DFI®

OPS100-SH

User's Manual

A-449-M-2008

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

Trademarks

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

FCC and DOC Statement on Class A

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

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

Notice:

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

Table of Contents

About this Manual

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

Warranty

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

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

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

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

Static Electricity Precautions

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

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

2. Wear an antistatic wrist strap.

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

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

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

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

Safety Measures

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

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

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

Safety Precautions

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

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

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

About the Package

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

- 1 OPS100-SH system unit
- 1 Quick Installation Guide

Optional Items

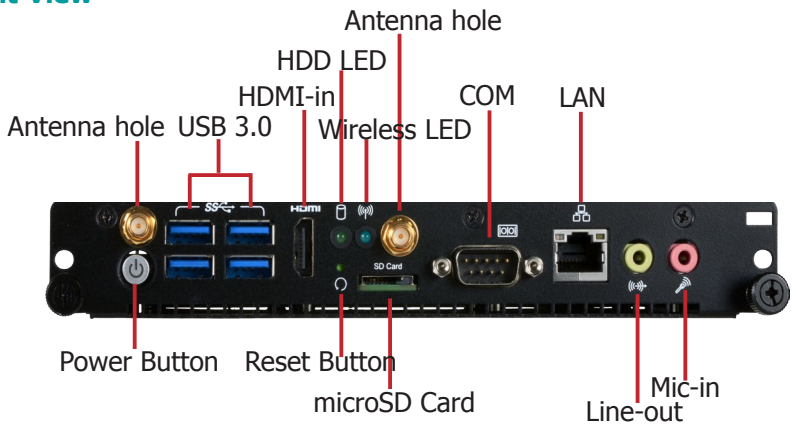
- Wall Mount kit
- Power Cord
- Power Adapter: 120W, 12V
- Docking Board: OPS-DB
- Wi-Fi + Bluetooth module: M.2 2230 802.11a/b/g/n/ac + Bluetooth 4.1, Intel AC8260, 2 cables, 2 antennas
- SSD: Intel® SSD 600P Series or M.2 2280 SATA 3.0 (64GB/128GB MLC)
- Video Capture: Yuan SC560N14K (4K@60 HDMI Capture Card PCIe x4)

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

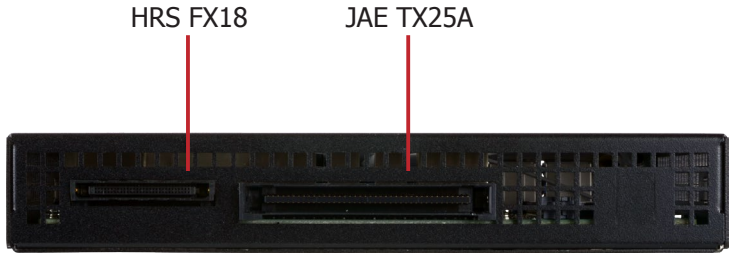
Chapter 1 - Introduction

Overview: OPS100-SH

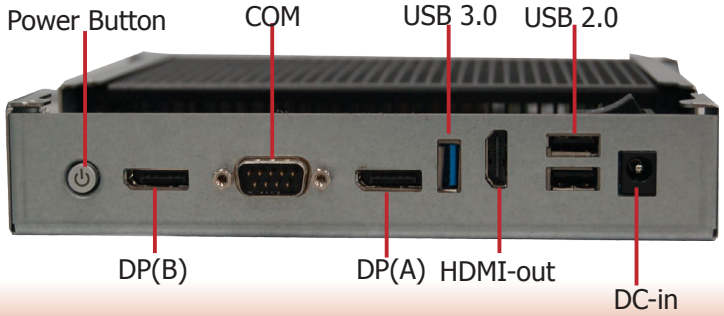
Front View



Rear View



Overview: OPS-DB



Key Features

Model Name	OPS100-SH
Processor	6th Generation Intel® Xeon® and Core™ processors
LAN	1 LAN port
COM	1 COM port
Display	1 HDMI-input
Audio	Microphone and Line-out ports
USB	4 USB 3.0 Type A ports
External Storage	microSD card slot
Power Switch	Power-on button and reset switch

Model Name	OPS-DB
Display	1 HDMI (2.0) and 2 DisplayPort (1.2) outputs
USB	1 USB 3.0 and 2 USB 2.0 Type A ports
COM	1 COM port
Power	12~19V DC-in
Power Switch	Power-on button

Notes:
1. Throughout this guide the OPS100-SH may be referred to as the OPS+ Module.
2. The OPS-DB (referred to as the Docking Board) is an expansion dock, which provides additional I/O connectivity.

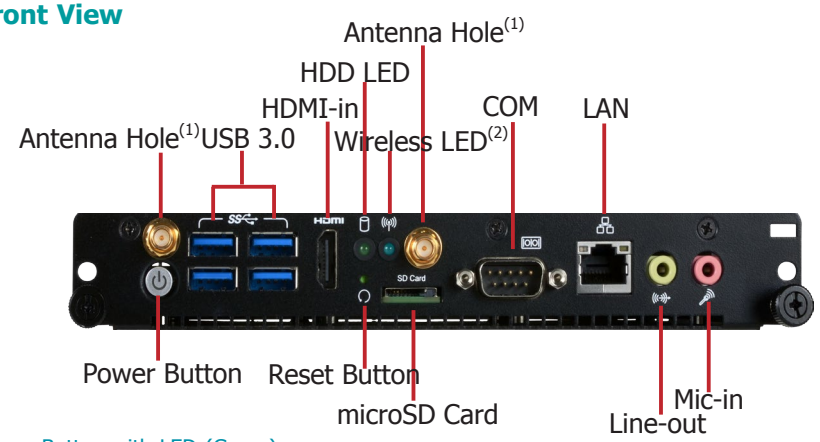
Specifications

Processor	Intel® Xeon® Processor E3-1515M v5, Quad Core, 8M Cache, 2.8GHz (3.7GHz) Intel® Core™ i5-6440EQ Processor, Quad Core, 6M Cache, 2.7GHz (3.4GHz) Intel® Core™ i3-6100E Processor, Dual Core, 3M Cache, 2.7GHz
Chipset	Intel® CM236 Chipset Intel® HM170 Chipset
Memory	• Supports dual-channel DDR4 2400/2133MHz • Supports 4GB/8GB/16GB SODIMM modules up to a total of 32GB
Graphics	Intel® HD Gen 9 Graphics OpenGL 5.0, DirectX 12, OpenCL 2.1 • Supports these codecs: HW Decode: AVC/H.264, MPEG2, VC1/WMV9, JPEG/MJPEG, HEVC/H265, VP8, VP9 HW Encode: MPEG2, AVC/H264, JPEG, HEVC/H265, VP8, VP9 • Output displays: 1 x HDMI-input 2 x DP (1.2): resolution up to 4096x2160 @ 60Hz 1 HDMI-output (2.0): resolution up to 3840x2160 @ 60Hz • Triple display: HDMI + 2 DP
Audio	• Realtek ALC888 • Audio ports: Mic-in and Line-out
Wireless Connectivity	• 1 x M.2 (Type 2230 E Key) (PCIe/USB) for wireless modules
Storage	• 1 x M.2 (Type 2280 M Key) (PCIe x4/SATA) for SSD modules • 1 x micro SD Card Slot
Ethernet	1 x Intel® I219LM PCIe with iAMT 11.6 (10/100/1000Mbps)
Expansion	1 x PCIe x4 expansion slot (on the OPS-DB Docking Board)
Front and rear Panel I/O Ports	• Front Panel 1 x GbE (RJ-45) 1 x RS-232 (DB-9) 4 x USB 3.0 (type A) 1 x HDMI-input 1 x Line-out 1 x Mic-in 1 x Power Button 1 x Reset Button 2 x Wi-Fi Module Antenna Holes • Rear Panel The JAE TX25A-80P connector: 1 x HDMI 2.0 1 x DP 1.2 2 x USB 2.0 1 x USB 3.0 1 x 12~19V DC-in The Hirose FX18-60S connector: 1 x DP 1.2

Platform Security	TPM 2.0 with Intel® TXT (Intel® Trusted Execution Technology)
Power	• Power input voltage: 12~19V DC-in (DC-in jack connector)
Cooling System	• Heatsink with fan
Environment	• Operating Temperature: 0°C to 45°C • Storage Temperature: -40 to 85°C • Relative Humidity: 10 to 90% RH (non-condensing)
Construction	• Aluminum + SGCC
Dimensions	• 180mm x 30mm x 119mm (W x H x D)
Weight	• TBD
OS Support	• Windows 10 Enterprise (64-bit) • Windows 8.1
Watch Dog Timer	System Reset, Programmable via Software from 1 to 255 Seconds
Standards and Certifications	Packaged Shock (Drop): 6 face drops, 2 corner drops and 3 edge drops for a total of 11 drops from a height of 36 inches if package weight < 20 pounds (30 inches if package weight ≥ 20 to < 40 pounds) Packaged Vibration: 0.015 g2/Hz from 5 Hz to 40 Hz, Sloping to 0.00015 g2/Hz at 500 Hz, Input acceleration is 1.09 gRMS, 1 hour per axis for all 3 axes for all samples; Random control limit tolerance is ± 3 dB.

Getting to Know the OPS100-SH

Front View



Power Button with LED (Green)

Press this button to power on or power off the system.

USB 3.0 Ports

These ports connect USB 3.0 or USB 2.0/1.1 devices.

HDMI-in Port

This port can be used to connect an HDMI source (e.g. an HDMI port of a computer) and let the signal pass through to another output display.

Reset Button

Press this button to reset the system without turning on or off the power.

COM Port

This port connects serial devices.

LAN Port

This port connects the system to a local area network (LAN).

Microphone/Line-out Ports

This port connects audio devices such as microphones and speakers.

microSD Card Slot

This port connects a microSD card that complies with SD specification v1.0/v1.1/v2.0 SDHC.

Wireless LED (2)

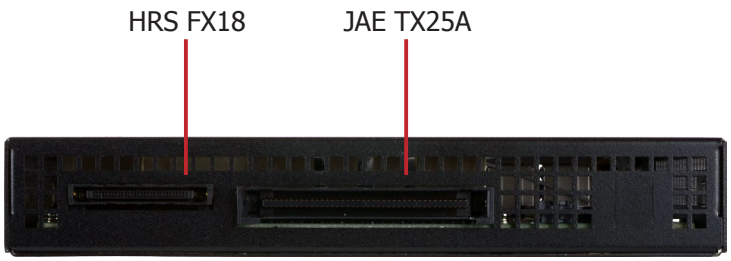
The wireless LED indicates the wireless connection status. The LED behavior depends on the wireless module used.

HDD LED (Green)

This LED indicates the status of the disk drive.

HDD State	Disk access activity	HDD present or HDD not present
LED Behavior	Blink	Off

Rear View



HRS FX18/JAE TX25A

The OPS+ Module enables the integration of a pluggable module and a display panel by employing a defined interconnect based on the JAE and HRS combo plug and their receptacle connectors.

For detailed pin assignments and connector specifications, refer to Chapter 4 and 5.

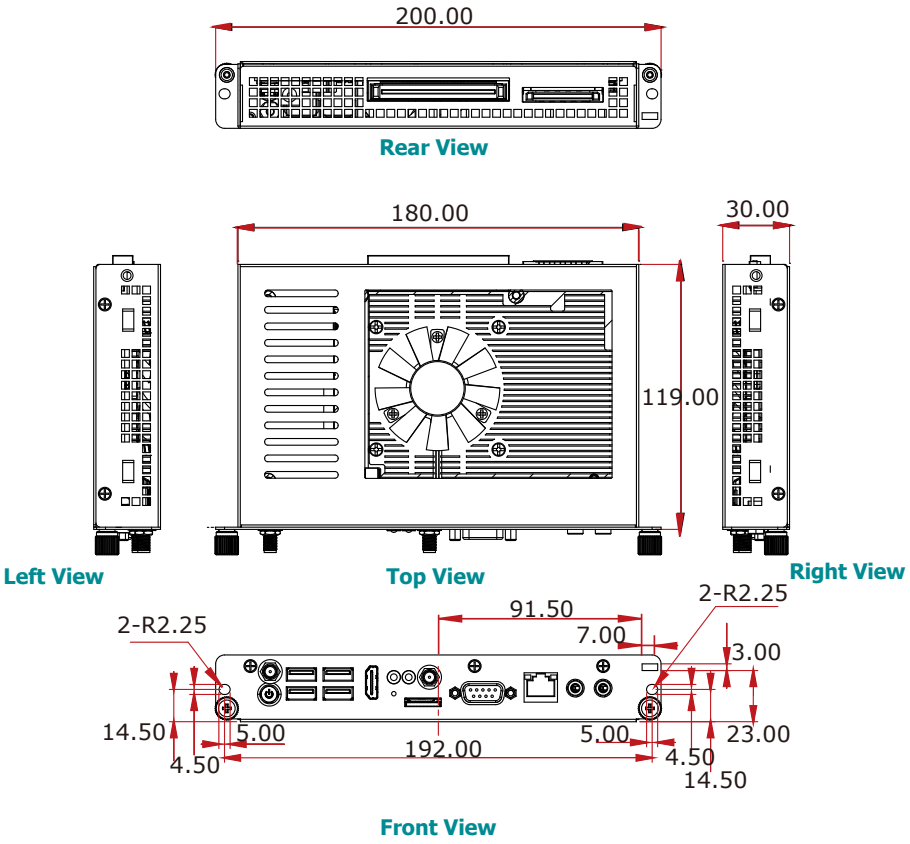
Notes:

1. The OPS+ Module is equipped with a Wi-Fi module to provide Wi-Fi connectivity. Please install antennas to these SMA connectors.
2. There may not be indicator light depending on the installed Wi-Fi module; for example, the LED will not be lit for Intel® Dual Band Wireless-AC 8260.

Mechanical Dimensions

Chassis Dimensions

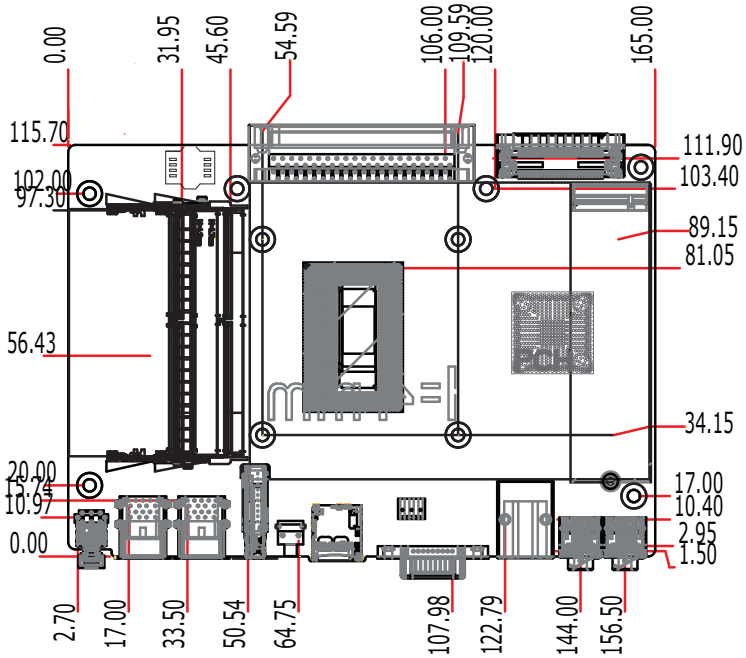
The overall dimensions of the OPS+ Module exclusive of the front panel frame is 180 x 30 x 119 mm (W x H x D). The following illustrations show the dimensions of the OPS+ Module as well as the dimension and location of the front panel screw holes:



Unit: mm

Motherboard Dimensions

The following illustration shows the overall dimensions of the motherboard and the components with their relative positions.



Unit: mm

Chapter 2 - Getting Started

Preparing the System

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

- Wireless Antennas (if wireless module is installed)
- AC power adapter
- CD-ROM drive (for installing software/drivers)

Installing Devices

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

- microSD card
- M.2 SSD card
- M.2 wireless card
- M.2 capture card

Configuring the BIOS

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

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

Installing the Operating System

Most operating system software can be installed using a DVD (and DVD burner) or bootable USB drive.
Please refer to your operating system manual for instructions on installing an operating system.

Installing the Drivers

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

Chapter 3 - Installing the Devices

Installing the OPS100-SH into a Display

Observe the following precautions and guidelines before starting any installation procedures described in this chapter:

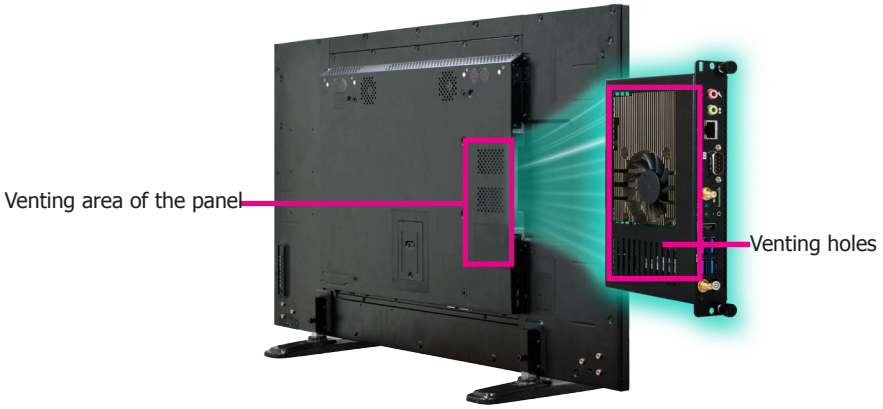
1. Make sure the system and all other peripheral devices connected to it have been powered-off.

2. Disconnect all power cords from all power sources and cables. Failure to disconnect power before you open the system or perform any procedures can result in or electrical shock or equipment damage.

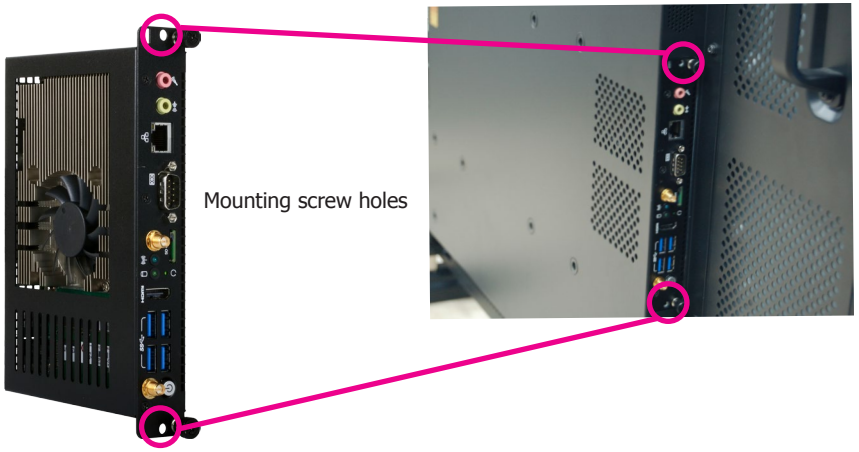
Integrating a computing system into a digital signage display is made easy by standardizing the connectors and signals between an OPS+ Module and an OPS-compliant display.

Note that the OPS+ Module does not support hot swapping; do not power on the display before the installation is complete. Please use the following steps to install the OPS+ Module into the display panel:

1. Align the OPS+ Module with the slot of the display and slide the module into the slot. Note that the venting holes should face outward to allow ambient airflow.



2. Secure the module by attaching two screws on the front panel.



3. Power on the display panel. The OPS+ Module should be automatically powered on.

Note:
The location of the OPS slot may be at the side or at the bottom of the display panel depending on the design.

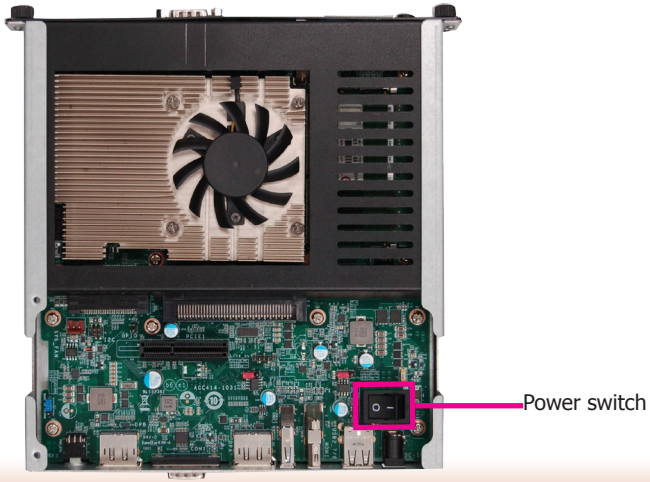
Installing the OPS100-SH into the OPS-DB

The OPS+ Module has an accompanying Docking Board and allows it to serve as a standalone computing system. The plug and unplug mechanism between the OPS+ Module and the Docking Board utilizes the combo connector at the back of the module. Please use the following steps to install the OPS+ Module into the Docking Board:

1. Align the OPS+ Module with the slot of the Docking Board and slide the module into the slot. Note that the venting holes should face upward to allow ambient airflow.

2. Secure the module by tightening the thumbscrews on the front panel.

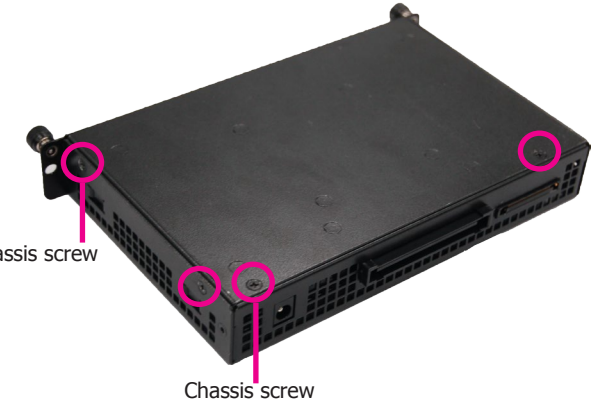
3. Connect the included AC power adapter. Turn on the system by pressing the power switch.



Removing the Chassis Cover

1. Observe the precautions at the beginning of this chapter before proceeding with the procedure. Make sure that all power cords and cables have been disconnected.

2. The 2 mounting screws on the sides and top cover of the system chassis, and the 3 screws that affix the front panel to the chassis should all be removed to open the system. Put these screws in a safe place for later use.



3. Lift the cover up to open the system.

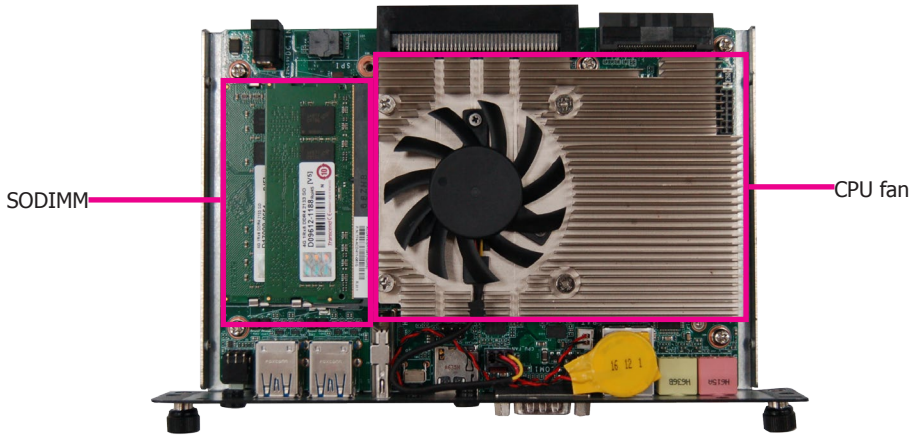
Installing a SODIMM

The SODIMM sockets are located on the top side of the system board; it can be accessed after removing the chassis cover. The memory module requirements are as follows:

- 260-pin DDR4 SODIMMs
- 2400 or 2133 MHz
- Non-ECC

To install the SO-DIMMs, follow these steps:

1. Open the system by following the "Removing the Chassis Cover" procedure.
2. Grasp the module by its edges and align the memory's notch with the socket's key; then insert the memory into the socket at an angle and push it down until the retaining clips snap into place.



Notes:

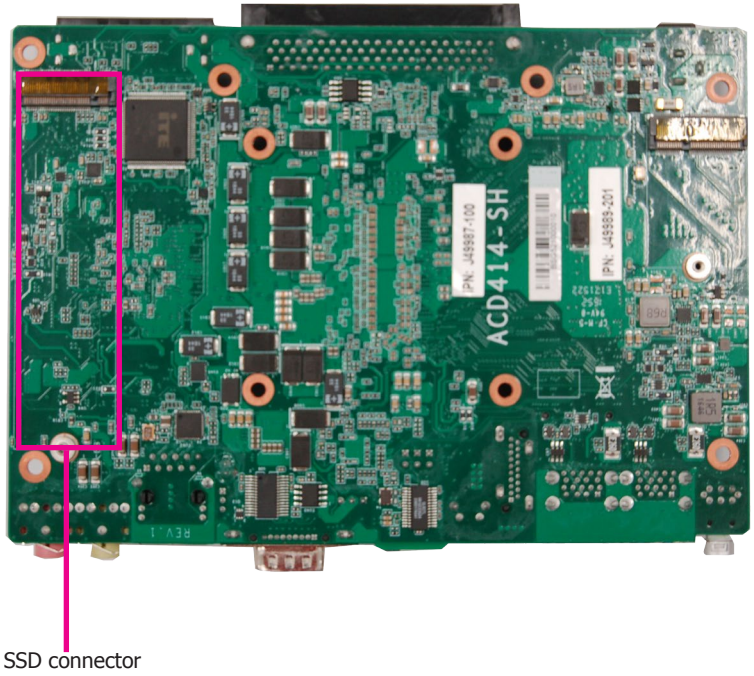
1. The system supports dual-channel configuration. To enable dual-channel, populate both SODIMM sockets.
2. The SODIMM sockets can only accept DDR4 memory modules. Please do not install other types of memory modules.

Installing an M.2 Module

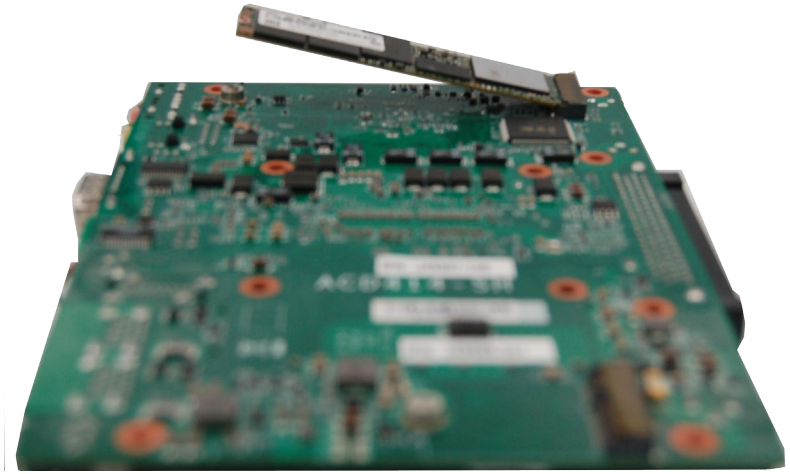
The onboard M.2 Type 2280 connector (M Key) is located on the back side of the system board. It supports SATA 3 modules (6.0 Gb/s) and M.2 PCI Express modules up to PCIe NVMe 3.0 x4. The system may come with a pre-installed Intel® Solid State Drive 600P Series available in a variety of capacities.

To install a M.2 module, follow these steps:

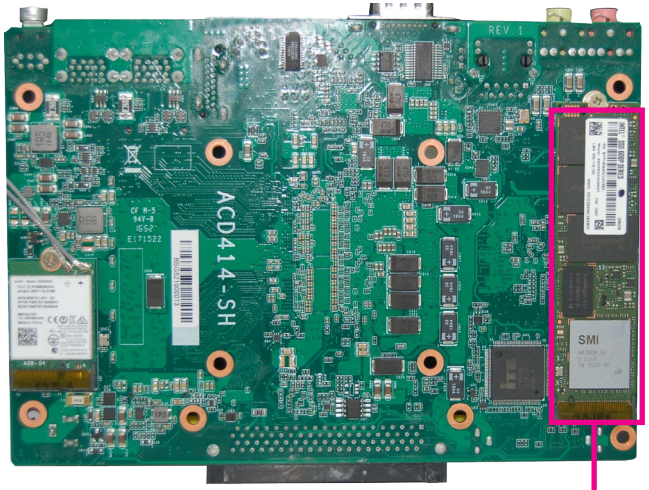
1. Grasp the module by its edges and align the notch of the M.2 module with the key in the connector.



