



VP101-BT

Fanless In-Vehicle Panel PC System with Touchscreen

User's Manual

Copyright

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

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

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

© 2019. All Rights Reserved.

Trademarks

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

FCC and DOC Statement on Class A

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

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

Notice:

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

Table of Contents

Copyright.....	2	Chapter 7 - BIOS Setup	28
Trademarks.....	2	Chapter 8 - Supported Software	40
FCC and DOC Statement on Class A	2		
Warranty	4		
Static Electricity Precautions	4		
Safety Measures.....	4		
Safety Precautions	5		
About the Package.....	5		
Chapter 1 - Introduction.....	6		
Overview.....	6		
Key Features	6		
Specifications.....	7		
Getting to Know the VP101-BT	8		
Mechanical Dimensions	9		
Chapter 2 - Getting Started	10		
Chapter 3 - Installing Devices.....	11		
Removing the Chassis Cover.....	11		
Chapter 4 - Jumper Settings.....	14		
Chapter 5 - Ports and Connectors.....	18		
Chapter 6 - Mounting Options	25		
Wall Mount.....	25		
Panel Mount	26		

About this Manual

An electronic file of this manual can be obtained from the DFI website at www.dfi.com. To download the user's manual from our website, please go to "Support" > "Download Center." On the Download Center page, select your product or type the model name and click "Search" to find all technical documents including the user's manual for a specific product.

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

Static Electricity Precautions

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

1. To prevent electrostatic build-up, leave the system board in its anti-static bag until you are ready to install it.
2. Wear an antistatic wrist strap.
3. Do all preparation work on a static-free surface.
4. Hold the device only by its edges. Be careful not to touch any of the components, contacts or connections.
5. Avoid touching the pins or contacts on all modules and connectors. Hold modules or connectors by their ends.



Important:

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

Safety Measures

To avoid damages to the system:

- Use the correct AC input voltage range.

To reduce the risk of electric shock:

- Unplug the power cord before removing the system chassis cover for installation or servicing. After installation or servicing, cover the system chassis before plugging the power cord.

Battery:

- Danger of explosion if battery incorrectly replaced.
- Replace only with the same or equivalent type recommend by the manufacturer.
- Dispose of used batteries according to local ordinance.

Safety Precautions

- Use the correct DC input voltage range.
- Unplug the power cord before removing the system chassis cover for installation or servicing. After installation or servicing, cover the system chassis before plugging the power cord.
- Danger of explosion if battery incorrectly replaced.
- Replace only with the same or equivalent type recommend by the manufacturer.
- Dispose of used batteries according to local ordinance.
- Keep this system away from humidity.
- Place the system on a stable surface. Dropping it or letting it fall may cause damage.
- The openings on the system are for air ventilation to protect the system from overheating. **DO NOT COVER THE OPENINGS.**
- Place the power cord in such a way that it will not be stepped on. Do not place anything on top of the power cord. Use a power cord that has been approved for use with the system and that it matches the voltage and current marked on the system's electrical range label.
- If the system will not be used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
- If one of the following occurs, consult a service personnel:
 - The power cord or plug is damaged.
 - Liquid has penetrated the system.
 - The system has been exposed to moisture.
 - The system is not working properly.
 - The system dropped or is damaged.
 - The system has obvious signs of breakage.
- The unit uses a three-wire ground cable which is equipped with a third pin to ground the unit and prevent electric shock. Do not defeat the purpose of this pin. If your outlet does not support this kind of plug, contact your electrician to replace the outlet.
- Disconnect the system from the DC outlet before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.

About the Package

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

- 1 VP101-BT Touch Panel PC
- One sheet of Poron Foam
- 1 Chassis Panel Mount Bracket
- 1 Quick Installation Guide

Optional Items

- Wall Mount kit
- Panel Mount kit
- Power Cord

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.

Chapter 1 - Introduction

Overview

VP101-BT

Side View



Top View



Bottom View



Key Features

Model Name	VP101-BT
Processor	Intel Atom® Processor E3800 Series
LAN	Two LAN ports
COM	Five serial ports
Display	Capacitive touchscreen One VGA One HDMI
USB	One USB 3.0 port and three USB 2.0 ports
Audio	Line-out and Microphone ports
Power	In-vehicle power management features

Specifications

Processor System	Intel Atom® Processor E3800 Series, BGA 1170 Intel Atom® E3845, Quad Core, 2M Cache, 1.91GHz, 10W Intel Atom® E3825, Dual Core, 1M Cache, 1.33GHz, 6W
Memory	<ul style="list-style-type: none"> • 2GB/4GB DDR3L-1333MHz onboard memory with ECC support
Touch Screen & Graphics	<p>Touchscreen</p> <ul style="list-style-type: none"> • 10.1" 1280x800 TFT LCD Panel with capacitive touchscreen • Brightness: 500 cd/m² • Contrast: 800:1 • Backlight Lifetime: 50,000 hours <p>Graphics</p> <ul style="list-style-type: none"> • Controller: Intel® HD Graphics • Display interfaces: <ul style="list-style-type: none"> 1 VGA port (24-bit, resolution up to 2560x1600 @ 60Hz) 1 HDMI port (resolution up to 1920x1080 @ 60Hz)
Storage/Expansion	<ul style="list-style-type: none"> • 1 x 2.5" SATA 2.0 Drive Bay • Onboard eMMC Storage: 4GB/8GB/16GB/32GB (available upon request) • Expansion Slots: <ul style="list-style-type: none"> 1 x Full-size Mini PCIe (PCIe/USB/3G/GPRS/CAN-Bus) plus a SIM card slot • 1 x Full-size Mini PCIe (SATA) • 1 x Half-size Mini PCIe (PCIe/USB/LPC) • 1 x microSD (available upon request)
Ethernet	2 x Intel® I210AT PCIe (10/100/1000Mbps)
I/O Ports and LED Indicators	<ul style="list-style-type: none"> • Top Panel <ul style="list-style-type: none"> - 3 x RS232/422/485 (DB9; one supports 8-bit DIO or CAN-Bus) - 1 x USB 3.0 (type A) - 1 x HDMI - 1 x power button - 1 x reset button - 2 x Wi-Fi module antenna hole • Bottom Panel <ul style="list-style-type: none"> - 1 x 3-pole power connector (terminal block) - 2 x GbE (RJ-45) - 2 x RS232/422/485 (DB9; one supports only RS232) - 3 x USB 2.0 (type A) - 1 x VGA - 1 x Line-out and Mic-in - 1 x Wi-Fi module antenna hole
Power	<ul style="list-style-type: none"> • Wide Range 9~36V DC-in (3-pin terminal block; VCC/ACC/GND) <p>In-Vehicle power management includes ignition On/Off and system on/off delay time control</p>
Environment	<ul style="list-style-type: none"> • Temperature <ul style="list-style-type: none"> - Operating: -20°C ~ 60°C - Storage: -30°C ~ 80°C • Relative Humidity: 5 to 85% RH (non-condensing)

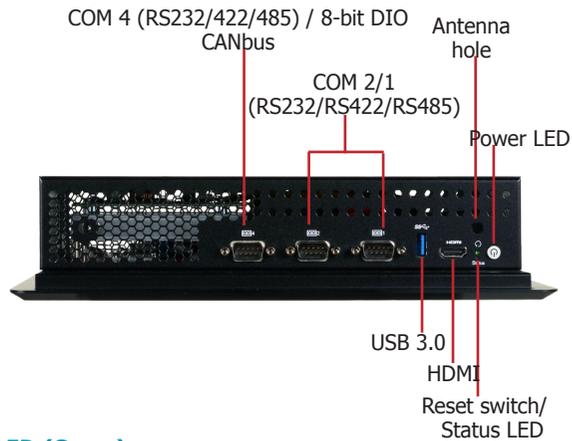
Vibration	OP: Random, 1Grms @ 5~500Hz, 30min Non-OP: Sweep sine, 3Grms @ 10~500Hz, 30min
Shock	OP: Half-sine, 3G @ 11ms Non-OP: Half-sine, 5G @ 11ms
Construction	<ul style="list-style-type: none"> • Aluminum Front Bezel • IP65 Front Panel Protection
Mounting	<ul style="list-style-type: none"> • Panel/VESA mount - Mounting brackets and screws*
Dimensions	• 294mm x 193mm x 65mm (W x H x D)
Weight	• 1.7 Kg
OS Support	<ul style="list-style-type: none"> • Windows 7 (32bit/64bit) • Windows 10 IoT Enterprise (32bit/64bit) • Ubuntu 16.04 (64-bit)
Certifications	CE, FCC Class A, E-Mark (E13)


Note:

*The mounting kit is optional and not supported in standard model. Please contact your sales representative for more information.

Getting to Know the VP101-BT

Top View



Power LED (Green)

This button only indicates power-on or power-off status. Note that this button cannot be used to power on or off the system; please power on or off the system via car ignition.

Status LED (Blue)

Indicates system status.

Status LED			
Suspend Mode	S0	S1-S3 (sleep)	S4, S5
LED Behavior	Off	Blinking	Off

Reset Switch

Press to restart the system without going through a full shutdown and boot cycle.

HDMI Port

Connects to the HDMI port of a display.

USB 3.0 Port

Connects USB 3.0 devices as well as devices from previous versions such as USB 2.0 or USB 1.1.

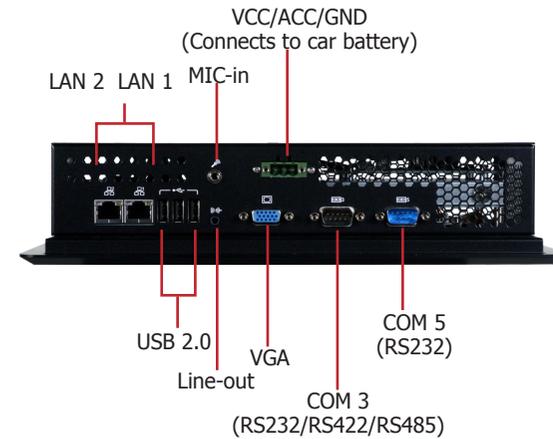
COM Ports

COM 1, COM 2 and COM 4 can be an RS232, RS422 or RS485 port. COM 4 can be used as an 8-bit Digital I/O, a serial or CANbus port via jumper selection.

Wireless Antenna Holes

Reserved for installing wireless antennas.

Bottom View



Power Connector

Connects a car battery for power supply.

LAN Ports

Connect a network device or a LAN cable for network connectivity.

USB 2.0 Ports

Connect USB 2.0 or 1.1 devices.

Line-out

Connects a speaker.

Mic-in

Connects a microphone.

COM Ports

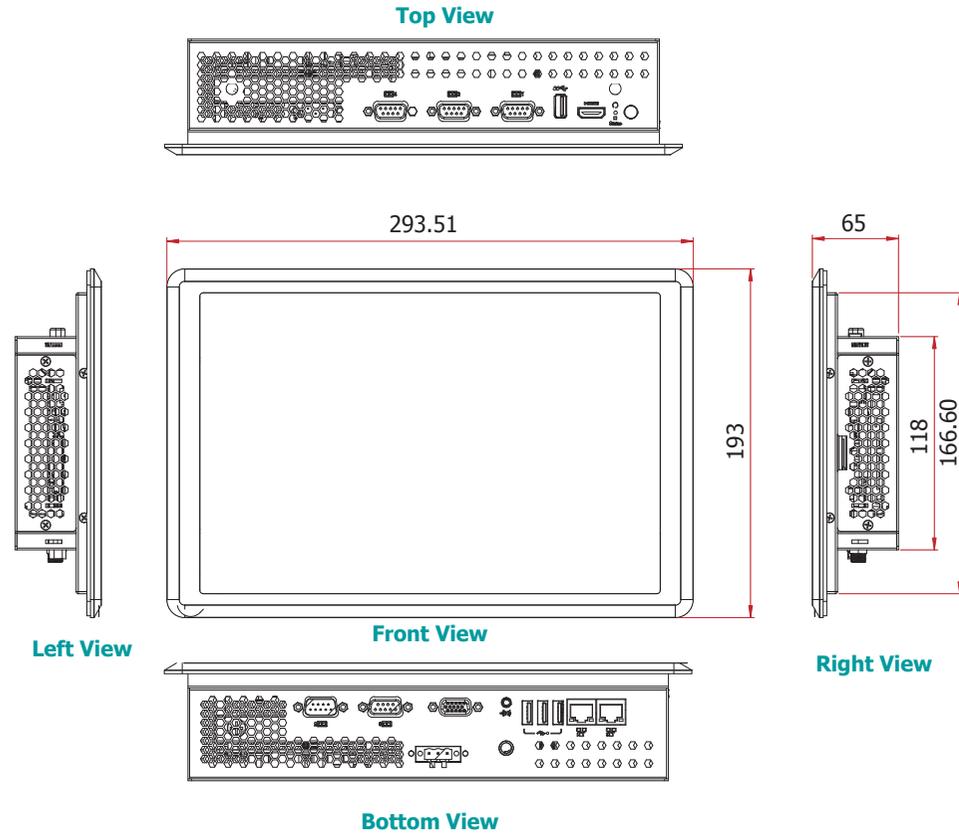
Connect serial devices. COM 3 can be an RS232, RS422 or RS485 port; COM 5 can only be an RS232 port.

VGA

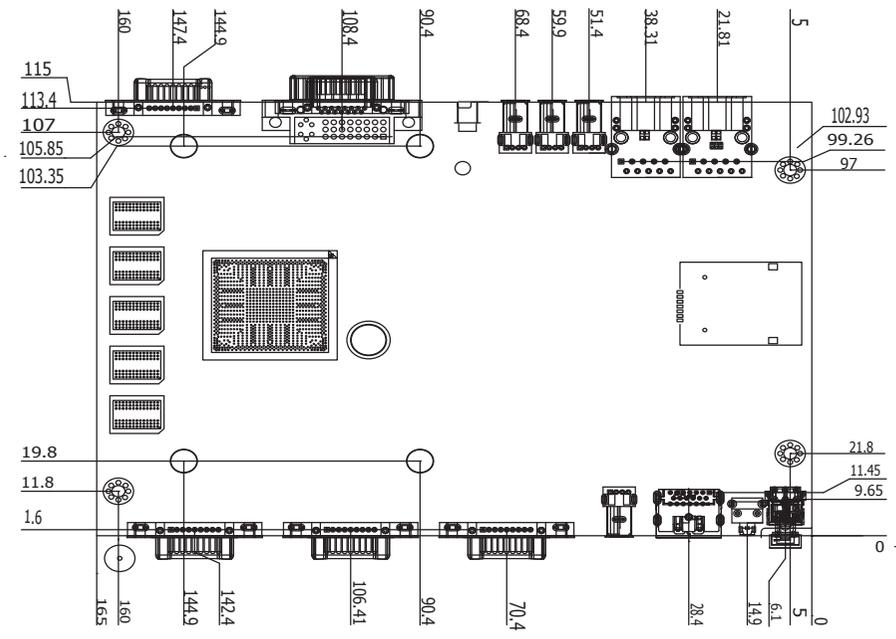
Connects the VGA port of a display device.

Mechanical Dimensions

Standard



Motherboard Dimensions



Chapter 2 - Getting Started

Preparing the System

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

- AC power adapter
- DVD-ROM drive (for installing software/drivers)
- Screwdriver

Installing Devices

The following devices can be installed in the system.

- Mini PCIe/mSATA cards

Configuring the BIOS

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

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

Installing the Operating System

Most operating system software can be installed using a DVD (and DVD burner) or bootable USB drive.

Please refer to your operating system manual for instructions on installing an operating system.

Installing the Drivers

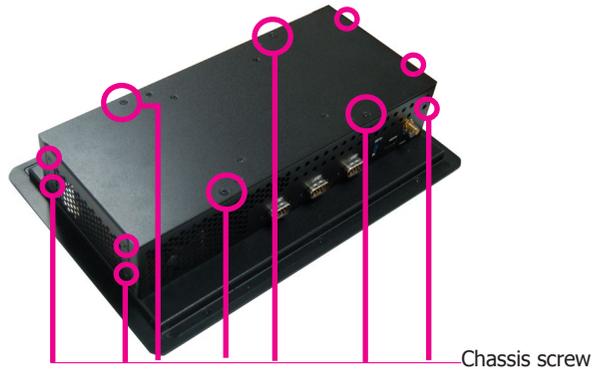
The system requires you to install drivers for some devices to operate properly. Refer to the Supported Software chapter for instructions on installing the drivers.

