

RKP-C220 Series Hardware User Manual

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RKP-C220 Series Hardware User Manual

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1. Introduction

Thank you for purchasing the Moxa RKP-C220 industrial computer. This manual covers hardware installation, connector interfaces, and BIOS setup of the RKP-C220. For software configuration and management, please refer to the user manual for the operating system on your computer.

Overview

The RKP-C220 Series rackmount computers are powered by 13th Gen Intel® Core™ i3/i5/i7/i9 processor. The computers come with a rich set of interface options, including up to 10 software-selectable RS-232/422/485 serial ports, up to 8 Gigabit Ethernet ports, 2 CANbus ports, and 4 digital inputs and 4 digital outputs. The RKP-C220 Series is equipped with 3 standard PCIe slots (x16, x8, and x1), providing various peripheral interface extension possibilities. Meanwhile, the Series comes with 2 lockable 2.5" SSD slots and 3 internal M.2 slots support Intel® RST RAID 0/1 functionality. In addition, an outer replaceable RTC battery design delivers a reliable, durable, and versatile platform for a more user-friendly option.

Package Checklist

Each basic system model is shipped with the following standard items.

- RKP-C220 Series rackmount computer
- A pair of rack-mounting brackets with 12 screws
- C15 to C13 power cord
- 10-pin terminal block for DI/DO
- Two 2.5" SSD door keys
- Two M.2 screws
- A thermal pad for the memory module
- Quick Installation Guide



NOTE

Please notify your sales representative if any of the above items are missing or damaged.

Product Features

The RKP-C220 computer has the following features:

- 13th Gen Intel® Core™ Raptor Lake-S processor and Intel® Q670E chipset
- 2U rackmount computers with fanless design
- Rich set of interfaces: Up to 8 LAN, up to 10 serial ports, and 2 CAN ports
- 2 SODIMM sockets support up to 64 GB
- 3 PCIe slots for expansion modules: x16, x8 (x4 signal), and x1 PCIe slots
- Unified front-panel connectivity design for easy access of interfaces
- -30 to 60°C operating temperature range



NOTE

The latest specifications for Moxa's products can be found at <https://moxa.com>.

Accessory List (Purchase separately)

- HS-M.2 2280-RKP-C220 (P/N: 3095010000593)
 - 1 x M.2 2280 heat sink with thermal pad attached
 - 1 x screw for M.2 2280 module
 - 2 x screw for M.2 2280 heat sink
- RKP-FAN (P/N: 3095010000592)
 - 1 x fan module
 - 1 x fan air baffle
 - 4 x screw for fan module

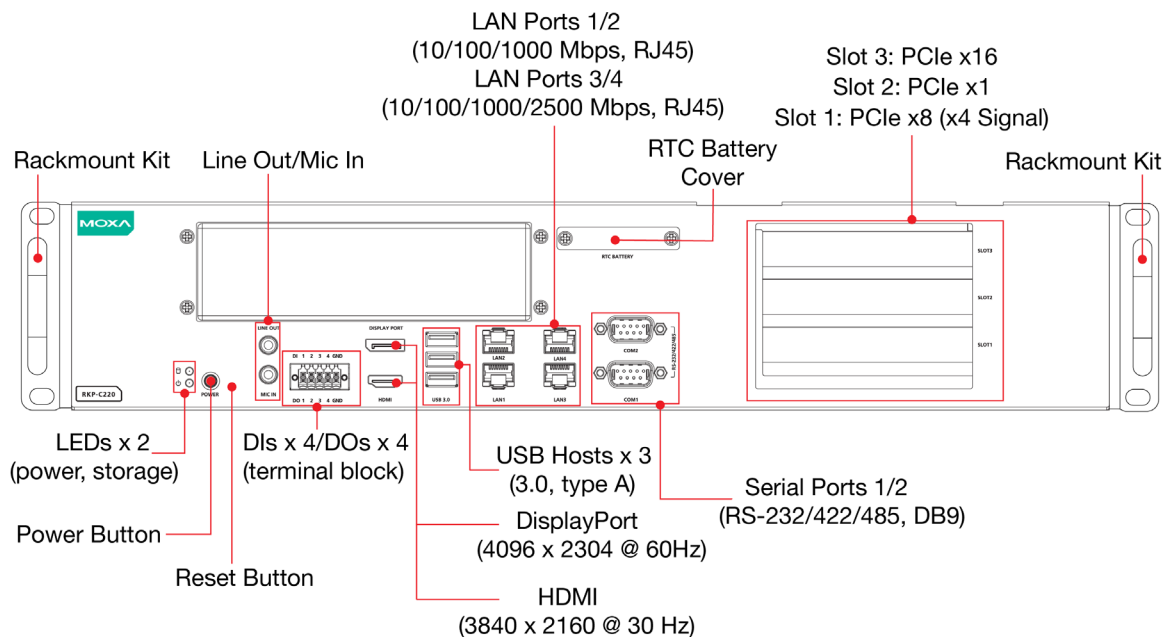
2. Hardware Introduction

In this chapter, we provide information about the RKP-C220 computer's hardware components.

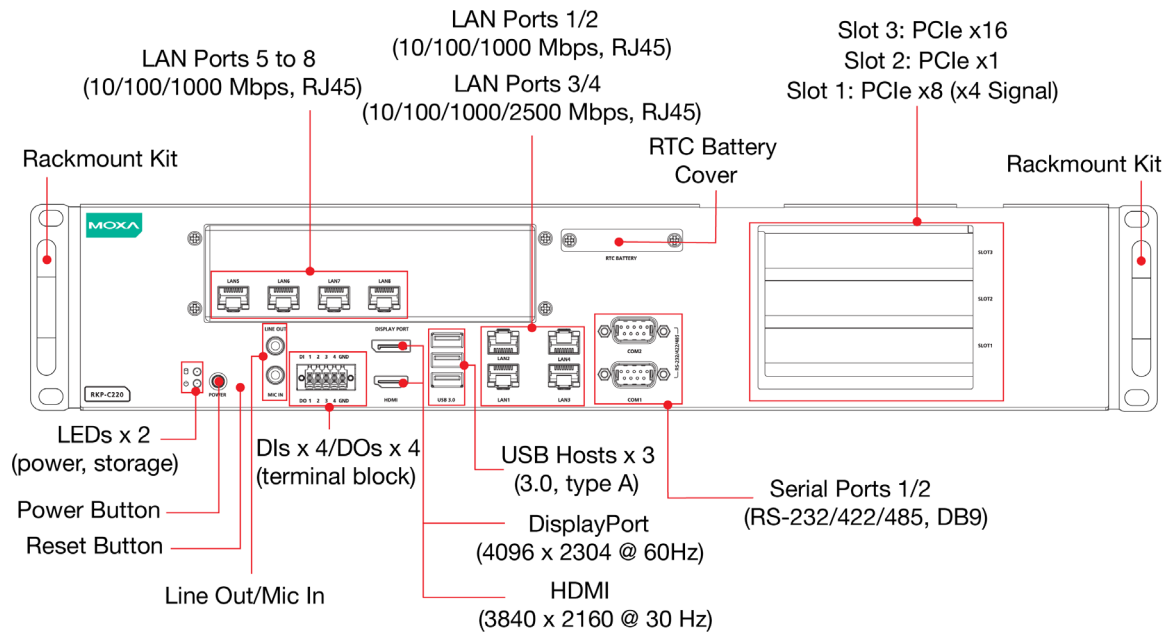
Appearance

Front View

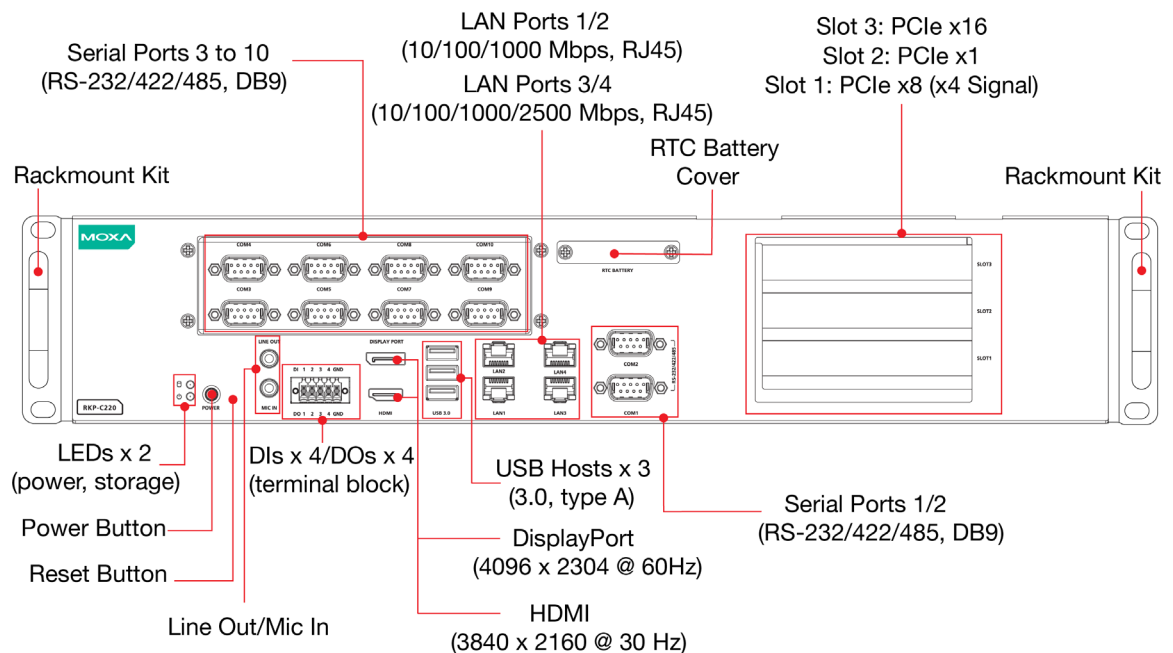
RKP-C220-C3-T/RKP-C220-C5-T/RKP-C220-C7-T/RKP-C220-C9-T Models



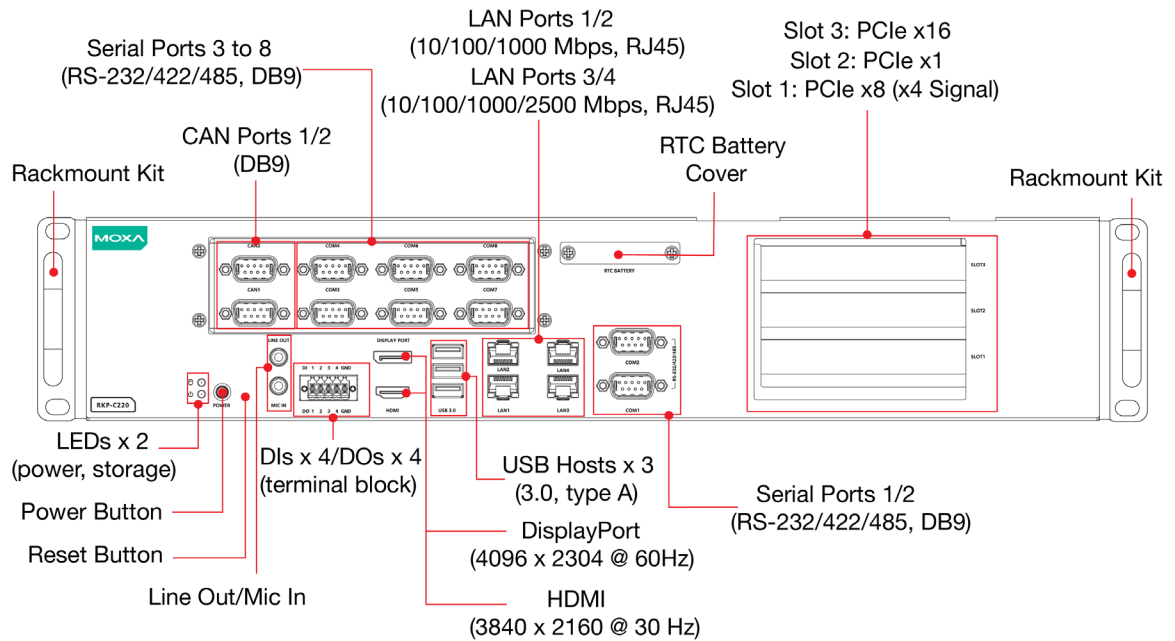
RKP-C220-C3-4L-T/RKP-C220-C5-4L-T/RKP-C220-C7-4L-T/RKP-C220-C9-4L-T Models



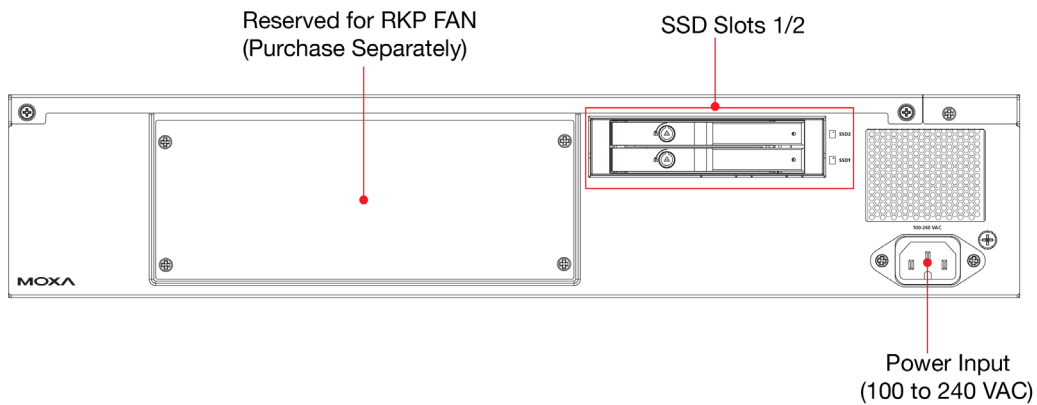
RKP-C220-C3-8C-T/RKP-C220-C5-8C-T/RKP-C220-C7-8C-T/RKP-C220-C9-8C-T Models



RKP-C220-C3-2CB6C-T/RKP-C220-C5-2CB6C-T/RKP-C220-C7-2CB6C-T/RKP-C220-C9-2CB6C-T Models

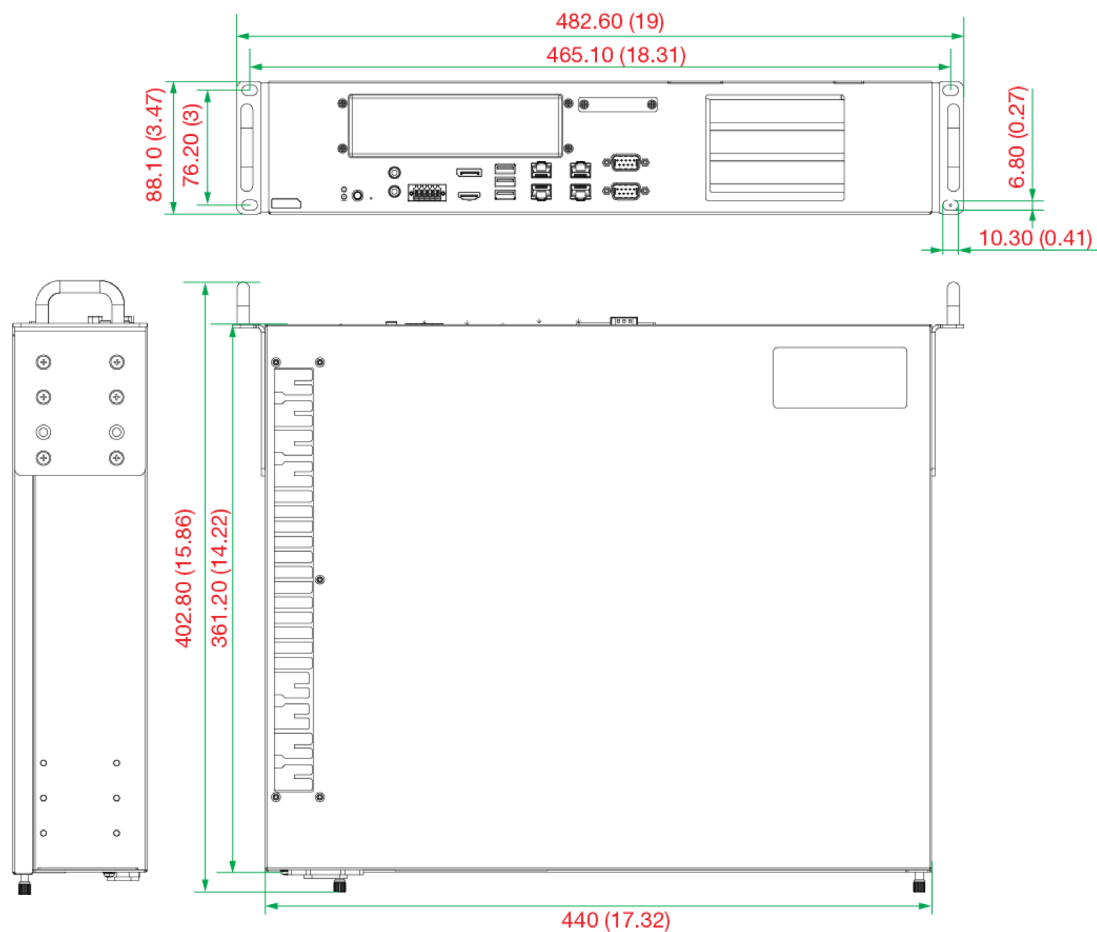


Rear View



Dimensions

Unit: mm (inch)



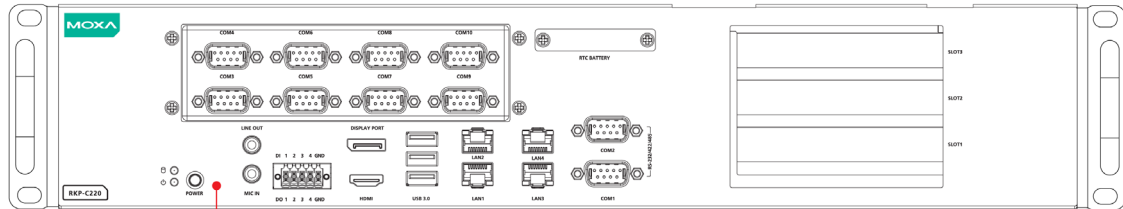
LED Indicators

The following table describes the function of the LED indicators located on the front panel of the computer.

LED	Color	Description
Power	Green	Power is ON
	OFF	No power input or any other power error
Ethernet LAN 1, LAN 2 (10/100/1000 Mbps)	Green	Steady ON: 10/100 Mbps Ethernet link Blinking: Data is being transmitted or received
	Yellow	Steady ON: 1000 Mbps Ethernet link Blinking: Data is being transmitted or received
	OFF	No Ethernet connection
Ethernet LAN 3, LAN 4 (10/100/1000/2500 Mbps)	Green	Steady ON: 10/100/1000 Mbps Ethernet link Blinking: Data is being transmitted or received
	Yellow	Steady ON: 2500 Mbps Ethernet link Blinking: Data is being transmitted or received
	OFF	No Ethernet connection
Storage	Yellow	Blinking: Data is being accessed from the SSD drive
	OFF	Data is not being accessed from the SSD drive

Reset Button

Pressing the **Reset** button, located on the front panel, initiates a hardware warm reboot. The button plays the same role as a desktop PC's reset button. After pressing the reset button, the system will reboot automatically. DO NOT use the Reset button under normal conditions; use it only if the software is not working properly. To protect the integrity of data being transmitted or processed, you should always reset the system via the operating system using the software reboot function.



Reset Button

Real Time Clock (RTC)

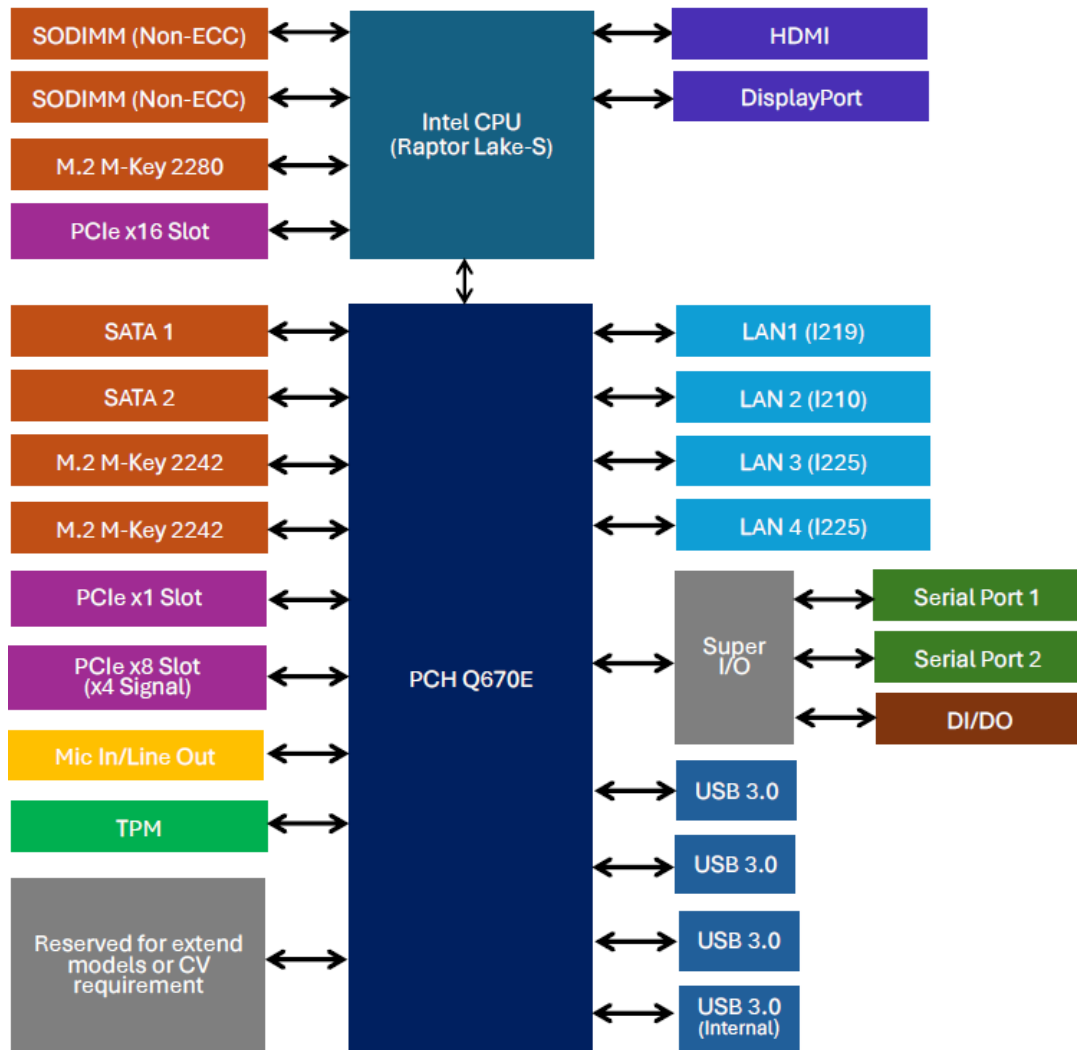
The RKP-C220's real-time clock is powered by a lithium battery. You can easily replace the battery yourself. Refer to **Replacing the RTC Battery** section for details. However, please note that there is a risk of explosion if the battery is replaced by an incorrect type of battery. Contact a qualified Moxa support engineer if you have any questions about the RTC battery.



ATTENTION

There is a risk of explosion if the battery is replaced by a battery of the incorrect type.

Hardware Block Diagram



3. Hardware Connections

The RKP-C220 computers are compact and rugged, making them suitable for industrial applications. The LED indicators allow users to monitor performance and quickly identify trouble spots. Multiple ports are provided for connecting a variety of different devices. The computers come with a reliable and stable hardware platform that lets you devote the bulk of your time to application development. This chapter describes the hardware installation and connector interfaces of the RKP-C220 computer.

