



# **ES520-HU**

## **Desktop Box PC**

### **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.

© 2015. 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
Trademarks .....	2
FCC and DOC Statement on Class A.....	2
About this Manual .....	4
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 the Know the ES520-HU .....	8
Mechanical Dimensions .....	9
Chapter 2 - Getting Started .....	10
Preparing the system .....	10
Installing Devices .....	10
Configuring the BIOS .....	10
Installing the Operating System .....	10
Installing the Drivers .....	10
Chapter 3 - Installing Device .....	11
Removing the Chassis Cover .....	11
Installing the SATA Drive .....	11
Installing the SODIMM .....	13
Installing a SIM Card .....	14
Installing Mini PCIe and/or mSATA Cards .....	15
Chapter 4 - Jumper Settings.....	16
Clear CMOS Data .....	16
Auto Power-on Select .....	16
USB Power Select .....	17
Mini PCIe Signal Select .....	17
Chapter 5 - Ports and Connectors.....	18
Front Panel I/O Ports .....	18
USB Ports .....	18
Rear Panel I/O Ports .....	19
12V DC-in .....	19
Graphics Interfaces .....	20

RJ45 LAN Ports .....	20
USB Ports .....	21
I/O Connectors .....	22
Digital I/O and or Power Connector .....	22
Front Audio Connector .....	22
COM (Serial) Ports .....	23
Front Panel Connector .....	23
SATA (Serial ATA) Connectors .....	24
SATA (Serial ATA) Power Connector .....	24
Expansion Slots .....	25
Cooling Fan Connectors .....	25
SMBus Connector .....	26
Chassis Intrusion Connector .....	26
Standby Power LED .....	27
Battery .....	27

Chapter 6 - Mounting Option .....	28
Wall Mount .....	28

Chapter 7 - BIOS Setup .....	30
Overview .....	30
AMI BIOS Setup Utility .....	31
Main .....	31
Advanced .....	31
Chipset .....	41
Boot.....	45
Security.....	46
Save & Exit.....	46
Updating the BIOS .....	47
Notice: BIOS SPI ROM .....	47

Chapter 8 - Supported Software .....	48
--------------------------------------	----

Chapter 9 - Intel AMT Settings .....	64
Overview .....	64
Enable Intel® AMT in the AMI BIOS.....	64
Enable Intel® AMT in the Intel® Management Engine BIOS .....	65
Extension (MEBX) Screen .....	65

Appendix A - Watchdog Sample Code .....	75
---	----

Appendix B - System Error Message.....	76
--	----

Appendix C - Troubleshooting .....	77
------------------------------------	----

## About this Manual

An electronic file of this manual can be obtained from the DFI website at [www.dfi.com](http://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 ES520-HU system unit
- 1 Quick Installation Guide

## Chapter 1 - Introduction

### Overview



Front View



Rear View

### Key Features

Model Name	ES520-HU
Processor	4th generation Intel® Core™ processors
LAN	2 LAN ports
COM	3 COM ports
Display	2 HDMI
USB	2 USB 2.0 ports at the front panel I/O ports; 4 USB 3.0 ports at the rear panel I/O ports
Audio	Realtek ALC888 5.1-channel High Definition Audio

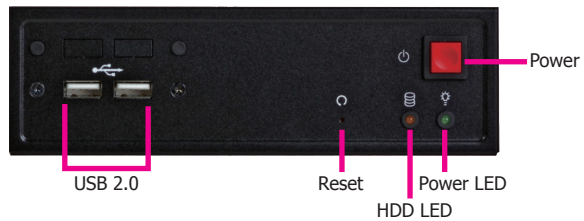
## Specifications

<b>Processor System</b>	<ul style="list-style-type: none"> <li>• 4th generation Intel® Core™ processors               <ul style="list-style-type: none"> <li>- Intel® Core™ i7-4650U, 4M Cache, 1.7GHz (3.3GHz), 15W</li> <li>- Intel® Core™ i5-4300U, 3M Cache, 1.9GHz (2.9GHz), 15W</li> </ul> </li> <li>• BGA 1168 packaging technology</li> <li>• 22nm process technology</li> </ul>
<b>Memory</b>	<ul style="list-style-type: none"> <li>• One 204-pin SODIMM socket</li> <li>• Supports DDR3L 1333/1600MHz</li> <li>• Supports up to 8GB system memory</li> <li>• Supports single channel memory interface</li> </ul>
<b>Graphics</b>	<ul style="list-style-type: none"> <li>• Intel® HD Graphics GT series</li> <li>• Display ports: 2 HDMI</li> <li>• HDMI: resolution up to 4096x2304 @ 24Hz or 2560x1600 @ 60Hz</li> </ul>
<b>Storage</b>	<ul style="list-style-type: none"> <li>• 1 2.5" SATA drive bay</li> </ul>
<b>Ethernet</b>	<ul style="list-style-type: none"> <li>• Intel® I210 PCI Express Gigabit Ethernet controller</li> <li>• Intel® I218 with iAMT9.5 Gigabit Ethernet Phy</li> <li>• Integrated 10/100/1000 transceiver</li> <li>• Fully compliant with IEEE 802.3, IEEE 802.3u, IEEE 802.3ab</li> </ul>
<b>Audio</b>	<ul style="list-style-type: none"> <li>• Realtek ALC888 5.1-channel High Definition Audio</li> </ul>
<b>I/O Ports</b>	<ul style="list-style-type: none"> <li>• Front Panel               <ul style="list-style-type: none"> <li>- 2 USB 2.0 ports</li> <li>- 1 HDD LED</li> <li>- 1 Power LED</li> <li>- 1 Power button</li> <li>- 1 Reset button</li> </ul> </li> <li>• Rear Panel               <ul style="list-style-type: none"> <li>- 2 DB-9 RS232 serial ports</li> <li>- 1 DB-9 RS485 serial port</li> <li>- 1 12V DC-in jack</li> <li>- 2 HDMI ports</li> <li>- 2 RJ45 LAN ports</li> <li>- 4 USB 3.0 ports</li> <li>- 1 Mic-in</li> <li>- 1 Line-out</li> </ul> </li> </ul>

<b>Expansion</b>	<ul style="list-style-type: none"> <li>• 2 Mini PCIe slots               <ul style="list-style-type: none"> <li>- 1 full size supports USB, PCIe, mSATA and LPC signals</li> <li>- 1 half size supports USB, PCIe and 3G signals</li> </ul> </li> <li>• 1 SIM card socket</li> </ul>
<b>Cooling System</b>	<ul style="list-style-type: none"> <li>• 1 system fan</li> </ul>
<b>Power</b>	<ul style="list-style-type: none"> <li>• Power input voltage               <ul style="list-style-type: none"> <li>- +12V DC</li> </ul> </li> </ul>
<b>Environment</b>	<ul style="list-style-type: none"> <li>• Temperature               <ul style="list-style-type: none"> <li>- Operating: 0°C ~ 50°C</li> <li>- Storage: -20°C ~ 85°C</li> </ul> </li> <li>• Humidity               <ul style="list-style-type: none"> <li>- Operating: 0% to 85% non-condensing</li> </ul> </li> </ul>
<b>Construction</b>	<ul style="list-style-type: none"> <li>• Sheet metal</li> </ul>
<b>Mounting</b>	<ul style="list-style-type: none"> <li>• Wall mount</li> </ul>
<b>Dimensions</b>	<ul style="list-style-type: none"> <li>• 166mm x 50mm x 157.3mm (W x H x D)</li> </ul>
<b>Weight</b>	<ul style="list-style-type: none"> <li>• 970g</li> </ul>
<b>OS Support</b>	<ul style="list-style-type: none"> <li>• Windows 7, WES 7, Windows 8.1</li> </ul>

## Getting to Know the ES520-HU

### Front View



#### Power

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

#### Power LED

Indicates the power status of the system.

#### HDD LED

Indicates the status of the hard drive.

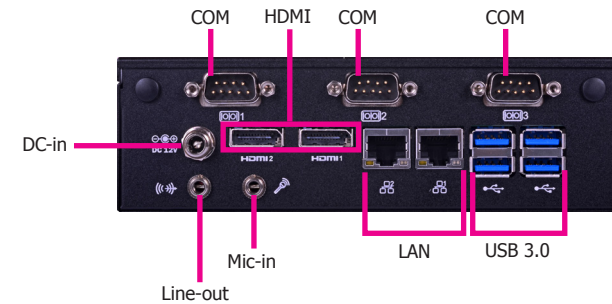
#### Reset Button

Press to reset the system.

#### USB Ports

Used to connect USB 2.0/1.1 devices.

### Rear View



#### COM Ports

Used to connect serial devices.

#### HDMI Port

Used to connect a HDMI device.

#### USB Ports

Used to connect USB 3.0 devices.

#### LAN Ports

Used to connect the system to a local area network.

#### Line-out jack

Used to connect to a speaker.

#### Mic-in jack

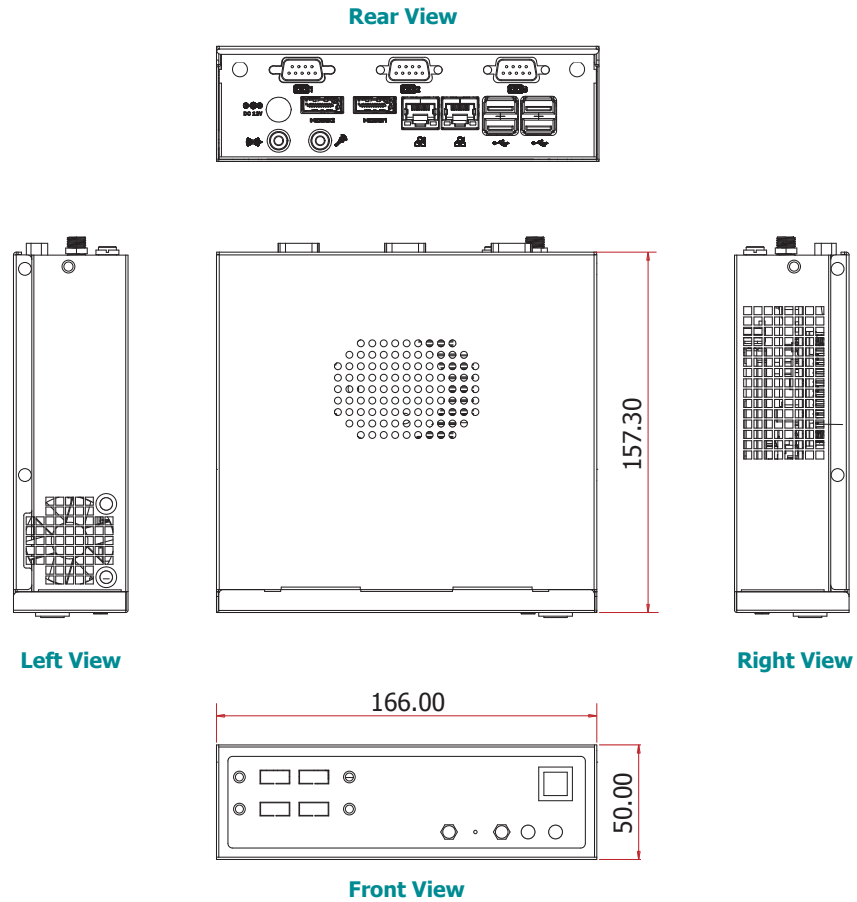
Used to connect to a microphone.

#### DC-in jack

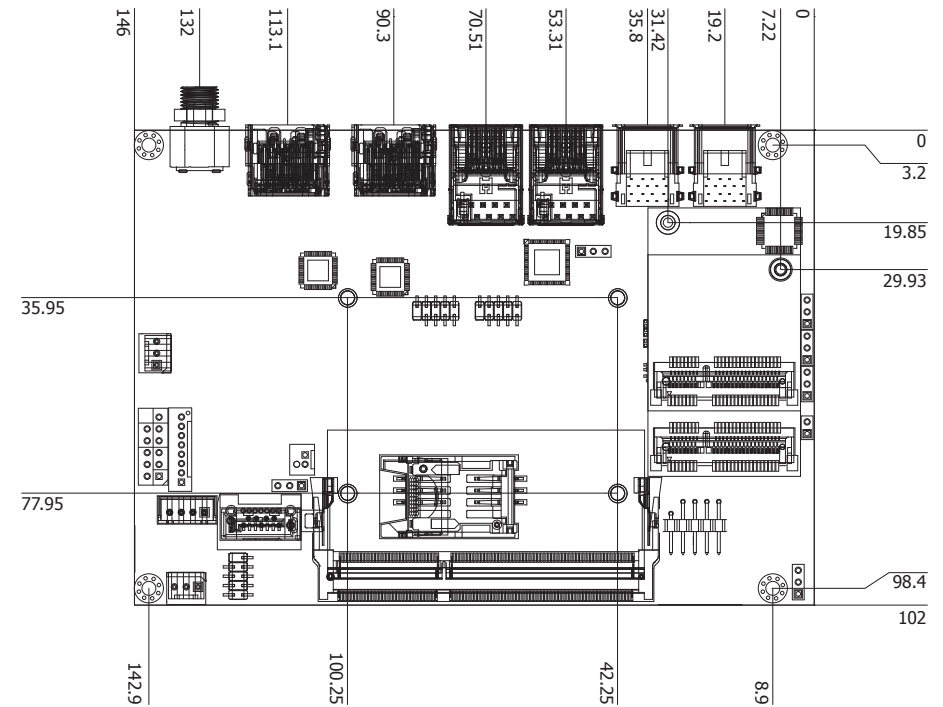
Used to plug a power adapter.

## Mechanical Dimensions

### Chassis Dimensions



### Motherboard Dimensions



## Chapter 2 - Getting Started

---

### Preparing the System

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

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

### Installing Devices

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

- Memory module
- SATA hard drive
- Mini PCIe card

### Configuring the BIOS

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

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

### Installing the Operating System

Most operating system software 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.

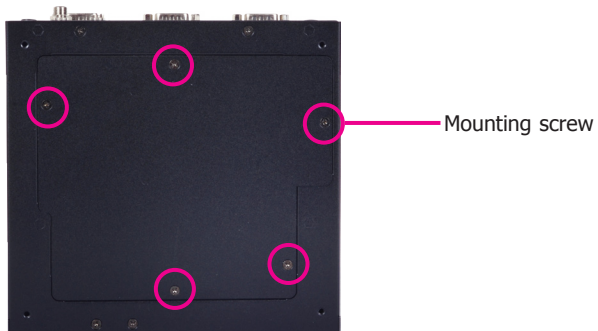
### Installing the Drivers

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.

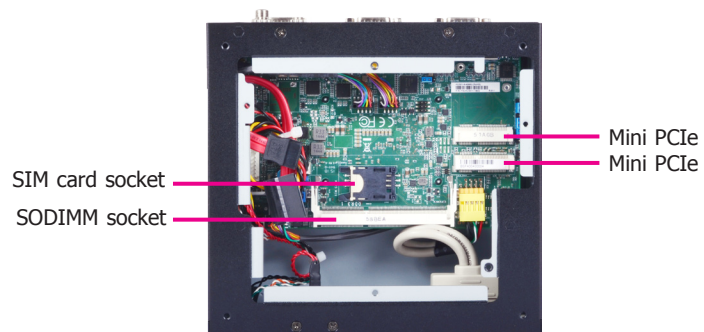
## Chapter 3 - Installing the Device

### Removing the Chassis Cover

1. Make sure the system and all other peripheral devices connected to it has been powered-off.
2. Disconnect all power cords and cables.
3. Remove the 5 mounting screws to open the cover on the bottom of the system.

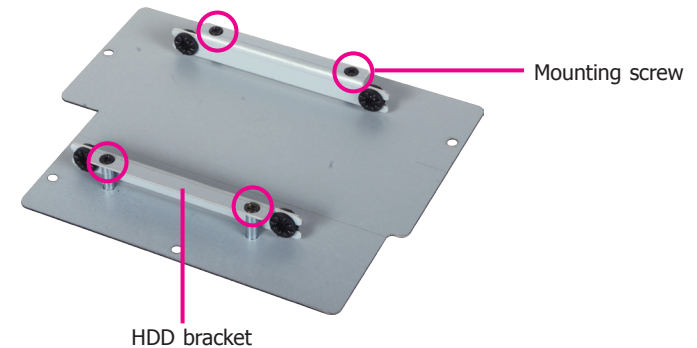


4. 2 Mini PCIe slots, the SODIMM socket and the SIM card socket are readily accessible after removing the chassis cover.

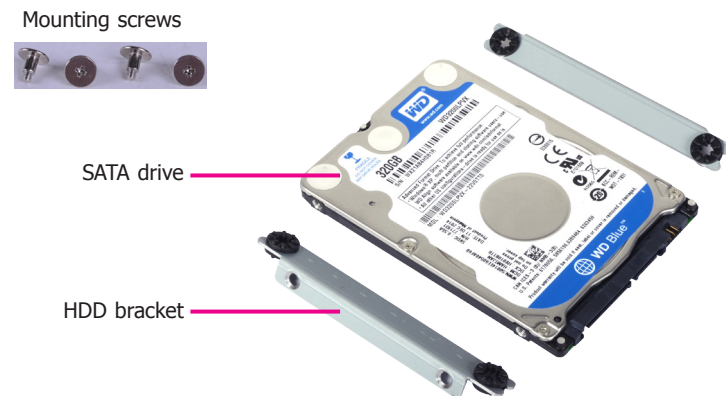


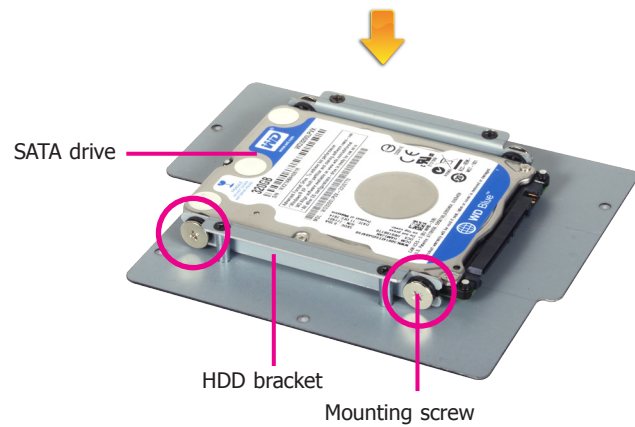
### Installing the SATA Drive

1. Fasten the 4 mounting screws that secure HDD brackets firmly to the system cover.

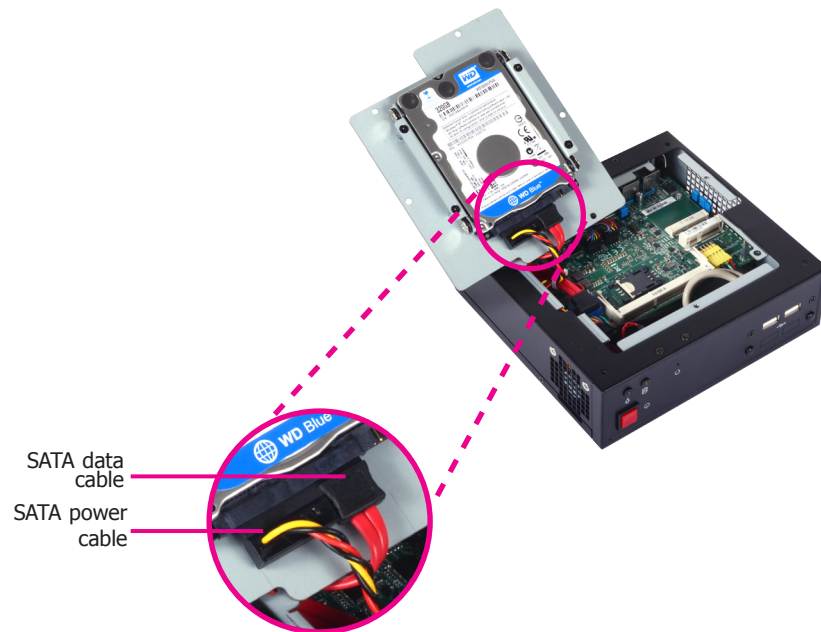


2. Align the mounting holes of the SATA drive with the mounting holes on the HDD brackets and then use the mounting screws provided to secure the drive in place.

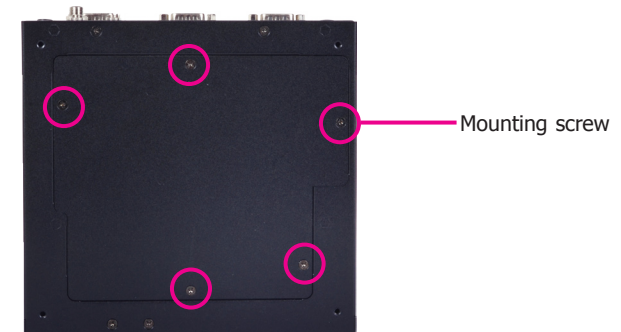




3. Connect the SATA data cable and the SATA power cable to the connectors on the SATA drive.



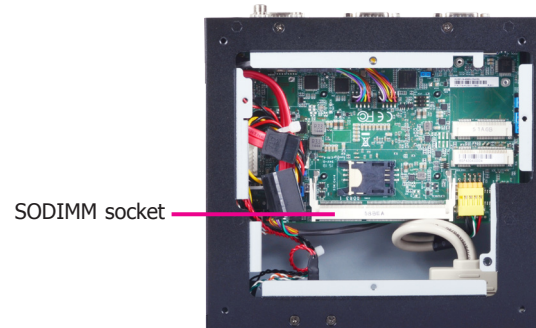
4. After completing steps above, fasten the cover with 5 mounting screws.



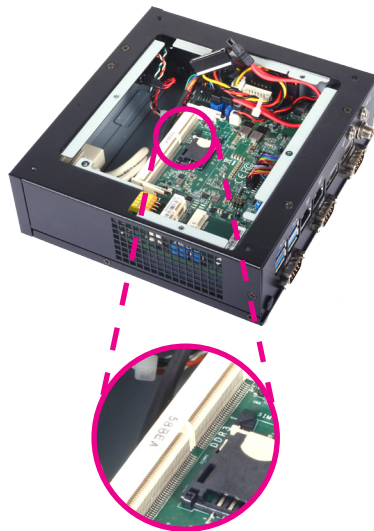


## Installing the SODIMM

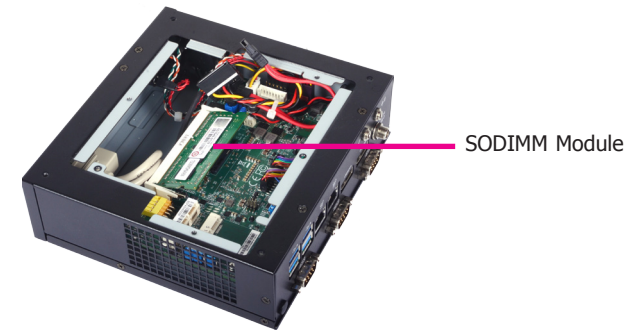
1. The SODIMM socket is located on the system board.



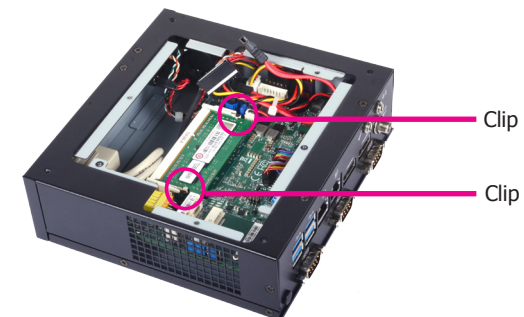
2. Note the key on the socket. The key ensures that the memory module can be plugged into the socket in one direction only.



3. Grasping the memory module by its edges, align it into the socket at an angle of approximately 30 degrees. The memory module must be installed into the socket without any gap between the SODIMM socket and the gold finger.

