

MC-3201 Series Hardware User Manual

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www.moxa.com/products

MOXA®

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MC-3201 Series Hardware User Manual

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1. Introduction

The MC-3201 computers are built around a 11th Gen Intel® Celeron® or Intel® Core™ i3, i5, or i7 processor and come with 2 DisplayPort interfaces, 2 USB 3.1 ports, 4 GbE ports, and 2 3-in-1 RS-232/422/485 serial ports. The MC-3201 is equipped with a 2.5" HDD/SSD slot and a built-in TPM 2.0 module.

Additional value and convenience are provided through a modular design with two independent slots for flexible system integration and expansion. Users have the option to add a variety of different communications modules, including Wi-Fi, 5G, LTE, GPS, and M.2 SATA SSD expansion modules.

With compliance with the IEC-60945 and E10 standards, the MC-3201 is sure to deliver stable and reliable system operation for marine and IIoT applications. These certifications are issued to products to indicate their suitability for marine applications.

Package Checklist

- MC-3201 Series embedded computer
- Terminal block to power jack converter
- Power-jack-to-terminal-block cable
- Wall-mounting kit
- Quick installation guide (printed)
- Warranty card



NOTE

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

Product Features

MC-3201 computers come with the following:

- 11th Gen Intel® Core™ processor (Tiger Lake U)
- built-in DDR4 memory slots; total capacity up to 32 GB
- M.2 B key socket for 5G, GPS, and M.2 SATA SSD expansion modules
- M.2 E key socket for Wi-Fi and BT expansion modules
- Mini-PCIe socket for LTE and mSATA expansion modules
- Variety of interfaces: 2 serial ports, 4 Giga LAN ports, 2 USB 3.1 (type A) ports, 4 USB 2.0 (type A) ports
- Built-in TPM 2.0 module
- IEC-60945 and E10 compliance

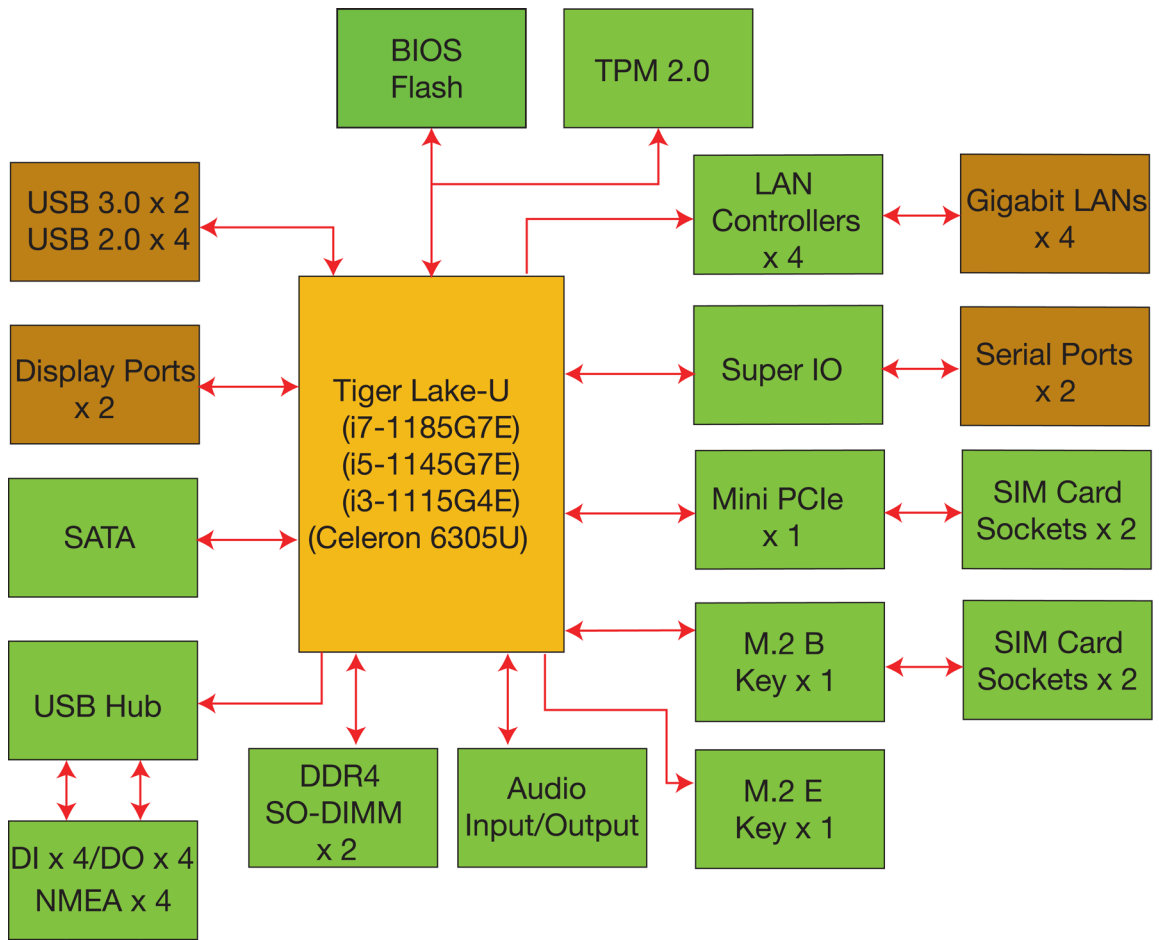
Hardware Specifications



NOTE

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

Hardware Block Diagram

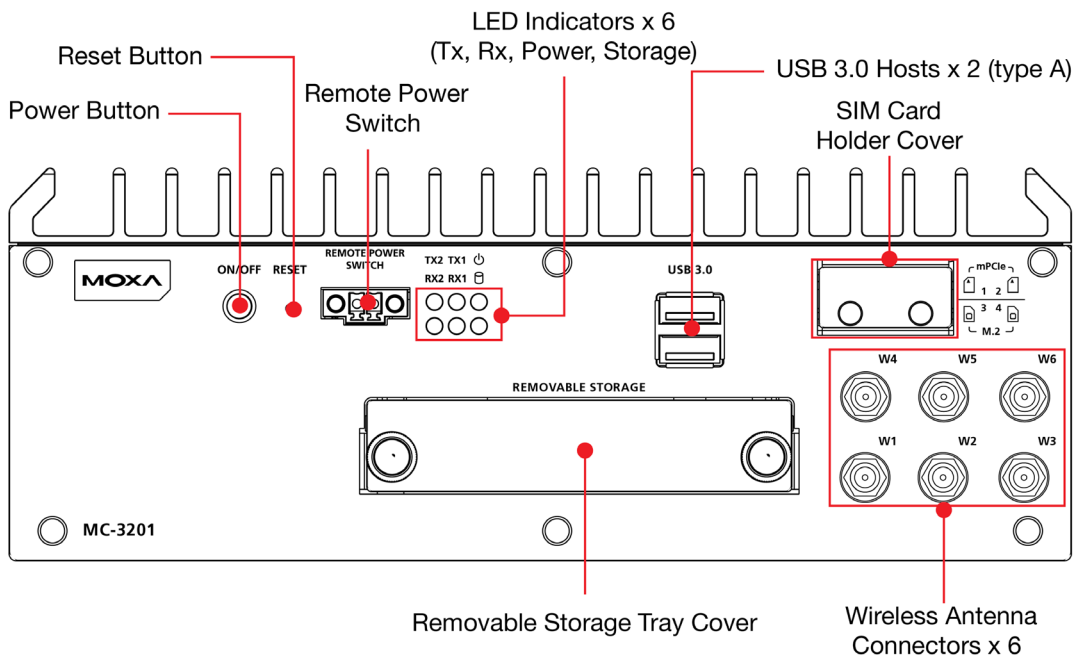


2. Hardware Introduction

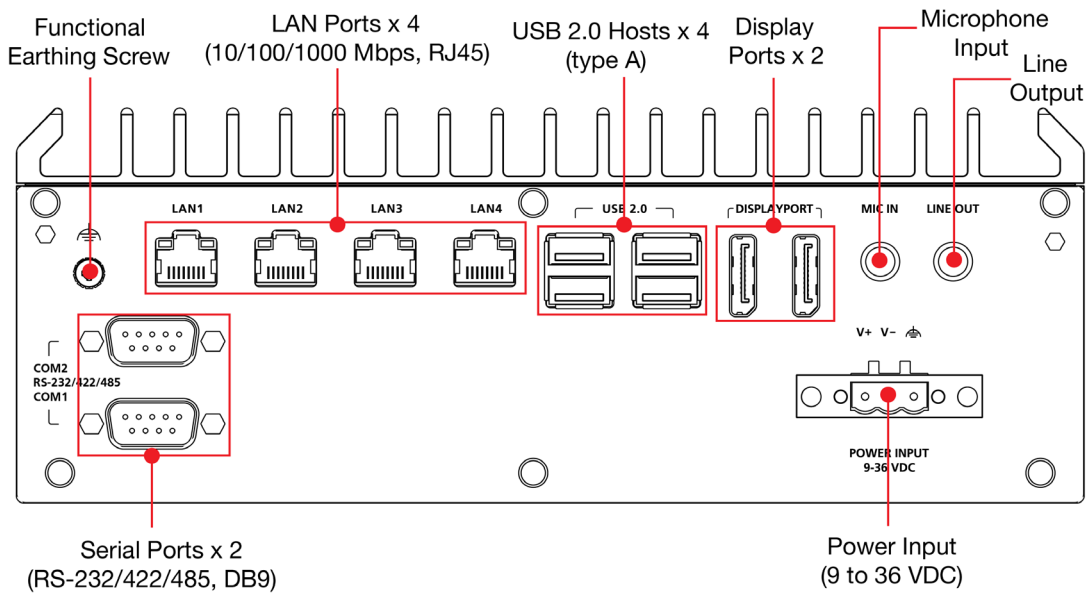
The MC-3201 computers are compact, well designed, and rugged enough for industrial applications. LED indicators help you monitor the performance and identify trouble spots. Multiple serial ports allow you to connect different devices. The wireless and LTG modules provide wireless operations, and the reliable and stable hardware platform lets you devote your attention to developing your applications.

Appearance

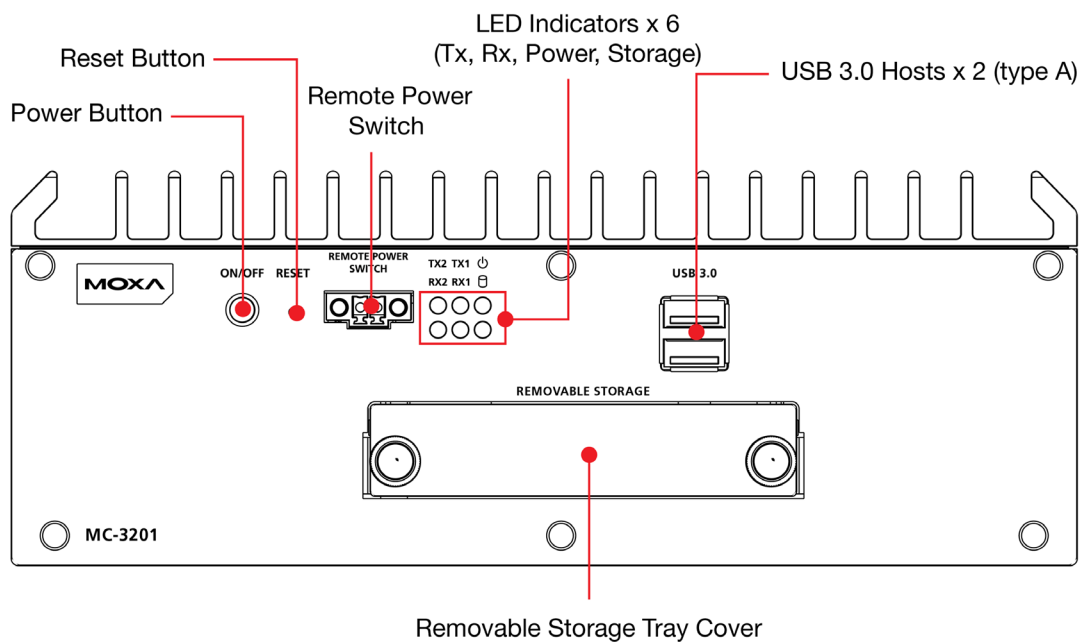
MC-3201-TGL1-S-S Front Panel



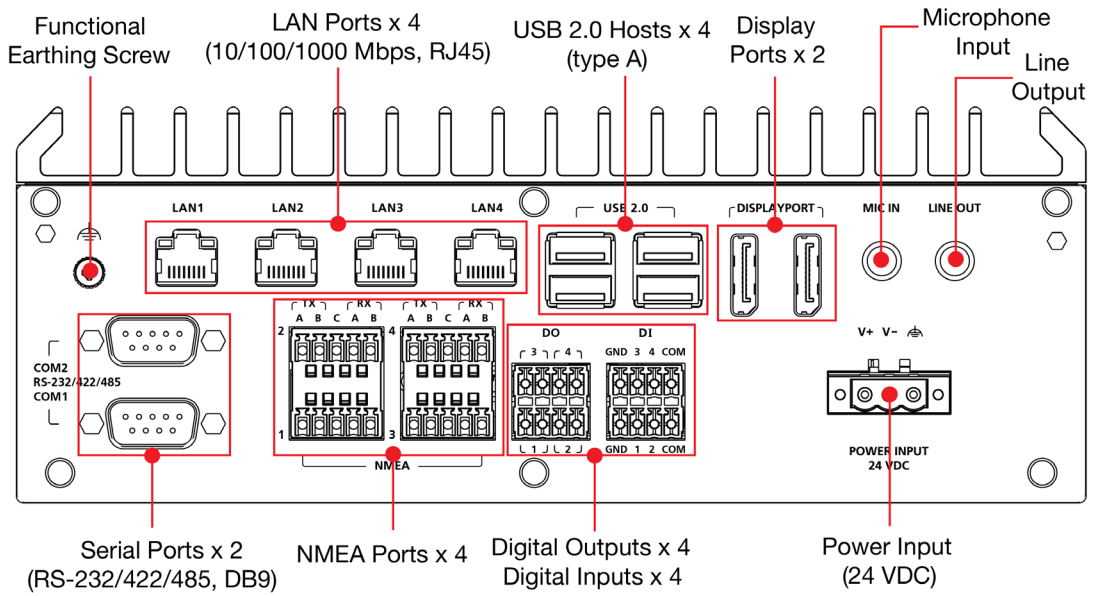
MC-3201-TGL1-S-S Rear Panel



MC-3201-TGL7-M-S Front Panel

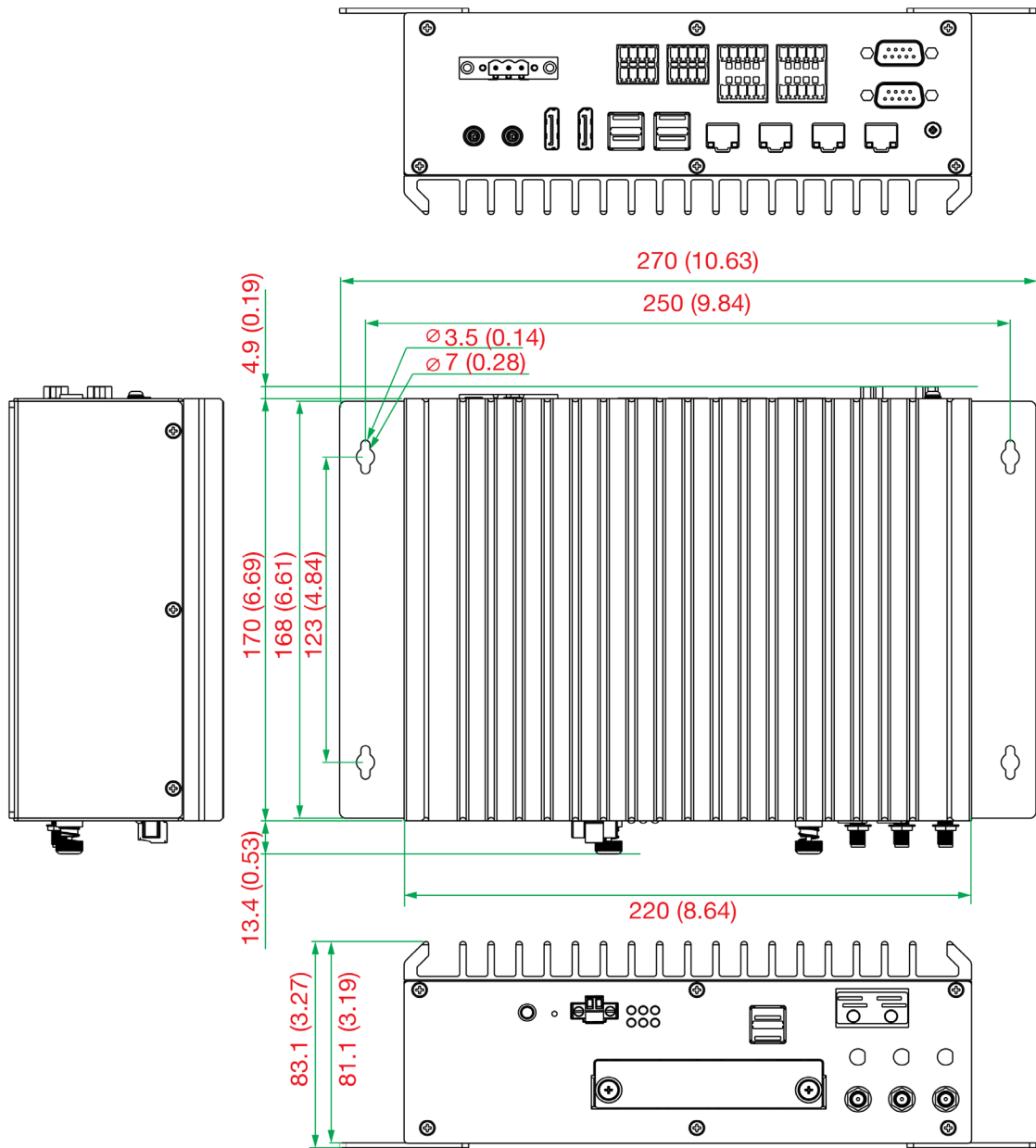


MC-3201-TGL7-M-S Rear Panel





Dimensions

Unit: mm (inch)



