DFI®

VC230-BT

In-Vehicle Box PC
User's Manual

A39830917

Copyright

Trademarks

FCC and DOC Statement on Class B

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

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

Notice:

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

Table of Contents

About this Manual

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

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

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

Safety Precautions

- Use the correct DC input voltage range.
- Unplug the power cord before removing the system chassis cover for installation or servicing. After installation or servicing, cover the system chassis before plugging the power cord.
- Danger of explosion if battery incorrectly replaced.
- Replace only with the same or equivalent type recommend by the manufacturer.
- Dispose of used batteries according to local ordinance.
- Keep this system away from humidity.
- Place the system on a stable surface. Dropping it or letting it fall may cause damage.
- The openings on the system are for air ventilation to protect the system from overheating. DO NOT COVER THE OPENINGS.
- Place the power cord in such a way that it will not be stepped on. Do not place anything on top of the power cord. Use a power cord that has been approved for use with the system and that it matches the voltage and current marked on the system's electrical range label.
- If the system will not be used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
- If one of the following occurs, consult a service personnel:

  - The power cord or plug is damaged.
  - Liquid has penetrated the system.
  - The system has been exposed to moisture.
  - The system is not working properly.
  - The system dropped or is damaged.
  - The system has obvious signs of breakage.

- The unit uses a three-wire ground cable which is equipped with a third pin to ground the unit and prevent electric shock. Do not defeat the purpose of this pin. If your outlet does not support this kind of plug, contact your electrician to replace the outlet.
- Disconnect the system from the DC outlet before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.

About the Package

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

- 1 VC230-BT system unit
- 1 CD disk includes
  - Manual
  - Drivers
- 1 Quick Installation Guide

Optional Items

- Wall Mount kit
- VESA Mount kit
- DIN Rail Mount kit
- CANbus modules
- Power Cord
- Power Adapter: Wide Range 9~36V

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

Before Using the System

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

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

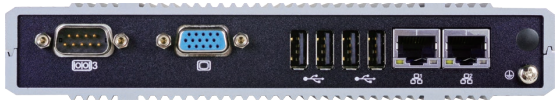
- Storage devices such as CFast card, Mini PCIe and/or mSATA card, M.2 modules, etc.

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

Chapter 1 - Introduction

Overview

Front View



Rear View

Key Features

Model Name	**VC230-BT**
Processor	Intel Atom® Processor E3800 Series
LAN	Two LAN ports
COM	Three serial ports
Display	One VGA One HDMI
USB	One USB 3.0 and four USB 2.0 Type A ports
Power	In-vehicle power management features

Specifications

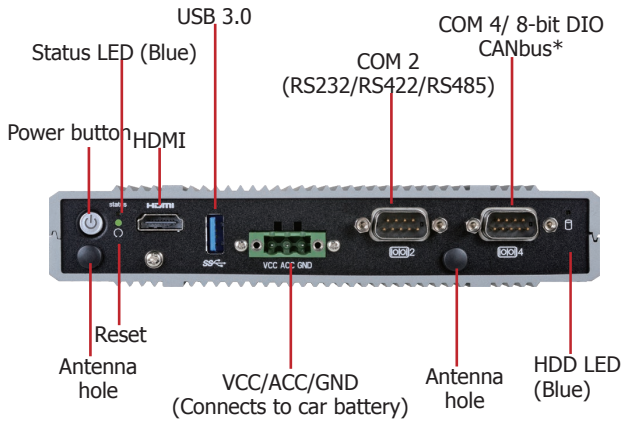
Processor System	Intel Atom® Processor E3800 Series, BGA 1170 Intel Atom® E3845, Quad Core, 2M Cache, 1.91GHz, 10W Intel Atom® E3825, Dual Core, 1M Cache, 1.33GHz, 6W
Memory	• 2GB/4GB DDR3L-1333/1066MHz onboard memory with ECC support
Graphics	• Controller: Intel® HD Graphics • Display interfaces: 1 VGA port (24-bit, resolution up to 2560x1600 @ 60Hz) 1 HDMI port (resolution up to 1920x1080 @ 60Hz) • Dual Display: VGA + HDMI
Storage/ Expansion	• Onboard eMMC Storage: 4GB/8GB/16GB/32GB (available upon request) • Expansion Slots: 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	• Front Panel - 2 x RS-232/422/485 (DB-9) (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 • Rear Panel - 2 x GbE (RJ-45) - 1 x RS-232/422/485 (DB-9) - 4 x USB 2.0 (type A) - 1 x VGA - 1 x Line-out (available upon request) - 1 x Wi-Fi module antenna hole
Power	• Wide Range 9~36V DC-in (3-pin terminal block) In-Vehicle power management includes ignition On/Off and system on/off delay time control
Environment	• Temperature - Operating: -20°C ~ 60°C - Storage: -40°C ~ 85°C
Vibration	MIL-STD 810G 514.6C-II Category 4
Shock	Half Sine Wave 15G, 11ms, 3 Shock Per Axis
Construction	• Aluminum + anodizing
Mounting	• Wall/VESA/DIN Rail mount - Mounting brackets and screws(1)
Dimensions	• 180mm x 33mm x 121.2mm (W x H x D)
Weight	• 800g
OS Support	• Windows 7, WES 7, Windows 8, WES 8, Windows 8.1, and Windows 10(2) • Linux (Distribution available upon request)
Certifications	Compliant with ISO 7637-2

Notes:

1. Optional and is not supported in standard model. Please contact your sales representative for more information.
2. Windows 10 will be available upon request. Please contact your sales representative for more information.

Getting to Know the VC230-BT

Front View



Power Button with LED (green)
Press to power on or off the system.

Reset Button
Press to reset the system.

Status LED (blue)
This LED will blink when the system is in the standby mode.

HDMI
Connects the HDMI port of a display device.

USB 3.0 Port
Connects USB 3.0 devices as well as USB 2.0 and 1.1 devices.

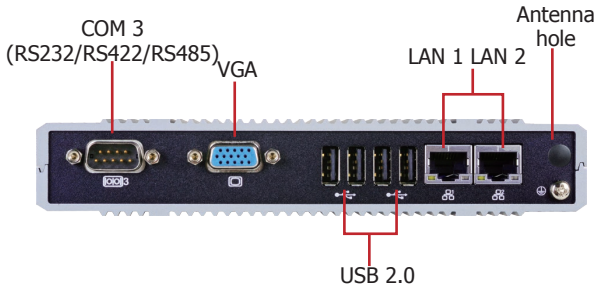
Power Connector
Connects to car battery for power supply.

COM Ports
Connect RS232/422/485 devices. COM 4 can also be used as an 8-bit digital input/output connector.

Disk Drive LED (blue)
Indicates the status of the storage drive, i.e., the mSATA card.

Disk Drive LED		
Disk Drive State	**Drive access activity**	**Drive present or not present**
LED Behavior	Blink	Off

Rear View



COM 3 Port
Connects RS232/RS422/RS485 devices.

VGA Port
Connects to the VGA port of a display device.

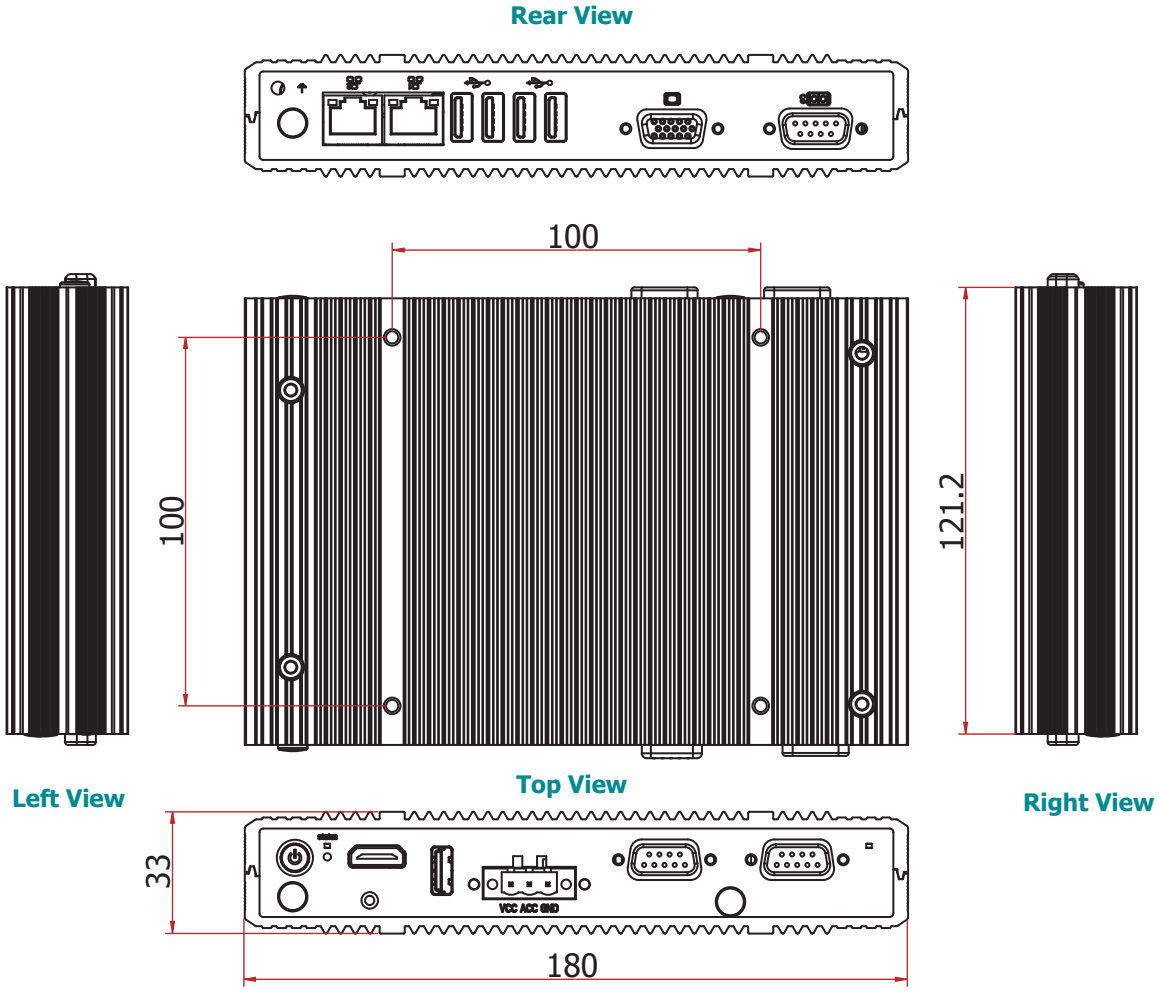
USB 2.0 Ports
Connect USB 2.0 and 1.1 devices.

LAN Ports
Connect the system to a local area network.

Antenna Holes
Connect Wi-Fi antennas.

Mechanical Dimensions

Chassis Dimension



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 is prepared using a DVD or bootable USB drive. Please refer to your operating system manual for instructions on installing an operating system.

Installing the Drivers

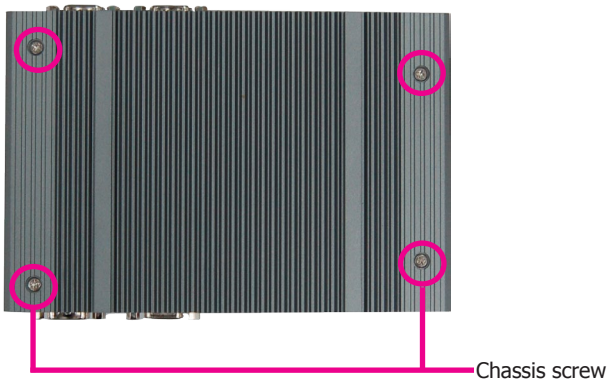
The system comes with a software package including drivers. These drivers must be installed to provide the best system performance. Refer to the Supported Software Chapter for instructions on installing drivers.

Chapter 3 - Installing Devices

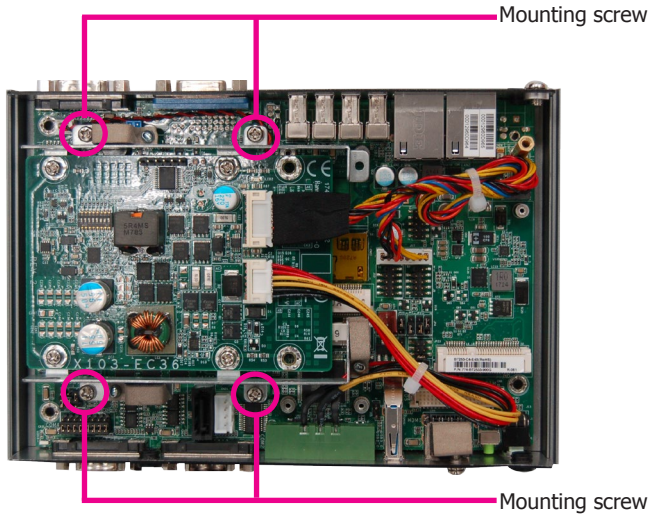
Removing the Chassis Cover

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



4. After removing the mounting screws, lift the bottom side of the chassis cover to open the system. To access the Mini PCIe and the micro SD slots, remove the four screws to uninstall the power board.



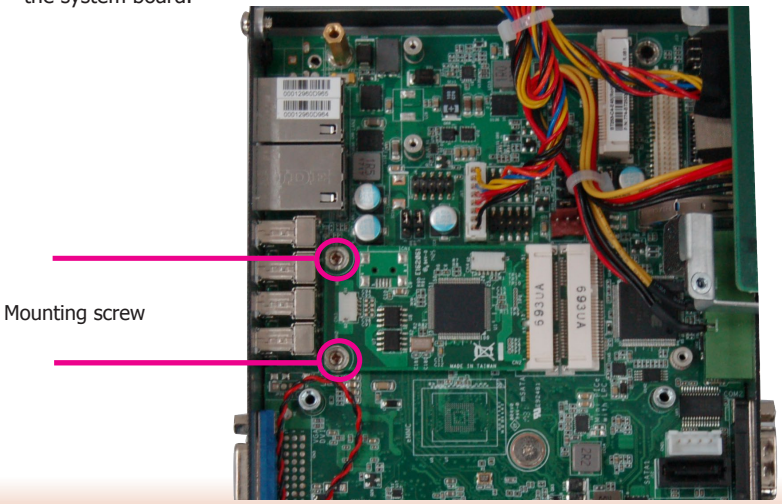
Installing a Mini PCIe Card

The system board is equipped with 3 Mini PCIe slots: two full-size (one with PCIe/USB/3G/CAN-bus signals and the other one with SATA signals) and one half-size (PCIe/USB/LPC signals) slots. Here we will demonstrate the installation of all 3 slots.

Installing a mSATA card in the full-size Mini PCIe slot

1. Remove the power board first; please refer to the previous section: Removing the Chassis Cover.
2. Grasp the Mini PCIe card by its edges and align the notch in the connector of the PCIe card with the notch in the connector on the system board.

