MPC-3000 Series Hardware User Manual

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www.moxa.com/products

MPC-3000 Series Hardware User Manual

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Technical Support Contact Information

www.moxa.com/support

Table of Contents

1. Introduction

The MPC-3000 Series panel computers with dual-core x6211E or quad-core x6425E processor deliver a reliable, durable, and versatile platform for use in industrial environments. With two software selectable RS-232/422/485 serial ports and two Gigabit Ethernet ports, the MPC-3000 Series panel computers support a wide variety of serial interfaces as well as high-speed IT communications, all with native network redundancy. Both regular and wide-screen models are available to meeting the display needs of various field applications.

Package Checklist

Each model is shipped with the following items:

- 1 MPC-3000 Series panel computer
- 1 2-pin terminal block for DC power input
- 1 10-pin terminal block for DIO
- 1 2-pin terminal block for remote power switch
- Panel-mounting kit
- Quick installation guide (printed)
- Warranty card

NOTE

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

Product Features

MPC-3000 computers include the following features:

- Panel computers with various screen sizes
- Intel Atom® x6211E dual-core or x6425E quad-core processor
- -30 to 60°C operation temperature, fanless and without a heater
- 400 / 1000 nit sunlight-readable LCD
- Glove-friendly, multi-touch screen
- Class 1 Division 2, ATEX Zone 2, and IECEx compliant
- 12/24 VDC power input

MPC-3000 Hardware Specifications

NOTE

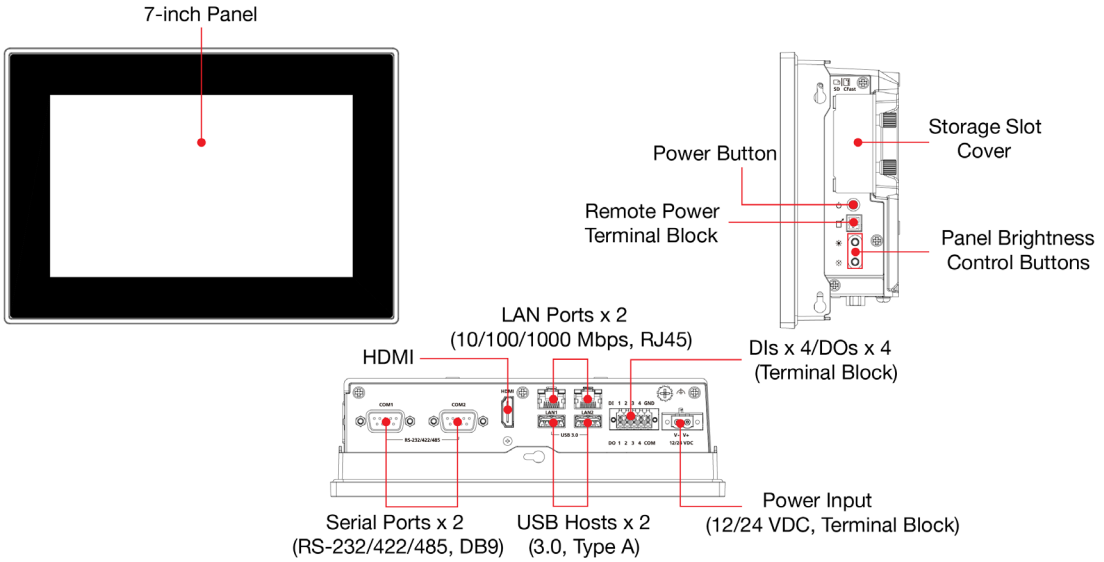
The latest specifications for Moxa's products can be found at https://moxa.com.

2. Hardware Introduction

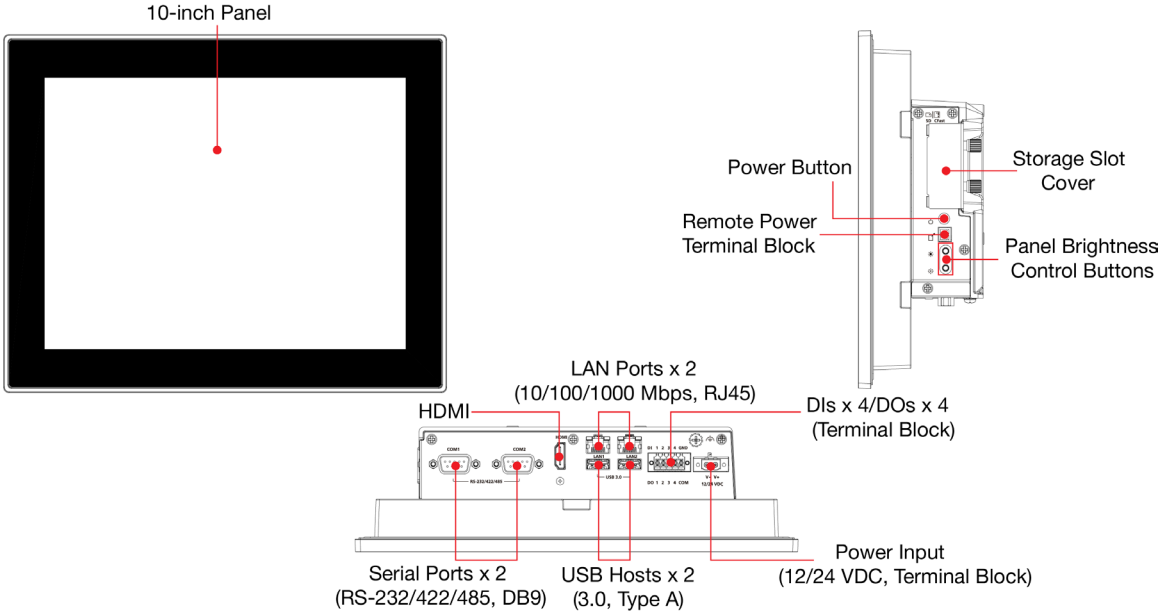
This chapter introduces the hardware design of the MPC-3000 Series, including the appearance and dimensions. In addition, various peripherals are also introduced for users to install their applications at different field sites.