LED Indicators

LED Name	Status	Function
Power 	Green	Power is on and computer is functioning normally
	Off	Power is off
Storage 1 (mSATA) 	Yellow	Blinking: Data transmission
	Off	No data transmission.
LAN 1/2/3/4 (on the connectors)	Green	Steady On: 100 Mbps Ethernet link Blinking: Data is being transmitted
	Yellow	Steady On: 1000 Mbps Ethernet link Blinking: Data is being transmitted
	Off	10 Mbps Ethernet link or LAN is not connected
Tx 1/2 (serial ports)	Green	Blinking: Data is being transmitted
	Off	No connection
Rx 1/2 (serial ports)	Yellow	Blinking: Data is being transmitted
	Off	No connection

3. Hardware Connection Description

In this chapter, we describe how to connect the MC-3201 computer to the network and to various devices.

Installing the MC-3201

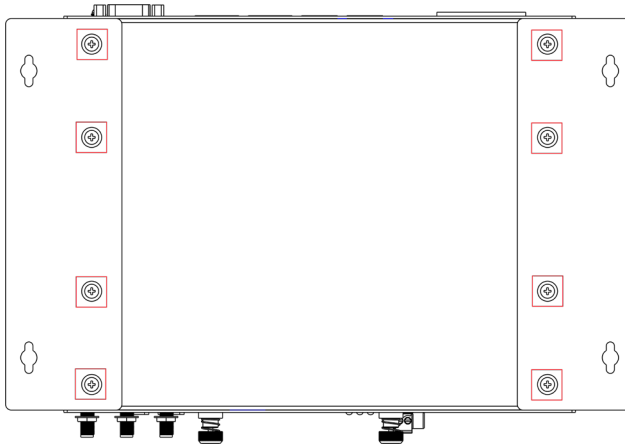
Wall Mounting

The MC-3201 can be installed on a wall by using the wall-mounting kit.

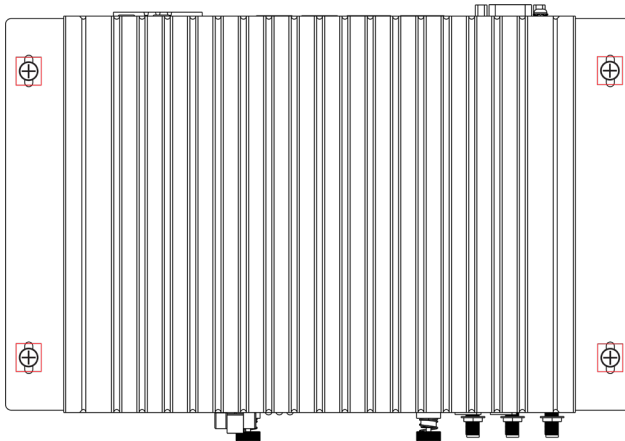
To install the MC-3201 on a wall, do the following:

- Step 1:** Use four screws for each bracket and attach the brackets to the back of the MC-3201. The screws are included in the wall-mounting kit. If you want to buy the screws separately, use the following specifications:

Screw-M/FMS M4x6mm Ni/90D Nylok



- Step 2:** Use two screws per bracket to attach the MC-3201 to a wall or cabinet.

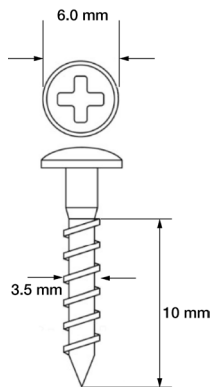




Note:

Mounting the MC-3201 to a wall requires four screws. Use the MC-3201 computer, with the wall-mounting brackets attached, as a guide to mark the correct locations of the screws on the wall.

The heads of the screws should be at least 6.0 mm in diameter, the shafts should be 3.5 mm in diameter with a minimum depth of 10 mm as shown in the figure on the right. Do not drive the screws in all the way; leave a space of about 2 mm to allow room for sliding the wall-mounting bracket between the wall and the screw.



Wiring Requirements

In this section, we describe how to connect serial devices to the MC-3201 computer.

Be sure to read and follow these common safety precautions before proceeding with the installation of any electronic device:

- Use separate paths to route wiring for power and devices. If power wiring and device wiring paths must cross, make sure the wires are perpendicular at the crossing point.



NOTE

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

- Use the type of signal transmitted through a wire to determine which wires should be kept separate. The rule of thumb is that wiring that shares similar electrical characteristics can be bundled together.
- Keep input wiring and output wiring separated.
- For future reference, you should label the wiring used for all your devices.



ATTENTION

Safety First!

Be sure to disconnect the power cord before installing and/or wiring your MC-3201.

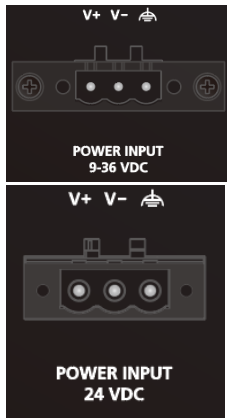
Wiring Caution!

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 ratings, the wiring could overheat, causing severe 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.

Connecting the Power



Connect the power connector/terminal block to the power supply that can provide 9 to 36 VDC (MC-3201-TGL1 model) or 24 VDC (MC-3201-TGL7 model). Before connecting the device to DC power inputs, make sure the DC power source voltage is stable. If the power is supplied properly, the Power LED will light up. The OS is ready when the Power LED glows solid green.

The input terminal block wiring should be installed by a skilled person.

Wire size: 12-28 AWG

- Torque value: 0.51 N-m
- Only one conductor per clamping point

If you are using a Class I adapter, the power cord should be connected to an outlet with an earthing connection.



ATTENTION

The equipment (MC-3201-TGL7-M-S) is intended to be supplied by the external power source (UL listed/ IEC 60950-1/ IEC 62368-1), whose output complies with ES1/SELV, output rating 24 VDC, 2.7 A min, and a minimum ambient temperature of 55°C.



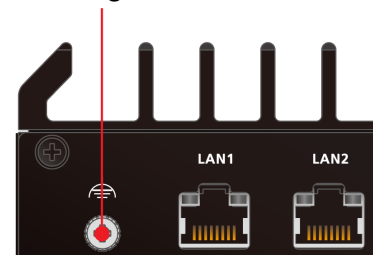
ATTENTION

The equipment (MC-3201-TGL1-S-S) is intended to be supplied by the external power source (UL listed/ IEC 60950-1/ IEC 62368-1), whose output complies with ES1/SELV, output rating is 9 to 36 VDC, 9.5 A min and a minimum ambient temperature of 55°C.

Grounding the Unit

Grounding and wire routing help limit the effects of noise due to electromagnetic interference (EMI). Run the ground connection from the functional earthing screw (M4) to the grounding surface prior to connecting the power.

Functional Earthing Screw



NOTE

A 4 mm² conductor must be used when the connection to the external grounding screw is utilized. The heat sink is grounded to the chassis by an internal screw.

Connecting to a Network

To connect the MC-3201 computer to a network, connect a network cable to the computer's Ethernet port and connect the other end of the cable to your Ethernet network. When the cable is properly connected, the LEDs on the computer's Ethernet port turn on to indicate a valid connection.

Four 10/100/1000 Mbps Ethernet ports with RJ45 connectors are located on the rear panel of the computer.



NOTE

The pin assignments for the MC-3201 computer's Ethernet port are shown in the following figure. If you want to use your own Ethernet cable, ensure that you match the pin assignments of the connector on the Ethernet cable.

Pin	10/100 Mbps	1000 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)-

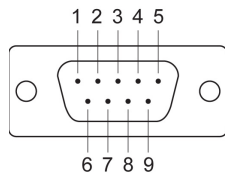
Connecting to a Serial Device

Use a serial cable to connect your serial device to the computer's serial port. The serial ports P1 to P2 have male DB9 connectors and can be configured for RS-232, RS-422, or RS-485 communication. For information on serial port configuration, refer to the MC-3201 software manual.

The pin assignments of the serial ports are shown in the following table:

DB9 Male Port

RS-232/422/485 Pinouts



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	-	-	-

Connecting to a USB Device

The MC-3201 is provided with two USB 3.0 ports with type-A connectors on the front panel, and four USB 2.0 ports on the rear panel. These ports can be used to connect to an external flash disk or hard drive. You can also use these USB ports to connect to a keyboard or a mouse.

Connecting to a Display Port

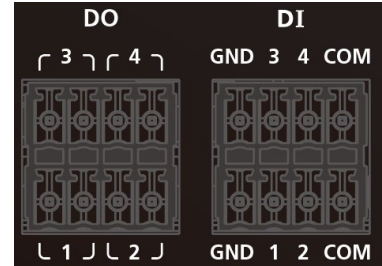
The MC-3201 Series offers two display ports located on the rear panel, allowing users to connect to a video device. Make sure you use a certified cable for a reliable video connection.

Connecting to an Audio Input and Output

The MC-3201 Series comes with a microphone input and a line output located on the rear panel, allowing users to connect an audio input and an audio output.

Connecting to a Digital Input and Digital Output

The MC-3201-TGL7 Series comes with four digital inputs and four digital outputs connectors located on the rear panel. These connectors are using terminal blocks; refer to the figure on the right for detailed pin definitions.

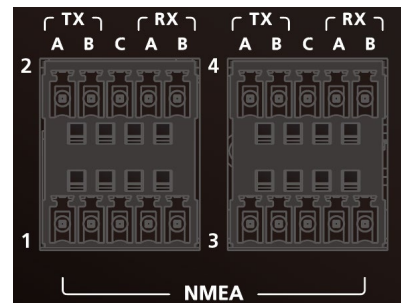


NOTE

Terminal block (J1)—R/C (XCFR2, XCFR8), socket soldered on to the PWB, DINKLE ENTERPRISE CO., LTD, type 5EHDRM, rated 300 V, 15 A, 105°C. Mating with plug type 5ESDVM rated 300 V, 15 A, 105°C. The plug-half connection is secured by screws; suitable for 12 to 28 AWG wire size, secured on plug by screws with a torque value of 0.51 N-m (4.5 lb-in).

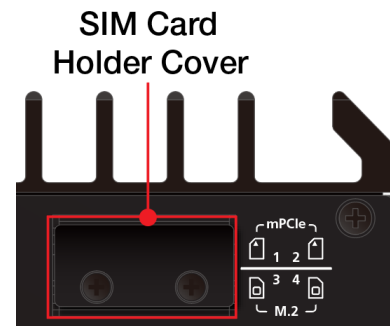
Connecting to a NMEA Port

The MC-3201-TGL7 Series also comes with four NMEA ports located on the rear panel. These ports are using terminal blocks; refer to the figure on the right for detailed pin definitions.



Inserting the USIM Card

The MC-3201-TGL1-S-S has four USIM slots for 5G/LTE wireless Internet connections. Each slot supports dual USIM cards. To install a USIM card, gently remove the outer cover on the front panel, and then insert the USIM card into the slot.



Installing Storage Disk

The MC-3201 offers one disk tray to allow users to install one storage disk such as a hard disk drive or solid-state drive.

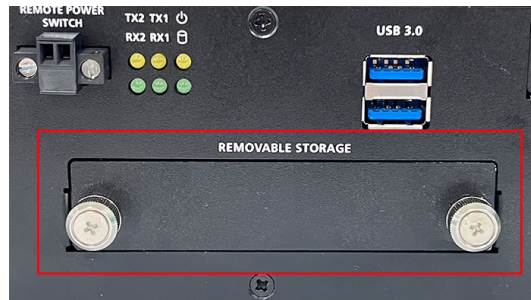


NOTE

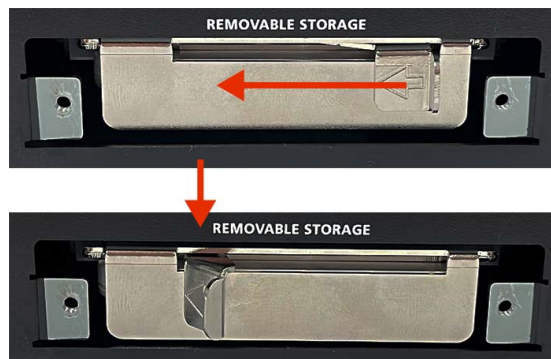
The installation of the storage disk shall be operated by a skilled person.

To install a storage disk, do the following:

Step 1: Unfasten two screws and remove the storage cover on the front panel of the MC-3201.



Step 2: Slide the latch on the disk tray to the left and pull out the tray from the slot.



Step 3: Place the storage disk onto the tray.



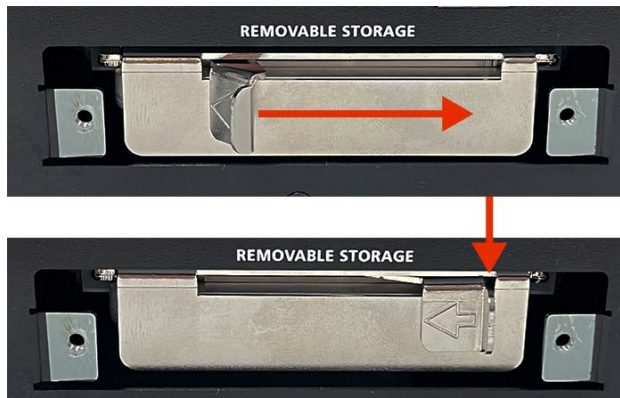
Step 4: Fasten the four screws on the back of the storage tray.



Step 5: Insert the storage tray into the storage slot of the MC-3201. Make sure you insert the tray into the plastic rails on both sides of the slot.



Step 6: The latch on the tray to the right to secure the tray in the slot.



Step 7: Put back the cover on the storage slot and fasten the two screws to secure the cover in place.



Restricted Access Location

This equipment is intended to be used in Restrict Access Location, like control room. The access can only be gained by SERVICE PERSONS or by USERS who have been instructed.



Caution

DANGER OF EXPLOSION IF BATTERY IS INCORRECTLY REPLACED. REPLACE ONLY WITH SAME OR EQUIVALENT TYPE RECOMMENDED BY THE MANUFACTURER. DISCARD USED BATTERIES ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.

RTC Battery Replacement

The MC-3201's real-time clock is powered by a lithium battery. We strongly recommend that you do not replace the lithium battery without help from a qualified Moxa support engineer. If you need to change the battery, contact the Moxa RMA service team.



ATTENTION

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



NOTE

The MC-3201 computer can be customized to support an easy RTC battery replacement function. Please contact your Moxa sales representative for details.