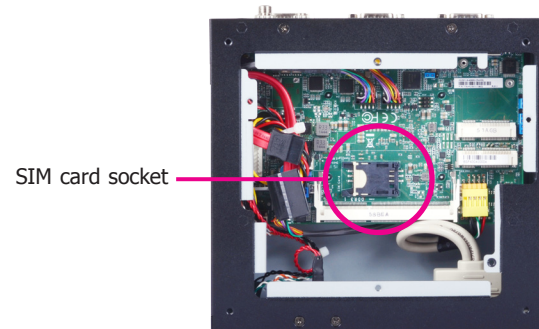


4. Press the memory module down until the clips at each end of the socket lock into position. You will hear a distinctive "click", indicating the module is correctly locked into the socket.

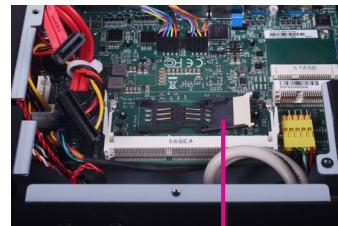
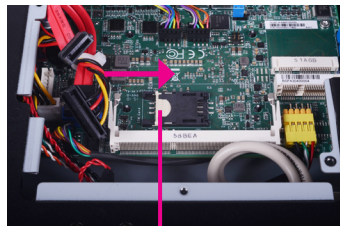


## Installing a SIM Card

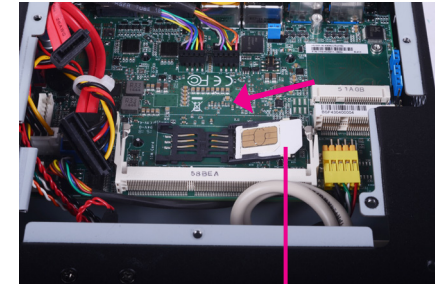
1. The SIM card socket is located on the system board.



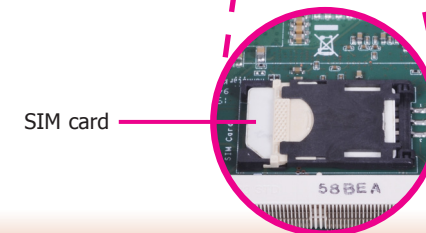
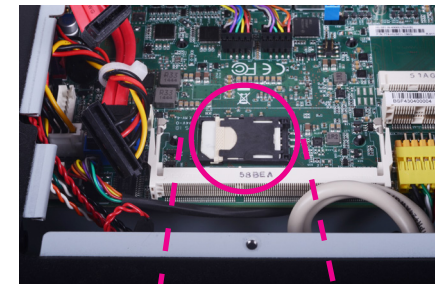
2. Press the SIM card cover backward slightly to release it.



3. Install a SIM card into the SIM card cover in position.

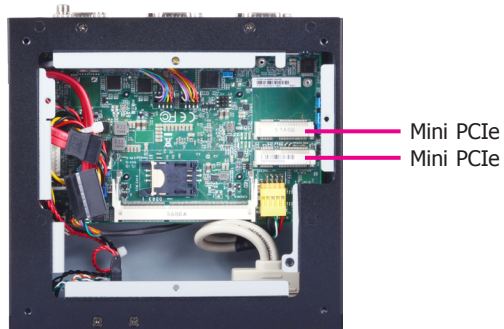


4. Close the SIM card cover and lock the

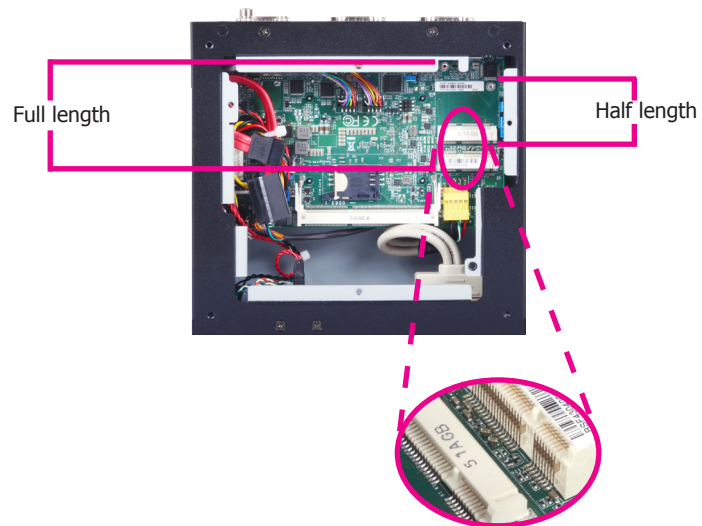


## Installing Mini PCIe and/or mSATA Cards

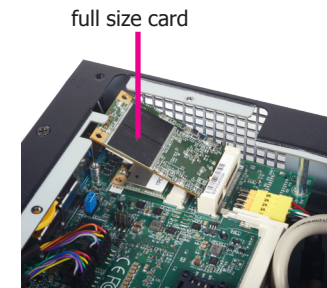
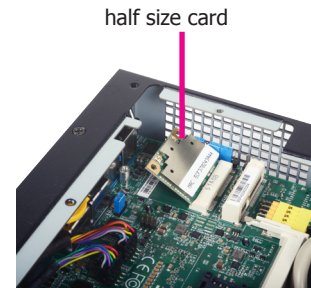
1. The system board is equipped with 2 Mini PCIe slots.



2. One Mini PCIe slot supports a full size Mini PCIe card and the other one supports a half size Mini PCIe card. Note the key on the slot. The key ensures that the Mini PCIe card can be plugged into the slot in one direction only.



3. Grasping the Mini PCIe card by its edges, align the card into the slot at an angle of approximately 30 degrees. Apply firm even pressure to each end of the card until it slips down into the slot. The Mini PCIe card must be installed into the slot without any gap between the Mini PCIe slot and the gold finger.



4. Press the Mini PCIe card down and use the mounting screw provided to secure the half size or full size card on the system board.



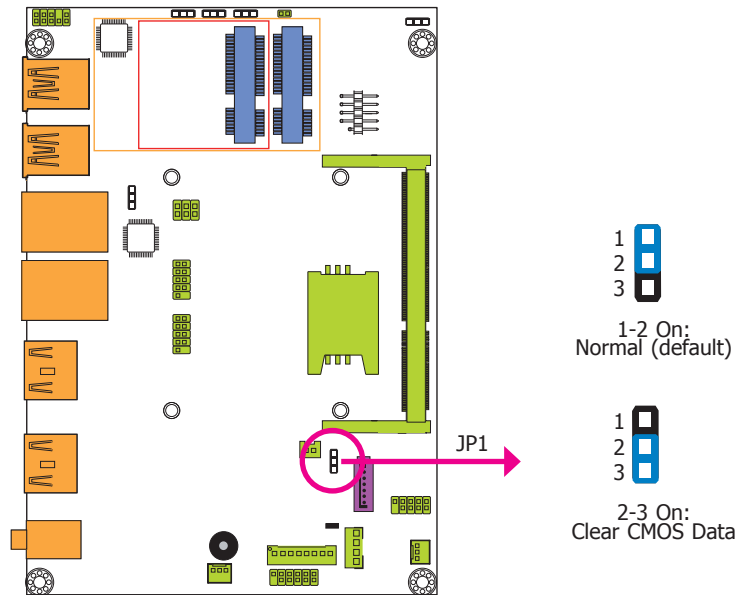
half size card



full size card

## Chapter 4 - Jumper Settings

### Clear CMOS Data



If you encounter the following,

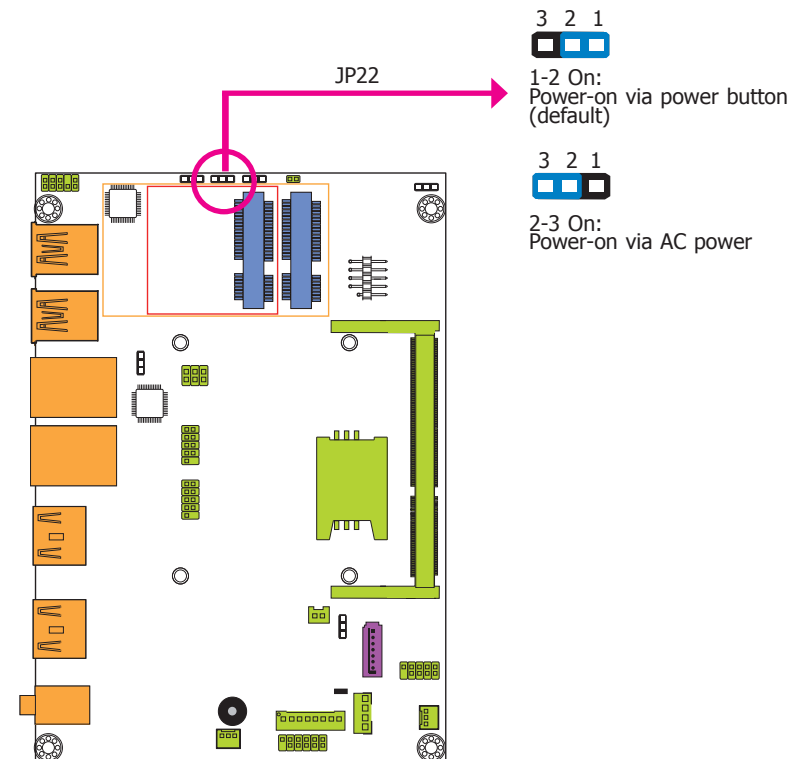
- CMOS data becomes corrupted.
- You forgot the supervisor or user password.

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

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

- Power-off the system and unplug the power cord.
- Set JP1 pins 2 and 3 to On. Wait for a few seconds and set JP1 back to its default setting, pins 1 and 2 On.
- Now plug the power cord and power-on the system.

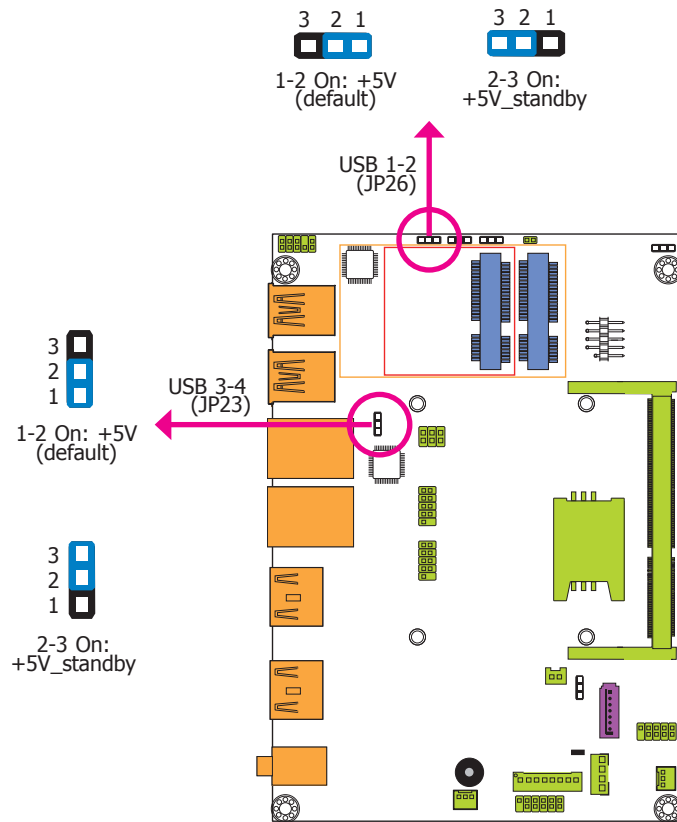
### Auto Power-on Select



JP22 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 JP22 pins 2 and 3 to On. If you want to use the power button, set pins 1 and 2 to On.

When using the JP22 "Power On" feature to power the system back on after a power failure occurs, the system may not power on if the power lost is resumed within 5 seconds (power flicker).

## USB Power Select



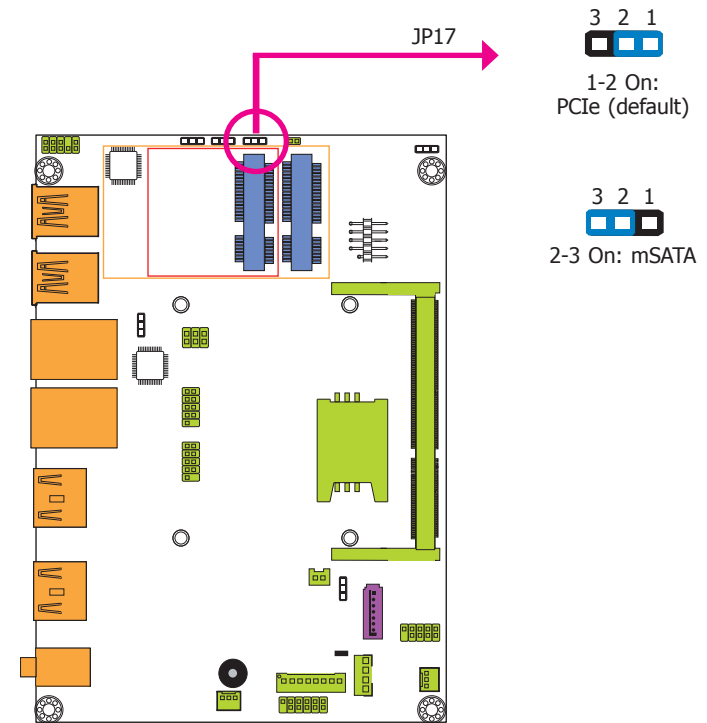
JP23 and JP26 are used to select the power of the USB ports. Selecting +5V\_standby will allow you to use a USB device to wake up the system.



### Important:

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

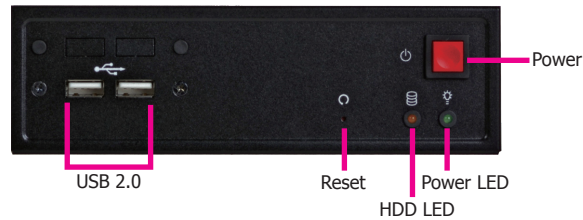
## Mini PCIe Signal Select



JP17 is used to select the Mini PCIe signal: PCIe (default) or mSATA.

## Chapter 5 - Ports and Connectors

### Front Panel I/O Ports



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

- 2 USB 2.0 ports

### USB Ports



The USB device allows data exchange between your computer and a wide range of simultaneously accessible external Plug and Play peripherals.

- **BIOS Setting**

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

- **Wake-On-USB Keyboard/Mouse**

The Wake-On-USB Keyboard/Mouse function allows you to use a USB keyboard or USB mouse to wake up a system from the S3 (STR - Suspend To RAM) state. To use this function:

- **Jumper Setting**

JP25 must be set to "2-3 On: +5V\_standby". Refer to "USB Power Select" in chapter 4 for more information.

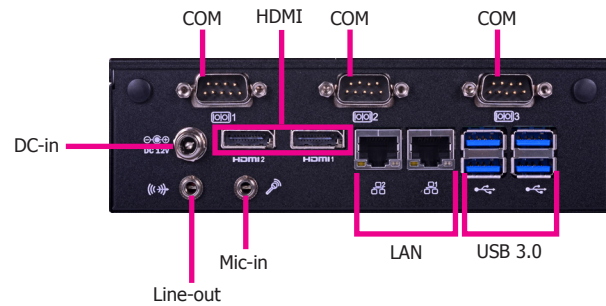


**Important:**

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



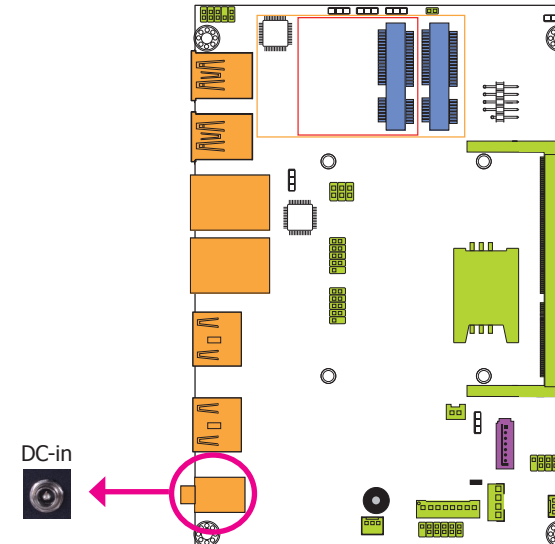
## Rear Panel I/O Ports



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

- 1 12V DC-in jack
- 3 COM ports
- 2 HDMI ports
- 2 RJ45 LAN ports
- 4 USB 3.0 ports
- 1 Mic-in
- 1 Line-out

## 12V DC-in

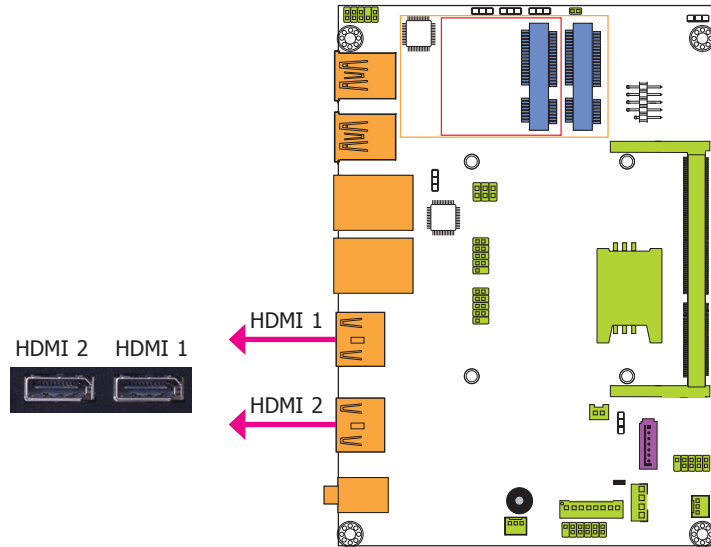


This jack provides maximum of 100W power and is considered a low power solution. Connect a DC power cord to this jack. We only provide 12V power adapter in the optional package contents. Using a voltage more than the recommended range may fail to boot the system or cause damage to the system board.

## Graphics Interfaces

The display ports consist of the following:

- 2 HDMI ports



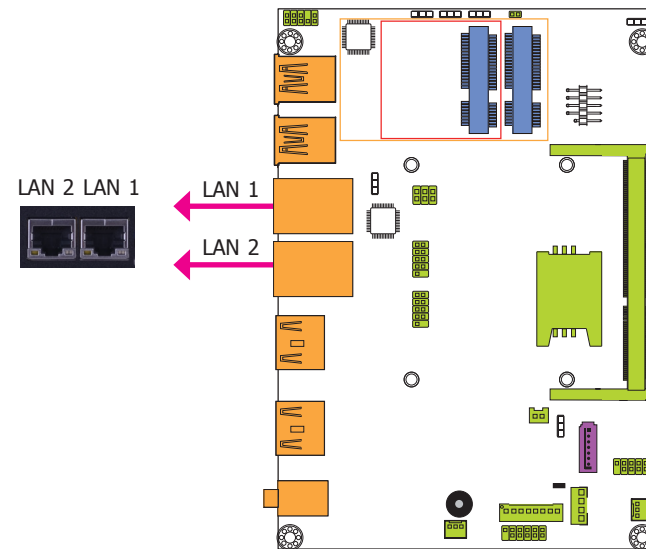
### HDMI Ports

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

### Driver Installation

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

## RJ45 LAN Ports



### Features

- Intel® I210 PCI Express Gigabit Ethernet controller
- Intel® I218 with iAMT9.5 Gigabit Ethernet Phy

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

### BIOS Setting

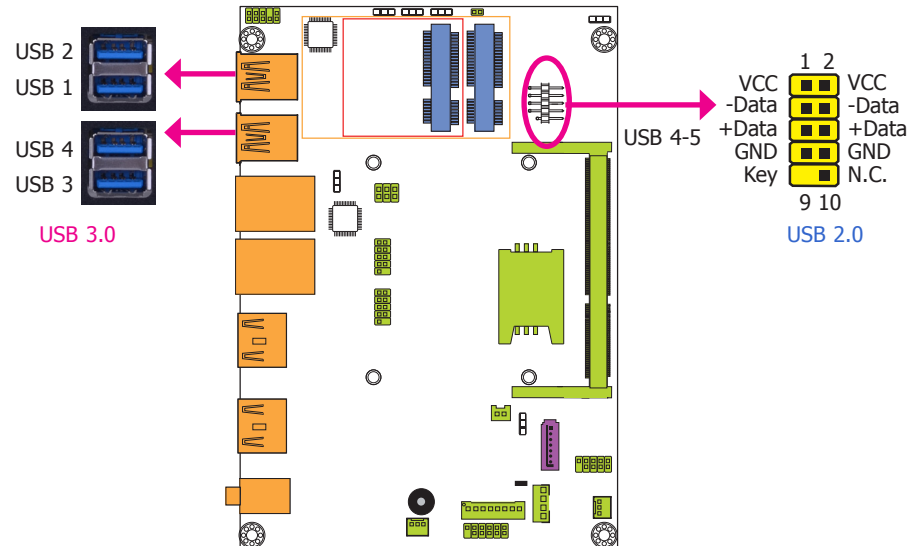
Configure the onboard LAN in the Chipset menu ("PCH-IO Configuration" submenu) of the BIOS. Refer to chapter 7 for more information.

### Driver Installation

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



## USB Ports



The USB device allows data exchange between your computer and a wide range of simultaneously accessible external Plug and Play peripherals.

The system board is equipped with four onboard USB 3.0 ports (USB 1-2/USB 3-4). The 10-pin connector allows you to connect 2 additional USB 2.0 ports (USB 4-5). The additional USB port may be mounted on a card-edge bracket. Install the card-edge bracket to an available slot at the rear of the system chassis and then insert the USB port cables to a connector.

## BIOS Setting

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

## Driver Installation

You may need to install the proper drivers in your 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:

## Jumper Setting

JP23 and JP26 must be set to "1-2 On: +5V\_standby". Refer to "USB Power Select" in chapter 4 for more information.

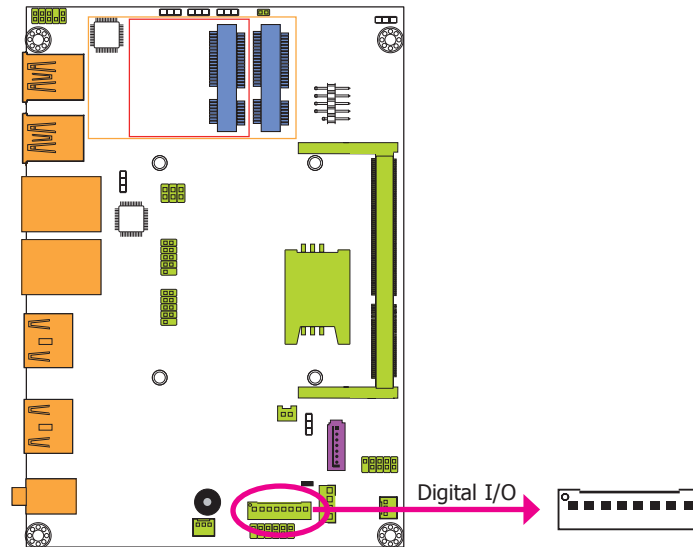


### Important:

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

## I/O Connectors

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

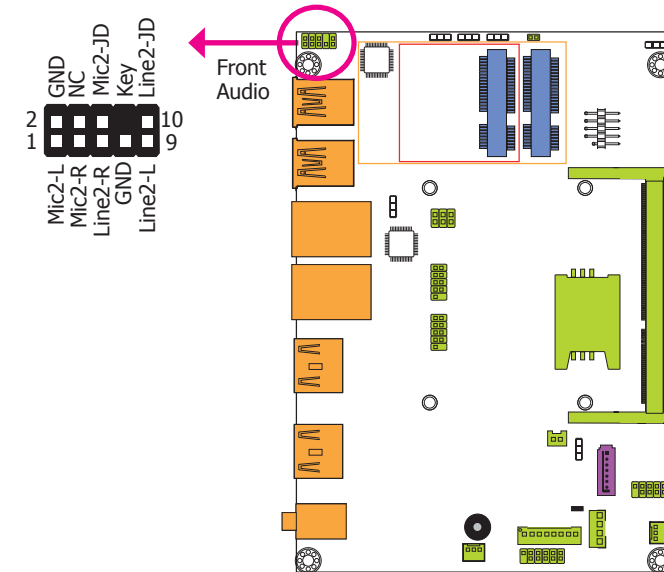


The 8-bit Digital I/O connector provides powering-on function to external devices that are connected to the connector.