Appearance

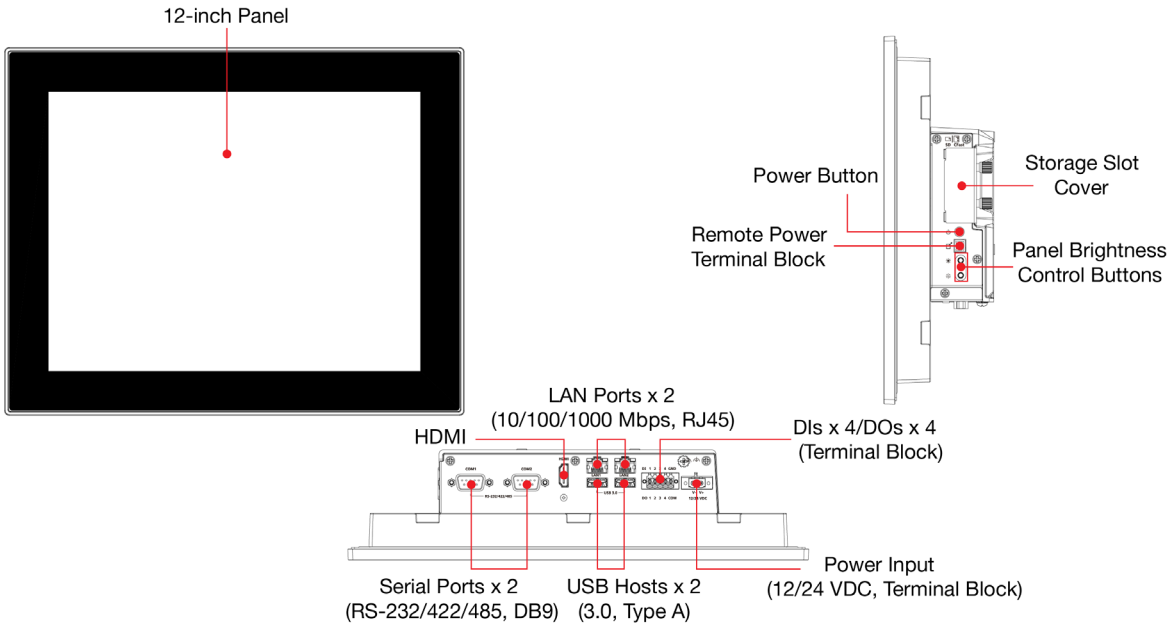
MPC-3070W Models



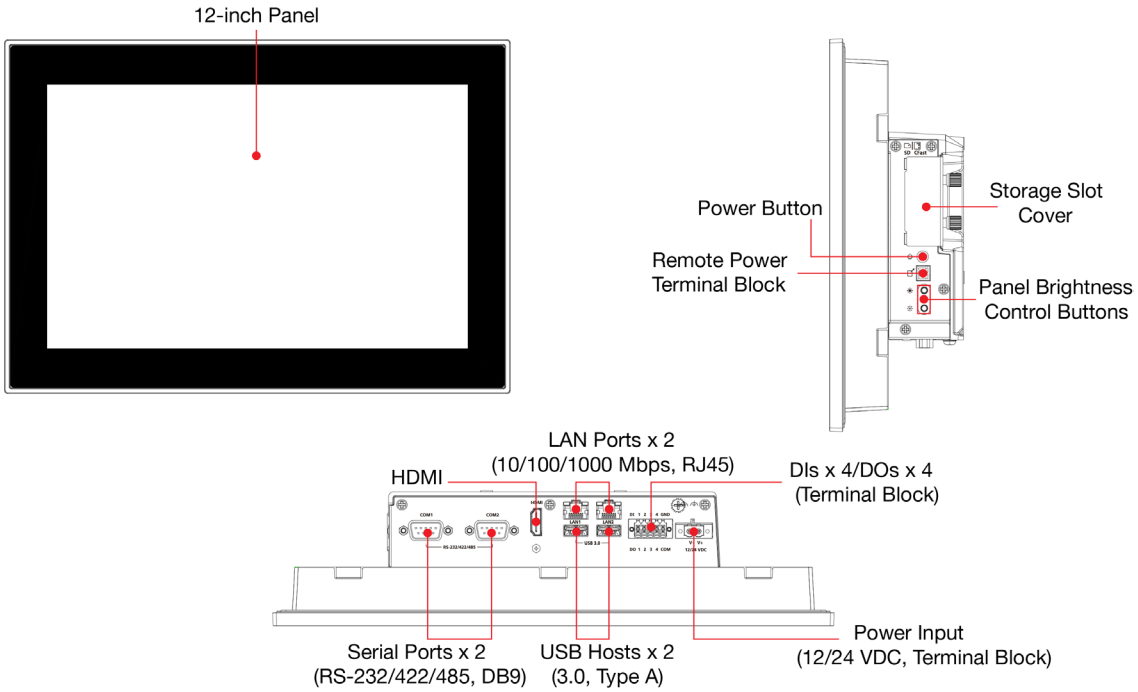
MPC-3100 Models



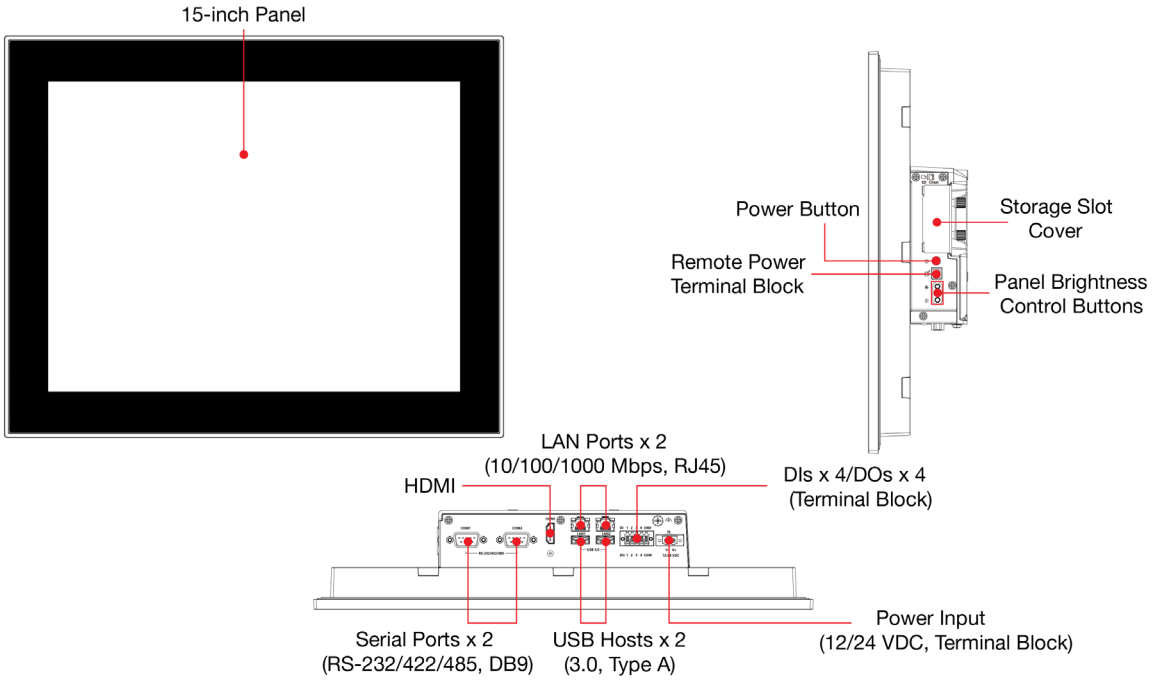
MPC-3120 Models



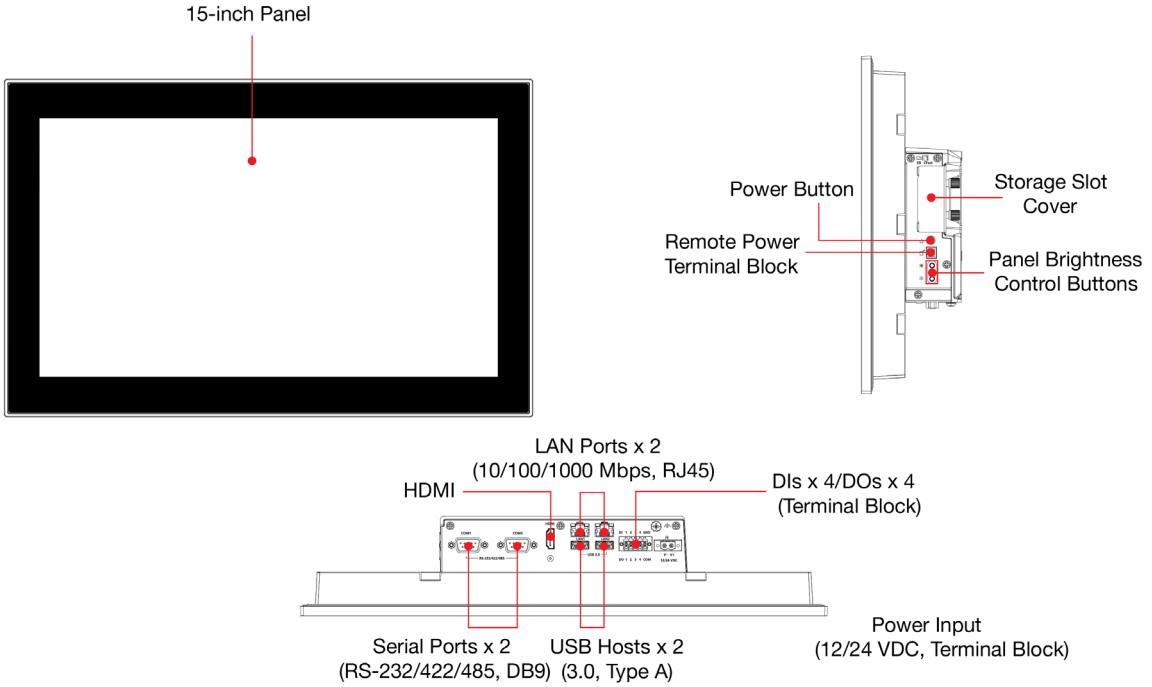
MPC-3120W Models



MPC-3150 Models



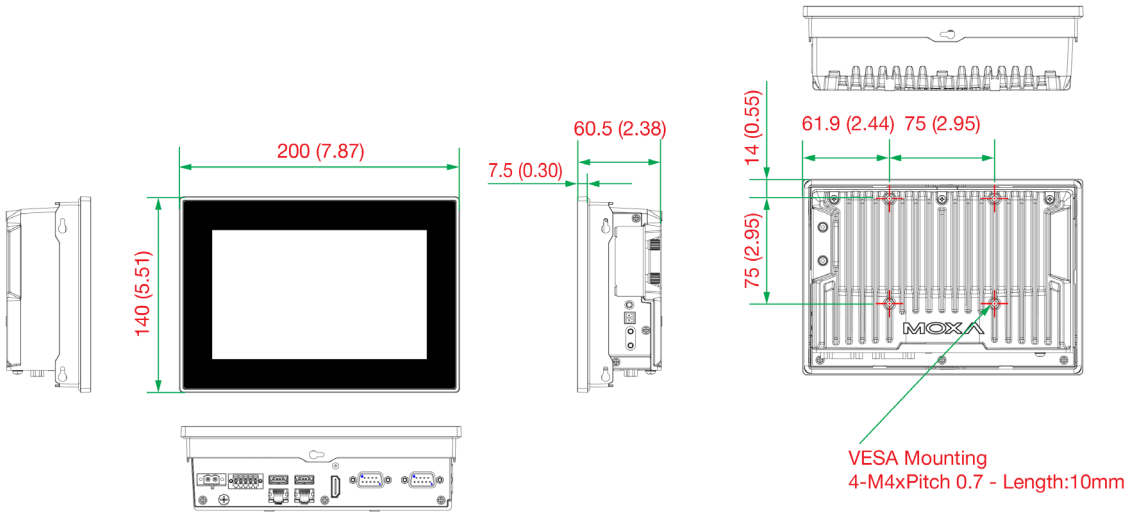
MPC-3150W Models



Dimensions

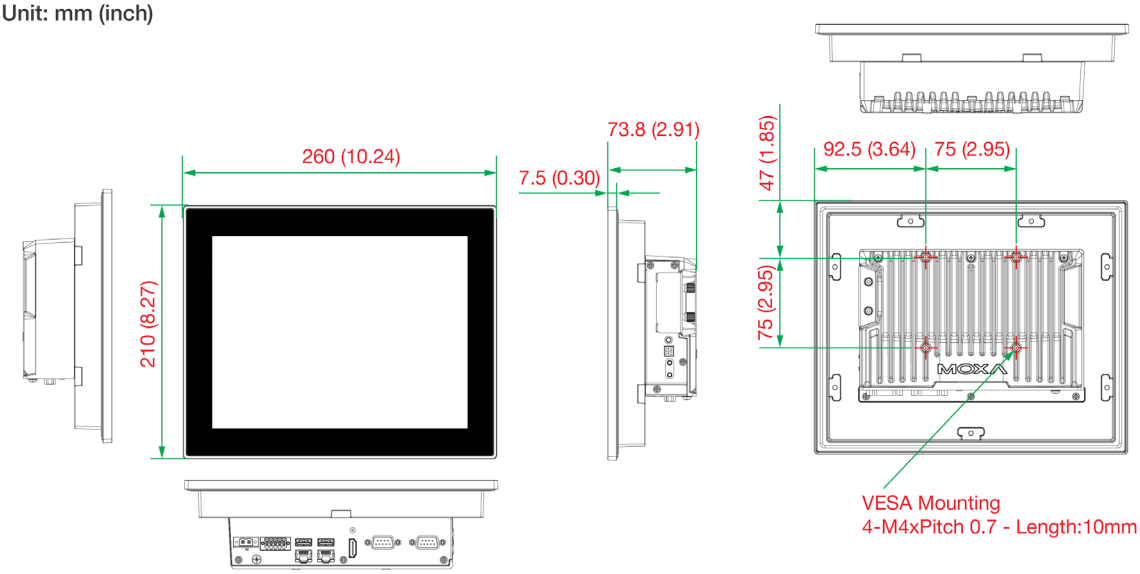
MPC-3070W Models

Unit: mm (inch)



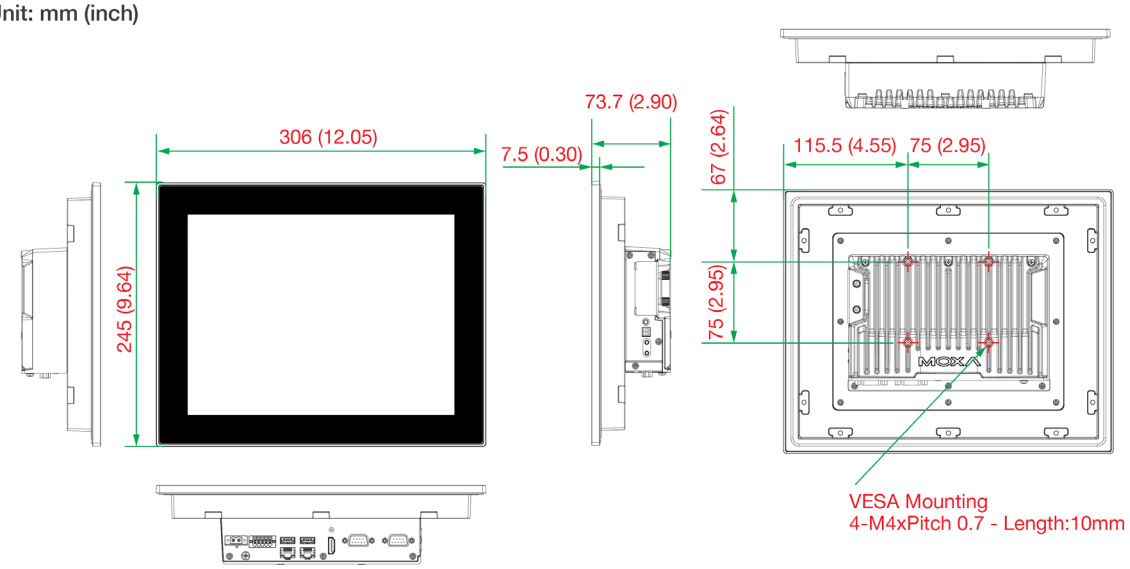
MPC-3100 Models

Unit: mm (inch)



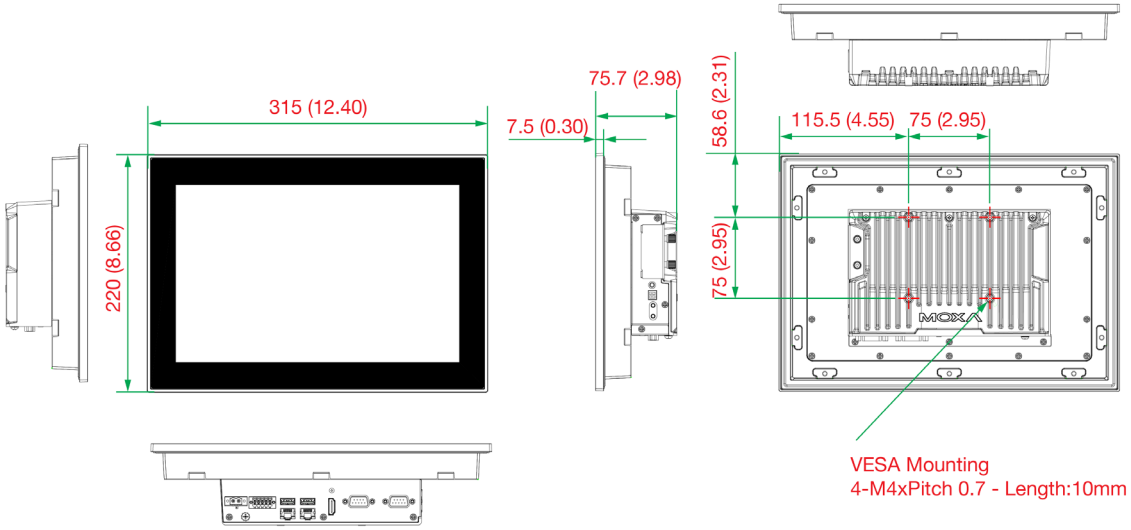
MPC-3120 Models

Unit: mm (inch)



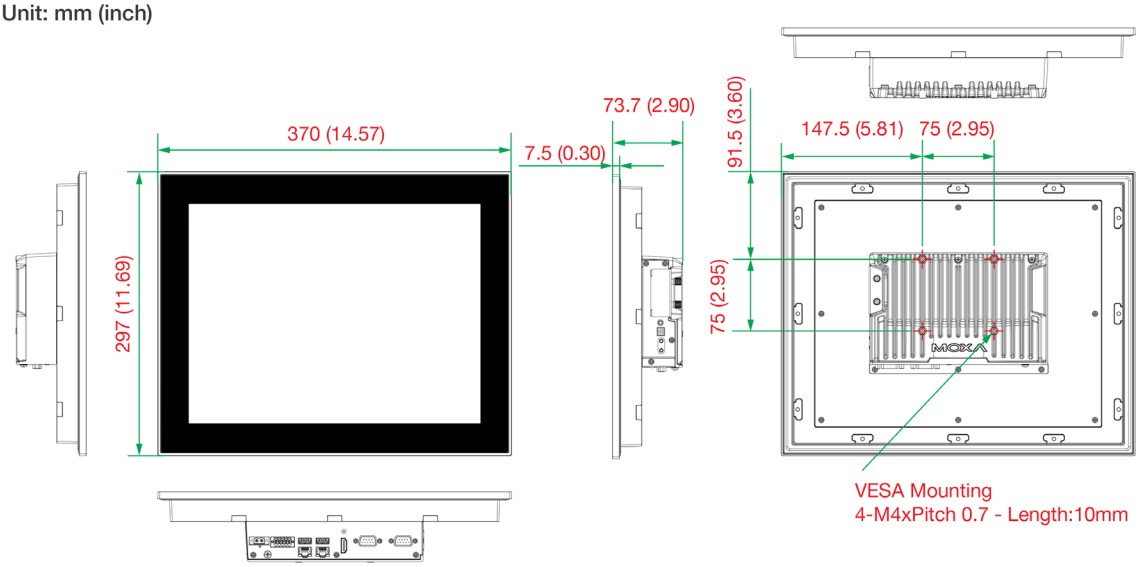
MPC-3120W Models

Unit: mm (inch)



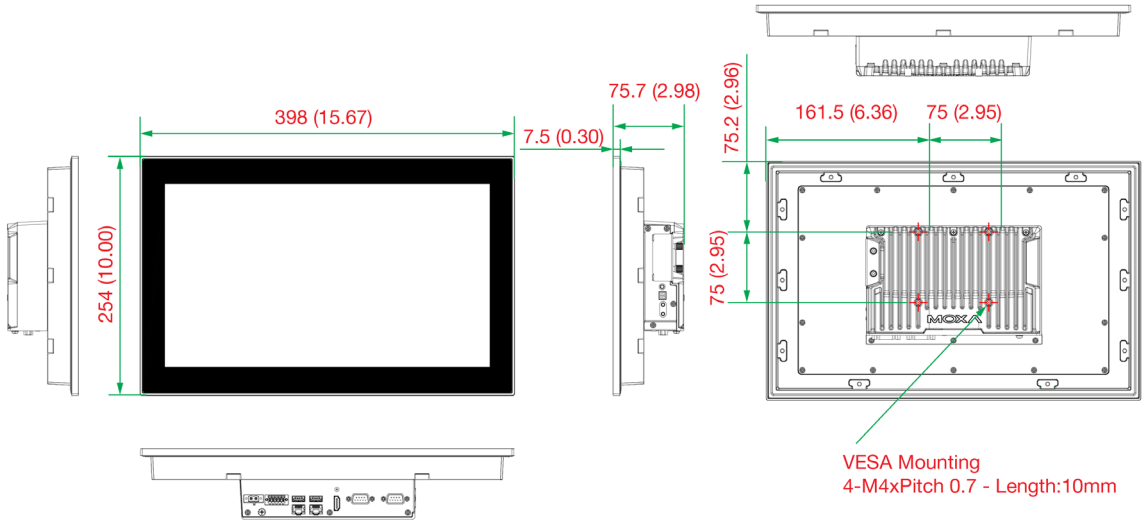
MPC-3150 Models

Unit: mm (inch)



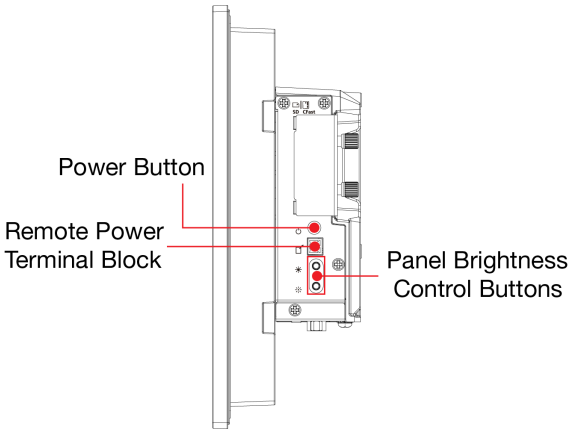
MPC-3150W Models

Unit: mm (inch)



Display Control Buttons

The MPC-3000 is provided with three display-control buttons on the right panel.



The display-control buttons can be used as described in the following table.

Symbol and Name	Usage	Function
Power	Press	Power on OR Enter sleep or hibernation mode OR Wake up **NOTE:** You can modify the function of the Power button in the OS settings menu
	Press and hold for 4 seconds	Power off
Brightness +	Press	Manually increase the brightness of the panel
Brightness -	Press	Manually decrease the brightness of the panel

3. Hardware Connection Description

In this chapter, we describe how to install the MPC-3000 and connect the MPC-3000 to the network and to various devices.