Chapter 3 - Installing Devices

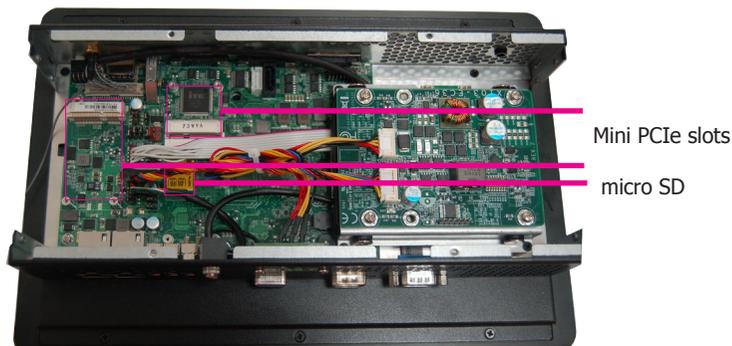
Removing the Chassis Cover

Please observe the following guidelines and follow the procedure to open the system.

1. Make sure the system and all other peripheral devices connected to it have been powered off.
2. Disconnect all power cords and cables.
3. The 12 mounting screws on the bottom and two sides of the system are used to secure the cover to the chassis. Remove these screws and then put them in a safe place for later use.



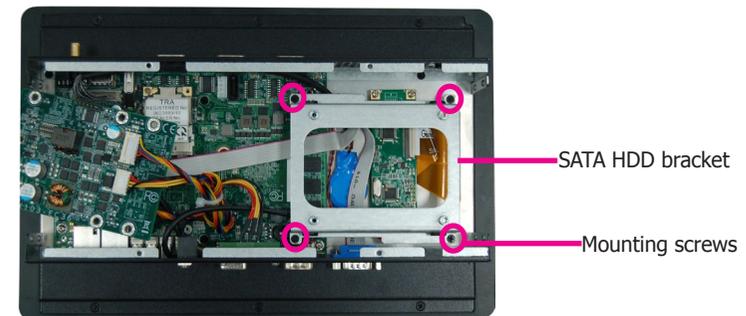
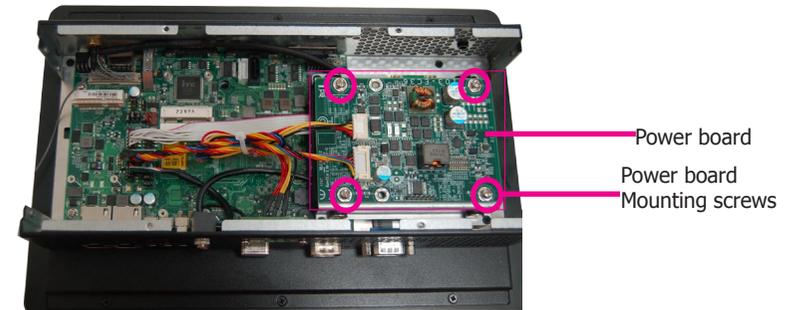
4. After removing the mounting screws, lift the bottom side of the chassis cover to open the system. The Mini PCIe and the micro SD slots will be readily accessible.
5. The Mini PCIe and the micro SD (optional) slots are readily accessible after removing the chassis cover.



Installing a SATA Drive

The system can accommodate one SATA drive. Please use the following procedure to install a SATA drive into the system.

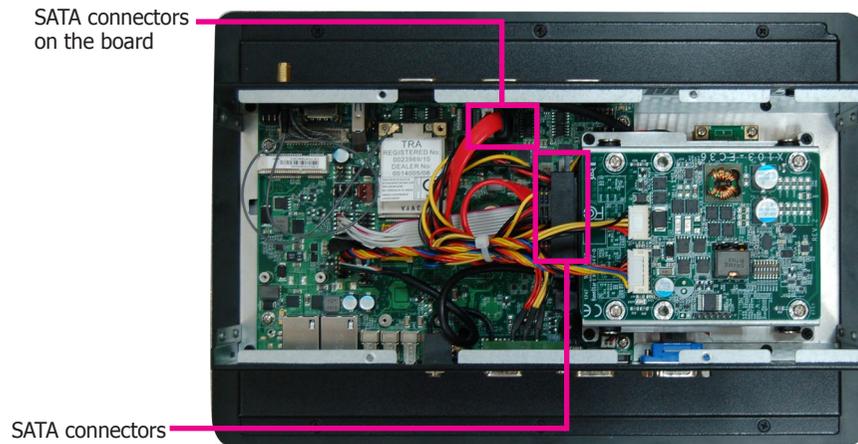
1. The SATA data and power connectors are on the system board beneath the power board. Please remove the power board first to take out the SATA HDD bracket.



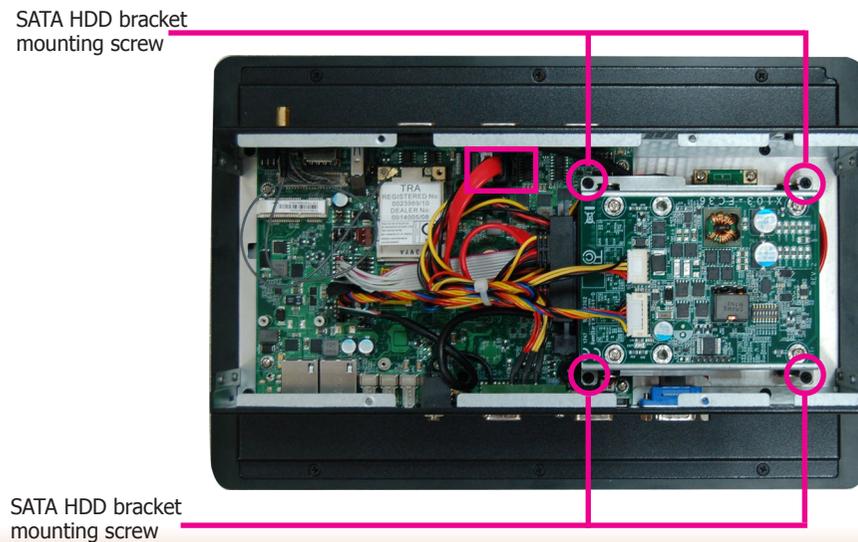
2. Align the mounting holes of the SATA drive with the mounting holes on the SATA HDD bracket and use the provided mounting screws to attach the SATA drive to the bracket.



3. Connect one end of the SATA cable to the SATA power and data connectors on the SATA drive and the other end of the SATA cable to the SATA power and data connectors on the system board.



4. Align the mounting holes of the SATA HDD bracket with the mounting holes on the system board and use the provided mounting screws to secure the HDD bracket in place.



Installing a Mini PCIe Card

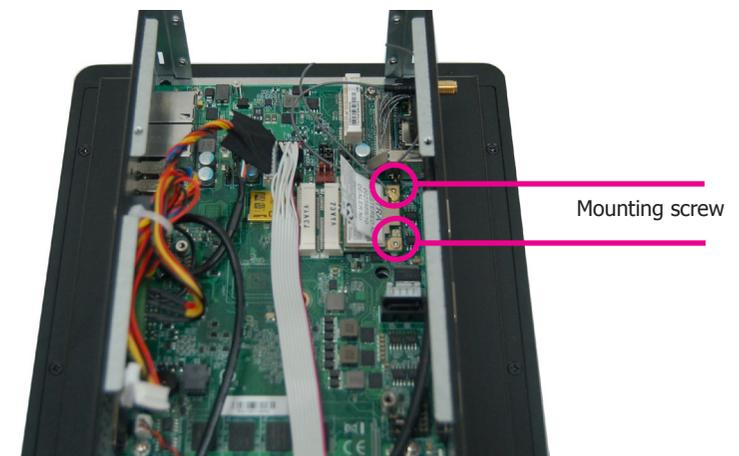
The system board is equipped with 3 Mini PCIe slots: two full-size and one half-size slots. Here we will demonstrate the installation of a half-size Mini PCIe card (PCIe/USB/LPC signals) for WiFi connection and a full-size slot for CANbus communication (PCIe/USB/3G/GPRS/CANbus signals).

Installing a Wi-Fi card in the half-size Mini PCIe slot

1. Grasp the Mini PCIe card by its edges and align the notch in the connector of the card with the notch in the connector on the system board.

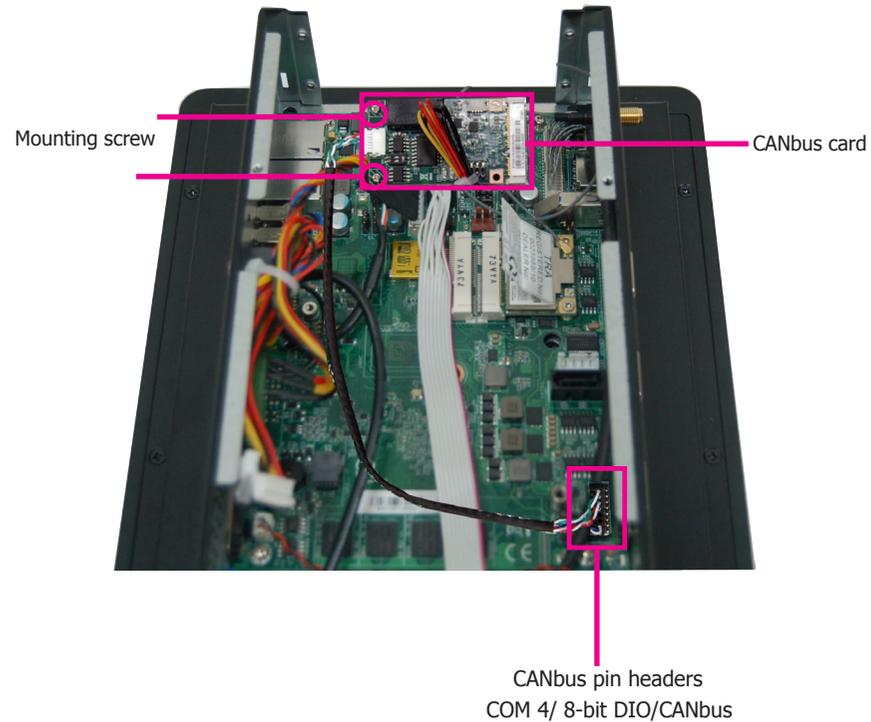


2. Push the Mini PCIe card down and use the provided mounting screws to secure the card on the system board.



Installing a CANbus card in the Mini PCIe slot

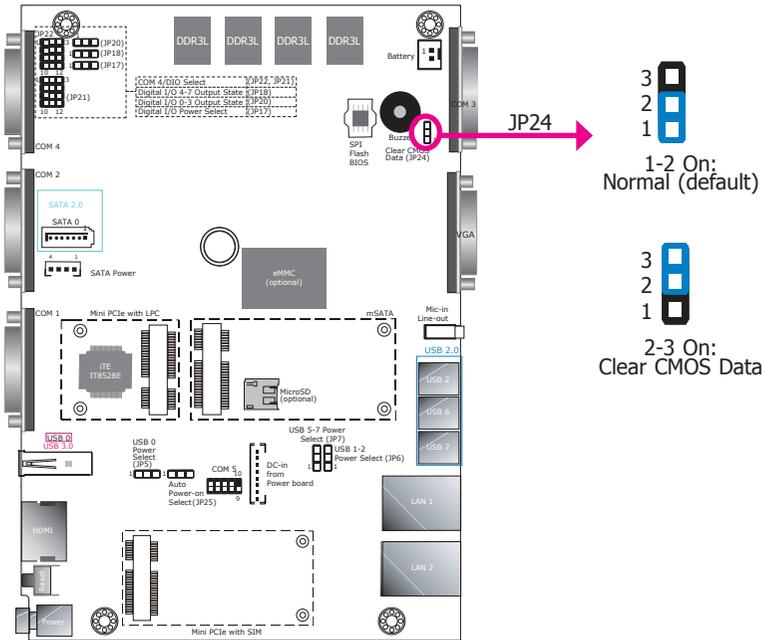
To install a CANbus card, connect the cable between the card the pin headers (JP21 and JP22), then you can use COM 4 as a CANbus port. For pin assignments for COM 4, refer to Chapter 5 – Ports and Connectors. To switch signals for COM 4, refer to Chapter 4 – Jumper Settings.

**Note:**

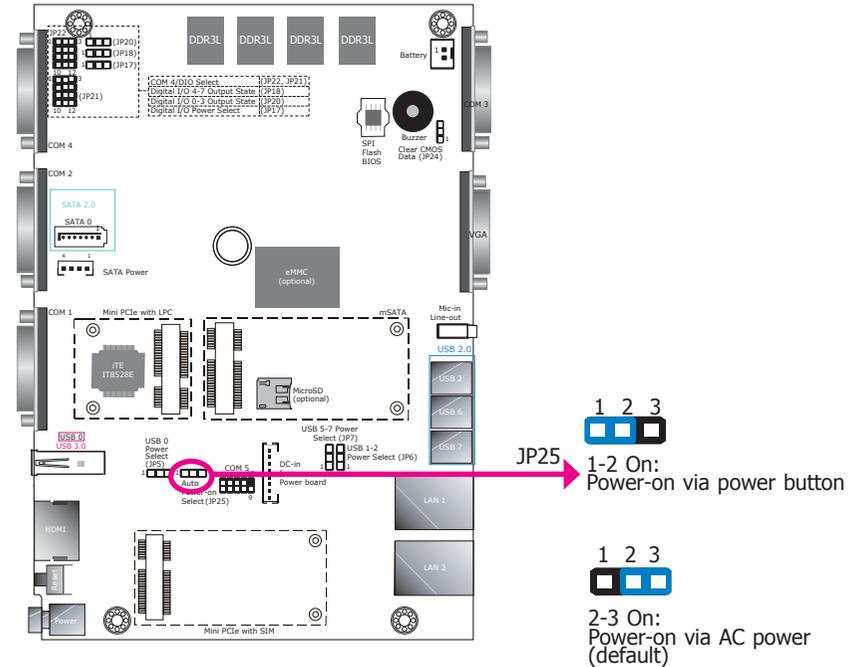
The system also has one additional full-size Mini PCIe slot that provides mSATA (SATA signals) interface.

Chapter 4 - Jumper Settings

Clear CMOS Data



Auto Power-on Select



If you encounter the following situations, you can reconfigure the system with the default values stored in the ROM BIOS.

- CMOS data becomes corrupted.
- You forgot the supervisor or user password.

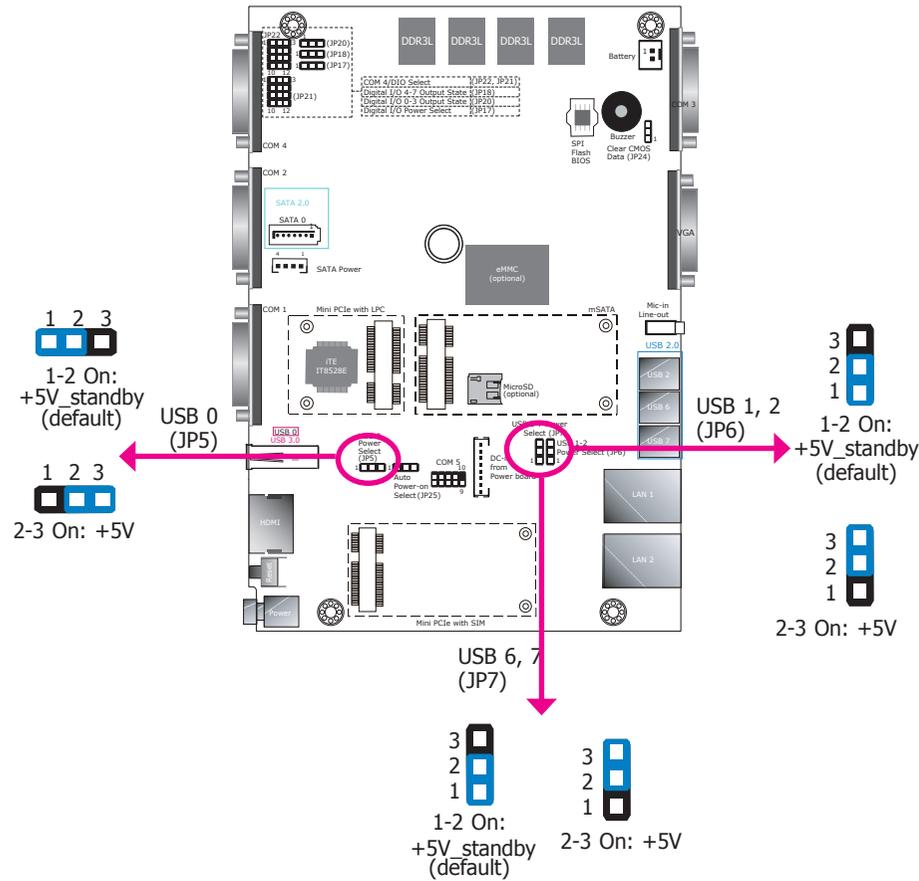
To load the default values stored in the ROM BIOS, please follow the steps below.