#### Digital I/O Connector

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

### Front Audio Connector



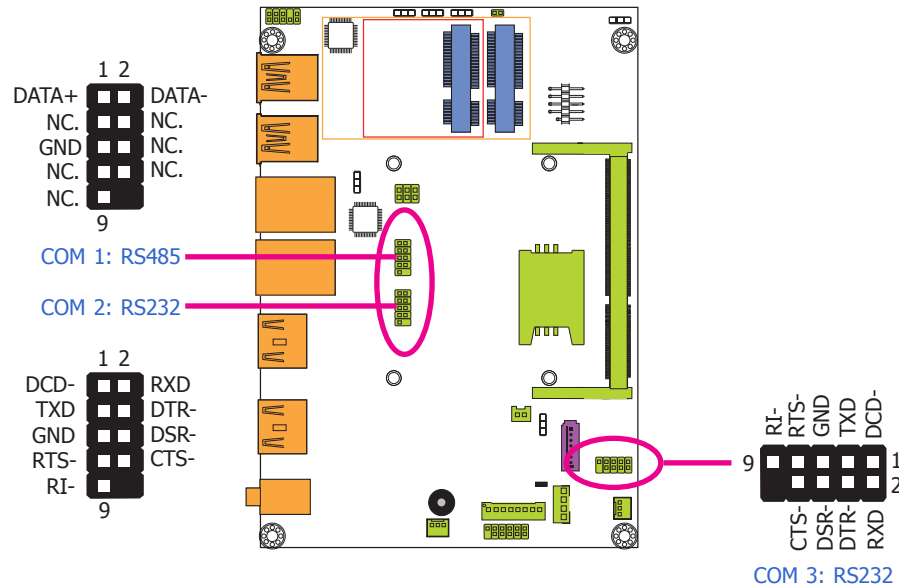
#### Front Audio

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

#### Driver Installation

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

## COM (Serial) Ports



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

The serial ports are asynchronous communication ports with 16C550A-compatible UARTs that can be used with modems, serial printers, remote display terminals, and other serial devices.

### Connecting External Serial Ports

Your COM port may come mounted on a card-edge bracket. Install the card-edge bracket to an available slot at the rear of the system chassis then insert the serial port cable to the COM connector. Make sure the colored stripe on the ribbon cable is aligned with pin 1 of the COM connector.

### BIOS Setting

Configure the serial COM ports in the Advanced menu ("Super IO Configuration" submenu) of the BIOS. Refer to the chapter 7 for more information.

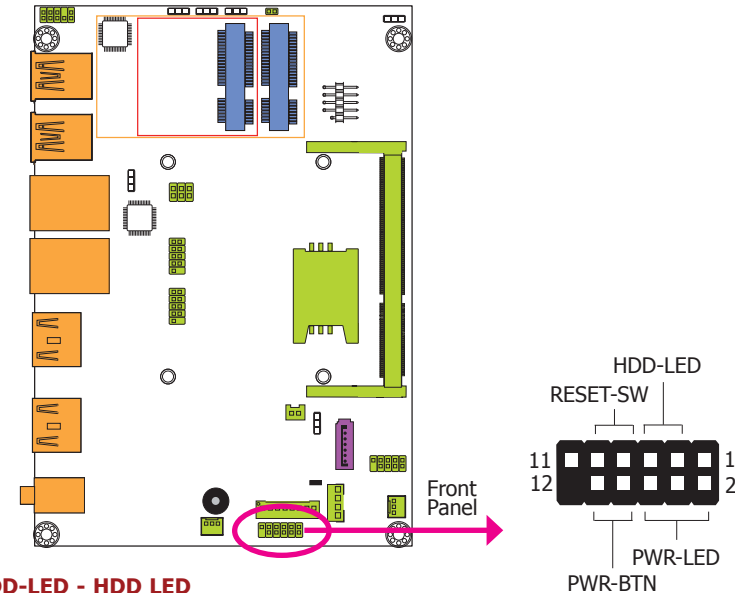


#### Note:

To make the RS485 auto flow control function work on COM 1, please set either 8 data bits + 1 stop bit or one of the following settings:

- (1) 8 data bits + 1 parity bit + 1 stop bit
- (2) 8 data bits + 1 parity bit + 2 stop bits
- (3) 8 data bits + 2 stop bits

## Front Panel Connector



### HDD-LED - HDD LED

This LED will light when the hard drive is being accessed.

### RESET-SW - Reset Switch

This switch allows you to reboot without having to power off the system.

### PWR-BTN - Power Switch

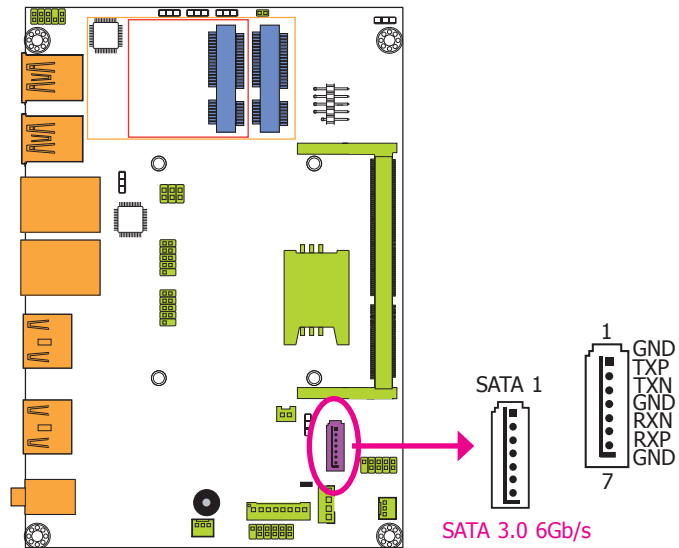
This switch is used to power on or off the system.

### PWR-LED - Power/Standby LED

When the system's power is on, this LED will light. When the system is in the S1 (POS - Power On Suspend) state, it will blink every second. When the system is in the S3 (STR - Suspend To RAM) state, it will blink every 4 seconds.

	Pin	Pin Assignment		Pin	Pin Assignment
HDD-LED	3	HDD Power	PWR-LED	2	LED Power
	5	Signal		4	LED Power
RESET-SW	7	Ground	PWR-BTN	6	Signal
	9	RST Signal		8	Ground
	11	N.C.		10	Signal

## SATA (Serial ATA) Connectors



### Features

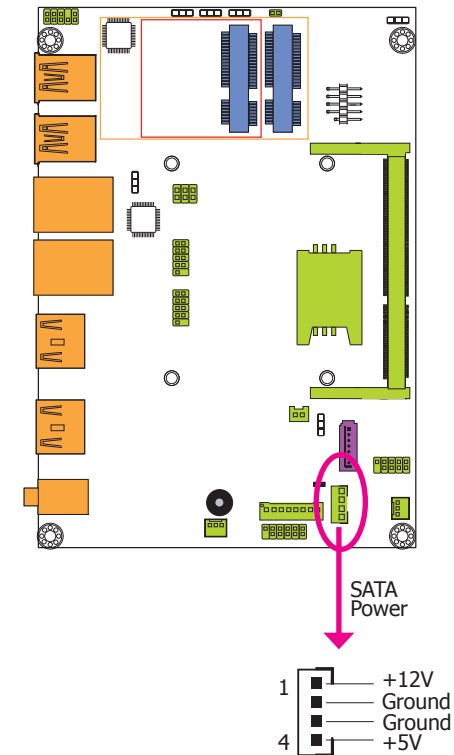
- 1 Serial ATA 3.0 port with data transfer rate up to 6Gb/s
- Integrated Advanced Host Controller Interface (AHCI) controller
- Supports Intel® Smart Response Technology

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

### BIOS Setting

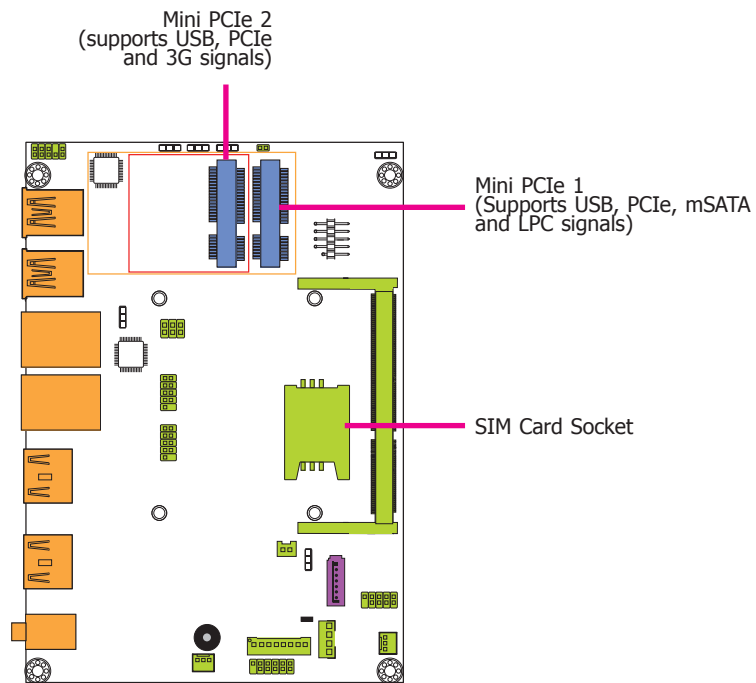
Configure the Serial ATA drives in the Advanced menu ("SATA Configuration" submenu) of the BIOS. Refer to chapter 7 for more information.

## SATA (Serial ATA) Power Connector



The SATA power connector supplies power to the SATA drive. Connect one end of the provided power cable to the SATA power connector and the other end to your storage device.

## Expansion Slots



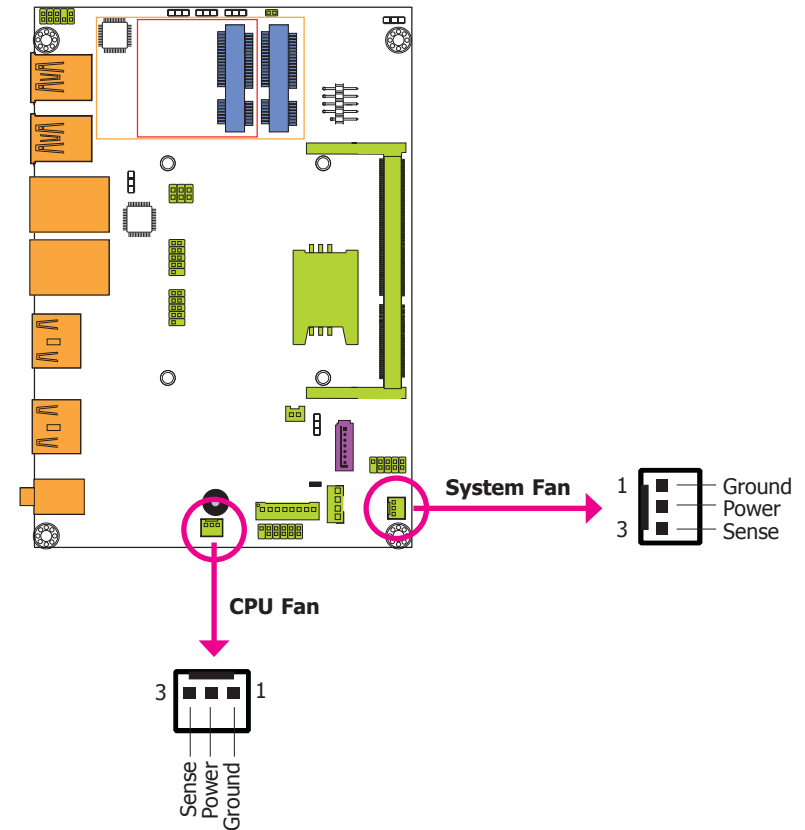
### Mini PCI Express Slots

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

### SIM Card Socket

The SIM slot on the system board is used to insert a SIM card.

## Cooling Fan Connectors

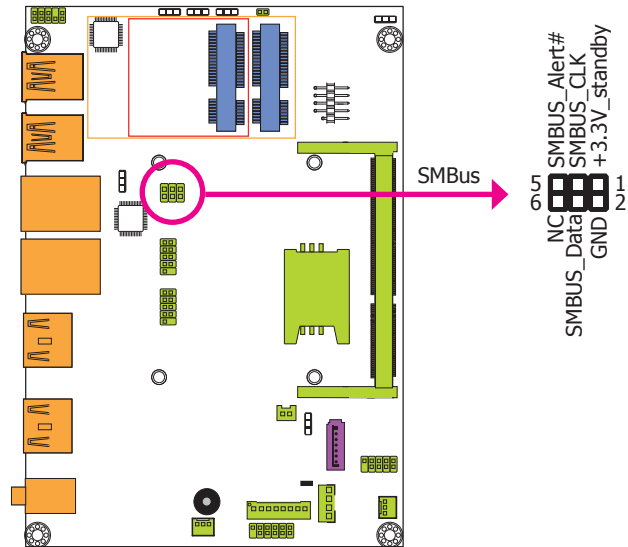


The fan connectors are used to connect cooling fans. The cooling fans will provide adequate airflow throughout the chassis to prevent overheating the CPU and system board components.

### BIOS Setting

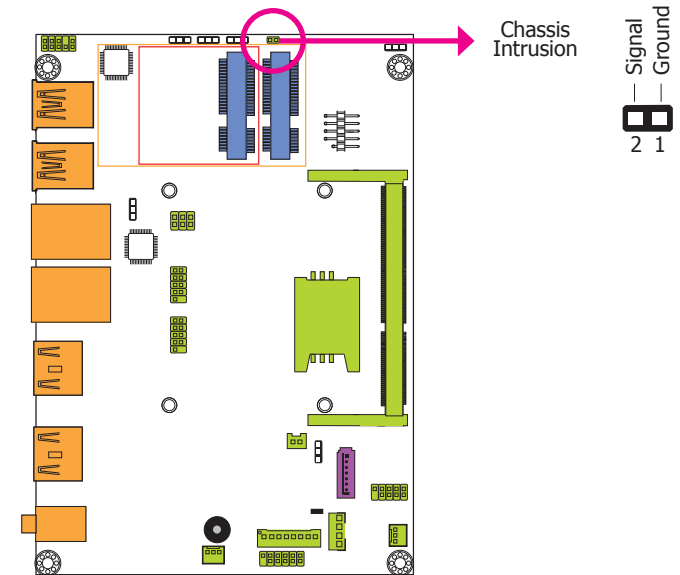
The Advanced menu ("NCT6106D HW Monitor" submenu) of the BIOS will display the current speed of the cooling fans. Refer to chapter 7 for more information.

## SMBus Connector



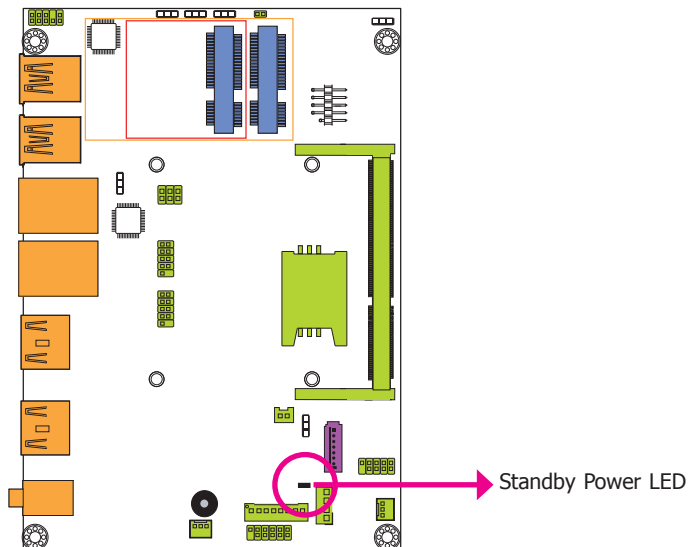
The SMBus (System Management Bus) connector is used to connect SMBus devices. It is a multiple device bus that allows multiple chips to connect to the same bus and enable each one to act as a master by initiating data transfer.

## Chassis Intrusion Connector



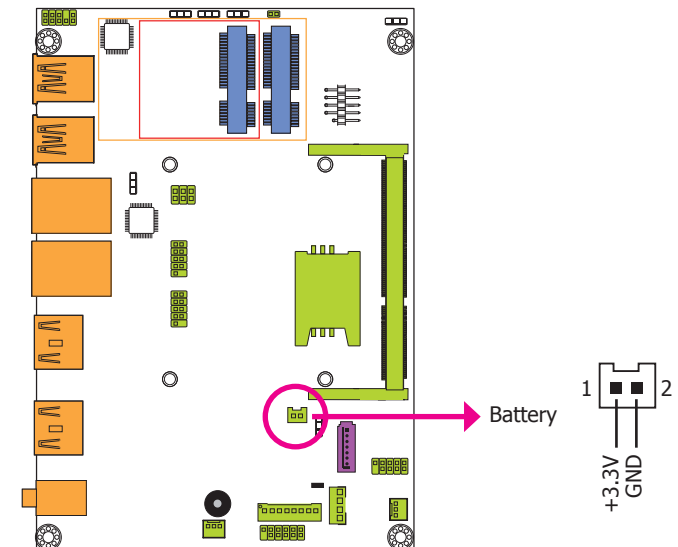
The board supports the chassis intrusion detection function. Connect the chassis intrusion sensor cable from the chassis to this connector. When the system's power is on and a chassis intrusion occurred, an alarm will sound. When the system's power is off and a chassis intrusion occurred, the alarm will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

## Standby Power LED



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

## Battery



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

### Safety Measures

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

## Chapter 6 - Mounting Option

### Wall Mount

The wall mount kit includes the following:

- 2 Wall mount brackets
- Bracket screws



**Note:**

The pictures in this document are used for illustration pupose only. The system board and all other components may differ depending on the configuration you have purchased. Please refer to the provided DVD for details relevant to the system board.

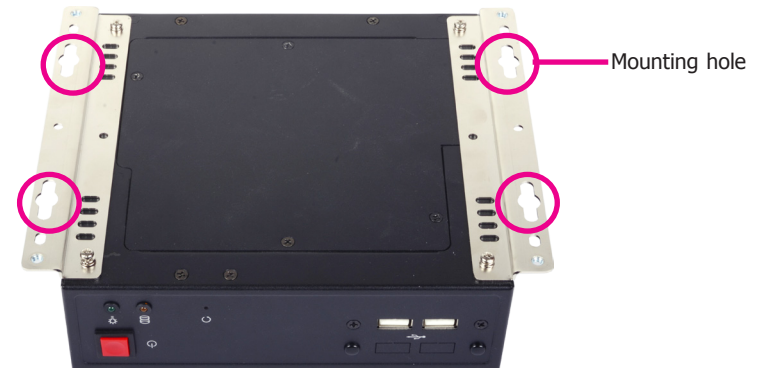
1. The mounting holes are located at the bottom of the system.



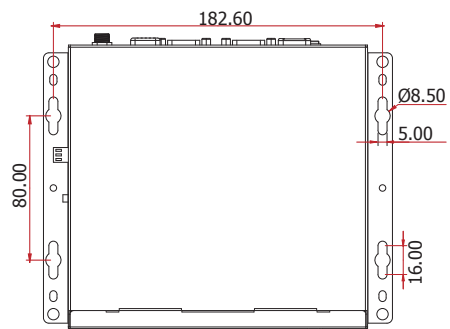
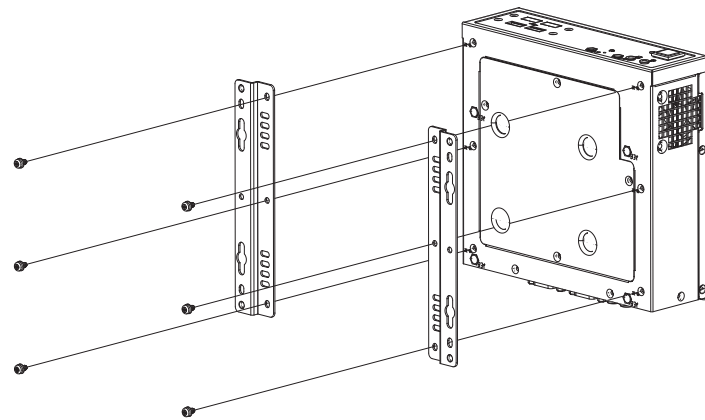
2. Mount the wall mount brackets on each side of the system with the mounting screws.



3. Mount the whole system on the wall by fastening the screws through the mounting holes.







## 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 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.
Tab	Select a field.
<F1>	Displays general help
<F2>	Pervious values
<F3>	Optimized defaults
<F4>	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.

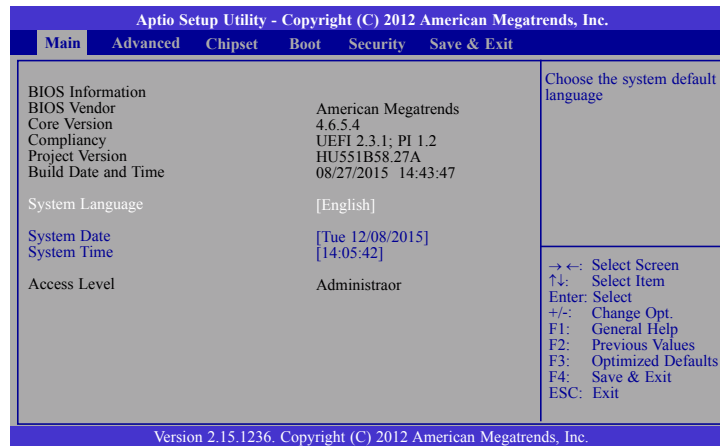
### Submenu

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.

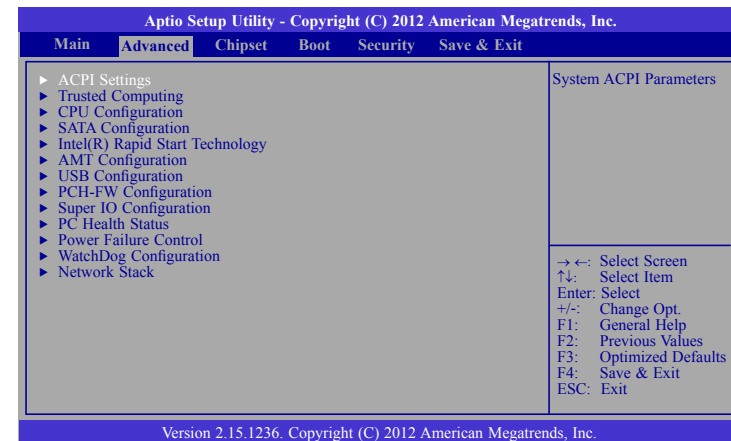
### Advanced

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.