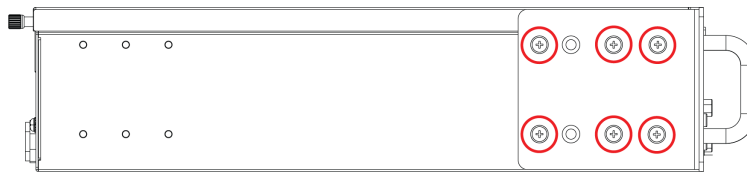
Installing Rack-mounting Ears

To install the computer on a rack, do the following:

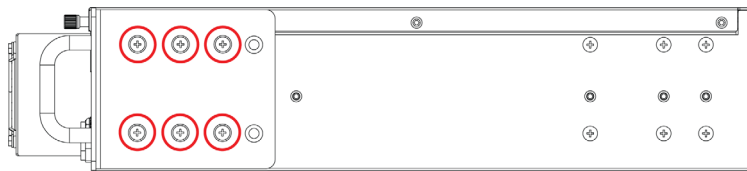
Step 1:

Use six M4 x 8 mm screws (in the package) for each rack-mounting bracket to attach them to the left and right sides of the computer. The screw locations for front mounting and rear mounting are different; refer to the following diagrams for the exact location of the screws.

Front Mounting

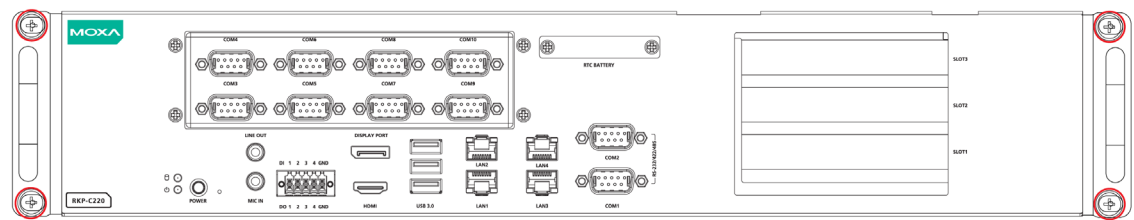


Rear Mounting



Step 2:

Place the RKP on a rack and use four screws to secure the rack-mounting ears to the rack.



NOTE

For better thermal performance, we recommend leaving 1U gap at the top and bottom when installing this computer.

Wiring Requirements

The following common safety precautions should be observed before installing any electronic device:

- Power wires and communication/signal wires should be routed through separate paths. If power and communication/signal wires must cross paths, make sure the wires are perpendicular at the intersection point.
- Use the type of signal transmitted through a wire to determine which wires should be bundled together and which ones should be kept separate. The rule of thumb is that wiring that carries similar electrical signals can be bundled together.
- When necessary, we strongly advise labeling the wiring for all devices in the system.



ATTENTION

Do not run signal or communication wiring and power wiring in the same wire conduit. To avoid interference, wires with different signal characteristics should be routed separately.



ATTENTION

Safety First!

Be sure to disconnect the power cord before installing and/or wiring your device.

Electrical Current Caution!

Calculate the maximum possible current in each power wire and common wire. Observe all electrical codes dictating the maximum current allowable for each wire size.

If the current goes above the maximum rating, the wiring could overheat, causing serious damage to your equipment.

Temperature Caution!

Be careful when handling the unit. When the unit is plugged in, the internal components generate heat, and consequently the outer casing may feel hot to the touch.

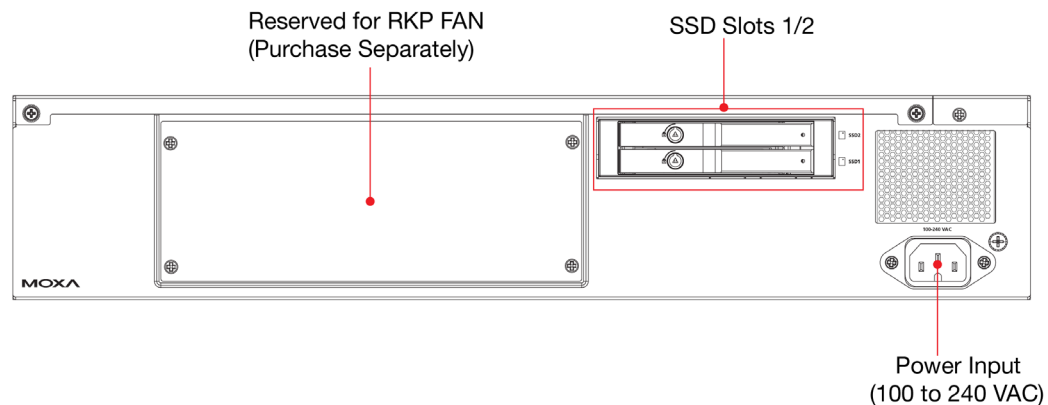


Restricted Access Location

This equipment is intended to be used in Restricted Access Locations, such as a computer room, with access limited to SERVICE PERSONAL or USERS who have been instructed on how to handle the metal chassis of equipment that is so hot that special protection may be needed before touching it. The location should only be accessible with a key or through a security identity system.

Connecting the Power

The RKP-C220 computers have one 100 to 240 VAC IEC 60320 C16 power inlet on the rear panel. Plug in the power cable to a power source. The power LED will light up to show that power is being supplied to the computer. The operating system boot-up process should take about 30 to 60 seconds to complete.



NOTE

For surge protection, connect the grounding connector located at the top right of the power connector with the earth (ground) or a metal surface. The power cord should be connected to a socket outlet with an earthing connection.



An 18 AWG cable size conductor must be used when the connection to the external grounding screw is used. An internal screw grounds the heat sink to the chassis.



NOTE

產品供電來源不會經過市電網絡，而由機櫃、機架等專屬設備提供電源，故產品不帶電線線組銷售。



WARNING

External metal parts of this equipment are hot!!

Before touching the equipment, you must take special precautions to protect your hands and body from serious injury.



警告

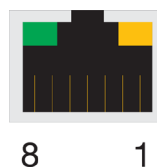
為避免電磁干擾，本產品不應安裝或使用於住宅環境。

Ethernet Ports

The RKP-C220 comes with 4 or 8 Gigabit LAN ports. When a LAN cable is properly connected, the LEDs on the front panel will glow to indicate the connection status.

The pin assignments are shown below:

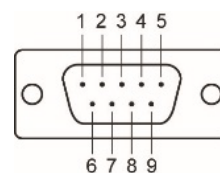
Pin	10/100 Mbps	1000/2500 Mbps
1	ETx+	TRD(0)+
2	ETx-	TRD(0)-
3	ERx+	TRD(1)+
4	-	TRD(2)+
5	-	TRD(2)-
6	ERx-	TRD(1)-
7	-	TRD(3)+
8	-	TRD(3)-



Serial Ports

The RKP-C220 comes with 2, 8, or 10 software-selectable RS-232/422/485 serial ports with DB9 connectors, which are located on the front panel. The pin assignments are shown below:

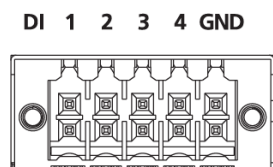
Pin	RS-232	RS-422	RS-485 (4-wire)	RS-485 (2-wire)
1	DCD	TxDA(-)	TxDA(-)	-
2	RxD	TxDB(+)	TxDB(+)	-
3	TxD	RxDB(+)	RxDB(+)	DataB(+)
4	DTR	RxDA(-)	RxDA(-)	DataA(-)
5	GND	GND	GND	GND
6	DSR	-	-	-
7	RTS	-	-	-
8	CTS	-	-	-



Digital Inputs/Digital Outputs

The RKP-C220 is provided with four digital inputs and four digital outputs in a terminal block. They are located on the front panel of the computer.

For pin definitions, see the figure below:



Digital Inputs

Dry Contact:
Logic 0: Short to Ground
Logic 1: Open

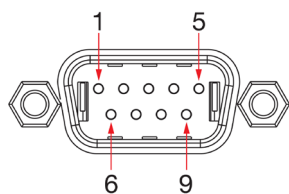
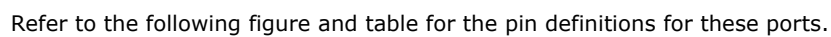
Digital Outputs

Current Rating: 200 mA per channel
Voltage: 0 to 24 VDC

DI Dry Contact

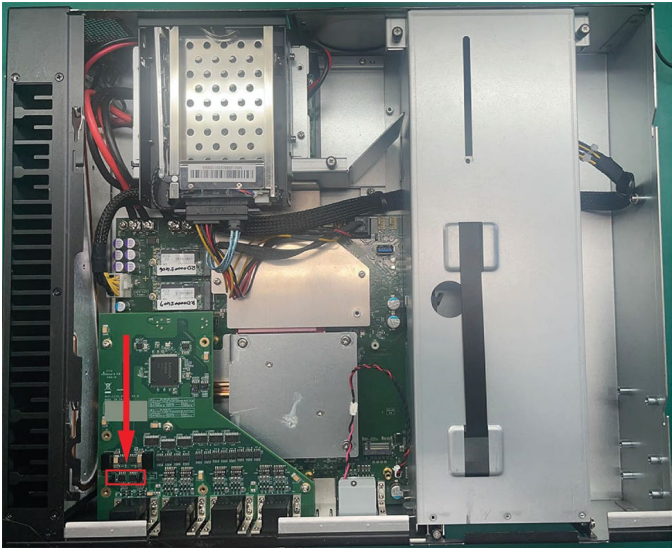
DO Contact Sink

The RKP-C220-Cx-2CB6C-T models come with 2 CANbus ports located on the front panel.

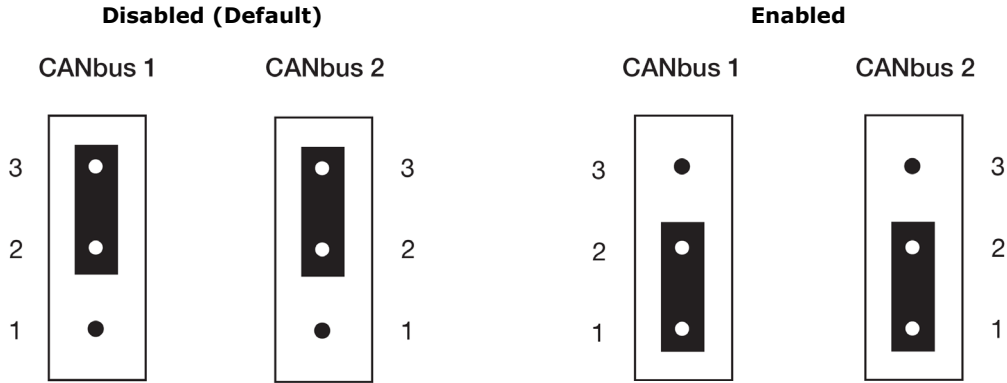


Pin	Definition
1	–
2	CAN_L
3	CAN_GND
4	–
5	–
6	(GND)
7	CAN_H
8	–
9	–

Two termination resistors (jumpers) are located as shown in the image below. The default setting for termination resistors is disabled, enabling it based on the application's needs. Open the top cover of the computer to find the location of the CANbus resistors.



To disable or enable the CANbus communication, adjust the jumpers by referring to the following figures.



Connecting USB Devices

Three USB 3.2 Gen 1 type-A connectors are located on the front panel. The ports support keyboard and mouse devices and can also be used to connect a flash disk for storing large amounts of data. One USB 3.2 Gen 1 type-A connector is located on the main board inside the computer to be used as a USB Dongle. The port provides a secure way to connect a flash disk for storing data or inserting product key.

Connecting to Displays

The RKP-C220 computers come with an HDMI 2.0b (3840 x 2160 @ 30 Hz) connector and a DisplayPort (4096 x 2304 @ 60Hz) connector located on the front panel.



NOTE

For a reliable audio or video connection, use HDMI-certified cables.

Installing Storage Disks



WARNING

When installing the storage, power off the computer and unplug the power cord from the power input to prevent any danger or damage.

The RKP-C220 computer is provided with two lockable storage slots on the rear panel for installing 2.5" SSDs and three M.2 M-key slots (1 x 2280, 2 x 2242) on the main board for storage expansion.

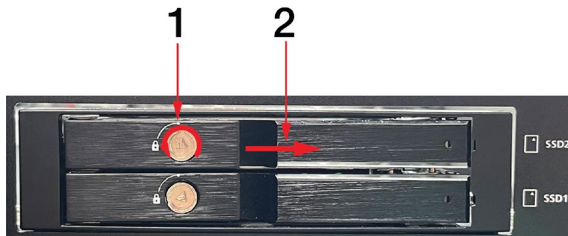
Installing a 2.5" SSD

To install a 2.5" SSD, do the following:

1. Unlock the door to the storage slot using the storage key.



2. Unlatch the storage slot door.



3. Insert the SSD into the slot.

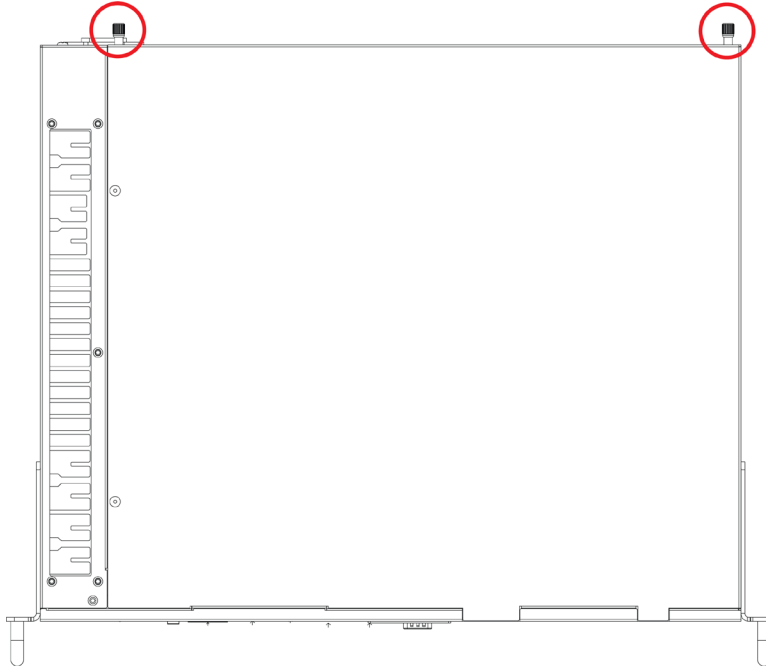


4. Close the storage slot door and lock it with the key.
5. Use the same method to install a storage (SSD) in the second slot.

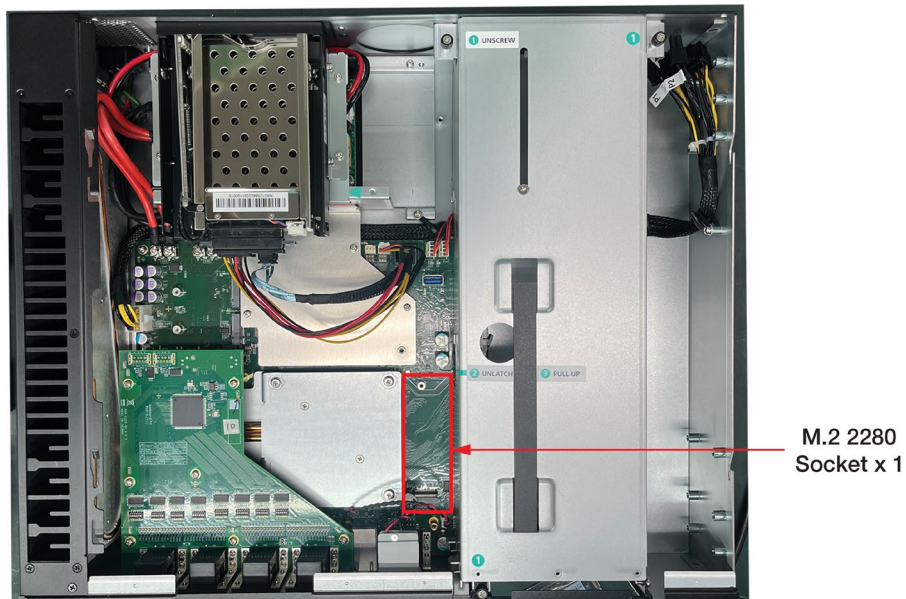
Installing an M.2.2280 SSD Module

To install an M.2 2280 M-key SSD module, do the following:

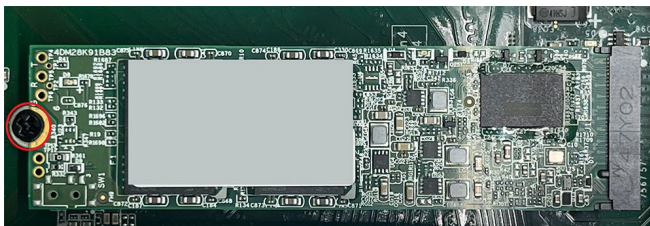
1. Unfasten the two hand-rotated screws on top rear panel and remove the top cover.



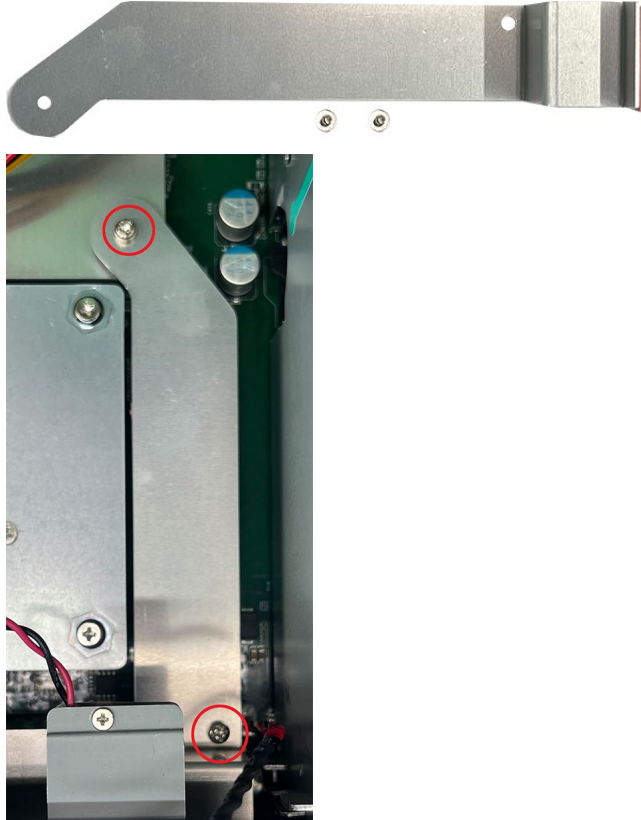
2. Find the location of the M.2 2280 socket.



3. Insert the M.2 2280 M-key SSD into the socket and secure the module using the M2.5 x 5 mm screw in the package.



4. Place an M.2 2280 heatsink (purchase separately) on top of the M.2 2280 module. The arc angle side should overlap the screw hole on the right bottom corner of the memory heat sink, and the other side, with a rectangular thermal pad attached, should attach to the back of the front panel. Fasten the 2 screws as indicated in the image.



NOTE

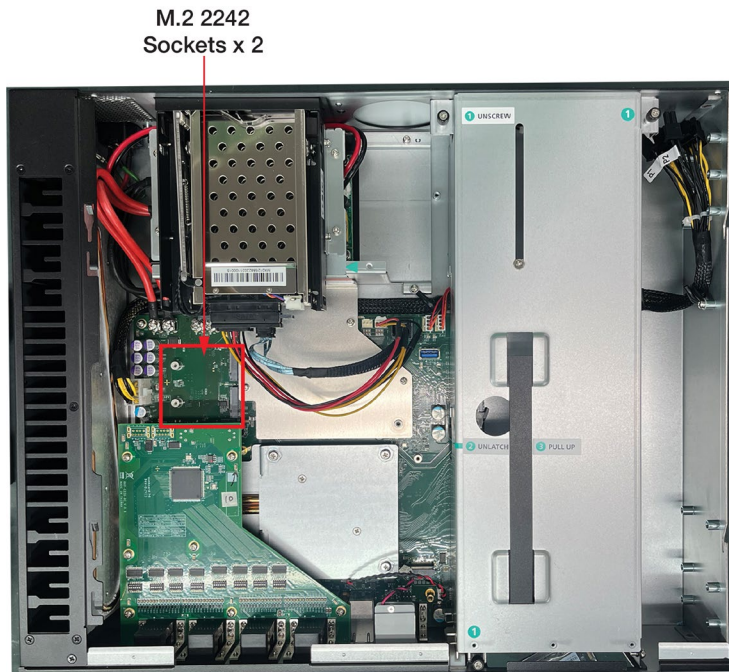
We strongly recommend purchasing an M.2 2280 heat sink (HS-M.2 2280-RKP-C220, P/N: 3095010000593) for better heat dissipation.

5. Replace the top cover and secure it with two hand-rotated screws on the top rear panel cover.

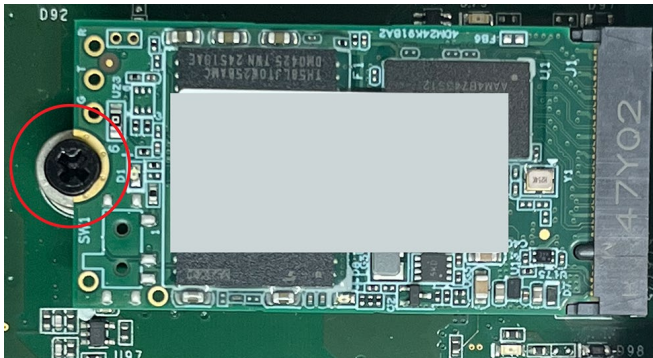
Installing an M2.2242 SSD Module

To install an M.2 2242 M-key SSD module, do the following:

1. Find the location of the M.2 2242 sockets.



2. Insert the M.2 2242 M-key SSD into the socket and secure it with the M2.5 x 5 mm screw provided in the package.



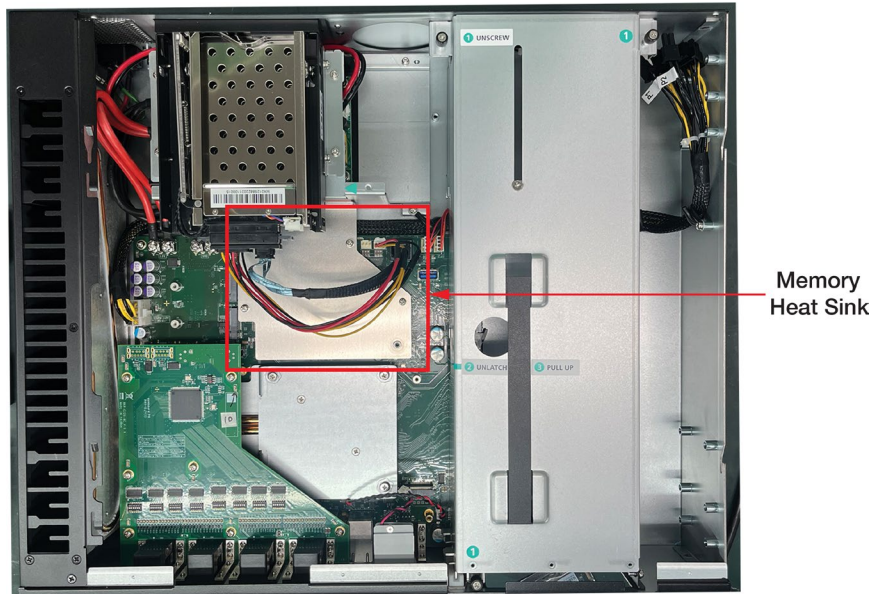
3. Use the same method to install a module in the other socket if required.
4. Replace the top cover and secure it with two hand-rotated screws on the top rear panel cover.

Replacing the Memory

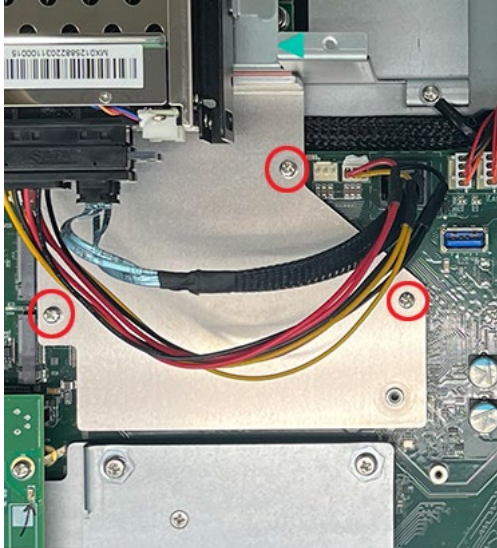
The RKP-C220 computers come with two SODIMM slots (non-ECC type) for a total memory size of up to 64 GB (32 GB per module). An 8 GB memory is preinstalled.

