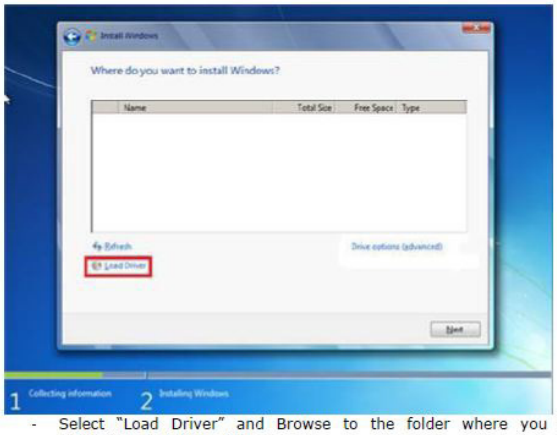
3. After step 1 and 2, make sure the memory size has been changed to 2GB on the main menu.



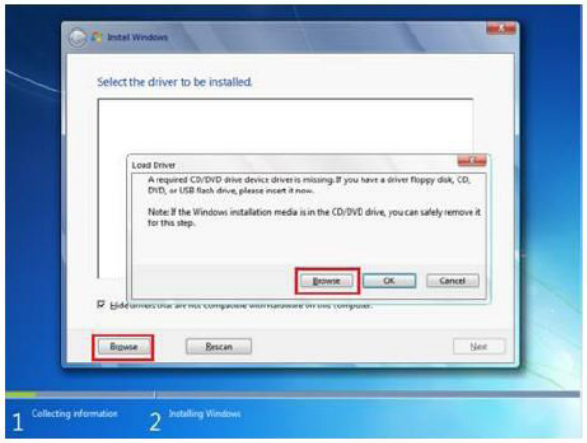
4. Enter the WIN7 install screen and follow steps below to load the IO driver.

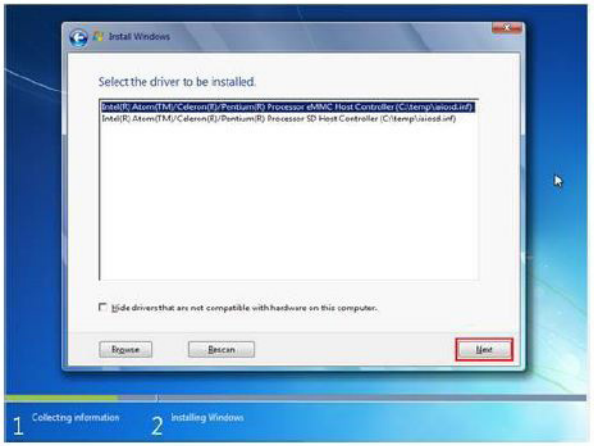
Installation:

- Prepare any removable media.
- Copy eMMC/SD driver files (Driver location on Bay Trail Driver CD item "**eMMC install OS file**") to any removable media (e.g Windows installation USB).
- Continue the procedure until you reach the screen below.

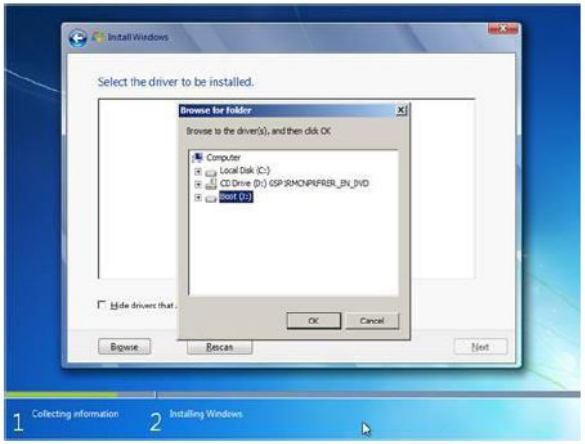


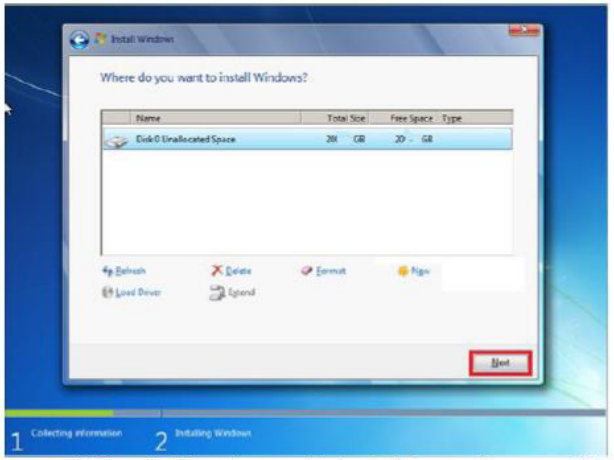
- Select "Load Driver" and Browse to the folder where you have copied eMMC/SD card driver files.