- Power-off the system and unplug the power cord.
- Set the jumper pins 2 and 3 to On. Wait for a few seconds and set the jumper back to its default setting, pins 1 and 2 On.
- Now plug the power cord and power-on the system.

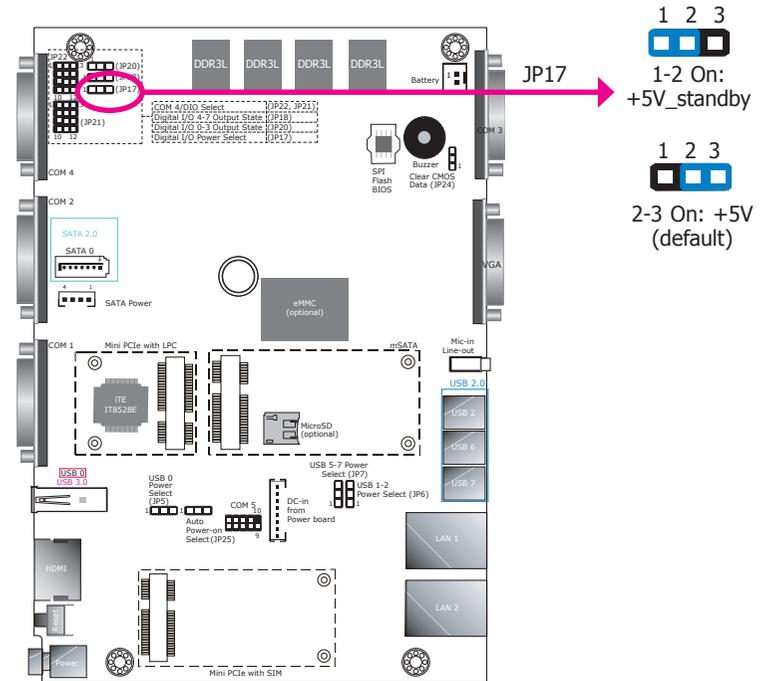
JP25 is used to select the method of powering on the system. If you want the system to power on whenever AC power comes in, set the jumper pins 2 and 3 to "On." If you want to use the power button, set pins 1 and 2 to "On."

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

USB Power Select



Digital I/O Power Select

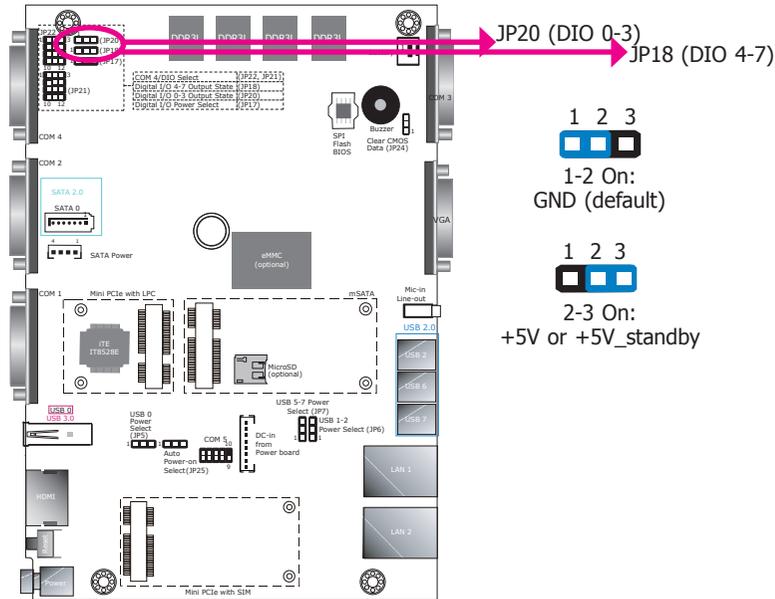


JP17 is used to select the power of the DIO (Digital I/O) signal.

JP5, JP6 and JP7 are used to select the power of the USB ports. Selecting +5V_standby will allow you to use USB devices to wake up the system.

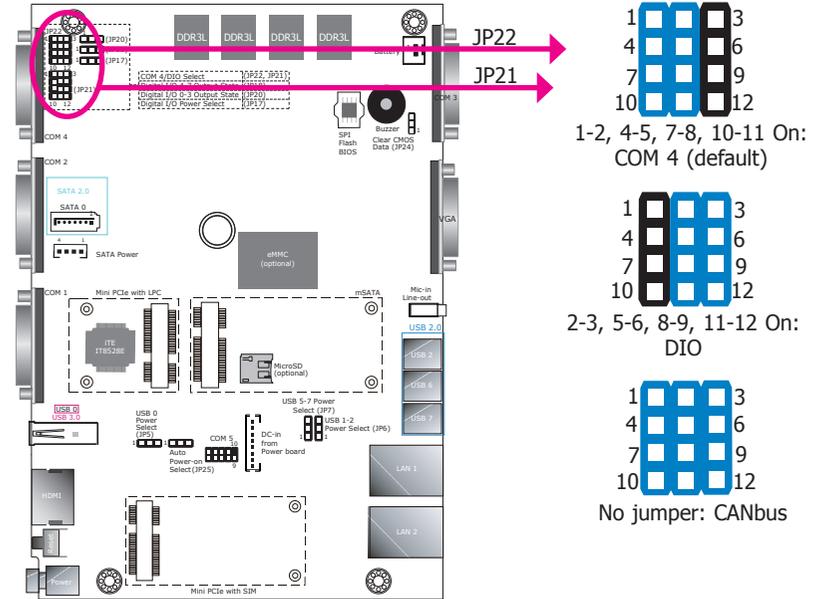
Important: If you are using the Wake-On-USB Keyboard/Mouse function for 2 USB ports, the +5V_standby power source of your power supply must support $\geq 1.5A$. For 3 or more USB ports, the +5V_standby power source of your power supply must support $\geq 2A$.

Digital I/O Output State



JP20 (DIO pin 0-3) and JP18 (DIO pin 4-7) are used to select the state of DIO output: pull-high or pull-low. When the pull-high state is selected, the level of the DIO signal will be the same as the JP17's setting.

COM 4/DIO/CANbus Select



The system board uses JP21 and JP22 to select among serial port COM 4, 8-bit DIO or CANbus on the front panel. For more information on installing a CANbus card, please refer to Chapter 3 – Installing Devices.

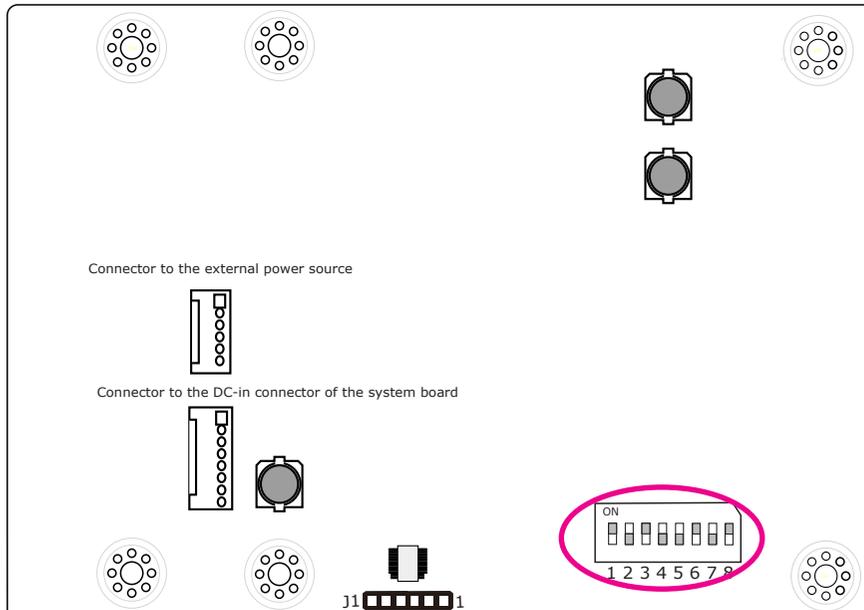


Note:

You cannot use COM 4, DIO and CANbus at the same time. Please set up JP21 and JP22 together.

System-on/off Delay Switch

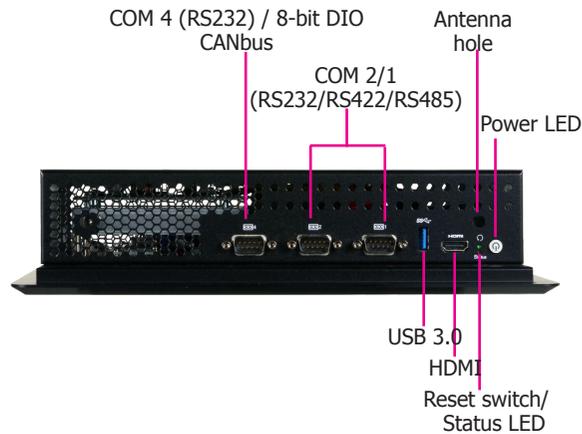
The DIP switch (SW1) on the **power board (X103- EC36)** can be used to turn on or off the system at a specific on/off delay time via car ignition. For the system's power connector and its pin assignments, please refer to Chapter 5 – Ports and Connectors.



SW1-2: System-on delay enable/disable				
	On (Default)	Enable (delay time setting adjustable by SW1-4 and 1-5 as shown below)		
	Off	Disable (System-on delay = 3 sec)		
SW1-4 and 1-5: System-on delay time setting				
	4	5	Time	
	On	On	10 sec (default)	
	Off	On	30 sec	
	On	Off	1 min	
	Off	Off	5 min	
SW1-3: System-off delay enable/disable				
	On (Default)	Enable (delay time setting adjustable by SW1-6, 1-7 and 1-8 as shown below)		
	Off	Disable (System-off delay = 0 sec)		
SW1-6, 1-7 and 1-8: System-off delay time setting				
	6	7	8	Time
	On	On	On	30 sec (default)
	Off	On	On	1 min
	On	Off	On	3 min
	Off	Off	On	5 min
	On	On	Off	10 min
	Off	On	Off	15 min
	On	Off	Off	30 min
	Off	Off	Off	1 hr

Chapter 5 - Ports and Connectors

Front Panel I/O Ports



The front I/O panel consists of the following ports:

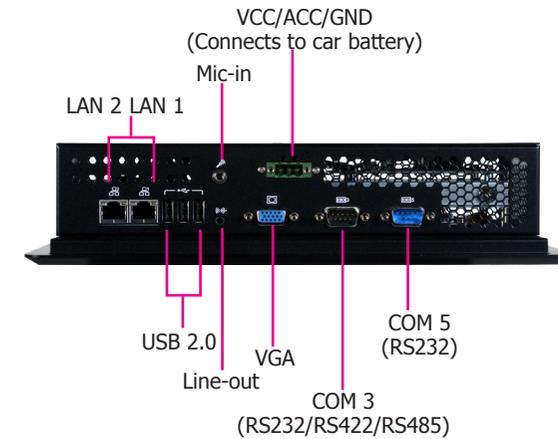
- Control and status panel
 - Power LED (green)
 - Status LED (blue)
 - A reset switch
- Display output
 - HDMI port
- USB 3.0 port
- Three serial ports:
 - COM 1 and 2 are RS232/RS422/RS485 ports
 - COM 4 can be a serial or an 8-bit DIO port*



Note:

You can also choose to configure the COM 4 port to be a CANbus (Controller Area Network) interface instead.

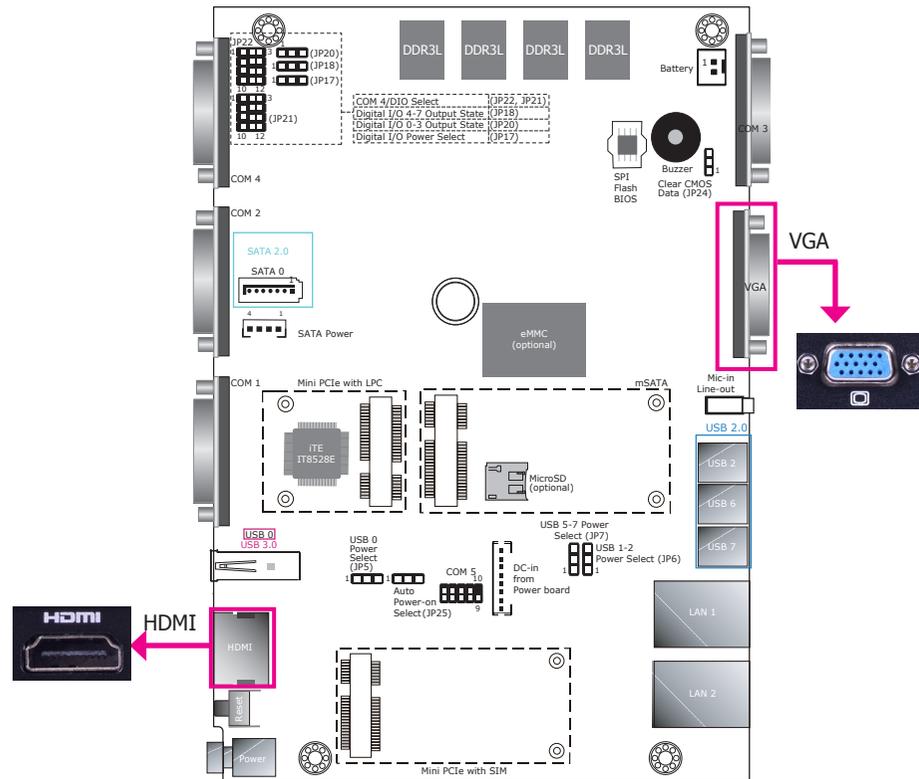
Rear Panel I/O Ports



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

- Two serial ports
 - RS232/RS422/RS485 port
 - RS232 port
- Display output
 - VGA port
- Audio output
 - Mic-in
 - Line-out
- Three USB 2.0 ports
- Two LAN ports
- Power connector (with ignition control)

Display Outputs



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.

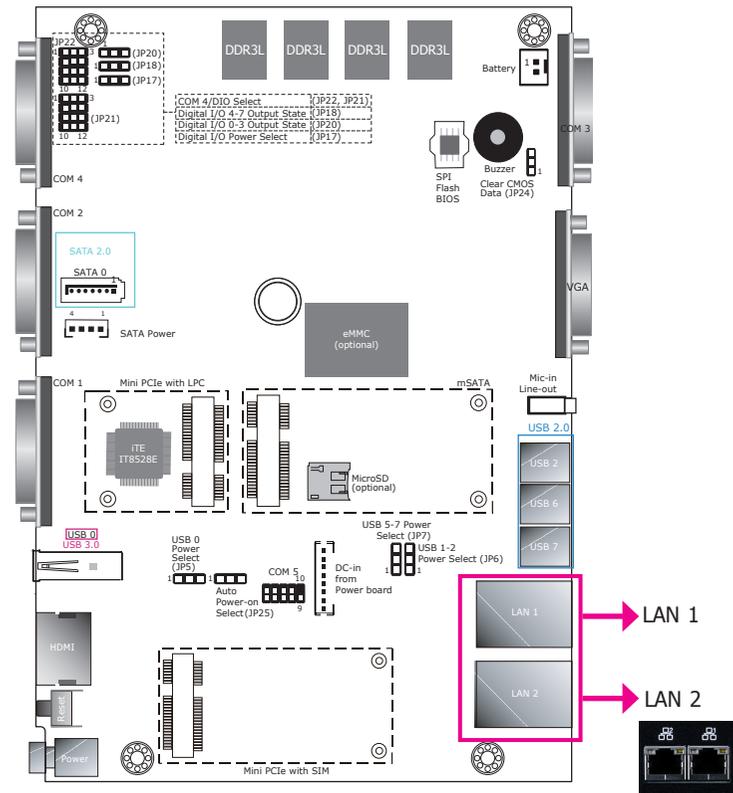
HDMI Port

The HDMI port, which carries both digital audio and video signals, is used to connect the HDMI port of an LCD monitor or a digital TV.

Driver Installation

Install the graphics driver. Please refer to Chapter 8 for more information.

RJ45 LAN Ports



Features

- 2 Intel® I210AT PCIe Gigabit Ethernet controllers

The LAN ports allow the system to connect to a local area network. They are capable of Pre-boot eXecution Environment (PXE), which boots up the system through a boot file and boot image from a remote server.