To replace the memory, do the following:

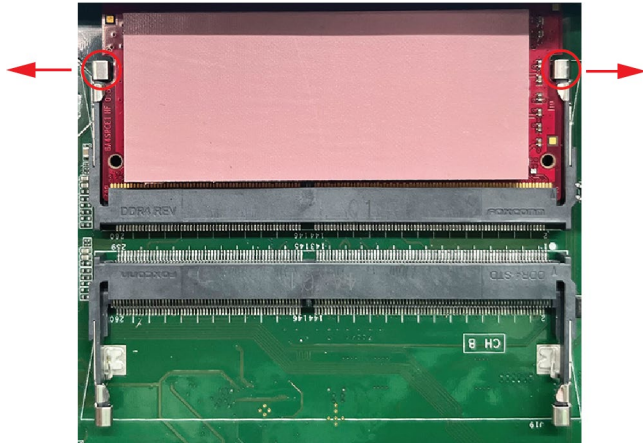
1. Disconnect the RKP-C220 from its power source.
2. Unfasten two hand-rotated screws on the top rear panel cover and remove the top cover.
3. Find the location of the memory heat sink.



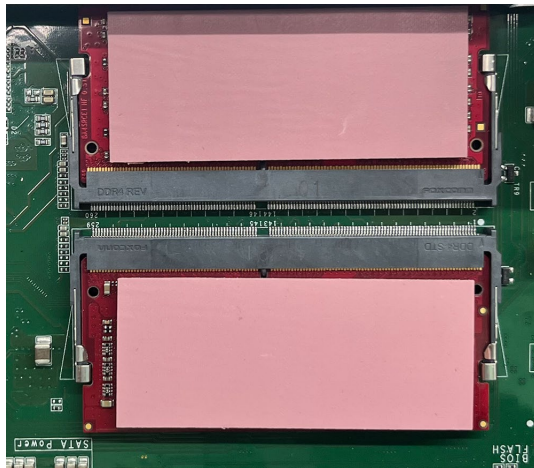
4. Unfasten the three M3 x 6 mm screws on the heat sink covering the memory, and remove the cover.



5. An 8 GB memory is preinstalled in the first slot with a thermal pad pasted. Remove it by pulling the two latches on both sides of the memory outwards.



6. Insert a new memory in the slot and press it down until you hear a click.
7. Paste the thermal pad (in the package) onto the memory.



8. Replace the heat sink and secure it with three M3 x 6 mm screws.
9. Replace the top cover and secure it with two hand-rotated screws on the top rear panel cover.

Installing PCIe Cards

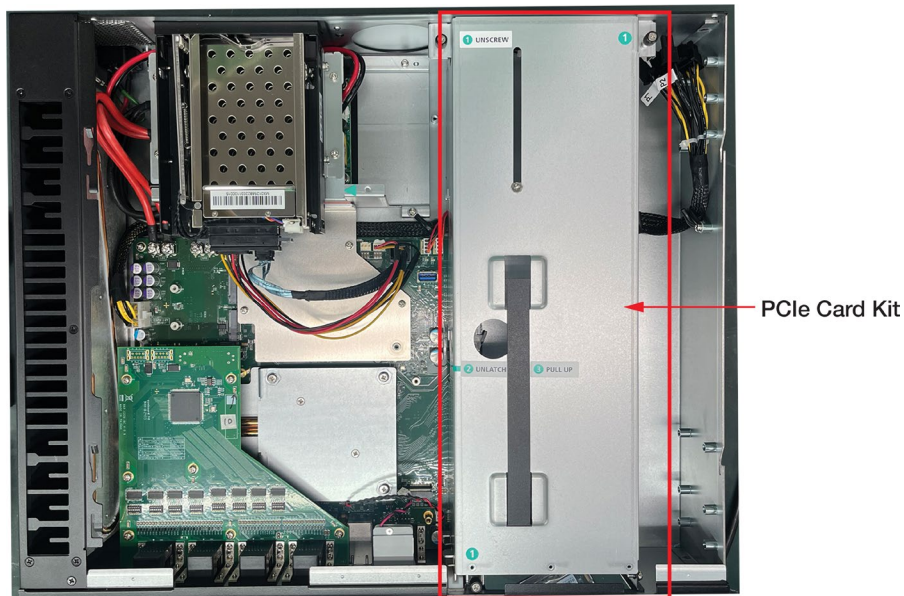


NOTE

If you have installed any PCIe cards, we strongly recommend purchasing and installing the RKP-FAN module (P/N: 3095010000592) for better heat dissipation. To install the RKP-FAN module, see the **Installing the RKP-FAN Module** section.

The RKP-C220 computer comes with three slots that support the PCIe interface. To insert PCIe cards, do the following:

1. Unfasten two hand-rotated screws on the top rear panel cover and remove the top cover.
2. Find the location of the PCIe card kit in the computer.



3. Unfasten three screws on the kit (indicated by stickers 1).



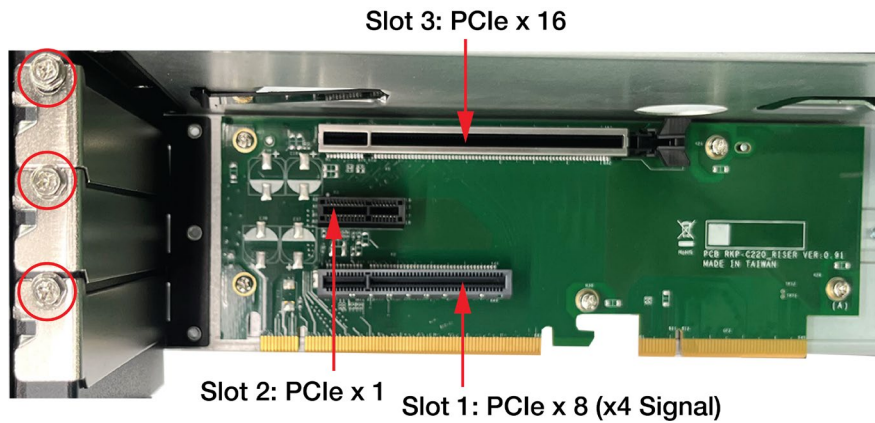
4. Press the latch at the bottom of the kit (indicated by the sticker ²).



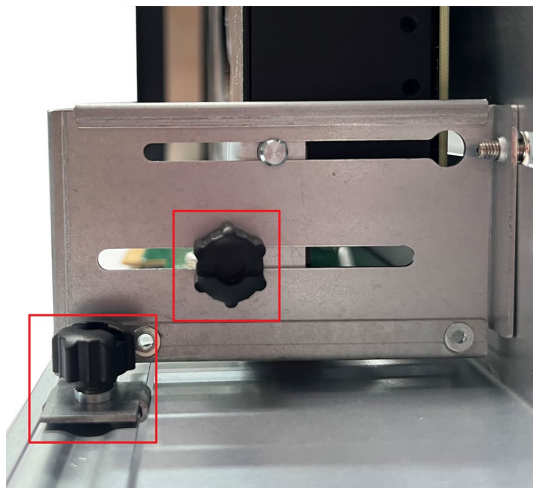
5. Pull up the handle of the kit (indicated by the sticker ³).



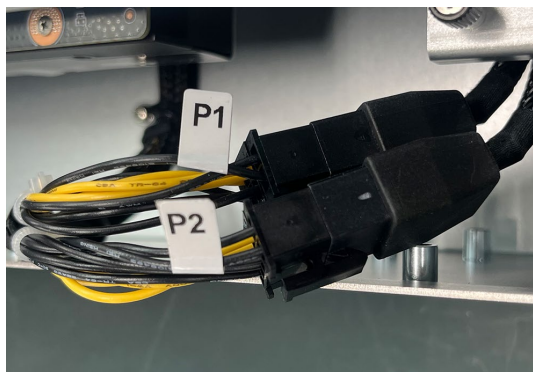
- Three different types of PCIe card sockets are provided. Ensure your card is inserted into the interface socket.



- To insert the card, remove the screw on the protection plate, and remove the protection plate.
- Insert the card carefully in the slot.
- There are two black screws on the adjustment plate at the end of the kit. Use them to fix the PCIe cards.



- If you have installed a graphics card, connect the power connectors provided at the end of the kit.

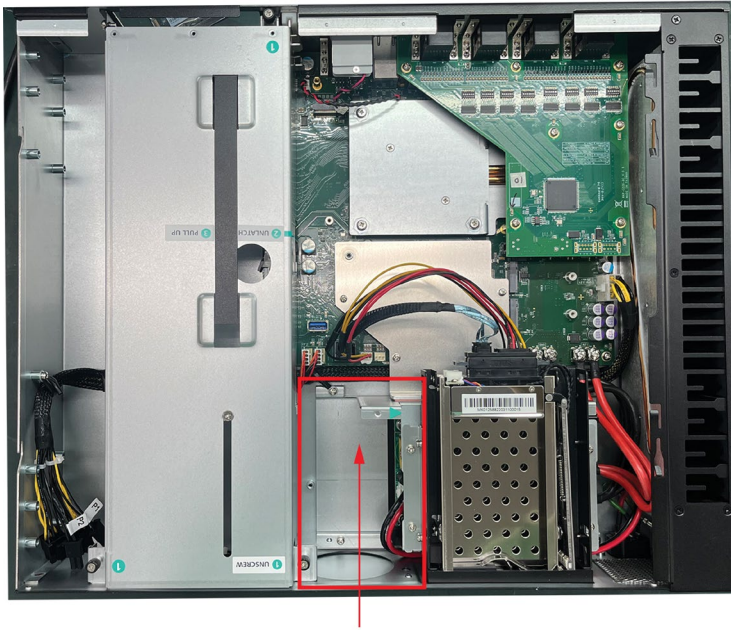


- Restore the kit carefully and secure it. Ensure the latch is locked and fasten all the screws to secure it.
- Replace the top cover and secure it with two hand-rotated screws on the top rear panel cover.

Installing the RKP-FAN Module

To install the RKP-FAN module (fan module), do the following:

1. Unfasten two hand-rotated screws on the top of the rear panel and remove the top cover.
2. Find the location for the fan air baffle (from the RKP-FAN accessory package)) first.

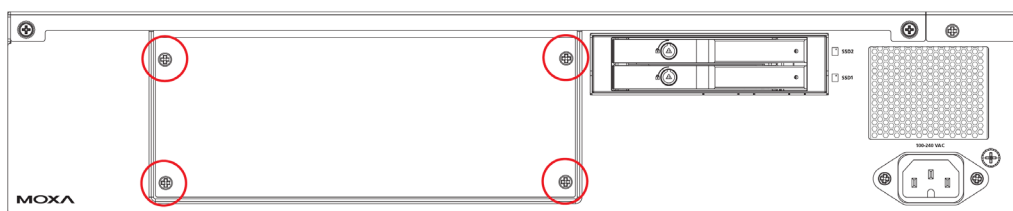


Fan Air Baffle Location

3. Find the green triangle indicator and place the fan air baffle (from the RKP-FAN accessory package) in the same direction as the green triangle indicated, then fasten the hand-rotated screw on the fan air baffle.



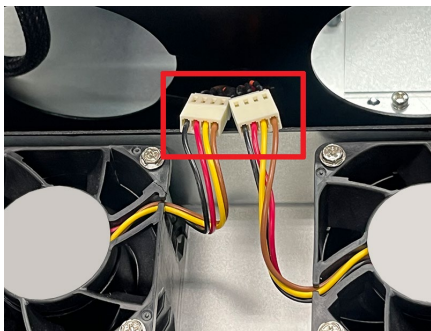
4. Replace the top cover and secure it with two hand-rotated screws on the top rear panel cover.
5. Unfasten the four screws on the cover of the aperture for the fan module on the rear panel and remove the cover.



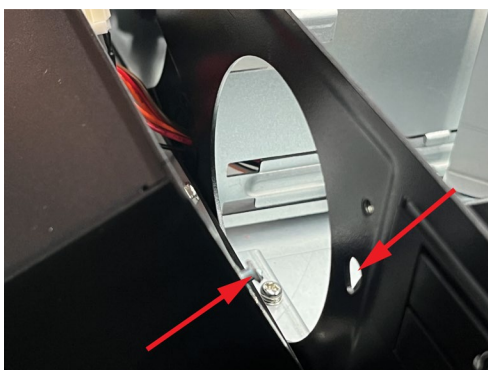
6. Tear off the tape on the fan power connector.



7. Connect the power cords of the fan module as shown in the image.



8. Install the fan module and make sure the latches pointed in the image are aligned.



9. Fasten the four screws on the fan module to secure it to the rear panel.

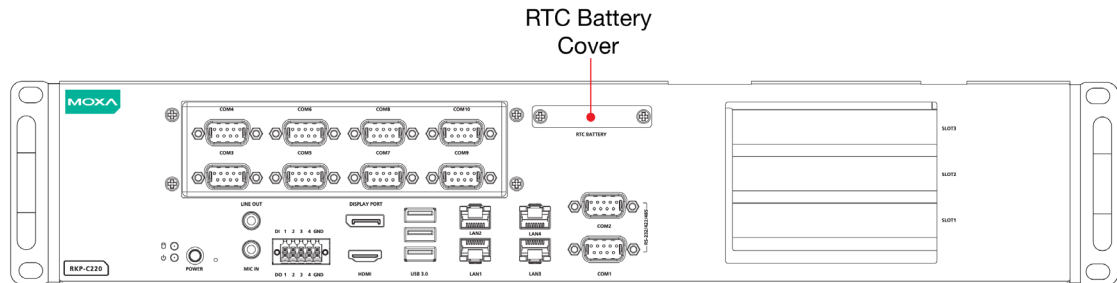


Replacing the RTC Battery

The RKP-C220 comes with one slot for a battery on the front panel of the computer. A lithium battery (3 V / 200 mA) is preinstalled in the slot.

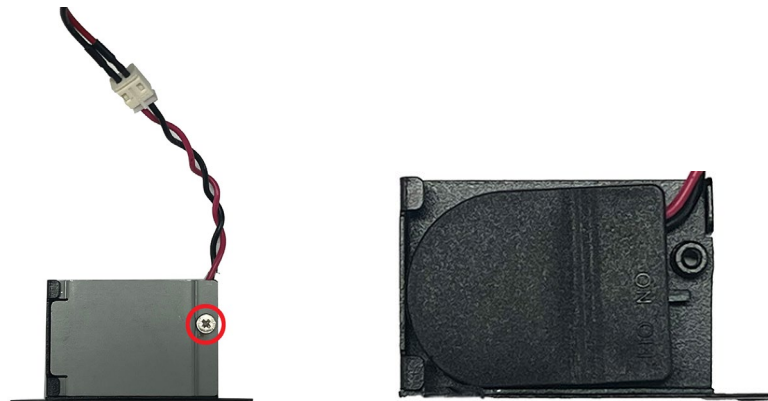
To replace the battery, do the following:

1. Unfasten the two screws on the battery cover.



2. Take off the cover.

The battery is attached to the slot cover, as shown in the image. Remove the screw on the cover and take off the battery holder.

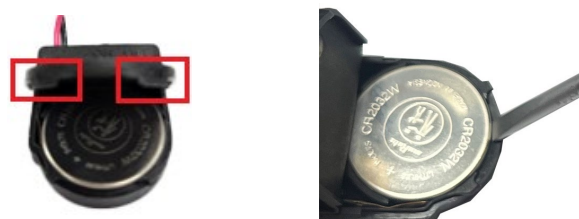


3. Pull out the two latches to open the battery holder and take out the battery.

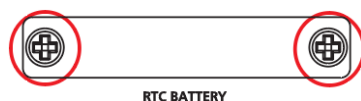


NOTE

We suggest using a screwdriver for safe removal. Unplugging the connector is allowed if needed. But remember to plug in the connector before placing the battery holder back in the slot.



4. Replace the new battery and close the holder.
5. Close the black battery holder, recover the metal plate on the top and bottom of the battery holder, and fasten the metal plates with the screw.
6. Place the battery holder back in the slot and secure it by fastening the two screws on the cover.





NOTE

Unplugging the connector on step 3 is allowable if needed, but remember to plug in the connector before placing the battery holder back in the slot.



WARNING

- Be sure to use the correct type of battery. Incorrect battery may cause system damage. Contact Moxa's technical support staff for assistance, if necessary.
- To reduce the risk of fire or burns, do not disassemble, crush, or puncture the battery; do not dispose of in fire or water and do not short external contacts.

4. BIOS Setup

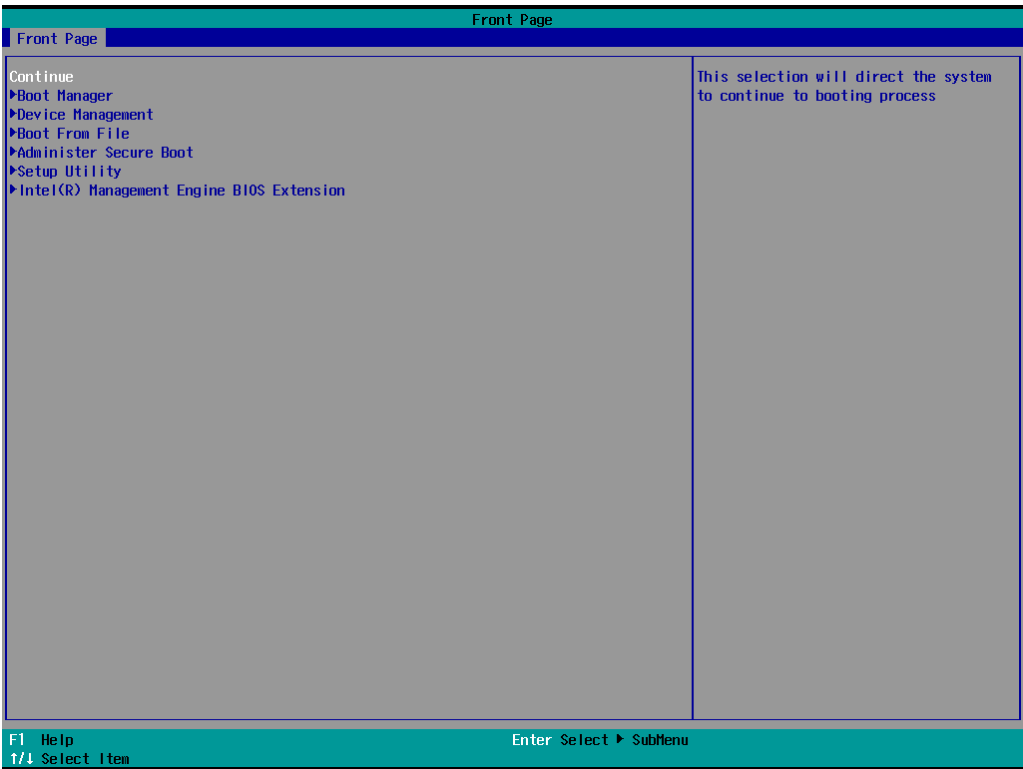
This chapter describes the BIOS settings of the RKP-C220 computer. The BIOS is a set of input/output control routines for peripherals, which are used to initialize system peripherals before the operating system is loaded. The BIOS setup allows the user to modify the system configurations of these peripherals' basic input/output interfaces.

Entering the BIOS Setup

To enter the BIOS setup utility, press the **F2** key while the system is booting up. The main **BIOS Setup** screen opens up with the following options:

- **Continue:** Continue to boot up
- **Boot Manager:** Select the device for booting up
- **Device Management:** Enter the device configuration menu
- **Boot From File:** Select the UEFI boot up file
- **Administer Secure Boot:** Enter the Secure Boot menu
- **Setup Utility:** Enter the BIOS configuration menu
- **MEBx:** Enter the AMT configuration menu (not supported in models with Intel® Celeron® and Core™ i3 processors)

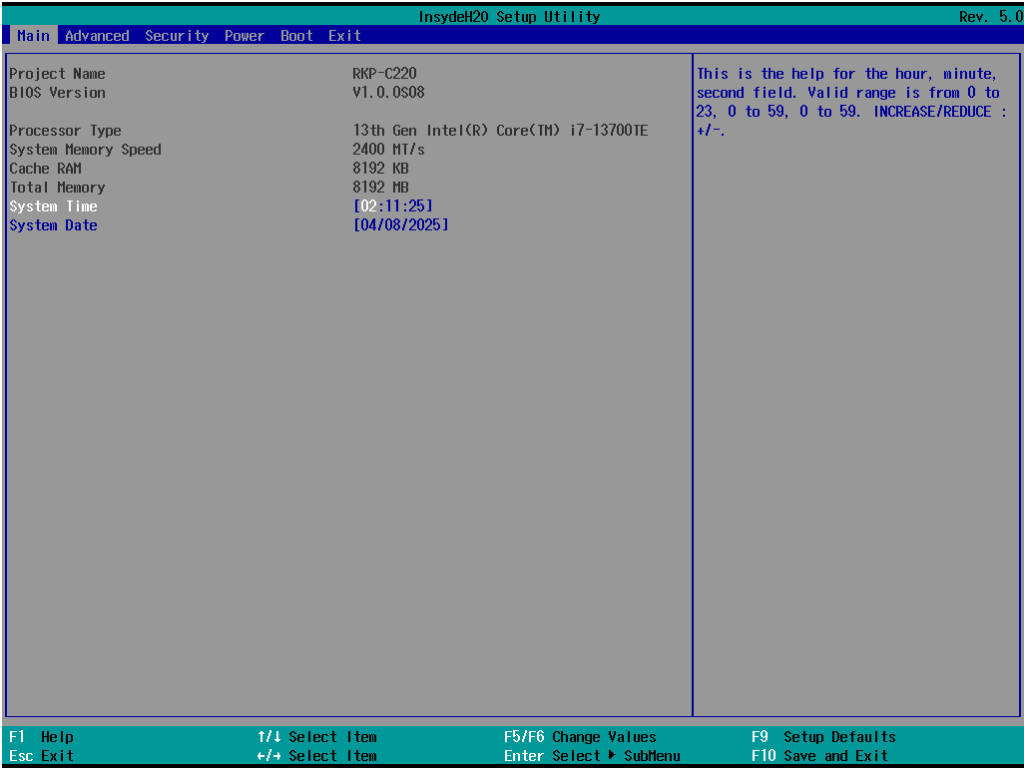
Select **F2** to enter the **BIOS configuration**.



When you enter **Setup Utility**, a basic description of each function key is listed at the bottom of the screen.

F1	General Help	↑ ↓	Select Item
F5/F6	Change Values	← →	Select Menu
F9	Setup Defaults	ESC	Exit
F10	Save and Exit	ENTER	Select or go to Submenu

The BIOS configuration screen will be shown when you enter the **Setup Utility** option, as shown in the following figure.

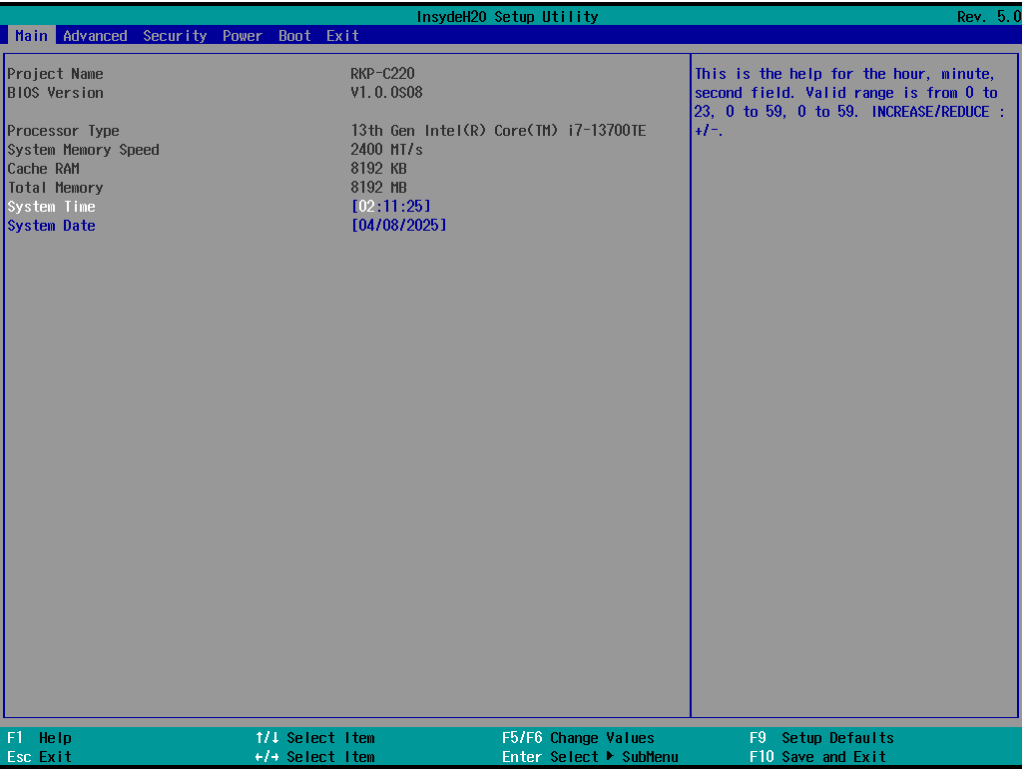


NOTE

The **Processor Type** information will vary depending on the computer model that you have purchased.

