

# **BXP-C101 Series Hardware User Manual**

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**Version 1.0, June 2026**

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# **BXP-C101 Series Hardware User Manual**

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# 1. Introduction

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The BXP-C101 Series computers are powered by three CPU options: Intel® Core™ 3-100U, 5-120U, and 7-150U processors. The computers come with a rich set of interface options including either two serial ports or five digital inputs and six digital outputs, two gigabit Ethernet ports, six USB ports, one HDMI, and one Display Port. A dual storage design that includes CFast and M.2 slots enable easy storage expansion. Both Wall-mount and DIN-rail mount models are available, making it easy to build data-communication systems at field sites.

## Package Checklist

Each model is shipped with the following items:

- BXP-C101 Series embedded computer
- 2-pin terminal block for DC power
- 2-pin terminal block for remote power
- 13-pin terminal block for DI/DOs (S2-DIO model only)
- M.2 SSD mounting screw and thermal pad
- mPCIe module mounting screw
- Quick installation guide (printed)
- Warranty card



### NOTE

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

## Product Features

BXP-C101 computers include the following features:

- Box-type computer with fan-less design
- Intel® Core™ Raptor Lake Refresh processor
- Compact size to fit most field applications
- Dual storage with a removable cover design for easy maintenance
- -30 to 70°C operating temperature range

## BXP-C101 Hardware Specifications



### NOTE

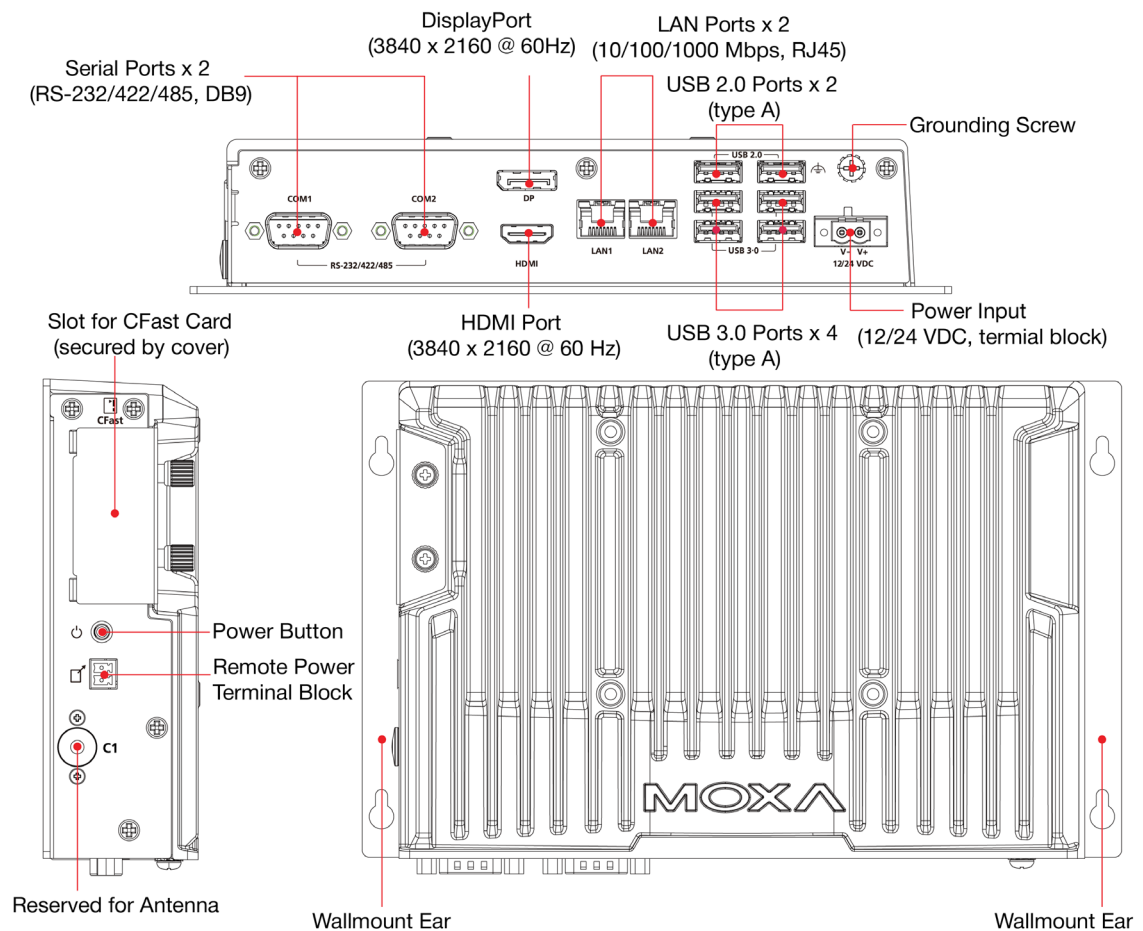
The latest specifications for Moxa's products can be found at <https://moxa.com>.

## 2. Hardware Introduction

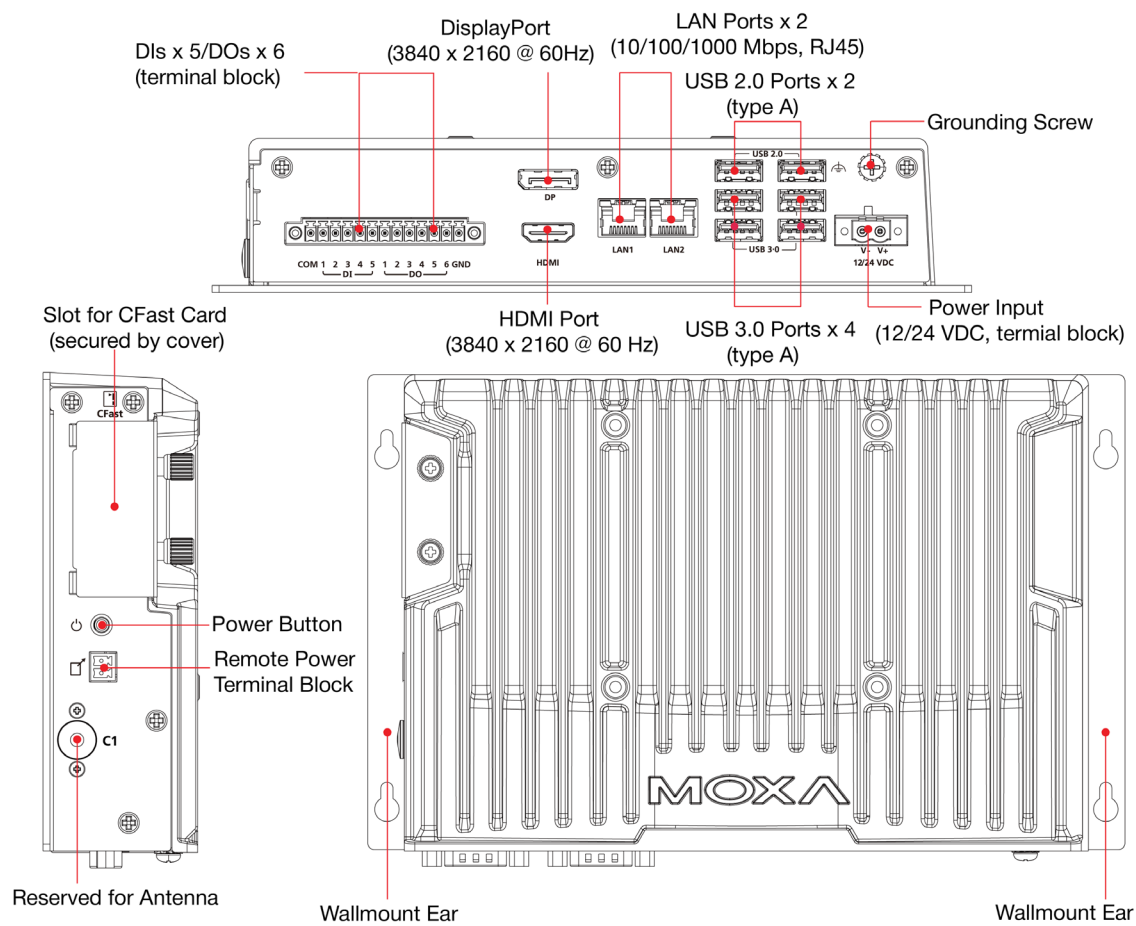
The BXP-C101 Series wall-mount computers are compact, well-designed, and rugged enough for industrial applications. LED indicators help you monitor performance and identify trouble spots, multiple serial ports or digital inputs/outputs allow you to connect different devices for wireless operation, and the reliable and stable hardware platform lets you devote your attention to developing your applications.

### Appearance

#### Serial Models (S1)



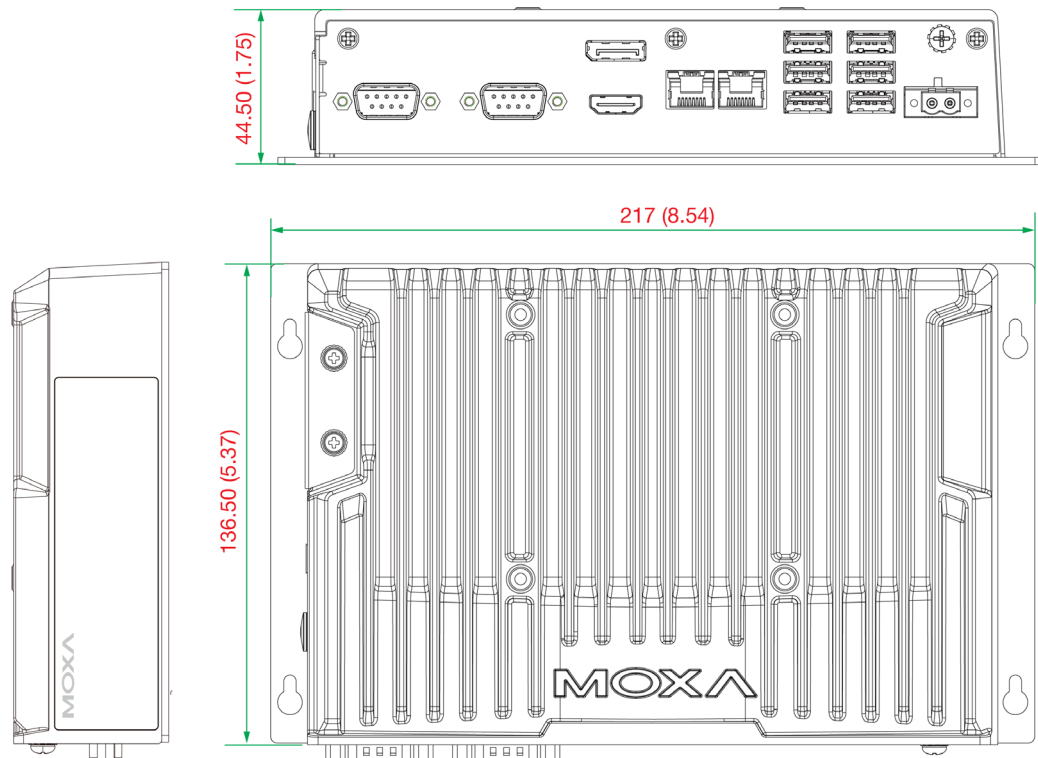
## DIO Models (S2)



# Dimensions

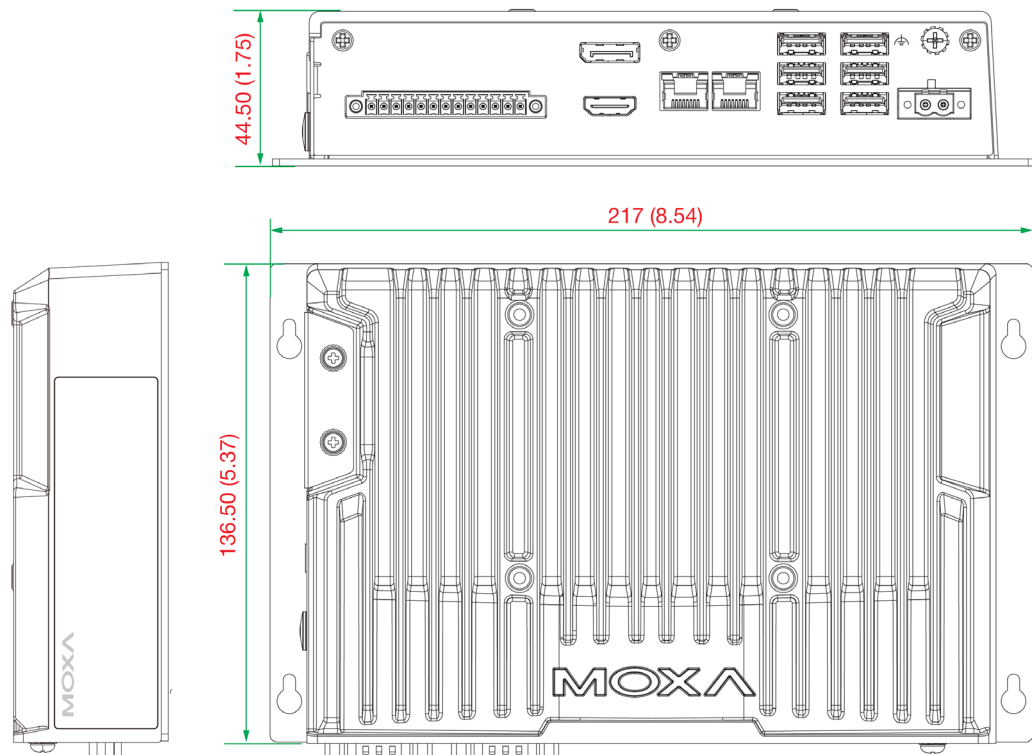
## Serial Models (S1) Wall Mounting

Unit: mm (inch)



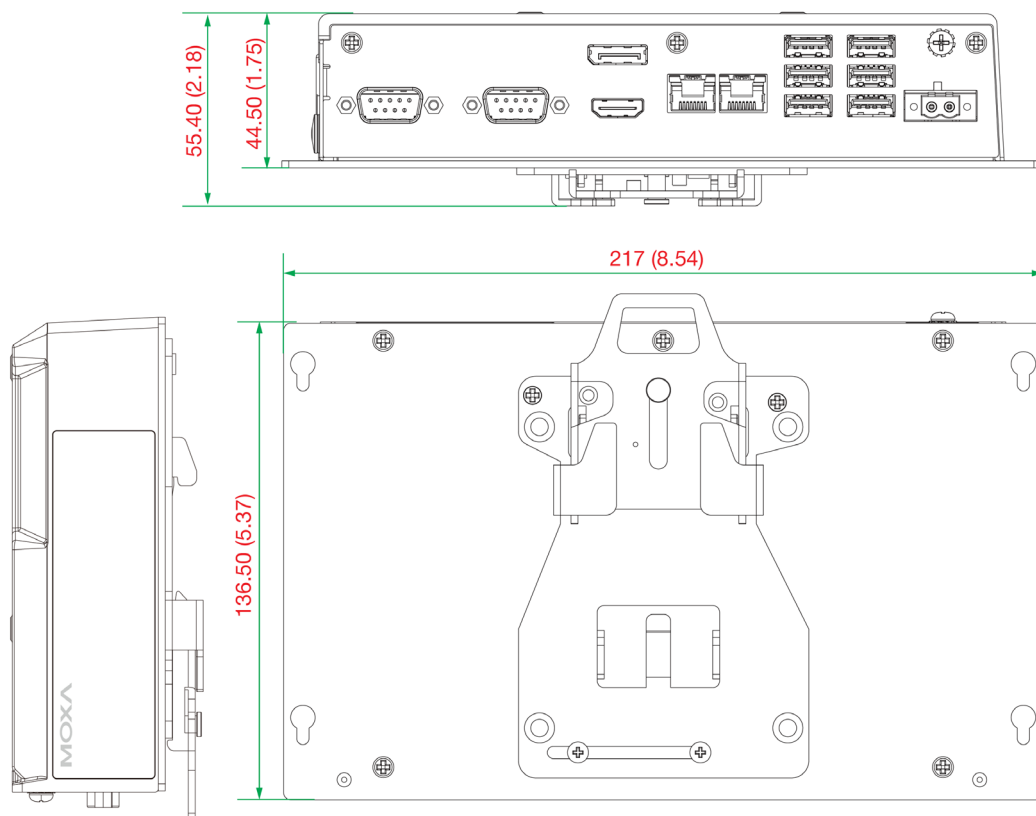
## DIO Models (S2) Wall Mounting

Unit: mm (inch)



