

DFI



SU551
Embedded SBC 3.5"
User's Manual

A42370952

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FCC and DOC Statement on Class B

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

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

Notice:

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

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About this Manual

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

Warranty

1. Warranty does not cover damages or failures that arised from misuse of the product, inability to use the product, unauthorized replacement or alteration of components and product specifications.
2. The warranty is void if the product has been subjected to physical abuse, improper installation, modification, accidents or unauthorized repair of the product.
3. Unless otherwise instructed in this user's manual, the user may not, under any circumstances, attempt to perform service, adjustments or repairs on the product, whether in or out of warranty. It must be returned to the purchase point, factory or authorized service agency for all such work.
4. We will not be liable for any indirect, special, incidental or 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.

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 SU551 board
- 1 COM port cable (Length: 300mm, 2 x COM ports)
- 1 Serial ATA data cable (Length: 300mm)
- 1 Serial ATA power cable (Length: 250mm)
- 1 Heat sink 0 to 60°C (Height: 20.85mm) or wide temp (Height: 30.85mm)

Optional Items

- USB port cable (Length: 200mm)
- Power adapter (60W, 12V)
- Heat spreader (Height: 11mm)
- Audio cable (Length: 160mm)

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

Before Using the System Board

Before using the system board, prepare basic system components.

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

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

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

Chapter 1 - Introduction

Specifications

| | | |
|------------------|-----------------|--|
| SYSTEM | Processor | 6th Generation Intel® Core™ Processors, BGA 1356 Intel® Core™ i7-6600U Processor, Dual Core, 4M Cache, 2.6GHz (3.4GHz), 15W Intel® Core™ i5-6300U Processor, Dual Core, 3M Cache, 2.4GHz (3.0GHz), 15W Intel® Core™ i3-6100U Processor, Dual Core, 3M Cache, 2.3GHz, 15W Intel® Celeron® Processor 3955U, Dual Core, 2M Cache, 2.0GHz, 15W 7th Generation Intel® Core™ Processors, BGA 1356 Intel® Core™ i7-7600U Processor, Dual Core, 4M Cache, 2.8GHz (3.9GHz), 15W Intel® Core™ i5-7300U Processor, Dual Core, 3M Cache, 2.6GHz (3.5GHz), 15W Intel® Core™ i3-7100U Processor, Dual Core, 3M Cache, 2.4GHz, 15W Intel® Celeron® Processor 3965U, Dual Core, 2M Cache, 2.2GHz, 15W |
| | Memory | One 204-pin SODIMM up to 8GB Single Channel DDR3L 1600MHz |
| | BIOS | Insyde SPI 128Mbit |
| | GRAPHICS | Controller Intel® HD Graphics GT Series |
| | Feature | OpenGL 5.0, DirectX 12, OpenCL 2.1 HW Decode: AVC/H.264, MPEG2, VC1/WMV9, JPEG/MJPEG, HEVC/H265, VP8, VP9 HW Encode: AVC/H.264, MPEG2, JPEG, HEVC/H265, VP8, VP9 |
| | Display | 1 x VGA 1 x LVDS 1 x DP++ VGA: resolution up to 1920x1200 @ 60Hz LVDS: dual channel 48-bit, resolution up to 1920x1200 @ 60Hz DP++: resolution up to 4096x2304 @ 60Hz |
| | Triple Displays | VGA + LVDS + DP++ |
| EXPANSION | Interface | 1 x Full-size Mini PCIe (PCIe/USB/SATA, SATA by default) 1 x Half-size Mini PCIe (PCIe/USB, PCIe by default) 1 x SIM (supported by half-size Mini PCIe) (available upon request) |
| AUDIO | Audio Codec | Realtek ALC888S-VD2-GR |
| ETHERNET | Controller | 1 x Intel® I210AT PCIe (10/100/1000Mbps) 1 x Intel® I219LM PCIe with iAMT11.0 (10/100/1000Mbps) (only Core i7/i5 supports iAMT) |
| REAR I/O | Ethernet | 2 x GbE (RJ-45) |
| | USB | 4 x USB 3.1 Gen 1 |
| | Display | 1 x VGA 1 x DP++ |

| | | |
|-----------------------|-------------------|---|
| INTERNAL I/O | Serial | 2 x RS-232/422/485 (2.0mm pitch) 2 x RS-232 (2.0mm pitch) |
| | USB | 2 x USB 2.0 (2.0mm pitch) |
| | Display | 1 x LVDS LCD Panel Connector 1 x LCD/Inverter Power |
| | Audio | 1 x Audio (Line-out/Mic-in) |
| | SATA | 2 x SATA 3.0 (up to 6Gb/s) 1 x SATA Power |
| | DIO | 1 x 8-bit DIO |
| | SMBus | 1 x SMBus |
| WATCHDOG TIMER | Output & Interval | System Reset, Programmable via Software from 1 to 255 Seconds |
| POWER | Type | Single 12V +/-10% DC |
| | Connector | Right Angle Connector (4-pin) DC Jack (available upon request) Vertical Type Connector (4-pin) (available upon request) |
| | Consumption | Typical: 6300U:12V @ 0.40A (4.80Watt) Max.: 6300U:12V @ 2.08A (24.96Watt) |
| | RTC Battery | CR2032 Coin Cell |
| OS SUPPORT | Microsoft | Windows 7 (/WES7) 32/64-bit Windows 8.1 (64-bit) Windows 10 IoT Enterprise 64-bit |
| | Linux | Debian 8 (with VESA graphic driver) CentOS 7 (with VESA graphic driver) Ubuntu 15.10 (Intel graphic driver available) |
| ENVIRONMENT | Temperature | Operating: 0 to 60°C (Opt. -20 to 70°C) Storage: -40 to 85°C |
| | Humidity | Operating: 5 to 90% RH Storage: 5 to 90% RH |
| | MTBF | 430,978 hrs @ 25°C; 253,129 hrs @ 45°C; 157,798 hrs @ 60°C |
| MECHANICAL | Dimensions | 3.5" SBC Form Factor 146mm (5.75") x 102mm (4.02") |
| | Height | PCB: 1.6mm Top Side: 15.5mm, Bottom Side: 4.0mm |
| CERTIFICATIONS | | CE, FCC, RoHS |

Features

● Watchdog Timer

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

● DDR3L

DDR3L SDRAM provides backward compatibility to DDR3 memory modules but can operate at the same or at a lower power level.

● Graphics

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

● Serial ATA

Serial ATA is a storage interface that is compliant with SATA 1.0a specification. With speed of up to 6Gb/s (SATA 3.0), it improves hard drive performance faster than the standard parallel ATA whose data transfer rate is 100MB/s.

● Gigabit LAN

Intel® I210AT PCI Express Gigabit Ethernet controller and Intel® I219LM PCI Express Gigabit Ethernet controller with iAMT11.0 support up to 1Gbps data transmission.

● Audio

The Realtek ALC888S-VD2-GR audio codec provides 2.1-channel High Definition audio output.

● Power Failure Recovery

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

● USB

The system board supports the USB 3.1 Gen 1. It is capable of running at a maximum transmission speed of up to 5 Gbit/s (625 MB/s) and is faster than USB 2.0 (480 Mbit/s, or 60 MB/s) and USB 1.1 (12Mb/s). USB 3.1 Gen 1 reduces the time required for data transmission, reduces power consumption, and is backward compatible with USB 2.0. It is a marked improvement in device transfer speeds between your computer and a wide range of simultaneously accessible external Plug and Play peripherals.

● Wake-On-LAN

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

● Wake-On-USB

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

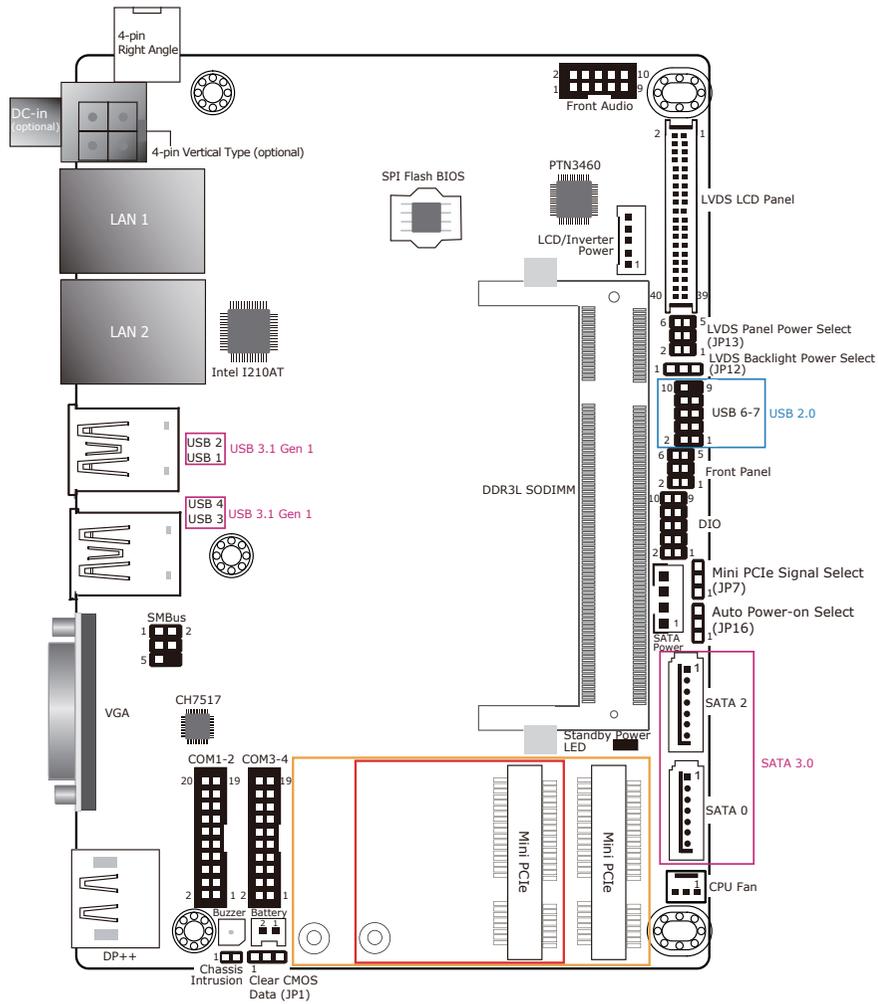
● ACPI STR

The system board is designed to meet the ACPI (Advanced Configuration and Power Interface) specification. ACPI has energy saving features that enable PCs to implement power management and plug-and-play with operating systems that support power management features.

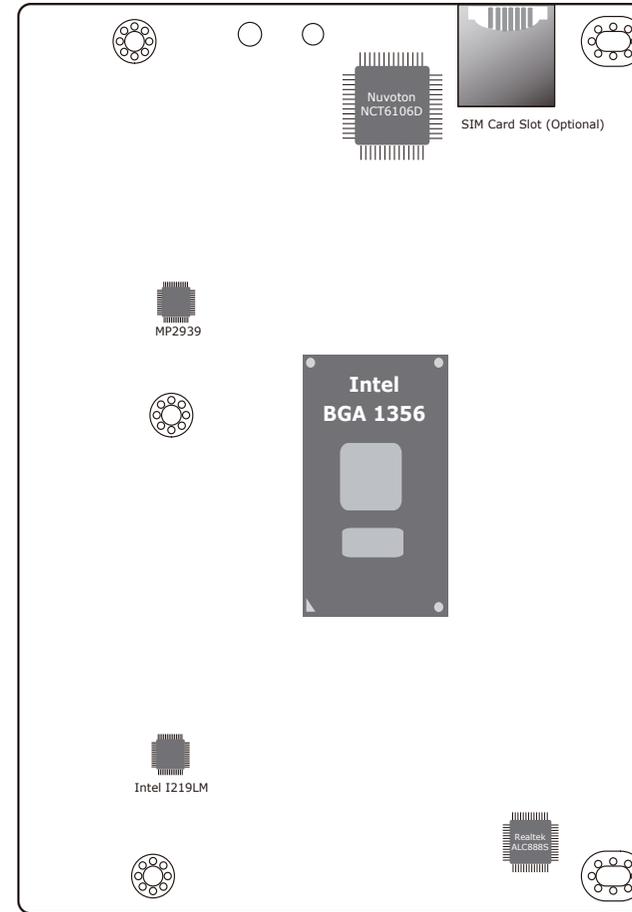
With ACPI, the system can further utilize the Ethernet adapter's wake-on-LAN (WOL) capability that enables remote wake-up if the Ethernet adapter supports such feature.

Chapter 2 - Hardware Installation

Board Layout

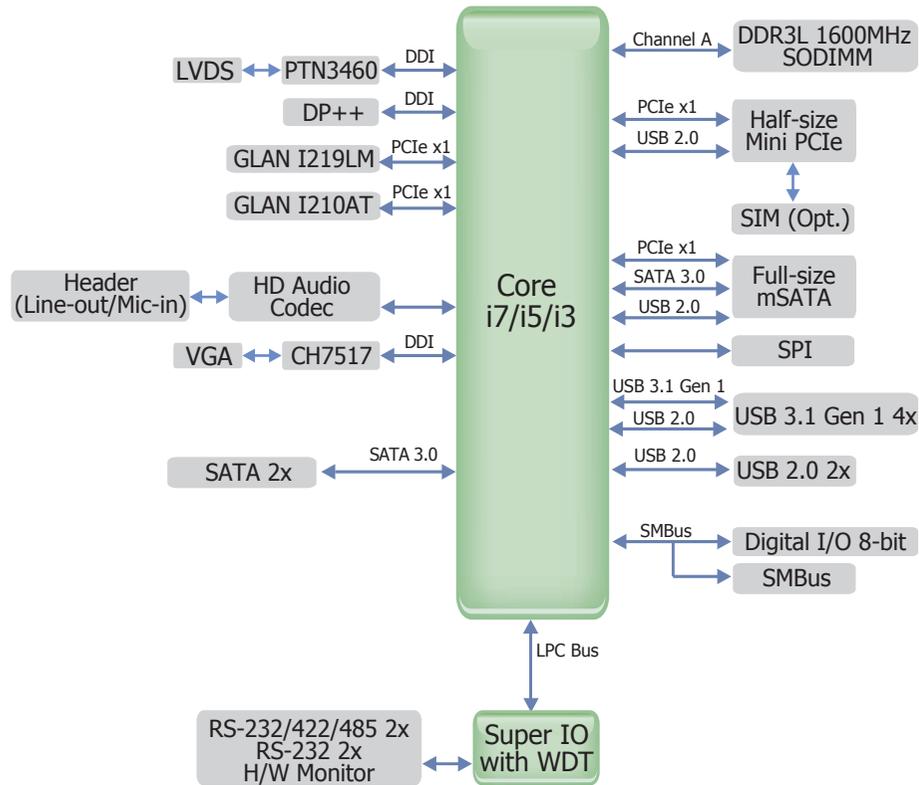


Top View

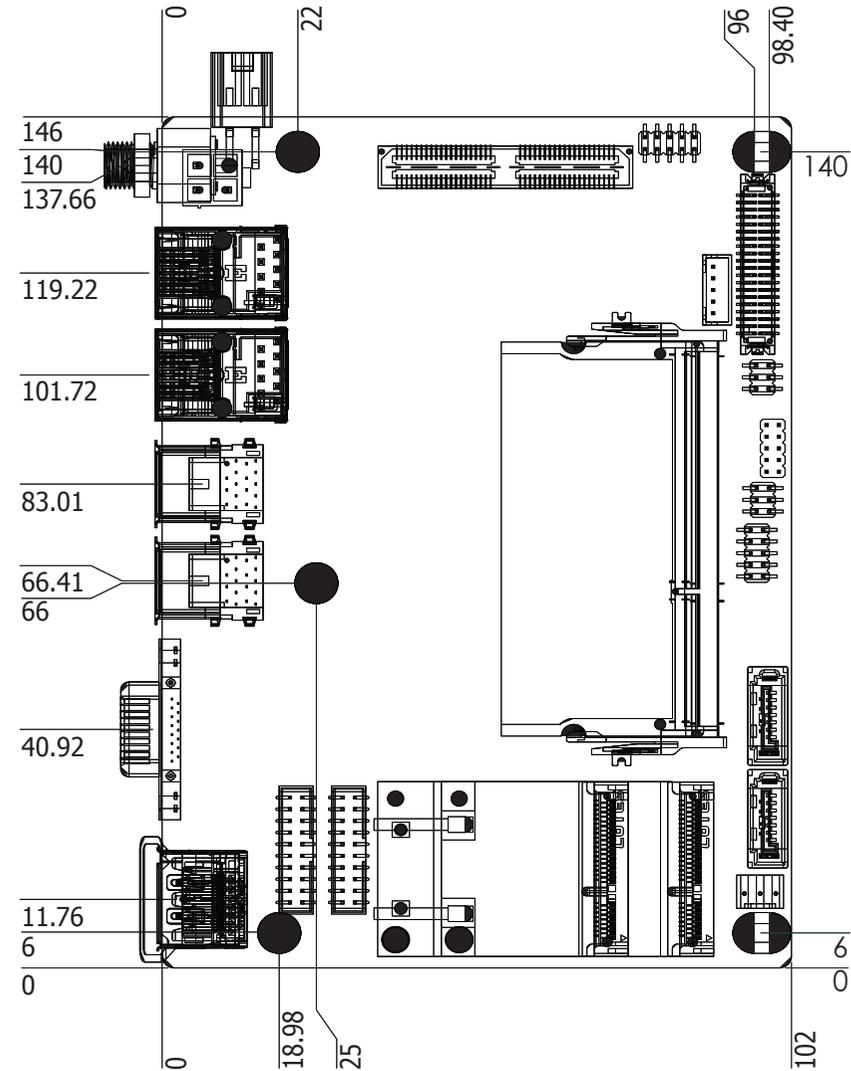


Bottom View

Block Diagram



Mechanical Diagram



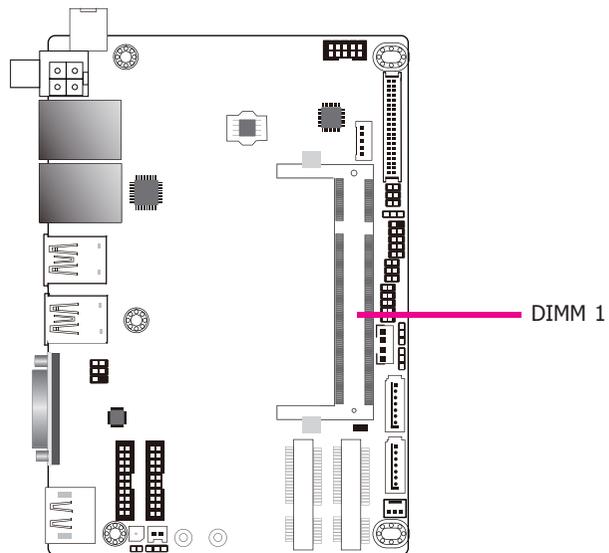
**Important:**

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

System Memory

**Important:**

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

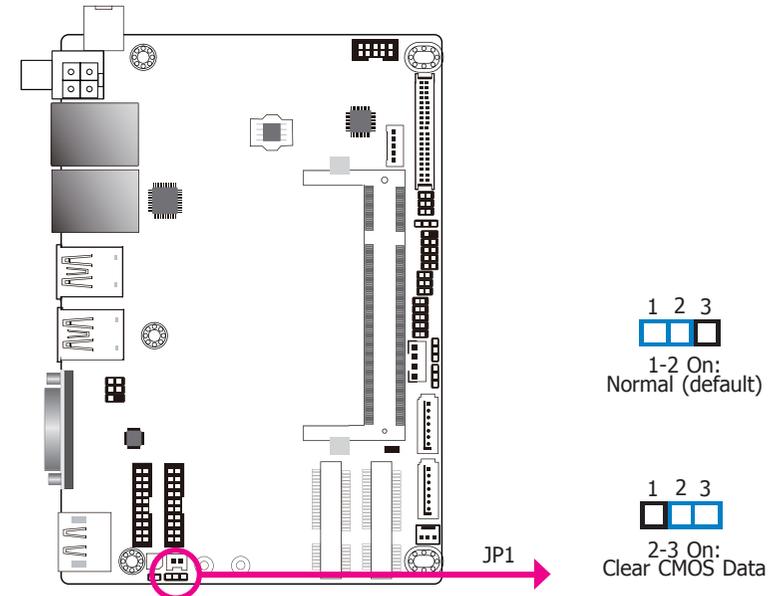


Features

- One 204-pin SODIMM up to 8GB
- Single Channel DDR3L 1600MHz

Jumper Settings

Clear CMOS Data



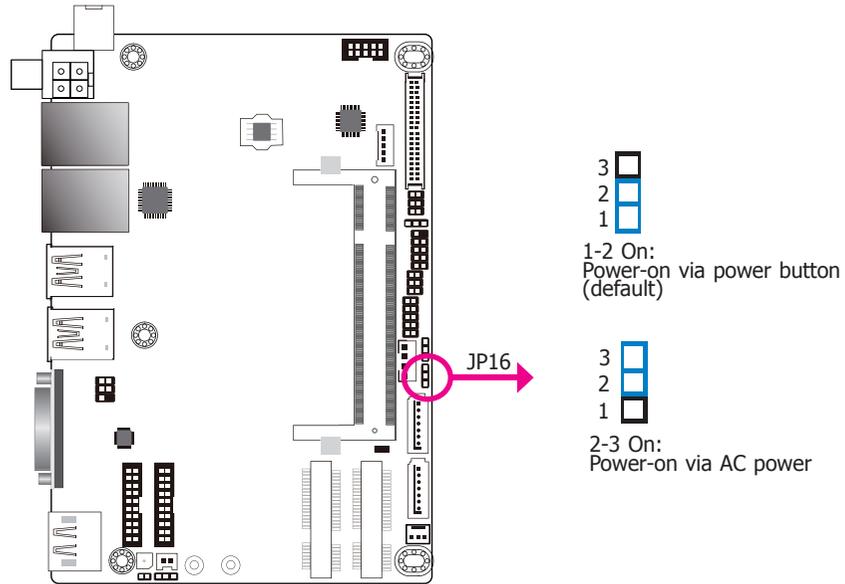
If you encounter the following conditions, you can reconfigure the system with the default values stored in the ROM BIOS.

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

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

1. Power-off the system and unplug the power cord.
2. Set 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.
3. Now plug the power cord and power-on the system.

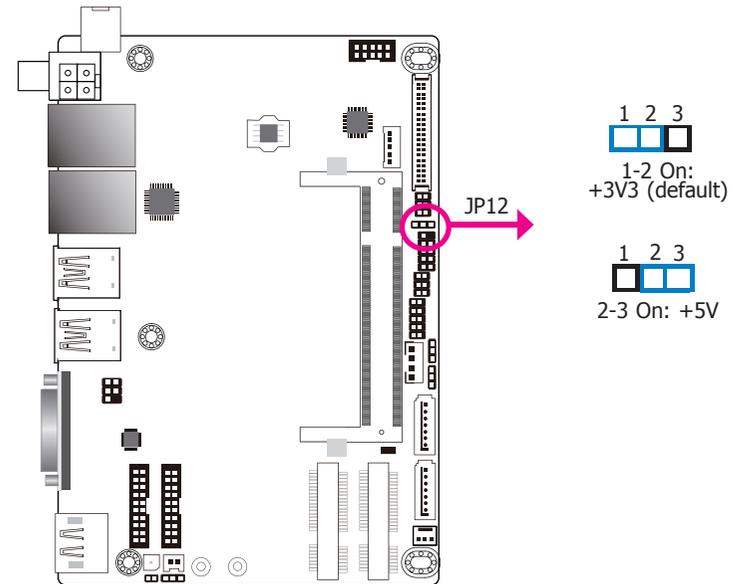
Auto Power-on Select



JP16 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 JP16 pins 2 and 3 to On. If you want to use the power button, set pins 1 and 2 to On.

When using the JP16 "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).

LVDS Backlight Power Select

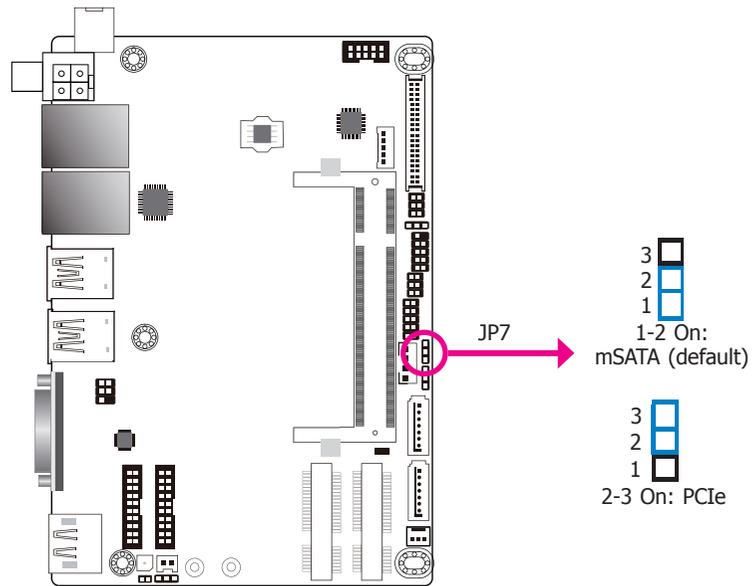


JP12 is used to select the power level of backlight brightness control: +3.3V or +5V.