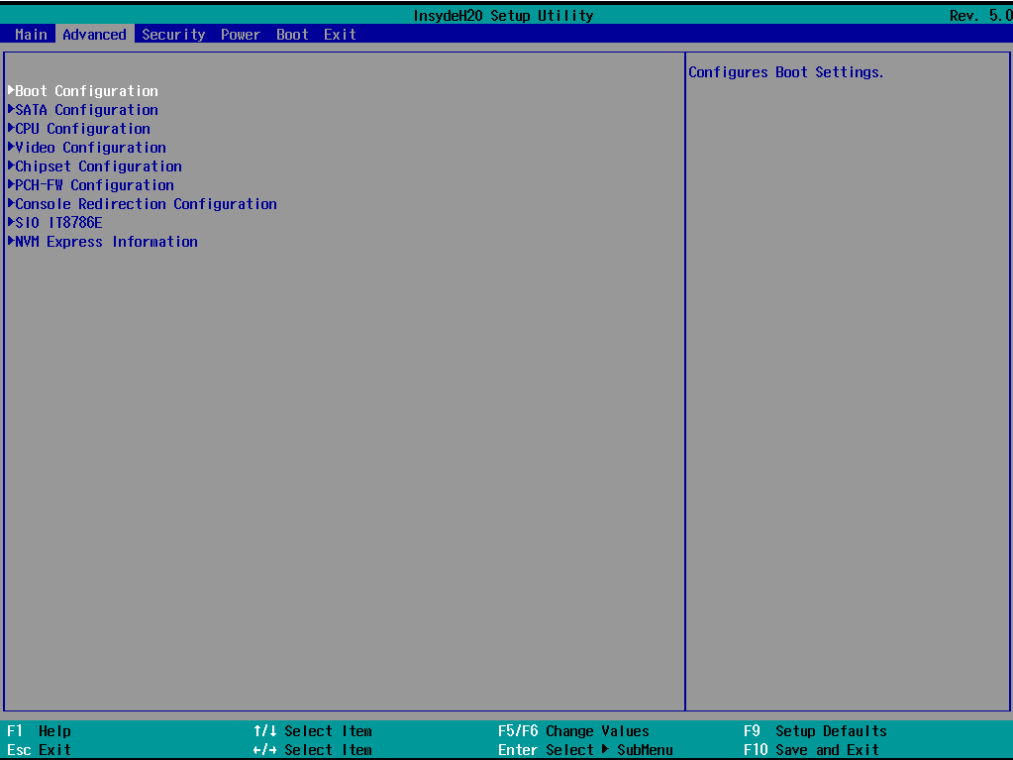
Main Page

The **Main** page displays basic system hardware information, such as model name, BIOS version, and CPU type.



Advanced Settings

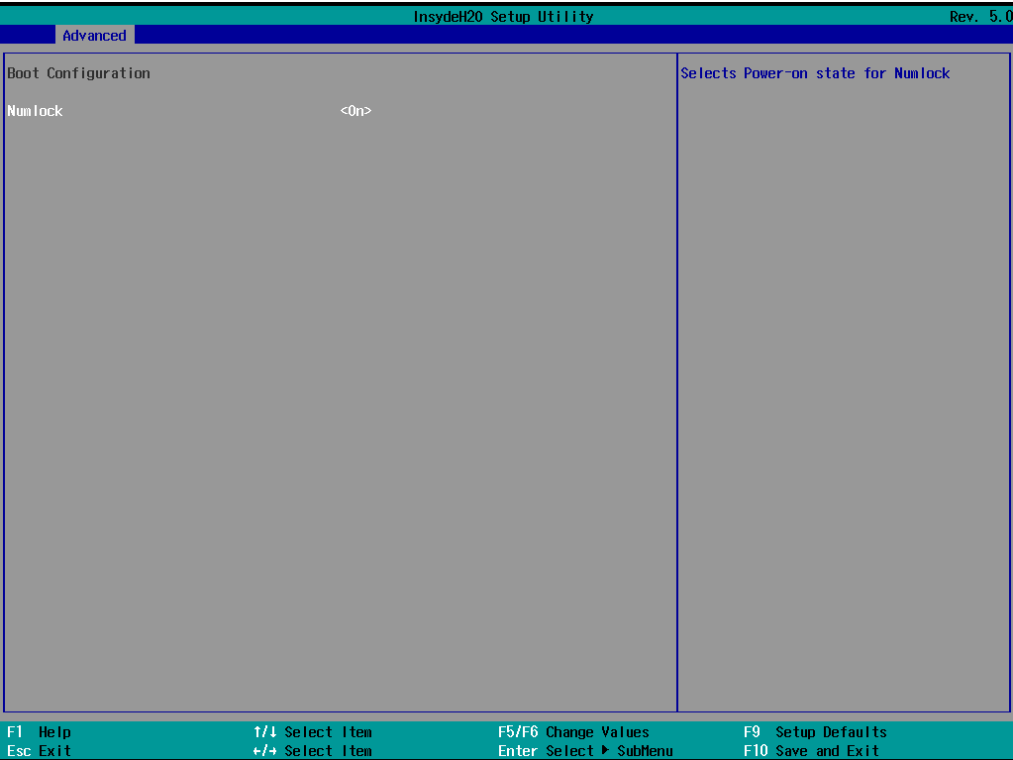
Select the **Advanced** tab in the BIOS setup utility to open the advanced features screen.



Boot Configuration

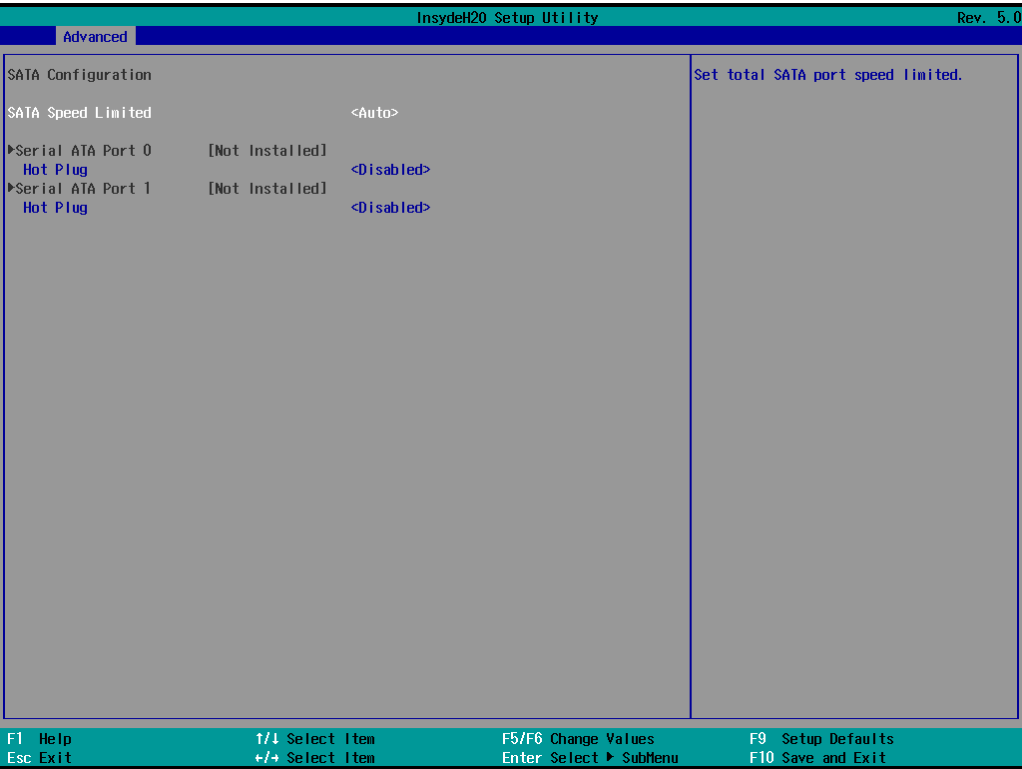
This item allows users to configure the default value of Numlock value.

Options: On (default), Off.



SATA Configuration

This section allows you to select the SATA speed limit and enable or disable the RAID mode.



SATA Speed Limited

Options: Auto (default), Gen 1, Gen 2, Gen 3

Serial ATA Port

This setting displays information on the drives installed on your computer.

SATA Port—Hot Plug

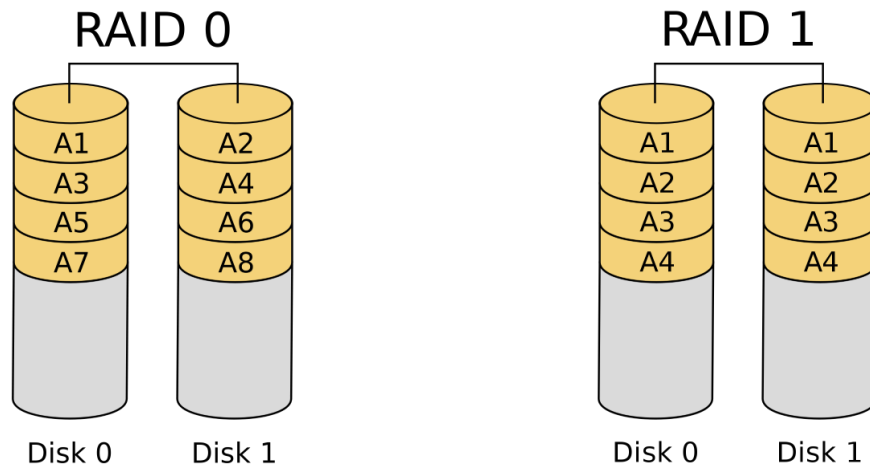
This item allows you to enable/disable hot-plugging capabilities (the ability to remove the drive while the computer is running) for the storage drives installed.

Options: Disabled (default), Enabled

RAID

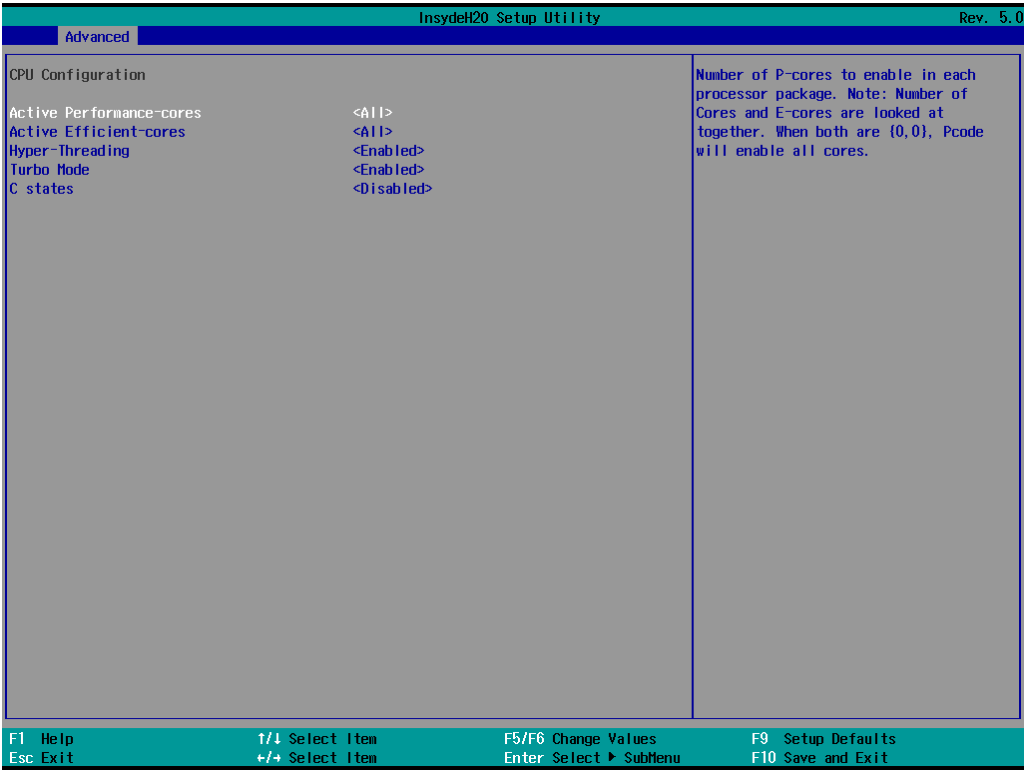
You must set the **Map XXXX** under **VMD** as **Enabled** to enable redundant array of inexpensive disks technology. The device has two SATA interfaces and two NVMe(PCH PCIE) interfaces, which support RAID level 0 and RAID level 1.

When using the continuous update policy, changes made to the data on the master drive while the system is not docked are automatically copied to the recovery drive when the system is re-docked. When using the on-request update policy, the master drive data can be restored to a previous state by copying the data on the recovery drive back to the master drive.



Source: https://en.wikipedia.org/wiki/Standard_RAID_levels for details.

CPU Configuration



Active Processor Cores

This item indicates the number of cores to enable in each processor package.

Active Efficient-Cores

This item indicates the number of E-cores to enable in each processor package.

Hyper-Threading

This feature makes the processor resources work more efficiently, enabling multiple threads to run on each core. It also increases processor throughput, improving overall performance on threaded software.

Options: Disabled, Enabled (default)

Turbo Mode

Enable/Disable processor Turbo Mode (not supported in models with an Intel® Celeron® processor).

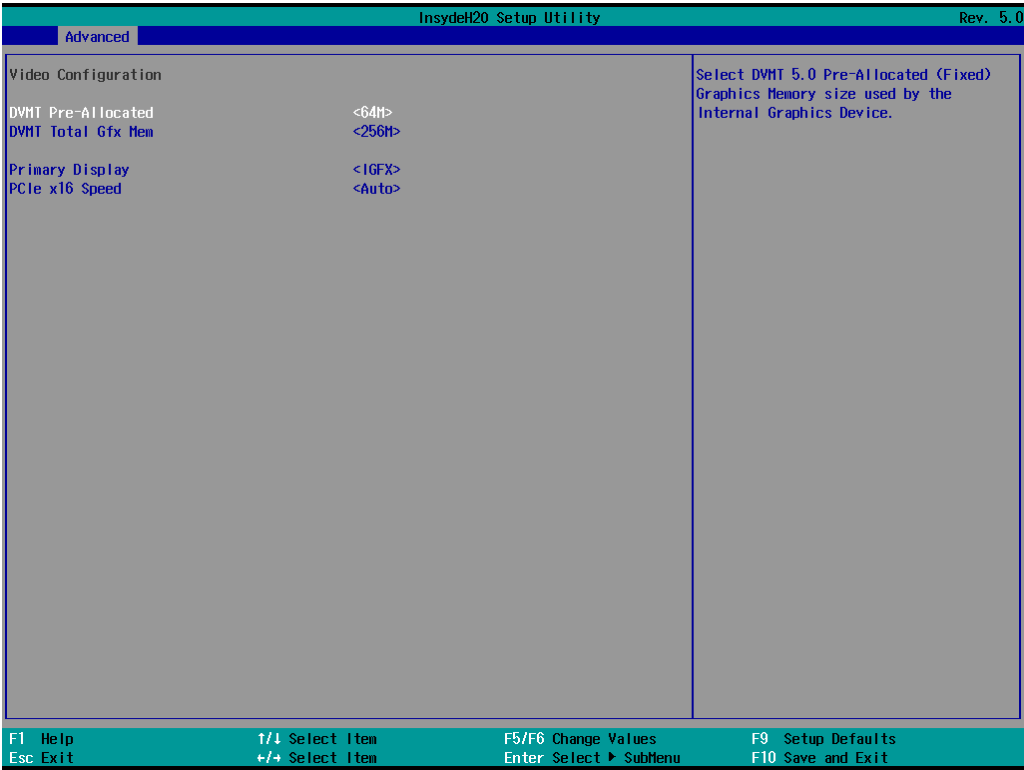
Options: Disabled, Enabled (default)

C states

Enable/Disable CPU Power Management. Allows CPU to go to C states when it's not 100% utilized.

Options: Disabled (default), Enabled

Video Configuration



DVMT Pre-Allocated

Selecting this option allows you to configure pre-allocated memory capacity for the IGD. Pre-allocated graphics memory is invisible to the operating system.

Options: 64M (default), 96M, 128M, 160M

DVMT: The amount of video memory your computer has depends on the amount of pre-allocated memory set for your system plus the Dynamic Video Memory Technology (DVMT). DVMT dynamically allocates system memory for use as video memory creating the most efficient use of available resources for maximum 2D/3D graphics performance.

DVMT Total Gfx Mem

This option allows you to configure the maximum amount of memory DVMT will use when allocating additional memory for the internal graphics device.

Options: 256 MB (default), 128 MB, Max.

Primary Display

This item allows you to configure the display from which graphic card. IFGX means internal graphic, and PEG Slot means external graphic.

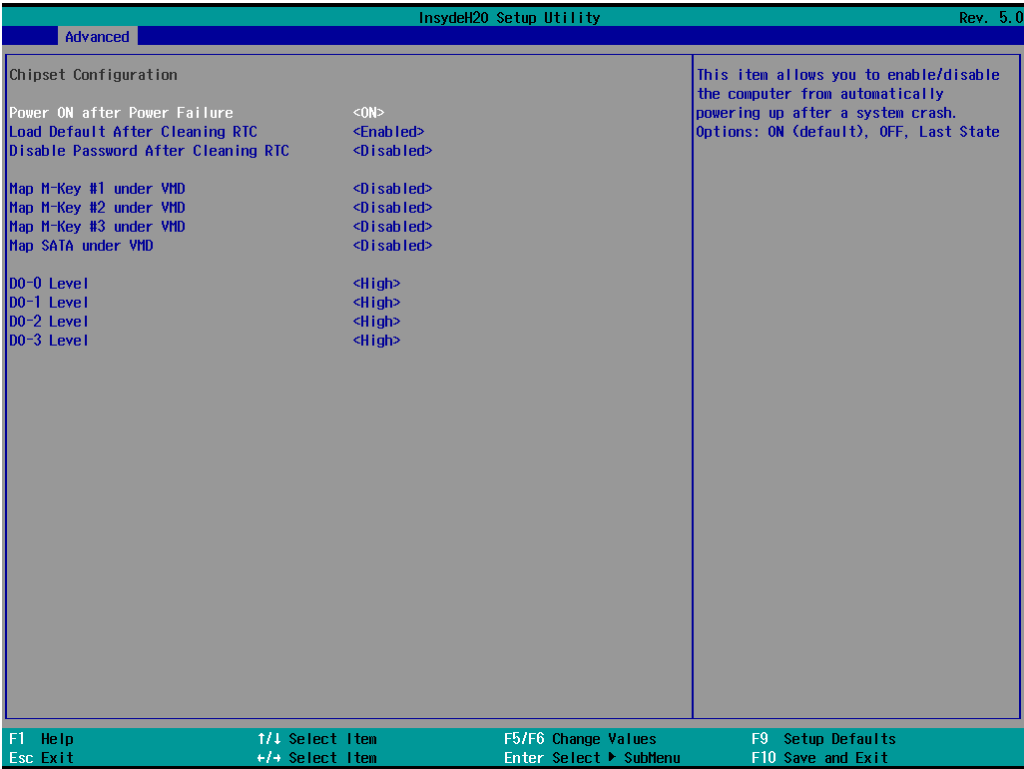
Options: IFGX (default), PEG Slot.

PCIe x16 Speed

Options: Auto (default), Gen1, Gen2, Gen3, Gen4.

Chipset Configuration

This option allows you to configure the chipset settings.



Power ON after Power Failure

This option allows you to enable/disable the computer from automatically powering up after system power is re-enabled.

Options: ON (default), OFF, Last State

Load Default After Cleaning RTC Battery

System will load default when detecting RTC battery loss.

Options: Disabled, Enabled (default)

Disable Password After Cleaning RTC

System will disable password when detect RTC battery loss.

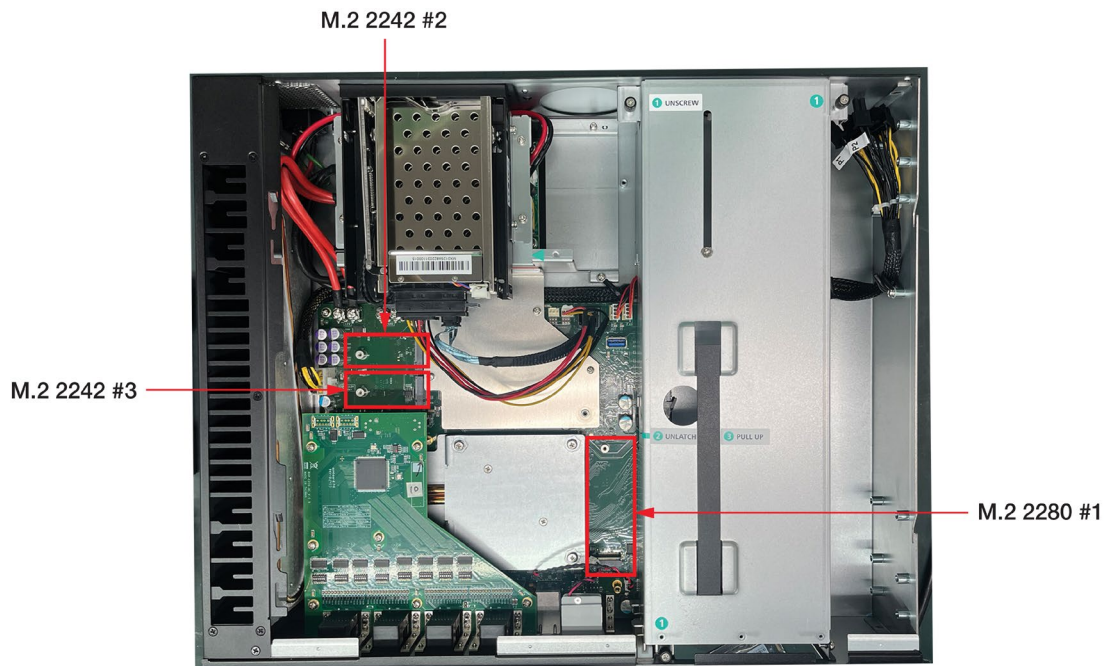
Options: Disabled, Enabled (default)

Map XXXX under VMD

Map/UnMap this Root Port to VMD. If enabled this item, you could config as RAID.