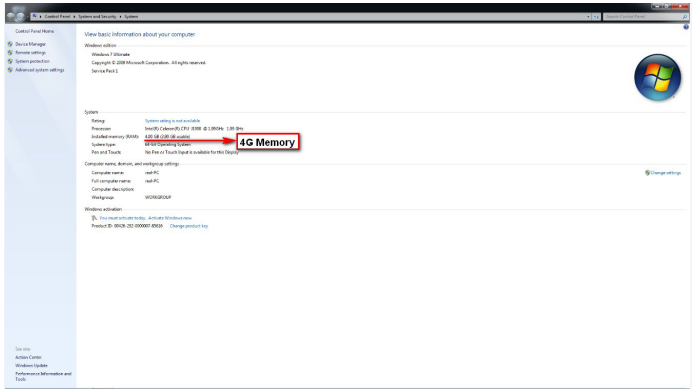
- Select eMMC Host Controller driver (first option) & Press/Click Next





- eMMC card will be shown as Unallocated Space. You may delete/create new partitions or let Windows decide
- Click Next
-
- Windows 7 setup will start copying files to eMMC and continue with rest of installation.

5. After finishing the installation, remember to change the setting of **EMMC Install Windows 7** back to **Disabled**.



Chapter 7 - Install Windows 7 64-bit into SD and eMMC Storage Devices

Testing Environment

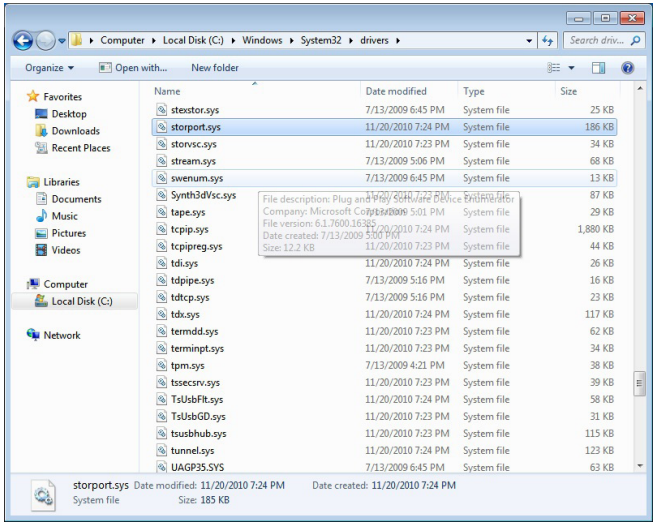
Platform: BT553 with 16G eMMC
BIOS: 5A.16A
Driver: BT-Series_1.0.2.0.0 (Demo)
OS: Windows 7 64bit SP1 Ultimate

Advanced Preparation

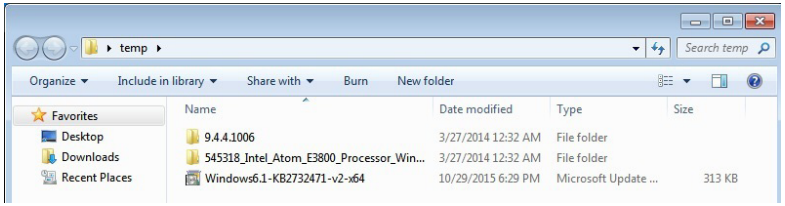
- Windows 7 64bit SP1 ISO image file
- Windows 7 IO Atom E3800 MR3 Driver
- Bay Trail Chipset Driver (It is included in Bay Trail Driver CD.)
- Windows6.1-KB2732471-v2-x64.msu (It is included in Bay Trail Driver CD.)

Obtain the Revised storport.sys and iaiosd Folder

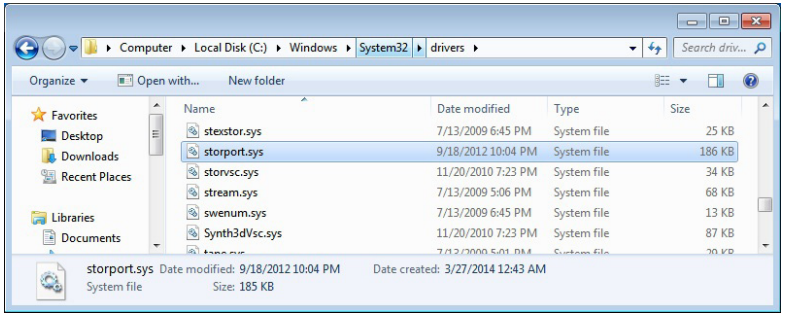
1. Install Windows 7 64bit SP1 into the BT553 system board.
2. After Windows 7 64bit SP1 is installed, you need to check the original file date of storport.sys in the file path: C->Windows->System32->driver.