2. Insert the M.2 module into the connector.



3. Secure the card to the riser screw on the board using the screw shipped with the M.2 module.



Installing a Wi-Fi Module

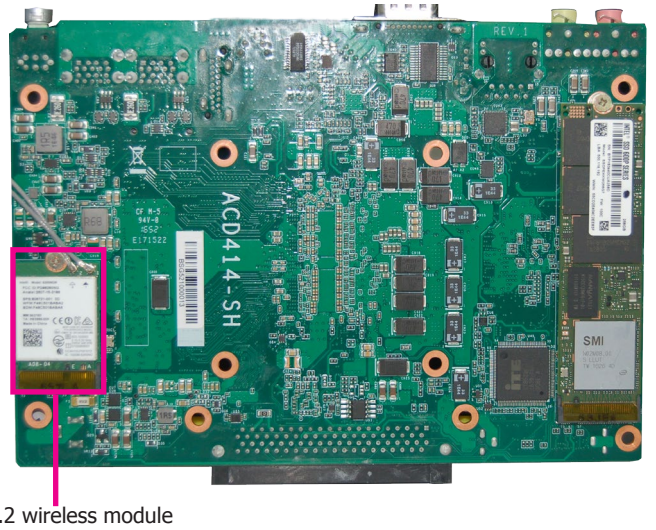
The system is also equipped with an M.2 Type 2230 connector (E Key). It supports PCIe and USB signals for wireless communication modules. The system may come with a pre-installed Intel® Dual Band Wireless-AC 8260, which complies with Wi-Fi 802.11ac and Bluetooth 4.2 standards.

To install the M.2 module, follow these steps:

1. Grasp the module by its edges and align the notch of the M.2 module with the key in the connector.

2. Insert the M.2 module into the connector.

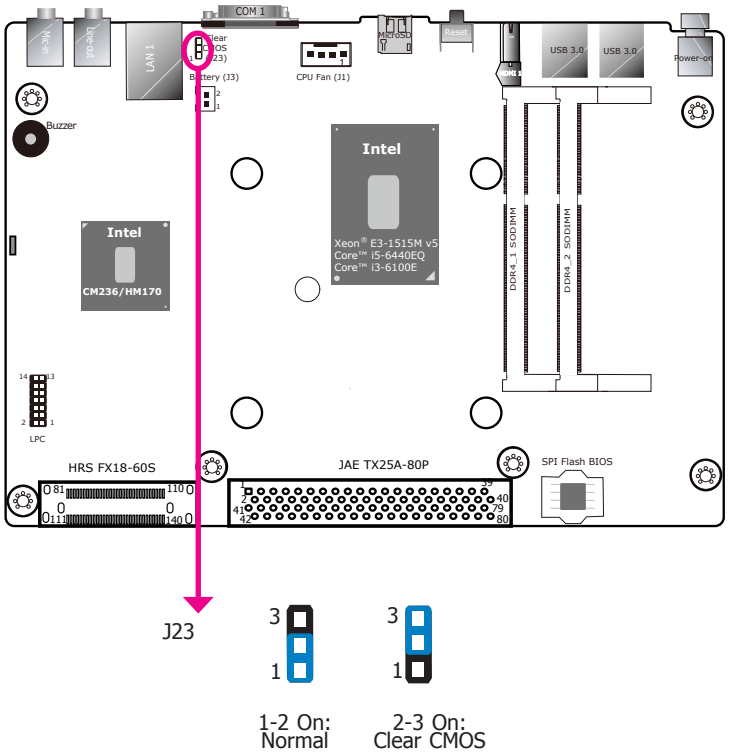
3. Secure the card to the riser screw on the board using the screw shipped with the M.2 module.



Chapter 4 - Board Layout and Jumper Settings

OPS100-SH

Clear CMOS Data



You can reconfigure the system with the default values stored in the ROM BIOS if you encounter the following situations:

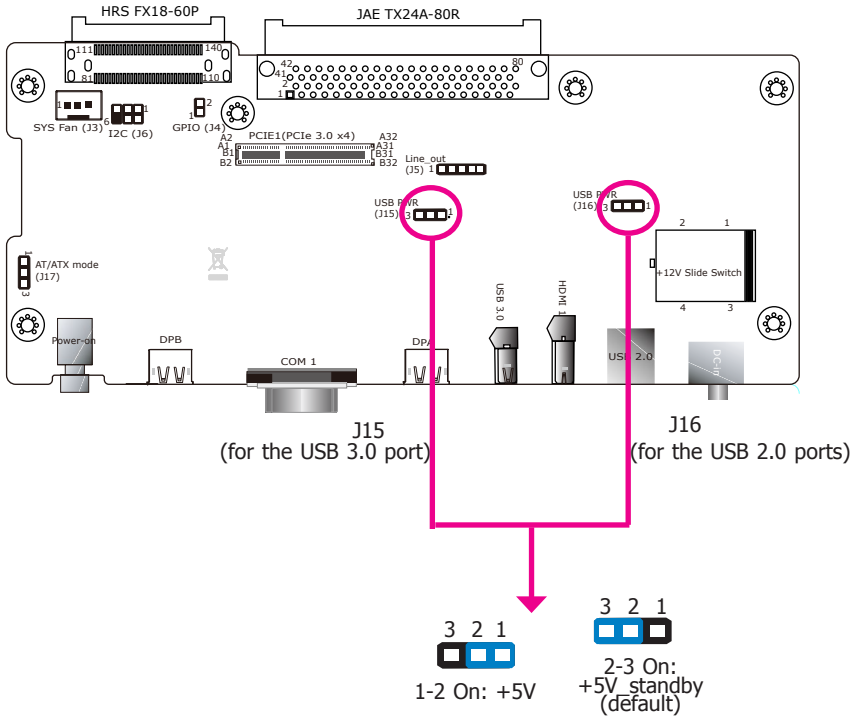
a) CMOS data becomes corrupted.
b) You forgot the supervisor or user password.

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

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

OPS-DB

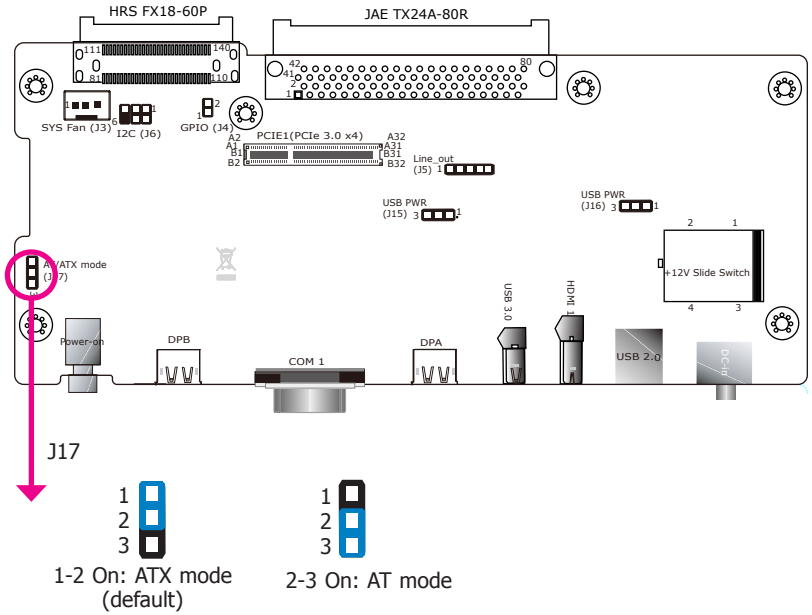
USB Power Select



J15 and J16 are used to select the power for the Docking Board's USB port 3.0 and USB ports 2.0 respectively. Selecting +5V_standby will allow you to use USB devices to wake up the system.

OPS-DB

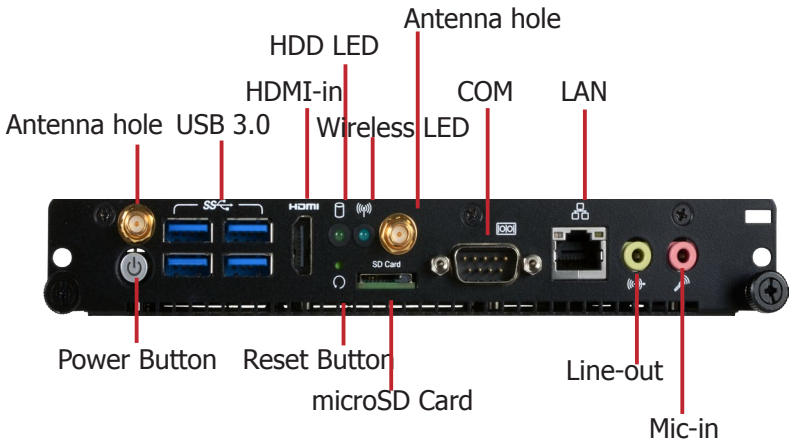
AT/ATX Mode Select



J17 is used to select the power-on mode: AT or ATX (default). The Docking Board is equipped with a hard switch to provide AT power scheme. With the AT mode, you need to manually turn off the system with the power switch; whereas in the ATX mode, the system can be powered off using the shut-down function provided by the OS.

Chapter 5 - Ports and Connectors

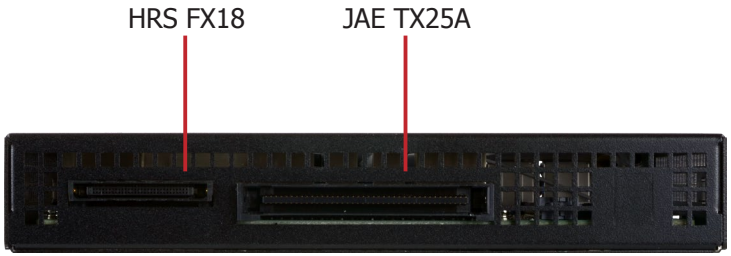
Front Panel I/O Ports



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

- Power button (green)
- Four USB 3.0 ports
- HDMI-in port
- HDD LED (green)
- Wireless LED (blue)
- Reset button
- microSD card slot
- COM (RS232) serial port
- LAN port
- Mic-in and line-out jack

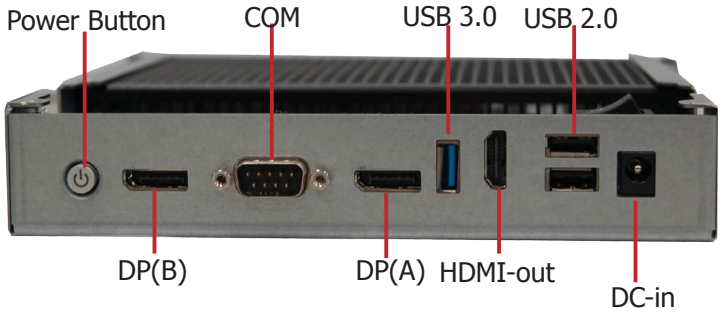
Rear Panel I/O Ports



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

- The right angle blind mate plug connector (the JAE TX25A-80P connector)
- The right angle mate plug connector (the HRS FX18-60S connector)

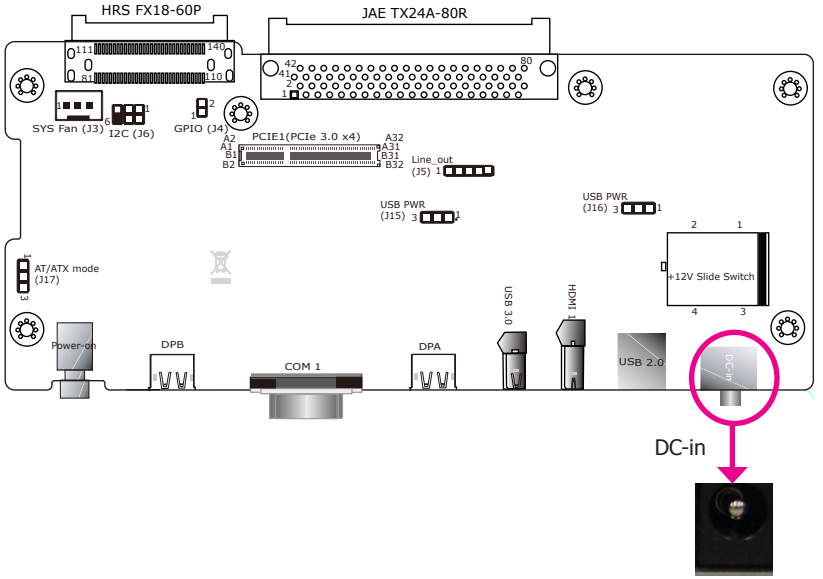
I/O Ports (OPS-DB)



The Docking Board provides these additional I/O ports:

- Two DisplayPort outputs
- HDMI-output port
- COM (RS232) serial port
- One USB 3.0 and two USB 2.0 ports
- DC-in jack

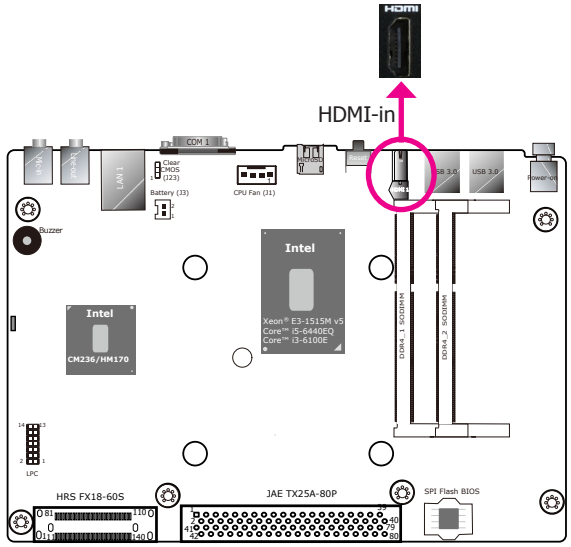
12~19V DC-in (OPS-DB)



Connect a DC power cord to this DC-in jack. Using a voltage more than the recommended range may fail to boot the system or damage the system board.

Display Interfaces (OPS100-SH and OPS-DB)

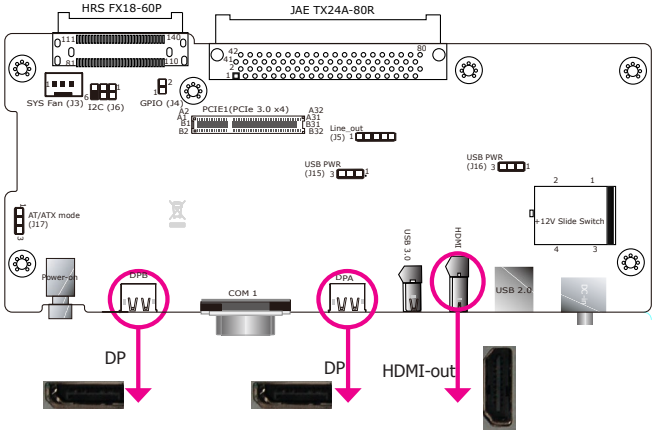
Display Interfaces (OPS100-SH)



HDMI-in Port (OPS100-SH)

The HDMI-in port can be enabled using the BIOS setup utility and be used to connect an audio/video source, such as a HDMI-compliant output of a PC, and let the signal pass through the device. The default mode for HDMI-in is disabled. You can configure its mode with the BIOS Setup Utility.

Display Interfaces (OPS-DB)



Using the Docking Board, the system supports triple display with the following output interfaces:

HDMI-out Port (OPS-DB)

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

DP Ports (OPS-DB)

The DisplayPort is a digital display interface used to connect a display device. The interface, developed by VESA and backwards compatible with VGA, DVI and HDMI, delivers higher performance than any other digital interfaces.

BIOS Setting

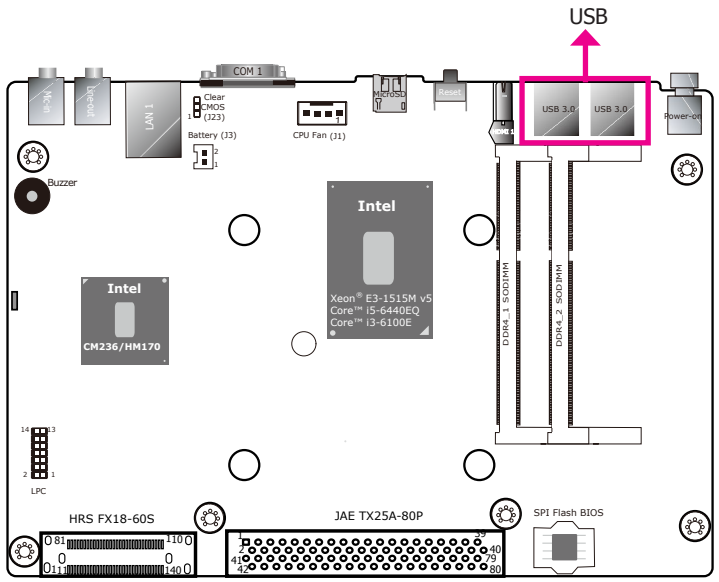
Configure the display devices in the Advanced menu ("Video Configuration" submenu) of the BIOS. Refer to Chapter 6 for more information.

Driver Installation

Install the graphics driver. Refer to Chapter 7 for more information.

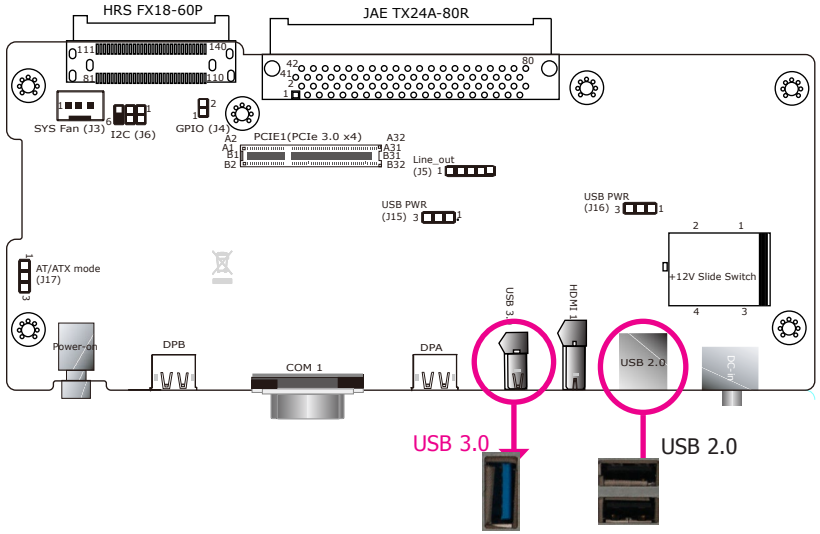
USB Ports (OPS100-SH and OPS-DB)

USB Ports (OPS100-SH)



The OPS100-SH is equipped with four USB 3.0 port. USB devices allow data exchange between your computer and a wide range of simultaneously accessible external Plug and Play peripherals.

USB Ports (OPS-DB)



The Docking Board is equipped with one USB 3.0 and two USB 2.0 ports. The USB 3.0 can transfer data up to 5 Gbps whereas the USB 2.0 can transfer data up to 480Mbps.

BIOS Setting

Configure the USB ports in the Advanced menu ("USB Configuration" submenu) of the BIOS. Refer to Chapter 6 for more information.

Driver Installation

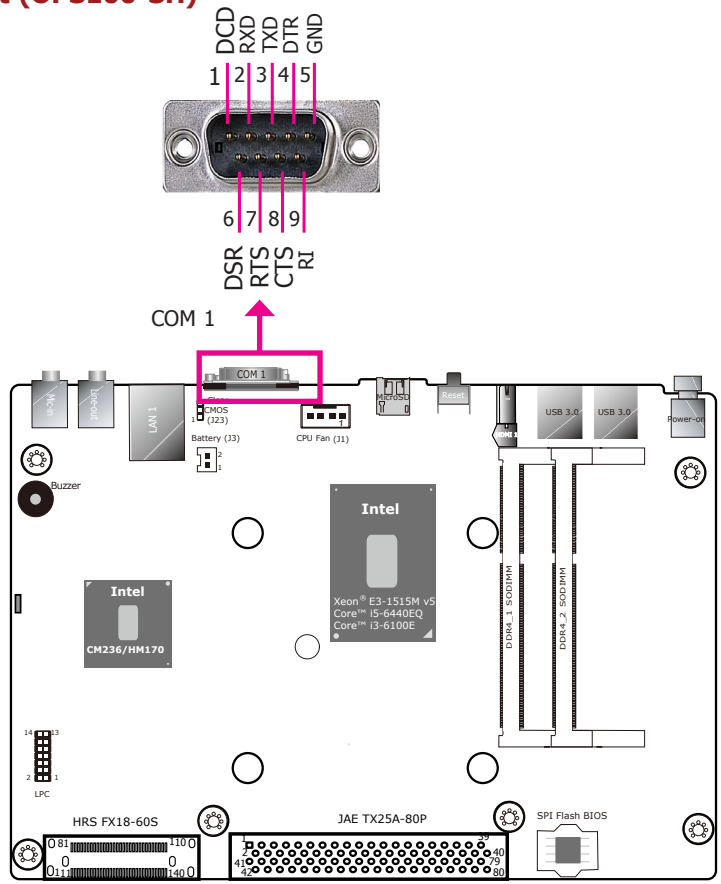
You may need to install the proper drivers in your operating system to use USB devices. Refer to Chapter 7 for more information.

Wake-On-USB Keyboard/Mouse

The Wake-On-USB Keyboard/Mouse function allows you to use a USB keyboard or USB mouse to wake up a system from the S3 (STR - Suspend To RAM) state. To use this function, you need to select power for the USB ports; refer to Chapter 4 for more information.

COM Port (OPS100-SH and OPS-DB)

COM Port (OPS100-SH)

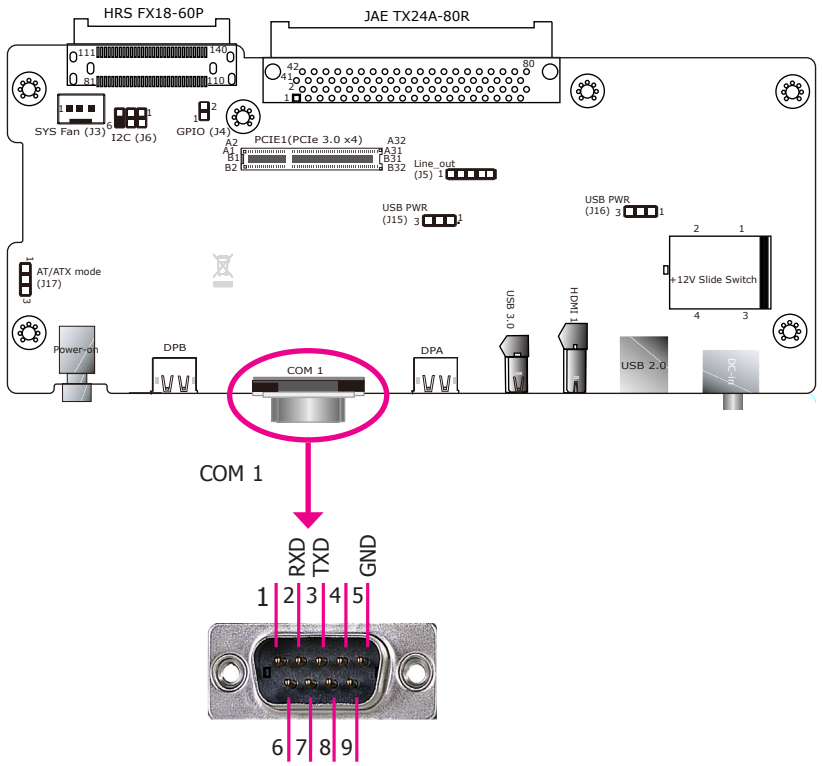


This COM port is an RS232 port and provides 9-pin serial communication.

BIOS Setting

Configure the serial ports in the "Advanced" menu (Super I/O submenu) of the BIOS. Refer to Chapter 6 for more information.

COM Port (OPS-DB)

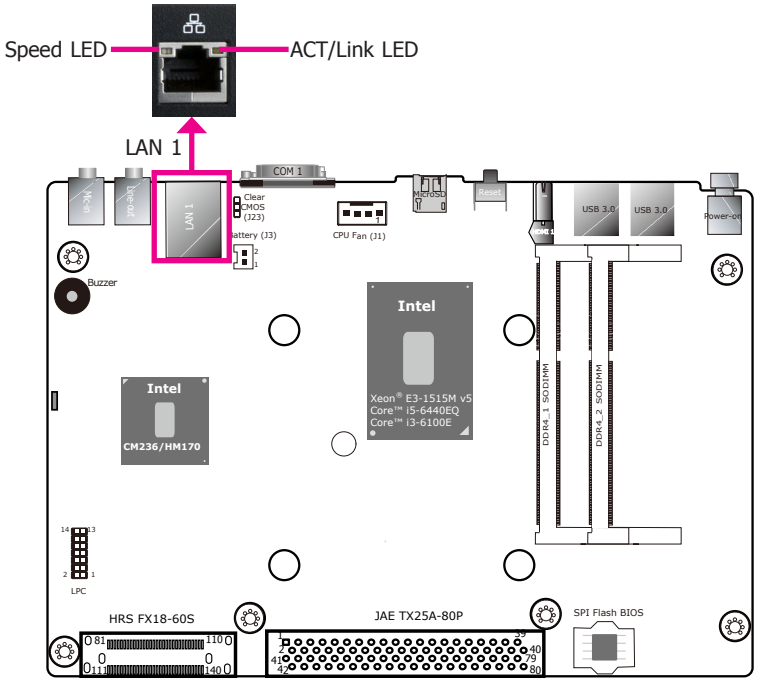


Unlike a normal 9-pin RS232 serial port, this COM port only provides RX and TX communication links.

BIOS Setting

Configure the serial ports in the "Advanced" menu (Super I/O submenu) of the BIOS. Refer to Chapter 6 for more information.

RJ45 LAN Port (OPS100-SH)



Features

- One Intel® I219LM PCI Express Gigabit Ethernet controller with support for iAMT11.6 (The SKU with the Intel® Core™ i3 processor does not support iAMT.)

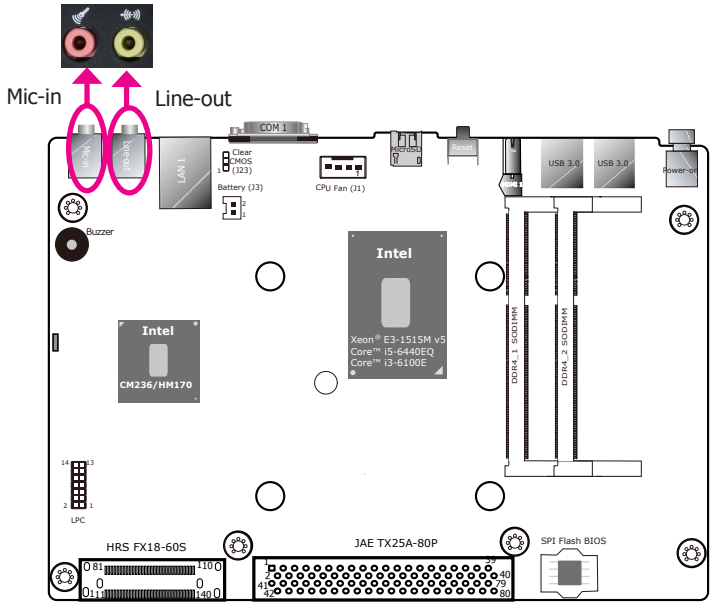
The LAN port allows the system board to connect to a local area network through an Ethernet link and enables remote system management and configurations with the Intel® Active Management Technology (AMT). Please refer to the following table for LED indications.

Activity/Link LED		Speed LED	
LED Behavior	**Description**	**LED Behavior**	**Description**
Off	No link	Off	10Mbps connection
Blinking	Data Activity	Green	100Mbps connection
On	Link	Orange	1Gbps connection

Driver Installation

Install the LAN drivers. Refer to Chapter 7 for more information.

Audio (OPS100-SH)



Front Audio

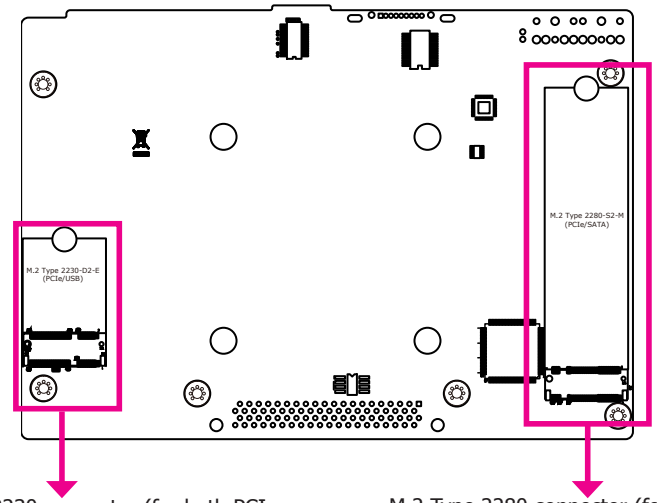
The system board is equipped with 2 audio jacks:

- Line-out Jack
  This jack is used to connect a headphone or external speakers with audio amplifiers.
- Mic-in Jack
  This jack is used to connect an external microphone.

