AVS-700 Series
APLEX High-end Vertical Application System 8/9th Gen. Intel Core-I and Xeon® Processors and C246 Chipset Platform User Manual

Release Date	Revision
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Revision History

Reversion	Date	Description
1.0	2021/10/27	Official Version

Warning!_____

This equipment will generate, use and radiate radio frequency energy and if not installed and used in accordance with the instructions manual, it may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to FCC Rules, which is designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user with its own expense will be required to take whatever measures may be required to correct the interference.

Electric Shock Hazard – Do not operate the machine with its back cover removed. There are dangerous high voltages inside.

Packing List

Accessories (as ticked) included in this package are:
☐ Adaptor ☐ Driver & manual CD disc ☐ Other._____(please specify)

Safety Precautions

Follow the messages below to prevent your systems from damage:

- Avoid your system from static electricity on all occasions.
- Prevent electric shock. Don‘t touch any components of this card when the card is power-on. Always disconnect power when the system is not in use.
- Disconnect power when you change any hardware devices. For instance, when you connect a jumper or install any cards, a surge of power may damage the electronic components or the whole system.

Table of Contents

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Chapter 1 Getting Started

1.1 Specifications

	AVS-700
System	
CPU	Intel 8/9th Gen. Core i3/i5/i7 Processors Intel® Xeon® E Processors, LGA 1151 Socket
Chipset	C246
Memory	4 x 288-pin DDR4 (2400/2666MHz) ECC DIMM memory sockets, Dual channel, up to 128GB support. (Core™ i5/i7/only support non-ECC) **Default: 8G DDR4 2666 U-DIMM**
BIOS	Insyde128Mbit
Outside IO Port	
Default I/O Ports	1 x Ethernet with Intel® I211AT PCIe (10/100/1000Mbps) 1 x Ethernet with Intel® I219LM PCIe with iAMT12.0 (10/100/1000Mbps) (only Xeon/Core i7/i5 supports iAMT) 4 x USB 3.1 Gen1 2 x USB 2.0 1 x RS-232/422/485 (RS-232 w/ power) (DB-9) 1 x PS/2 (mini-DIN-6) 1 x VGA (up to 1920x1200@60Hz) 2 x DP++ (up to 4096x2160@60Hz) 1 x Power Switch 1 x Reset Switch
Storage Space	
Storage	Mainboard Backside connectors: 4x SATA3 channels (RAID 0/1/5/10): 1 x Mini PCIe (PCIe/mSATA, share w/SATA conn. as opt./USB2.0) 1 x M.2 2242/2280 M key (PCIe x4 NVMe, Intel Optane Memory Support) Default: 1 x M.2 256G TLC 2280 with Win10/ 1 x 2T 3.5” HDD
Expansion	

Expansion Slot	1 x PCIe x16 (Gen 3) (x8/x8 signals as opt., MOQ required) 3 x PCIe x4 (Gen 3) 2 x PCI
Power	
Power Input	500W PSU (100V~220V AC-IN)
Misc	
Misc	1x Infineon TPM1.2/2.0 (opt., MOQ required) 1x Watchdog Timer (256 steps)
Mechanical	
Construction	Beige Color
Mounting	Rackmount (Default)
Dimensions	451.2 x 429 x 173.6 mm (LxWxH)
Net Weight	15.3Kg
Ventilation	2 x 92cm System Fan with Quick Access Filter
Environmental	
Operating Temperature	0~45℃
Storage Temperature	-20~60℃
Operating Humidity	0 to 90%, non-condensing
Storage Humidity	0 to 90%, non-condensing
Certification	CE, FCC , RoHS
Operating System Support	Microsoft® Win10 IoT 64-bit Traditional Chinese, Linux

1.2 Dimensions

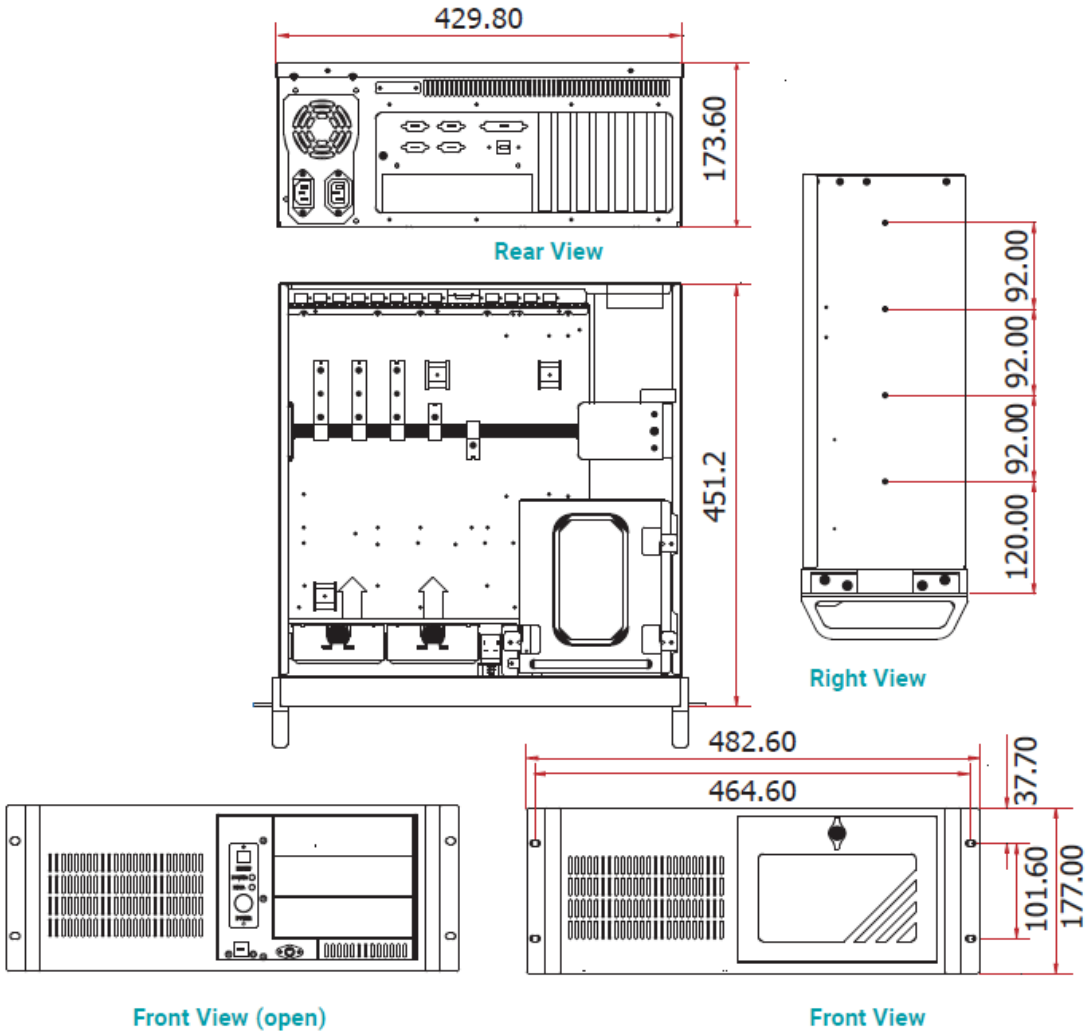


Figure 1.1: Dimension of AVS-700

1.3 Brief Description of AVS-700

AVS-700 is designed with MB CPU fan-less and GPU card expansion with smart fan support. It is powerful with Intel 8th and 9th Generation Core i3/i5/i7 processor and Intel Xeon-E processors, and it supports 4 x 260-pin DDR4 SO-DIMM up to 128GB memory. They come with 4 x USB 3.1 Type A, 2 x USB 2.0 Type A, and 2 x USB 2.0 at front panel, 2 x LAN, 2 x DP++, 1 x VGA, 1 x COM ports, and 1 x power switch. AVS-700 supports easy-accessible 4 x 2.5” SATA3 HDD space and 100-220V AC power

input. AVS-700 has up to 1 x PCIe x16(Gen3), 3 x PCIe x 4(Gen3) and 2 x PCI socket for expansion. It is plating beige color SECC chassis design, and can be rackmount. AVS-700 works well with our other products and they can provide an absolute easy way to perform control maintenance.

Figure 1.2: Front View of AVS-700

Figure 1.3: Rear View of AVS-700

Chapter 2 Hardware

2.1 Jumpers and Connectors Location

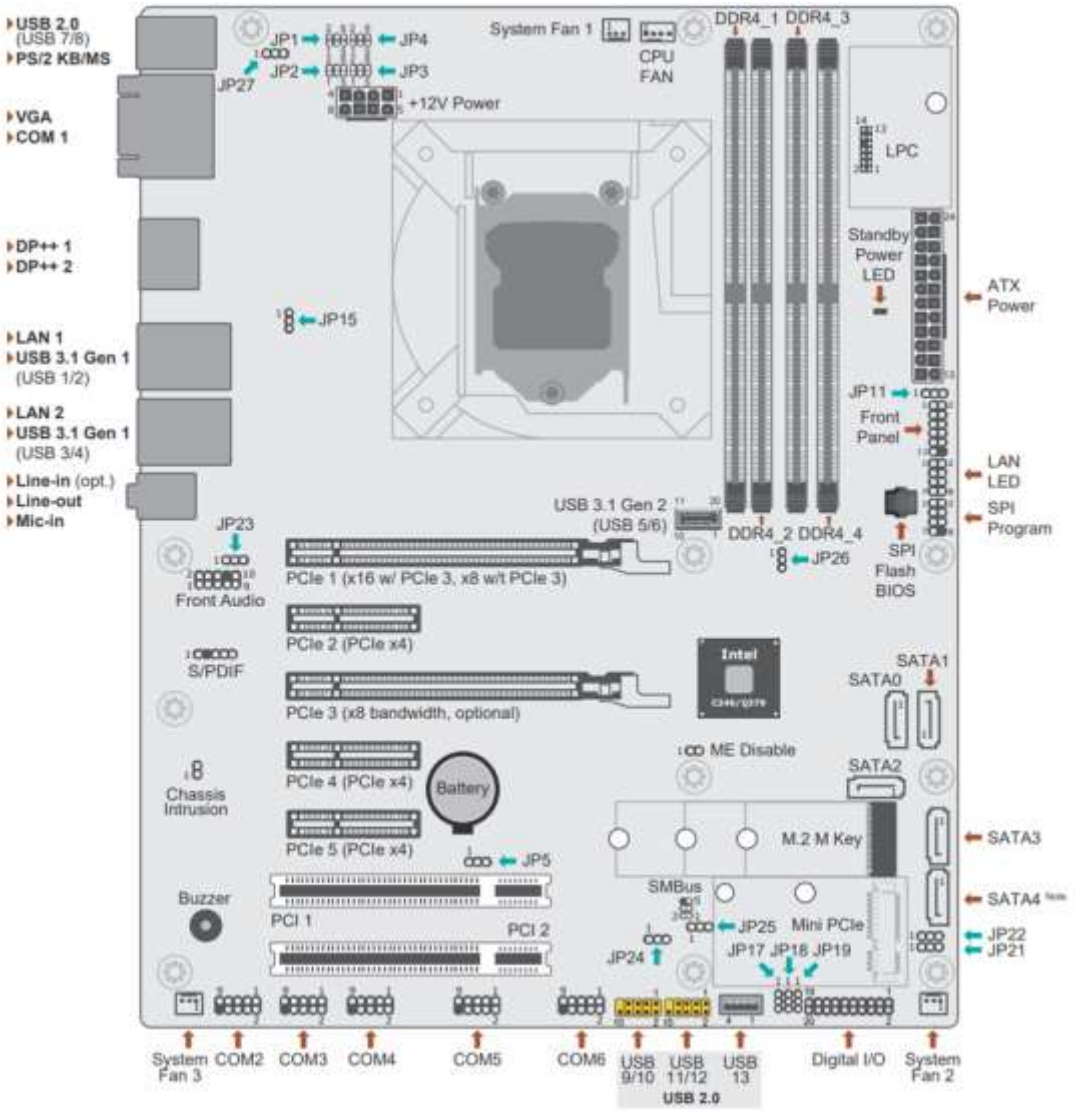


Figure 2.1: CS632 Jumpers and Connectors Location

2.2 Jumper Settings

Mini PCIe/mSATA Signal Select	JP21
Mini PCIe (default)	1-2 On
mSATA	2-3 On

Mini PCIe/mSATA Power Select	JP22
3V3DU (default)	1-2 On
3V3	2-3 On

Clear CMOS	JP5
Normal (default)	1-2 On
Clear CMOS	2-3 On

COM 1 RS232/422/485 Select	JP3	JP1/JP2
RS232 (default)	1-3, 4-6 On	1-3, 2-4 On
RS422 Full Duplex	3-5, 4-6 On	3-5, 4-6 On
RS485	3-5, 2-4 On	3-5, 4-6 On

Note:
When COM 1 RS232/422/485 is selected, JP1 and JP2 must be set in accordance to JP3.