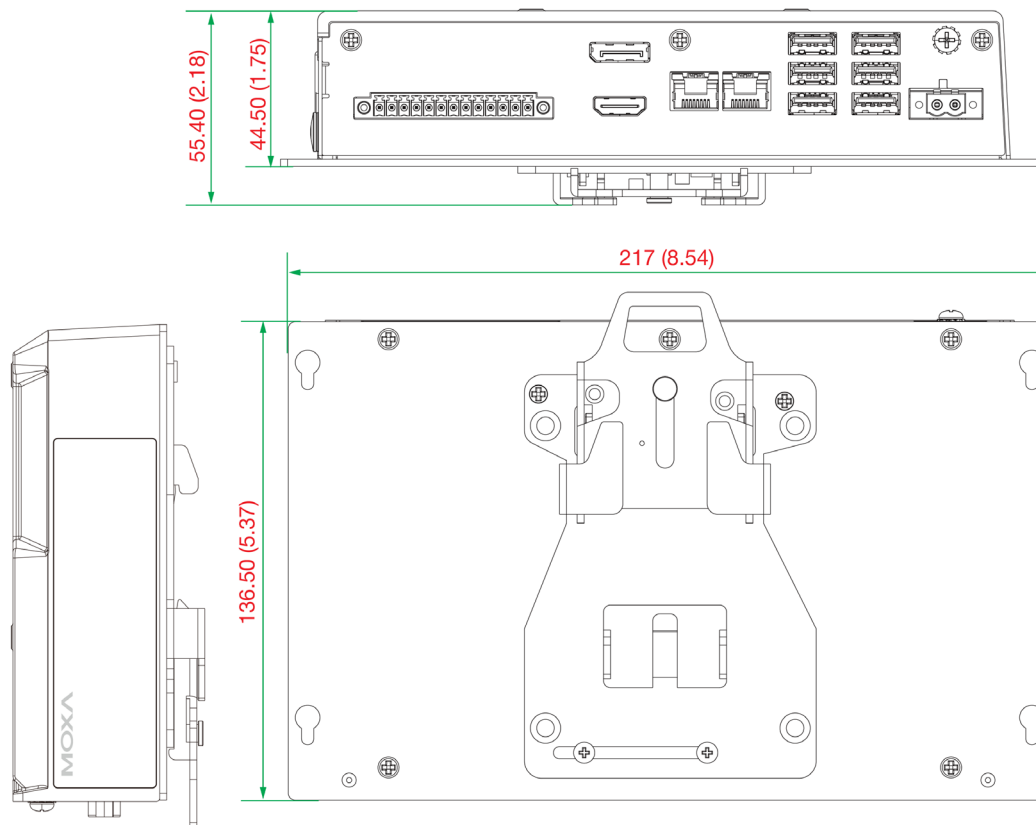
### **Serial Models (S1) DIN-rail Mounting**

Unit: mm (inch)



### **DIO Models (S2) DIN-rail Mounting**

Unit: mm (inch)



# LED Indicators

The following table describes the LED indicators located on the front panel of BXP-C101 computers.

| LED Name                                          | LED Color | LED Function                                                                            |
|---------------------------------------------------|-----------|-----------------------------------------------------------------------------------------|
| <b>Power</b>                                      | Green     | Power is on (S0 state)                                                                  |
|                                                   | Off       | Power is off (S5 state)                                                                 |
| <b>Ethernet<br/>(10/100 Mbps)<br/>(1000 Mbps)</b> | Green     | Steady ON: 10/100 Mbps Ethernet link<br>Blinking: Data is being transmitted or received |
|                                                   | Yellow    | Steady ON: 1000 Mbps Ethernet link<br>Blinking: Data is being transmitted or received   |
|                                                   | Off       | No Ethernet connection                                                                  |

## Real Time Clock (RTC)

The BXP-C101's real-time clock is powered by a lithium battery. You can easily replace the battery yourself using an optional battery kit. Refer to the 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 questions or need help replacing the RTC battery.



### ATTENTION

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

## 3. Hardware Connection Description

In this chapter, we describe how to connect the BXP-C101 to the network and to various devices.

### Installing the BXP-C101

#### Wall-mounting Models

The BXP-C101 computer comes with one wall-mounting plate pre-installed when shipped.

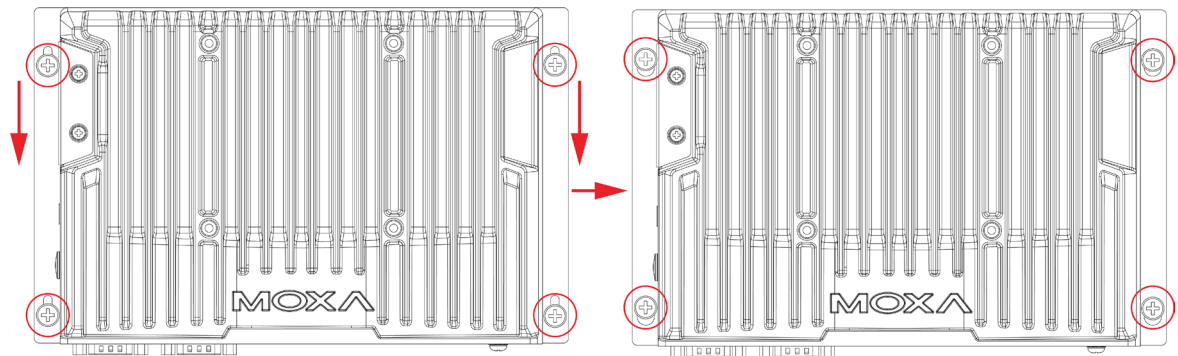


#### Caution

Peripheral devices should be kept at least 25 mm away from the computer.

To mount the computer on to a wall or a cabinet, do the following:

1. Place the computer on a wall or a cabinet, and then fasten the two screws on each side of the bracket.
2. Push the computer downwards to ensure the computer has been securely fixed to the mounting surface.



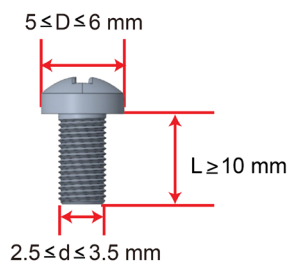
**Fastening Torque: 10Kgf-cm**



#### NOTE

The four screws for attaching the wall-mounting brackets to the wall or cabinet are NOT included in the product package; they need to be purchased separately.

The specification of the 4 screws to be purchased separately is indicated in the diagram below.

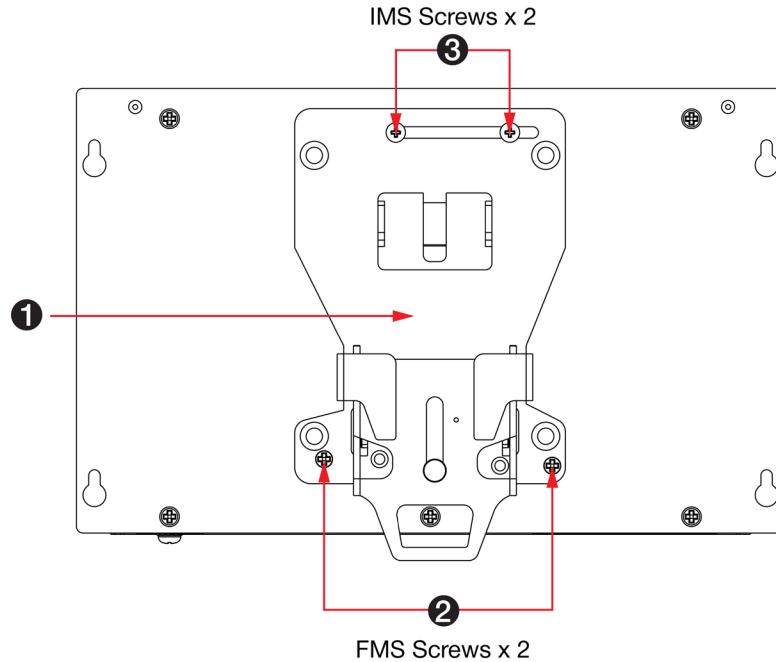


### **DIN-rail Mounting Models (optional)**

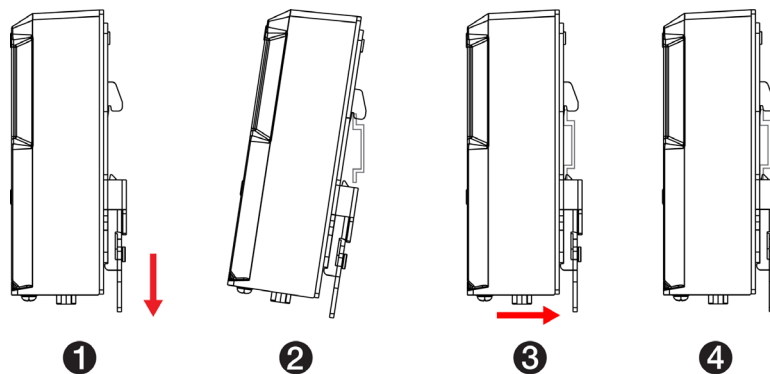
The BXP-C101 computer comes with one optional DIN-rail mounting kit, which needs to be purchased separately.

To mount the computer on to a DIN rail, do the following:

1. Attach the DIN-rail mounting bracket to the computer on the bottom side by placing it as indicated in the figure below and fastening four screws (two FMS and two IMS).



2. Pull down the slider of the DIN-rail mounting kit.
3. Insert the top of the DIN rail into the slot just below the upper hook of the DIN-rail mounting kit.
4. Push the unit on to the DIN rail to latch it firmly in place as shown in the following illustrations.



Once the computer is mounted properly, you will hear a click and the slider will rebound back into place automatically.



### **NOTE**

This computer is intended to be installed only in an area with restricted access. In addition, for safety reasons, the computer should be installed and handled only by qualified and experienced professionals.



## ATTENTION

### Safety First!

Be sure to disconnect the power cord before installing and/or wiring your BXP-C101.

### Wiring Caution!

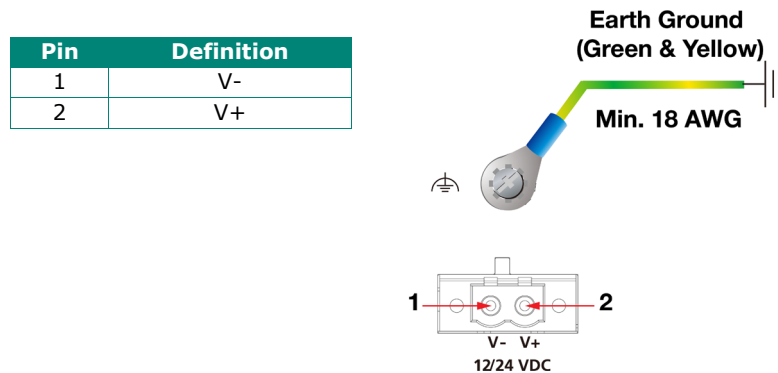
Calculate the maximum possible current in each power wire and common wire. Observe all electrical codes dictating the maximum current allowable for each wire size. If the current goes above the maximum ratings, the wiring could overheat, causing serious damage to your equipment.

### 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.

## Connecting the Power

The BXP-C101 computer is provided with 2-pin power input connectors in a terminal block on the front panel. Insert the power-cord wires into the connectors and tighten them to secure the wires in place. Push the power button. The power LED will light up to indicate that power is being supplied to the computer. It should take about 30 to 60 seconds for the operating system to complete the boot-up process.



The power input specification is given below:

- The DC power source rating is 12 VDC @ 5.2 A or 24 VDC @ 2.6 A.
- A minimum wire gauge of 18 AWG is required.
- Power input leads stripping length of 7 to 8 mm is recommended.
- Rated Cable Temp  $\geq 97.2^{\circ}\text{C}$ .

For surge protection, connect the grounding connector located below the power connector with the earth (ground) or a metal surface.



## NOTE

This computer is intended to be supplied by a UL Listed Power Unit "LPS" (or "Limited Power Source") rated 12 V @ 5.2 A min., 24 V @ 2.6 A min., and minimum Tma = 70°C. If you need assistance with purchasing a power adapter, contact the Moxa technical support team.



## NOTE

If using Class I adapter, the power cord adapter should be connected to a socket outlet with an earthing connection or the power cord and adapter must comply with Class II construction.



## ATTENTION

Before connecting the BXP-C101 computer to the DC power inputs, make sure the DC power source voltage is stable.

- The wiring for the input terminal block shall be installed by a skilled person.
- Wire type: Cu
- Only use 18-12 AWG wire size and a torque value of 0.5 N-m.
- Use only one conductor in a clamping point between the DC power source and the power input.



## 警告

為避免電磁干擾，本產品不應安裝或使用於住宅環境。

# Communication Connections

## Connecting to the Network

Connect your network cable to the computer's Ethernet port. The other end of the cable should be connected 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.

The BXP-C101 computer has two 10/100/1000 Mbps Ethernet ports with RJ45 connectors on the front panel. Refer to the following table for the pin assignments:



| 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)-   |



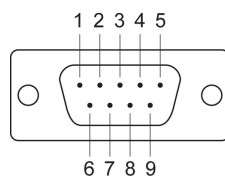
## NOTE

For reliable Ethernet connections, we recommend enabling the ports in standard temperatures and keeping them enabled in high/low temperature environments.

## Connecting to a Serial Device

The BXP-C101 computer (S1) comes with 2 software-selectable RS-232/422/485 serial ports on the front panel. The ports use DB9 male connectors. The pin assignments are shown in the following table:

### DB9 Male Port

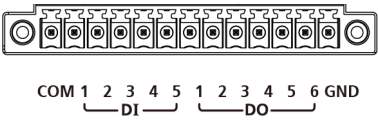


### RS-232/422/485 Pinouts

| 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    | -       | -               | -               |

# Digital Inputs/Digital Outputs

The BXP-C101 computer (S2) comes with five digital inputs and six digital outputs in a terminal block. Refer to the following figure for the pin definitions and the current ratings.



### Digital Inputs

*Dry Contact:*

Logic 0: Close to GND

Logic 1: Open

*Wet Contact:*

Logic 0: 10 to 30 VDC

Logic 1: 0 to 3 VDC

### Digital Outputs

*Current Rating:*

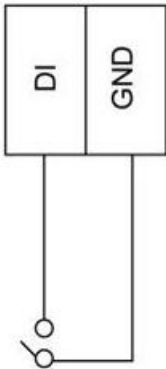
200 mA per channel

*Voltage:*

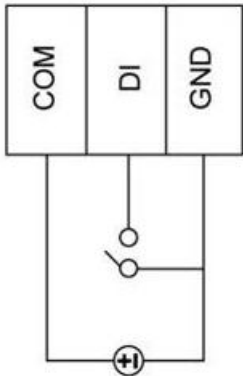
0 to 30 VDC

For the wiring method, refer to the following diagram:

#### DI Dry Contact

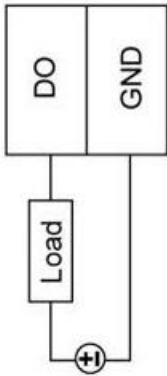


#### DI Wet Contact



#### DO Contact

Sink



## USB Device

The BXP-C101 computer comes with 4 USB 3.0 ports and 2 USB 2.0 ports on the front panel. The USB ports can be used to connect to peripherals, such as keyboard, mouse, or flash drives for expanding the system's storage capacity.

## Connecting Displays

The BXP-C101 computer comes with a VGA and an HDIM display output located on the front panel.



### NOTE

For reliable video streaming, use premium HDMI-certified cables.

# Installing a CFast Card

The BXP-C101 computer comes with one slot for plugging in a CFast card.



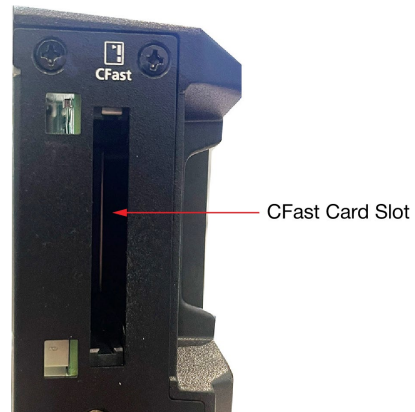
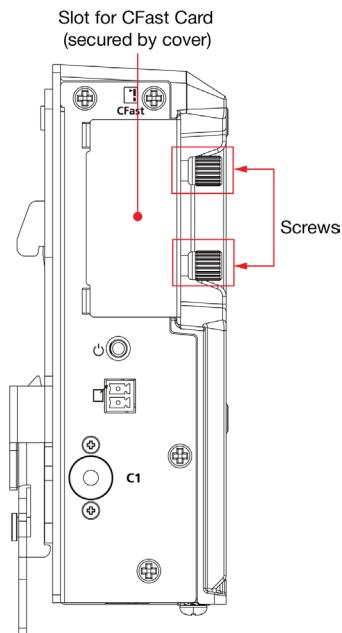
## Warning

### EXPLOSION HAZARD

CFast card should only be replaced or installed in a non-hazardous location.