BIOS Setting

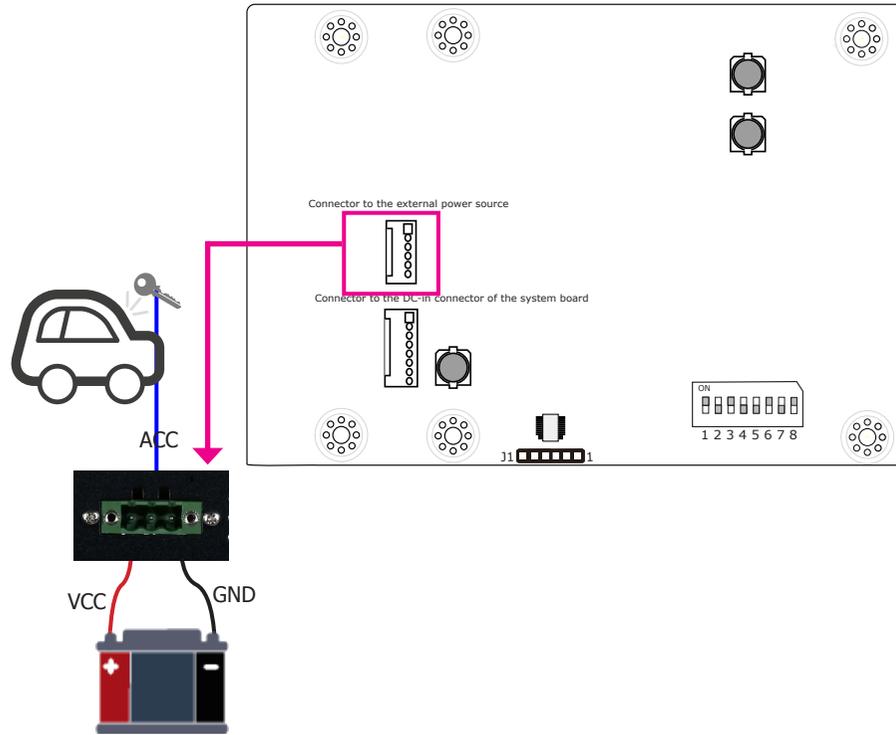
Configure PXE related functions in the Advanced menu ("Advanced" > "Network Stack Configuration" and "Advanced" > "CSM Configuration" submenus) of the BIOS. Refer to Chapter 7 for more information.

Driver Installation

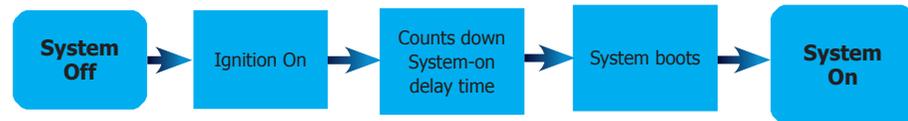
Install the LAN drivers. Refer to Chapter 8 for more information.

Power Connector

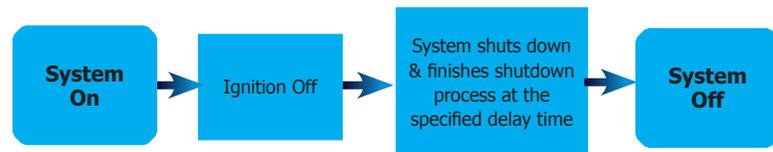
Power Board (X103- EC36)



System startup process with in-vehicle power control



System shutdown process with in-vehicle power control



The 3-pole power connector connects to a car battery for power supply. Note that the system accepts a wide power range of 9 to 36V with in-vehicle power management that includes ignition on/off and system on/off delay time control; please refer to the table on the right for startup/shutdown control and the above diagram for startup/shutdown process diagram.

System-on/off Delay Switch

The DIP switch (SW1) on the power board (X103- EC36) can be used to turn on or off the system at a specific on/off delay time via car ignition. Note that this table shows that same information as the one in Chapter 4 – Jumper Settings.

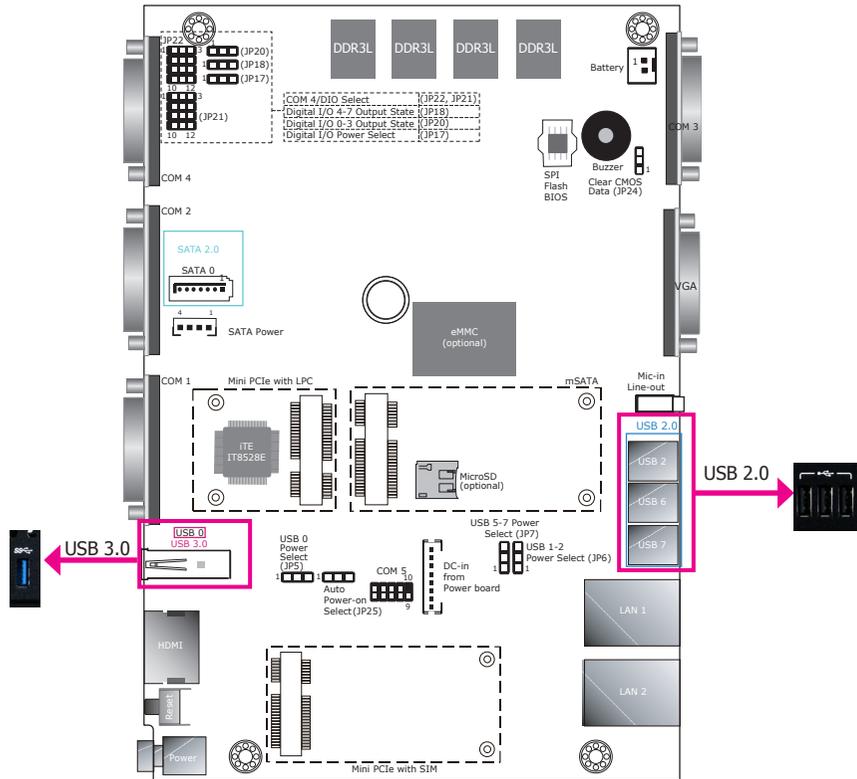
SW1-2: System-on delay enable/disable				
	On (Default)	Enable (delay time setting adjustable by SW1-4 and 1-5 as shown in the table below)		
	Off	Disable (System-on delay = 3 sec)		
SW1-4 and 1-5: System-on delay time setting Configure the number of seconds after which the system will start the power-on process.				
	4	5	Time	
	On	On	10 sec (default)	
	Off	On	30 sec	
	On	Off	1 min	
Off	Off	5 min		
SW1-3: System-off delay enable/disable				
	On (Default)	Enable (delay time setting adjustable by SW1-6, 1-7 and 1-8 as shown in the table below)		
	Off	Disable (System-off delay = 0 sec)		
SW1-6, 1-7 and 1-8: System-off delay time setting* Configure the number of seconds by which the system will complete the power-off process.				
	6	7	8	Time
	On	On	On	30 sec (default)
	Off	On	On	1 min
	On	Off	On	3 min
	Off	Off	On	5 min
	On	On	Off	10 min
	Off	On	Off	15 min
	On	Off	Off	30 min
Off	Off	Off	1 hr	



Note:

The OS will start the shut-down procedure after the car ignition switches off and will complete the shutdown procedure within the specified system-off delay time. Please make sure that system-off delay time is sufficient to allow the OS to shut down completely.

USB Ports



The USB devices allow data exchange between your system and a wide range of simultaneously accessible external Plug and Play peripherals.

The system board is equipped with 1 external USB 3.0 and 3 external USB 2.0 ports.

BIOS Setting

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

Driver Installation

You may need to install the proper drivers in your operating system to use the USB device. Refer to Chapter 8 for more information.

Wake-On-USB Keyboard/Mouse

The Wake-On-USB Keyboard/Mouse function allows you to use a USB keyboard or USB mouse to wake up a system from the S3 (STR - Suspend To RAM) state. To use this function, set the jumpers JP5, JP6 and JP7 must be set to "1-2 On: +5V_standby". Refer to "USB Power Select" in Chapter 4 for more information.



Important:

When installing Windows 7, only native USB devices (USB port 0 to USB port 2) can operate under the DOS mode. Please refer to the following tables for more information on the types of the USB ports.

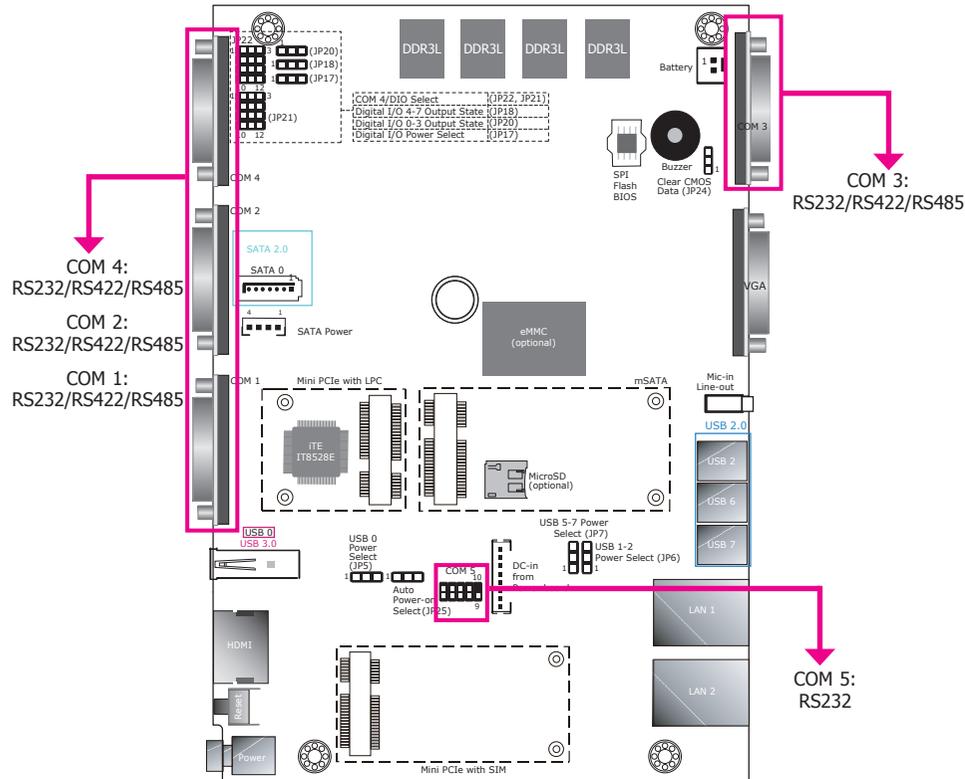
Table 1. OS Selection

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

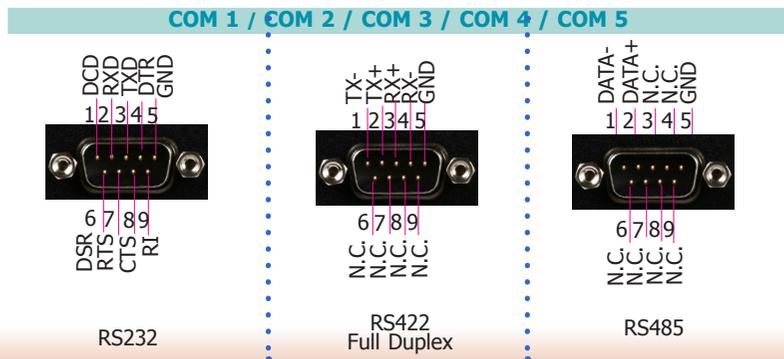
Table 2. The Types of the USB Ports

Model Name	BT253
USB 0 (3.0)	Native
USB 2	Native (shared with the USB 3.0 port)
USB 6 (2.0)	HSIC port 2
USB 7 (2.0)	HSIC port 3

COM Ports / 8-bit DIO / CANbus



COM 1, COM 2, COM 3 and COM 4 can be selected among RS232, RS422 and RS485 whereas COM 5 is only an RS232 port. In addition, COM 4 can be used as a serial, an 8-bit DIO or a CANbus port; refer to Jumper Settings in Chapter 4 for the respective configuration.



CANbus Port

The Controller Area Network (CAN) enables communication among engine control units (ECUs) and sensors used in a motor vehicle.

8-bit DIO

The 8-bit Digital I/O connector can be configured as 8 inputs or outputs to provide monitoring and control function to connected external devices. We have built support software called EAPI that enables the functionality of hardware components. Please contact our tech support or sales representatives for the support software package.

BIOS Setting

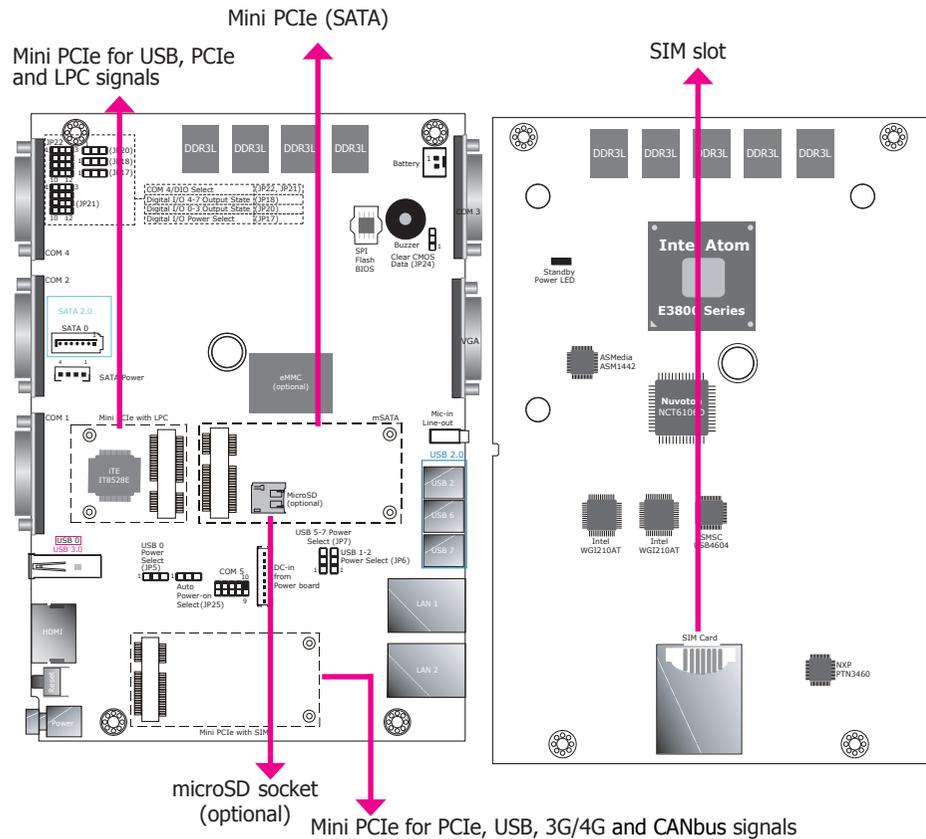
Configure the COM ports including its communication mode in the Advanced menu ("Super IO Configuration" submenu) of the BIOS. Refer to Chapter 7 for more information.

Pins	COM 1 ~ COM 5 Pin Assignments			
	RS232	RS422 (full)	RS422 (half)	RS485
1	DCD	RX+	RX+	DATA+
2	RXD	RX-	RX-	DATA-
3	TXD	TX+	NC	NC
4	DTR	TX-	NC	NC
5	GND	NC	NC	NC
6	DSR	NC	NC	NC
7	RTS	NC	NC	NC
8	CTS	NC	NC	NC
9	RI	NC	NC	NC

COM 4 DIO			
Pins	DIO Pin Assignments		
	COM 4		
1	DIO_0	6	DIO_4
2	DIO_1	7	DIO_5
3	DIO_2	8	DIO_6
4	DIO_3	9	DIO_7
5	GND		

COM 4 CANbus			
Pins	CANbus Pin Assignments		
	COM 4		
1	CAN1-L	6	J1708-L
2	CAN1-H	7	J1708-H
3	CAN2-L	8	N/C
4	CAN2-H	9	N/C
5	GND		

Expansion Slots



SIM Slot

The SIM slot can work with the top-side Mini PCIe slot to provide 3G/4G connectivity.