3. Then, install Chipset Driver, IO Driver, and Windows6.1-KB2732471-v2-x64.msu into OS and reboot your computer.



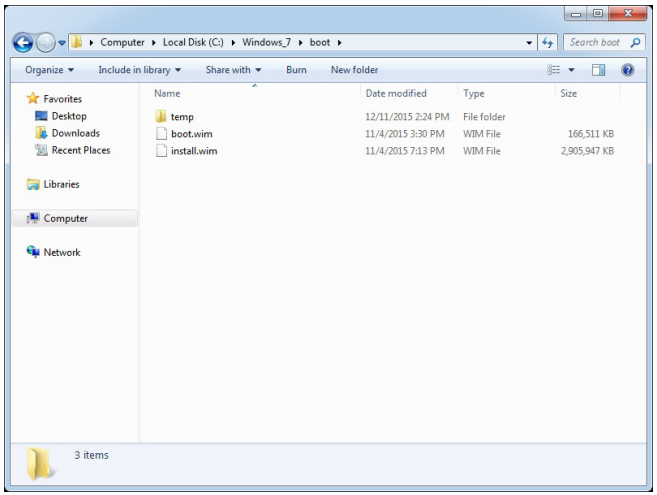
4. Check whether the file date of storport.sys is changed to 2012/9/18 10:04pm. If the date is changed, you can copy this file from the folder.



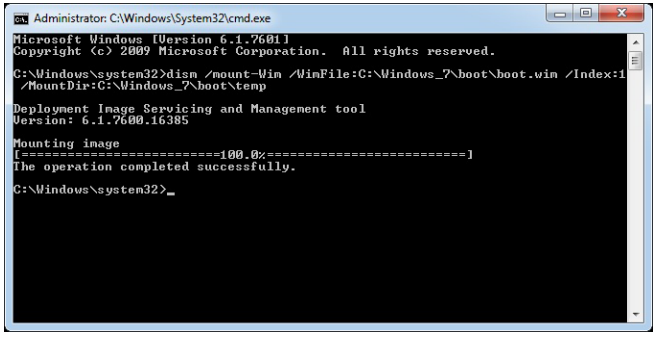
5. When operating the BT553 system board, you can copy the iaiosd folder in the file path: C:\Program Files (x86)\Intel\Intel Processor Win7 IO Drivers 64Bit\ or copy the whole folder of Intel Processor Win7 IO Drivers 64Bit.

Adjust the Original Windows 7 SP 1 iso

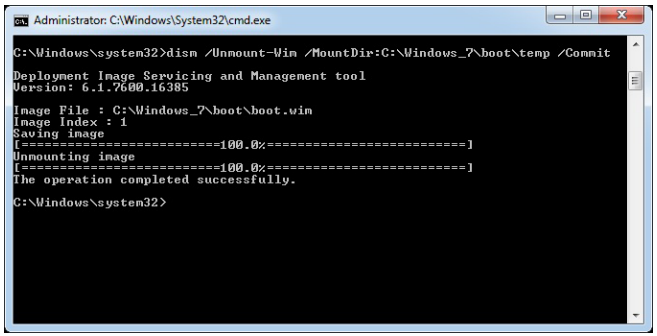
1. First, you need to take the iso from Windows 7 64bit SP1 CD driver and then take **boot.wim** and **install.wim** from the Source folder in iso.



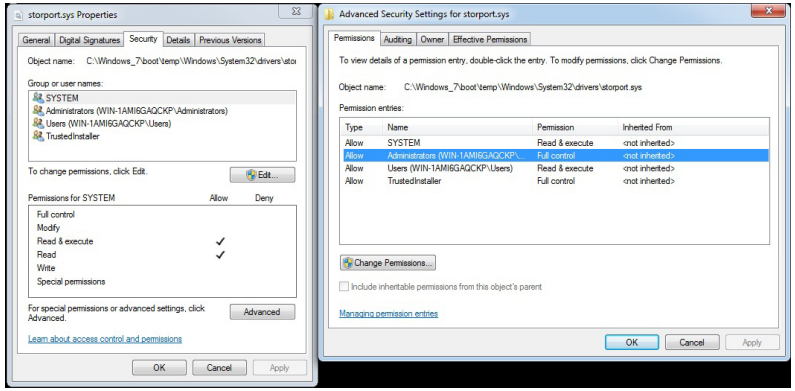
2. Use the administrator authority to open the command prompt and key in: dism /mount-Wim /WimFile:C:\Windows_7\boot\boot.wim /Index:1 /MountDir:C:\Windows_7\boot\temp to mount the **wim** file.