To plug in the cards, do the following:

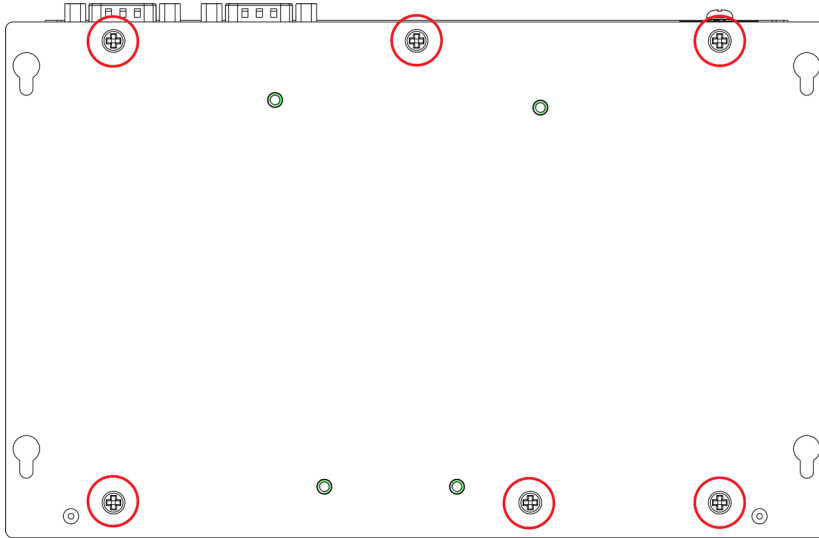
1. Remove the two screws that secure the slot cover.
2. Remove the cover and locate the CFast card slot.



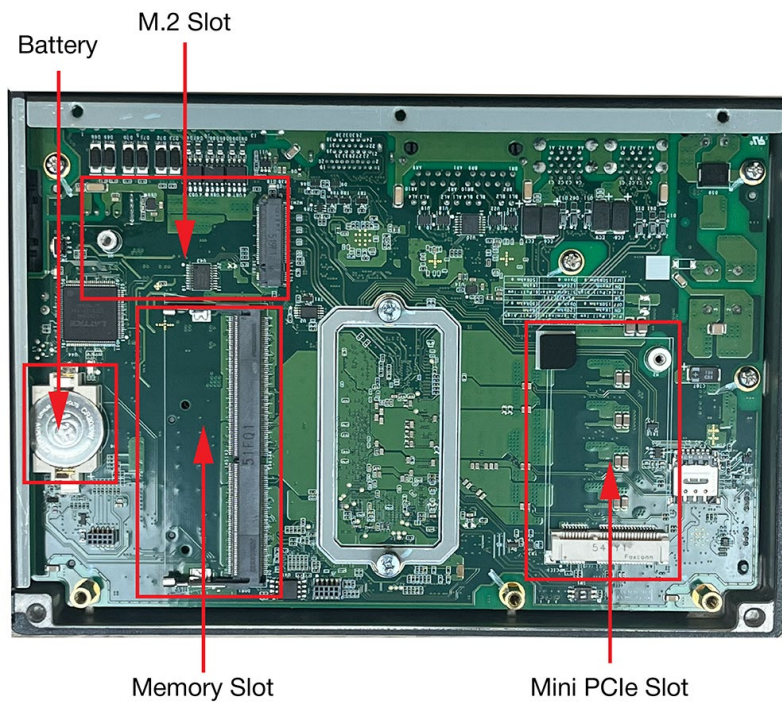
To remove the card, simply push them in to release it and take it out.

# Installing/Replacing the Internal Components

To access the computer's internal components, you will first need to unfasten the six screws on the wall-mounting plate at the bottom of the computer and remove the plate.

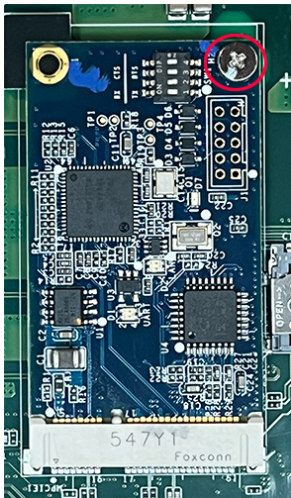


Location of the internal modules are shown in the following figure:



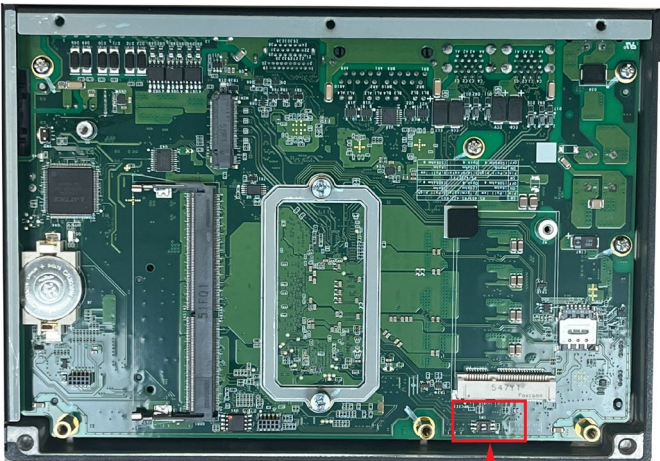
# Installing the Mini PCIe module

- 1. Insert the Mini PCIe module in the slot.
- 2. Fasten the screw.

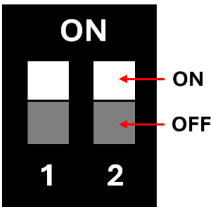
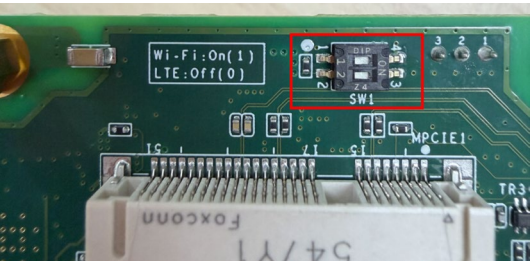


# Switching the Mini PCIe Card Socket

BXP-C101 comes with a wireless module socket and DIP switches for installing a Wi-Fi or LTE module. The DIP switches, located in the area marked by a Red box in the following image, enable installation of the required module type.



Module Selection Switch

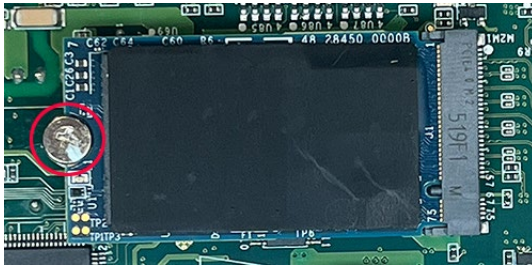


| SW1 |              |
|-----|--------------|
| ON  | Wi-Fi module |
| OFF | LTE module   |

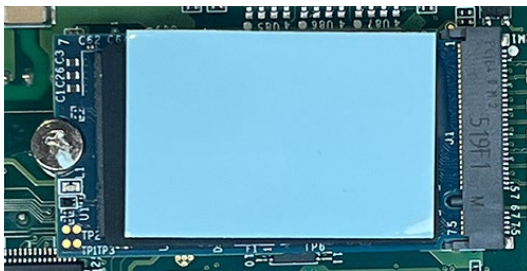
For example, if you want to install an LTE module in the slot, you need to turn SW1 to OFF. Similarly, to install a Wi-Fi module in the slot, turn SW1 to ON.

## Installing the M.2 Module

1. Insert the M.2 module in the slot.
2. Fasten the screw.



3. Place the thermal pad.



## Replacing the RTC Battery

The BXP-C101 computer comes with a lithium battery (3 V/200 mAh) preinstalled in the slot.



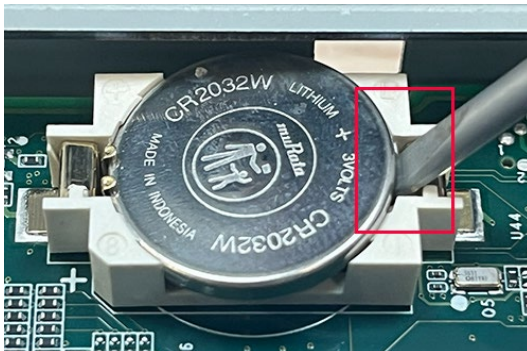
### Warning

#### EXPLOSION HAZARD

- Do not remove or replace batteries unless the power has been disconnected and the area is free of ignitable concentrations.
- To reduce the risk of fire or burns, do not disassemble, crush, or puncture the battery; do not dispose of it in fire or water and do not short external contacts.
- RTC batteries should only be replaced or installed in a non-hazardous location.
- Be sure to use the correct type of battery. Incorrect batteries may cause system damage. Contact Moxa's technical support staff for assistance, if necessary.
- The RTC must only be replaced with Panasonic battery type BR2032\*, BR-2032\*, BR2032, or BR-2032.

To replace the battery, do the following:

1. Use a screwdriver to remove the old battery by pushing the right latch of the slot outwards.



2. Remove the old battery and insert the new one.
3. Replace the wall-mounting plate.

## 4. BIOS Setup

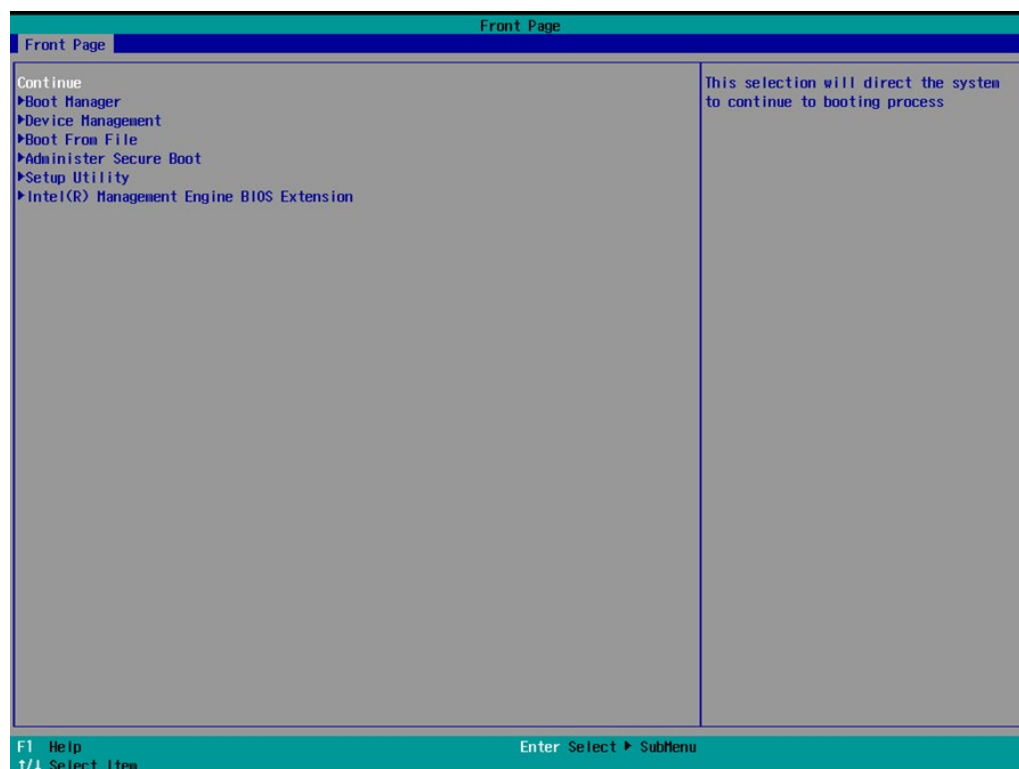
In this chapter, we describe the BIOS settings for the BXP-C101 computer. The BIOS is a set of input/output control routines for peripherals to initialize the basic settings. The BIOS helps boot the system before the operating system is loaded. The BIOS setup allows the user to modify the system configuration for basic input/output peripherals. All the configurations are stored in the CMOS RAM, which has a 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)

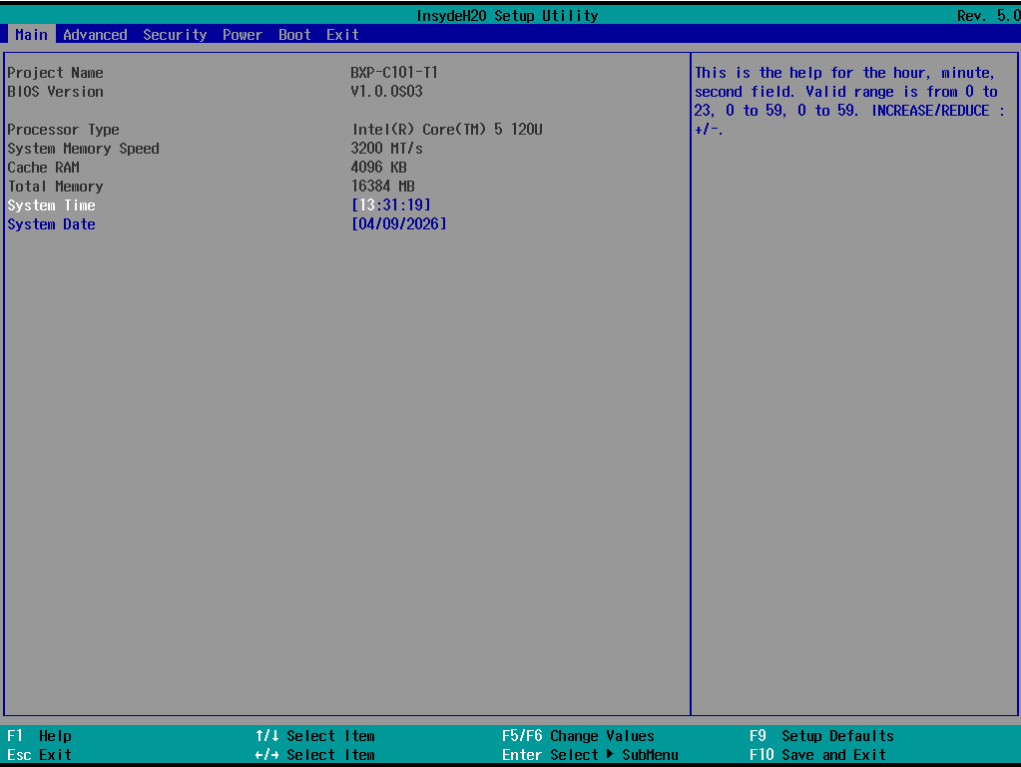
Select **F2** to enter the **BIOS configuration**.



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.

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

The BIOS configuration screen will be shown when you enter the **Setup Utility** option.