**Important:**

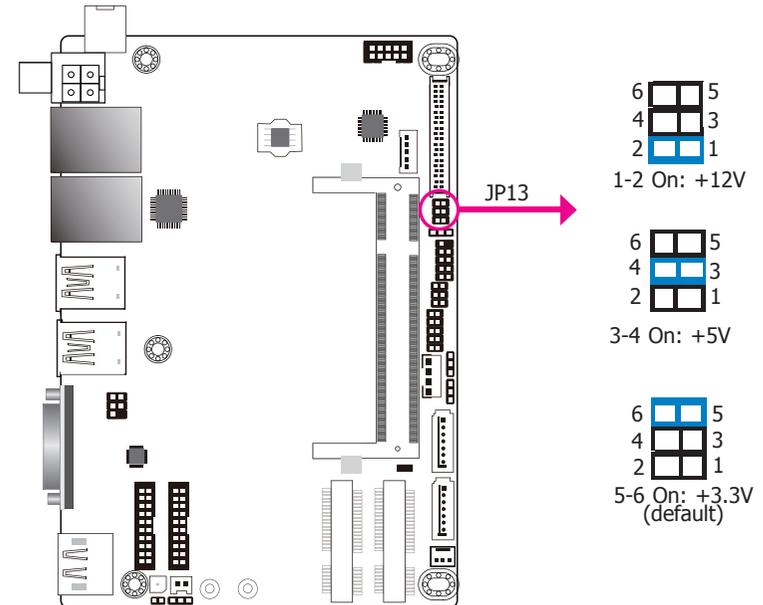
Before powering-on the system, make sure that the power settings of JP12 match the power specification of backlight control. Selecting the incorrect voltage will seriously damage the backlight.

Mini PCIe Signal Select



JP7 is used to select the Mini PCIe slot (full-size) signal: PCIe or mSATA (default).

LVDS Panel Power Select

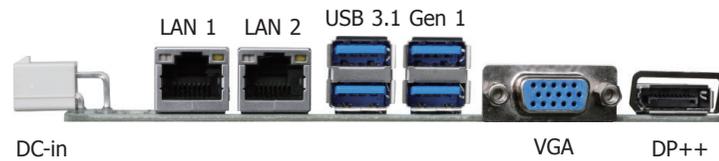


JP13 is used to select the power supplied with the LCD panel.

**Important:**

Before powering-on the system, make sure that the power settings of JP13 match the LCD panel's specification. Selecting the incorrect voltage will seriously damage the LCD panel.

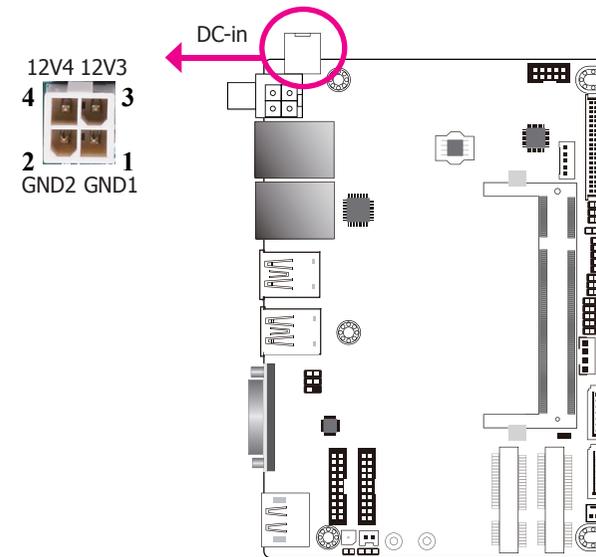
Rear Panel I/O Ports



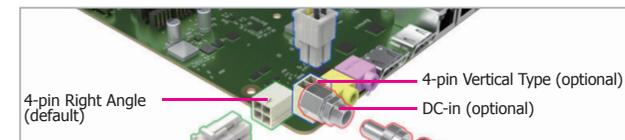
The rear panel I/O ports consist of the following:

- 1 DC-in connector
- 2 GbE (RJ-45)
- 4 USB 3.1 Gen 1 ports
- 1 VGA port
- 1 DP++ port

12V DC-in



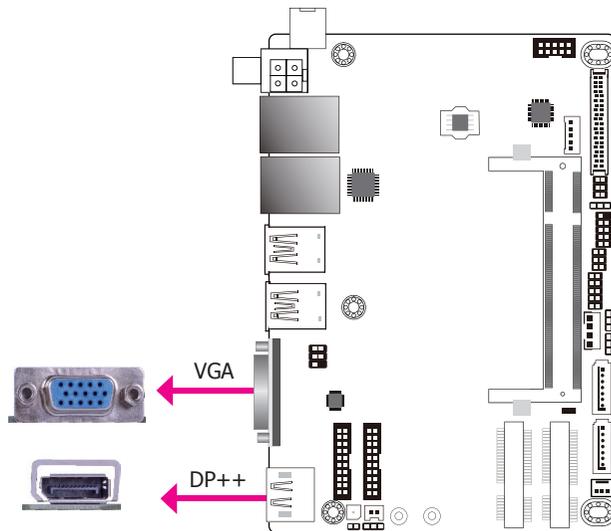
The 4-pin right-angle connector on the system board co-lays with a DC-in jack (optional) or 4-pin vertical type connector (optional) as the photo displayed below.



Graphics Interfaces

The display ports consist of the following:

- 1 VGA port
- 1 DP++ port



VGA Port

The VGA port is used for connecting a VGA monitor. Connect the monitor's 15-pin D-shell cable connector to the VGA port. After you plug the monitor's cable connector into the VGA port, gently tighten the cable screws to hold the connector in place.

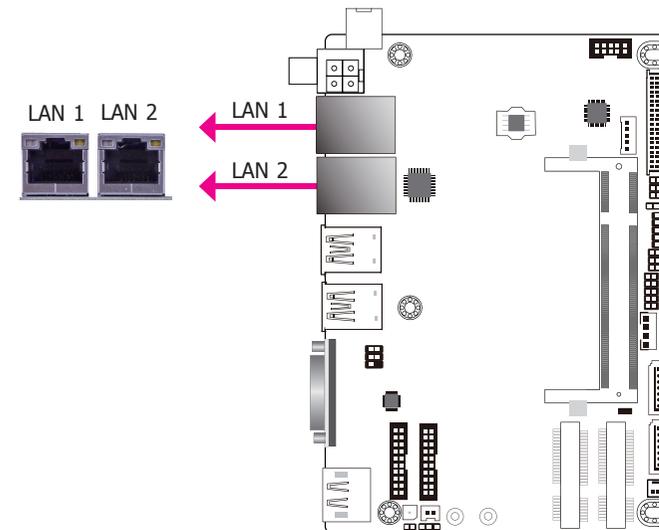
DP++ Port

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

Driver Installation

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

RJ45 LAN Ports



Features

- Intel® I210AT PCI Express Gigabit Ethernet controller
- Intel® I219LM PCIe with iAMT11.0

The LAN port allows the system board to connect to a local area network with a network hub.

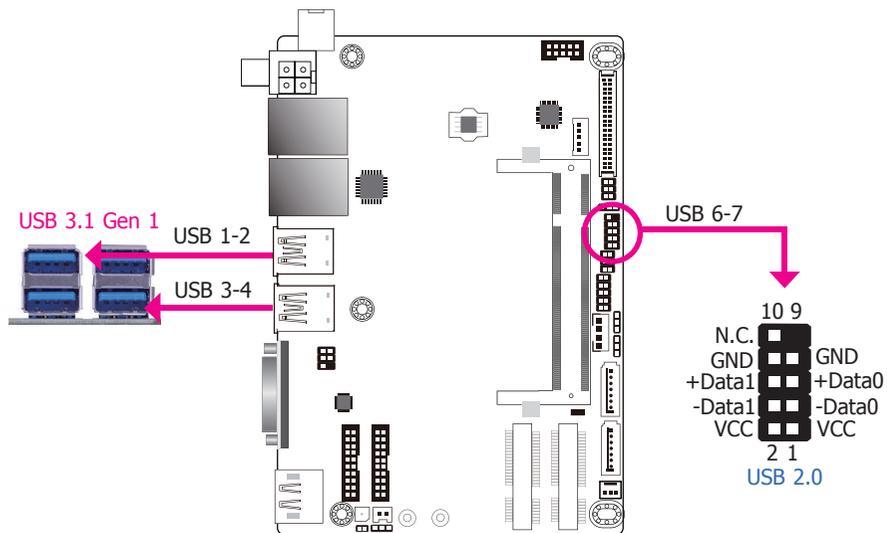
BIOS Setting

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

Driver Installation

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

USB Ports



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

The system board is equipped with 4 onboard USB 3.1 Gen 1 ports (USB 1-2/3-4). The 10-pin connector allows you to connect 2 additional USB 2.0 ports (USB 6-7). The additional USB ports may be mounted on a card-edge bracket. Install the card-edge bracket to an available slot at the rear of the system chassis and then insert the USB port cables to a connector.

BIOS Setting

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

Driver Installation

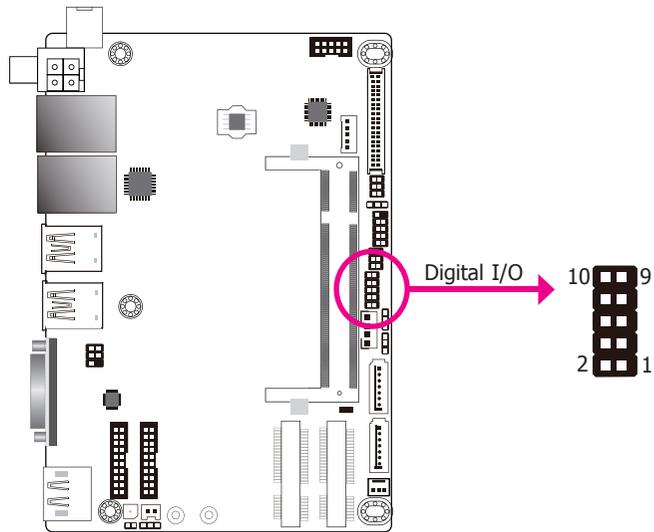
You may need to install the proper drivers in your operating system to use the USB device. Refer to Chapter 4 for more information.

Wake-On-USB Keyboard/Mouse

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

I/O Connectors

Digital I/O Connector

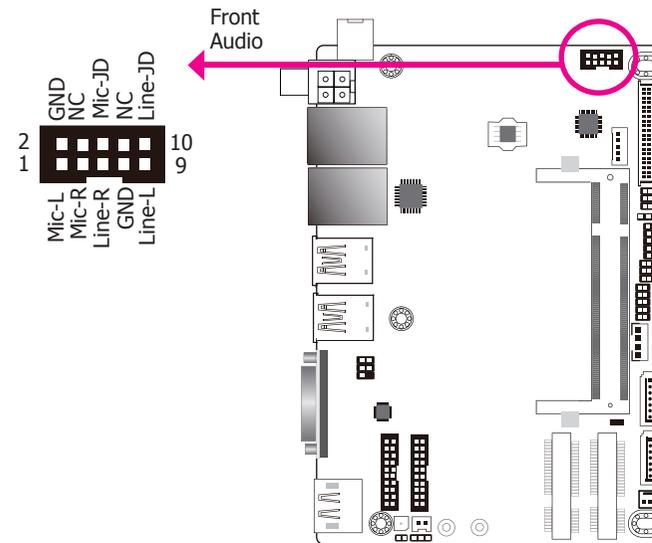


The 8-bit Digital I/O connector provides monitoring and control functions to the connected external devices.

Digital I/O Connector

| Pin | Function |
|-----|----------|
| 1 | DIO7 |
| 2 | DIO6 |
| 3 | DIO5 |
| 4 | DIO4 |
| 5 | DIO3 |
| 6 | DIO2 |
| 7 | DIO1 |
| 8 | DIO0 |
| 9 | 5V |
| 10 | GND |

Front Audio Connector



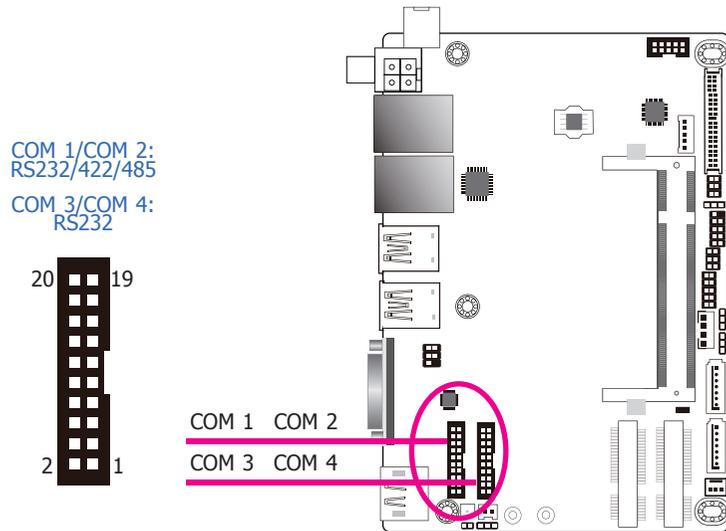
Front Audio

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

Driver Installation

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

COM (Serial) Ports



COM 1 and COM 2 can be selected among RS232, RS422 and RS485. COM 3 and COM 4 are fixed at RS232. Configure COM 1 and COM 2 serial communication mode in the BIOS ("SIO NUVOTON6106D" submenu of the Advanced menu).

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

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

BIOS Setting

Configure the serial COM ports in the Advanced menu ("SIO NUVOTON6106D" submenu) of the BIOS. Refer to the chapter 3 for more information.

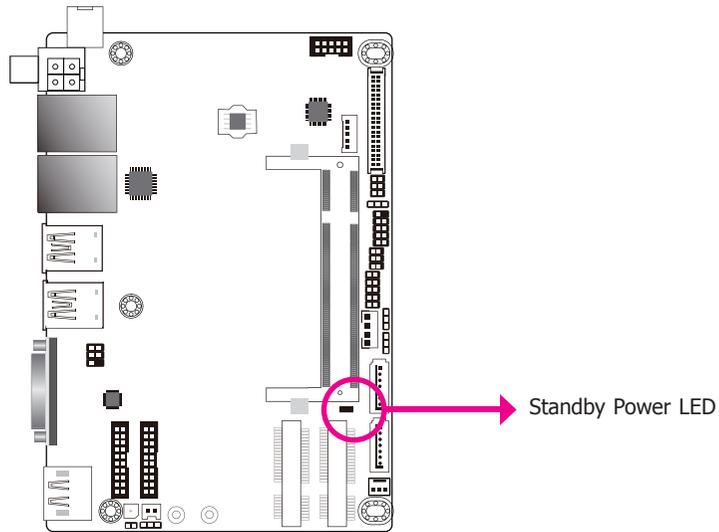
COM 1/COM 2 Connector

| Pin | RS232 | RS422 | RS485 |
|-----|-------|---------|---------------|
| 1 | DCD_1 | TX(B)_1 | RX(B)/TX(B)_1 |
| 2 | DSR_1 | NC | NC |
| 3 | SIN_1 | TX(A)_1 | RX(A)/TX(A)_1 |
| 4 | RTS_1 | NC | NC |
| 5 | SO_1 | RX(A)_1 | NC |
| 6 | CTS_1 | NC | NC |
| 7 | DTR_1 | RX(B)_1 | NC |
| 8 | RI_1 | NC | NC |
| 9 | GND | GND | GND |
| 10 | GND | GND | GND |
| 11 | DCD_2 | TX(B)_2 | RX(B)/TX(B)_2 |
| 12 | DSR_2 | NC | NC |
| 13 | SIN_2 | TX(A)_2 | RX(A)/TX(A)_2 |
| 14 | RTS_2 | NC | NC |
| 15 | SO_2 | RX(A)_2 | NC |
| 16 | CTS_2 | NC | NC |
| 17 | DTR_2 | RX(B)_2 | NC |
| 18 | RI_2 | NC | NC |
| 19 | GND | GND | GND |
| 20 | GND | GND | GND |

COM 3/COM 4 Connector

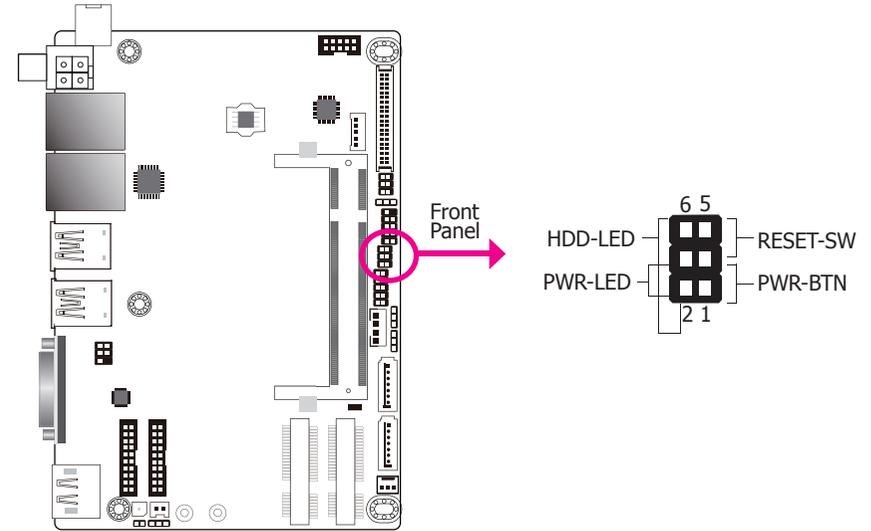
| Pin | RS232 |
|-----|-------|
| 1 | DCD_3 |
| 2 | DSR_3 |
| 3 | SIN_3 |
| 4 | RTS_3 |
| 5 | SO_3 |
| 6 | CTS_3 |
| 7 | DTR_3 |
| 8 | RI_3 |
| 9 | GND |
| 10 | GND |
| 11 | DCD_4 |
| 12 | DSR_4 |
| 13 | SIN_4 |
| 14 | RTS_4 |
| 15 | SO_4 |
| 16 | CTS_4 |
| 17 | DTR_4 |
| 18 | RI_4 |
| 19 | GND |
| 20 | GND |

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.

Front Panel Connector



HDD-LED - HDD LED

This LED will be lit 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

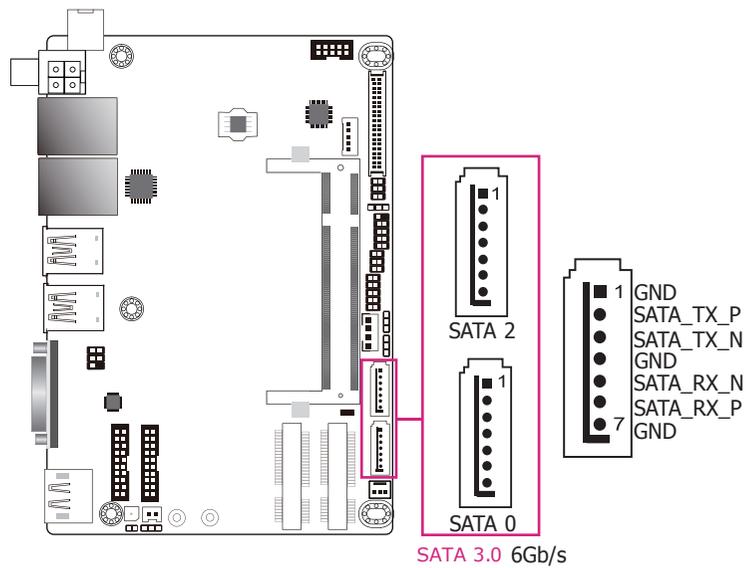
This switch is used to power on or off the system.

PWR-LED - Power/Standby LED

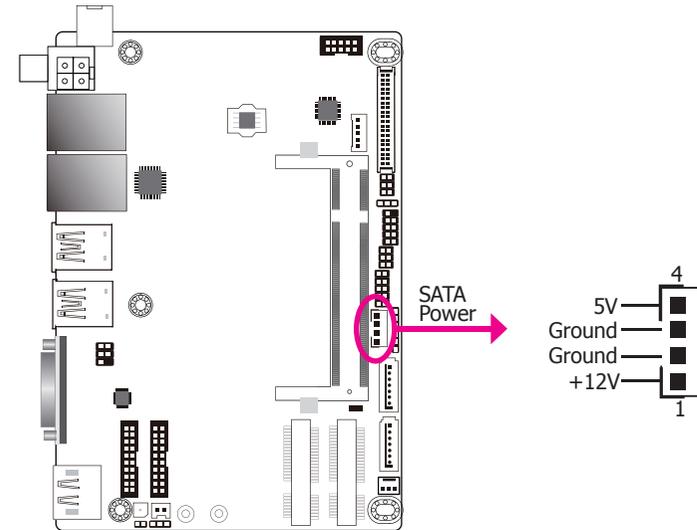
When the system's power is on, this LED will be lit. When the system is in the S1 (POS - Power On Suspend) state, it will blink every second. When the system is in the S3 (STR - Suspend To RAM) state, it will blink every 4 seconds.

| | Pin | Pin Assignment | | Pin | Pin Assignment |
|----------|-----|----------------|---------|-----|----------------|
| HDD-LED | 6 | HDD_LED | PWR-BTN | 1 | Power Button |
| | 2 | LED Power | | 3 | Ground |
| RESET-SW | 3 | Ground | PWR-LED | 2 | LED Power |
| | 5 | RST Signal | | 4 | SUS_LED |

SATA (Serial ATA) Connectors



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.

Features

- 2 Serial ATA 3.0 ports with data transfer rate up to 6Gb/s
- Integrated Advanced Host Controller Interface (AHCI) controller with RAID mode

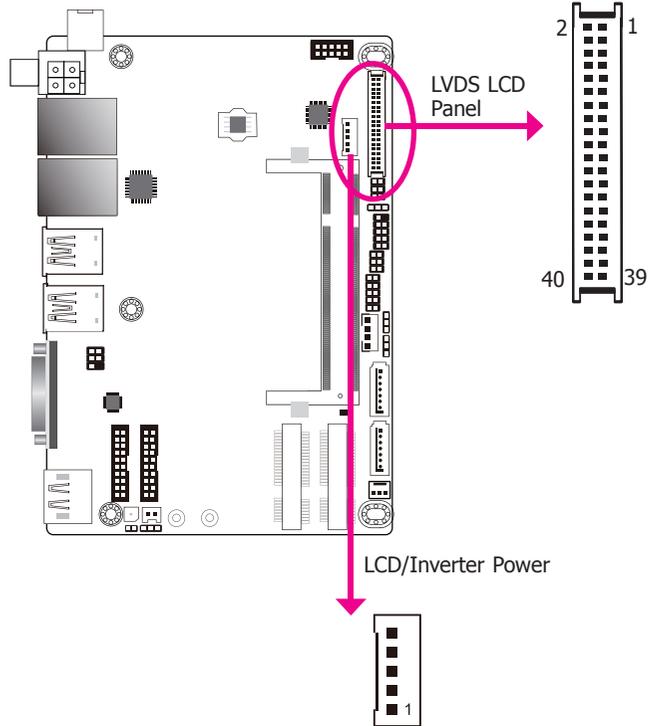
The Serial ATA connector is used to connect the Serial ATA device. Connect one end of the Serial ATA data cable to a SATA connector and the other end to your Serial ATA device.

BIOS Setting

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

LVDS LCD Panel Connector

LCD/Inverter Power Connector



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

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

BIOS Setting

Configure the system graphics and the LCD panel in the Advanced menu (the "Video Configuration" submenu) of the BIOS. Refer to chapter 3 for more information.