4. BIOS Setup

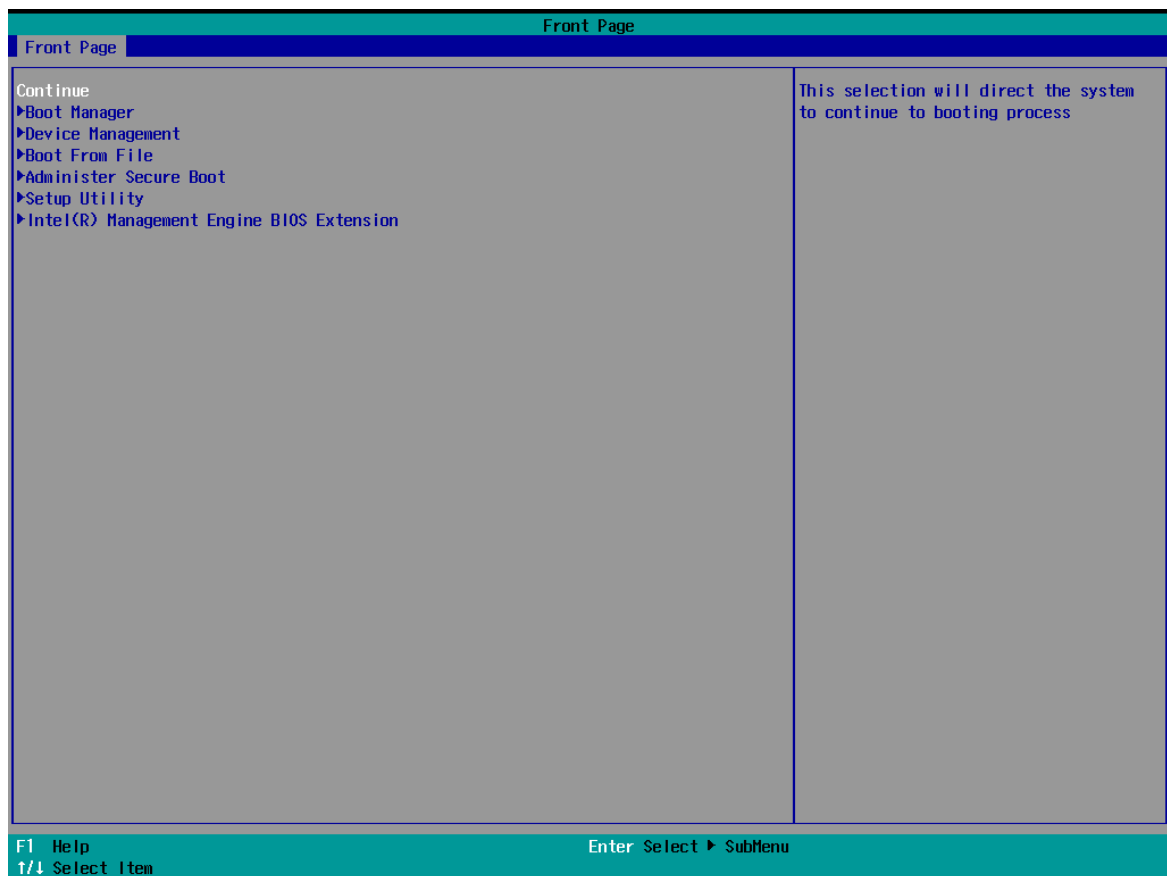
In this chapter, we describe the BIOS settings for the MC-3201 computer. The BIOS is a set of input/output control routines for peripherals to initialize the basic settings. The BIOS helps boot the system before the operating system is loaded. The BIOS setup allows the user to modify the system configuration for basic input/output peripherals. All the configurations are stored in the CMOS RAM, which has backup battery in case the computer is not connected to a power source. Consequently, the data stored in the CMOS RAM is retained when the system is rebooted, or the power is disconnected.

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 will appear. You can configure the following settings on this screen.

- **Continue:** Continue to boot up
- **Boot Manager:** Select the device for boot 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
- **Intel® Management Engine BIOS Extension:** Enter the AMT configuration menu (not supported in models with Intel® Celeron® and Core™ i3 processors)

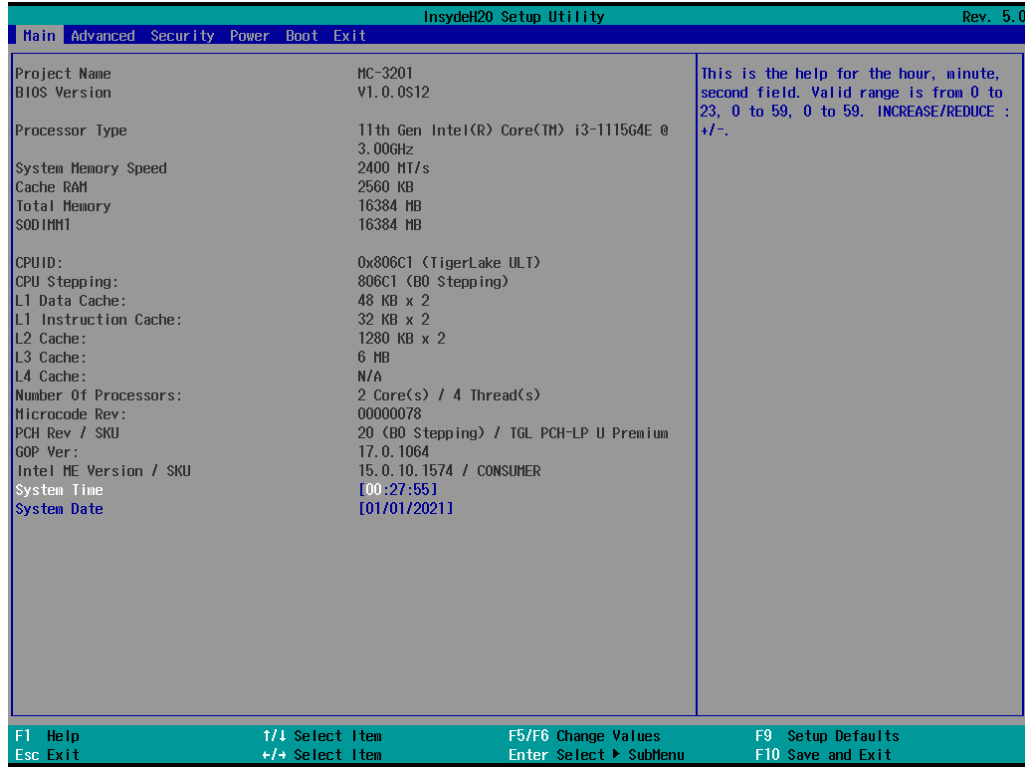
Select **F2** to enter the **BIOS configuration**.



When you enter the **Setup Utility**, a basic description of each function key is listed at the bottom of the screen. Refer to these descriptions to learn how to use them.

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.

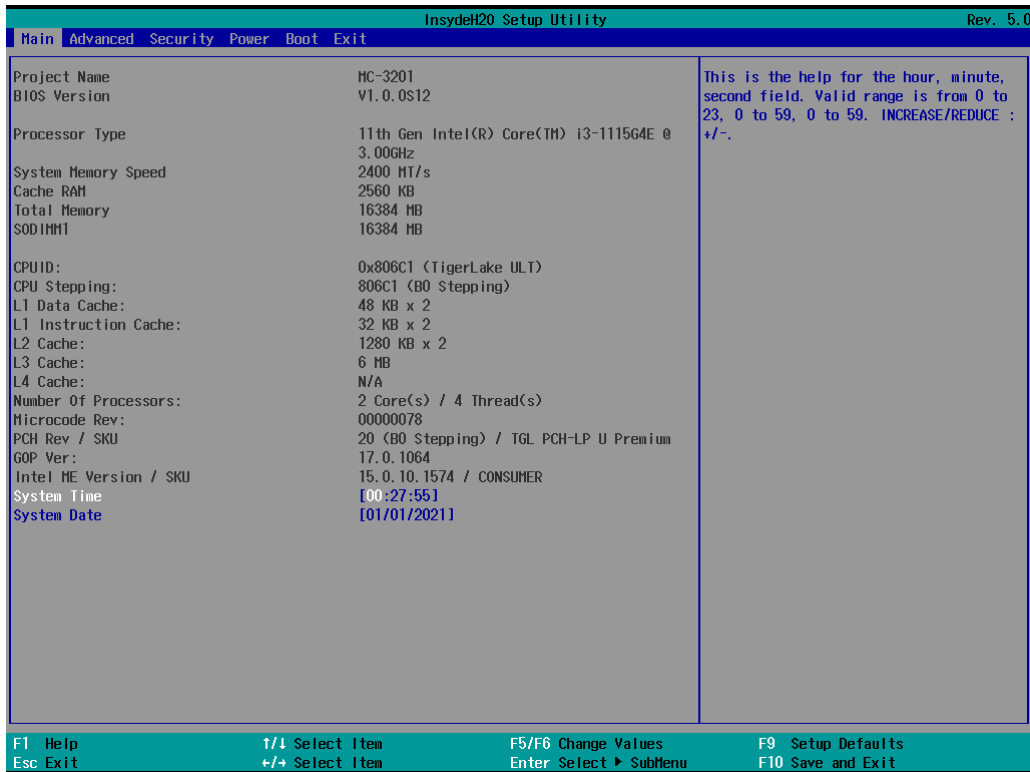


NOTE

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

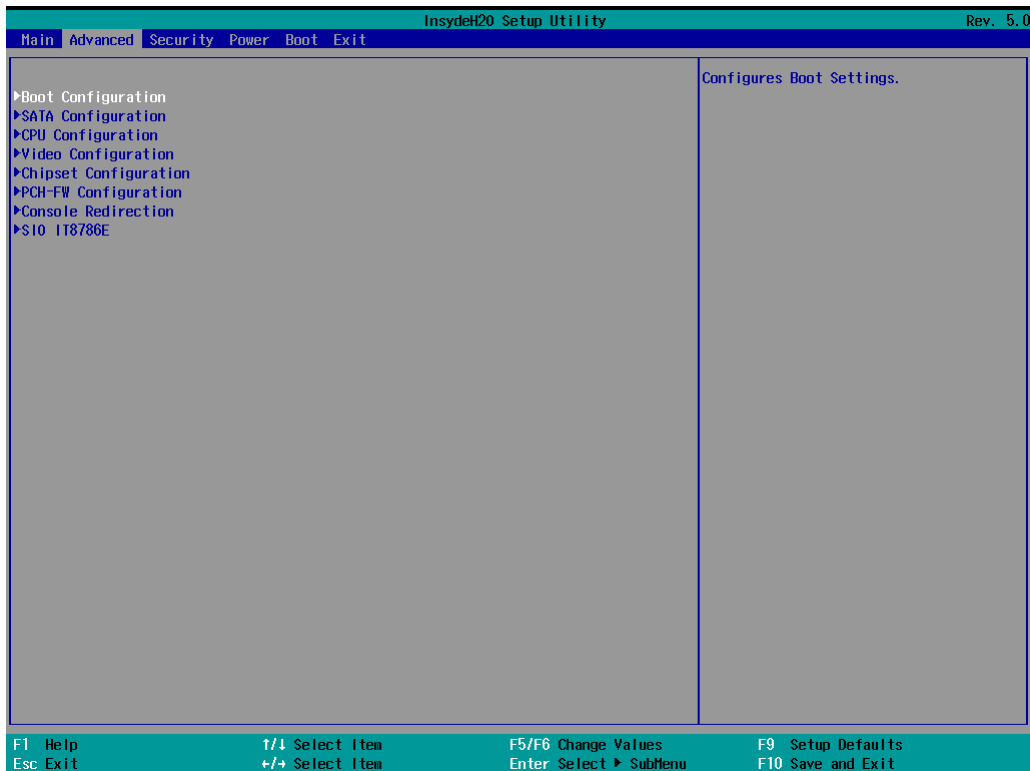
Main Page

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



Advanced Settings

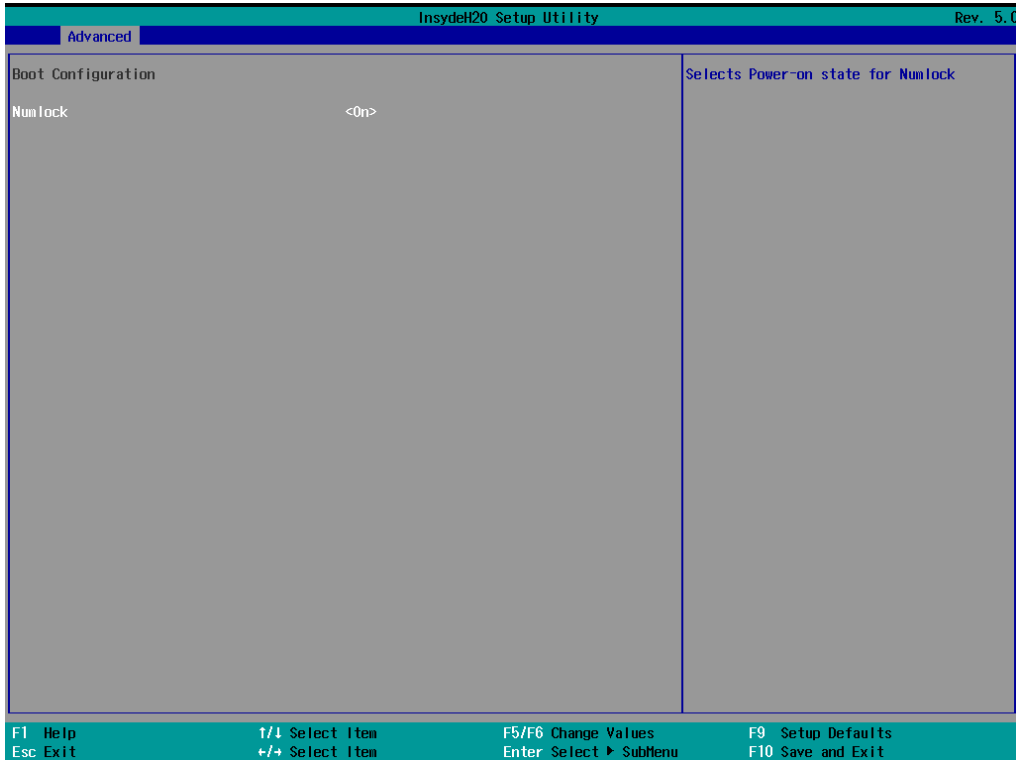
Select the **Advanced** tab in the main menu to open the advanced features screen.



Boot Configuration

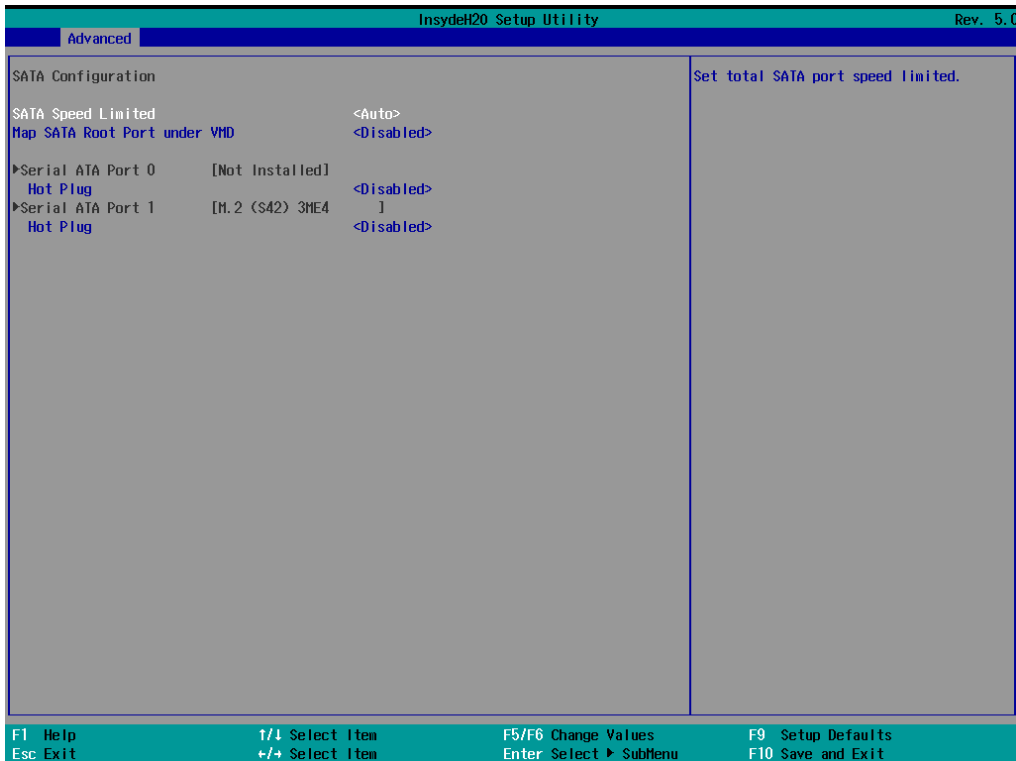
The **Numlock** option allows configuration of the Numlock value.