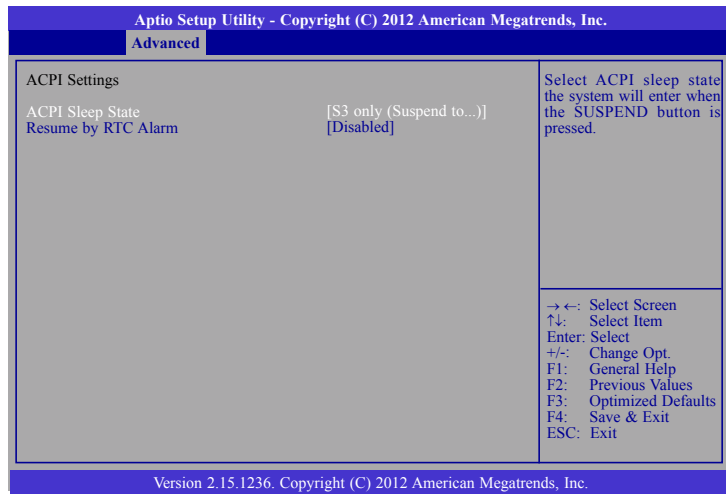
#### Important:

Setting incorrect field values may cause the system to malfunction.



## ACPI Settings

This section is used to configure the system ACPI parameters.



### ACPI Sleep State

Selects the highest ACPI sleep state the system will enter when the Suspend button is pressed.

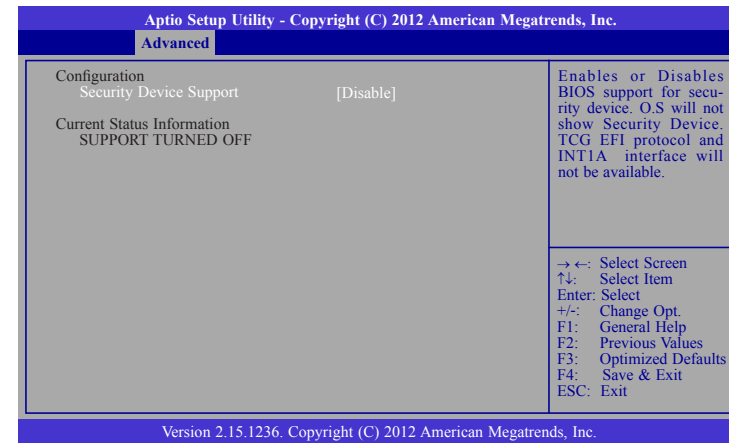
**S3 only (STR)** Enables the Suspend to RAM.  
**S3 available for OS to choose from**

### Resume by RTC Alarm

When Enabled, the system uses the RTC to generate a wakeup event.

## Trusted Computing

This section configures settings relevant to Trusted Computing innovations.

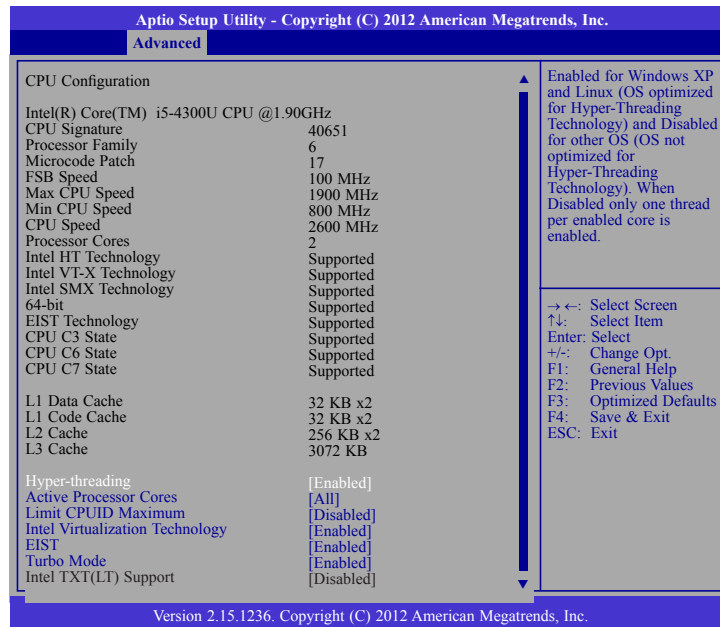


### Security Device Support

This field is used to enable or disable BIOS supporting for the security device. O.S will not show the security device. TCG EFI protocol and INT1A interface will not be available.

## CPU Configuration

This section is used to configure the CPU. It will also display the detected CPU information.



### Hyper-threading

Enables this field for Windows XP and Linux which are optimized for Hyper-Threading technology. Select disabled for other OSes not optimized for Hyper-Threading technology. When disabled, only one thread per enabled core is enabled.

### Active Processor Cores

Number of cores to enable in each processor package.

### Limit CPUID Maximum

Disabled for Windows XP.

### Intel Virtualization Technology

When this field is set to Enabled, the VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.

## EIST

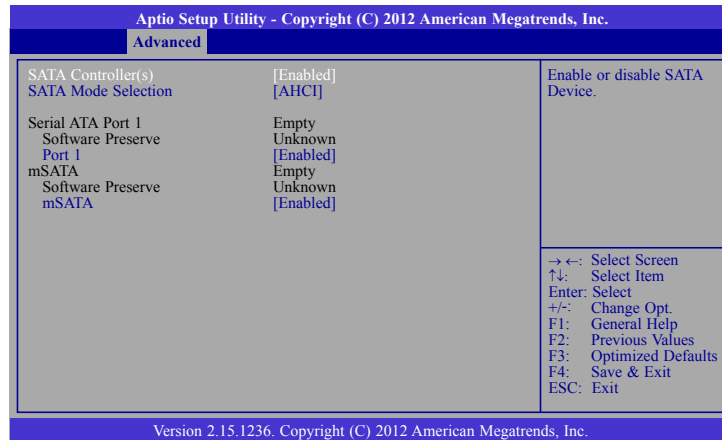
This field is used to enable or disable the Intel Enhanced SpeedStep Technology.

## Turbo Mode

The options are Enabled or Disabled.

## SATA Configuration

This section is used to configure the settings of SATA device.



### SATA Controller(s)

This field is used to enable or disable Serial ATA devices.

### SATA Mode Selection

The mode selection determines how the SATA controller(s) operates.

#### AHCI Mode

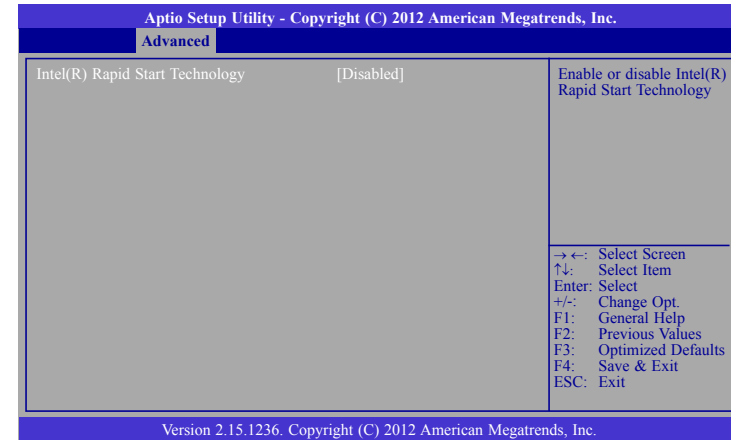
This option allows the Serial ATA devices to use AHCI (Advanced Host Controller Interface).

#### Port 1 and mSATA

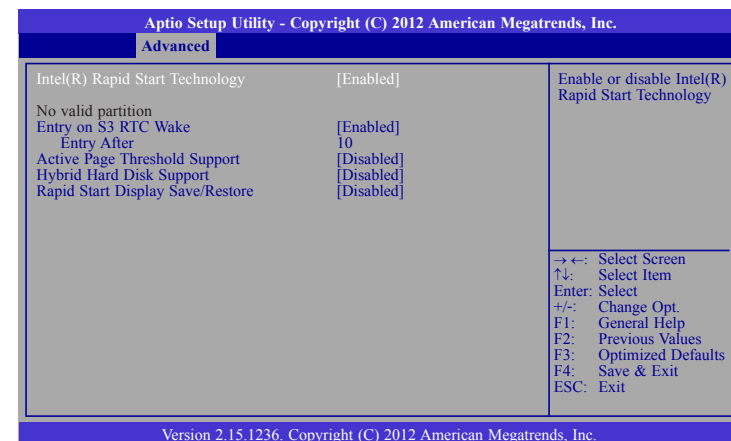
This field is used to enable or disable the serial ATA port.

## Intel(R) Rapid Start Technology

This section is used to enable or disable the Intel Rapid Start Technology.



When enabled, it will display the following information.



**Entry on S3 RTC Wake**

This field is used to enable or disable the rapid start invocation upon S3 RTC wake.

**Entry After**

Enables RTC wake timer at S3 entry. Enters the value range from 0 (immediately) to 120 minutes.

**Active Page Threshold Support**

This field is used to support RST with small partition.

**Hybrid Hard Disk Support**

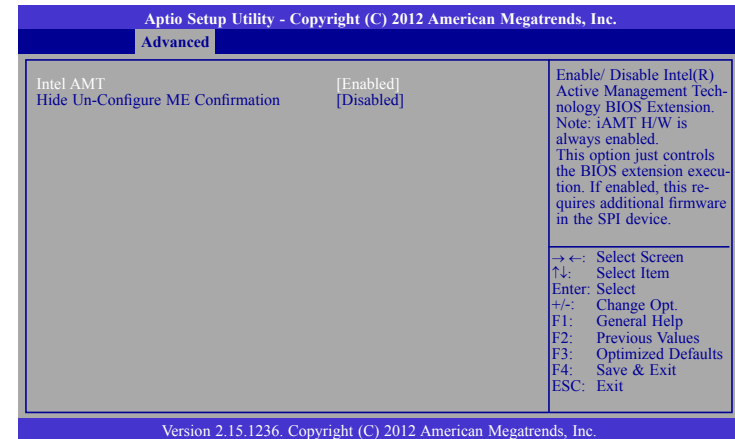
Enables or disables the hybrid hard disk support.

**Rapid Start Display Save/Restore**

Enables or disables the rapid start display save or restore.

**AMT Configuration**

This section configures the parameters of Active Management Technology.

**Intel AMT**

Enables or disables the AMT function.

**Hide Un-Configure ME Confirmation**

OEMFlag Bit 6: Hide Un-configure ME without the password confirmation prompt.

## USB Configuration

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

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.		
Advanced		
USB Configuration		Enables Legacy USB support. AUTO option disables legacy support if no USB devices are connected. DISABLE option will keep USB devices available only for EFI applications.
USB Module Version	8.10.28	
USB Devices: 1 Keyboard, 1 Hub		
Legacy USB Support	[Enabled]	
EHCI Hand-off	[Disabled]	
		→ ←: Select Screen ↑ ↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.		

### Legacy USB Support

#### Enabled

Enables legacy USB.

#### Disabled

Keeps USB devices available only for EFI applications.

#### Auto

Disables support for legacy when no USB devices are connected.

### EHCI Hand-off

This is a workaround for OSes without the EHCI hand-off support. The EHCI ownership change should be claimed by the EHCI driver.

## PCH-FW Configuration

This section only displays the parameters of Management Engine Technology.

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.		
Advanced		
ME FW Version	9.5.30.1808	Configure Management Engine Technology Parameters.
ME Firmware Mode	Normal Mode	
ME Firmware Type	Full Sku Firmware	
ME Firmware SKU	5MB	
PTT Capability/State	1/0	
► Firmware Update Configuration		
		→ ←: Select Screen ↑ ↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.		

### Firmware Update Configuration

This field is used to configure the parameters of Management Engine Technology.

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.		
Advanced		
Me FW Image Re-Flash	[Disabled]	Enable or Disable Me FW Image Re-Flash function
		→ ←: Select Screen ↑ ↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.		



## Super IO Configuration

This section is used to configure the I/O functions supported by the onboard Super I/O chip.

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.		
Advanced		
Super IO Configuration		Windows/Linux (DOS) for COM port setting.
Super IO Chip	NCT6106D	
OS Select	[Windows]	
<ul style="list-style-type: none"> <li>Serial Port 1 Configuration</li> <li>Serial Port 2 Configuration</li> <li>Serial Port 3 Configuration</li> </ul>		
		→ ←: Select Screen ↑ ↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.		

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.		
Advanced		
Serial Port 2 Configuration		Enable or Disable Serial Port (COM)
Serial Port	[Enabled]	
Device Settings	IO=2F8h; IRQ=3;	
Change Settings	[Auto]	
		→ ←: Select Screen ↑ ↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.		

## Serial Port 1 Configuration to Serial Port 3 Configuration

Sets the parameters of serial port 1 (COM A) to serial port 3 (COM C).

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.		
Advanced		
Serial Port 1 Configuration		Enable or Disable Serial Port (COM)
Serial Port	[Enabled]	
Device Settings	IO=3F8h; IRQ=4;	
Change Settings	[Auto]	
		→ ←: Select Screen ↑ ↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.		

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.		
Advanced		
Serial Port 3 Configuration		Enable or Disable Serial Port (COM)
Serial Port	[Enabled]	
Device Settings	IO=3E8h; IRQ=11;	
Change Settings	[Auto]	
		→ ←: Select Screen ↑ ↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.		

### Serial Port

Enables or disables the serial COM port.

### Change Settings

Selects the IO/IRQ settings for the super I/O device.


**Note:**

To make the RS485 auto flow control function work on COM 1, please set either 8 data bits + 1 stop bit or one of the following settings:

- (1) 8 data bits + 1 parity bit + 1 stop bit
- (2) 8 data bits + 1 parity bit + 2 stop bits
- (3) 8 data bits + 2 stop bits

### PC Health Status

This section displays the hardware health monitor.

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.	
Advanced	
<b>PC Health Status</b> ▶ Smart Fan Function SYS Thermistor Temp : +33.0 C CPU (PECI) Temp : +32.0 C CPUFan Speed : 5465 RPM SysFan 1 Speed : N/A VCore : +1.744 V VIN0 (5V) : +5.017 V VIN1 (12V) : +12.144 V VIN2 (DRAM) : +1.328 V VBAT : +3.072 V	Smart Fan function setting  → ←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.	

### Smart Fan Function

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.	
Advanced	
<b>Smart Fan Function</b> CPU Smart Fan Control [Enabled] Boundary 4 60 Boundary 3 50 Boundary 2 40 Boundary 1 30 Speed Count 5 100 Speed Count 4 75 Speed Count 3 50 Speed Count 2 40 Speed Count 1 30 System Smart Fan (1) Control [Enabled] Boundary 4 60 Boundary 3 50 Boundary 2 40 Boundary 1 30 Speed Count 5 100 Speed Count 4 75 Speed Count 3 50 Speed Count 2 40 Speed Count 1 30	Enable CPU Smart Fan  → ←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.	

### CPU Smart Fan Control

When this feature is set to Automatic, the CPU's fan speed will rotate according to the CPU's temperature. The higher the temperature, the faster the speed of rotation.

### System Smart Fan Control

When this feature is set to Automatic, the System's fan speed will rotate according to the System's temperature. The higher the temperature, the faster the speed of rotation.

### Boundary 1 to Boundary 4

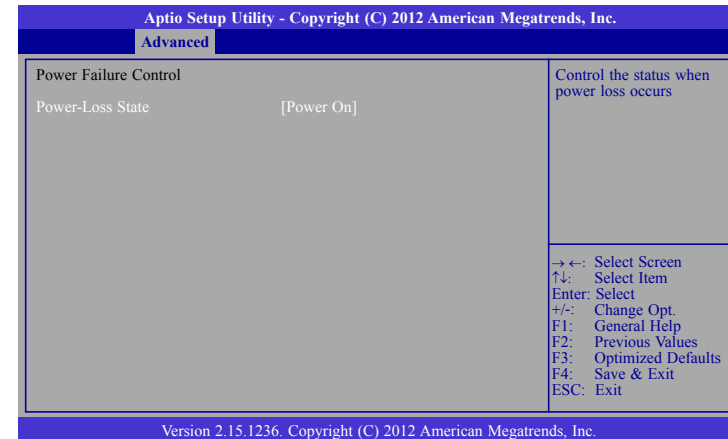
The range is 0-127.

### Speed Count 1 to Speed Count 5

The range is 1-100%.

### Power Failure Control

This section configures the status control when the power failure occurs.



### Power-Loss State

Controls the status when the power loss occurs.

### Power Off

When power returns after an AC power failure, the system's power is off. You must press the Power button to power-on the system.

### Power On

When power returns after an AC power failure, the system will automatically power-on.

### Last State

When power returns after an AC power failure, the system will return to the state where you left off before power failure occurs. If the system's power is off when AC power failure occurs, it will remain off when power returns. If the system's power is on when AC power failure occurs, the system will power-on when power returns.

## WatchDog Configuration

This section sets the system watchdog parameters.

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.	
Advanced	
WatchDog Parameters	WatchDog Count Mode Selection
WatchDog Count Mode [Second]	
WatchDog TimeOut Value 0	
→ ←: Select Screen ↑ ↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit	
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.	

### WatchDog Count Mode

Selects the watchdog count mode.

### WatchDog TimeOut Value

Enters the watchdog timeout value. 0 means disabled.

## Network Stack

This section is used to enable or disable UEFI network stack.

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.	
Advanced	
Network Stack [Disabled]	Enable/Disable UEFI network stack.
→ ←: Select Screen ↑ ↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit	
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.	

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

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.	
Advanced	
Network Stack [Enabled]	Enable/Disable UEFI network stack.
Ipv4 PXE Support [Enabled]	
Ipv6 PXE Support [Enabled]	
→ ←: Select Screen ↑ ↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit	
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.	

### Ipv4 PXE Support

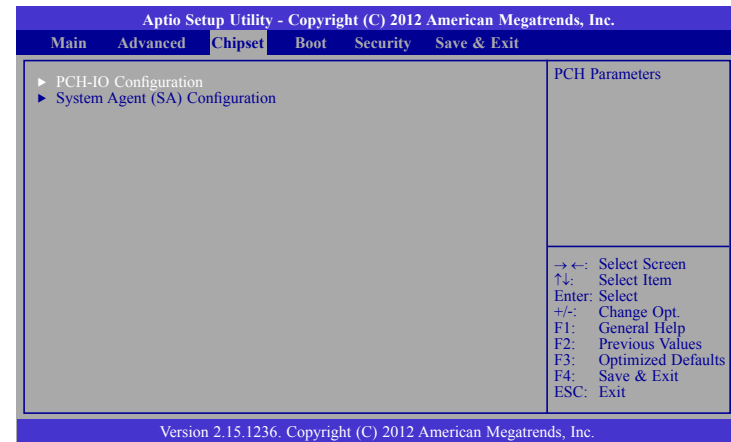
When enabled, Ipv4 PXE boot supports. When disabled, Ipv4 PXE boot option will not be created.

### Ipv6 PXE Support

When enabled, Ipv6 PXE boot supports. When disabled, Ipv6 PXE boot option will not be created.

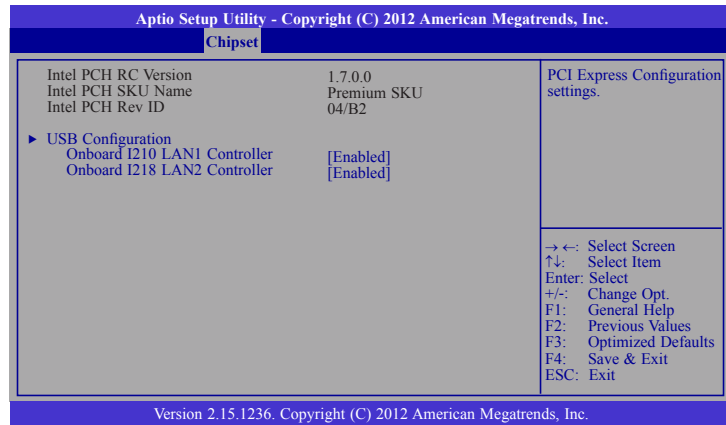
## Chipset

This section configures relevant chipset functions.



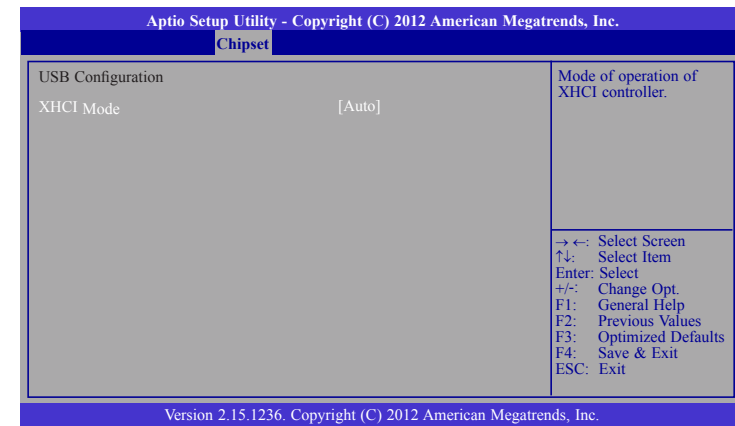
## PCH-IO Configuration

This section illustrates the PCH parameters.



## USB Configuration

This field is used to configure the USB settings.

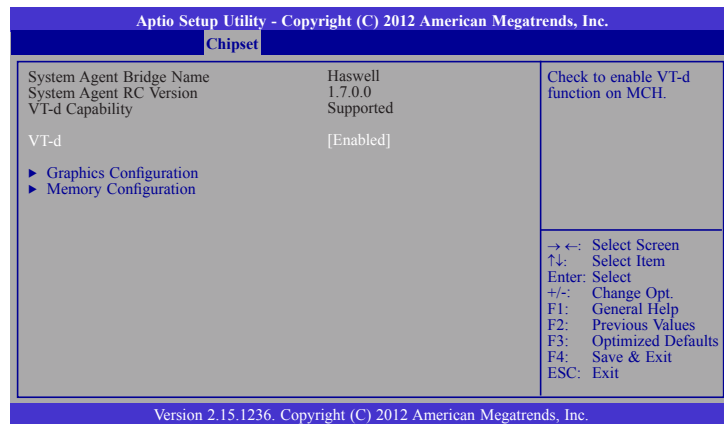


### XHCI Mode

Selects the operation mode of the XHCI controller. The options are Smart Auto, Auto, Enabled, Disabled and Manual.

### System Agent (SA) Configuration

This section is used to configure the parameters of System Agent.

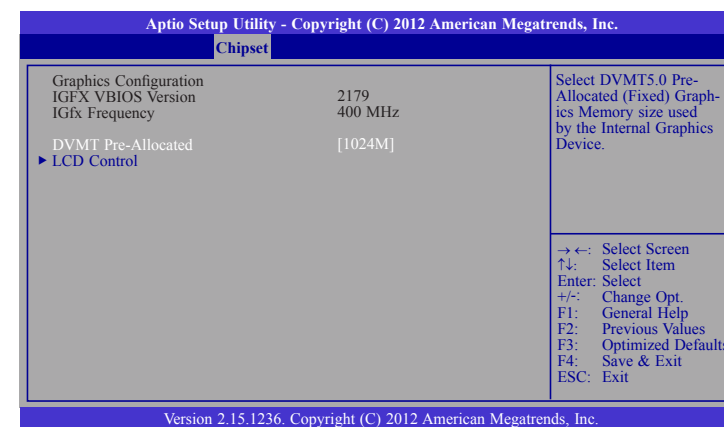


#### VT-d

Enables the VT-d function on MCH.

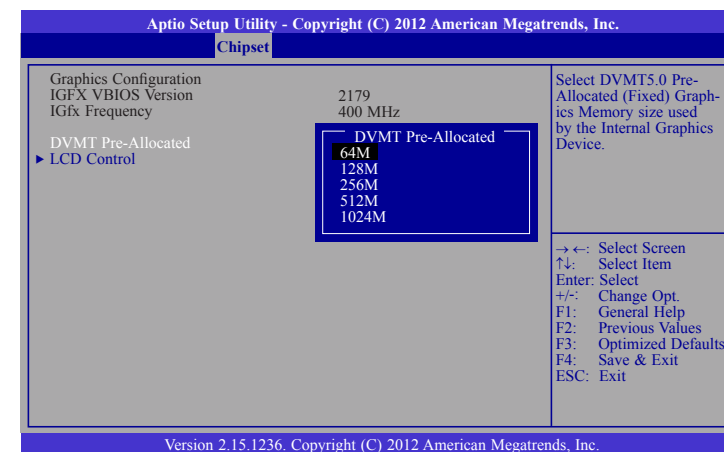
### Graphics Configuration

This field configures the graphics settings.