Note:

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

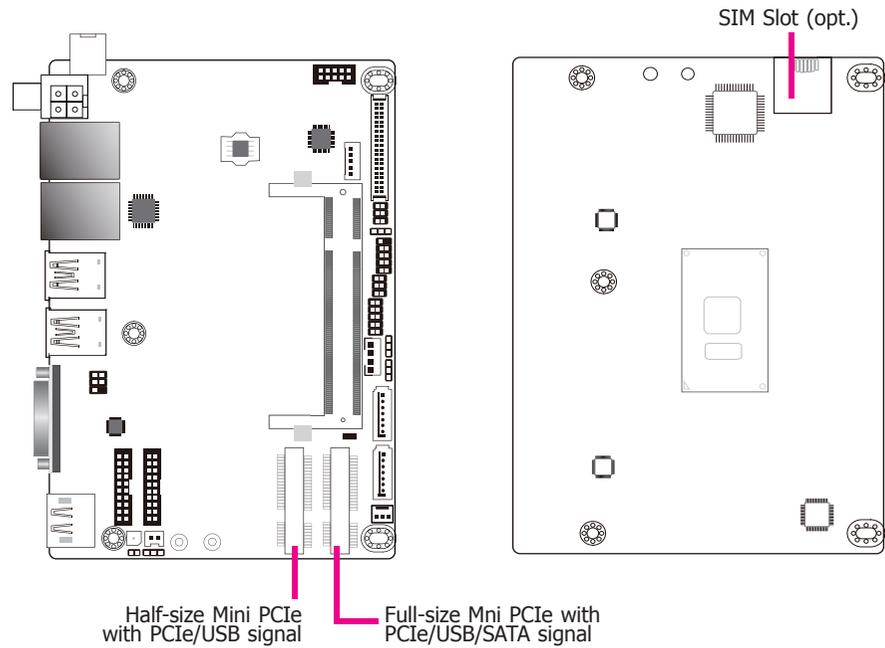
LVDS LCD Panel Connector

| Pin | Function | Pins | Function |
|-----|-----------------------|------|------------------------|
| 1 | GND | 2 | GND |
| 3 | LVDS_Out3+ (Odd_3+) | 4 | LVDS_Out7+ (Even_3+) |
| 5 | LVDS_Out3- (Odd_3-) | 6 | LVDS_Out7- (Even_3-) |
| 7 | GND | 8 | GND |
| 9 | LVDS_Out2+ (Odd_2+) | 10 | LVDS_Out6+ (Even_2+) |
| 11 | LVDS_Out2- (Odd_2-) | 12 | LVDS_Out6- (Even_2-) |
| 13 | GND | 14 | GND |
| 15 | LVDS_Out1+ (Odd_1+) | 16 | LVDS_Out5+ (Even_1+) |
| 17 | LVDS_Out1- (Odd_1-) | 18 | LVDS_Out5- (Even_1-) |
| 19 | GND | 20 | GND |
| 21 | LVDS_Out0+ (Odd_0+) | 22 | LVDS_Out4+ (Even_0+) |
| 23 | LVDS_Out0- (Odd_0-) | 24 | LVDS_Out4- (Even_0-) |
| 25 | GND | 26 | GND |
| 27 | LVDS_CLK1+ (Odd_CLK+) | 28 | LVDS_CLK2+ (Even_CLK+) |
| 29 | LVDS_CLK1- (Odd_CLK-) | 30 | LVDS_CLK2- (Even_CLK-) |
| 31 | GND | 32 | GND |
| 33 | DDC_CLK | 34 | NC |
| 35 | DDC_DATA | 36 | +3.3V |
| 37 | Panel Power | 38 | Panel Power |
| 39 | Panel Power | 40 | Panel Power |

LCD/Inverter Power Connector

| Pin | Function |
|-----|--------------------------------|
| 1 | +12V |
| 2 | GND |
| 3 | Panel Backlight On/Off Control |
| 4 | Dimming Control |
| 5 | +5V |

Expansion Slots



Mini PCI Express Slot

These two Mini PCIe sockets support PCIe x1 and USB 2.0 signals and can be used to insert Mini PCIe cards.

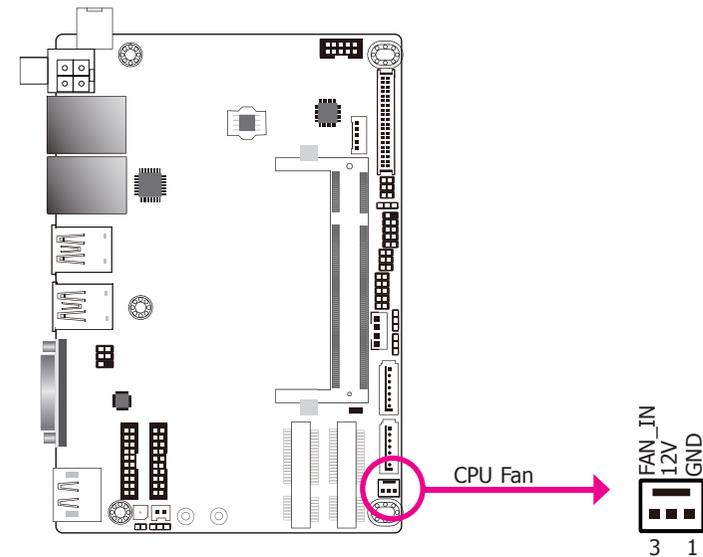
mSATA Port

The full-size Mini PCIe socket supports the installation of a Mini PCIe card or an mSATA card. To switch between these two signals, use JP7. Refer to the previous section for more information.

SIM Slot (optional)

The SIM slot on the system board is used to insert a SIM card and can be used in conjunction with the Mini PCI Express slot to provide mobile communication capability.

Cooling Fan Connector

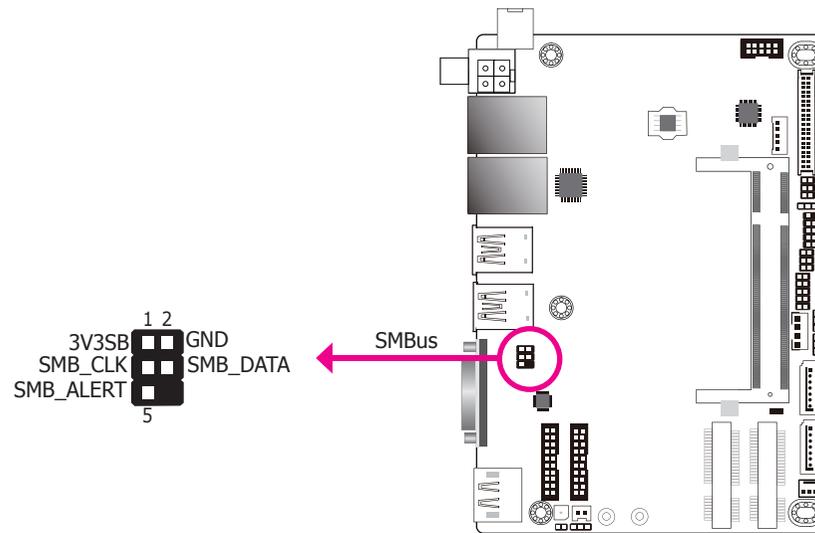


The fan connector is used to connect the cooling fan. The cooling fan will provide adequate airflow throughout the chassis to prevent overheating the CPU and system board components.

BIOS Setting

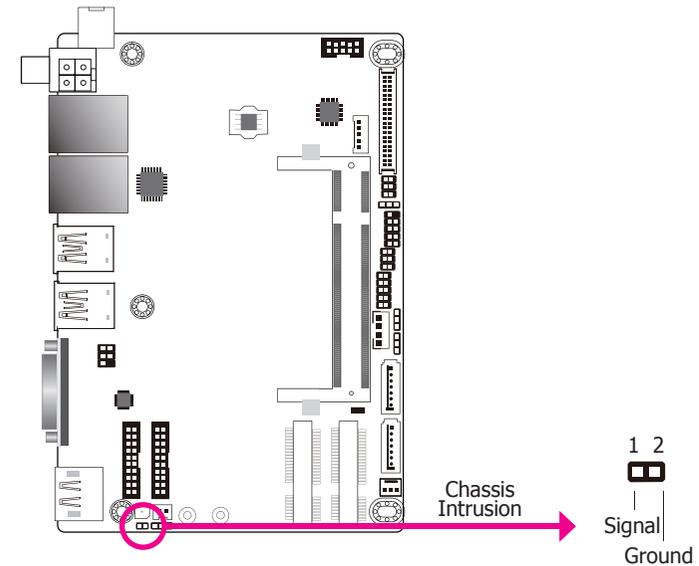
The Advanced menu ("PC Health Status" of the "SIO NUVOTON6106D" submenu) of the BIOS will display the current speed of the cooling fan. Refer to Chapter 3 for more information.

SMBus Connector



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

Chassis Intrusion Connector

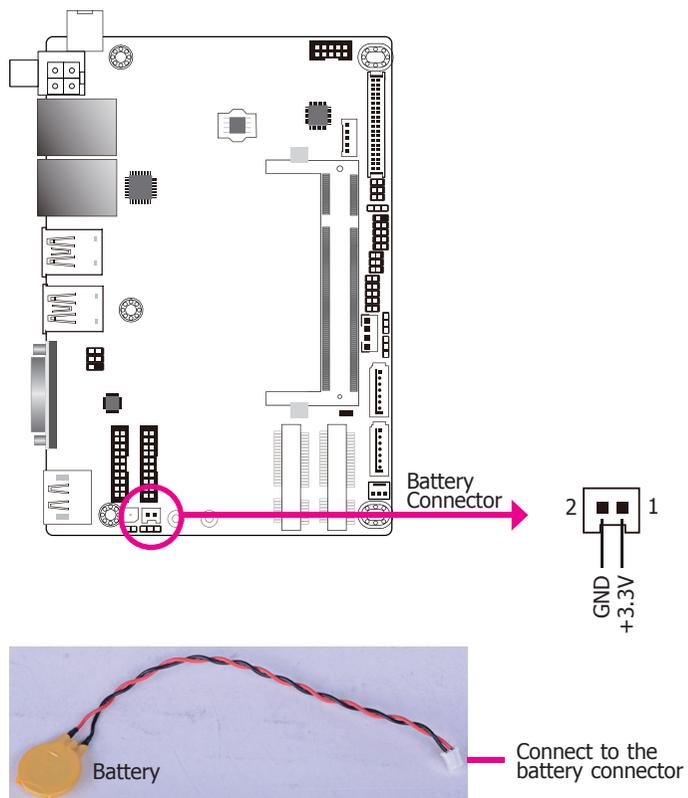


The board supports the chassis intrusion detection function. Connect the chassis intrusion sensor cable from the chassis to this connector. When the system's power is on and a chassis intrusion occurred, an alarm will sound. When the system's power is off and a chassis intrusion occurred, the alarm will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

BIOS Setting

Configure the chassis intrusion detection function in the Advanced menu ("SIO NUVOTON6106D" submenu) of the BIOS. Refer to the chapter 3 for more information.

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 recommended by the manufacturer.
- Dispose of used batteries according to local ordinance.

Chapter 3 - BIOS Setup

Overview

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

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



Note:

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

Default Configuration

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

Entering the BIOS Setup Utility

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

The BIOS Setup Utility does not require an operating system to run. After you power up the system, the BIOS message appears on the screen and the memory count begins. After the memory test, the message "Press DEL to run setup" will appear on the screen. If the message disappears before you respond, restart the system or press the "Reset" button. You may also restart the system by pressing the <Ctrl> <Alt> and 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. |
| <F1> | Help |
| <F5> | Change values |
| <F6> | Change defaults |
| <F9> | Setup defaults |
| <F10> | Save and Exit |
| <Enter> | Press <Enter> to enter the highlighted submenu. |

Scroll Bar

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

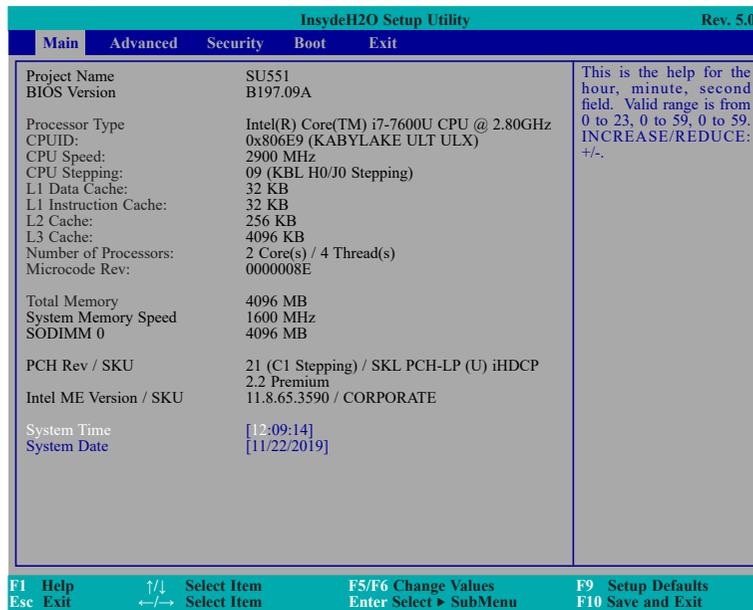
Submenu

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

Insyde BIOS Setup Utility

Main

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



System Time

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

System Date

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

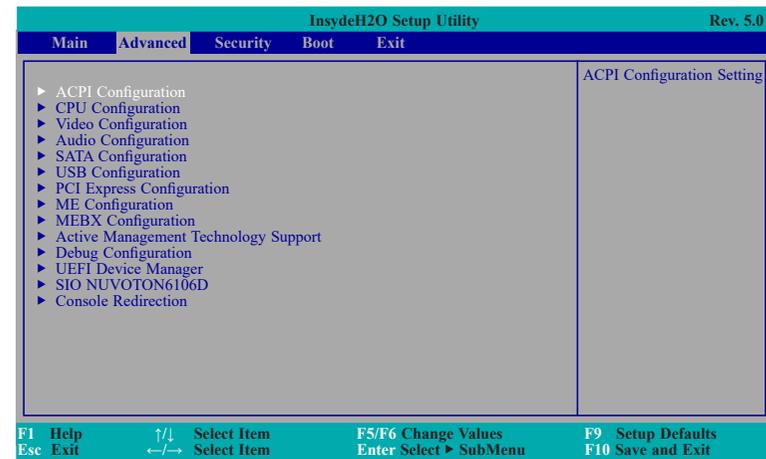
Advanced

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



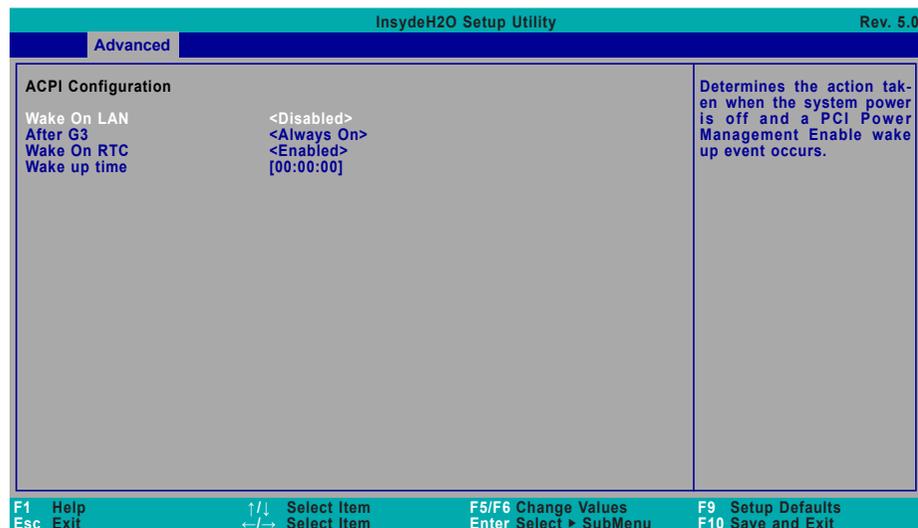
Important:

Setting incorrect field values may cause the system to malfunction.



ACPI Configuration

This section configures the system ACPI parameters.



Wake On LAN

Enable or Disable this field to allow LAN signal to power up the system.

After G3

This field is to specify what state the system should be in when power is re-applied after a power failure.

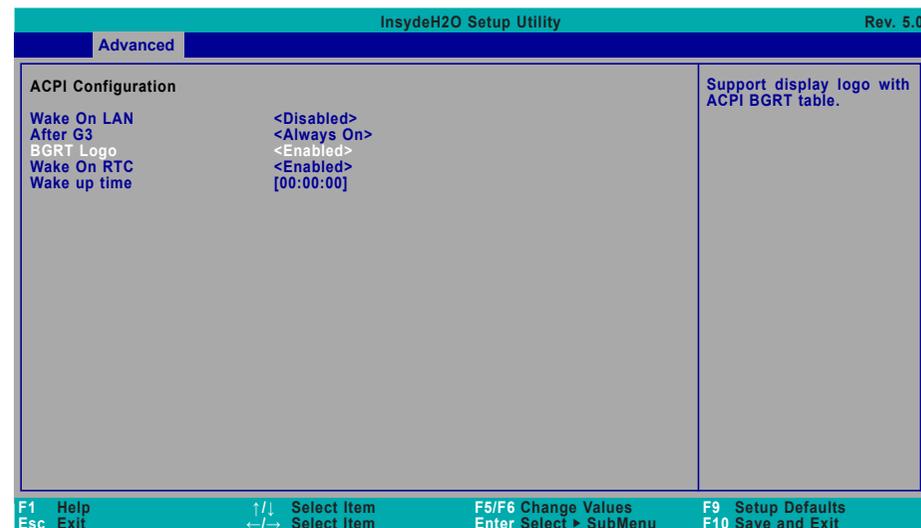
- Always On** The system automatically powers on after power failure.
- Always Off** The system remains power off after power failure. Power-on signal input is required to power up the system.

Wake On RTC

When Enabled, the system will automatically wake up from S4/S5 state at a designated time every day via the Real-time clock (RTC) battery.

[Wake up time]

Configure the time of day the system will wake on RTC — [HH:MM:SS]. This field will only appear when "Wake On RTC" is enabled.



BGRT Logo

This field is used to enable or disable to support display logo with ACPI BGRT table. This field is only available when Quiet Boot is enabled.

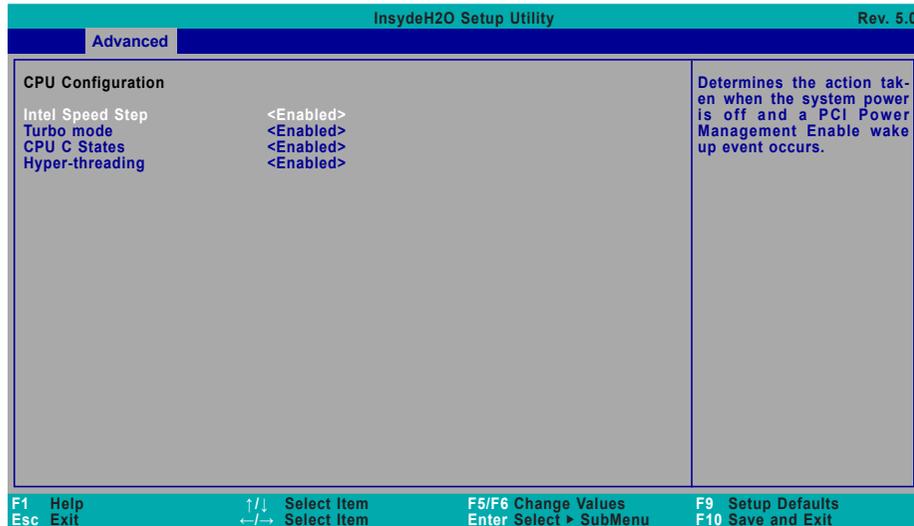


Note:

To enable "Quiet Boot", please refer to the Boot menu section in this chapter for more information.

CPU Configuration

Configure CPU processing related settings in this page.



Hyper-threading

Enable or disable Hyper-threading. When it is enabled, a physical core will perform as two logical processors, and the user may experience better computational efficiency of the system. Please make sure that the OS operating on your system is optimized for Hyper-Threading, e.g. Windows and Linux. This field is not available when the equipped CPU does not support Hyper-threading.

Intel Speed Step

This field is used to enable or disable the Enhanced Intel SpeedStep® Technology (EIST), which helps optimize the balance between system's power consumption and performance. After it is enabled in the BIOS, EIST features can then be enabled via the operating system's power management.

Turbo Mode

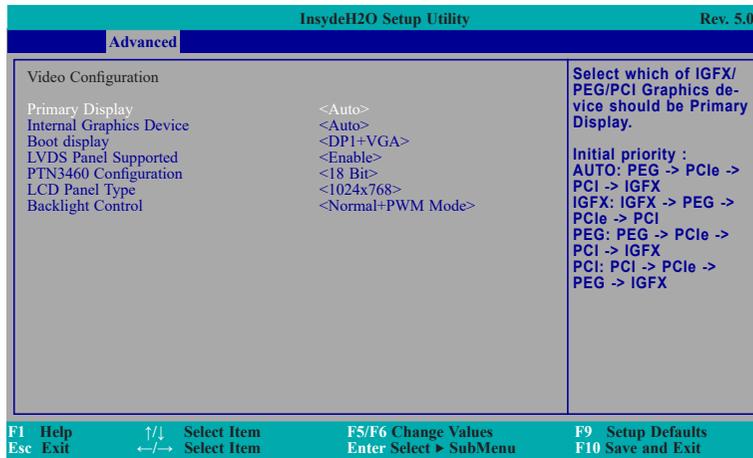
Enable or disable turbo mode of the processor. This field will only be displayed when "Intel Speed Step" is enabled. This field is not available when the equipped CPU does not support Turbo Mode.

CPU C States

Enable or disable CPU Power Management. It allows CPU to go to C States when it's not 100% utilized.

Video Configuration

This section configures the video settings.



LCD Panel Type

Select the type of LCD panel connected to the system's LCD connector — 800x480, 800x600, 1024x768, 1366x768, 1280x1024, 1920x1080. Please check the specifications of your LCD monitor.

Backlight Type

Select the polarity and PWM mode — Invert+PWM Mode, Invert+DC Mode, Normal+PWM Mode, Normal+DC Mode.

Primary Display

Select among Auto, IGFX, PEG, and PCI Graphics devices to be the primary display.

Integrated Graphics Device

Keep IGFX enabled or disabled based on the setup options.

Boot display

Select the video device that will be activated during system booting — LCD+DP1, LCD+VGA, DP1+VGA, VGA+DP1.

LVDS Panel Supported

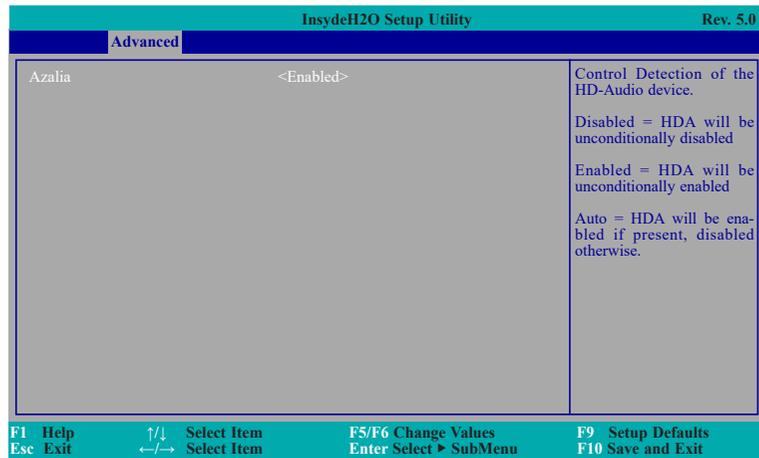
Enable or disable the LVDS Panel LCD.

PTN3460 Configuration

Select the LFP panel color depth: 18 bit, 24 bit, 36 bit, and 48 bit.

Audio Configuration

This section configures the audio settings.



HD Audio

Control the detection of the high-definition audio device.

Disabled

HD Audio will be unconditionally disabled.

Enabled

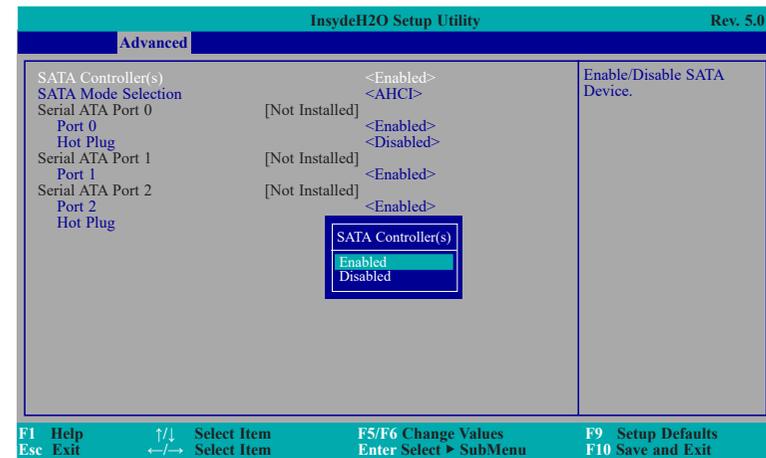
HD Audio will be unconditionally enabled.

Auto

HD Audio will be enabled if present and disabled otherwise.

SATA Configuration

This section is designed to select the SATA controller and the type of hard disk drive which are installed in your system unit.



SATA Controller(s)

Enable or disable Serial ATA devices.