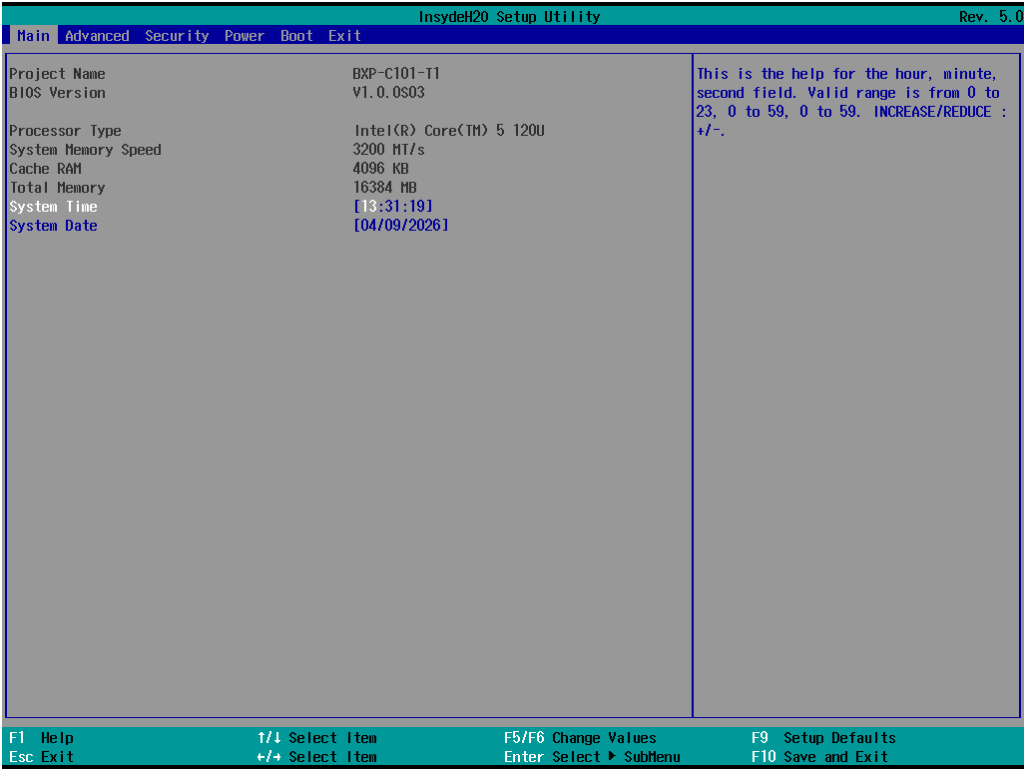


## NOTE

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

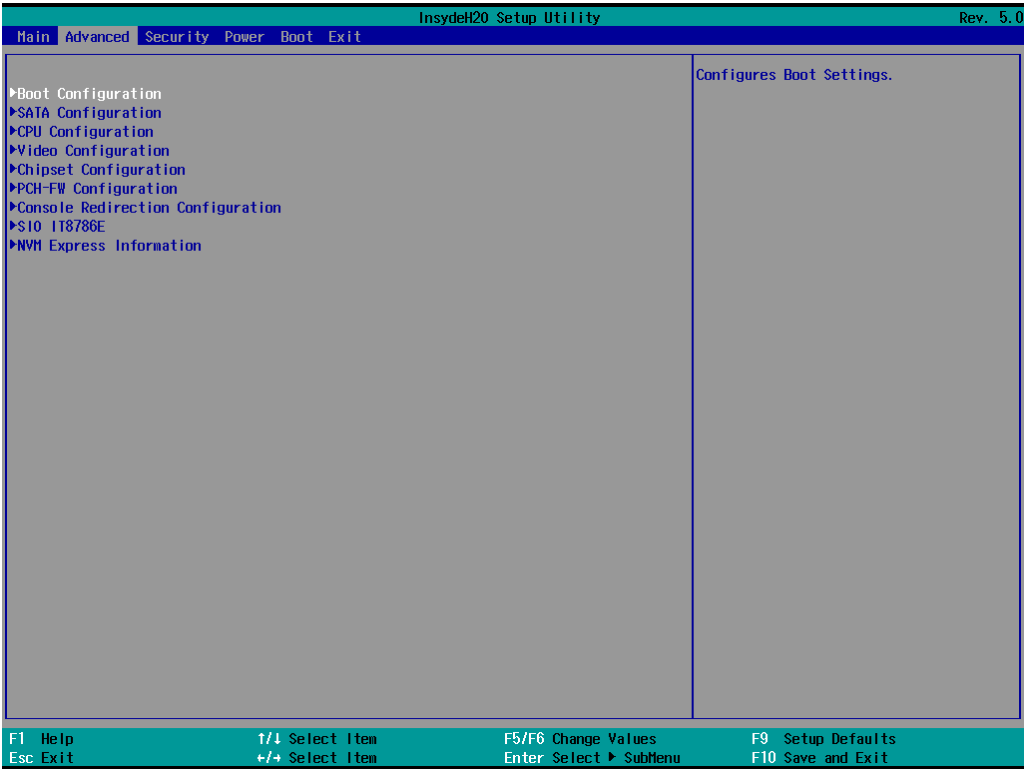
# Main Page

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



# Advanced Settings

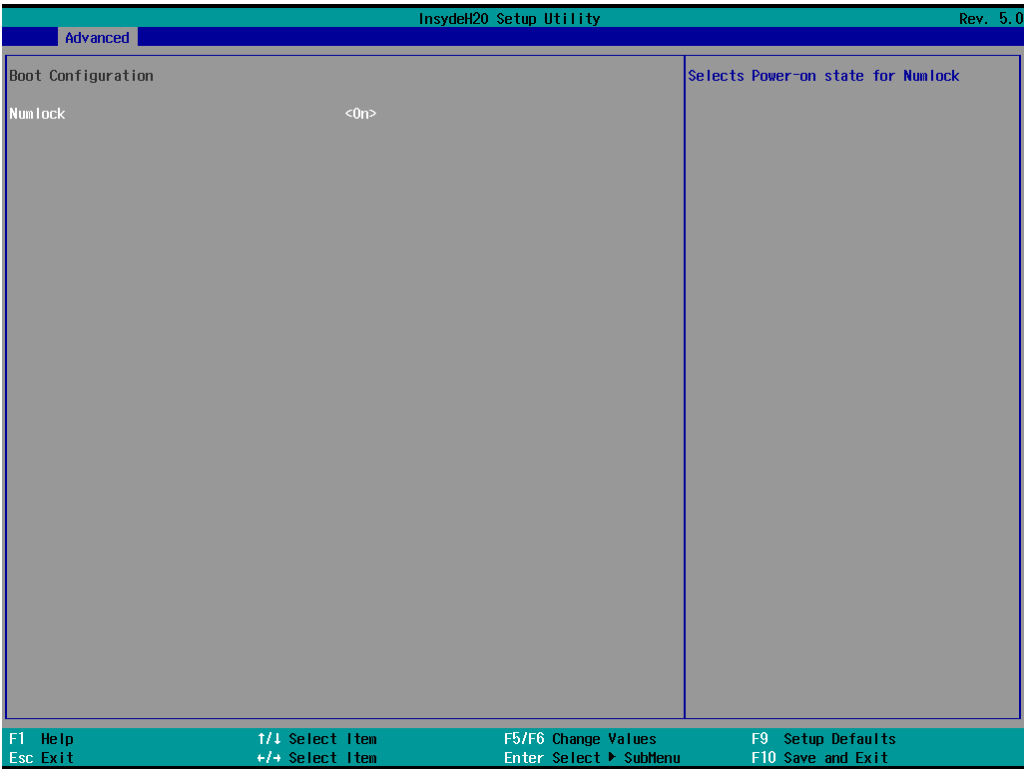
Select the **Advanced** tab in the main menu to open the advanced features screen.



# Boot Configuration

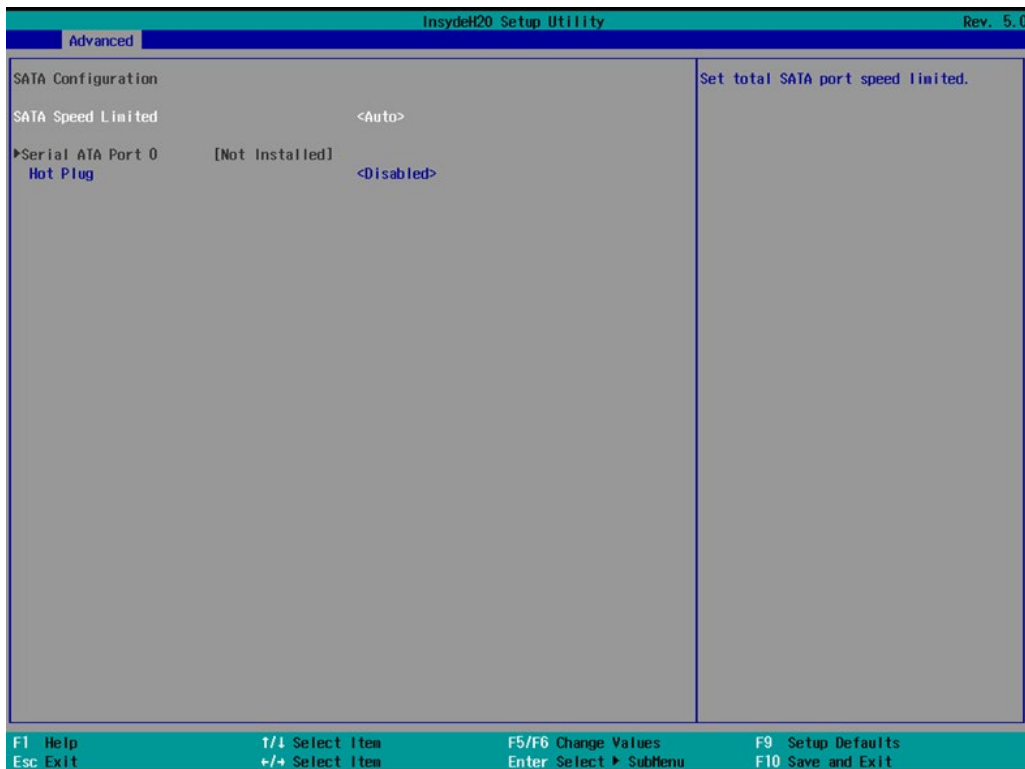
The **Numlock** option allows configuration of the Numlock value.

Options: On (default), Off.



## SATA Configuration

This section allows you to select the SATA speed limit and hot plug setting.



### SATA Speed Limited

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

### Serial ATA Port

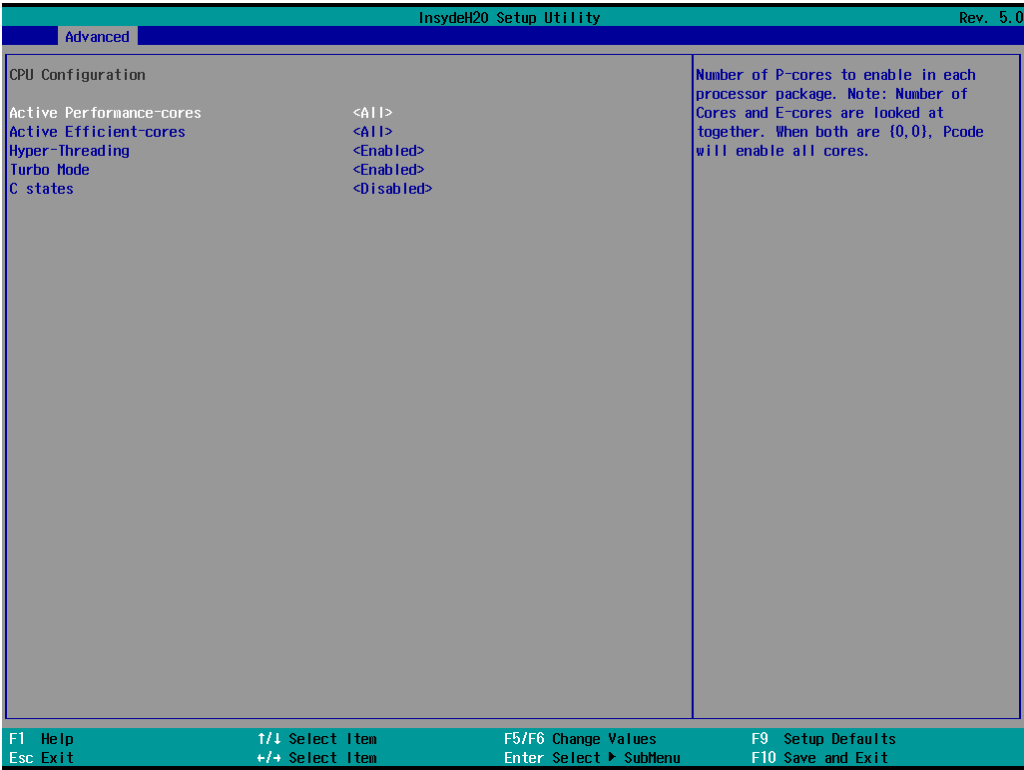
This setting displays information on the installed drives.

### 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

# CPU Configuration



## Active Processor Cores

This item indicates the number of cores to enable in each processor package (Cores number depended on the processor).

## 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 Intel® Celeron® ).

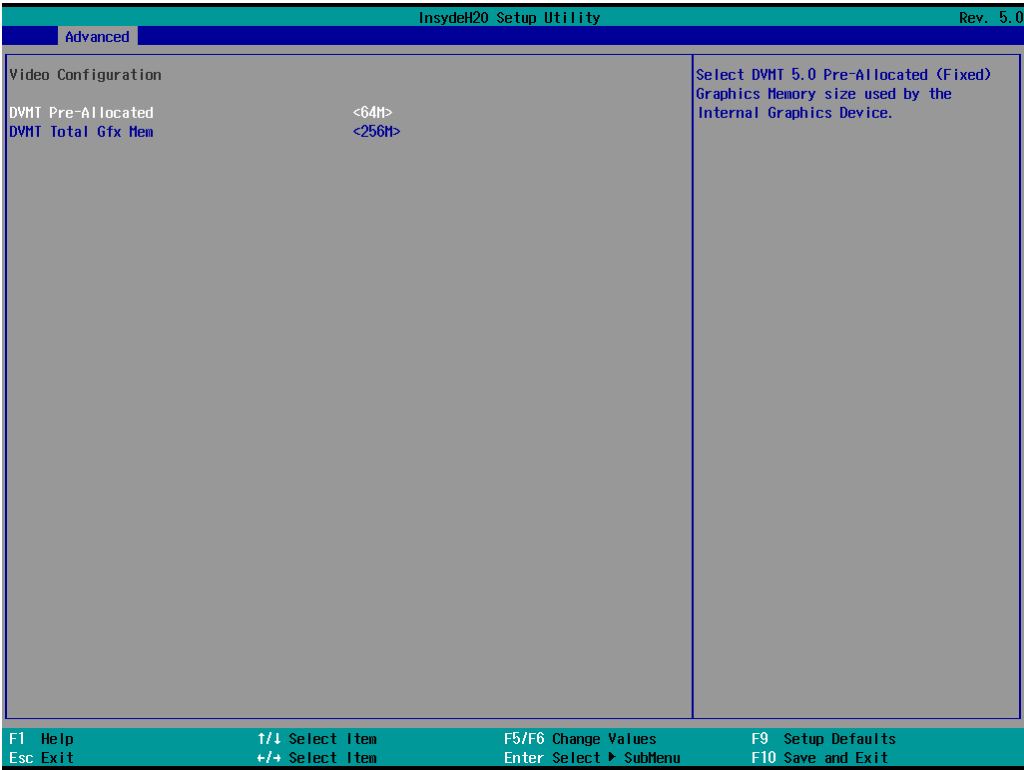
Options: Disabled, Enabled (default)

## 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

This item 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.

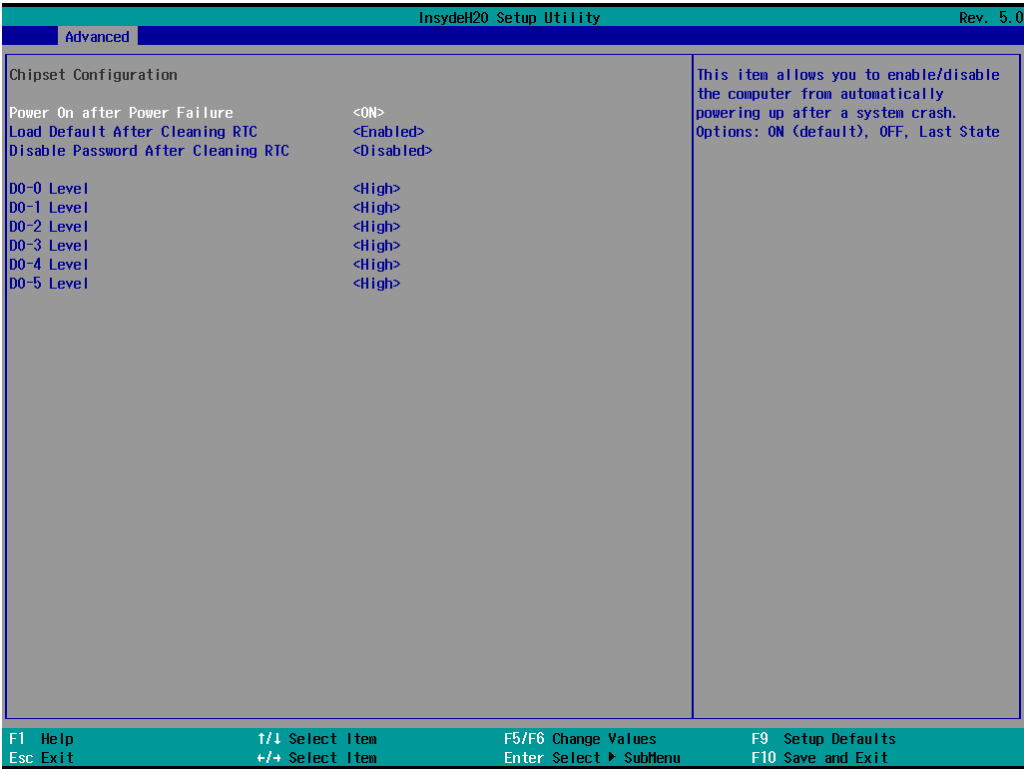
## DVMT Total Gfx Mem.