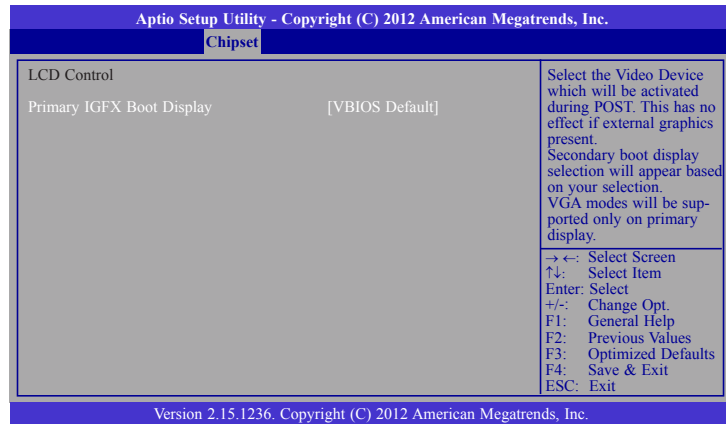
#### DVMT Pre-Allocated

Selects DVMT 5.0 Pre-Allocated (Fixed) Graphics Memory size used by the Internal Graphics Device. Please refer to the information shown below.



## LCD Control

This field configures the LCD control.



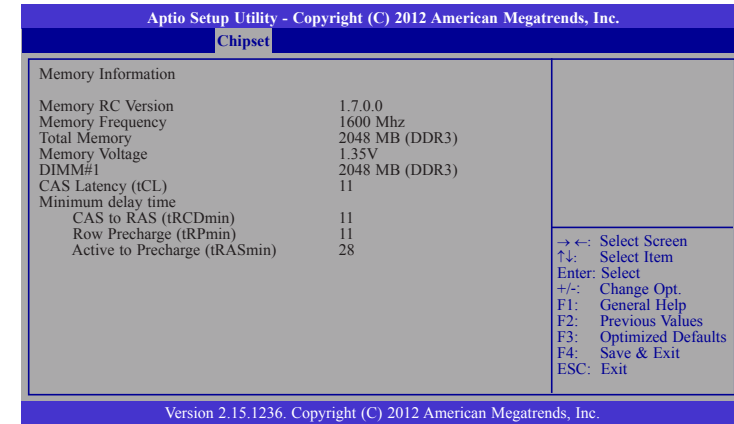
## Primary IGFX Boot Display

Selects the primary display device.



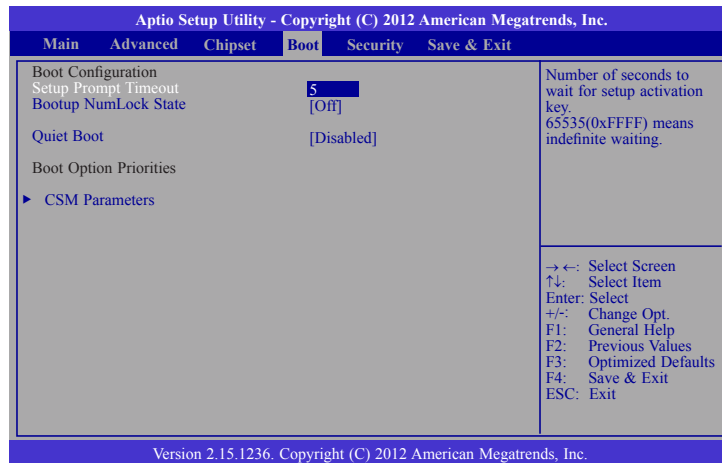
## Memory Configuration

This field only displays the memory configuration.





## Boot



### Setup Prompt Timeout

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

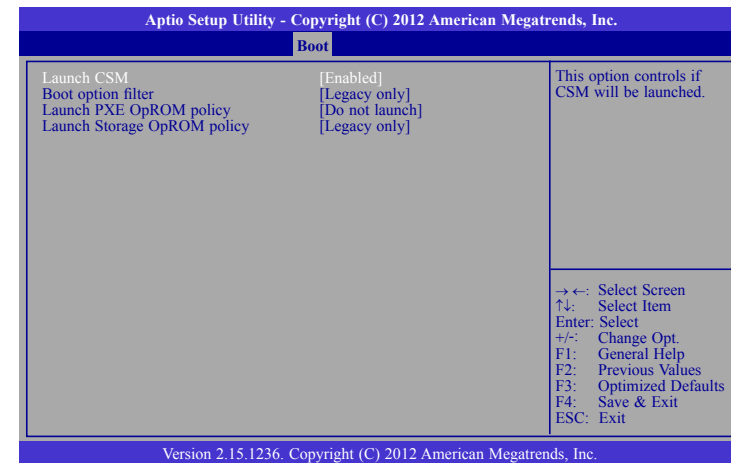
### Bootup NumLock State

This allows you to determine the default state of the numeric keypad. By default, the system boots up with NumLock on wherein the function of the numeric keypad is the number keys. When set to Off, the function of the numeric keypad is the arrow keys.

### Quiet Boot

Enables or disables the quiet boot function.

## CSM Parameters



### Launch CSM

This option controls if CSM will be launched.

### Boot option filter

This option controls what devices system can boot to.

### Launch PXE OpROM policy

Controls the execution of UEFI and legacy PXE OpROM.

### Launch Storage OpROM policy

Controls the execution of UEFI and legacy storage OpROM.

## Security

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.					
Main	Advanced	Chipset	Boot	Security	Save & Exit
<b>Password Description</b> If ONLY the Administrator's password is set, then this only limits access to Setup and is only asked for when entering Setup. If ONLY the User's password is set, then this is a power on password and must be entered to boot or enter Setup. In Setup the User will have Administrator rights. The password length must be in the following range: Minimum length                      3 Maximum length                      20 Administrator Password User Password				Set Administrator Password.  → ←: Select Screen ↑ ↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit	

Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.

### Administrator Password

Sets the administrator password.

### User Password

Sets the user password.

## Save & Exit

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.					
Main	Advanced	Chipset	Boot	Security	Save & Exit
Save Changes and Reset Discard Changes and Reset  Save Options Save Changes Discard Changes  Restore Defaults Boot Override  Launch EFI Shell from filesystem device				Reset the system after saving the changes  → ←: Select Screen ↑ ↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit	

Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.

### 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 made.

### 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.

### Save Changes

Saves changes done so far to any of the setup options.

### Discard Changes

Discards changes done so far to any of the setup options.

### 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 of all the setup options.

### Launch EFI Shell from filesystem device

Attempts to Launch EFI Shell application (Shellx64.efi) from one of the available filesystem devices.

## Updating the BIOS

To update the BIOS, you will need the new 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>.

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

+-----+
|               AMI Firmware Update Utility(APTIO) v2.25               |
|               Copyright (C)2012 American Megatrends Inc. All Rights Reserved. |
+-----+

Reading file ..... done
FFS checksums ..... ok
Erasing NVRAM ..... done
Writing NVRAM ..... done
Verifying NVRAM ..... 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

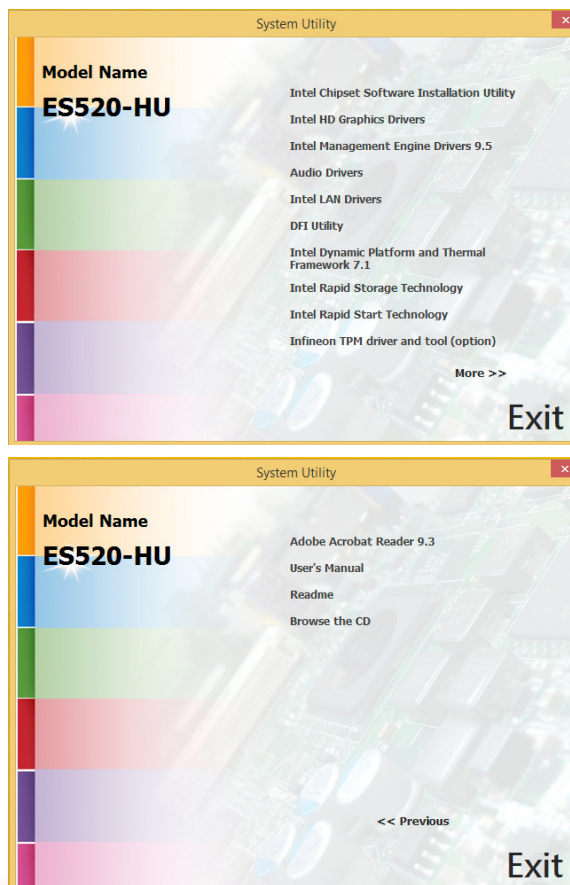
Some devices of the system require drivers from hardware manufactures to operate properly. The system may come with a CD/DVD that contains drivers, utilities and software applications. Insert the CD into a CD-ROM drive. The auto-run screen (Mainboard Utility CD) will appear. If the "Autorun" does not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

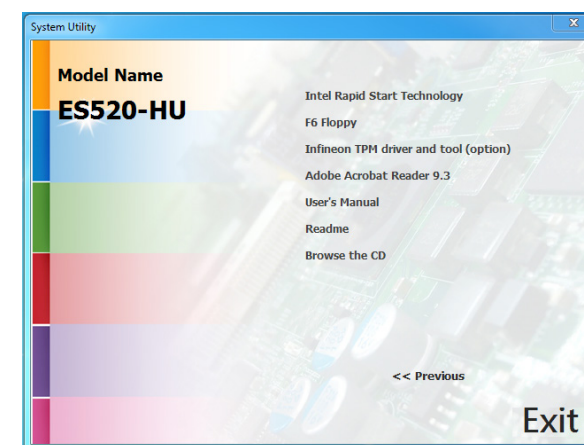
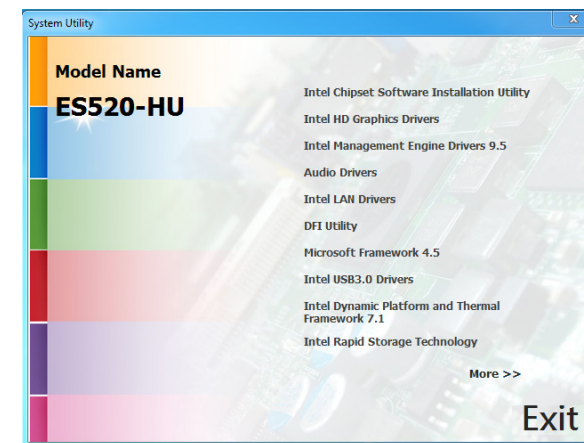
<http://www.dfi.com/DownloadCenter>

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.

### Auto Run Page (For Windows 8.1)



### Auto Run Pages (For Windows 7)



## Intel Chipset Software Installation Utility

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

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

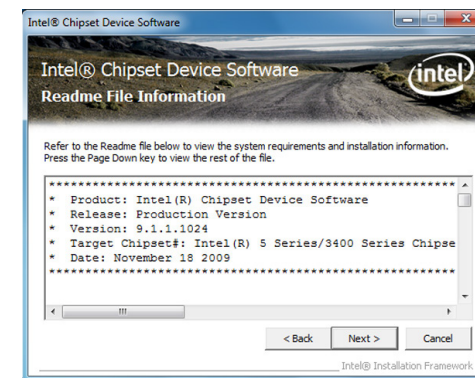
1. Setup is now ready to install the utility. Click Next.



2. Read the license agreement then click Yes.



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



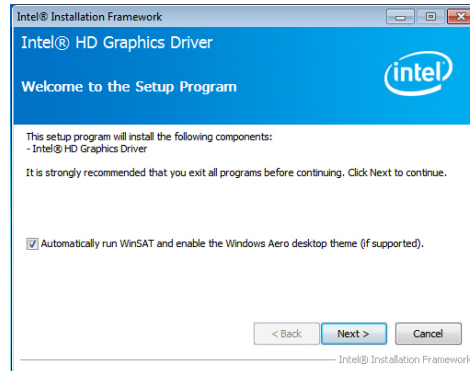
4. After completing installation, click Finish to exit setup.



## Intel HD Graphics Drivers

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

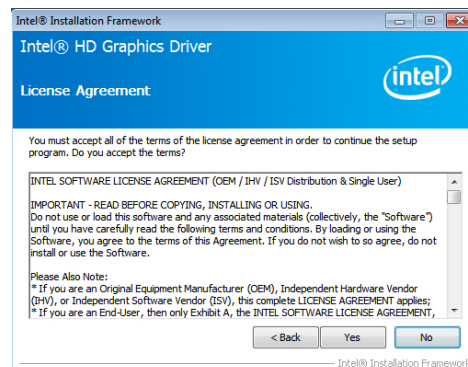
1. Setup is now ready to install the graphics driver. Click Next.



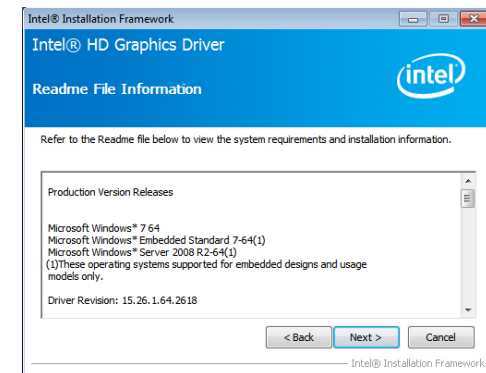
By default, the "Automatically run WinSAT and enable the Windows Aero desktop theme" is enabled. With this enabled, after installing the graphics driver and the system rebooted, the screen will turn blank for 1 to 2 minutes (while WinSAT is running) before the Windows 7/Windows 8 desktop appears. The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

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

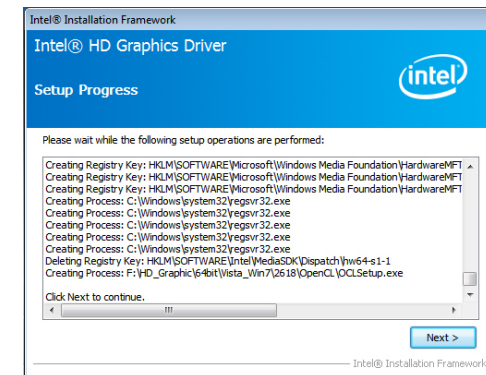
2. Read the license agreement then click Yes.



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

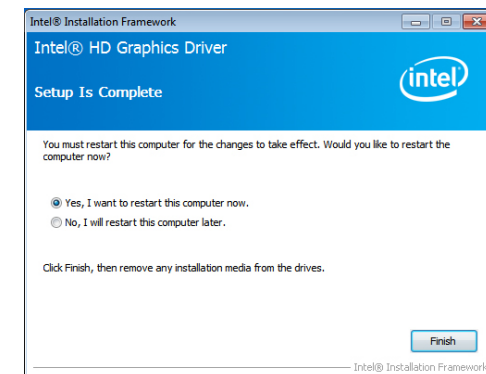


4. Setup is now installing the driver. Click Next to continue.



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

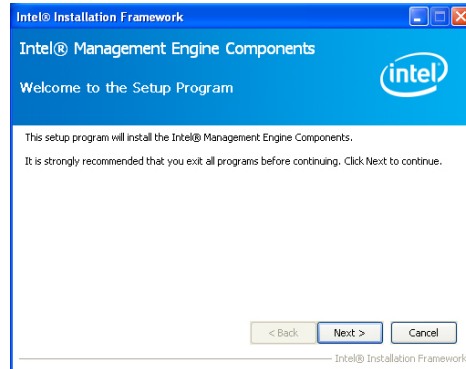
Restarting the system will allow the new software installation to take effect.



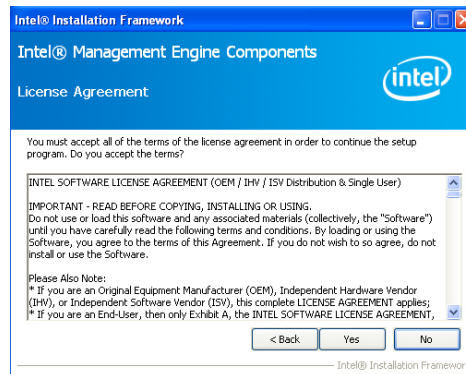
## Intel Management Engine Drivers 9.5

To install the driver, click "Intel Management Engine Drivers 9.5" on the main menu.

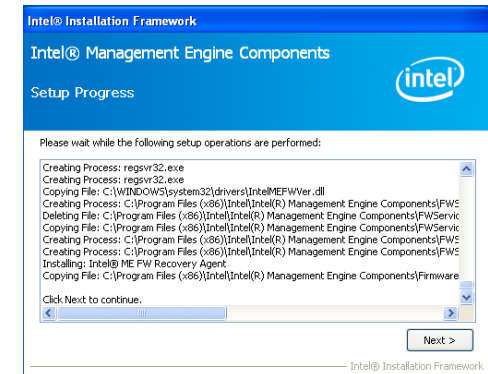
1. Setup is ready to install the driver.  
Click Next.



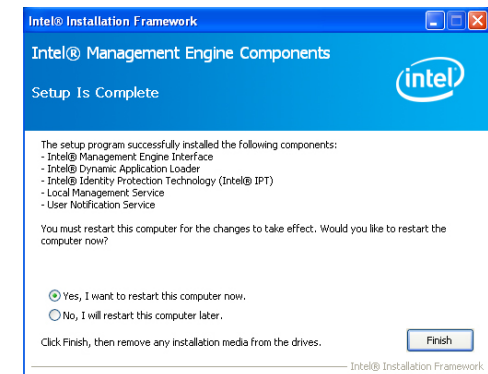
2. Read the license agreement then click Yes.



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



4. After completing installation, click Finish.





## Audio Drivers

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

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



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

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



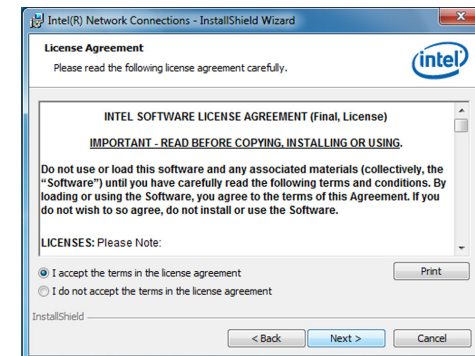
## Intel LAN Drivers

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

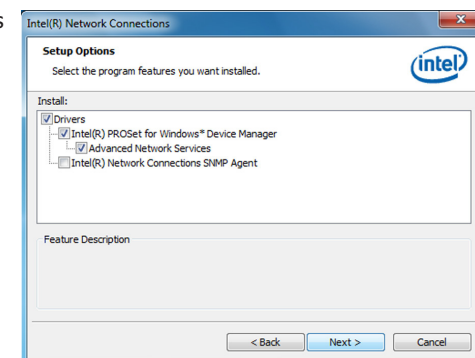
1. Setup is ready to install the driver. Click Next.



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

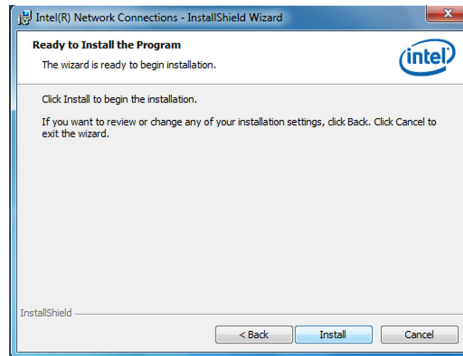


3. Select the program features you want installed then click Next.

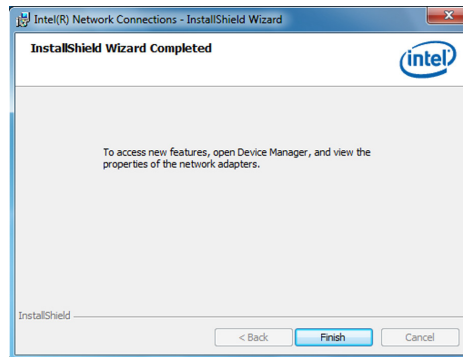




- Click Install to begin the installation.



- After completing installation, click Finish.



## DFI Utility

DFI Utility provides information about the board, Watchdog, DIO, and Backlight. To access the utility, click "DFI Utility" on the main menu.



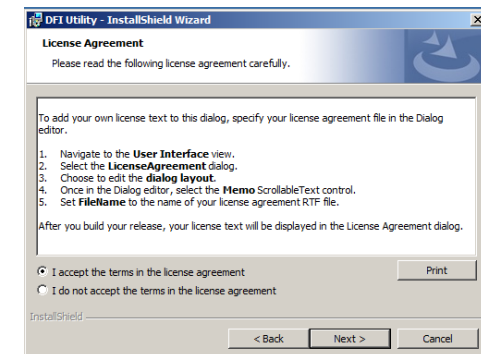
### Note:

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

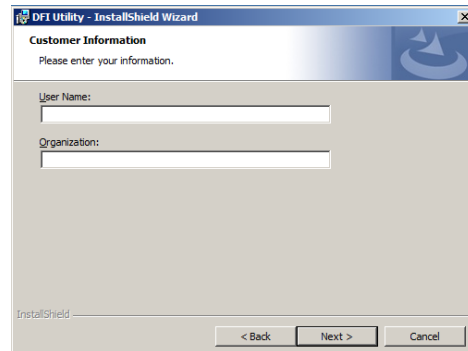
- Setup is ready to install the DFI Utility driver. Click "Next".



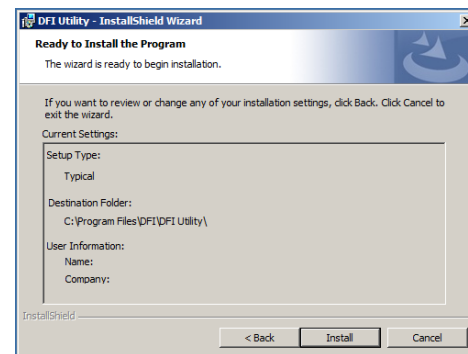
- Click "I accept the terms in the license agreement" then click "Next".



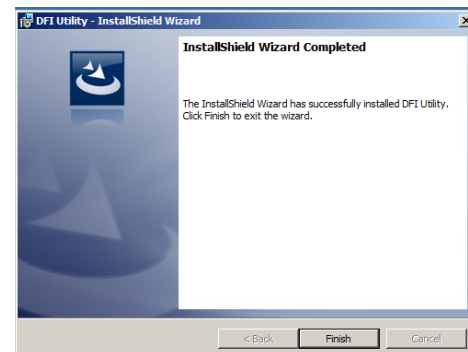
3. Enter "User name" and "Organization" information then click "Next".



4. Click "Install" to begin the installation.



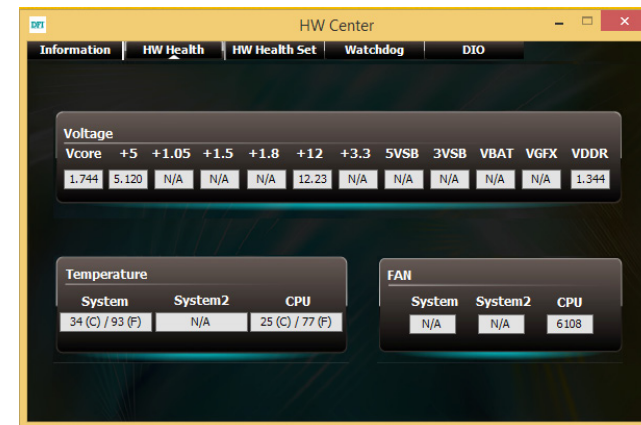
5. After completing installation, click "Finish".



