

# **MPC-3000 Series Windows 10 IoT Enterprise LTSC 2021 (21H2) User Manual**

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# MPC-3000 Series Windows 10 IoT Enterprise LTSC 2021 (21H2) User Manual

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# 1. Introduction

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This Windows 10 IoT Enterprise LTSC 2021 (21H2) user manual is applicable to Moxa's x86-based computers listed below and covers the complete set of instructions for these series. Detailed instructions on configuring advanced settings are covered in the following chapters of the manual. Before referring to sections in these chapters, confirm that the hardware specification of your computer model supports the functions/settings covered in this manual.

## Applicable Series

- **MPC-3070W Series**
- **MPC-3100 Series**
- **MPC-3120 Series**
- **MPC-3120W Series**
- **MPC-3150 Series**
- **MPC-3150W Series**

## Moxa Windows

Moxa computers are integrated with Windows drivers and I/O controller utilities based on the recent up-to-date version of Microsoft Windows so that you can use the most compatible hardware-software combination in your application fields.

## 2. System Initialization

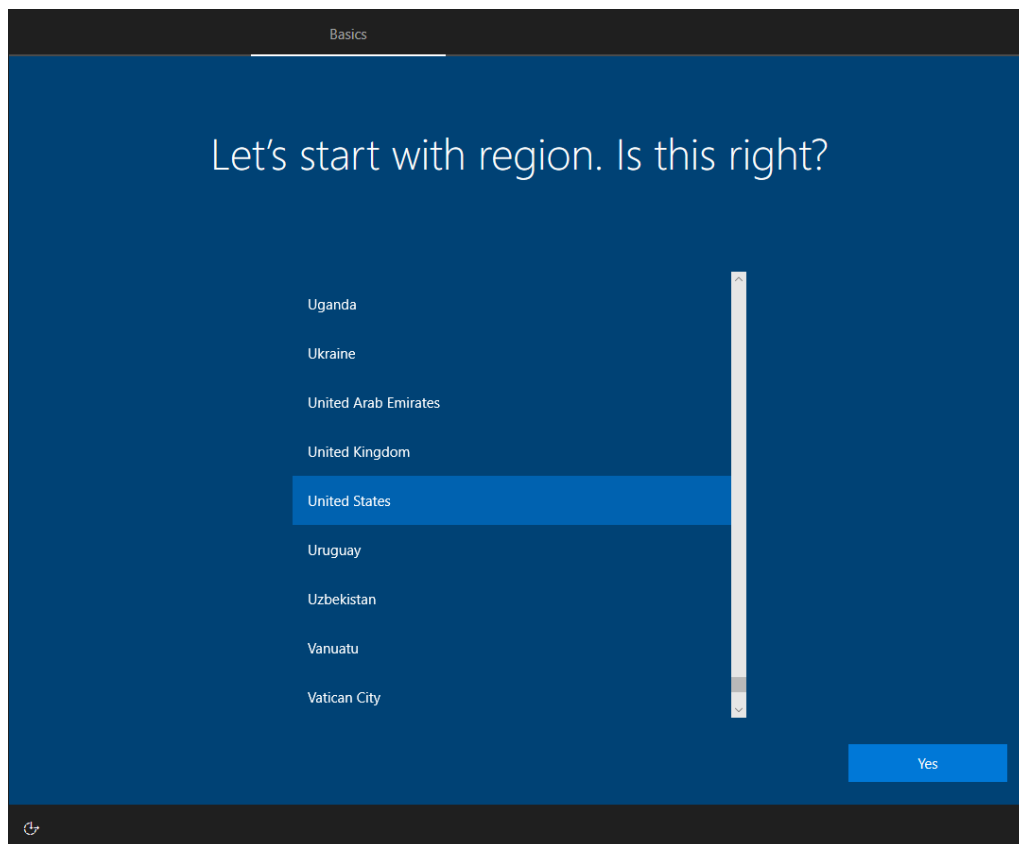
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In this chapter, we describe how to initialize the system settings when you boot up the computer for the first time. When you turn on the computer, you will see the Windows Out of Box Experience (OOBE) wizard. OOBE consists of a series of screens that require customers to accept the license agreement, connect to the internet, log in with or sign up for a Microsoft Account, and share information with the OEM.

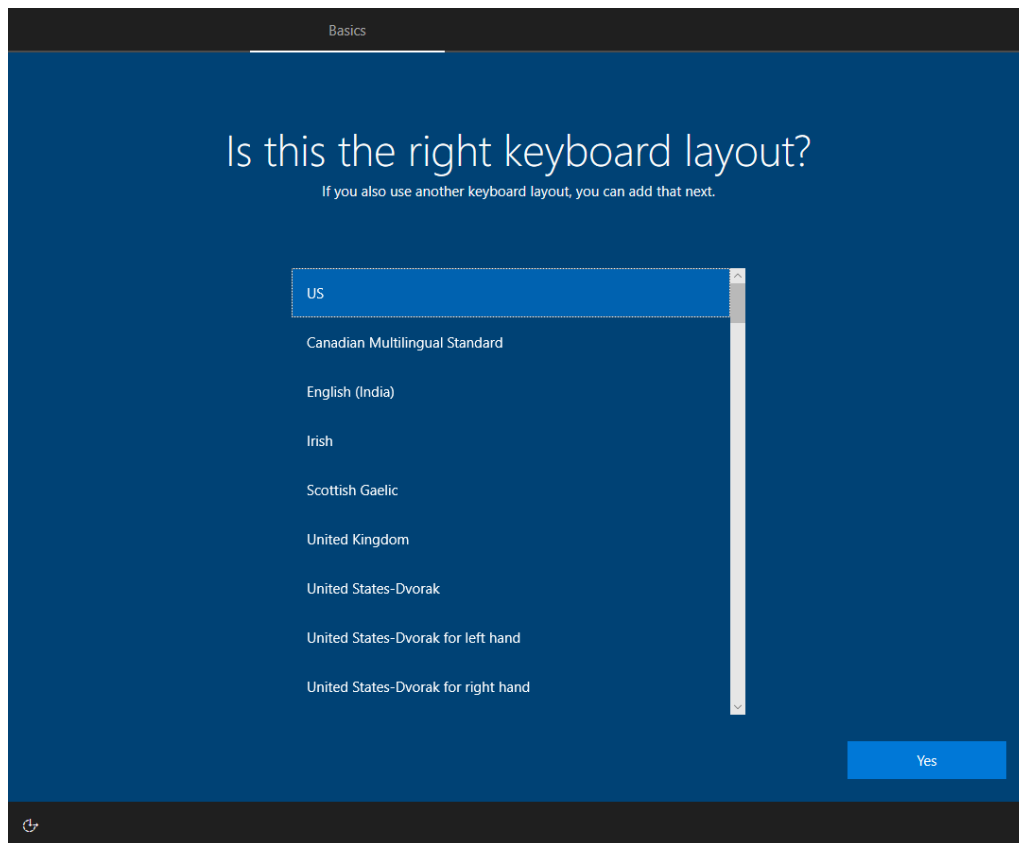
### Initializing User Settings

The following is a non-exhaustive list of OOBE screens that you will see in the order that they are listed here:

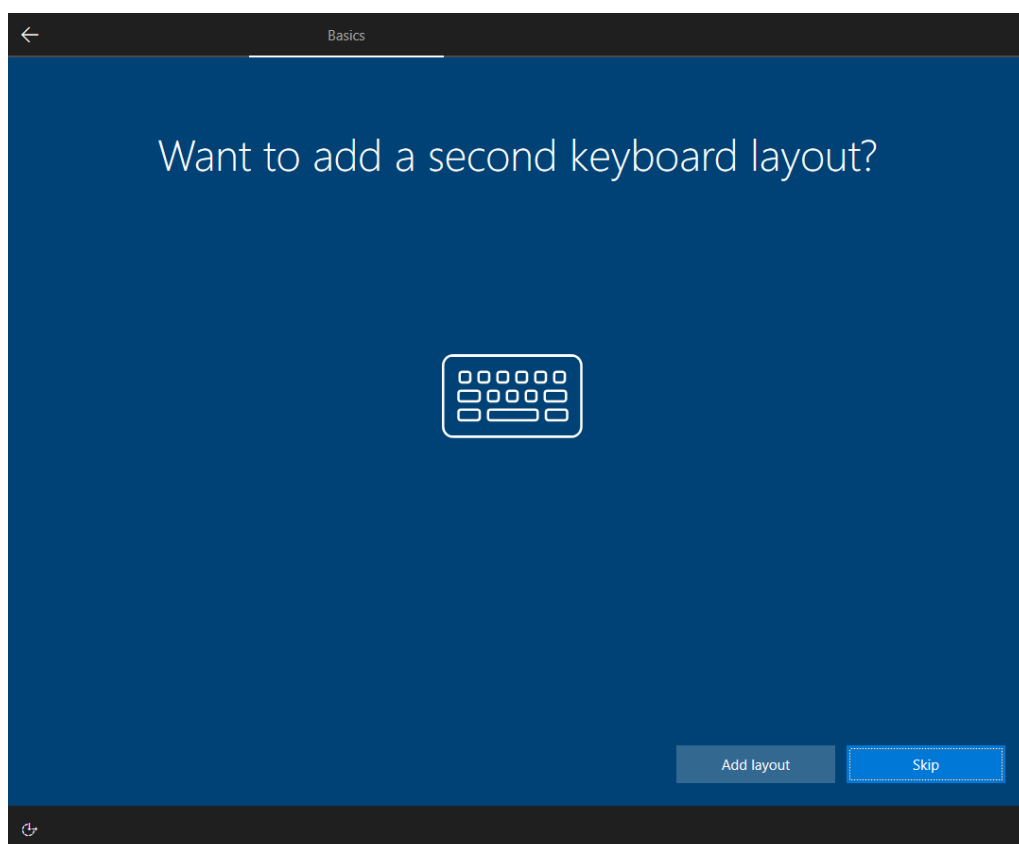
1. Select a region.



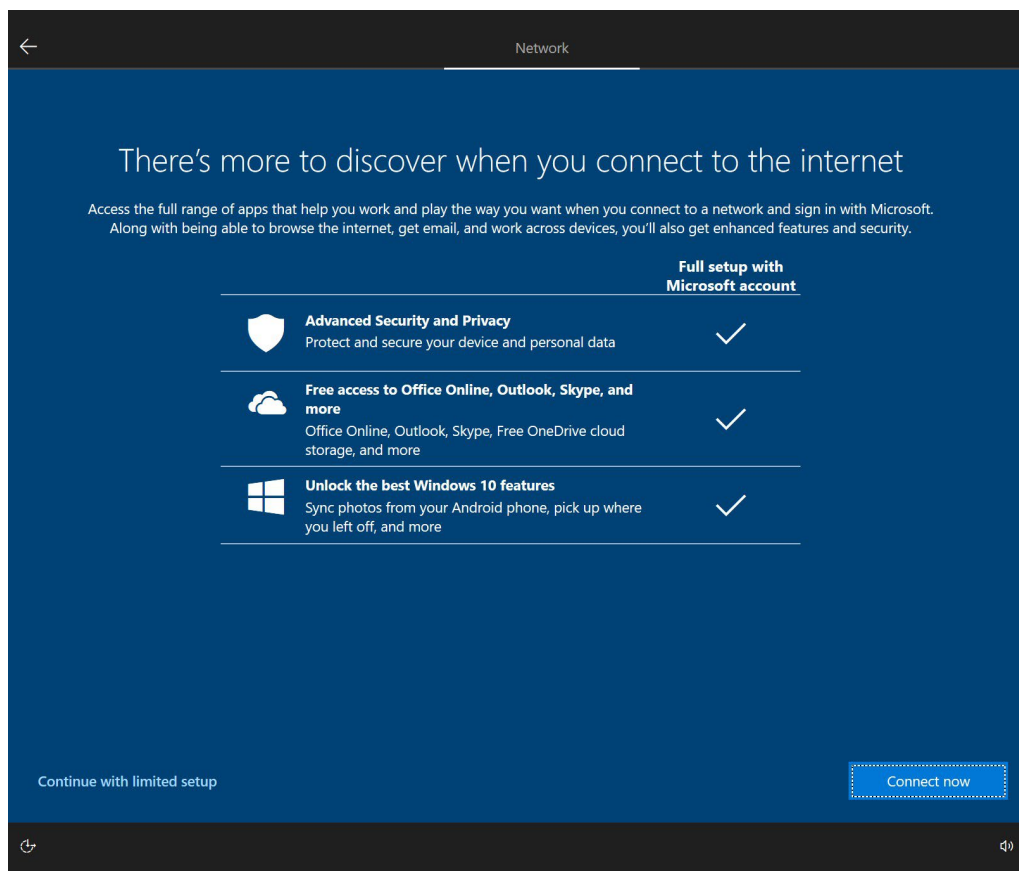
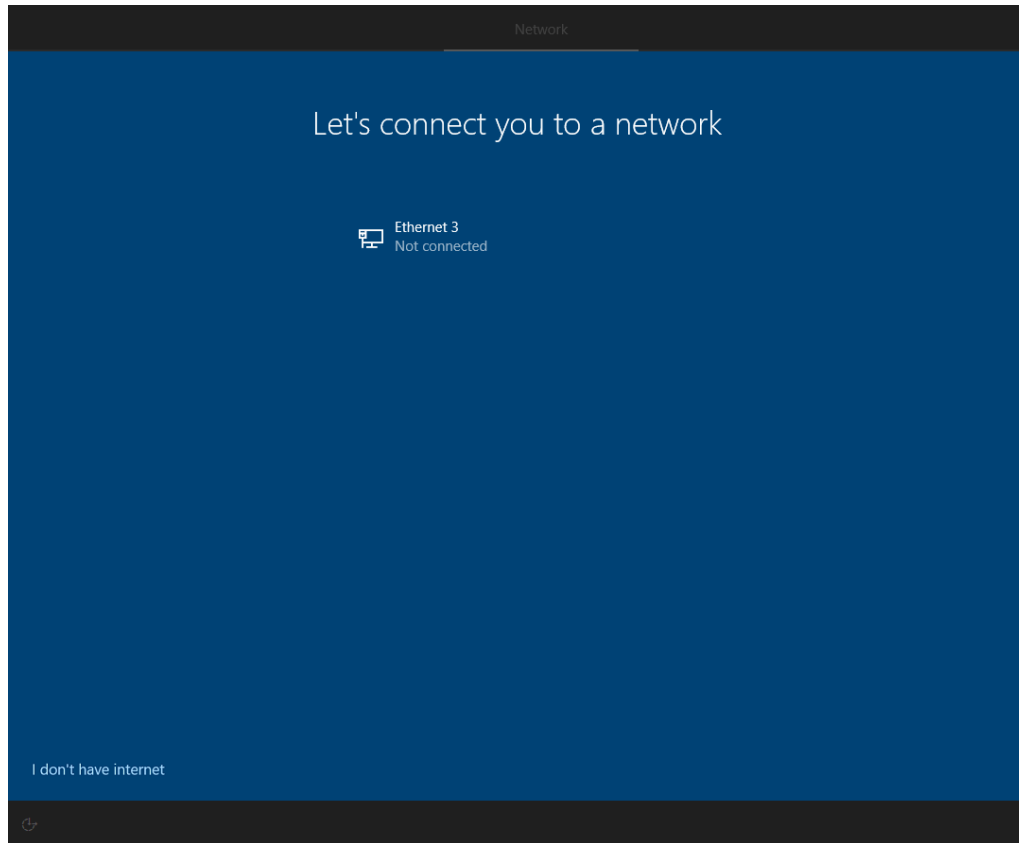
2. Select a keyboard.



3. Select a second keyboard.

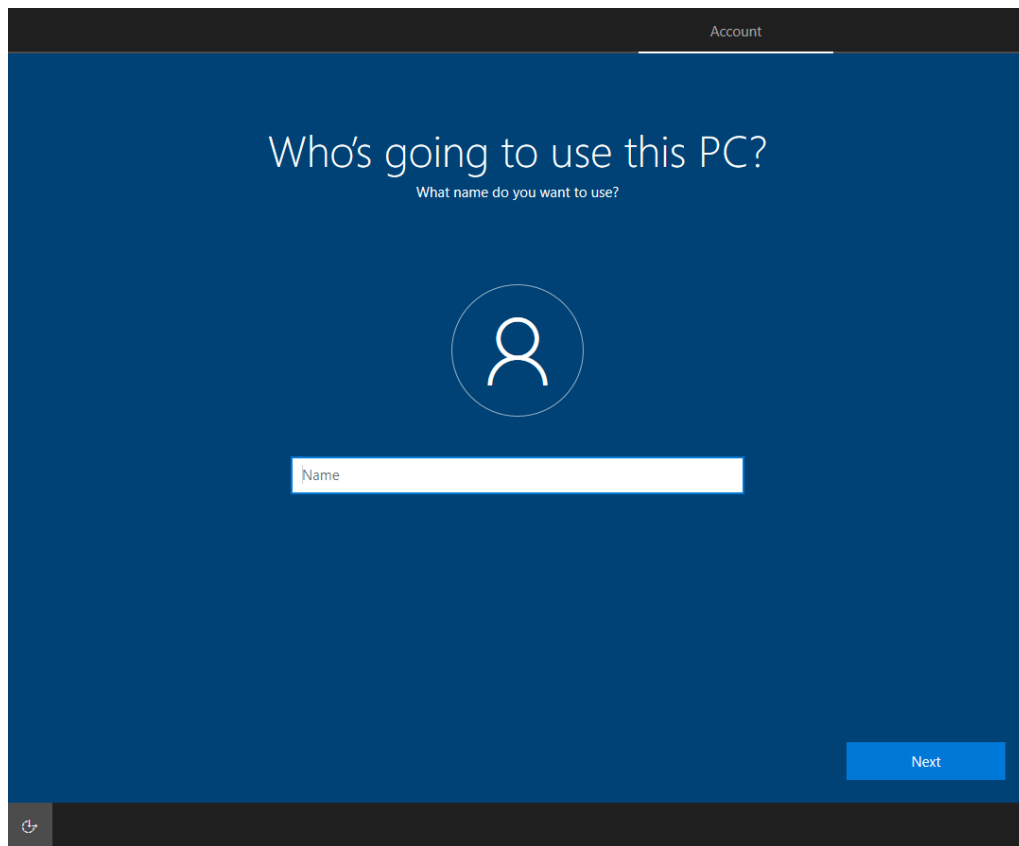


4. Connect to a network or continue with limited setup.

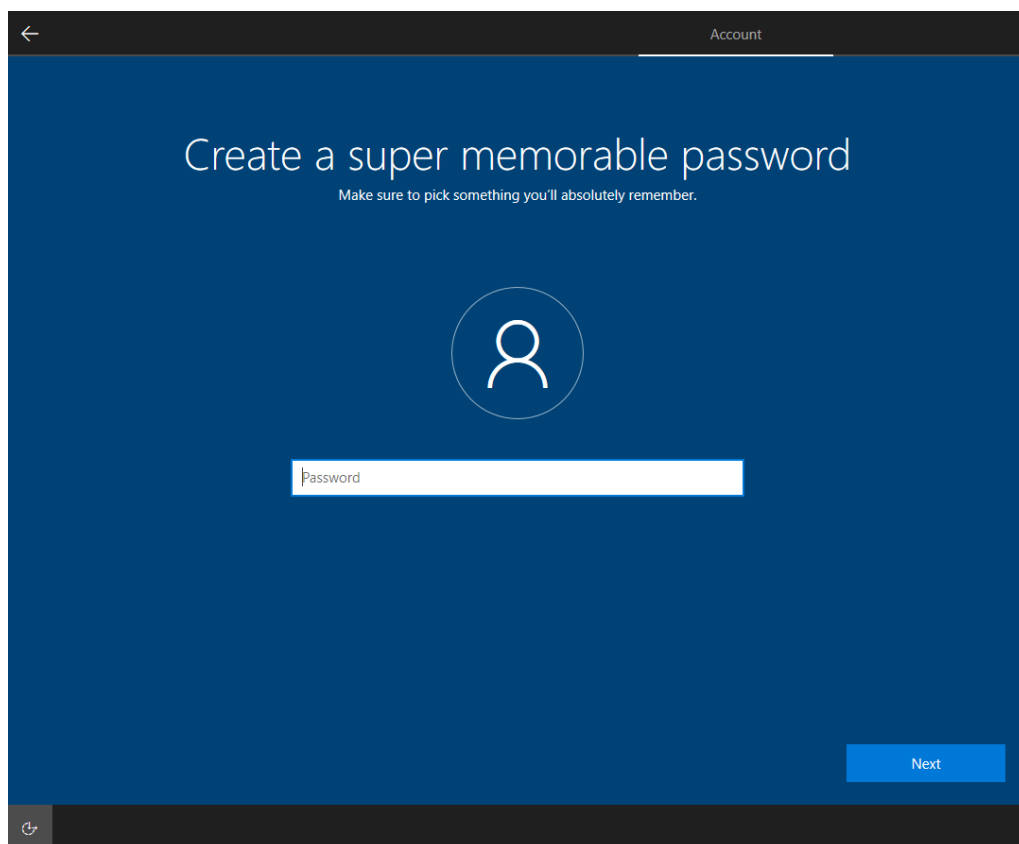




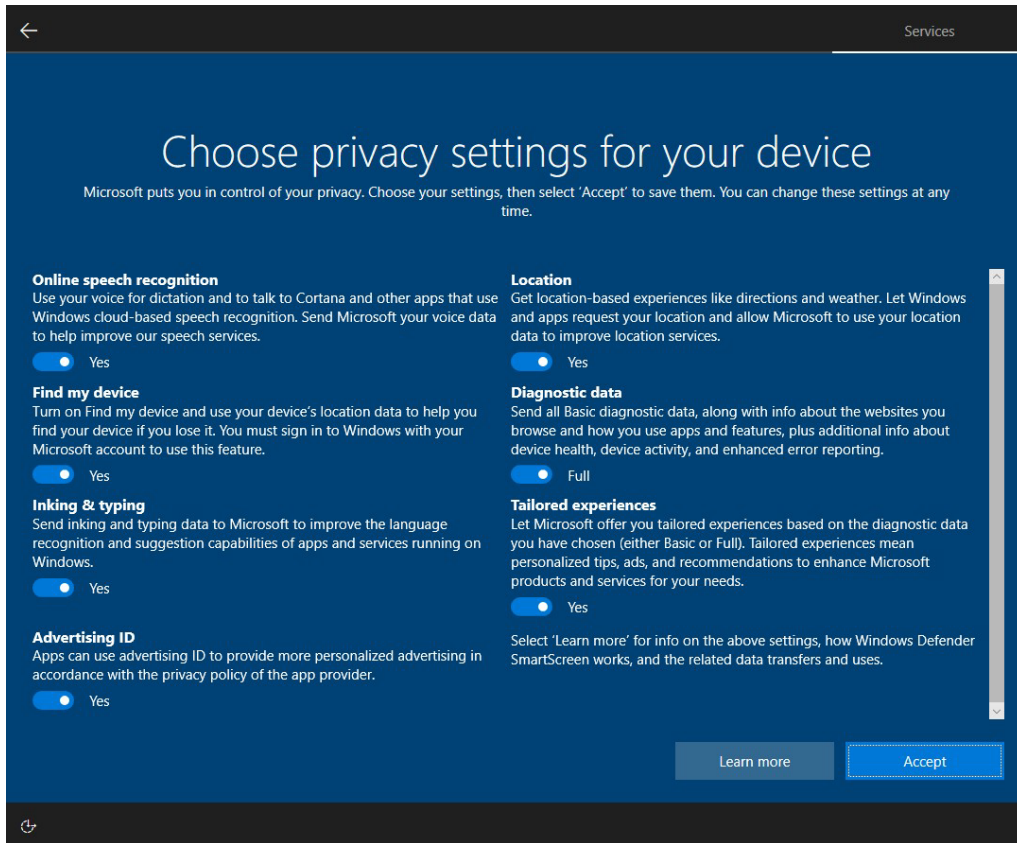
5. Sign in to or create a local account or a Microsoft account (MSA).