Mini PCI Express Slots

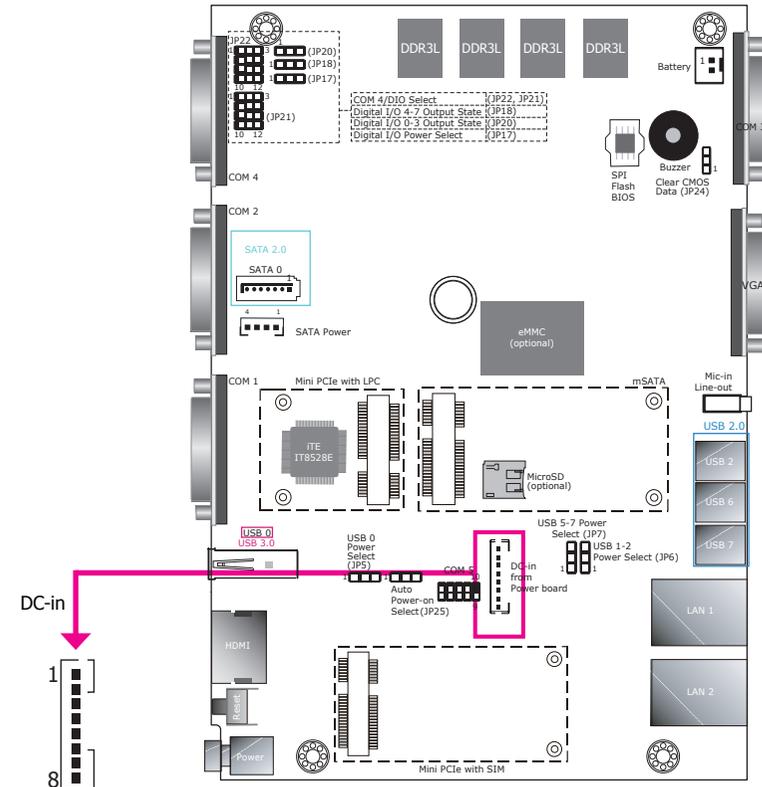
The three Mini PCI Express slots on the system board are used to install 2 full-size Mini PCIe cards and one half-size Mini PCIe card. These card slots can accommodate different types of Mini PCIe cards to expand capabilities of the system in different aspects, including capacity and communication. For example, the half-size Mini PCIe slot can be installed with a Bluetooth or WiFi module while the other two slots can be installed with an mSATA module and a cellular module (or a CANbus module).

microSD Socket

The microSD socket allows you to install a microSD card for expansion of the available memory.

I/O Connectors

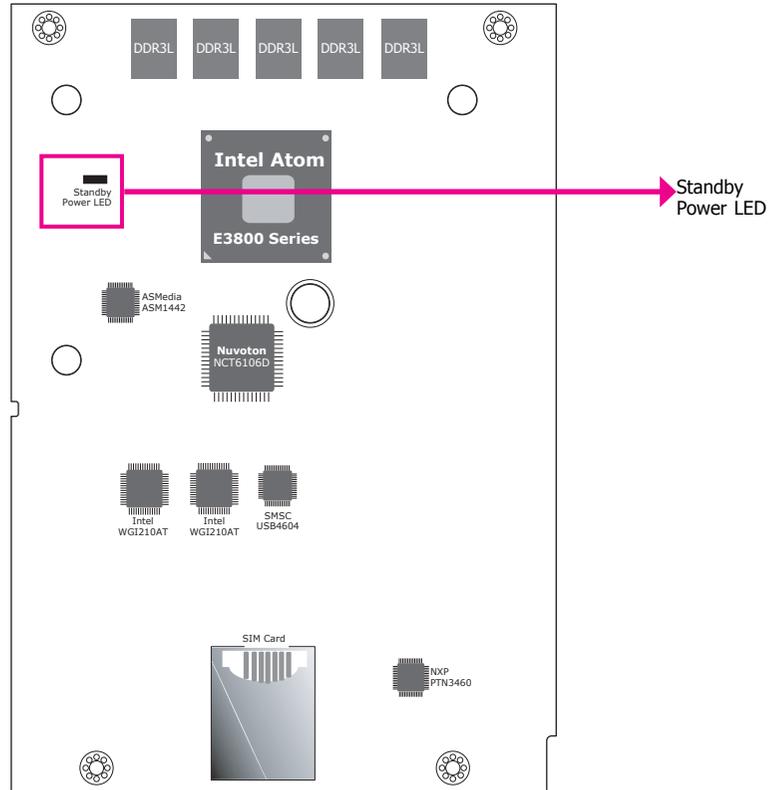
DC-in Connector



Pins	DC-in Connector	
1	GND	5 I2C_DATA
2	GND	6 12V_IN
3	POWER-OFF	7 12V_IN
4	I2C_CLK	8 12V_IN

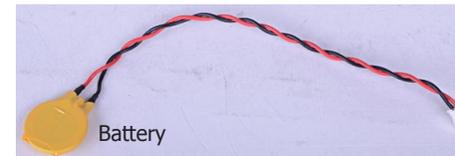
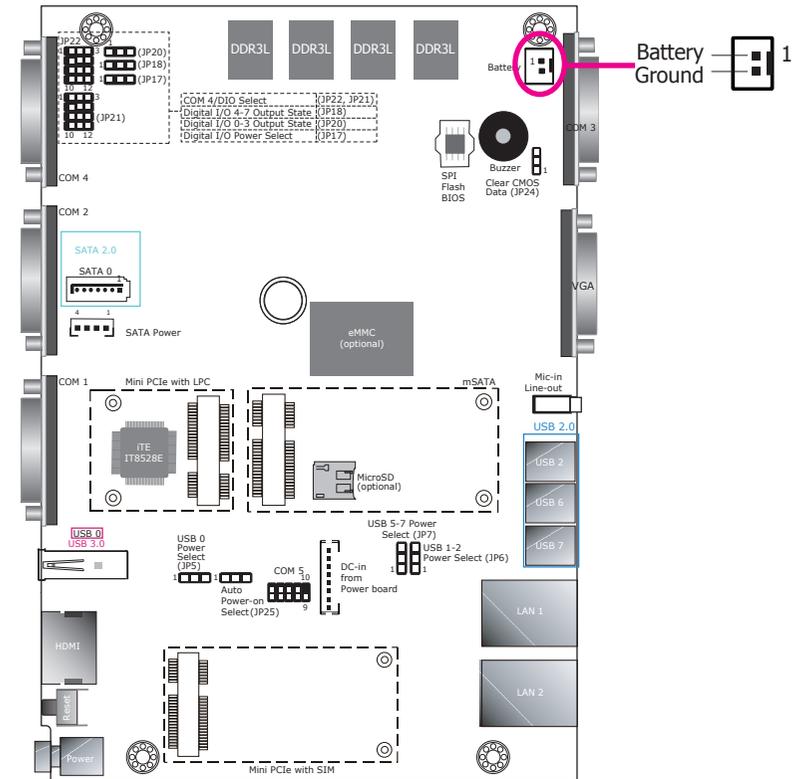
This DC-in connector is used to connect to the DC-out connector of the power board (*X103-EC36*).

LEDs



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

Battery



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

Safety Measures

- Danger of explosion if battery incorrectly replaced.
- Replace only with the same or equivalent type recommend by the manufacturer.
- Dispose of used batteries according to local ordinance.

Chapter 6 - Mounting Options

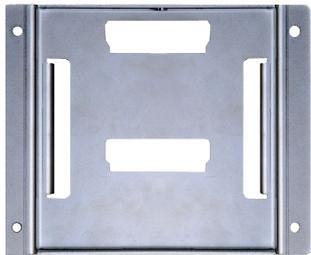
Wall Mount


Note:

The system unit used in the following illustrations may not resemble the actual one. These illustrations are for reference only.

The wall mount kit includes the following:

- 2 wall mount brackets
- Bracket screws

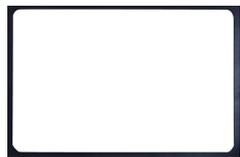


Wall mount bracket 1



Wall mount bracket 2

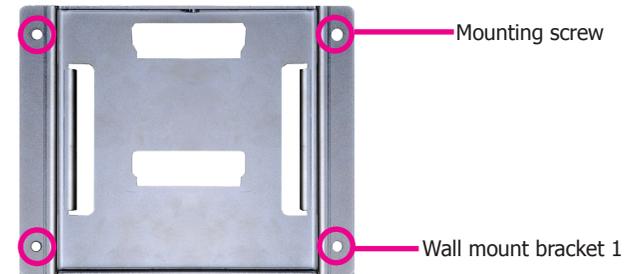
1. Before starting any installation procedure, attach the poron foam to the Panel PC.



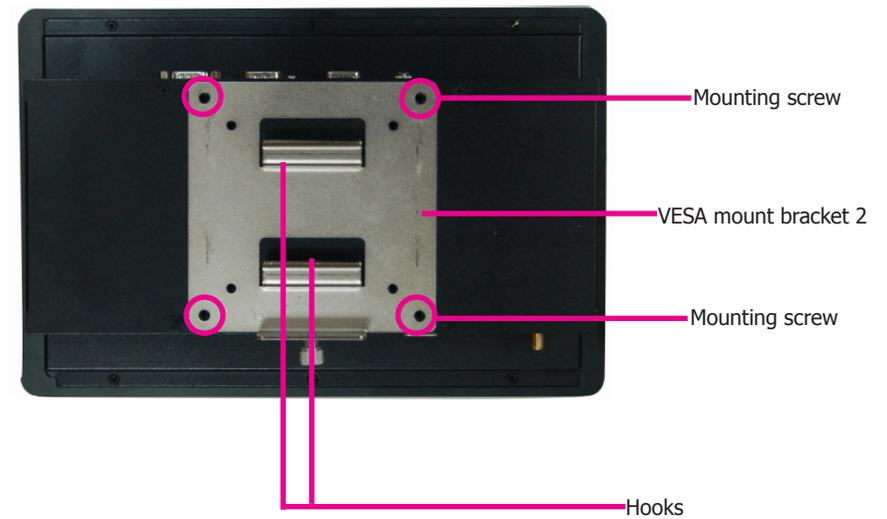
Poron foam



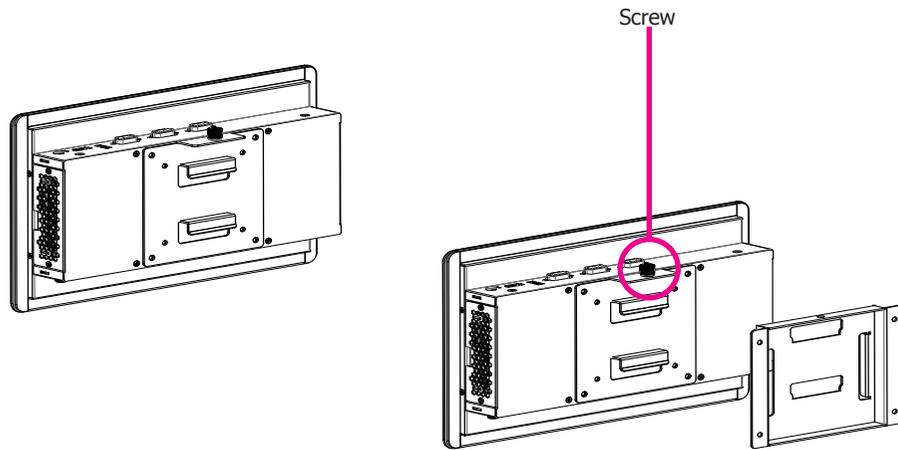
2. Select a place on the wall where you will mount the system.
3. Use the provided mounting screws to attach "Wall mount bracket 1" to the wall.



4. Attach the other bracket (wall mount bracket 2) to the rear of the system.



- Slide the Panel PC to "wall mount bracket 1" to attach the two brackets with the hooks. Then tighten the screw to secure the assembly in place.



Panel Mount



Note:

The system unit used in the following illustrations may not resemble the actual one. These illustrations are for reference only.

The panel mounting kit includes the following:

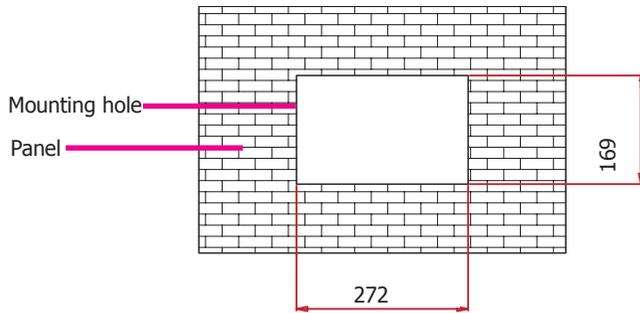
- 6 mounting clamps



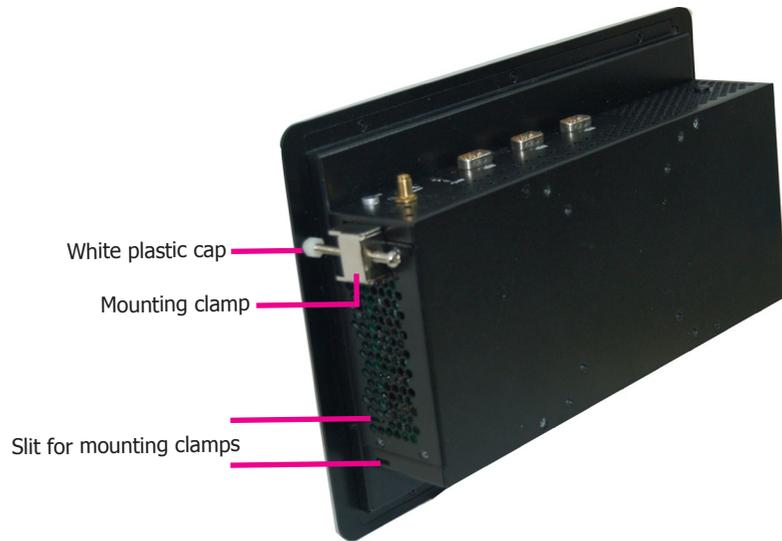
- Before starting any installation procedures, attach the poron foam to the Panel PC.



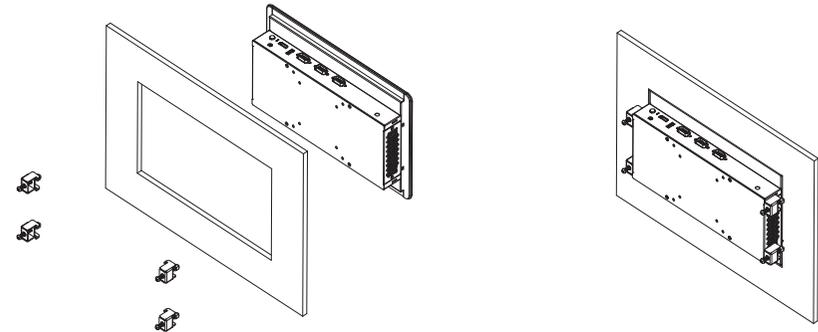
- Select a place on the panel (or wall) where you will mount the system.
- Cut out a shape on the panel that corresponds to the system's rear dimensions (272mm x 169mm) and ensure that the system can be fitted into the panel properly.



4. Insert the system from the outside surface of the panel into the mounting hole until it is properly fitted against the panel.
5. Position the mounting clamps along the rear edges of the system and insert them into the slits around the system.



6. The first and second clamps must be positioned and secured diagonally prior to mounting the rest of the clamps. Tighten the clamp's screw using an electric screwdriver by pressing the white plastic cap onto the back of the panel. The illustration below shows that all clamps are properly mounted.



Chapter 7 - BIOS Setup

Overview

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

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



Note:

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

Default Configuration

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

Entering the BIOS Setup Utility

The BIOS Setup Utility can only be operated from the keyboard and all commands are 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 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 highlight 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.
<F1>	Display general help
<F2>	Load previous values
<F9>	Load optimized defaults
<F10>	Saves and resets the setup program.
<Enter>	Press <Enter> to enter the highlighted submenu.

Scroll Bar

When a scroll bar appears to the right of the setup screen, it indicates that there are more available fields not shown on the screen. Use the up and down arrow keys to scroll through all the available fields.

Submenu

When "►" appears on the left of a particular field, it indicates that a submenu which contains additional options are available for that field. To display the submenu, move the highlight to that field and press <Enter>.

AMI BIOS Setup Utility

Main

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



System Date

The date format is <day>, <month>, <date>, <year>. Day displays a day, from Sunday to Saturday. Month displays the month, from January to December. Date displays the date, from 1 to 31. Year displays the year, from 1980 to 2099.

System Time

The time format is <hour>, <minute>, <second>. The time is based on the 24-hour military-time clock. For example, 1 p.m. is 13:00:00. Hour displays hours from 00 to 23. Minute displays minutes from 00 to 59. Second displays seconds from 00 to 59.