Driver Installation

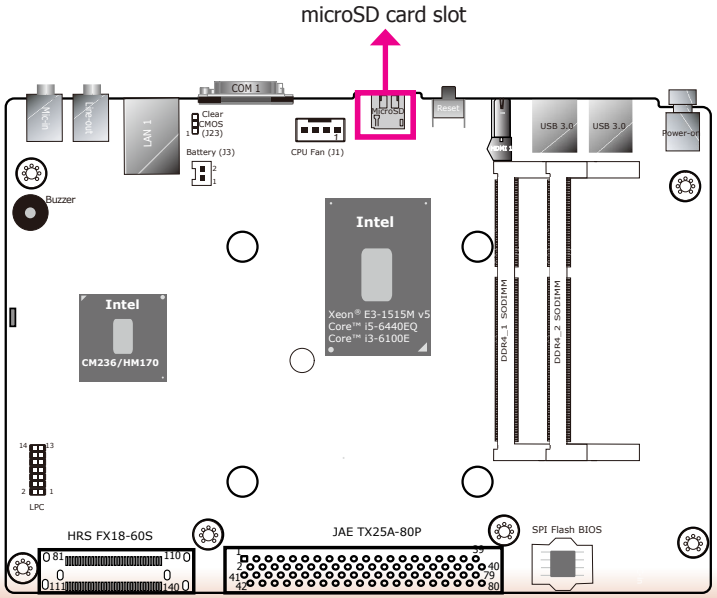
Install the audio driver. Refer to Chapter 7 for more information.

Storage and Communication Expansion Slots (OPS100-SH and OPS-DB)



M.2 Type 2230 connector (for both PCI Express and USB 2.0 interfaces)

M.2 Type 2280 connector (for both PCI Express x4 and SATA 3.0 interfaces)



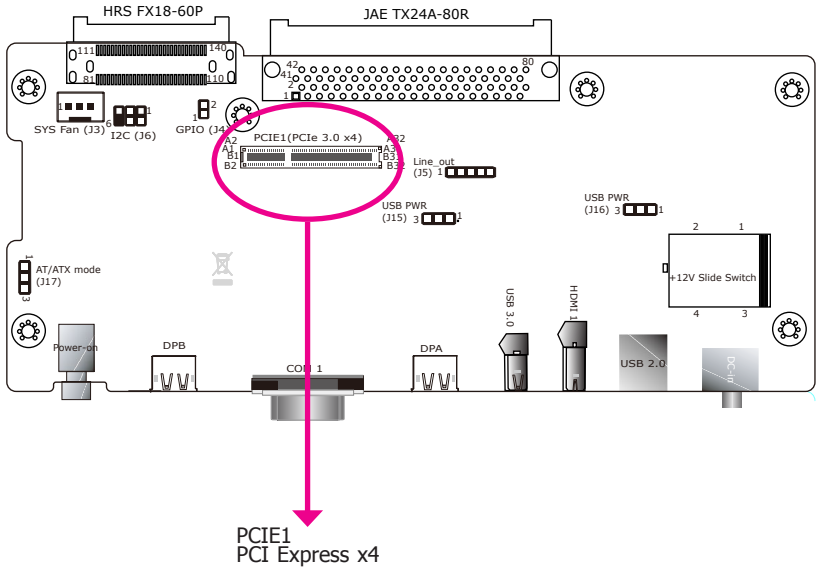
M.2 Slots (OPS100-SH)

The M.2 card slots on the back side of the system board are used to install M.2 (NGFF) modules. The M.2 Type 2280 (M Key) slot can be inserted with either an mSATA SSD card or a PCIe NVMe card with the form factor of M.2 22x80 mm. However, the PCIe Gen 3.0 x4 is capable of up to 3940 MB/s transfer speed whereas SATA 3.0 can only provide up to 600MB/s transfer speed.

The M.2 Type 2230 (E Key) slot can be inserted with a Wi-Fi module with the form factor of M.2 22x30 mm to provide wireless communication capability.

microSD Connector (OPS100-SH)

This connector supports SD specification v1.0/v1.1/v2.0 SDHC and can connect a Micro Secure Digital memory card up to 32 GB to moderately expand system capacity. In contrast to the internal M.2 slots, the microSD connector can be accessed externally.

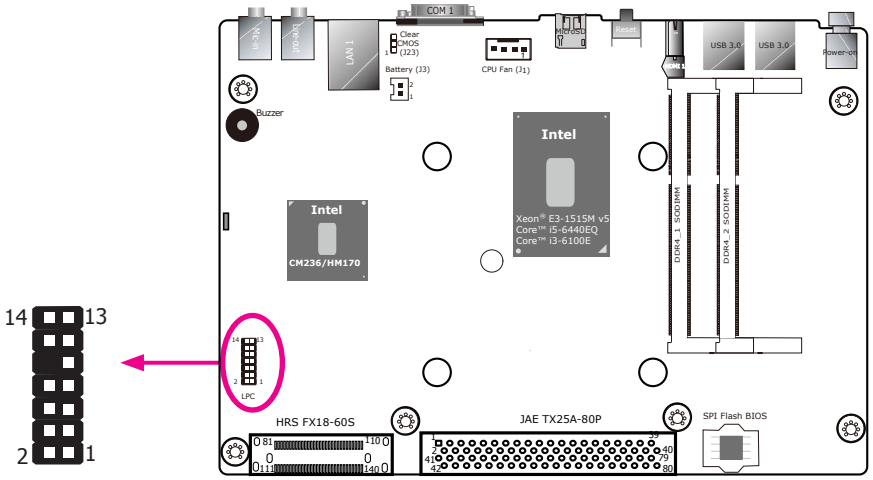


PCIe Expansion Slot (OPS-DB)

The expansion slot provides PCIe 3.0 x4 bandwidth and can be used to insert a PCIe card for storage expansion or to provide network connectivity.

Internal I/O Connectors

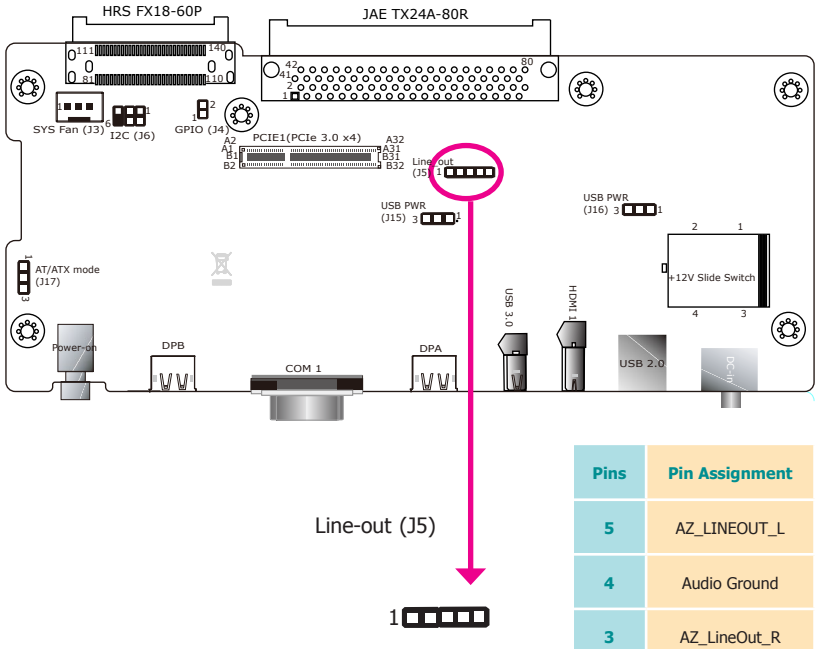
LPC Connector (OPS100-SH)



Pins	Pin Assignment	Pins	Pin Assignment
7	L_AD3	14	5V
6	3V3	13	5VSB
5	L_FRAME#	12	GND
4	L_AD0	11	INT_SERIRQ
3	L_RST#	10	Key
2	L_AD1	9	L_AD2
1	L_CLK	8	GND

The Low Pin Count Interface was defined by Intel® Corporation to facilitate the industry's transition towards legacy free systems. It allows the integration of low-bandwidth legacy I/O components within the system, which are provided by the embedded controller. It is also used to interface Trusted Platform Module (TPM) devices. For more information about LPC bus, please refer to the Intel® Low Pin Count Interface Specification. The table above indicates the pin assignments of the LPC connector.

Line-out Connector (OPS-DB)

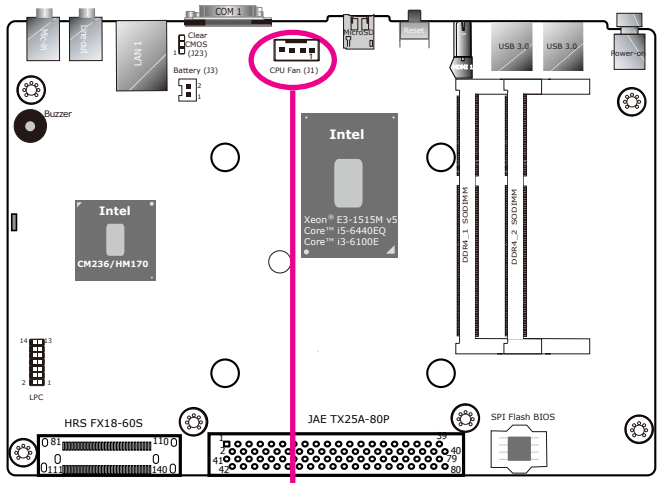


Pins	Pin Assignment
5	AZ_LINEOUT_L
4	Audio Ground
3	AZ_LineOut_R
2	No Connect
1	No Connect

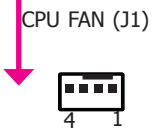
The Line-out connector provides both left and right channel for audio output.

FAN Connector (OPS100-SH and OPS-DB)

FAN Connector (OPS100-SH)

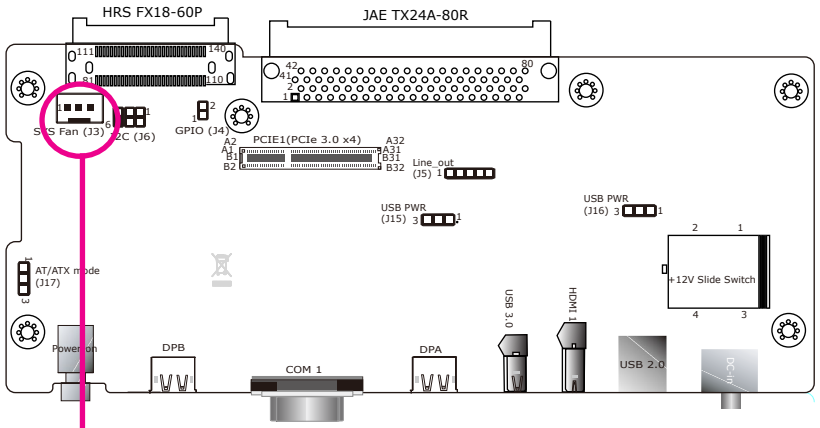


Pins	Pin Assignment
4	Speed Control
3	Sense
2	Power
1	Ground

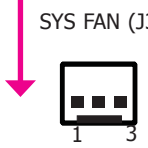


The fan connector is used to connect the cooling fan of a CPU heatsink.

FAN Connector (OPS-DB)

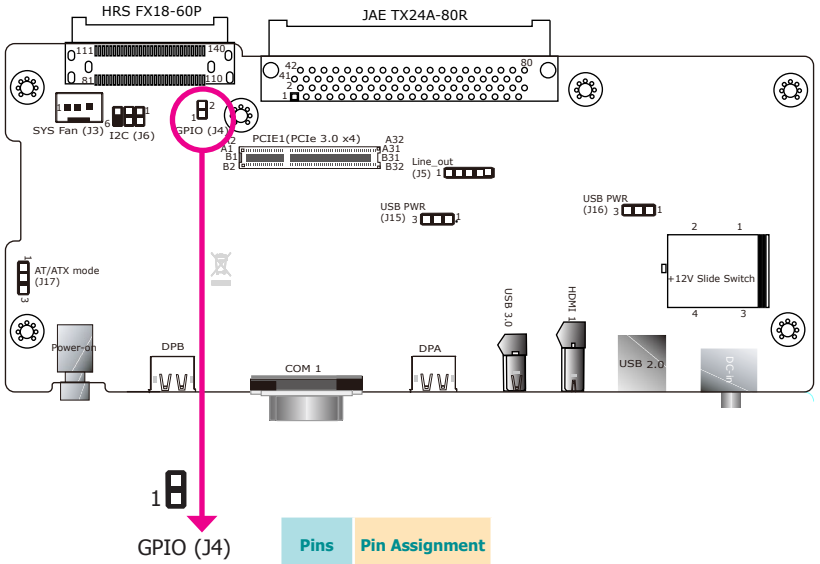


Pins	Pin Assignment
3	No Connect
2	PWM Control
1	Ground



The fan connector is used to connect a cooling fan for the system.

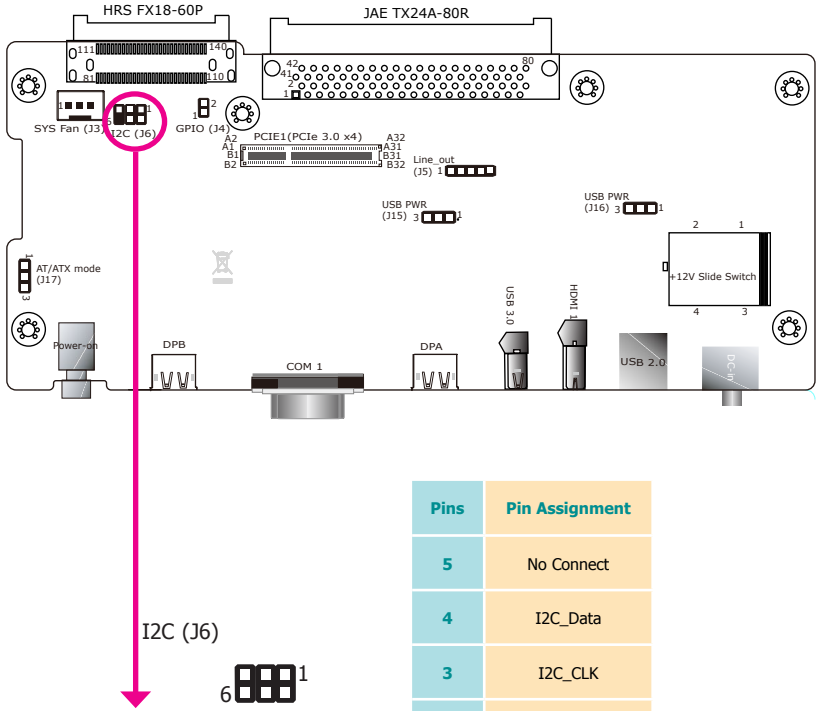
GPIO Connector (OPS-DB)



Pins	Pin Assignment
2	GPIO
1	Ground

The General-purpose input/output (GPIO) is a software-programmable and multi-purpose interface, with configurable pull-up or pull-down for each pin. The GPIOs are useful in many embedded applications to provide monitoring and control functions of connected devices.

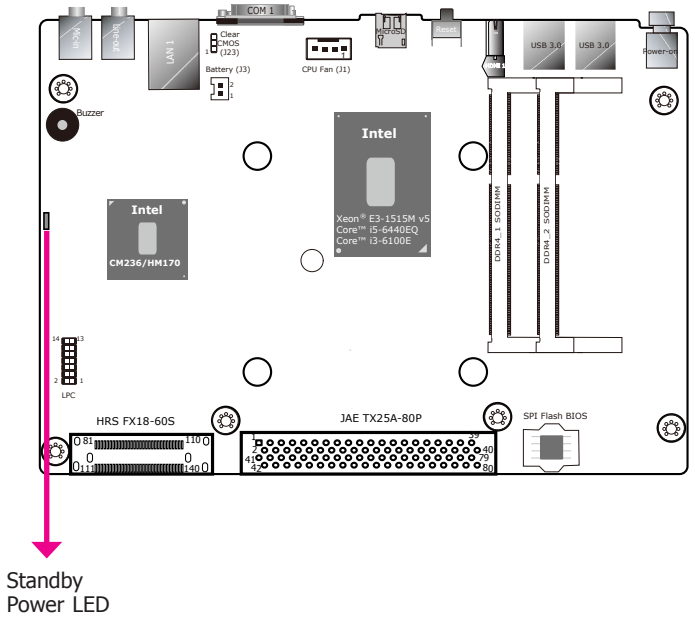
I2C Connector (OPS-DB)



Pins	Pin Assignment
5	No Connect
4	I2C_Data
3	I2C_CLK
2	Ground
1	3V3SB

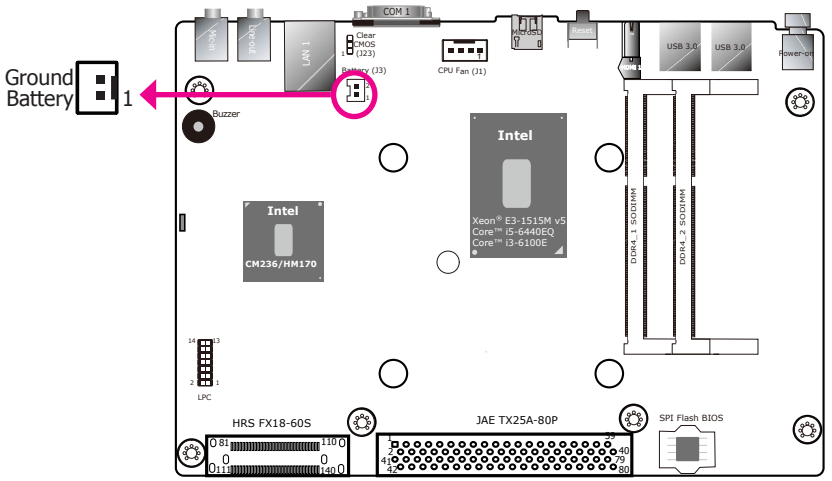
The I2C bus is a multi-device and serial communication bus. It can be used to provide short-distance communication among low-speed peripheral ICs.

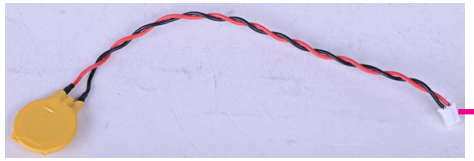
Standby Power LED (OPS100-SH)



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

Battery (OPS100-SH)





Battery

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

Safety Measures

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

The TX25A-80P Connector (OPS100-SH)

The OPS+ Module enables the integration of a pluggable module and a display panel by employing the defined interconnect based on the JAE and HRS combo plug and their receptacle connectors. The right angle blind mate plug connector (p/n: JAE TX25A-80P-LT-H1E) should be mated with the receptacle connector (p/n: JAE TX24A-80R-LT-H1E); together, they provide interfacing for the following functions:

Power: DC-IN +12V~+19V@12A max

Display Interface: 2*HDMI 2.0 (or DVI or DP, 4K at 60Hz)

Audio: left and right Channel

USB: 1*USB 3.0 and 3*USB 2.0

Control and Sensors: 1*UART and Consumer Electronics Control (CEC, note that the OPS100-SH does not support this function)

Control and Management Signals: the OPS+ Module power status, power-on via display panel, OPS+ Module detect, system fan control, and device reset.

The following table lists the pin assignments of the 80-pin JAE connector:

Pins	Pin Assignment	Description	I/O(1)	Pins	Pin Assignment	Description	I/O
40	+12V~+19V	Power	-	80	GND	Ground	-
39	+12V~+19V	Power	-	79	GND	Ground	-
38	+12V~+19V	Power	-	78	GND	Ground	-
37	+12V~+19V	Power	-	77	GND	Ground	-
36	+12V~+19V	Power	-	76	GND	Ground	-
35	+12V~+19V	Power	-	75	GND	Ground	-
34	+12V~+19V	Power	-	74	PWR_STATUS	PowerGood	OUT(OC)(2)
33	+12V~+19V/NC	Power/NC	-	73	PS_ON#	Pluggable Signal ON	IN
32	GND	Ground	-	72	PB_DET	Pluggable Board Detect	OUT
31	DVI0_HPD	DVI-D	IN	71	Not Available	Not Available	I/O
30	DVI0_DDC_CLK	DVI-D	I/O	70	AZ_LINEOUT_R	Audio-R ch	OUT
29	DVI0_DDC_DATA	DVI-D	I/O	69	AZ_LINEOUT_L	Audio-L ch	OUT
28	GND	Ground	-	68	GND	Ground	-
27	TMDS0_2+	DVI-D	OUT	67	USB_PP0	USB	I/O
26	TMDS0_2-	DVI-D	OUT	66	USB_PN0	USB	I/O
25	GND	Ground	-	65	GND	Ground	-
24	TMDS0_1+	DVI-D	OUT	64	USB_PP1	USB	I/O
23	TMDS0_1-	DVI-D	OUT	63	USB_PN1	USB	I/O
22	GND	Ground	-	62	GND	Ground	-
21	TMDS0_0+	DVI-D	OUT	61	USB_PP2	USB	I/O
20	TMDS0_0-	DVI-D	OUT	60	USB_PN2	USB	I/O
19	GND	Ground	-	59	GND	Ground	-
18	TMDS0_CLK+	DVI-D	OUT	58	StdA_SSTX+	USB3.0	OUT
17	TMDS0_CLK-	DVI-D	OUT	57	StdA_SSTX-	USB3.0	OUT
16	GND	Ground	-	56	GND	GND	-
15	DDP_HPD	DisplayPort	IN	55	StdA_SSRX+	USB3.0	IN
14	DDP_AUXP	DisplayPort	I/O	54	StdA_SSRX-	USB3.0	IN
13	DDP_AUXN	DisplayPort	I/O	53	GND	Ground	-
12	GND	Ground	-	52	UART_TXD	UART 3.3V	OUT
11	DDP_0P	DisplayPort	OUT	51	UART_RXD	UART 3.3V	IN
10	DDP_0N	DisplayPort	OUT	50	SYS_FAN	System Fan Control	OUT
9	GND	Ground	-	49	RSVD	Reserved	-
8	DDP_1P	DisplayPort	OUT	48	RSVD	Reserved	-
7	DDP_1N	DisplayPort	OUT	47	RSVD	Reserved	-
6	GND	Ground	-	46	RSVD	Reserved	-
5	DDP_2P	DisplayPort	OUT	45	RSVD	Reserved	-
4	DDP_2N	DisplayPort	OUT	44	RSVD	Reserved	-
3	GND	Ground	-	43	RSVD	Reserved	-
2	DDP_3P	DisplayPort	OUT	42	RSVD	Reserved	-
1	DDP_3N	DisplayPort	OUT	41	RSVD	Reserved	-

Notes:
(1) The I/O column definition is in reference to the OPS+ pluggable board.
(2) OC= Open Collector.

Signal Description

Here is the detailed description of each signal passing through the TX25A-80P connector.

Pin No.	Signal	I/O	Description
Power and Ground			
33, 34, 35, 36, 37, 38, 39, 40	+12V~+19V	-	The Pluggable Module supports a voltage range of +12V~+19V DC IN (mandatory). The maximum total current rating shall not exceed 12A (1A per pin). The in-rush current of the pluggable module shall not exceed 14A to ensure successful power up operation. It is mandatory for the OPS-C manufacturers to provide a Power Rating label on the Pluggable Module and/or product brief/catalog which indicates the power consumption of the module (e.g. 40W). Display manufacturers must indicate the power supply spec for OPS-C on the product brief/catalogue (e.g. 16V/4A)
3, 6, 9, 12, 16, 19, 22, 25,28, 32, 53, 56, 59, 62, 65, 68, 75, 76, 77, 78, 79, 80	GND	-	Ground
DVI-D/TMDS			
31	DVI_HPD	I	DVI Hot Plug Detect. Active High
30	DVI_DDC_CLK	I/O	Display Data Channel Signals DVI Control Data and Clock. These are single-ended control signals used for communications between the chipset DVI display port and a panel device (Sink).
29	DVI_DDC_DATA		
27	TMDS2+	O	TMDS Data Channel
26	TMDS2-		
24	TMDS1+		
23	TMDS1-		
21	TMDS0+		
20	TMDS0-		
18	TMDS_CLK+	O	TMDS Clock Channel
17	TMDS_CLK-		
DisplayPort			
15	DDP_HPD	I	Display Port Hot Plug Detect. Active High
14	DDP_AUXP	I/O	Display Port Auxiliary Channel
13	DDP_AUXN		
11	DDP_0P	O	Display Port Data Channel
10	DDP_0N		
8	DDP_1P		
7	DDP_1N		
5	DDP_2P		
4	DDP_2N		
2	DDP_3P		
1	DDP_3N		
Audio Signals			
70	AZ_LINEOUT_R	O	Audio Right Channel
69	AZ_LINEOUT_L		Audio Left Channel
USB Interface			
67	USB_PP0	I/O	USB2.0 Differential Pair
66	USB_PN0		
64	USB_PP1		
63	USB_PN1		
61	USB_PP2		USB3.0 SuperSpeed Transmitter Differential Pair
60	USB_PN2		
58	StdA_SSTX+	O	USB3.0 SuperSpeed Transmitter Differential Pair
57	StdA_SSTX-		
55	StdA_SSRX+	I	USB3.0 SuperSpeed Receiver Differential Pair
54	StdA_SSRX-		
UART Interface			
52	UART_TXD	O	Transmitted UART data from pluggable board, UART 3.3V LVTTL signal. Assign as COM 1 for the UART Port in the pluggable module.
51	UART_RXD	I	Received UART data for pluggable board, UART 3.3V LVTTL signal. Assign as COM 1 for the UART Port in the pluggable module.
OPS Control Interface			
74	PWR_STATUS	OC	Power status indication signal or Power Good status of the pluggable board. This pin shall be Open Collector and pull up to +3.3V on the docking/control board side. High: Pluggable board power off state Low: Pluggable board power on state
73	PS_ON#	I	Pluggable Signal ON: This is meant for signal initiation to power ON or boot up the Pluggable Module. PS_ON# shall be asserted at least 500ms after power is delivered from PSU to the board via the JAE connector (G3 to S5 state). Pull up to +3.3V on the pluggable board. A pulse width present on the PS_ON# shall be detected and responded to within 200ms to ensure successful operation. Use case: Power button initiation from the panel control board to the Pluggable board via, for example, IR remote control ON. The PWRBTN# pin on the Intel ICH/PCH can be utilized for this purpose. PWRBTN# has a 16 ms of internal debounce logic. External debouncing circuit is not required. Refer to the respective platform design guide and chipset datasheet. +If the pluggable board present state is S5, the transitions start as soon as the PWRBTN# is pressed (but after the debounce logic), and does not depend on when the Power Button is released. +If pluggable board present state is S0-S4 and if PWRBTN# is held low for at least four consecutive seconds, this will initiate unconditional transition to S5 state.
72	PB_DET	O	Pluggable board detection. Output signal, recommend grounded on the pluggable board side with pull up to +3.3V on the docking/control board side. High: No Pluggable Low: Pluggable board Present
71	CEC	I/O	Consumer Electronics Control for Proof of Play/Display initiative. Can also be used for display panel status detection and other control functions. *Note that the OPS100-SH does not support the CEC function.