6. Set a password.



7. Choose your privacy settings.



## Initializing the System

After the OOBЕ settings, you will be redirected to the device desktop of the device. Wait until the process is complete. The device will reboot, and the new settings will take effect after the system restarts.

```
SetupComplete
C:\Windows\system32>start/wait c:\windows\system32\SetOEMModel.exe
C:\Windows\system32>start/wait c:\windows\system32\SortNetName.exe
C:\Windows\system32>reg delete "HKEY_LOCAL_MACHINE\Software\Microsoft\Windows\CurrentVersion\Run" /v "SetupComplete" /f
The operation completed successfully.
```

# 3. BitLocker

BitLocker is a Windows disk encryption feature, designed to protect data by providing encryption for entire volumes. BitLocker addresses the threats of data theft or exposure from lost, stolen, or inappropriately decommissioned devices.

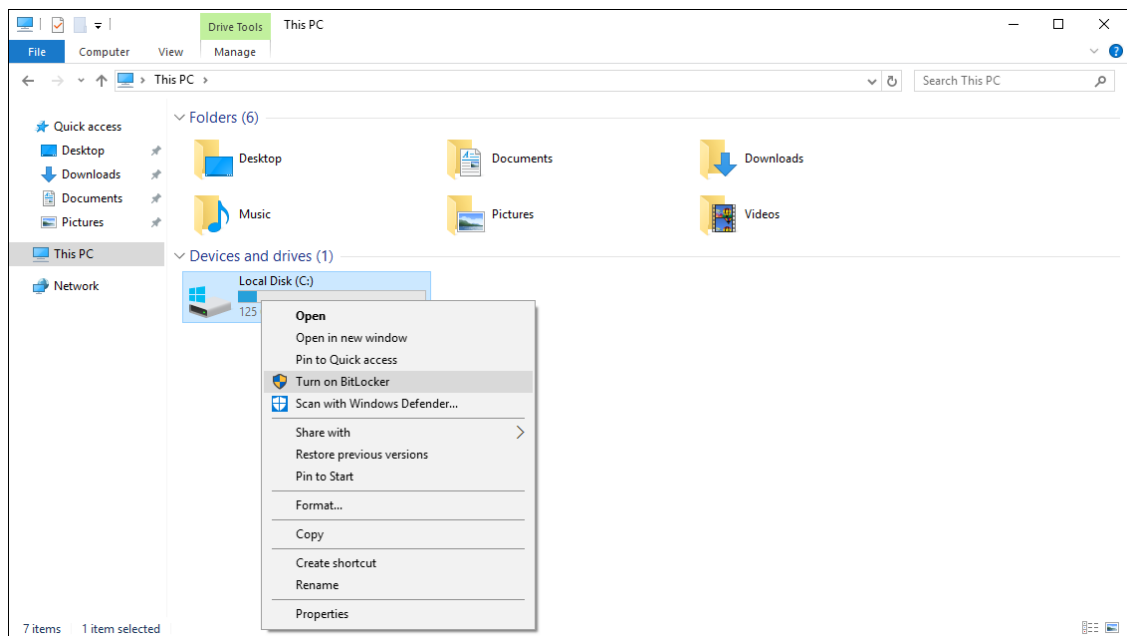
For more information about BitLocker, go to:

<https://learn.microsoft.com/en-us/windows/security/operating-system-security/data-protection/bitlocker/>

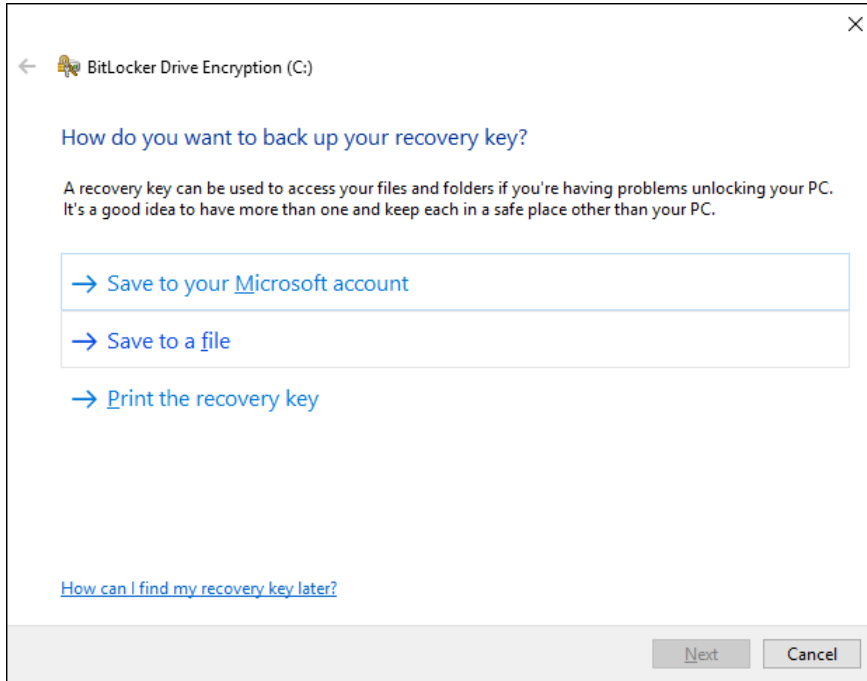
This chapter describes the BitLocker setup process.

## Enabling the BitLocker

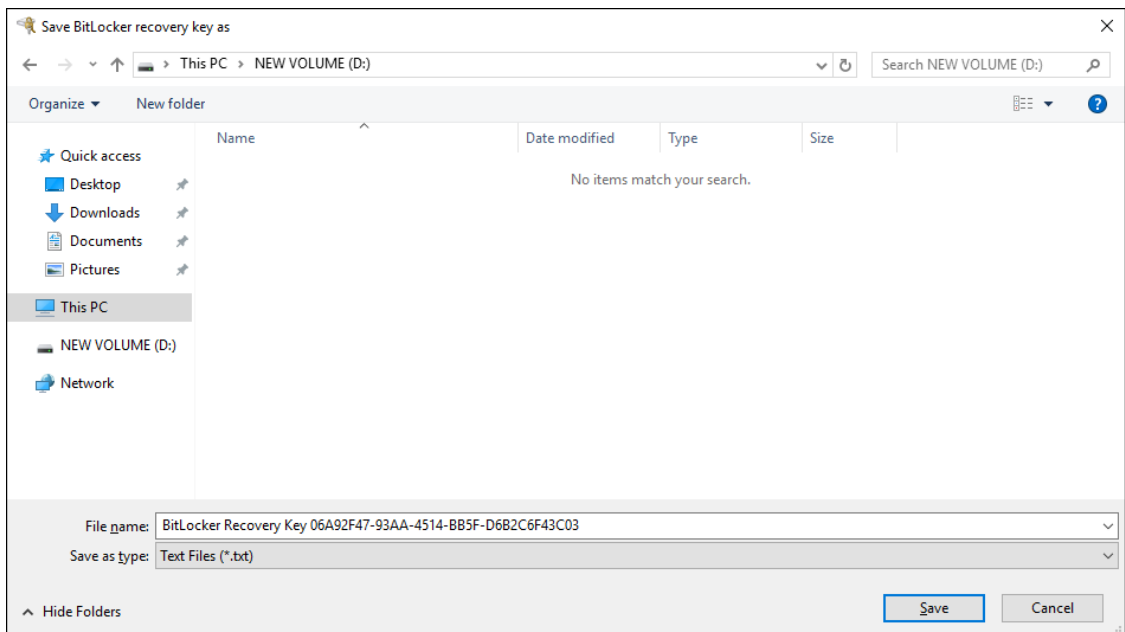
1. In the **Windows Devices and drives**, right-click on the drive and select **Turn on BitLocker**.



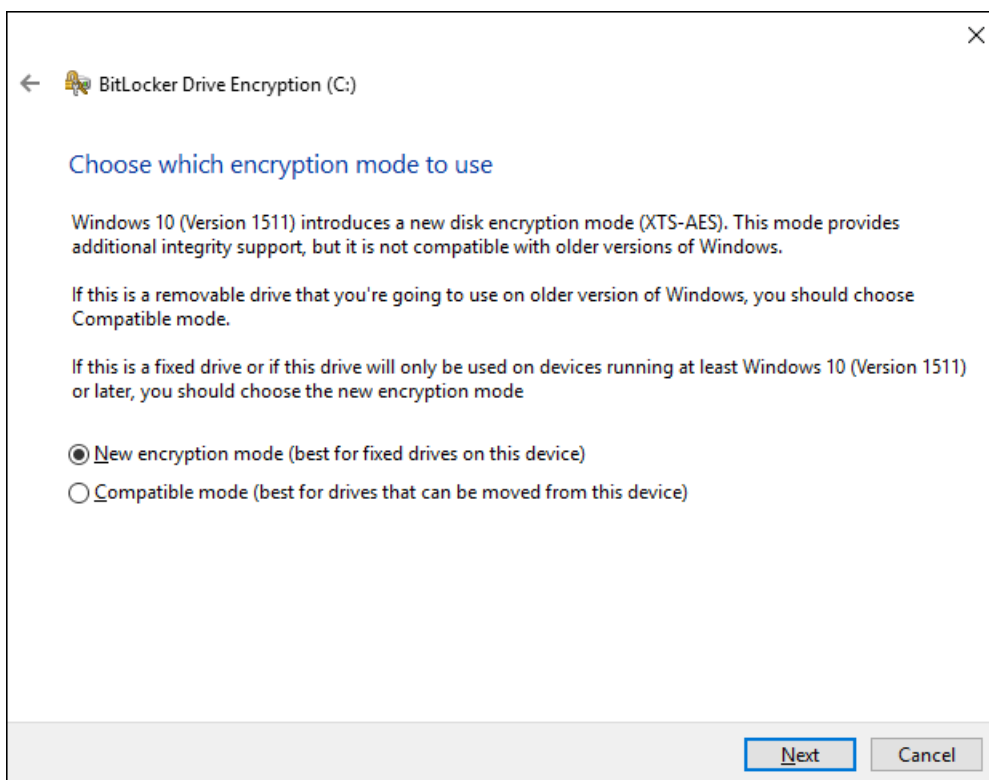
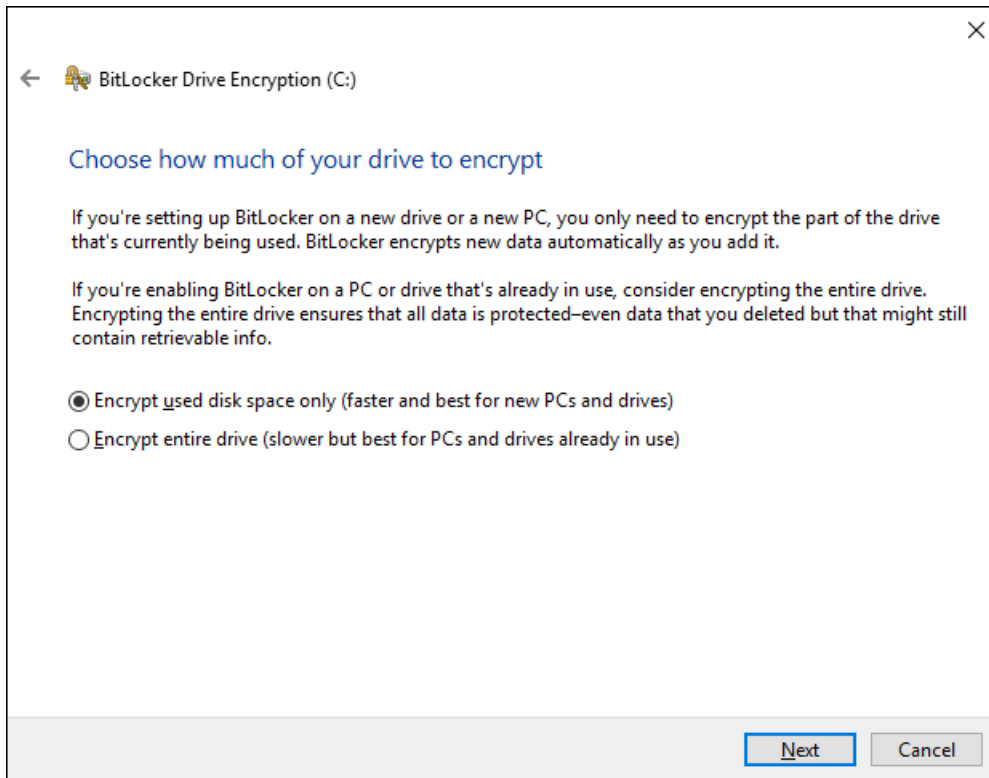
2. Select an option to back up the recovery key. For example, select **Save to a file**.



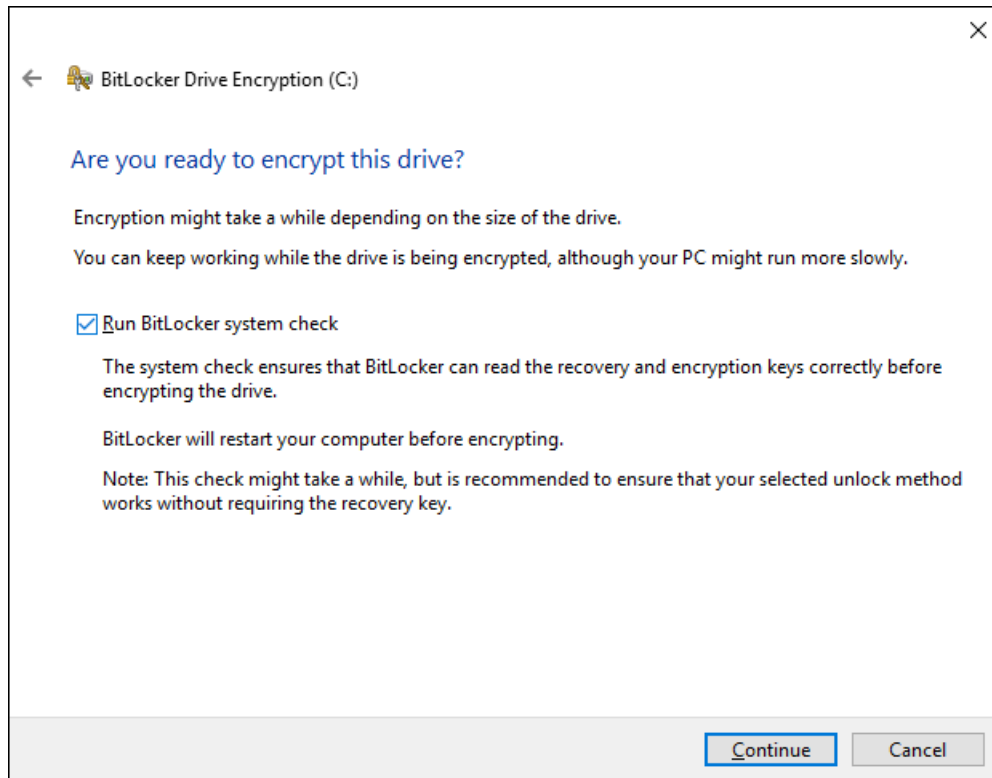
3. Select the path to store the file in.



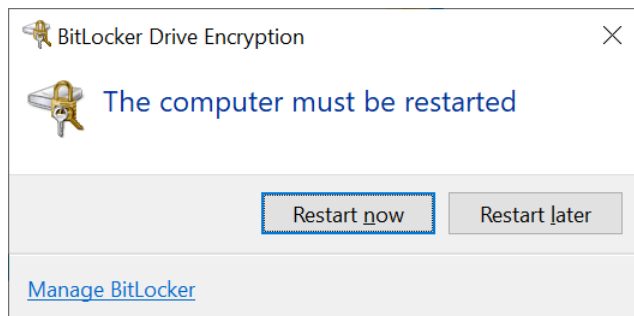
4. Follow the onscreen instructions to specify the drive encryption options.



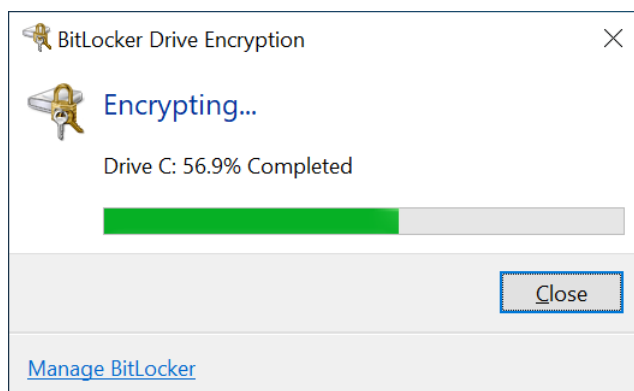
5. Click **Continue**.