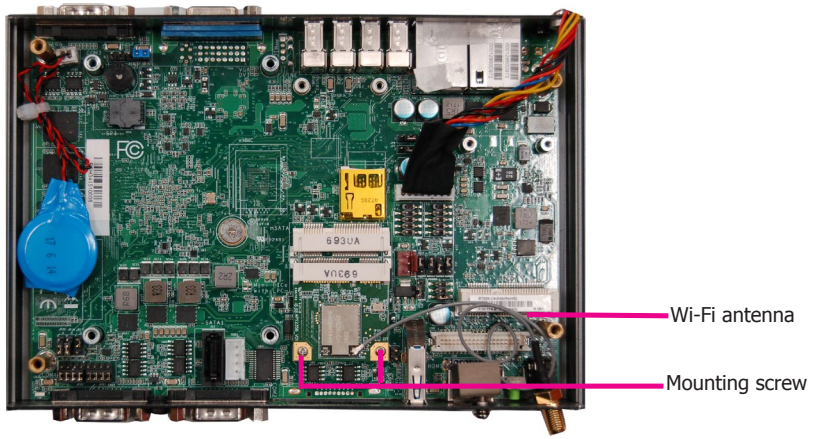
3. Push the Mini PCIe card down and use the provided mounting screws to secure the card on the system board.



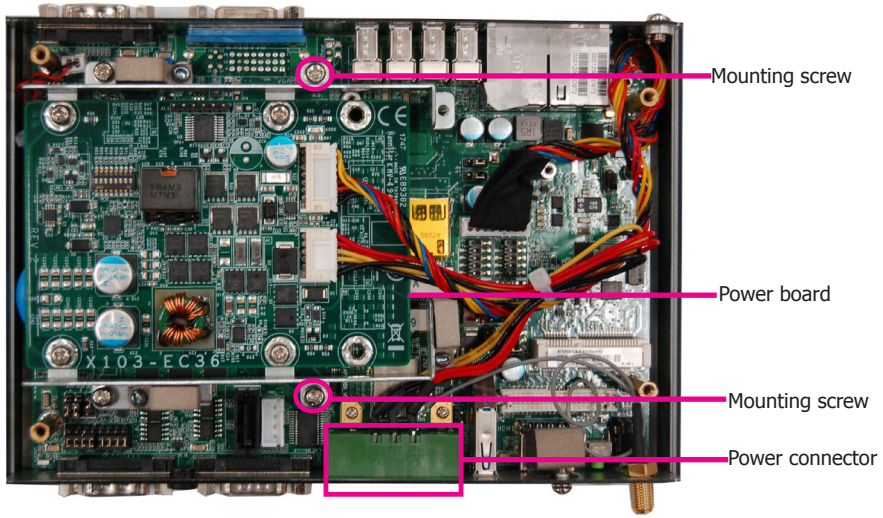
Installing a Wi-Fi card in the half-size Mini PCIe slot

1. Remove the power board and the power connector first; please refer to the previous section: Removing the Chassis Cover.

2. Grasp the Mini PCIe card by its edges and align the notch in the connector of the PCIe card with the notch in the connector on the system board.
3. Push the Mini PCIe card down and use the provided mounting screws to secure the card on the system board.

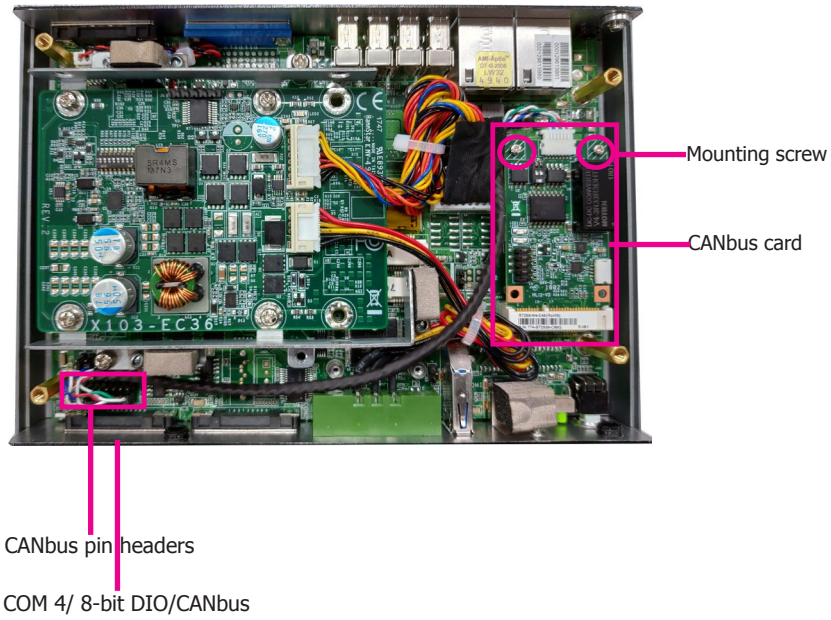


4. Install the power connector back to the system.
5. Put the power board back to the system and secure it on the system board with the mounting screws.



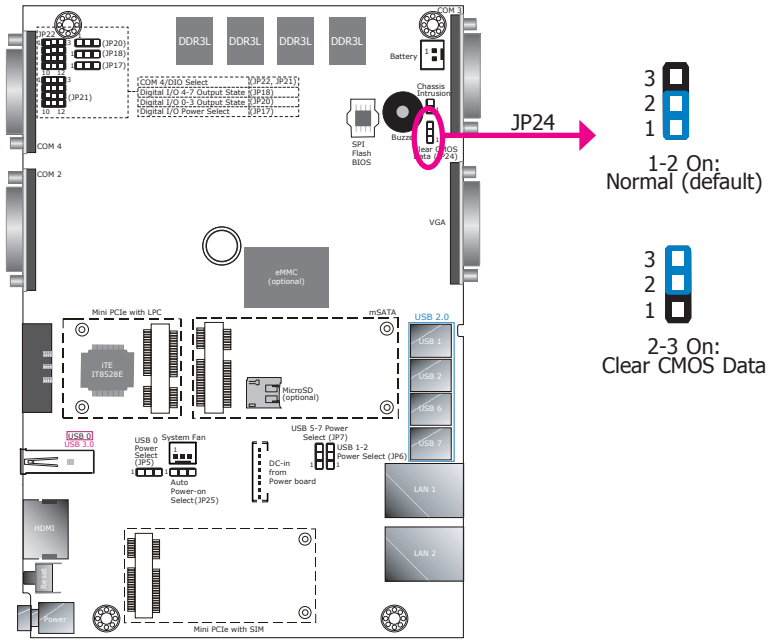
Installing a CANbus card in the Mini PCIe slot

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



Chapter 4 - Jumper Settings

Clear CMOS Data



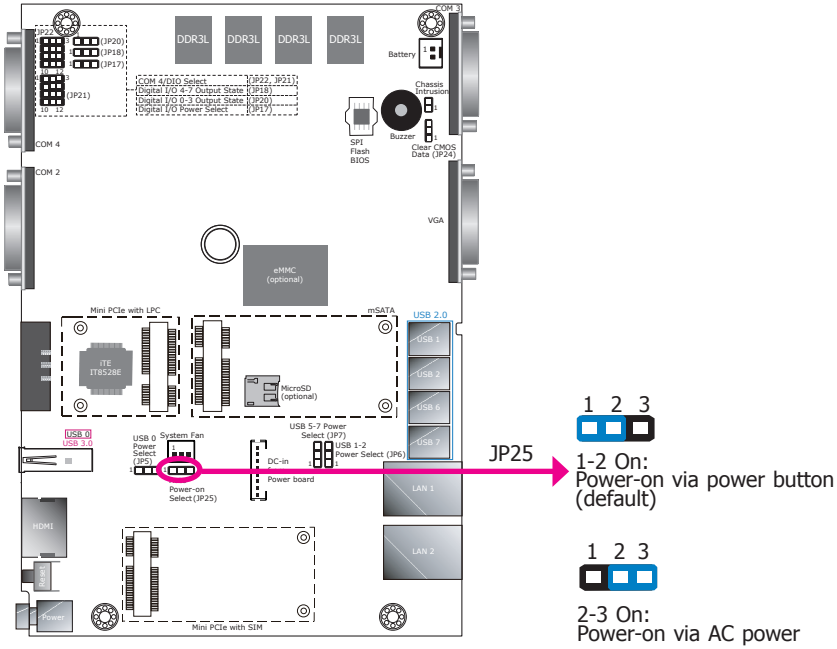
If you encounter the following situations, you can reconfigure the system with the default values stored in the ROM BIOS.

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

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

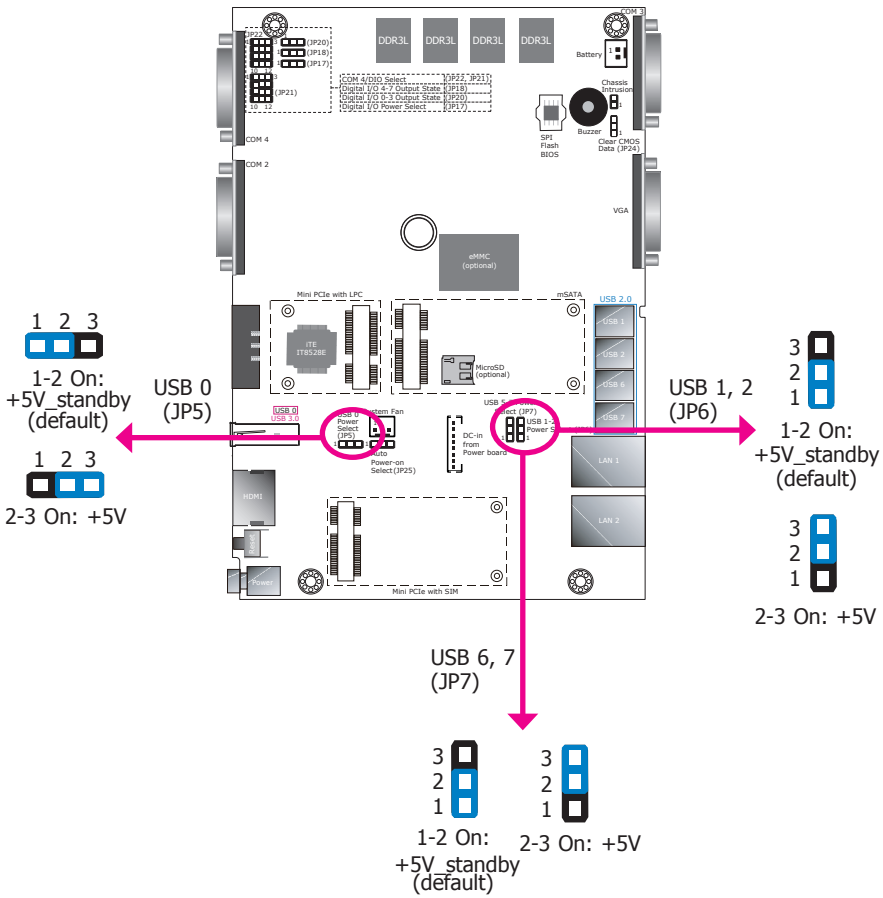
Auto Power-on Select



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).

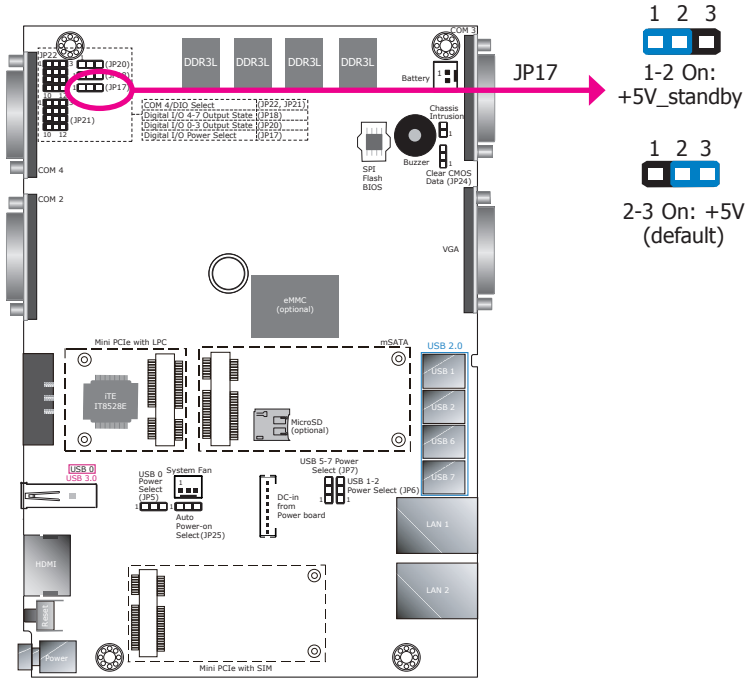
USB Power Select



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.

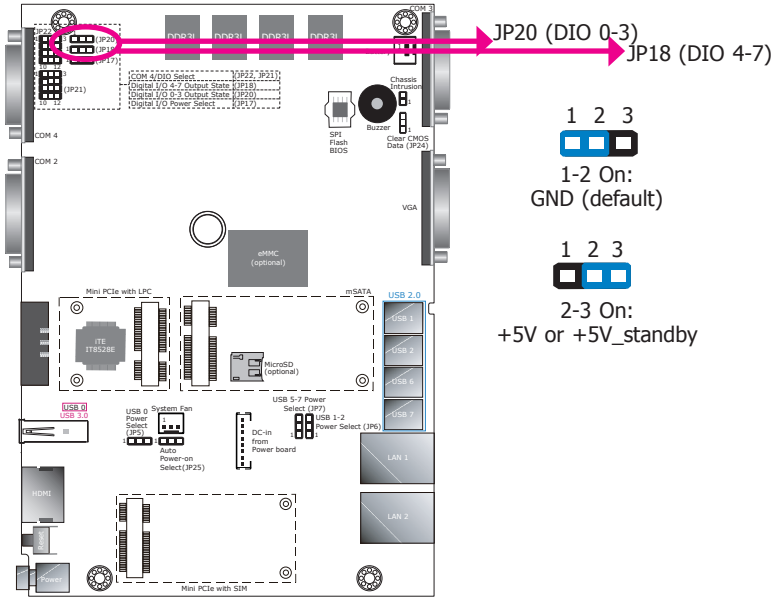
Important:
If you are using the Wake-On-USB Keyboard/Mouse function for 2 USB ports, the +5V_standby power source of your power supply must support ≥1.5A. For 3 or more USB ports, the +5V_standby power source of your power supply must support ≥2A.

Digital I/O Power Select



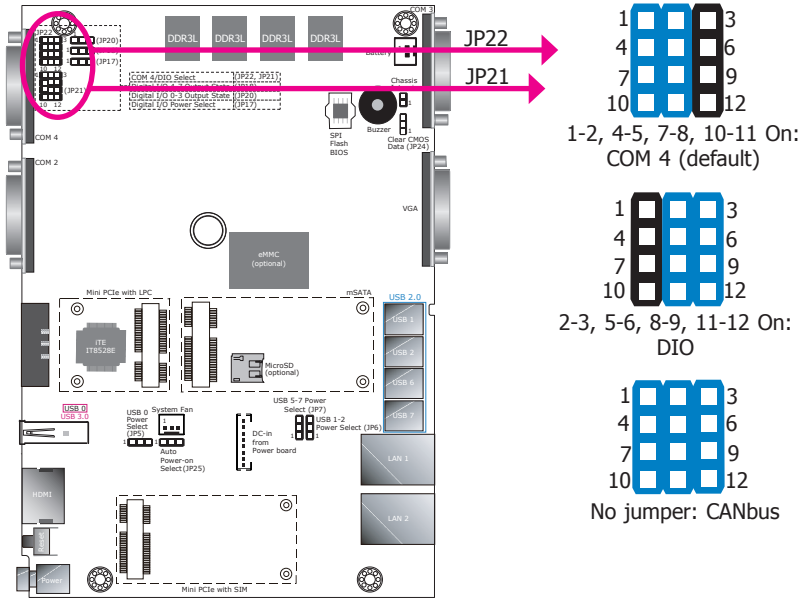
JP17 is used to select the power of the DIO (Digital I/O) signal.