COM 1 RS232/Power Select	JP4
RS232 (default)	1-3 (RI-), 2-4 (DCD-) On
RS232 with power	3-5 (+5V), 4-6 (+12V) On

USB Power Select	JP15/23/24/25/26/27
5VDU (default)	1-2 On
5V	2-3 On

Power-on Select	JP11
Power Button (default)	1-2 On
AC In	2-3 On

Digital I/O Power Select	JP17
+5VDU (default)	1-2 On
+5V	2-3 On

Digital I/O Output State	JP18 (DIO 0~3) JP19 (DIO 4~7)
Digital I/O Power (default)	1-2 On
GND	2-3 On

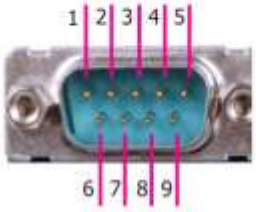
2.3 Pin Assignments

Front Panel

	Pin	Assignment		Pin	Assignment
	1	NC	PWR-LED	2	LED Power
HD-LED	3	HDD Power		4	LED Power
	5	Signal		6	Signal
RESET	7	GND	ATX-SW	8	GND
	9	Signal		10	Signal
	11	NC		12	---

COM 1 Port: RS232/RS232 with Power/RS422/RS485

COM 2/3/4/5/6 Headers: RS232



COM 1

Pin	RS232	RS232 with Power	RS422 Full Duplex	RS485
1	DCD-	+12V	RX+	DATA+
2	SIN-	SIN-	RX-	DATA-
3	SO-	SO-	TX+	NC
4	DTR-	DTR-	TX-	NC
5	GND	GND	GND	GND
6	DSR-	DSR-	NC	NC
7	RTS-	RTS-	NC	NC
8	CTS-	CTS-	NC	NC
9	RI-	+5V	NC	NC

Front Audio

Pin	Assignment	Pin	Assignment
1	Mic2-L	2	GND
3	Mic2-R	4	NC
5	Line2-R	6	Mic2-JD
7	GND	8	---
9	Line2-L	10	Line2-JD

USB 2.0 9-10/11-12 Headers

Pin	Assignment	Pin	Assignment
1	PWR	2	PWR
3	DATA-	4	DATA-
5	DATA+	6	DATA+
7	GND	8	GND
9	---	10	NC

Digital I/O

Pin	Assignment	Pin	Assignment
1	GND	2	+12V
3	DIO7	4	+12V
5	DIO6	6	GND
7	DIO5	8	+5V
9	DIO4	10	+5V
11	DIO3	12	GND
13	DIO2	14	+5DVU
15	DIO1	16	+5VDU
17	DIO0	18	GND
19	GND	20	---

USB 3.1 Gen2 5-6 Header (opt.)

Pin	Assignment	Pin	Assignment
1	GND	20	PWR
2	TX+	19	DATA-
3	TX-	18	DATA+
4	GND	17	GND
5	RX+	16	RX+
6	RX-	15	RX-
7	GND	14	GND
8	DATA+	13	TX+
9	DATA-	12	TX-
10	PWR	11	GND

LPC

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

LAN LED

Pin	Assignment	Pin	Assignment
1	GBE_LED_1000-	2	GBE_LED_100-
3	GBE_LED_LINK_ACT-	4	3V3DU
5	LINK_1000_4	6	LINK_100_4
7	LINK_ACTIVITY_4	8	3V3DU

CPU Fan

Pin	Assignment
1	GND
2	+12V
3	Sense
4	Speed Control

System Fan 1/2/3

Pin	Assignment
1	GND
2	Power
3	Sense

+12V Power

Pin	Assignment	Pin	Assignment
1	GND	5	12V
2	GND	6	12V
3	GND	7	12V
4	GND	8	12V

S/PDIF

Pin	Assignment
1	+5V
2	---
3	SPDIF OUT
4	GND
5	SPDIF IN

SATA 3.0 0/1/2/3/4(opt.) (If M.2 changes to mSATA mode, SATA 0 has no function.)

Pin	Assignment
1	GND
2	TX+
3	TX-
4	GND
5	RX-
6	RX+
7	GND

ATX Power

Pin	Assignment	Pin	Assignment
1	+3.3V	13	+3.3V
2	+3.3V	14	-12V
3	GND	15	GND
4	+5V	16	PS_ON#
5	GND	17	GND
6	+5V	18	GND
7	GND	19	GND
8	PWR_OK	20	NC
9	+5VSB	21	+5V
10	+12V	22	+5V
11	+12V	23	+5V
12	+3.3V	24	GND

Chassis Intrusion

Pin	Assignment
1	Signal
2	GND

SMBus

Pin	Assignment	Pin	Assignment
1	3V3DU	2	GND
3	SMB_CLK	4	SMB_DATA
5	SMB_ALERT	6	---

Chapter 3 BIOS Setup

3.1 Overview

▶ Overview

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

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

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

Entering the BIOS Setup Utility
The BIOS Setup Utility can only be operated from the keyboard and all commands are keyboard commands. The commands are available at the right side of each setup screen.
The BIOS Setup Utility does not require an operating system to run. After you power up the system, the BIOS message appears on the screen and the memory count begins. After the memory test, the message "Press DEL to run setup" will appear on the screen. If the message disappears before you respond, restart the system or press the "Reset" button. You may also restart the system by pressing the <Ctrl> <Alt> and <Del> keys simultaneously.

Legends

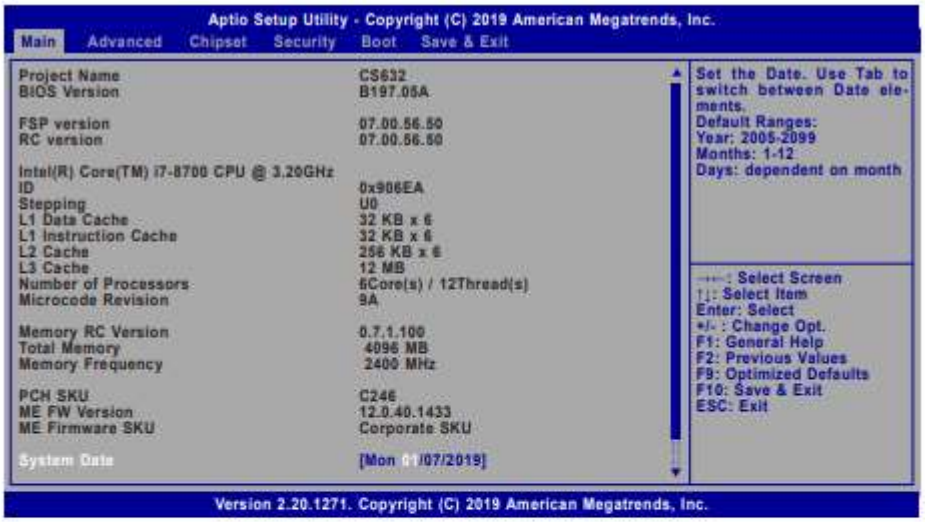
Keys	Function
Right / Left arrow	Move the highlight left or right to select a menu
Up / Down arrow	Move the highlight up or down between submenus or fields
<Enter>	Enter the highlighted submenu
+ (plus key)/F6	Scroll forward through the values or options of the highlighted field
- (minus key)/F5	Scroll backward through the values or options of the highlighted field
<F1>	Display general help
<F2>	Display previous values
<F9>	Optimized defaults
<F10>	Save and Exit
<Esc>	Return to previous menu

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>.

3.2 Main Settings

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



System Date

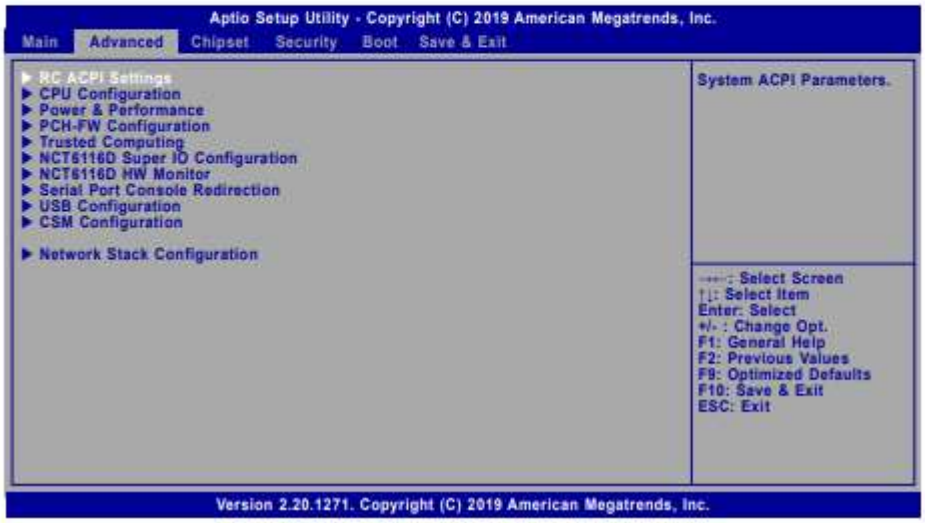
The date format is <month>, <date>, <year>. Press "Tab" to switch to the next field and press "-" or "+" to modify the value.

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.

3.3 Advanced Settings

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.



RC ACPI Configuration

Wake system from S5

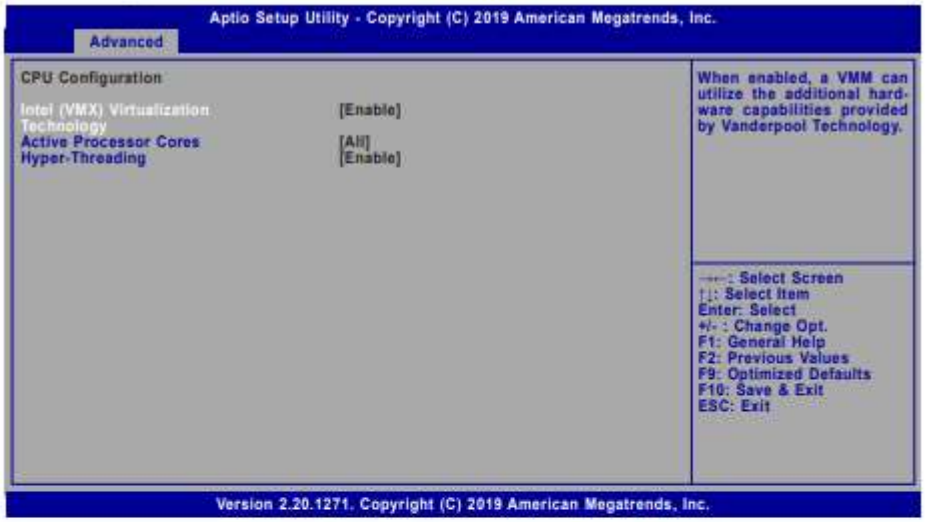
When Enabled, the system will automatically power up at a designated time every day. Once it's switched to [Enabled], please set up the time of day — hour, minute, and second — for the system to wake up.

State After G3

Select between S0 State, and S5 State. This field is used to specify what state the system is set to return to when power is re-applied after a power failure (G3 state).

S0 State	The system automatically powers on after power failure.
S5 State	The system enter soft-off state after power failure. Power-on signal input is required to power up the system.

CPU Configuration



Intel (VMX) Virtualization Technology

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

Active Processor Cores

Select number of cores to enable in each processor package: all or 1.

Hyper-threading

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

Note:
Some of the fields may not be available when the features are not supported by the equipped CPU.