This 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 section 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

## 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 detecting RTC battery loss.

Options: Disabled, Enabled (default)

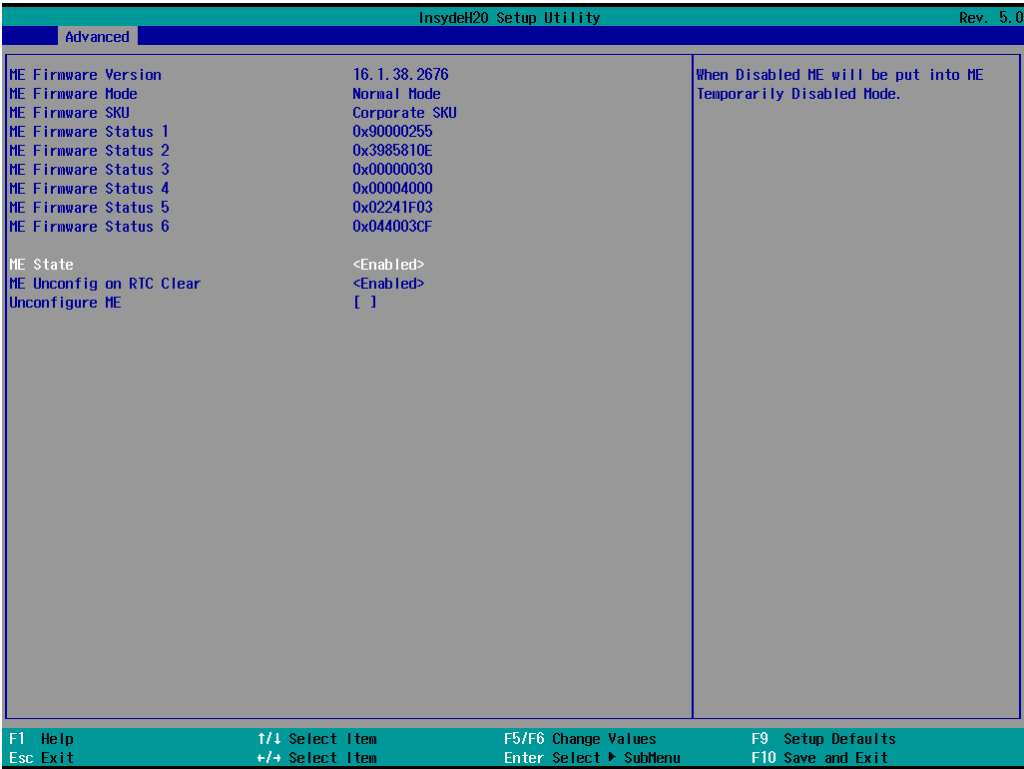
## DO-X Level (S2)

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

Options: High (default), Low

# 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.

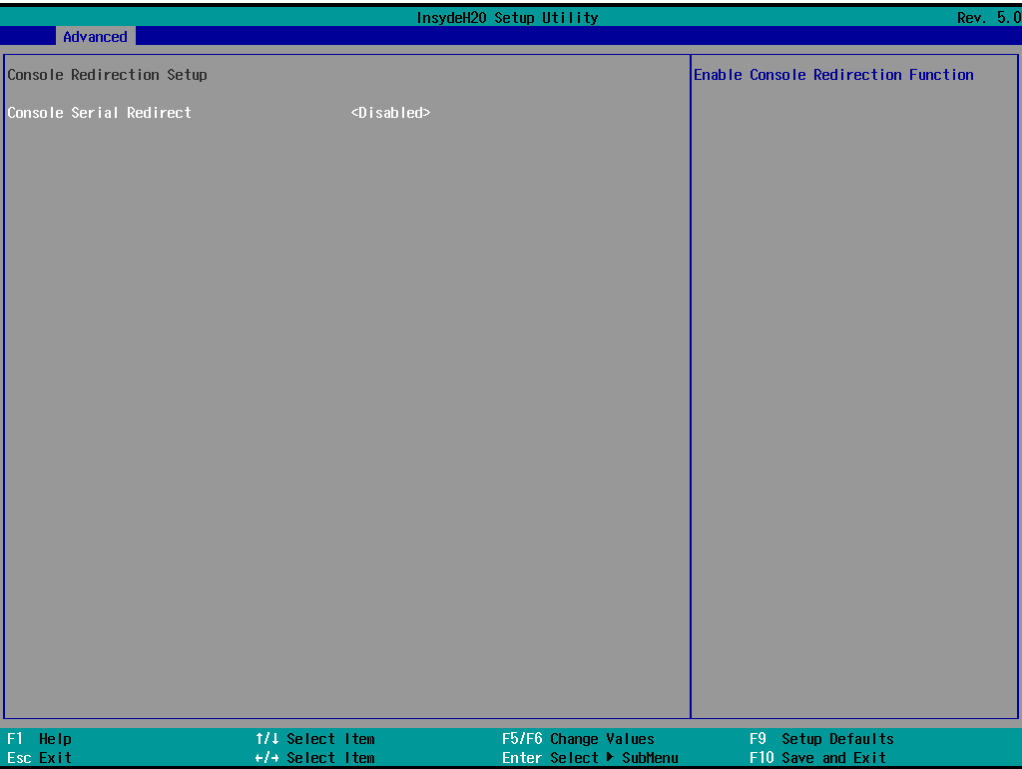
Options: Disabled, Enabled (default)

## Unconfigure ME

Unconfigure ME by resetting MEBx password to default.

# Console Redirection (S1)

This section allows you to configure the console redirection settings.



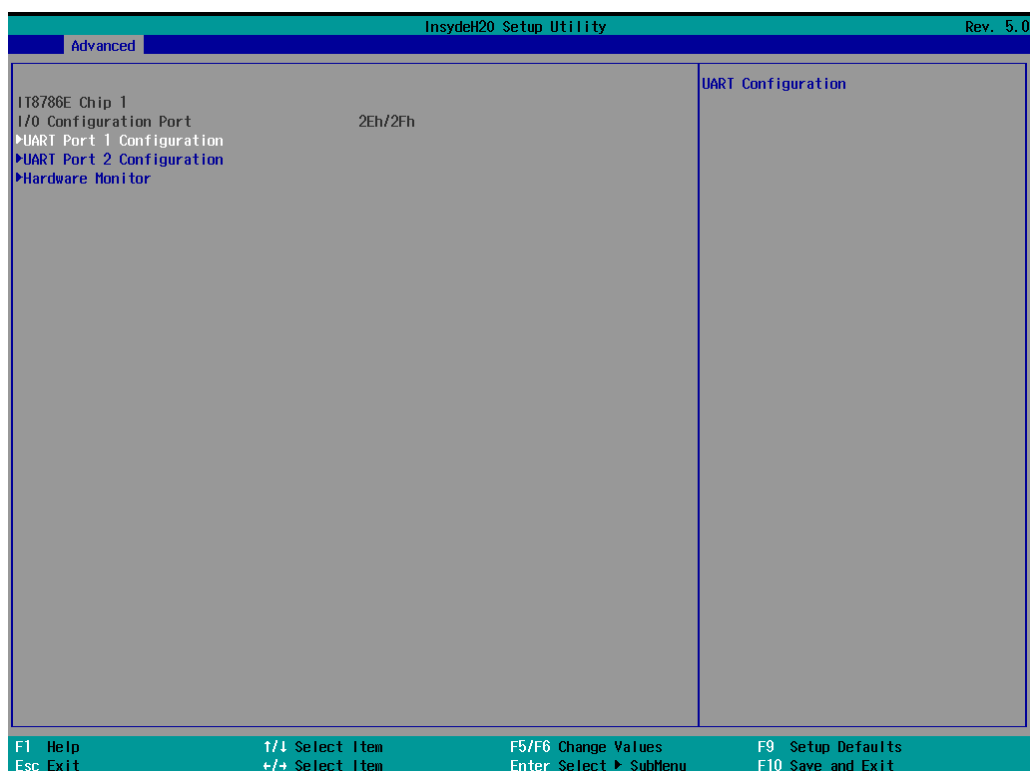
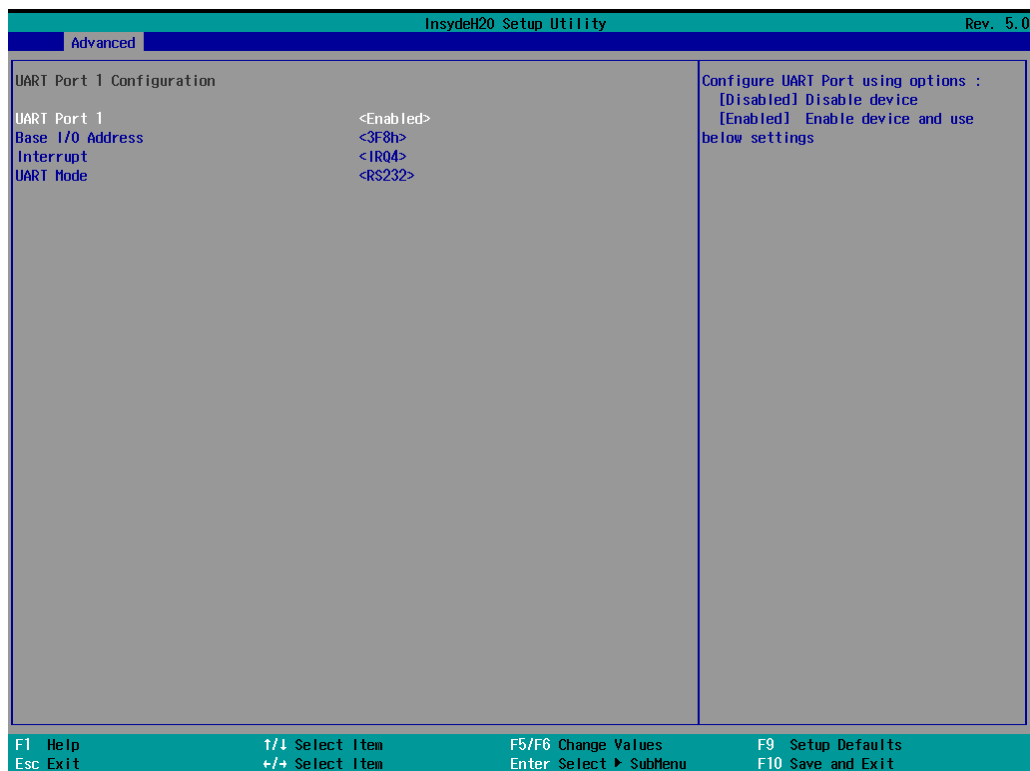
## Console Serial Redirect (S1)

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

Options: Disabled (default), Enabled

# SIO ITE8786E

This section allows users to configure SIO settings.



## UART Port X (S1)

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

Disable: Disable the UART port 1 connection

Enable: Enable the UART Port 1 connection (default)

## UART Port 2

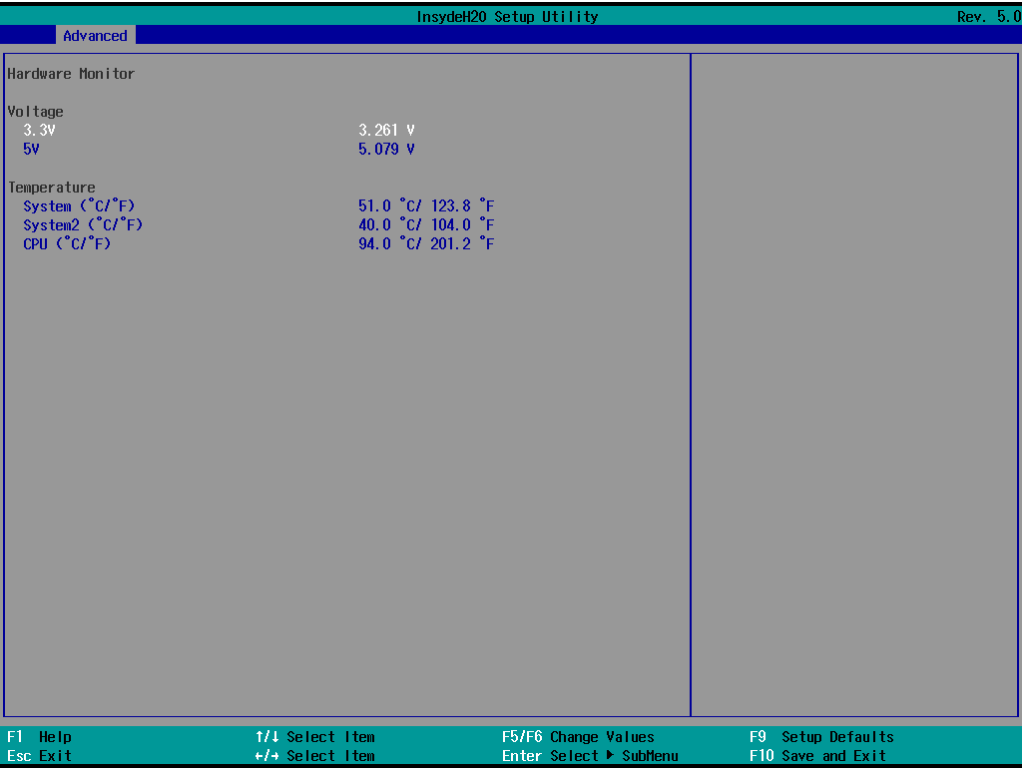
This function allows users to configure the resources for the UART port 2.

Disable: Disable the UART port 2 connection

Enable: Enable the UART Port 2 connection (default)

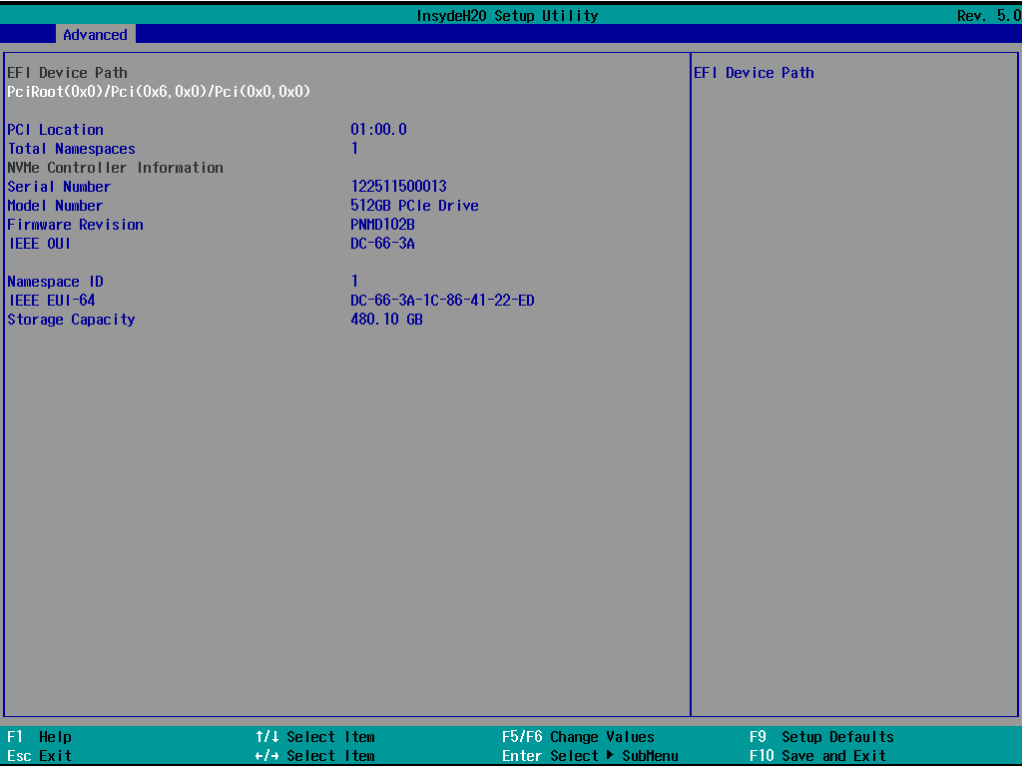
## Hardware Monitor

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



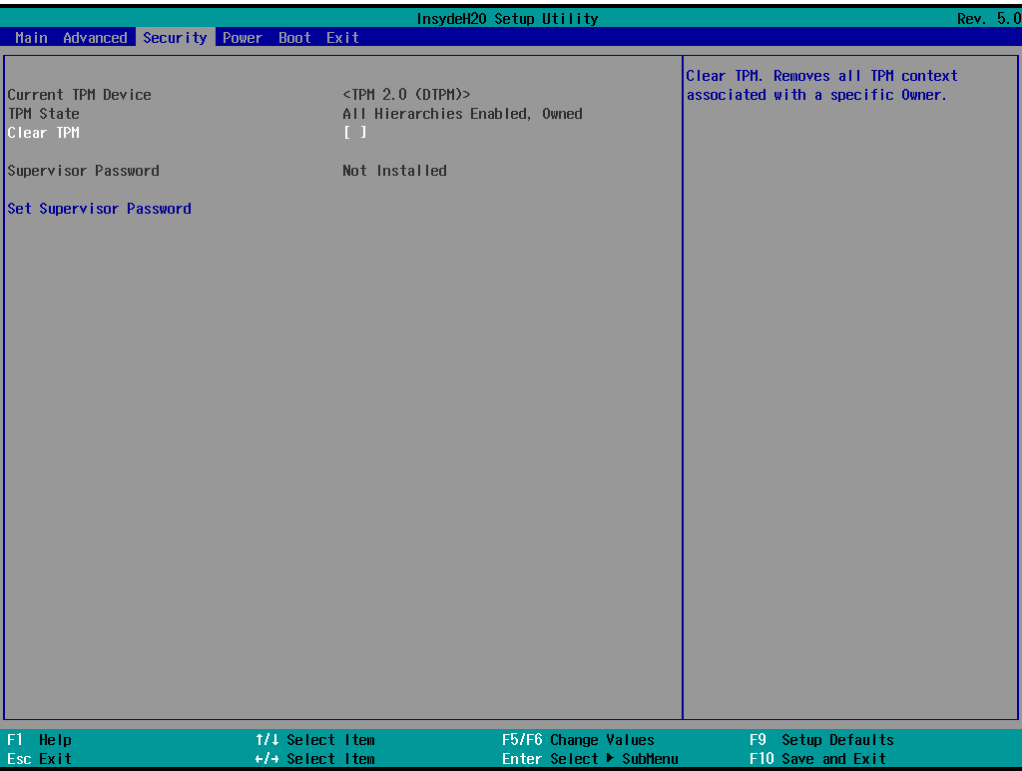
# NVM Express Information

This section allows you to view NVMe devices stats such as SN, MN, and storage capacity other storage information.