SATA Mode Selection

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

AHCI

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

Intel RST Premium (With Intel Optane System Acceleration)

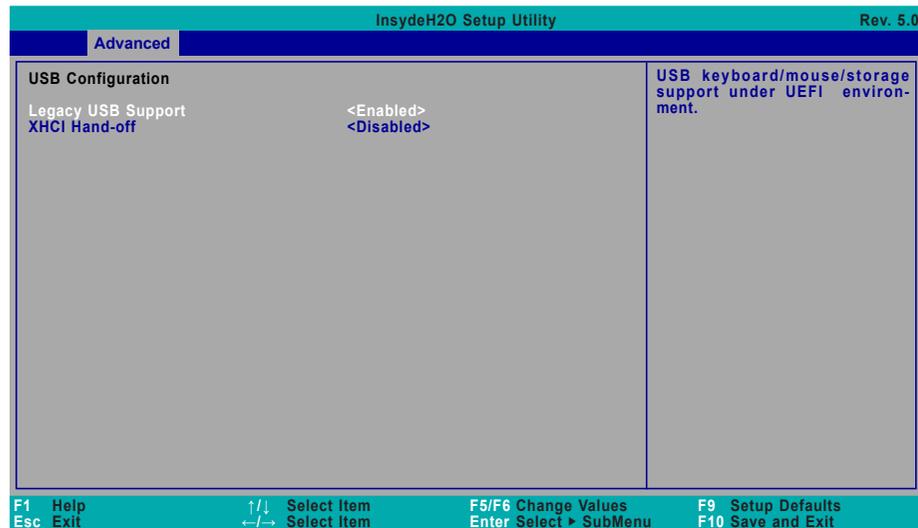
This option allows the Serial ATA controller(s) to use UEFI, RAID, and Intel Rapid Storage Technology. Intel® Optane Memory will be enabled if the current model is equipped with a CPU that supports Intel® Optane Memory.

Serial ATA Port 0, 1 and 2/Hot Plug

Enable or disable each Serial ATA port and its hot plug function.

USB Configuration

This section configures the parameters of the USB device.



Legacy USB Support

Enabled Enable Legacy USB support.

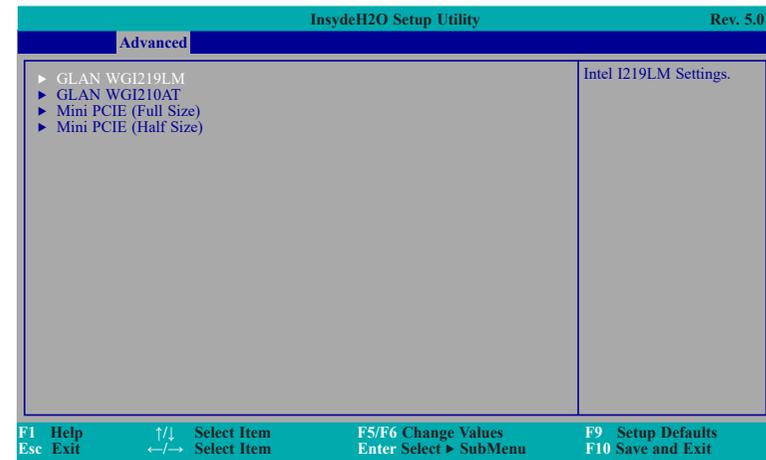
Disabled Keep USB devices available only for EFI applications.

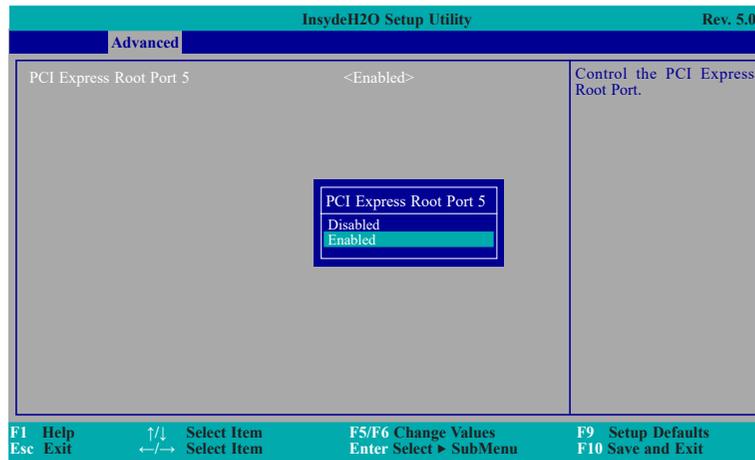
XHCI Hand-off

Enable or disable XHCI Hand-off.

PCI Express Configuration

This section configures settings relevant to PCI Express root ports.





Select one of the PCI Express channels and press enter to configure the following settings.

PCI Express Root Port

Enable or disable the PCI Express Root Port.

PCIe Speed

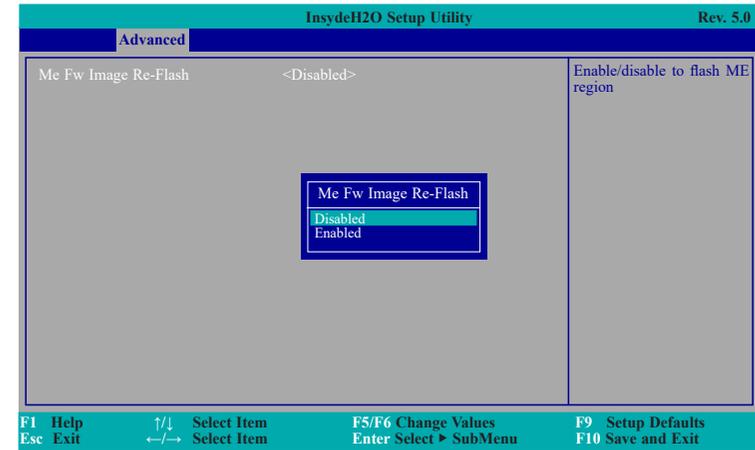
Select PCIe Speed of the current port — AUTO, Gen1, Gen2, or Gen3. Gen 3 is only available for the PCIE1 port. This field may not appear when the speed of the port is not configurable.

Hot Plug

Enable or disable hot plug function of the port. This field may not appear when the port does not support hot plug.

ME Configuration

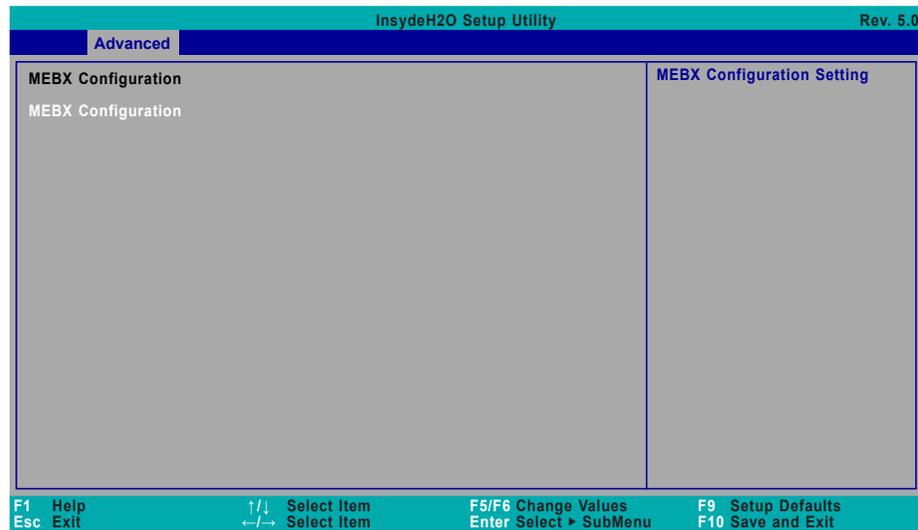
This section configures settings of Intel ME flashing.



Me Fw Image Re-Flash

Enable or disable Intel ME Intel® Management Engine firmware flashing.

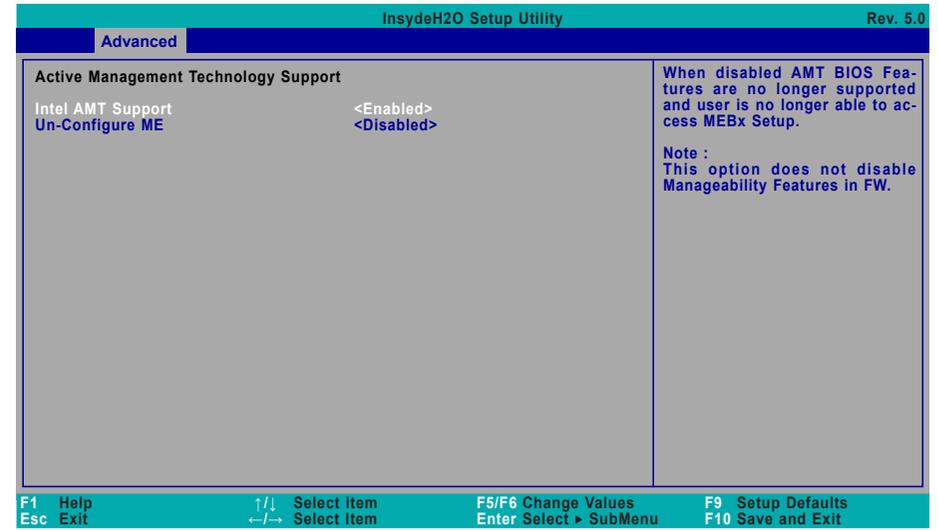
MEBX Configuration



MEBX Configuration

Configure Intel® Active Management Technology (Intel® AMT) in the Intel® Management Engine BIOS Extension (MEBX) setup menu. Please refer to Chapter 6 for instructions.

Active Management Technology Support



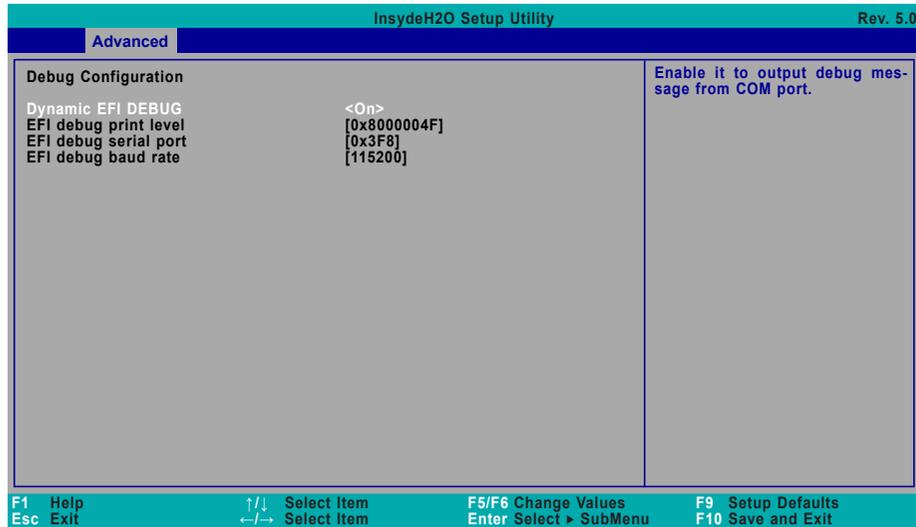
Intel AMT Support

- Enabled** Enable AMT. When this field is enabled, the user is allowed to configure AMT settings via MEBX.
- Disabled** Disable AMT. When this field is disabled, AMT settings cannot be configured and MEBX is not allowed to enter.

Un-configure ME

Enable or disable ME unconfiguration without password.

Debug Configuration



Dynamic EFI DEBUG

This field is used to turn on or off the function to output debug message from COM port. When this field is set to "On", the following EFI debug configurations will be displayed.

EFI debug print level

Default value is 0x8000004F.

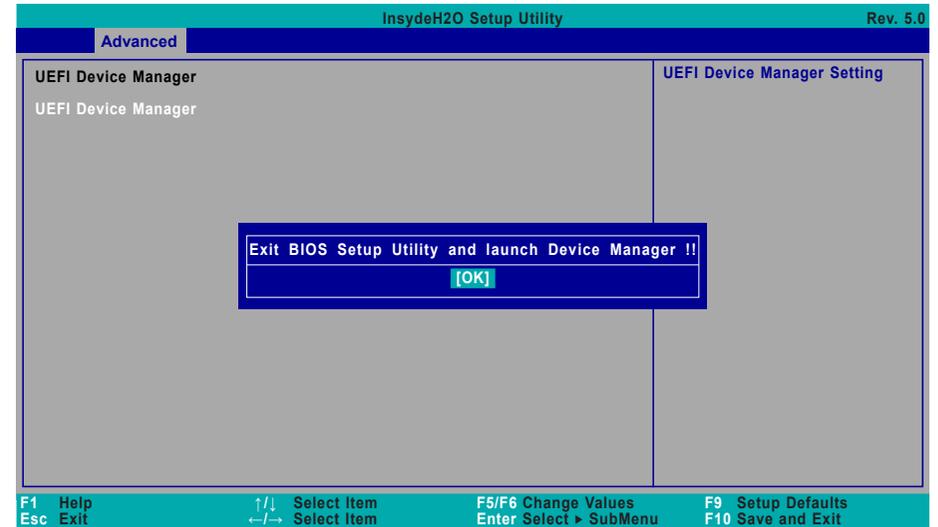
EFI debug serial port

Default value is 0x3F8.

EFI debug baud rate

Default value is 115200.

UEFI Device Manager



Press "Enter" and "OK" to enter UEFI Device Manager setup page. More device settings can be configured in the UEFI Device Manager, including LAN, Network Stacks, UEFI Intel RST and etc.



Note:

Network Device will not be configurable in Device Manager if "Network Stack" is disabled in the "Boot" menu.

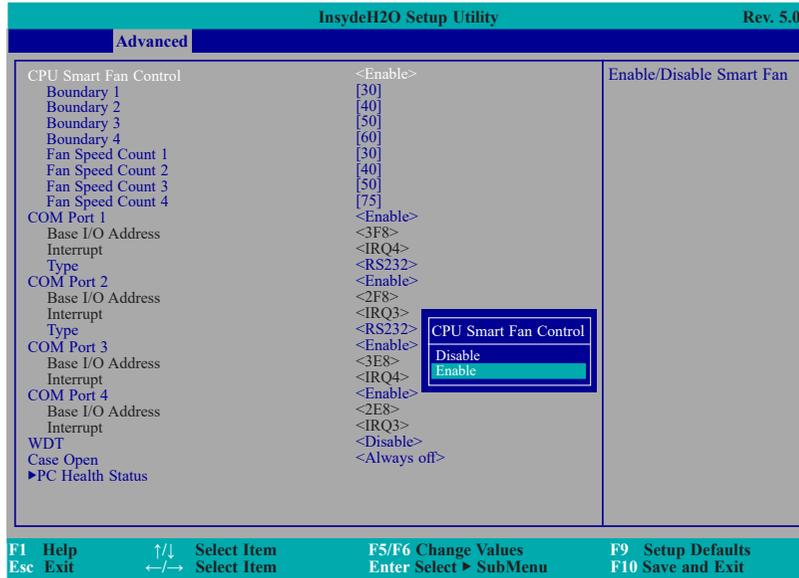


Note:

Intel® Rapid Storage Technology will only be configurable in Device Manager when the "Boot Type" in the "Boot" menu is set to UEFI compatible options.

SIO NUVOTON6106D

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



CPU Smart Fan Control

Enable or disable the CPU smart fan.

Boundary 1 to Boundary 4

Set the boundary temperatures that determine the operation of the fan with different fan speeds accordingly. For example, when the system or the CPU temperature reaches boundary 1 temperature, the system or CPU fan should be turned on and operate at the designated speed. The range is from 0-127°C.

Fan Speed Count 1 to Fan Speed Count 4

Set the fan speed. The range is from 0 (fan stop)-100% (full speed).

Smart Fan is a fan speed moderation strategy that depends on the current system temperature. When the system temperature goes higher than the Boundary setting, the fan speed will be turned up to the setting of the Fan Speed Count that bears the same index as the Boundary field.

CPU Smart Fan Control

Enable or disable the system smart fan. When disabled, fan speed will not be controllable according to different system temperatures. Instead, a Fix Fan Speed Count field will be displayed to configure at which speed the fan will always be fixed regardless of system temperature.

▼ CPU Smart Fan Control = [Enabled]

Boundary 1 to Boundary 4

Set the boundary temperatures that determine the fan speeds accordingly, the value ranging from 0-127°C. For example, when the system temperature reaches Boundary 1 setting, the fan speed will be turned up to the designated speed of the Fan Speed Count 1 field.

Fan Speed Count 1 to Fan Speed Count 4

Set the fan speed, the value ranging from 1-100%, 100% being full speed. The fans will operate according to the specified boundary temperatures above-mentioned.

▼ CPU Smart Fan Control = [Disabled]

Fix Fan Speed Count

Set the fan speed, the value ranging from 1-100%, 100% being full speed. The fans will always operate at the specified speed regardless of gauged temperatures.

COM Port 1 to COM Port 4

Enables or disables the serial ports (COM). The following bracketed fields will only appear when the port is enabled.

Type

Select the COM port serial mode — RS422, RS232, or RS485. This field is not available for COM 3 and COM 4, which only support RS232.

WDT

Enable or disable the Watchdog Timer (WDT) function. A counter will appear if you select to enable WDT. Input any value between 1 to 255 seconds.

▼ WDT = [Enable]

COUNTER

Set the timeout value of the WDT — 1-255 seconds.

Case Open

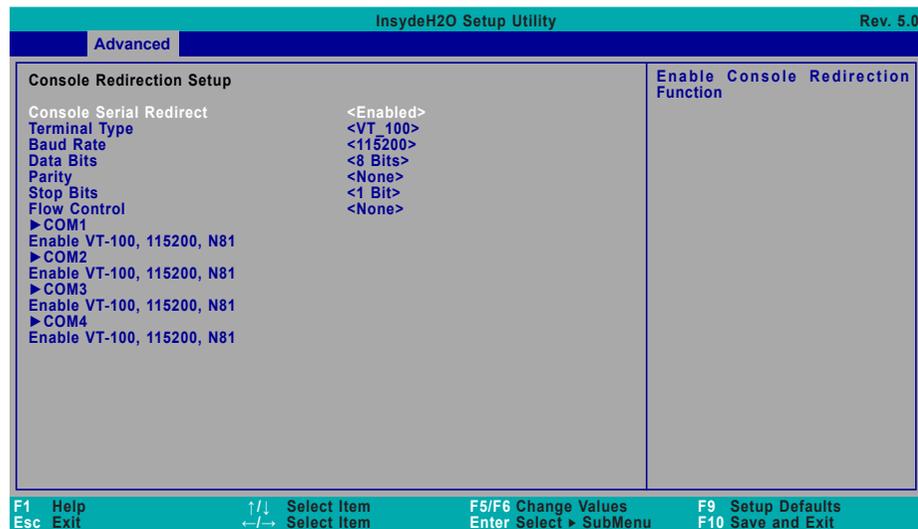
Enable or disable the case open detection function.

PC Health Status

This section displays PC health status.

| InsydeH2O Setup Utility | | Rev. 5.0 |
|-------------------------|-----------------|------------------------|
| Advanced | | |
| PC Health Status | | |
| Voltage | | |
| V _{CORE} | 0.960 V | |
| 5V | 4.978 V | |
| +12V | 12.320 V | |
| V _{DDQ} | 1.360 V | |
| V _{BAT} | 3.056 V | |
| 3V _{SB} | 3.312 V | |
| Temperature | | |
| System (°C/°F) | 30.0 C/ 86.0 F | |
| CPU (°C/°F) | 38.5 C/ 101.3 F | |
| Fan Speed | | |
| CPU FAN | 7180 RPM | |
| F1 Help | ↑/↓ Select Item | F5/F6 Change Values |
| Esc Exit | ←/→ Select Item | Enter Select ► SubMenu |
| | | F9 Setup Defaults |
| | | F10 Save and Exit |

Console Redirection



Terminal Type

Select terminal type — VT_100, VT_100+, VT_UTF8 or PC_ANSI.

Baud Rate

Select baud rate — 115200, 57600, 38400, 19200, 9600, 4800, 2400 or 1200.

Data Bits

Select data bits — 7 bits or 8 bits.

Parity

Select parity bits — none, even or odd.

Stop Bits

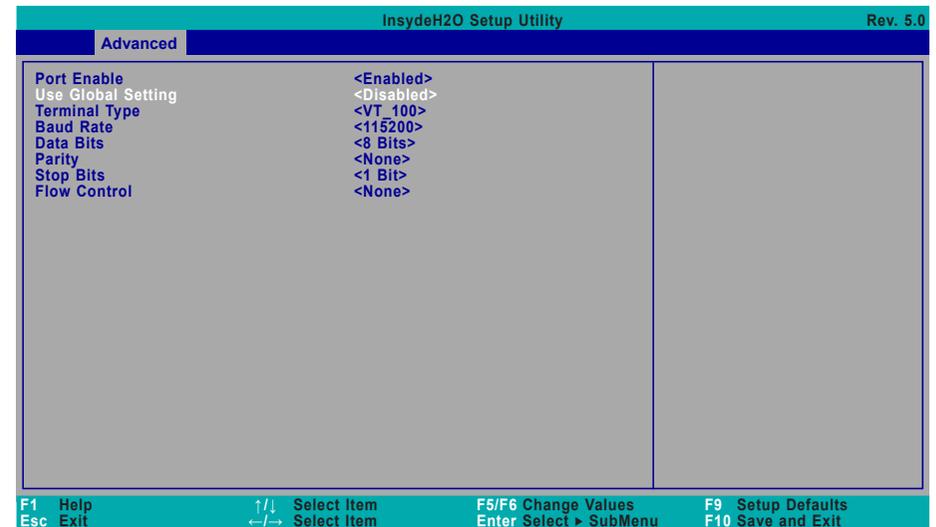
Select stop bits — 1 bit or 2 bits.

Flow Control

Select flow control type — none, RTS/CTS or XON/XOFF.

► COM1/COM2/COM3/COM4

Configure individual COM port serial settings in the submenu.



Port Enable

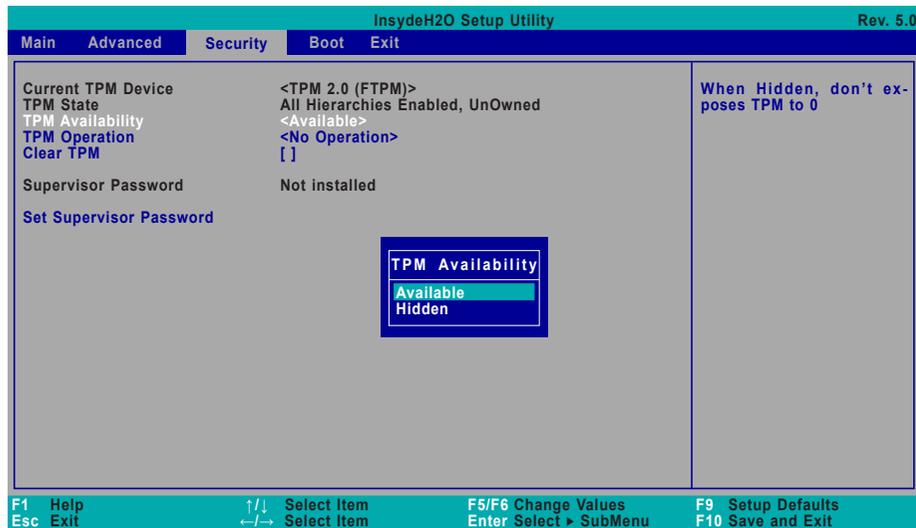
This field is used to enable or disable the COM port to redirect the console.

Use Global Setting

This field is to enable or disable using the global setting. When "Use Global Setting" is enabled, settings of the current port will depend on Console Redirection settings. When "Use Global Setting" is disabled, settings of the current port can be configured independently in this section.

Security

This section configures the security settings for entering the BIOS setup utility.



TPM Availability

Set the TPM availability — Available, or Hidden.

TPM Operation

Select one of the supported operation to change TPM state.

Clear TPM

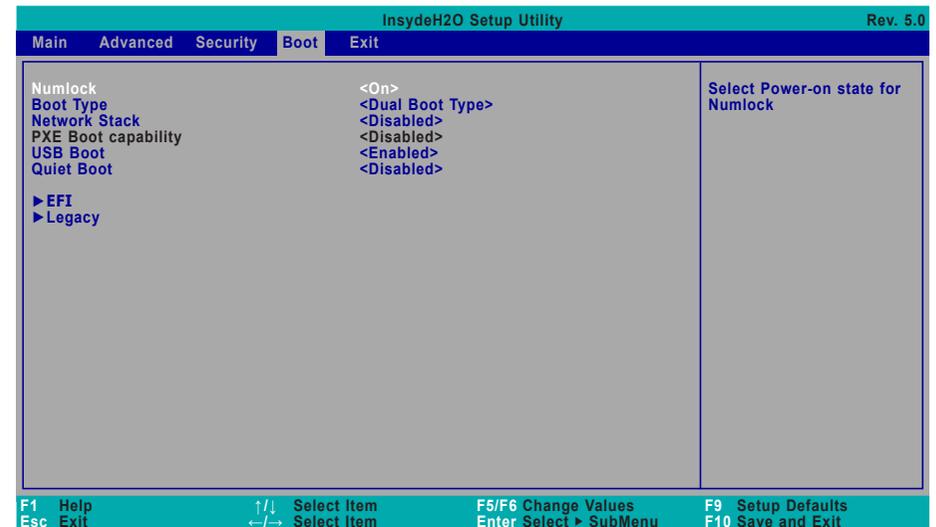
Remove all TPM context associated with a specific owner.