6. Restart the computer.

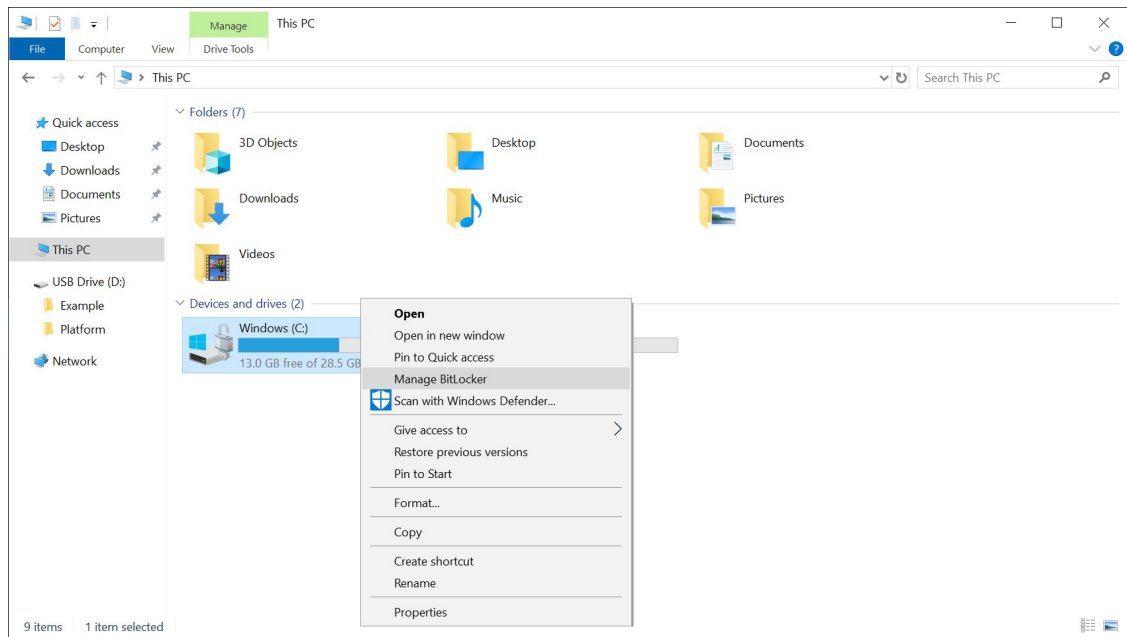


7. Wait for the encryption process to complete and then click **Close**.

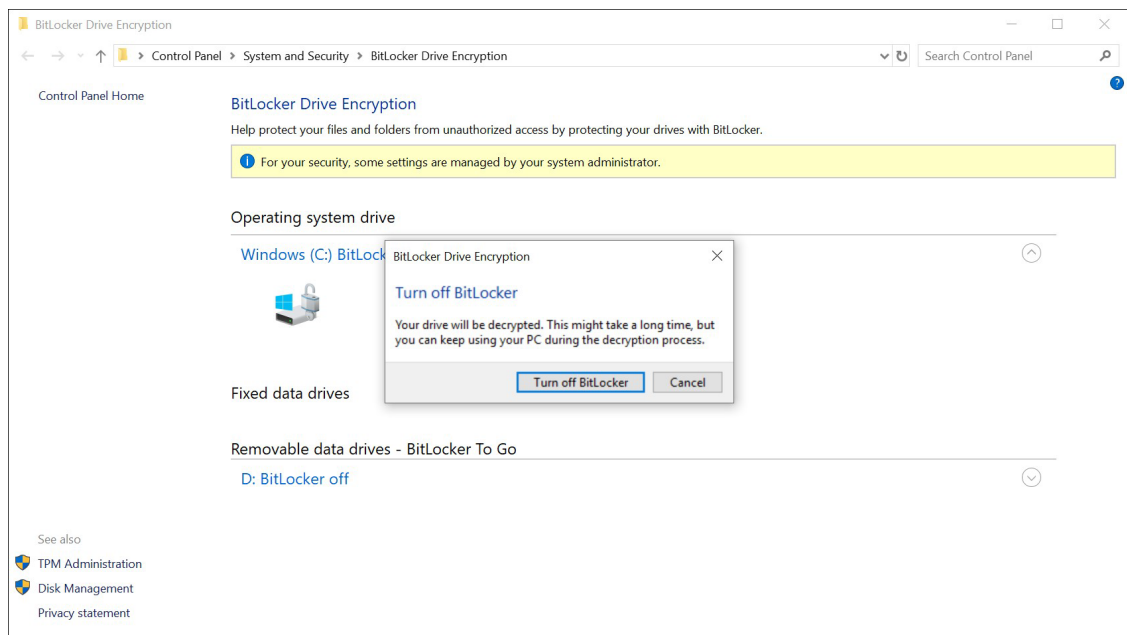


# Disabling the BitLocker

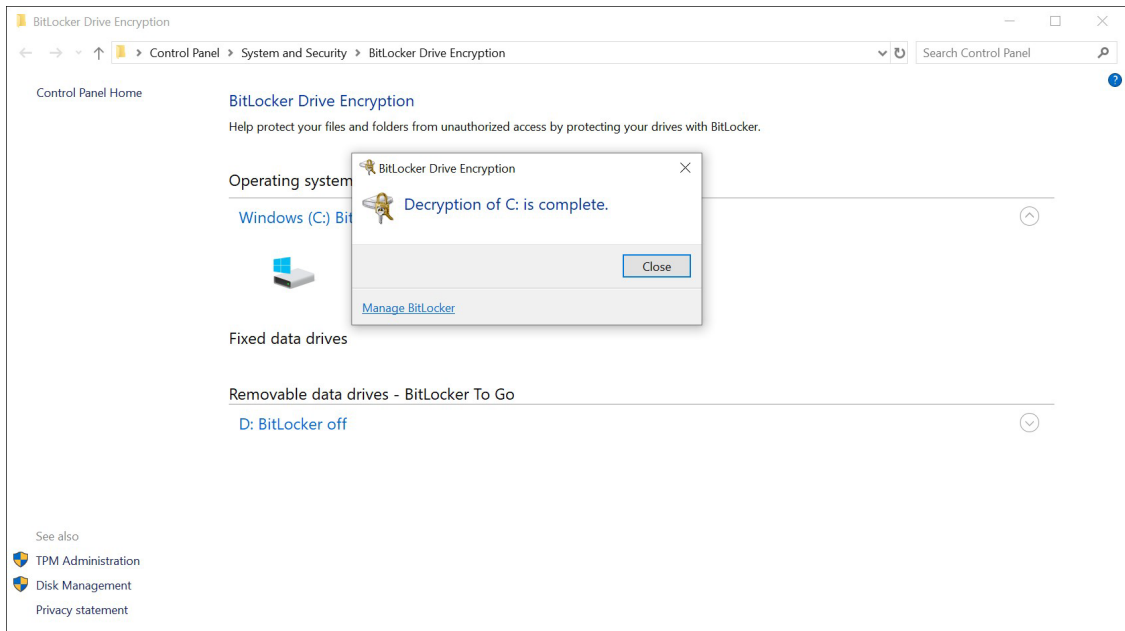
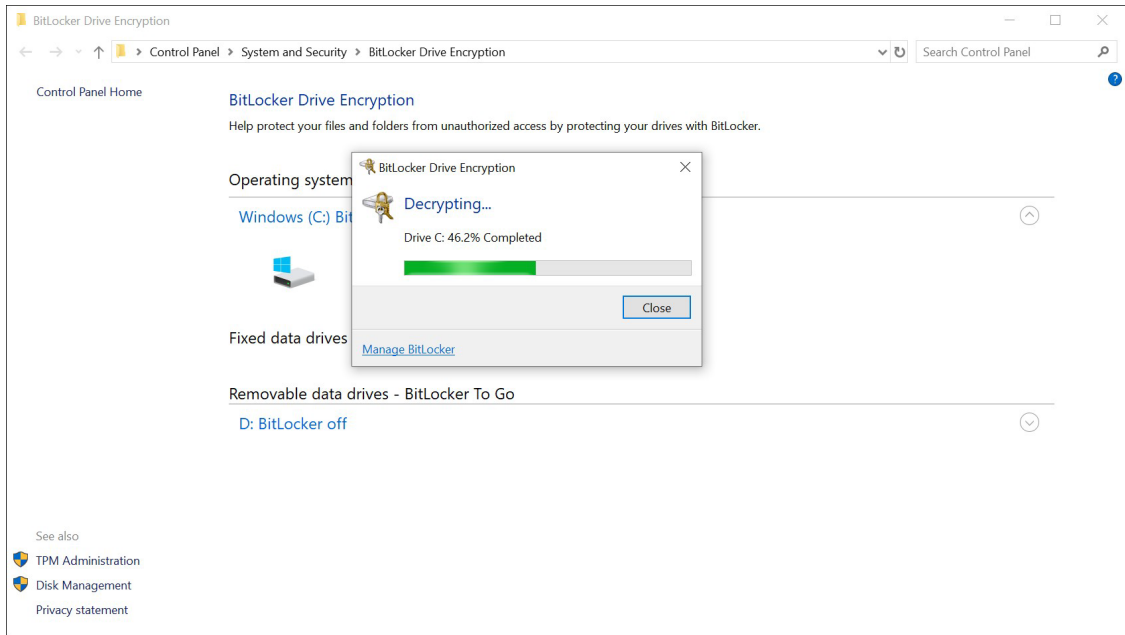
1. In the **Windows Devices and drives**, right-click on the drive and select **Manage BitLocker**.



2. Click on **Turn off BitLocker**.

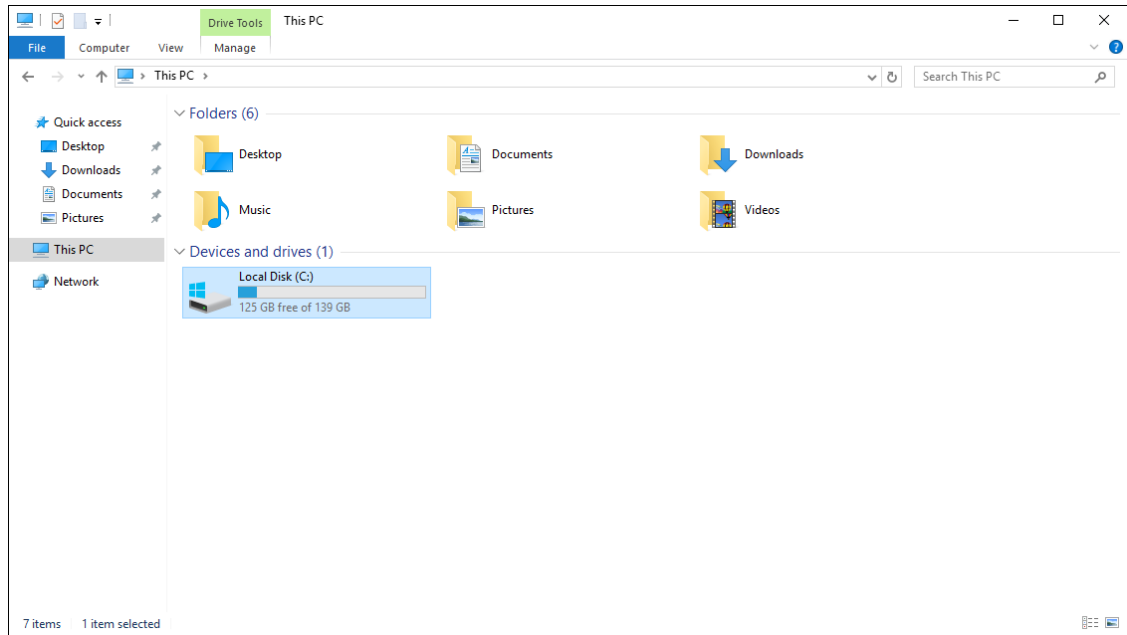


3. Wait for the decryption process to complete and click **Close** to exit the program.





4. Check the disk status after the decryption process is completed.



## 4. RAID

RAID is the acronym for **Redundant Array of Independent Disk** which indicates the use of combining multiple disks into one or more logical units for data redundancy, performance improvement, or both.

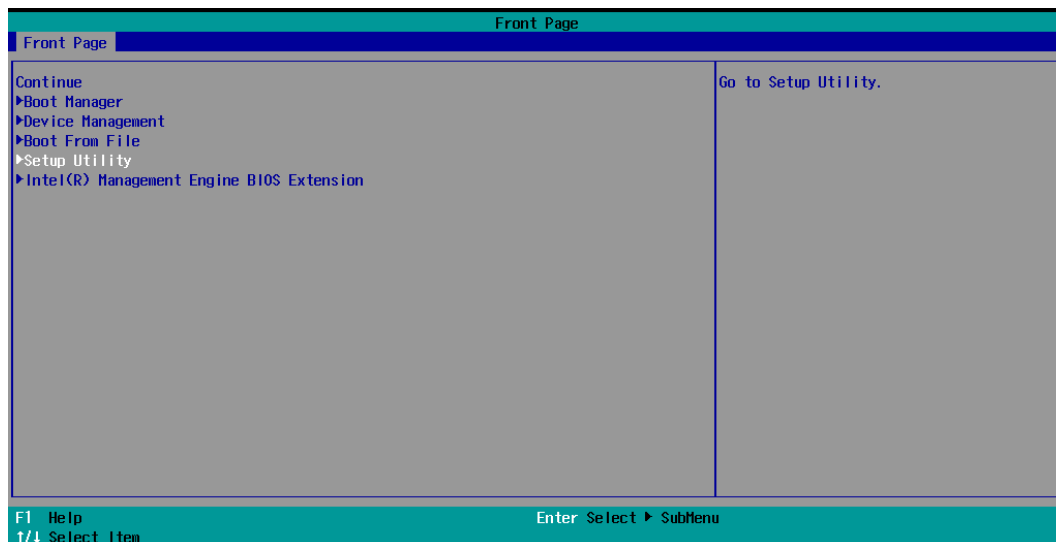
This chapter describes the setup process for Intel® RAID (Intel® RST) and SW RAID.

### ● NOTE

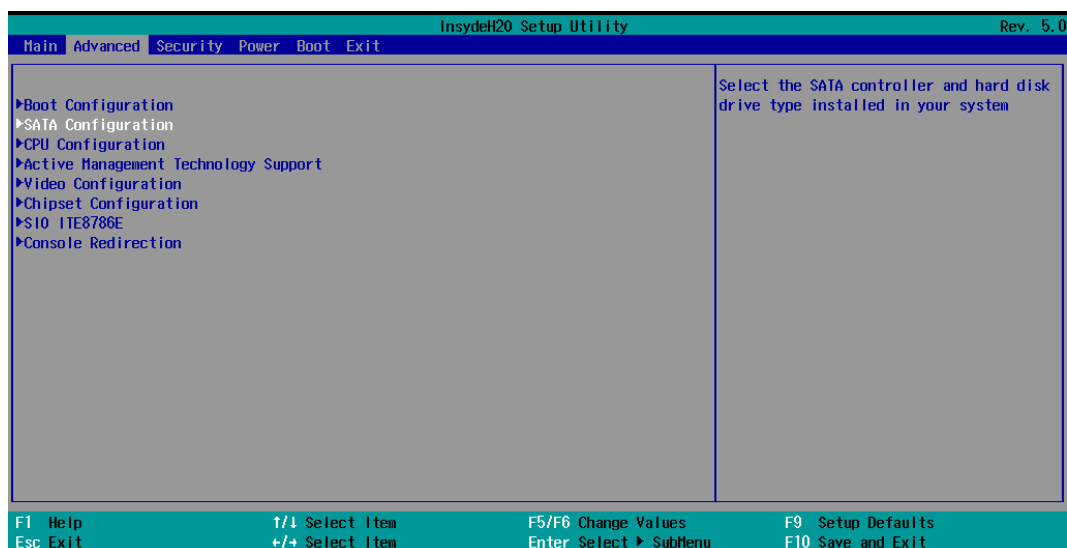
Use hard disks of the same brand, same model, and same capacity to create a RAID for best performance.

## Intel® RAID: Changing the RAID Mode

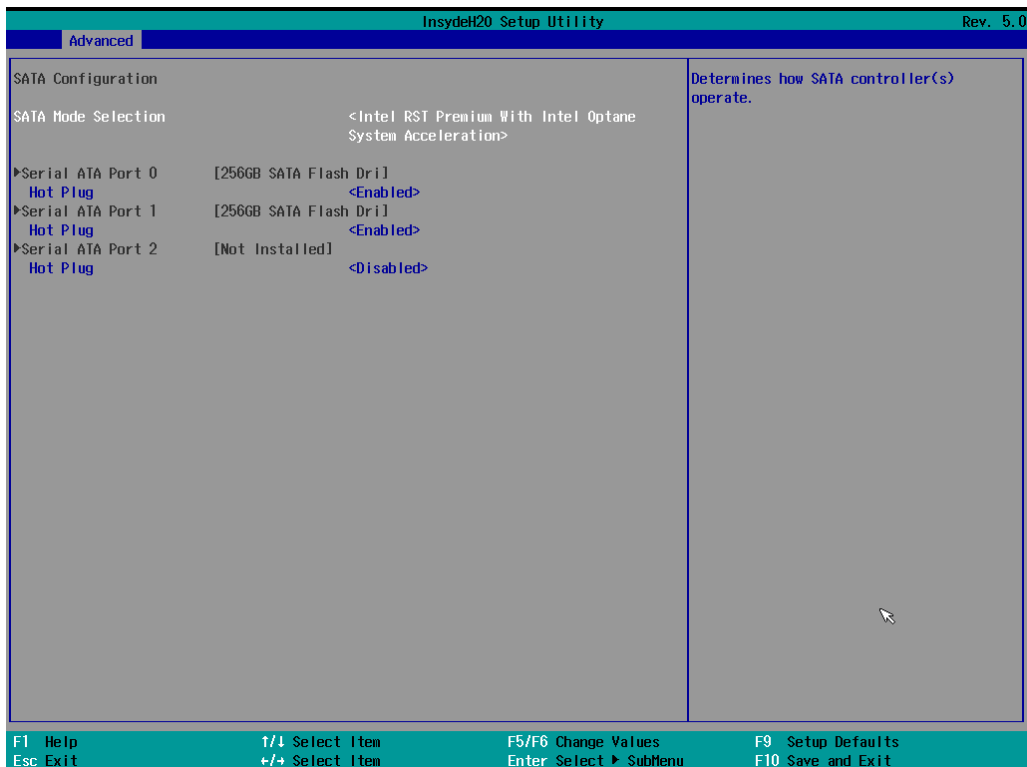
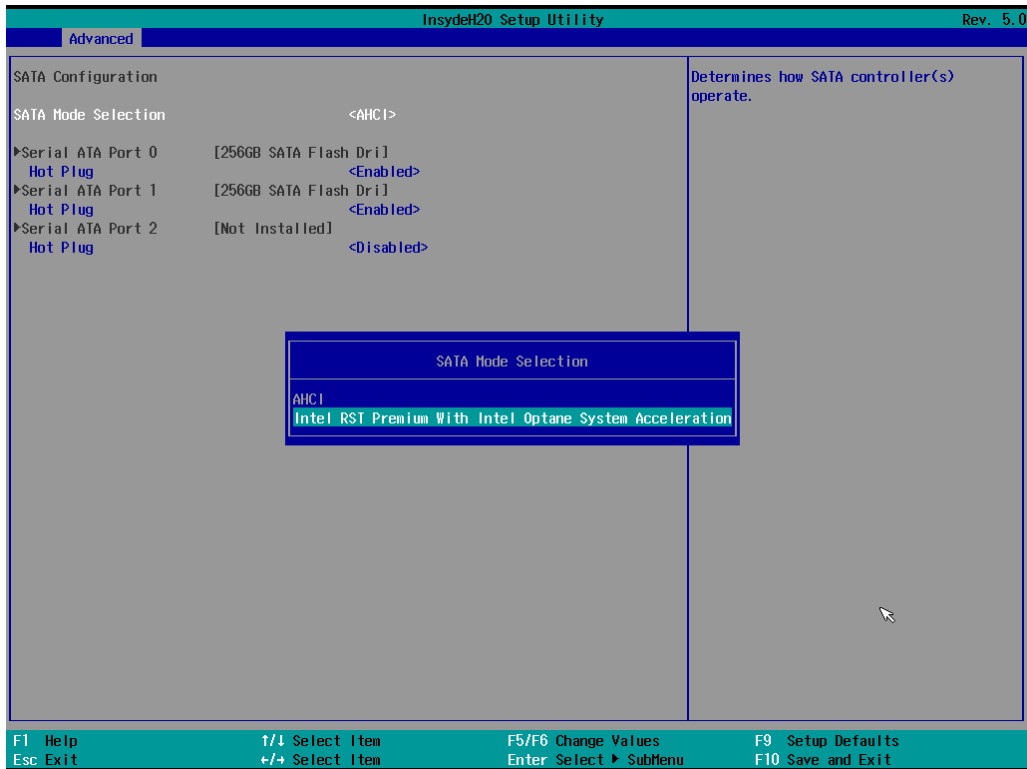
1. Power on the computer and press **F2** to enter the BIOS menu.
2. Select the **Setup Utility** option.