Power & Performance

Intel(R) SpeedStep(tm)

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

Turbo Mode

Enable or disable turbo mode of the processor. This field will only be displayed when EIST is enabled.

C states

Enable or disable CPU Power Management. It allows CPU to enter "C states" when it's idle and nothing is executing.

PCH-FW Configuration

ME State

When this field is set to Disabled, ME will be put into ME Temporarily Disabled Mode.

Manageability Features State

Enable or disable Intel(R) Manageability features. This option disables/enables Manageability Features support in FW. To disable, support platform must be in an unprovisioned state first.

AMT BIOS Features

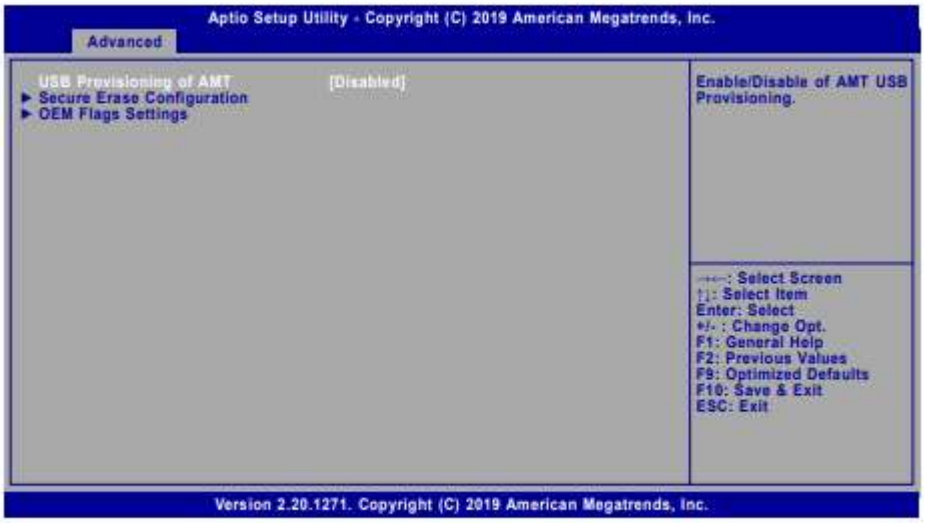
When disabled, AMT BIOS features are no longer supported and user is no longer able to access MEBx Setup. This option does not disable manageability features in FW.

ME Unconfig on RTC Clear

When disabled, ME will not be unconfigured on RTC Clear.

Note:
The sub-menus are detailed in following sections.

► AMT Configuration



USB Provisioning of AMT

Enable or disable AMT USB Provisioning.

► AMT Configuration ► Secure Erase Configuration

Secure Erase Mode

Select Secure Erase module behavior: Simulated or Real.

Force Secure Erase

Enable or disable Force Secure Erase on next boot.

► AMT Configuration ► OEM Flags Settings

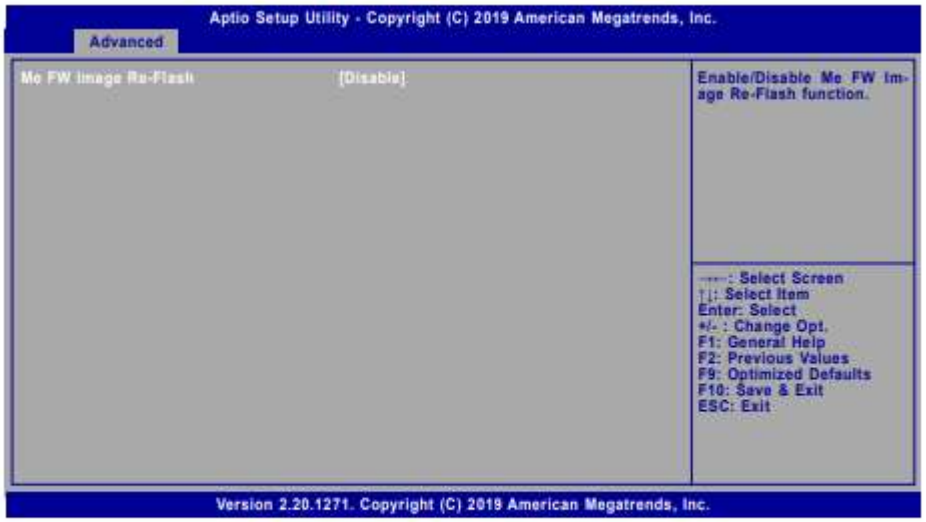
Hide Unconfigure ME Confirmation Prompt

Enable or disable to hide unconfigure ME confirmation prompt when attempting ME unconfiguration.

Unconfigure ME

Enable or disable to unconfigure ME with resetting MEBx password to default.

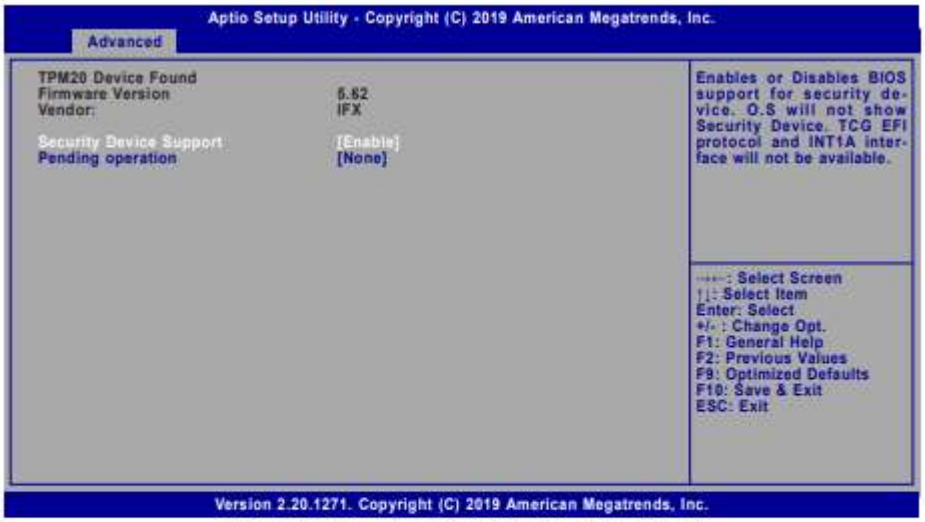
► Firmware Update Configuration



Me FW Image Re-Flash

This field is used to enable or disable the ME FW Image Re-Flash function, which allows the user to update the ME firmware.

Trusted Computing



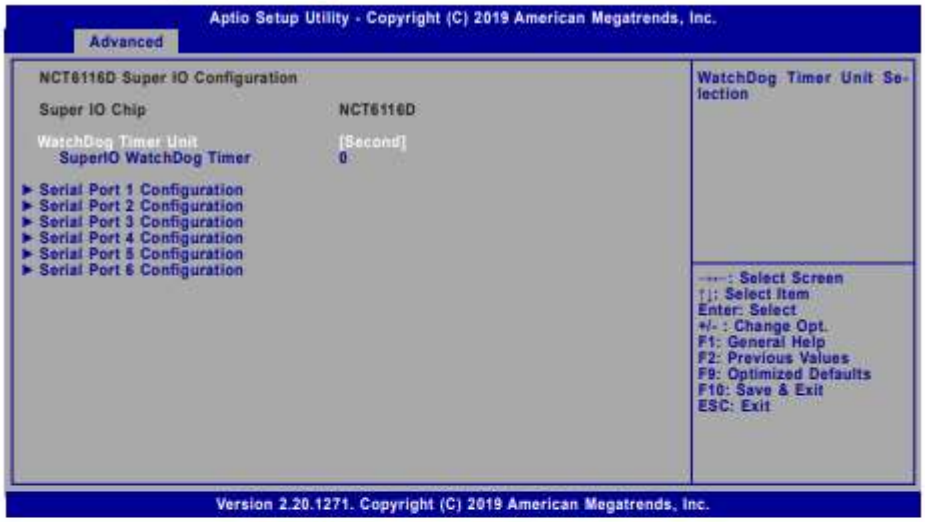
Security Device Support

This field is used to enable or disable BIOS support for the security device such as an TPM 2.0 to achieve hardware-level security via cryptographic keys.

Pending operation

To clear the existing TPM encryption, select "TPM Clear" and restart the system. This field is not available when "Security Device Support" is disabled.

NCT6116D Super IO Configuration



WatchDog Timer Unit

Select WatchDog Timer Unit – Second or Minute.

SuperIO WatchDog Timer

Set SuperIO WatchDog Timer Timeout value. The range is from 0 (disabled) to 255.

Note:
The sub-menus are detailed in following sections.

► **Serial Port 1/2/3/4/5/6 Configuration**

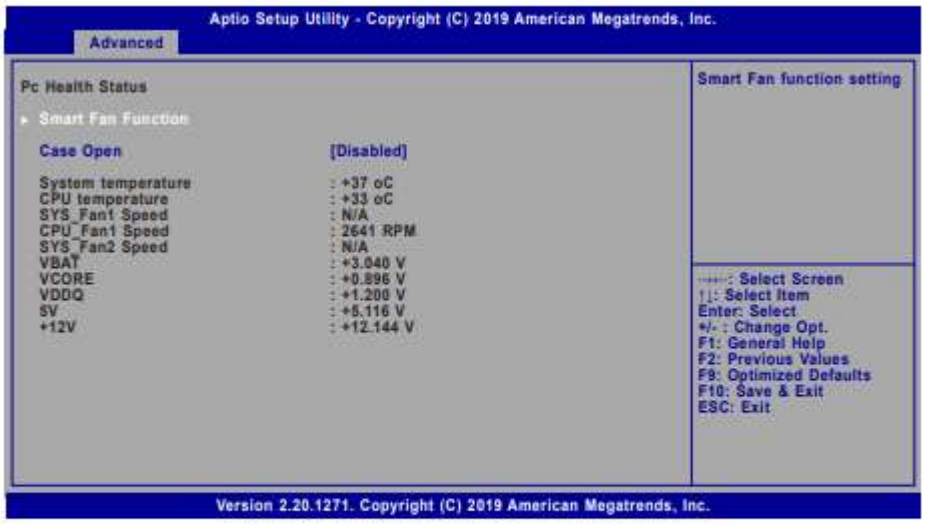
Serial Port

Enable or disable the current serial COM port.

RS485 Auto Flow

Enable or disable RS485 auto flow. This field is only available for COM ports that support RS485 mode.

NCT6116D HW Monitor

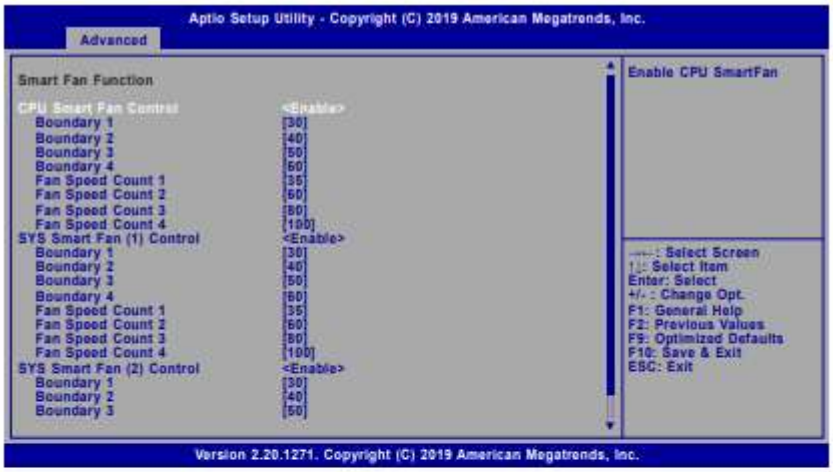


This section displays the system's health information, i.e. voltage readings, CPU and system temperatures, and fan speed readings.

Case Open

Enable or disable the case open detection function.