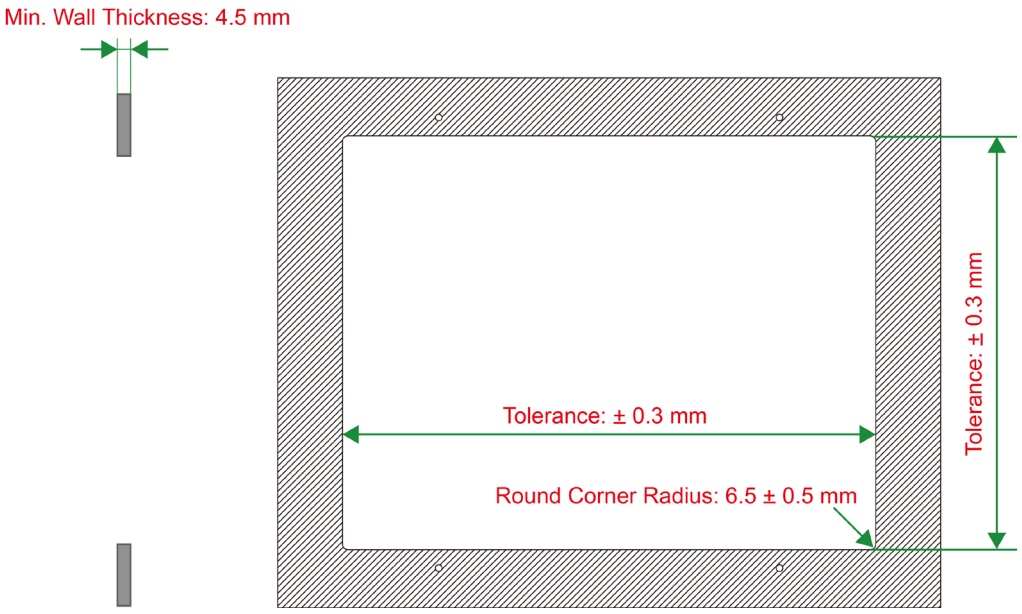
Hardware Installation

ATTENTION

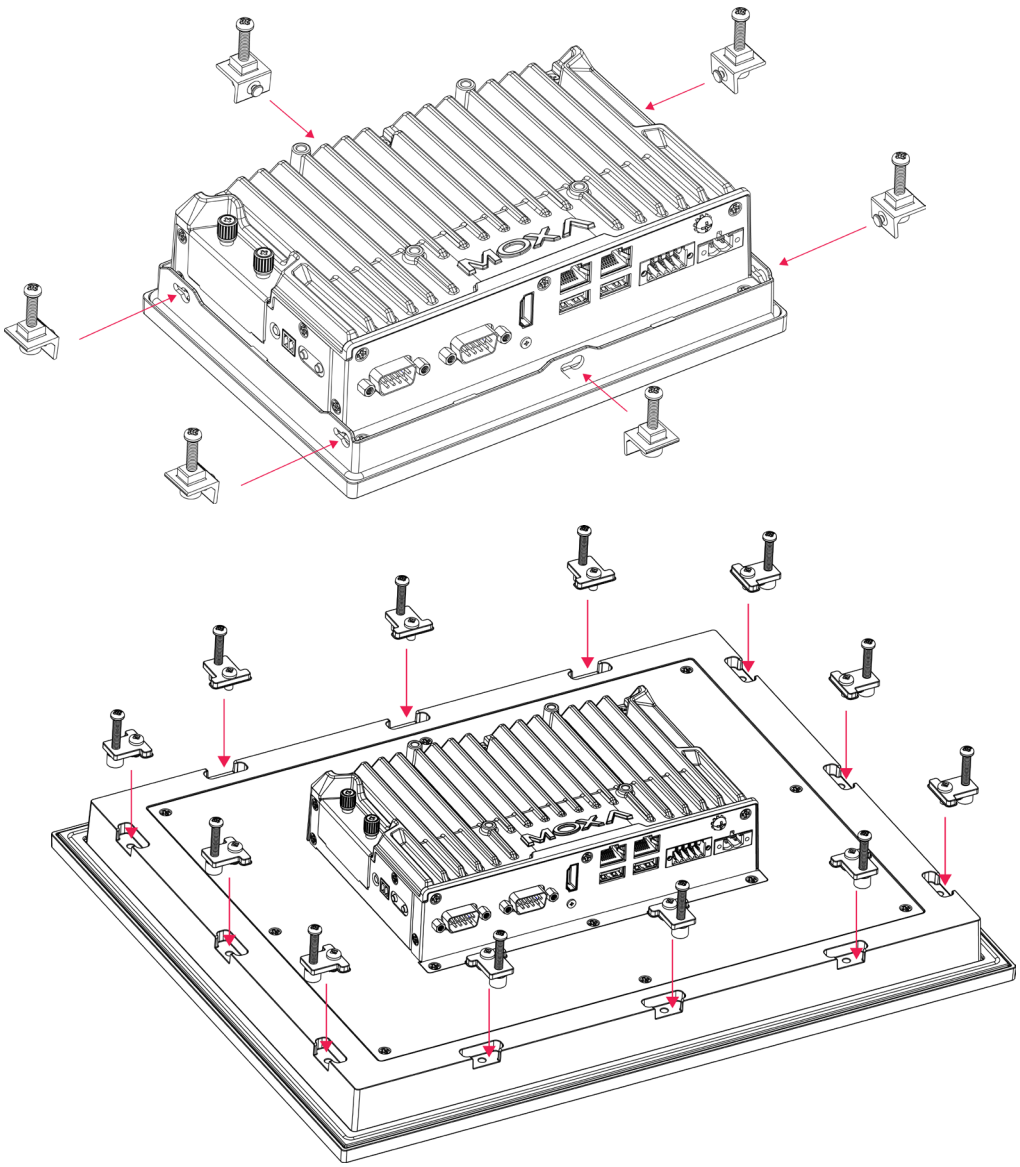
All the installations must be installed by skilled persons to avoid any equipment damage.

Panel Mounting

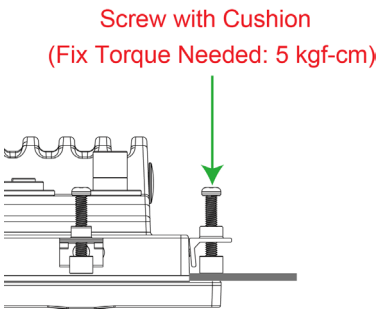
A panel-mounting kit consisting of 6 (MPC-3070W), 7 (MPC-3100), 10 (MPC-3120/3120W), 11 (MPC-3150W) or 12 (MPC-3150) mounting clamps is provided in the MPC-3000 package. Details on the dimension tolerance and the cabinet space required to panel mount the MPC-3000 are illustrated in the following sections:



To install the panel-mounting kit on the MPC-3000, insert the mounting clamps in the mounting holes provided on the rear panel and slide the clamps to the ends of the panel as shown in the following figures:



Use a torque of 5 kgf-cm to secure the mounting screws to fasten the panel-mounting kit onto the wall.



Ensure that there is adequate space behind the panel for ventilation, and that the panel material and thickness can support the weight of the device.

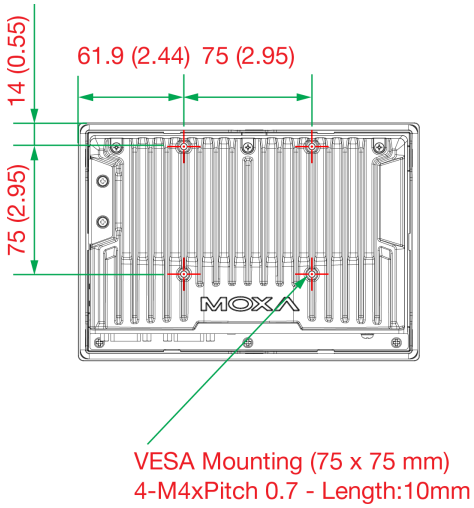
VESA Mounting (optional)

ATTENTION

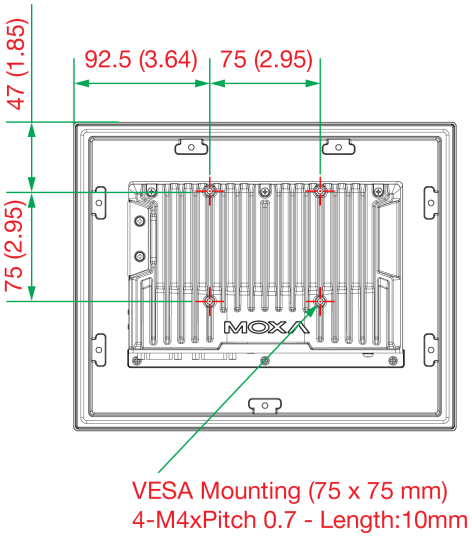
VESA mounting is not applicable to the marine applications.

The VESA mounting installation directions are shown below.

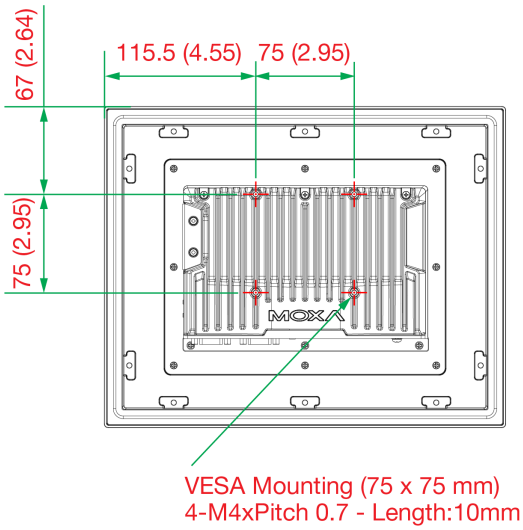
MPC-3070W



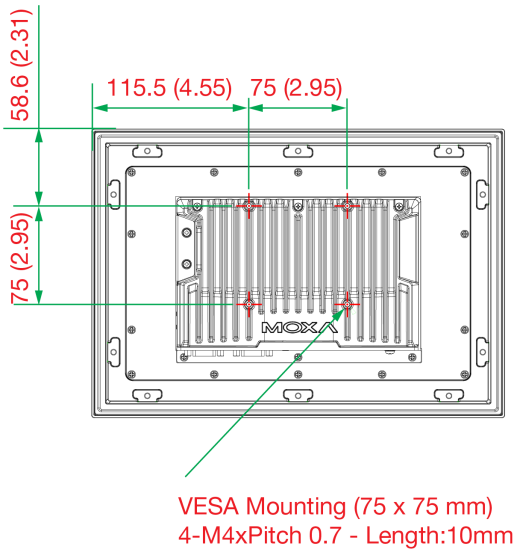
MPC-3100

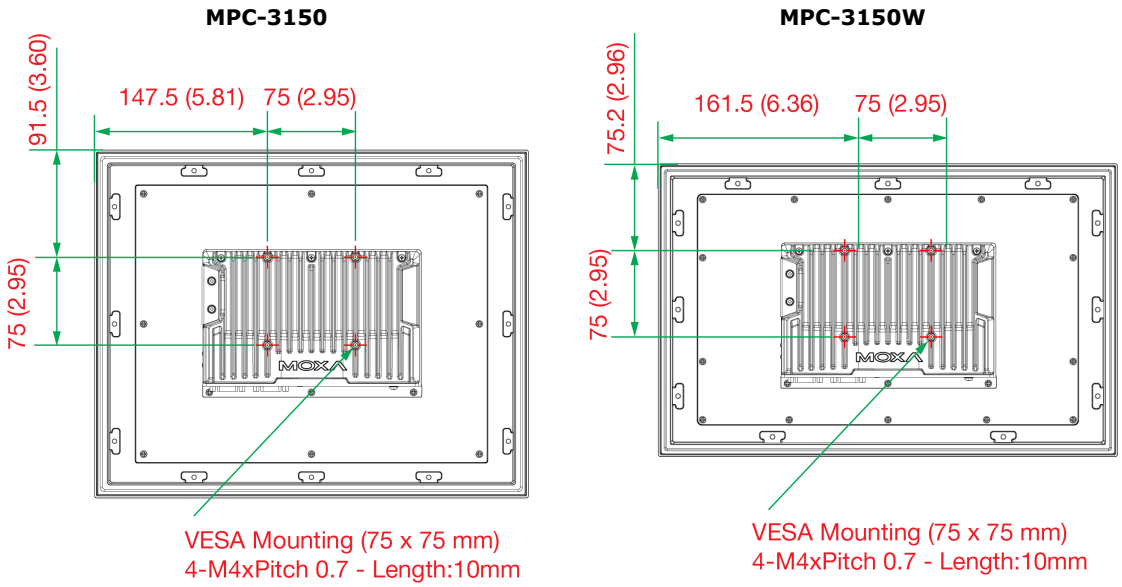


MPC-3120



MPC-3120W

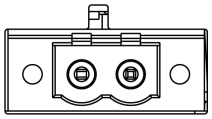




Communication Connections

DC Power Input

The MPC-3000 uses a DC power input. The DC pin assignments are shown in the figure. To connect the power source to the 2-pin terminal block, use the 60-W power adapter. The terminal block is available in the accessories package. The required wire size is 12-18 AWG (wire type: Cu) and the torque value 0.5 N-m (4.425 lb-in) should be applied.

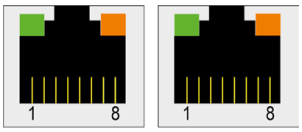


V- V+

12/24 VDC

Connecting to the Network

The pin assignments for the two Fast Ethernet 10/100/1000 Mbps RJ45 ports are shown in the following table:



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)-

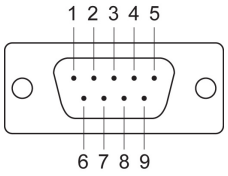
The LEDs on the LAN ports indicate the following:

LAN 1/LAN 2 (indicators on the connectors)	Green	100 Mbps Ethernet mode
	Yellow	1000 Mbps Gigabit Ethernet mode
	Off	No activity / 10 Mbps Ethernet mode

Connecting to a Serial Device

The MPC-3000 offers two software-selectable RS-232/422/485 serial ports over a DB9 connector. The pin assignments for the ports are shown in the following table:

DB9 Male Port



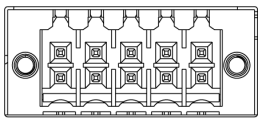
RS-232/422/485 Pinouts

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	–	–	–

Digital Inputs/Digital Outputs

The MPC-3000 is provided with a DIO port, which is a 10-pin terminal block that includes 4 DIs and 4 DOs as illustrated in the following figure.

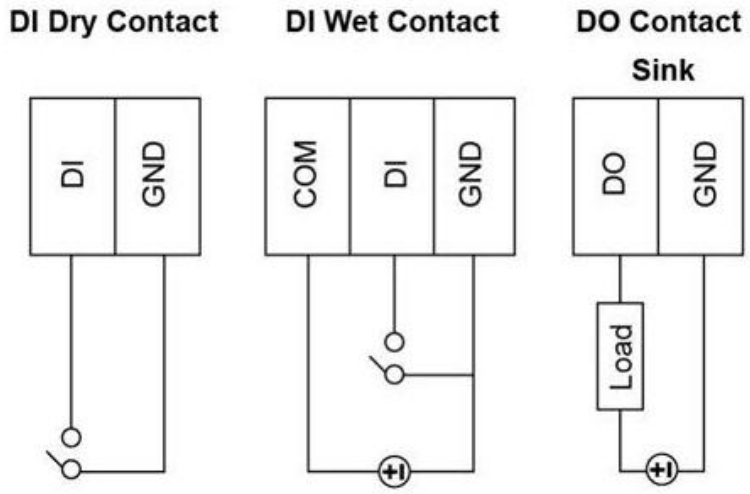
DI 1 2 3 4 GND



Digital Voltage: 30 VDC
Digital Output: 10 mA (Single port)

DIO terminal block (plug matched with socket) with wire size 30 and torque value 0.5 N-m (4.425 lb-in)

DO 1 2 3 4 COM



Connecting to a USB Device

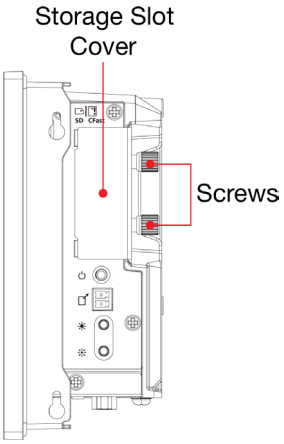
Two USB 3.0 ports are available on the bottom panel. Use these ports to connect mass-storage drives and other peripherals.

Installing SD and CFast Card

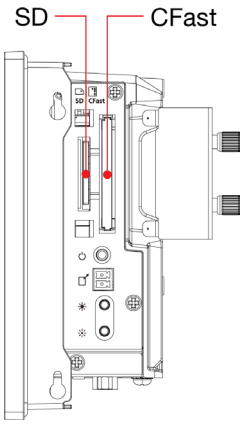
The MPC-3000 provides two storage options—CFast and SD card. The storage slots are located on the right panel. You can install the OS on the CFast card and save your data into the SD card. For a list of compatible CFast models, check the *MPC-3000 component compatibility report* available on Moxa's website.