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



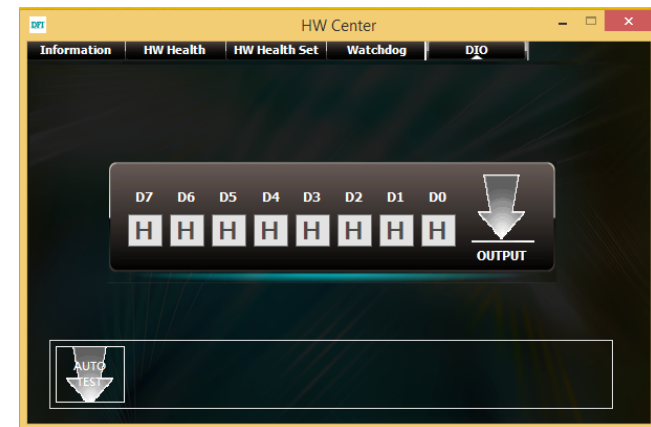
Information



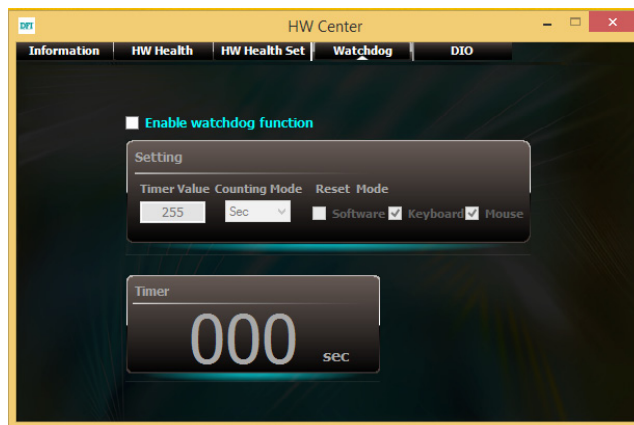
HW Health



HW Health Set



DIO

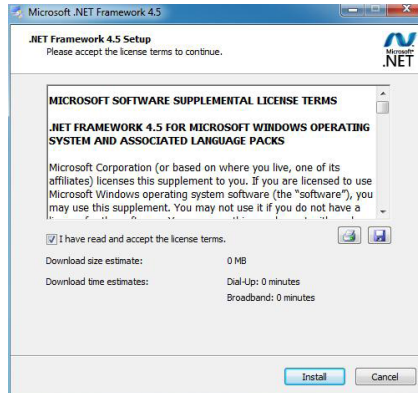


WatchDog

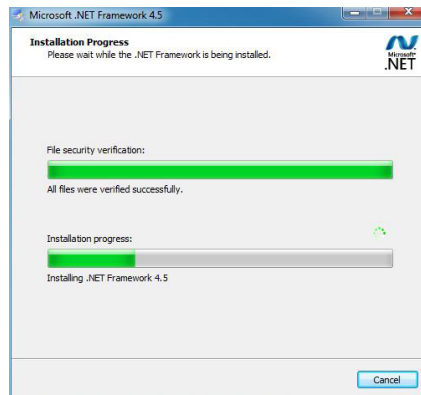
## Microsoft Framework 4.5 (For Windows 7)

To install the utility, click "Microsoft Framework 4.5" on the main menu.

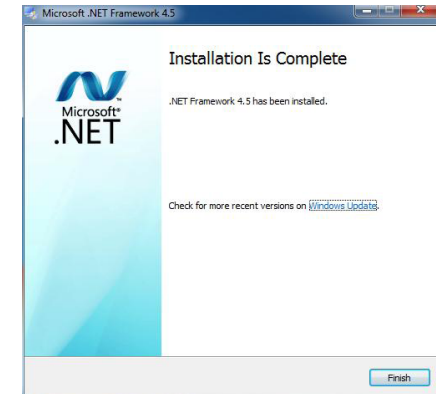
1. Read and accept the license agreement. Then, click "Installation".



2. Setup is installing the driver.



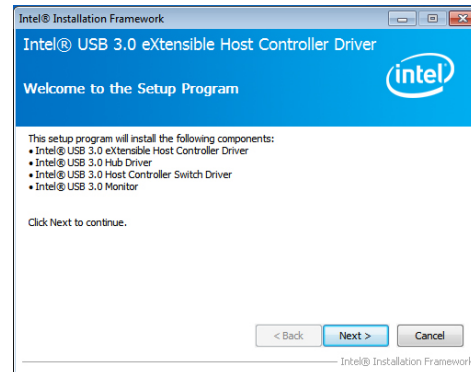
3. After completing installation, click Finish.



## Intel USB 3.0 Drivers (For Windows 7)

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

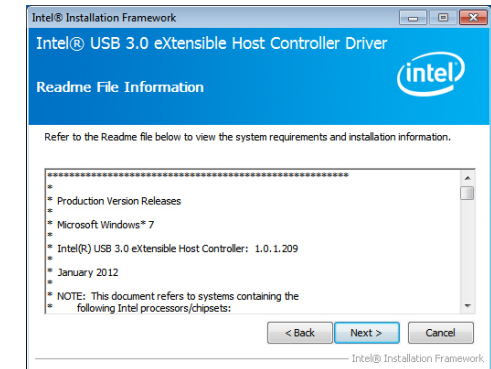
1. Setup is ready to install the driver. Click Next.



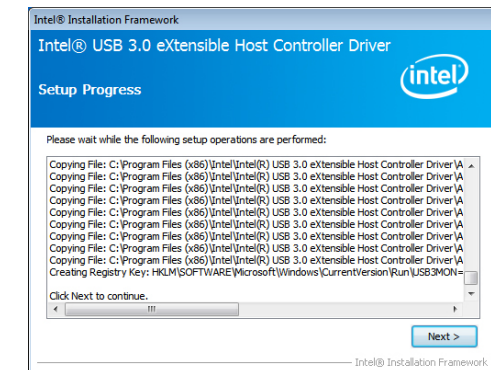
2. Read the license agreement then click Yes.



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



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



5. After completing installation, click Finish.

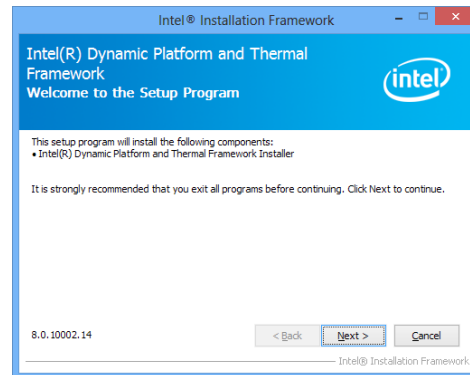


## Intel Dynamic Platform and Thermal Framework 7.1

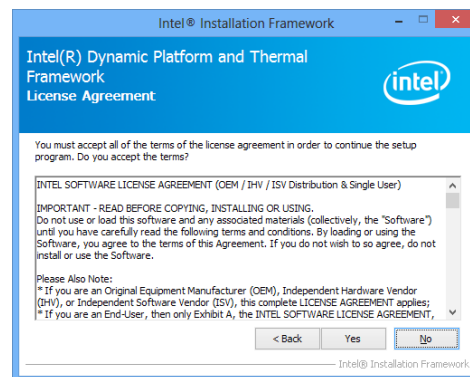
The Intel Dynamic Platform and Thermal Framework Technology enables the control of power and temperature management for the system protection.

To install the driver, click “Intel Dynamic Platform and Thermal Framework 7.1” on the main menu.

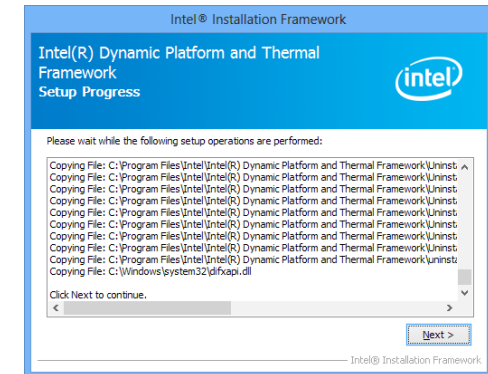
1. Setup is now ready to install the utility. Exit all programs before continuing and click Next to continue.



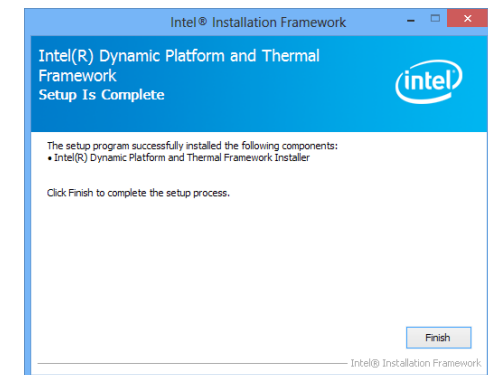
2. Read the license agreement and then click Yes.



3. After the setup progress finishes, click Next to continue..



4. Click Finish to complete the setup process.



## Intel Rapid Storage Technology

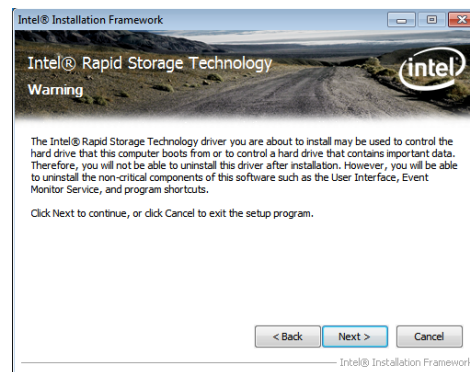
The Intel Rapid Storage Technology is a utility that allows you to monitor the current status of the SATA drives. It enables enhanced performance and power management for the storage subsystem.

To install the driver, click "Intel Rapid Storage Technology" on the main menu.

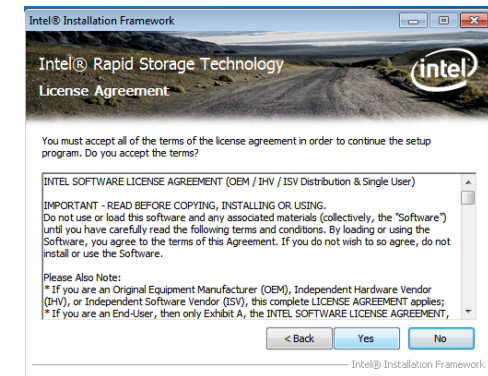
1. Setup is now ready to install the utility. Click Next.



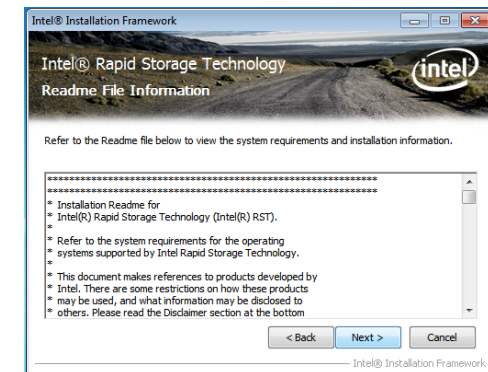
2. Read the warning then click Yes.



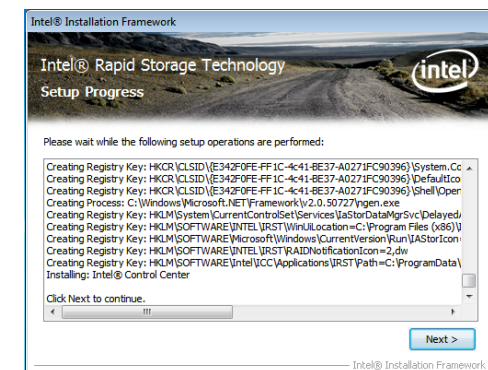
3. Read the license agreement then click Yes.



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



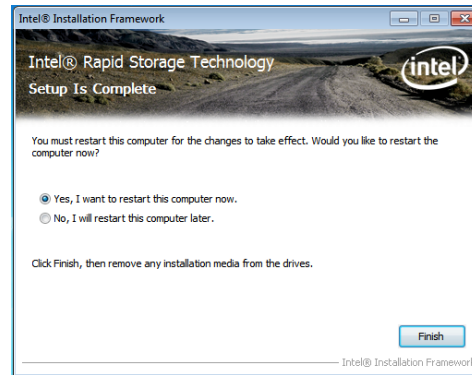
5. Setup is now installing the utility. Click Next to continue.





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

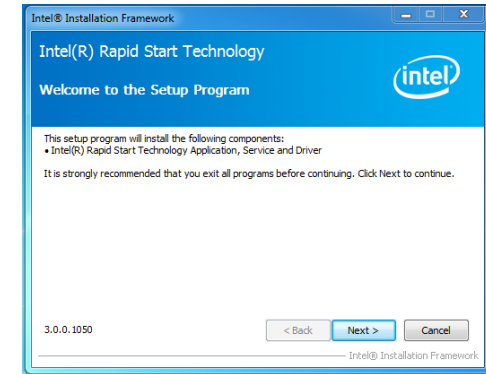
Restarting the system will allow the new software installation to take effect.



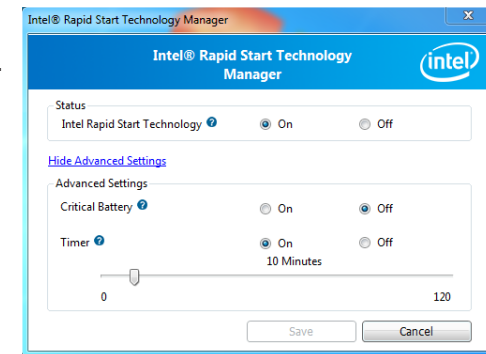
## Intel Rapid Start Technology

The Intel Rapid Start Technology is a utility that allows your system to wake up and run faster. To install the driver, click "Intel Rapid Start Technology" on the main menu.

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



2. Click ON and select the Advanced Settings to enable the Intel Rapid Start Technology. Then, click Save.

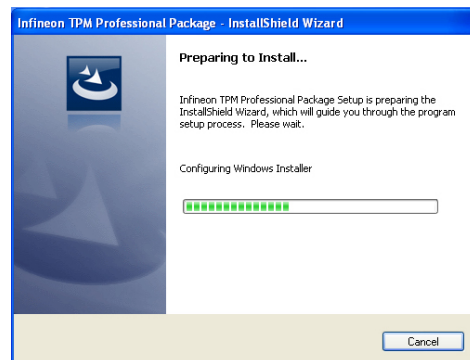




## Infinion TPM Driver and Tool (optional)

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

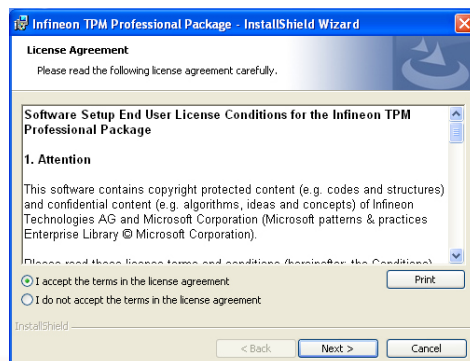
1. The setup program is preparing to install the driver.



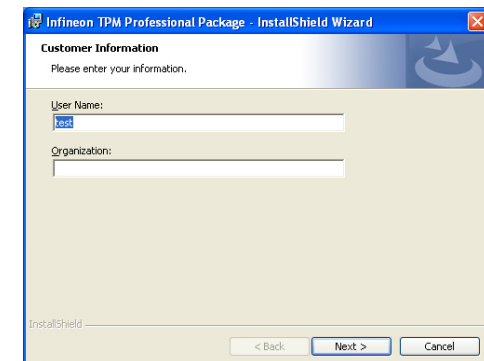
2. The setup program is now ready to install the utility. Click Next.



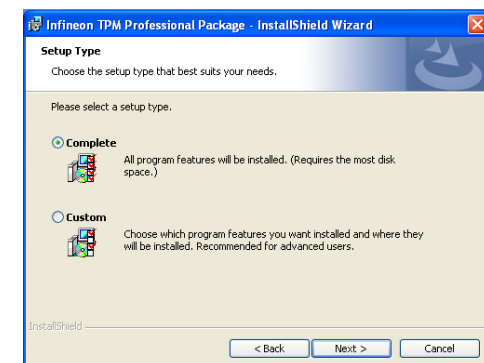
3. Click “I accept the terms in the license agreement” and then click “Next”.



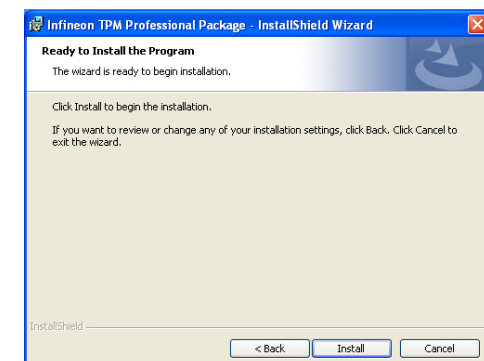
4. Enter the necessary information and then click Next.



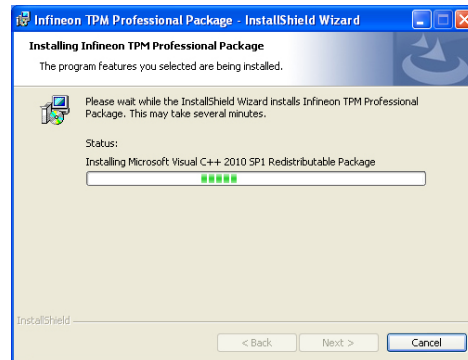
5. Select a setup type and then click Next.



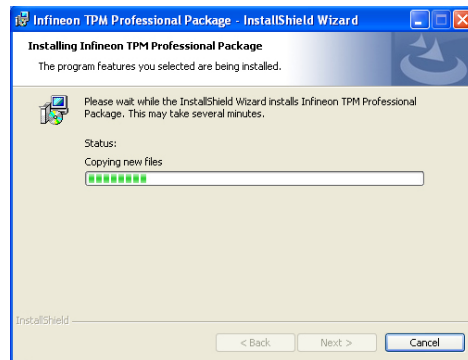
6. Click Install.



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



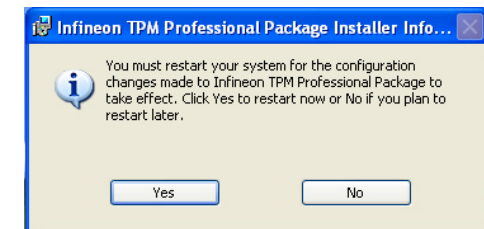
8. The setup program is currently installing the Microsoft Visual C++ package.



9. Click Finish.



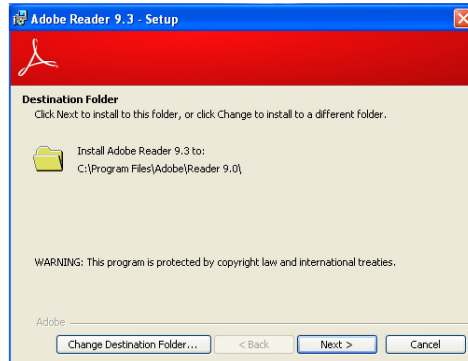
10. Click "Yes" to restart your system.



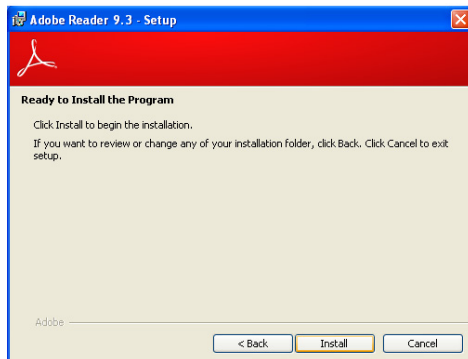
## Adobe Acrobat Reader 9.3

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

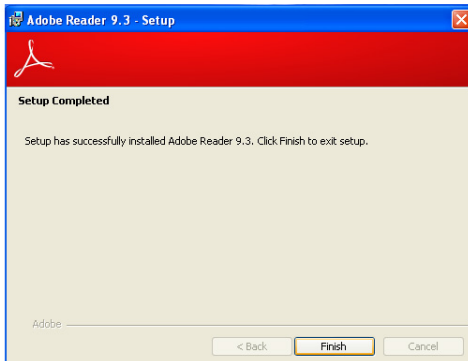
1. Click Next to install or click Change Destination Folder to select another folder.



2. Click Install to begin installation.



3. Click Finish to exit installation.



## Chapter 9 - Intel AMT Settings

### Overview

Intel Active Management Technology (Intel® AMT) combines hardware and software solution to provide maximum system defense and protection to networked systems.

The hardware and software information are stored in non-volatile memory. With its built-in manageability and latest security applications, Intel® AMT provides the following functions.

- **Discover**

Allows remote access and management of networked systems even while PCs are powered off; significantly reducing desk-side visits.

- **Repair**

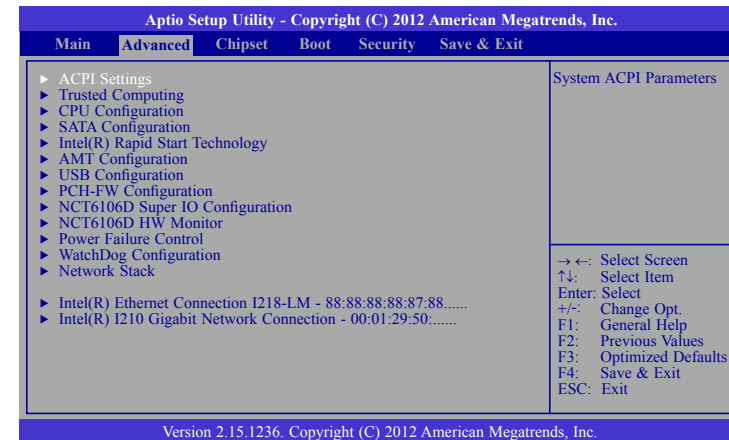
Remotely repair systems after OS failures. Alerting and event logging help detect problems quickly to reduce downtime.

- **Protect**

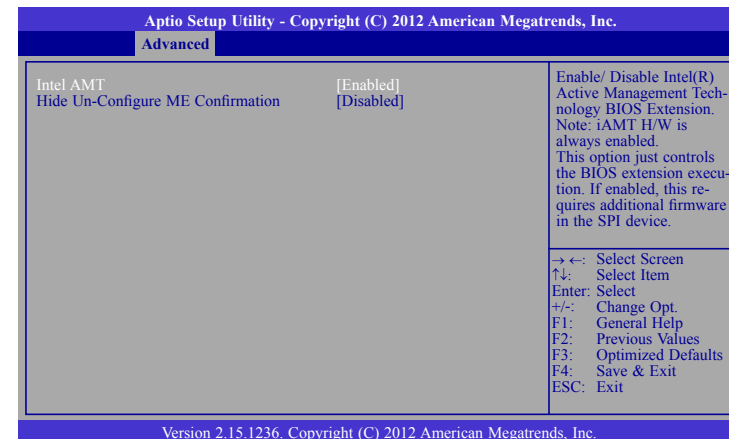
Intel AMT's System Defense capability remotely updates all systems with the latest security software. It protects the network from threats at the source by proactively blocking incoming threats, reactively containing infected clients before they impact the network, and proactively alerting when critical software agents are removed.