Options: On (default), Off.



SATA Configuration

These items allow 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

Map SATA Root Port under VMD

Options: Disabled (default), Enabled

Serial ATA Port

This setting displays information on the installed drives.

SATA Port Hot Plug

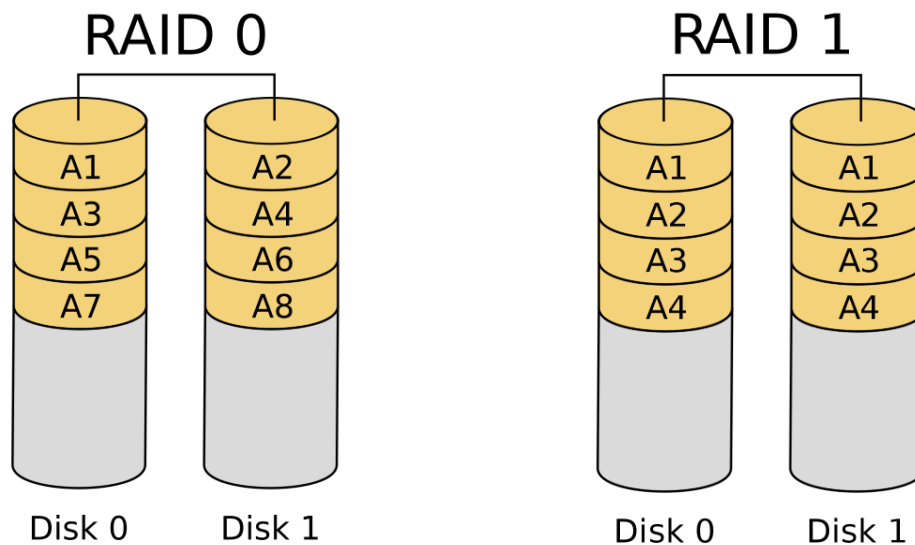
This setting allows you to enable/disable hot-plugging capabilities (the ability to remove the drive while the computer is running) that are configured by software for installed storage drives.

Options: Disabled (default), Enabled

RAID

You must set the **Map SATA Root Port under VDM** to **Enabled** to enable **redundant array of inexpensive disks** technology. The device has two SATA interfaces, which only support RAID level 0 and RAID level 1.

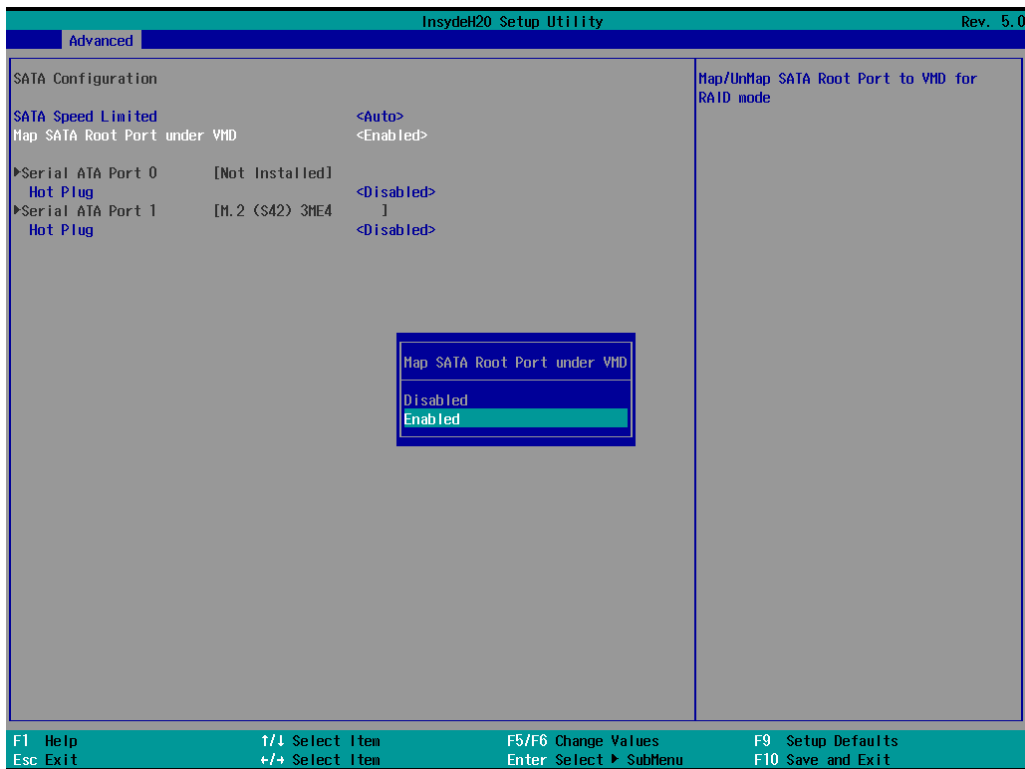
When using the continuous update policy, changes made to the data on the master drive while the system is not docked are automatically copied to the recovery drive when the system is re-docked. When using the on-request update policy, the master drive data can be restored to a previous state by copying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



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

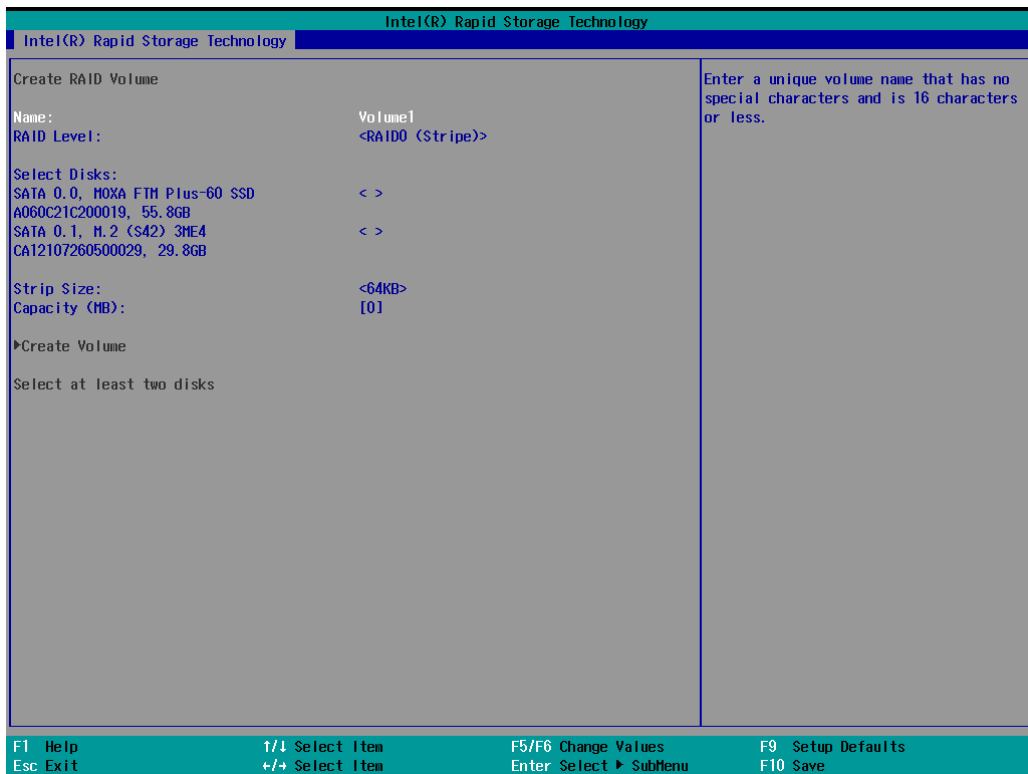
Intel Rapid Storage Technology

This section allows users to configure Intel® Rapid Storage Technology.

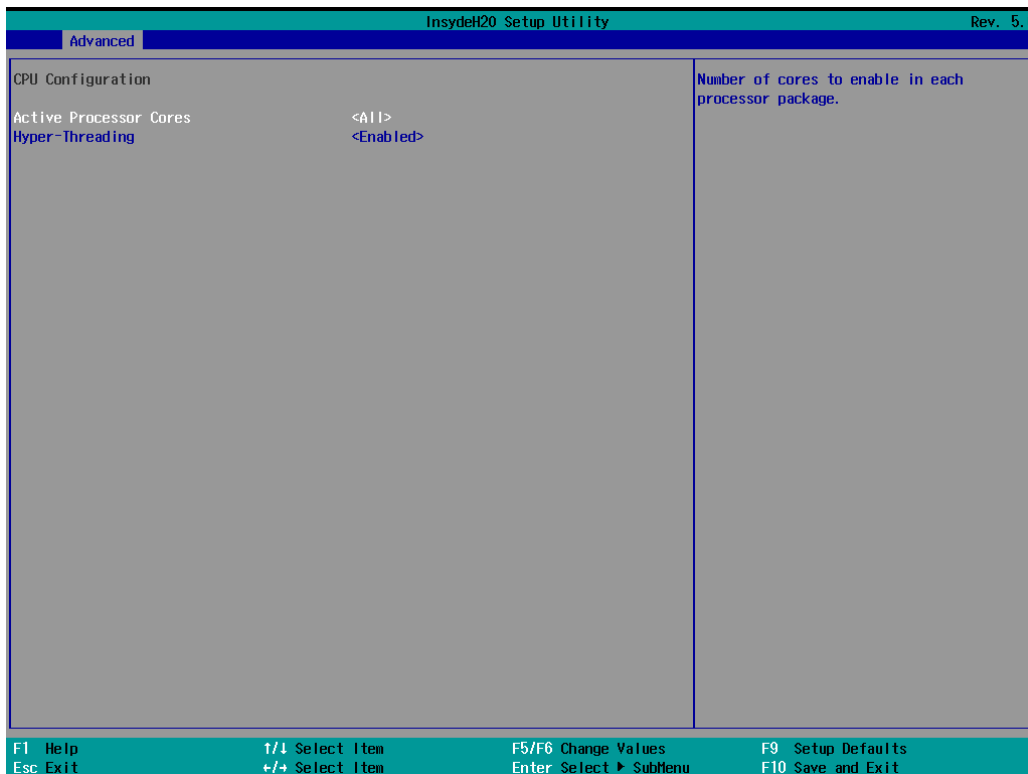


After enabling **Map SATA Root Port under VMD**, saving changes, and rebooting the system, you can select the **Device Manager** to configure the Intel Rapid Storage Technology settings.





CPU Configuration



Active Processor Cores

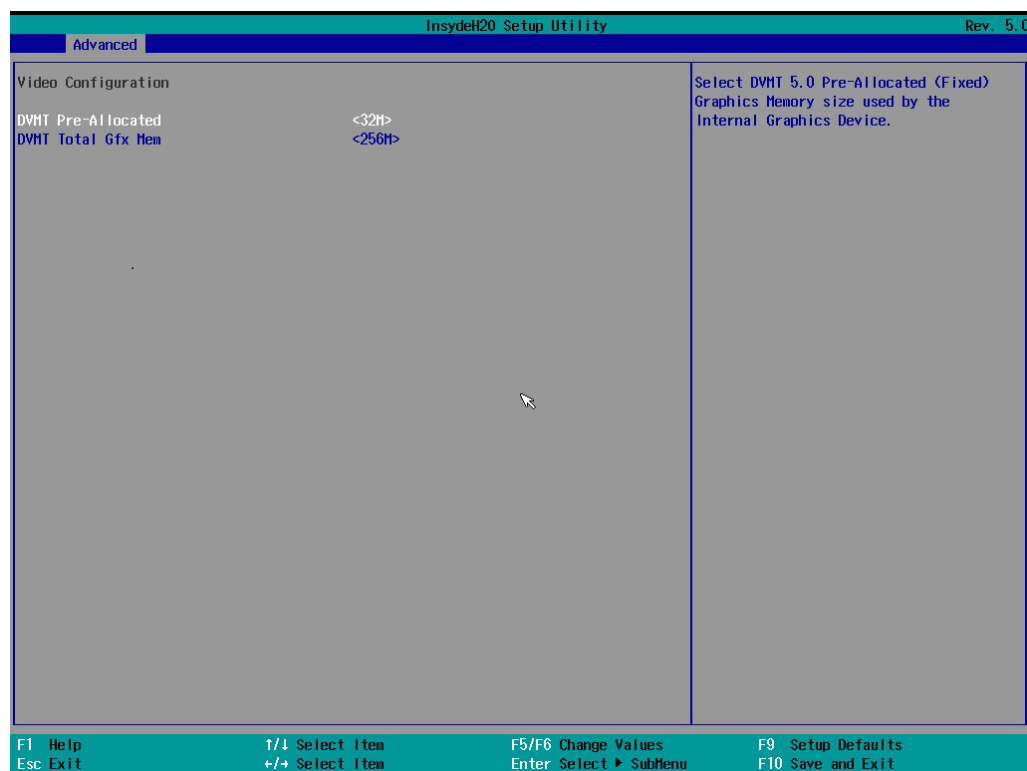
This item indicates the number of cores to enable in each processor package.

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)

Video Configuration



DVMT Pre-Allocated

This item allows you to configure pre-allocated memory capacity for the IGD. Pre-allocated graphics memory is invisible to the operating system.

Options: 32M (default), 96M, 128M, 160M

DVMT: The amount of video memory your computer has is dependent 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.

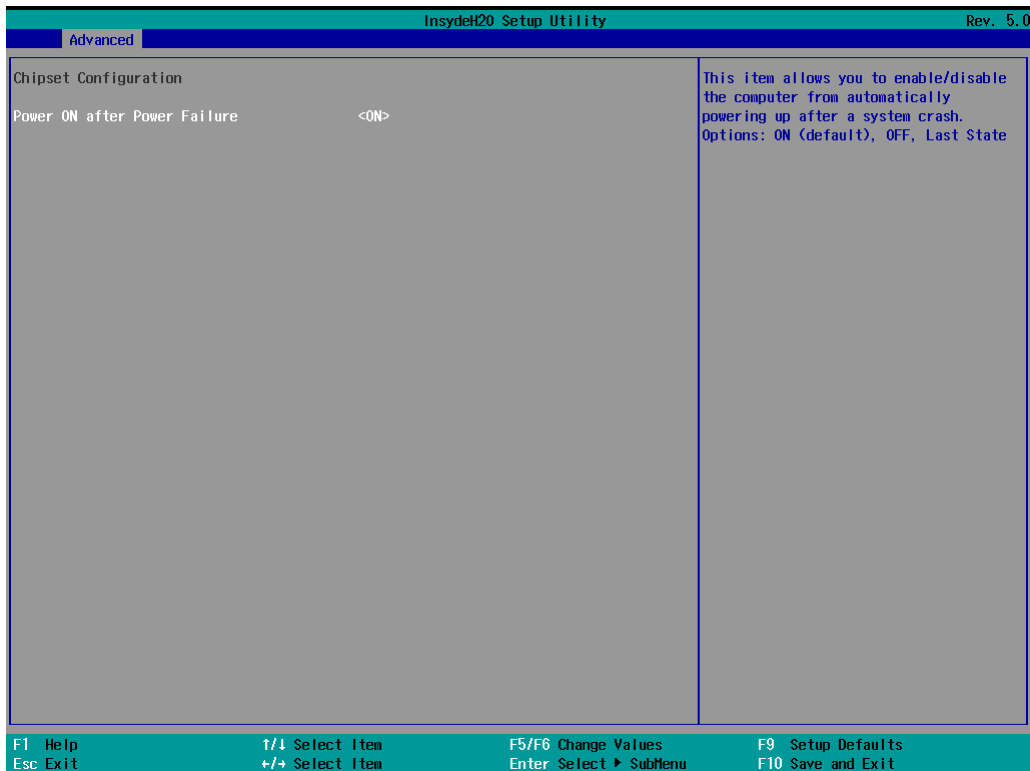
DVMT Total Gfx Mem.

This item 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.

Chipset Configuration

This item allows you to configure the chipset settings.