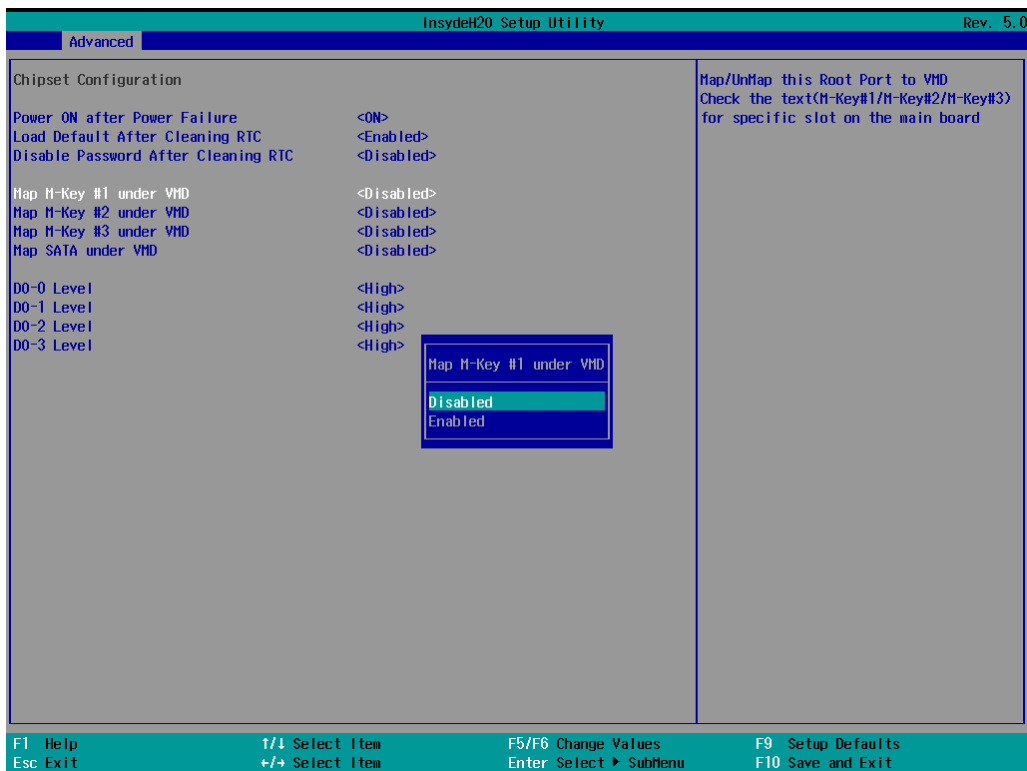
For NVMe, you could find the mapping text to the slot on the motherboard. Please reference below picture.

Options: Disabled (default), Enabled

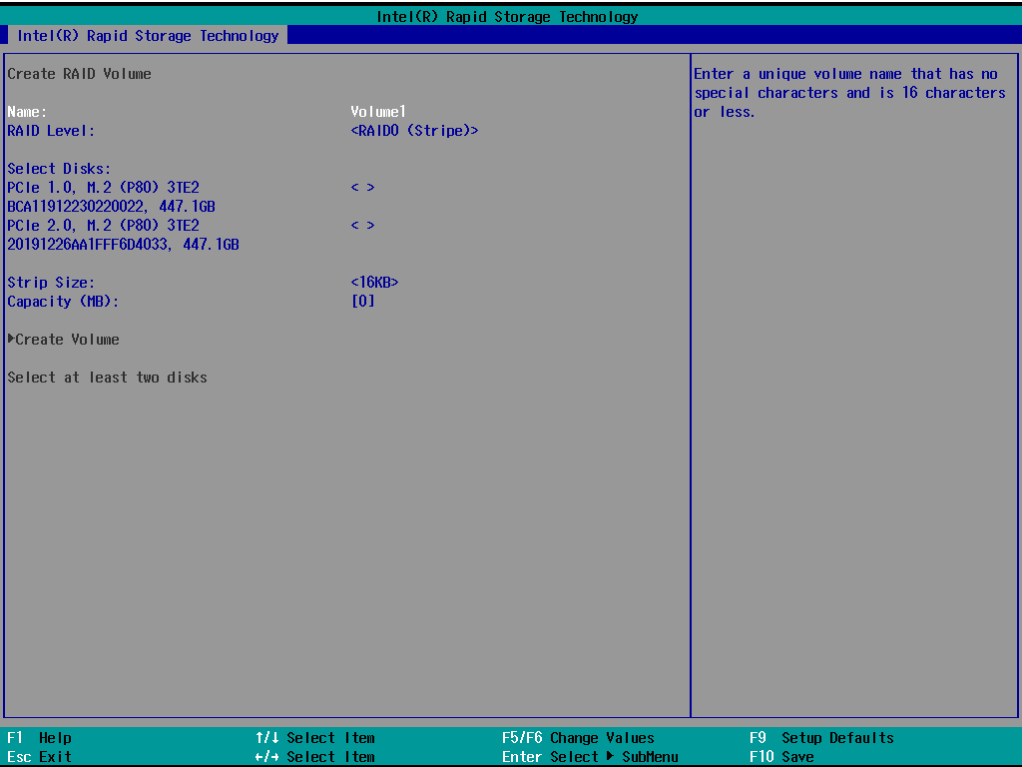


Intel Rapid Storage Technology

This section allows users to configure Intel® Rapid Storage Technology. RKP-C220 provides NVMe and SATA device to config as RAID.



After enabling **Map XXXX** under **VMD**, saving changes, and rebooting the system, you can select the Device Manager to configure the Intel Rapid Storage Technology settings.



DO-X Level

This item allows users to set the DO to high or low.

Options: High (default), Low



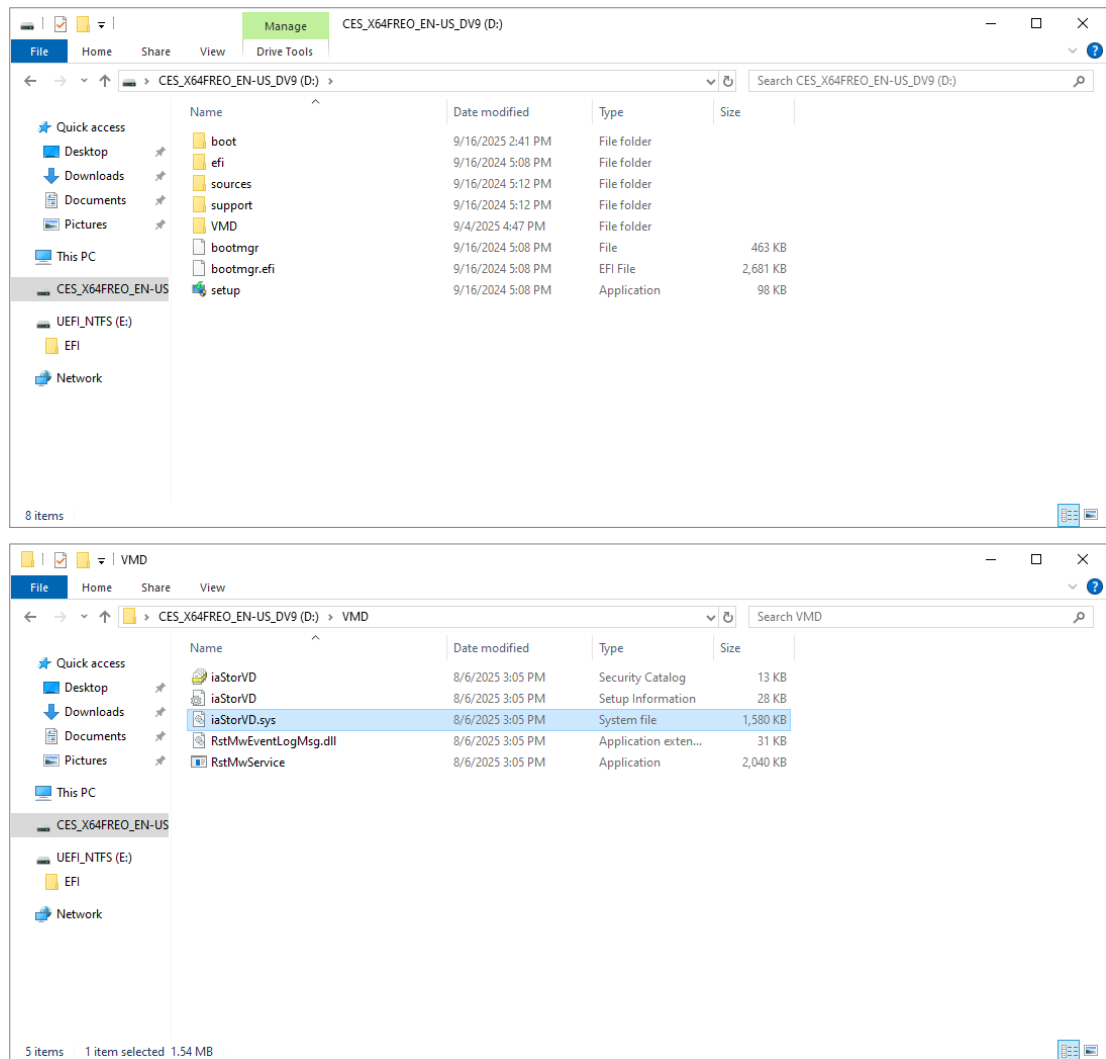
NOTE

If you plan to install Windows OS on the RAID volume, you might experience a situation where the installer fails to recognize the RAID disk during setup.

To resolve this, please refer to the Install Windows on the RAID Volume section.

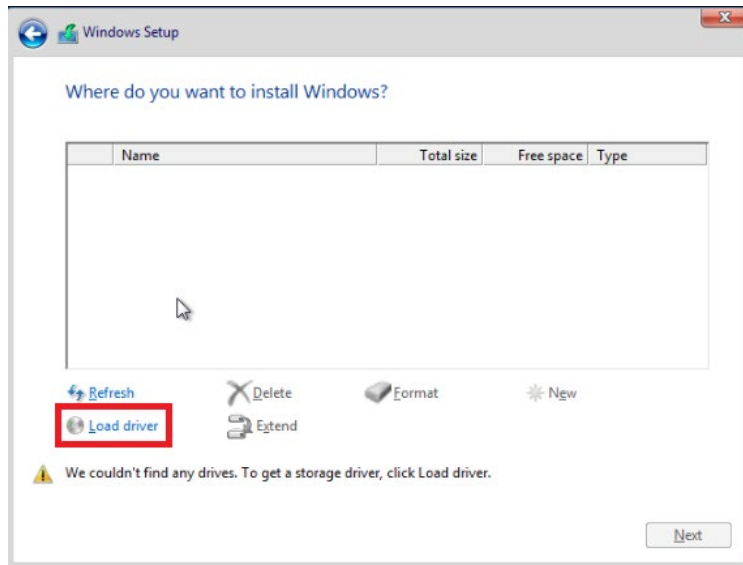
Install Windows on the RAID Volume

1. Download the VMD drivers from Moxa website.
2. Extract the driver and copy all driver files USB key media (which is used to install Windows). The file **iaStorVD.sys** that will be used later on is located here.

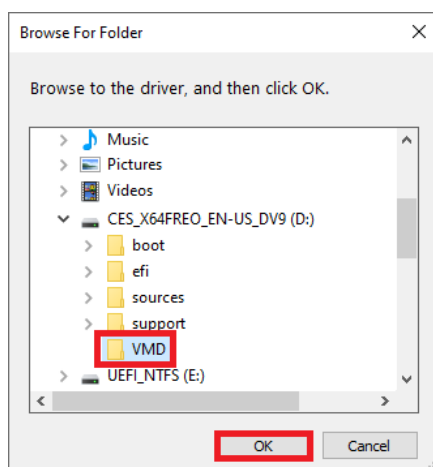
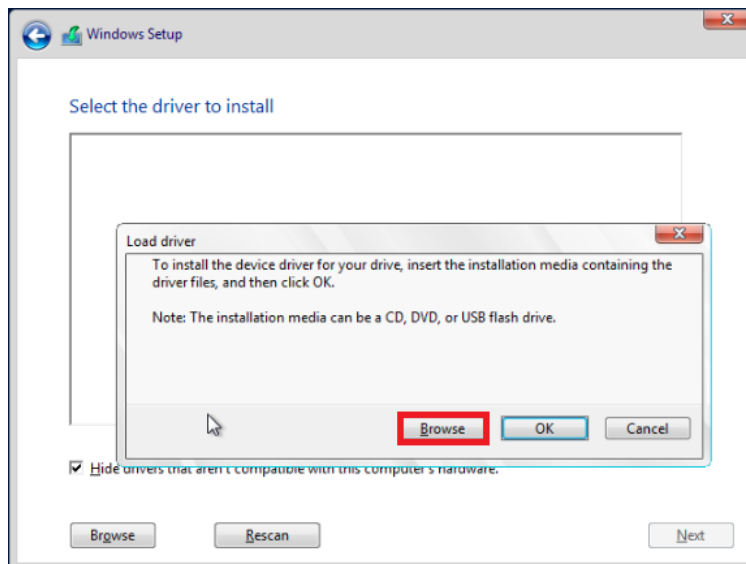


3. Start the Windows OS installation process.

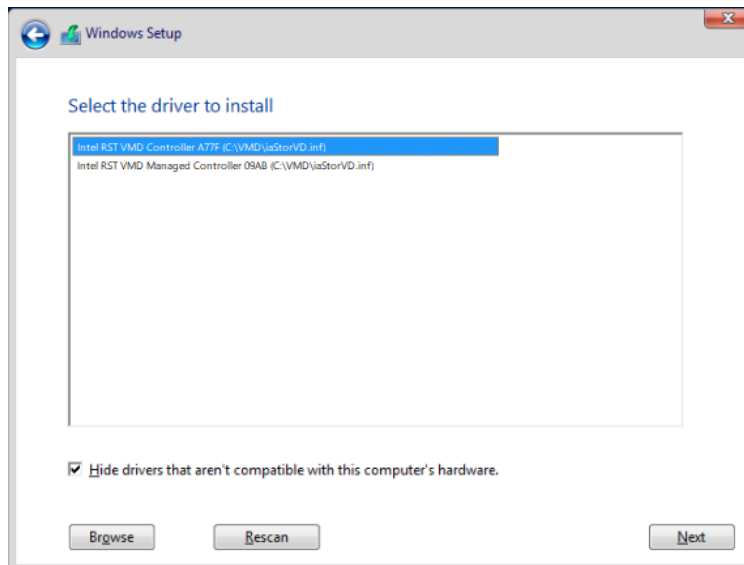
- During the OS installation process, click **Load Driver**. The VMD driver will need to be installed to detect the drives being managed by Intel® RST under the Intel® VMD Controller.



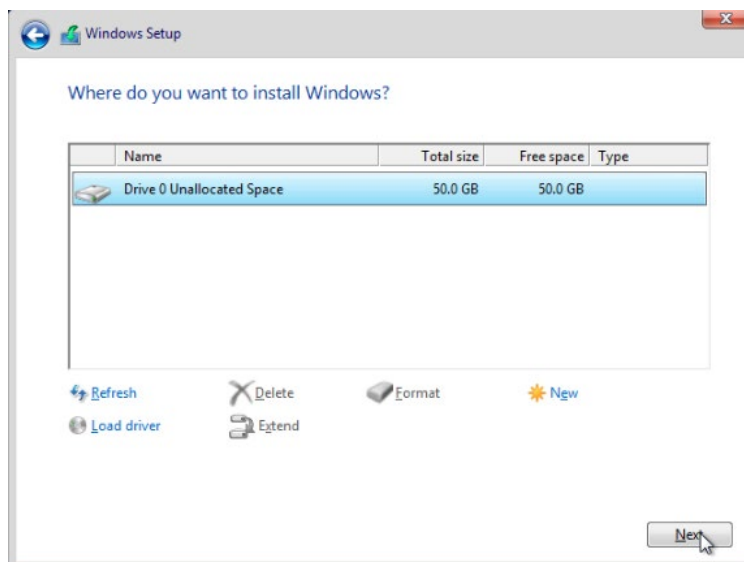
- Browse to the location of the **iaStorVD.sys** file. This file should be under **../VMD/** within the driver files copied in the USB key media.



6. Select the driver and click **Next**.



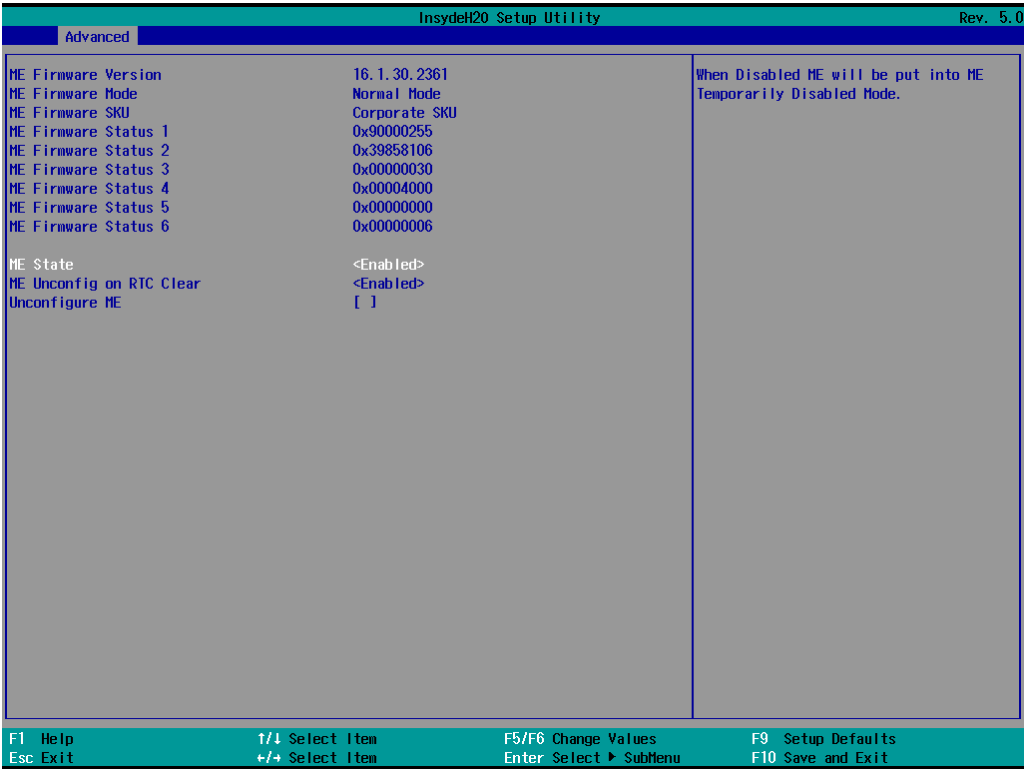
7. Select the driver for the OS installation.



8. Complete the OS installation process.

PCH-FW Configuration

This section allows you to configure the PCH-FW settings.



ME State

When Disabled ME will be put into ME Temporarily Disabled Mode.

Options: Disabled, Enabled (default)

ME Unconfig on RTC Clear

When Disabled ME will not be unconfigured on RTC Clear.

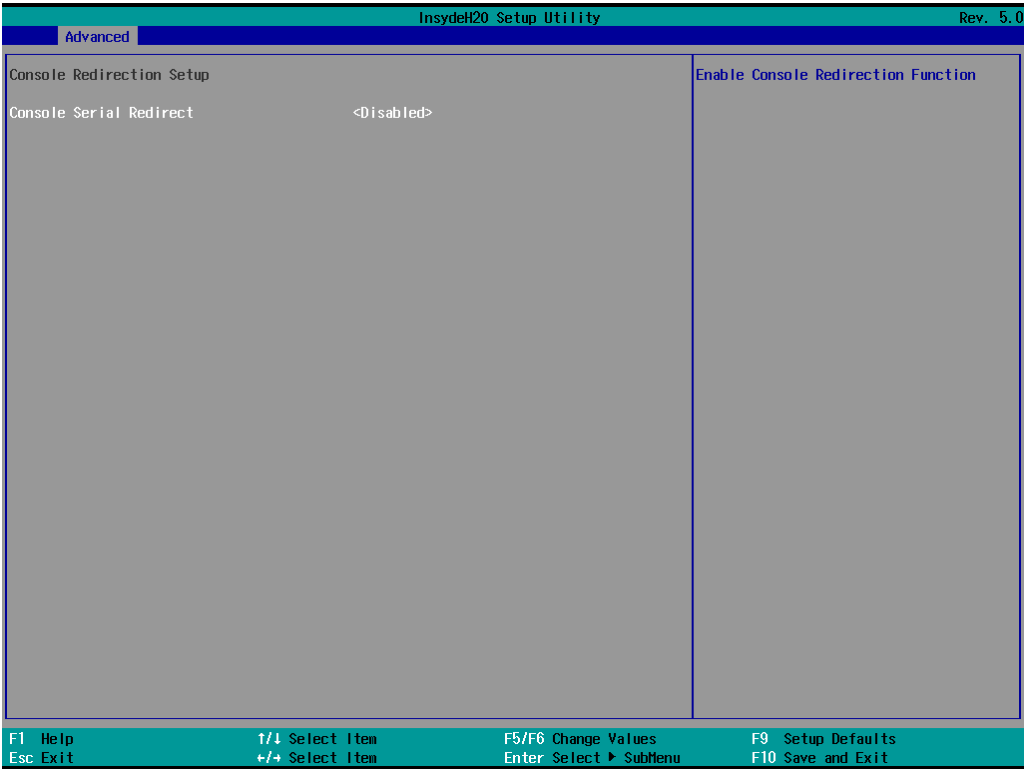
Options: Disabled, Enabled (default)

Unconfigure ME

Unconfigure ME by resetting MEBx password to default.

Console Redirection

This section allows you to configure the console redirection settings.



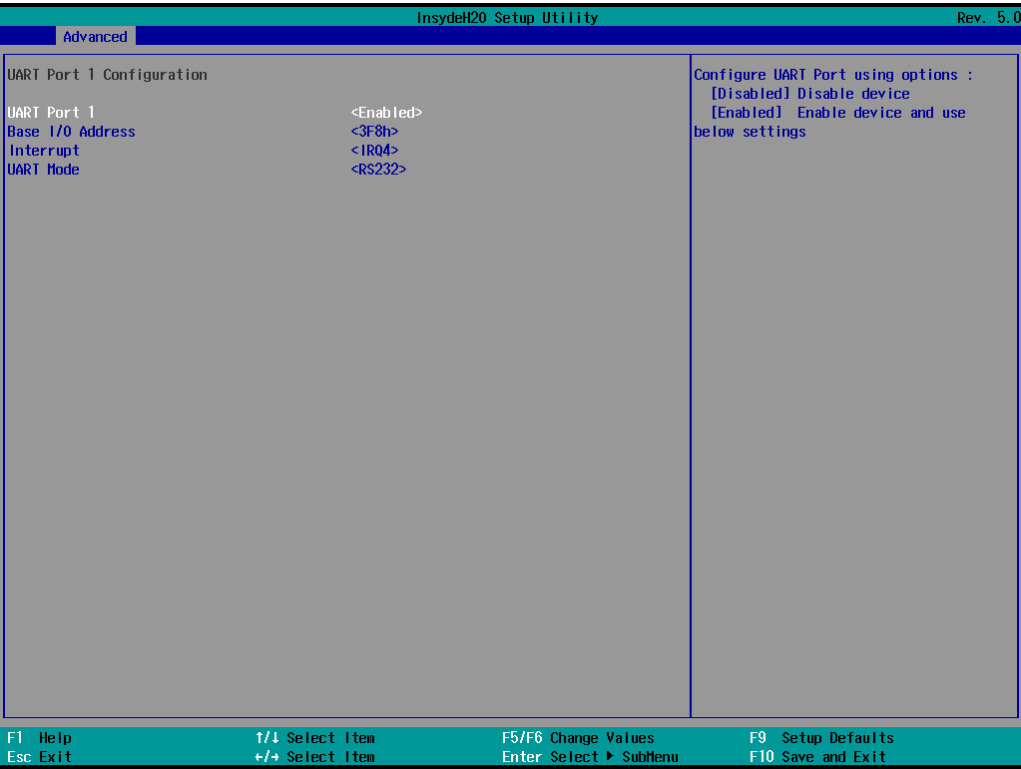
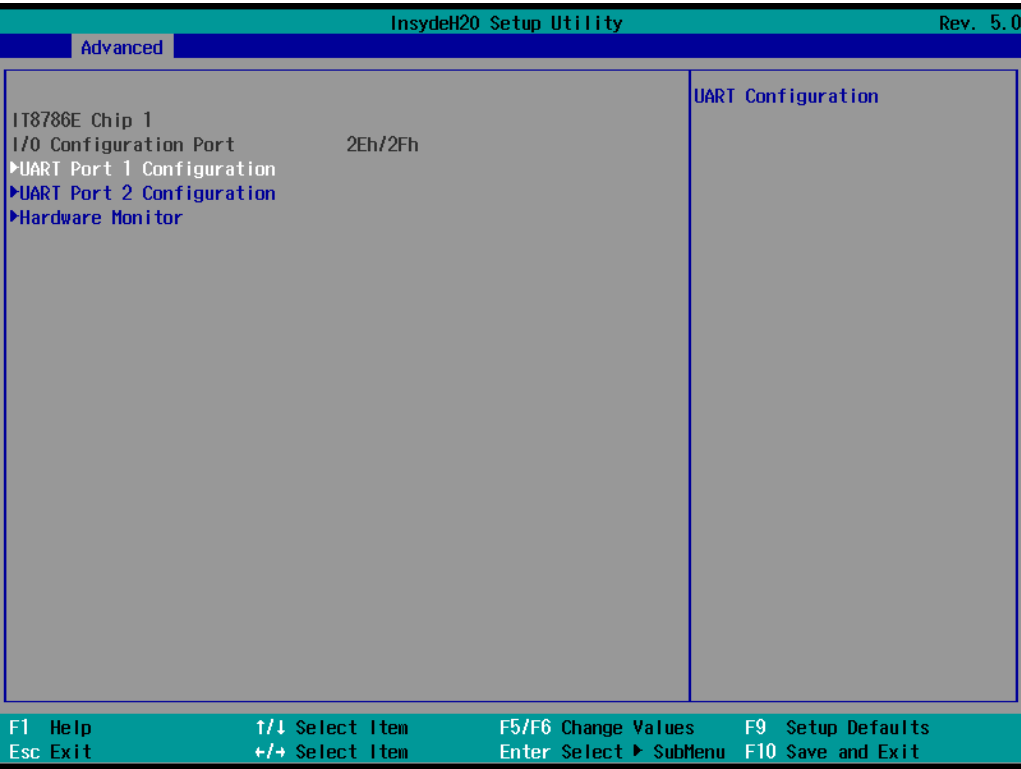
Console Serial Redirect

When the Console Redirection Function is enabled, the console information will be sent to both the display monitor and the serial port (COM1).