### Enable Intel® AMT in the AMI BIOS

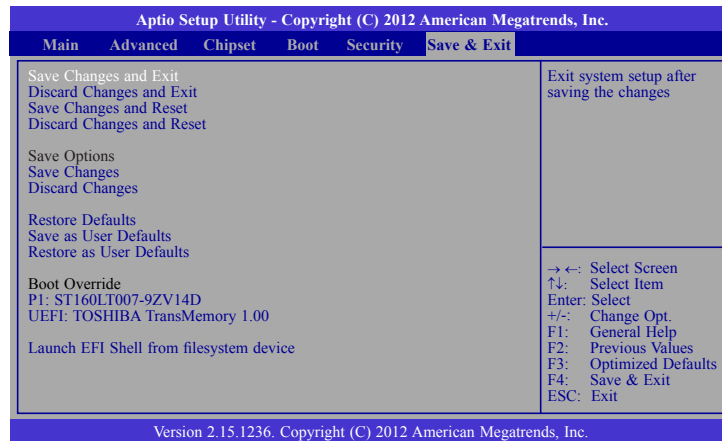
1. Power-on the system then press <Del> to enter the main menu of the AMI BIOS.
2. In the **Advanced** menu, select **AMT Configuration**.



3. In the **Advanced** menu, select **Enable** in the **AMT** field.



4. In the **Save & Exit** menu, select **Save Changes and Reset** then select **OK**.

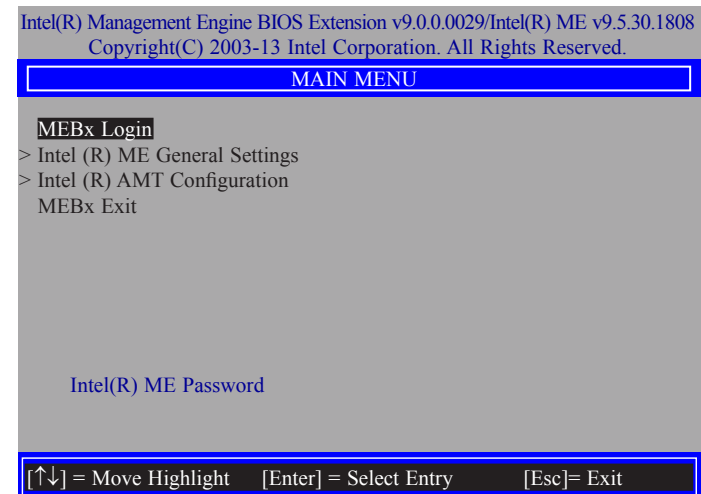


## Enable Intel® AMT in the Intel® Management Engine BIOS Extension (MEBX) Screen

1. When the system reboots, the following message will be displayed. Press **<Ctrl-P>** as soon as the message is displayed; as this message will be displayed for only a few seconds.

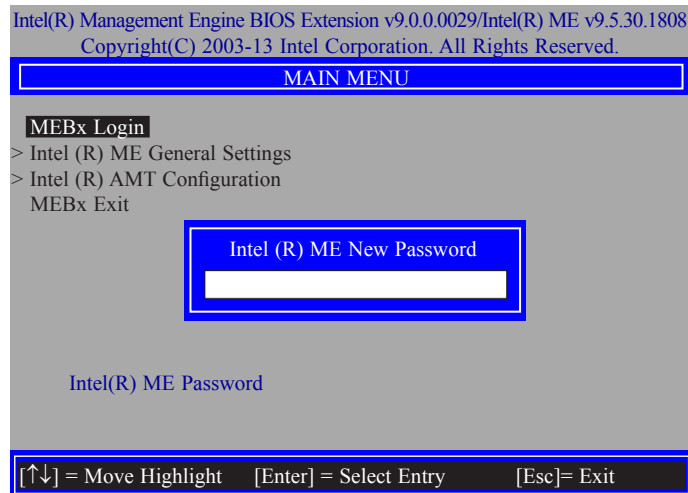


2. You will be prompted for a password. The default password is "**admin**". Enter the default password in the space provided under Intel(R) ME Password then press Enter.

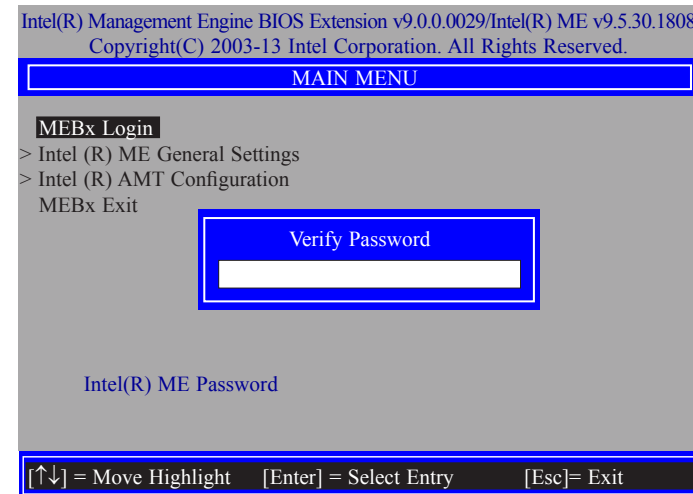


3. Enter a new password in the space provided under Intel(R) ME New Password then press Enter. The password must include:

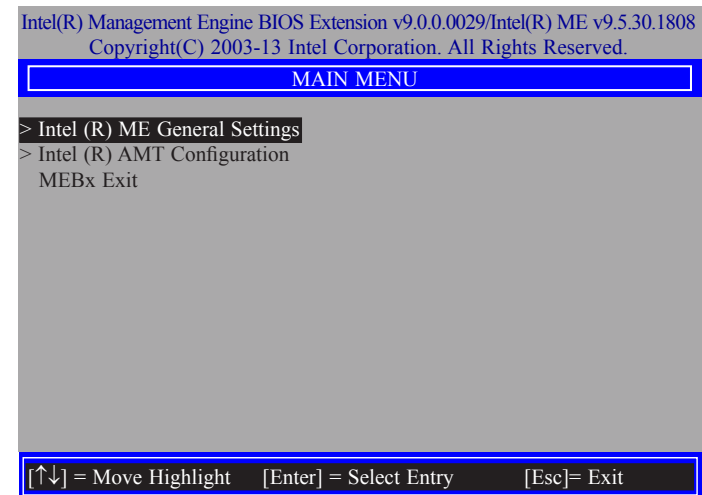
- 8-32 characters
- Strong 7-bit ASCII characters excluding : , and " characters
- At least one digit character (0, 1, ...9)
- At least one 7-bit ASCII non alpha-numeric character, above 0x20, (e.g. !, \$, ;)
- Both lower case and upper case characters



4. You will be asked to verify the password. Enter the same new password in the space provided under Verify Password then press Enter.



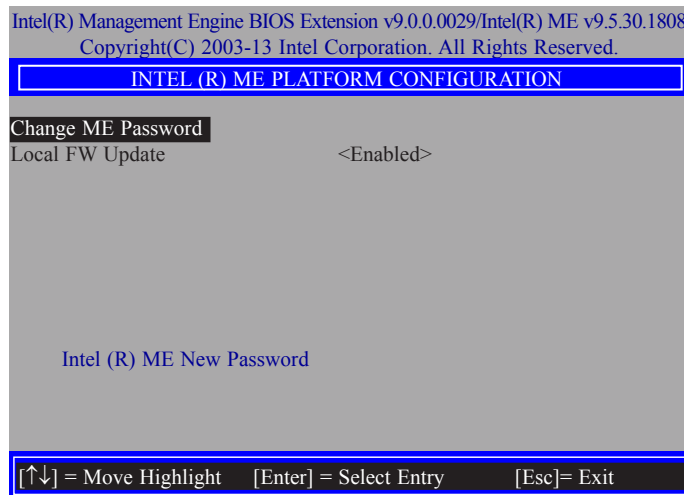
5. Select **Intel(R) ME General Settings** then press Enter.



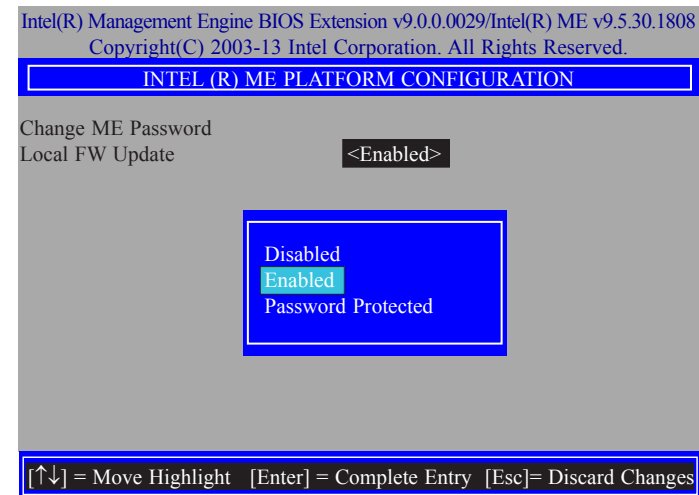
6. Select **Change Intel(R) ME Password** then press Enter.

You will be prompted for a password. The default password is "**admin**". Enter the default password in the space provided under Intel(R) ME New Password then press Enter.

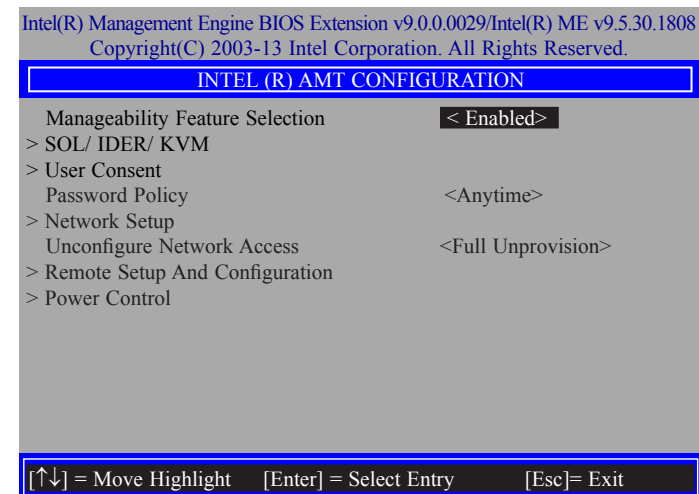
- 8-32 characters
- Strong 7-bit ASCII characters excluding : , and " characters
- At least one digit character (0, 1, ...9)
- At least one 7-bit ASCII non alpha-numeric character, above 0x20, (e.g. !, \$, ;)
- Both lower case and upper case characters



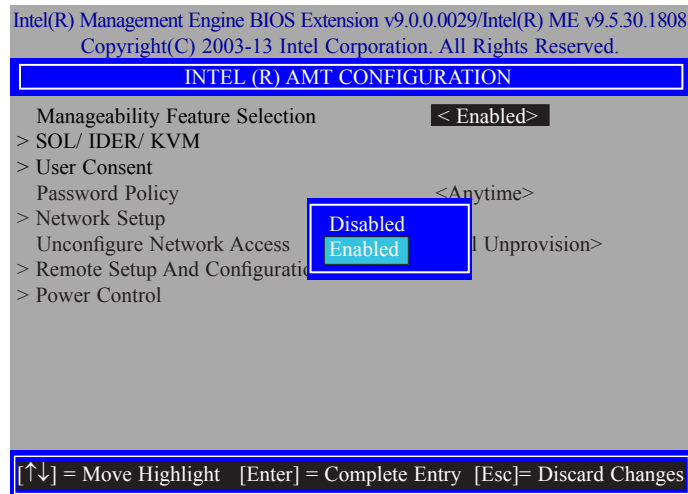
7. Select **Local FW Update** then press Enter. Select **Enabled** then press Enter.



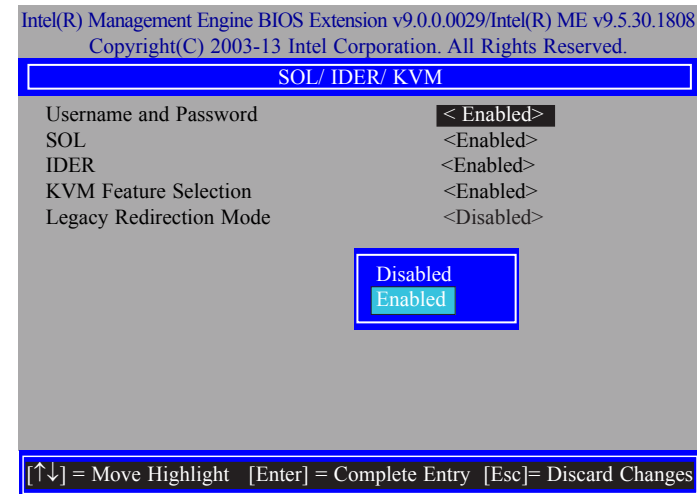
8. Select Previous Menu until you return to the **Main Menu**. Select **Intel(R) AMT Configuration** then press Enter.



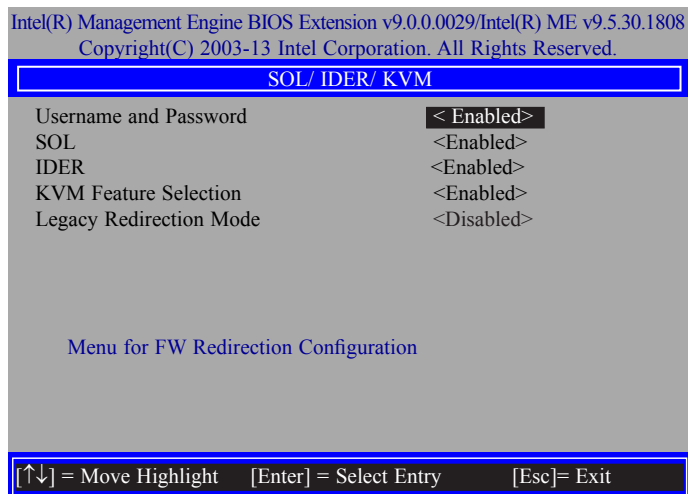
9. In the **Intel(R) AMT Configuration** menu, select **Manageability Feature Selection** then press Enter. Select **Disabled** then press Enter.



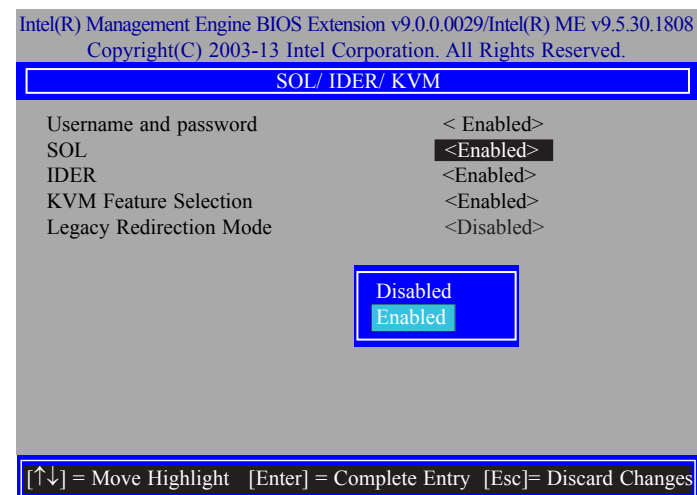
11. In the **SOL/IDER/KVM** menu, select **Username and Password** then press Enter. Select **Disabled** then press Enter.



10. In the **Intel(R) AMT Configuration** menu, select **SOL/IDER/KVM** then press Enter.

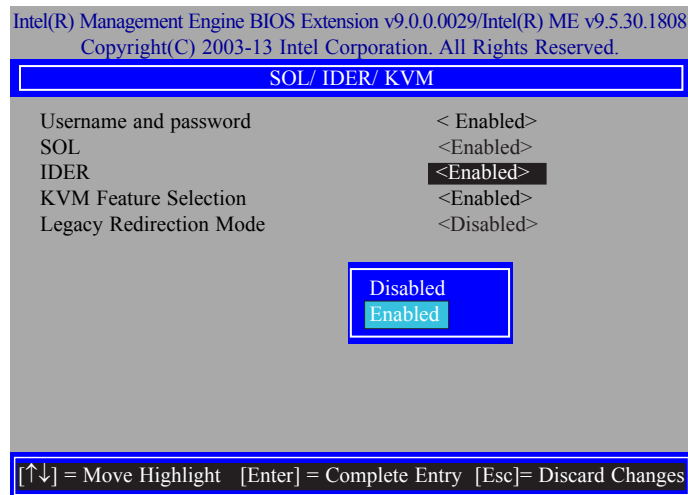


12. In the **SOL/IDER/KVM** menu, select **SOL** then press Enter. Select **Disabled** then press Enter.

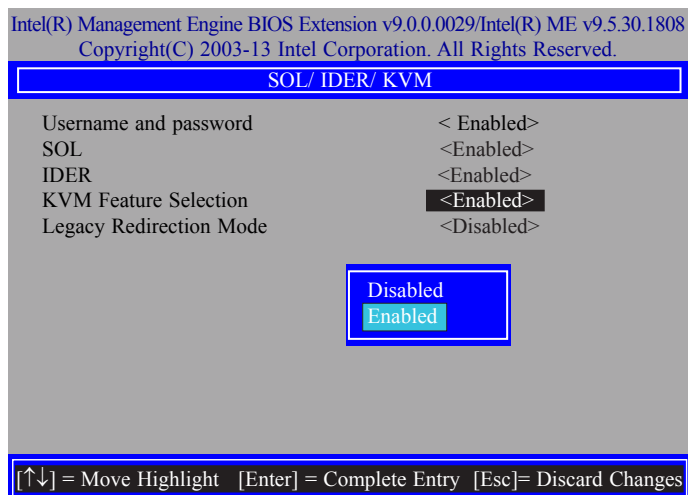




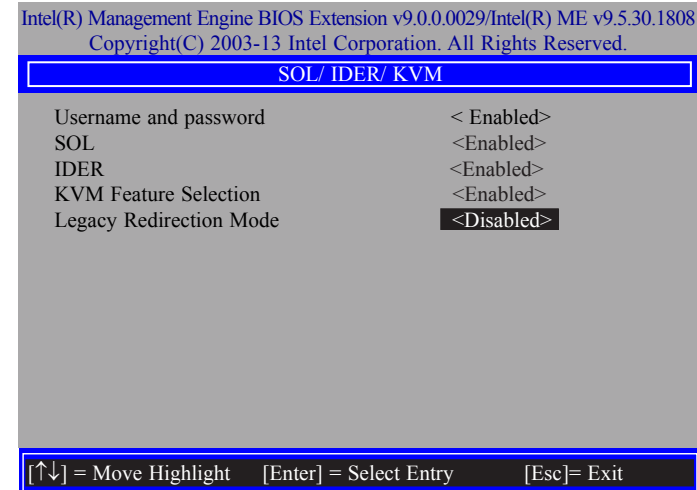
13. In the **SOL/IDER/KVM** menu, select **IDER** then press Enter. Select **Disabled** then press Enter.



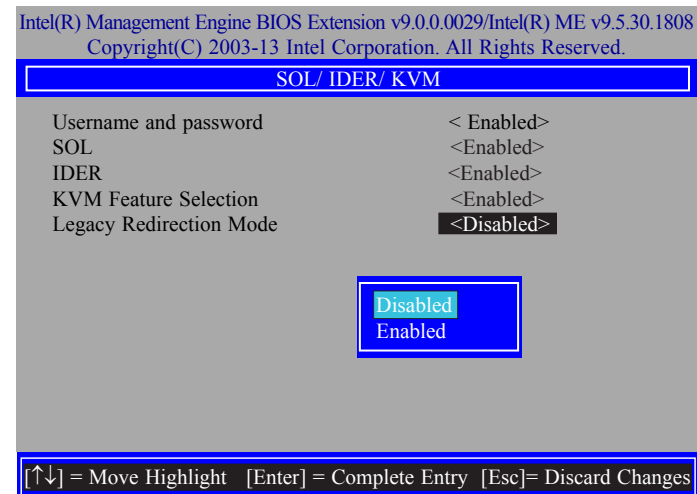
14. In the **SOL/IDER/KVM** menu, select **KVM Feature Selection** then press Enter. Select **Disabled** then press Enter.



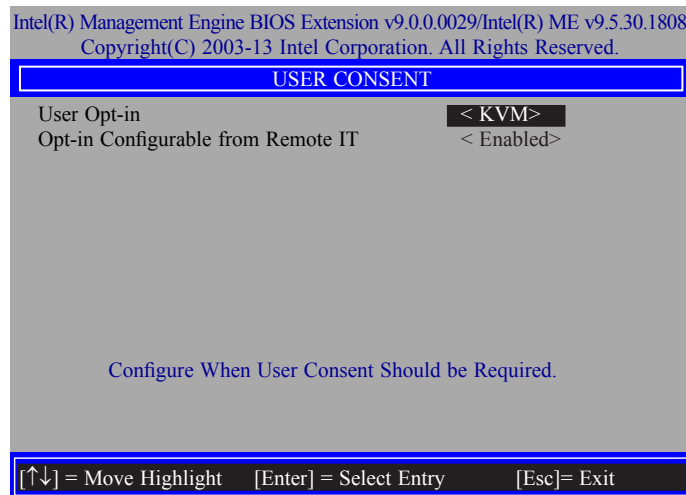
15. In the **SOL/IDER/KVM** menu, select **Legacy Redirection Mode** then press Enter.



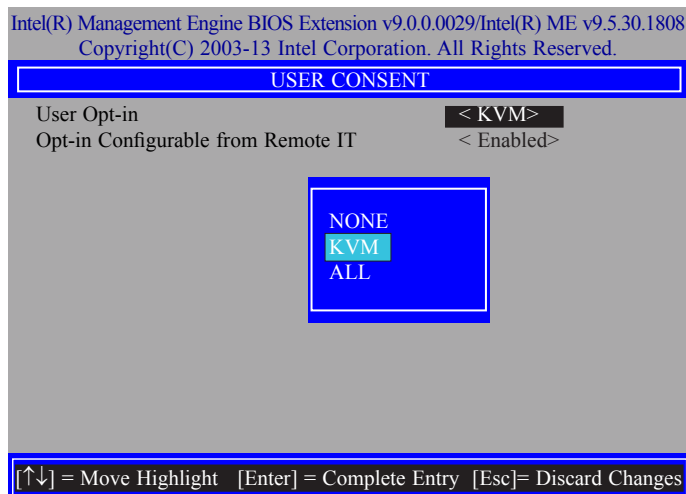
16. Select **Enabled** then press Enter.



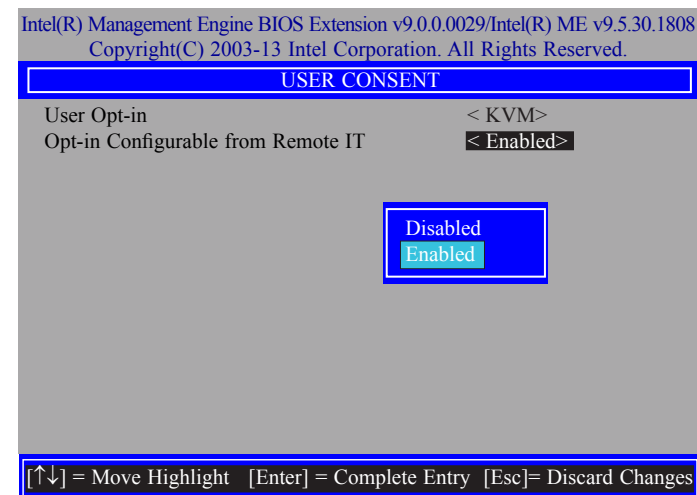
17. Select Previous Menu until you return to the **Intel(R) AMT Configuration** menu. Select **User Consent** then press Enter.