Power ON after Power Failure

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

Options: ON (default), OFF, Last State

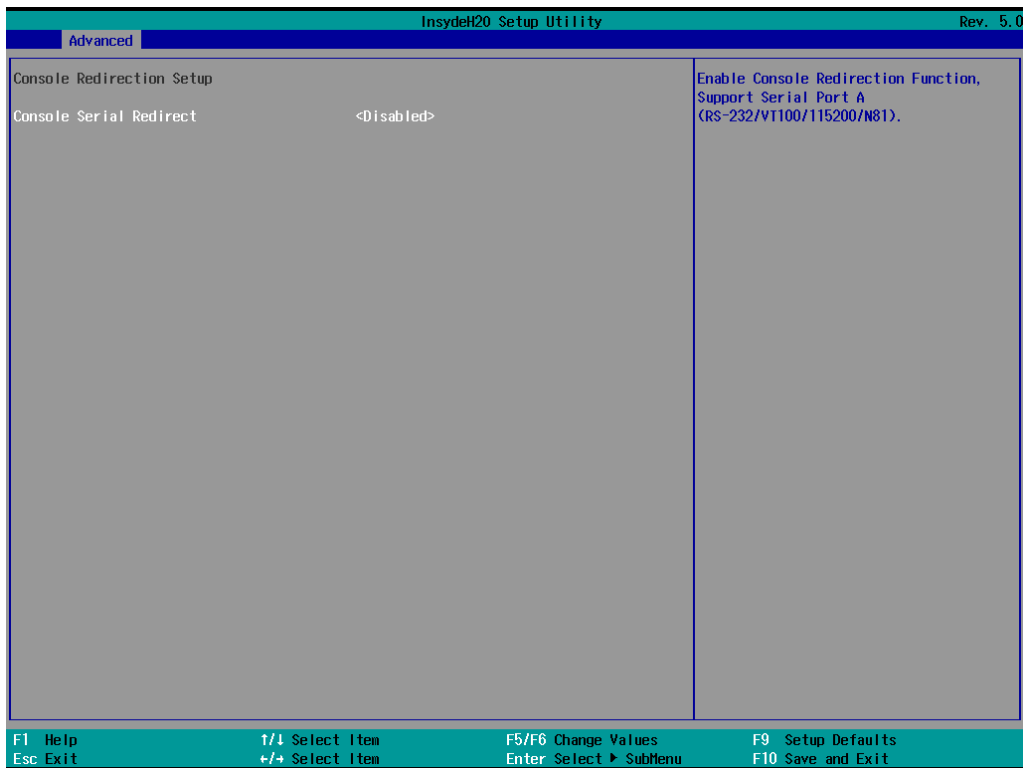
PCH-FW Configuration

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

Console Redirection

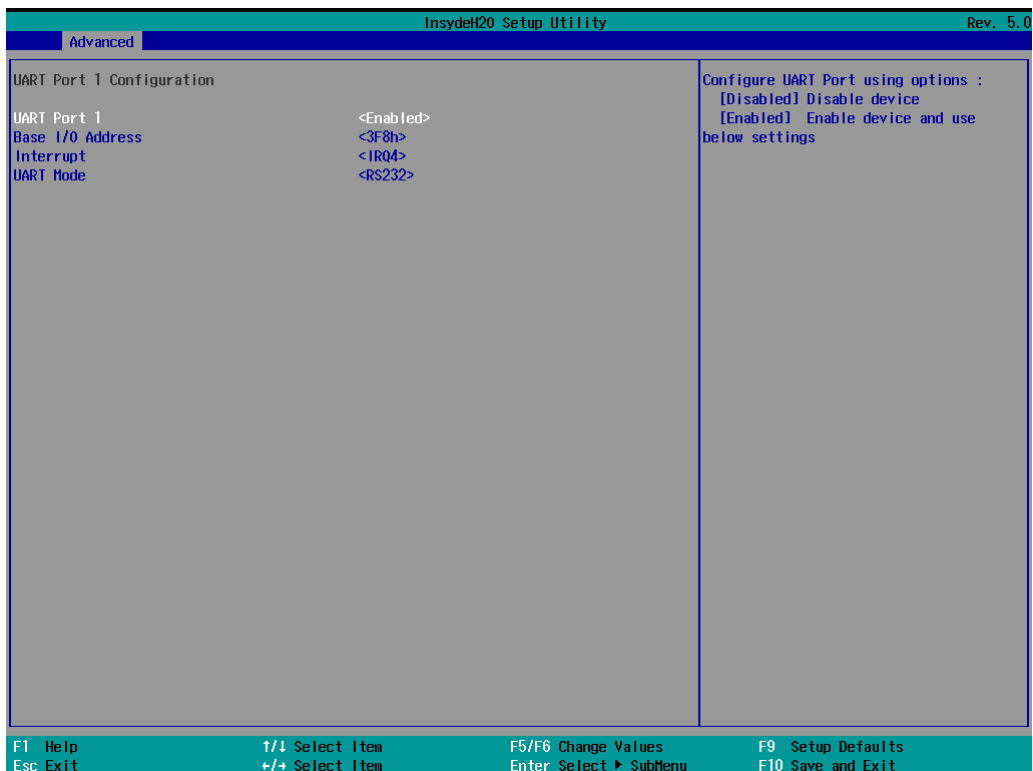
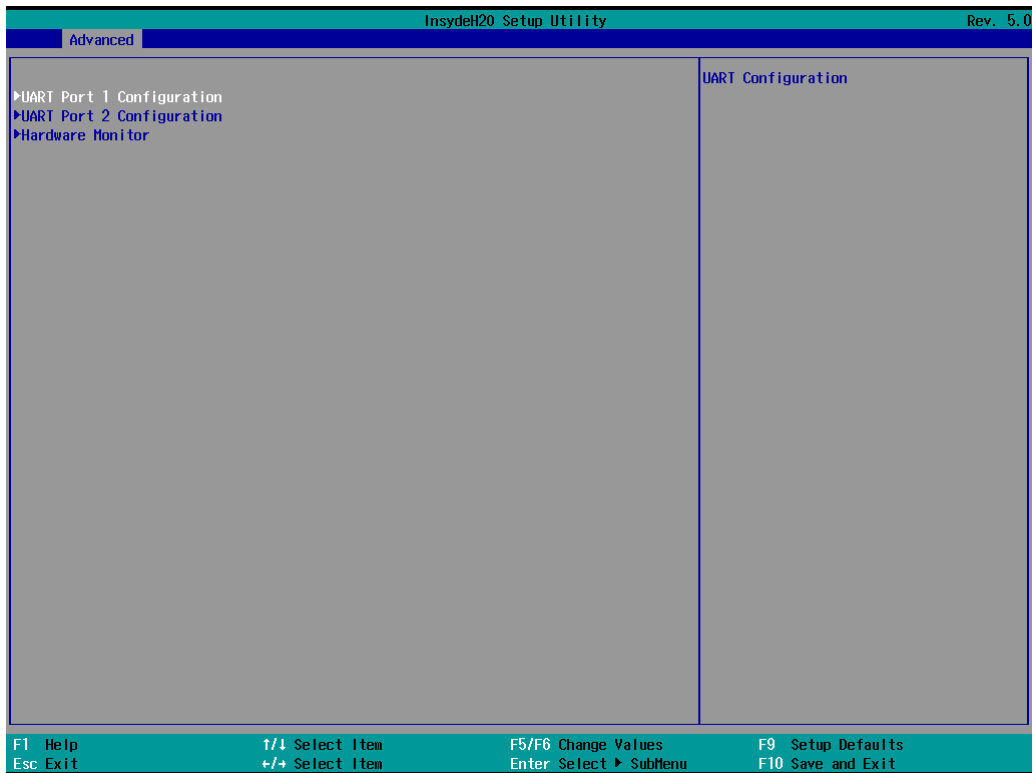
When the Console Redirection Function is enabled, the console information will be output to both the display monitor and through the serial port.

Options: Disabled (default), Enabled



SIO ITE8786E

This section allows users to configure SIO settings.



Serial Port A

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

Disable: Disables the serial port A connection

Enable: Enables the Serial Port A connection (default)

Serial Port B

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

Disable: Disables the serial port B connection

Enable: Enables the Serial Port B connection (default)

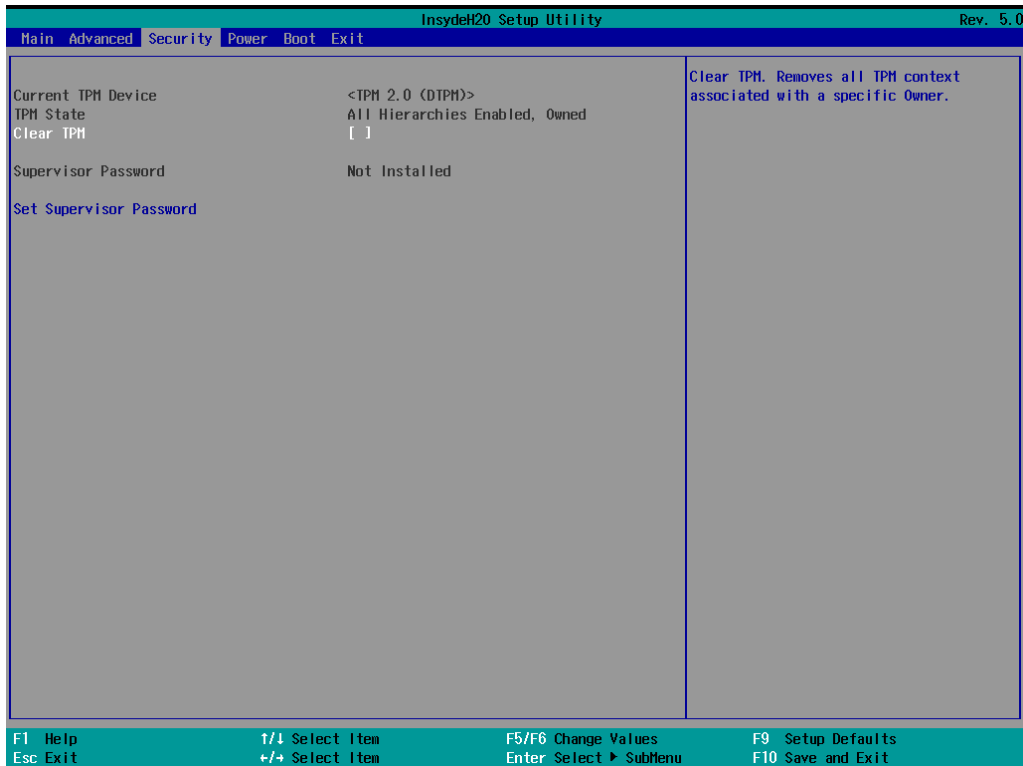
Hardware Monitor

This item allows you to view stats such as CPU and system temperature, voltage levels, and other chipset information.



Security Settings

This section allows users to configure security-related settings with a supervisor password and user password.



Current TPM Device

This item shows if the system has TPM device and its type.

TPM State

This item allows you view the status of current TPM settings.

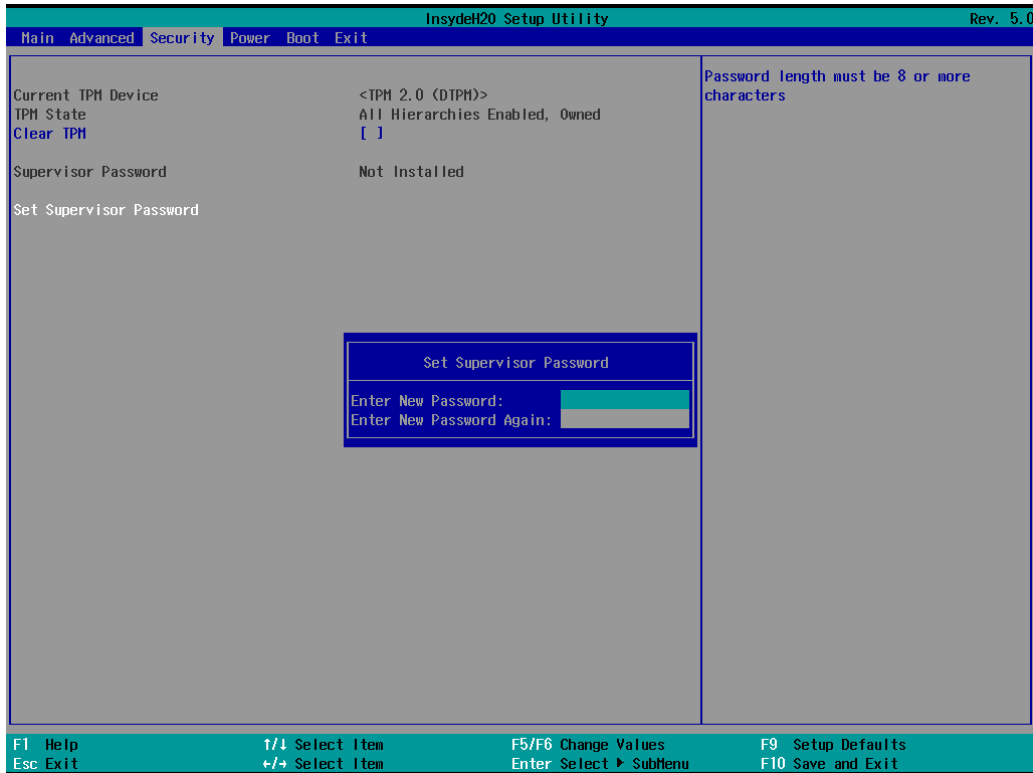
Clear TPM

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

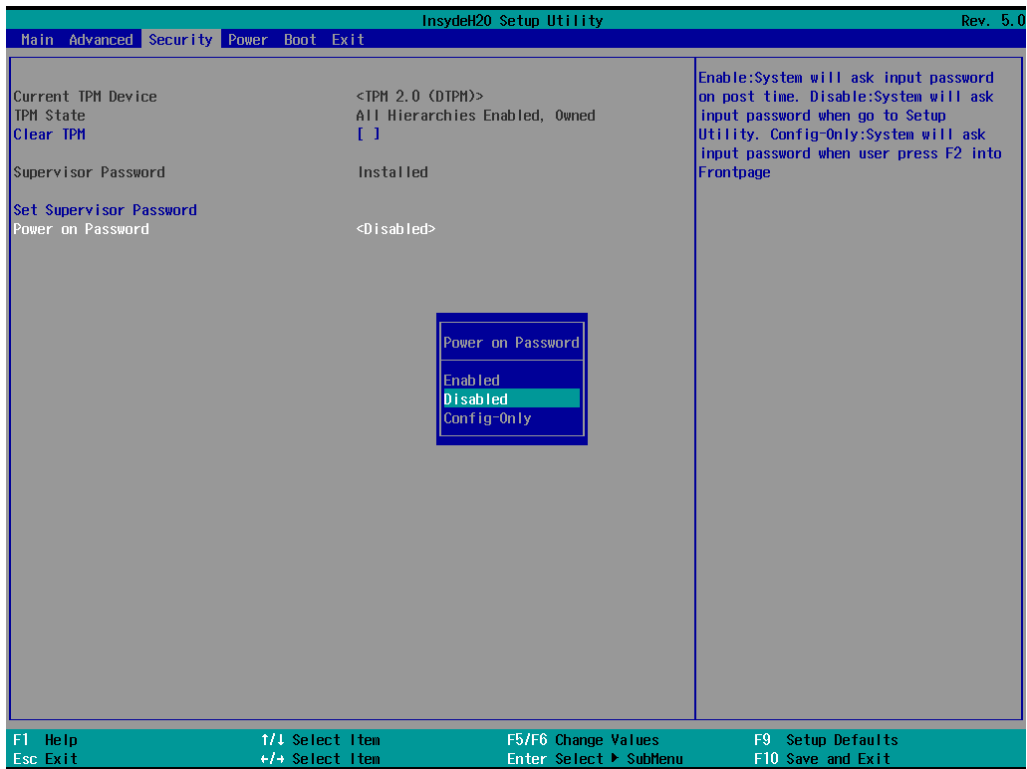
Set Supervisor Password

This item allows you to set the supervisor password. Select the **Set Supervisor Password** option and enter the password and confirm the password again.

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 should be displayed.