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

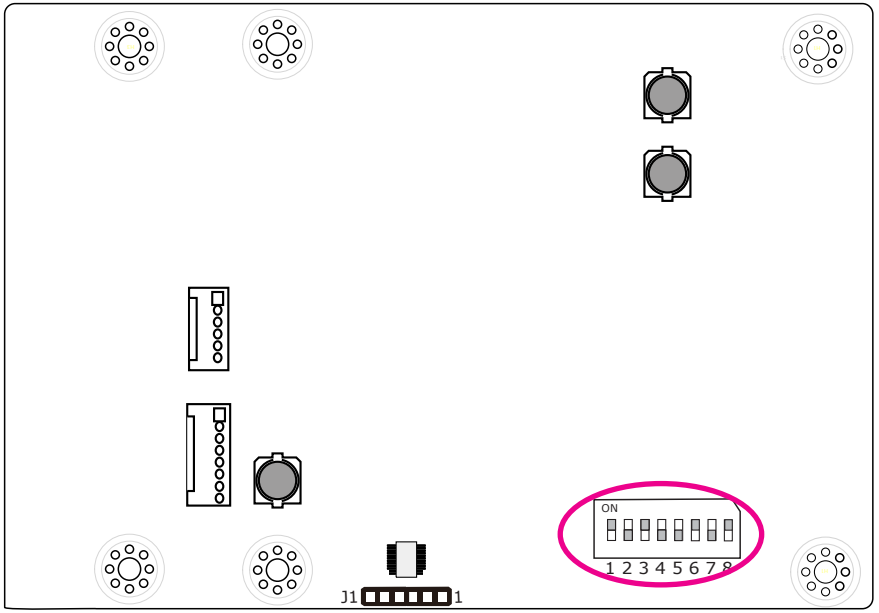


The system board uses JP21 and JP22 to select among serial port COM 4, 8-bit DIO or CAN-bus on the front panel.

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 in the table 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

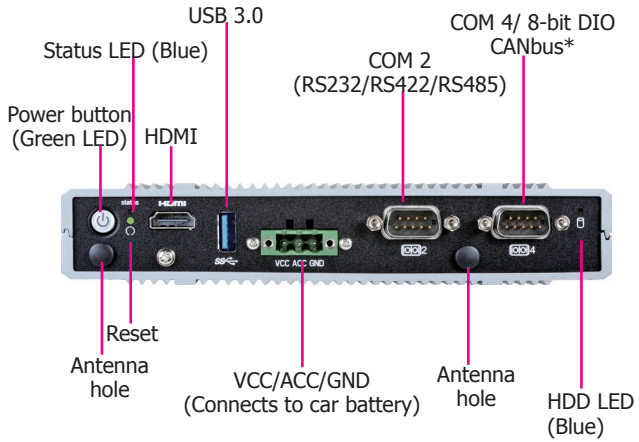
On (Default)	Enable (delay time setting adjustable by SW1-6, 1-7 and 1-8 as shown in the table below)
Off	Disable (System-off delay = 0 sec)

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



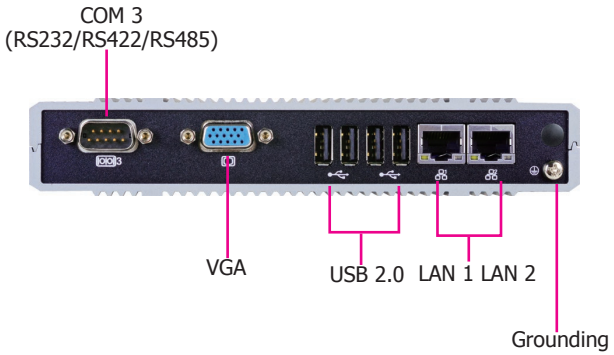
The front panel I/O port consists of the following ports:

- Power button with LED (green)
- Status LED (blue)
- Disk Drive LED (blue)
- A reset button
- HDMI port
- USB 3.0 port
- Power connector
- Two Serial ports:
  COM 2 is an RS232/RS422/RS485 port
  COM 4 can be a serial or an 8-bit DIO port

Note:

* You can choose to wire the COM 4 port to be a CANbus (Controller Area Network) interface instead. Please refer to Chapter 4 and 5 for signal selection and wiring procedure.

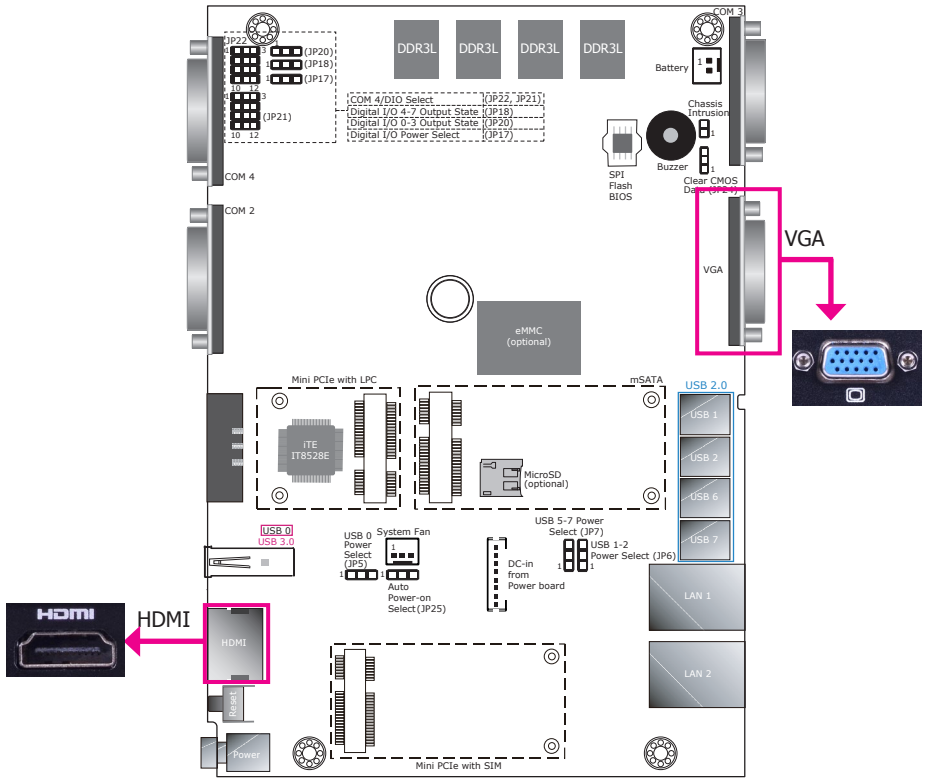
Rear Panel I/O Ports



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

- RS232/RS422/RS485 port
- VGA port
- Four USB 2.0 ports
- Two LAN ports

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.

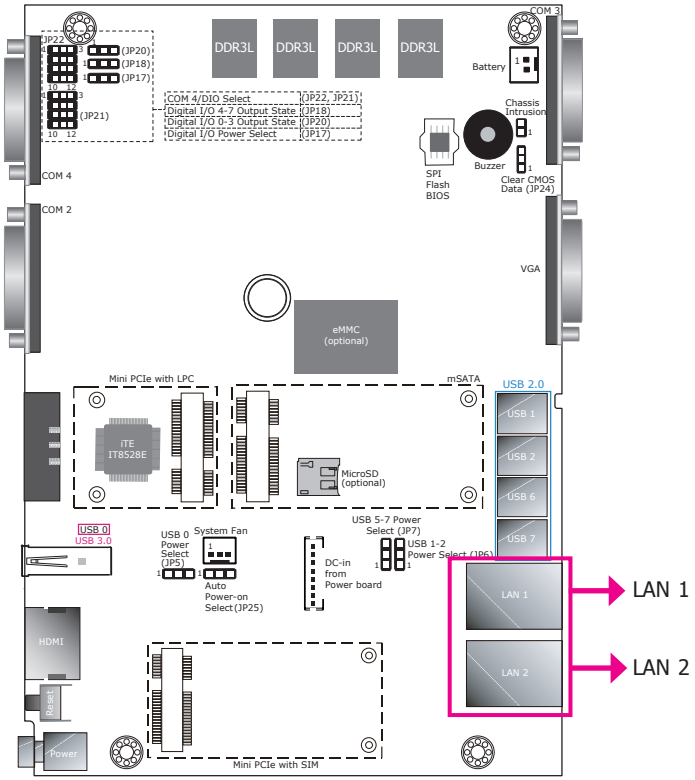
HDMI Port

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, disabled by default) and WoL (Wake on LAN, enabled by default).

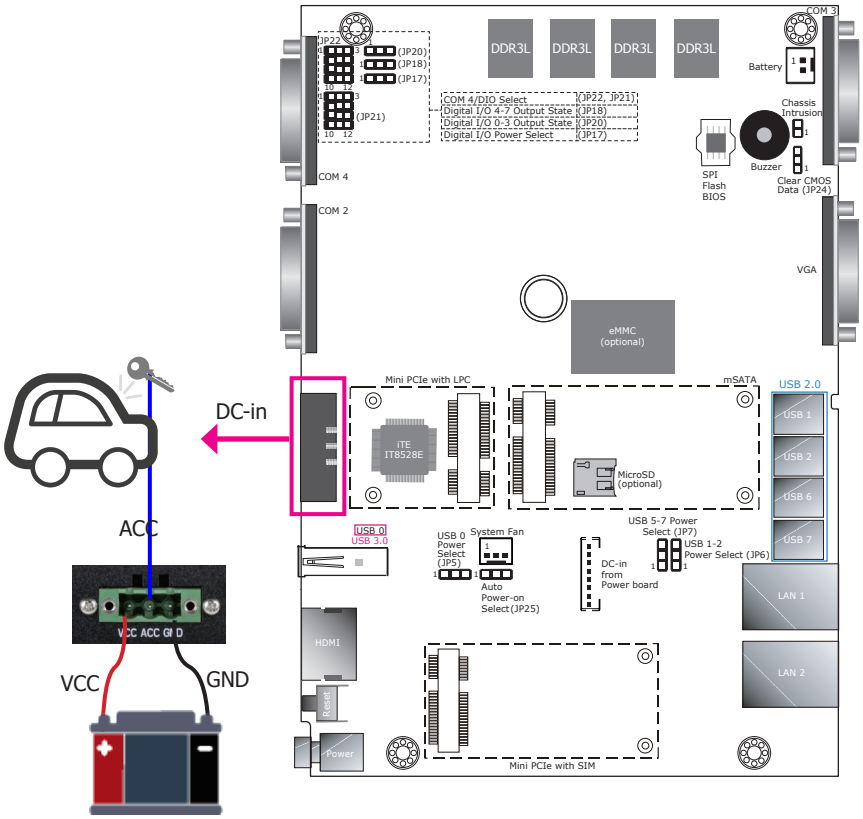
BIOS Setting

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



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 more information.

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)
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SW1-3: System-off delay enable/disable

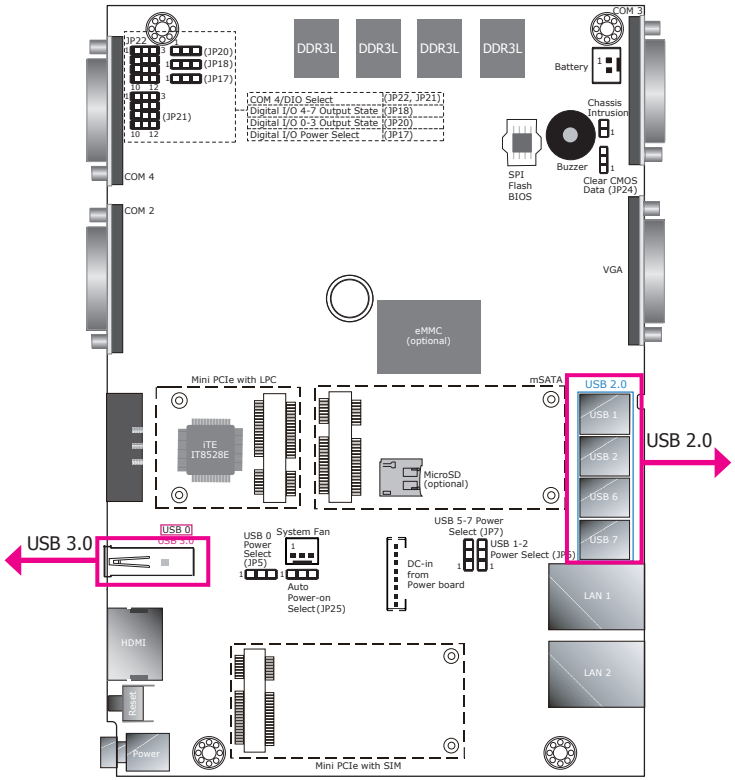
On (Default)	Enable (delay time setting adjustable by SW1-6, 1-7 and 1-8 as shown in the table below)
Off	Disable (System-off delay = 0 sec)

SW1-6, 1-7 and 1-8: System-off delay time setting

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 4 external USB 2.0 ports.

BIOS Setting

Configure USB 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.