Set Supervisor Password

Set the supervisor's password and the length of the password must be longer than one character.

Boot

This section configures boot options.



Numlock

Select the power-on state for numlock.

Boot Type

Select the boot type — UEFI Boot Type, Legacy Boot Type or Dual Boot Type. If you select "UEFI Boot Type" or "Dual Boot Type", the "Network Stack", "PXE Boot capability", "USB Boot" and "Quiet Boot" will show up. If you select "Legacy Boot Type", "PXE Boot to LAN", "USB Boot" and "Quiet Boot" will show up.



Note:

Please press F10 to save the settings and re-start the system board after changing "Boot Type".

Network Stack

This field is used to enable or disable network stacks, i.e. IPv4 or IPv6 network protocols.

PXE Boot capability

This field is only available when "Boot Type" is set to "UEFI Boot Type" or "Dual Boot Type", and when "Network Stack" is enabled.

- Disabled** Support Network Stack
- UEFI** IPv4/IPv6
- Legacy** Legacy PXE OPROM only

PXE Boot to LAN

Enable or disable Boot into the Pre-boot Execution Environment (PXE) stored in the LAN. This field is only available when "Boot Type" is set to "Legacy Boot Type" or "Dual Boot Type", and when "Network Stack" is enabled.

USB Boot

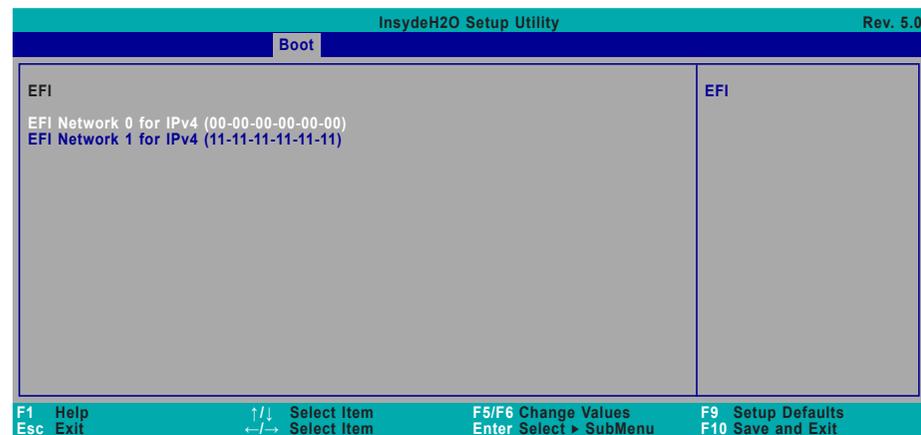
Enable or disable booting to USB boot devices.

Quiet Boot

Enable or disable booting in text mode.

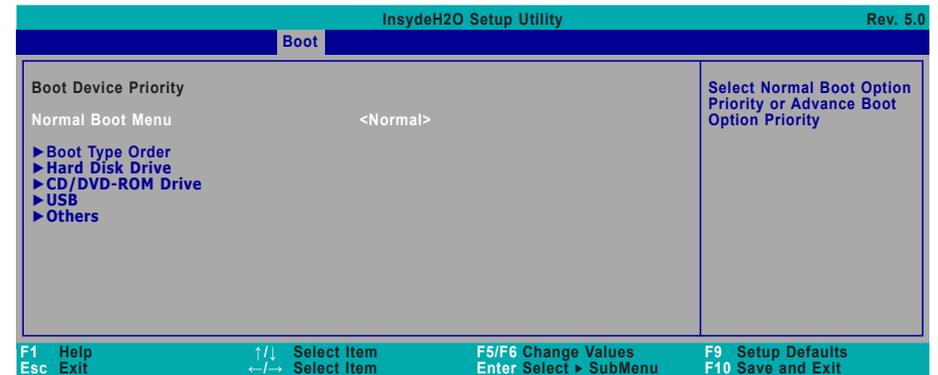
► EFI

Configure boot priorities in this submenu. Press -/+ or F5/F6 to move the highlighted item down/up the priority list. This field is only available when "Boot Type" is set to "UEFI Boot Type" or "Dual Boot Type".



► Legacy

Configure boot priorities in this submenu. Re-arrange the order by pressing -/+ or F5/F6 to move the highlighted item down/up the priority list. This field is only available when "Boot Type" is set to "Legacy Boot Type" or "Dual Boot Type".



Normal Boot Menu

Select a priority arranging method.

- Normal** Boot priority is arranged according to the type of the storage devices, and the configured order.
- Advance** Boot priority is arranged according to the configured order regardless of the type of the storage devices.

► Boot Type Order

Arrange the priority of types of the storage devices.

► Hard Disk Drive/ ► CD/DVD-ROM Drive / ► USB / ► Others

Arrange the priority of the storage devices in each category. The submenu will not be displayed when there is no available storage device of the type.

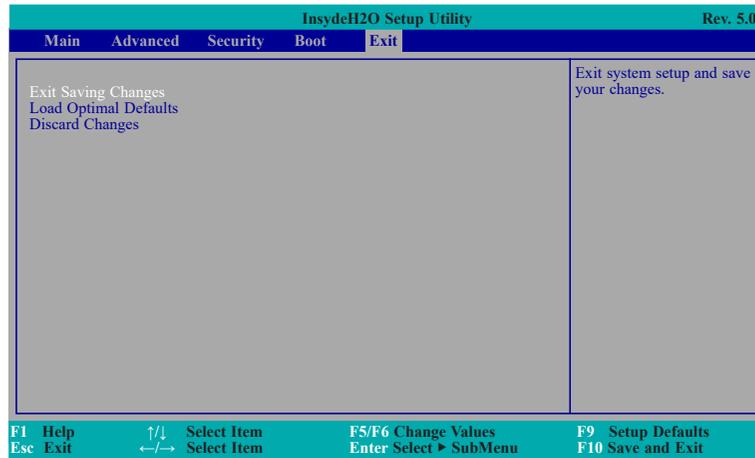


Note:

When a desired LAN port for PXE boot is not listed as a boot device, please confirm that the "PXE Boot to LAN", "PXE boot capability", "Network Stack" and the LAN controller of the said LAN (go to "Advanced" > "PCI Express Configuration") are enabled. Please press F10 to save the settings and re-start the system board for the settings to take effect.

Exit

This section configures the parameters for exiting the BIOS menu.



Exit Saving Changes

Select this field and then press <Enter> to exit the system setup and save your changes.

Load Optimal Defaults

Select this field and then press <Enter> to load optimal defaults.

Discard Changes

Select this field and then press <Enter> to exit the system setup without saving your changes.

Updating the BIOS

To update the BIOS, you will need the new BIOS file and a flash utility. Please contact technical support or your sales representative for the files and specific instructions about how to update BIOS with the flash utility. For updating Insyde BIOS in UEFI mode, you may refer to the how-to video at <https://www.dfi.com/tw/knowledge/video/31>.

Notice: BIOS SPI ROM

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

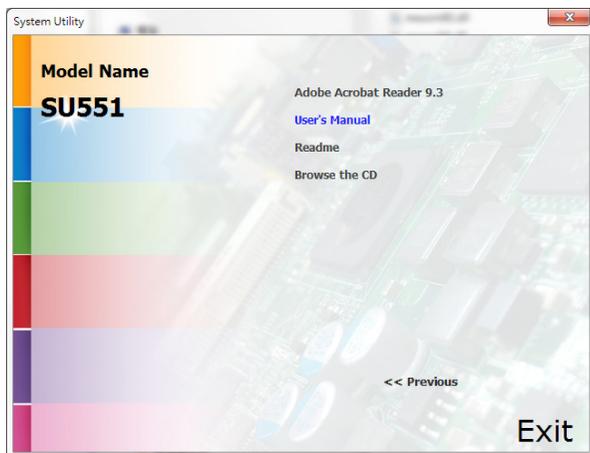
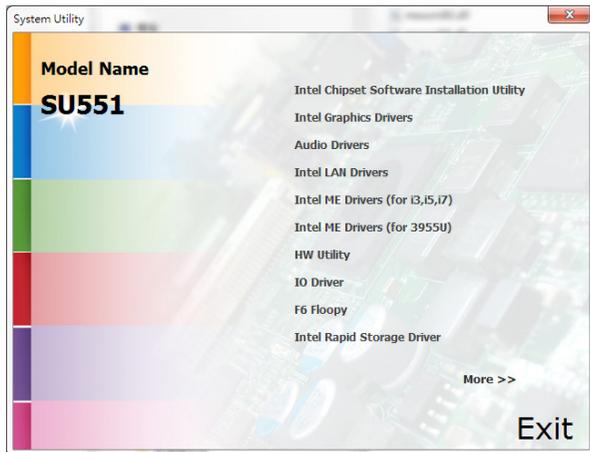
**Note:**

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

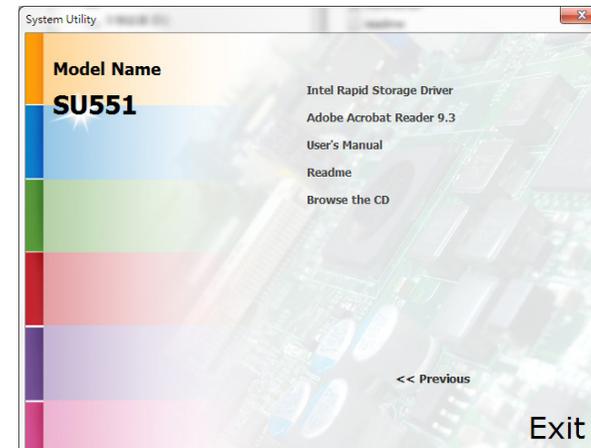
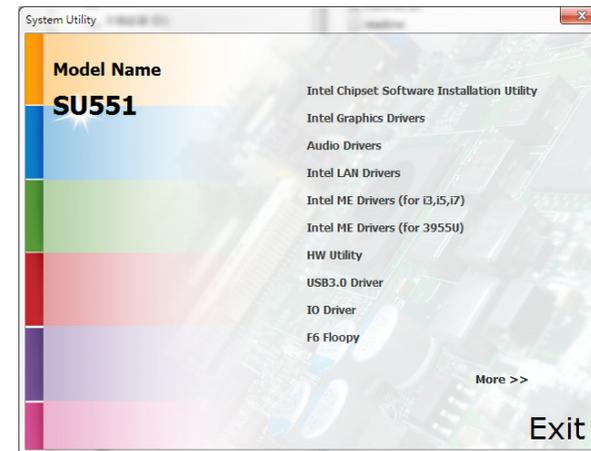
Chapter 4 - Supported Software

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

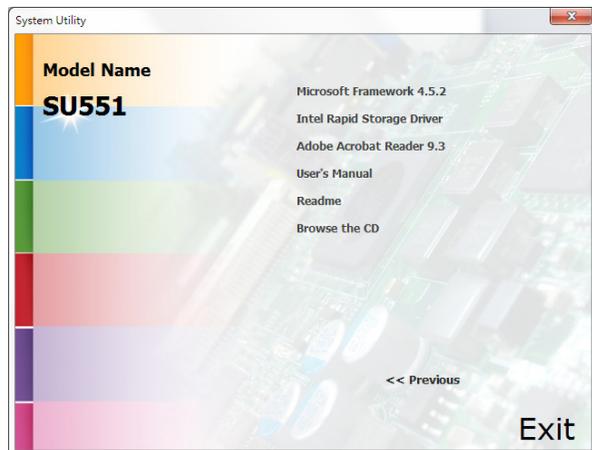
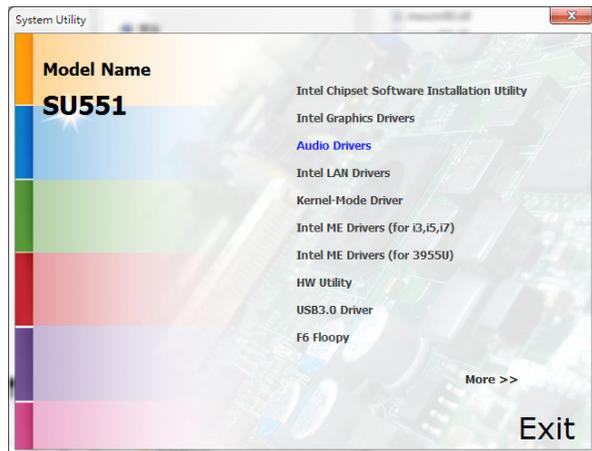
For Windows 10



For Windows 8.1



For Windows 7

**Note:**

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

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 ready to install the utility. Click "Next".



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



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



- Click "Finish" to exit setup.



Intel Graphics Drivers

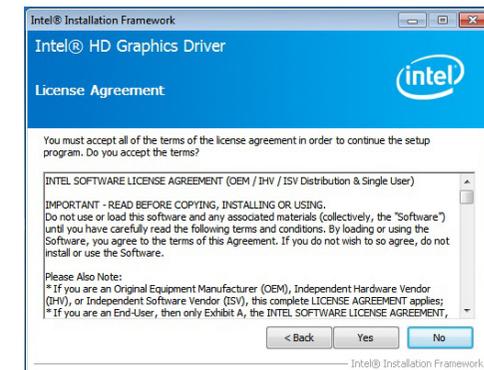
To install the driver, click "Intel Graphics Drivers" on the main menu.

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

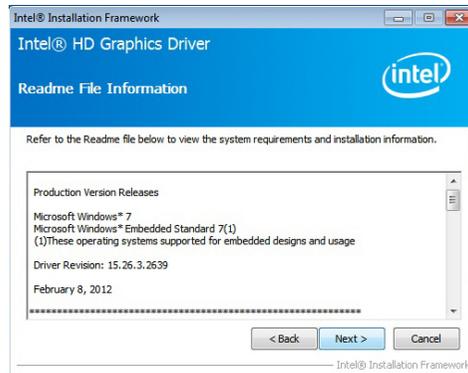


By default, the "Automatically run WinSAT and enable the Windows Aero desktop theme" is enabled. With this enabled, after installing the graphics driver and the system rebooted, the screen will turn blank for 1 to 2 minutes (while WinSAT is running) before the Windows 7/Windows 8.1/Windows 10 desktop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

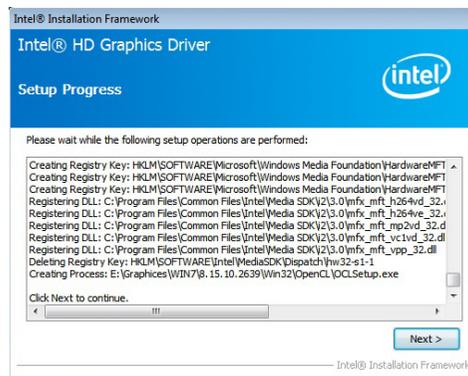
- Read the license agreement then click "Yes".



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



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



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

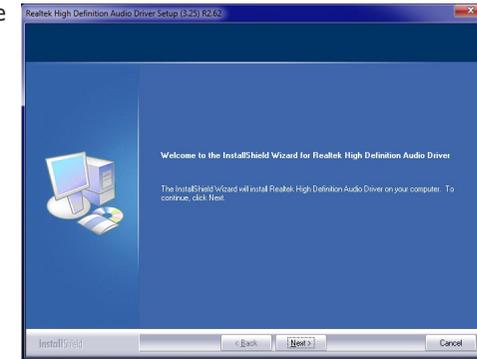
Restarting the system will allow the new software installation to take effect.



Audio Drivers

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

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



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

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



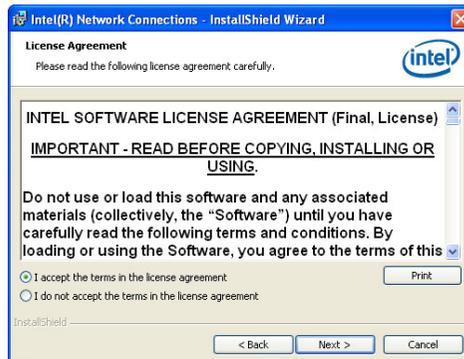
Intel LAN Drivers

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

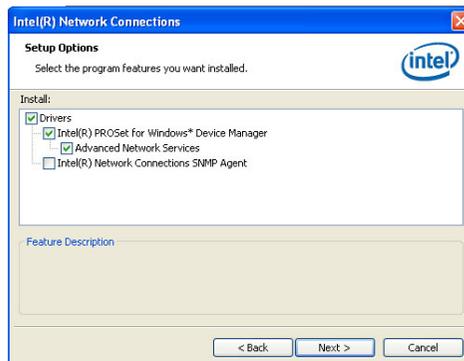
1. Setup is ready to install the driver. Click "Next".



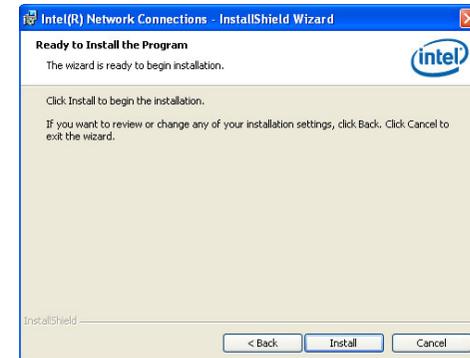
2. Click "I accept the terms in the license agreement" then click "Next".



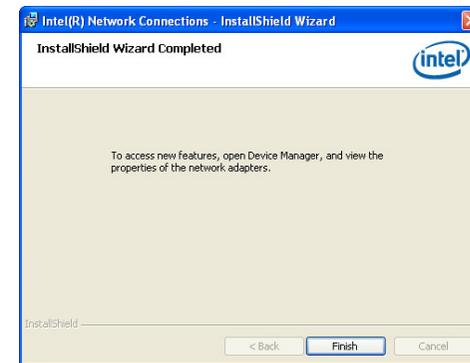
3. Select the program features you want installed then click "Next".



4. Click "Install" to begin the installation.



5. After completing installation, click "Finish".



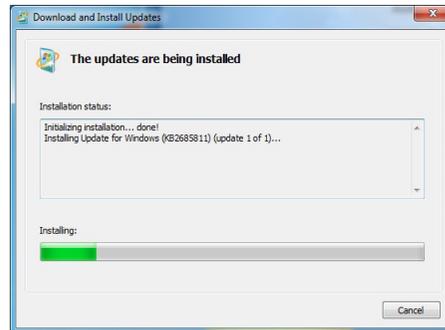
Kernel Mode Driver Framework (For Windows 7 only)

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

1. Click "Yes" to install the update.



2. The update is installed now.



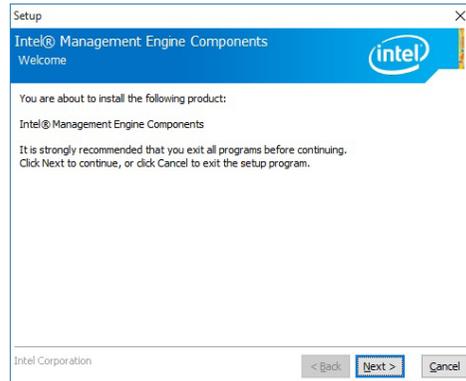
3. Click "Restart Now" to restart your computer when the installation is complete.



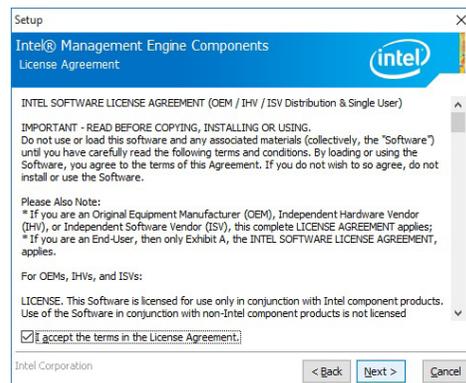
Intel Management Engine Drivers

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

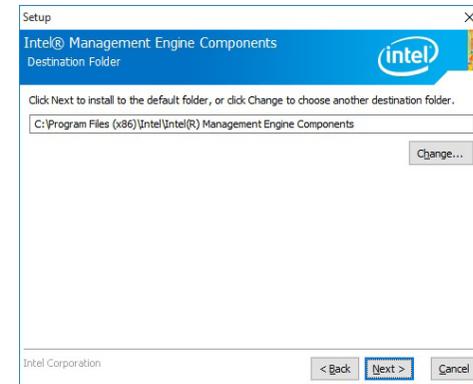
1. Setup is ready to install the driver. Click "Next".



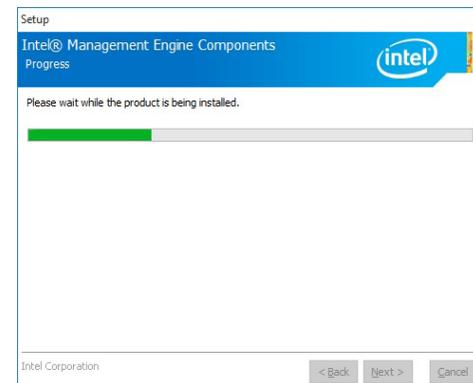
2. Read the license agreement then click "Next".



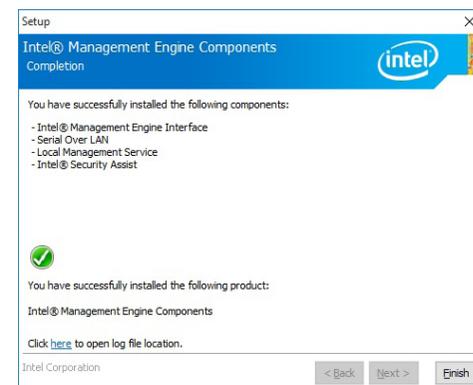
3. Setup is currently installing the driver. After installation has completed, click "Next".



4. Please wait while the product is being installed.



5. After completing installation, click "Finish".



HW Utility

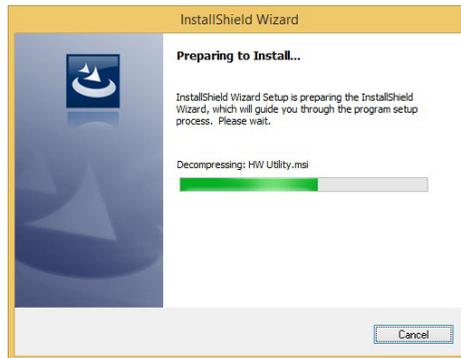
HW Utility provides information about the board, Watchdog, and DIO. To access the utility, click "HW Utility" on the main menu.



Note:

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

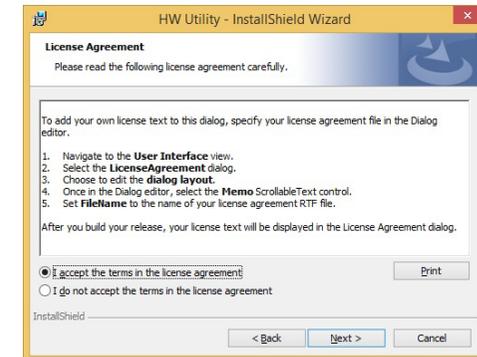
1. Setup is ready to install the driver.



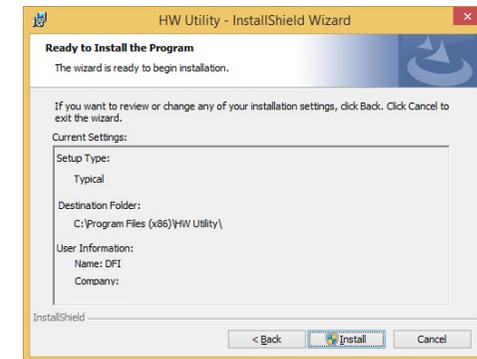
2. Click "Next" to continue.



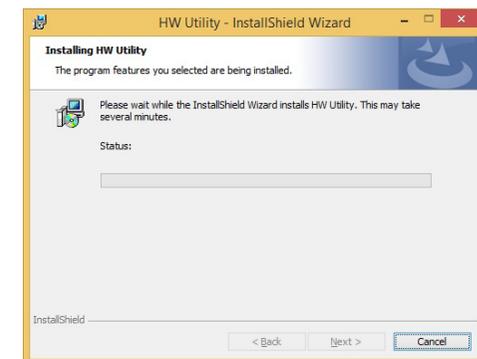
3. Read the license agreement then click "I accept the terms in the license agreement". Click "Next".



4. The wizard is ready to begin installation. Click "Install".



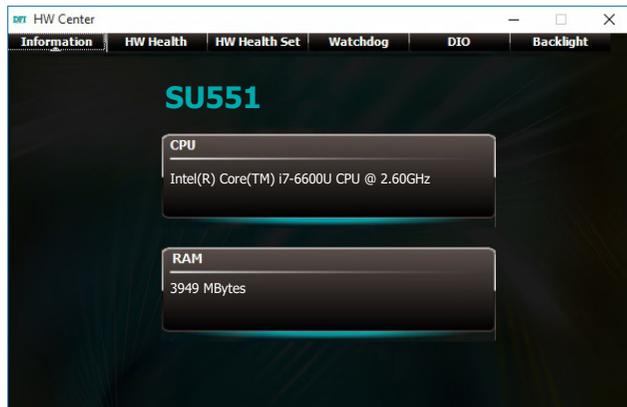
5. Please wait while the program features are being installed.