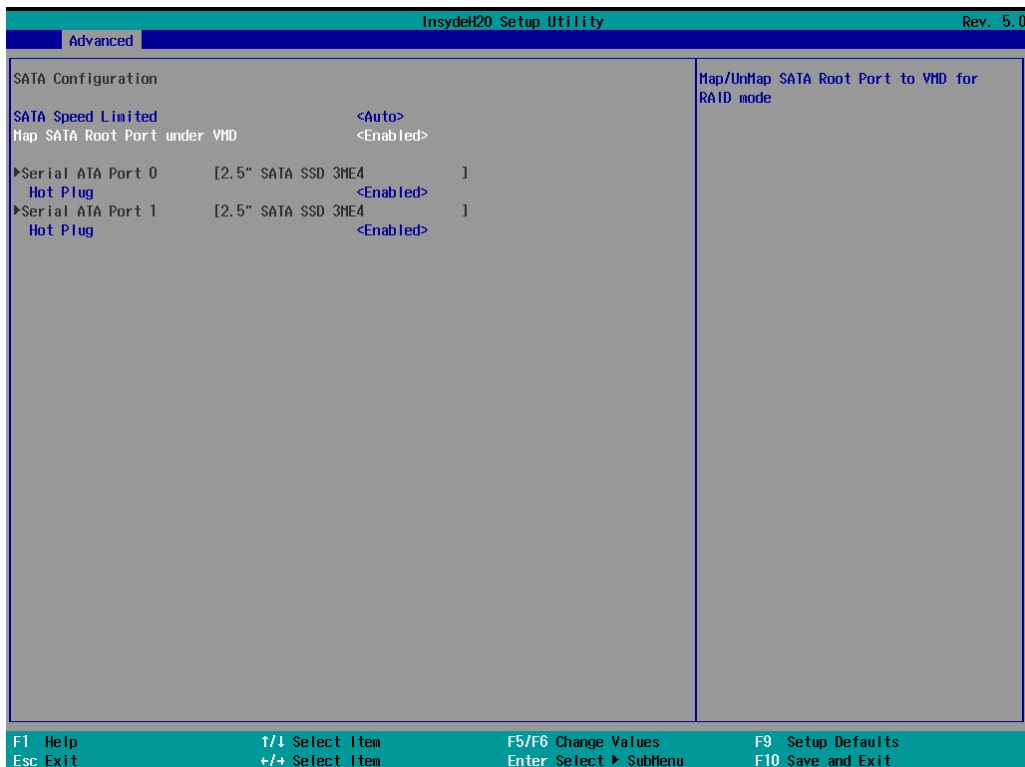
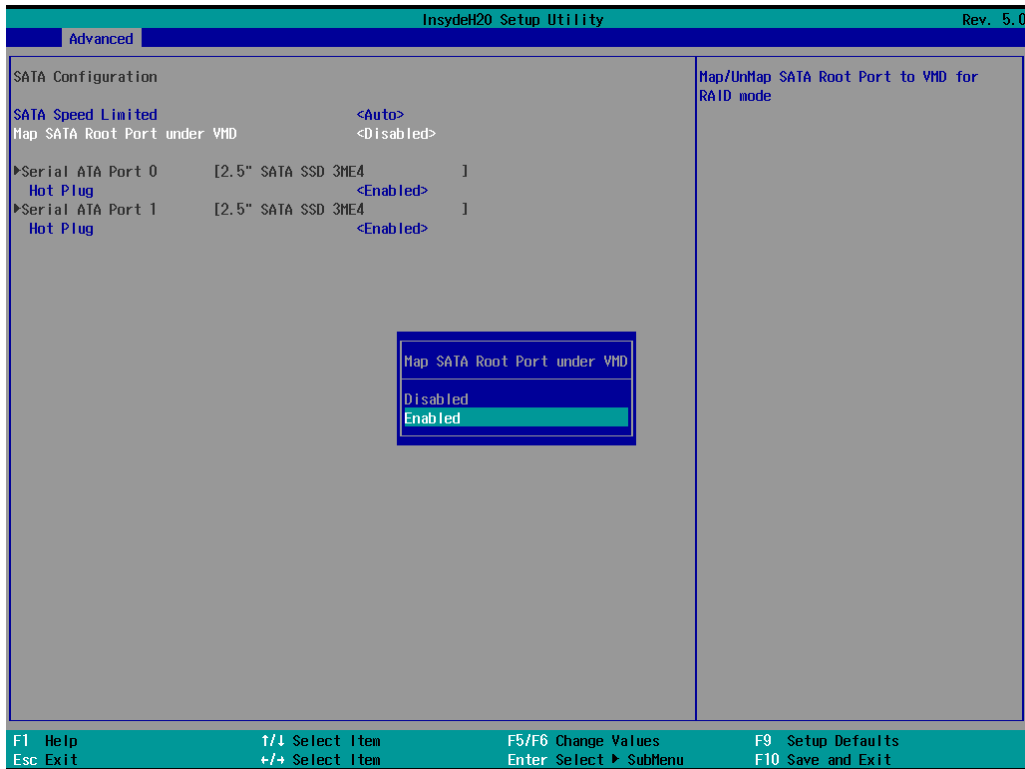
3. Select the **SATA Configuration** option.



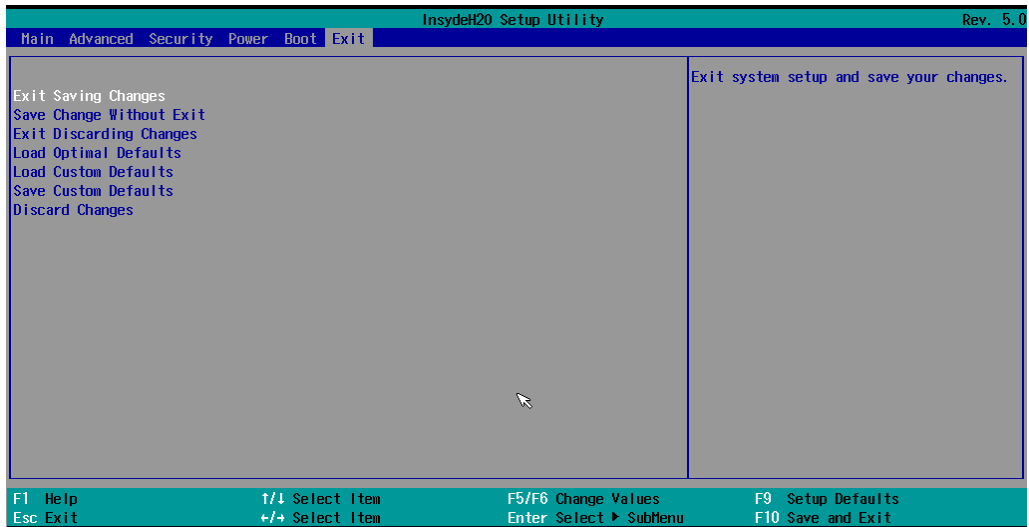
- If your device processor is older than **11th Gen Intel® Core™ Processor (Intel® Tiger-Lake)**, select the **SATA Mode Selection** followed by the **Intel RST Premium option**. Enable the **Hot Plug** function on all ports.



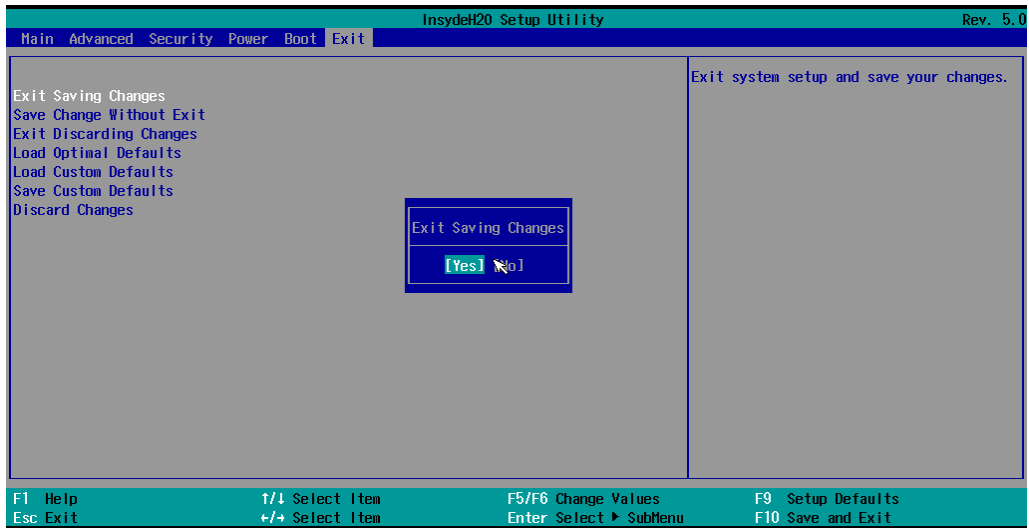
- If your device CPU is **11th Gen Intel® Core™ Processors (Intel® Tiger-Lake)** or newer processor generation, select the **Map SATA Root Port under VMD** and **Enable** this option. Enable the **Hot Plug** function on all ports.



- Press **F10** to save the settings and then press **ESC** to return to the main page.

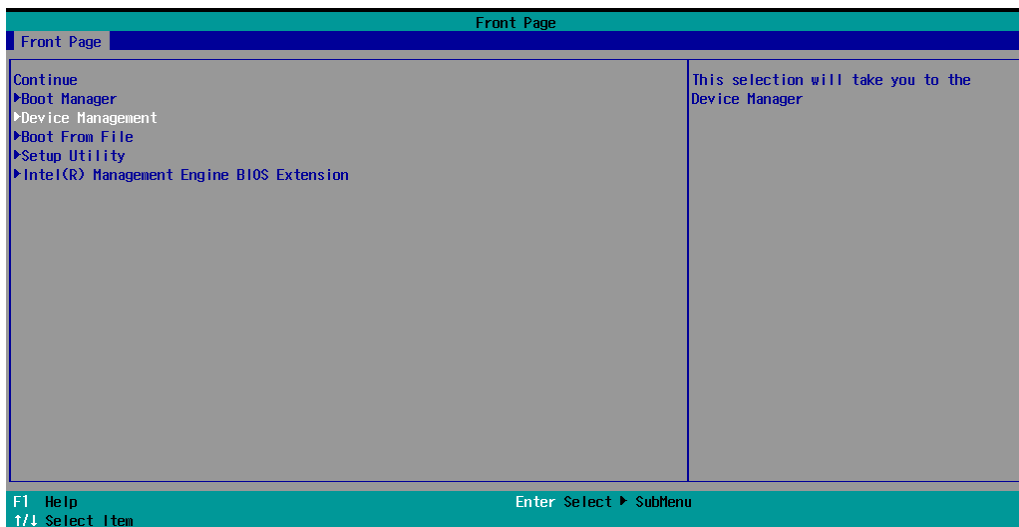


- Select **Exit Saving Changes**, and then select **Yes** to save the settings.

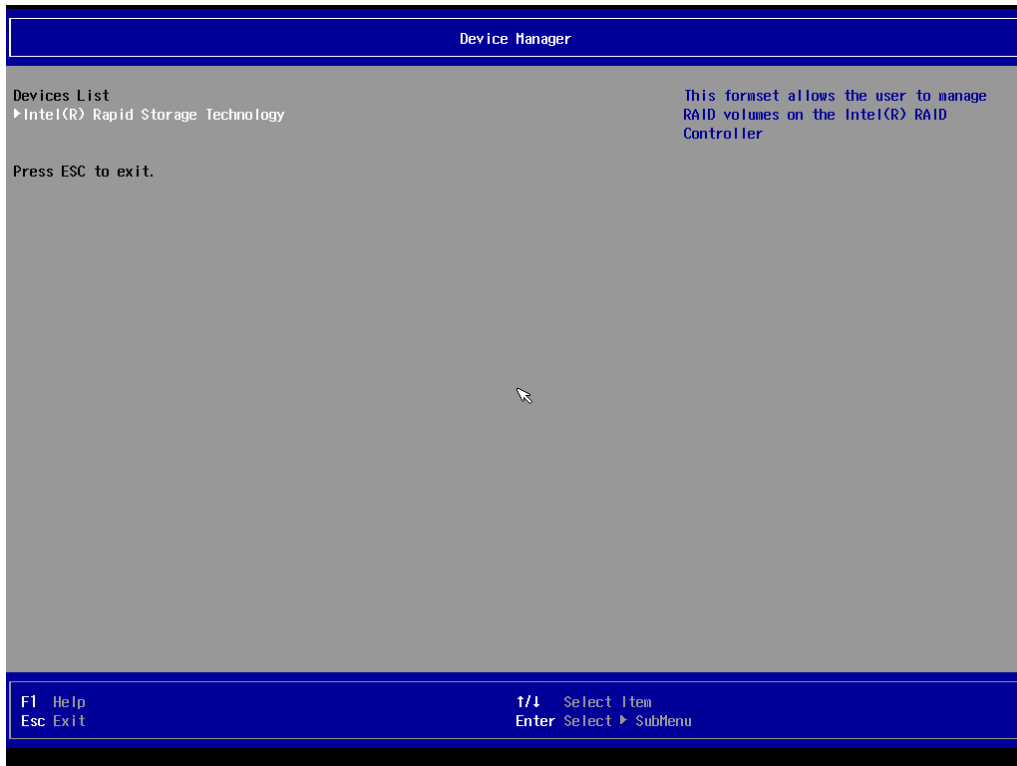


## Intel® RAID: Creating a RAID Disk in BIOS

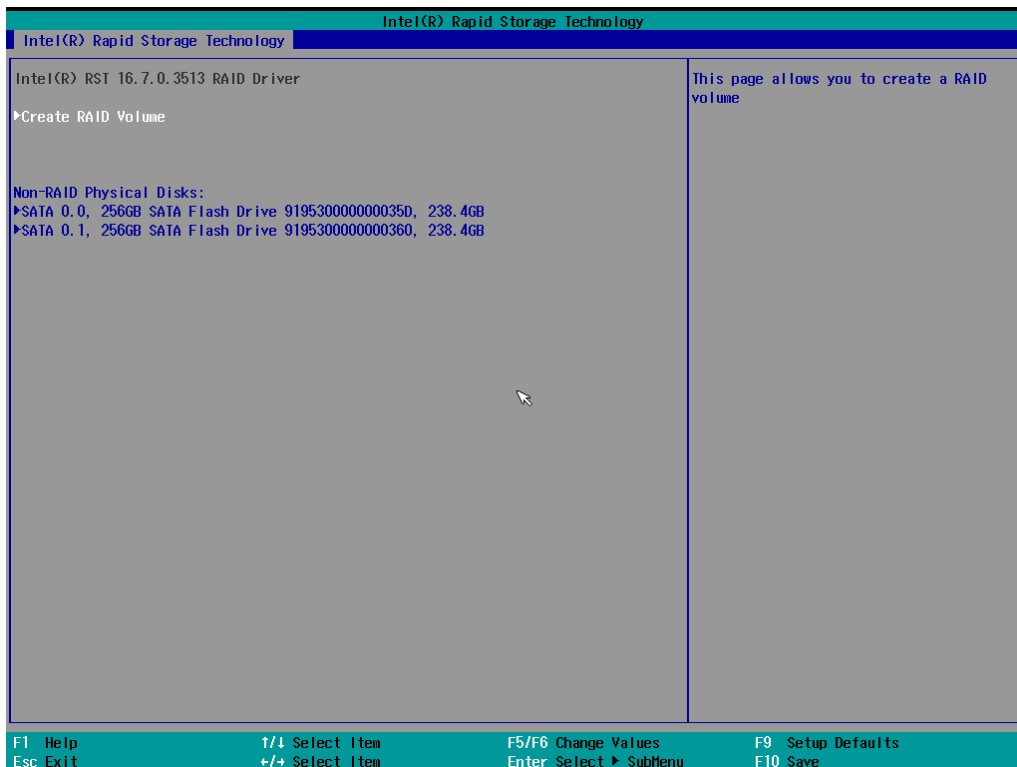
- Power on the computer and press **F2** to enter the BIOS menu.
- Select the **Device Management** option.



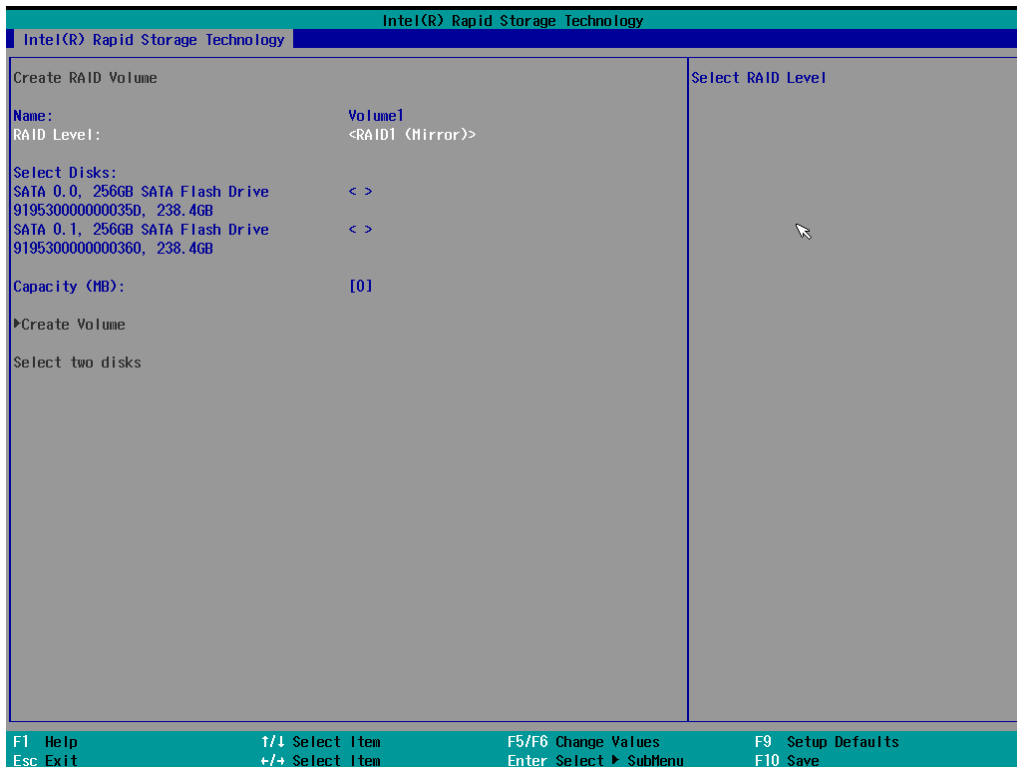
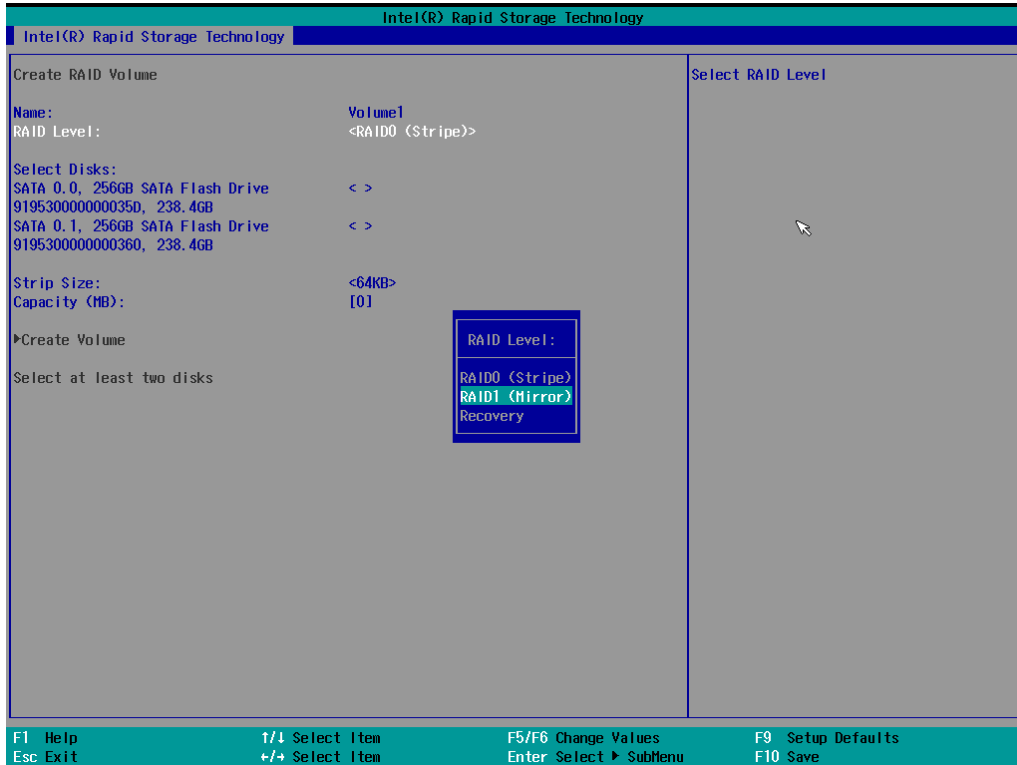
3. Select **Intel® Rapid Storage Technology**.