► Smart Fan Function



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

▼ SYS Smart Fan/CPU Smart Fan Control = [Enabled]

Boundary 1 to Boundary 4

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

Fan Speed Count 1 to Fan Speed Count 4

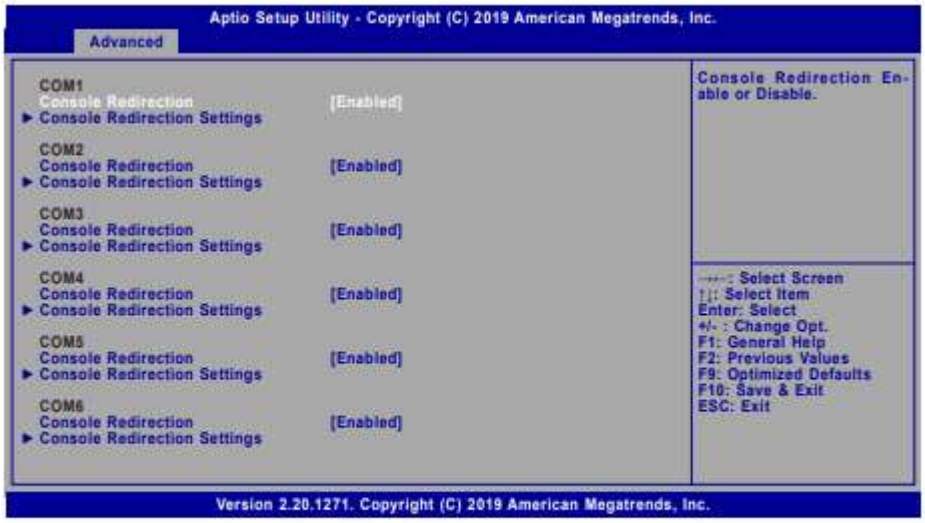
Set the fan speed, the value ranging from 1-100%, 100% being full speed. The fans will operate according to the specified boundary temperatures above-mentioned.

▼ SYS Smart Fan/CPU Smart Fan Control = [Disabled]

Fix Fan Speed Count

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

Serial Port Console Redirection



Console Redirection

By enabling Console Redirection of a COM port, the sub-menu of console redirection settings will become available for configuration as detailed in the following.

► **Console Redirection Settings**

Configure the serial settings of the current COM port.

Terminal Type

Select terminal type: VT100, VT100+, VT-UTF8 or ANSI.

Bits per second

Select serial port transmission speed: 9600, 19200, 38400, 57600 or 115200.

Data Bits

Select data bits: 7 bits or 8 bits.

Parity

Select parity bits: None, Even, Odd, Mark or Space.

Stop Bits

Select stop bits: 1 bit or 2 bits.

Flow Control

Select flow control type: None or Hardware RTS/CTS. Flow Control is for RS485 mode and is only supported by Serial Port 1 (COM1).

USB Configuration

Legacy USB Support

Enabled	Enable Legacy USB support.
Disabled	Keep USB devices available only for EFI applications.
Auto	Disable Legacy support if no USB devices are connected.

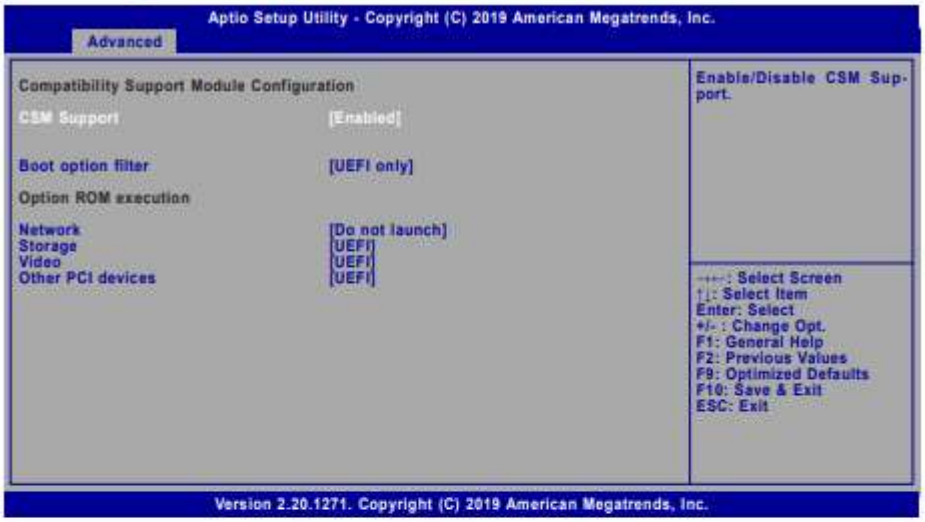
XHCI Hand-off

Enable or disable XHCI Hand-off.

USB Mass Storage Driver Support

Enable or disable USB Mass Storage Driver Support.

CSM Configuration



CSM Support

This section is used to enable or disable CSM Support. The following fields are only available when "CSM Support" is enabled.

Boot option filter

This field controls Legacy/UEFI ROMs priority. Select among UEFI and Legacy, Legacy only or UEFI only.

Network

This field controls the execution of UEFI and Legacy Network OpROM.

Storage

This field controls the execution of UEFI and Legacy Storage OpROM.

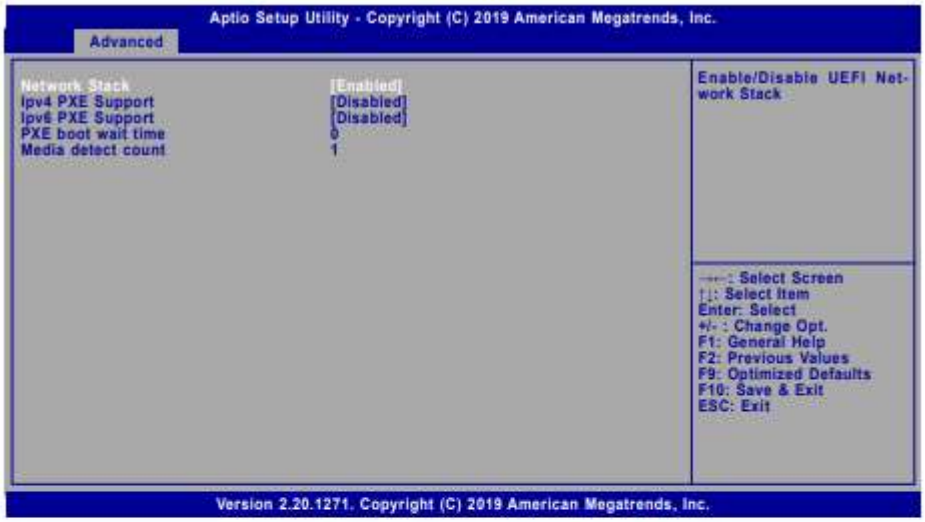
Video

This field controls the execution of UEFI and Legacy Video OpROM.

Other PCI devices

This field determines OpROM execution policy for devices other than Network, Storage or Video.

Network Stack Configuration



Network Stack

Enable or disable UEFI network stack. The following fields will appear when this field is enabled.

Ipv4 PXE Support

Enable or disable IPv4 PXE boot support. If disabled, IPv4 PXE boot support will not be available.

Ipv6 PXE Support

Enable or disable IPv6 PXE boot support. If disabled, IPv6 PXE boot support will not be available.

PXE boot wait time

Set the wait time in seconds to press ESC key to abort the PXE boot. Use either +/- or numeric keys to set the value.

Media detect count

Set the number of times the presence of media will be checked. Use either +/- or numeric keys to set the value.

3.4 Chipset Settings

Graphics Configuration

Primary Display

Select which of IGFX/PEG/PCI Graphics device to be the primary display.

Internal Graphics

Keep IGFX "Enabled" or "Disabled" based on the setup options, or select "Auto" for auto-detection.

PEG Port Configuration

Enable Root Port

Enable or disable the root port, or select "Auto" for auto-detection.

Max Link Speed

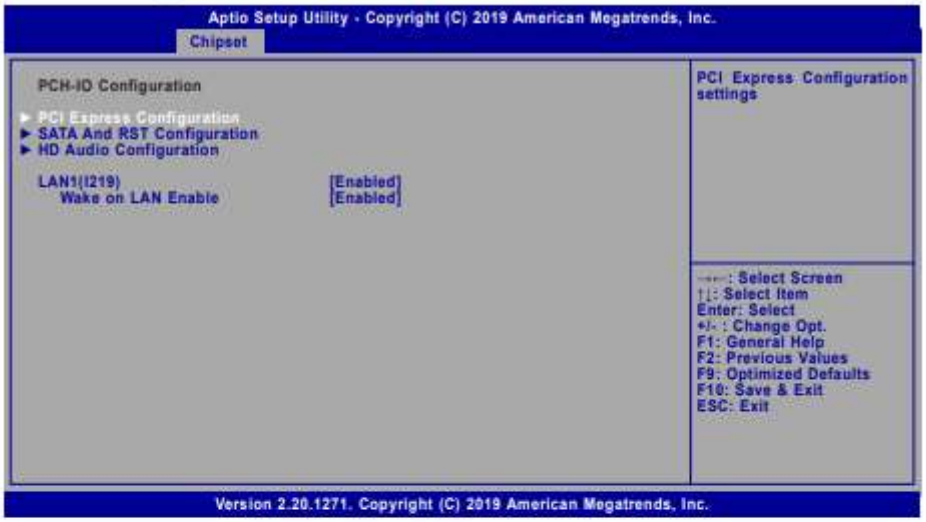
Configure PCIE1/PCIE3 port's Max Speed: Auto, Gen1, Gen2 or Gen3.

► PEG Port Feature Configuration

Detect Non-Compliance Device

Enable or disable this field to detect non-compliance PCIe devices in the PEG.

PCH-IO Configuration



LAN1(I219)

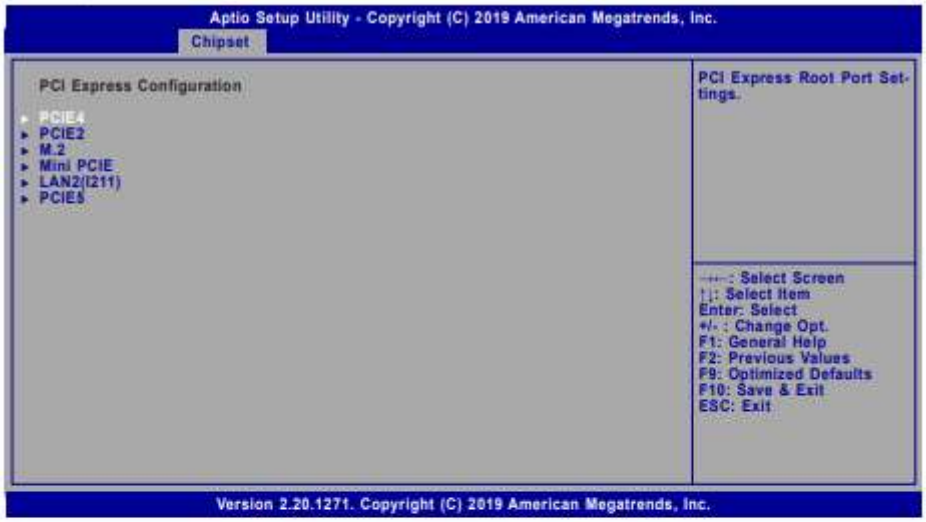
Enable or disable onboard NIC.

Wake on LAN Enable

Enable or disable integrated LAN to wake the system.

Note:
The sub-menus are detailed in following sections.

PCI Express Configuration



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

PCIE4/PCIE2/M.2/Mini PCIE/LAN2(I211)/PCIE5

Enable or disable the PCI Express Root Port. The following fields are only available when the PCIe root port is enabled.

PCIe Speed

Select PCIe Speed of the current port — AUTO, Gen1, Gen 2, or Gen3. This field may not appear when the speed of the port is not configurable.

Hot Plug

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

Detect Non-Compliance Device

Enable or disable this field to detect non-compliance PCIe devices in the PEG. This field may not appear when the port does not support Non-compliant device detection.

SATA And RST Configuration

SATA Controller(s)

This field is used to enable or disable the Serial ATA controller.

SATA Speed

This field is used to select SATA speed generation limit: Auto, Gen1, Gen2 or Gen3.

SATA Mode Selection

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

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

Intel RST Premium With Intel Optane System Acceleration This option allows you to create RAID or Intel Rapid Storage configuration along with Intel® Optane™ system acceleration on Serial ATA devices.

Use RST Legacy OROM

This field shows up when SATA Mode Selection is set to Intel RST Premium With Intel Optane System Acceleration. Enable or disable to use RST Legacy OROM when CSM is enabled.