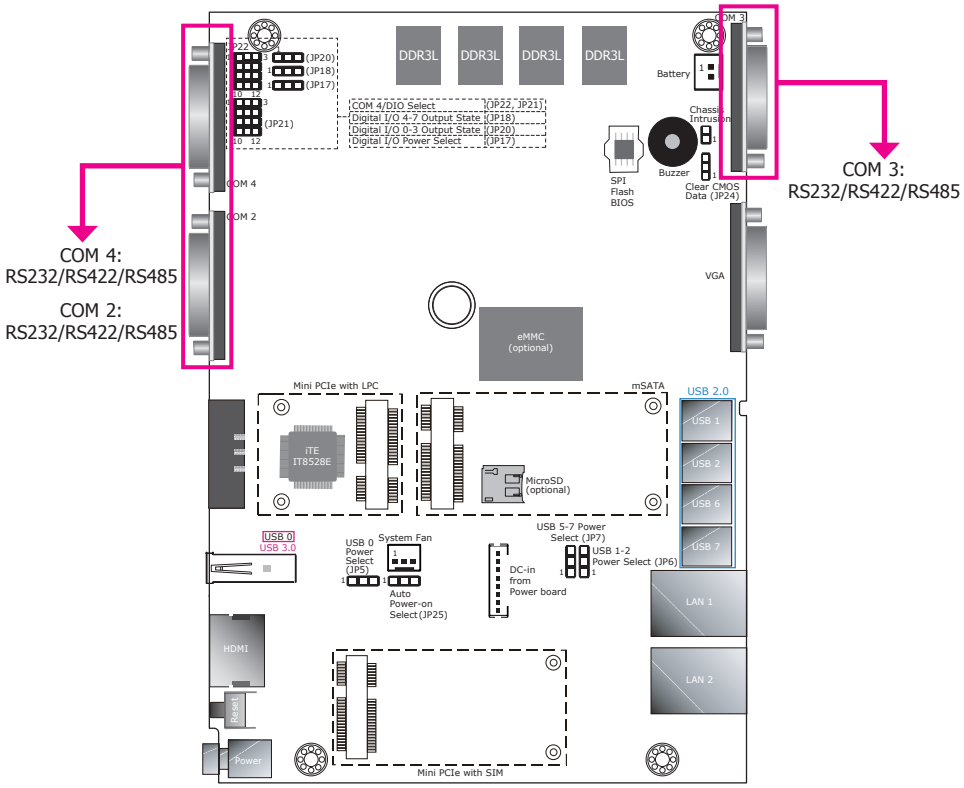
Table 1. OS Selection

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

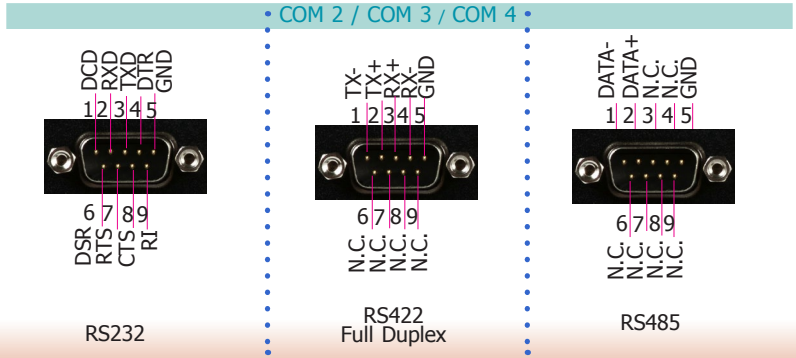
Table 2. The Types of the USB Ports

Model Name	BT253
USB 0 (3.0)	Native
USB 1	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 2, COM 3 and COM 4 can be selected among RS232, RS422 and RS485. 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

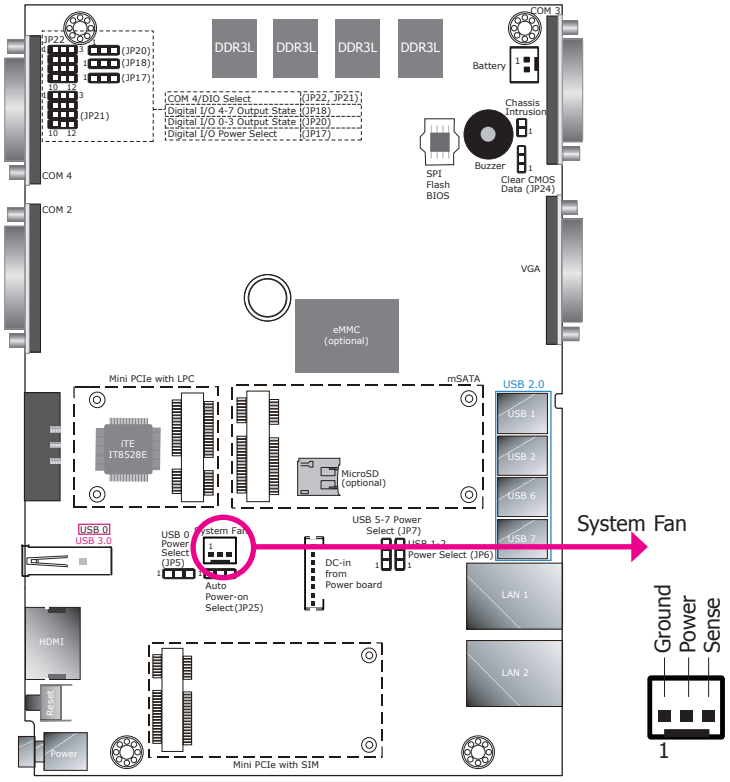
Configure the COM ports including its communication mode in the Advanced menu ("NCT6106D Super IO Configuration" submenu) of the BIOS. Refer to Chapter 7 for more information.

Pins	COM 2/ COM 3/ COM 4 Pin Assignments				DIO Pin Assignments
	RS232	RS422 (full)	RS422 (half)	RS485	
1	DCD	RX+	RX+	DATA+	DIO_0
2	RXD	RX-	RX-	DATA-	DIO_1
3	TXD	TX+	NC	NC	DIO_2
4	DTR	TX-	NC	NC	DIO_3
5	GND	NC	NC	NC	GND
6	DSR	NC	NC	NC	DIO_4
7	RTS	NC	NC	NC	DIO_5
8	CTS	NC	NC	NC	DIO_6
9	RI	NC	NC	NC	DIO_7

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		

Cooling Fan Connector

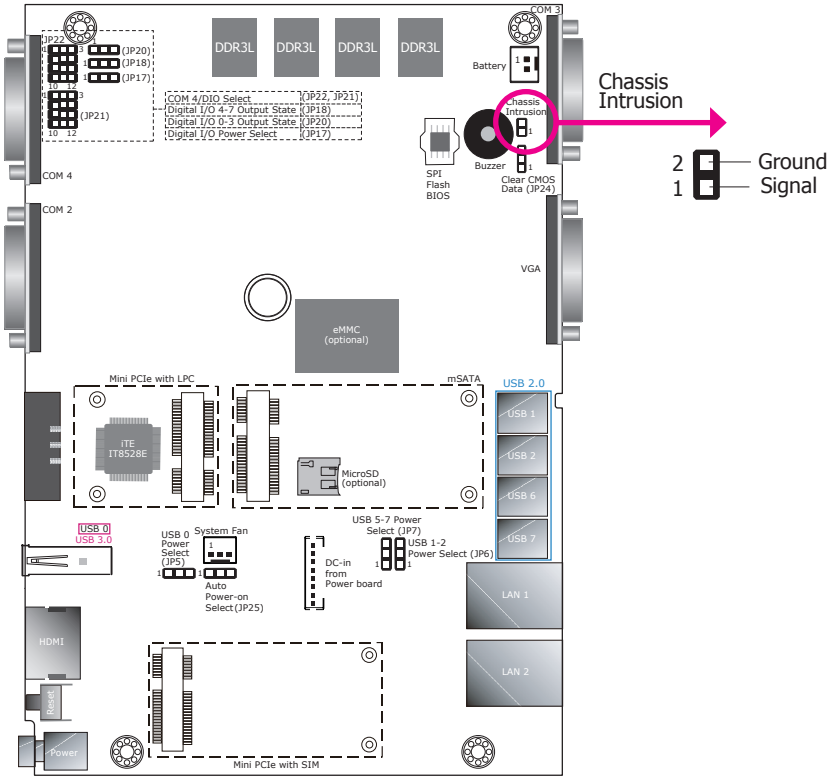


The fan connector is used to connect the cooling fan. The cooling fan will provide adequate airflow throughout the chassis to prevent overheating the CPU and system board components.

BIOS Setting

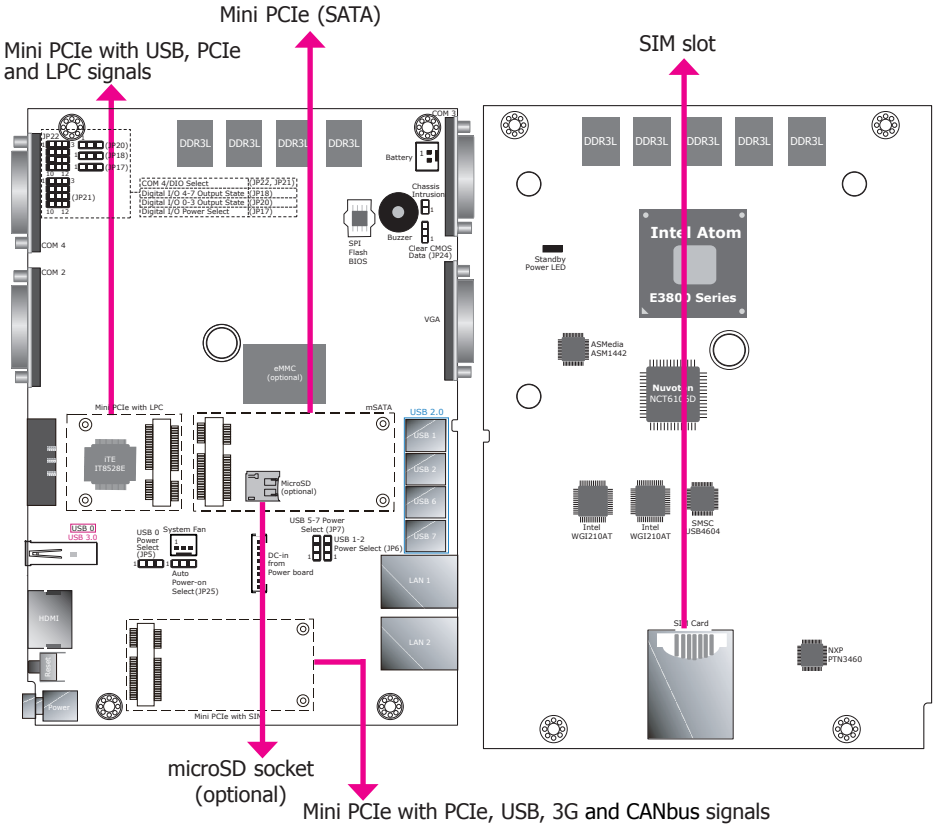
The Advanced menu ("HW Monitor" submenu) of the BIOS will display the current speed of the cooling fans. Refer to Chapter 7 for more information.

Chassis Intrusion Connector



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

Expansion Slots



SIM Slot

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

Mini PCI Express Slots

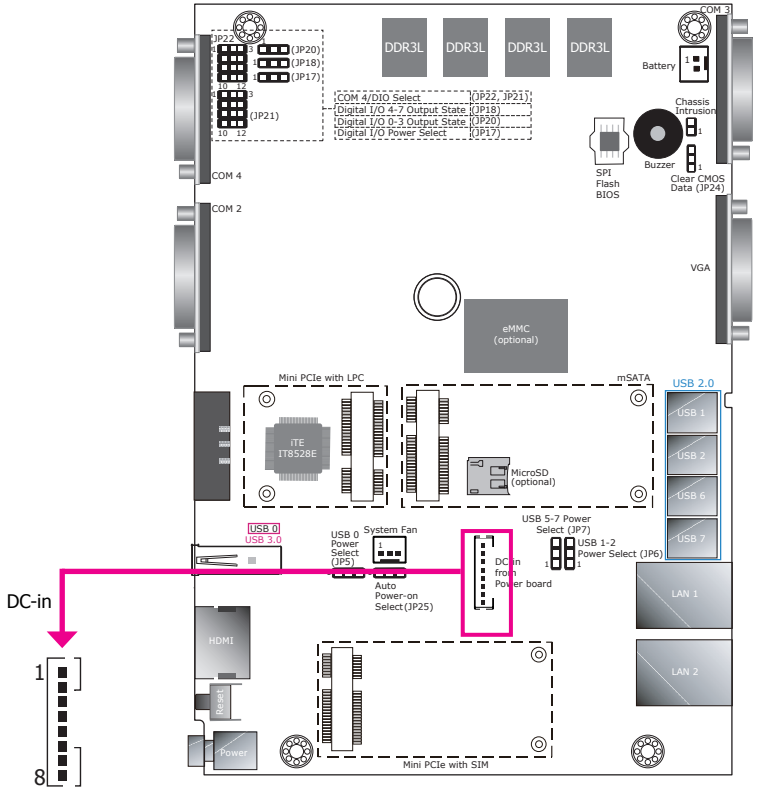
The three Mini PCI Express slots on the system board are used to install 2 full-size Mini PCIe cards and one half-size Mini PCIe card. These card slots can accommodate different types of Mini PCIe cards to expand capabilities of the system in different aspects, including capacity and communication. For 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

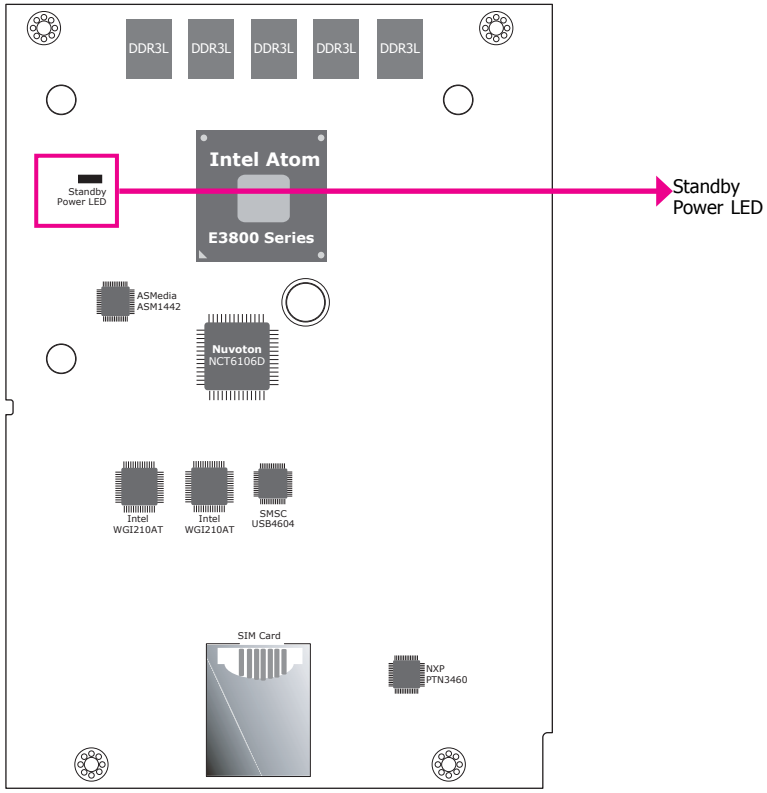
DC-in Connector



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

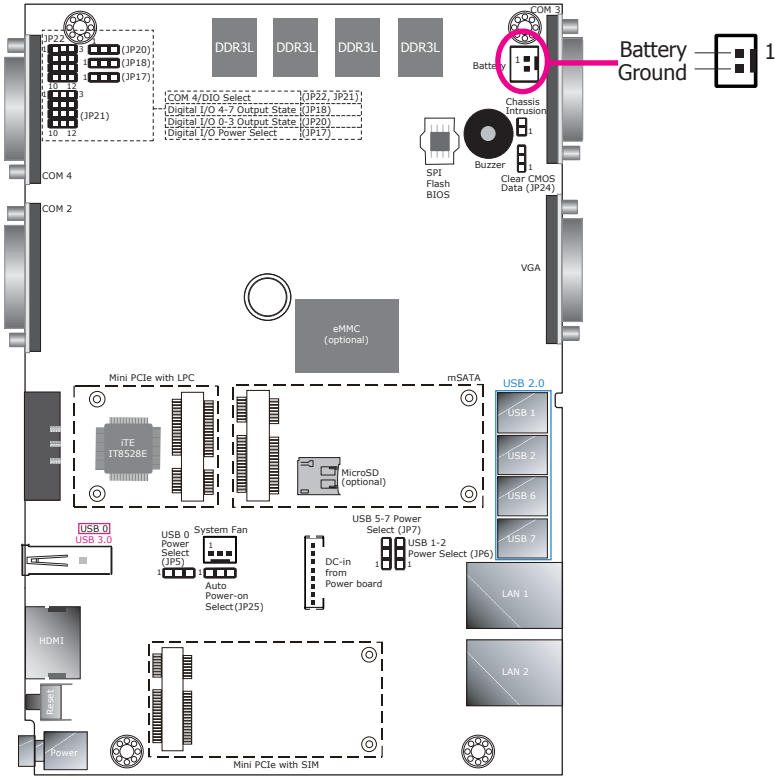
This DC-in connector is used to connect to the DC-out connector of the power board (*X103-EC36*).