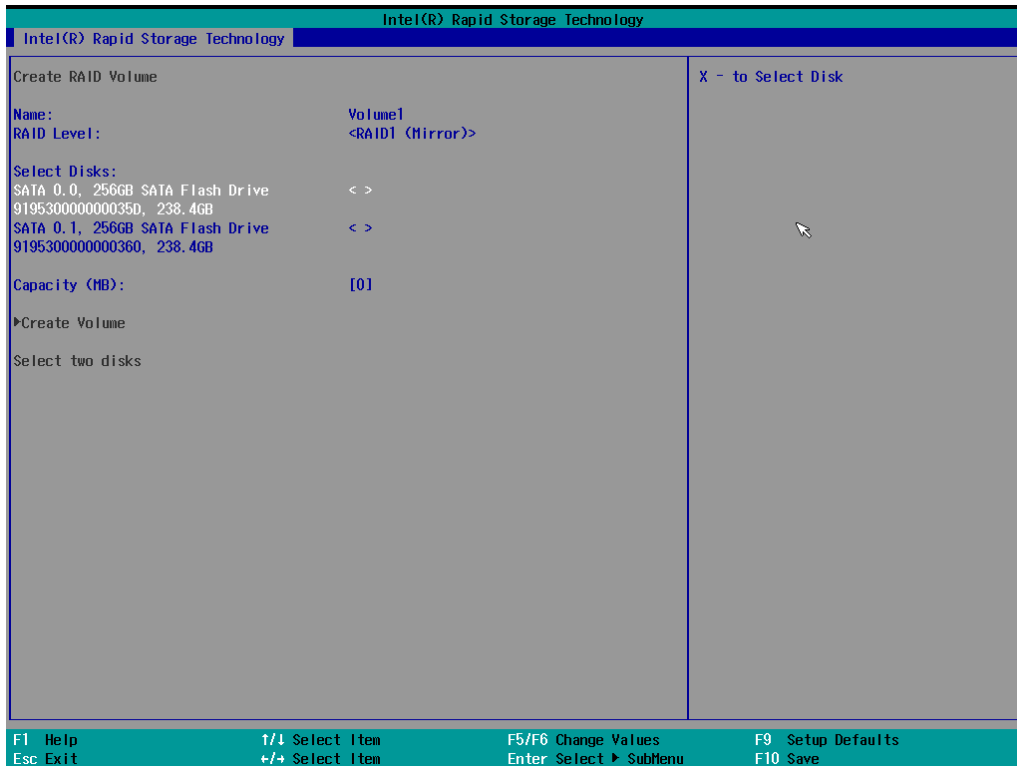
4. Select **Create RAID Volume**.



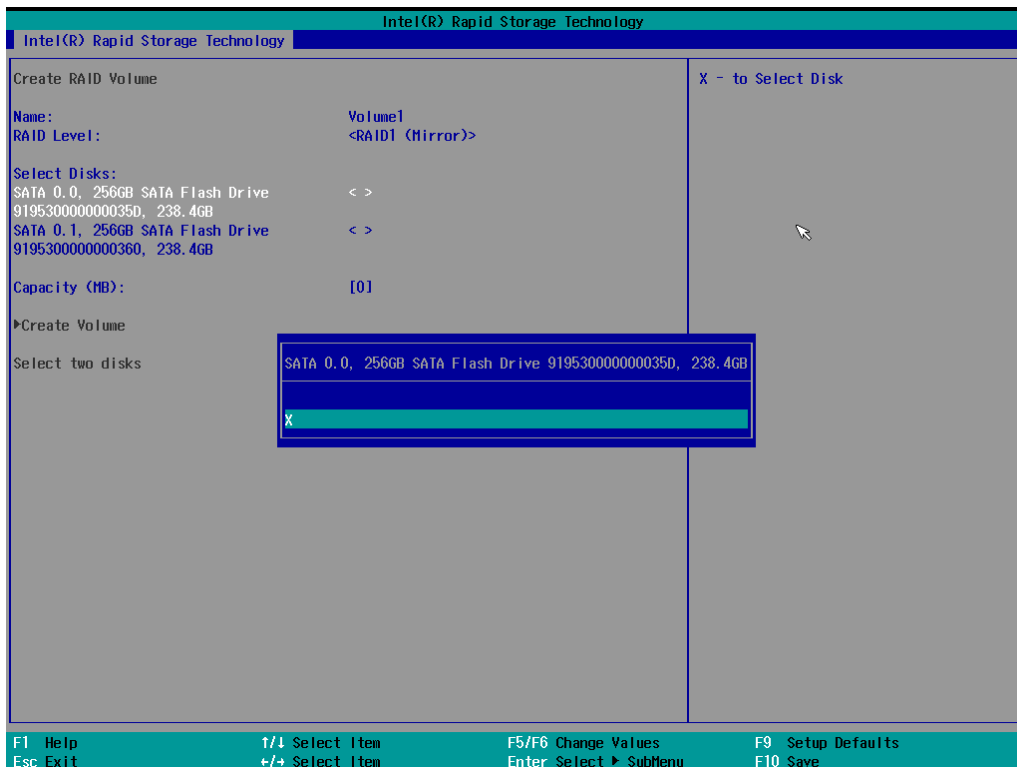
- Select the **RAID Level** option and then press **Enter** to select the raid level; for example, **RAID1(Mirror)**.



6. Select the target disk.

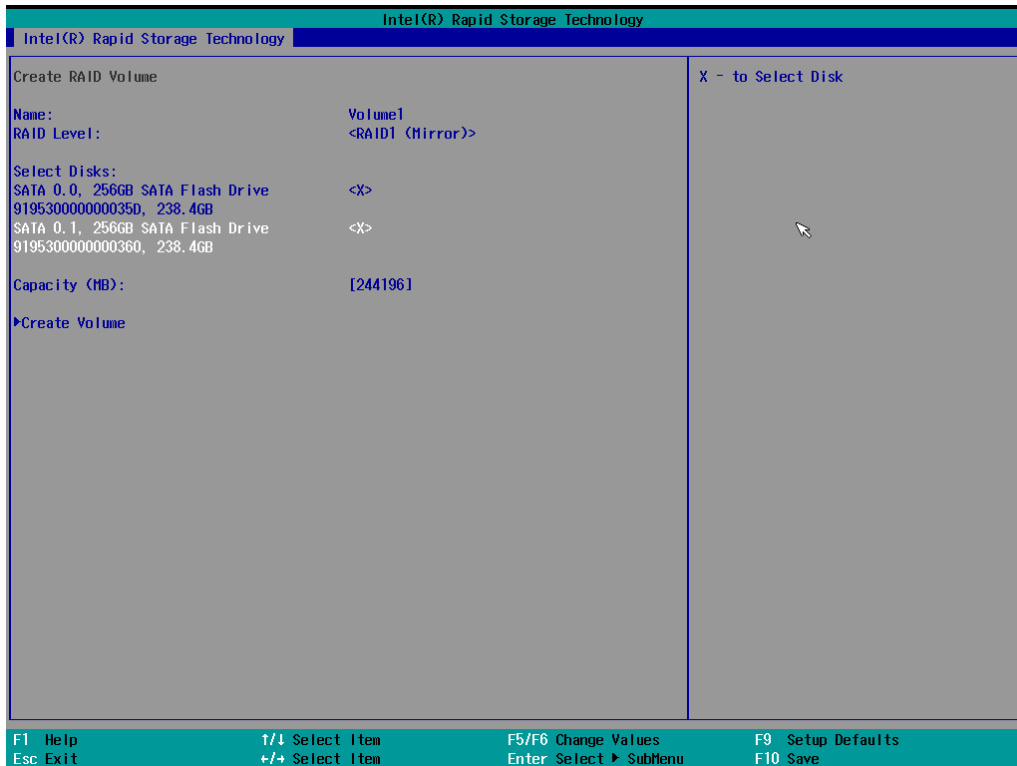


7. Enter **X** and then press **Enter**.

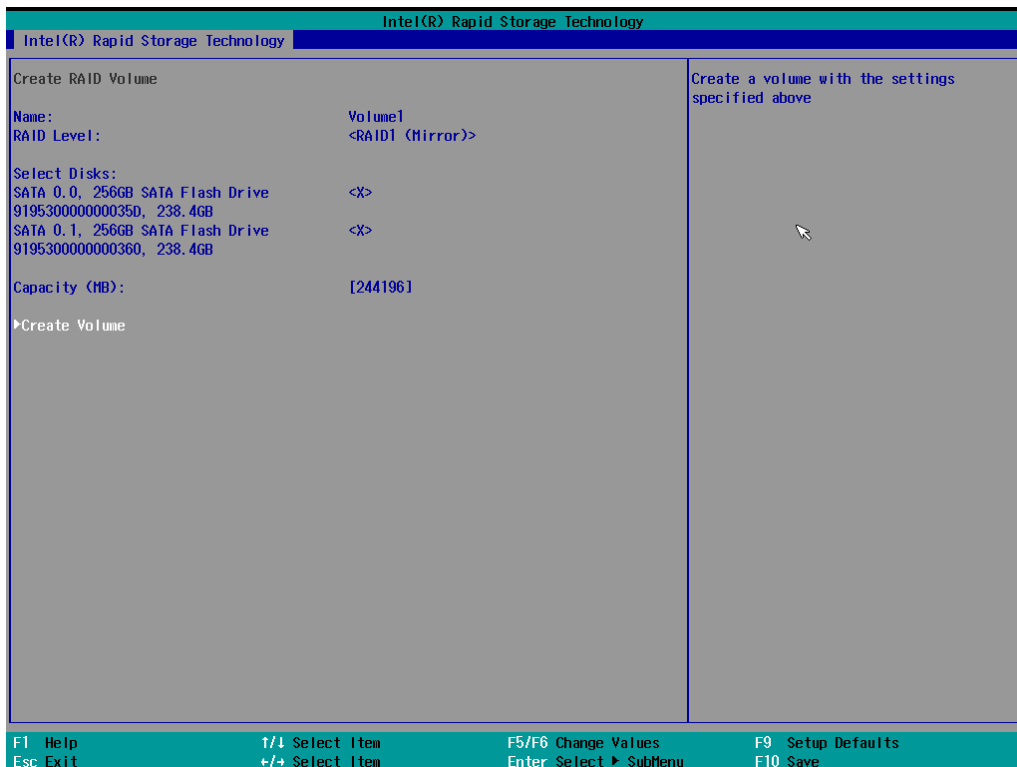




8. The disk is now marked with an **X** next to it to indicate the selection.



9. Select the **Create Volume** option.



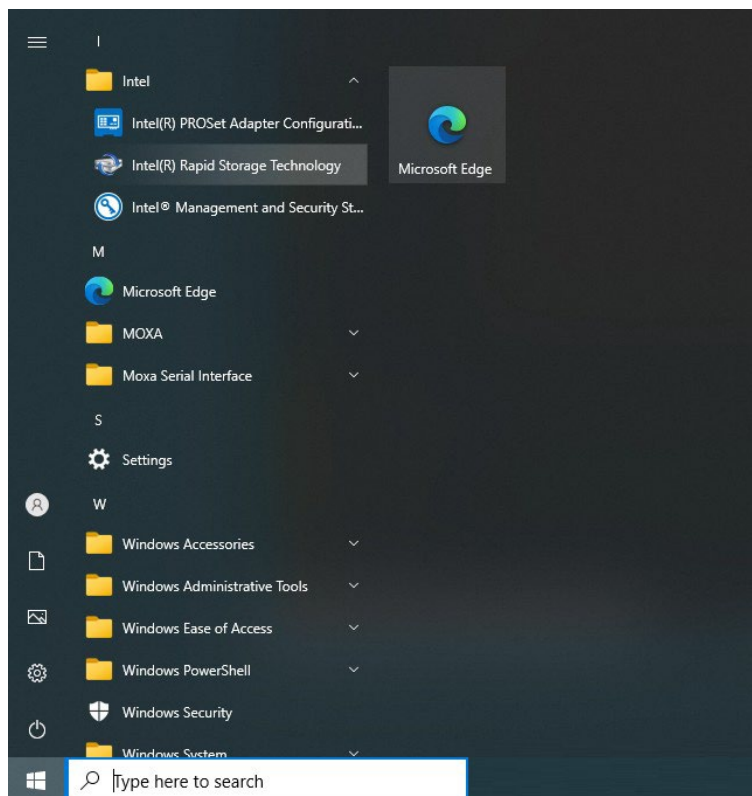
10. A RAID volume is created based on the settings specified.



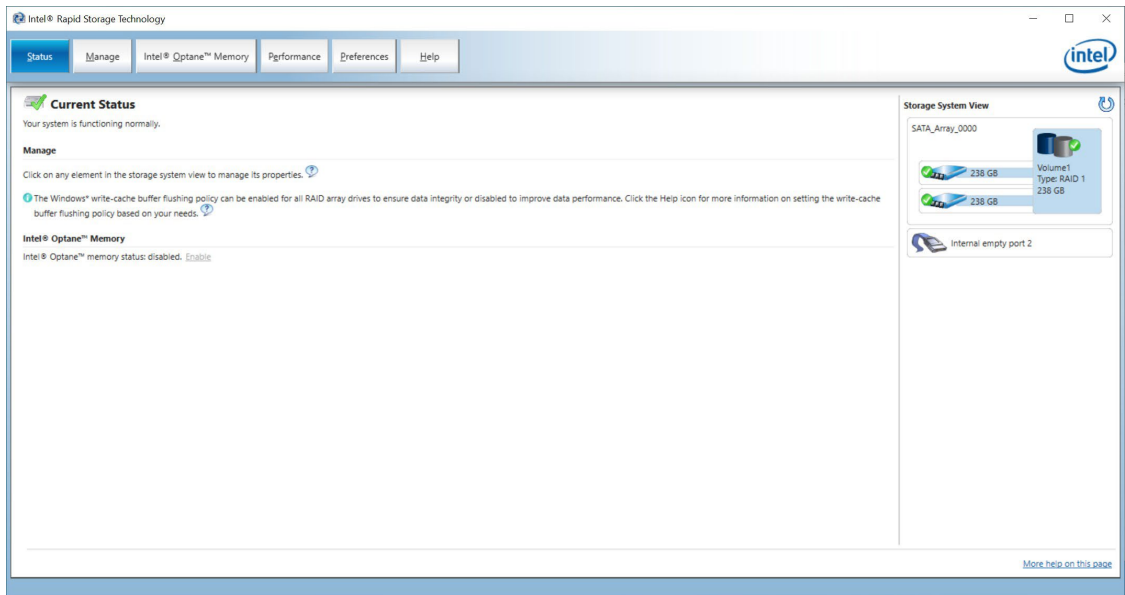
11. Press **F10** to save the settings.

## Intel® RAID: Replacing a Disk

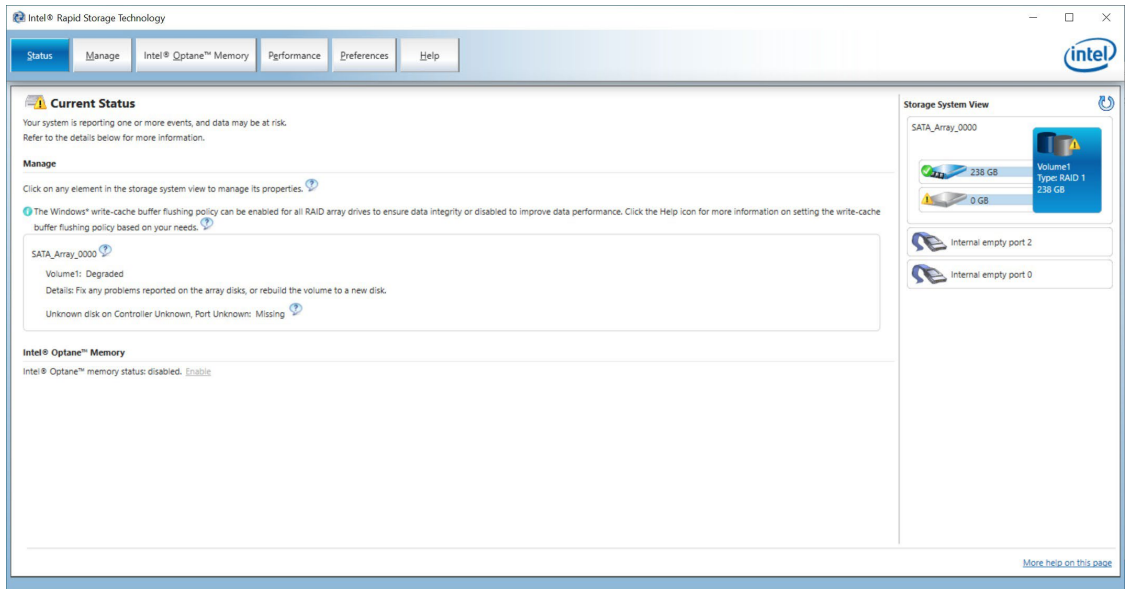
1. If your device processor is older than 11th Gen Intel® Core™ Processor (Intel® Tiger-Lake), run **Intel® Rapid Storage Technology** from the Windows Start menu.



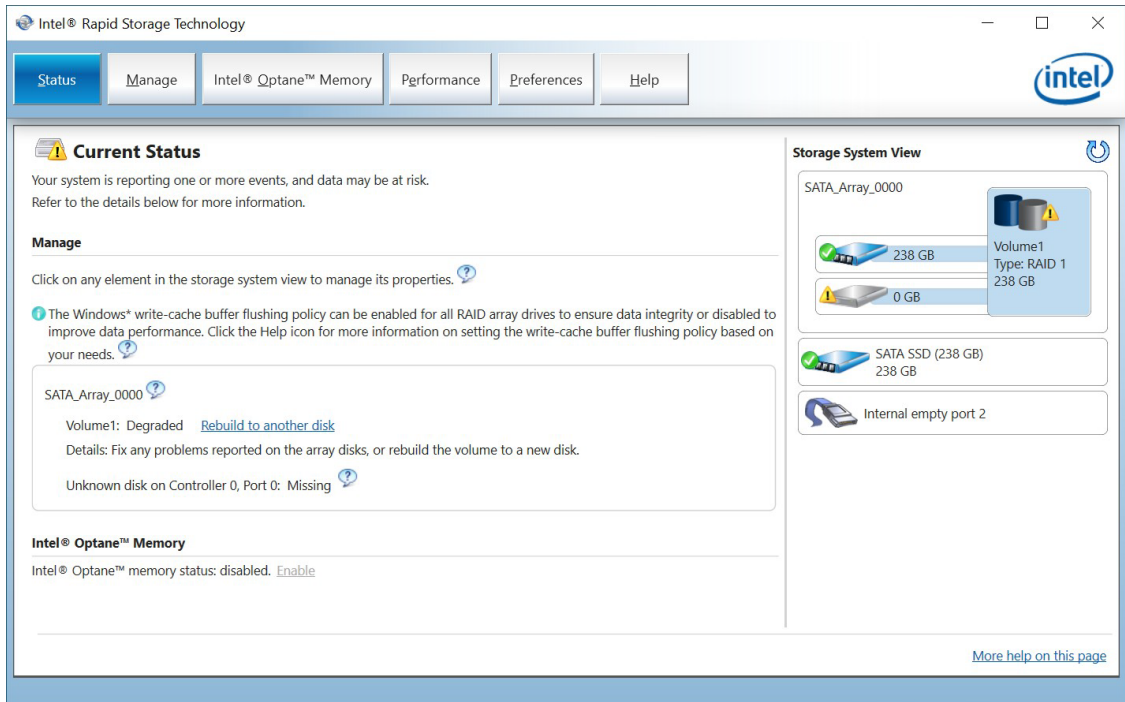
## 2. Physically unplug the target SSD.