# Security Settings

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



## Current TPM Device

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

## TPM State

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

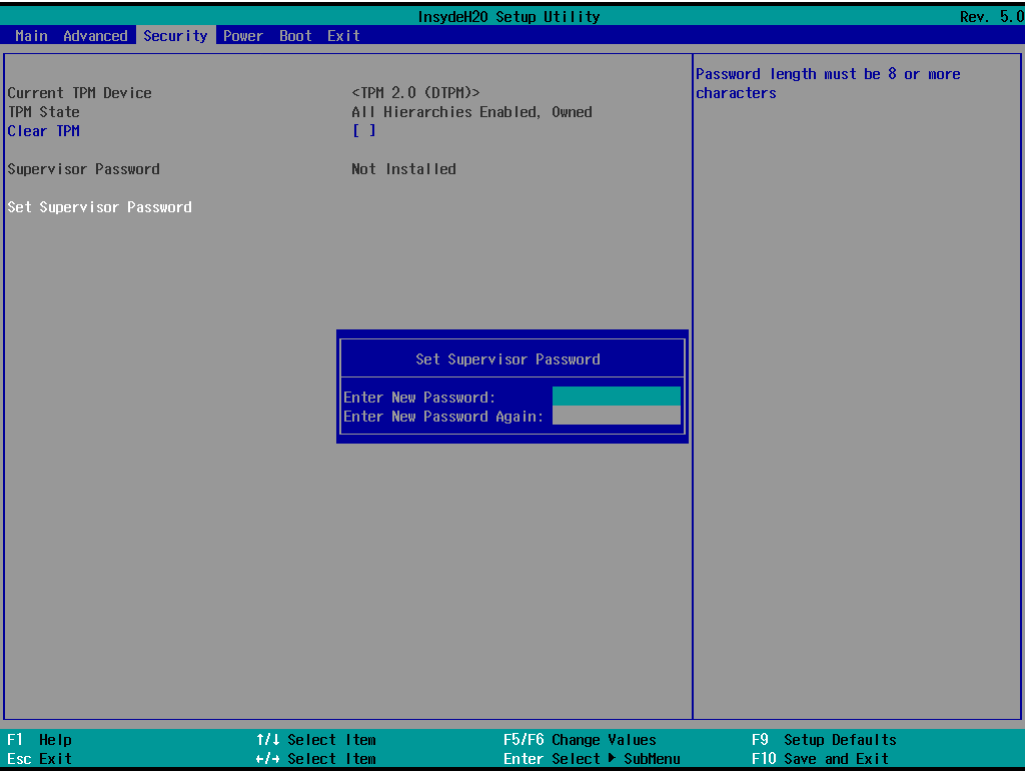
## Clear TPM

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

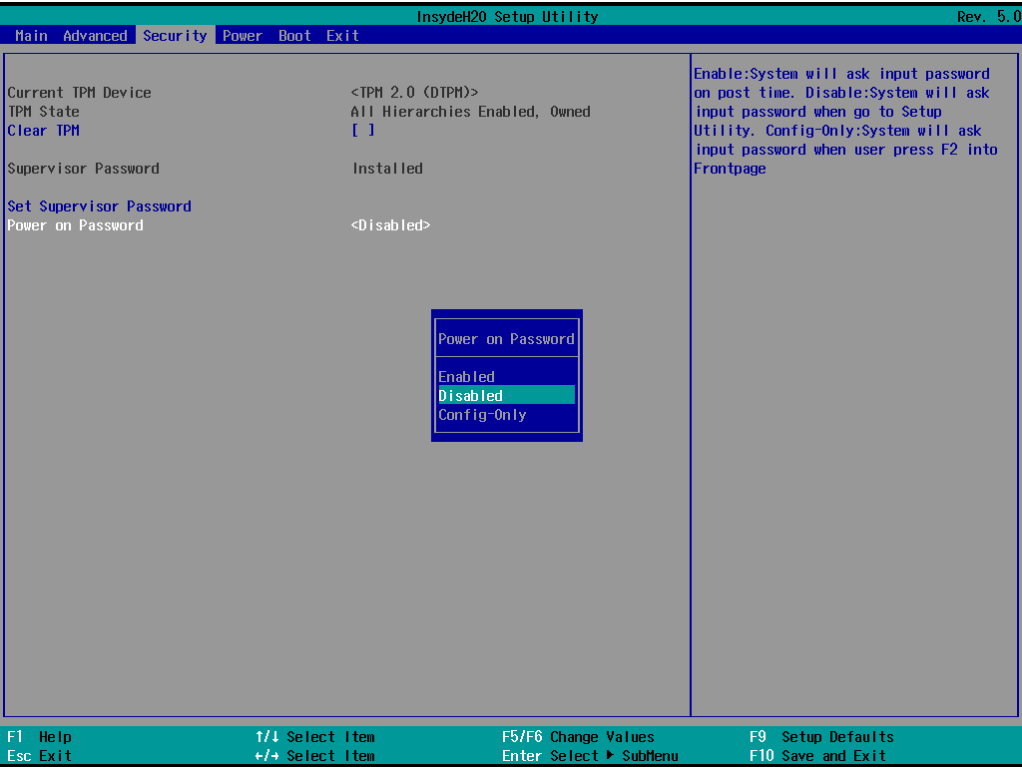
# Set Supervisor Password

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.



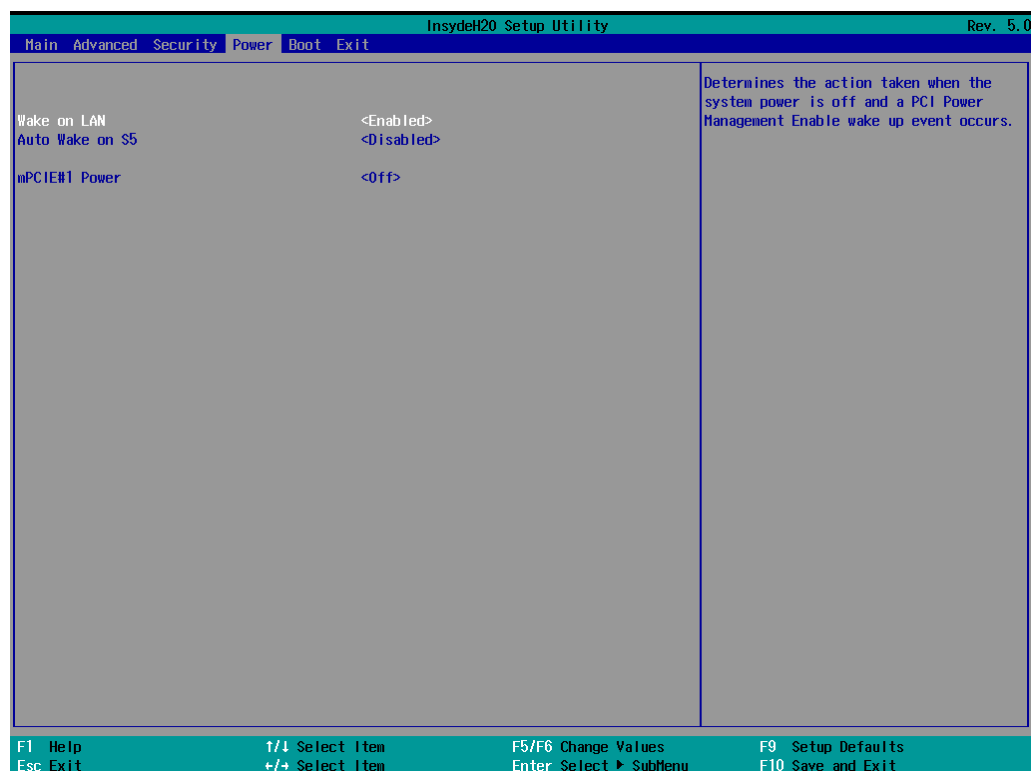
After setting the supervisor password, you can choose when the input password screen should be displayed.



- 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

This section allows users to configure power settings.



## Wake on LAN

This feature is used to wake the system using 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)

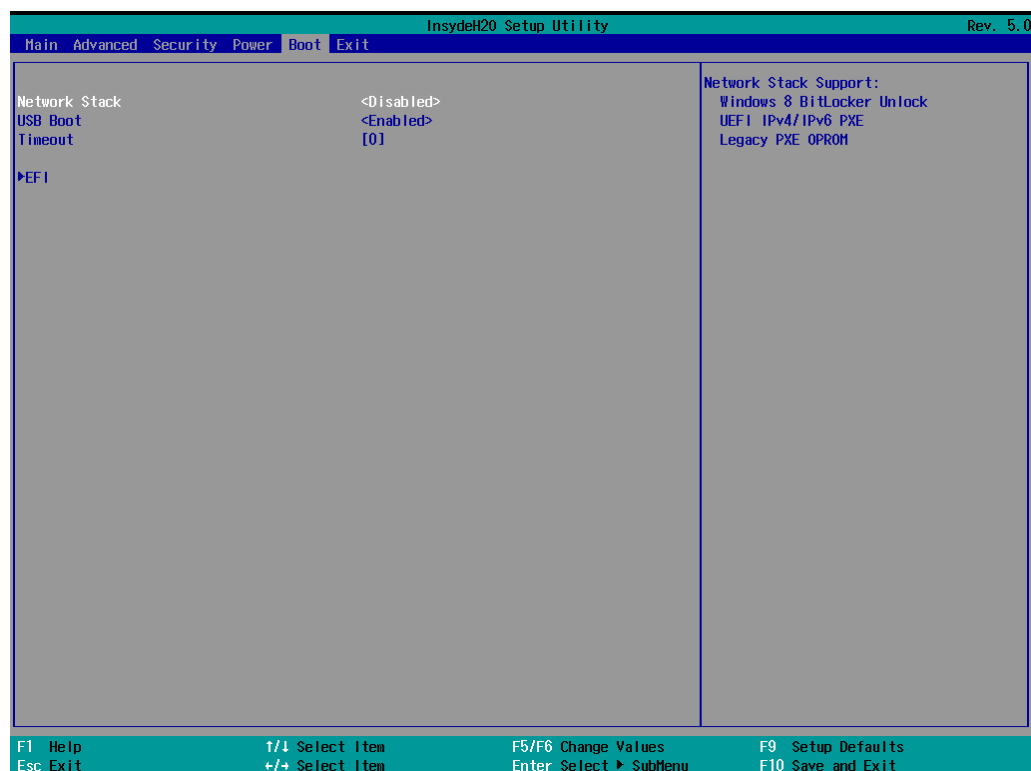
## mPCIEx Power

This item allows users to power on or power off the mPCIe ports.

Options: On, Off (default)

# Boot Settings

This 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

PXE booting is for booting a system over a network. You can start PXE over IPv4 or IPv6 using this item.

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

## USB Boot

Set booting to USB boot devices capability.