- After completing installation, click "Finish".



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



Information

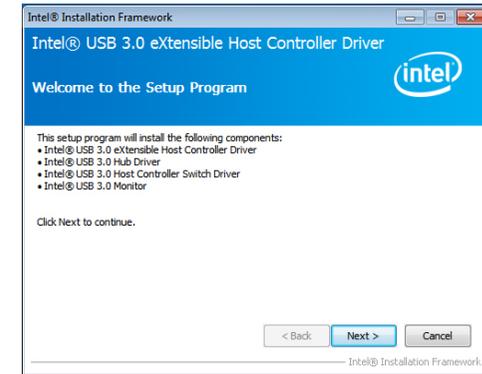
Note: The screenshot displayed above is for illustrative purpose only, and may not resemble the actual screen.

The SU551 HW Utility features the following tabs: Information, HW Health, HW Health set, Watchdog, DIO and Backlight. Click on the tabs to access each function.

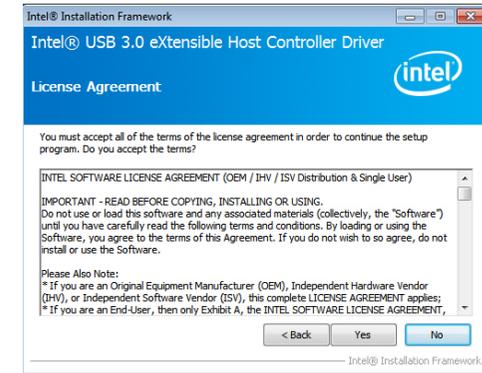
Intel USB 3.0 Drivers (For Windows 7 and Windows 8.1)

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

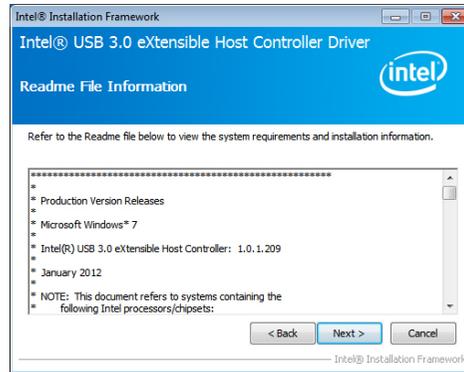
- Setup is ready to install the driver. Click "Next".



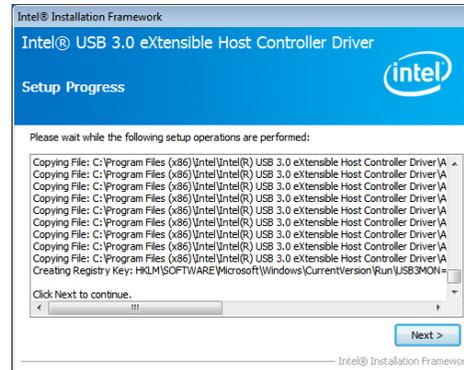
- Read the license agreement then click "Yes".



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



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



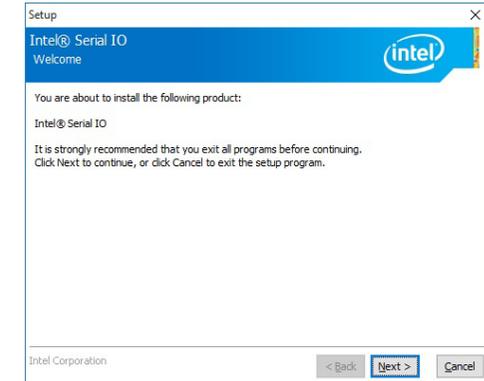
5. After completing installation, click "Finish".



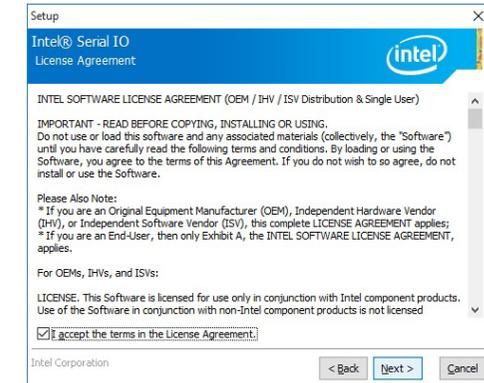
IO Driver (For Windows 10 and Windows 8.1)

To install the driver, click "Intel Serial IO Driver" on the main menu.

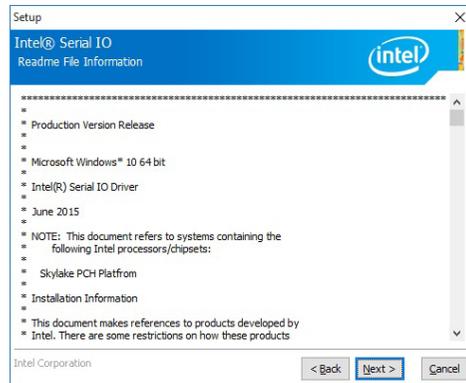
1. Setup is ready to install the driver. Click "Next".



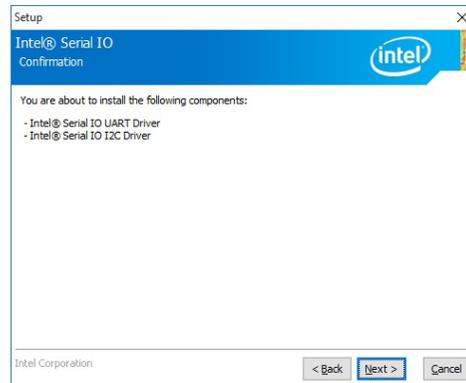
2. Read the license agreement carefully. Click "I accept the terms in the License Agreement" then click "Next".



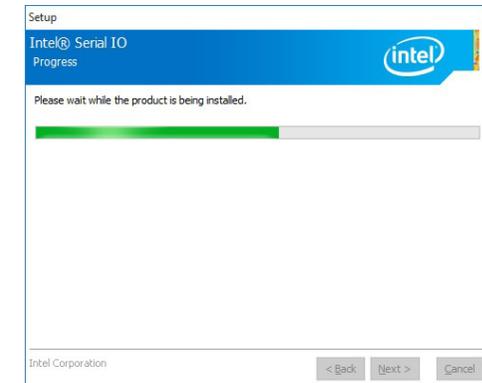
3. Read the file information then click "Next".



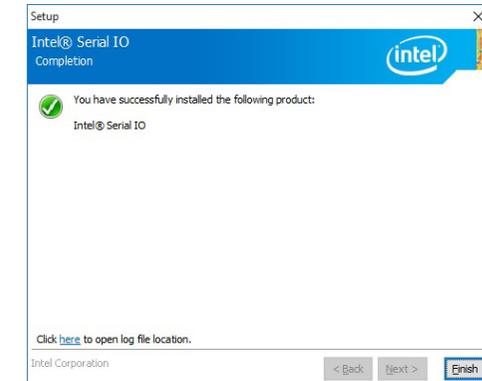
4. Setup is ready to install the driver. Click "Next".



5. Setup is now installing the driver.



6. Click "Finish".



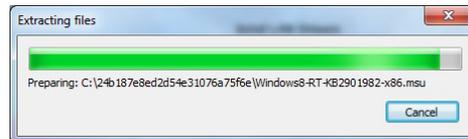
Microsoft Framework 4.5.2 (For Windows 7)


Note:

Before installing Microsoft Framework 4.5.2, make sure you have updated your Windows 7 operating system to Service Pack 1.

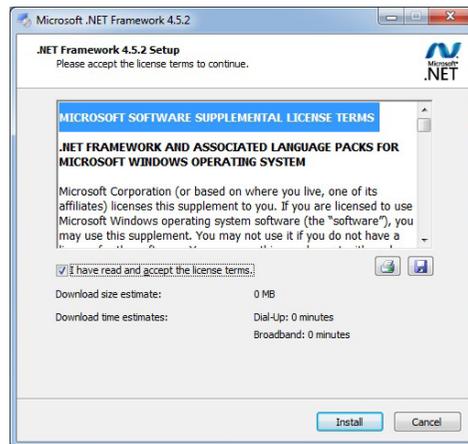
To install the driver, click "Microsoft Framework 4.5.2" on the main menu.

1. Setup is now extracting files.

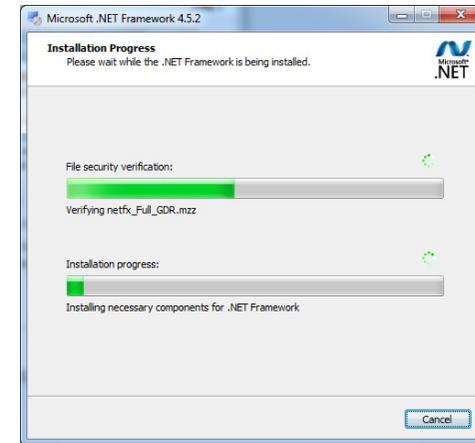


2. Read the license agreement carefully.

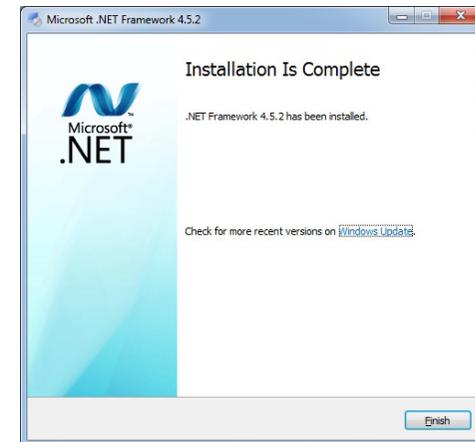
Click "I have read and accept the terms of the License Agreement" then click "Install".



3. Setup is now installing the driver.



4. Click "Finish".



Intel® Rapid Storage Technology

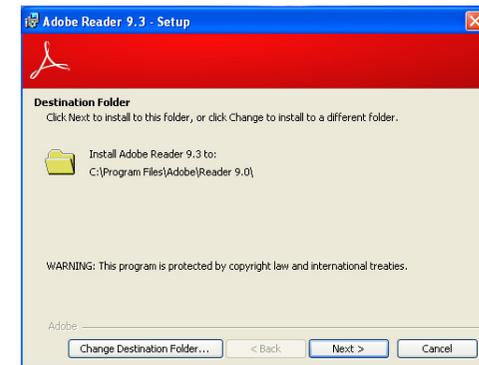
The Intel Rapid Storage Technology is a utility that allows you to monitor the current status of the SATA drives. It enables enhanced performance and power management for the storage subsystem.

To install the driver, click "Intel Rapid Storage Technology" on the main menu. Please refer to **Chapter 5** for more information.

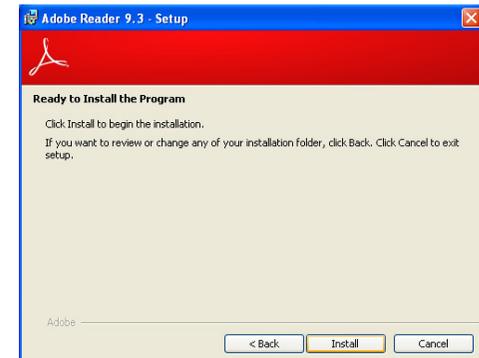
Adobe Acrobat Reader 9.3 (For Windows 7 and Windows 8.1)

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

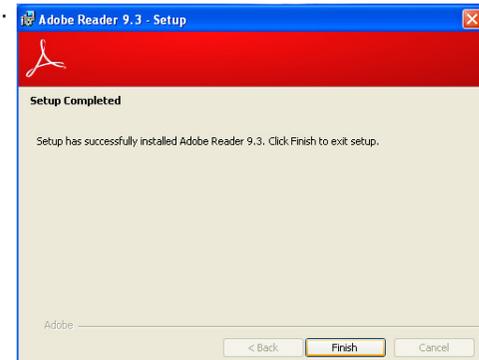
1. Click "Next" to install or click "Change Destination Folder" to select another folder.



2. Click "Install" to begin installation.



3. Click "Finish" to exit installation.



Chapter 5 - RAID

The system board allows configuring RAID on Serial ATA drives. It supports RAID 0, RAID 1, and RAID 5.

RAID Levels

RAID 0 (Striped Disk Array without Fault Tolerance)

RAID 0 uses two new identical hard disk drives to read and write data in parallel, interleaved stacks. Data is divided into stripes and each stripe is written alternately between two disk drives. This improves the I/O performance of the drives at different channel; however it is not fault tolerant. A failed disk will result in data loss in the disk array.

RAID 1 (Mirroring Disk Array with Fault Tolerance)

RAID 1 copies and maintains an identical image of the data from one drive to the other drive. If a drive fails to function, the disk array management software directs all applications to the other drive since it contains a complete copy of the drive's data. This enhances data protection and increases fault tolerance to the entire system. Use two new drives or an existing drive and a new drive but the size of the new drive must be the same or larger than the existing drive.

RAID 5

RAID 5 stripes data and parity information across hard drives. It is fault tolerant and provides better hard drive performance and more storage capacity.

Settings

To enable the RAID function, the following settings are required.

1. Connect the Serial ATA drives.
2. Enable RAID in the BIOS.
3. Create a RAID volume.
- 3-1. Create a RAID volume if the boot type is UEFI.
4. Install the Intel Rapid Storage Technology Utility.

Step 1: Connect the Serial ATA Drives

Refer to chapter 2 for details on the location of the Serial ATA ports.

**Important:**

1. Make sure you have installed the Serial ATA drives and connected the data cables otherwise you won't be able to enter the RAID BIOS utility.
2. Treat the cables with extreme caution especially while creating RAID. A damaged cable will ruin the entire installation process and operating system. The system will not boot and you will lost all data in the hard drives. Please give special attention to this warning because there is no way of recovering back the data.

Step 2: Enable RAID in the BIOS

1. Power-on the system then press to enter the main menu of the Insyde BIOS.
2. Go to "Advanced" menu, and select the "SATA Configuration" menu.
3. Change the "SATA Mode Selection" to "RAID" mode.
4. Save the changes in the "Exit" menu.
5. Reboot the system.

Step 3: Create a RAID Volume

1. When the Intel® RST option ROM status screen displays during POST, press <Ctrl> and <I> simultaneously to enter the option ROM user interface.
2. Select 1: Create RAID Volume and press <Enter>.
3. Use the up or down arrow keys to select the RAID level and press <Enter>.
4. Use the up or down arrow keys to select the strip size and press <Enter>.
5. Press <Enter> to select the physical disks.
6. Use the up or down arrow keys to scroll through the list of hard drives and press <Space> to select the drive.
7. Press <Enter>.
8. Select the volume size and press <Enter>. You must select less than one hundred percent of the available volume space to leave space for the second volume.
9. Press <Enter> to create the volume.
10. At the prompt, press <Y> to confirm volume creation.
11. Select 4: Exit and press <Enter>.
12. Press <Y> to confirm exit.



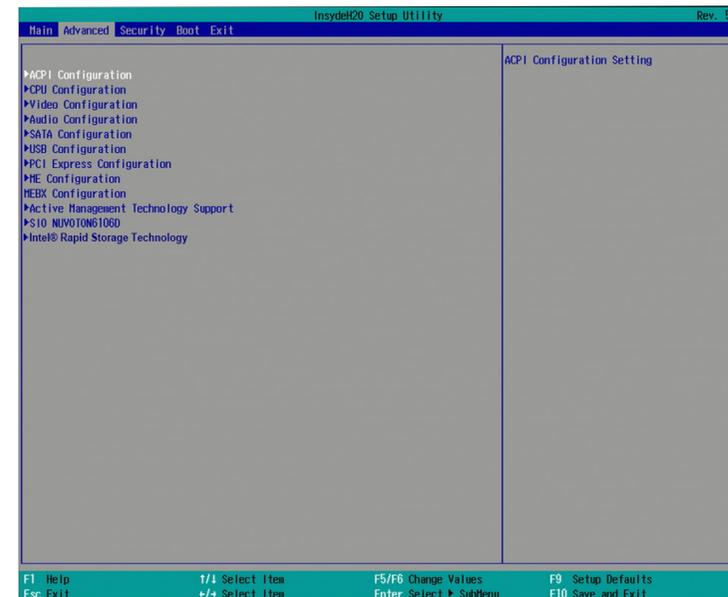
Note:

These steps are cited from the Intel® Support site, "Set Up a System with Intel® Matrix RAID Technology" (Article ID: 000005789).

Step 3-1: Create a RAID Volume if the boot type is UEFI

If the boot type is set to UEFI, RAID volume creation will be different. Please use the following steps to create RAID volumes. To set the boot type, enter the Insyde BIOS and go to "Boot" > "Boot Type".

1. Go to the "Advanced" menu of the Insyde BIOS.
2. The "Intel® Rapid Storage Technology" menu appears. Enter this menu.

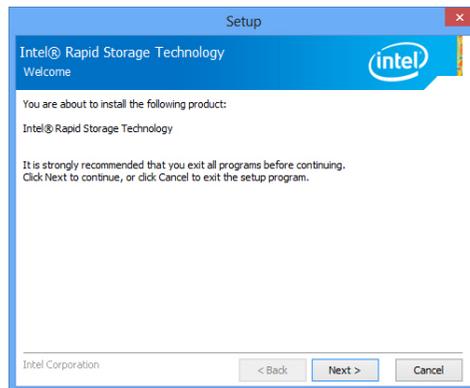


3. The screen displays all available drives. Select "Create RAID volume" to create a RAID volume".
4. Use the up or down arrow keys to select the RAID level and press <Enter>.
5. Use the up or down arrow keys to scroll through the list of hard drives and press <Space> to select the drive.
6. Press <Enter>.
7. Use the up or down arrow keys to select the strip size and press <Enter>.
8. Enter the volume size and press <Enter>.
9. At the prompt, press <Y> to confirm volume creation.

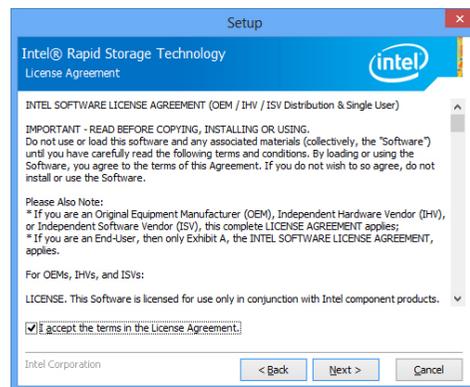
Step 4: Install the Intel Rapid Storage Technology Utility

The Intel Rapid Storage Technology Utility can be installed from within Windows. It allows RAID volume management (create, delete, migrate) from within the operating system. It will also display useful SATA device and RAID volume information. The user interface, tray icon service and monitor service allow you to monitor the current status of the RAID volume and/or SATA drives. It enables enhanced performance and power management for the storage subsystem.

1. Insert the provided DVD into an optical drive.
2. Click "Intel Rapid Storage Technology Utility" on the main menu.
3. Setup is ready to install the utility. Click "Next".



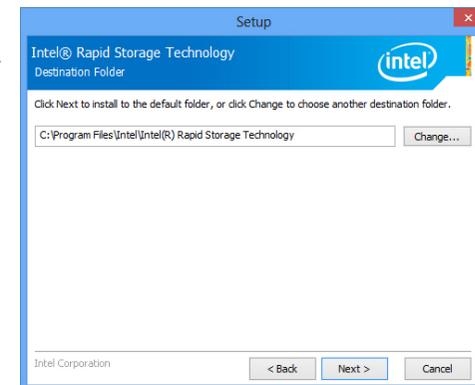
4. Read the license agreement and click "I accept the terms in the License Agreement". Then, click "Next".



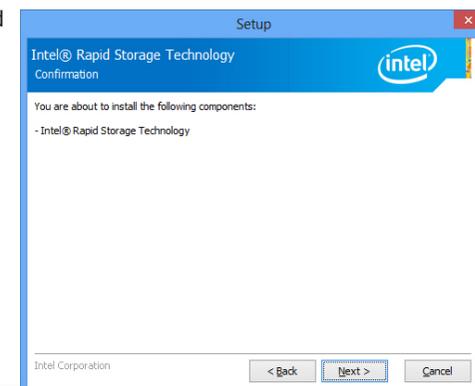
5. Go through the readme document to view system requirements and installation information then click "Next".



6. Click "Next" to install to the default folder or click "Change" to choose another destination folder".



7. Confirm the installation and click "Next".



8. Click "Yes, I want to restart this computer now" to complete the installation and then click "Finish".



Chapter 6 - 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**

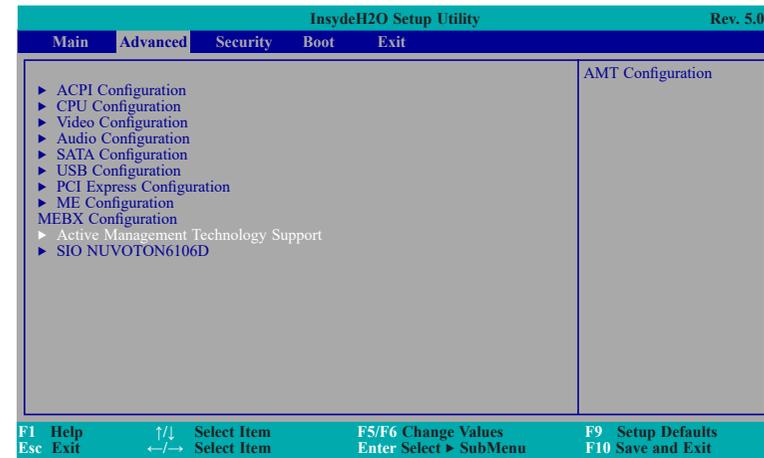
Remotely repair systems after OS failures. Alerting and event logging help detect problems quickly to reduce downtime.

- **Protect**

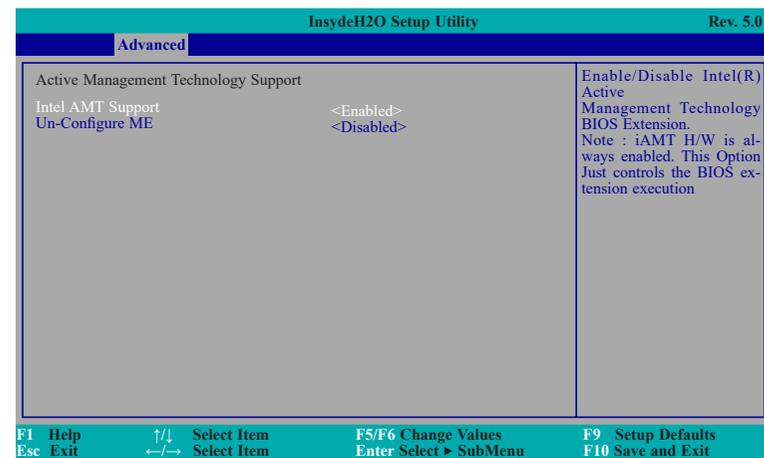
Intel AMT's System Defense capability remotely updates all systems with the latest security software. It protects the network from threats at the source by proactively blocking incoming threats, reactively containing infected clients before they impact the network, and proactively alerting when critical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

Enable Intel® AMT in the Insyde BIOS

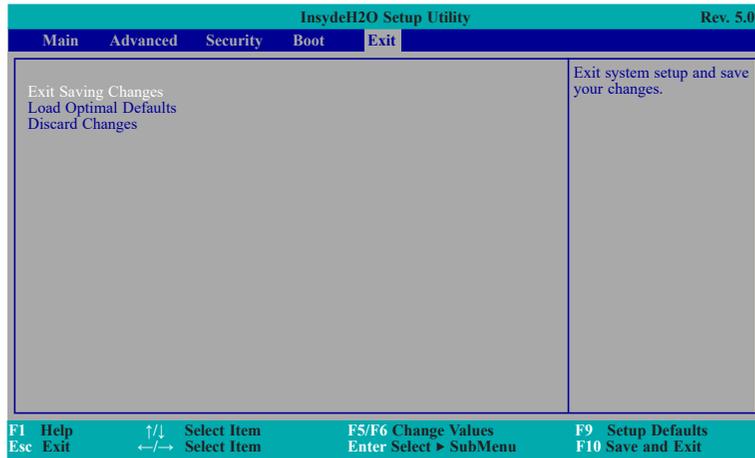
1. Power-on the system then press to enter the main menu of the Insyde BIOS.
2. In the **Advanced** menu, select **Active Management Technology Support**.