To install the storage devices, do the following:

1. Remove the 2 screws holding the storage-slot cover to the MPC-3000.



2. Remove the cover and locate the SD and CFast card slots.



3. Reattach the cover and secure it with screws.

Real-time Clock

The real-time clock (RTC) 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. The contact details are available at: http://www.moxa.com/rma/about_rma.aspx.

ATTENTION

There is a risk of explosion if the clock's lithium battery is replaced with an incompatible battery. Dispose of used batteries according to the Instructions.

Powering On/Off the MPC-3000

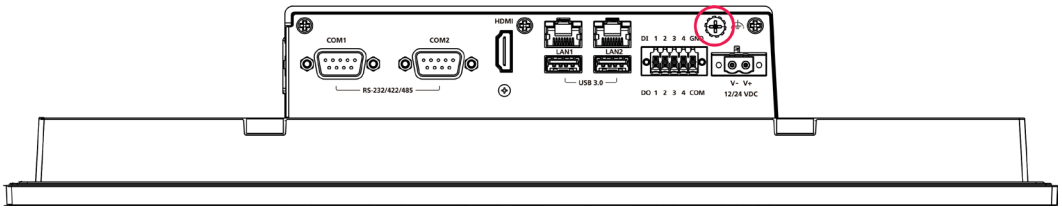
Connect a **Terminal Block to Power Jack Converter** to the MPC- 3000 terminal block and connect a 60 W power adapter to the converter. Supply power through the power adapter. After you have connected a power source, the system Power button turns on automatically. It takes about 10 to 30 seconds for the system to boot up. You can change the power-on behavior of your computer by changing the BIOS settings.

To power off the MPC-3000, we recommend using the "shut down" function provided by the OS installed on the MPC. If you use the **Power** button, you may enter one of the following states depending on the power management settings in the OS: standby, hibernation, or system shutdown mode. If you encounter problems, you can press and hold the **Power** button for 4 seconds to force a hard shutdown of the system.

Grounding the MPC-3000

Proper grounding and wire routing help to limit the effects of noise from electromagnetic interference (EMI). Run the ground connection from the ground screw to the grounding surface prior to connecting the power source.

The minimum cross-sectional area required for the protective earthing conductor is 3.31 mm². A mandatory external bonding facility with a cross-sectional area of at least 4 mm² must be installed for effective conductivity.



ATTENTION

This equipment is intended to be supplied by the external power source, which is evaluated according to UL/EN/IEC 62368-1 or UL/IEC 60950-1. The power source shall comply with ES1/SELV and LPS requirements, output rating is 12 VDC, 5.6 A (min.) or 24 VDC, 2.8 A (min.), and an ambient temperature of 60°C minimum.

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

4. BIOS Setup

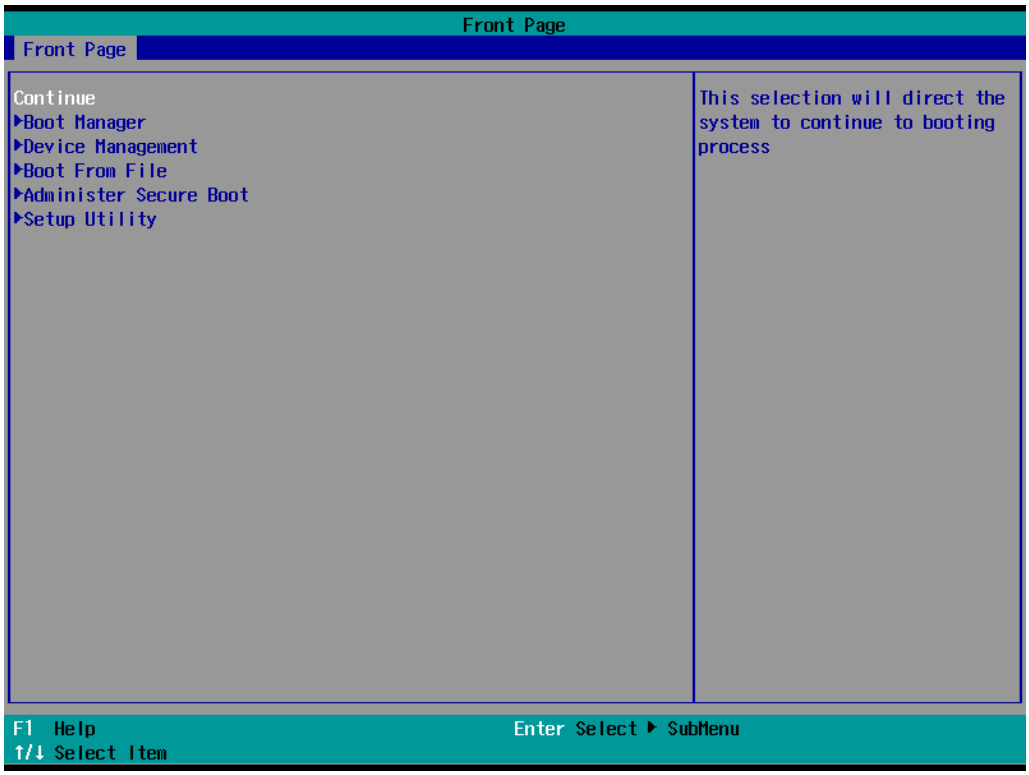
In this chapter, we describe the BIOS settings for the MPC-3000 computer. The BIOS is a set of input/output control routines for peripherals to initialize the basic settings. The BIOS helps boot the system before the operating system is loaded. The BIOS setup allows the user to modify the system configuration 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

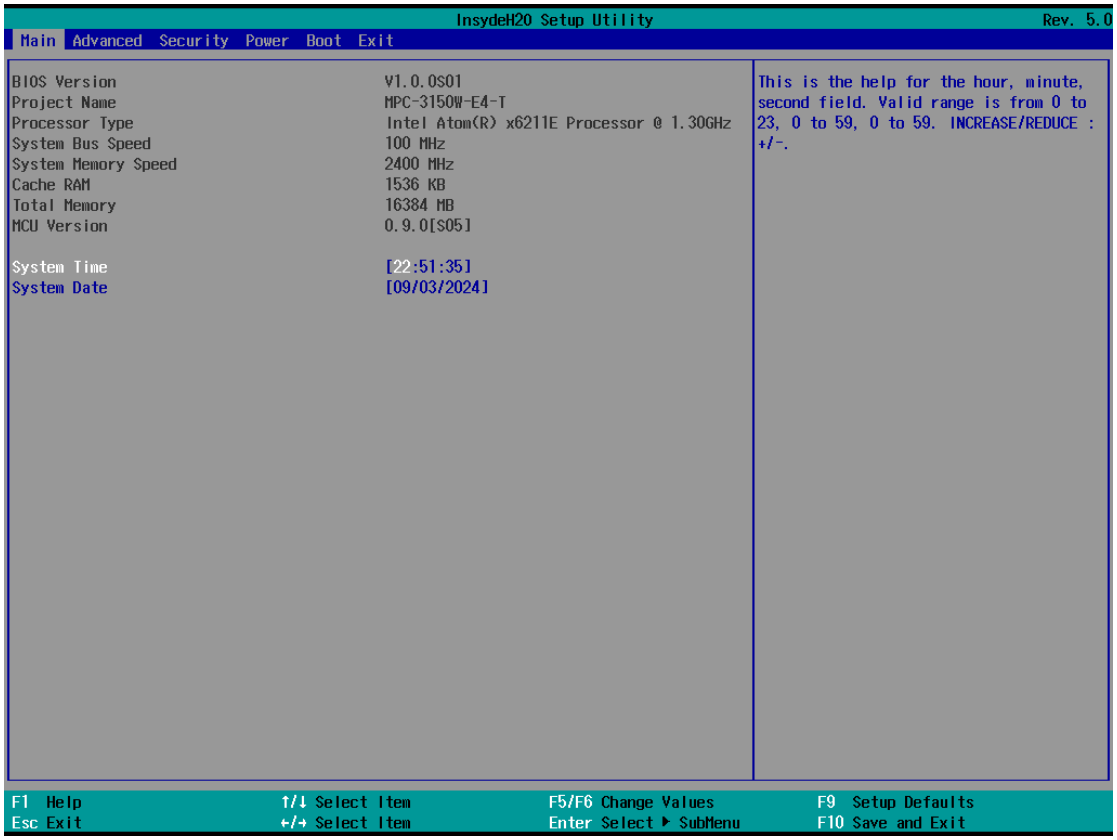
Select **F2** to enter the **BIOS configuration**.



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**	**EN TER**	**Select or go to Submenu.**

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

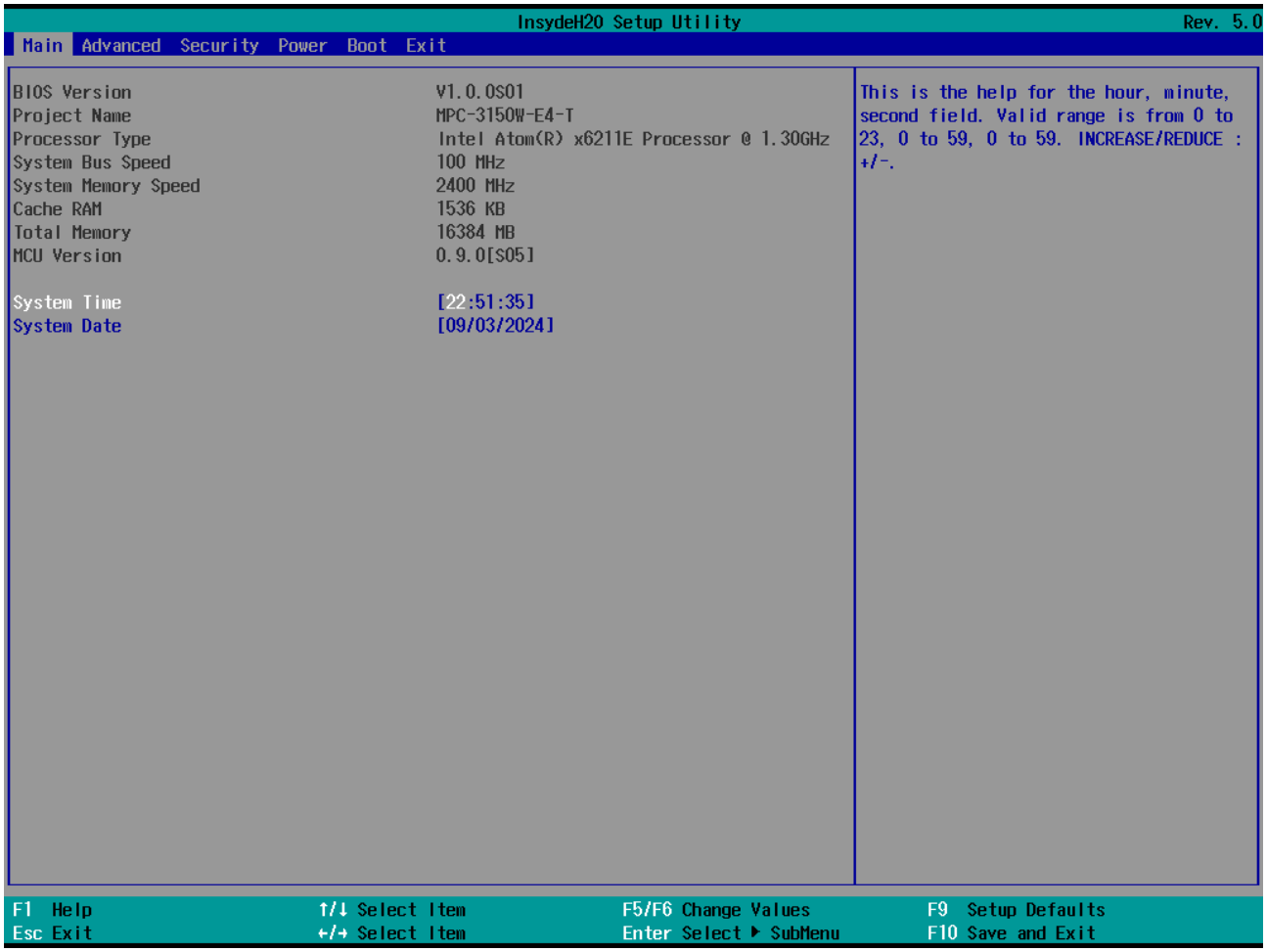


NOTE

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

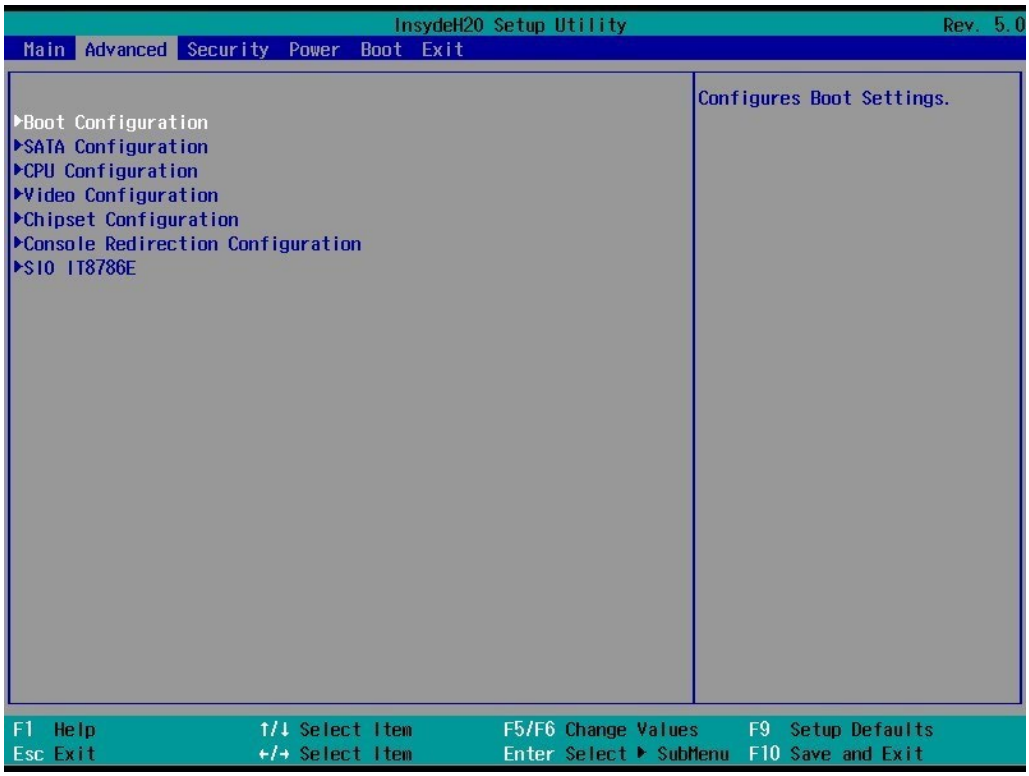
Main Page

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.