50	SYS_FAN	O	System Fan: This signal shall be used to control the display panel system fan. Recommended pull up +3.3V on docking board side and routed to the system fan control. High: System Fan OFF Low: System Fan ON Note: This signal shall be triggered ON by the thermal management system (EC) in the pluggable module only when needed. Use case: In a situation where the display panel is in standby mode and the Pluggable Module is still operating (e.g., remote maintenance etc), the system fan solution may still be needed and since display panel is in standby mode there is no way to control the system fan. This pin therefore serves as an option to trigger the system fan to operate when necessary.
Reserved			
41, 42, 43, 44, 45, 46, 47, 48, 49	RSVD	-	These pins are RESERVED for future expansion and shall be left as No Connect(NC)

The FX18-60S Connector (OPS100-SH)

The right angle mate plug connector (p/n: Hirose FX18-60S-0.8SH) should be mated with the receptacle connector (p/n: Hirose FX18-60P-0.8SH); together, they provide interfacing for the following functions:

Power Contacts: 5V, 3V3@0.5A max

Display Interface: 1*DisplayPort 1.2 (4K at 60Hz)

PCI Express Expansion: 1*PCI-Express 3.0 x4

Control and Management Signals: 1*GPIO, 1*I2C, PHY device management signals

The following table lists the pin assignments of the 60-pin HRS connector:

Pins	Pin Assignment	Description	I/O(1)	Pins	Pin Assignment	Description	I/O
110	DDI1_TXP0			140	Hot Plug - Hot Plug Detect		
109	DDI1_TXN0			139	DDI1_TXP2		
108	GND	Ground		138	DDI1_TXN2		
107	DDI1_TXP1			137	GND	Ground	
106	DDI1_TXN1			136	DDI1_TXP3		
105	GND	Ground		135	DDI1_TXN3		
104	DDI_AUXP			134	GND	Ground	-
103	DDI_AUXN			133	GPIO	GPIO	
102	GND			132	PCIe_RST		
101	I2C1_DATA1	I2C Data	I/O	131	SLEEP_S3	PHY Status	OUT
100	I2C1_CLK	I2C Clock	OUT	130	LAN_DISABLE	PHY Status	OUT
99	GND	Ground		129	I2C_DATA_LAN	I2C/SMBus Data	I/O
98	PCIE_CLK_P	PCIe CLK	OUT	128	I2C_CLK_LAN	I2C/SMBus CLK	OUT
97	PCIE_CLK_N	PCIe CLK	OUT	127	GND	Ground	-
96	GND	Ground		126	PCIE-TXP3	PCIe	OUT
95	GND	Ground	-	125	PCIE-TXN3	PCIe	OUT
94	PCIE-RXP3	PCIe	IN	124	GND	Ground	-
93	PCIE-RXN3	PCIe	IN	123	GND	Ground	-
92	GND	Ground	-	122	PCIE-TXP2	PCIe	OUT
91	GND	Ground	-	121	PCIE-TXN2	PCIe	OUT
90	PCIE-RXP2	PCIe	IN	120	GND	Ground	-
89	PCIE-RXN2	PCIe	IN	119	GND	Ground	-
88	GND	Ground	-	118	PCIE-TXP1	PCIe	OUT
87	GND	Ground	-	117	PCIE-TXN1	PCIe	OUT
86	PCIE-RXP1	PCIe	IN	116	GND	Ground	-
85	PCIE-RXN1	PCIe	IN	115	GND	Ground	-
84	GND	Ground	-	114	PCIE-TXP0	PCIe	OUT
83	GND	Ground	-	113	PCIE-TXN0	PCIe	OUT
82	PCIE-RXP0	PCIe	IN	112	GND	Ground	-
81	PCIE-RXN0	PCIe	IN	111	PCI_E_WAKE	PHY Status	IN

Notes:
(1) The I/O column definition is in reference to the OPS+ pluggable board.
(2) OC= Open Collector.

Signal Description

Here is the detailed description of each signal passing through the FX18-60S connector.

Pin No.	Signal	I/O	Description
Display Interface			
140	DDP_HPD	I	Display Port Hot Plug Detect. Active High
139	DDI1_TXP2		Display Port Data Channels
138	DDI1_TXN2		
136	DDI1_TXP3		
135	DDI1_TXN3		
110	DDI1_TXP0		
109	DDI1_TXN0		
107	DDI1_TXP1		
106	DDI1_TXN1		
104	DDI_AUXP		Display Port Auxiliary Channel
103	DDI_AUXN		
PCIe Interface			
132	PCIe_RST	I	
126	PCIE-TXP3	O	PCI Express Differential Transmit Pair Signals
125	PCIE-TXN3	O	
122	PCIE-TXP2	O	
121	PCIE-TXN2	O	
118	PCIE-TXP1	O	
117	PCIE-TXN1	O	
110	PCIE-TXP0	O	
109	PCIE-TXN0	O	
111	PCI_E_WAKE	I	Wake Indicator from PCI-E PHY Device
96	PCIE_CLK_P	O	100-MHz PCIe 3.0 specification compliant differential output clocks to PCIe devices
97	PCIE_CLK_N	O	
94	PCIE-RXP3	I	PCI Express Differential Receive Pair Signals
93	PCIE-RXN3	I	
90	PCIE-RXP2	I	
89	PCIE-RXN2	I	
86	PCIE-RXP1	I	
85	PCIE-RXN1	I	
82	PCIE-RXP0	I	
81	PCIE-RXN0	I	
I2C/GPIO interface (5pins – 2 used for LAN Control)			
133	GPIO	I/O	General purpose Input Output, 3.3V
129	I2C_DATA_LAN	I/O	System Management Data Link to external PHY
128	I2C_CLK_LAN	I/O	System Management Clock Link to external PHY
101	I2C1_DATA1	I/O	I2C bus data
100	I2C1_CLK	O	I2C bus clock
LAN Control Interface (5 pins)			
130	LAN_DISABLE	O	It should be connected to LAN_DISABLE_N on the PHY. PCH will drive it low to put the PHY into a low power state when functionality is not needed.
129	I2C2_DATA_LAN	I/O	System Management (I2C/SMBus) Data Link to external PHY
128	I2C2_CLK_LAN	I/O	System Management (I2C/SMBus) Clock link to external PHY
131	SLEEP_S3	O	LAN sub-system sleep control. When it is deasserted it indicates that the PHY device must be powered. When it is asserted, power can be shut off to the PHY device.
111	PCIE_WAKE	I	Wake Indicator from PCI-E PHY Device

Chapter 6 - 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, repeatedly press "Delete" to enter the setup utility. If the message disappears before you respond, restart the system or press the "Reset" button. You may also restart the system by pressing the <Ctrl> <Alt> and <Del> keys simultaneously.

Legends

Keys	Function
Right and Left arrows	Moves the highlight left or right to select a menu.
Up and Down arrows	Moves the highlight up or down between submenu or fields.
<Esc>	Exit to the BIOS Setup Utility.
<F1>	Help
<F5>	Change values
<F6>	Change values
<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.

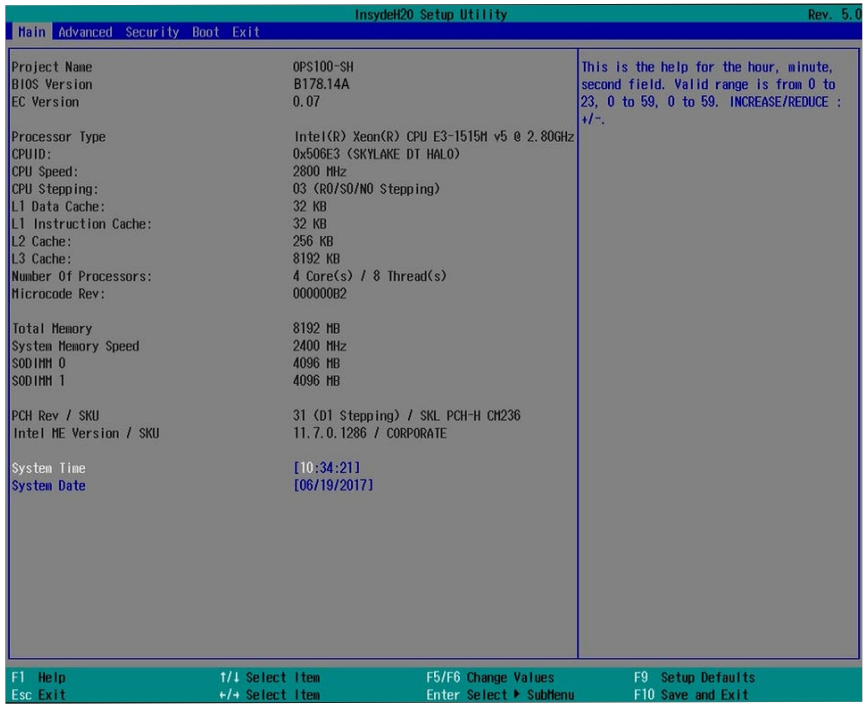
Submenu

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.

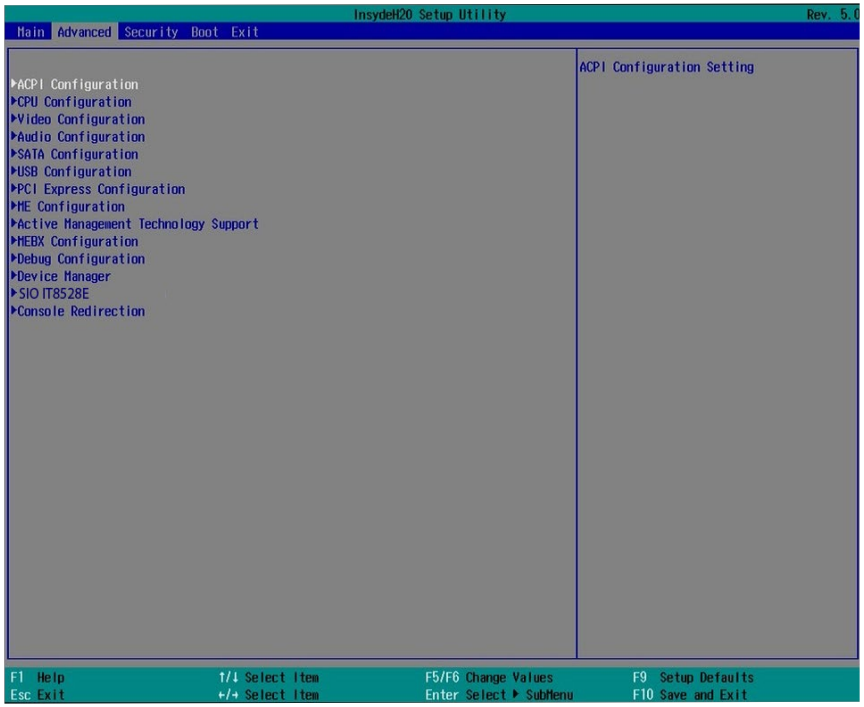
System Date

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

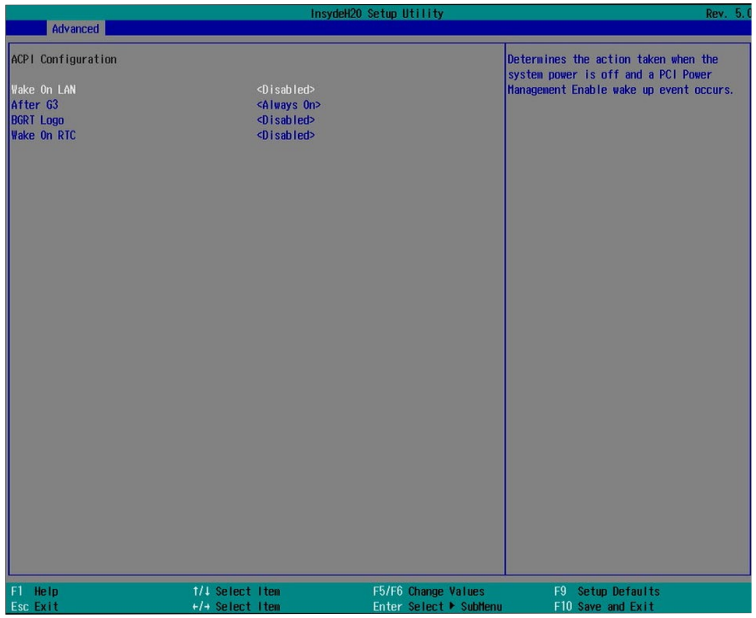
The Advanced menu allows you to configure your system for basic operation. Some entries are defaults required by the system board, while others, if enabled, will improve the performance of your system or let you set some features according to your preference.

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



ACPI Settings

This section configures system ACPI parameters.



Wake on LAN

Enable or disable WOL (wake-on-LAN) to wake the system through the Ethernet adapter.

State After G3

This field is to specify which state the system should be in when power is re-applied after a power failure (G3, the mechanical-off, state).

Always On The system is powered on.

Always Off The system is powered off.

BGRT Logo

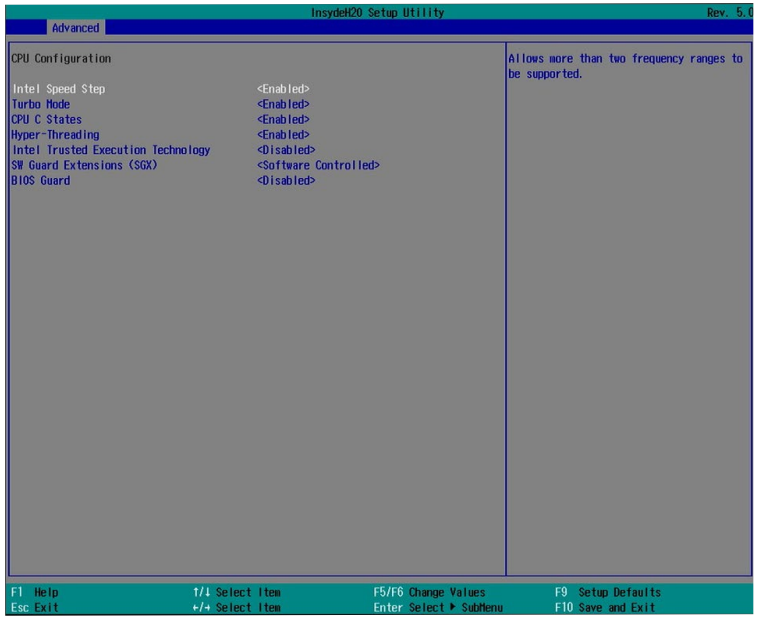
Enable or disable the display of an operating system logo or image during boot using the BGRT (Boot Graphics Resource Table) mechanism.

Wake on RTC

Automatically power the system on at a particular time every day from the Real-time clock battery. Specify the wake up time of the day below: <hour>, <minute>, <second>.

CPU Configuration

This section configures the CPU.



Intel® SpeedStep™

Enable or disable the Enhanced Intel SpeedStep® Technology, which helps optimize the balance between system's power consumption and performance. After it is enabled in the BIOS, you can take advantage of its offering by setting power schemes from the operating system's power options.

Turbo Mode

Enable or disable processor turbo mode, which allows the processor core to automatically run faster than the base frequency by taking advantage of thermal and power headroom. Note this option is not available on the Core™ i3 processor.

CPU C States

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

Hyper-Threading

Enable Intel® Hyper-Threading Technology (HT) on the processor to improve performance of operating systems and software that are optimized for hyper-threading technology. Please check the software specifications to determine if enabling HT can be advantageous to the overall system performance.

Intel® Trusted Execution Technology

Enable Trusted Execution Technology on the processor to defend against malicious attacks by validating the integrity of the system. Note that the default setting is disabled. Before you enable this feature, please enable and provision the TPM first. For more information, please contact technical support. Note this option is only available for the Xeon® processor.

SW Guard Extensions (SGX)

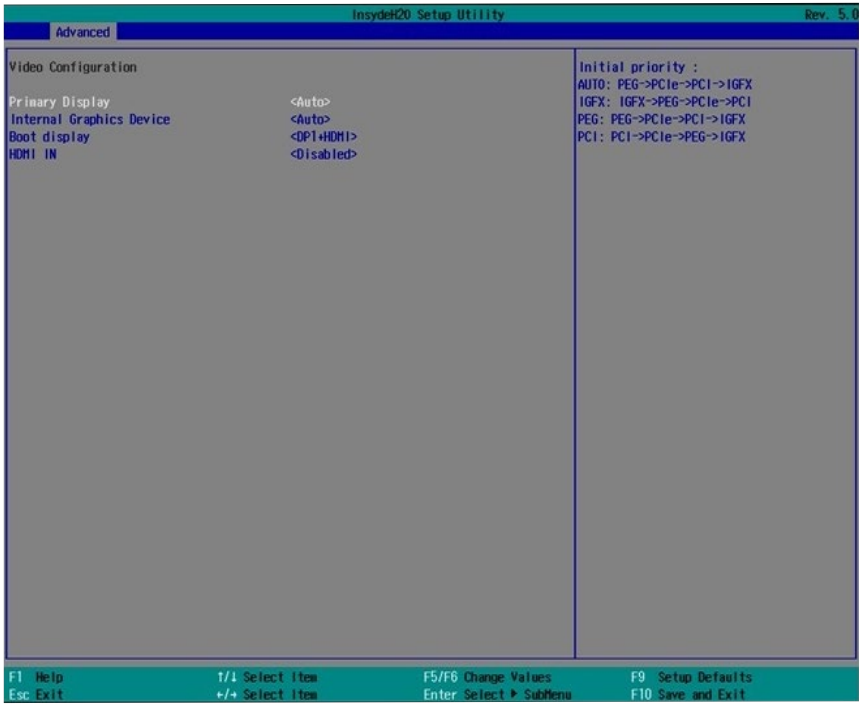
Enable Intel® SW Guard Extensions (SGX) on the processor to help protect application IP and data. Alternatively, select "Software Controlled" to enable or disable this feature by individual software program. Intel SGX is a set of new CPU instructions that can be used by applications to set aside private regions of code and data. Note this option is only available for the Xeon® processor.

BIOS Guard

Enable BIOS Guard to guard against BIOS recovery attacks and ensure that updates to the BIOS and Embedded Controller are authenticated and secure. Note this option is only available for the Xeon® processor.

Video Configuration

This section configures the video settings. Note that the configuration options may vary depending on the "Boot type" selected in the "Boot" menu.



Primary Display

Select the primary display for the system. The options are Auto or IGFX (internal graphics). The order of video device initialization will be as follows:

Auto mode: PEG (PCIe Graphics devices connected to PEG lanes directly routed from the CPU)->PCIe graphics devices->PCI graphics devices->IGFX (internal graphics)

IGFX: IGFX (internal graphics)->PEG (PCIe Graphics devices connected to PEG lanes directly routed from the CPU)->PCIe graphics devices->PCI graphics devices

Note that this option is only shown if the "Boot type" is set to "Dual" or "UEFI".

Internal Graphics Device

Enable, disable or automatically detect the internal graphics.

Boot display

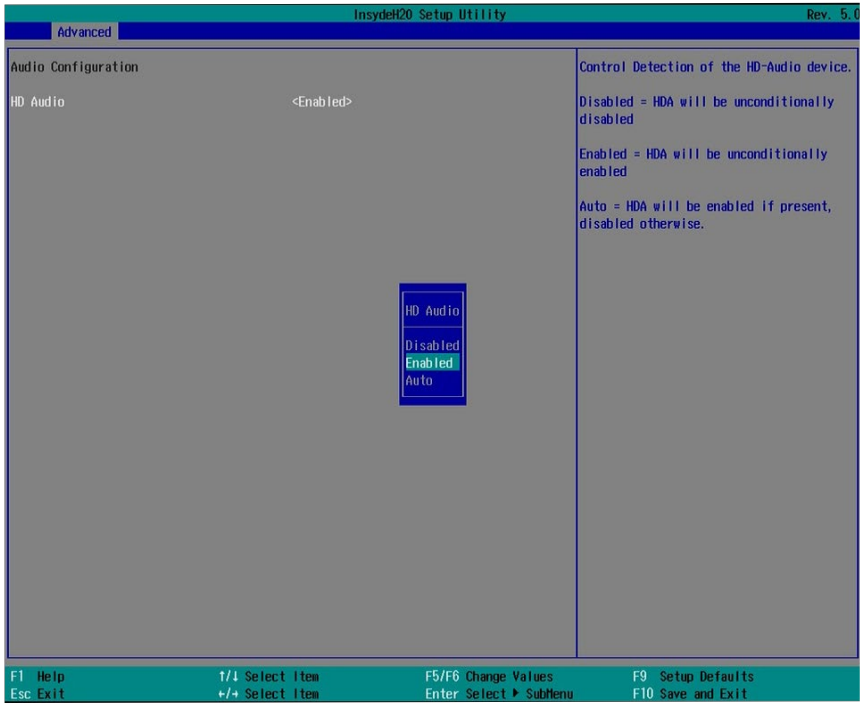
Prioritize device combination for display during system boot. Note that this option will be shown only if the "Boot type" is set to "Dual" or "Legacy".

HDMI-in

Enable the HDMI-in option to let the HDMI signal pass through the system by connecting an HDMI-compliant source device to the front HDMI-in port. The default is disabled.

Audio Configuration

This section configures the audio settings.



HD Audio

Control the detection of the high-definition audio devices.

Disabled

High-definition audio devices will be unconditionally disabled.

Enabled

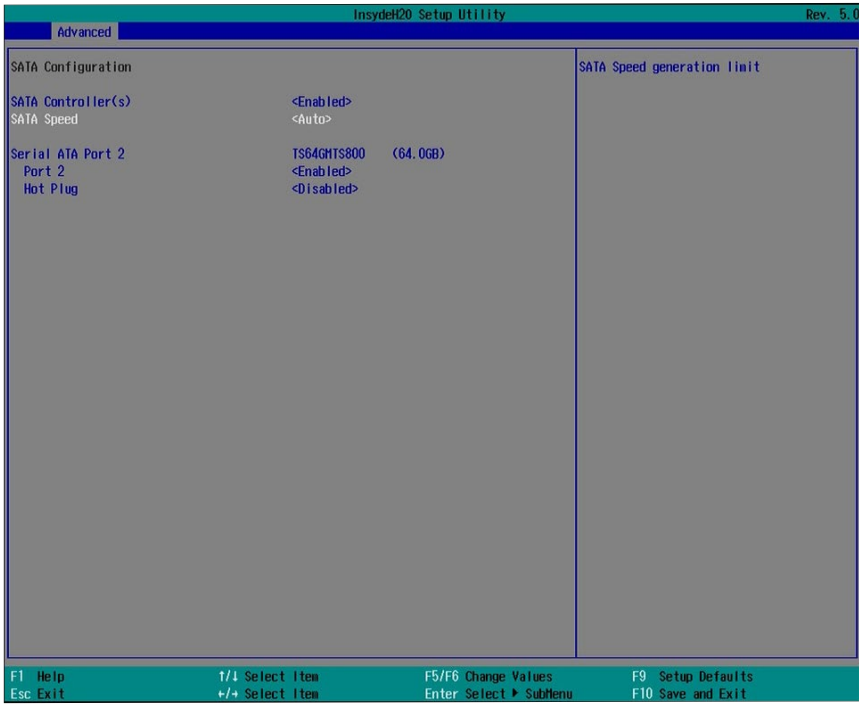
High-definition audio devices will be unconditionally enabled.

Auto

High-definition audio devices will be enabled if present and disabled otherwise.

SATA Configuration

This section configures SATA controllers.



SATA Controller(s)

Enable or disable Serial ATA controllers.

SATA Speed

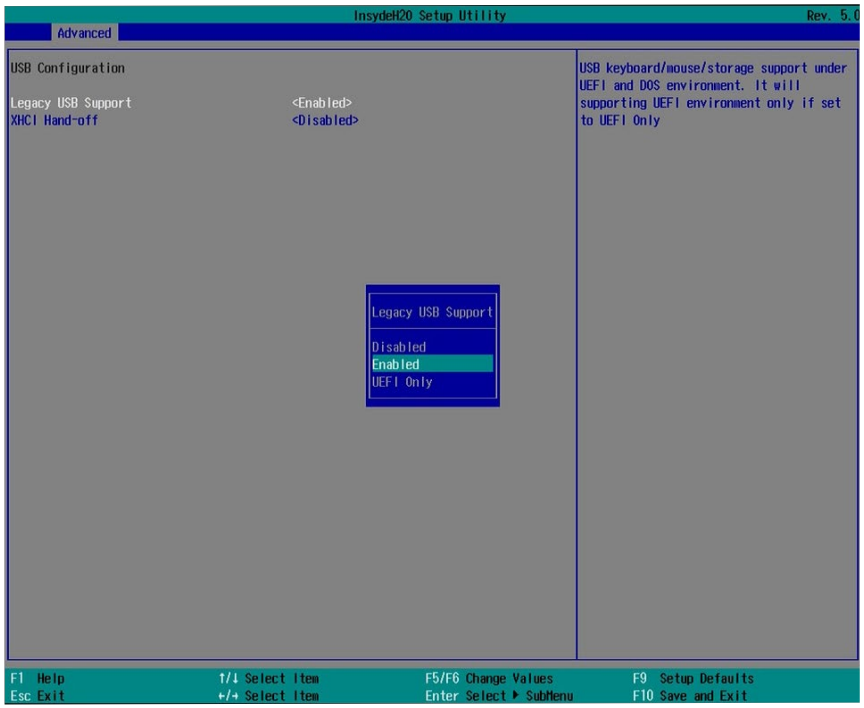
Select Serial ATA device speed. The options are Gen1 (1.5 Gbit/s), Gen2 (3 Gbit/s), Gen3 (6 Gbit/s) or auto.

Serial ATA Port 2 Hot Plug

Enable or disable each Serial ATA port and its hot plug function. Note this SATA port controls the SATA signal of the M.2 Type 2280 connector on the system board. Therefore, if a PCIe NVMe SSD is used instead of an mSATA SSD, this option will not be shown.

USB Configuration

This section configures the parameters of the USB devices.



Legacy USB Support

Disabled

Disable USB keyboard/mouse/storage support.

Enabled

Enable USB keyboard/mouse/storage support.

UEFI Only

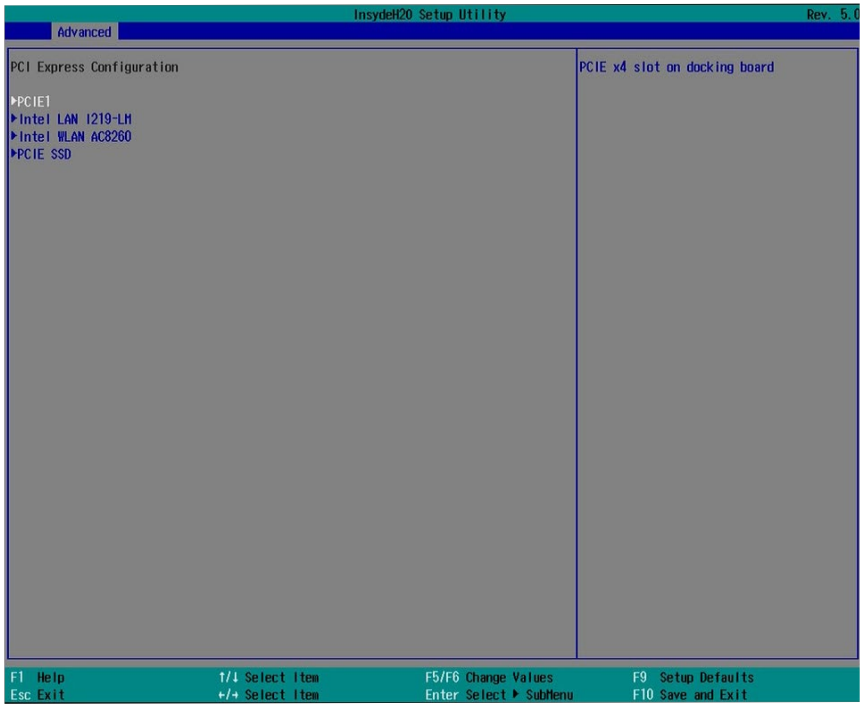
Enable USB keyboard/mouse/storage support only under UEFI environment.

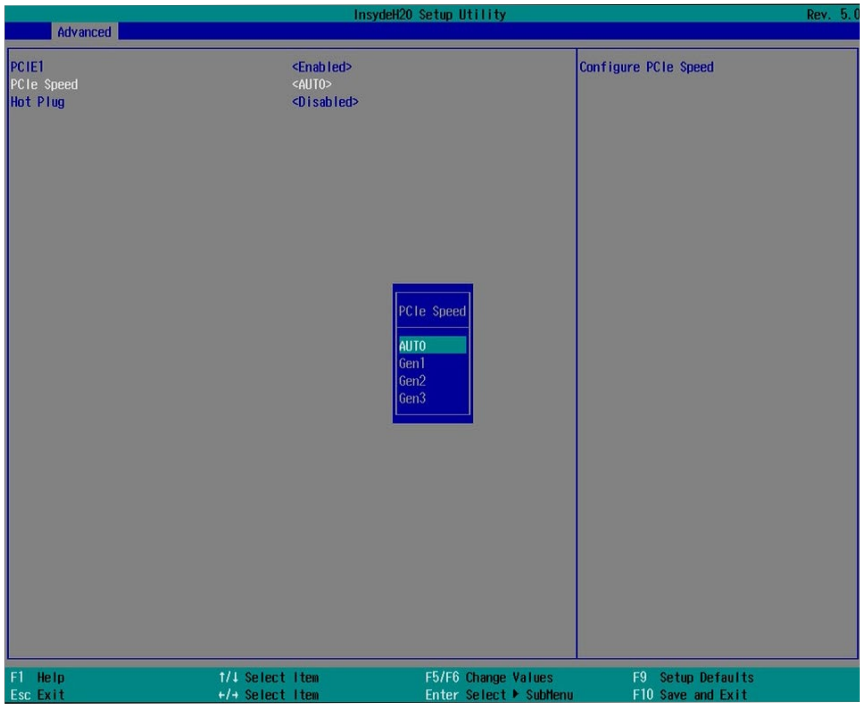
XHCI Hand-off

Enable this item for operating systems that do not support xHCI Hand-off. The XHCI ownership change will be claimed by the XHCI driver.