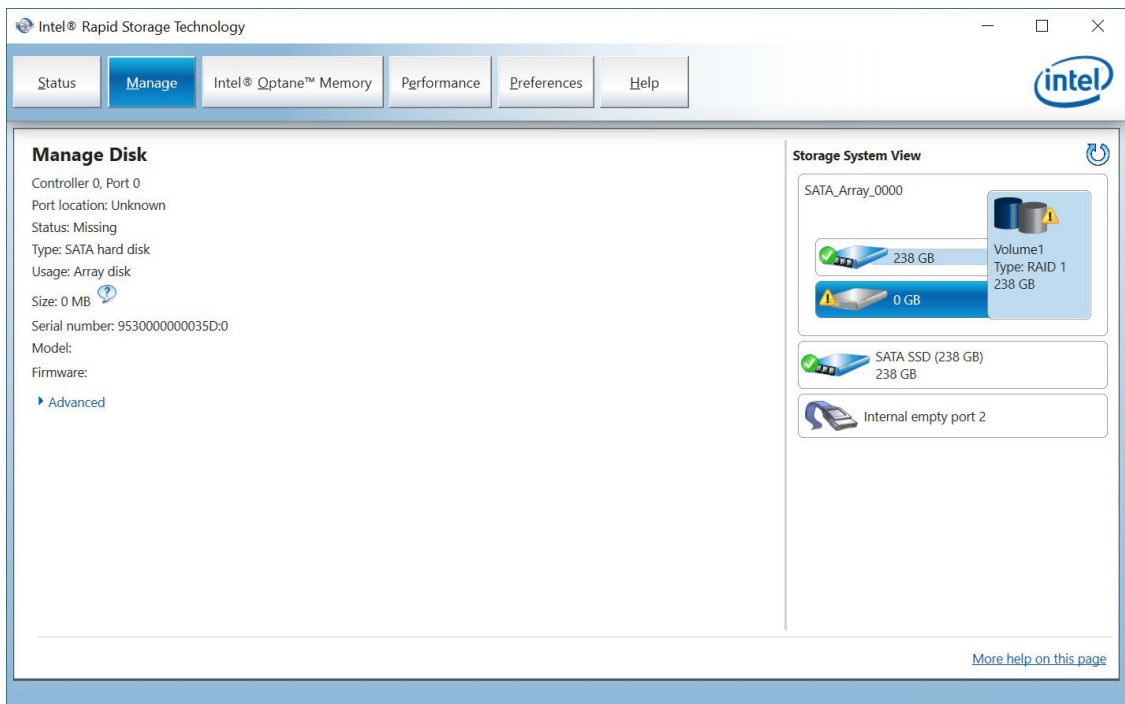
The status of the SSD that is unplugged will change from green (check mark) to yellow (exclamation mark) as shown below:



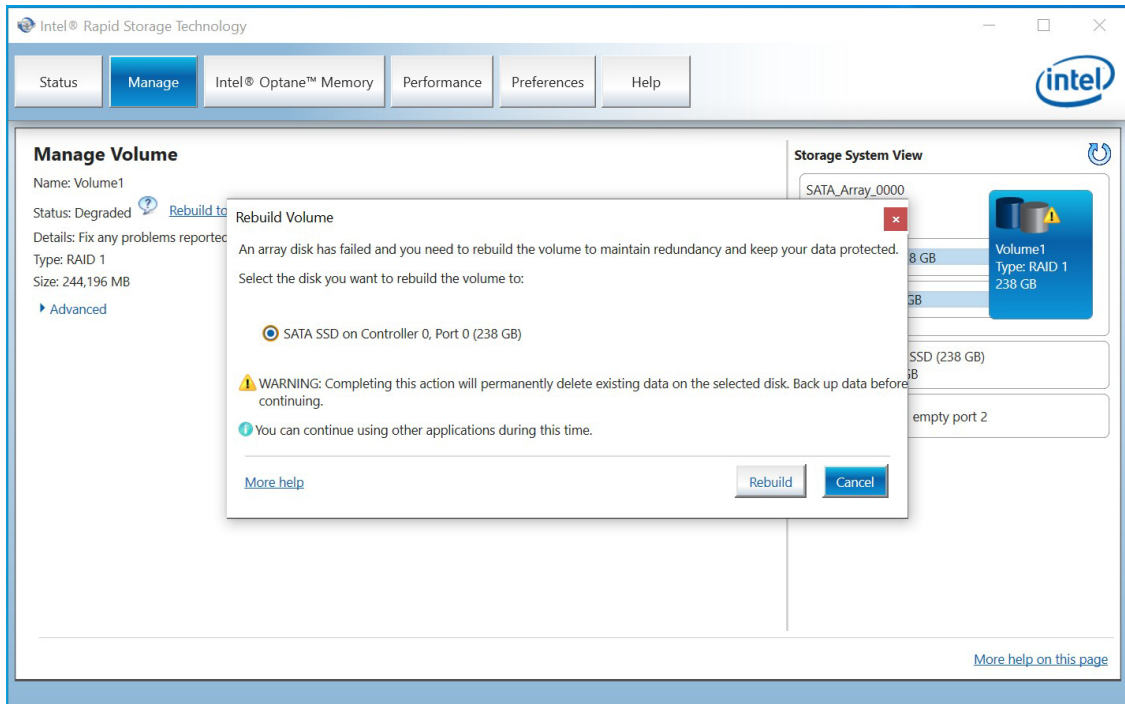
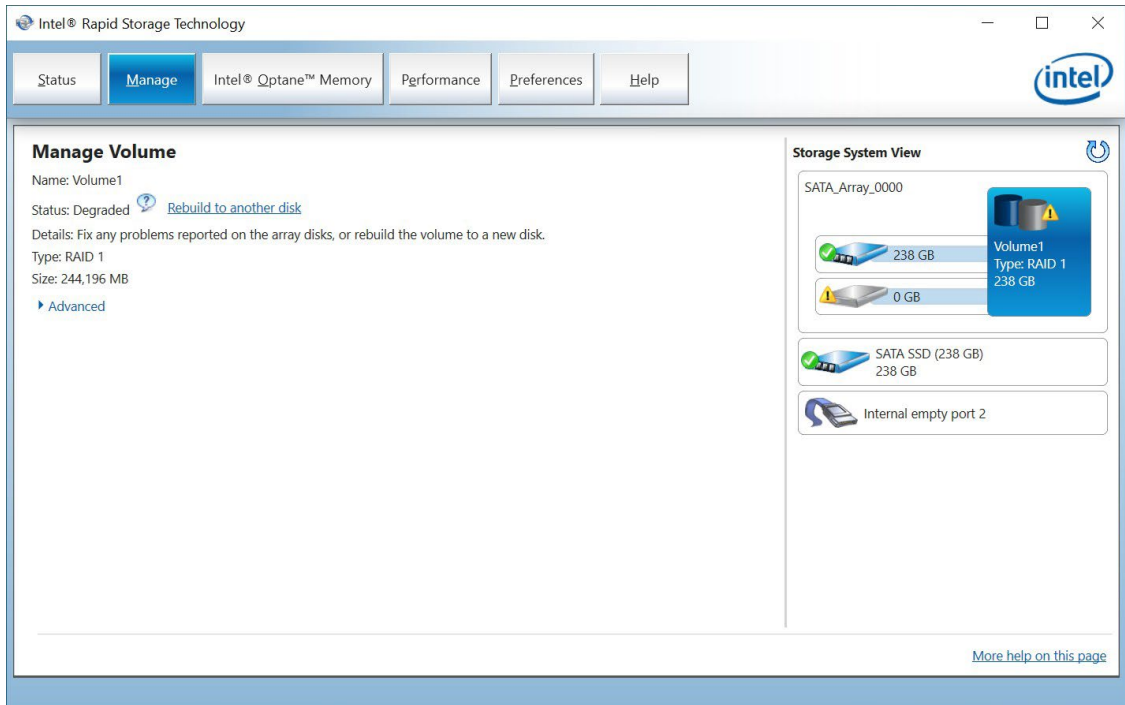
3. Install the new SSD.



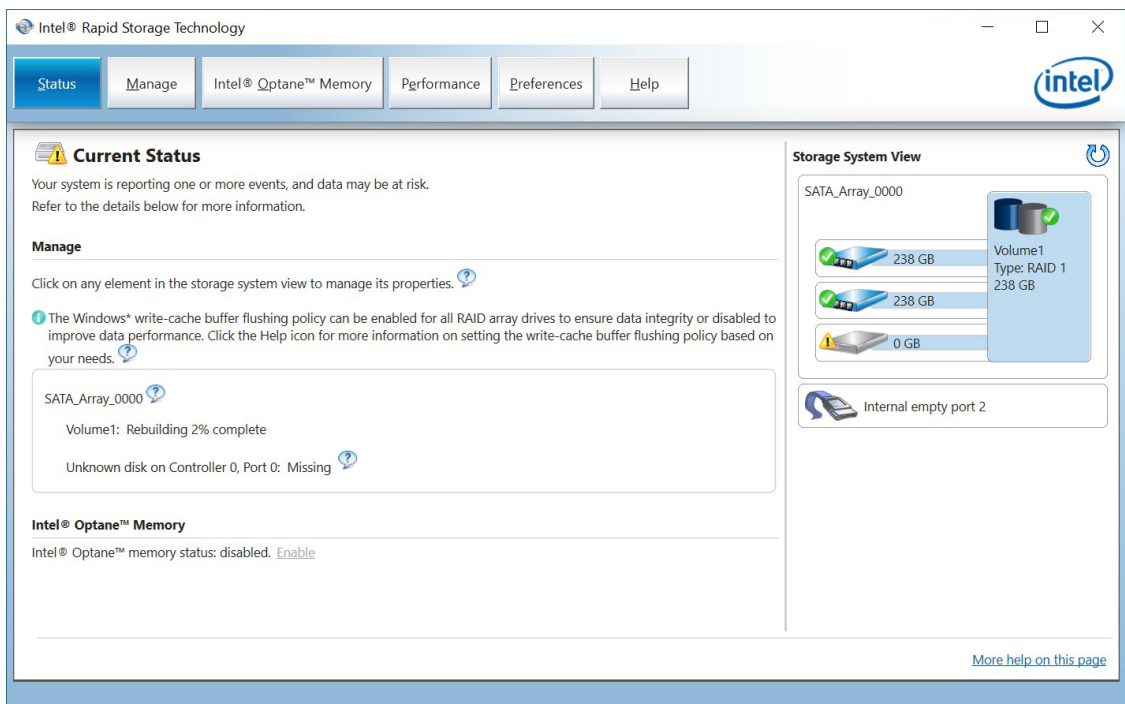
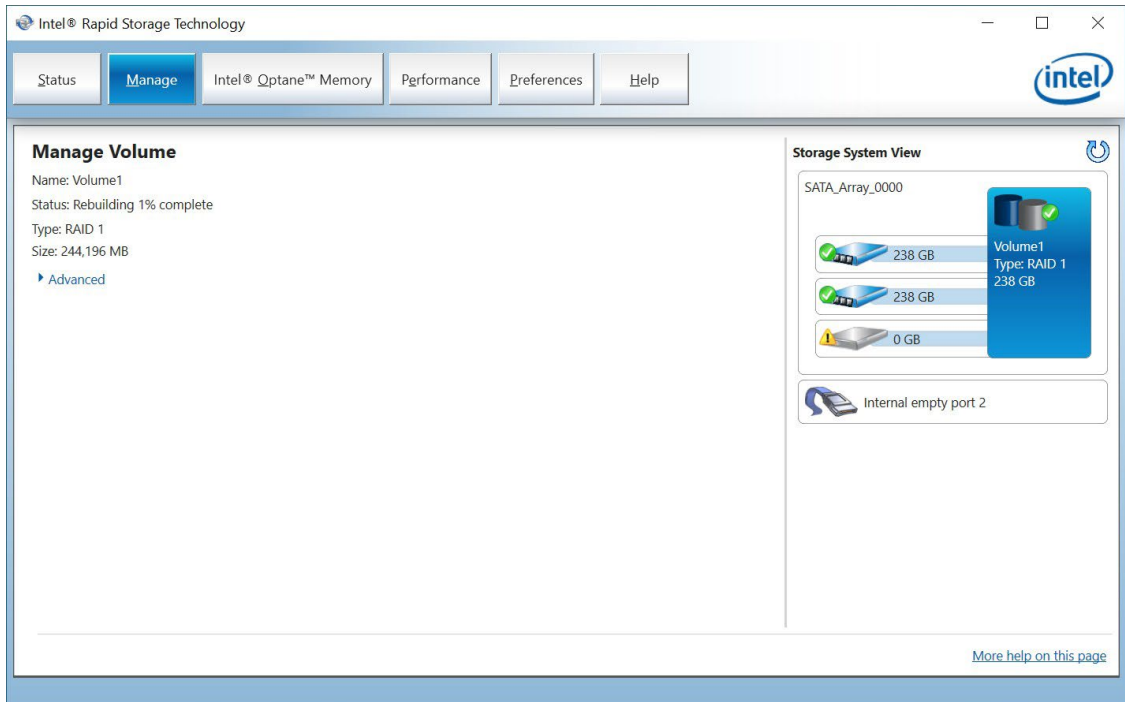
4. Click on the **Manage** tab.

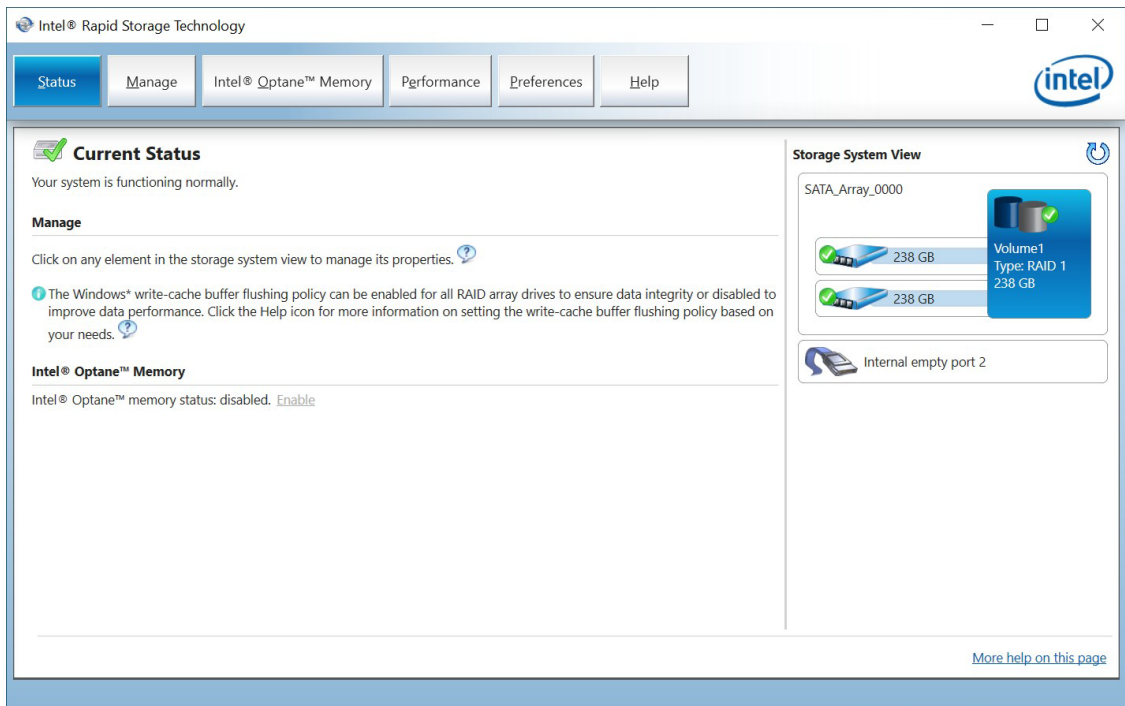


5. Select the new SSD and then click **Rebuild**.

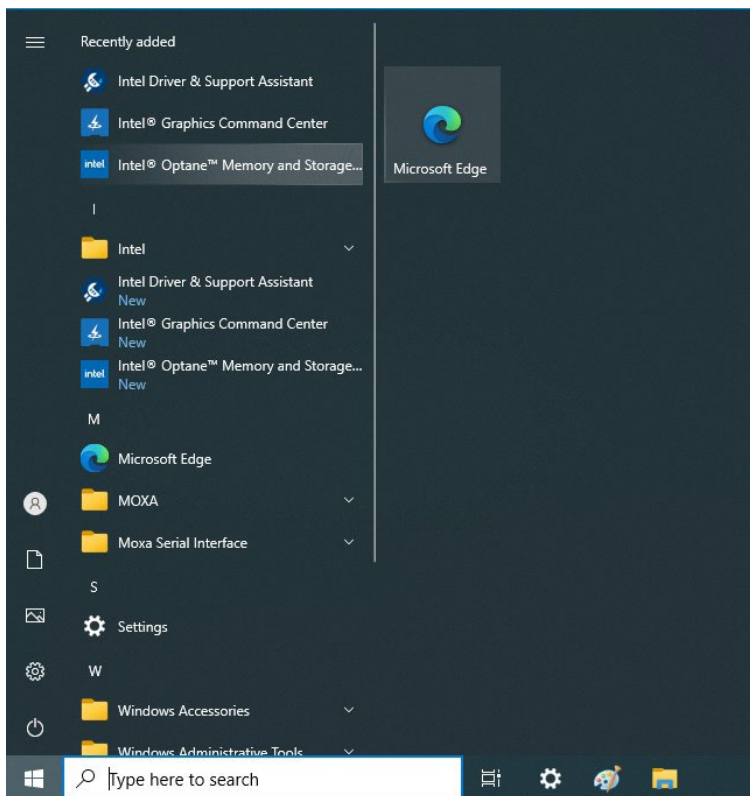


6. Wait for the rebuild process to complete.

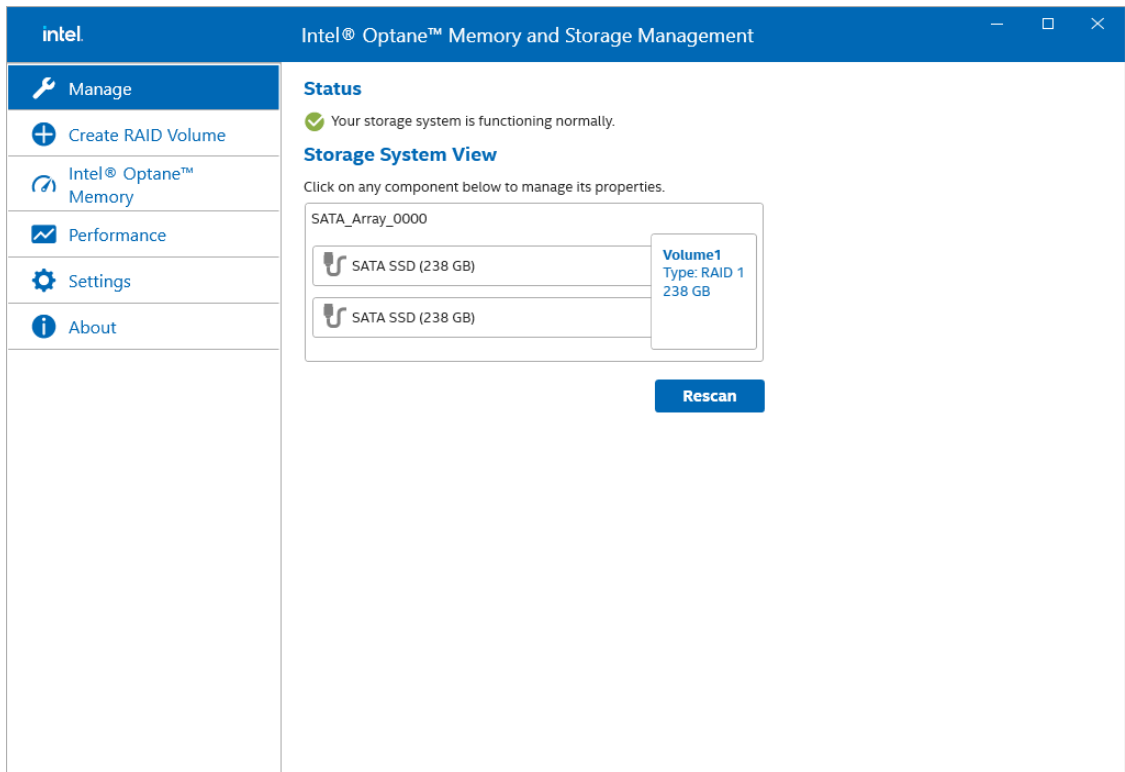




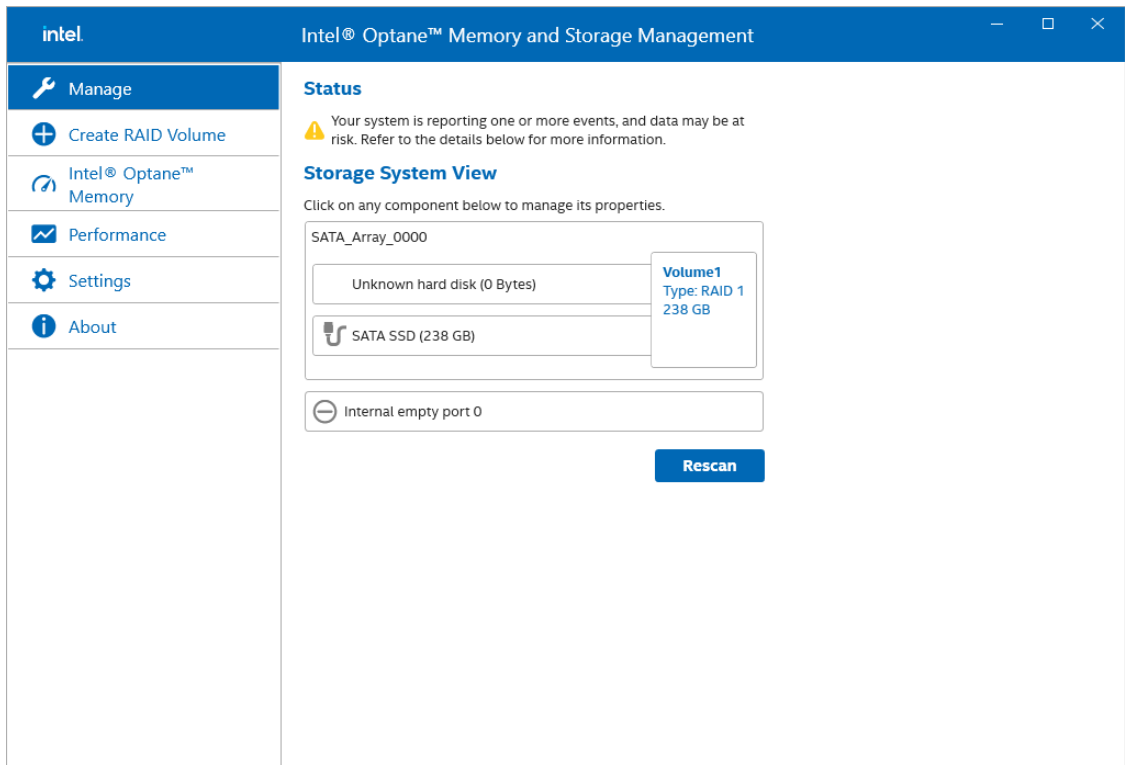
7. If your device CPU is 11th Gen Intel® Core™ Processors (Intel® Tiger-Lake) or newer processor generation, run **Intel® Optane™ Memory and Storage Management** from the Windows Start menu.