Advanced

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



Important:

Setting incorrect field values may cause the system to malfunction.



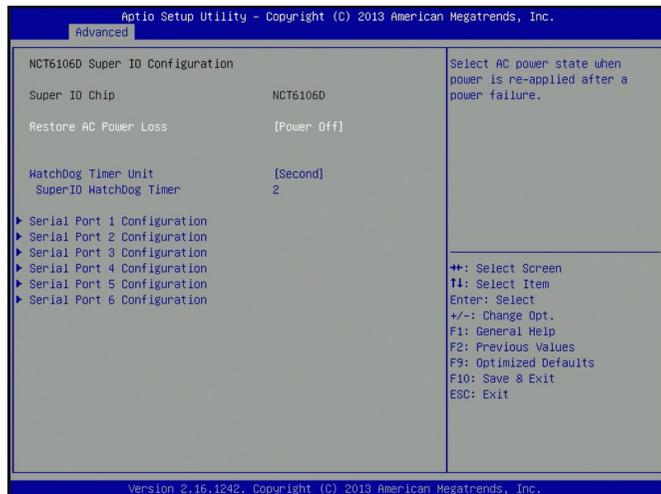
OS Selection

OS Selection: Windows 7 or Windows 8.X.

eMMC Support: enable or disable the CPU's support for the eMMC. The eMMC is an optional device.

NCT6106D Super IO Configuration

This section sets the serial ports' parameters.

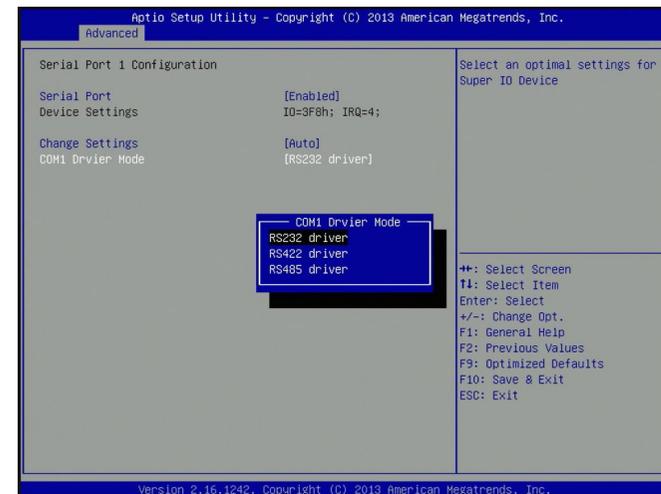


Restore AC Power Loss

Set the AC power loss to power-on or power-off. When it is set to power-off, the system's status will remain power-off after an AC power loss event. When it is set to power-on, the system will automatically power on after an AC power loss event.

WatchDog Timer Unit

Select the timer unit, i.e., minutes or seconds, for the watchdog timer. And input any value between 1 and 255 in the "SuperIO WatchDog Timer" field to enable and "0" to disable this function. This function uses a timed delay before a system powers down or resets after the BIOS or operating system fails.



Serial Port 1-6 Configuration

Enable or disable each COM port.

Change Settings

Select the IO and IRQ address for each COM port.

COM Driver Mode

Set the serial communication mode for each COM port. This option is only available for COM Port 1 to 4.

HW Monitor

This section shows system health information.

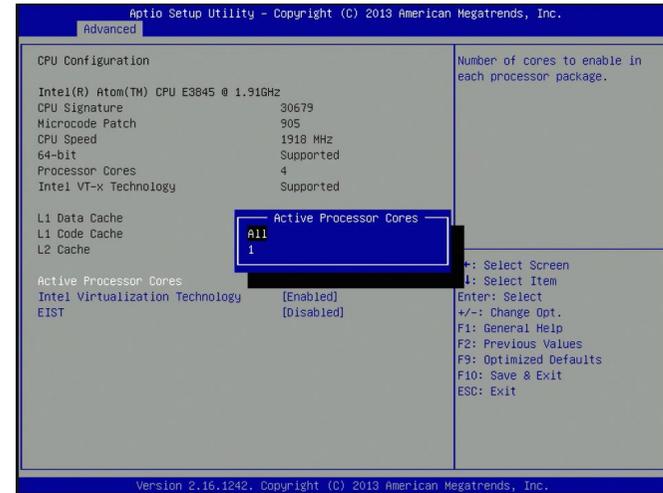


Case Open

Set this field to "Enabled" to allow the system to alert you of a chassis intrusion event. Note that the chassis intrusion connector should be connected for this function to work.

CPU Configuration

This section configures the CPU. It also displays the CPU information.



Active Processor Cores

Select "1" to use only one of the CPU's cores or "All" for all of the available cores.

Intel Virtualization Technology

Select "Enabled" to let the system utilize the hardware-assisted virtualization capabilities provided by Intel® Virtualization Technology (Intel® VT) in a virtualized environment.

EIST

Enable or disable the Enhanced Intel SpeedStep® Technology (EIST), which helps optimize the balance between system's power consumption and performance. After it is enabled in the BIOS, you can enable the EIST feature using the operating system's power management.

SATA Configuration

This section configures SATA devices. It also shows the information about the installed SATA drives.



Serial-ATA (SATA)

Serial-ATA Controller 0-1

Activate or deactivate the SATA controller.

Serial-ATA Port 0 and Port 1

Enable or disable Serial ATA port 0 and 1.

The SATA Port 0 controls the onboard SATA port.

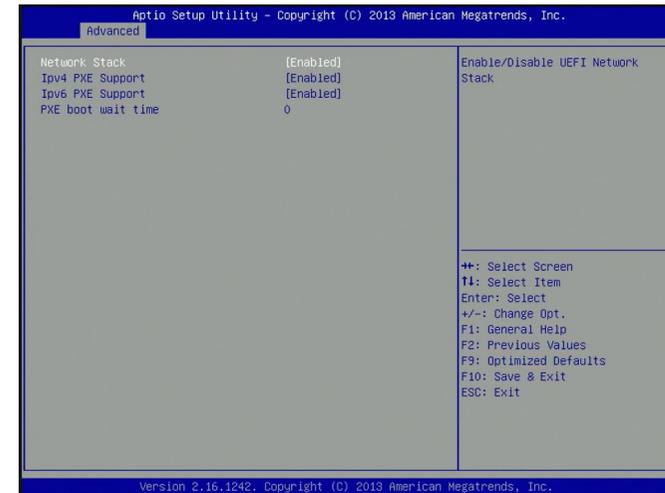
The SATA Port 1 controls the Mini PCIe slot for mSATA (full size).

SATA Port HotPlug

Enable or disable hot-plugging for Serial-ATA port 0 and 1.

Network Stack Configuration

This section configures network stack settings.



When the Network Stack is enabled, the screen will display the following information:

Ipv4 PXE Support

When enabled, Preboot eXecution Environment (PXE) boot using IPv4 addressing scheme will be supported. When disabled, the Ipv4 PXE boot option will not be supported.

Ipv6 PXE Support

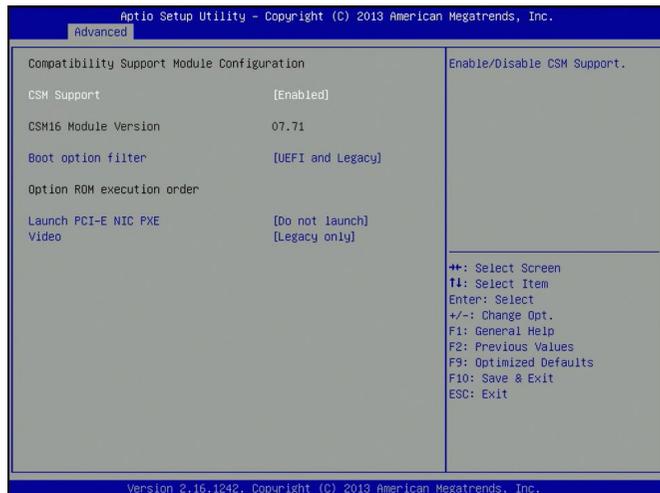
When enabled, Preboot eXecution Environment (PXE) boot using IPv6 addressing scheme will be supported. When disabled, the Ipv6 PXE boot option will not be supported.

PXE boot wait time

Enter the wait time value to abort PXE boot by pressing the "ESC" key.

CSM Configuration

This section configures the Compatibility Support Module (CSM) settings.



CSM Support

Enable or disable the CSM support.

Boot option filter

This option sets the boot options: Legacy, UEFI, or both. This setting will affect the available boot options under the "Boot Option Priorities" in the "Boot" menu.

Launch PCI-E NIC PXE

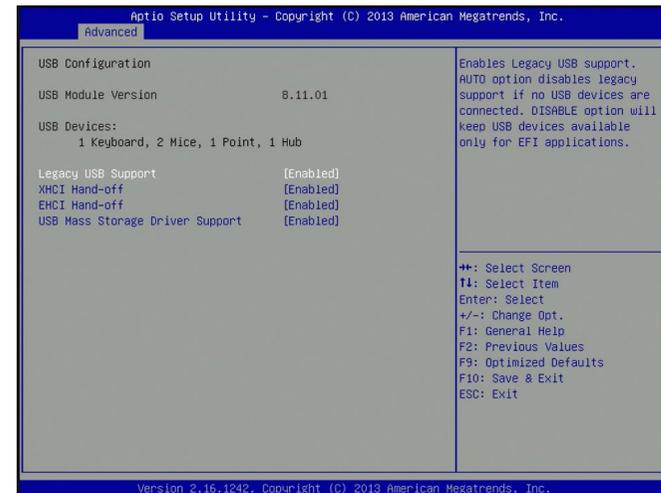
Enable or disable the execution of PXE Option ROM through network interfaces. If you choose to use the UEFI boot, configure the "Network Stack Configuration" menu too.

Video

Choose to allow the execution of UEFI only, Legacy Video Option ROM or none.

USB Configuration

This section configures the parameters of USB devices.



Legacy USB Support

Enabled

Enable legacy USB support.

Disabled

Keep USB devices available only for EFI applications.

Auto

Disable the support for legacy USB devices when no USB devices are connected.

XHCI Hand-off

Enable this option for operating systems that do not support Extensible Host Controller Interface (xHCI) Hand-off. The XHCI ownership change will be claimed by the XHCI driver.

EHCI Hand-off

This item is for operating systems that do not support Enhanced Host Controller Interface (EHCI) Hand-off. When it is enabled, EHCI ownership change will be claimed by the EHCI driver.

USB Mass Storage Driver Support

Enable or disable the the USB Mass Storage Driver.



Important:

When installing Windows 7, only native USB 2.0 devices (USB port 0 to USB port 2) can operate in DOS mode. Please refer to the following tables for more information on the types of the USB ports.

Table 1. OS Selection

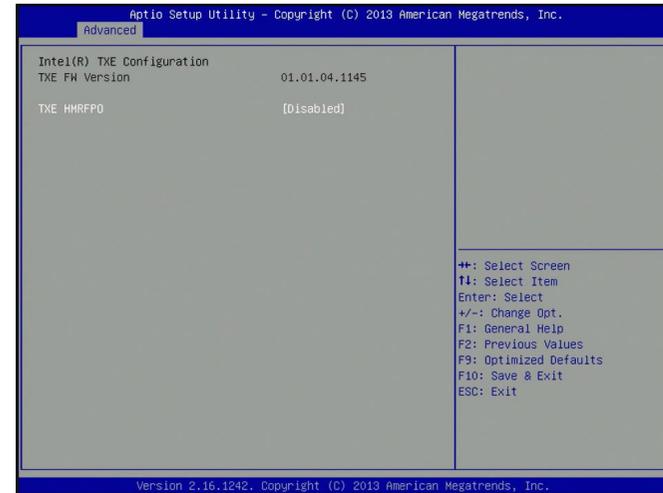
Operation Environment for Customers	DOS	Windows 7	Windows 8.x	Linux
OS Selection in the BIOS Advanced Menu	Windows 8.x	Windows 7	Windows 8.x	Windows 8.x
Available USB ports	All	When installing Windows 7 for the first time, only native USB 2.0 ports can work. Please refer to table 2 below for the USB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

Table 2. The Types of the USB Ports

Model Name	BT253
USB 0 (3.0)	Native
USB 2	Native (shared with the USB 3.0 port)
USB 6 (2.0)	HSIC port 2
USB 7 (2.0)	HSIC port 3

Security Configuration

This section configures the Intel® TXE (Intel® Trusted Execution Engine).

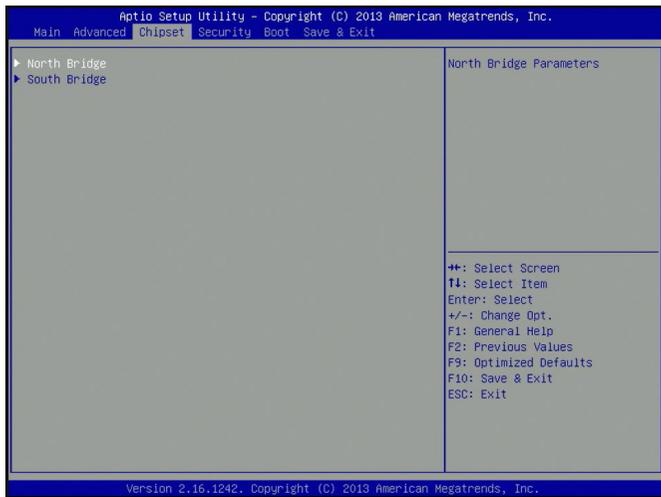


TXE HMRFP0

Enable or disable the Intel® Trusted Execution Engine.

Chipset

This section configures chipset functions.



Select one of the following menus to configure:

North Bridge

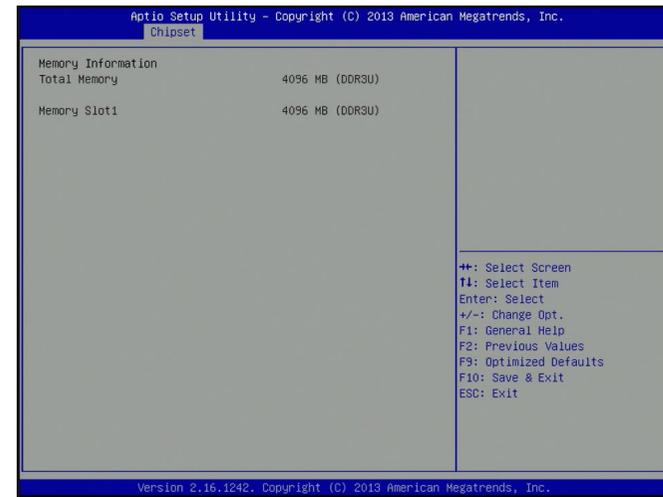
The item in the North Bridge includes memory information.

South Bridge

The items in the South Bridge include USB controllers and PCI Express ports.

Memory Configuration

This section displays the information of the installed memory modules.



South Bridge

This section configures the South Bridge.



Select one of the following items to configure:

USB Configuration

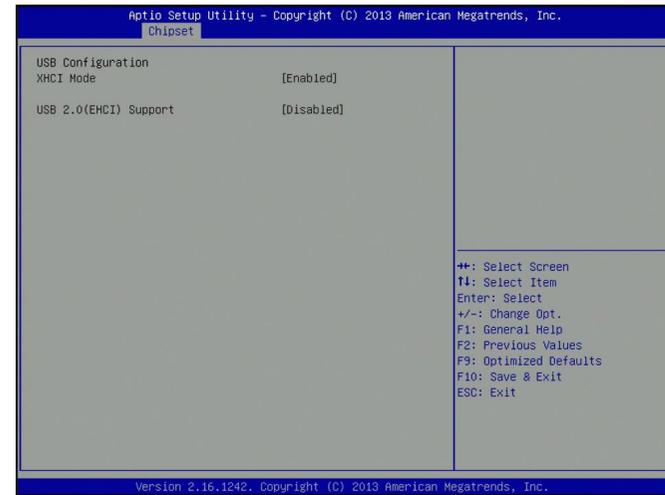
This option lets you configure USB controllers.

PCI Express Configuration

This option lets you configure PCI Express ports.