PCI Express Configuration

This section configures the settings of PCI Express root ports.





PCI Express Configuration

Select a PCI Express root port and press "Enter" to configure.

PCIE1 (denotes the PCIe x4 slot on the Docking Board) /Intel LAN I219-LM/ Intel WLAN AC8260 (pre-installed on the M.2 Type 2230 connector)/PCIE SSD (denotes the M.2 Type 2280 connector)

For each PCIe root port, configure the following parameters:

Enable/Disable

Enable or disable this PCI Express root port.

PCIe Speed

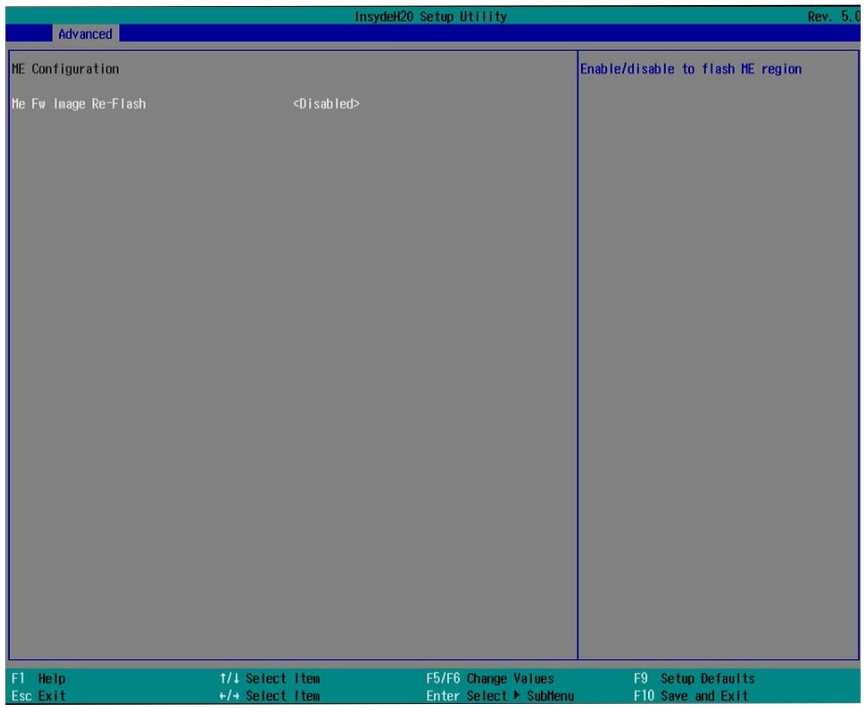
Select the speed of the PCI Express root port: Auto, Gen1 (2.5 GT/s), Gen2 (5 GT/s) or Gen3 (8 GT/s).

Hot Plug

Enable or disable the hot plug function of the PCIe root port.

ME Configuration

This section configures flashing of the Intel® Management Engine.



Me Fw Image Re-Flash

Enable or disable Intel® Management Engine firmware flashing when updating the BIOS.

Active Management Technology Support

The section allows you to enable or disable the Intel® Active Management Technology (Intel® AMT) BIOS extension. Refer to Chapter 8 - Intel AMT Settings for more information. Note that this function is not available for the Intel® Core™ i3 processor.

Intel AMT Support

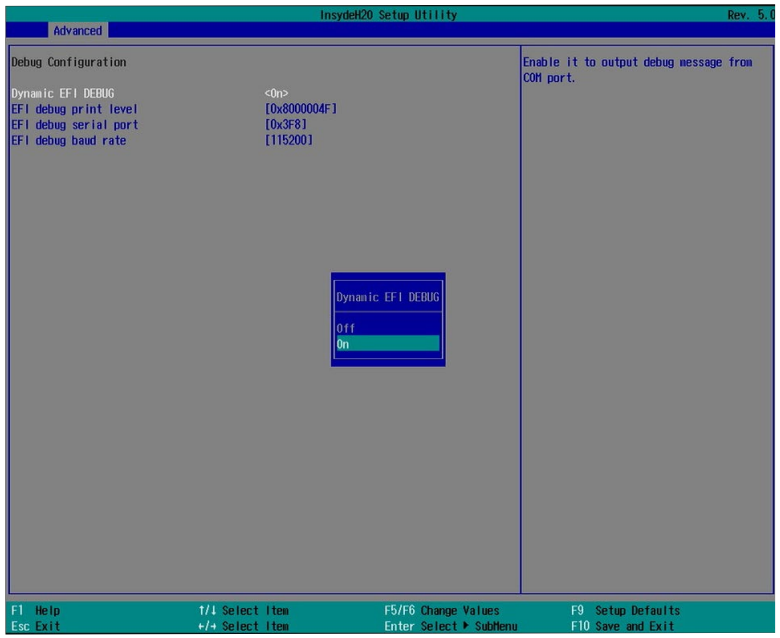
Enable or disable Intel® Active Management Technology BIOS extension.

Un-Configure ME

Clears all ME related configurations without requiring a password on the next boot.

Debug Configuration

This section configures the debug function.



Dynamic EFI Debug

Enable or disable output of the log messages for debugging through a serial port.
If you select to enable this function, please set a serial port for this purpose with the following parameters:

EFI debug print level

Enter or choose the desired print level for displaying different type of log messages. The options are as follows:

0x00000001: Display messages of system initialization
0x00000002: Display warning messages
0x00000004: Display messages of Load events
0x00000008: Display messages of EFI File system
0x00000040: Display informational debug messages
0x80000000: Display Error messages
0x8000004F: Display all types of messages shown above (This is the default.)

EFI Debug serial port

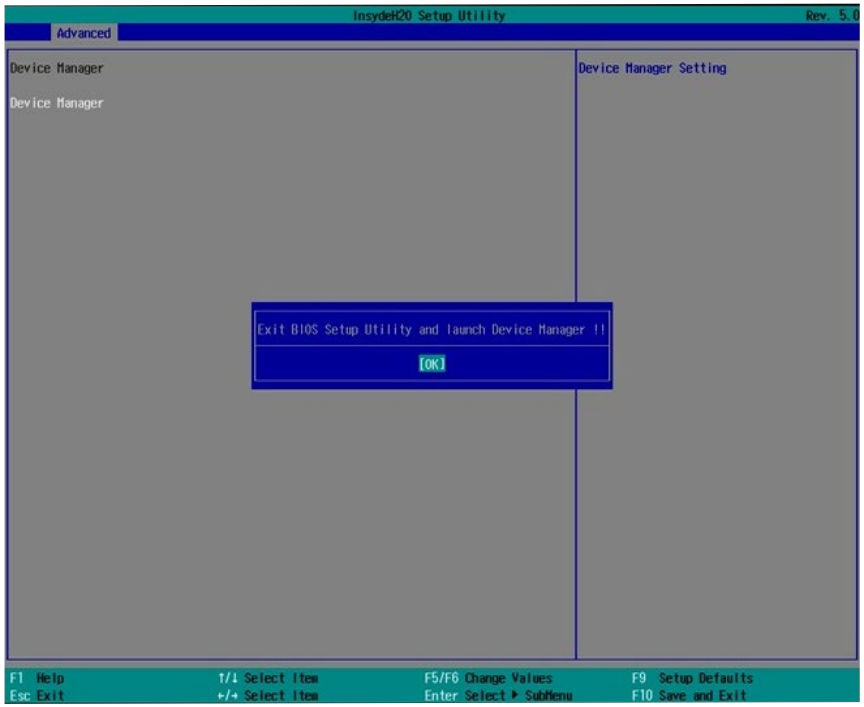
Enter or choose the serial port number for message output. The options are COM1 (0x3F8)/ COM2 (0x2F8). The default is 0x3F8.

EFI Debug baud rate

Enter or choose the baud rate for serial communication. The default is 115200.

Device Manager

This Device Manager menu is used to configure UEFI network settings when the "Network Stack" is enabled in the "Dual" or "UEFI" boot mode. Refer to the "Boot" section in this chapter. To access this menu, go to "Advanced">"Device Manager". The screen will warn you that you are going to exit the BIOS setup utility.

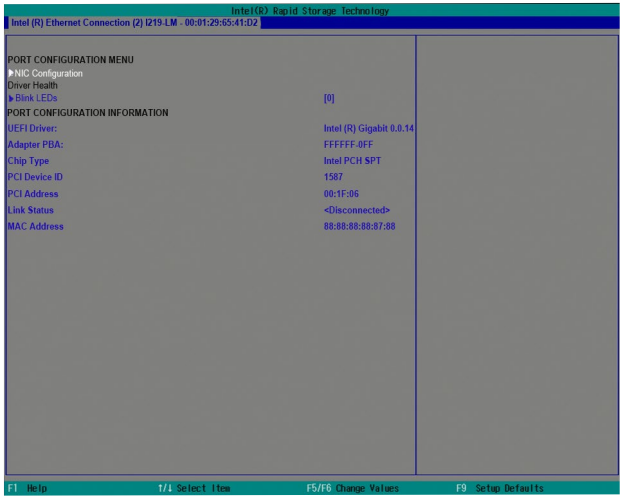


Network Device List

The "Device Manager" screen is displayed. And if the "Network Stack" or the "PXE Boot to LAN" option is enabled from the "Boot" menu, the "Network Device List" should be shown in the "Device list". Select "Network Device List" to view all of the detected network devices. For each network device, you can select to view and configure its settings. In addition, you can select either the IPv4 or IPv6 network settings for UEFI network configurations.

Port Configuration Menu

This screen shows hardware information for the Ethernet controllers and configures their operation.



Blink LEDs

Enter the duration (seconds) for the Ethernet's ACT LED to blink to indicate its presence.

NIC Configuration

This screen configures the Ethernet controller. Select the link speed from the following options: Auto Negotiated, 10Mbps Half, 10Mbps Full, 100Mbps Half, and 100Mbps Full.

IPv4 Network Configuration

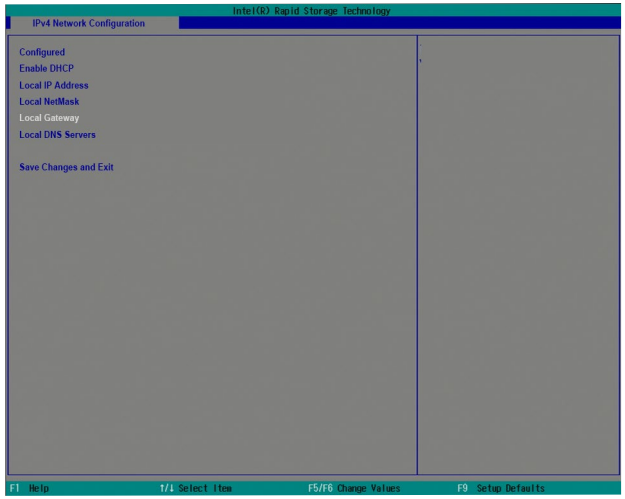
This screen configures the IP addressing method (DHCP or static IP). For static IP addressing, configure the following:

Local IP address and subnet mask: Enter the IP address for the network device in the IPv4 format:

x . x . x . x (x must be a decimal value between 0 and 255).

Local Gateway: Enter the gateway address in the IPv4 format.

Local DNS (Domain Name System) Servers: Enter DNS (Domain Name System) server IP addresses in the IPv4 format.



IPv6 Network Configuration

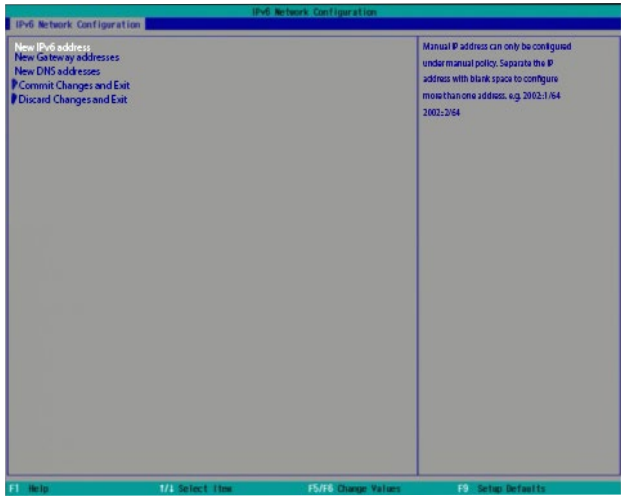
If you select to use IPv6 network settings, enter the Interface ID (64 bit).
Policy: Select either automatic or manual. And select "Advanced Configuration" to configure IPv6 network address manually if the manual option is selected.

New IPv6 address: Enter the IP address for the network device in the IPv6 format:

x : x : x : x : x : x : x : x : x (x can be any hexadecimal value between 0 and FFFF). Place a space to separate each IP address to enter more than one address.

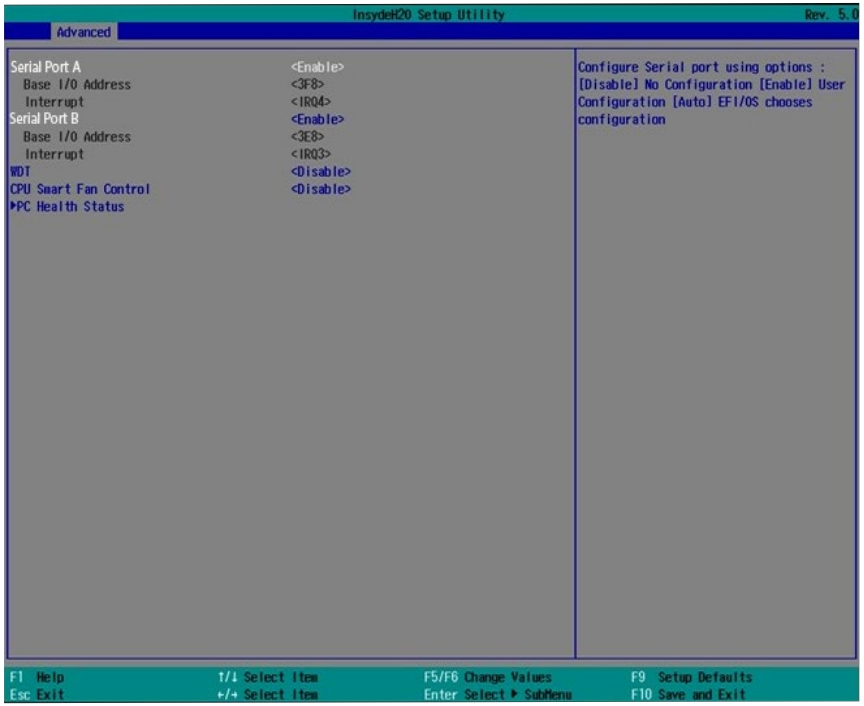
New Gateway addresses: Enter gateway addresses in the IPv6 format.

New DNS addresses: Enter DNS (Domain Name System) server IP addresses in the IPv6 format.



Super IO Configuration

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



Serial Port A and Serial Port B

Enable or disable each serial port.

Disable Disable this serial port.

Enable Enable this serial port.

It also shows the Base I/O address and the assigned interrupt number.

WDT

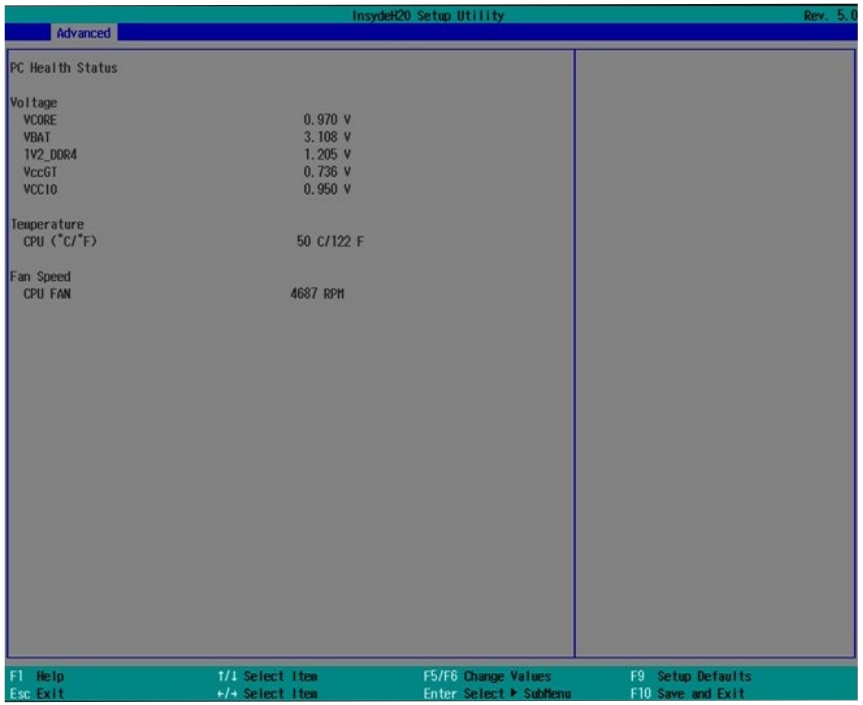
Enable or disable the watchdog function. A counter will appear if you select to enable WDT. Input any value between 1 and 255.

CPU Smart Fan Control

Enable the CPU smart fan control to let the system dynamically adjust fan speeds according to CPU temperatures.

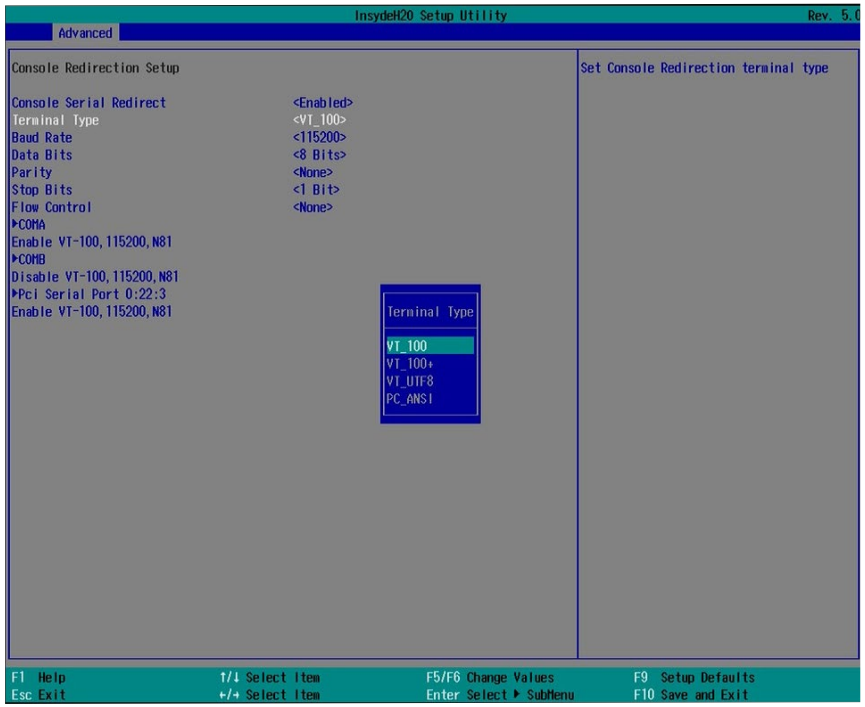
PC Health Status

This section displays PC health information such as the voltages and CPU and system temperatures.



Console Redirection

Console redirection lets you monitor and control the system from a remote station by re-directing the host screen output through a serial port.



Console Serial Redirect

Enable or disable the console redirection function. (The default is disabled.) If you select to enable it, please configure the following parameters for serial communication between the system and a remote station:

Terminal type: VT_100, VT_100+, VT_UTF8, or PC_ANSI.

Baud rate: 115200, 57600, 38400, 19200, 9600, 4800, 2400 or 1200.

Data bits: 8 bits or 7 bits.

Parity: None, Even or Odd.

Stop bits: 1 bit or 2 bits.

Flow control: None, RTS/CTS or XON/XOFF

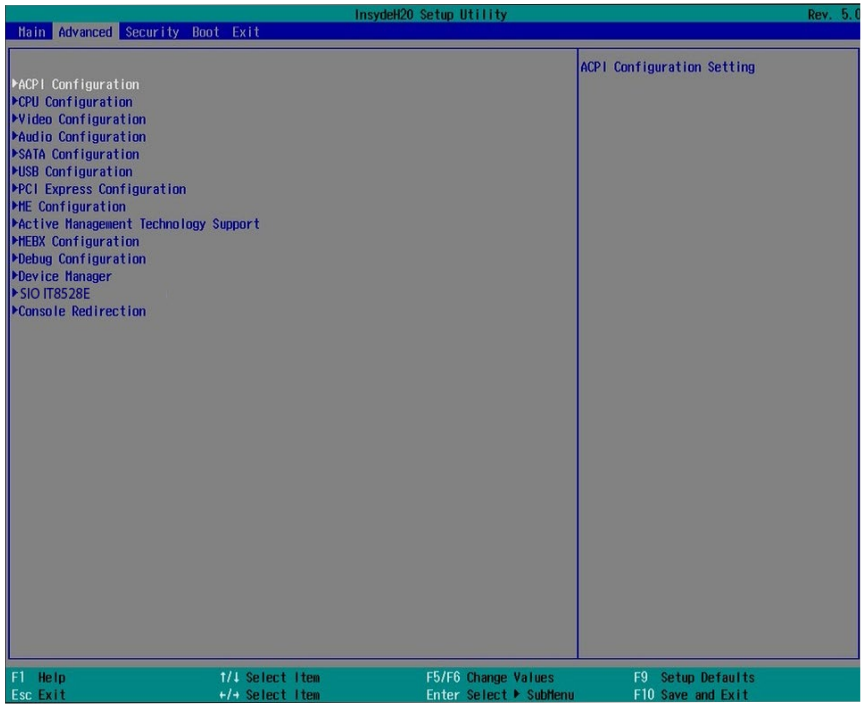
This is the global setting for all of the designated serial ports for the console redirection function.

COMA/COMB/PCI Serial Port

Enable or disable the serial redirection function for each of the detected serial ports on the system. And configure the serial communication parameters to be used between the system and a remote station. Alternatively, choose to use the pre-configured global settings from the previous menu.

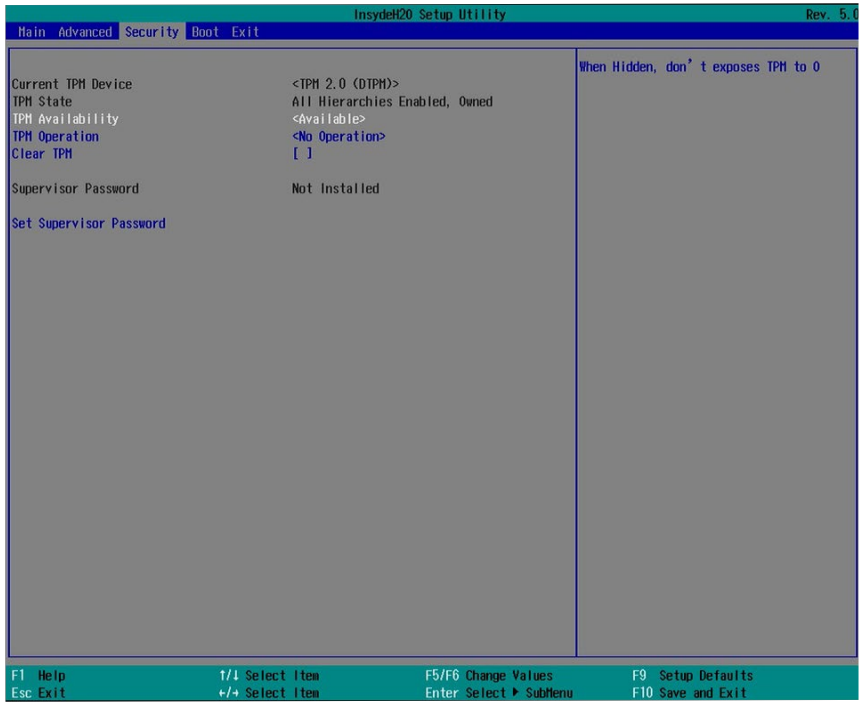
MEBX Configuration

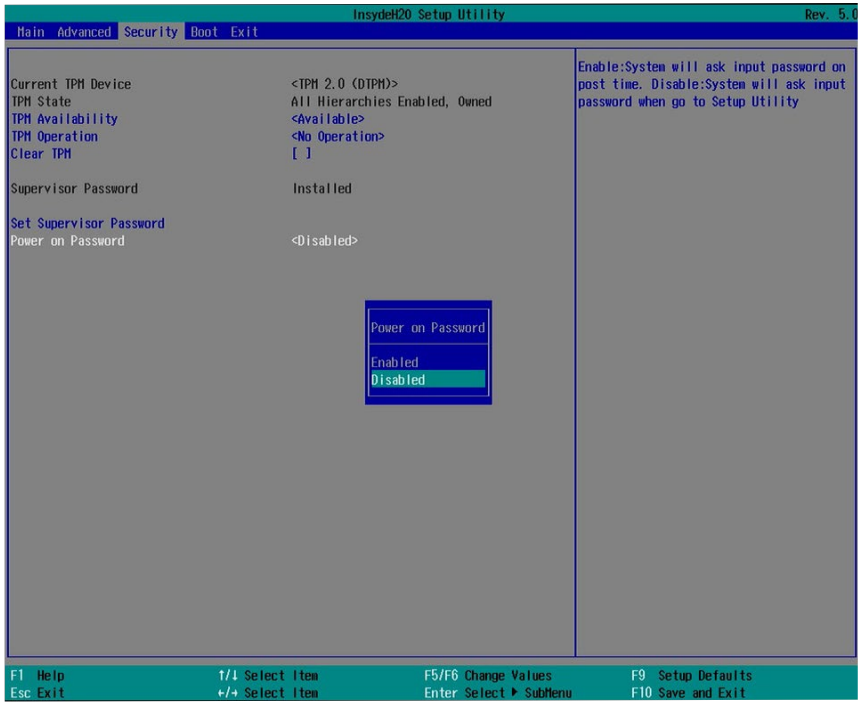
The Manageability Engine BIOS Extension (MEBx) Setup allows you to set up Intel® Active Management Technology (Intel® AMT). For more information, please refer to Chapter 8.



Security

This section configures the Trusted Platform Module (TPM) function.





TPM Availability

Show or hide TPM availability and its configurations.

TPM Operation

Enable or disable the TPM function. It displays the following options:

- No Operation: No changes to the current state.
- Disable: Disable and deactivate TPM.
- Enable: Enable and activate TPM.

Clear TPM

Remove all TPM ownership contents.

Note:
To enable the Intel® TXT function on the system, please enable the activate the TPM function first.

Set Supervisor Password

Set the administrative password for entering the BIOS utility or upon entering the power-on self-test (POST) process. The length of the password must be greater than 1 character and less than or equal to 10 characters.

Power-on Password

If you select to set the supervisor password, this option will be shown. Enable or disable prompt for password at boot.

Boot

This section configures boot options.

Numlock

Select the power-on state for the Num Lock key.

Boot Type

Select the boot type. The options are Dual Boot, Legacy Boot and UEFI Boot Type.

Network Stack

This option is shown only when the boot type is set to Dual or UEFI.

Enable or disable UEFI network stack. It supports the operation of these functions or software: Windows 8 BitLocker Network Unlock, UEFI IPv4/IPv6 PXE and legacy PXE option ROM.

If this function is enabled, you can then go to "Advanced">"Device Manager" to configure network settings for network connection under the UEFI environment.

PXE Boot to LAN

Enable or disable Preboot eXecution Environment (PXE) boot to LAN. In the UEFI or Dual boot mode, this function can only be enabled if the Network Stack support is enabled.

USB Boot

Enable or disable booting to USB boot devices.

Boot Device Priority

This section configures legacy or EFI boot order or both depending on the "Boot Type" selected.

EFI Boot Menu

Use + and - keys to arrange the priority of the boot devices in the list.