3. Select **Enabled** in the **Intel AMT Support** field.

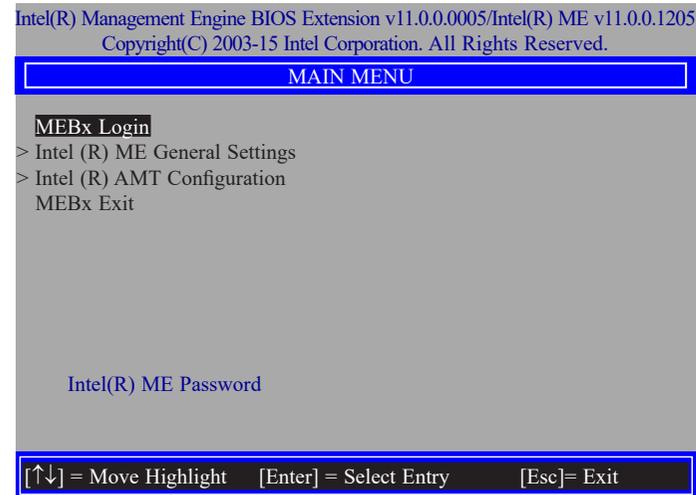


4. In the **Exit** menu, select **Exit Saving Changes** then select **OK**.



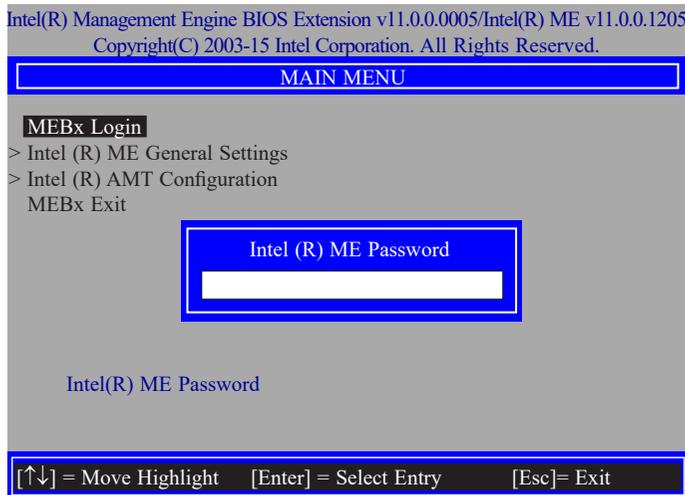
Configure Intel® AMT in the Intel® Management Engine BIOS Extension (MEBX) Screen

1. When the system reboots, 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.

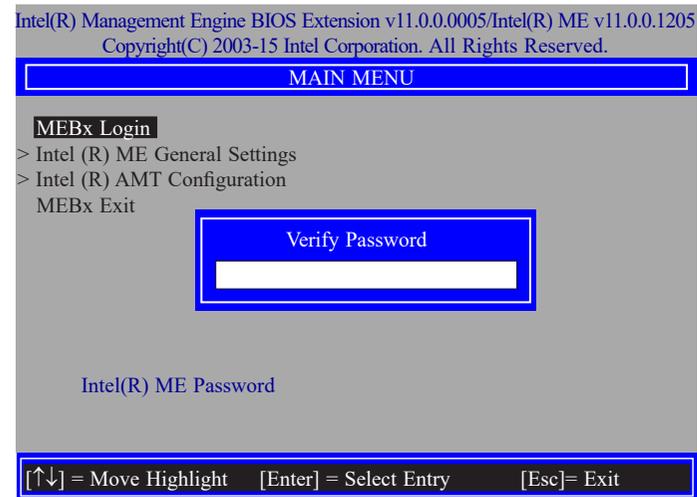


2. Enter a password in the space provided under Intel(R) ME Password then press Enter. The password must include:

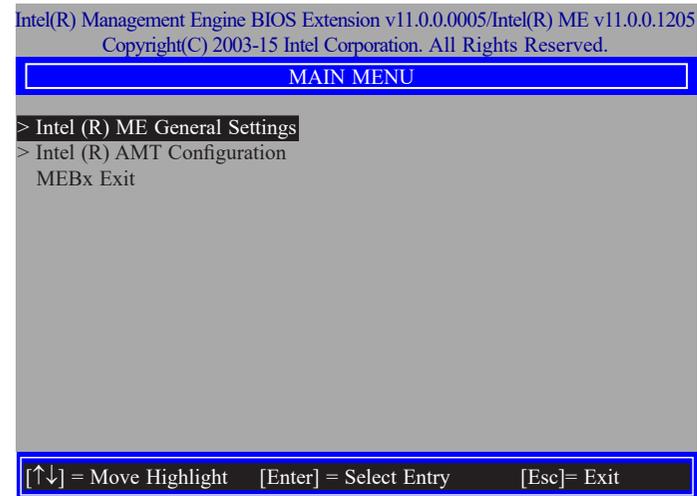
- 8-32 characters
- Strong 7-bit ASCII characters excluding : , and " characters
- At least one digit character (0, 1, ...9)
- At least one 7-bit ASCII non alpha-numeric character, above 0x20, (e.g. !, \$, ;)
- Both lower case and upper case characters



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



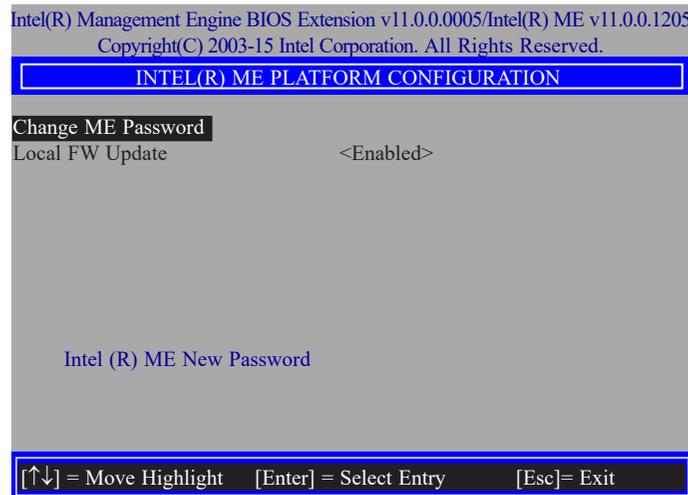
4. Select **Intel(R) ME General Settings** then press Enter.



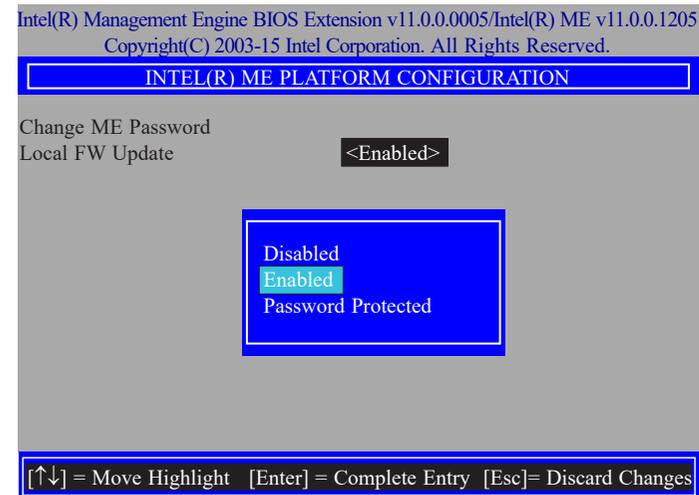
5. Select **Change Intel(R) ME Password** then press Enter.

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.

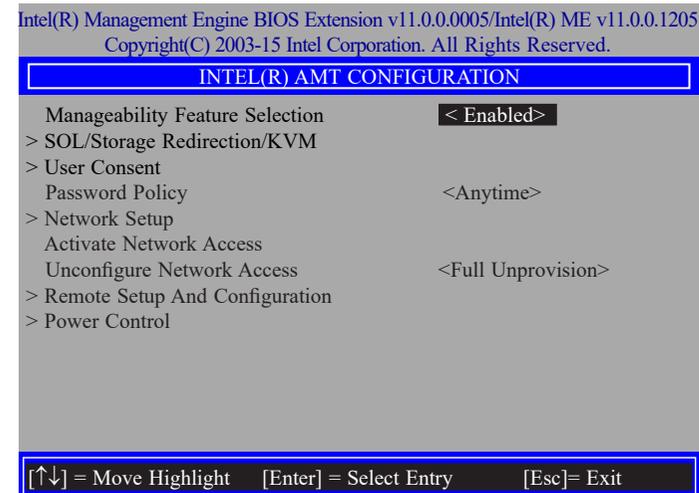
- 8-32 characters
- Strong 7-bit ASCII characters excluding : , and " characters
- At least one digit character (0, 1, ...9)
- At least one 7-bit ASCII non alpha-numeric character, above 0x20, (e.g. !, \$, ;)
- Both lower case and upper case characters



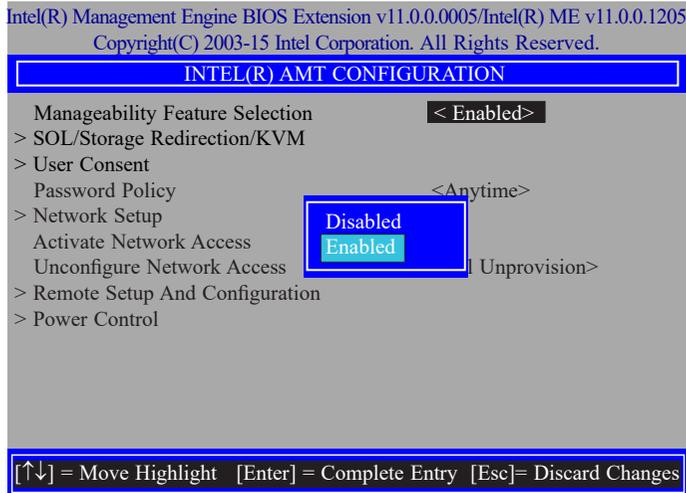
6. Select **Local FW Update** then press Enter. Select **Enabled** or **Disabled** or **password Protected** then press Enter.



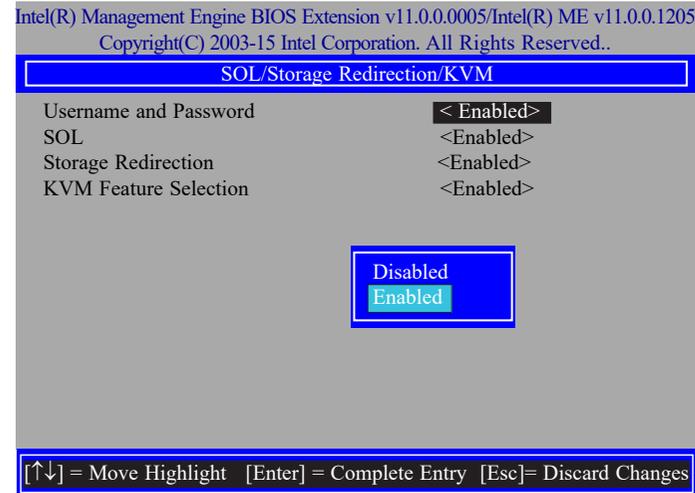
7. Select Previous Menu until you return to the **Main Menu**. Select **Intel(R) AMT Configuration** then press Enter.



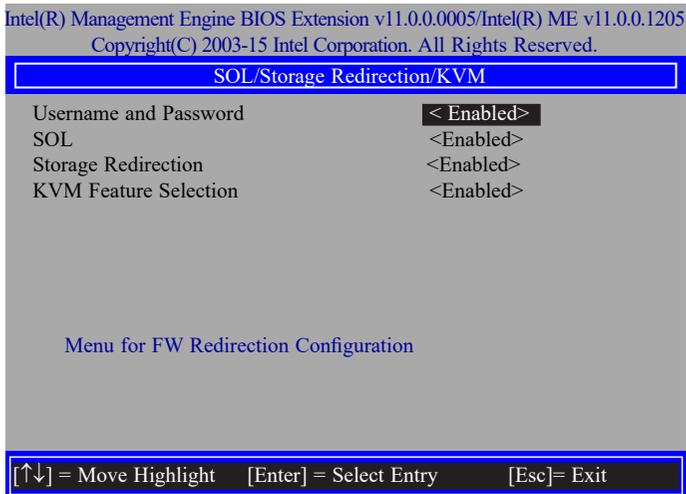
8. In the **Intel(R) AMT Configuration** menu, select **Manageability Feature Selection** then press Enter. Select **Enabled** or **Disabled** then press Enter.



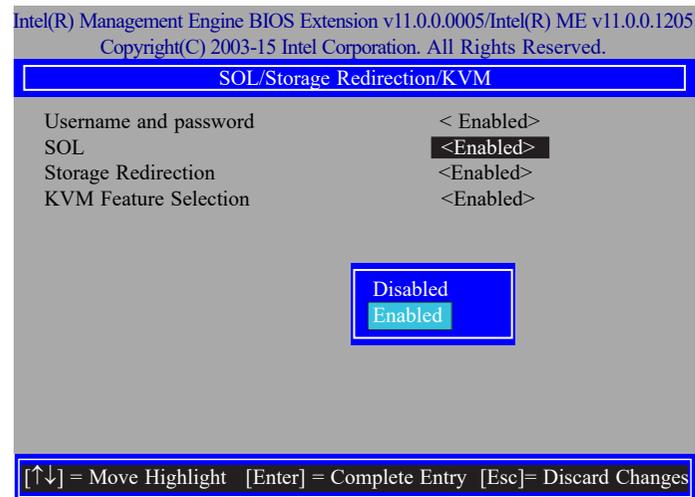
10. In the **SOL/Storage Redirection/KVM** menu, select **Username and Password** then press Enter. Select **Enabled** or **Disabled** then press Enter.



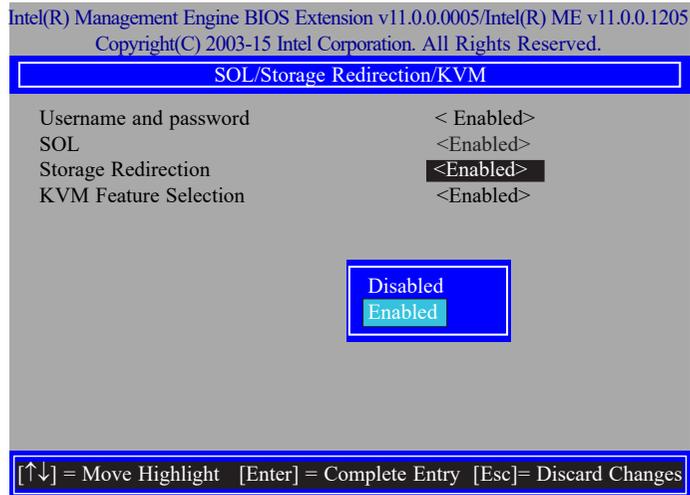
9. In the **Intel(R) AMT Configuration** menu, select **SOL/Storage Redirection/KVM** then press Enter.



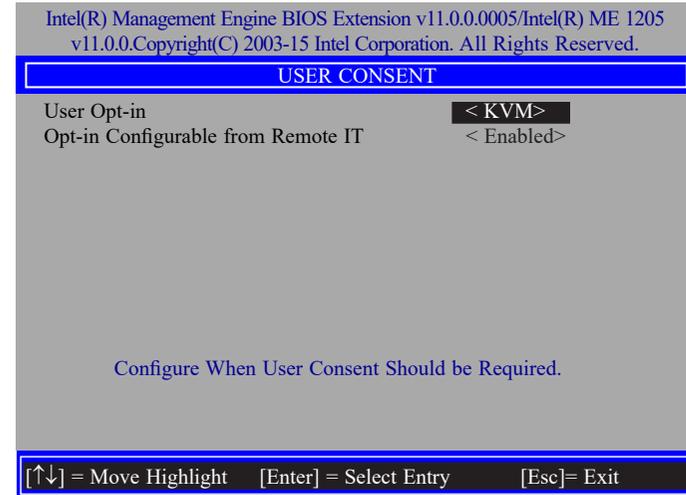
11. In the **SOL/Storage Redirection/KVM** menu, select **SOL** then press Enter. Select **Enabled** or **Disabled** then press Enter.



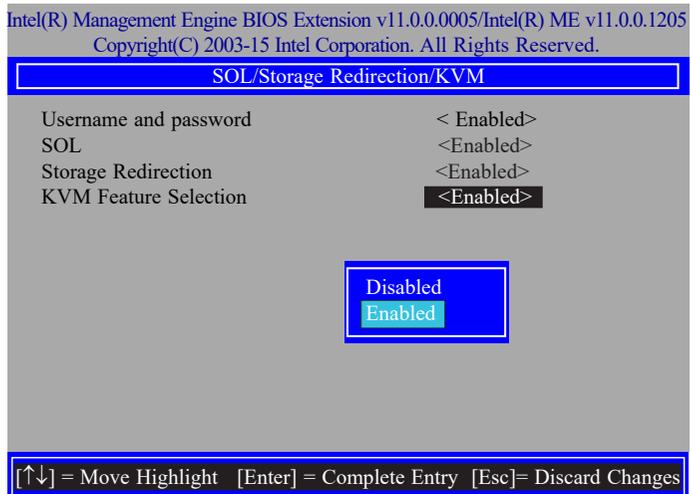
12. In the **SOL/Storage Redirection/KVM** menu, select **Storage Redirection** then press Enter. Select **Enabled** or **Disabled** then press Enter.



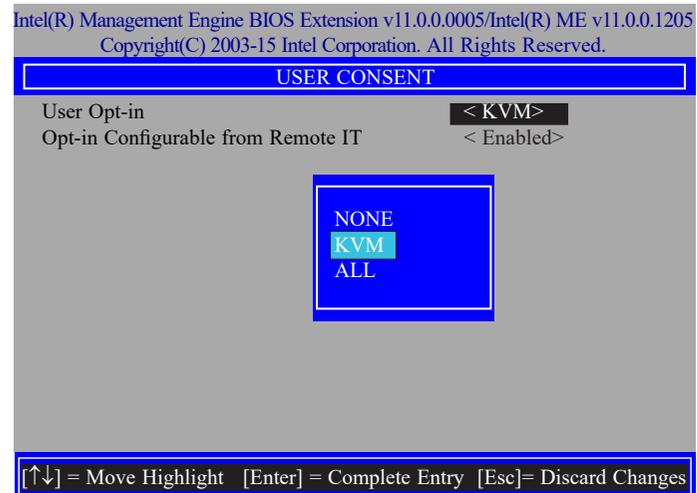
14. Select Previous Menu until you return to the **Intel(R) AMT Configuration** menu. Select **User Consent** then press Enter.



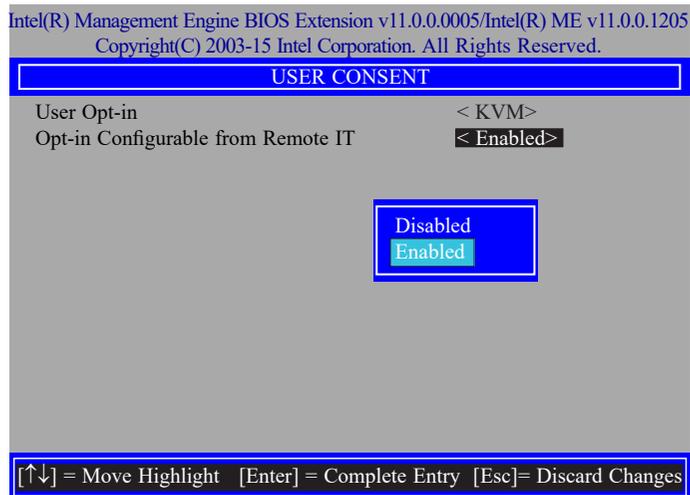
13. In the **SOL/IDER/KVM** menu, select **KVM Feature Selection** then press Enter. Select **Enabled** or **Disabled** then press Enter.



15. In the **User Consent** menu, select **User Opt-in** then press Enter. Select **None** or **KVM** or **ALL** then press Enter.

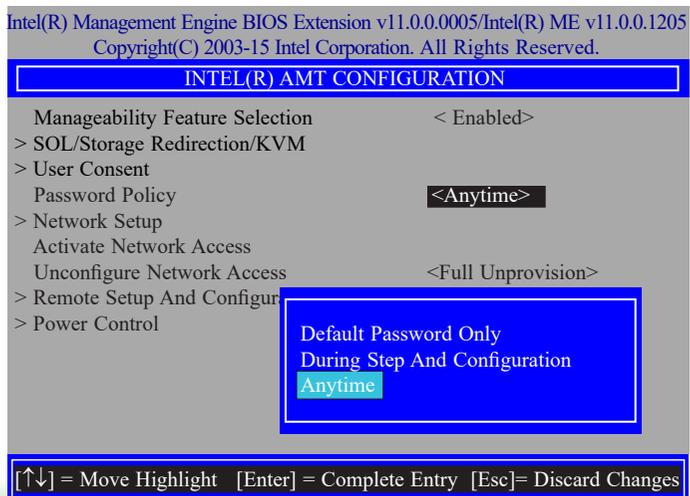


16. In the **User Consent** menu, select **Opt-in Configurable from Remote IT** then press Enter. Select **Enabled** or **Disable Remote Control of KVM Opt-in Policy** then press Enter.

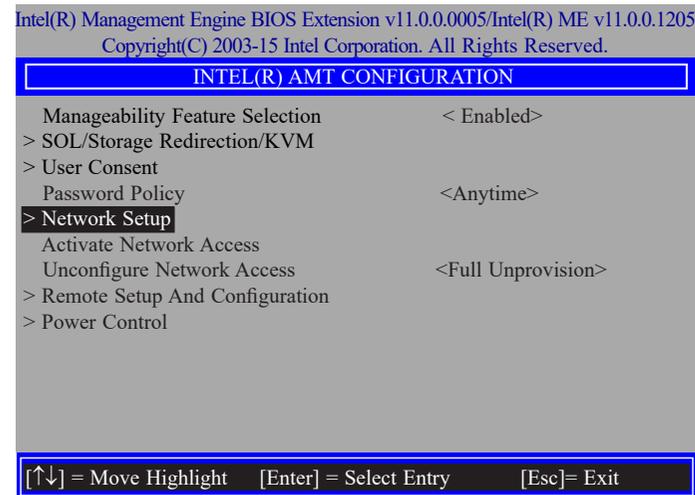


17. Select Previous Menu until you return to the **Intel(R) AMT Configuration** menu. Select **Password Policy** then press Enter.

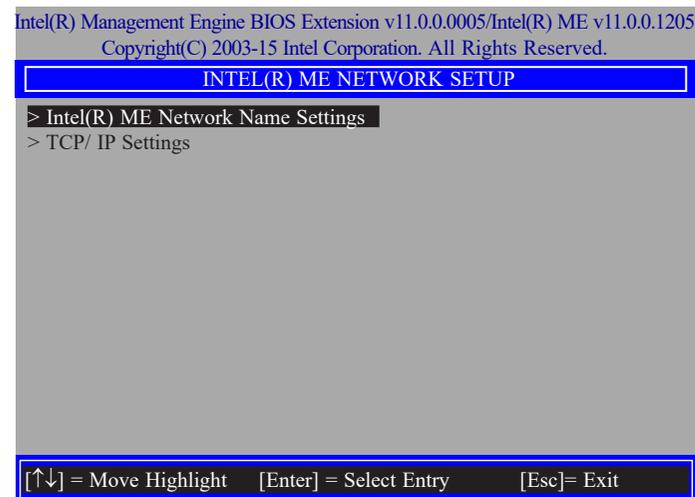
You may choose to use a password only during setup and configuration or to use a password anytime the system is being accessed.



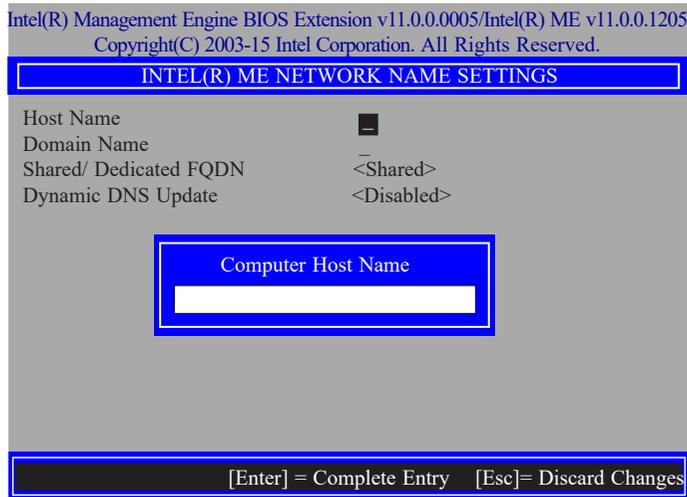
18. In the **Intel(R) AMT Configuration** menu, select **Network Setup** then press Enter.