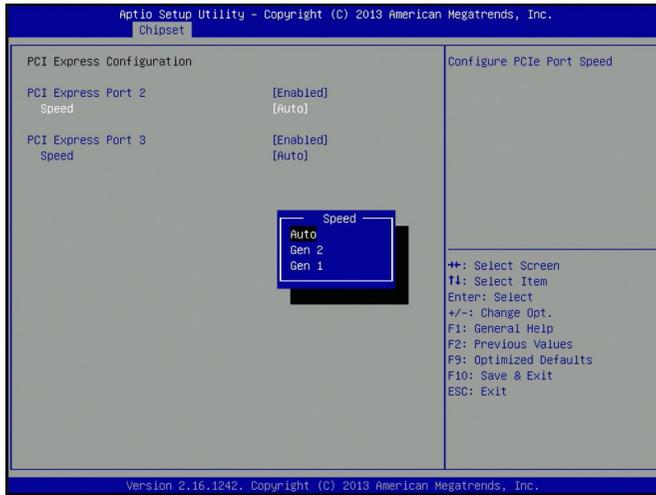
USB Configuration

This section displays information about the system's support for USB controllers.



PCI Express Configuration

This section configures PCI Express root ports.



PCI Express Port 2 and 3

Enable or disable each PCI Express root port in the chipset.

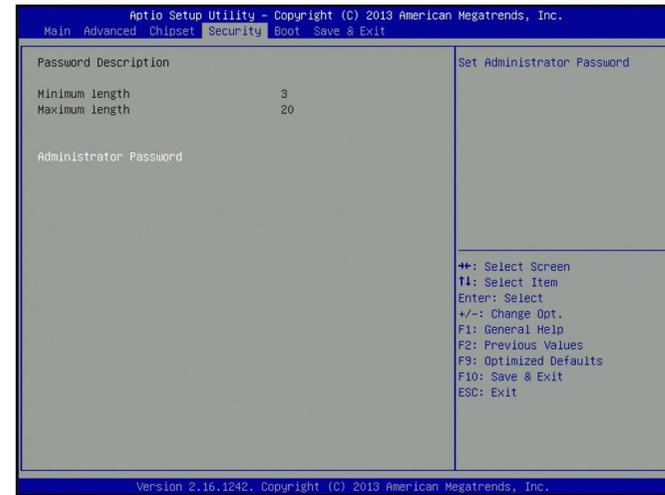
The PCI Express Port 2 controls the full-size Mini PCIe (with PCIe and USB signals) slot.

The PCI Express Port 3 controls the half-size Mini PCIe (with PCIe, USB and LPC signals) slot.

Speed

Select the speed for the PCI Express port: Auto, Gen1 (2.5 GT/s) or Gen2 (5 GT/s).

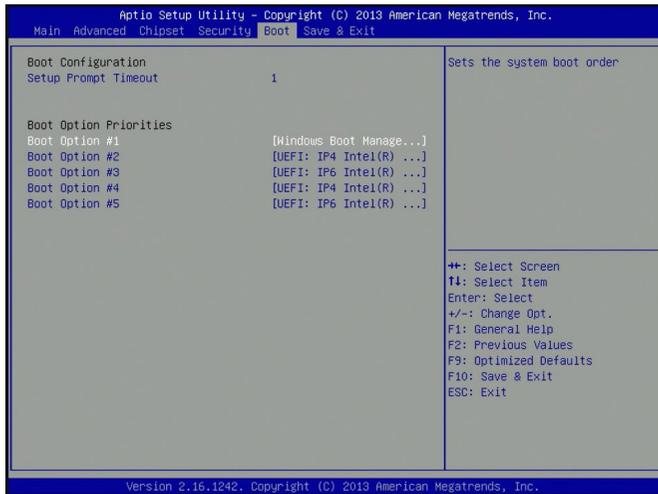
Security



Administrator Password

Set the administrator password. The length of the password must be at least 3 characters and less than or equal to 20 characters. This password establishes the BIOS administrative privilege for entering the setup utility.

Boot



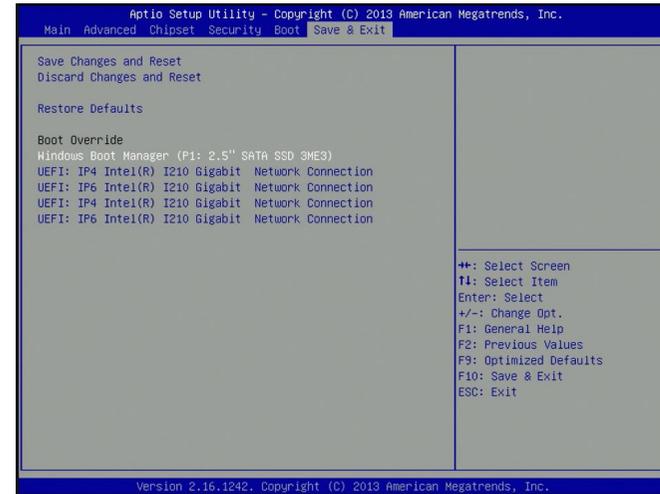
Setup Prompt Timeout

Select the number of seconds to wait for the setup activation key. 65535 (0xFFFF) denotes indefinite waiting.

Boot Option Priorities

This allows you to select detected devices to be the boot devices and boot order of the devices.

Save & Exit



Save Changes and Reset

To save your changes, select this field and then press <Enter>. A dialog box will appear. Select "Yes" to reset the system after saving all changes.

Discard Changes and Reset

To discard your changes, select this field and then press <Enter>. A dialog box will appear. Select Yes to reset the system setup without saving any changes.

Restore Defaults

To restore and load the optimized default values, select this field and then press <Enter>. A dialog box will appear. Select "Yes" to restore the default values for all the setup options.

Boot Override

Select a boot device below to override a previously defined boot device in the "Boot" menu and boot the system with the selection.

Updating the BIOS

To update the BIOS, you will need the new BIOS file and a flash utility. Please contact technical support or your sales representative for the latest BIOS file and the firmware update utility. For instructions on how to update BIOS with the flash utility, please see <https://www.dfi.com/knowledge/video/5> from the Knowledge Base of the DFI website.

```
C:\AFU\AFUDOS>afudos filename /B /P /N

+-----+
|          AMI Firmware Update Utility(APTIO) v2.25          |
|          Copyright (C)2008 American Megatrends Inc. All Rights Reserved.          |
+-----+

Reading file ..... done
Erasing flash ..... done
Writing flash ..... done
Verifying flash ..... done
Erasing BootBlock ..... done
Writing BootBlock ..... done
Verifying BootBlock ..... done

C:\AFU\AFUDOS>
```

Notice: BIOS SPI ROM

1. The Intel® Management Engine has already been integrated into this system board. Due to the safety concerns, the BIOS (SPI ROM) chip cannot be removed from this system board and used on another system board of the same model.
2. The BIOS (SPI ROM) on this system board must be the original equipment from the factory and cannot be used to replace one which has been utilized on other system boards.
3. If you do not follow the methods above, the Intel® Management Engine will not be updated and will cease to be effective.

Note:



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

Chapter 8 - Supported Software

Some devices of the system require drivers from hardware manufactures to operate properly. The system may come with a CD/DVD that contains drivers, utilities and software applications. Insert the CD into a CD-ROM drive. The auto-run screen (Mainboard Utility CD) will appear. If the "Autorun" does not automatically start, please go to the root directory of the CD and double-click "Setup".

If your product package does not include a CD/DVD, you can download the latest drivers from the DFI Download Center:

<http://www.dfi.com/DownloadCenter>

Once you are in the Download Center page, select your product or type the model name and click "Search" to find product-related resources such as documentation and drivers.

Intel Chipset Device Software

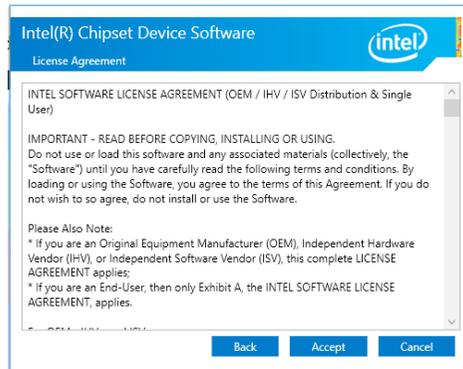
The Intel® Chipset Device Software is used for updating Windows® INF files so that the Intel chipset can be recognized and configured properly in the system.

To install the utility, follow these steps:

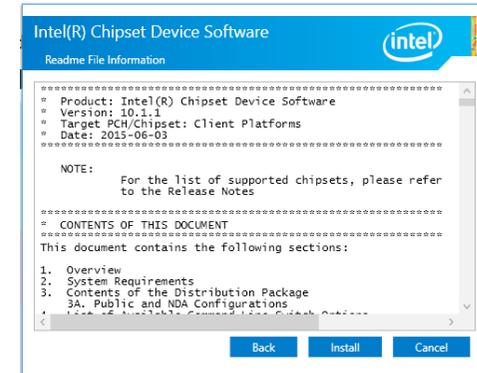
1. Setup is ready to install the utility. Click "Next".



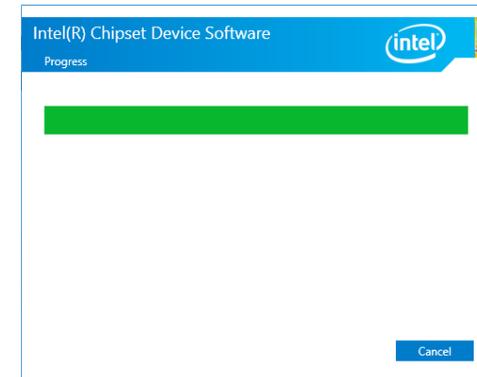
2. Read the license agreement, and then click "Yes".



3. Go through the readme document for system requirements and installation tips, and then click "Next". Please wait while the installation is in progress.



4. Please wait while the installation is in progress.



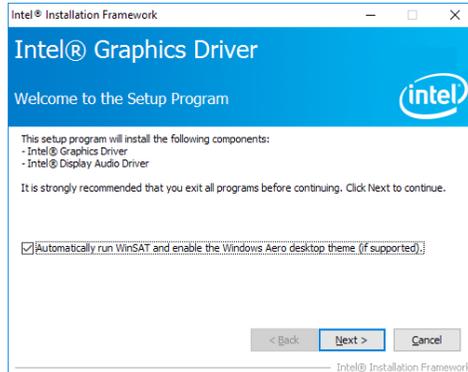
5. Click "Restart Now" to allow the new software installation to take effect.



Intel Graphics Driver

To install this driver, follow these steps:

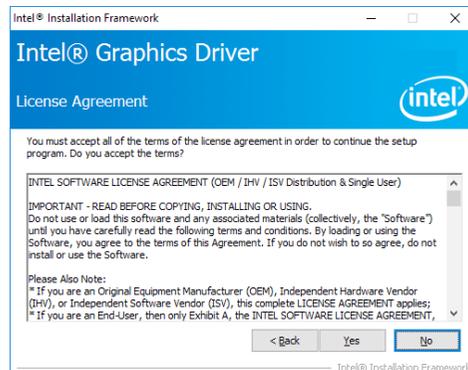
1. Setup is now ready to install the graphics driver. Click "Next".



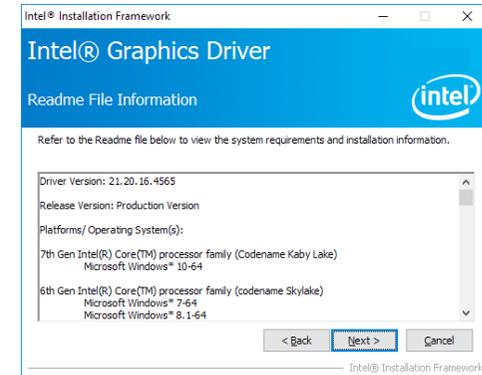
By default, the "Automatically run WinSAT and enable the Windows Aero desktop theme" is enabled. When this is enabled and after the system reboots, the screen will turn blank for 1 to 2 minutes (while WinSAT is running) before the Windows 7 or Windows 10 desktop appears. The "blank screen" period is the time Windows is testing the graphics performance.

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

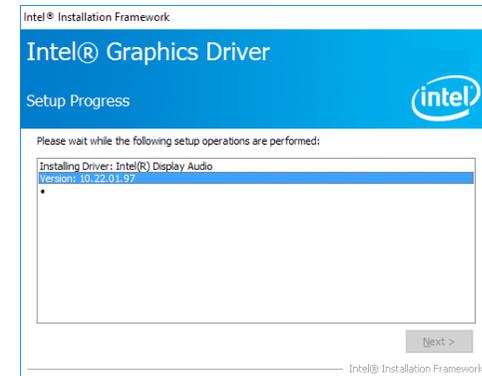
2. Read the license agreement, and then click "Yes".



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

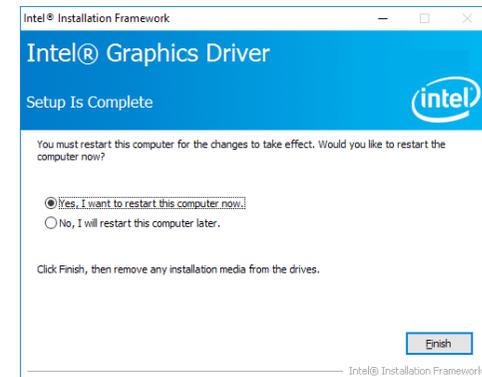


4. Setup is now installing the driver. Click "Next" to continue.



5. Click "Yes, I want to restart this computer now", and then click "Finish".

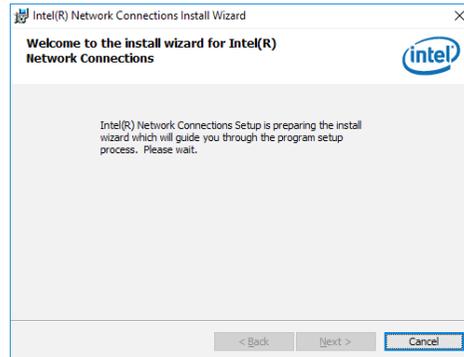
Restarting the system will allow the new software installation to take effect.



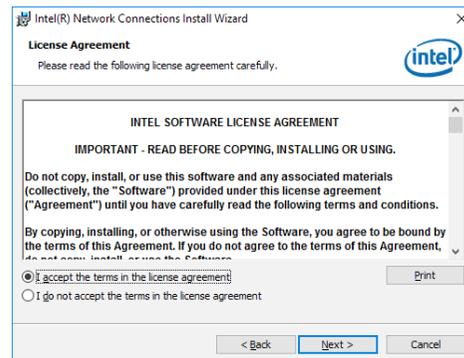
Intel LAN Driver

To install this driver, follow these steps:

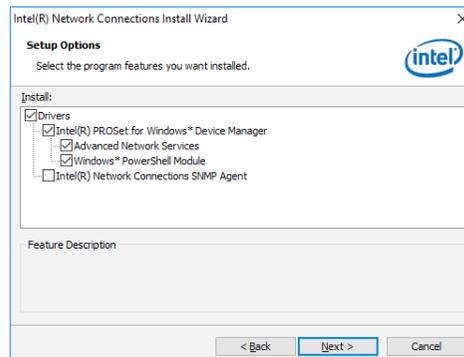
1. Setup is preparing to install the driver. Click "Next" to continue.



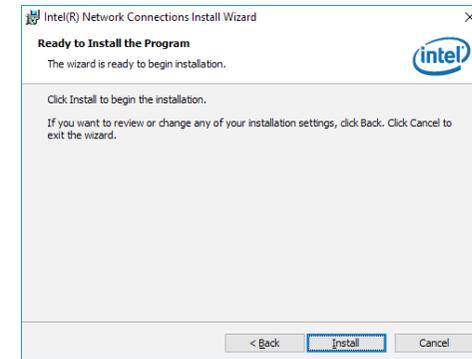
2. Click "I accept the terms in the license agreement" if you accept the agreement, and then click "Next".



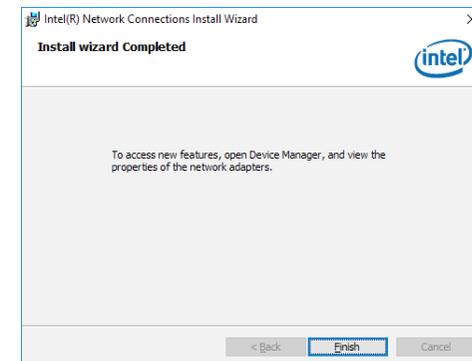
3. Select the program features you want to install, and then click "Next".



4. Click "Install" to begin the installation.



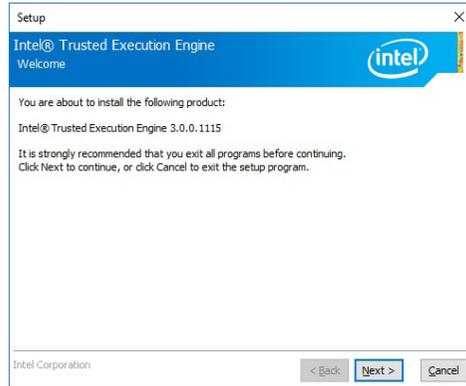
5. After the installation is complete, click "Finish".