Legacy Boot Menu

Normal

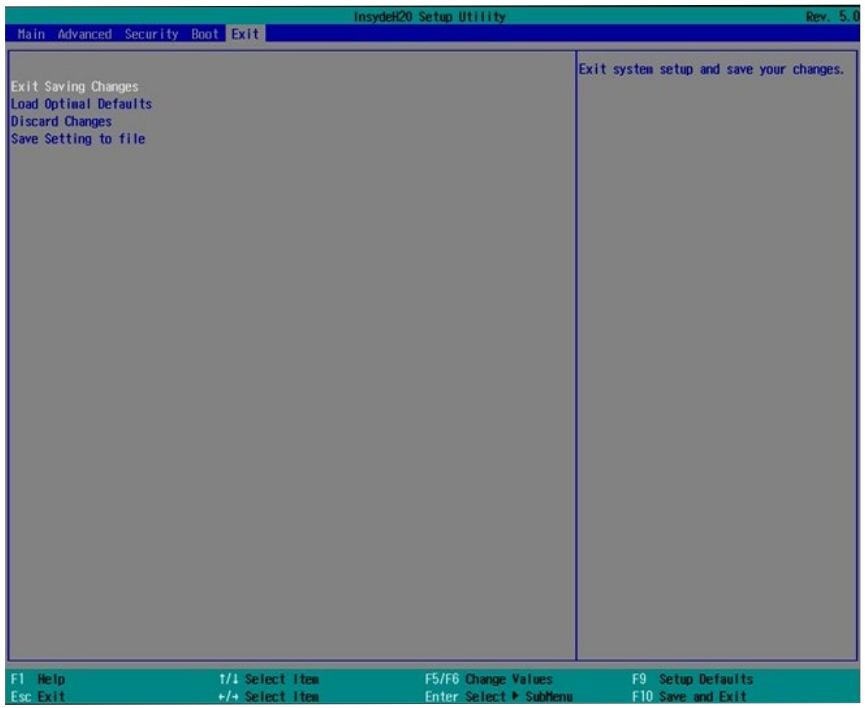
For this option, determine the boot order for the devices within each category. Use the + and - key to arrange the priority of the boot devices in the list. The first device in the list has the highest boot priority.

Advance

For this option, determine the boot order for all bootable devices. Use + and - keys to arrange the priority of the detected boot devices in the list. The first device in the list has the highest boot priority.

Exit

This section configures the parameters for exiting the BIOS setup utility.



Exit Saving Changes

Select this field and press <Enter> to exit BIOS setup and save your changes.

Load Optimal Defaults

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

Discard Changes

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

Save Setting to file

Select this option to save BIOS configuration settings to a USB drive. The operation will fail if there aren't any USB devices detected on the system. The saved configuration will have the DSF file extension and can be used for restoration.

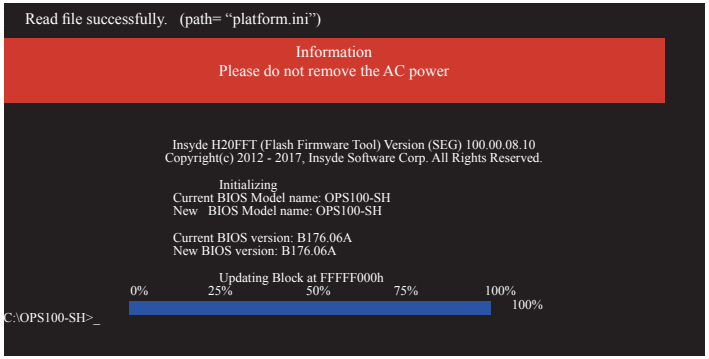
Restore Setting from file

Select this option to restore BIOS configuration settings from a USB drive. Note that this option will not be available if there aren't any USB devices detected on the system.

Updating the BIOS

To update the BIOS, you will need an updated BIOS file and a flash utility. Please contact technical support or your sales representative for the files and specific instructions on how to update BIOS with the flash utility.

When you download the given BIOS file, you may find a BIOS flash utility attached with the BIOS file. This is the utility for performing the BIOS update procedure. For your convenience, we will also provide you with an auto-execution file in the BIOS file downloaded. This auto-execution file will bring you directly to the flash utility menu soon after system boots up and finishes running the boot files in your boot disk.



Notice: BIOS SPI ROM

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

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

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

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

Chapter 7 - Supported Software

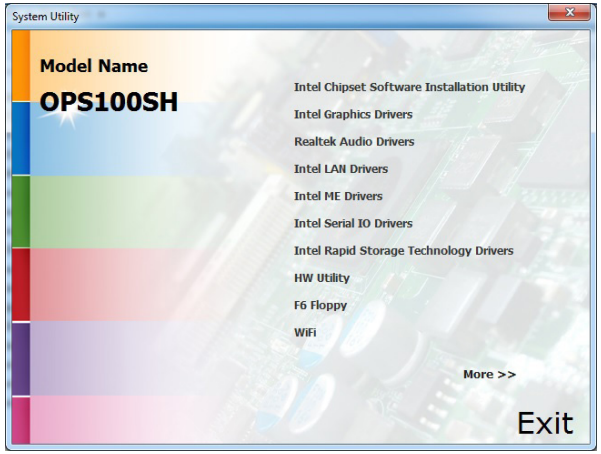
Some devices of the system require drivers from hardware manufactures to operate properly. The system may come with a CD/DVD that contains drivers, utilities and software applications. Insert the CD into a CD-ROM drive. The auto-run screen (Mainboard Utility CD) will appear. If the "Autorun" does not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

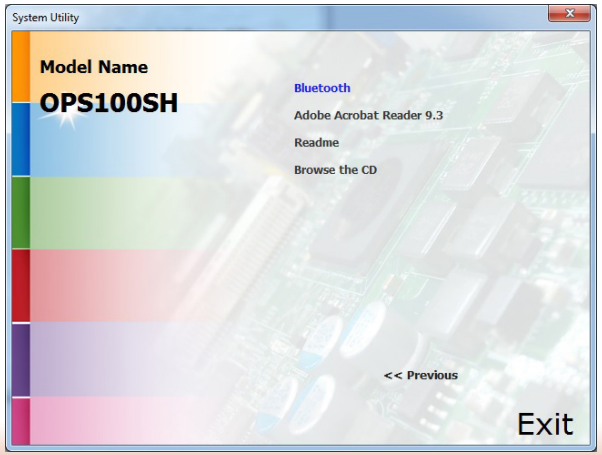
If your product package does not include a CD/DVD, you can download the latest drivers from the DFI Download Center:

http://www.dfi.com/DownloadCenter

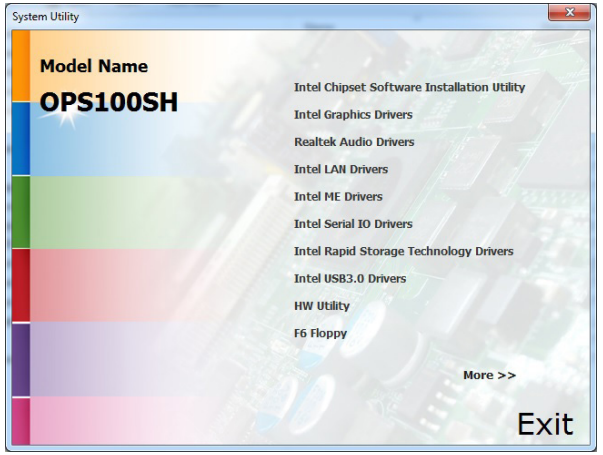
Once you are in the Download Center page, select your product or type the model name and click "Search" to find product-related resources such as documentation and drivers.

For Windows 10





For Windows 8.1

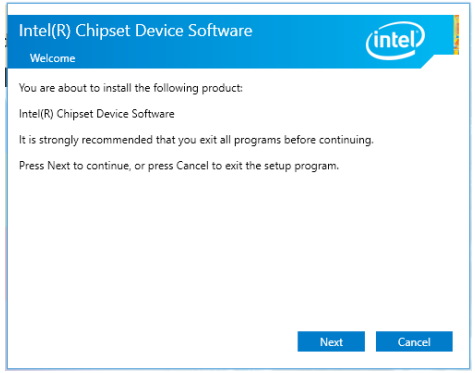


Intel Chipset Software Installation Utility

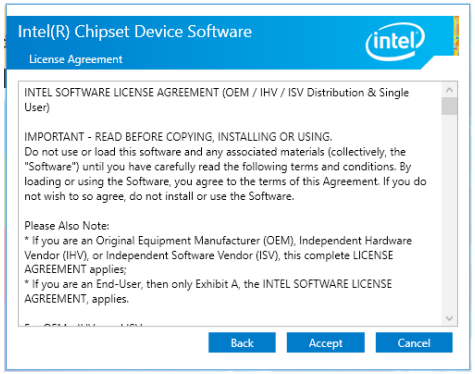
The Intel Chipset Software Installation Utility is used for updating Windows® INF files so that the Intel chipset can be recognized and configured properly in the system.

To install the utility, follow these steps:

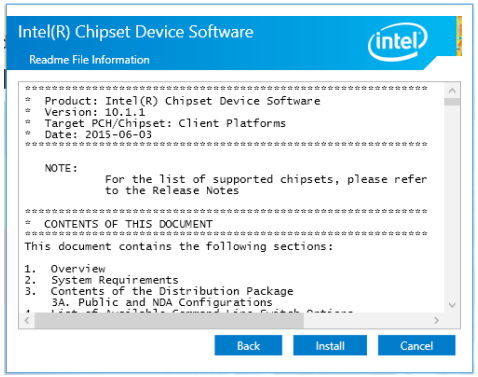
1. Setup is ready to install the utility. Click "Next".



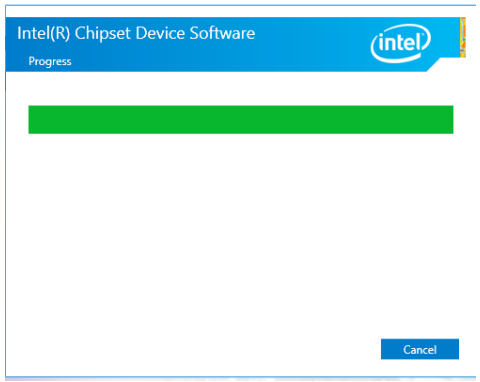
2. Read the license agreement, and then click "Yes".



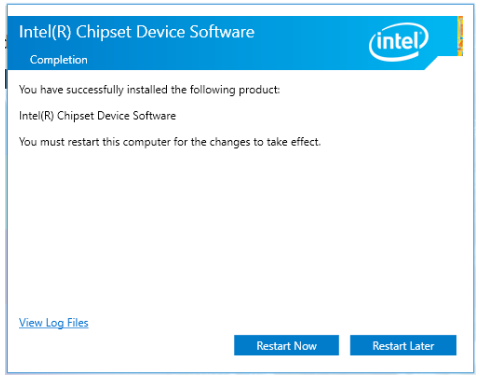
3. Go through the readme document for system requirements and installation tips, and then click "Next". Please wait while the installation is in progress.



4. Please wait while the installation is in progress.



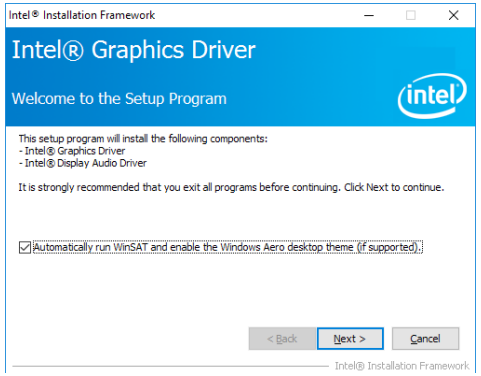
5. Click "Restart Now" to allow the new software installation to take effect.



Intel Graphics Drivers

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

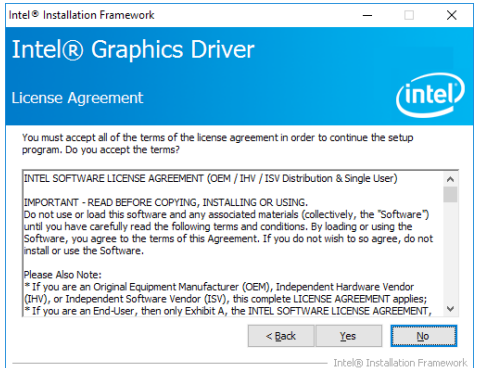
1. Setup is now ready to install the graphics driver. Click "Next".



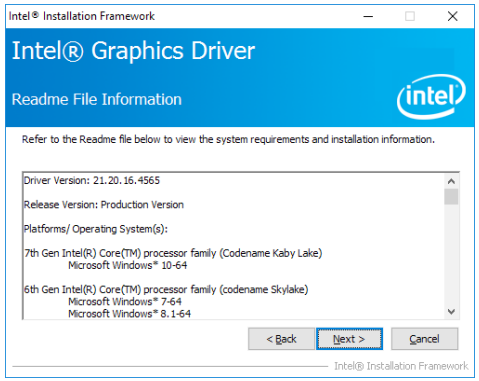
By default, the "Automatically run WinSAT and enable the Windows Aero desktop theme" is enabled. With this is enabled and after the system is rebooted, the screen will turn blank for 1 to 2 minutes (while WinSAT is running) before the Windows 7/ Windows 8.1/ Windows 10 desktop appears. The "blank screen"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

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

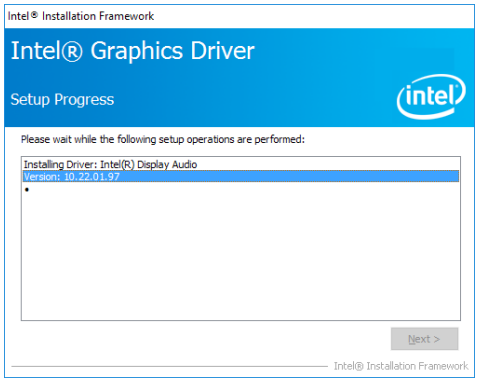
2. Read the license agreement, and then click "Yes".



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

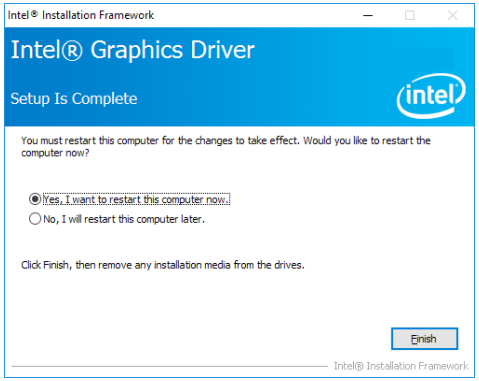


4. Setup is now installing the driver. Click "Next" to continue.



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

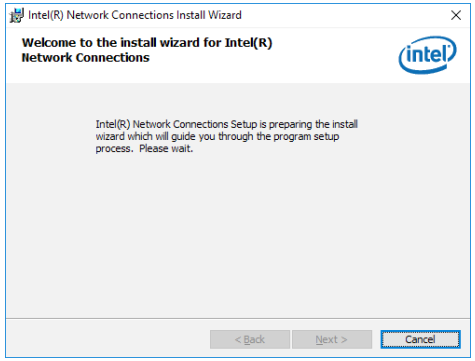
   Restarting the system will allow the new software installation to take effect.



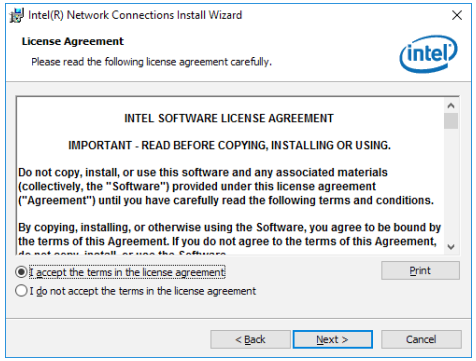
Intel LAN Drivers

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

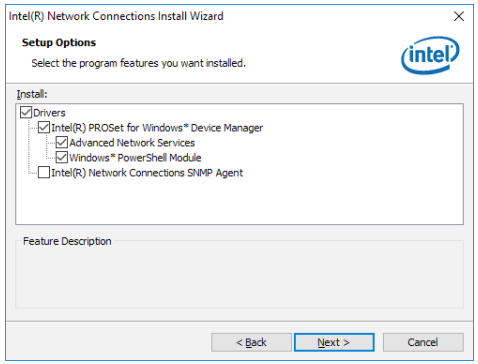
1. Setup is preparing to install the driver. Click "Next" to continue.



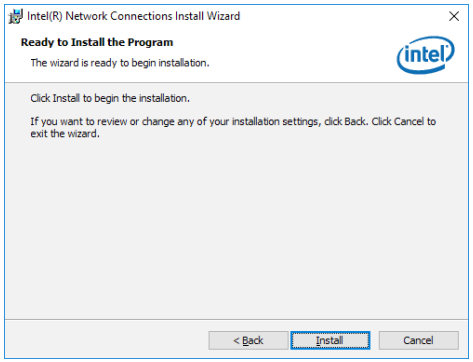
2. Click "I accept the terms in the license agreement" if you accept the agreement, and then click "Next".



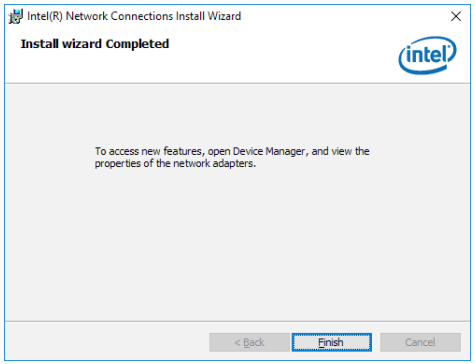
3. Select the program features you want installed, and then click "Next".



4. Click "Install" to begin the installation.



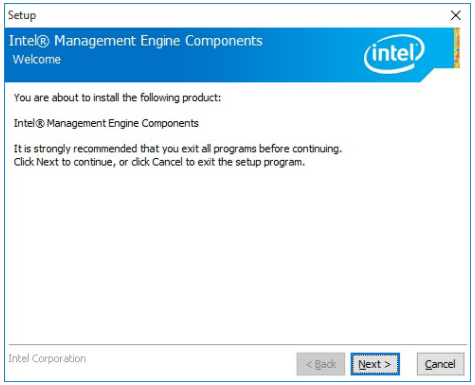
5. After the installation is complete, click "Finish".



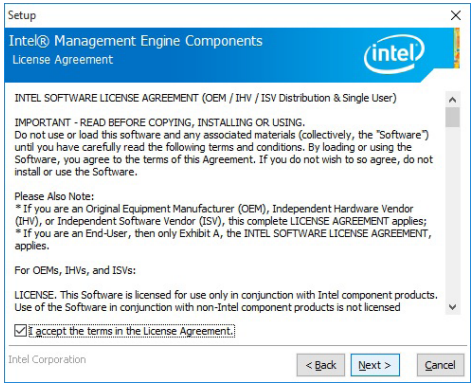
Intel Management Engine Drivers

To install the driver, click "Intel ME Drivers" in the main menu.

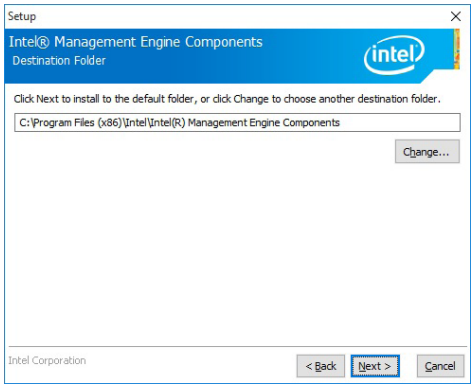
1. Setup is ready to install the driver. Click "Next" to continue.



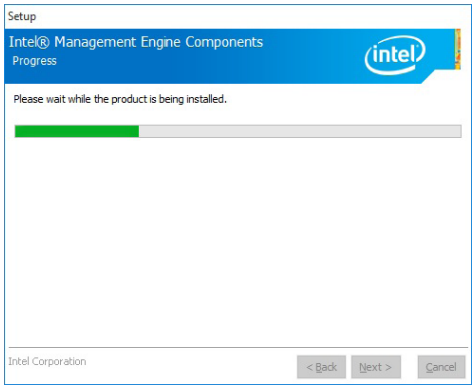
2. Read the license agreement, and then click "Next".



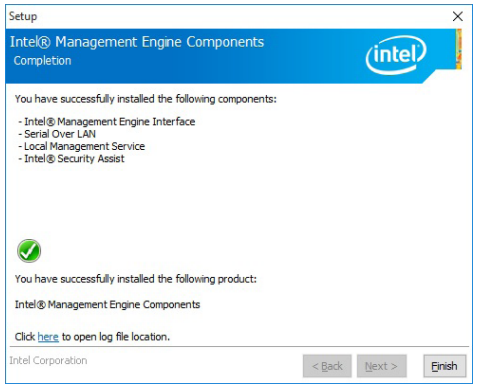
3. Setup is currently installing the driver. After the installation is complete, click "Next".



4. Please wait while the product is being installed.



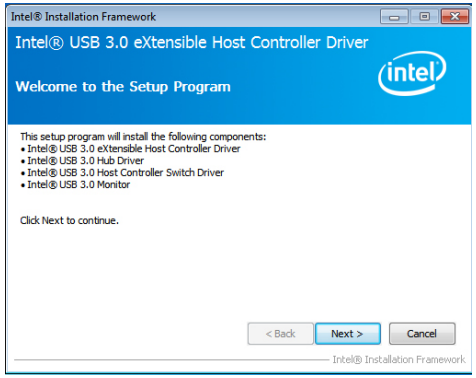
5. After the installation is complete, click "Finish".



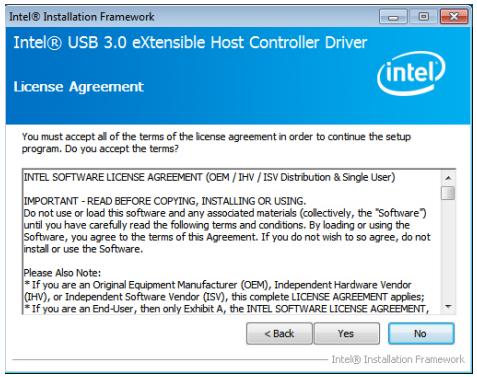
Intel USB 3.0 Drivers (for Windows 8.1)

To install the driver, click "Intel USB3.0 Drivers" in the main menu.

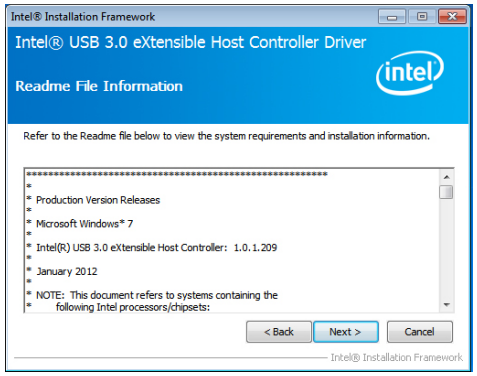
1. Setup is ready to install the driver. Click "Next" to continue.



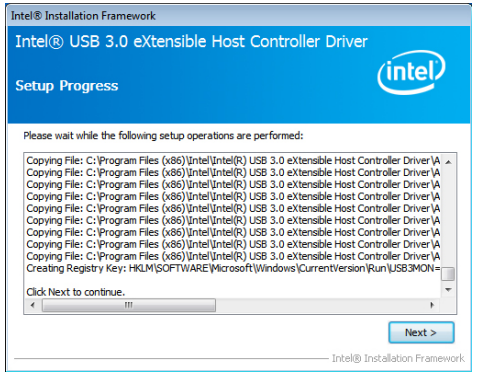
2. Read the license agreement, and then click "Yes".



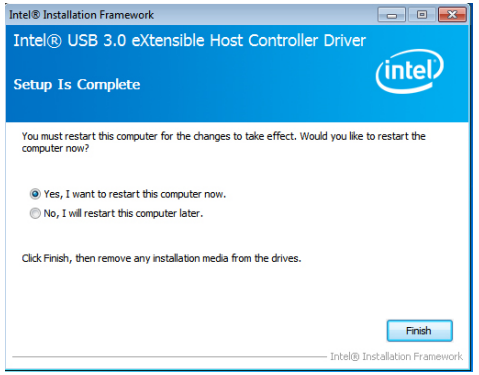
3. Go through the readme document for more installation tips, and then click "Next".



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



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

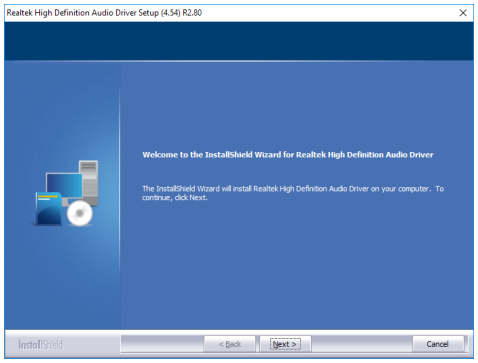


Audio Drivers

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

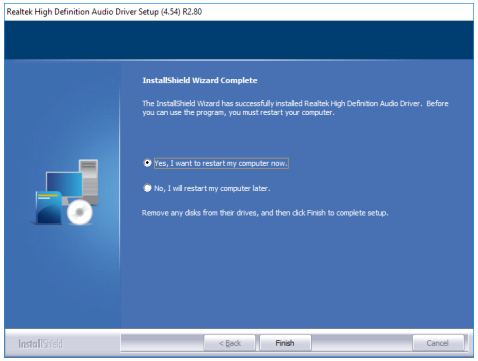
1. Setup is now ready to install the audio driver. Click "Next".

2. Follow the rest of the steps on the screen; click "Next" each time you finish a step.



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

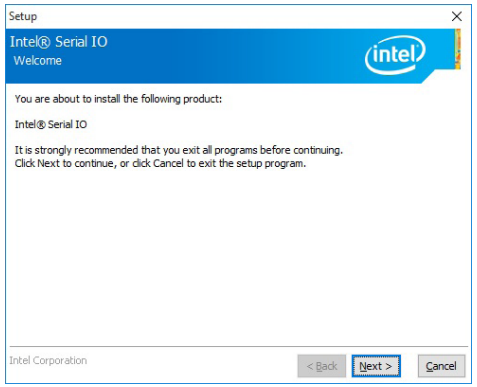
   Restart the system to allow the new software installation to take effect.



Serial IO Drivers

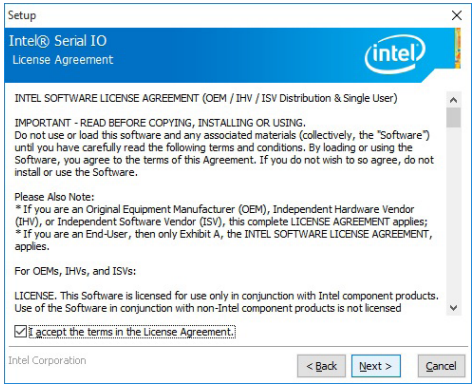
To install the driver, click "Intel Serial IO Drivers" in the main menu.

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

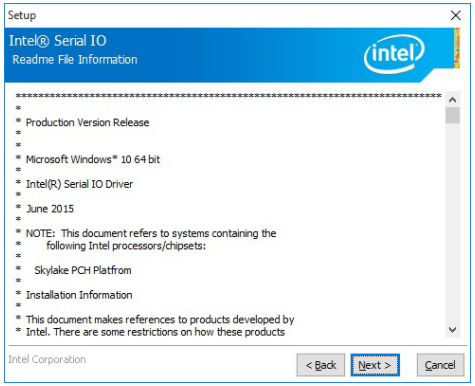


2. Read the license agreement carefully.

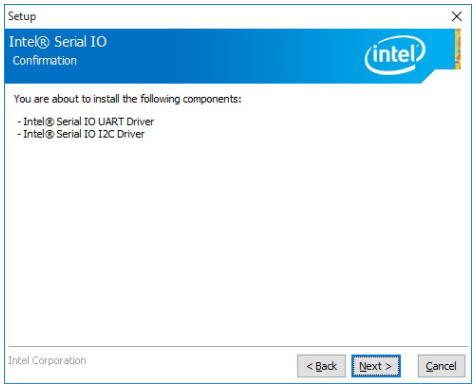
   Click "I accept the terms in the License Agreement" if you agree with the terms in the agreement and then click "Next".



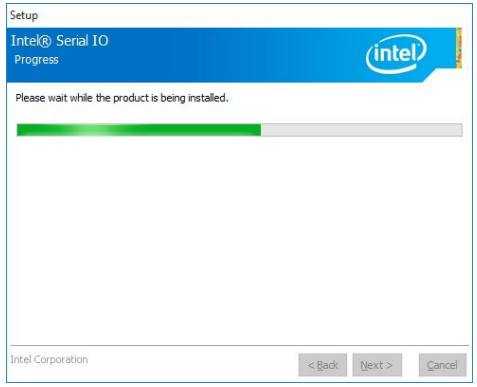
3. Read the file information and then click "Next".



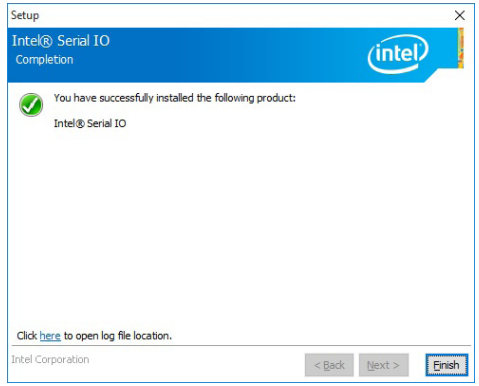
4. Setup is ready to install the driver. Click "Next" to begin the installation.