Port 0/1/2/3/4/ and Hot Plug

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

HD Audio Configuration

HD Audio

Control the detection of the HD Audio device.

Disabled HDA will be unconditionally disabled.

Enabled HDA will be unconditionally enabled.

3.5 Security Settings

Administrator Password

Set the administrator password. To clear the password, input nothing and press enter when a new password is asked. Administrator Password will be required when entering the BIOS.

User Password

Set the user password. To clear the password, input nothing and press enter when a new password is asked. User Password will be required when powering up the system.

Secure Boot

Secure Boot

The Secure Boot store a database of certificates in the firmware and only allows the OSes with authorized signatures to boot on the system. To activate Secure Boot, please make sure that "Secure Boot" is "[Enabled]", Platform Key (PK) is enrolled, "System Mode" is "User", and CSM is disabled. After enabling/disabling Secure Boot, please save the configuration and restart the system. When configured and activated correctly, the Secure Boot status will be "Active".

Secure Boot Customization

Select the secure boot mode — Standard or Custom. When set to Custom, the following fields will be configurable for the user to manually modify the key database.

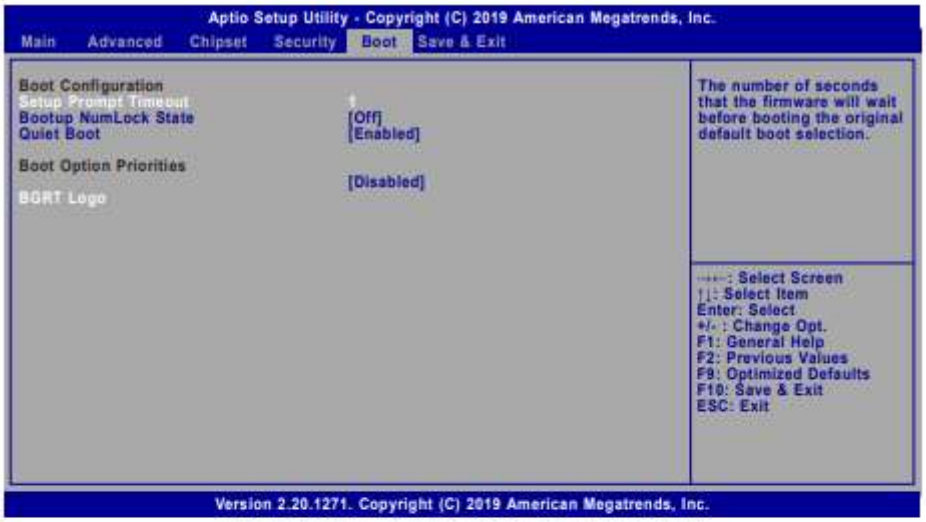
Restore Factory Keys

Force system to User Mode. Load OEM-defined factory defaults of keys and databases onto the Secure Boot. Press Enter and a prompt will show up for you to confirm.

Reset To Setup Mode

Clear the database from the NVRAM, including all the keys and signatures installed in the Key Management menu. Press Enter and a prompt will show up for you to confirm.

3.6 Boot Settings



Setup Prompt Timeout

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

Bootup NumLock State

Select the keyboard NumLock state: On or Off.

Quiet Boot

This section is used to enable or disable quiet boot option.

Boot Option Priorities

Rearrange the system boot order of available boot devices.

BGRT Logo

It is used to enable or disable to support display logo with ACPI BGRT table.

Note:
If "Boot option filter" of "CSM Configuration" is set to "UEFI and Legacy" or "UEFI only" and "Quiet Boot" is set to enabled, "BGRT Logo" will show up for configuration. Refer to the Advanced > CSM Configuration for more information.

3.7 Save & Exit Settings

Save Changes and Reset

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

Discard Changes and Reset

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

Restore Defaults

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

Boot Override

Move the cursor to an available boot device and press Enter, and then the system will immediately boot from the selected boot device. The Boot Override function will only be effective for the current boot. The "Boot Option Priorities" configured in the Boot menu will not be changed.

► Save Setting to file

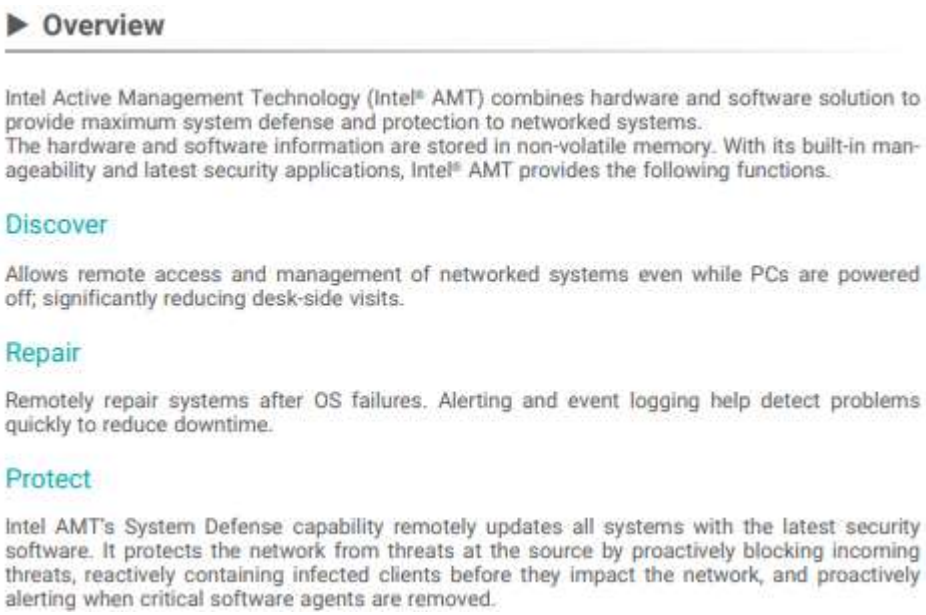
Select this option to save BIOS configuration settings to a USB flash device.

► Restore Setting from file

This field will appear only when a USB flash device is detected. Select this field to restore setting from the USB flash device.

Chapter 4 Intel AMT Settings

4.1 Introduction



▶ Overview

Intel Active Management Technology (Intel® AMT) combines hardware and software solution to provide maximum system defense and protection to networked systems.
The hardware and software information are stored in non-volatile memory. With its built-in manageability and latest security applications, Intel® AMT provides the following functions.

Discover

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

Repair

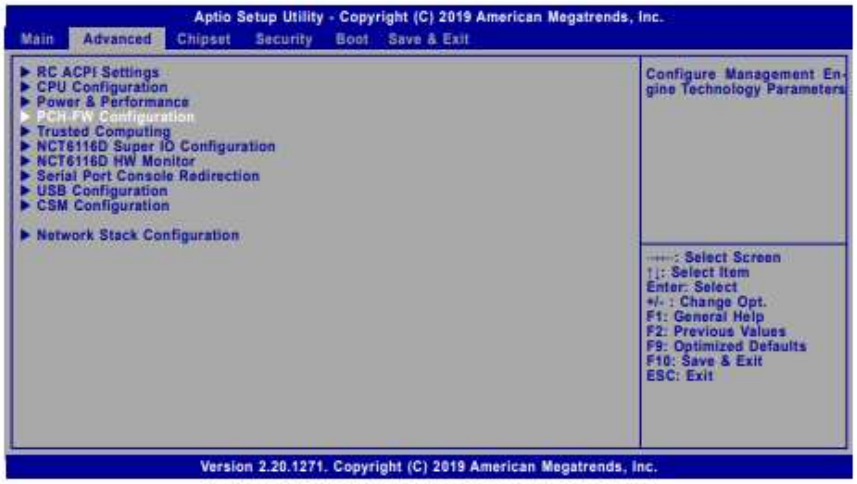
Remotely repair systems after OS failures. Alerting and event logging help detect problems quickly to reduce downtime.

Protect

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

4.2 Enable Intel® AMT in the AMI BIOS

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



3. Set the **AMT BIOS Features** field to **Enabled**.

4. Press F4, or go to the **Save & Exit** menu, select **Save Changes and Reset** and then press <Enter>. A dialog box will appear. Select **Yes** and press Enter to reset the system after saving all changes made.

4.3 Entering Management Engine BIOS Extension (MEBX)

When the system reboots, the following message will be displayed. Press **<Ctrl + P>** as soon as the message is displayed. This message will only be displayed very briefly.

4.4 MEBX

Main Menu

Select **MEBx Login** under Main Menu and press Enter. A prompt that requires password input will show up.

1. Enter the default password "**admin**".

2. Enter a new 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. !, $, ;);
   - At least one lower case and one upper case characters.
3. Enter the new password again to verify the new password.

Intel(R) ME General Settings

Select **Intel(R) ME General Settings** under Main Menu and then press Enter.

Change ME Password

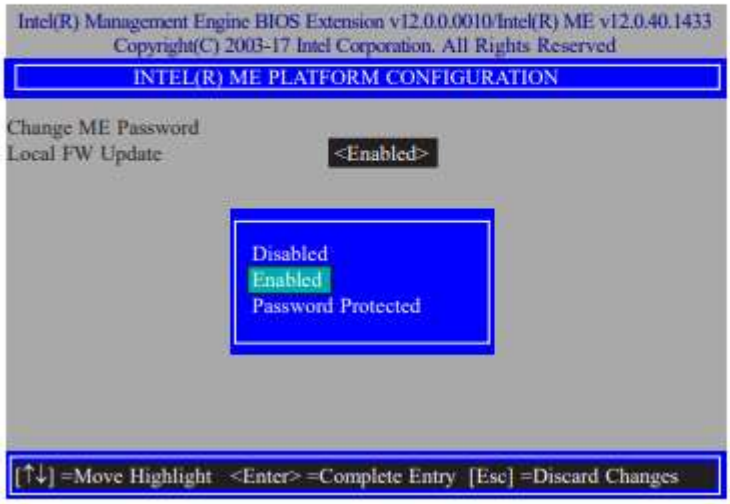
If you want to change ME password, select **Change ME Password** and then press Enter. A prompt that requires password input will show up.

1. Enter the current password and then press Enter.

2. Enter a new 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. !, $, ;);
   - At least one lower case and one upper case characters.
3. Enter the new password again to verify the new password.

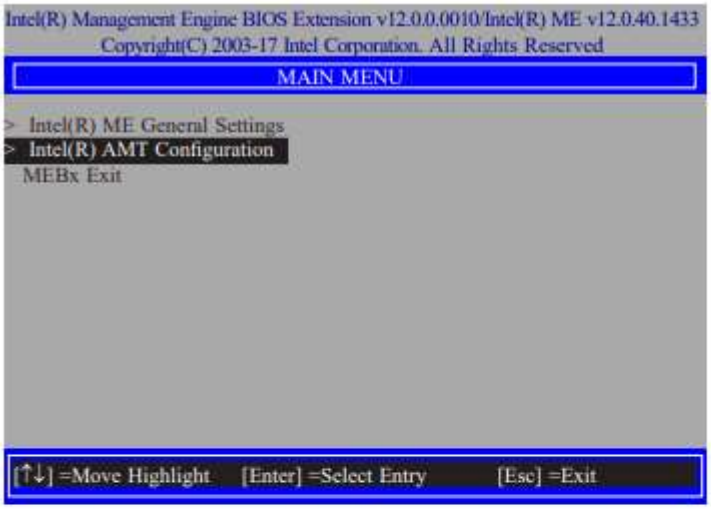
Local FW Update

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



Intel(R) AMT Configuration

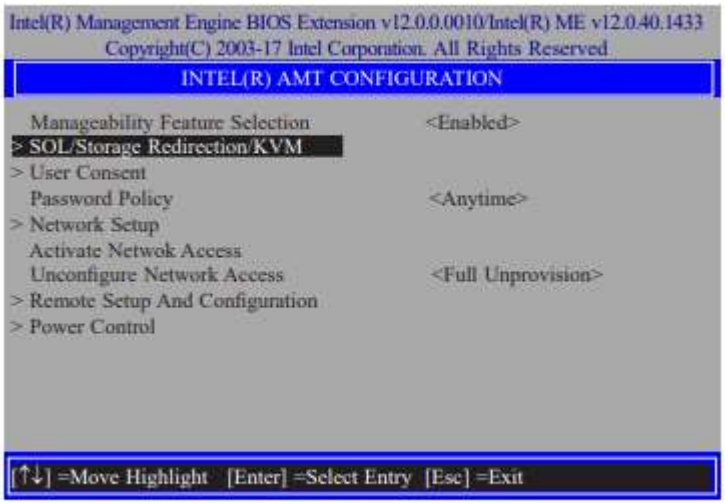
Select Intel(R) AMT Configuration under Main Menu and then press Enter.