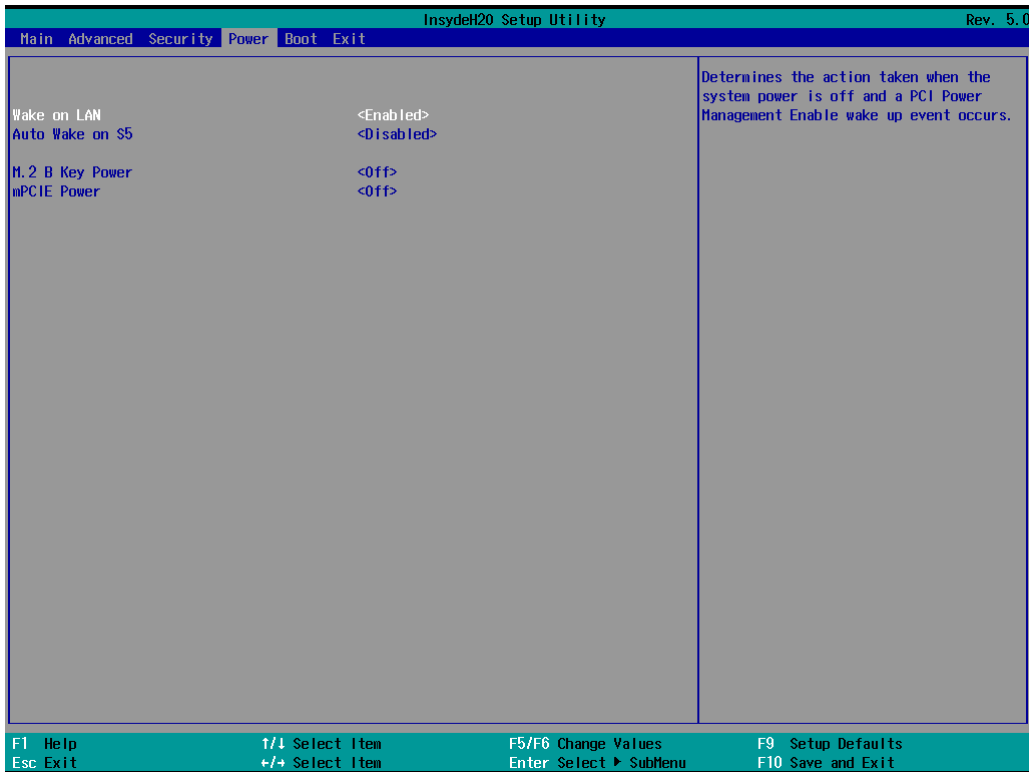
Enable: System will ask for the password on post time

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 section allows users to configure power settings.



Wake on LAN

This feature is used to wake the system by a LAN device from a remote host.

Options: Enabled (default), Disabled

Auto Wake on S5

This item 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)

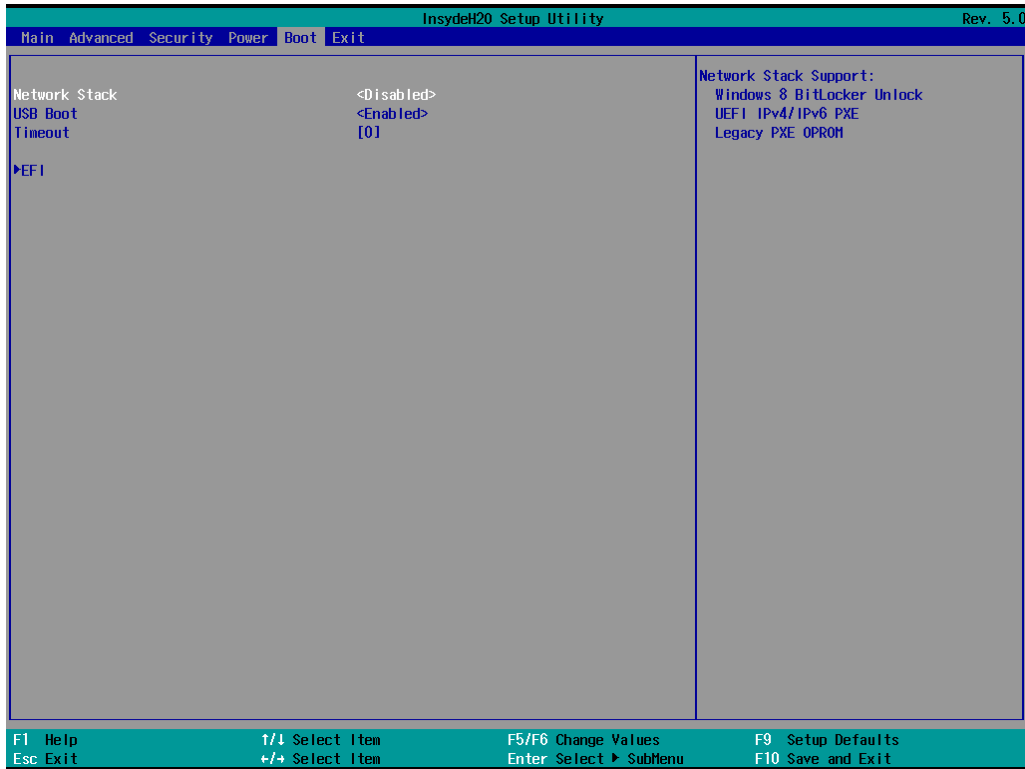
M.2 B Key Power

This item allows you to control the default power of the M.2 B Key slot.

Options: Off (default), on

Boot Settings

The section allows users to configure boot settings.



NOTE

If you do not add any storage, you will not see the EFI option.

Network Stack

It deploys 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

This item will be shown only when you have enabled the Network Stack.

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

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

USB Boot

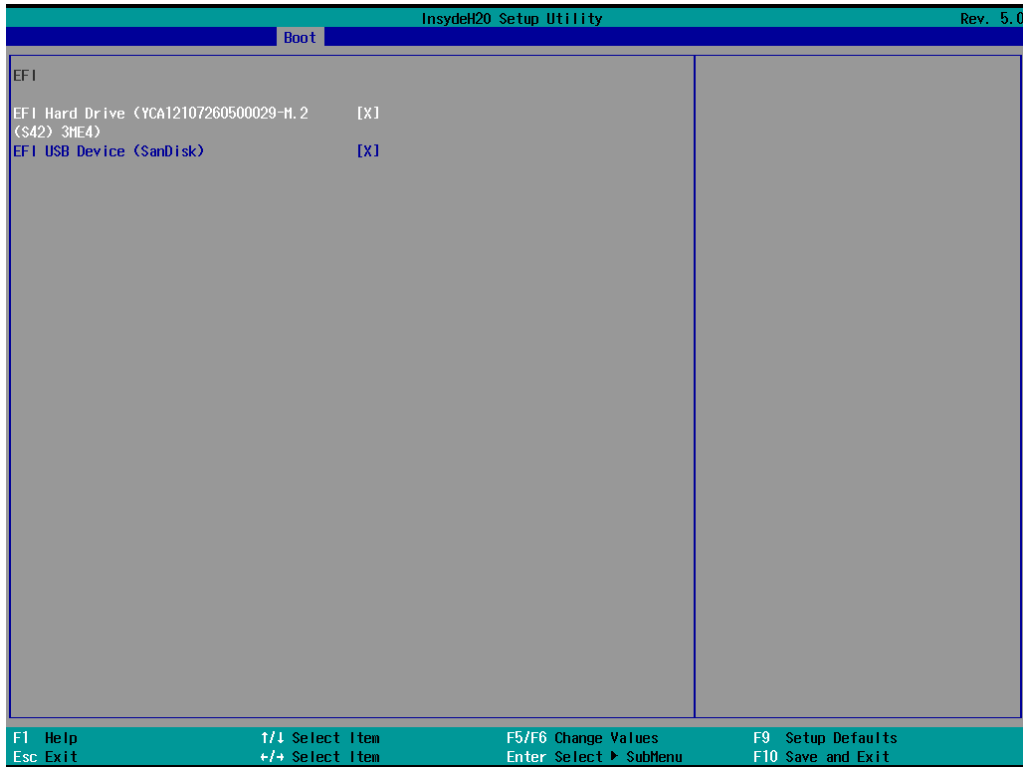
Set booting to USB boot devices capability.

Options: Enabled (Default), Disabled

Timeout

This item allows users to set the number of second that the firmware will wait before booting the original default boot selection.

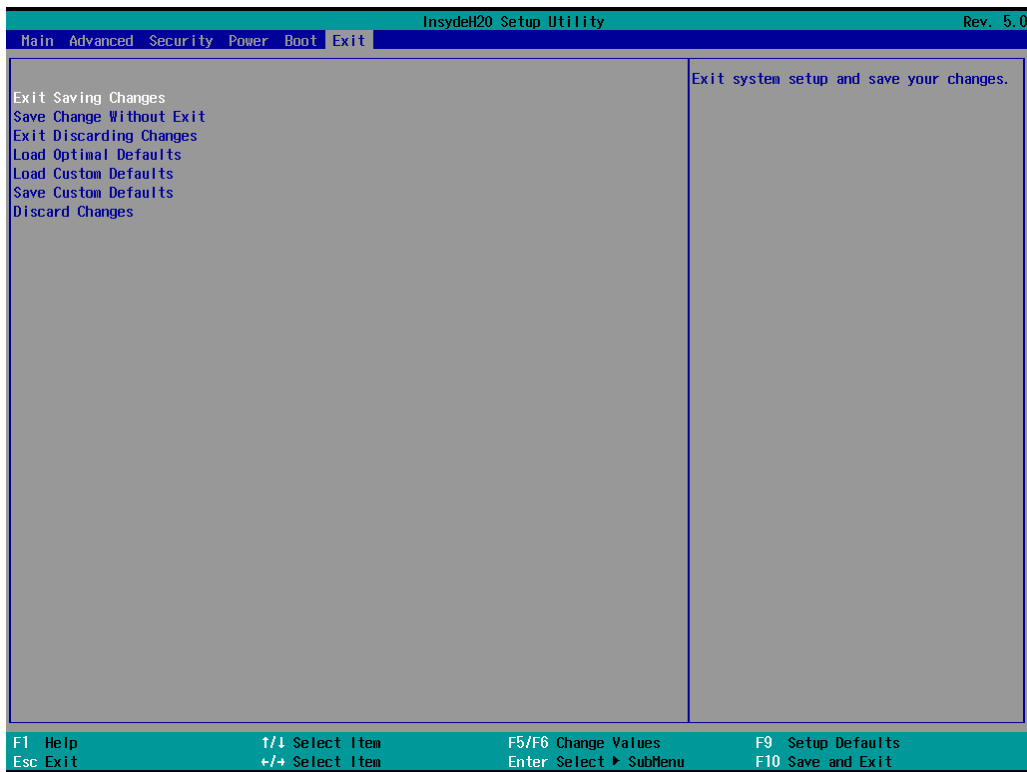
EFI



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

Exit Settings

The section allows users to exit the BIOS environment.



Exit Saving Changes

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

Options: Yes (default), No

Save Change Without Exit

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

Options: Yes (default), No

Exit Discarding Changes

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

Options: Yes (default), No

Load Optimal Defaults

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

Options: Yes (default), No

Load Custom Defaults

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

Options: Yes (default), No

Save Custom Defaults

This item allows you to save the current BIOS values as a "custom default" that may be reverted to at any time by the load custom defaults selection.

Options: Yes (default), No

Discard Changes

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

Options: Yes (default), No

Enabling AMT

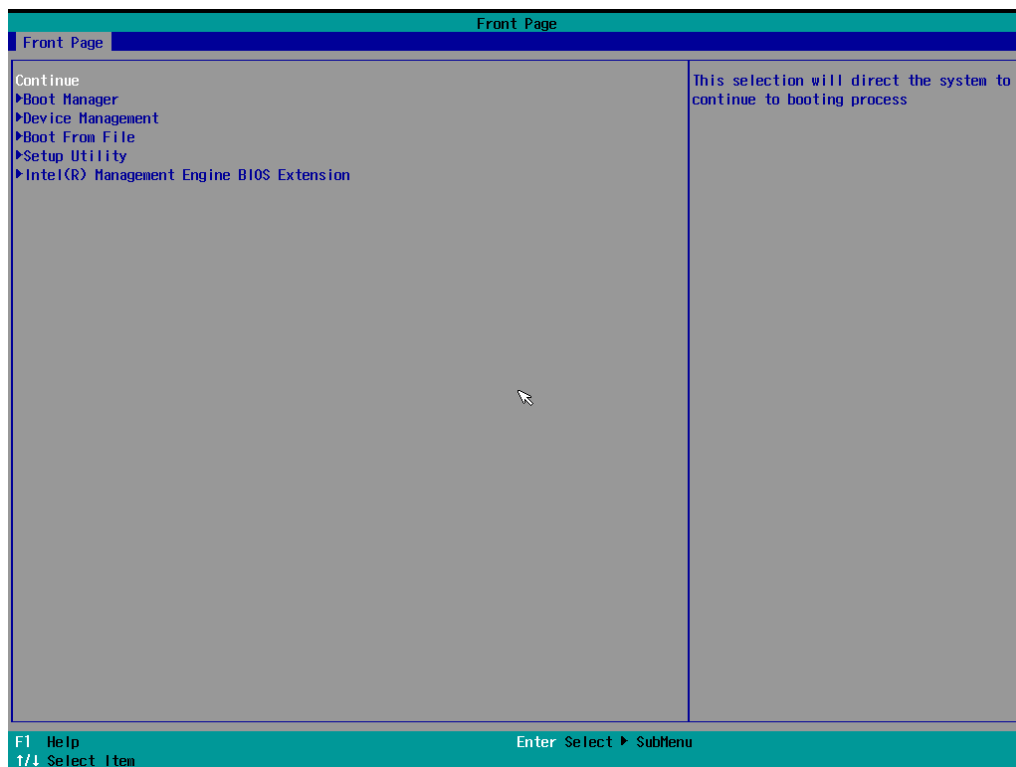


NOTE

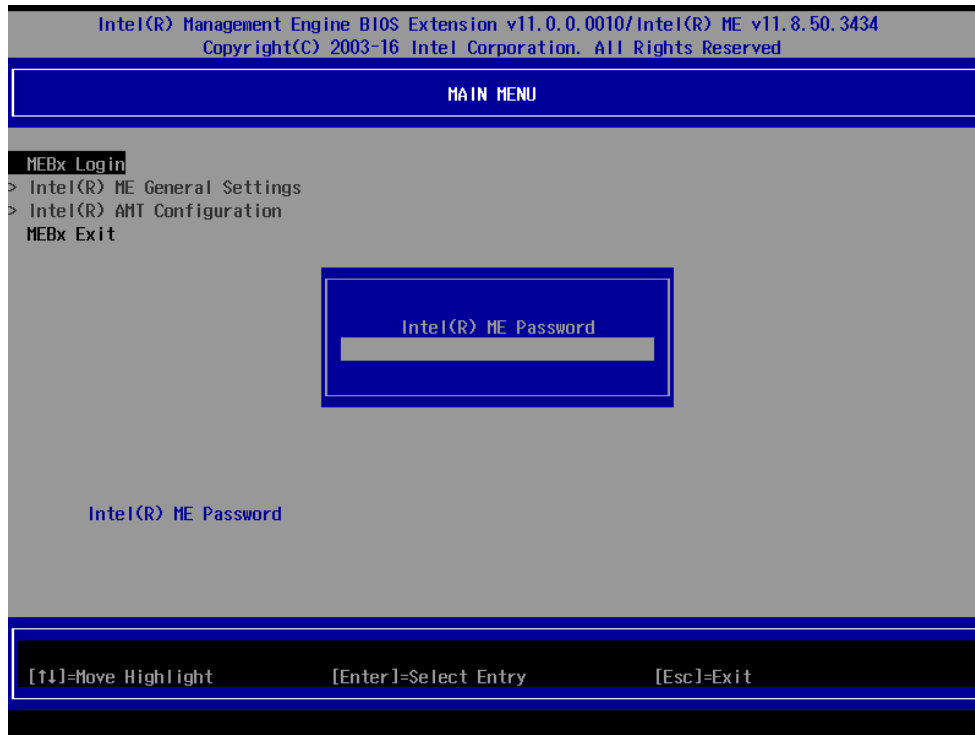
The AMT function is not supported in the models with Celeron and i3 CPU.