5. Setup is now installing the driver.



6. Click "Finish" to exit the setup.



Wi-Fi/Bluetooth

To install Wi-Fi drivers, click "WiFi" in the main menu.

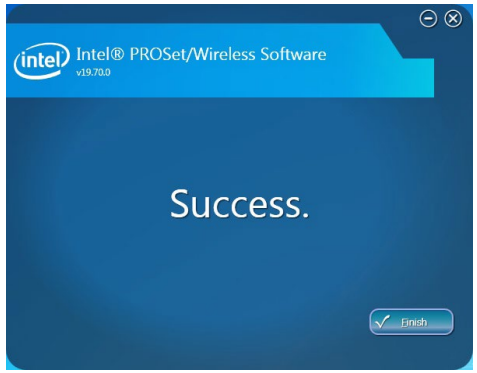
The Intel PROSet/Wireless Software Setup screen will be displayed.

1. Read the End User License Agreement carefully.

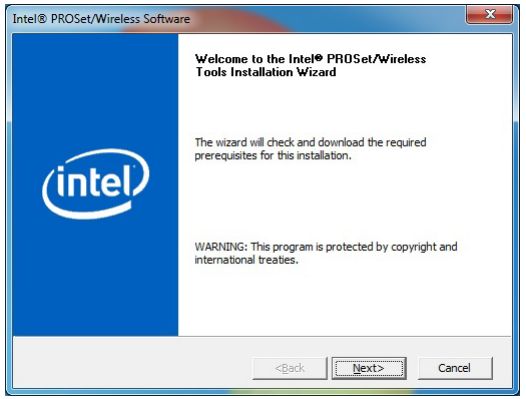
   Click the box if you agree with the terms in the agreement and then click "install" to install with default settings or "Customize" to install with selected features.

2. Setup is now installing the driver.

2. Click "Finish" to exit the setup.



To install Bluetooth drivers, click "Bluetooth " in the main menu. The Intel PROSet/Wireless Tools Installation Wizard will start. Please follow the on-screen instructions to complete the installation.



Chapter 8 - Intel AMT Settings

Overview

Intel Active Management Technology (Intel® AMT) combines hardware and software solutions to provide maximum system defense and protection to networked systems. Note that the SKU with the Intel® Core™ i3 processor does not support iAMT.

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**

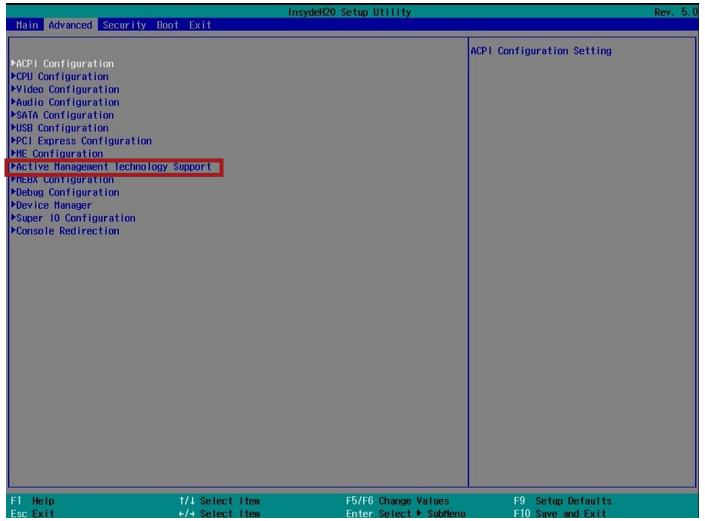
Remotely repair systems after OS failures. Alerting and event logging help detect problems quickly to reduce downtime.

- **Protect**

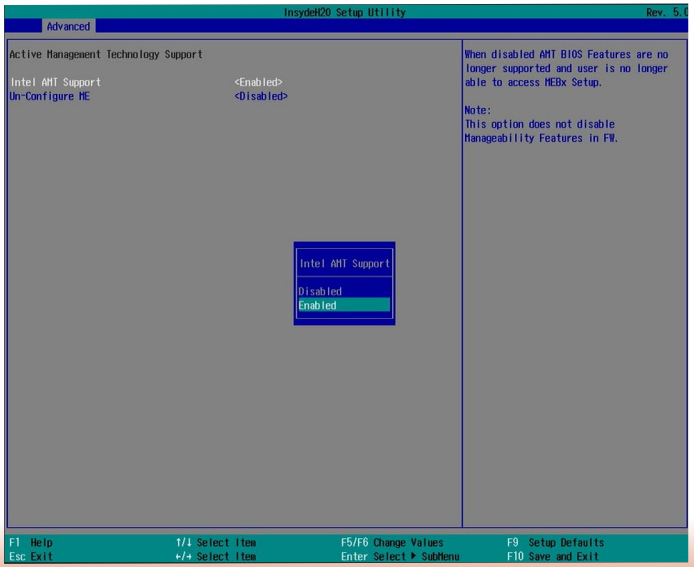
Intel AMT's System Defense capability remotely updates all systems with the latest security software. It protects the network from threats at the source by proactively blocking incoming threats, reactively containing infected clients before they impact the network, and proactively alerting when critical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

Enable Intel® AMT in the BIOS

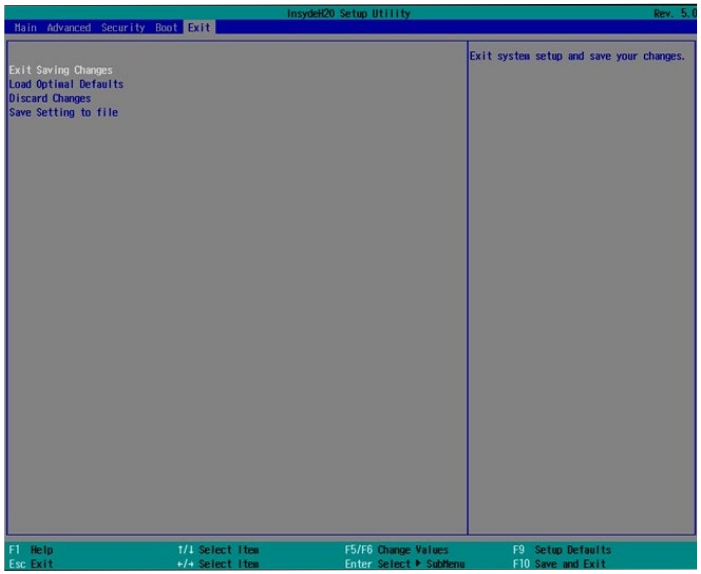
1. Power on the system then press <Del> to enter the main menu of the BIOS setup utility.
2. In the "Advanced" menu, select "Active Management Technology Support".



3. In the "Active Management Technology Support" menu, select "Enabled" for "Intel AMT Support".

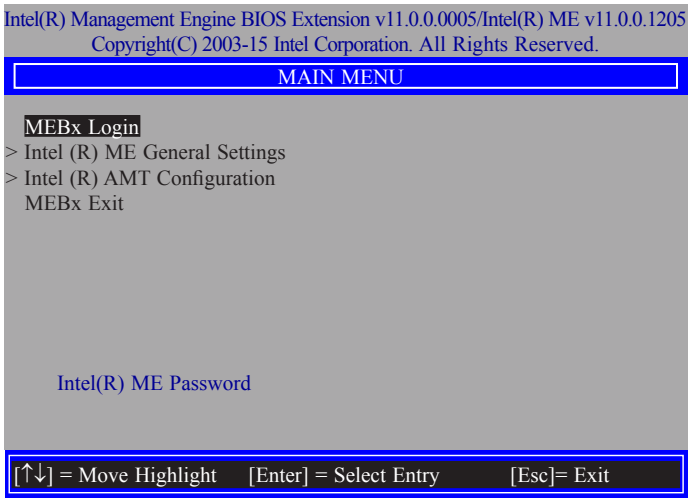


4. In the "Exit" menu, select "Exit Saving Changes", and then select "OK".



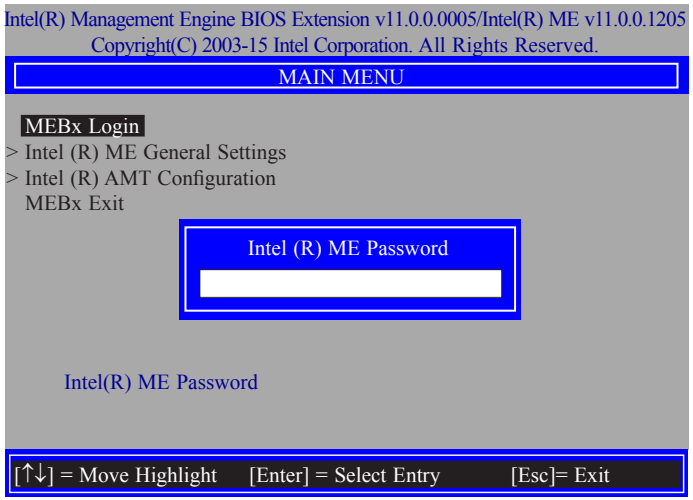
Set up Intel® AMT using the Intel® Management Engine BIOS Extension (MEBX)

1. After the system reboots, press <Del> to enter the BIOS menu again.
2. In the "Advanced" menu, select "MEBX Configuration" to enter the Manageability Engine BIOS Extension (MEBx) Setup.
3. 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, and then press "Enter".

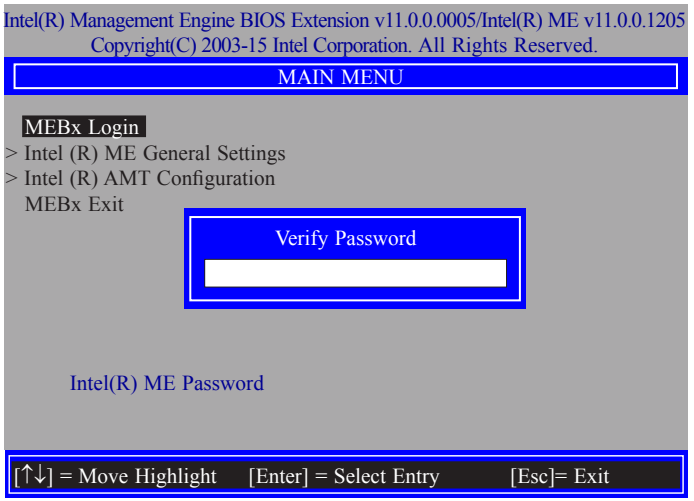


4. Enter a password in the space provided under "Intel(R) ME Password", and then press "Enter". The password must include:

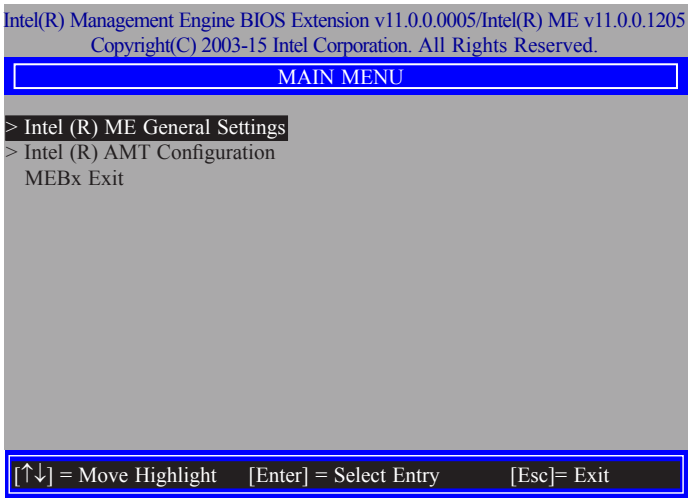
   - 8-32 characters
   - Strong 7-bit ASCII characters excluding **: ,** and **"** characters
   - At least one digit character (0, 1, ...9)
   - At least one 7-bit ASCII non alpha-numeric character, above 0x20, (e.g. !, $, ;)
   - Both lower case and upper case characters



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



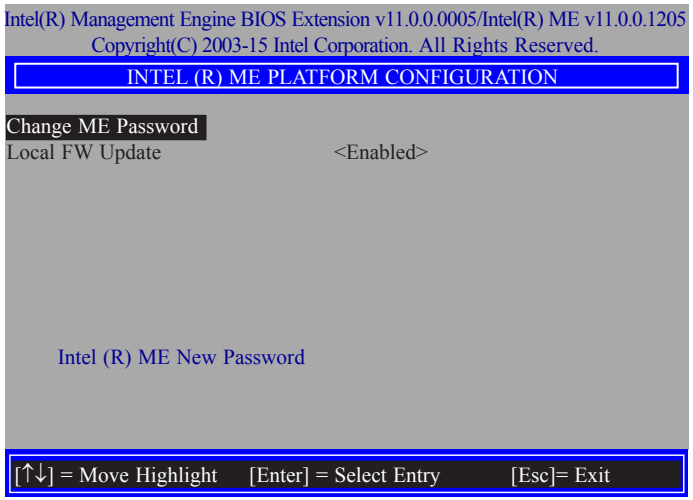
6. Select "Intel(R) ME General Settings" and press "Enter".



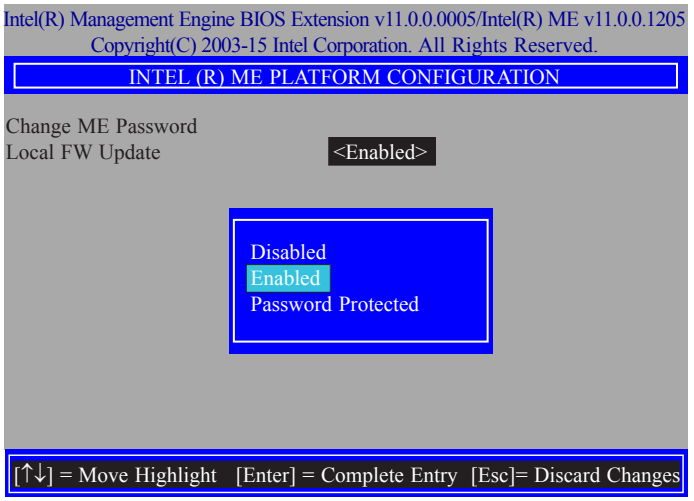
7. Select "Change Intel(R) ME Password" and press "Enter".

   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", and then press "Enter".

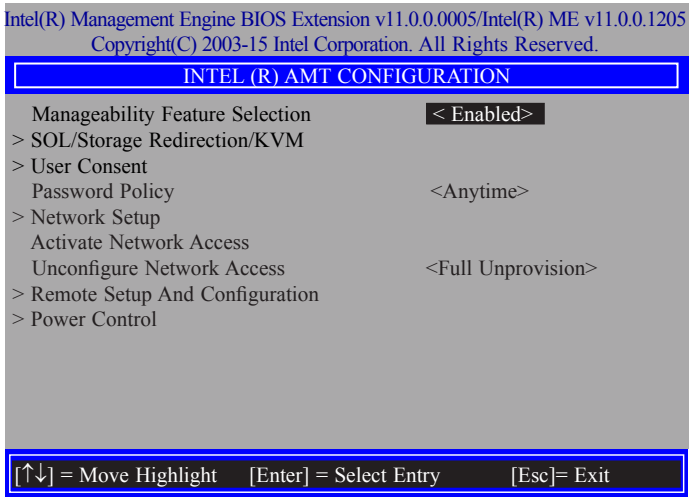
   - 8-32 characters
   - Strong 7-bit ASCII characters excluding **:**, and **"** characters
   - At least one digit character (0, 1, ...9)
   - At least one 7-bit ASCII non alpha-numeric character, above 0x20, (e.g. !, $, ;)
   - Both lower case and upper case characters



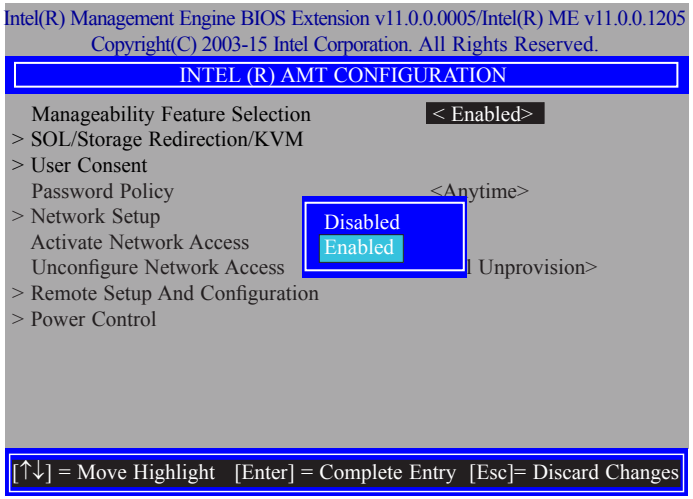
8. Select "Local FW Update" and press "Enter". Select "Enabled", "Disabled" or "Password Protected", and then press "Enter".



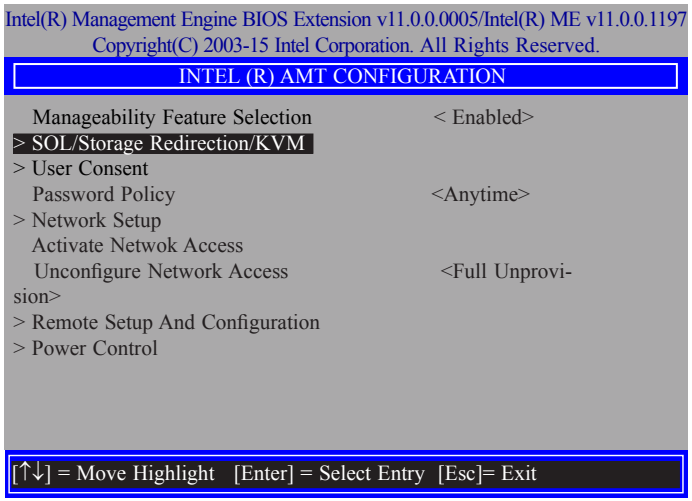
9. Select Previous Menu until you return to the "Main Menu". Select "Intel(R) AMT Configuration" and press "Enter".



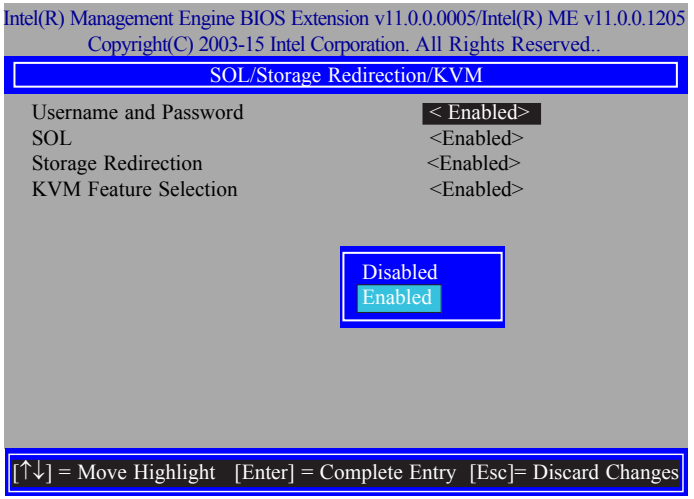
10. In the "Intel(R) AMT Configuration" menu, select "Manageability Feature Selection" and then press "Enter". Select "Enabled" or "Disabled", and then press "Enter".



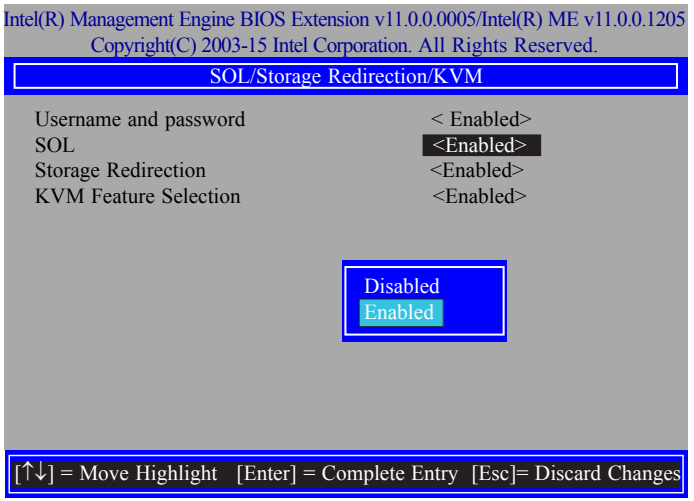
11. In the "Intel(R) AMT Configuration" menu, select "SOL/Storage Redirection/KVM" and press "Enter".



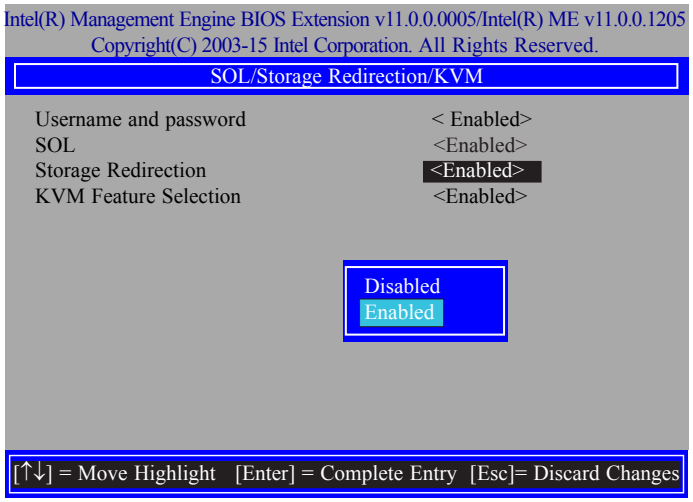
12. In the "SOL/Storage Redirection/KVM" menu, select "Username and Password" and then press "Enter". Select "Enabled" or "Disabled", and then press "Enter".



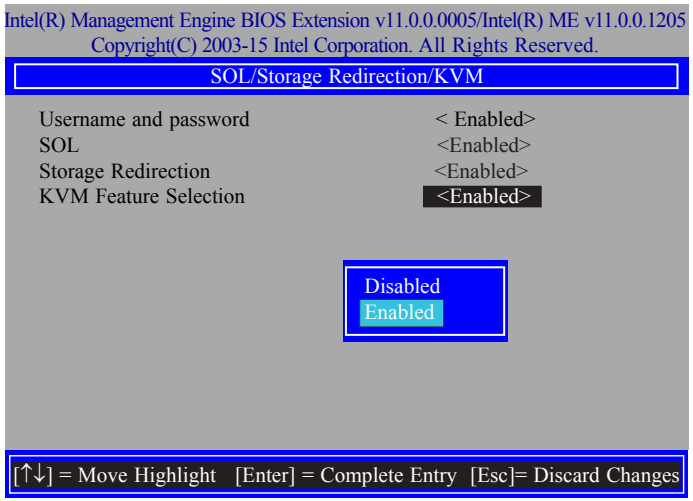
13. In the "SOL/Storage Redirection/KVM" menu, select "SOL" and then press "Enter". Select "Enabled" or "Disabled", and then press "Enter".



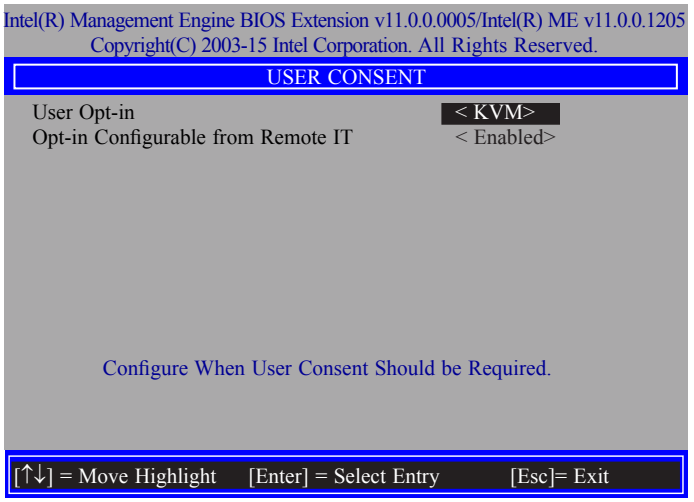
14. In the "SOL/Storage Redirection/KVM" menu, select "Storage Redirection" and then press "Enter". Select "Enabled" or "Disabled", and then press "Enter".



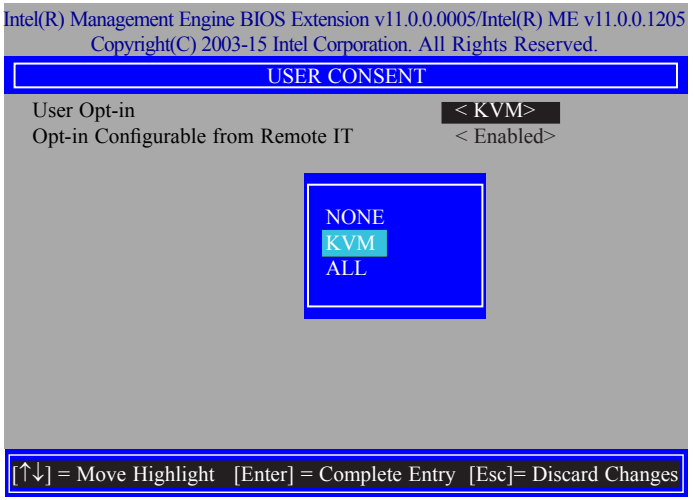
15. In the "SOL/IDER/KVM" menu, select "KVM Feature Selection" and then press "Enter". Select "Enabled" or "Disabled", and then press "Enter".



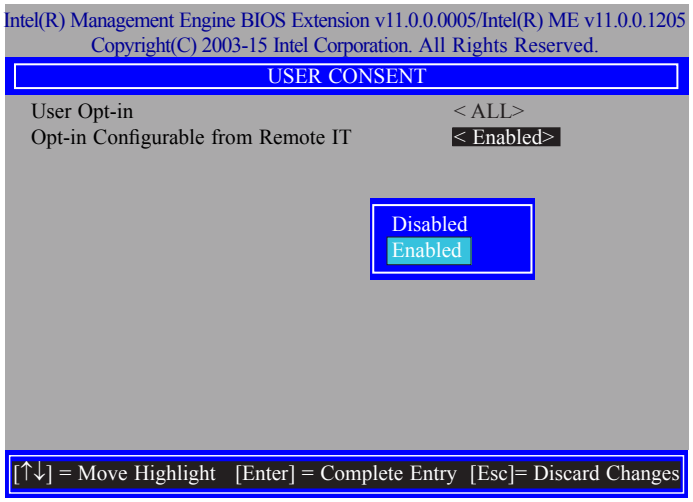
16. Select Previous Menu until you return to the "Intel(R) AMT Configuration" menu. Select "User Consent" and press "Enter".



17. In the "User Consent" menu, select "User Opt-in" and then press "Enter". Select "None" or "KVM" or "ALL", and then press "Enter".

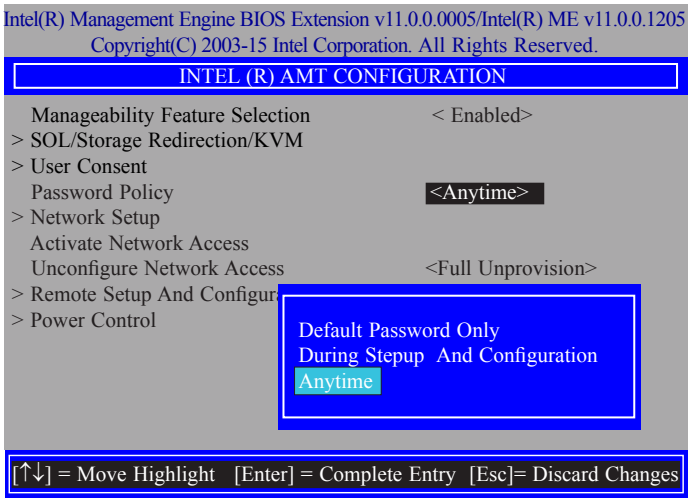


18. In the "User Consent" menu, select "Opt-in Configurable from Remote IT" and then press "Enter". Select "Enabled" or "Disable Remote Control of KVM Opt-in Policy", and then press "Enter".

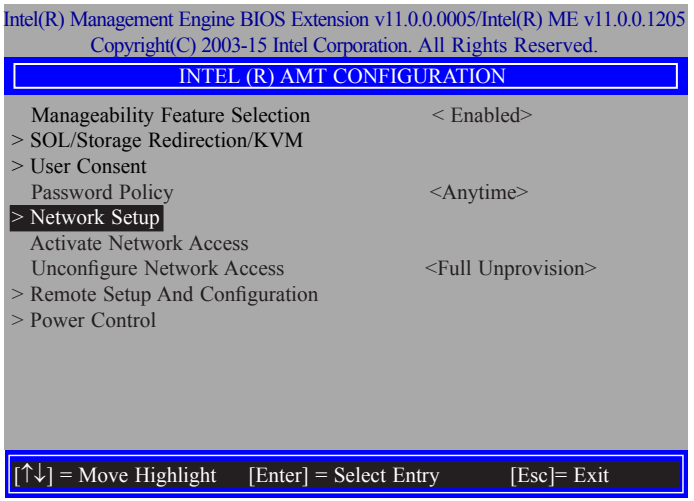


19. Select Previous Menu until you return to the "Intel(R) AMT Configuration" menu. Select "Password Policy", and then press "Enter".