Manageability Feature Selection

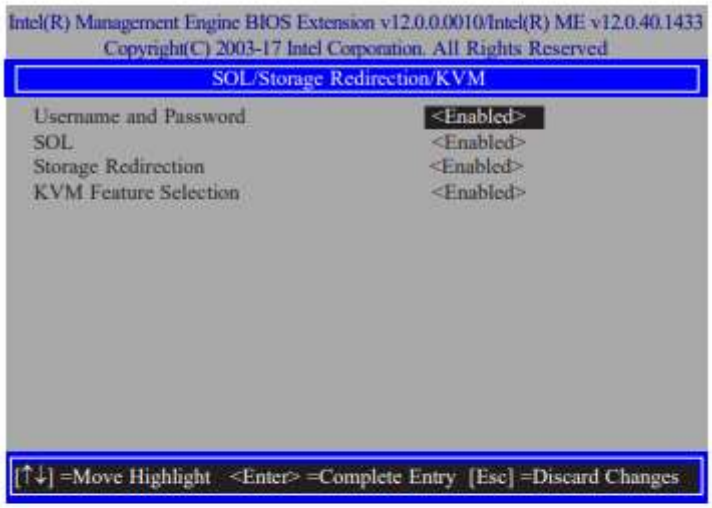
Select **Enabled** or **Disabled** then press Enter. When disabled, all the following fields will be hidden. After disabling the field, system restart is required.

> SOL/Storage Redirection/KVM



Press Enter to enter the submenu.

> SOL/Storage Redirection/KVM



Move the cursor to select a field and press Enter to display options.

Username and Password

Select Enabled or Disabled then press Enter.

SOL

Select Enabled or Disabled then press Enter.

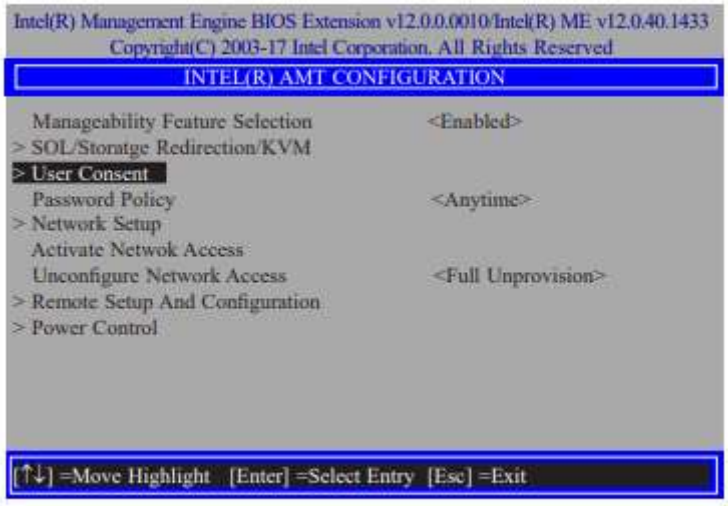
Storage Redirection

Select Enabled or Disabled then press Enter.

KVM Feature Selection

Select Enabled or Disabled then press Enter.

> User Consent



Press Enter to enter the submenu.

> User Consent

Move the cursor to select a field and press Enter to display options.

User Opt-in

Select **NONE** or **KVM** or **ALL** then press Enter.

Opt-in Configurable from Remote IT

Select **Enabled** or **Disabled** then press Enter.

Password Policy

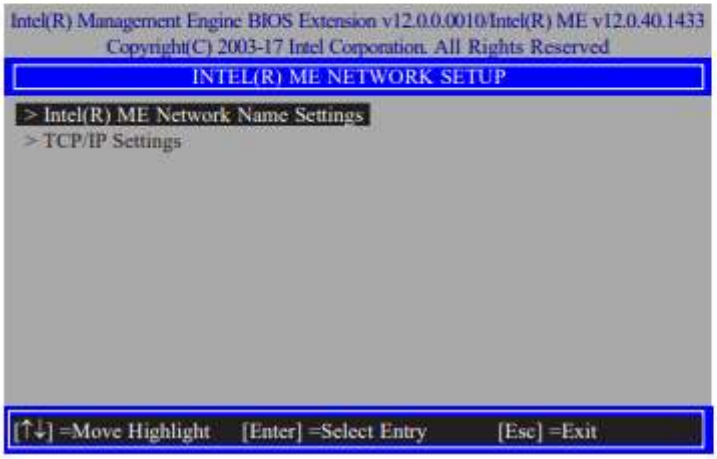
Under the **Intel(R) AMT Configuration** menu, select **Password Policy** then press Enter. You may choose to use a password only during setup and configuration or to use a password anytime the system is being accessed.

> Network Setup

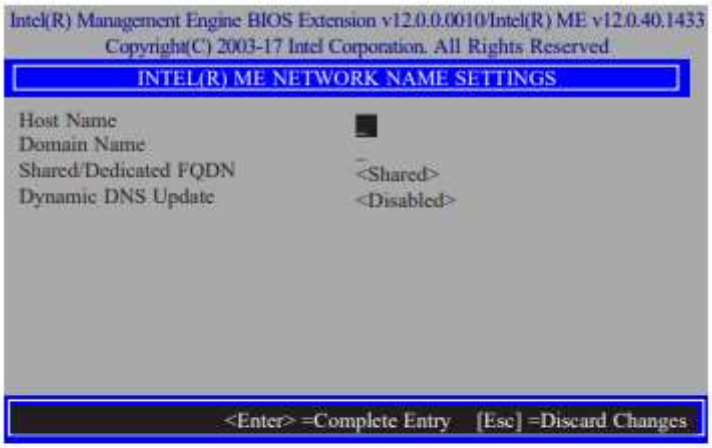
Under the **Intel(R) AMT Configuration** menu, select **Network Setup** and then press Enter.

> Intel(R) ME Network Name Settings

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



Move the cursor to select a field and press Enter to display options.



Host Name

Enter the computer's host name and then press Enter.

Domain Name

Enter the computer's domain name and then press Enter.

Shared/Dedicated FQDN

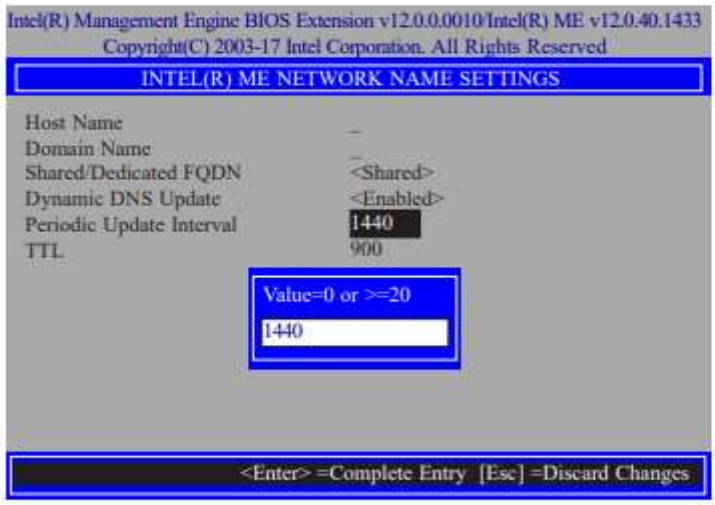
Select **Shared** or **Dedicated** and then press Enter.

Dynamic DNS Update

Select Enabled or Disabled then press Enter. When Dynamic DNS Update is Enabled, the following fields will show up.

Periodic Update Interval

Enter a value and then press Enter.

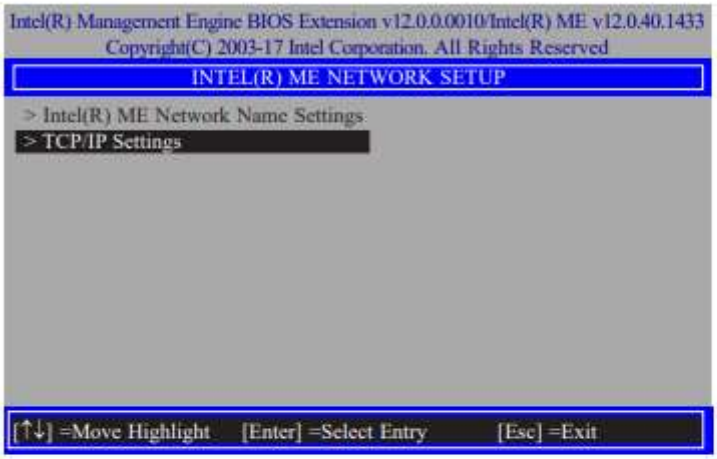


TTL

Enter a value for the Time-to-live (TTL) field and then press Enter.

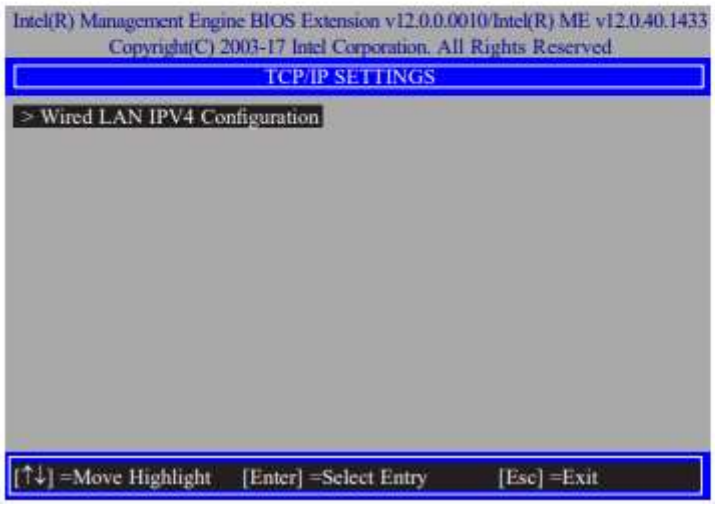
> TCP/IP Settings

Under the Intel(R) ME Network Setup menu, select TCP/IP Settings and then press Enter.



> Wired LAN IPV4 Configuration

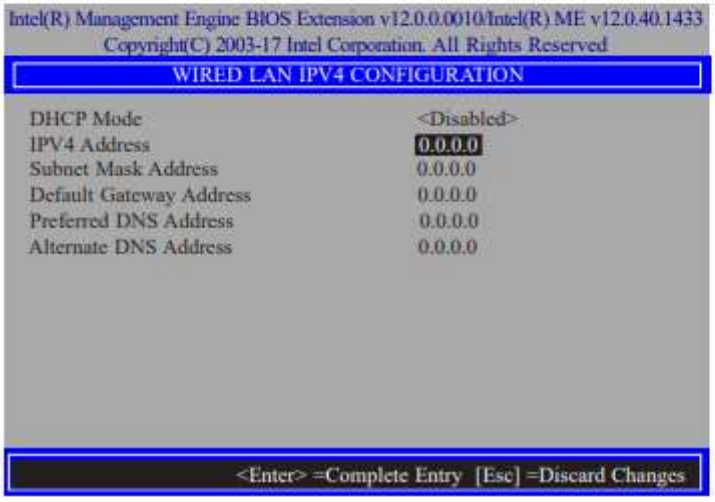
Under **TCP/IP Settings**, select **Wired LAN IPV4 Configuration** and then press Enter.



DHCP Mode

Select **Enabled** or **Disabled** then press Enter. Please make sure there is a DHCP server in the network when this field is enabled.

When DHCP is **Disabled**, please manually input a static route by configuring the fields as shown below.



IPv4 Address

Assign a valid and available IP address to the system. Insert a value from 0.0.0.0 to 255.255.255.255 in IPv4 format.

Subnet Mask Address

Insert a value from 0.0.0.0 to 255.255.255.255 in IPv4 format.

Default Gateway Address

Insert a value from 0.0.0.0 to 255.255.255.255 in IPv4 format.