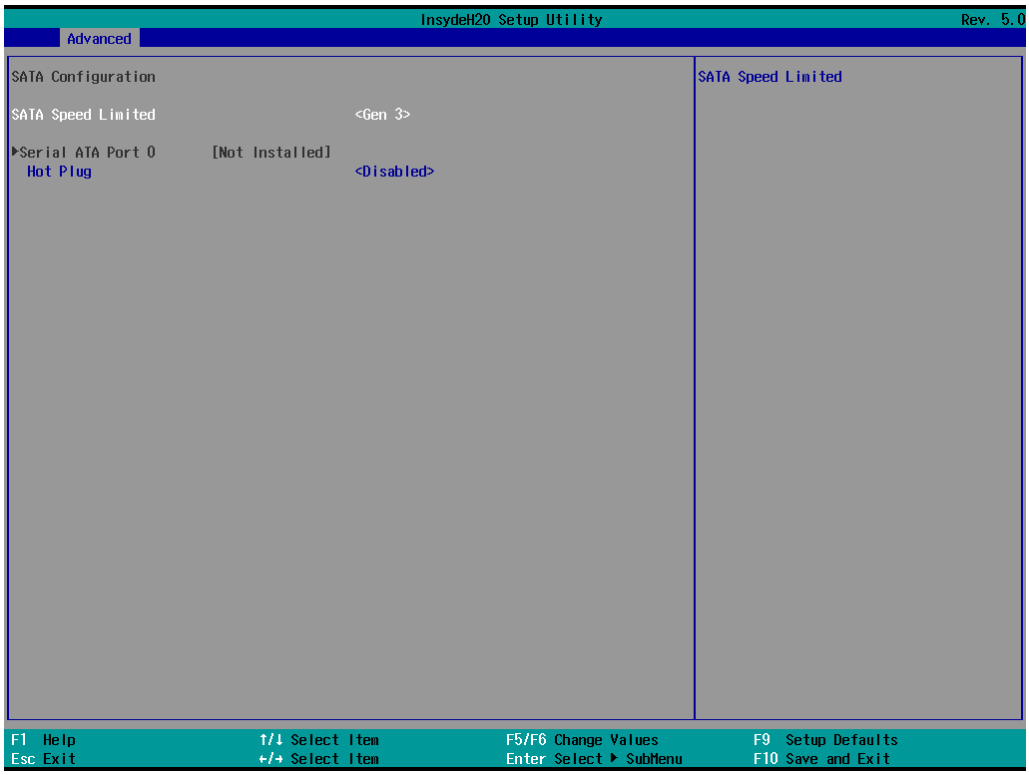
Boot Configuration

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

Options: On (default), Off.

SATA Configuration

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



SATA Speed Limited

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

Serial ATA Port

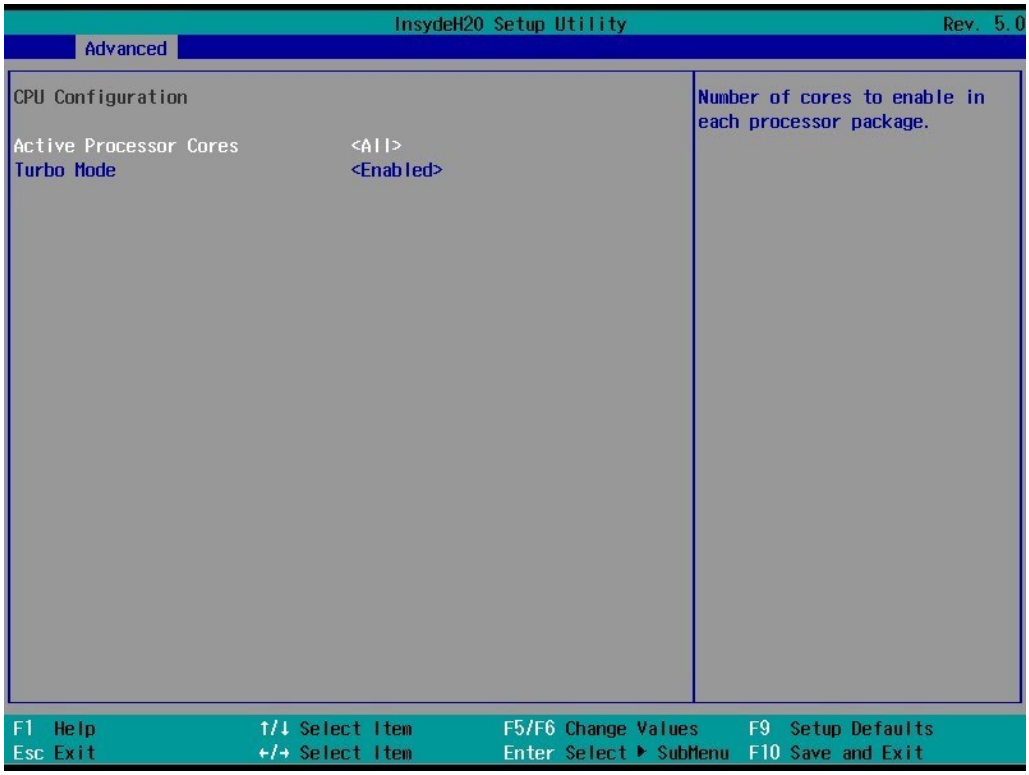
This setting displays information on the installed drives.

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).

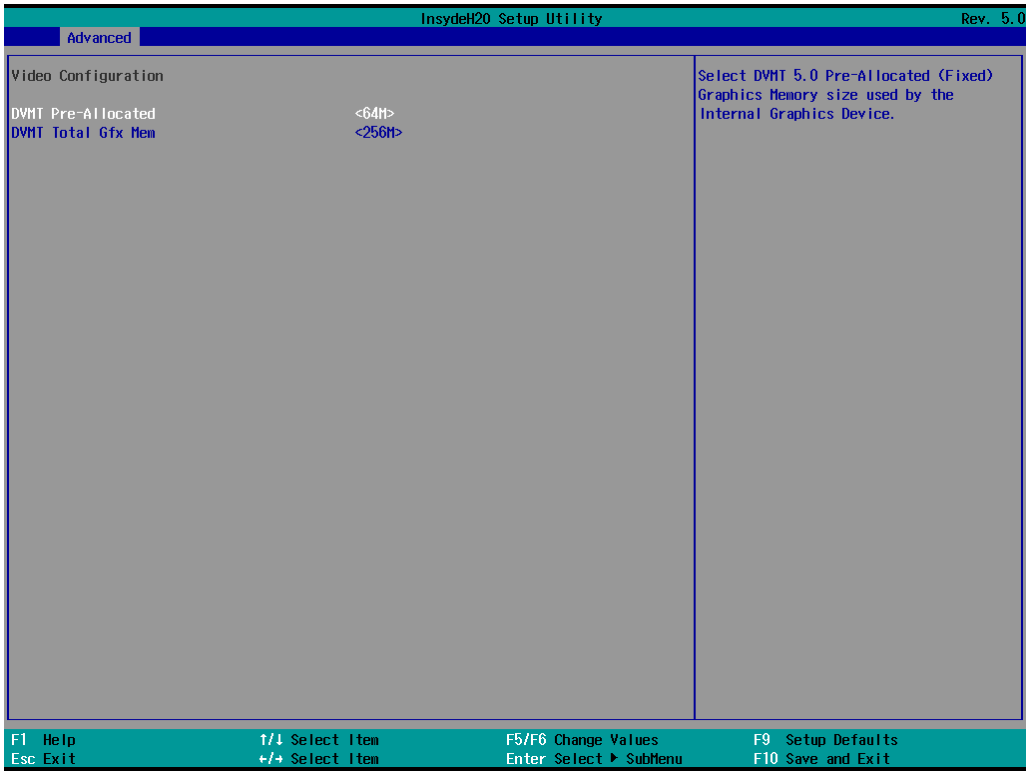
Options: All (default), 1, 2, 3

Turbo Mode

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

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: 64M (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.

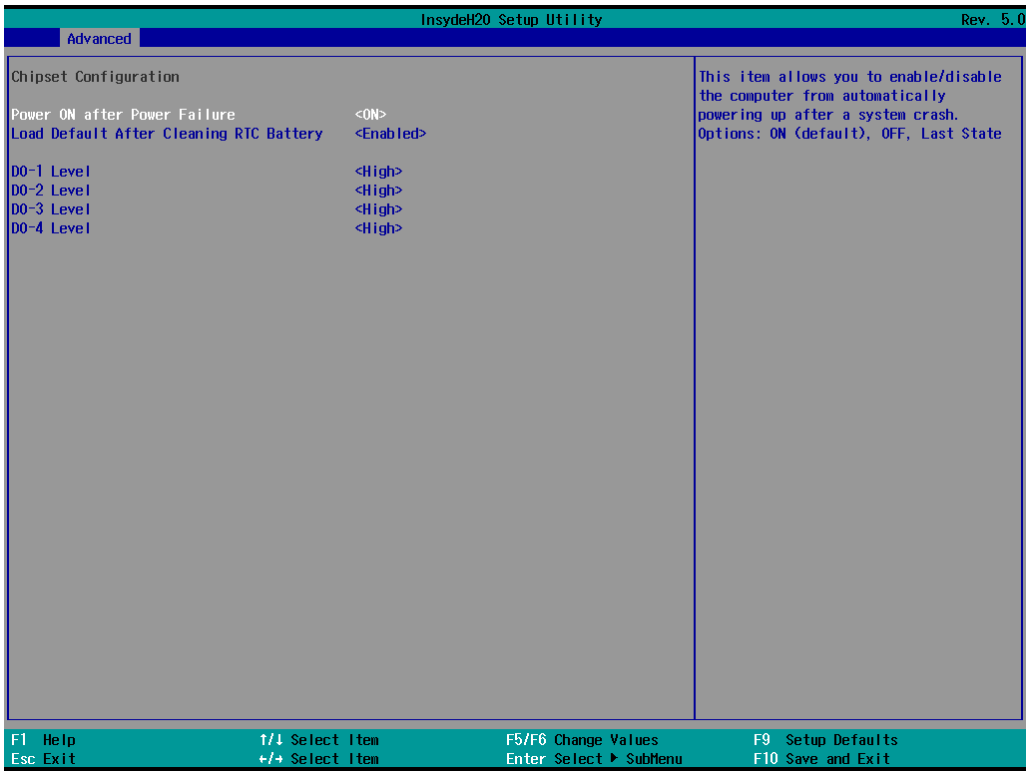
DVMT Total Gfx Mem.

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 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)

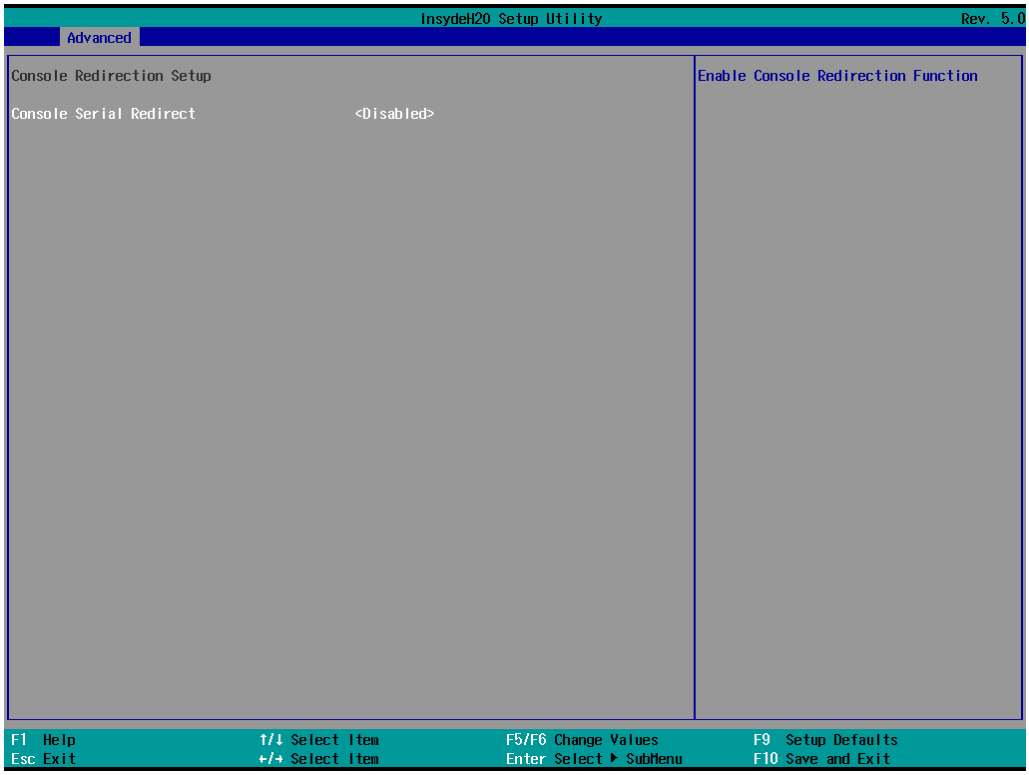
DO-X Level

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

Options: High (default), Low

Console Redirection

This section allows you to configure the console redirection settings.



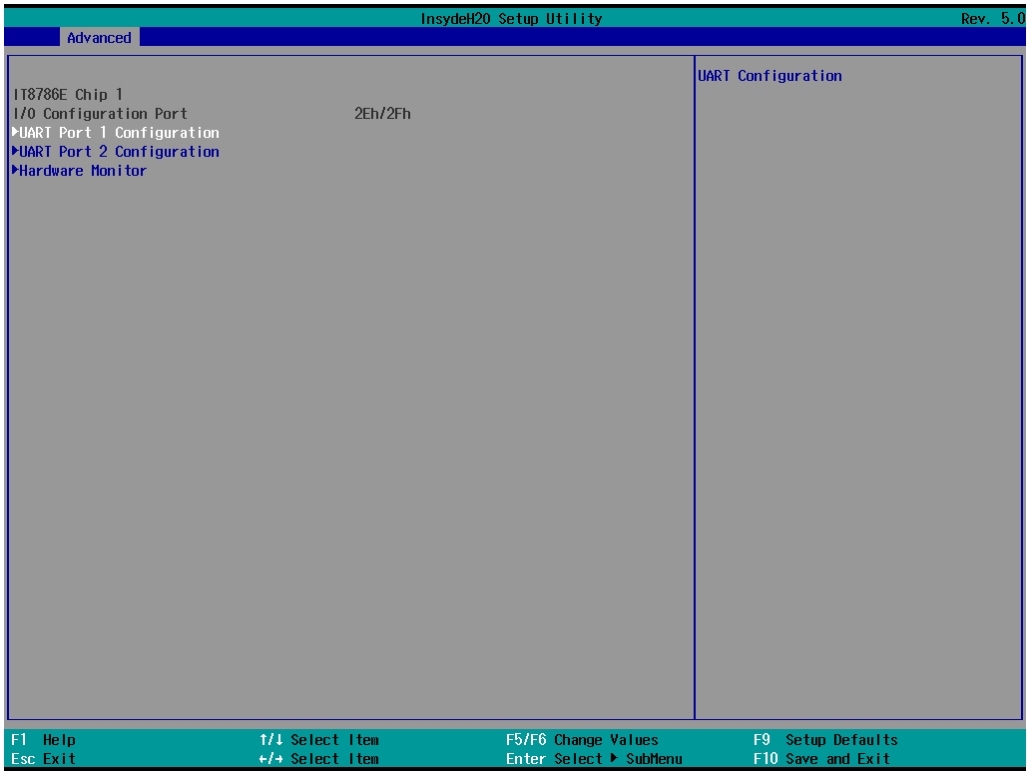
Console Serial Redirect

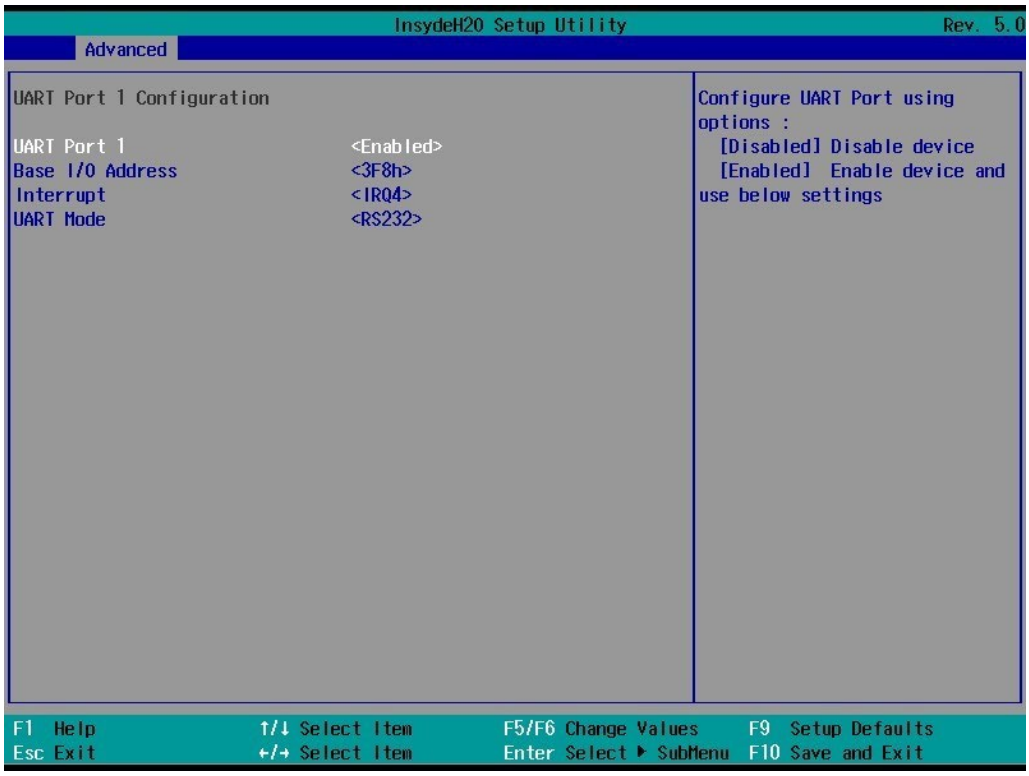
When the Console Redirection Function is enabled, the console information will be sent both to the display monitor and the serial port (COM1).