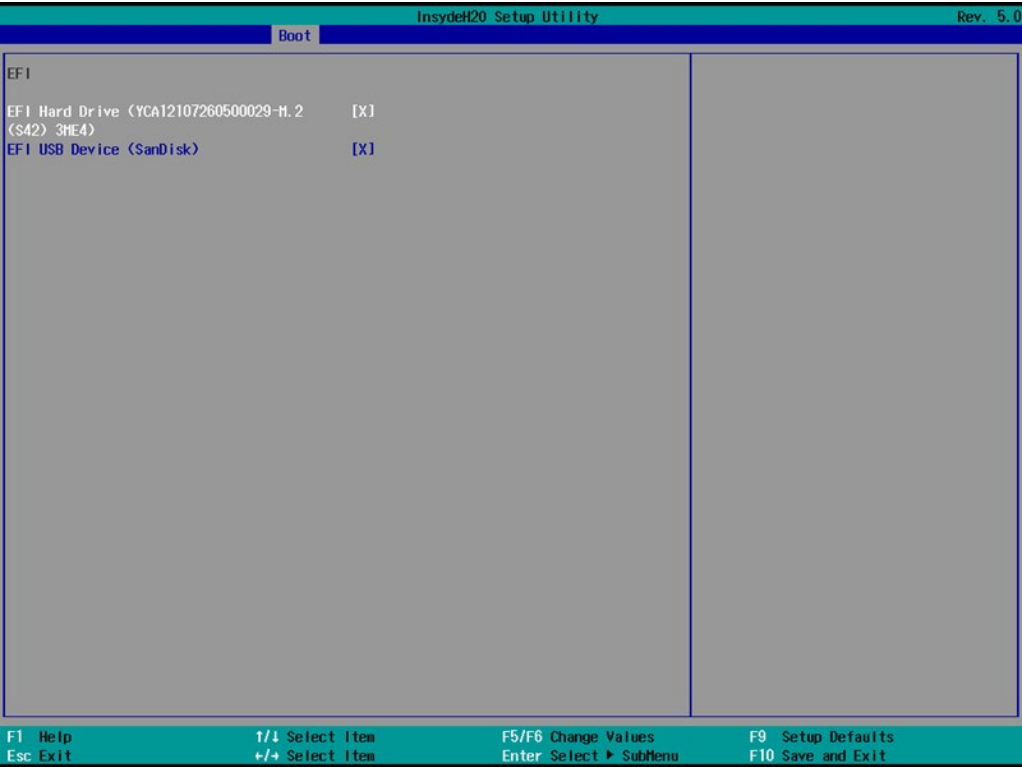
Options: Enabled (Default), Disabled

## Timeout

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

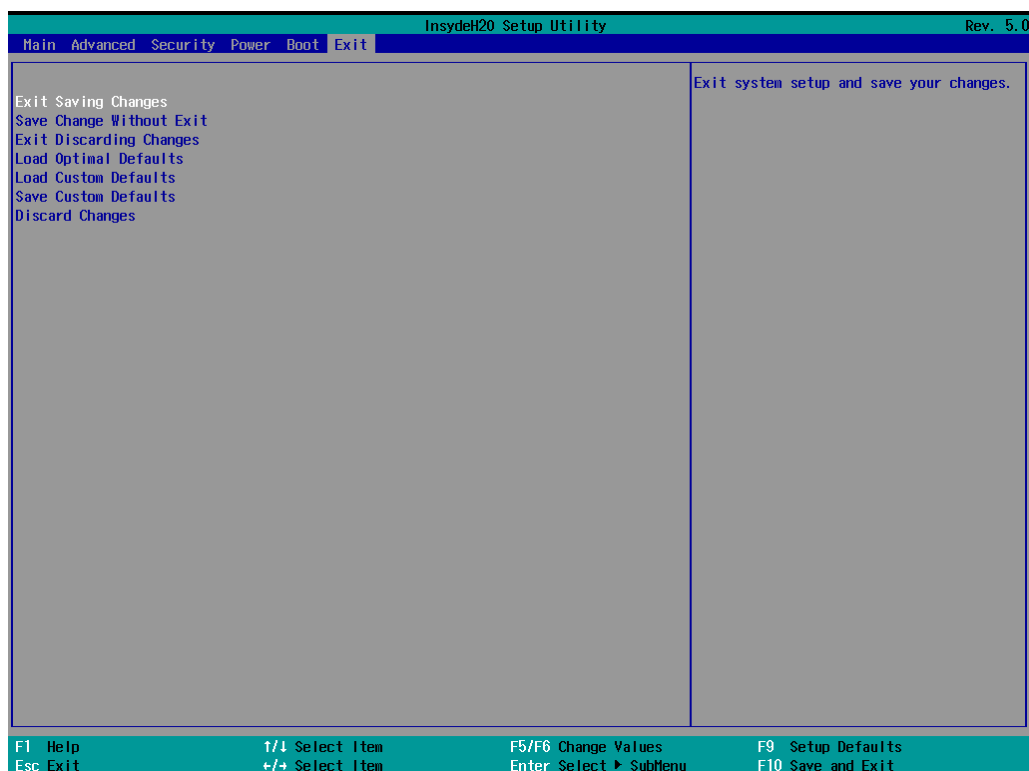
# EFI

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

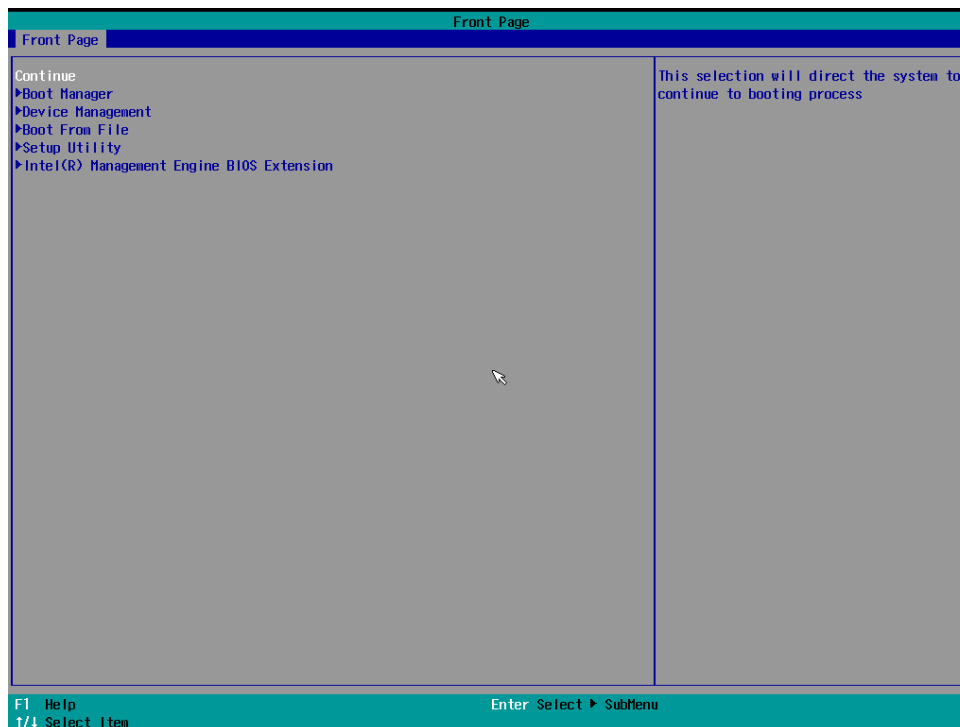


## NOTE

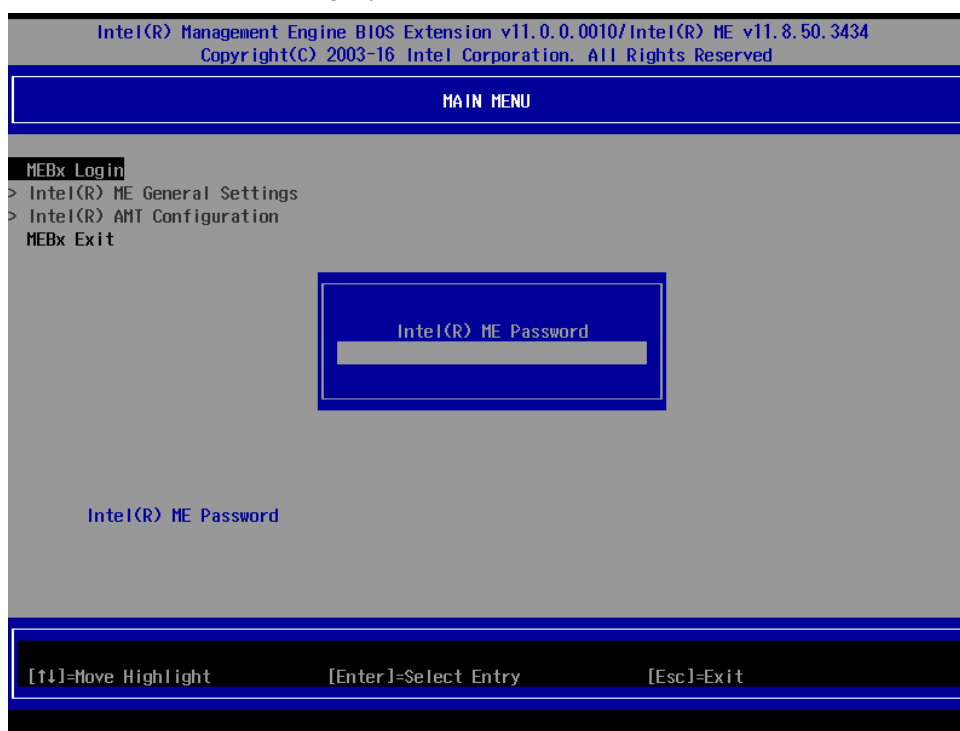
The AMT function is NOT supported in models with Intel® Celeron® and Intel® Core™ i3 processors.

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:

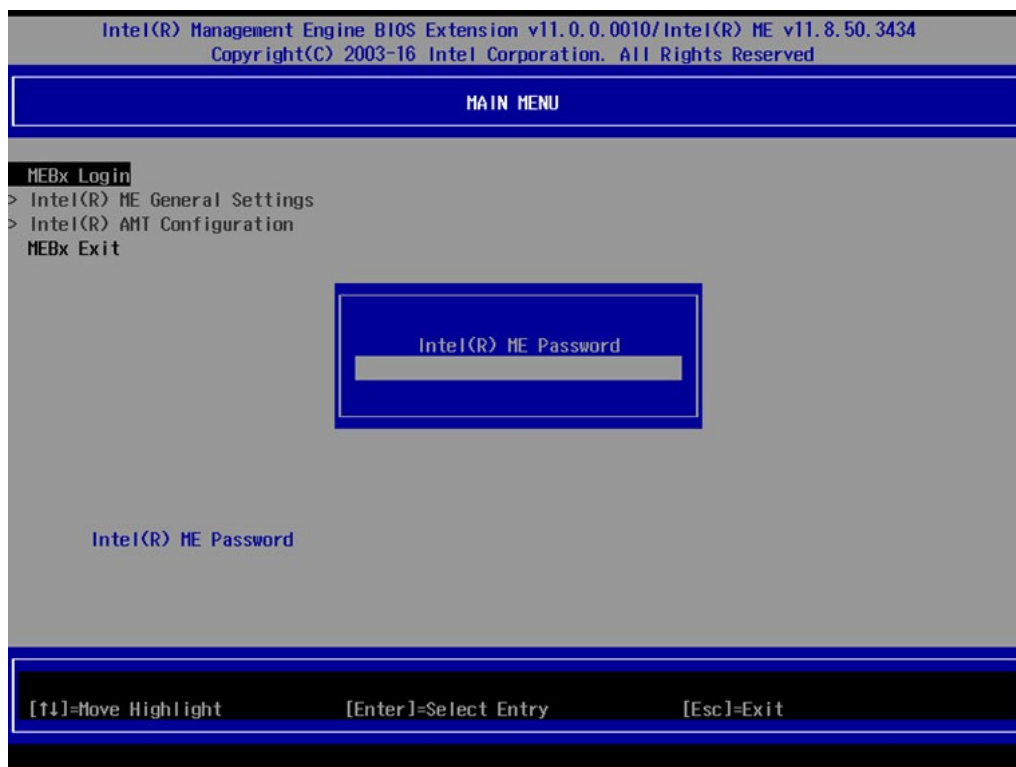
1. Select **Intel® Management Engine BIOS Extension** to enter the **AMT** configuration.



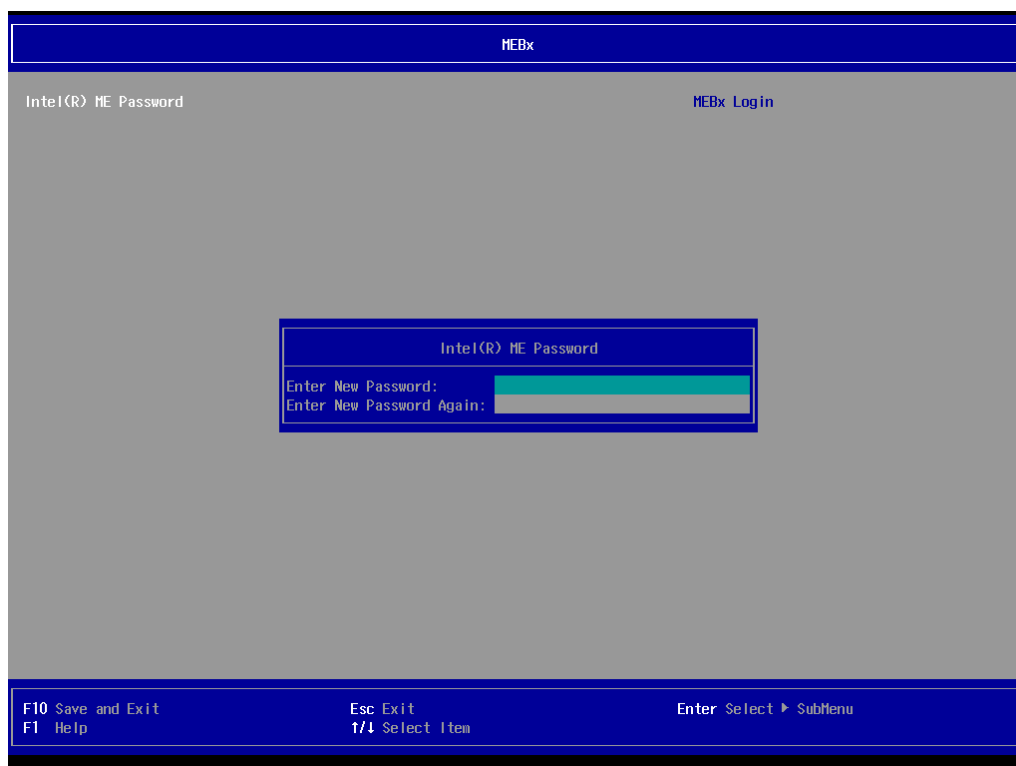
2. Press **<Enter>** to start the login procedure.



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**. Type the new password again.



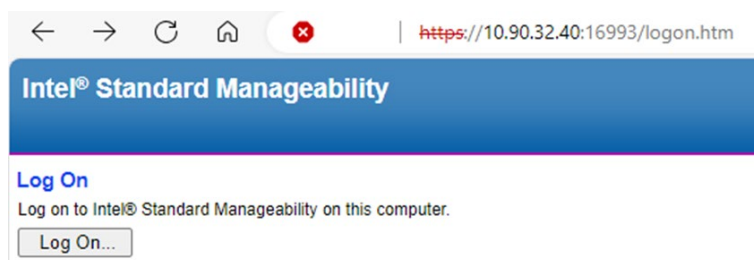
5. Select **Intel® AMT Configuration** to enable remote access without a local user present for consent, select **User Consent**, and then select **User Opt-in** and change the value to **None**.



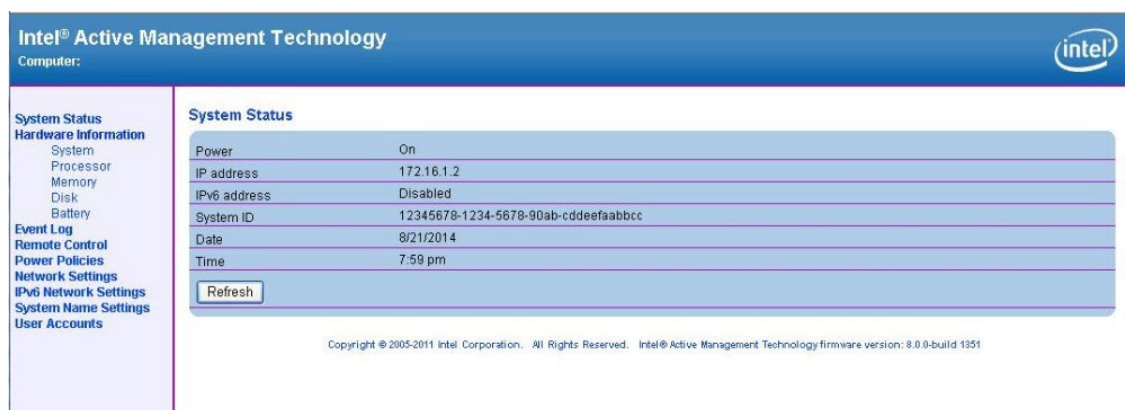
# Using AMT

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 **16993**. The AMT logon screen will appear.



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



## NOTE

The AMT port is LAN1.



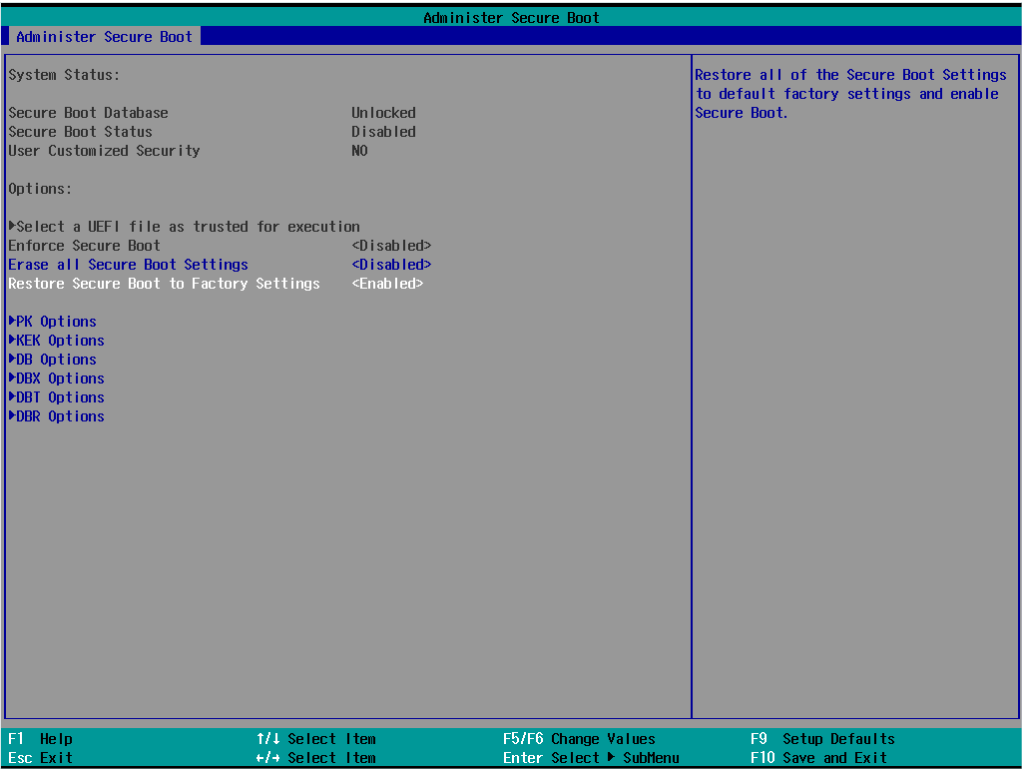
## NOTE

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](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.