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

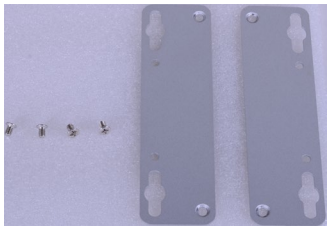
- Danger of explosion if battery incorrectly replaced.
- Replace only with the same or equivalent type recommend by the manufacturer.
- Dispose of used batteries according to local ordinance.

Chapter 6 - Mounting Options

Wall Mount

The wall mount kit includes the following:

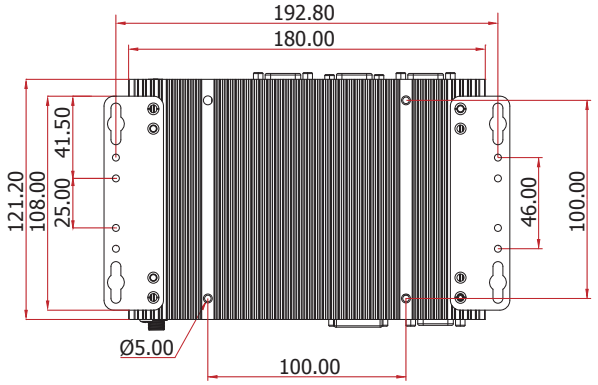
- 2 Wall mount brackets
- Bracket screws



1. If the mounting screws have been previously attached to the top chassis of the system, please remove them first.

2. At the top side of the system, use the provided mounting screws to secure the wallmount brackets on both sides of the system.

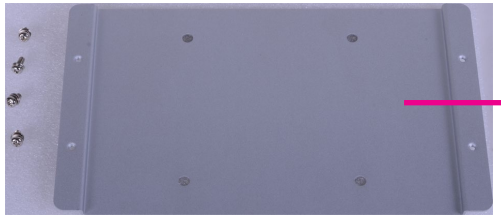
3. The following diagram shows the location and dimension of the wall-mount screw holes.

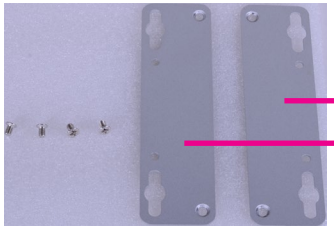


VESA Mount

The vesa mount kit includes the following:

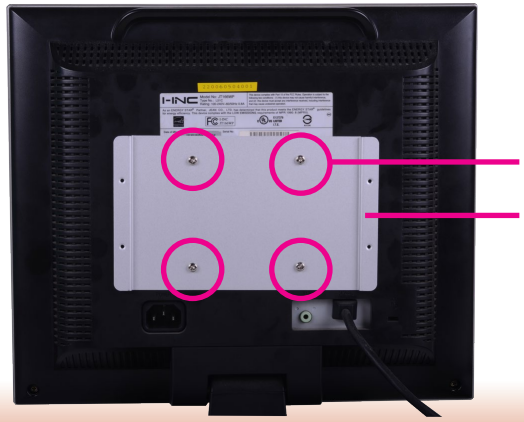
- 1 VESA mount bracket A
- 2 VESA mount bracket B
- Bracket screws



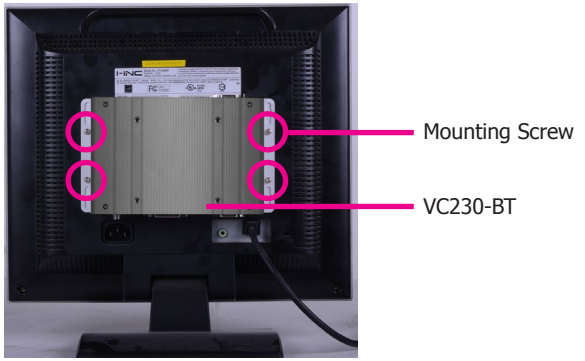


1. Prior to installing VESA bracket A, make sure you have already installed VESA bracket B. (Please refer to the above Wall Mount procedure.)

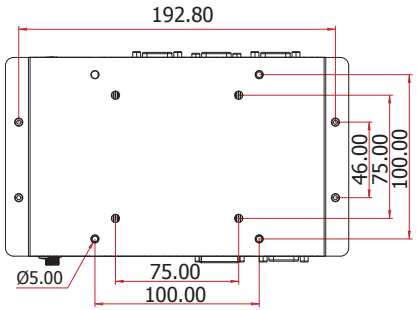
2. Use the provided mounting screws to secure VESA bracket A in place.



3. Align VESA bracket A with VESA bracket B and then use the provided mounting screws to secure the system in place.



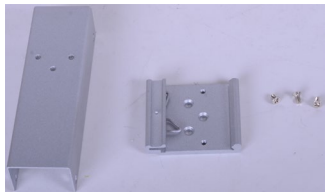
4. The following diagram shows the location and dimension of the VESA-mount screw holes.



DIN-rail Mount

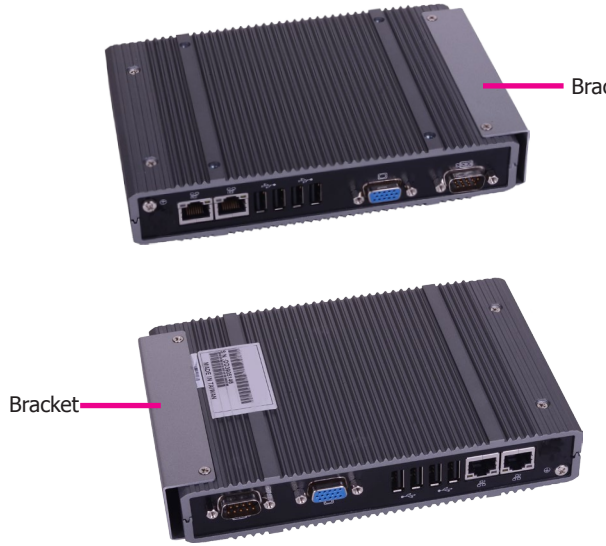
The DIN-rail mount kit includes the following:

- 1 DIN-rail clip
- 1 bracket
- Bracket screws

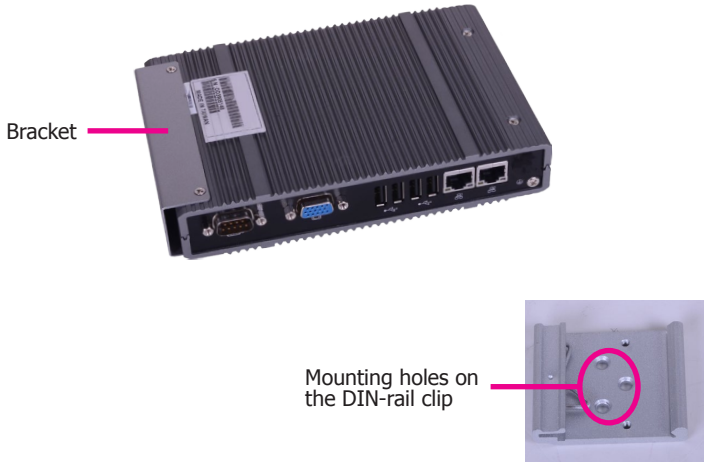


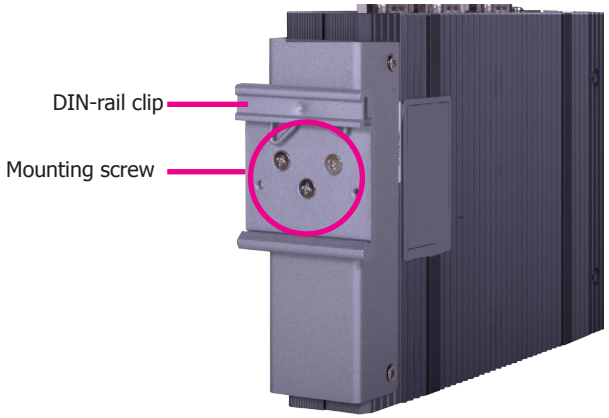
1. Locate the mounting screws on both top and bottom sides of the system. Remove these screws and then put them in a safe place for later use.

2. Align the mounting holes on the bracket with the mounting holes of the system, and then use the screws removed in step 1 to secure the bracket in place.



3. Align the mounting holes on the DIN-rail clip with the mounting holes on the bracket, and then use the provided mounting screws to secure the bracket in place.




DIN-rail clip
Mounting screw

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 <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.
<F1>	Display general help
<F2>	Load pervious 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.

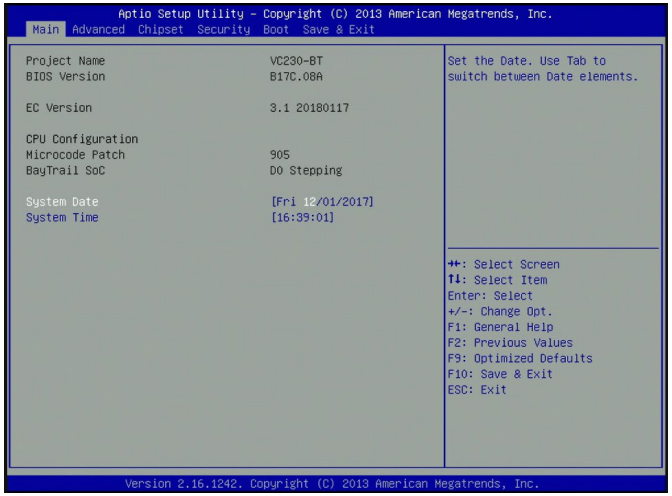
Submenu

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.

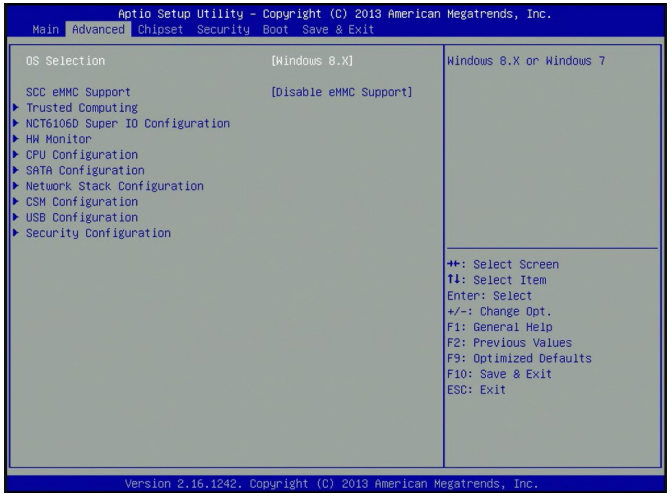
System Time

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.



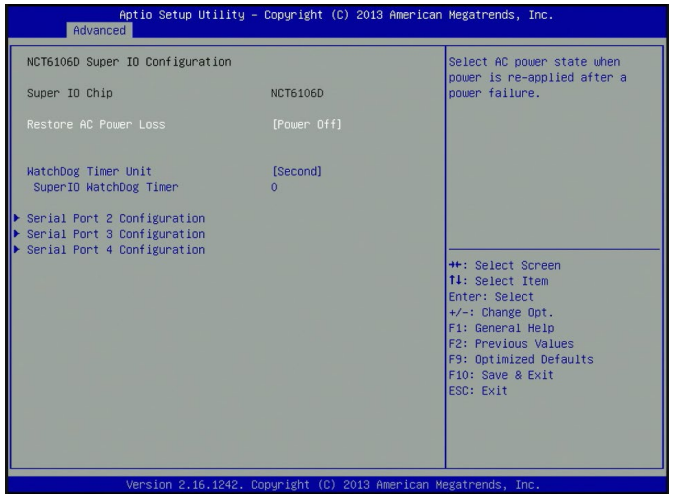
OS Selection

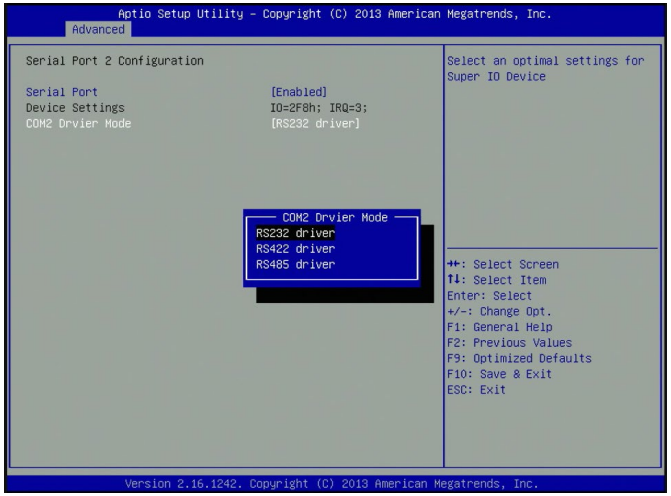
OS Selection: Windows 7 or Windows 8.X.

SCC 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 be power-off after an AC power loss event. When it is set to power-on, the system's status will be 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 a BIOS or an operating system failure is detected.

Serial Port 2-4 Configuration

Enable or disable each COM port.

Change Settings

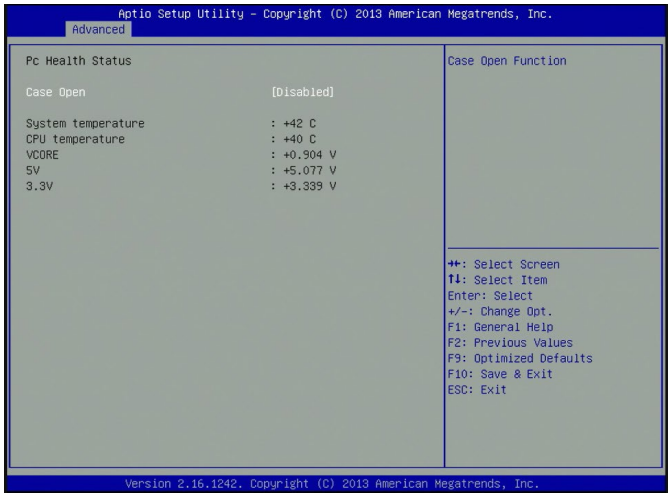
Select the IO and IRQ address for each COM port.

COM Driver Mode

Set the serial communication mode for each COM port. This option is only available for COM Port 2 to 4.

HW Monitor

This section shows system health information.