Options: Disabled (default), Enabled

SIO ITE8786E

This section allows users to configure SIO settings.





UART Port 1

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.

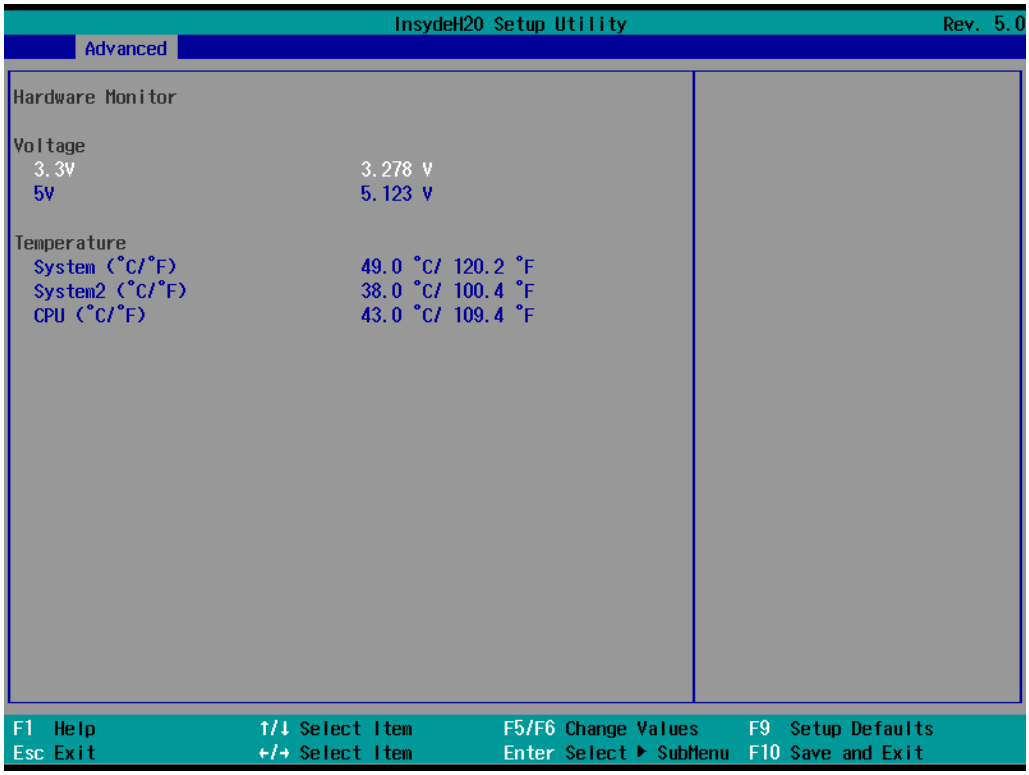
Disable: Disable the UART port 2 connection

Enable: Enable the UART port 2 connection (default)

> **NOTE**
>
> All other UART ports can only be configured by an OS utility.

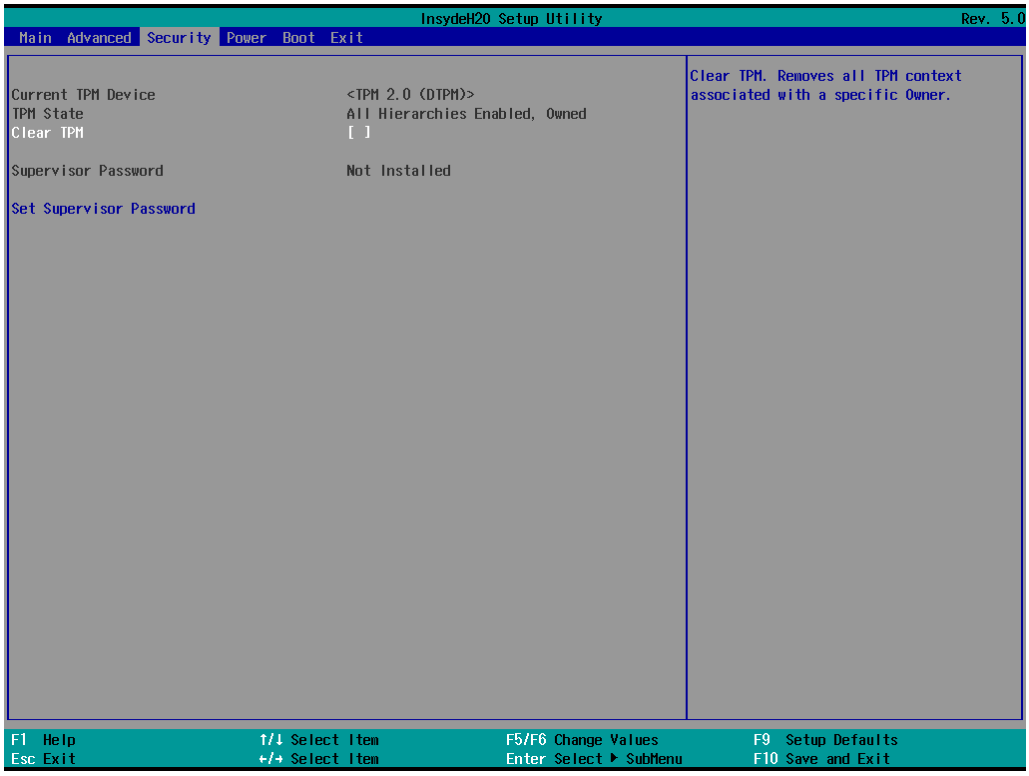
Hardware Monitor

This section 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.



Current TPM Device

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

TPM State

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

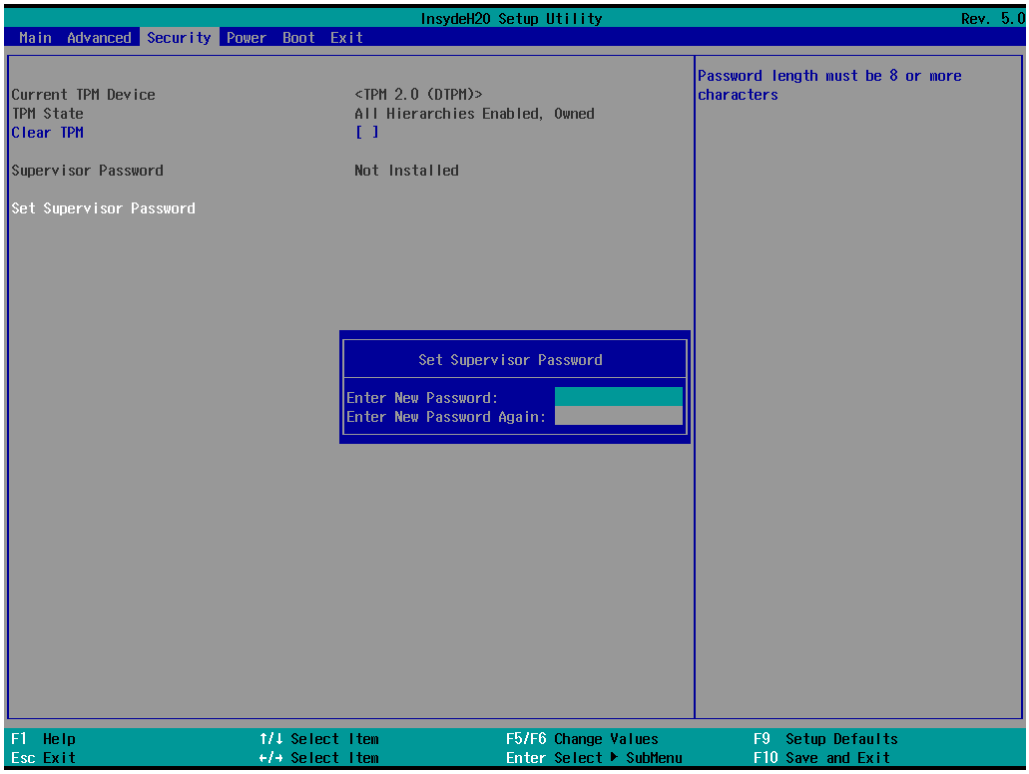
Clear TPM

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.

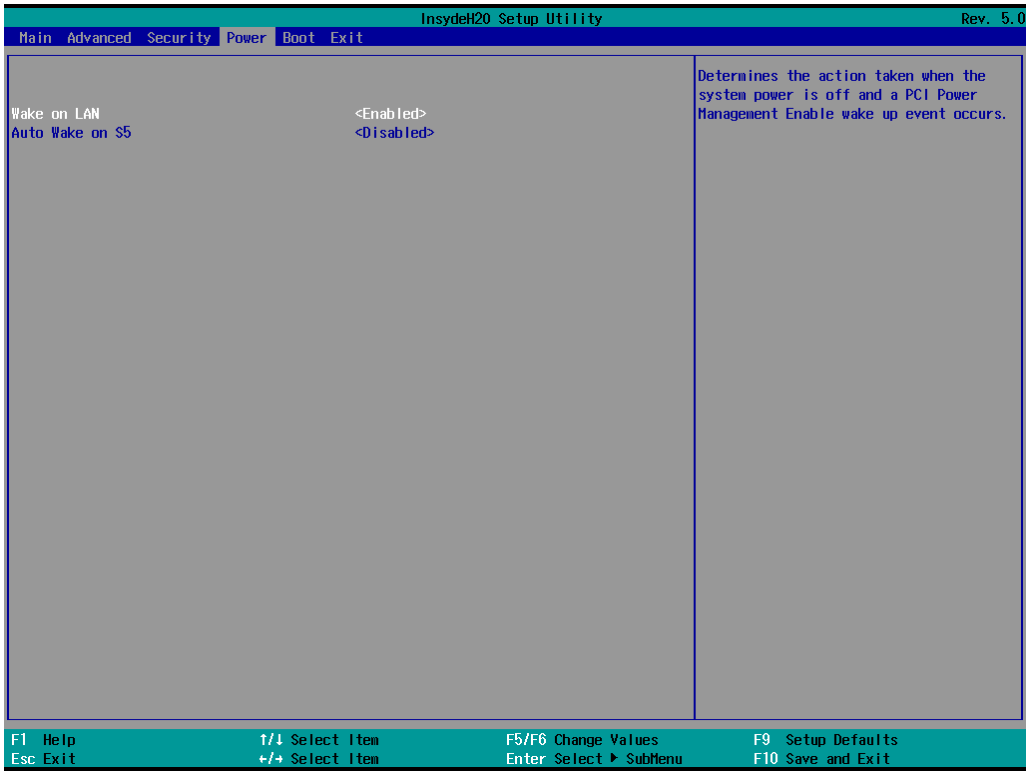
Enable: System will ask for the password on post time

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

This 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

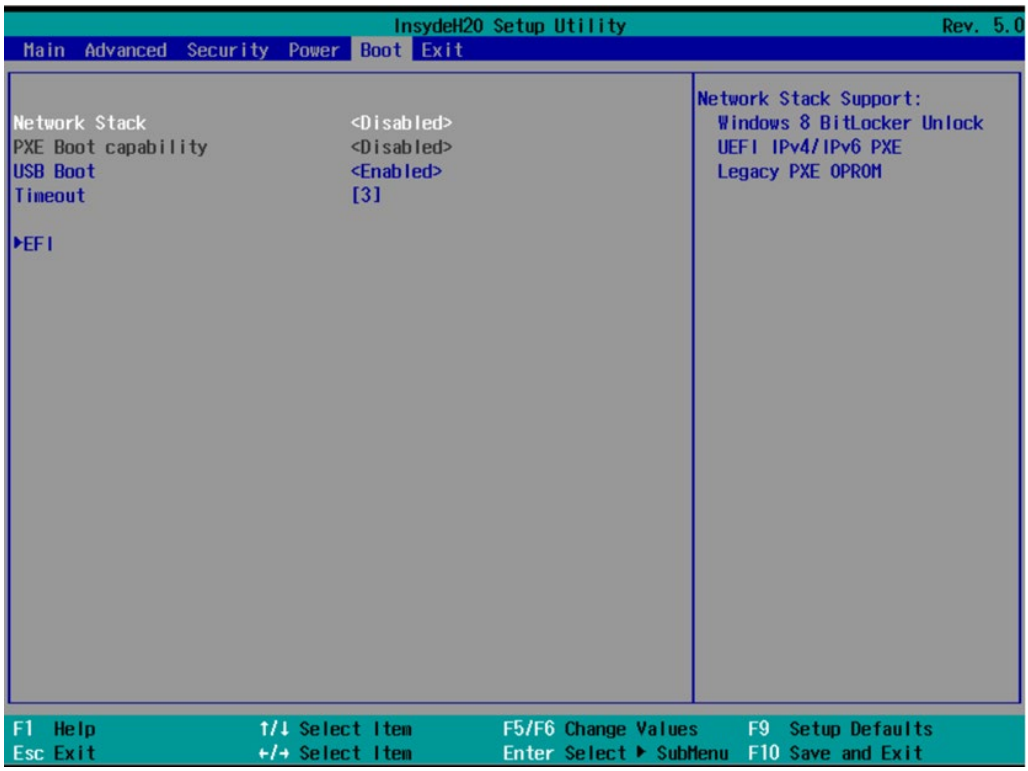
Auto Wake on S5

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)

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

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.