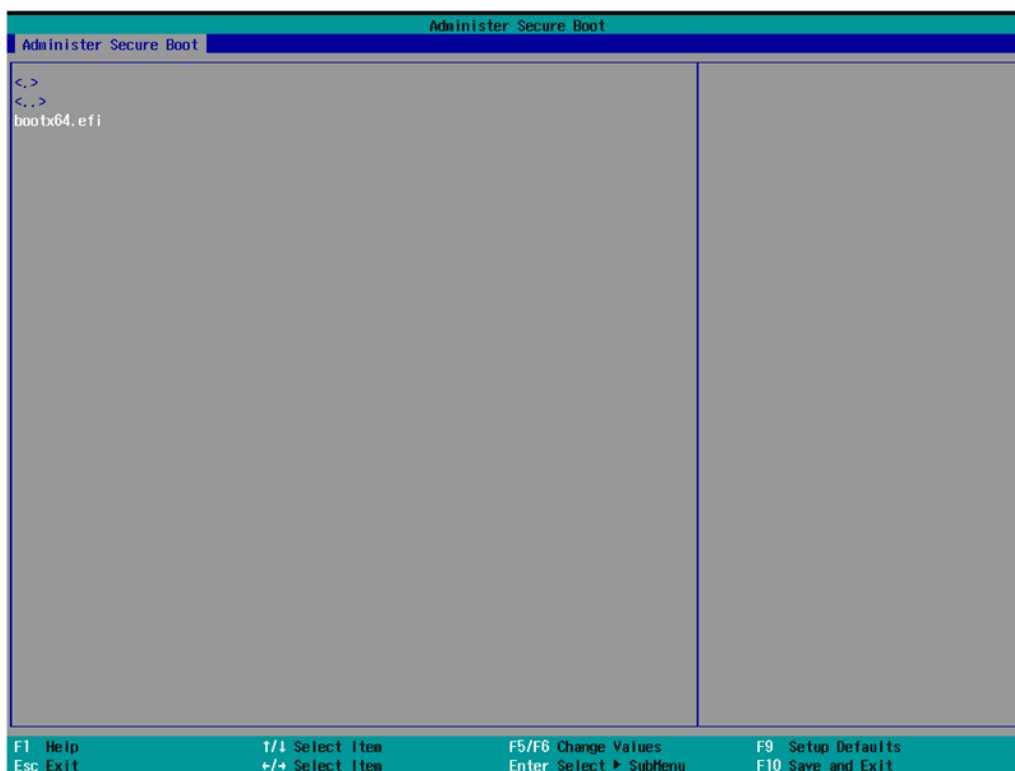
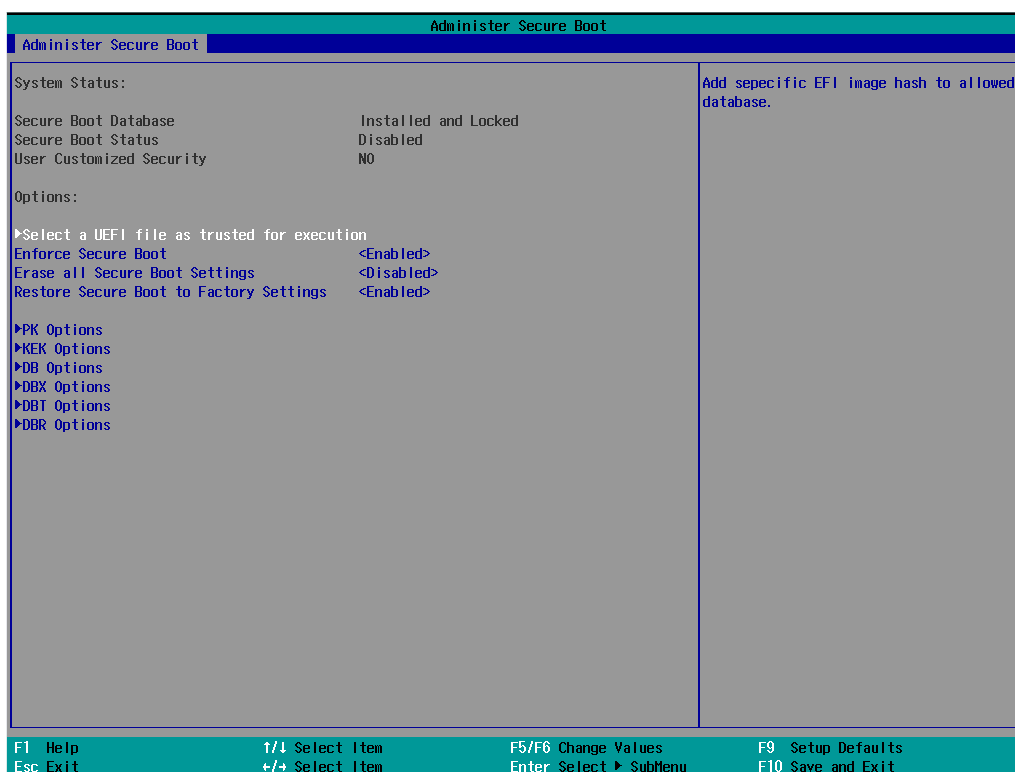
## Enabling UEFI Secure Boot

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



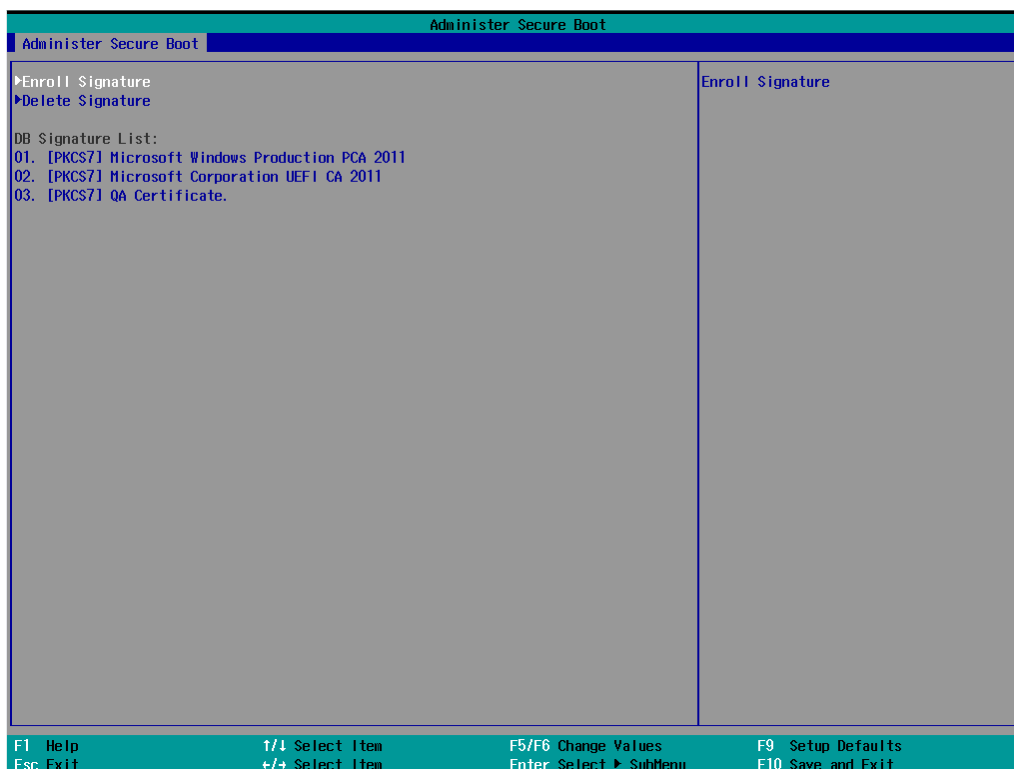
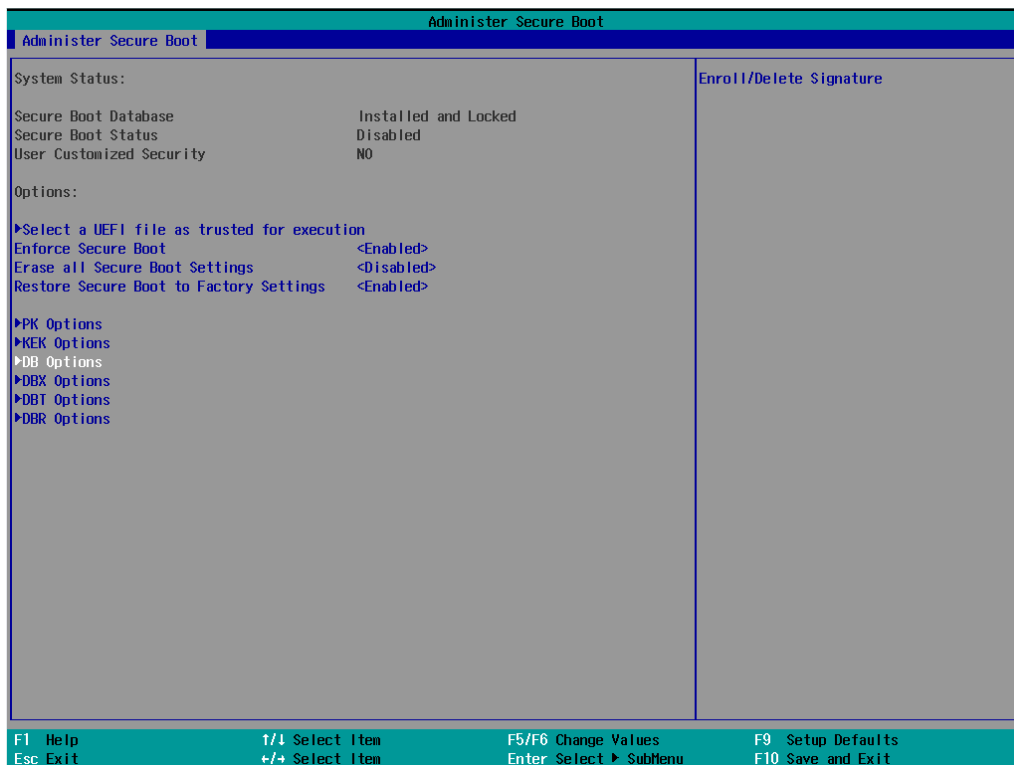
Moxa has included the Microsoft key in the BIOS by default. If you cannot boot up the computer using a non-Windows OS, use the following examples.

## Enroll EFI Image



1. Enter **Administer Secure Boot** and select the option **Select a UEFI file as trusted for execution**.
2. Enter the loader name 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.



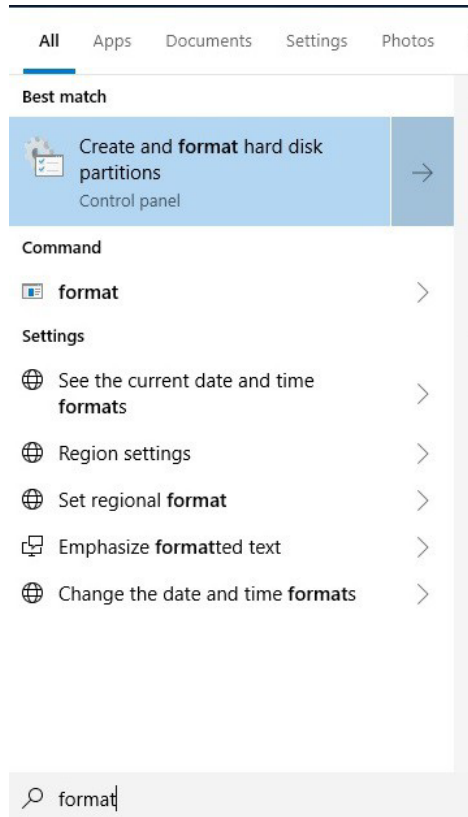
## NOTE

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.

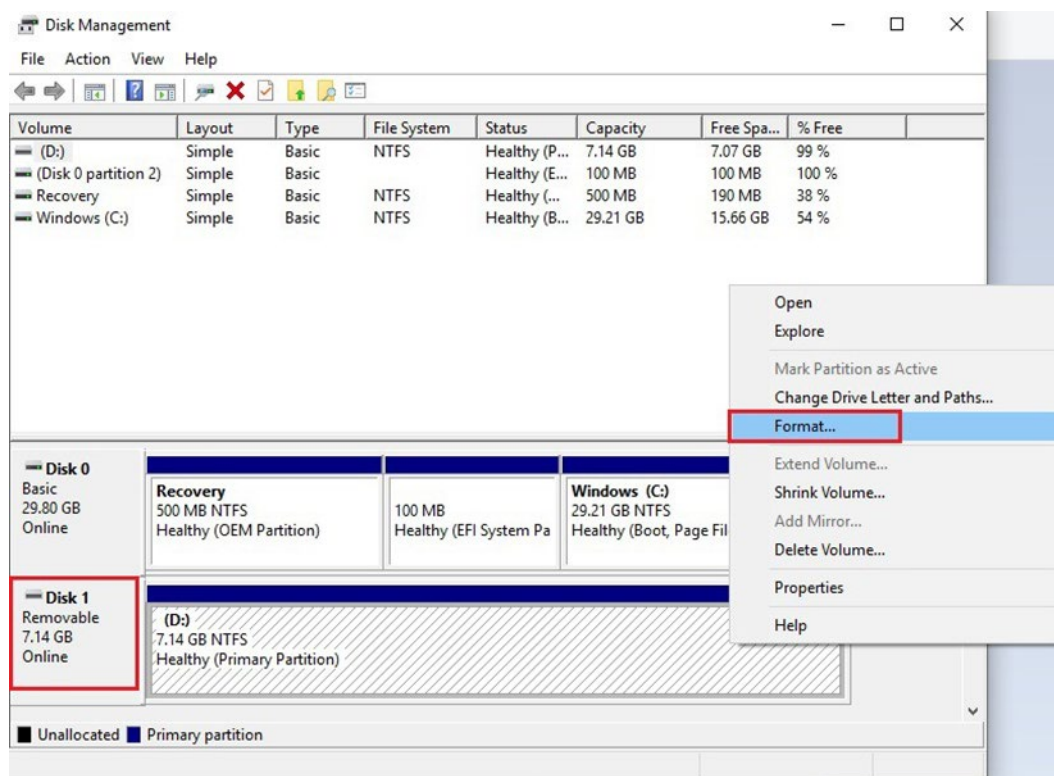
### Step 1: Create a Bootable USB Disk

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

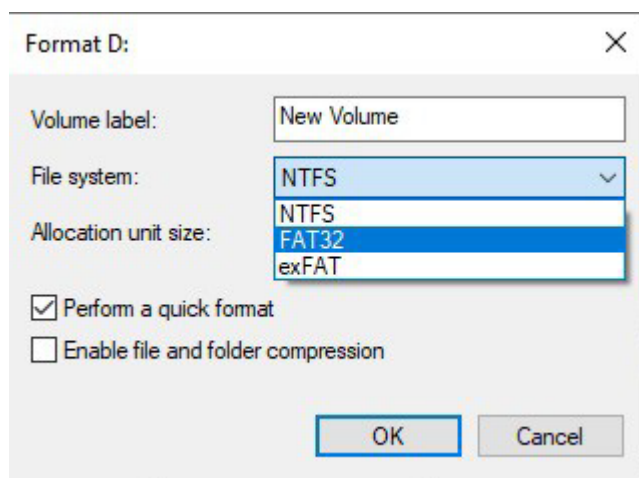
1. Insert a USB disk in the computer's USB drive.
2. Search for "format" and select **Create and format hard disk partitions**.



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 **xxxxxx.efi** (the file name is based on the upgrade file 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)

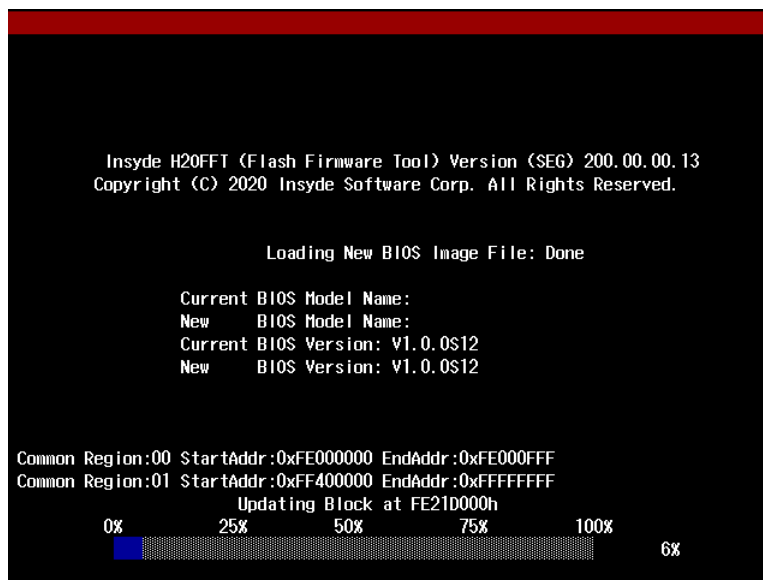
Shell> fs0:
fs0:\> xxxxxx.efi
```

4. Wait until the upgrade procedure is completed.



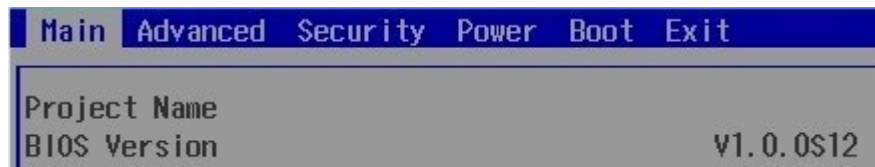
#### ATTENTION

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 the 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 user will be required to correct the interference at his or her 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.