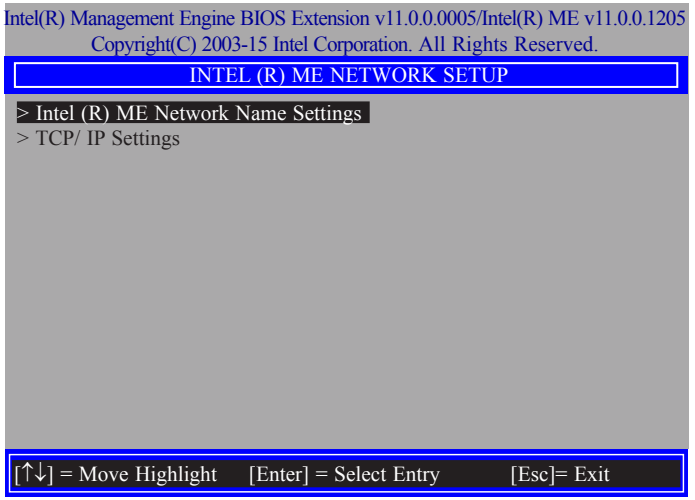
You may choose to use a password only during setup and configuration or to use a password anytime the system is being accessed.



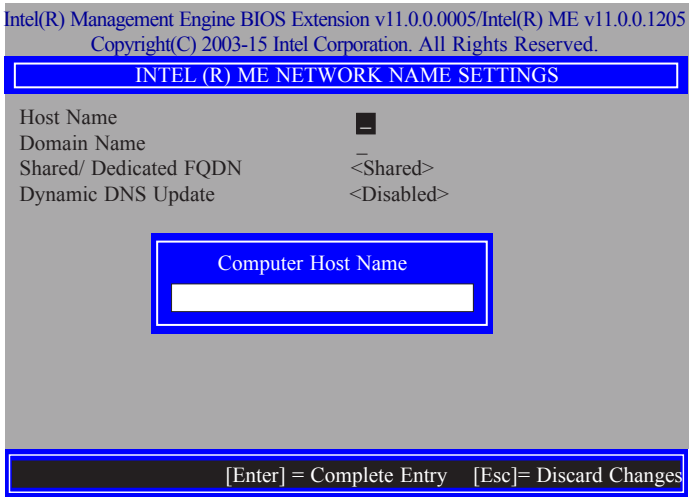
20. In the "Intel(R) AMT Configuration" menu, select "Network Setup", and then press "Enter".



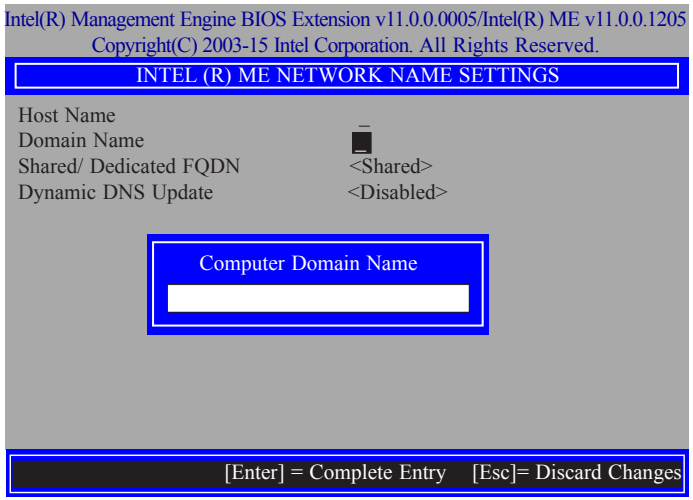
21. In the "Intel(R) ME Network Setup" menu, select "Intel(R) ME Network Name Settings", and then press "Enter".



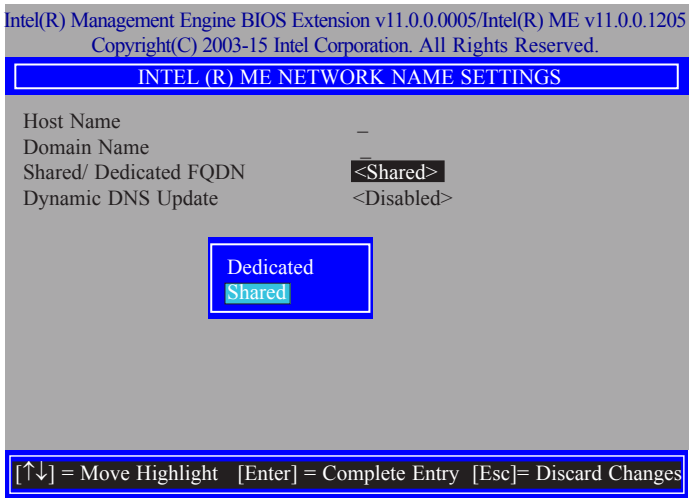
22. In the "Intel(R) ME Network Name Settings" menu, select "Host Name", and then press "Enter". Enter the computer's host name and press "Enter".



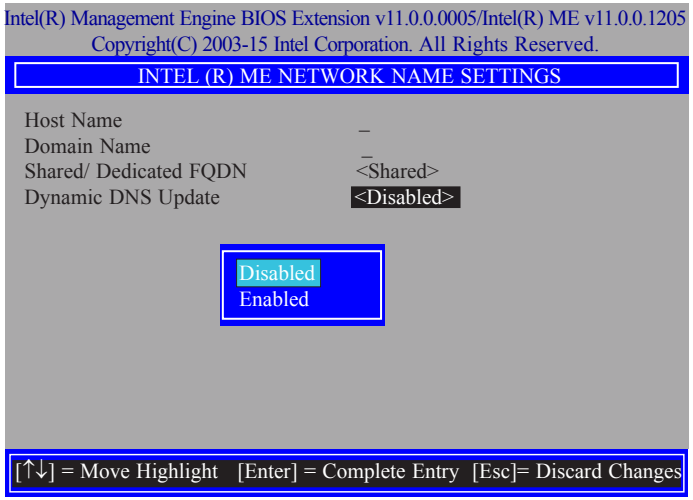
23. Select "Domain Name" and then press "Enter". Enter the computer's domain name, and then press "Enter".



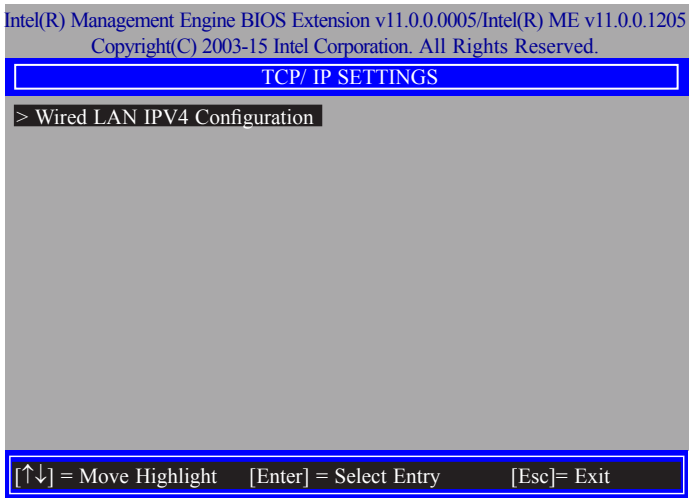
24. Select "Shared/Dedicated FQDN" and then press "Enter". Select "Shared" or "Dedicated", and then press "Enter".



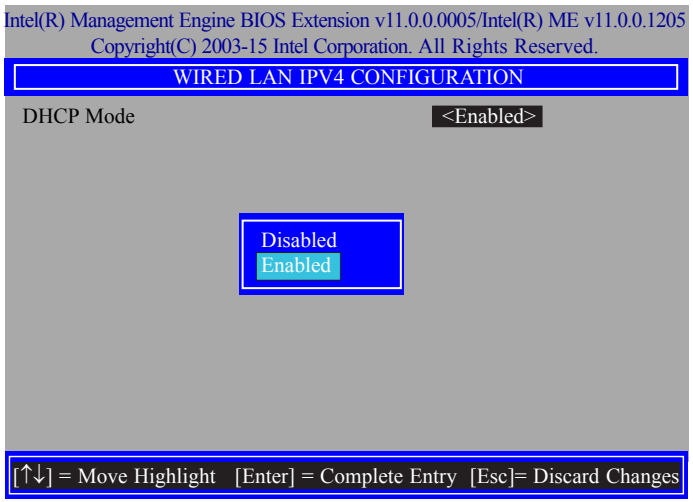
25. Select "Dynamic DNS Update" and then press "Enter". Select "Enabled" or "Disabled", and then press "Enter".



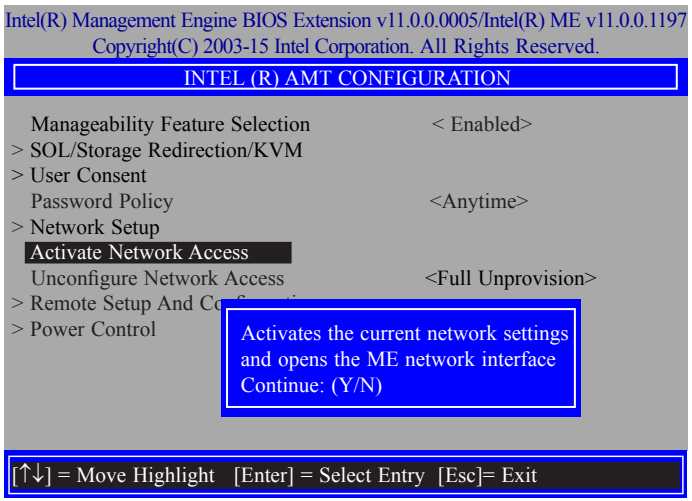
26. Select Previous Menu until you return to the "Intel(R) ME Network Setup" menu. Select "TCP/IP Settings" and press "Enter".



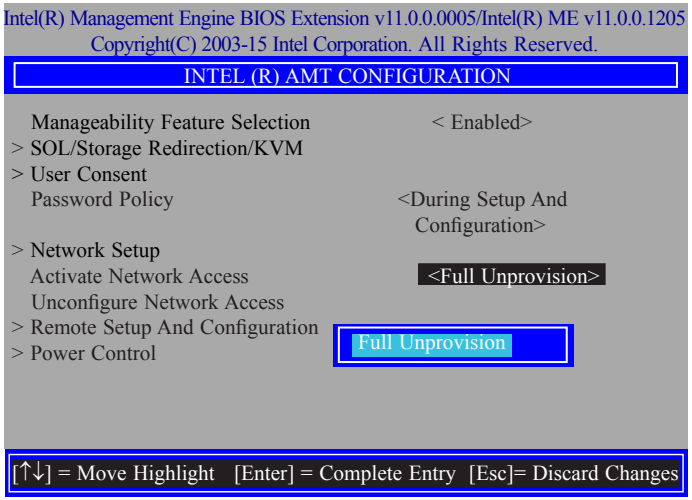
27. In the "TCP/IP Settings" menu, select "Wired LAN IPV4 Configuration", and then press "Enter".



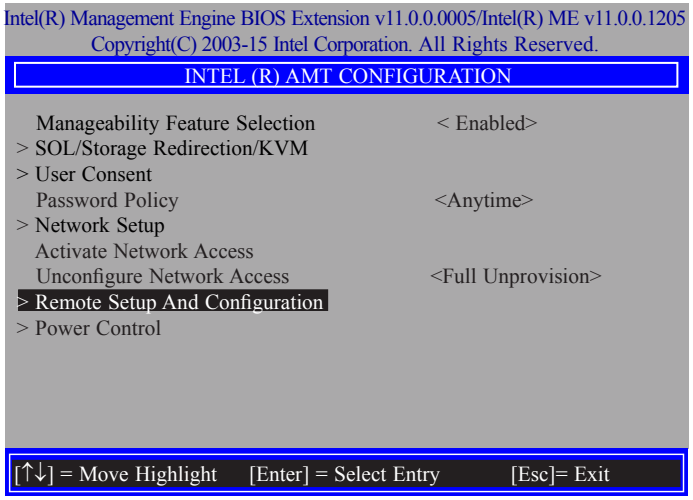
28. In the "Intel(R) AMT Configuration" menu, select "Activate Network Access", and then select "Yes/No" and press "Enter".



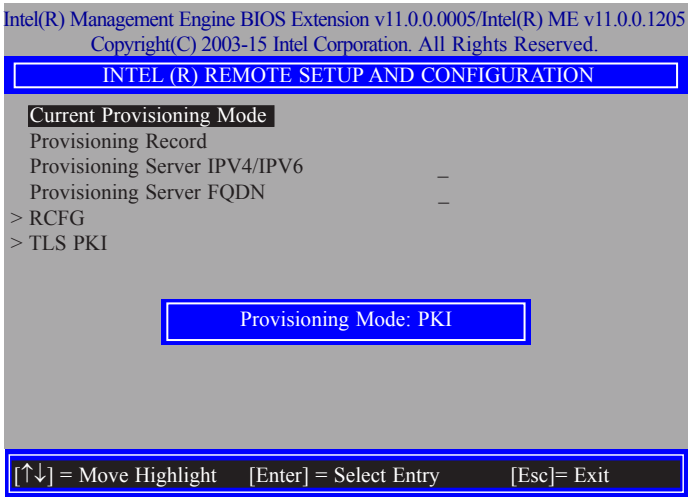
29. In the "Intel(R) AMT Configuration" menu, select "Unconfigure Network Access", and then press "Enter".



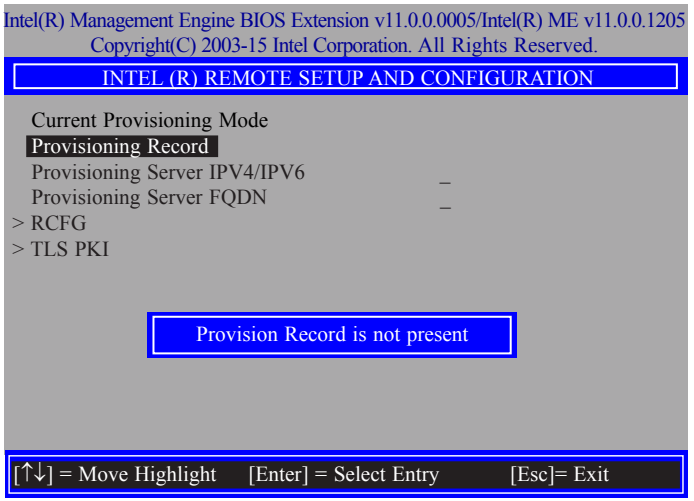
30. In the "Intel(R) AMT Configuration" menu, select "Remote Setup And Configuration", and then press "Enter".



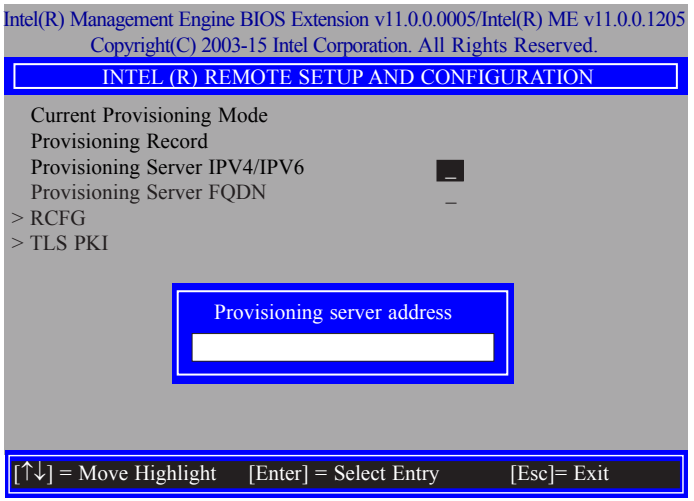
31. In the "Intel(R) Remote Setup And Configuration" menu, select "Current Provisioning Mode", and then press "Enter".



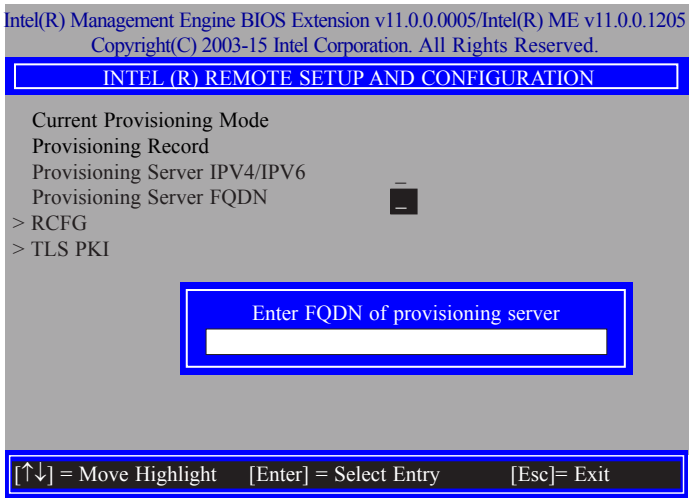
32. In the "Intel(R) Remote Setup And Configuration" menu, select "Provisioning Record", and then press "Enter".



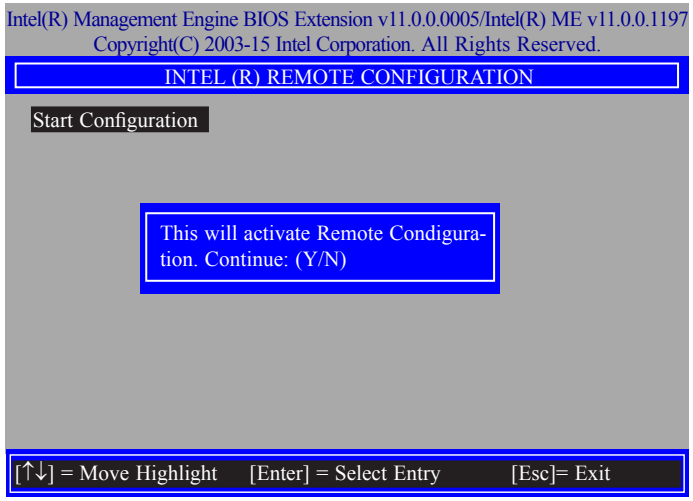
33. In the "Intel(R) Remote Setup And Configuration" menu, select "Provisioning server IPV4/IPV6", enter "Provisioning server address" and press "Enter".



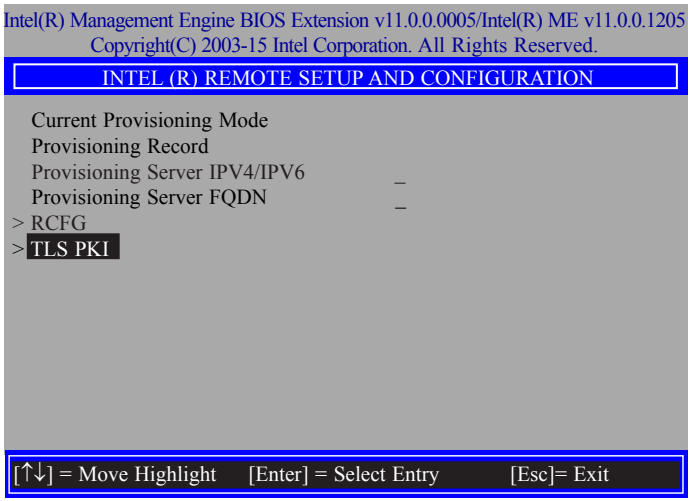
34. In the "Intel(R) Remote Setup And Configuration" menu, select "Provisioning server FQDN", enter the FQDN of Provisioning server, and then press "Enter".



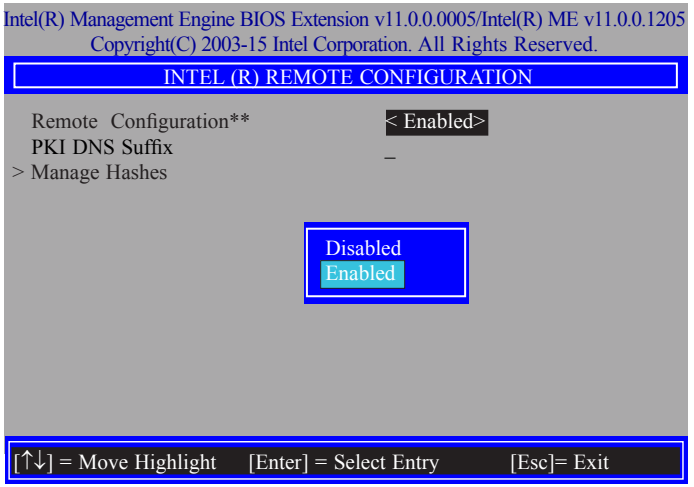
35. In the "Intel(R) Remote Setup And Configuration" menu, select "RCFG" and press "Enter", and then select "Start Configuration Y/N" and press "enter".



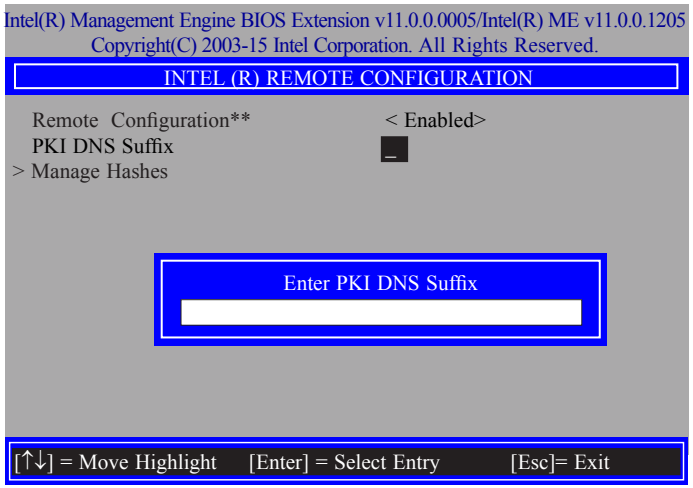
36. In the "Intel(R) Remote Setup And Configuration" menu, select "TLS PKI", and then press "Enter".



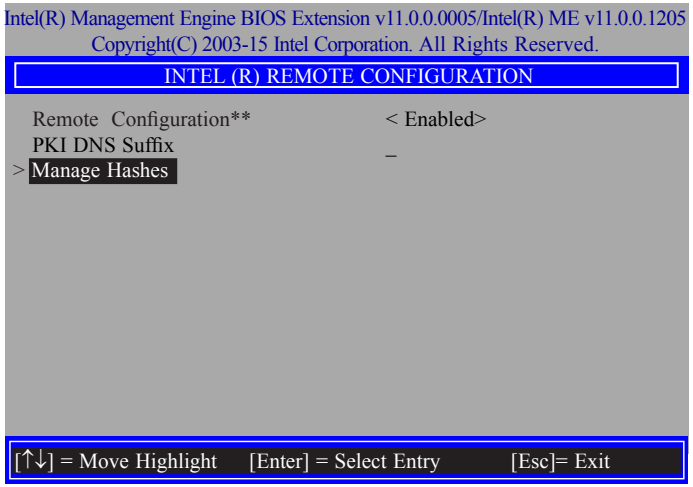
37. In the "Intel(R) Remote Configuration" menu, select "Remote Configuration**" and press "Enter", and then select "Enabled" or "Disabled" and press "Enter".



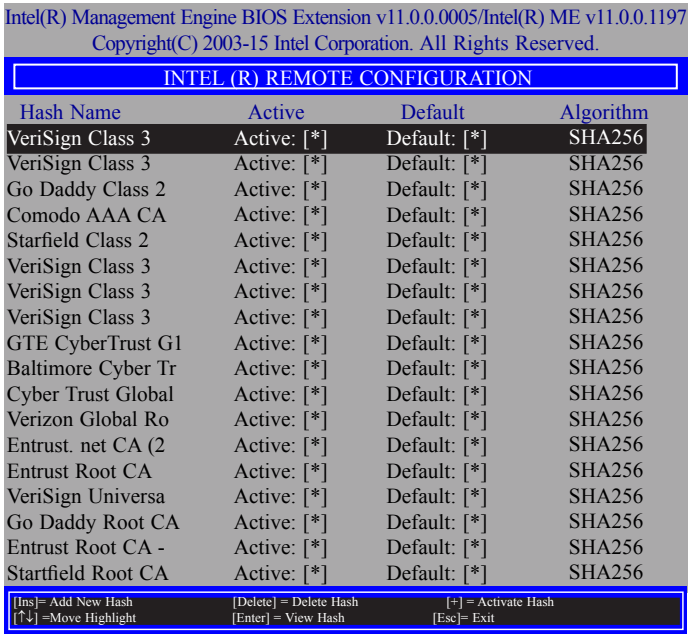
38. Select "PKI DNS Suffix", enter the "PKI DNS Suffix", and then press "Enter".



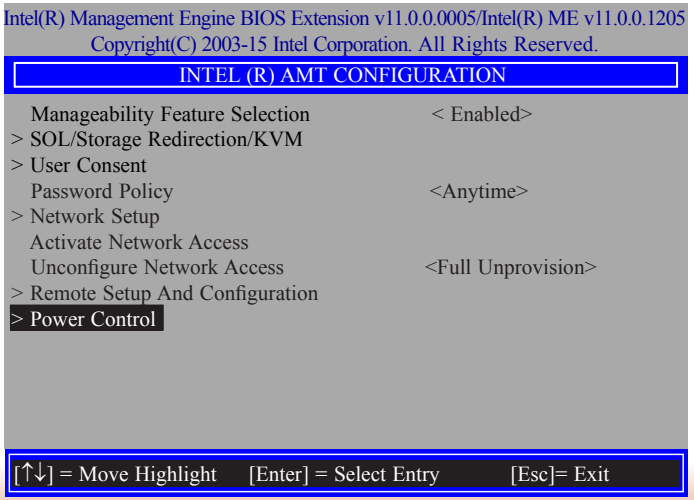
39. Select "Manage Hashes" and press "Enter", and then select one of the hash names.



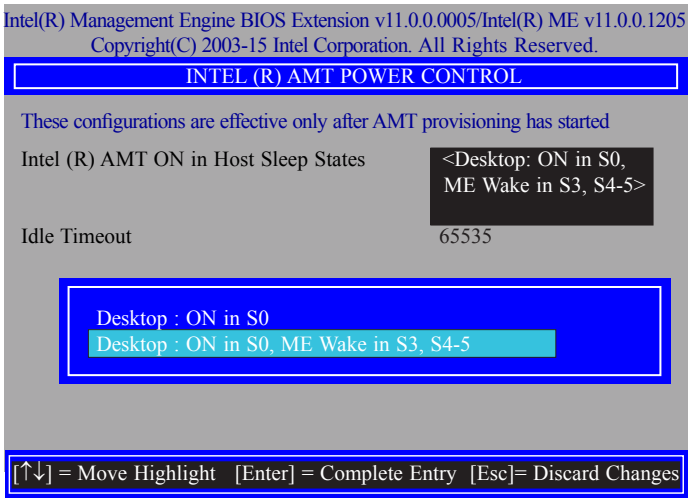
40. In the "Intel(R) AMT Configuration" menu, select Power Control, and then press "Enter".



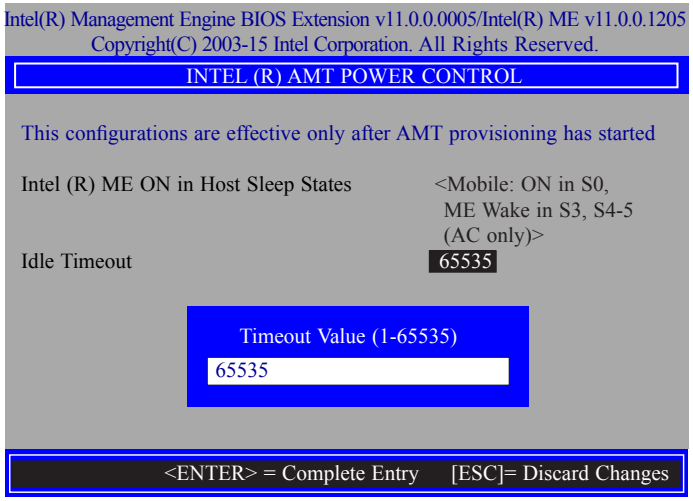
41. In the "Intel(R) AMT Power Control" menu, select "Intel(R) AMT ON in Host Sleep States" and then press "Enter". Select an option and press "Enter".



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



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



44. Select Previous Menu until you return to the "Main Menu". Select "Exit", and then press "Enter". Type "Y" and press "Enter".