Preferred DNS Address

Insert a value from 0.0.0.0 to 255.255.255.255 in IPv4 format.

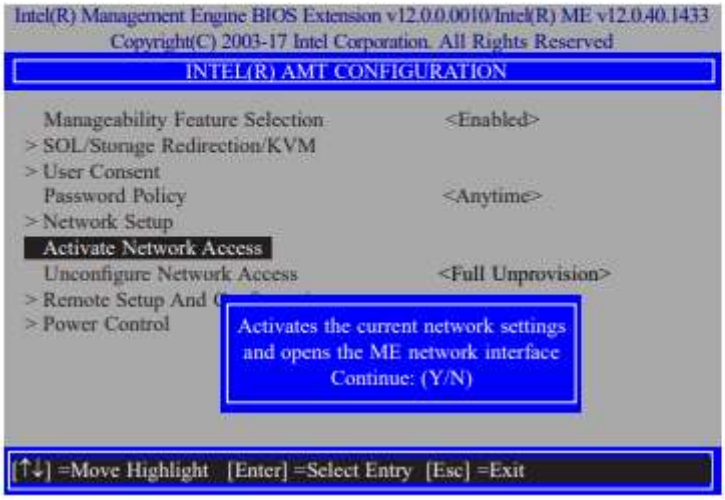
Alternate DNS Address

Insert a value from 0.0.0.0 to 255.255.255.255 in IPv4 format.

▶ MEBX ▶ Intel(R) AMT Configuration

Activate Network Access

Under the **Intel(R) AMT Configuration** menu, select **Activate Network Access** and press Enter, and then press Y to activate the ME network connection with the settings configured previously, or press N to abort.

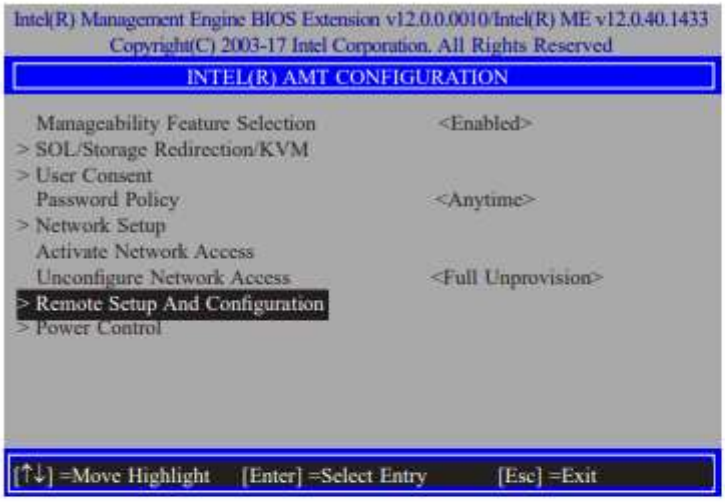


Unconfigure Network Access

Under the **Intel(R) AMT Configuration** menu, select **Undconfigure Network Access** and press Enter, and then press Enter to fully deactivate the ME network connection and reset configuration to factory default. Press Y to confirm or N to abort.

> Remote Setup And Configuration

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



Current Provisioning Mode

The current mode — Public Key Infrastructure (PKI) — is displayed.

Provisioning Record

Press Enter to view the record.

Provisioning Server IPV4/IPV6

Enter the address of the server then press Enter, and then insert the TCP/UDP port number.

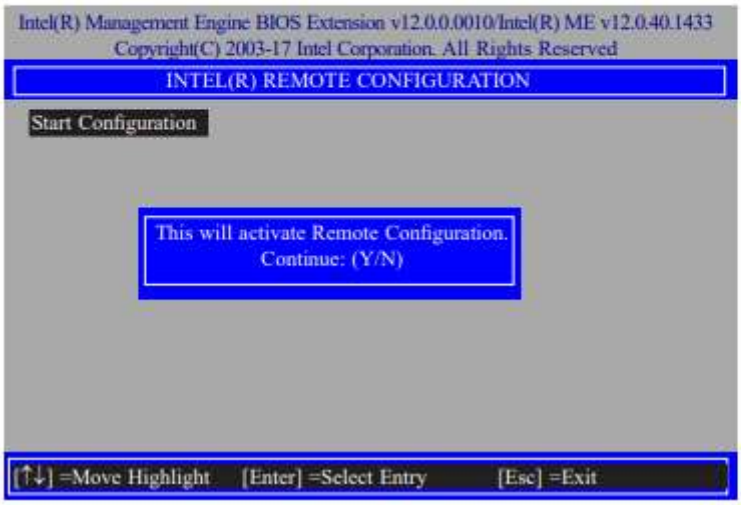
Provisioning Server FQDN

Enter the Fully Qualified Domain Name (FQDN) of the server and then press Enter.

▶ MEBX ▶ Intel(R) AMT Configuration ▶ Remote Setup And Configuration

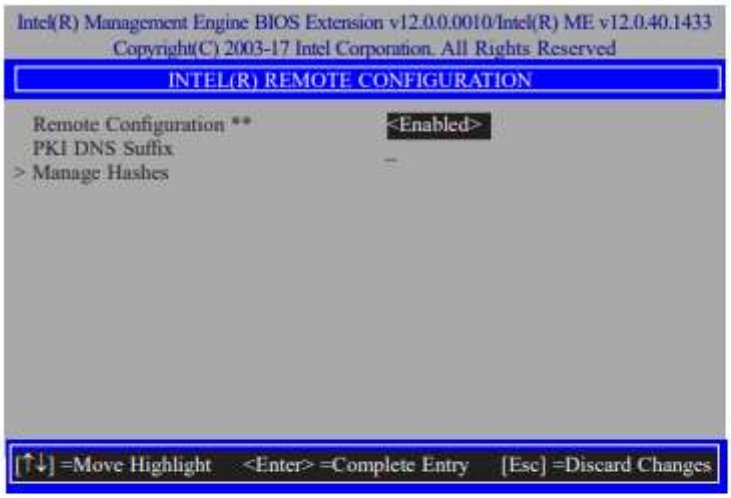
> RCFG

Press Enter, select **Start Configuration**, and then press Enter to activate Remote Configuration (RCFG). Press Y to confirm or N to abort.



> TLS PKI

The system adopts PKI for encryption and authentication, and the TLS protocol for communication security to ensure remote configuration safety.



Remote Configuration **

Select **Enabled** or **Disabled** then press Enter.

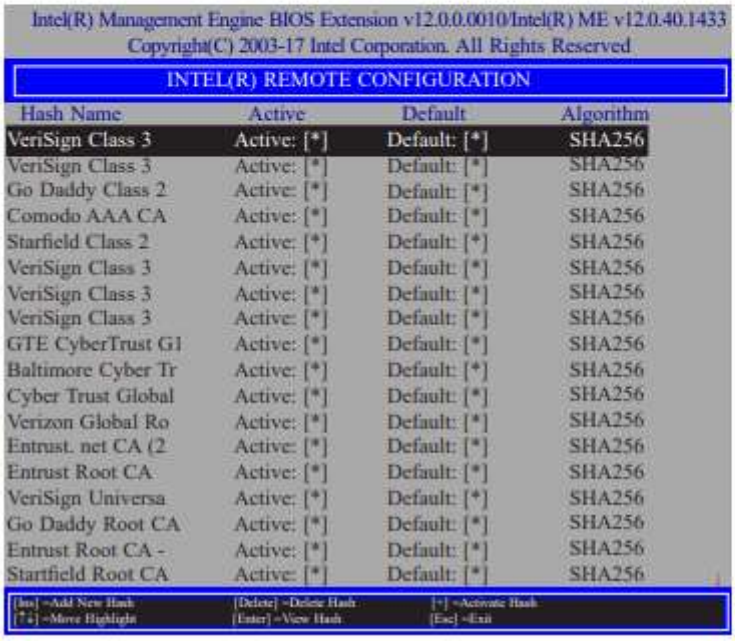
PKI DNS Suffix

Specify the DNS Suffix of the PKI server, and then press Enter.

> Manage Hashes

Select a hash name and then press the following keys to execute a function.

Insert	– enter a custom hash certificate name,
Delete	– delete a hash
Enter	– view hash information
+	– activate or deactivate a hash
Esc	– exit



▶ MEBX ▶ Intel(R) AMT Configuration

> Power Control

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

Intel(R) AMT ON in Host Sleep States

Select an option and then press Enter.

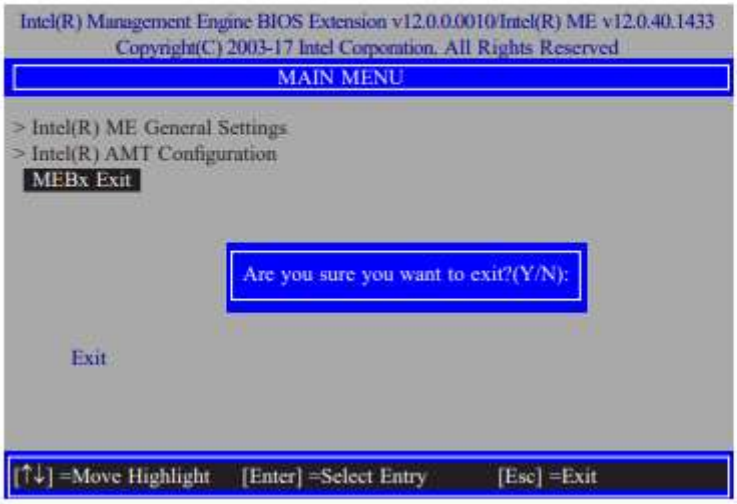
Idle Timeout

Enter a timeout value and press Enter.

▶ MEBX

MEBx Exit

Under the Main Menu, select MEBx Exit and then press Enter. Press Y to confirm or N to abort.



Chapter 5 RAID

The system board allows configuring RAID on Serial ATA drives. It supports RAID 0, RAID 1, RAID 5 and RAID 10.

▶ RAID Levels

RAID 0 (Striped Disk Array without Fault Tolerance)

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

RAID 1 (Mirroring Disk Array with Fault Tolerance)

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

RAID 5

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

RAID 10 (Mirroring and Striping)

RAID 10 is a combination of data striping and data mirroring providing the benefits of both RAID 0 and RAID 1. Use four new drives or an existing drive and three new drives for this configuration.

RAID Level	Min. Drives	Protection	Description
RAID 0	2	None	Data striping without redundancy
RAID 1	2	Single Drive Failure	Disk mirroring
RAID 5	3	Single Drive Failure	Block-level data striping with distributed parity
RAID 10	4	1 Disk Per Mirrored Stripe (not same mirror)	Combination of RAID 0 (data striping) and RAID 1 (mirroring)

▶ Setup Procedure

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

1. Install SATA drives.
2. Enable RAID in the Insyde BIOS.
3. Create a RAID volume.
4. Install the Intel Rapid Storage Technology Utility.

Step 1: Install SATA Drives

Refer to chapter 2 for details on connecting the Serial ATA drives.

Important:

1. Please make sure the SATA drives that you are to create a RAID volume with are connected and powered, and are able to be detected by the system. Otherwise, the RAID BIOS utility would not be accessible.
2. While creating a RAID volume, please make sure the system, drives, and cables are perfectly steady and mounted correctly. Disturbance during creating a RAID volume will result in irreversible data corruption sotred on the drive.

Step 2: Enable RAID in the AMI BIOS

1. Power-on the system then press <Del> to enter the main menu of the AMI BIOS.
2. Go to "Chipset" menu and select the "PCH-IO Configuration" menu then "SATA And RST Configuration" menu.
3. Change the "SATA Mode Selection" to "Intel RST Premium With Intel Optane System Acceleration" mode.
4. Press F10 to save the changes.
5. Reboot the system.

Step 3: Create a RAID Volume

1. Go to the "Advanced" menu of the AMI BIOS and select "Intel(R) Rapid Storage Technology".

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

Step 4: Install the Intel Rapid Storage Technology Utility

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

Chapter 6 Supported Software

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

▶ Auto-run Menu

After inserting your DVD-ROM into your optical drive or executing your DVD image, the System Utility auto-run menu may pop up. Click on the utility or driver that is to be installed on the system. Please refer to the following sections that correspond to your selection for more information.