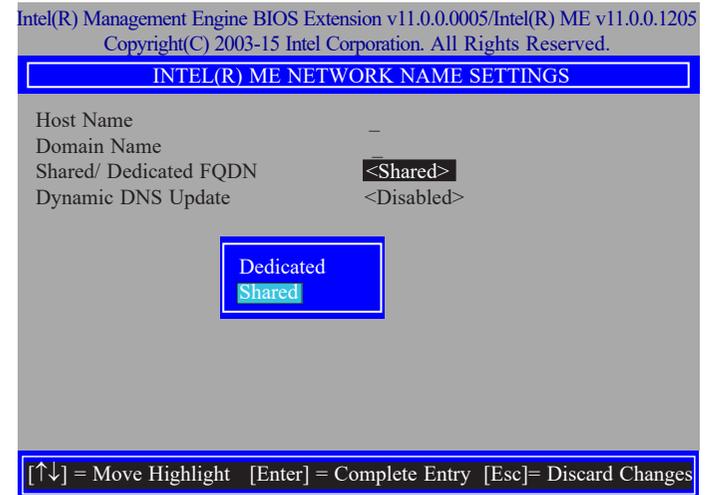
19. In the **Intel(R) ME Network Setup** menu, select **Intel(R) ME Network Name Settings** then press Enter.



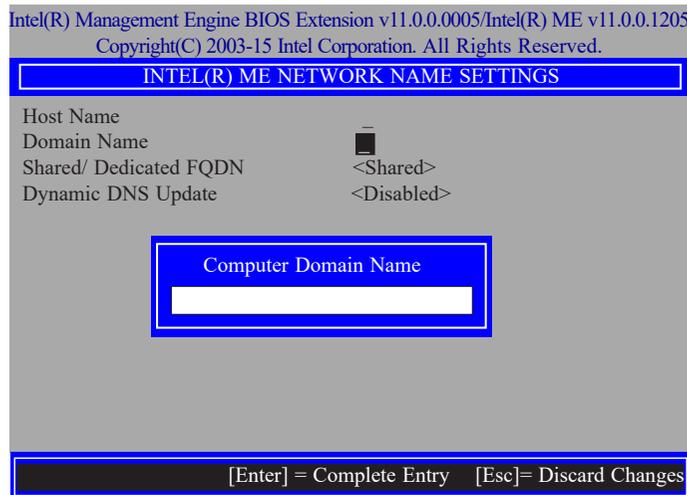
20. In the **Intel(R) ME Network Name Settings** menu, select **Host Name** then press Enter. Enter the computer's host name then press Enter.



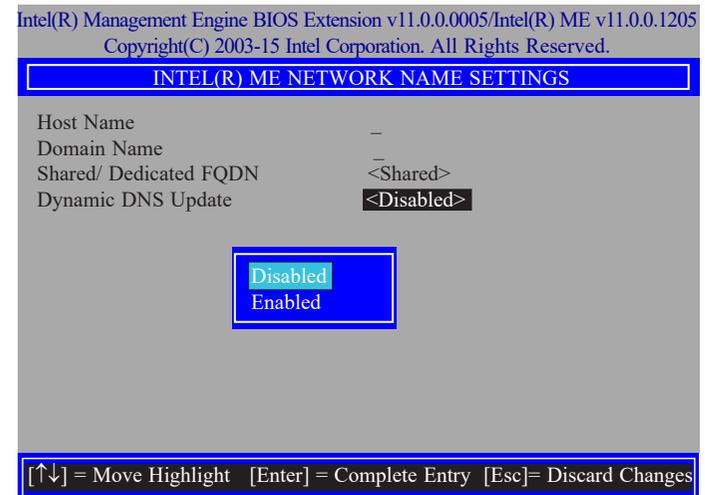
22. Select **Shared/Dedicated FQDN** then press Enter. Select **Shared** or **Dedicated** then press Enter.



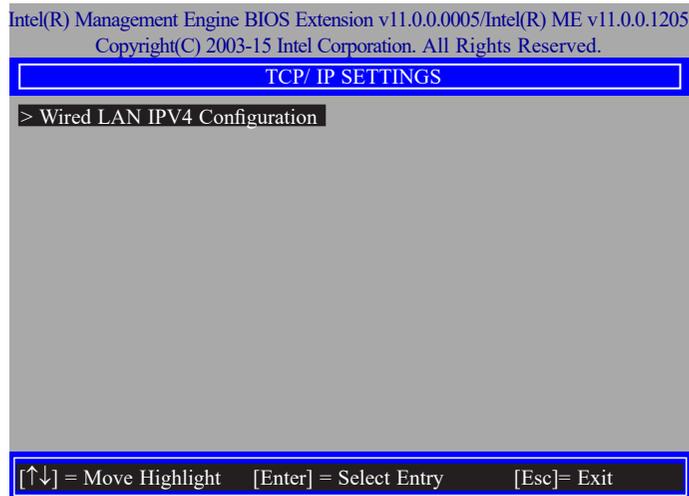
21. Select **Domain Name** then press Enter. Enter the computer's domain name then press Enter.



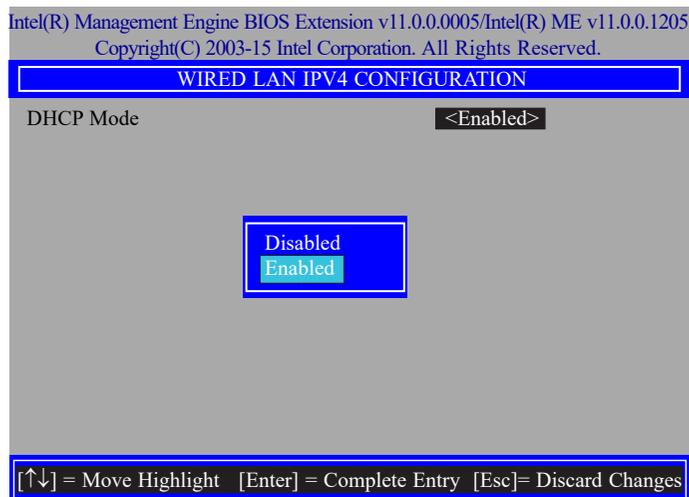
23. Select **Dynamic DNS Update** then press Enter. Select **Enabled** or **Disabled** then press Enter.



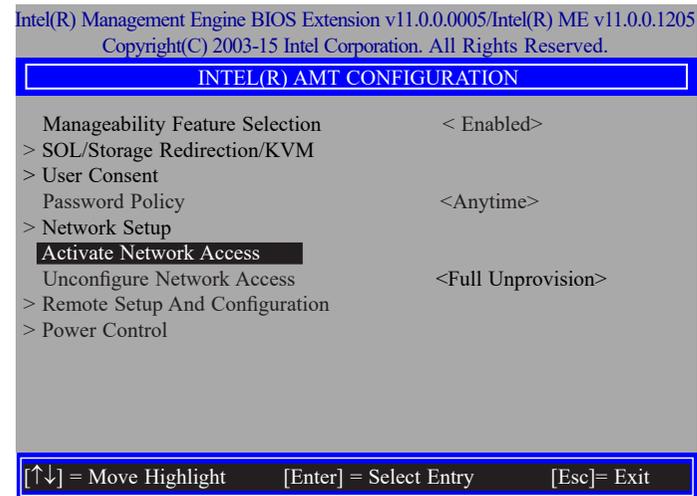
24. Select Previous Menu until you return to the **Intel(R) ME Network Setup** menu. Select **TCP/IP Settings** then press Enter.



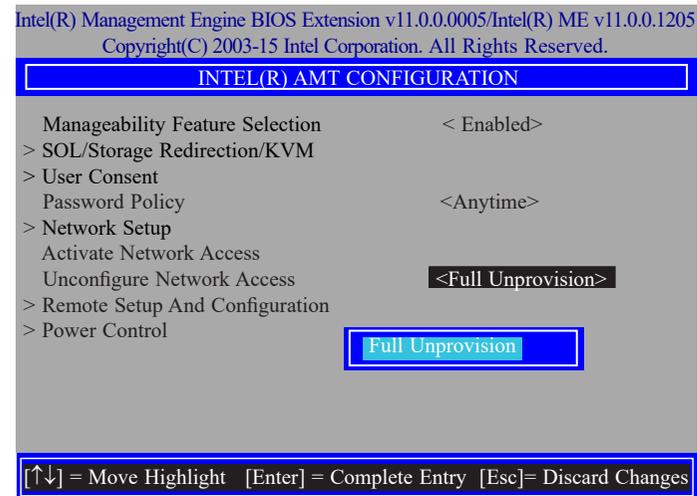
25. In the **TCP/IP Settings** menu, select **Wired LAN IPV4 Configuration** then press Enter.



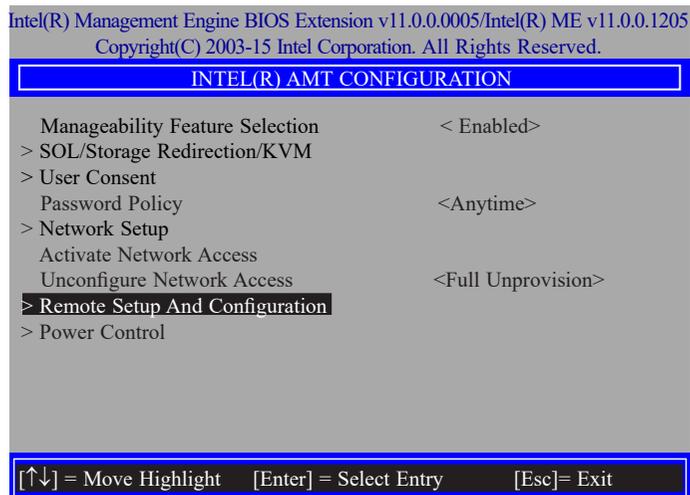
26. In the **Intel(R) AMT Configuration** menu, select **Activate Network Access** then press Enter.



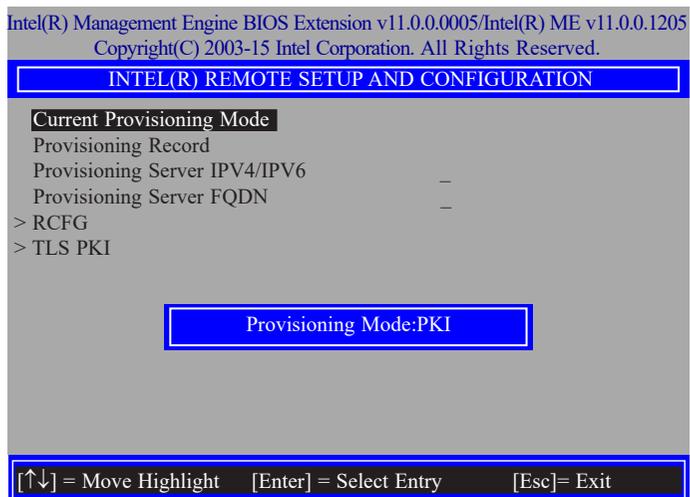
27. In the **Intel(R) AMT Configuration** menu, select **Unconfigure Network Access** then press Enter.



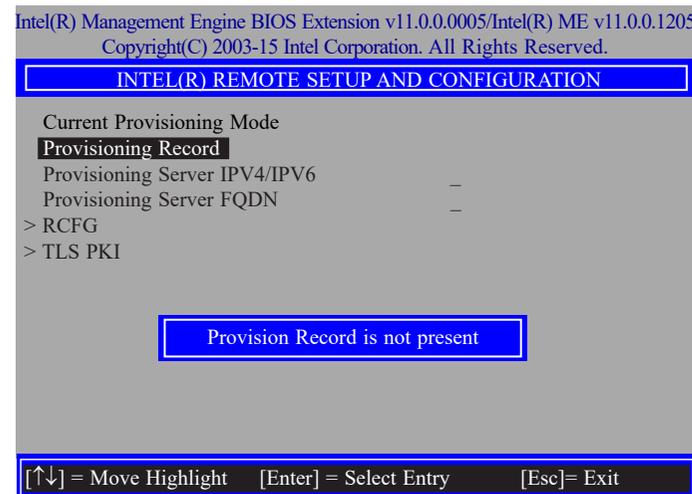
28. In the **Intel(R) AMT Configuration** menu, select **Remote Setup And Configuration** then press Enter.



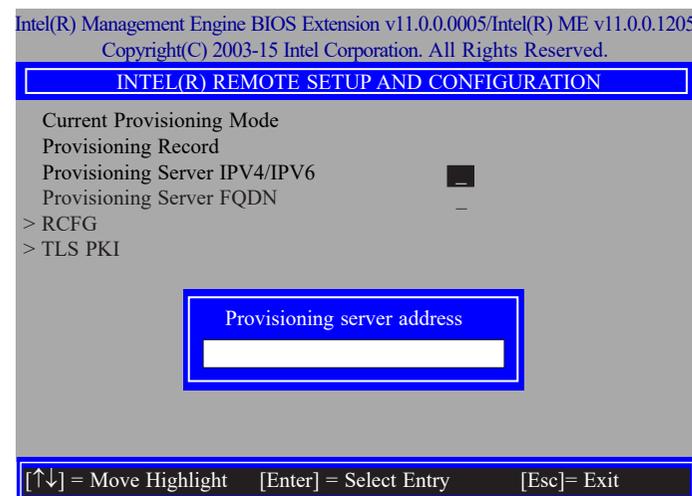
29. In the **Intel(R) Remote Setup And Configuration** menu, select **Current Provisioning Mode** then press Enter.



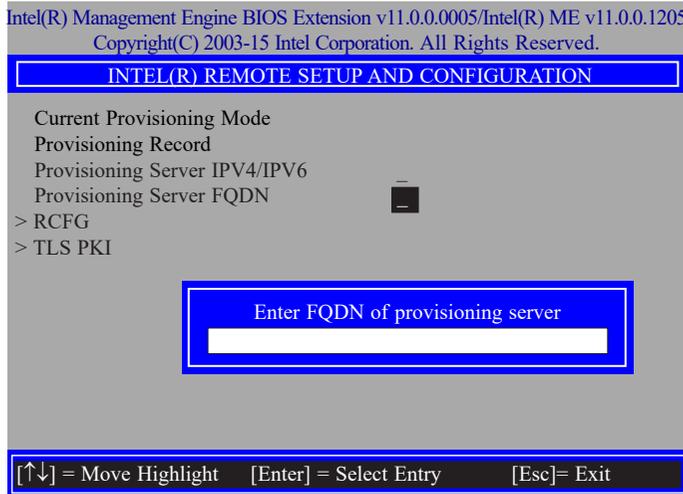
30. In the **Intel(R) Remote Setup And Configuration** menu, select **Provisioning Record** then press Enter.



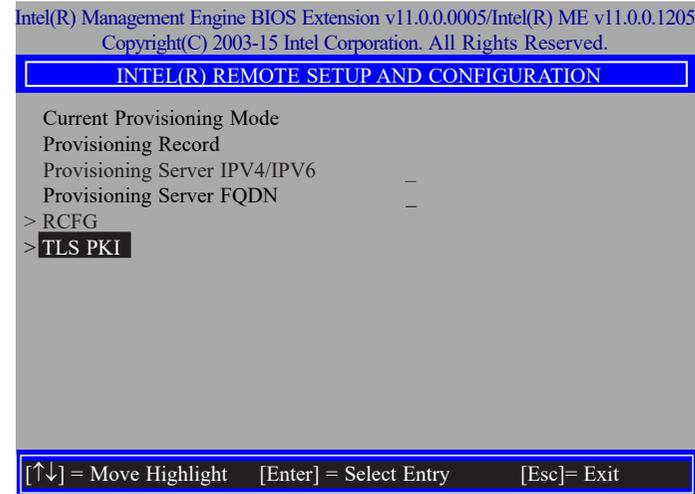
31. In the **Intel(R) Remote Setup And Configuration** menu, select **Provisioning server IPV4/IPV6**, enter the Provisioning server address then press Enter.



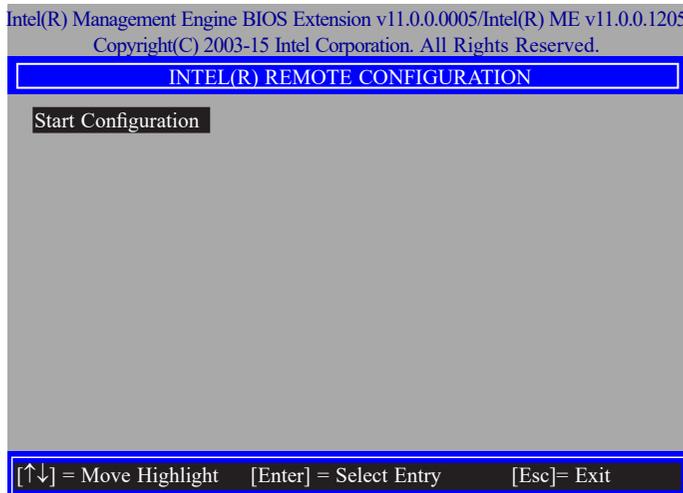
32. In the **Intel(R) Remote Setup And Configuration** menu, select **Provisioning server FQDN**, enter the FQDN of Provisioning server then press Enter.



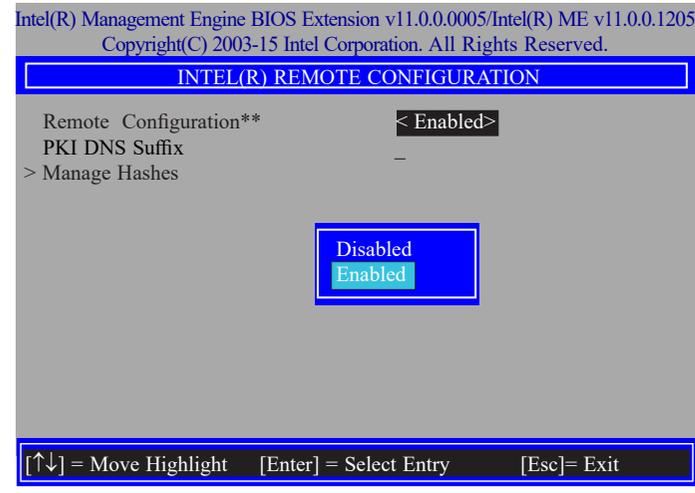
34. In the **Intel(R) Remote Setup And Configuration** menu, select **TLS PKI** then press Enter.



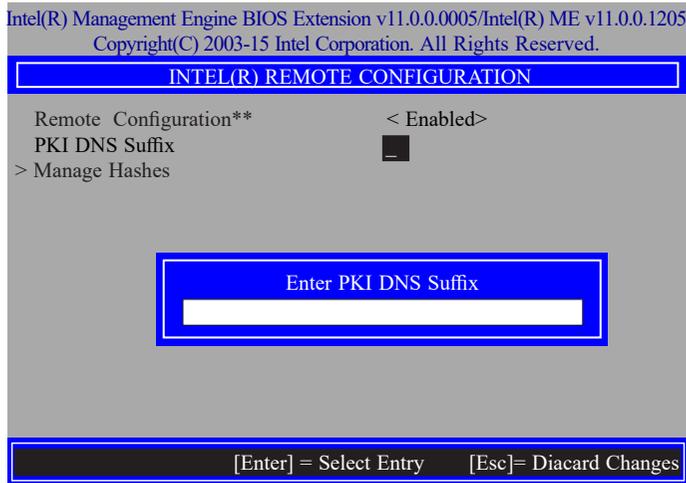
33. In the **Intel(R) Remote Setup And Configuration** menu, select **RCFG** then press Enter, and select **Start Configuration** then press enter.



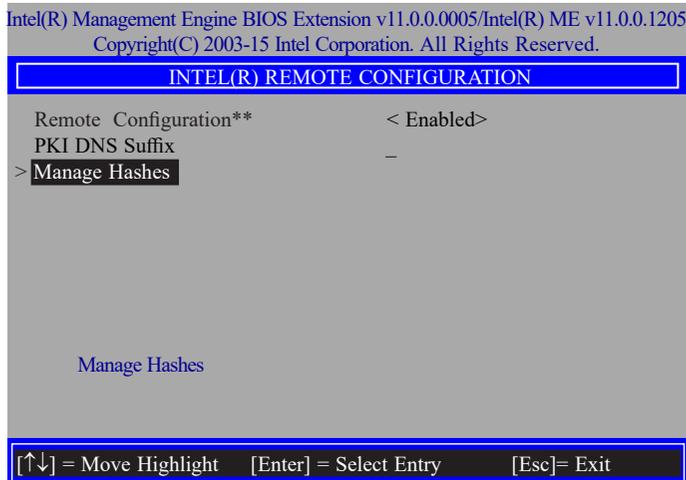
35. In the **Intel(R) Remote Configuration** menu, select **Remote Configuration**** then press Enter, select **Enabled** or **Disabled** then press Enter.



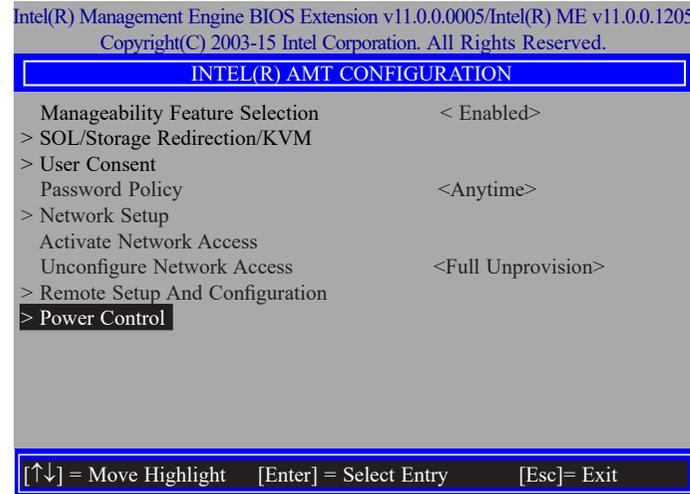
36. Select **PKI DNS Suffix**, Enter the PKI DNS Suffix then press Enter.



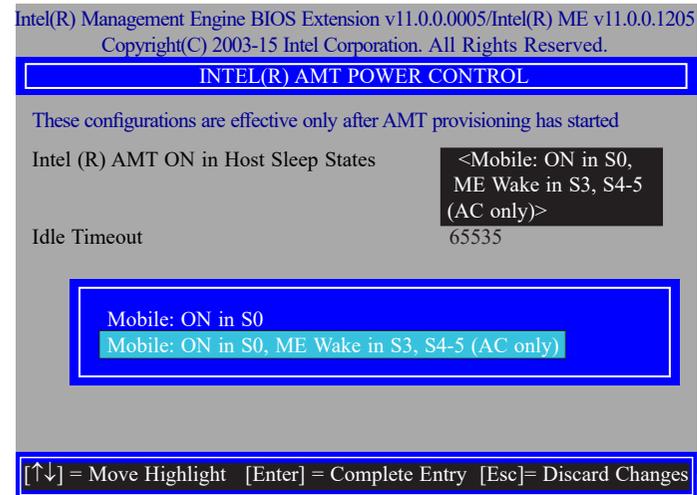
37. Select **Manage Hashes** then press Enter, and select one of hash name.



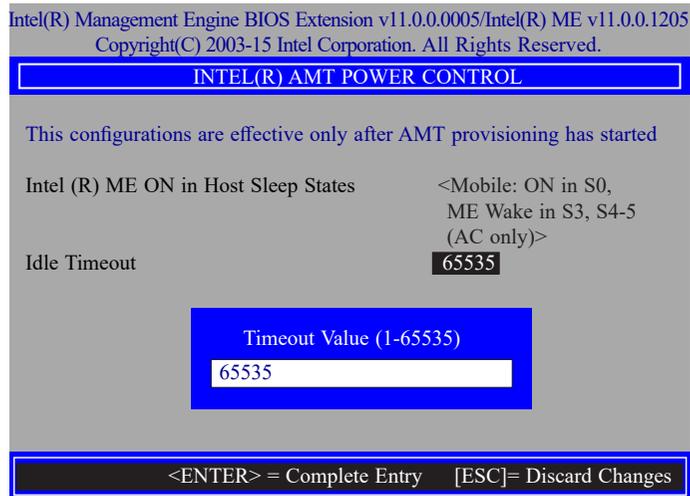
38. In the **Intel(R) AMT Configuration** menu, select **Power Control** then press Enter.



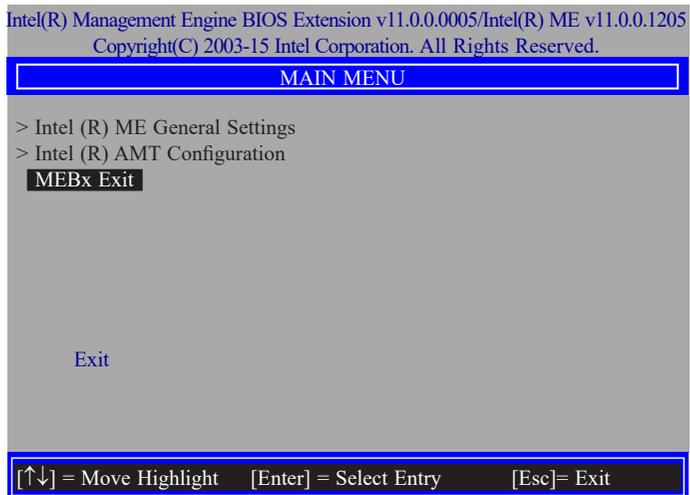
39. In the **Intel(R) AMT Power Control** menu, select **Intel(R) AMT ON in Host Sleep States** then press Enter. Select an option then press Enter.



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



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



Appendix A - 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 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.

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.