8. Physically unplug the target SSD.

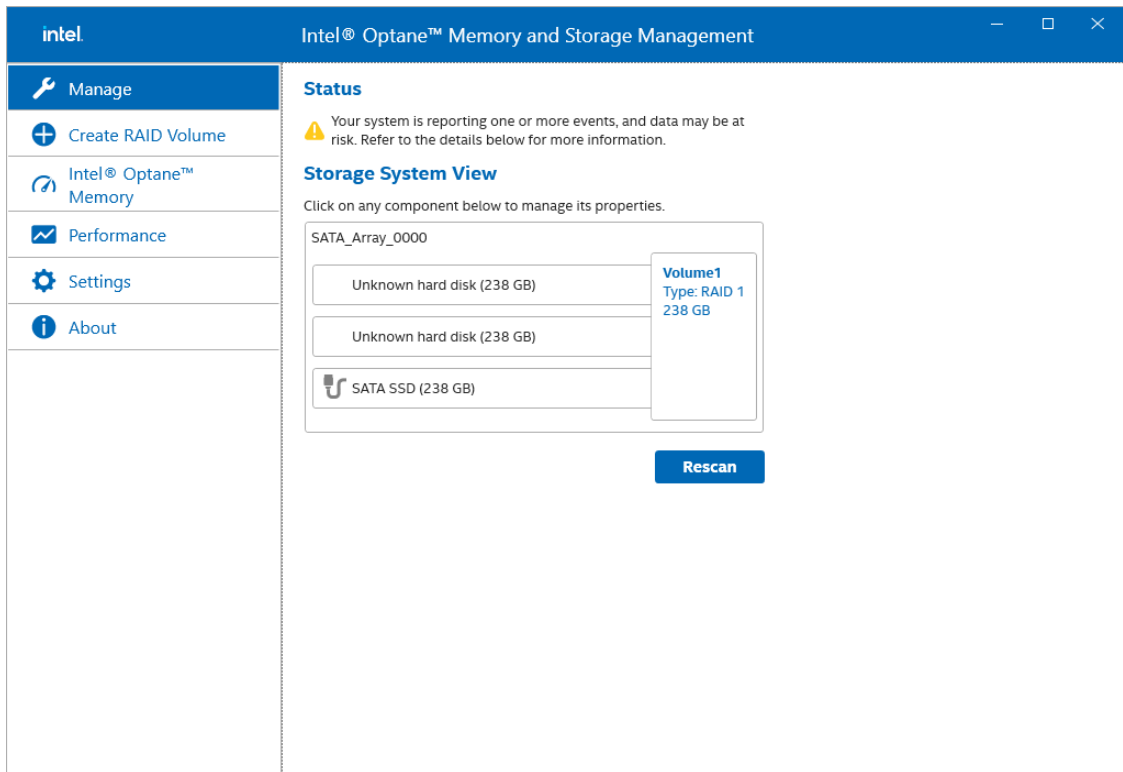


The status of the SSD that is unplugged will change to **Unknown hard disk (0 Bytes)** as shown below:

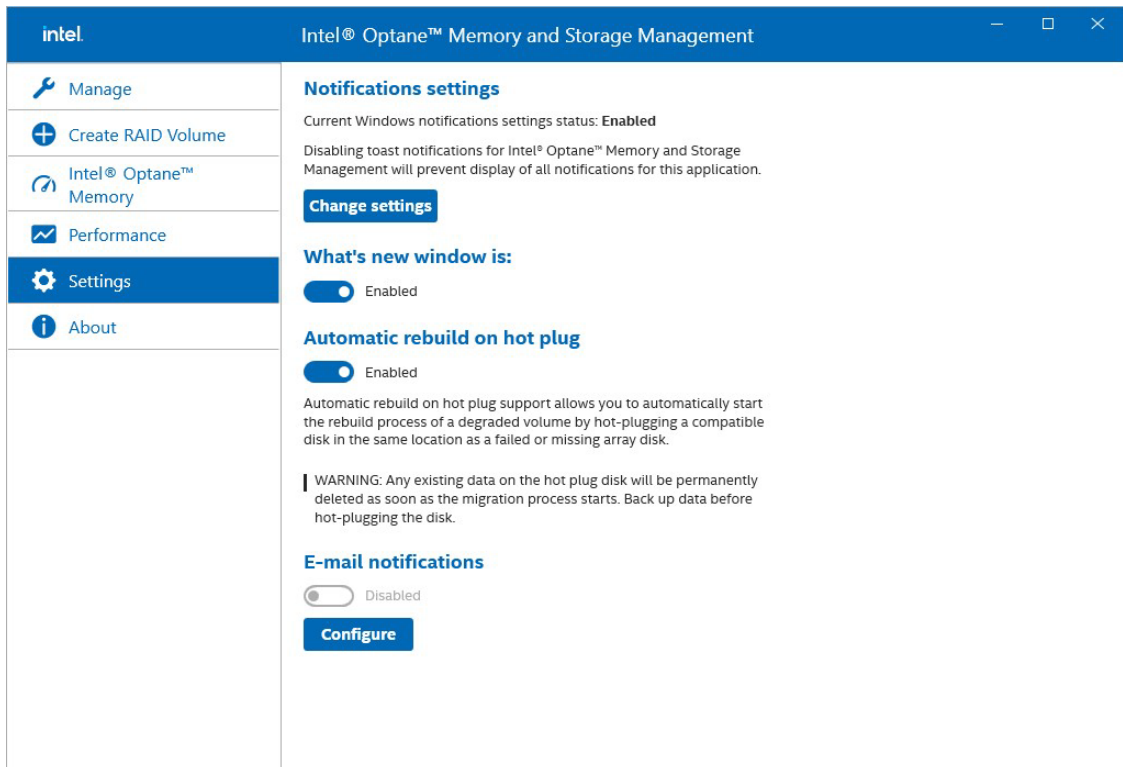




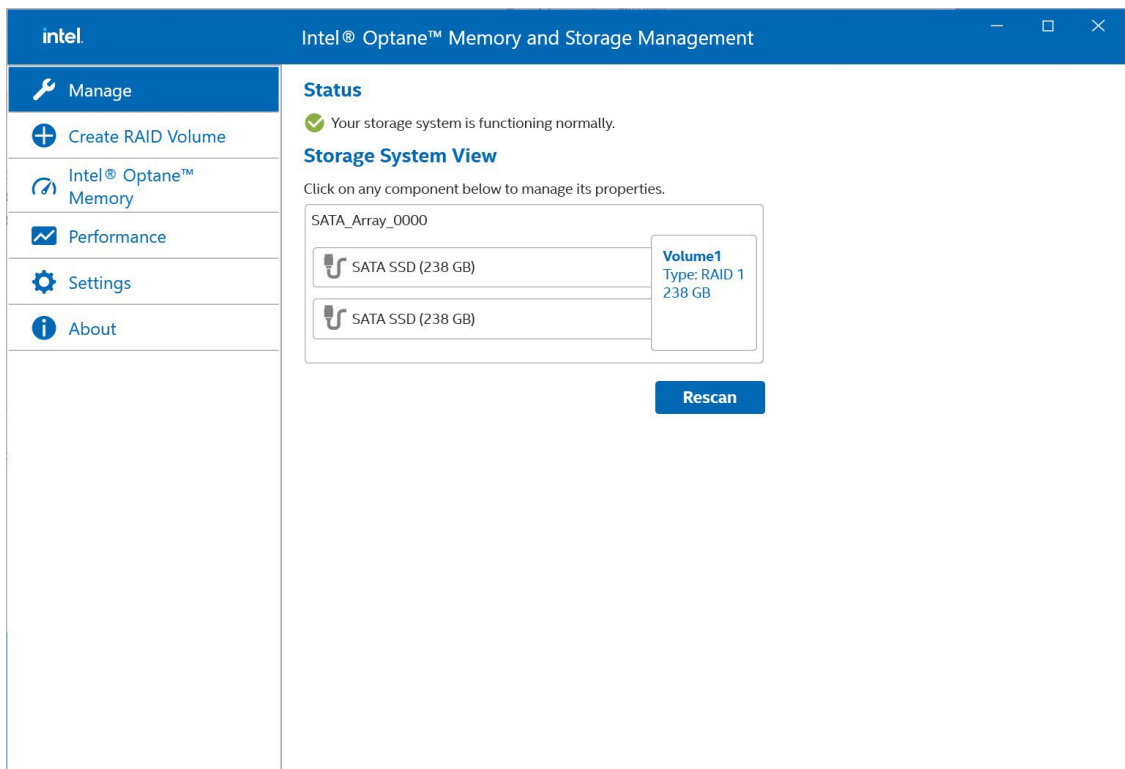
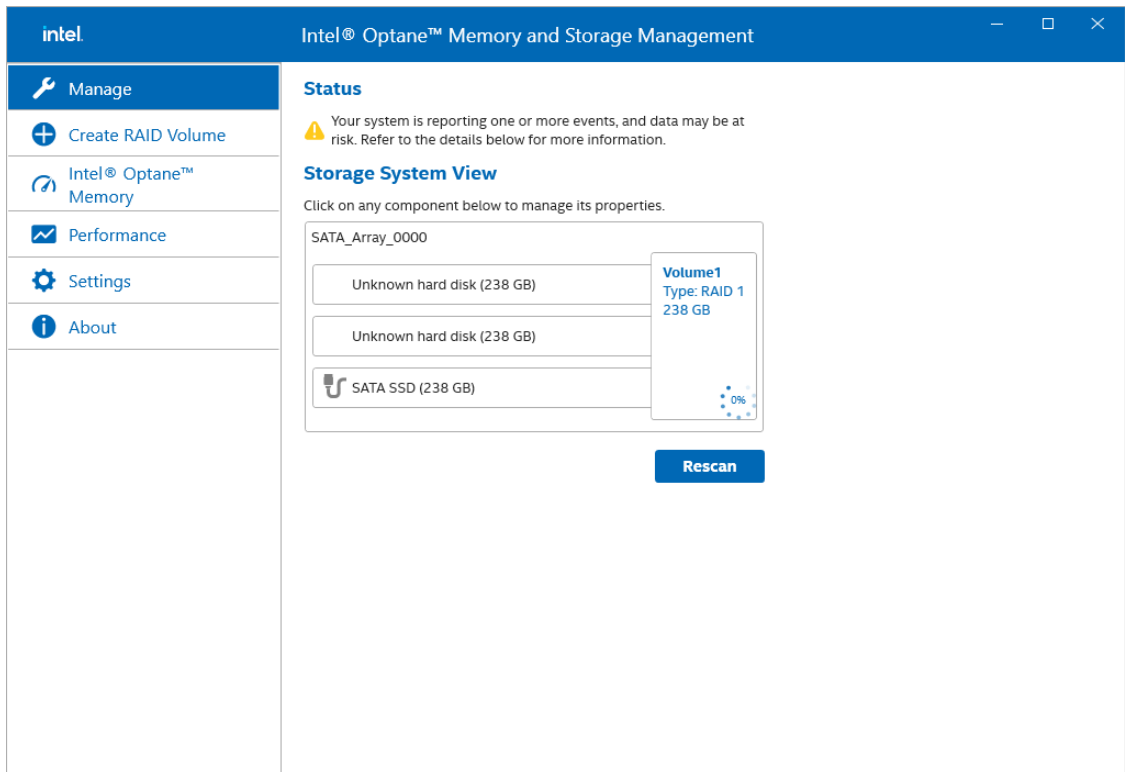
9. Install the new SSD in the same location.



10. Click on the **Settings** tab. Enable **Automatic rebuild on hot plug**.

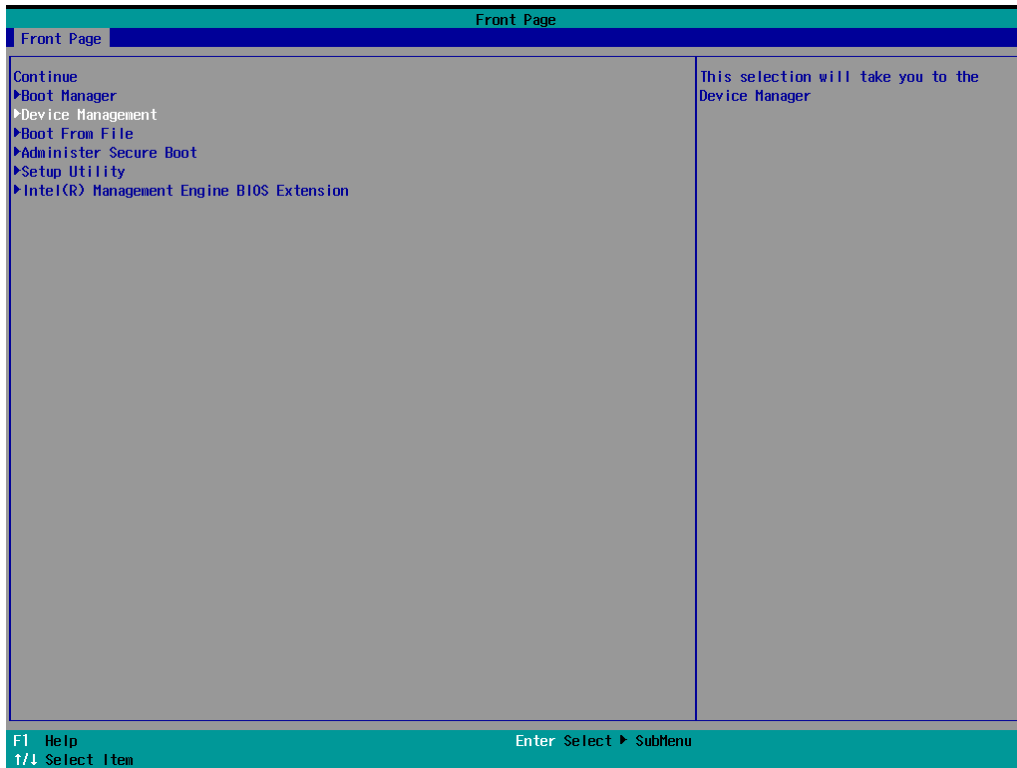


11. It will start rebuilding automatically. Wait for the rebuild process to complete.



# Intel® RAID: Removing a RAID Volume From the BIOS

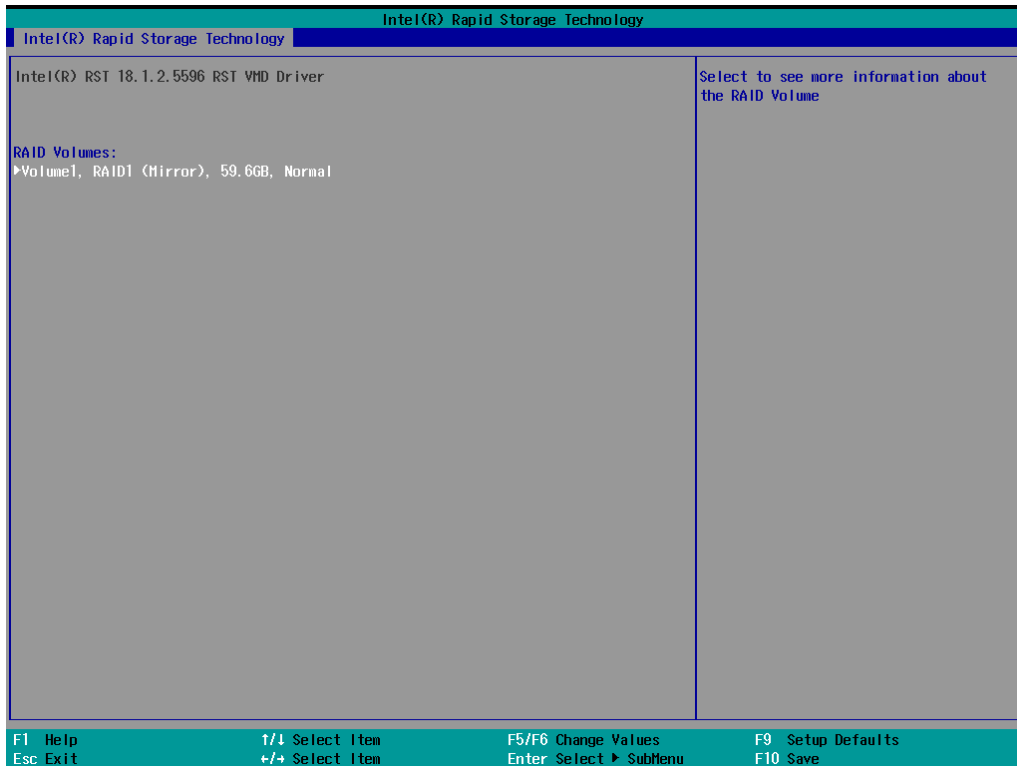
1. Power on the computer and press **F2** to enter the BIOS menu.
2. Select **Device Management**.



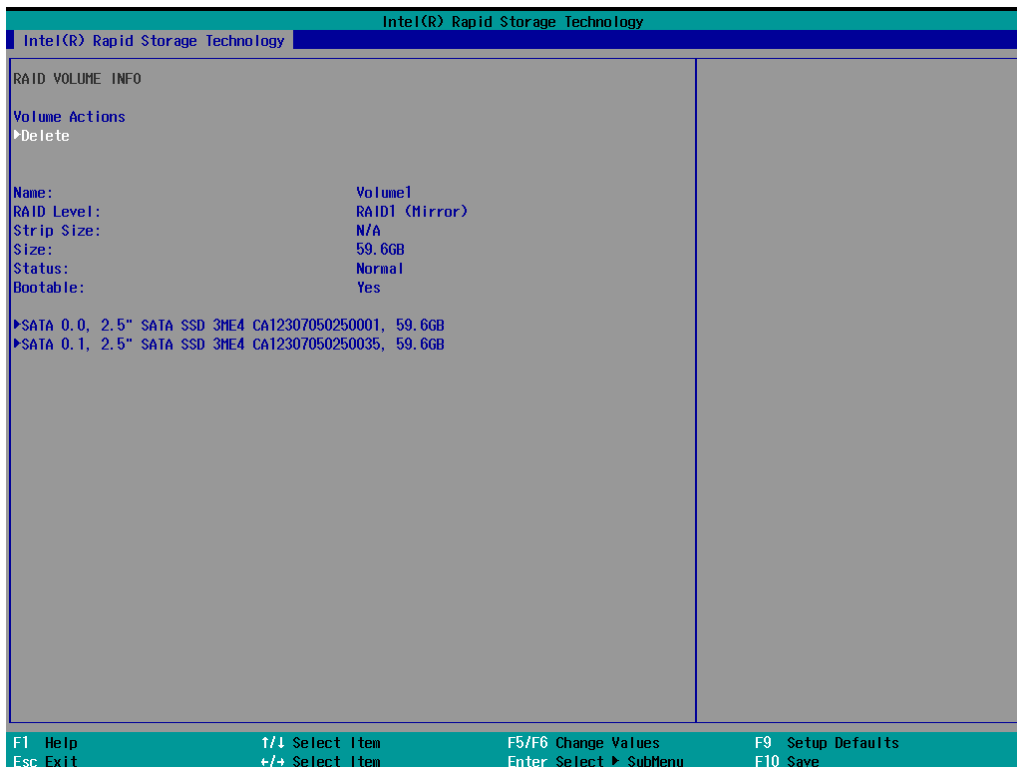
3. Select the **Intel® Rapid Storage Technology** option.