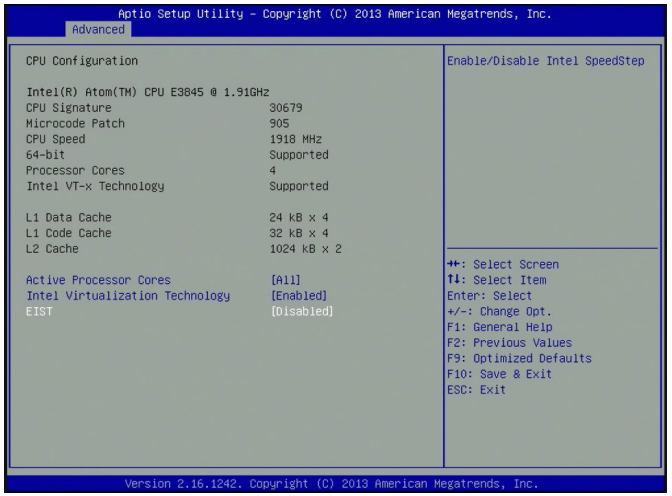


Case Open

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

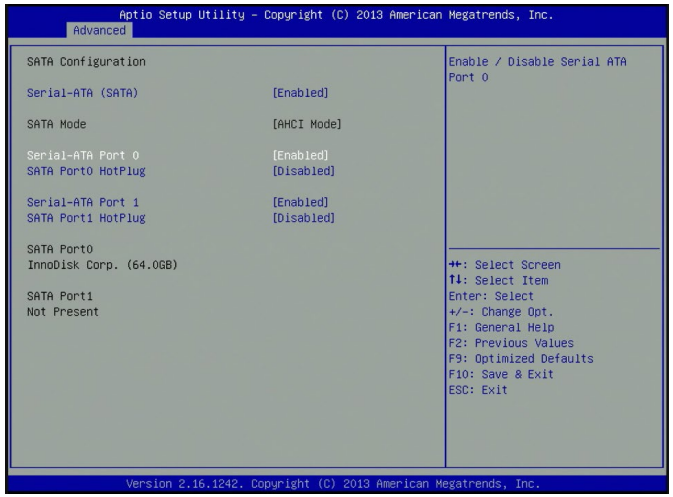
Select "Enabled" to let the system utilize the hardware-assisted virtualization capabilities provided by Intel® Virtualization Technology (Intel® VT) in a virtualized environment.

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

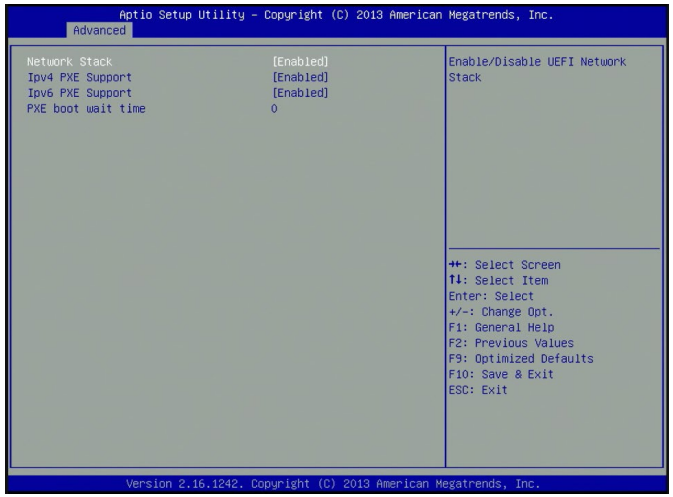
Enable or disable Serial ATA port 0 and 1.
The SATA Port 0 controls the onboard SATA port.
The SATA Port 1 controls the Mini PCIe slot for mSATA (full size).

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 set to enabled, it will display the following information:

Ipv4 PXE Support

When enabled, PXE boot using IPv4 addressing scheme will be supported. When disabled, Ipv4 PXE boot option will not be supported.

Ipv6 PXE Support

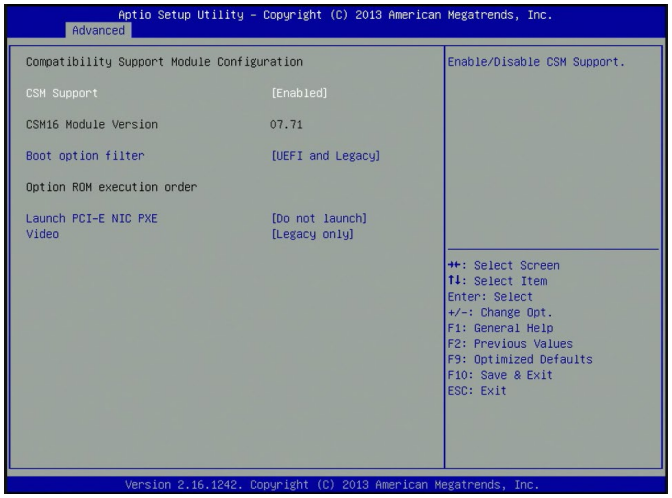
When enabled, PXE boot using IPv6 addressing scheme will be supported. When disabled, Ipv6 PXE boot option will not be supported.

PXE boot wait time

Enter the wait time value to abort the 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 boot options available for the "Boot Option Priorities" in the "Boot" menu.

Launch PCI-E NIC PXE

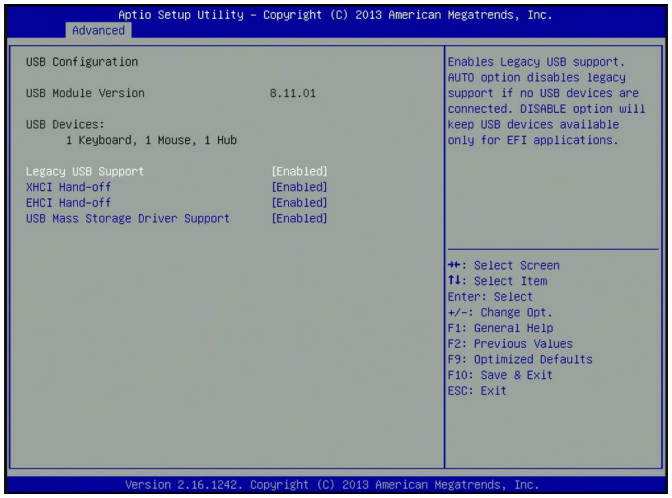
Enable or disable the execution of PXE Option ROM through network interfaces. If you choose to use the UEFI boot, configure the "Network Stack Configuration" menu too.

Video

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

USB Configuration

This section configures the parameters of the USB devices.



Legacy USB Support

Enabled
Enable legacy USB support.

Disabled
Keep USB devices available only for EFI applications.

Auto
Disable support for legacy 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 support of 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 under the DOS mode. Please refer to the following tables for more information on the types of the USB ports.

Table 1. OS Selection

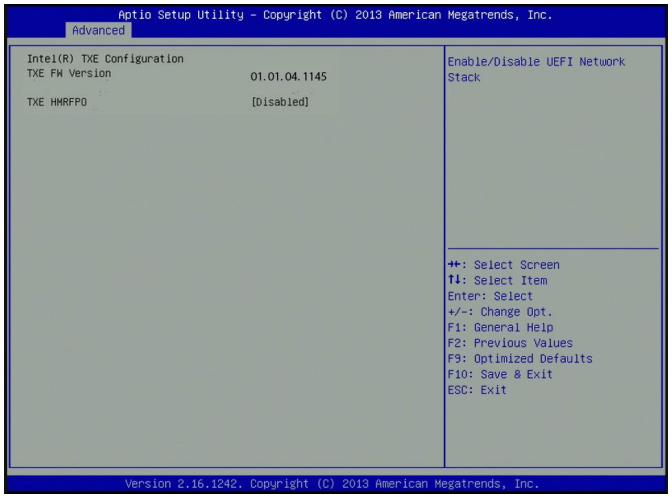
Operation Environment for Customers	DOS	Windows 7	Windows 8.x	Linux
OS Selection in the BIOS Advanced Menu	Windows 8.x	Windows 7	Windows 8.x	Windows 8.x
Available USB ports	All	When installing Windows 7 for the first time, only native USB 2.0 ports can work. Please refer to table 2 below for the USB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

Table 2. The Types of the USB Ports

Model Name	BT253
USB 0 (3.0)	Native
USB 0	Native
USB 1	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 the 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

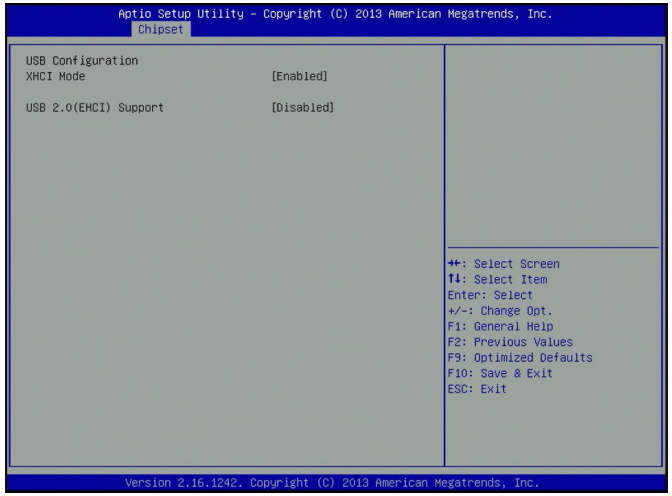
This option lets you configure USB controllers.

PCI Express Configuration

This option lets you configure PCI Express ports.

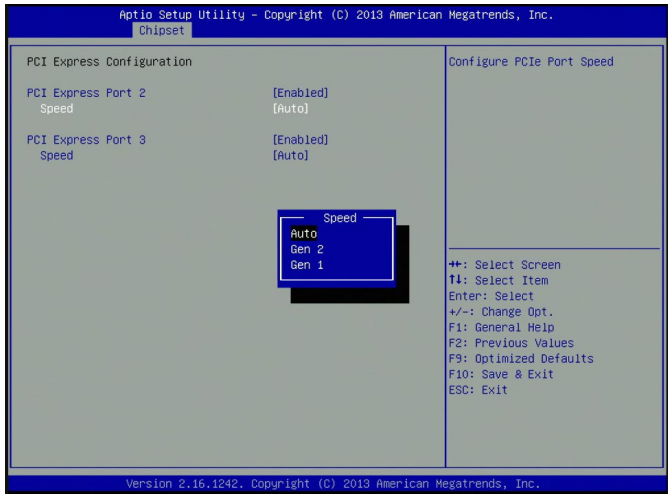
USB Configuration

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



PCI Express Configuration

This section configures the PCI Express root ports.



PCI Express Port 2 and 3

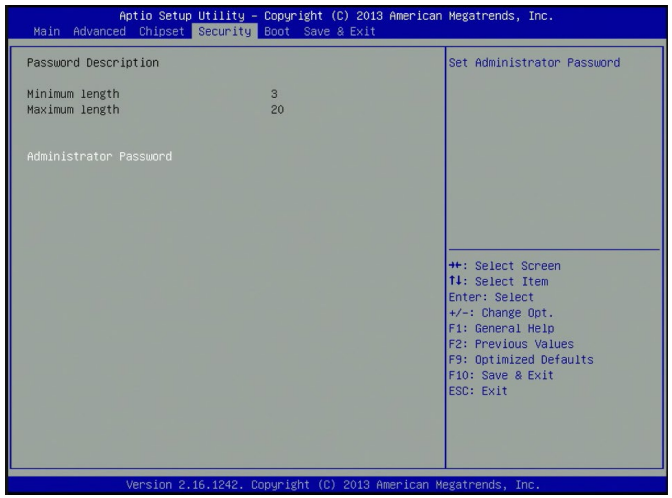
Enable or disable each PCI Express root port in the chipset.

Speed

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

The PCI Express Port 2 controls the full-size Mini PCIe (for PCIe and USB signals) slot.
The PCI Express Port 3 controls the half-size Mini PCIe (for PCIe, USB and LPC signals) slot.

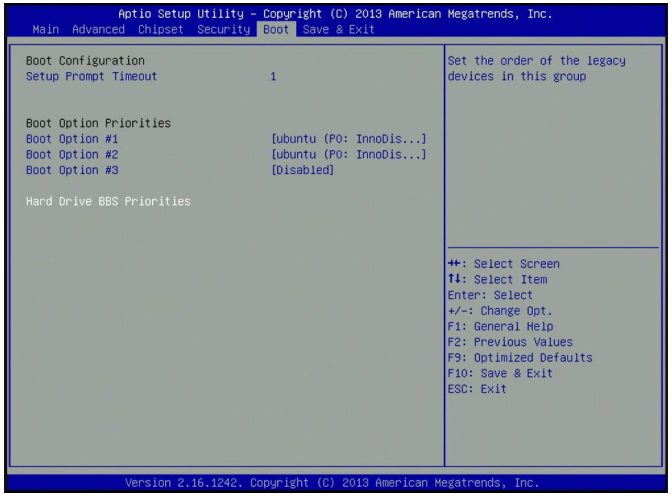
Security



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



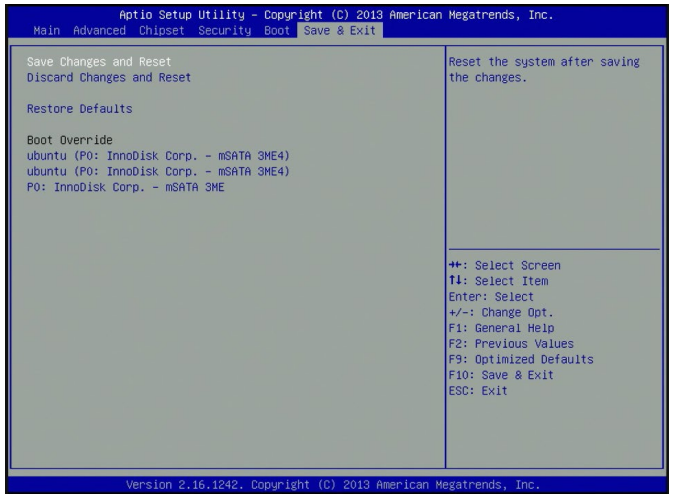
Setup Prompt Timeout

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 the order of the devices from which the systems boots.

Save & Exit



Save Changes and Reset

To save the 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 the 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.

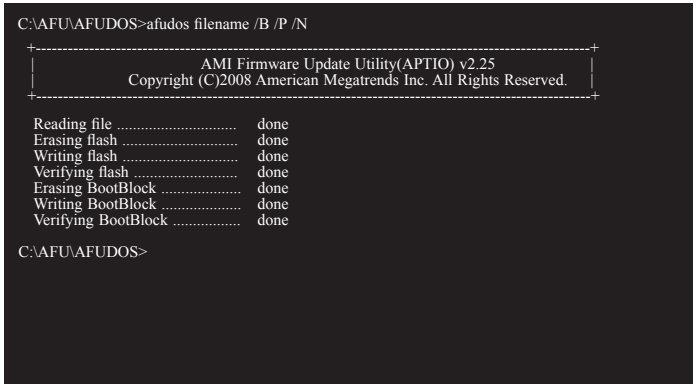
Updating the BIOS

To update the BIOS, you will need an updated BIOS file and a flash utility, AFUDOS.EXE. Please contact technical support or your sales representative for the files.

To execute the utility, type:

A:> AFUDOS BIOS_File_Name /b /p /n

then press <Enter>.