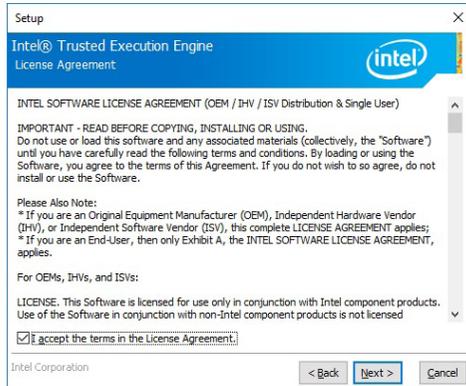
Intel TXE Driver

To install the Intel® Trusted Execution Engine Interface (Intel® TXE) Driver, follow these steps:

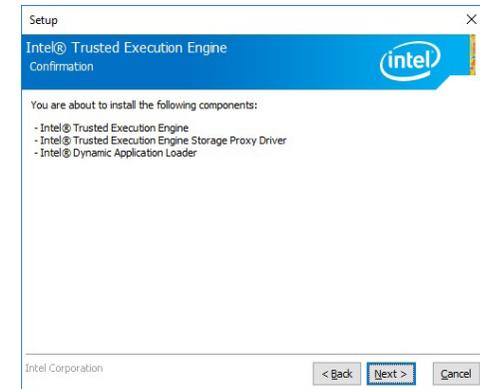
1. You are about to install the driver. Click "Next" to continue.



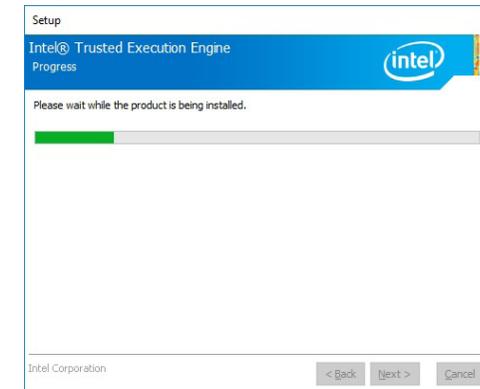
2. Read the license agreement, and then click "Next".



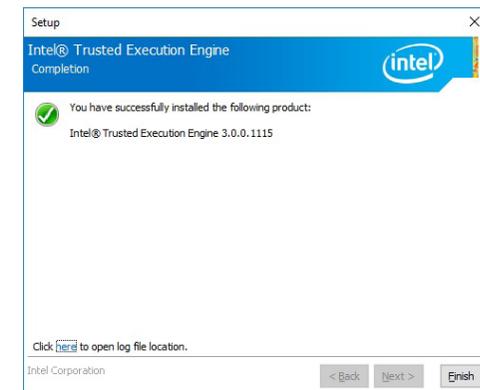
3. Setup is currently installing the driver. Click "Next" to confirm the installation.



4. Please wait while the product is being installed.



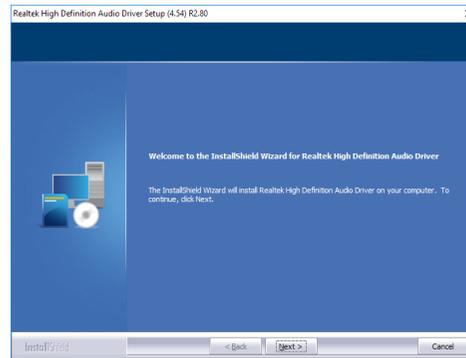
5. After the installation is complete, click "Finish".



Audio Driver

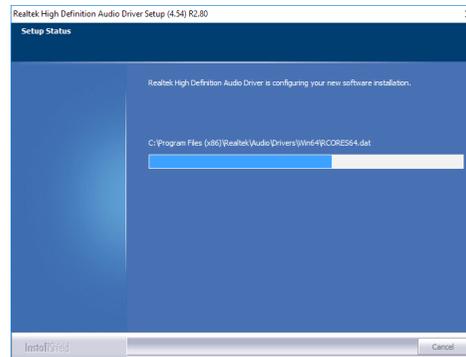
To install this driver, follow these steps:

1. Setup is now ready to install the audio driver. Click "Next".
2. Follow the steps of the on-screen instructions; click "Next" each time you finish a step.



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

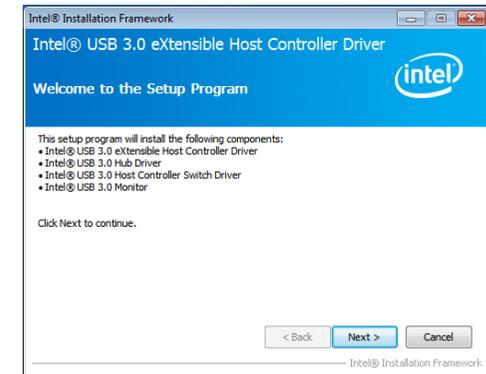
Restart the system to allow the new software installation to take effect.



Intel USB 3.0 Drivers (for Windows 7 only)

To install this driver, follow these steps:

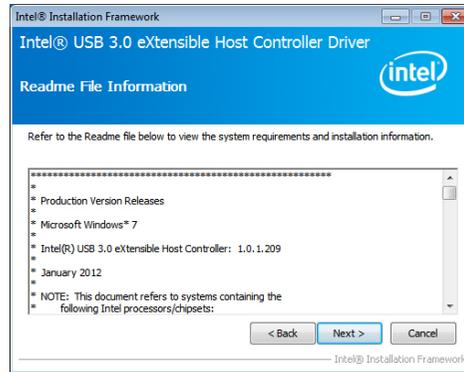
1. Setup is ready to install the driver. Click "Next" to continue.



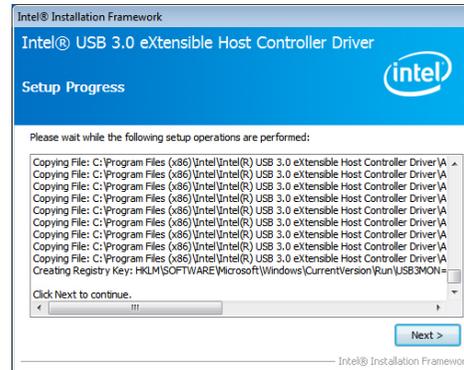
2. Read the license agreement and then click "Yes" if you agree with the terms in the agreement.



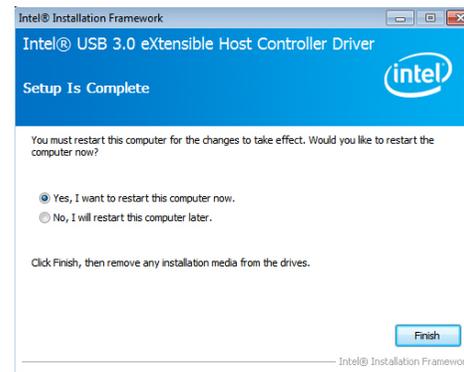
3. Go through the readme document for more installation tips and then click "Next".



4. Setup is currently installing the driver. After the installation is complete, click "Next".



5. After the installation is complete, click "Finish".



Infinion TPM Driver and Tool (optional)

To install this driver, follow these steps:

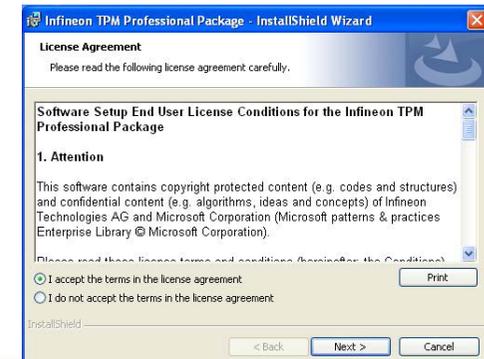
1. The setup program is preparing to install the driver.



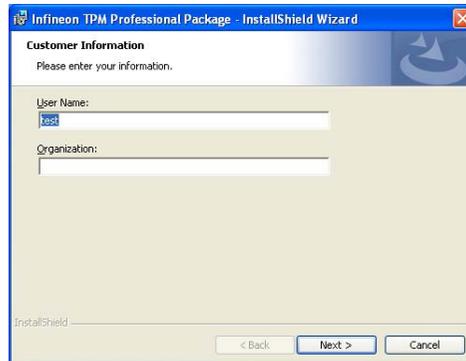
2. The setup program is now ready to install the utility. Click "Next" to continue.



3. Click "I accept the terms in the license agreement" if agree with the terms in the agreement and then click "Next".



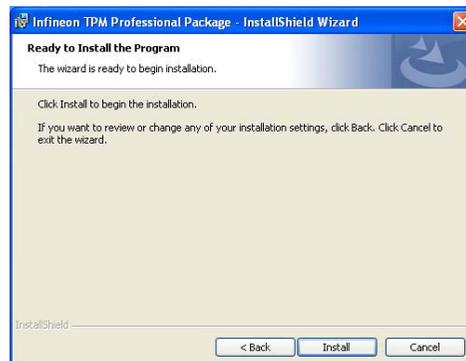
4. Enter the necessary information and then click "Next".



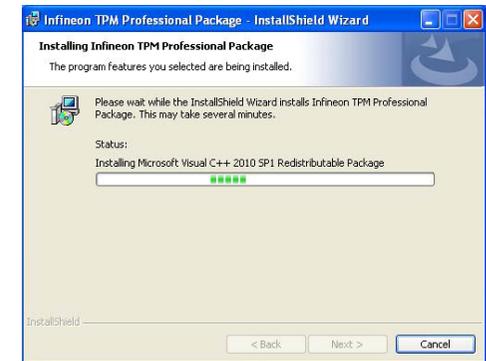
5. Select the setup type and then click "Next".



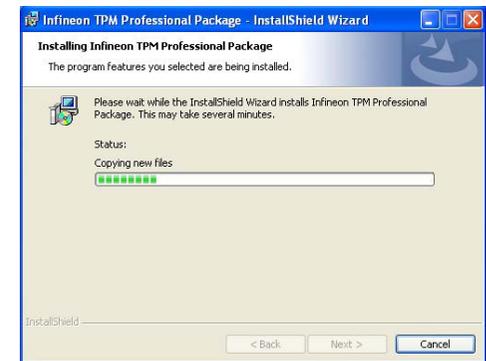
6. Click "Install" to start the installation.



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



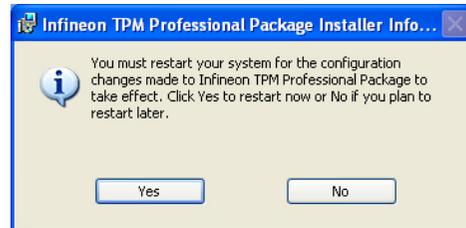
8. The setup program is currently installing the Microsoft Visual C++ package.



9. Click "Finish" to exit setup.



10. Click "Yes" to restart your system.



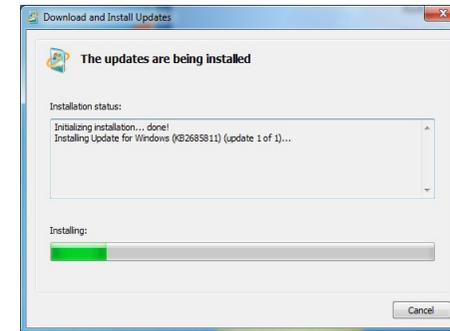
Kernel Mode Driver Framework (for Windows 7 only)

To install the driver, follow these steps:

1. Click "Yes" to install the update.



2. The update is being installed now.



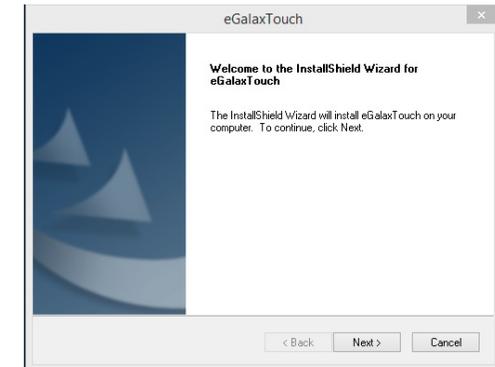
3. Click "Restart Now" to restart your computer when the installation is complete.



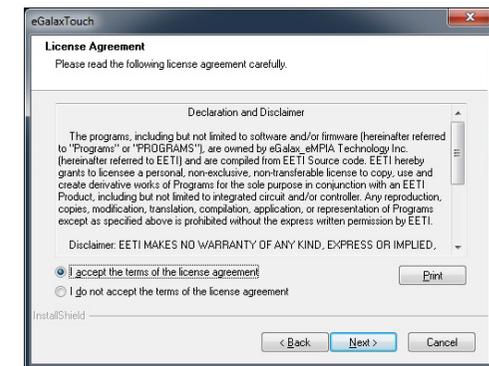
eGalax Touch

To install the driver, click "eGalax Touch" on the main menu.

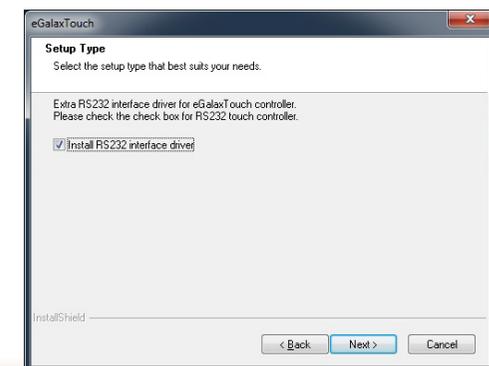
1. Click "Next" to install eGalax Touch on your computer.



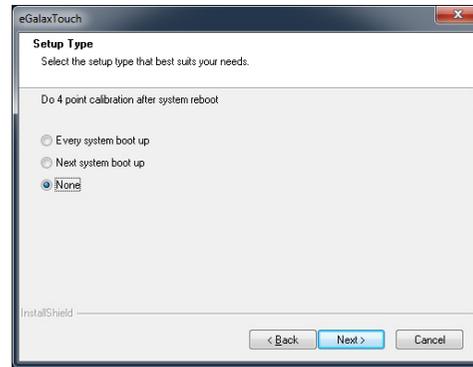
2. Read the license agreement and click "I accept the terms of the license agreement." Then, click "Next".



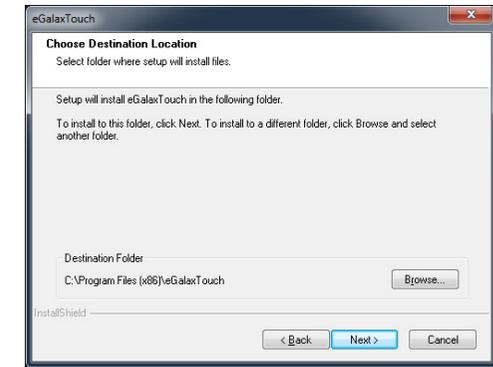
3. Select the setup type for installing RS232 interface driver and click "Next".



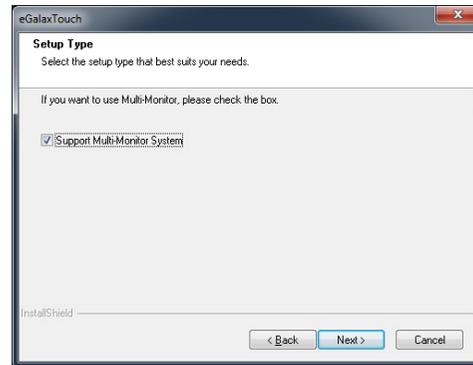
4. Select the setup type for 4-point calibration and click "Next".



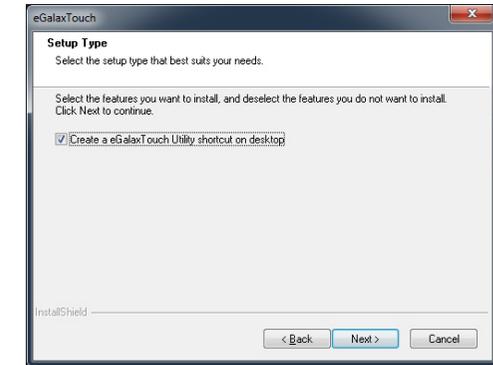
6. Select the folder where the setup will install files and click "Next."



5. Configure the support for multiple monitors.



7. Select the setup type for creating desktop shortcut and click "Next."



8. After the installation is complete, you can find the eGalax Touch program on your desktop or Start menu.