Click "More >>" on the lower right to go to the next page of the auto-run menu, and click "<< Previous" to return to the previous menu.

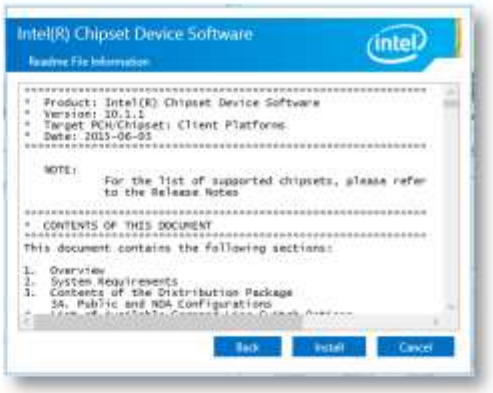
6.1 Intel Chipset Software Installation Utility

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.

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

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

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



4. The step displays the installing status in the progress.

5. After completing installation, click "Restart Now" to exit setup.

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

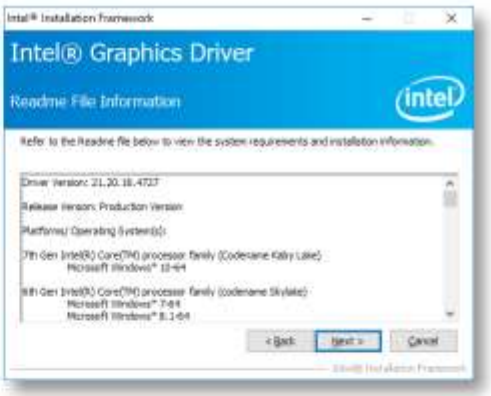
6.2 Intel® HD Graphics Drivers

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

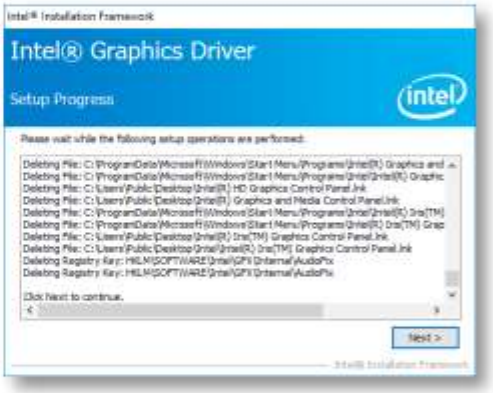
By default, the "Automatically run WinSAT and enable the Windows Aero desktop theme" is enabled. With this enabled, after installing the graphics driver and the system rebooted, the screen will turn blank for 1 to 2 minutes (while WinSAT is running) before the Windows 10 desktop appears. The "blank screen" period is the time Windows is testing the graphics performance.
We recommend that you skip this process by disabling this function then click "Next".

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

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



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



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

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

6.3 Realtek Audio Drivers

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

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

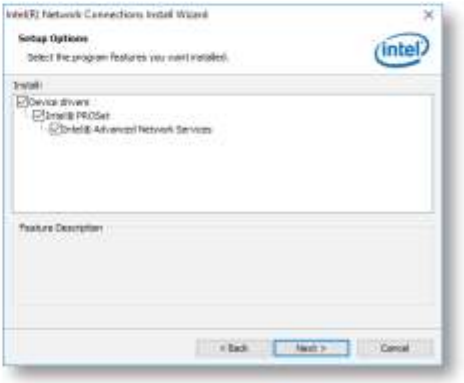
   Restarting the system will allow the new software installation to take effect.

6.4 Intel® LAN Driver

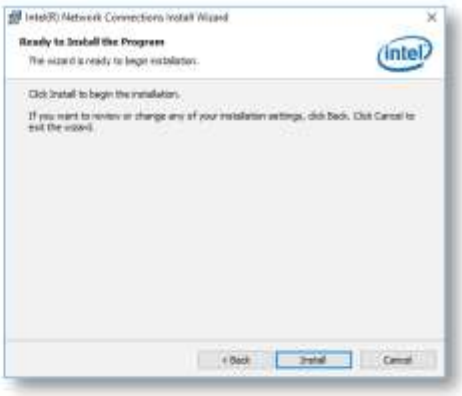
1. Setup is ready to install the driver. Click "Next".

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

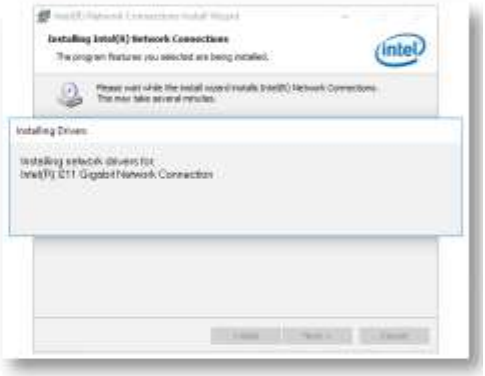
3. Select the program features you want installed then click "Next".



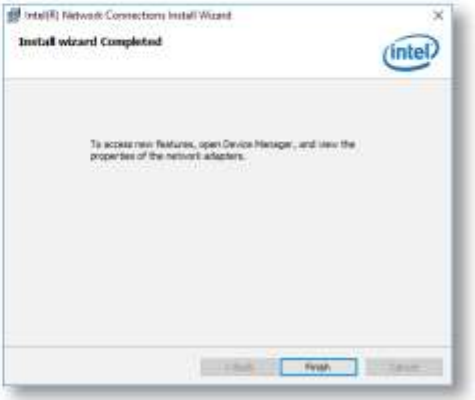
4. Click "Install" to begin the installation.



5. The step displays the installing status in the progress.

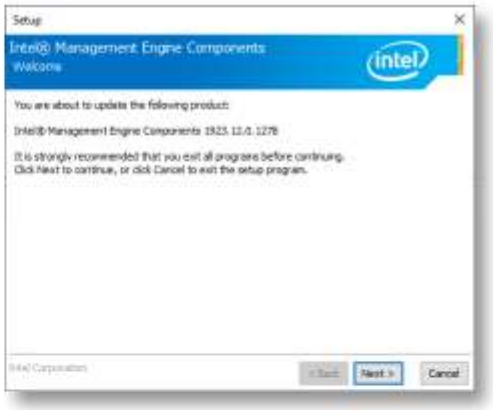


6. After completing installation, click "Finish".



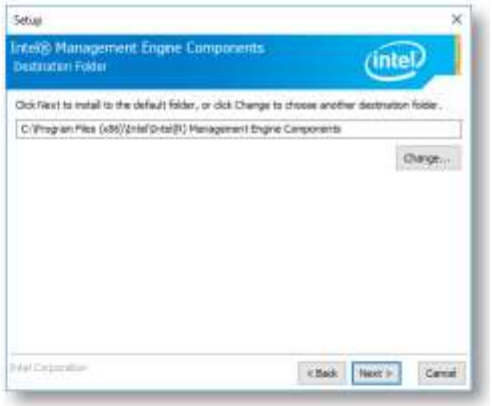
6.5 Intel® ME Drivers

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

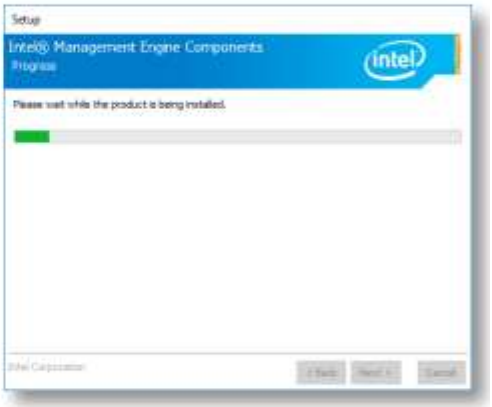


2. Read the license agreement then tick "I accept the terms in the License Agreement". Click "Next".

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



4. Please wait while the product is being installed.



5. After completing installation, click "Finish".

6.6 Intel® Serial IO Drivers

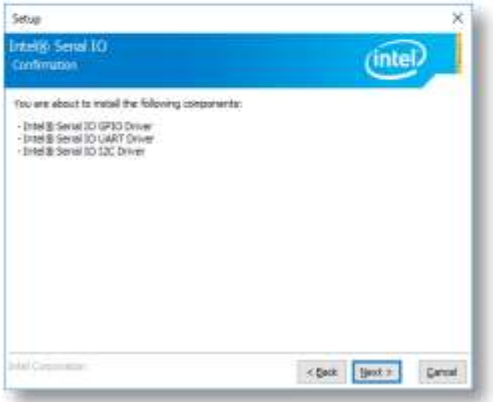
1. Setup is ready to install the driver. Click "Next".

2. Read the license agreement carefully.

   Tick "I accept the terms in the License Agreement" then click "Next".

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

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



5. Setup is now installing the driver.

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

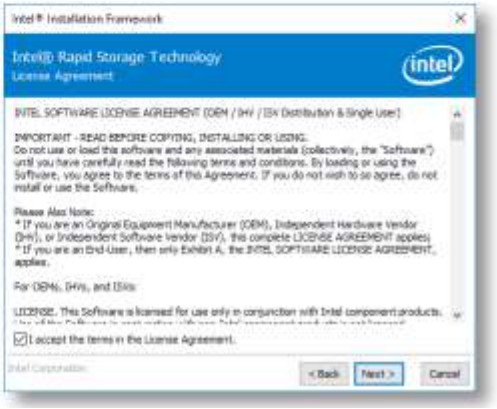
   Restarting the system will allow the new software installation to take effect.

6.7 Intel® Rapid Storage Technology

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

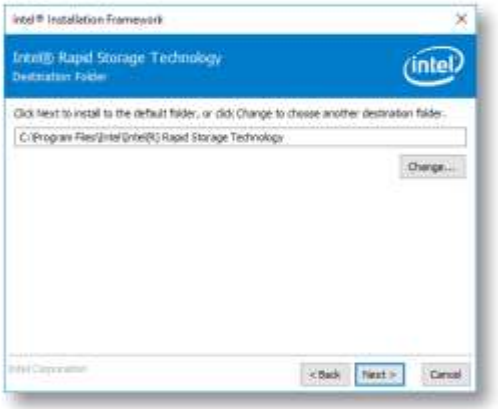
1. Setup is ready to install the utility. Click "Next".

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



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

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

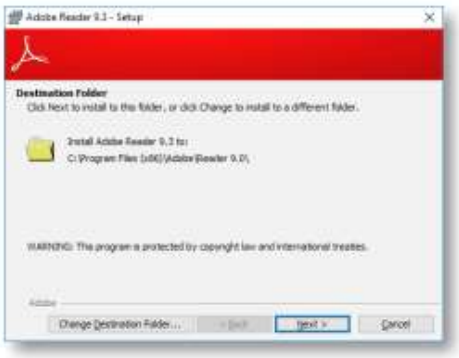


5. Confirm the installation and click "Next".

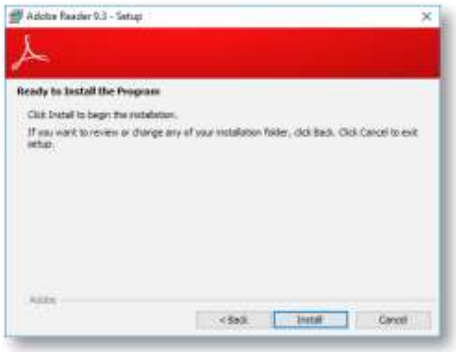
6. Click "Yes, I want to restart this computer now" to complete the installation and then click "Finish".

6.8 Adobe Acrobat Reader 9.3

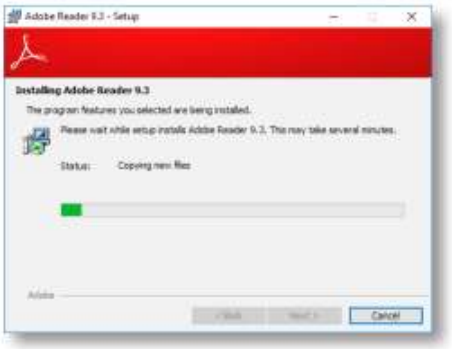
1. Click "Next" to install or click "Change Destination Folder" to select another folder.



2. Click "Install" to begin installation.



3. Setup is now installing the driver.



4. Click "Finish" to exit installation.