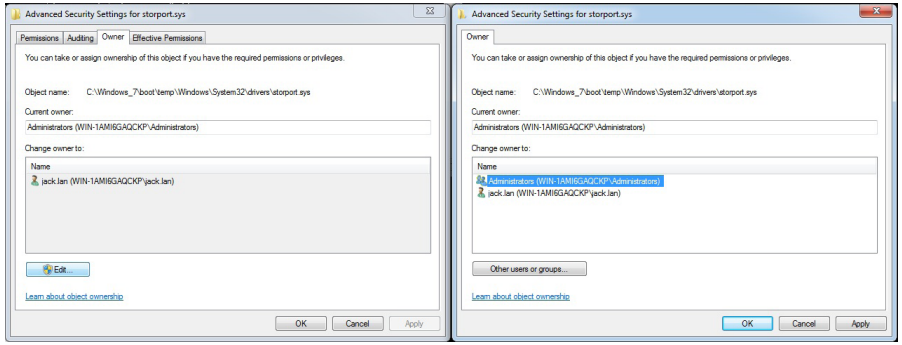
3. Use storport.sys that you get in Step 2 to overwrite storport.sys in Windows\System32\drivers\ of the mounted temp folder.
4. Close the temp folder and then key in dism /Unmount-Wim /MountDir:C:\Windows_7\boot\temp /Commit into the command prompt to unmount the **wim** file.



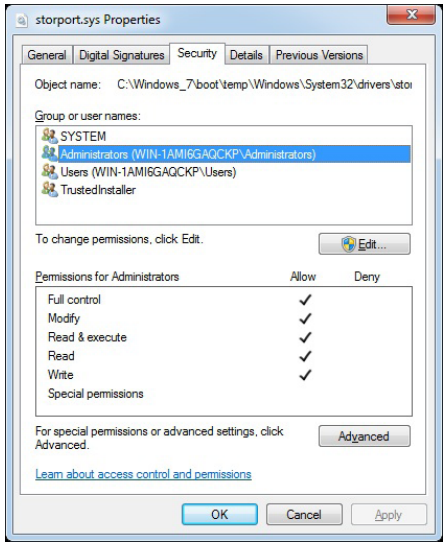
5. Repeat Step 2 to Step 4, and change /Index:1 to /Index:2 in Step 2.
6. Use the administrator authority to open the command prompt and key in: dism /mount-Wim /WimFile:C:\Windows_7\boot\install.wim /Index:1 /MountDir:C:\Windows_7\boot\temp to mount the **install.wim** file.
7. Enter temp\Windows\System32\drivers, but you have no authority to overwrite storport.sys in the **install.wim** file.
8. Right click on storport.sys and select "Properties" to enter the "Security" settings. Then, click "Advanced" for further settings.



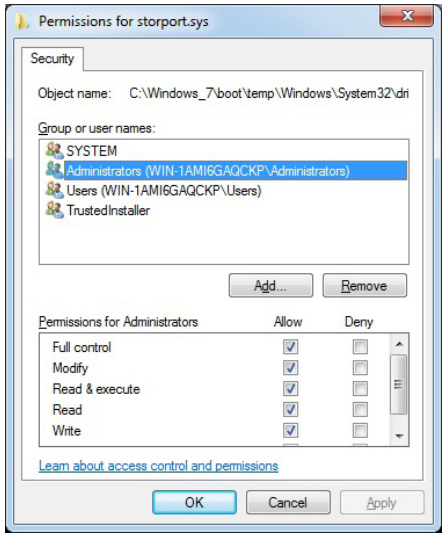
9. After you enter the Advanced Security Settings for storport.sys, select "Owner" and click "Edit" to change the owner to **Administrator**.



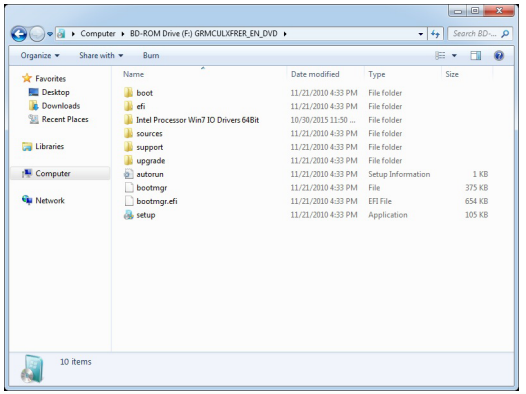
10. Right click on storport.sys again and select "Properties" to enter the "Security" settings. Then, click "Edit" for further settings.