Options: Disabled (default), Enabled

SIO ITE8786E

This option allows users to configure serial port settings.



UART Port 1

This function allows users to configure the resources for the serial port 1.

Enable: Enables the Serial Port 1 connection (default)

Disable: Disables the Serial Port 1 connection

UART Port 2

This function allows users to configure the resources for serial port 2.

Enable: Enables the Serial Port 2 connection (default)

Disable: Disables the Serial Port 2 connection

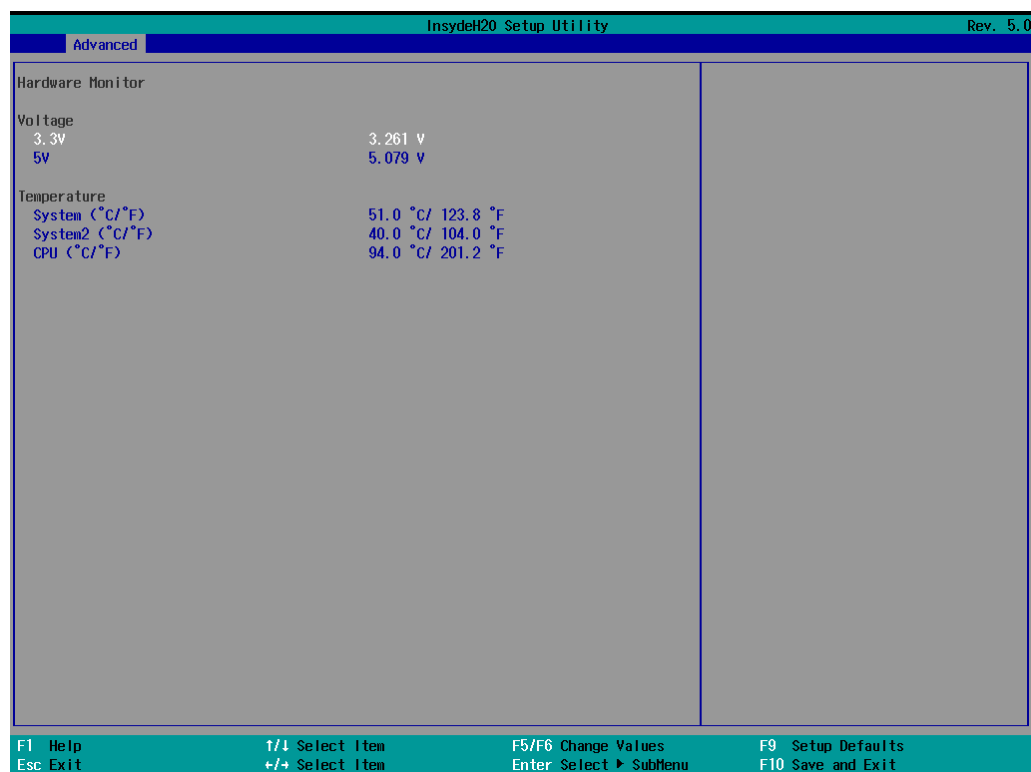


NOTE

The other UART ports can only be configured by OS utility.

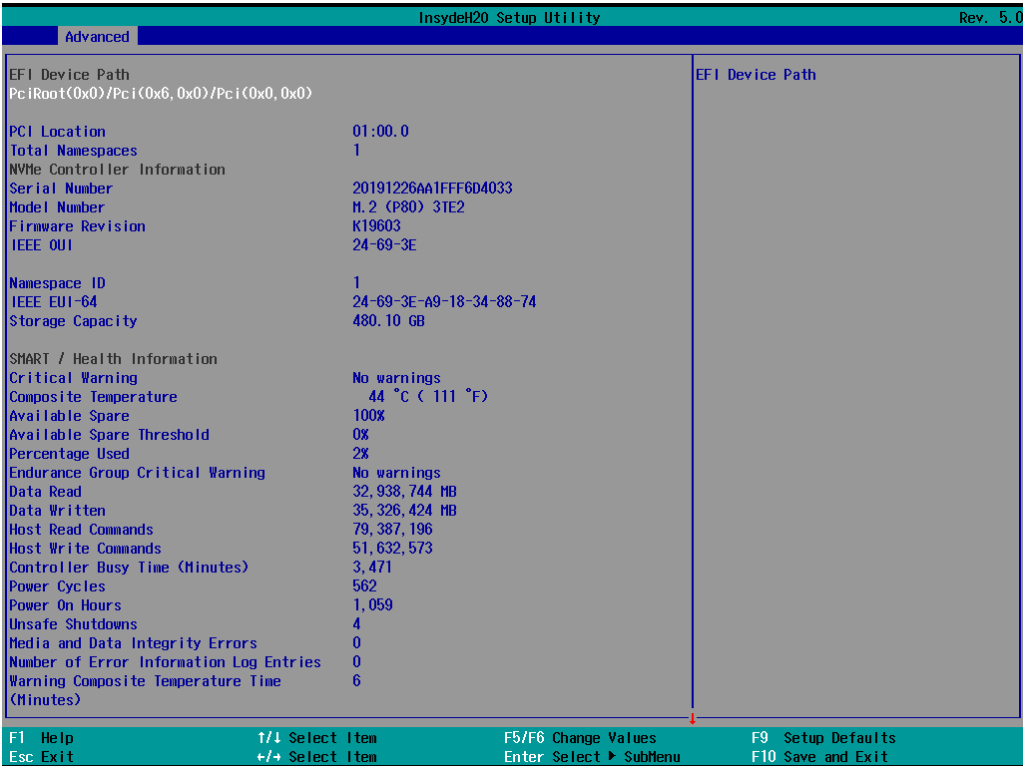
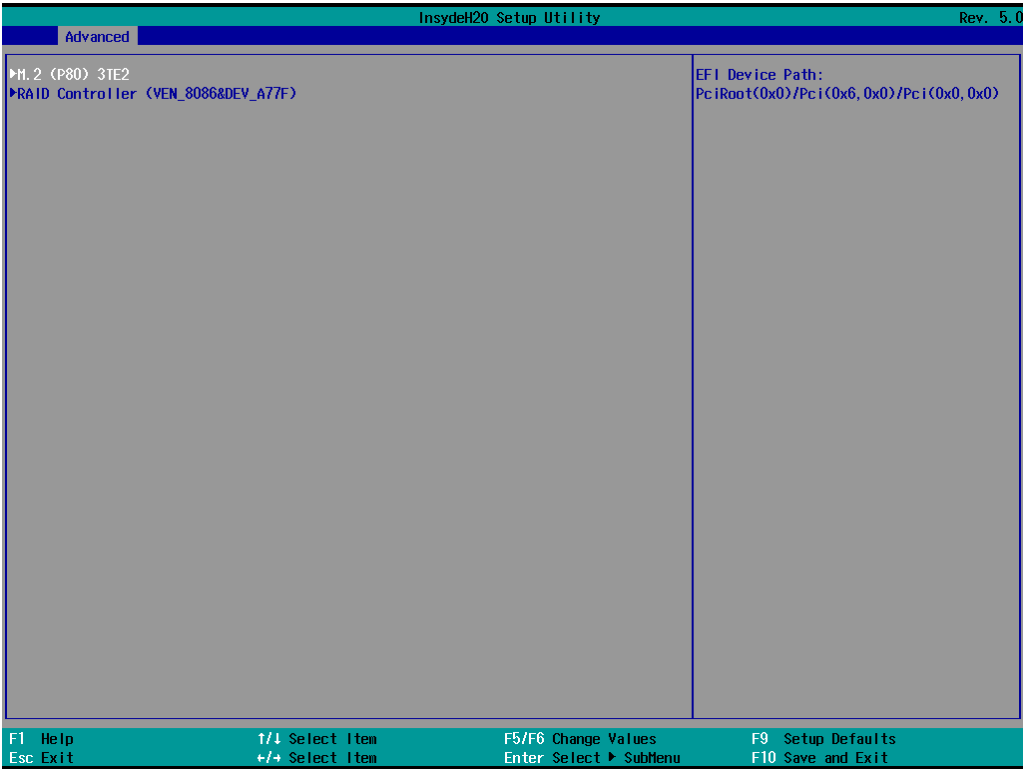
Hardware Monitor

This option allows users to view stats on the computer such as CPU and system temperature, voltage levels, and other chipset information.



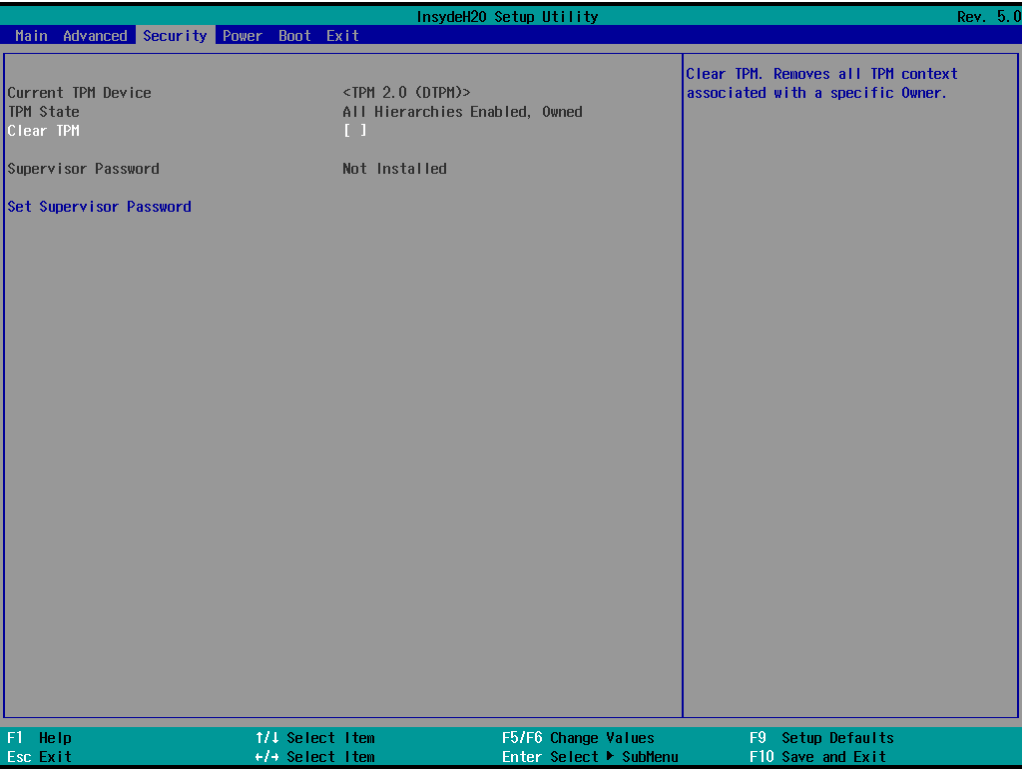
NVM Express Information

This section allows users to check NVMe device information.



Security Settings

The **Security** page includes security-related settings. You will require the supervisor password and user password.



Current TPM Device

This item indicates if the system has a TPM module configured and provides information on its type.

TPM State

This item allows users to view the current TPM settings.

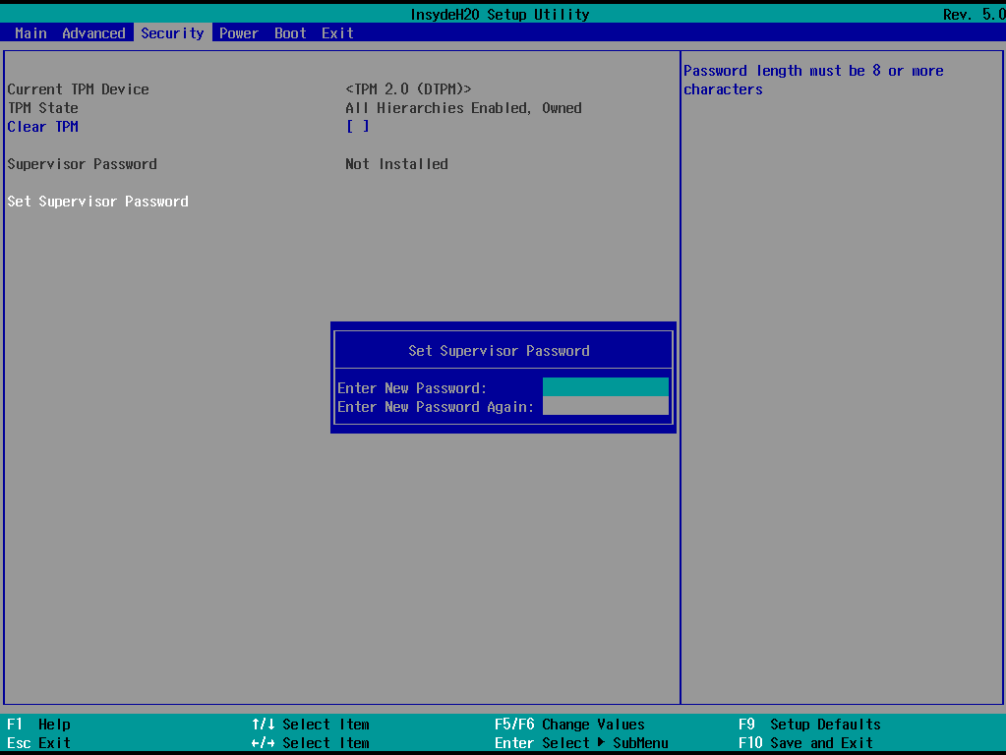
Clear TPM

This item allows users to remove all TPM context associated with a specific owner.

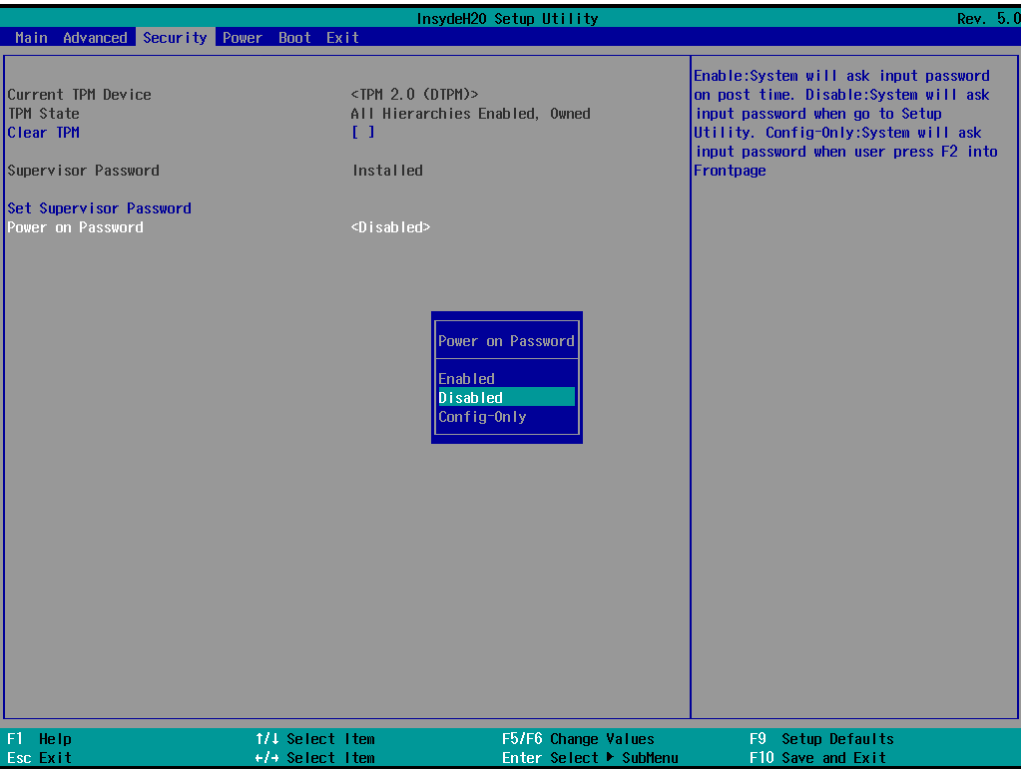
Set Supervisor Password

This item allows you to set the supervisor password. To set the password, select the **Set Supervisor Password** option, enter the password, and re-confirm the password.

To delete the password, select the **Set Supervisor Password** option and enter the old password; leave the new password fields blank, and then press enter.



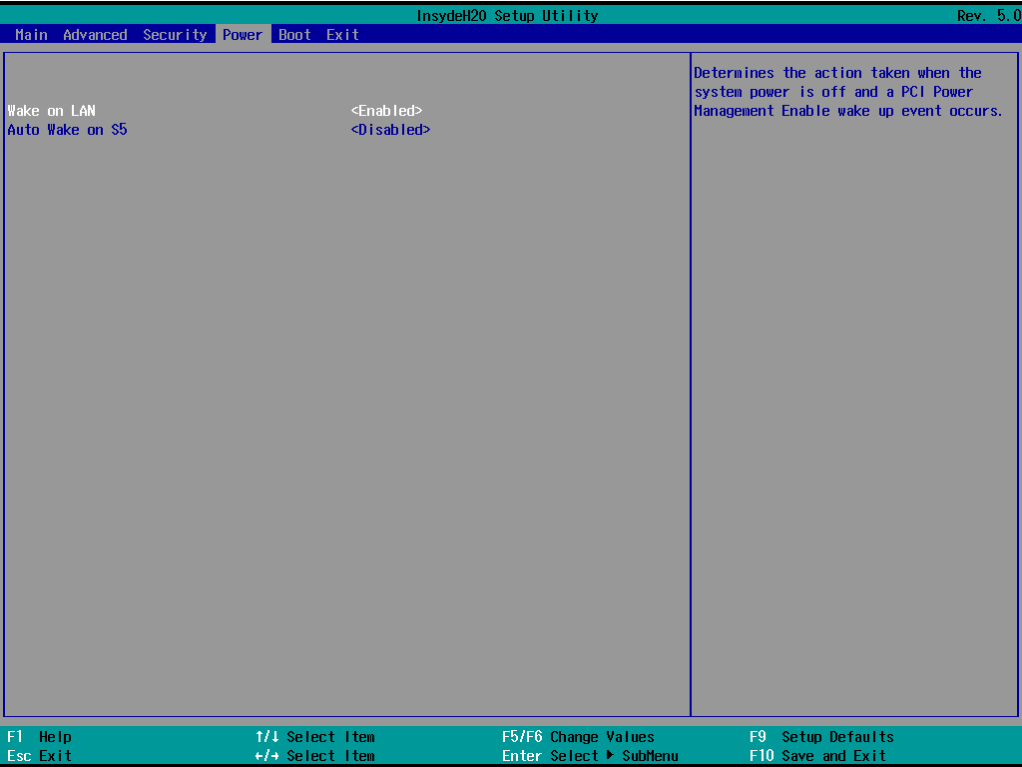
After setting the supervisor password, users can choose when the input password screen will pop up.



- Enable:** System will ask input password during post time.
- Disable:** System will ask for the password to go to the setup utility.
- Config Only:** System will only ask for the password when you select the config (F2) option

Power Settings

The Power page allows users to configure the power settings of the computer.



Wake on LAN

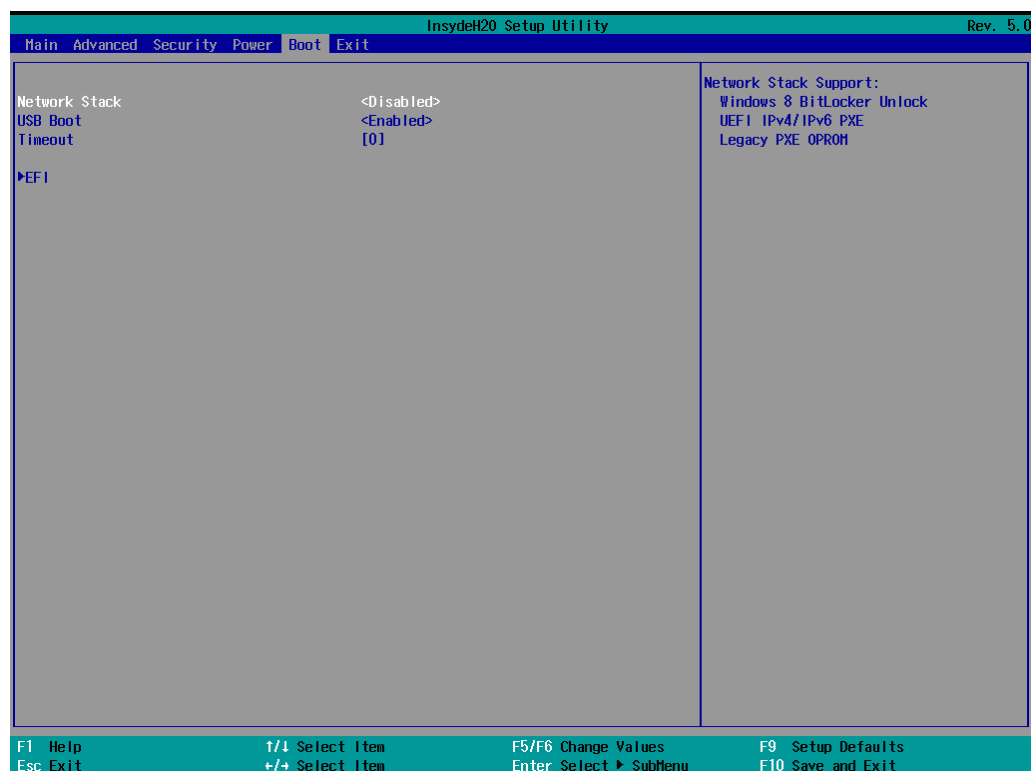
Enable this feature if you want to wake up the system by a LAN device from a remote host.
Options: Enabled (default), Disabled

Auto Wake on S5

This option allows you to configure the computer to wake from S5 status. S5 stands for Soft Off, where the PSU remains engaged but power to all other parts of the system is cut. Auto wake on S5 schedules a soft reboot at certain periodic times that may be specified in the BIOS.
Options: Disabled (default); By Every Day (user specifies a regular daily time when the computer will power up); By Day of Month (user specifies a regular day each month when the computer will power up)

Boot Settings

The **Boot** page includes configuration settings for the boot-up process.



NOTE

If you have not added any storage to your computer, you will not see the EFI option.

Network Stack

This option is used to deploy an Internet Protocol (IP) stack. The IP stack provides an application library to open/close connections to remote devices and send/receive data between the remote devices.

Options: Disabled (default), Enabled

PXE Boot capability

PXE Booting is booting a system over a network. This option allows users to start PXE over IPv4 or IPv6

Options: Disabled (default), UEFI: IPv4, UEFI: IPv6, UEFI: IPv4/IPv6

USB Boot

Used to enable or disable boot-up from USB devices.