18. In the **User Consent** menu, select **User Opt-in** then press Enter. Select **None** then press Enter.

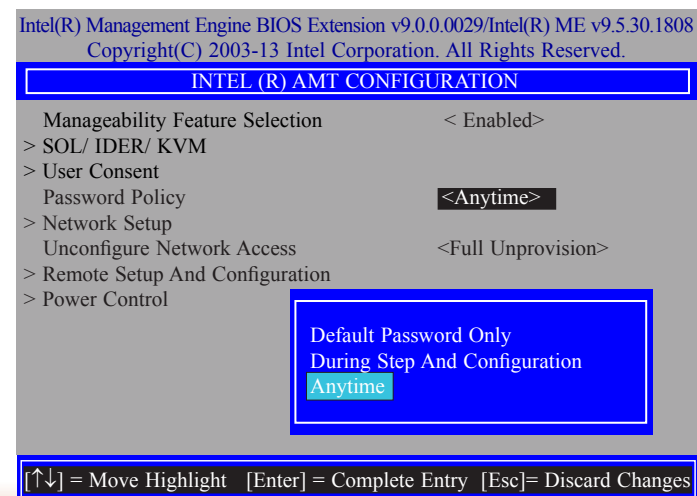


19. In the **User Consent** menu, select **Opt-in Configurable from Remote IT** then press Enter. Select **Disable Remote Control of KVM Opt-in Policy** then press Enter.

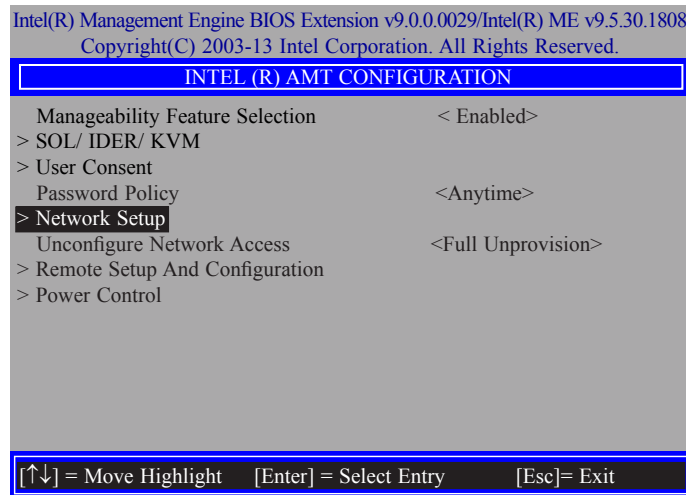


20. Select Previous Menu until you return to the **Intel(R) AMT Configuration** menu. Select **Password Policy** then press Enter.

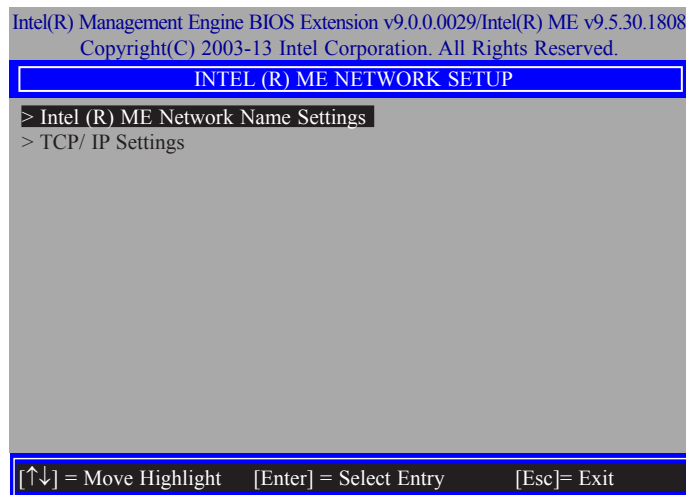
You may choose to use a password only during setup and configuration or to use a password anytime the system is being accessed.



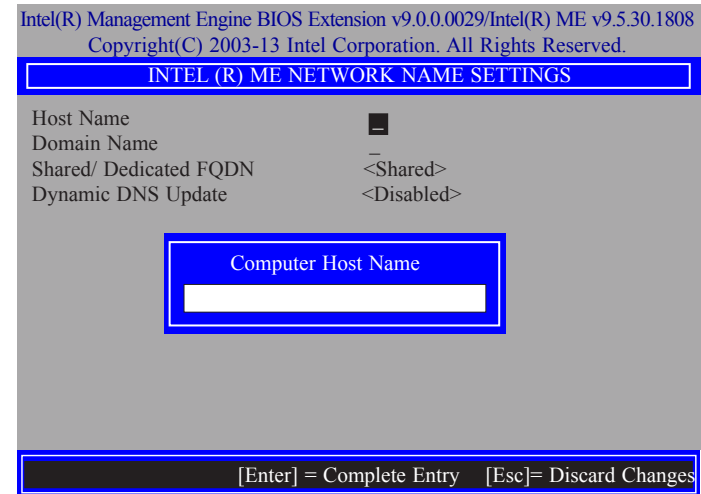
21. In the **Intel(R) AMT Configuration** menu, select **Network Setup** then press Enter.



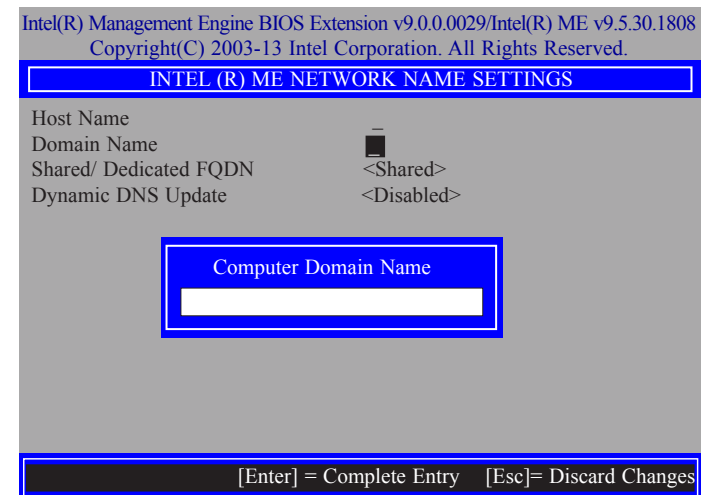
22. In the **Intel(R) ME Network Setup** menu, select **Intel(R) ME Network Name Settings** then press Enter.



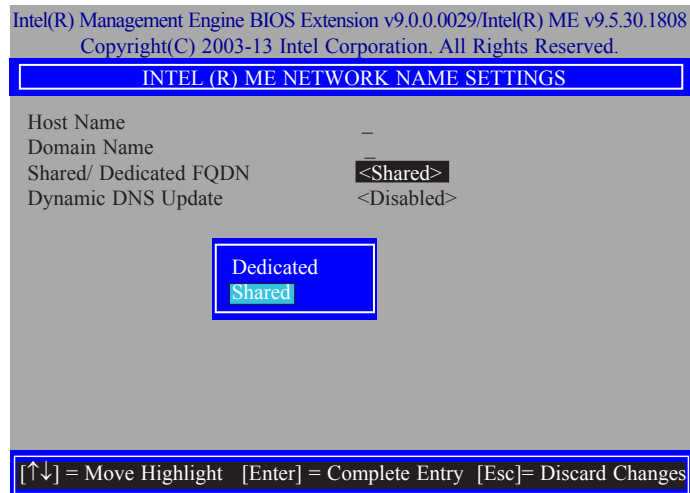
23. In the **Intel(R) ME Network Name Settings** menu, select **Host Name** then press Enter. Enter the computer's host name then press Enter.



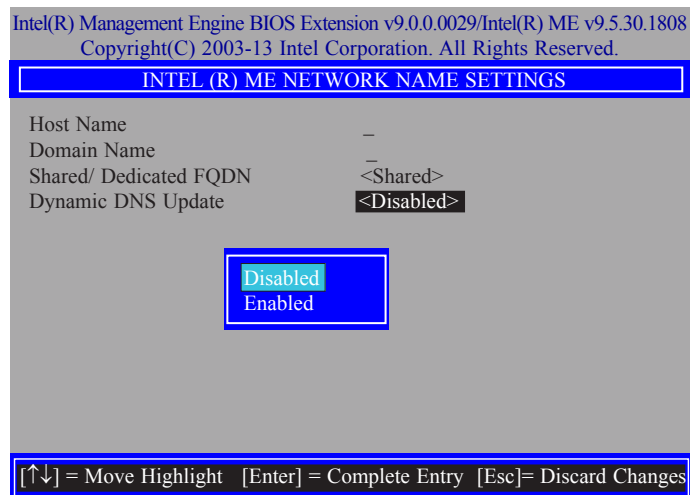
24. Select **Domain Name** then press Enter. Enter the computer's domain name then press Enter.



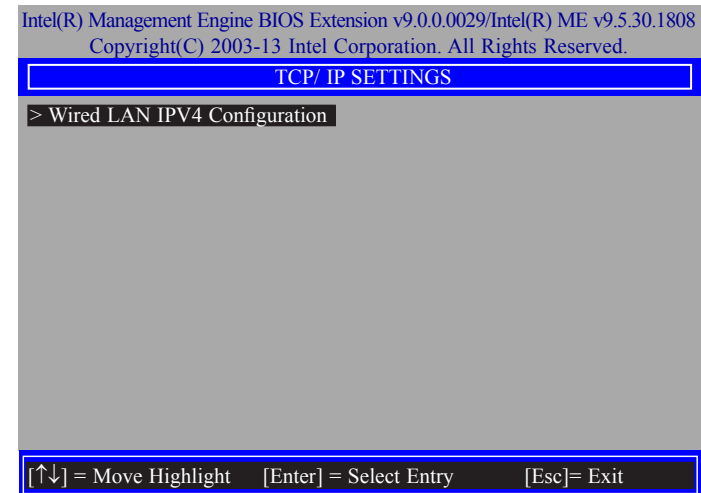
25. Select **Shared/Dedicated FQDN** then press Enter. Select **Shared** or **Dedicated** then press Enter.



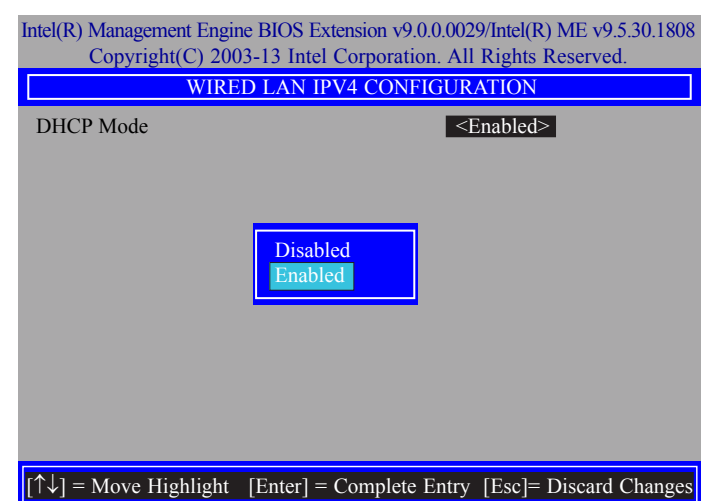
26. Select **Dynamic DNS Update** then press Enter. Select **Enabled** or **Disabled** then press Enter.



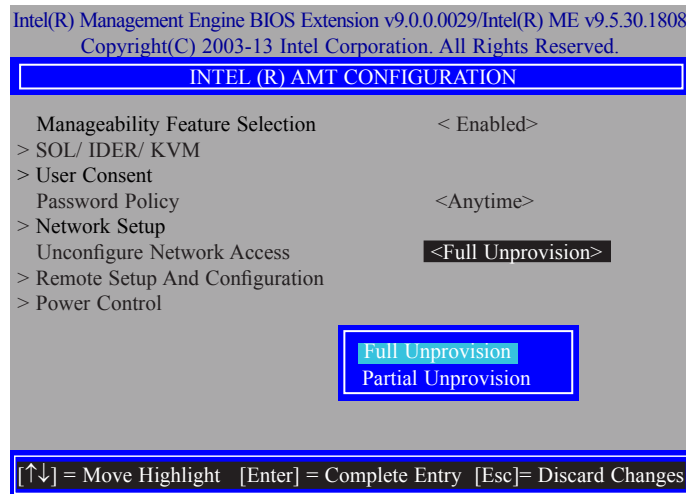
27. Select Previous Menu until you return to the **Intel(R) ME Network Setup** menu. Select **TCP/IP Settings** then press Enter.



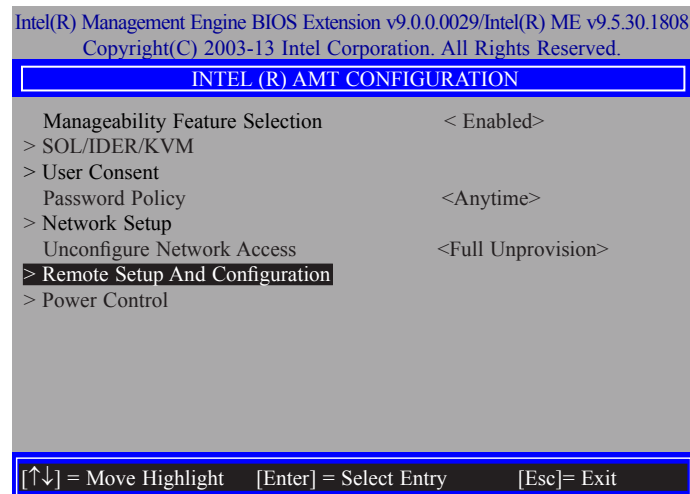
28. In the **TCP/IP Settings** menu, select **Wired LAN IPV4 Configuration** then press Enter.



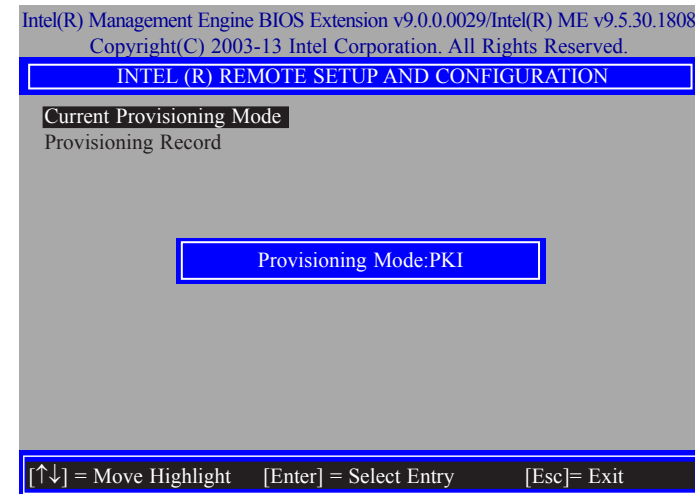
29. In the **Intel(R) AMT Configuration** menu, select **Unconfigure Network Access** then press Enter.



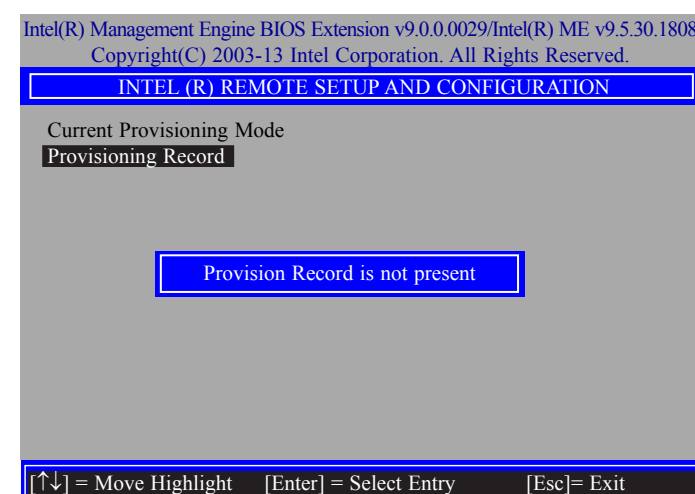
30. In the **Intel(R) AMT Configuration** menu, select **Remote Setup And Configuration** then press Enter.



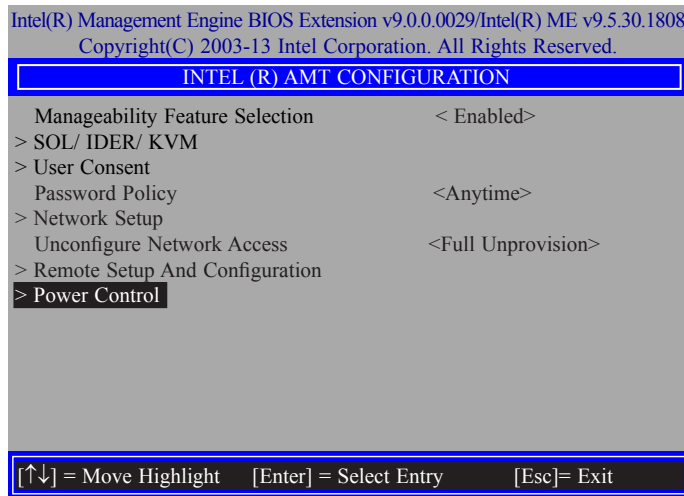
31. In the **Intel(R) Remote Setup And Configuration** menu, select **Current Provisioning Mode** then press Enter.



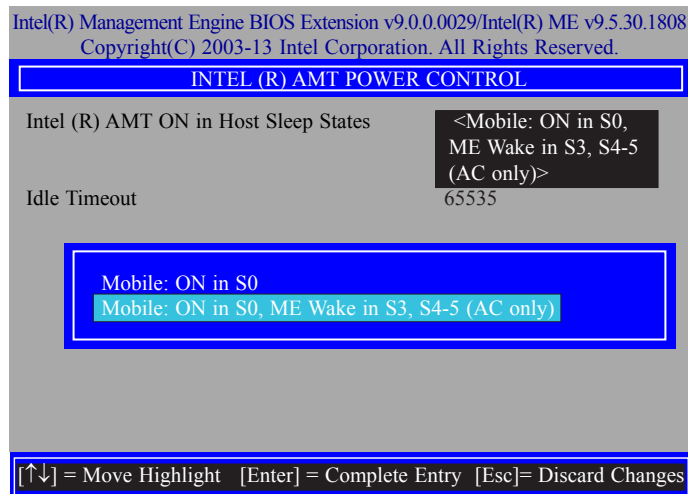
32. In the **Intel(R) Remote Setup And Configuration** menu, select **Provisioning Record** then press Enter.



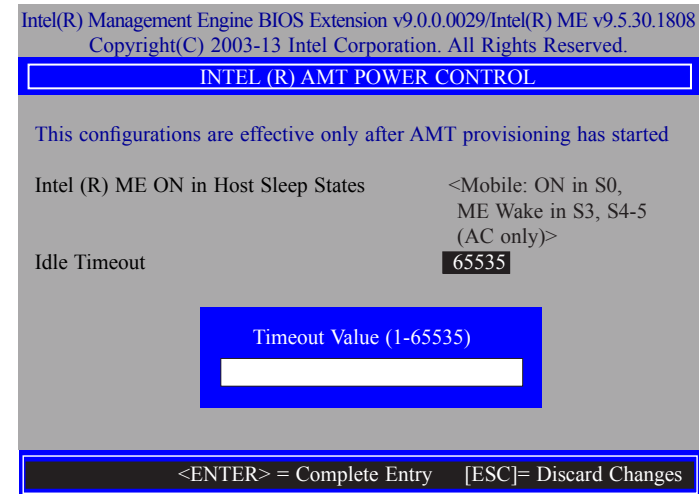
33. In the **Intel(R) AMT Configuration** menu, select **Power Control** then press Enter.



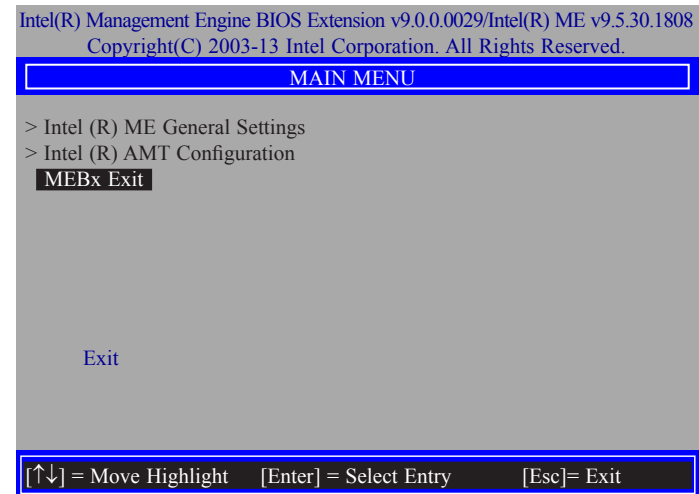
34. In the **Intel(R) AMT Power Control** menu, select **Intel(R) AMT ON in Host Sleep States** then press Enter. Select an option then press Enter.



35. In the **Intel(R) AMT Power Control** menu, select **Idle Timeout** then press Enter. Enter the timeout value (1-65535).



36. Select Previous Menu until you return to the **Main Menu**. Select **Exit** then press Enter. Type **Y** then press Enter.



## Appendix A - Watchdog Sample Code

;Software programming example:

```

;-----
;(1) Enter Super IO Configuration mode
;-----
MOV     DX,2EH
MOV     AL,87H
OUT     DX,AL
OUT     DX,AL

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

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

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

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

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

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

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

```

## Appendix B - System Error Message

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

### Error Messages

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

#### CMOS BATTERY HAS FAILED

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



**Important:**

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

#### CMOS CHECKSUM ERROR

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

#### DISPLAY SWITCH IS SET INCORRECTLY

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

#### FLOPPY DISK(S) fail (80)

Unable to reset floppy subsystem.

#### FLOPPY DISK(S) fail (40)

Floppy type mismatch.

#### Hard Disk(s) fail (80)

HDD reset failed.

#### Hard Disk(s) fail (40)

HDD controller diagnostics failed.

#### Hard Disk(s) fail (20)

HDD initialization error.

#### Hard Disk(s) fail (10)

Unable to recalibrate fixed disk.

#### Hard Disk(s) fail (08)

Sector Verify failed.

#### Keyboard is locked out - Unlock the key

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

#### Keyboard error or no keyboard present

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

#### Manufacturing POST loop

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

#### BIOS ROM checksum error - System halted

The checksum of ROM address F0000H-FFFFFH is bad.

#### Memory test fail

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



## Appendix C - Troubleshooting Checklist

### Troubleshooting Checklist

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

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

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

### Monitor/Display

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

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

#### The picture seems to be constantly moving.

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

#### The screen seems to be constantly wavering.

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

### Power Supply

#### When the computer is turned on, nothing happens.

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

### Floppy Drive

#### The computer cannot access the floppy drive.

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

## Hard Drive

### Hard disk failure.

1. Make sure the correct drive type for the hard disk drive has been entered in the BIOS.
2. If the system is configured with two hard drives, make sure the bootable (first) hard drive is configured as Master and the second hard drive is configured as Slave. The master hard drive must have an active/bootable partition.

### Excessively long formatting period.

If your hard drive takes an excessively long period of time to format, it is likely a cable connection problem. However, if your hard drive has a large capacity, it will take a longer time to format.

## Serial Port

### The serial device (modem, printer) doesn't output anything or is outputting garbled characters.

1. Make sure that the serial device's power is turned on and that the device is on-line.
2. Verify that the device is plugged into the correct serial port on the rear of the computer.
3. Verify that the attached serial device works by attaching it to a serial port that is working and configured correctly. If the serial device does not work, either the cable or the serial device has a problem. If the serial device works, the problem may be due to the onboard I/O or the address setting.
4. Make sure the COM settings and I/O address are configured correctly.

## Keyboard

### Nothing happens when a key on the keyboard was pressed.

1. Make sure the keyboard is properly connected.
2. Make sure there are no objects resting on the keyboard and that no keys are pressed during the booting process.

## System Board

1. Make sure the add-in card is seated securely in the expansion slot. If the add-in card is loose, power off the system, re-install the card and power up the system.
2. Check the jumper settings to ensure that the jumpers are properly set.
3. Verify that all memory modules are seated securely into the memory sockets.
4. Make sure the memory modules are in the correct locations.
5. If the board fails to function, place the board on a flat surface and seat all socketed components. Gently press each component into the socket.
6. If you made changes to the BIOS settings, re-enter setup and load the BIOS defaults.