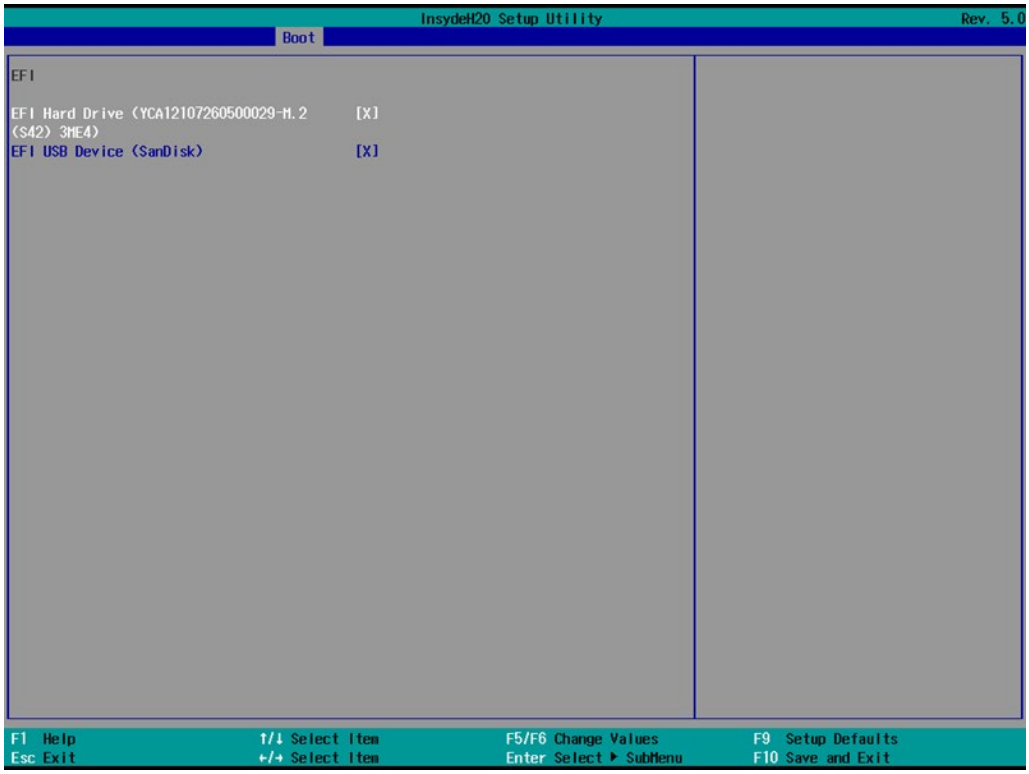
Options: Enabled (Default), Disabled

Timeout

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

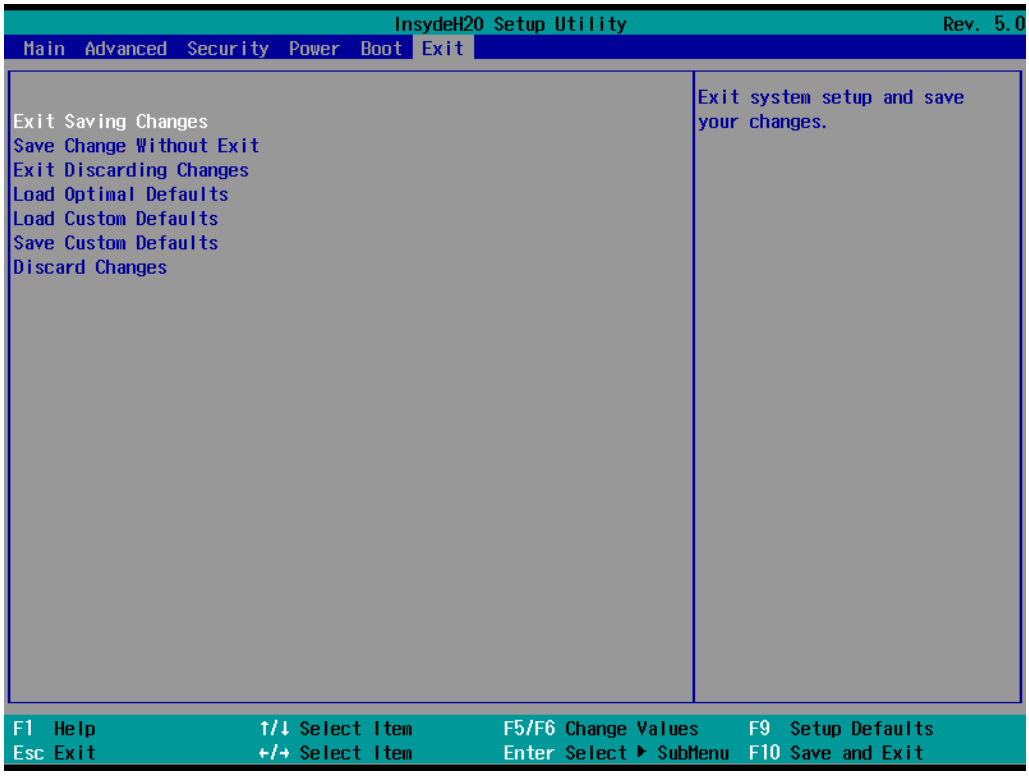
EFI

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



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

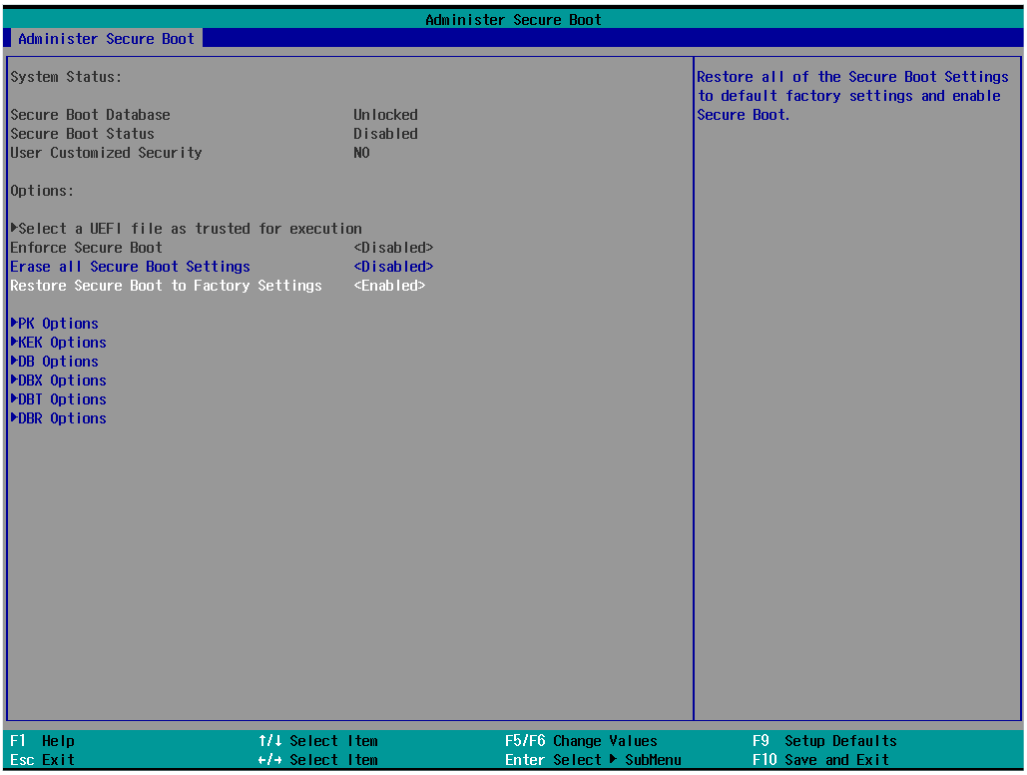
Discard Changes

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

Options: Yes (default), No

Administering Secure Boot

Press F2 to go to the Administer Secure Boot.



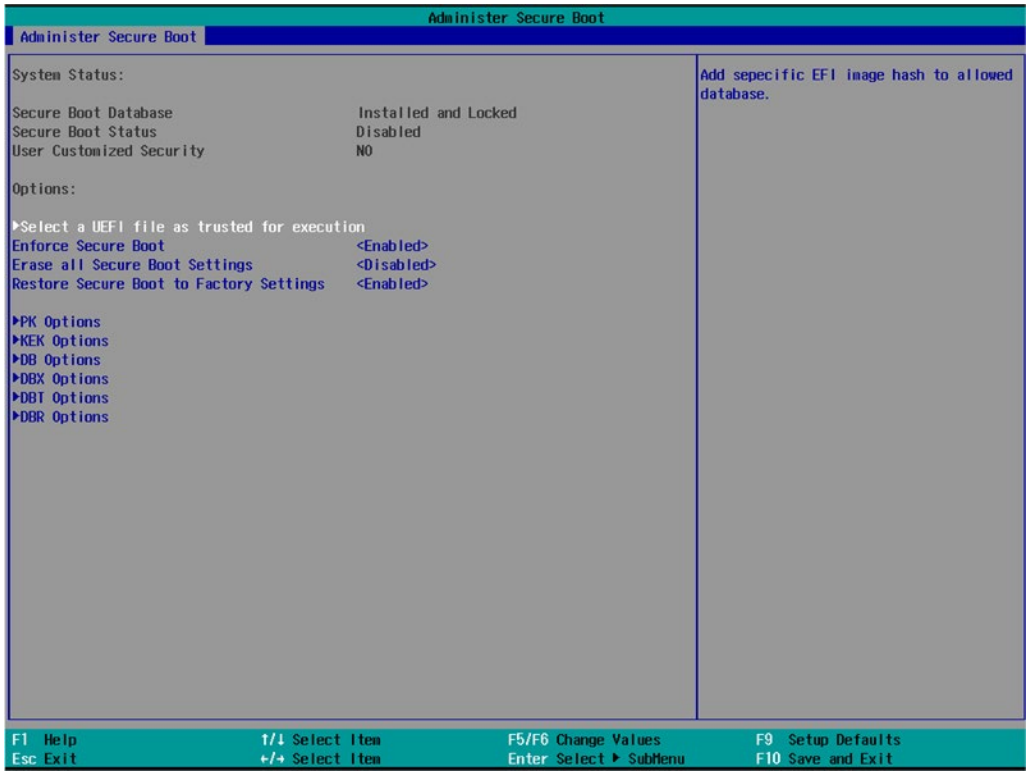
Secure Boot helps computers resist attacks and infection from malware. The feature defines an interface between the operating system and BIOS. It detects tampering with boot loaders, key operation system files, and unauthorized option ROMs by validating their digital signatures.

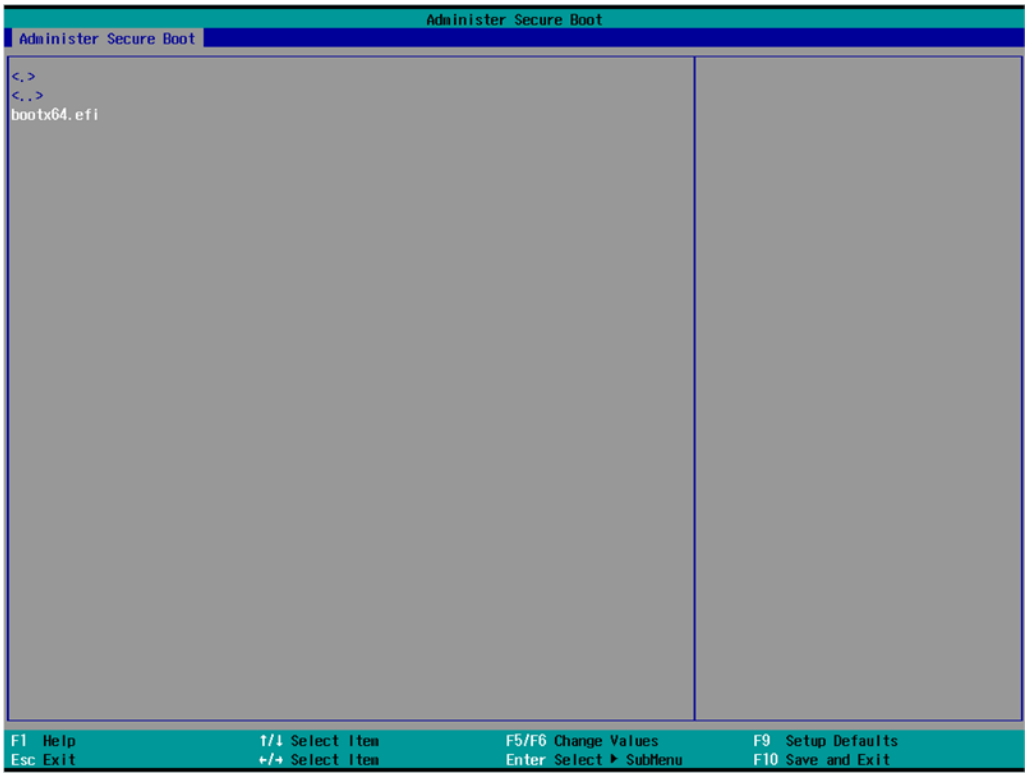
Enabling UEFI Secure Boot

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.

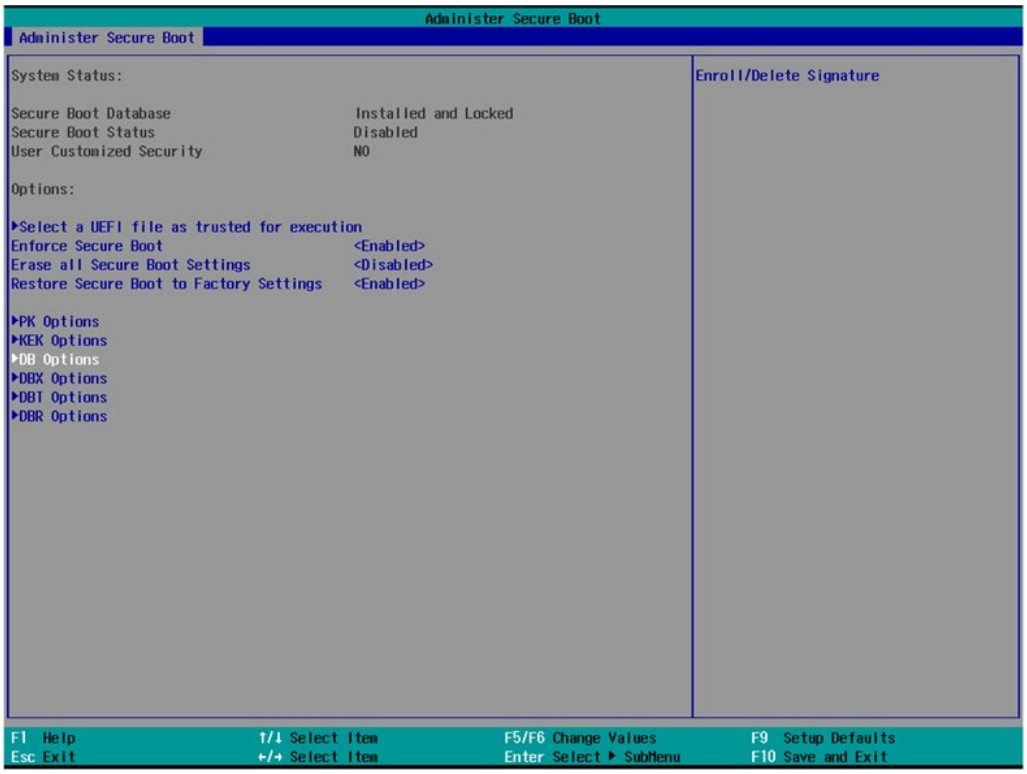
Enroll EFI Image

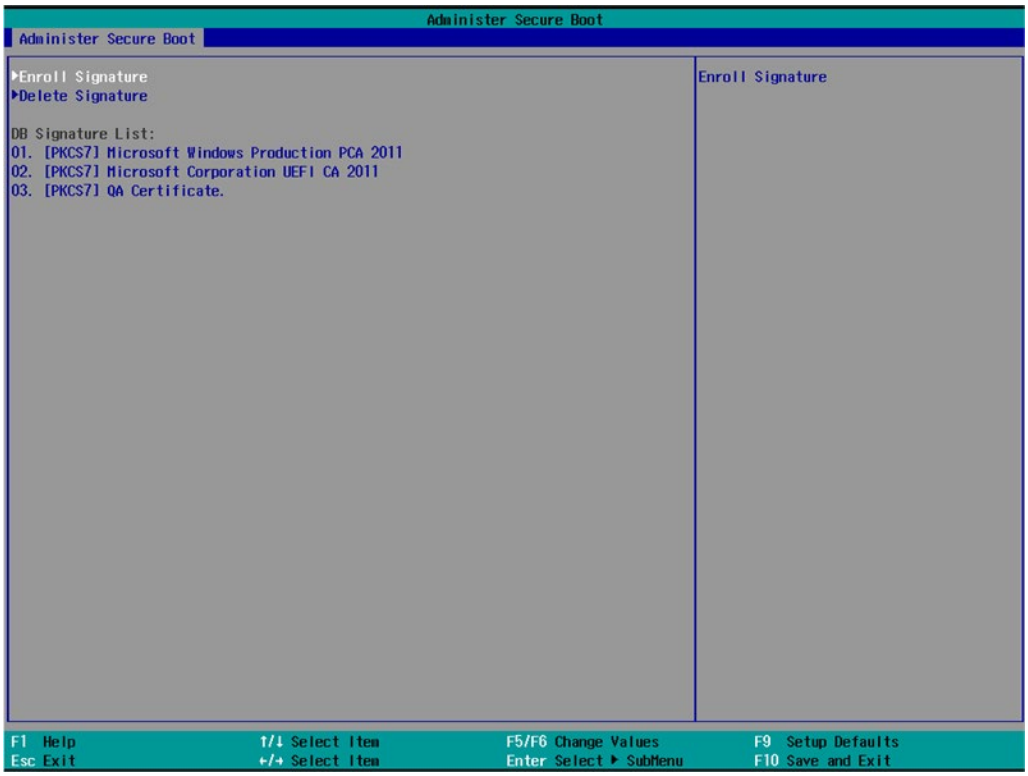




1. Enter **Administer Secure Boot** and select the option **Select a UEFI file as trusted for execution**.
2. Enter the loader name followed by the UEFI standard \EFI\BOOT\BOOT{machine type short-name}. E.g., efi\boot\BootX64.efi, Debian (EFI\debian\grubx64.efi), Suse (EFI\opensuse\grubx64.efi)

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.