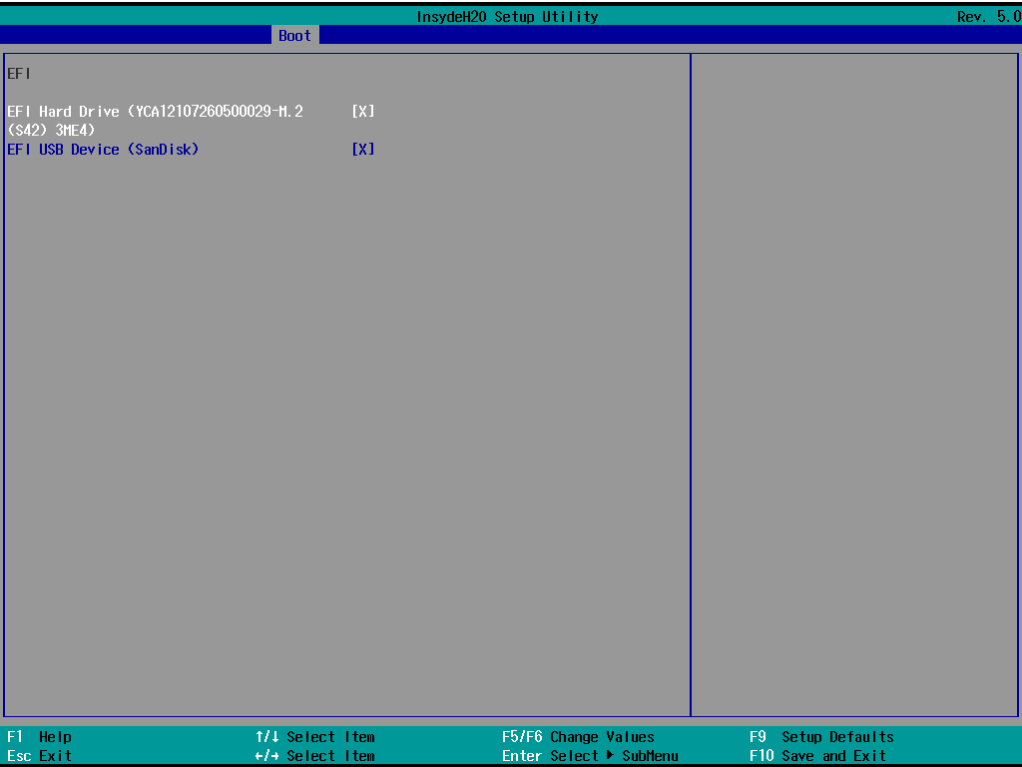
Options: Enabled (Default), Disabled

Timeout

This item allows users to set the number of seconds that the firmware will wait before booting with the original default boot option.

EFI

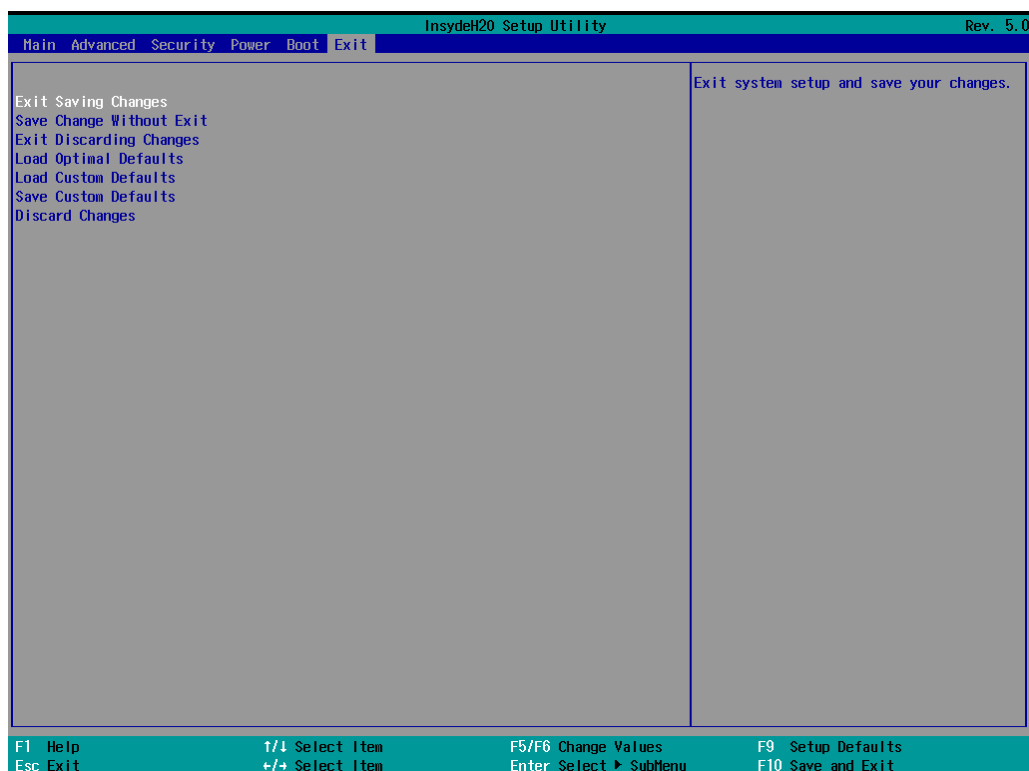
This option allows users to select the boot order. Use F5 (move down) or F6 (move up) to change the value.



This item allows users to select the boot order. Use F5 (move down) or F6 (move up) to change the value.

Exit Settings

The **Exit** page includes options to exit the BIOS environment.



Exit Saving Changes

This option allows you to exit the BIOS environment and save the values you have just configured.

Options: Yes (default), No

Save Change Without Exit

This option allows you to save changes without exiting the BIOS environment.

Options: Yes (default), No

Exit Discarding Changes

This option allows you to exit without saving any changes that might have been made to the BIOS.

Options: Yes (default), No

Load Optimal Defaults

This option allows you to revert to the factory default BIOS values.

Options: Yes (default), No

Load Custom Defaults

This option allows you to load custom default values for the BIOS settings.

Options: Yes (default), No

Save Custom Defaults

This option allows you to save the current BIOS values as a custom default that may be reverted to at any time by using the **Load Custom Defaults** option.

Options: Yes (default), No

Discard Changes

This option allows you to discard all settings you have just configured.

Options: Yes (default), No

Enabling AMT

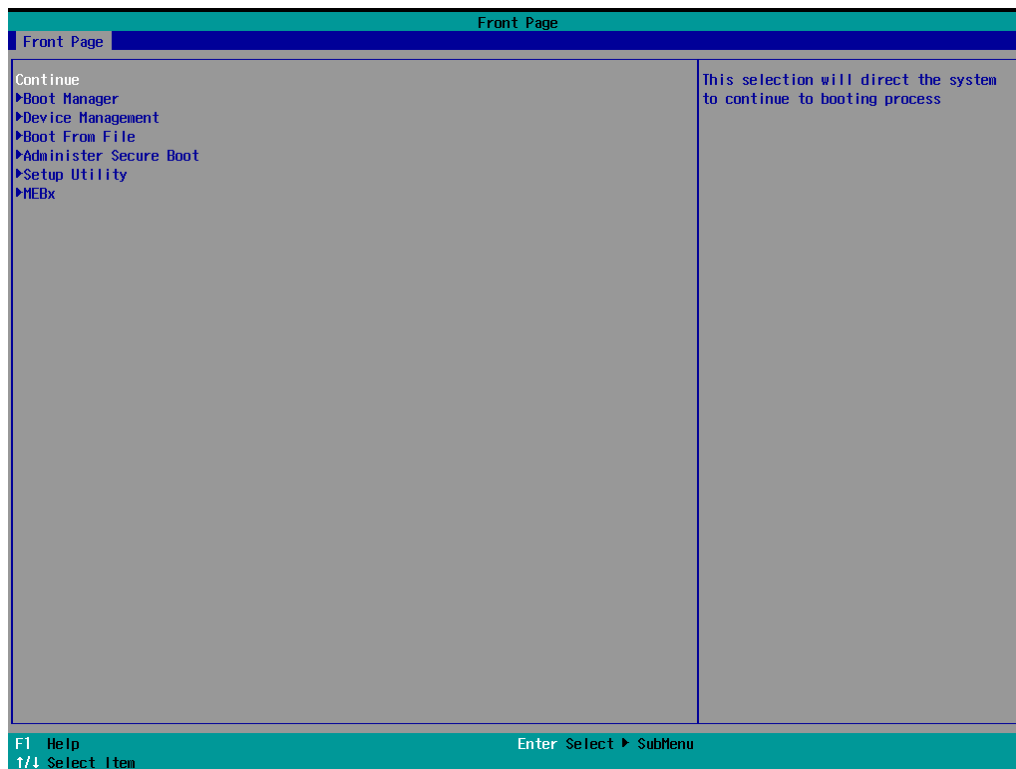


NOTE

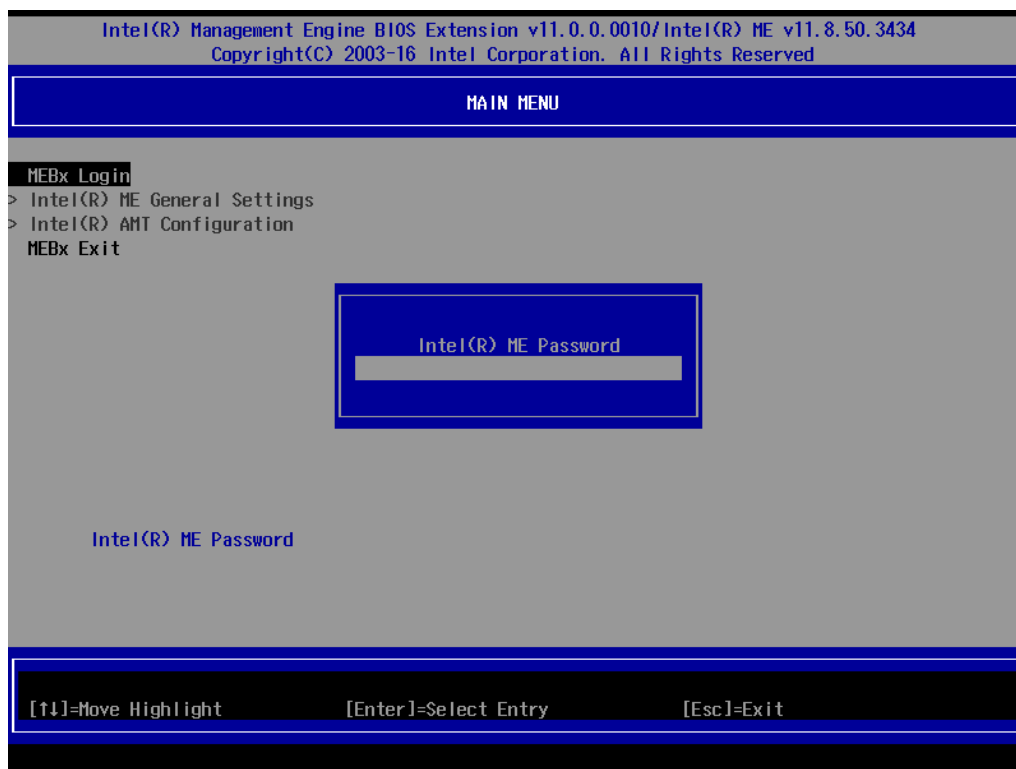
The AMT function is not supported in the models with Celeron and i3 CPU.

To enter the BIOS setup utility, press the "F2" key while the system is booting up. The main BIOS Setup screen will appear. Five options will be available:

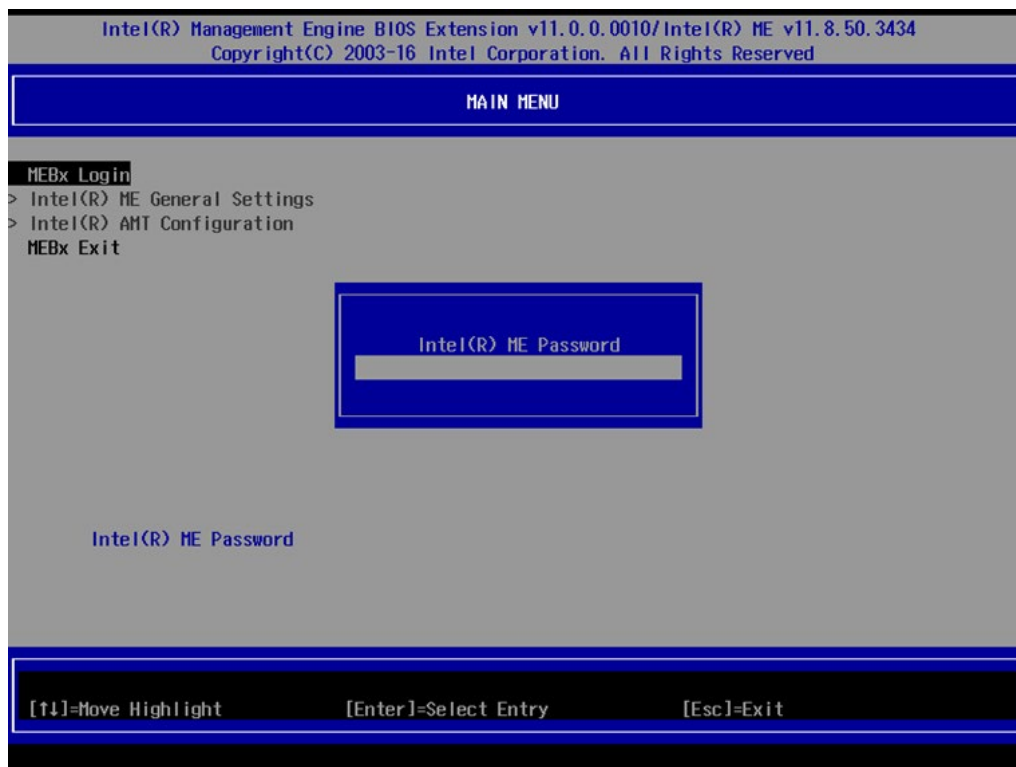
1. Select **Intel® Management Engine BIOS Extension (MEBx)** to enter the AMT configuration.



2. Press **<Enter>** to start the login procedure.



3. Type the default password: **admin**.



4. Type the new password. It must include both upper-case and lower-case characters, numbers, and special symbols. E.g., **Admin'12**.

Intel(R) Management Engine BIOS Extension v11.0.0.0010/Intel(R) ME v11.8.50.3434
Copyright(C) 2003-16 Intel Corporation. All Rights Reserved

MAIN MENU

MEBx Login
> Intel(R) ME General Settings
> Intel(R) AMT Configuration
MEBx Exit

Intel(R) ME New Password

Intel(R) ME Password

[↑↓]=Move Highlight [Enter]=Select Entry [Esc]=Exit

5. Select **Intel® AMT Configuration** to enable remote access without a local user present for consent, select **User Consent**, and then select **User Opt-in** and change the value to **None**.
6. Set Static IP or DHCP by request.

Intel(R) Management Engine BIOS Extension v11.0.0.0010/Intel(R) ME v11.8.50.3434
Copyright(C) 2003-16 Intel Corporation. All Rights Reserved

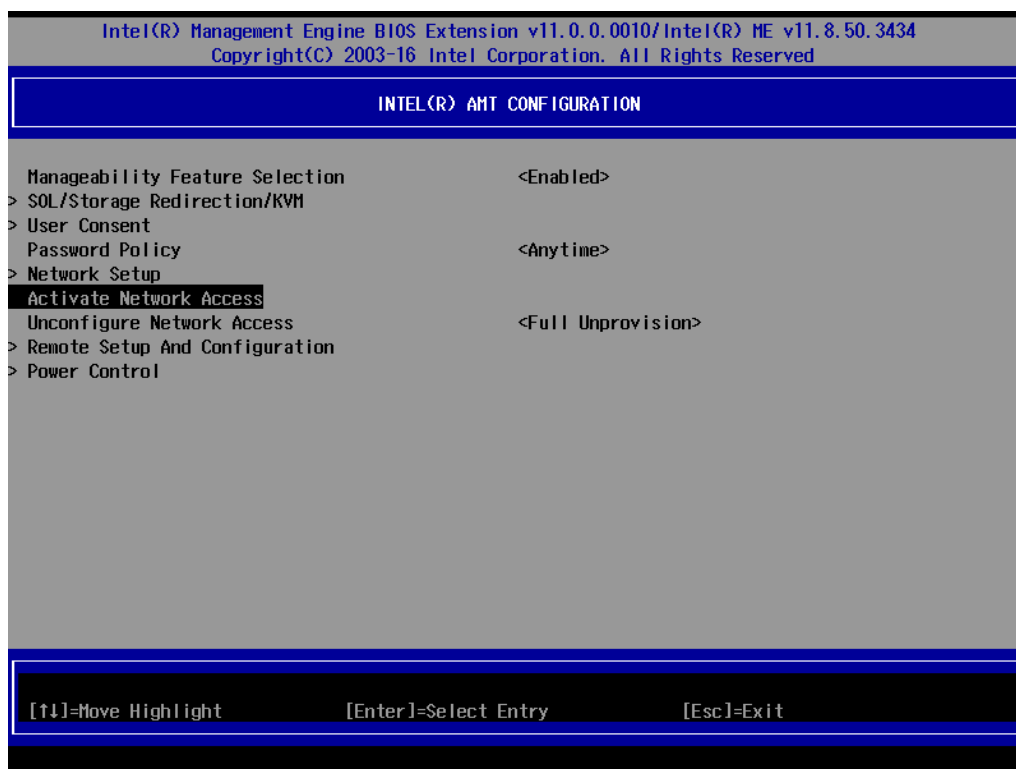
WIRED LAN IPV4 CONFIGURATION

DHCP Mode	<Disabled>
IPV4 Address	172.16.1.2
Subnet Mask Address	255.255.255.0
Default Gateway Address	0.0.0.0
Preferred DNS Address	0.0.0.0
Alternate DNS Address	0.0.0.0

Subnet mask (e.g. 255.255.255.0)

[↑↓]=Move Highlight [Enter]=Select Entry [Esc]=Exit

7. Set Active Network Access to enable remote access capability.



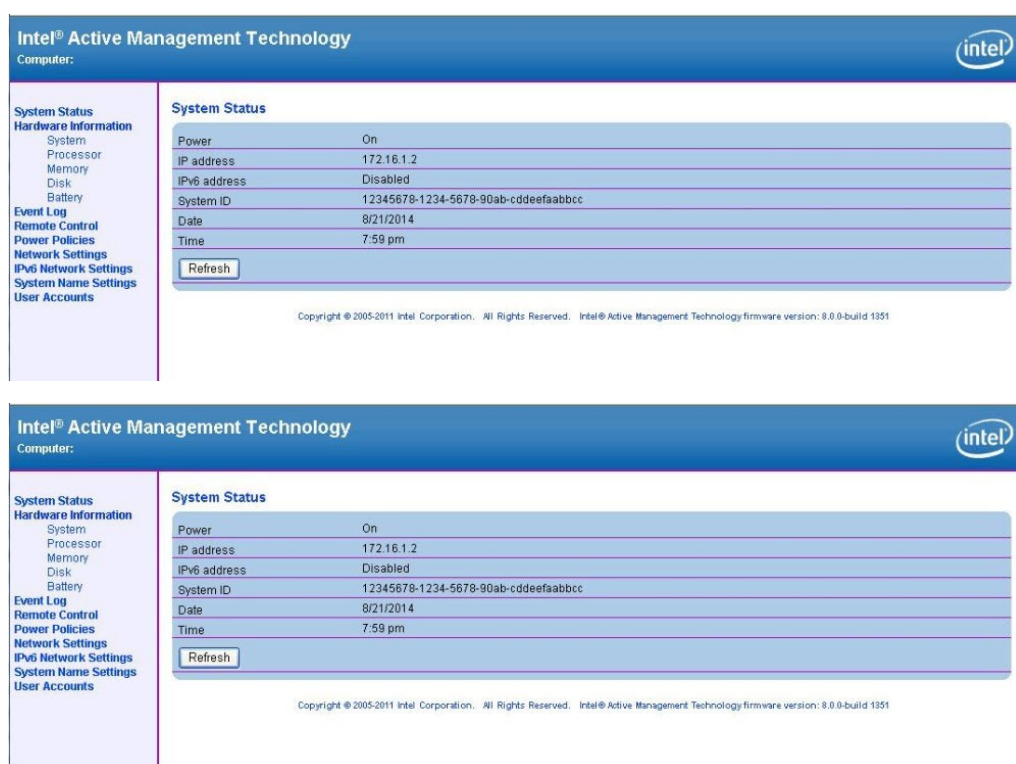
Using Active Management Technology (AMT)

You can use any AMT tool available to run the remote management function using a web browser.

1. Type the IP address of your computer as configured in the AMT configuration settings with port **16992**. The AMT logon screen will appear.



2. Click **Log On** and type the username (**admin**) and password.



NOTE

The AMT port is LAN 1.



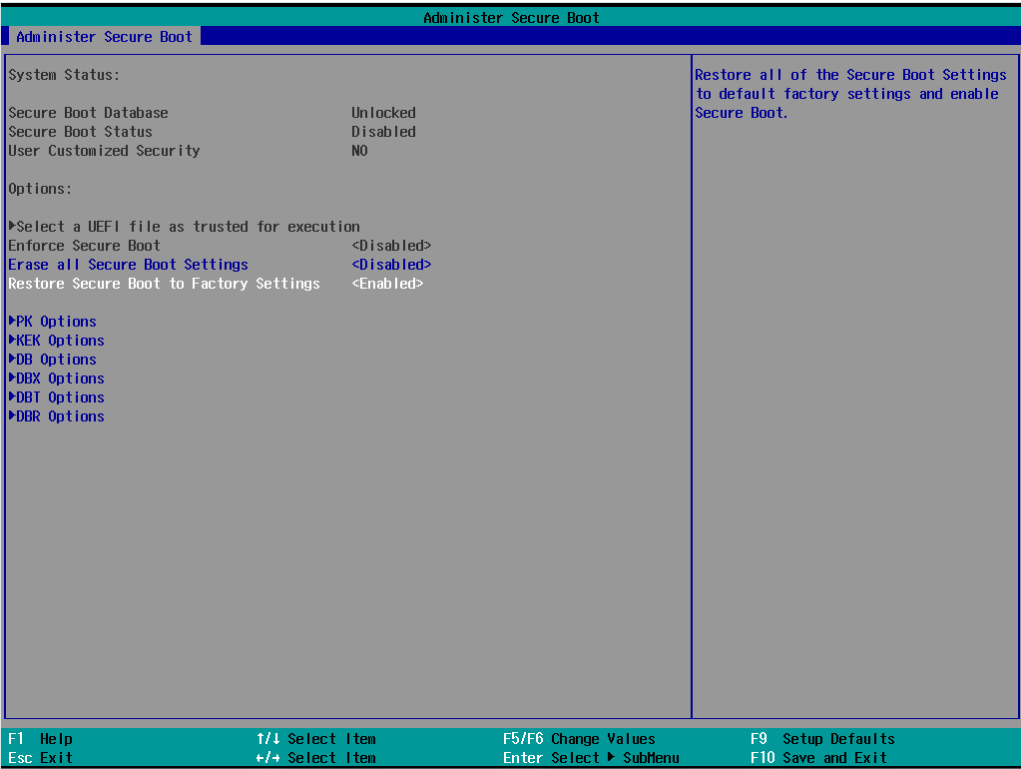
NOTE

For details, refer to the Intel® AMT Implementation and Reference Guide at:

https://software.intel.com/sites/manageability/AMT_Implementation_and_Reference_Guide/default.htm?url=WordDocuments%2Faccessingintelamtviathewebuiinterface.htm

Administering Secure Boot

Press F2 to go to the Administer Secure Boot.



Secure Boot helps computers resist attacks and infection from malware. The feature defines an interface between the operating system and BIOS. It detects tampering with boot loaders, key operation system files, and unauthorized option ROMs by validating their digital signatures.