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:

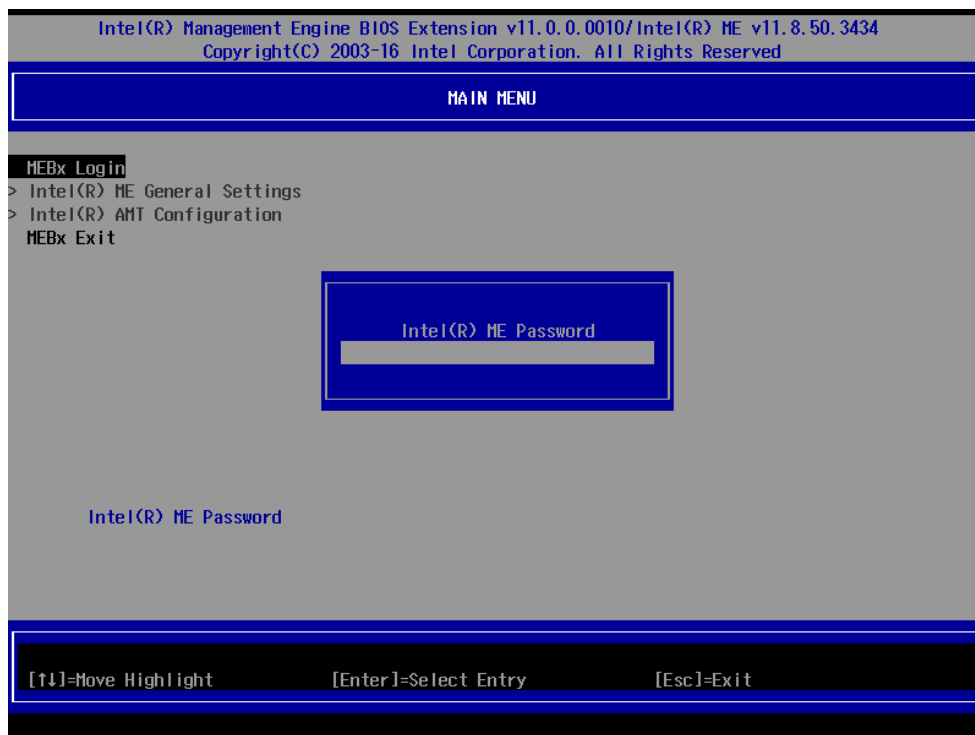
1. Select **Intel® Management Engine BIOS Extension** to enter the **AMT configuration**.



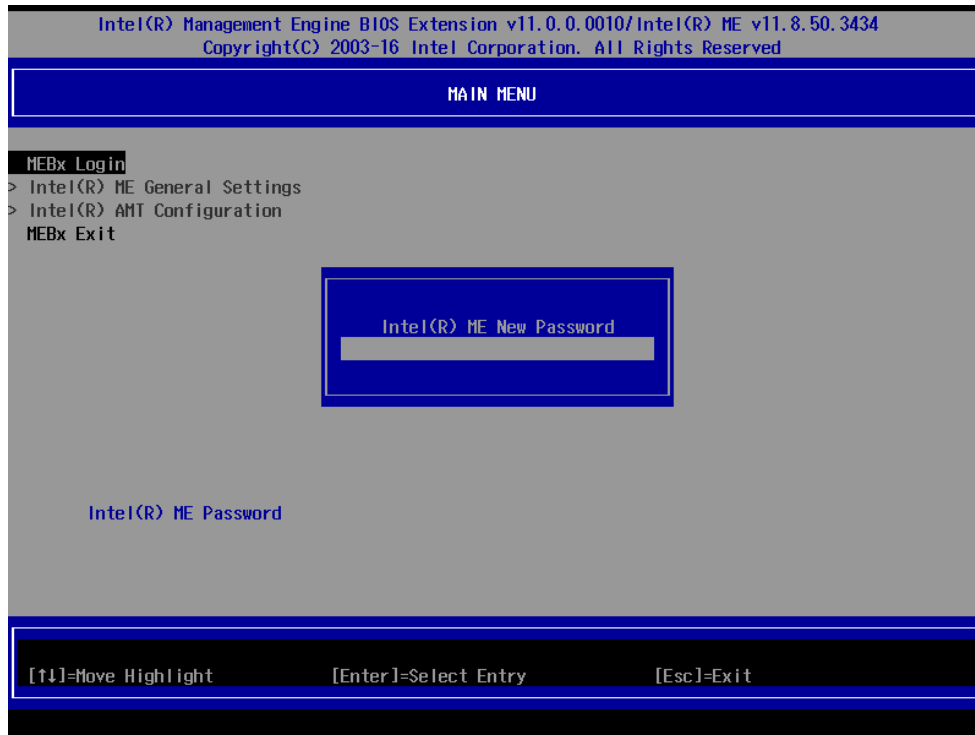
2. Press **<Enter>** to start the login procedure.



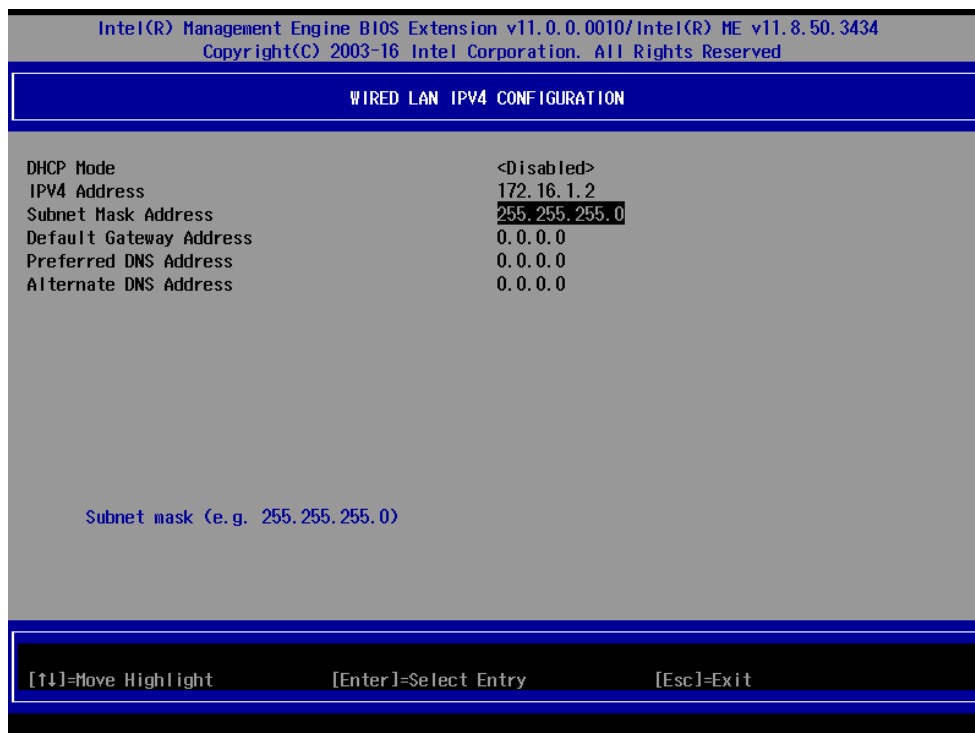
3. Type the default password: **admin**



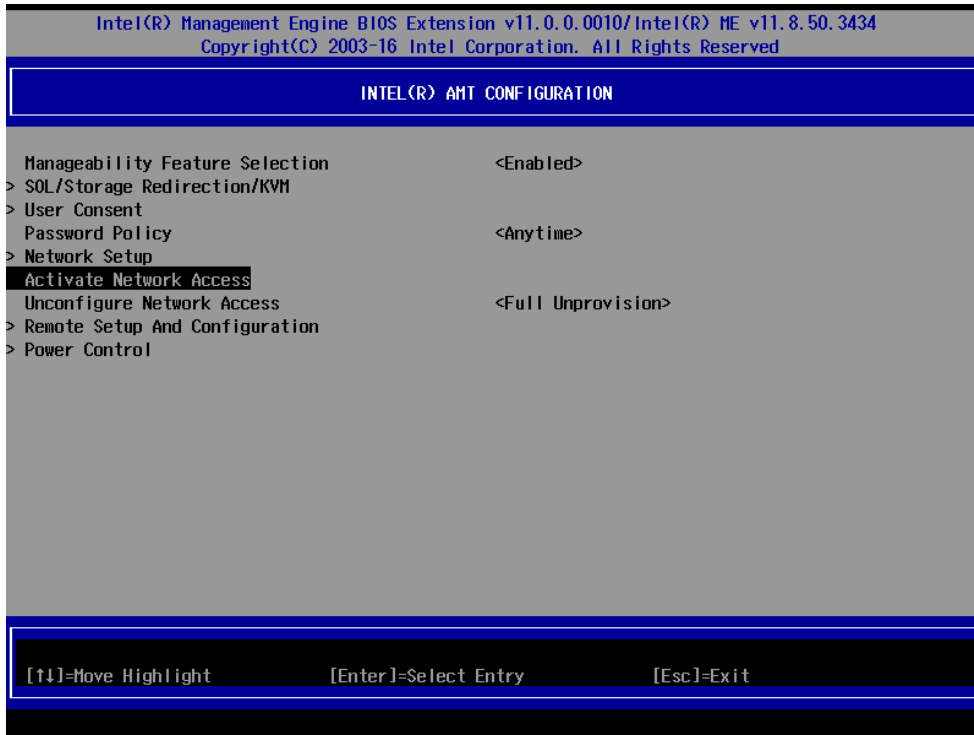
4. Type the new password. It must include both upper-case and lower-case characters, numbers, and special symbols. E.g., **Admin'12**.



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.



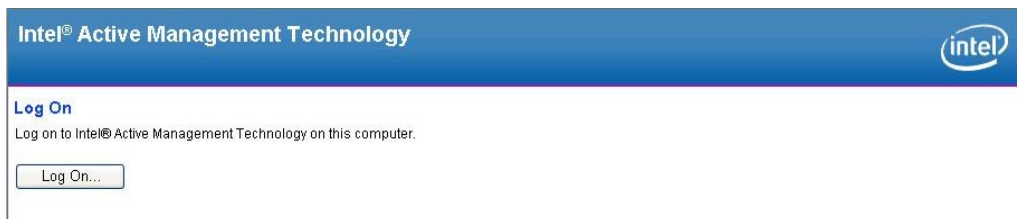
- Set **Activate Network Access** to enable remote access capability.



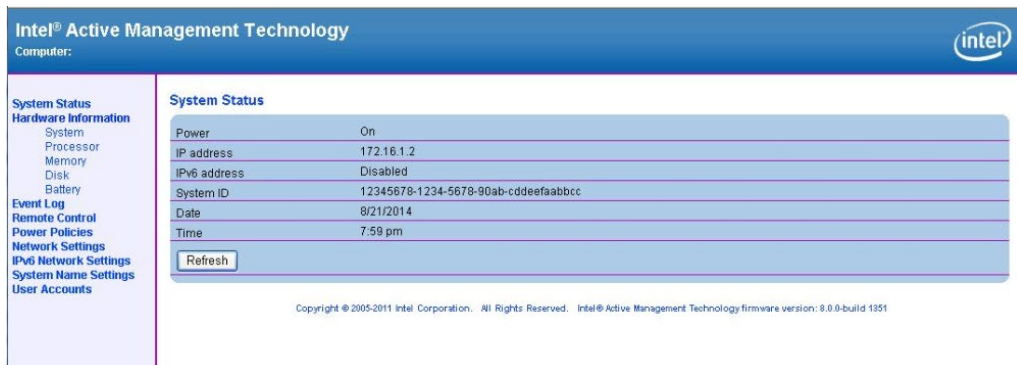
Using AMT

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

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



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





NOTE

The AMT port is LAN1.



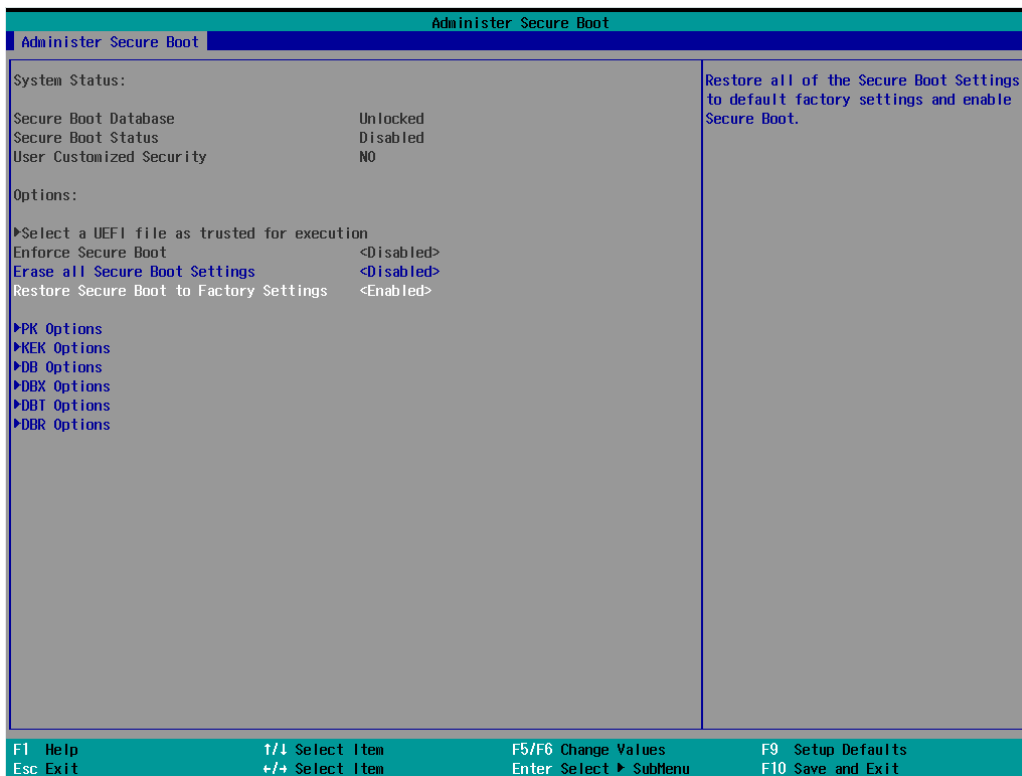
NOTE

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 a computer 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.

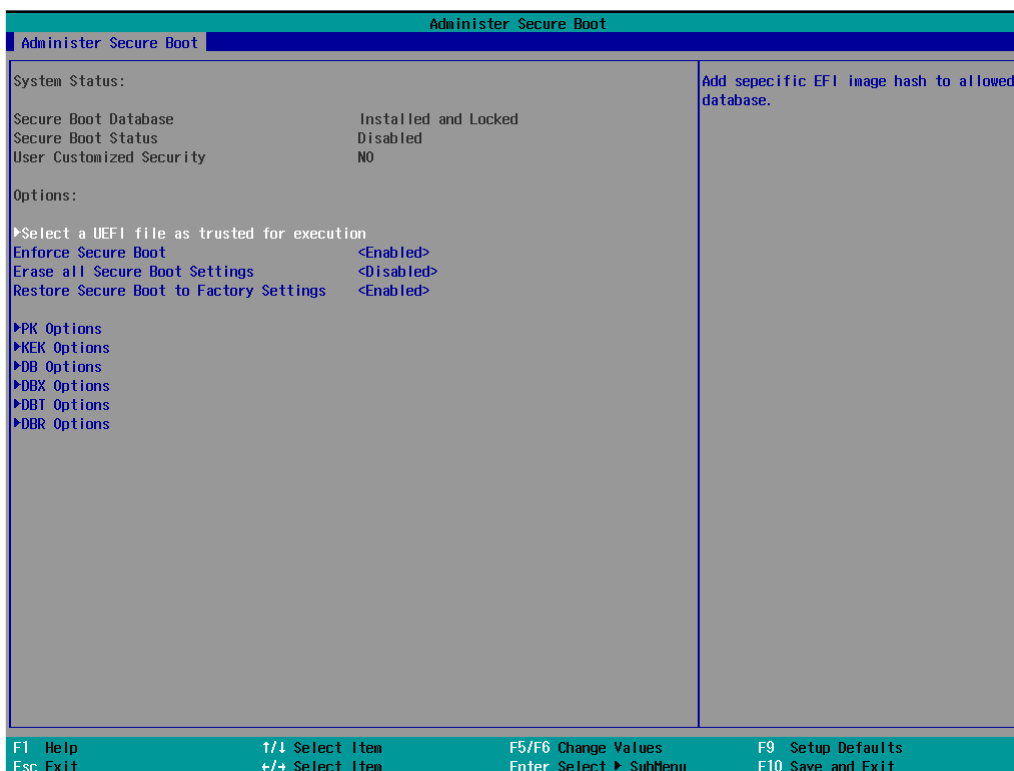
Enabling UEFI Secure Boot

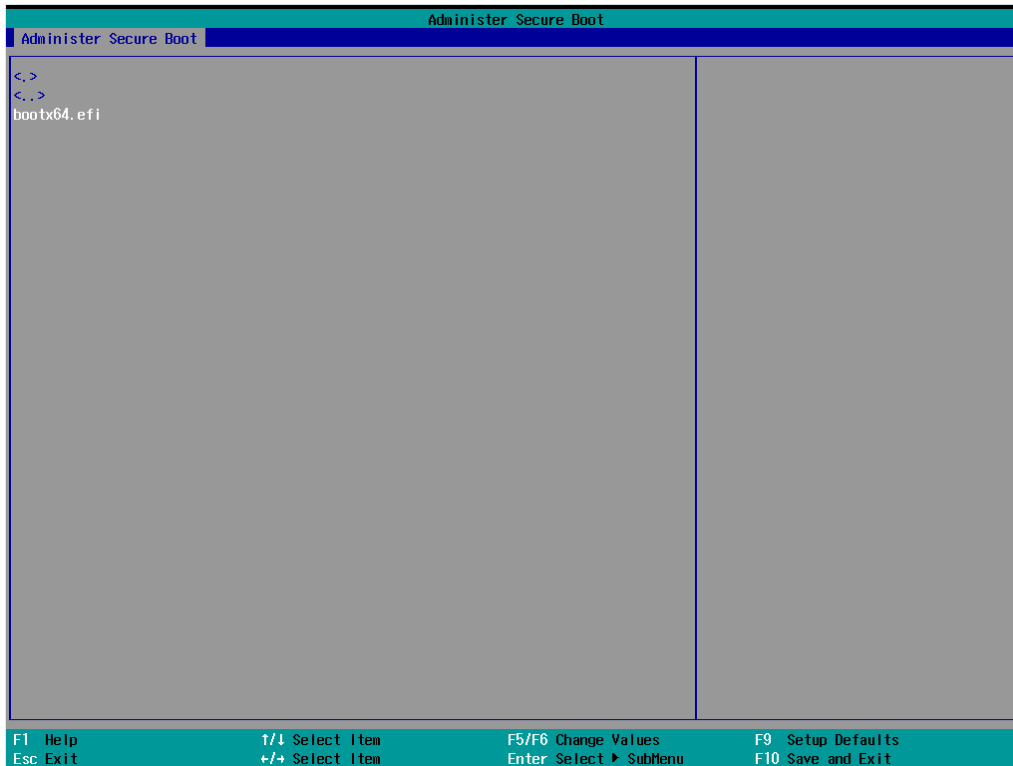
Set as "enabled" in "Restore Secure Boot to Factory Settings" under Administer Secure Boot menu. Press F10 as save and exist.