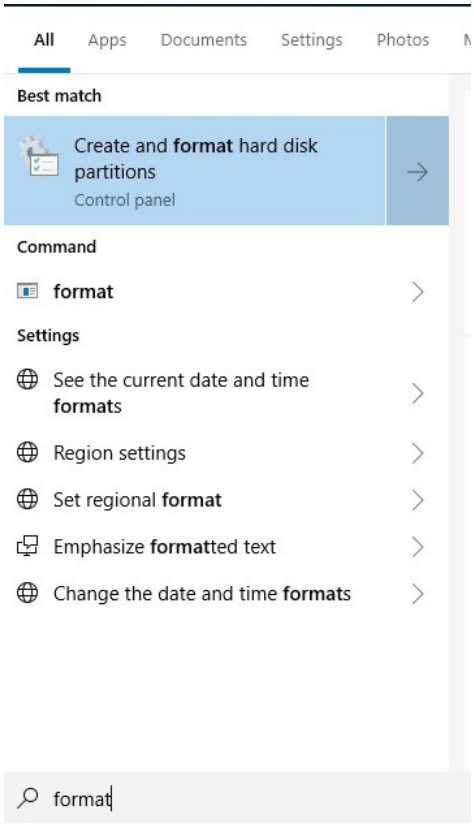
NOTE

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.

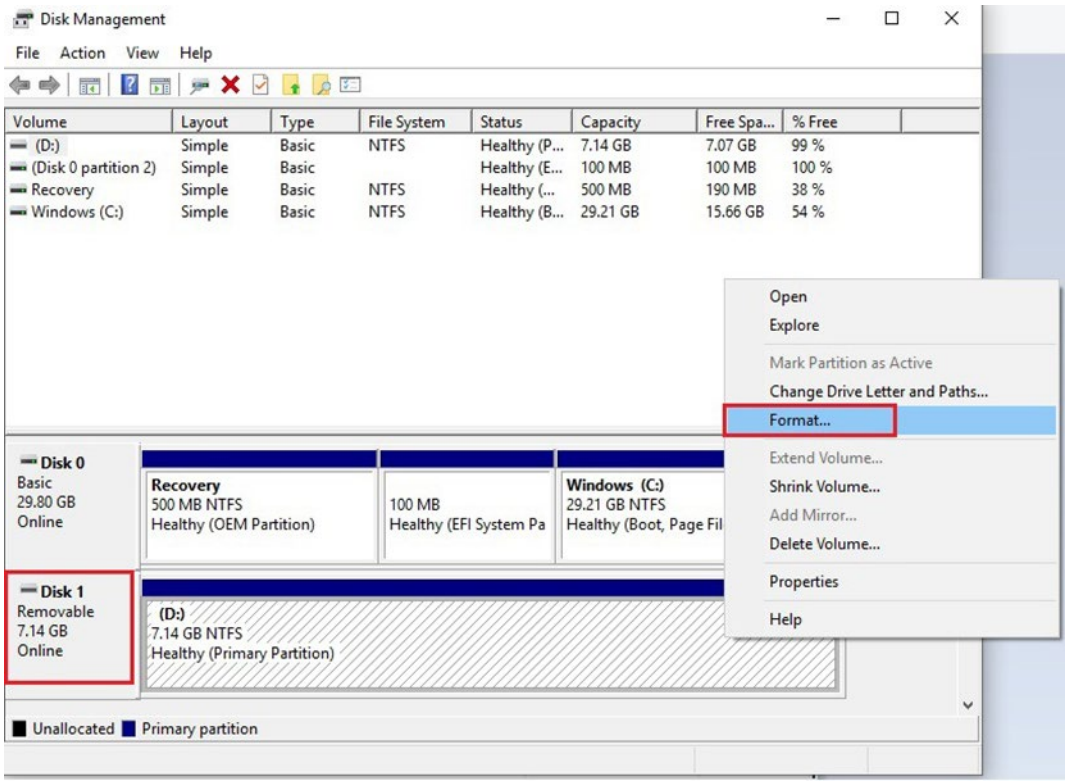
Step 1: Create a Bootable USB Disk

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

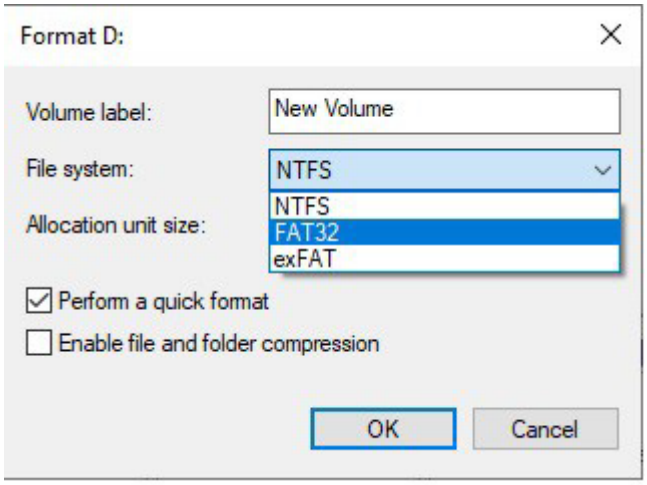
1. Insert a USB disk in the computer's USB drive.
2. Search for "format" and select **Create and format hard disk partitions**.



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

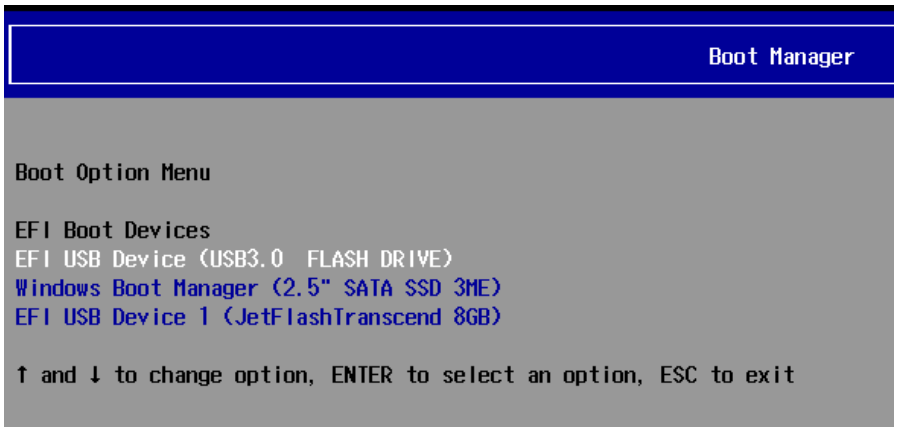
You must use the BIOS upgrade installation file to upgrade the BIOS. Contact Moxa's technical department for assistance. The BIOS upgrade file includes an **efi** folder and an **xxxx.efi** file. Copy the **efi** folder and **xxxx.efi** file to the bootable USB disk.

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.

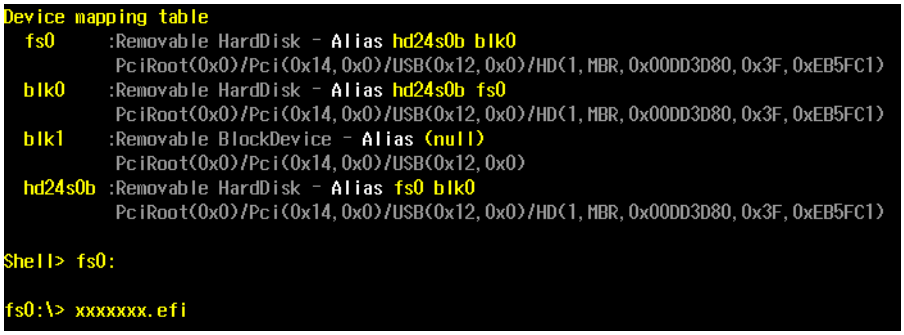
   If the BIOS cannot recognize the USB drive as the boot-up device, the USB drive might not have a partition table. Use the Windows command line tool **diskpart** to rebuild the partition table.

2. Select the USB Disk.



   The screen will switch to the SHELL environment.

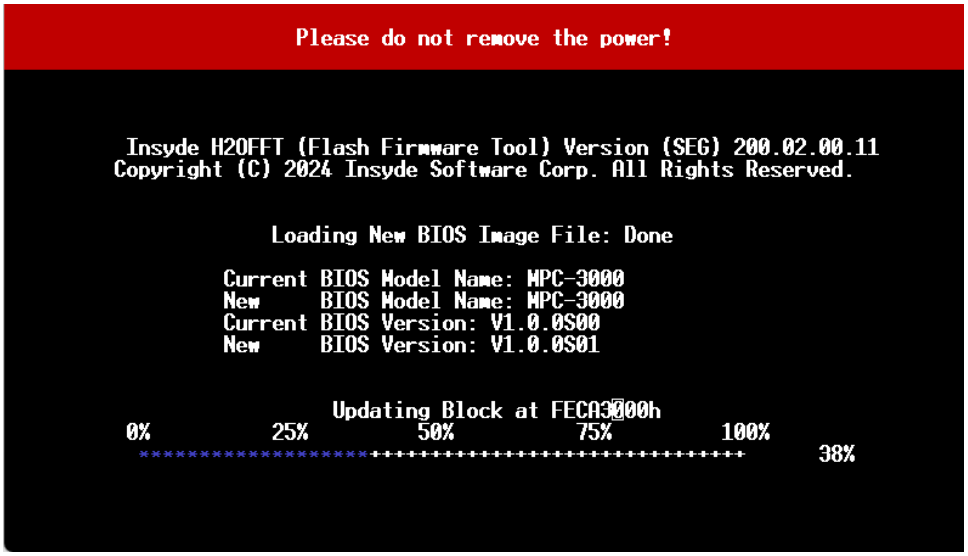
3. Type **fs0:**, go to the directory where the upgrade file is located, and type **xxxxxx.efi** (the file name is based on the upgrade file from Moxa).



4. Wait until the upgrade procedure is completed.

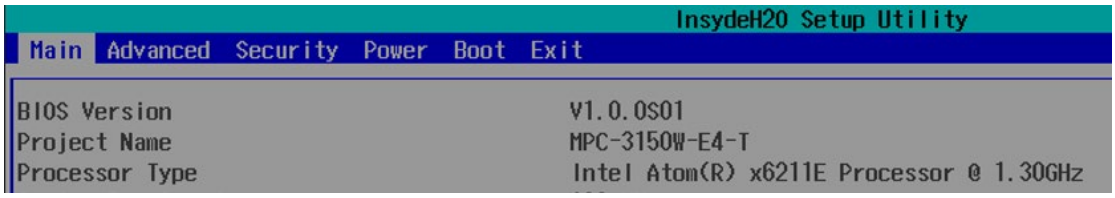
ATTENTION

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

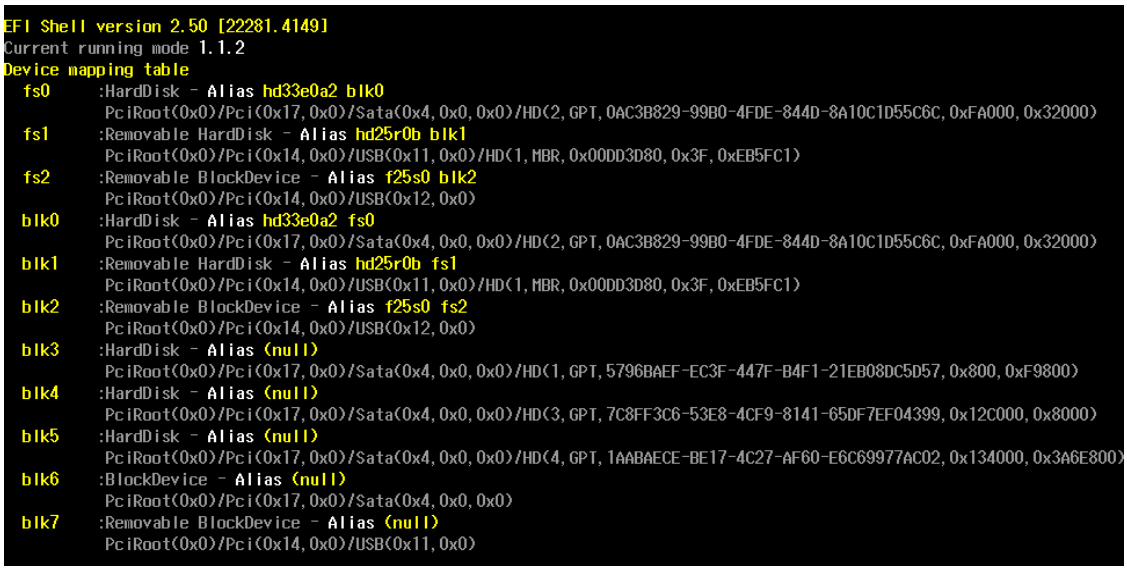


When the upgrade is finished, the computer will automatically reboot.

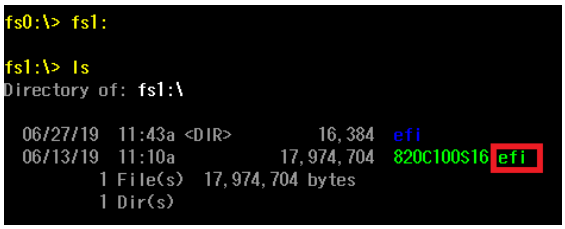
You can check the BIOS version on the Main page to confirm the upgrade.



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



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.



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.