Notice: BIOS SPI ROM

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

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

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

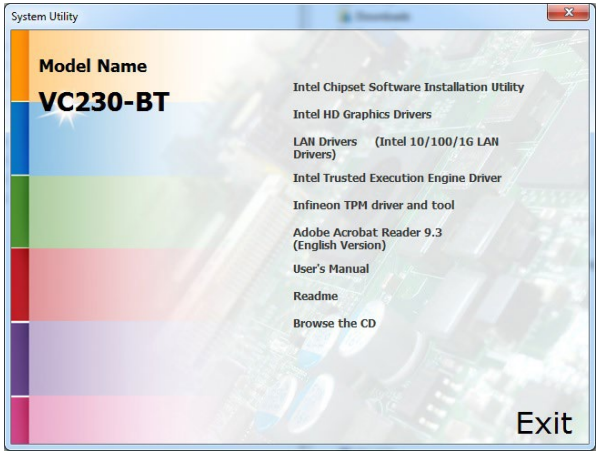
Note:
a. You can take advantage of flash tools to update the default configuration of the BIOS (SPI ROM) to the latest version anytime.
b. When the BIOS IC needs to be replaced, you have to populate it properly onto the system board after the EEPROM programmer has been burned and follow the technical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

Chapter 8 - Supported Software

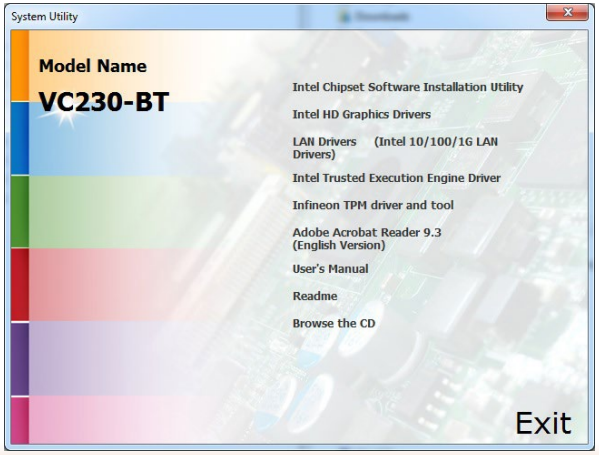
The DVD that came with the system board contains drivers, utilities and software applications required to enhance the performance of the system board.

Insert the DVD into a DVD-ROM drive. The auto-run screen will appear. If the "Auto-run" does not automatically start, please go directly to the root directory of the DVD and double-click "Setup".

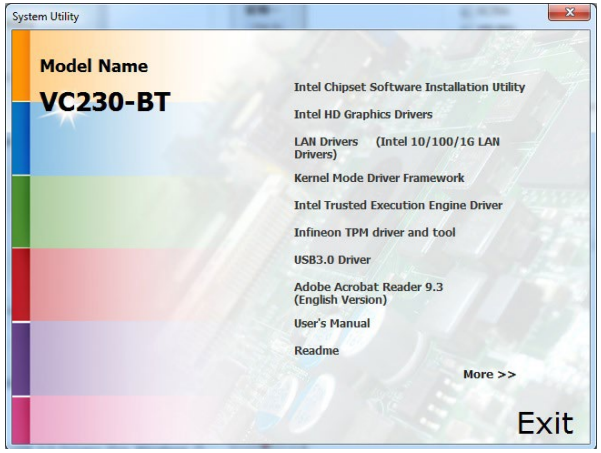
For Windows 10

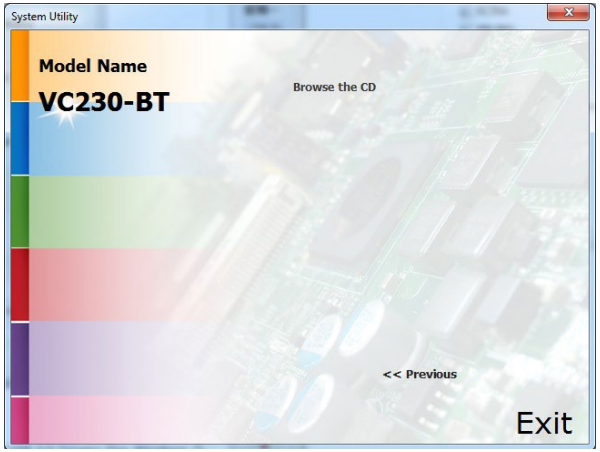


For Windows 8.1



For Windows 7



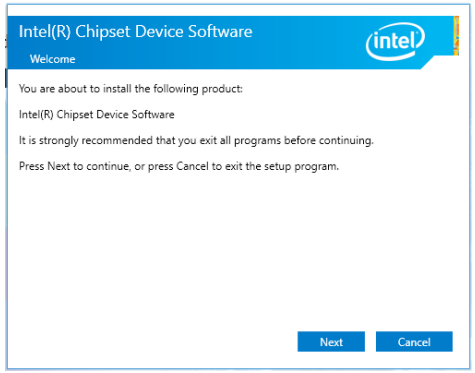


Intel Chipset Device Software

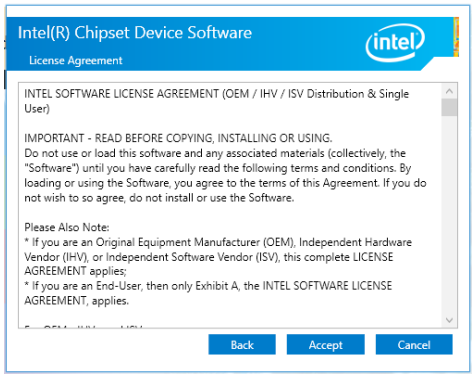
The Intel® Chipset Device Software is used for updating Windows® INF files so that the Intel chipset can be recognized and configured properly in the system.

To install the utility, follow these steps:

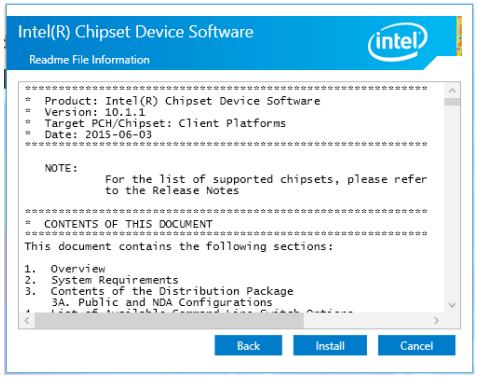
1. Setup is ready to install the utility. Click "Next".



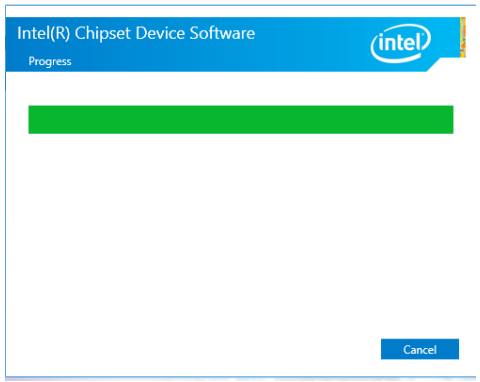
2. Read the license agreement, and then click "Yes".



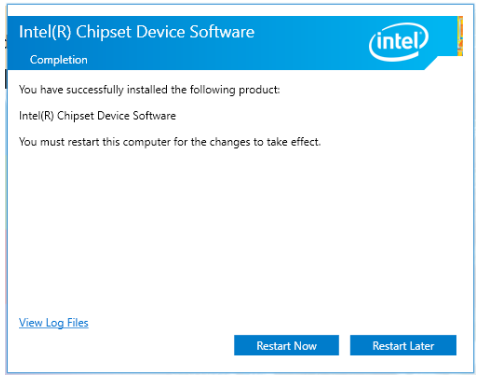
3. Go through the readme document for system requirements and installation tips, and then click "Next". Please wait while the installation is in progress.



4. Please wait while the installation is in progress.



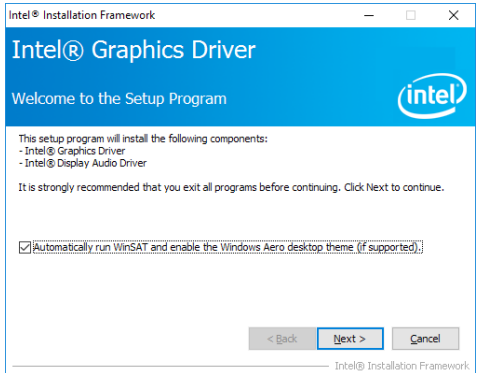
5. Click "Restart Now" to allow the new software installation to take effect.



Intel Graphics Driver

To install this driver, follow these steps:

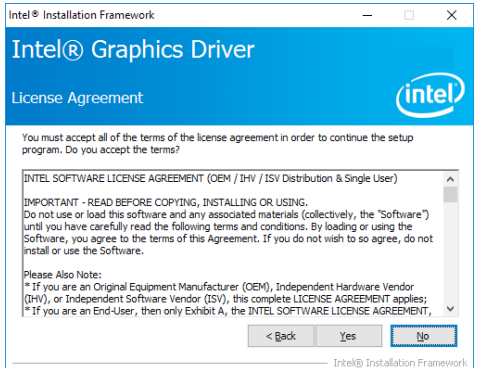
1. Setup is now ready to install the graphics driver. Click "Next".



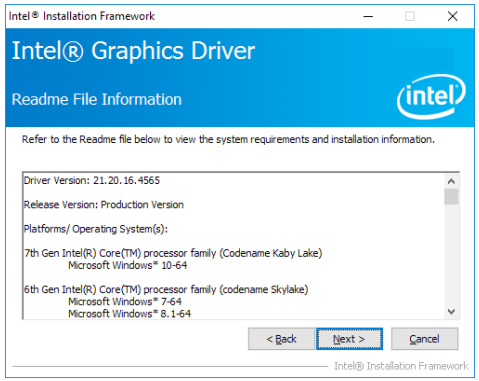
By default, the "Automatically run WinSAT and enable the Windows Aero desktop theme" is enabled. When this is enabled and after the system reboots, the screen will turn blank for 1 to 2 minutes (while WinSAT is running) before the Windows 7/ Windows 8.1/ Windows 10 desktop appears. The "blank screen" period is the time Windows is testing the graphics performance.

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

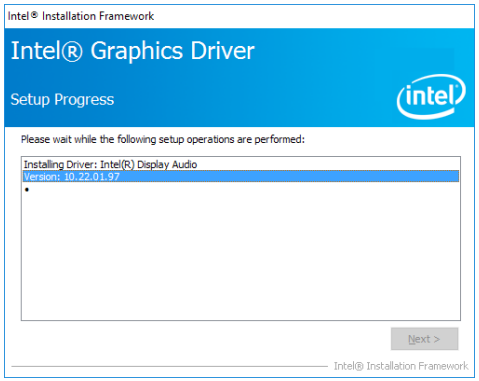
2. Read the license agreement, and then click "Yes".



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

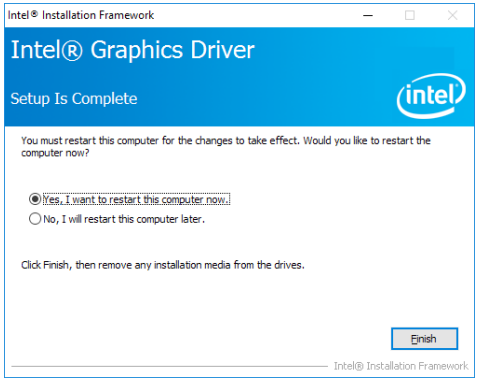


4. Setup is now installing the driver. Click "Next" to continue.



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

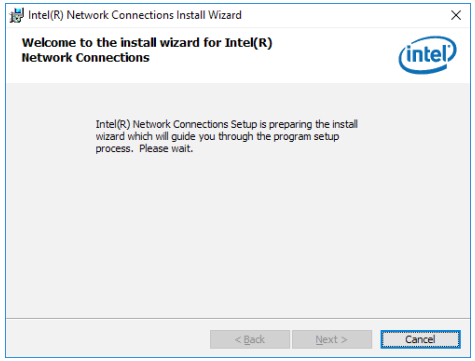
   Restarting the system will allow the new software installation to take effect.



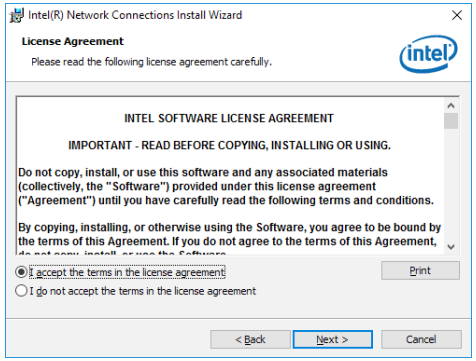
Intel LAN Driver

To install this driver, follow these steps:

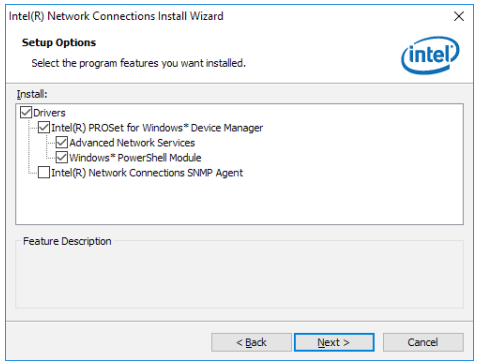
1. Setup is preparing to install the driver. Click "Next" to continue.



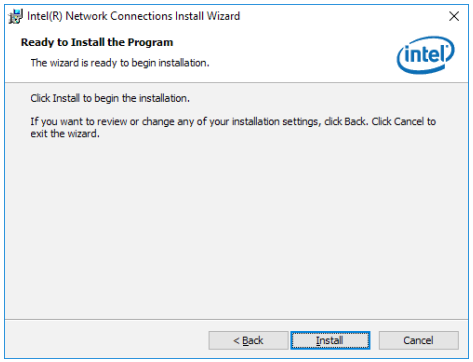
2. Click "I accept the terms in the license agreement" if you accept the agreement, and then click "Next".



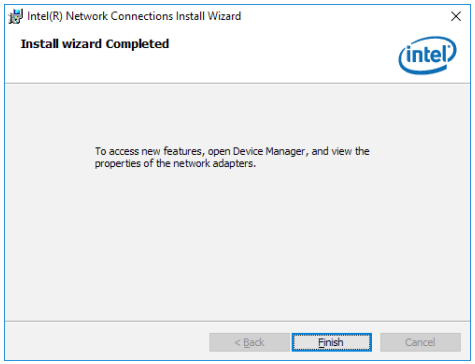
3. Select the program features you want to install, and then click "Next".



4. Click "Install" to begin the installation.



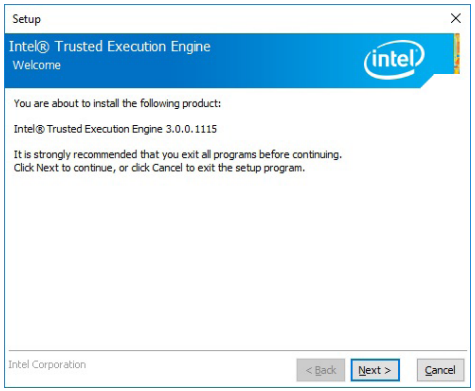
5. After the installation is complete, click "Finish".