11. Tick "Full Control" to allow permissions for administrators and then click "OK."



12. Use storport.sys that you get in Step 11 to overwrite this storport.sys
13. Close the temp folder and then key in dism /Unmount-Wim /MountDir:C:\Windows_7\boot\temp /Commit into the command prompt to unmount the **wim** file.
14. Repeat three times of Step 6 to Step 14 and change the index value in Step 6 to 2, 3 and 4 sequentially.
15. Place proceeded **boot.wim** and **install.wim** back to the original iso file.
16. Place the root content of iso file into iaiosd produced from the BT553 system operation or into the Intel Processor Win7 IO Drivers 64Bit folder to create the new iso file.



Install OS into eMMC Storage Devices

1. Burn iso into a piece of CD and use it to boot your computer.
2. Enable eMMC Install Windows 7 in the BIOS options.
3. Select "LoadDriver" in Where do you want to install Windows?
4. Click "Browse" to select the iaiosd folder from the CD or from Intel Processor Win7 IO Drivers 64Bit folder, and then click "OK."
5. Select **Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor eMMC Host Controller** and then click "Next" to start the installation.
6. When **Disk 0 Unallocated Space** shows on your computer screen, please click "Install."
7. Click "Next" to start and complete the installation.

Appendix A - Watchdog Sample Code

```
;Software programming example:

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

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

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

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

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

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

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

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

Appendix B - System Error Message

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

Error Messages

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

CMOS BATTERY HAS FAILED

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

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

CMOS CHECKSUM ERROR

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

DISPLAY SWITCH IS SET INCORRECTLY

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

FLOPPY DISK(S) fail (80)

Unable to reset floppy subsystem.

FLOPPY DISK(S) fail (40)

Floppy type mismatch.

Hard Disk(s) fail (80)

HDD reset failed.

Hard Disk(s) fail (40)

HDD controller diagnostics failed.

Hard Disk(s) fail (20)

HDD initialization error.

Hard Disk(s) fail (10)

Unable to recalibrate fixed disk.

Hard Disk(s) fail (08)

Sector Verify failed.

Keyboard is locked out - Unlock the key

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

Keyboard error or no keyboard present

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

Manufacturing POST loop

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

BIOS ROM checksum error - System halted

The checksum of ROM address F0000H-FFFFFH is bad.

Memory test fail

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

Appendix C - Troubleshooting Checklist

Troubleshooting Checklist

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

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

1. The power switch of each peripheral device is turned on.
2. All cables and power cords are tightly connected.
3. The electrical outlet to which your peripheral devices are connected is working. Test the outlet by plugging in a lamp or other electrical device.
4. The monitor is turned on.
5. The display's brightness and contrast controls are adjusted properly.
6. All add-in boards in the expansion slots are seated securely.
7. Any add-in board you have installed is designed for your system and is set up correctly.

Monitor/Display

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

1. Make sure that the monitor's power switch is on.
2. Check that one end of the monitor's power cord is properly attached to the monitor and the other end is plugged into a working AC outlet. If necessary, try another outlet.
3. Check that the video input cable is properly attached to the monitor and the system's display adapter.
4. Adjust the brightness of the display by turning the monitor's brightness control knob.

The picture seems to be constantly moving.

1. The monitor has lost its vertical sync. Adjust the monitor's vertical sync.
2. Move away any objects, such as another monitor or fan, that may be creating a magnetic field around the display.
3. Make sure your video card's output frequencies are supported by this monitor.

The screen seems to be constantly wavering.

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

Power Supply

When the computer is turned on, nothing happens.

1. Check that one end of the AC power cord is plugged into a live outlet and the other end properly plugged into the back of the system.
2. Make sure that the voltage selection switch on the back panel is set for the correct type of voltage you are using.
3. The power cord may have a "short" or "open". Inspect the cord and install a new one if necessary.

Floppy Drive

The computer cannot access the floppy drive.

1. The floppy diskette may not be formatted. Format the diskette and try again.
2. The diskette may be write-protected. Use a diskette that is not write-protected.
3. You may be writing to the wrong drive. Check the path statement to make sure you are writing to the targeted drive.
4. There is not enough space left on the diskette. Use another diskette with adequate storage space.

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.