Moxa has put Microsoft key in BIOS in default; if users cannot boot up by "Non Windows OS", use the following example.

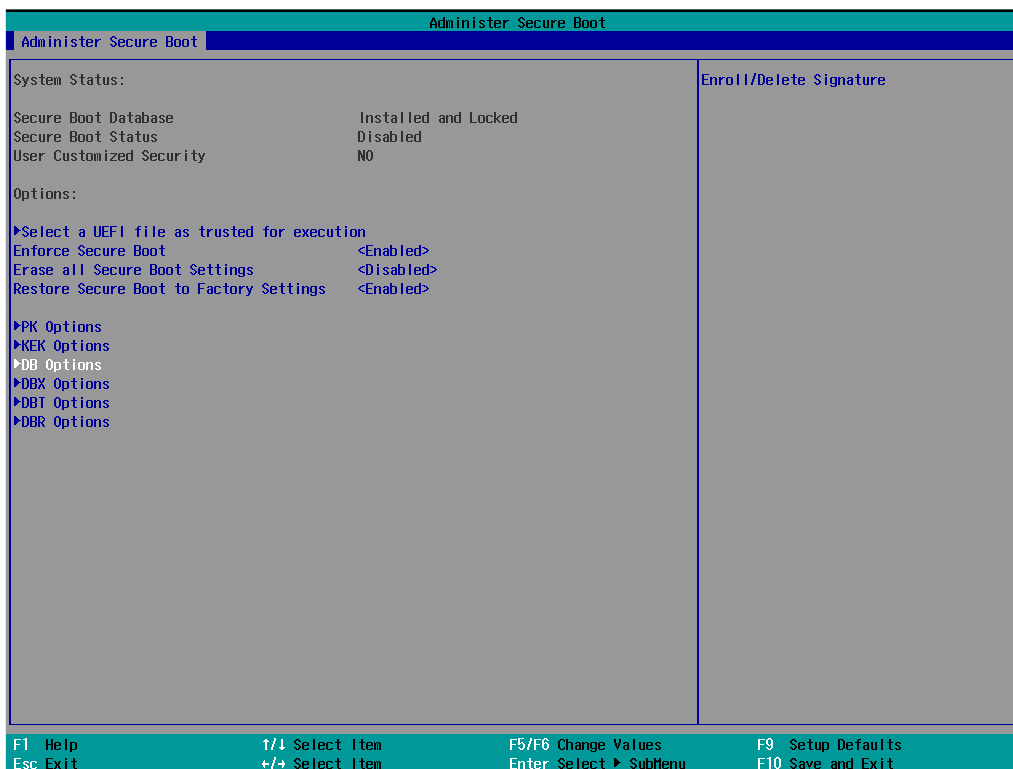
Enroll EFI Image

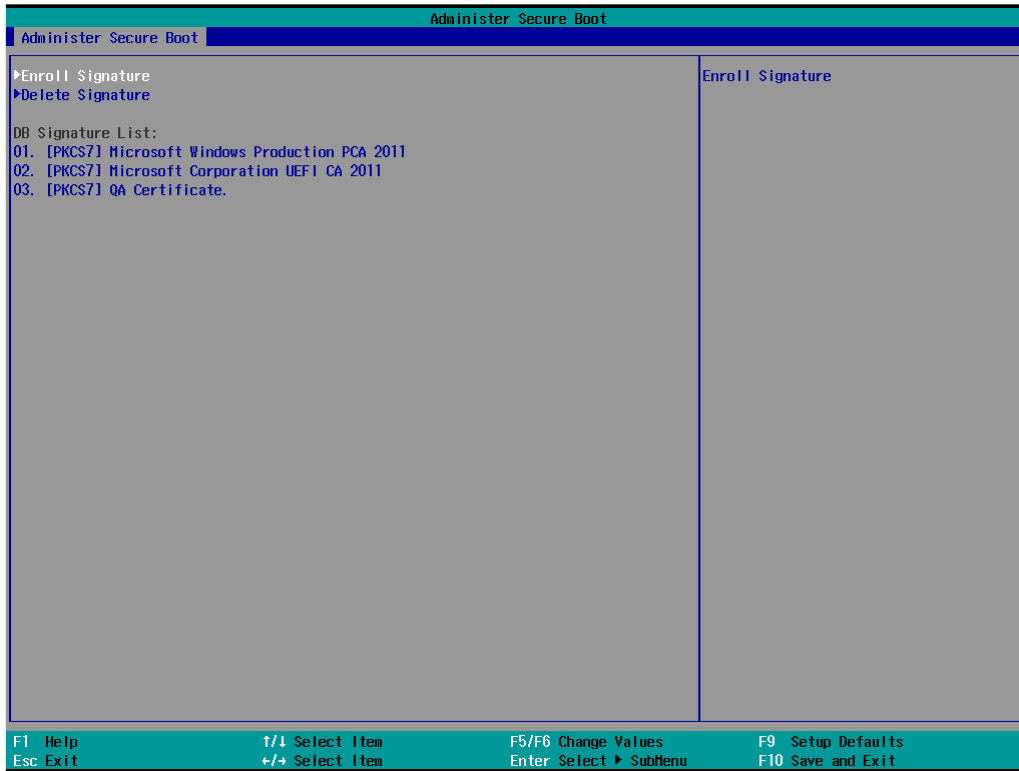




Enter "Administer Secure Boot" once again and see "Select a UEFI file as trusted for execution", put loader into the database named and followed by the UEFI standard \EFI\BOOT\BOOT{machine type short-name}. E.g., efi\boot\BootX64.efi, Debian (EFI\debian\grubx64.efi), Suse (EFI\opensuse\grubx64.efi)

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.



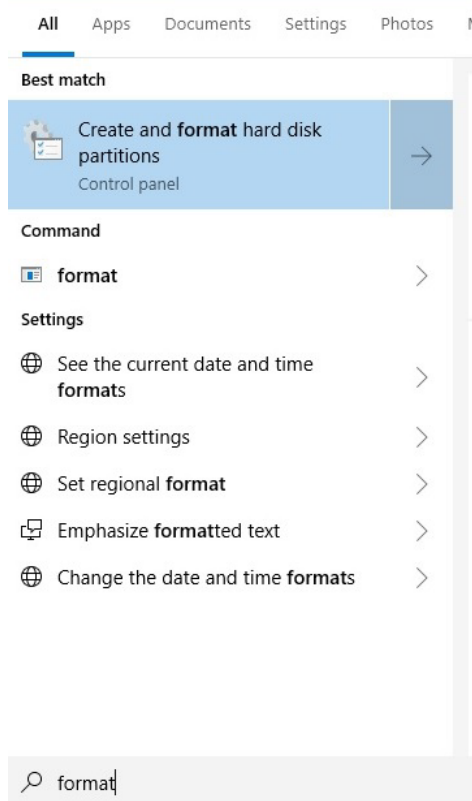
NOTE

It is possible to permanently damage the computer when upgrading the BIOS. We strongly recommend that you contact Moxa's technical support staff for assistance to obtain all the necessary tools and the most current advice before attempting to upgrade the BIOS on any Moxa device.

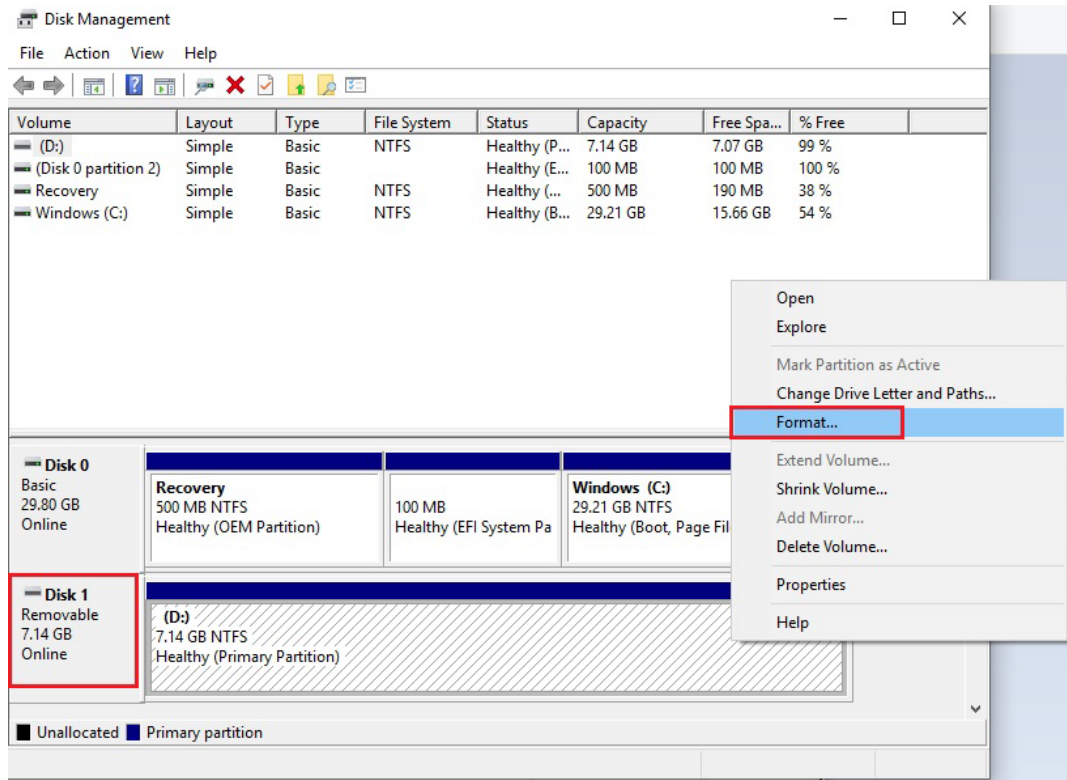
Step 1: Create a Bootable USB Disk

Before upgrading the BIOS, you must create a bootable USB drive as a system boot device for use in the future.

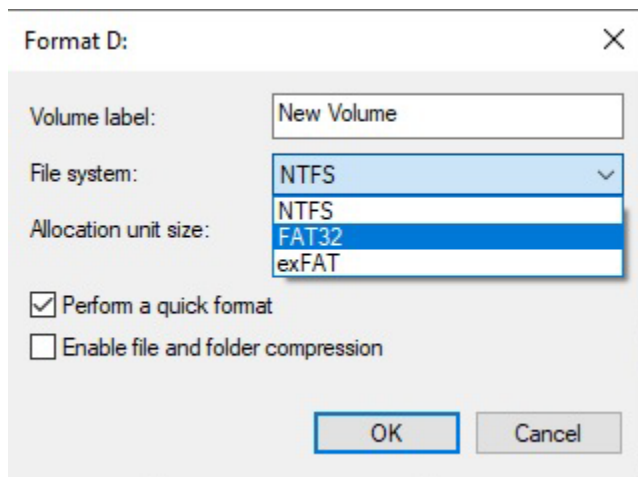
1. Insert a USB disk in the computer's USB drive.
2. Search for "format" and select **Create and format hard disk partitions**.



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



4. Select **FAT32** and click **OK** to start formatting the 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. The BIOS upgrade file includes an **efi** folder and an **xxxx.efi** file. Copy the **efi** folder and **xxxx.efi** file to the bootable USB disk.

Step 3: Run the Upgrade Program on Your Computer

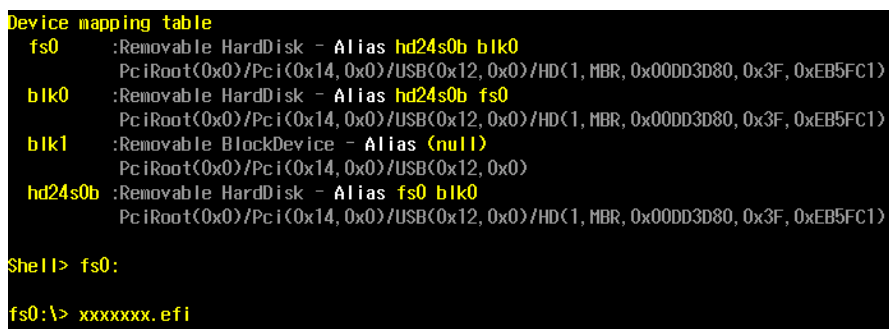
1. Reboot the computer with the boot disk and press F2 to go to the Boot Manager.
If the BIOS cannot recognize the USB drive as the boot-up device, the USB drive might not have a partition table. Use the Windows command line tool **diskpart** to rebuild the partition table.

2. Select the USB Disk.



The screen will switch to the SHELL environment.

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

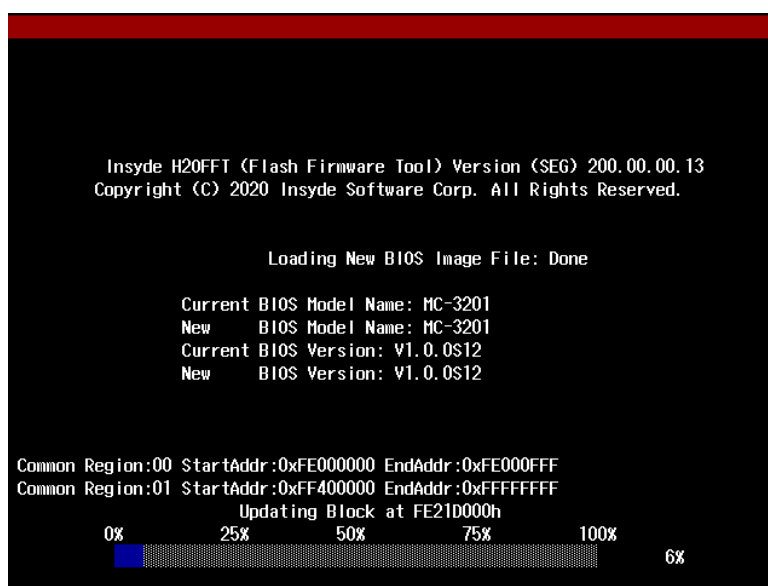


4. Wait until the upgrade procedure is completed.



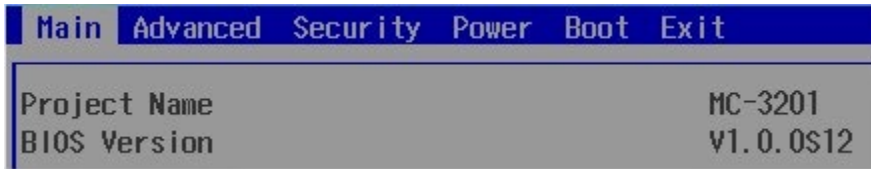
ATTENTION

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



When the upgrade is finished, the computer will automatically reboot.

You can check BIOS version on the Main page to confirm the upgrade.



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

```
EFI Shell version 2.50 [22281.41491]
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,1AABAECE-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)
```

5. Go to each fsx (x stands for the number) and type ls to view the content of the boot device. If you find an upgrade file, 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. Regulatory Approval Statement



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.