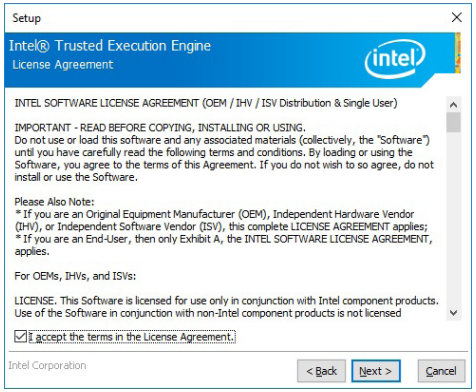
Intel TXE Driver

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

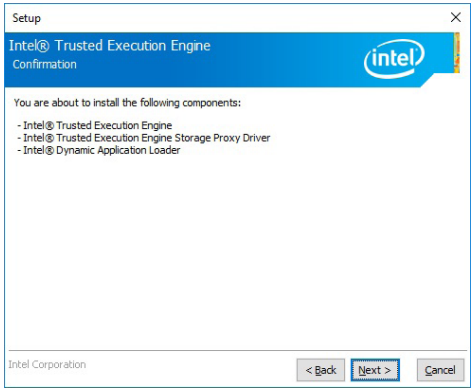
1. You are about to install the driver. Click "Next" to continue.



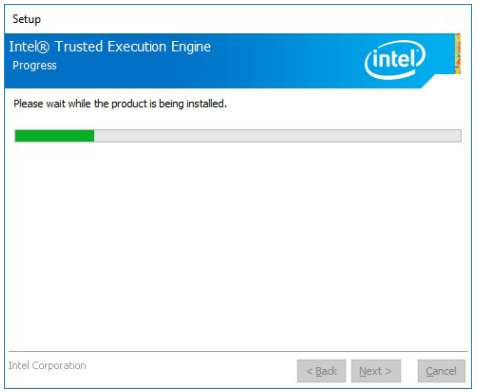
2. Read the license agreement, and then click "Next".



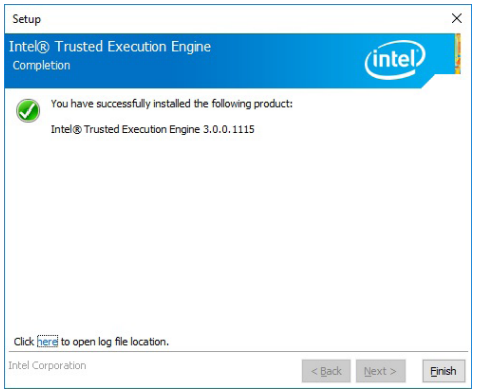
3. Setup is currently installing the driver. Click "Next" to confirm the installation.



4. Please wait while the product is being installed.



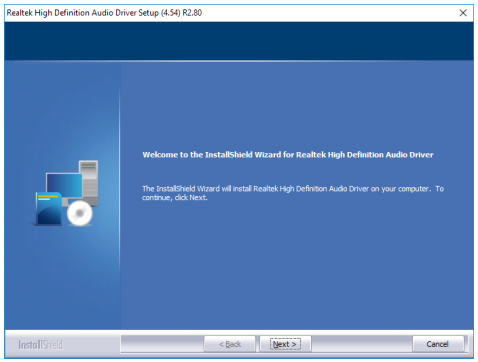
5. After the installation is complete, click "Finish".



Audio Driver

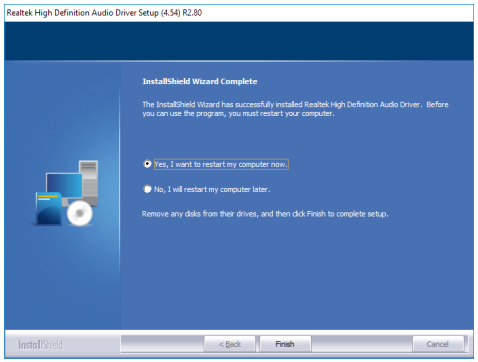
To install this driver, follow these steps:

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".

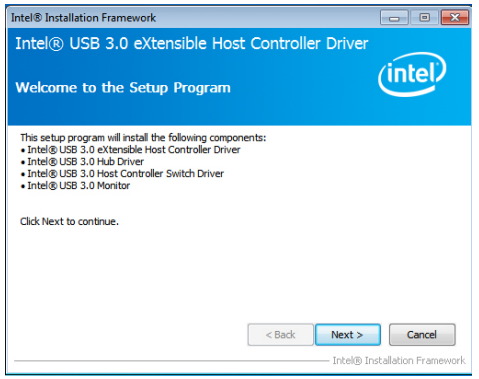
   Restart the system to allow the new software installation to take effect.



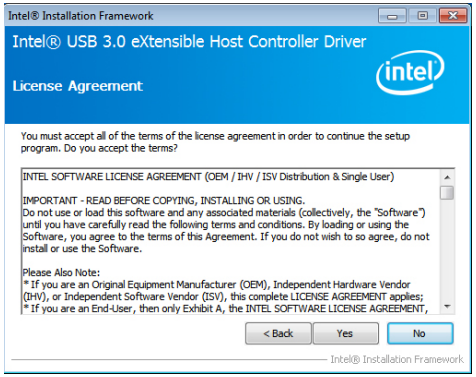
Intel USB 3.0 Drivers (for Windows 7 only)

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

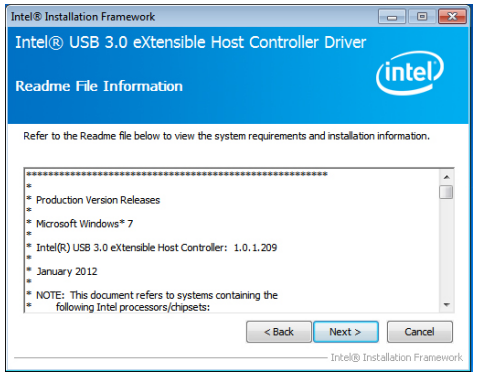
1. Setup is ready to install the driver. Click "Next" to continue.



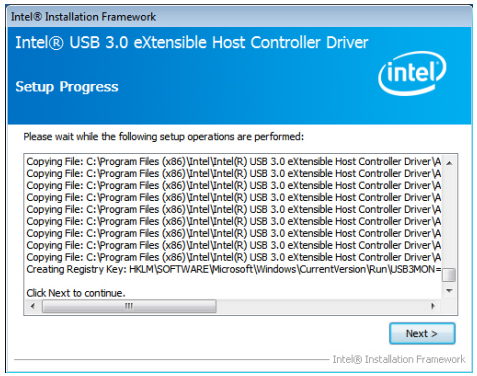
2. Read the license agreement and then click "Yes" if you agree with the terms in the agreement.



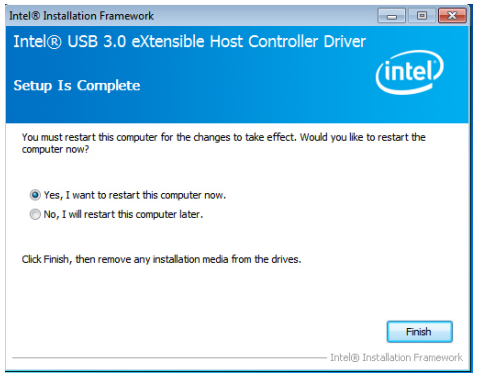
3. Go through the readme document for more installation tips and then click "Next".



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



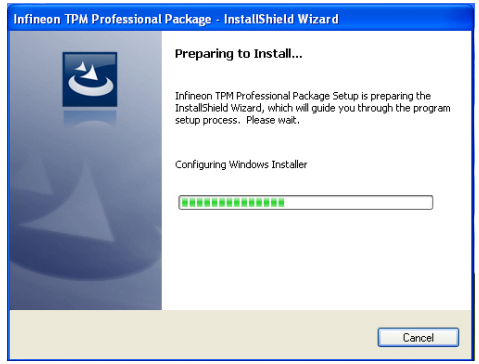
5. After the installation is complete, click "Finish".



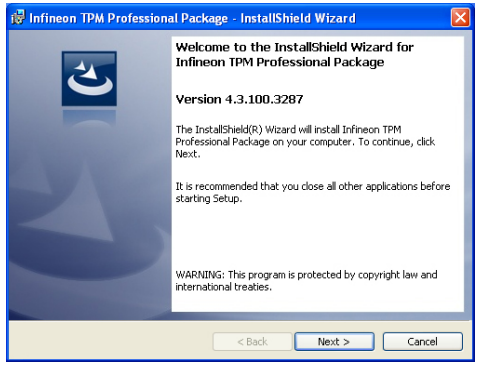
Infineon TPM Driver and Tool (optional)

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

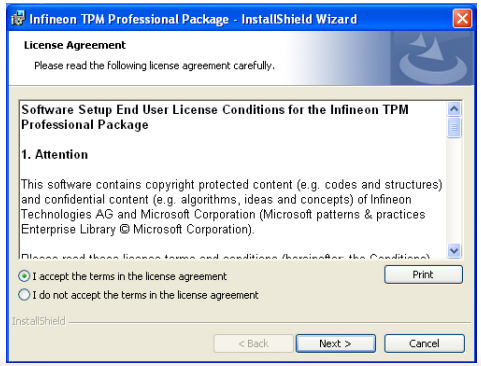
1. The setup program is preparing to install the driver.



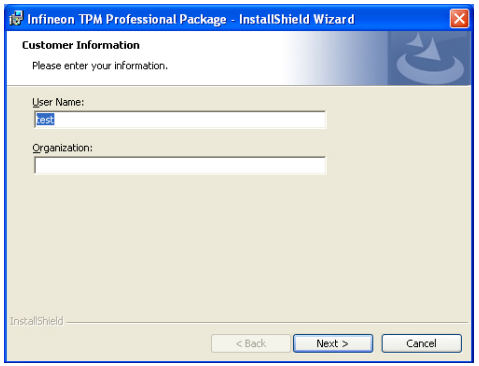
2. The setup program is now ready to install the utility. Click "Next" to continue.



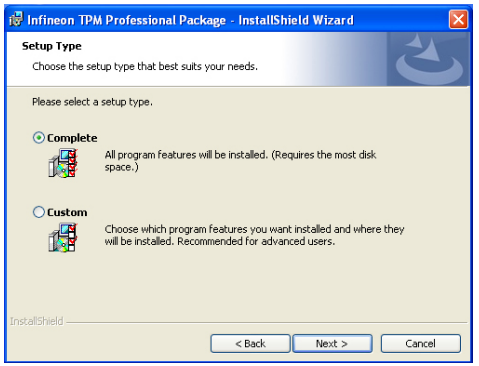
3. Click "I accept the terms in the license agreement" if agree with the terms in the agreement and then click "Next".



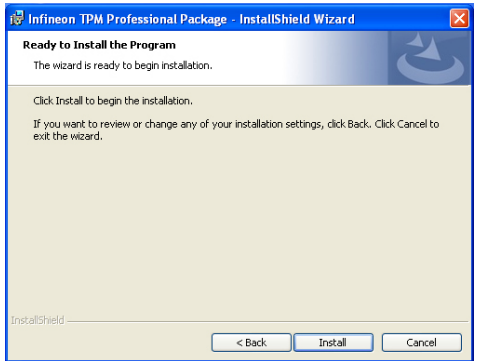
4. Enter the necessary information and then click "Next".



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

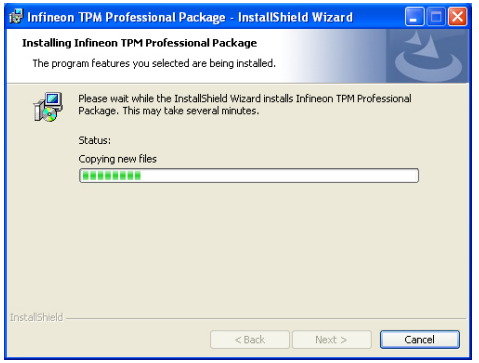


6. Click "Install" to start the installation.



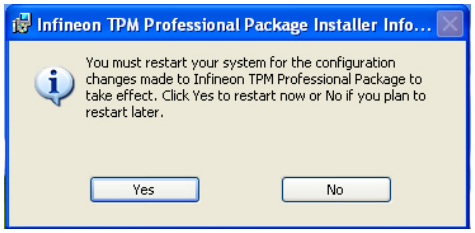
7. TPM requires installing the Microsoft Visual C++ package prior to installing the utility. Click "Install".

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



9. Click "Finish" to exit setup.

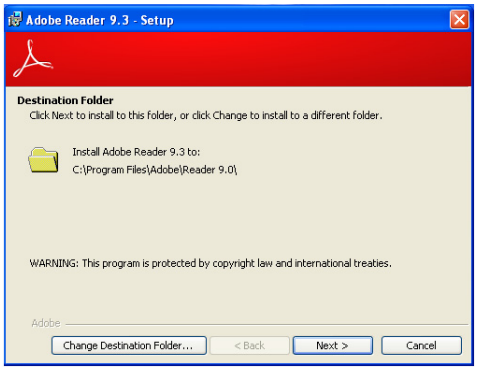
10. Click "Yes" to restart your system.



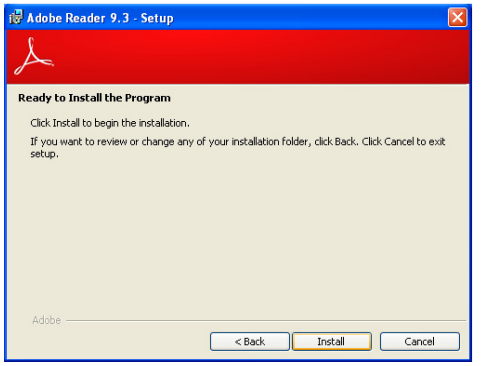
Adobe Acrobat Reader 9.3

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

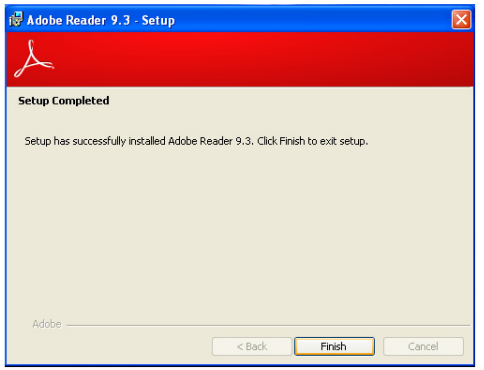
1. Click Next to install or click Change Destination Folder to select another folder.



2. Click "Install" to begin installation.



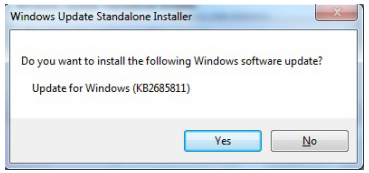
3. Click "Finish" to exit setup.



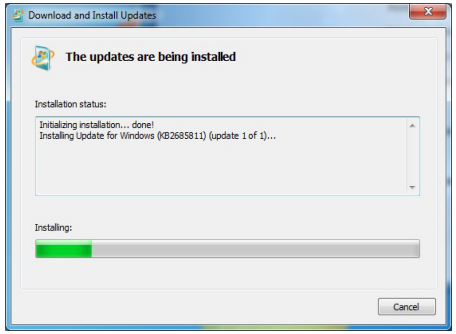
Kernel Mode Driver Framework (for Windows 7 only)

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

1. Click "Yes" to install the update.



2. The update is being installed now.



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