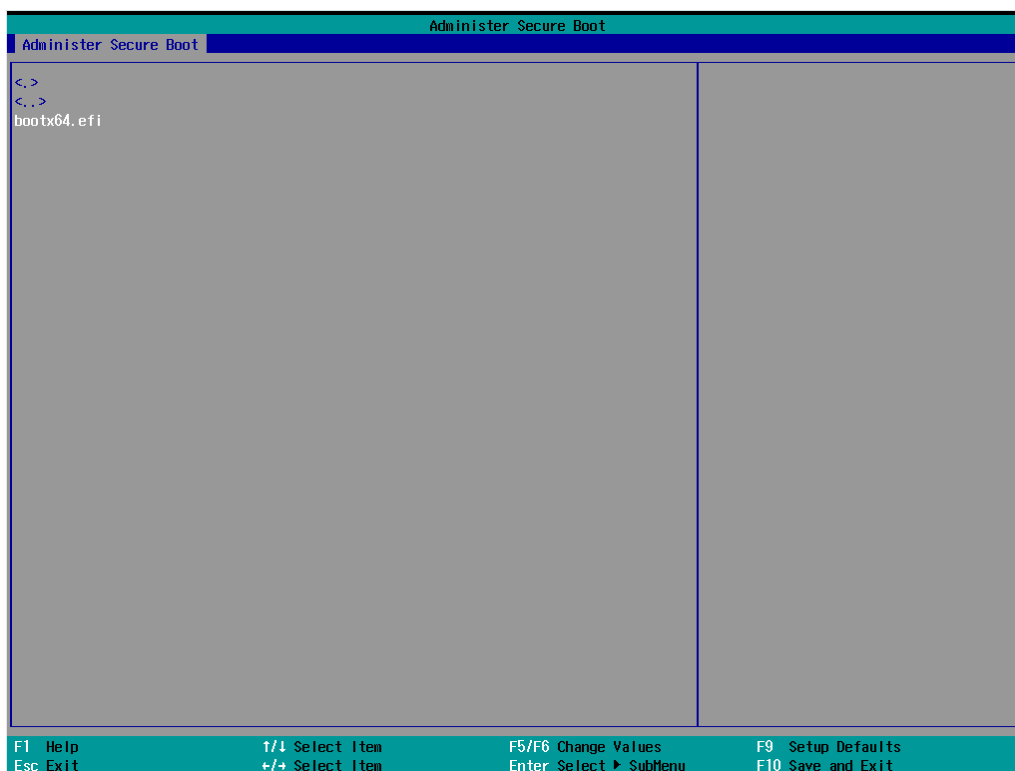
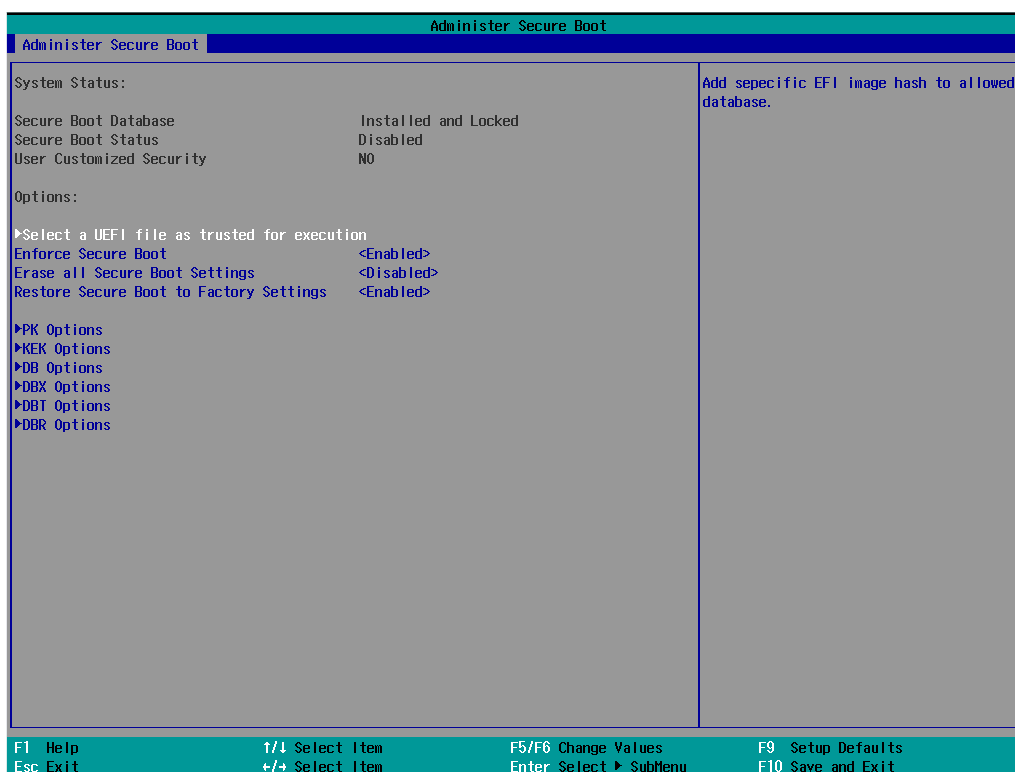
Enabling UEFI Secure Boot

Set as “enabled” in “Restore Secure Boot to Factory Settings” under Administer Secure Boot menu. Press F10 as save and exist.



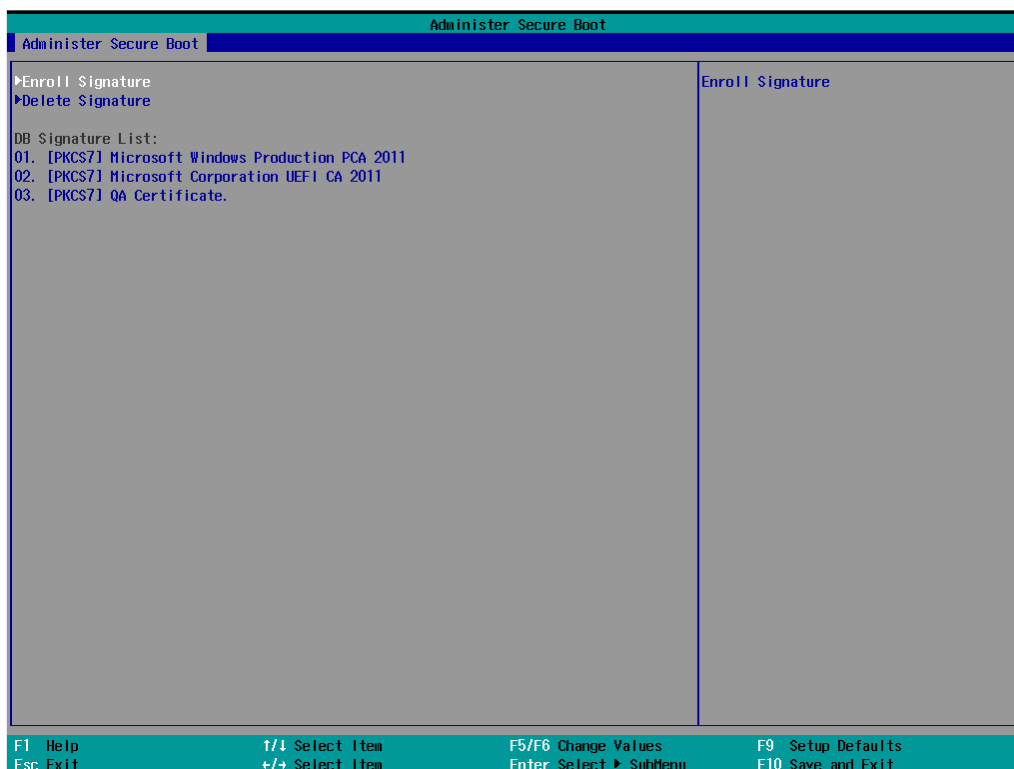
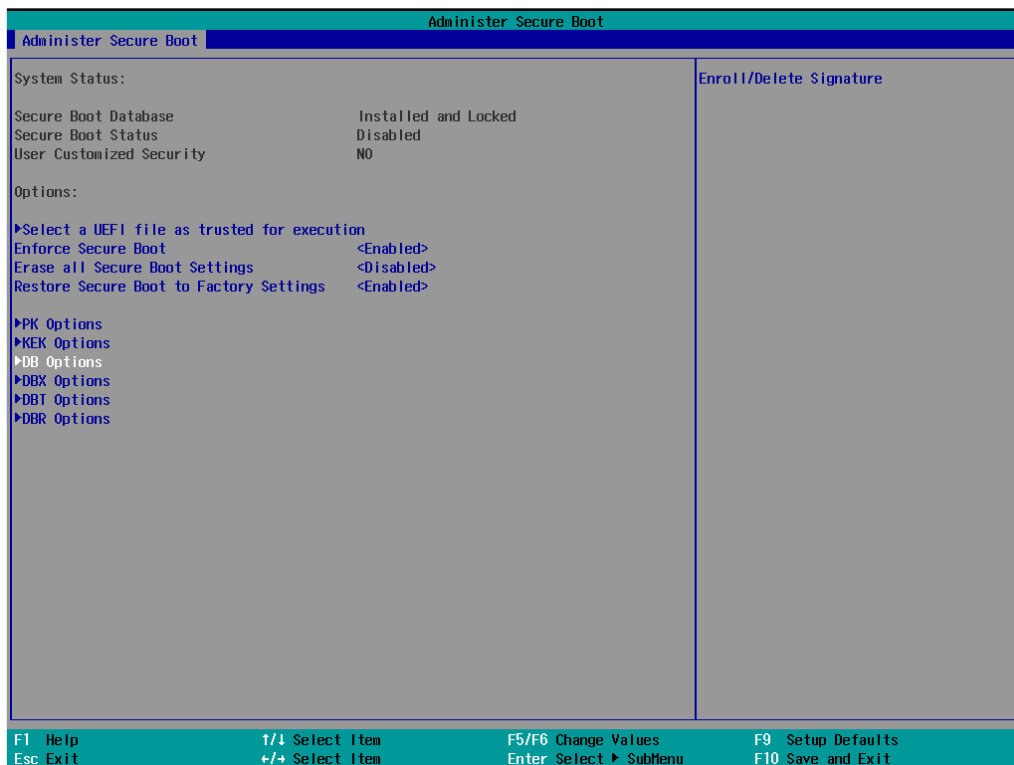
Moxa has included a Microsoft key in BIOS by default; if users cannot boot up using a non-Windows OS, use the following example:

Enroll EFI Image



Enter "Administer Secure Boot" once again and see "Select a UEFI file as trusted for execution", put loader into the database named and followed by the UEFI standard \EFI\BOOT\BOOT{machine type short-name}. E.g., efi\boot\BootX64.efi, Debian (EFI\debian\grubx64.efi), Suse (EFI\opensuse\grubx64.efi)

Enroll Customer Key



Enter "DB OPTION" and enroll your key. Please make sure your key is CRT format and uses RSA 2048 or better.

Upgrading the BIOS

This section describes how to upgrade the BIOS on your computer.



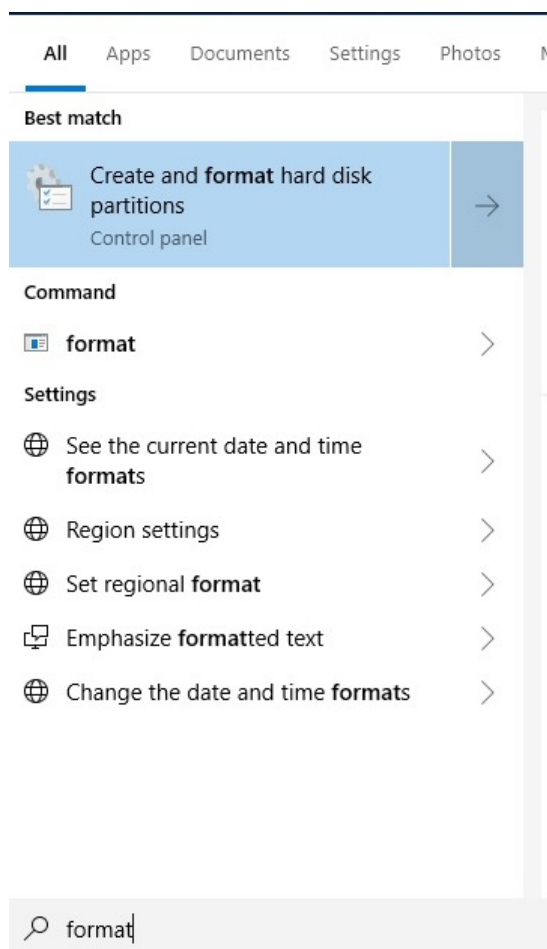
NOTE

Incorrect BIOS updates may permanently damage the computer. We strongly recommend that you contact the Moxa technical support team for assistance in obtaining all the necessary tools and the most current information before attempting to upgrade the BIOS on any Moxa device.

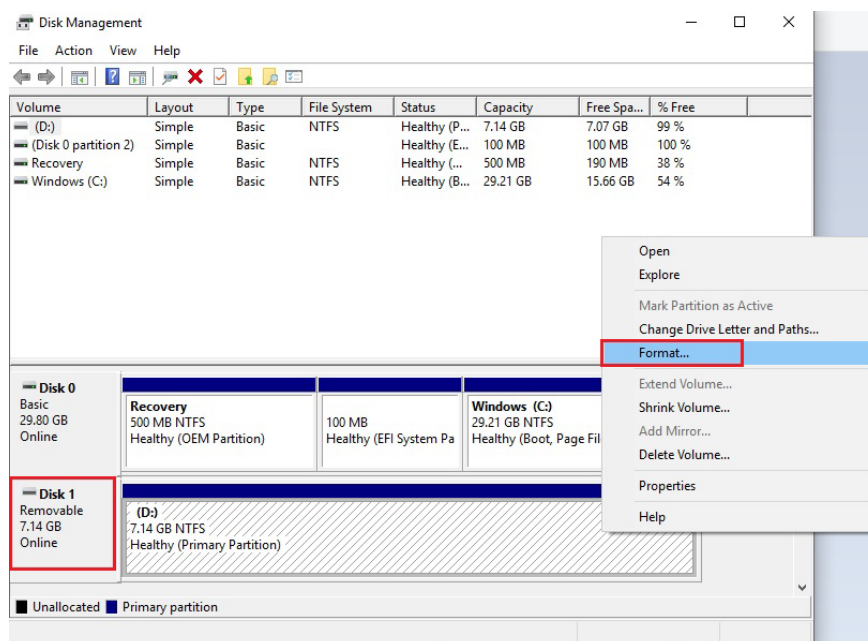
Step 1: Create a Bootable USB Disk

Before upgrading the BIOS, you must create a bootable USB drive for the system.

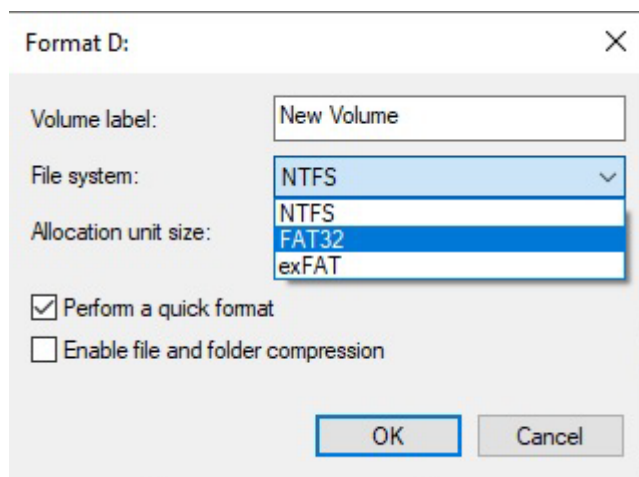
1. Insert a USB disk in the computer's USB drive.
2. Search for "format" and select **Create and format hard disk partitions**.



3. Right click on the USB disk and select **Format**.



4. Select **FAT32** for the **File System** and click **OK** to start formatting the USB disk.



Step 2: Prepare the Upgrade File

You must use the BIOS upgrade installation file to upgrade the BIOS. Contact Moxa's technical department for assistance.

1. Get the BIOS upgrade file (includes an **efi** folder and an **xxxx.efi** file)
2. Copy the **efi** folder and **xxxx.efi** file to the bootable USB disk.

Step 3: Run the Upgrade Program on the Computer

1. Reboot the computer from the USB device and press **F2** while it is booting up to go to the Boot Manager.

If the BIOS does not recognize the USB device as the boot device, the USB device may not have a partition table. Use the Windows command line tool **diskpart** to rebuild the partition table.

2. Select the USB disk to boot from.



The screen will switch to the SHELL environment.

3. Type **fs0:**, then go to the directory where the upgrade file is located and type **xxxxxx.efi** (the name of the file is based on the upgrade file you get from Moxa).

```
Device mapping table
fs0      :Removable HardDisk - Alias hd24s0b blk0
          :PciRoot(0x0)/Pci(0x14,0x0)/USB(0x12,0x0)/HD(1,MBR,0x00DD3D80,0x3F,0xEB5FC1)
blk0     :Removable HardDisk - Alias hd24s0b fs0
          :PciRoot(0x0)/Pci(0x14,0x0)/USB(0x12,0x0)/HD(1,MBR,0x00DD3D80,0x3F,0xEB5FC1)
blk1     :Removable BlockDevice - Alias (null)
          :PciRoot(0x0)/Pci(0x14,0x0)/USB(0x12,0x0)
hd24s0b  :Removable HardDisk - Alias fs0 blk0
          :PciRoot(0x0)/Pci(0x14,0x0)/USB(0x12,0x0)/HD(1,MBR,0x00DD3D80,0x3F,0xEB5FC1)

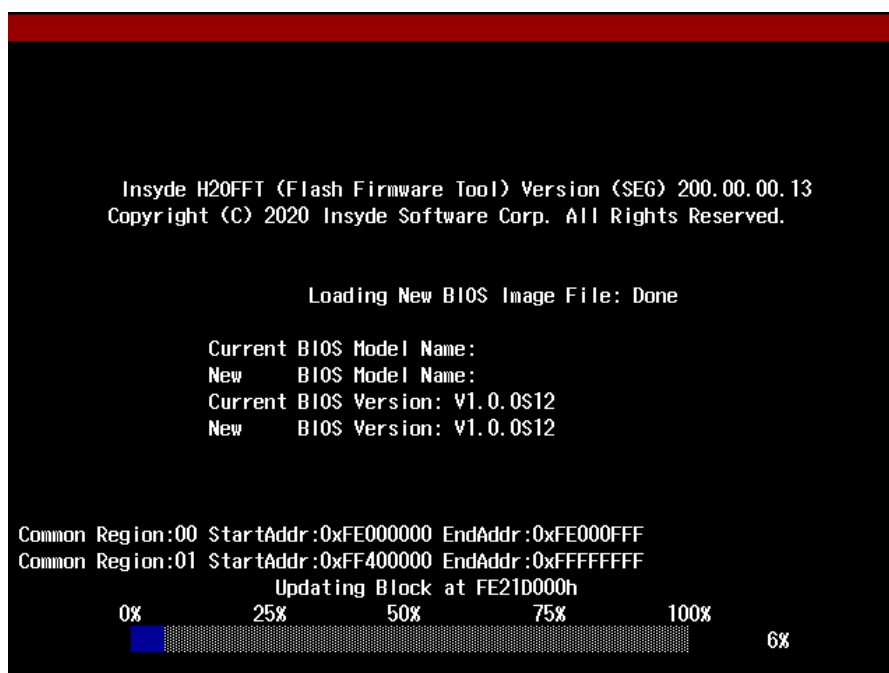
Shell> fs0:
fs0:\> xxxxxxx.efi
```

4. The upgrade program will run automatically. Wait for the process to complete.

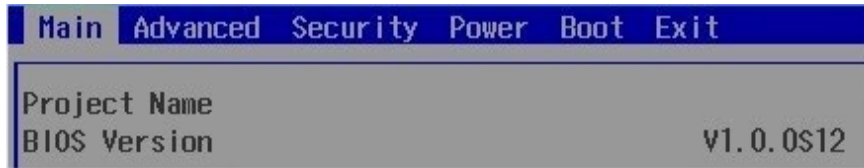


ATTENTION

Do NOT switch off the power supply during the BIOS upgrade, since doing so may cause the system to crash.



- When the upgrade is done, the computer will automatically reboot.
You can check the BIOS version on the Main page.



If the system has more than one boot device, you will see more than one fsx (x represents the number of devices).

```
EFI Shell version 2.50 [22281.4149]
Current running mode 1.1.2
Device mapping table
fs0      :HardDisk - Alias hd33e0a2 blk0
          :PciRoot(0x0)/Pci(0x17,0x0)/Sata(0x4,0x0,0x0)/HD(2,GPT,0AC3B829-99B0-4FDE-844D-8A10C1D55C6C,0xFA000,0x32000)
fs1      :Removable HardDisk - Alias hd25r0b blk1
          :PciRoot(0x0)/Pci(0x14,0x0)/USB(0x11,0x0)/HD(1,MBR,0x00DD3D80,0x3F,0xEB5FC1)
fs2      :Removable BlockDevice - Alias f25s0 blk2
          :PciRoot(0x0)/Pci(0x14,0x0)/USB(0x12,0x0)
blk0     :HardDisk - Alias hd33e0a2 fs0
          :PciRoot(0x0)/Pci(0x17,0x0)/Sata(0x4,0x0,0x0)/HD(2,GPT,0AC3B829-99B0-4FDE-844D-8A10C1D55C6C,0xFA000,0x32000)
blk1     :Removable HardDisk - Alias hd25r0b fs1
          :PciRoot(0x0)/Pci(0x14,0x0)/USB(0x11,0x0)/HD(1,MBR,0x00DD3D80,0x3F,0xEB5FC1)
blk2     :Removable BlockDevice - Alias f25s0 fs2
          :PciRoot(0x0)/Pci(0x14,0x0)/USB(0x12,0x0)
blk3     :HardDisk - Alias (null)
          :PciRoot(0x0)/Pci(0x17,0x0)/Sata(0x4,0x0,0x0)/HD(1,GPT,5796BAEF-EC3F-447F-B4F1-21EB08DC5D57,0x800,0xF9800)
blk4     :HardDisk - Alias (null)
          :PciRoot(0x0)/Pci(0x17,0x0)/Sata(0x4,0x0,0x0)/HD(3,GPT,7C8FF3C6-53E8-4CF9-8141-65DF7EF04399,0x12C000,0x8000)
blk5     :HardDisk - Alias (null)
          :PciRoot(0x0)/Pci(0x17,0x0)/Sata(0x4,0x0,0x0)/HD(4,GPT,1AABAECF-BE17-4C27-AF60-E6C69977AC02,0x134000,0x3A6E800)
blk6     :BlockDevice - Alias (null)
          :PciRoot(0x0)/Pci(0x17,0x0)/Sata(0x4,0x0,0x0)
blk7     :Removable BlockDevice - Alias (null)
          :PciRoot(0x0)/Pci(0x14,0x0)/USB(0x11,0x0)
```

- Access each device path **fsx** (x is the device index), then type **ls** to view the content of the boot device until you locate the upgrade file and run it.

```
fs0:\> fs1:
fs1:\> ls
Directory of: fs1:\

06/27/19 11:43a <DIR>          16,384 efi
06/13/19 11:10a          17,974,704 820c100s16 efi
1 File(s) 17,974,704 bytes
1 Dir(s)
```

A. Safety Installation Instructions

A. RTC Battery Warning



ATTENTION

There is a risk of explosion if the wrong type of battery is used. To avoid this potential danger, always be sure to use the correct type of battery. Contact the Moxa RMA service team if you need to replace your battery.

Caution

There is a risk of explosion if the battery is replaced by an incorrect type. Dispose of used batteries according to the instructions on the battery.

B. Rack-mounting Warning

The following or similar rack-mounting instructions are included with the installation instructions:

- (1) Elevated Operating Ambient:** If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than the room ambient temperature. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature (T_{ma}) specified by the manufacturer.
- (2) Reduced Air Flow:** Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.
- (3) Mechanical Loading:** Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.
- (4) Circuit Overloading:** Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
- (5) Reliable Grounding:** Reliable grounding of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g., by using power strips).



This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Class A: FCC Warning! 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 commercial environment. 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.

Operation of this equipment in a residential area is likely to cause harmful interference in which case the users will be required to correct the interference at their own expense.



European Community



WARNING

This is a class A product. If used in a domestic environment, this product may cause undesirable radio interference, in which case the user may be required to take adequate measures to prevent the interference from affecting nearby devices.