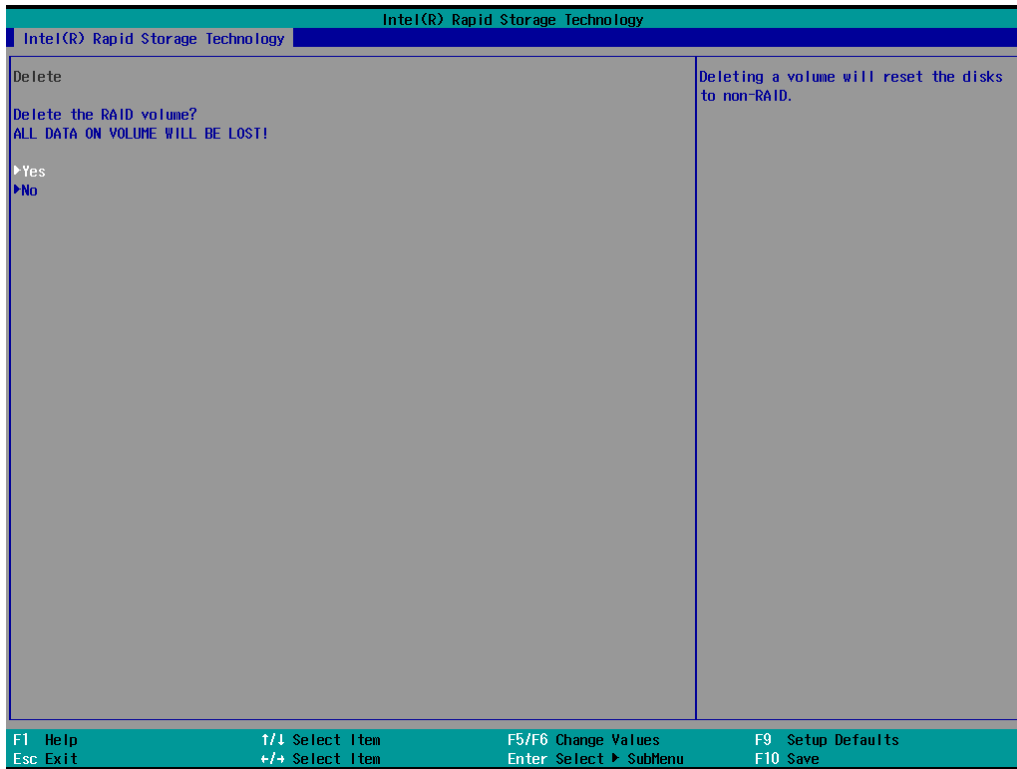
4. Select the RAID volume that you want to remove.



5. Select **Delete** and then press **Enter**.



6. Select **Yes** to confirm and then press **Enter**.



7. Press **F10** to save the settings.

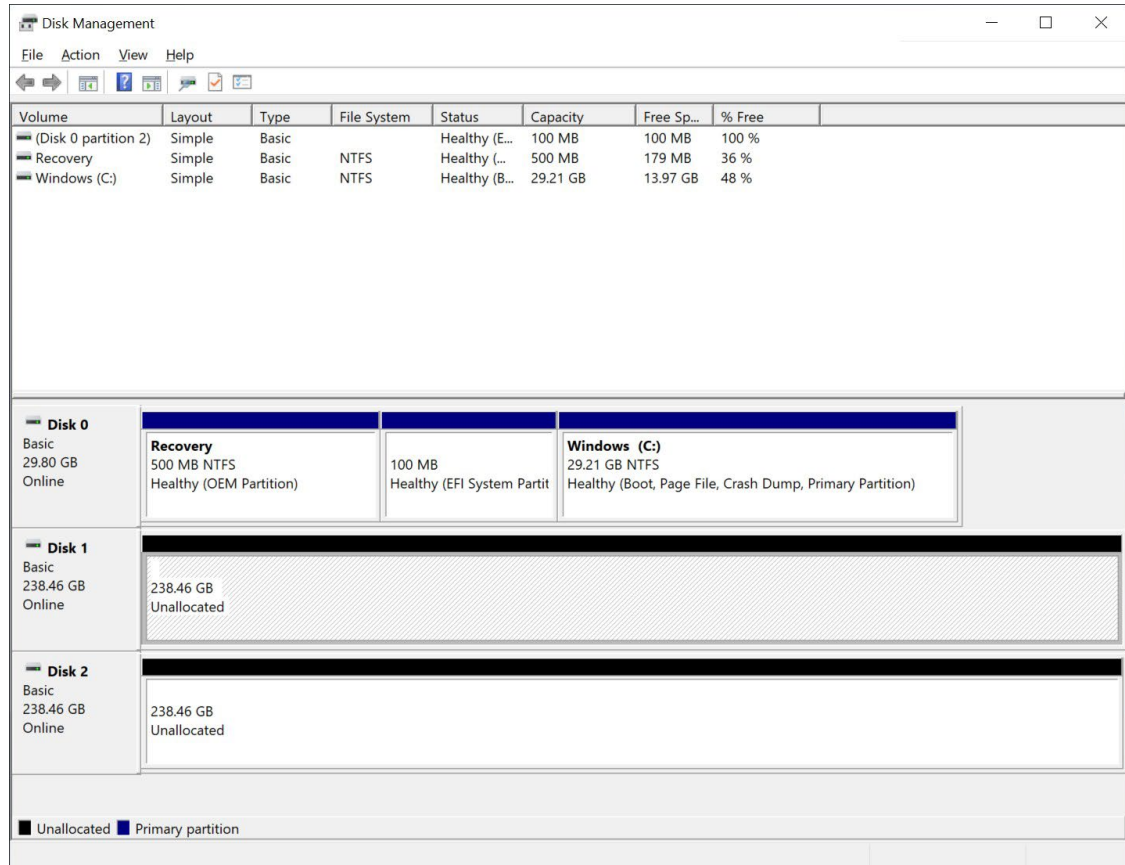
● **NOTE**

Use hard disks of the same brand, same model, and same capacity to create a RAID for best performance.

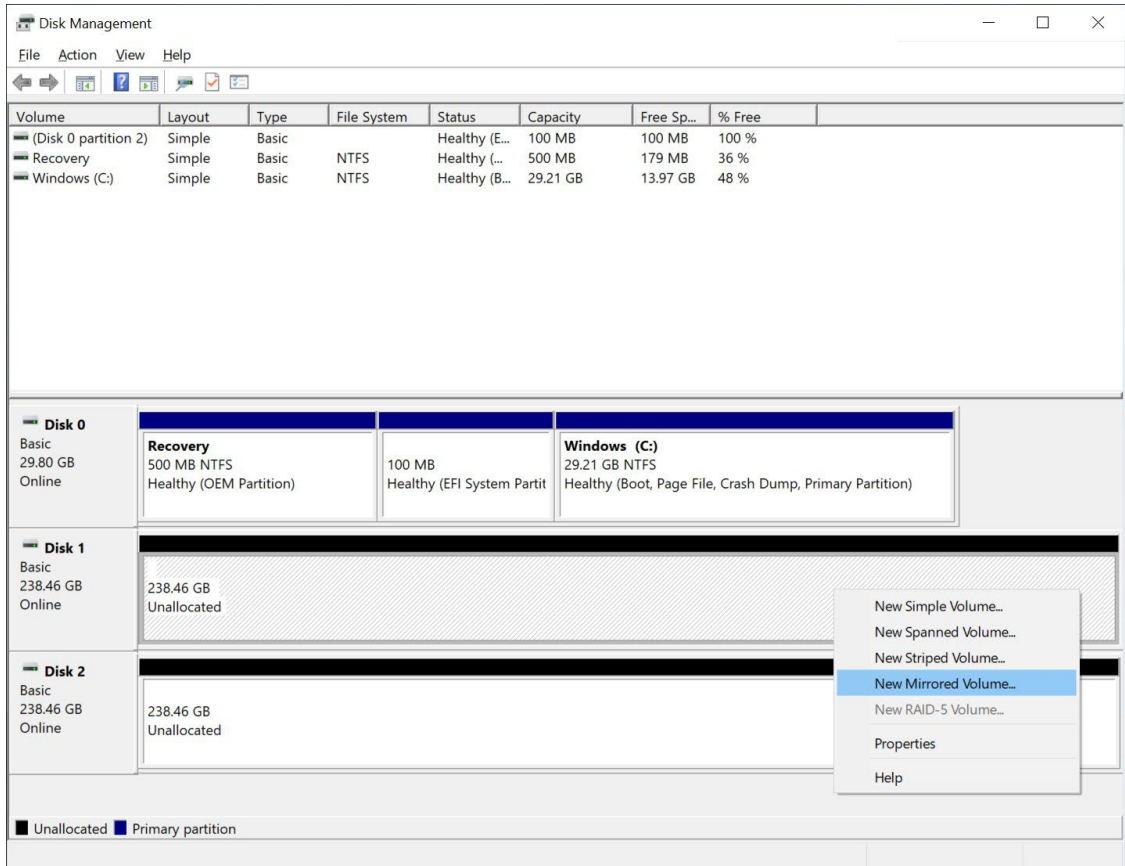
# SW RAID: Creating a RAID 0 or RAID 1 Disk From Disk Management

1. Run **Disk Management**.

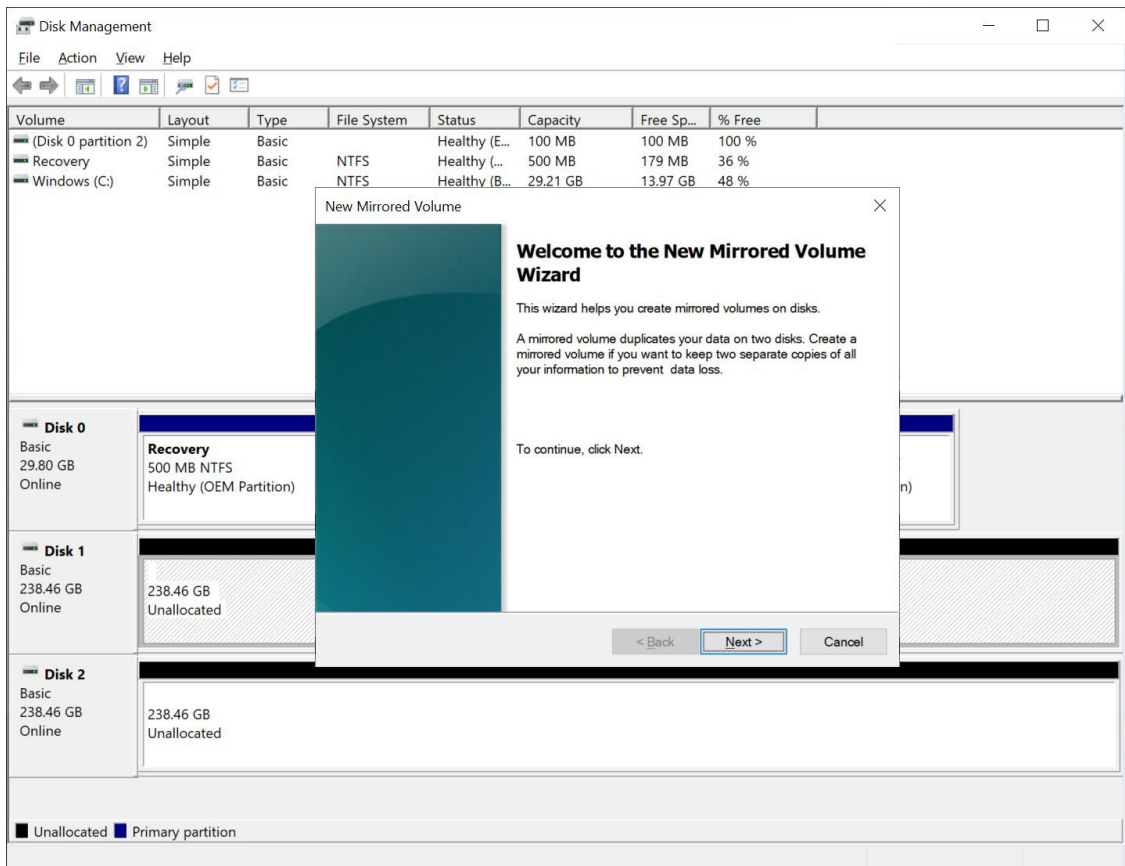
All connected disks should have the disk status **Unallocated**. If the disk status is not **Unallocated**, you can right-click on the disk and select **Delete Volume**.



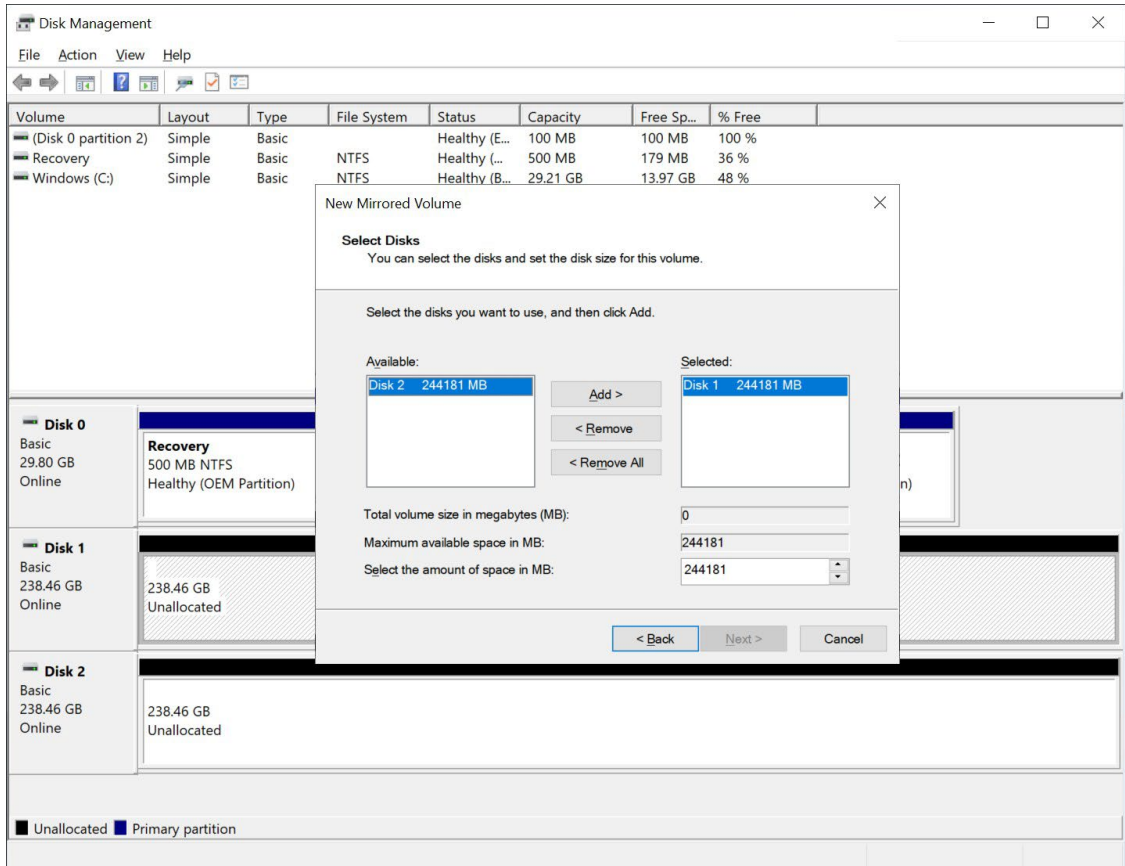
2. Right-click the target disk. Select the target volume type. For example: **RAID1(Mirror)**.



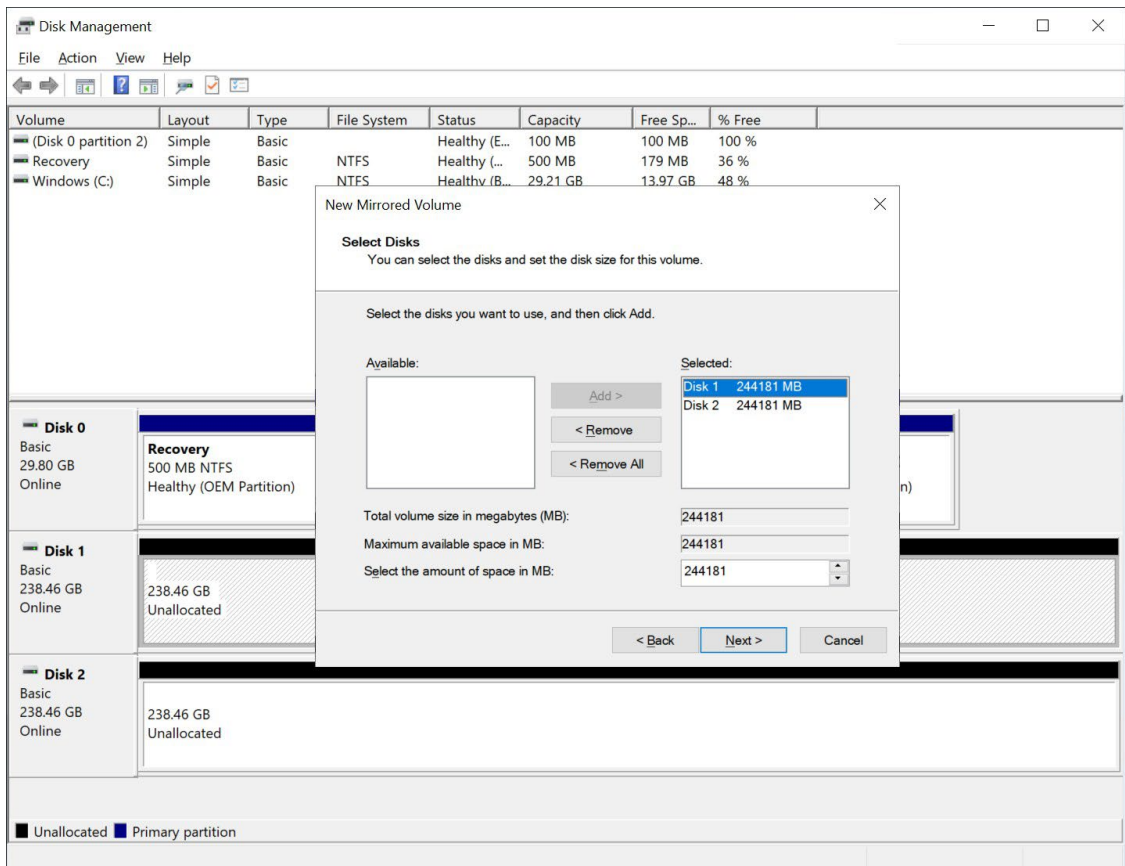
3. To continue, click **Next**



- Select the disks you want to use, and then click **Add**.

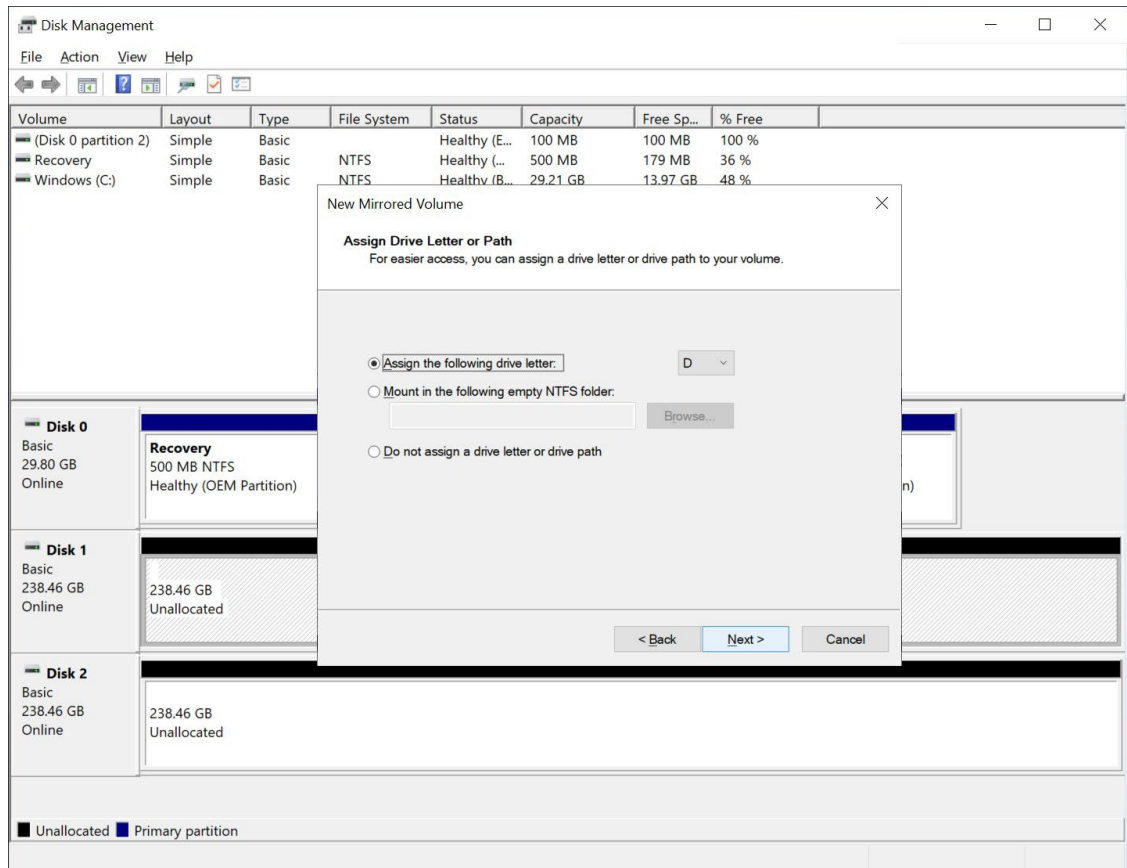


- Click **Next**.

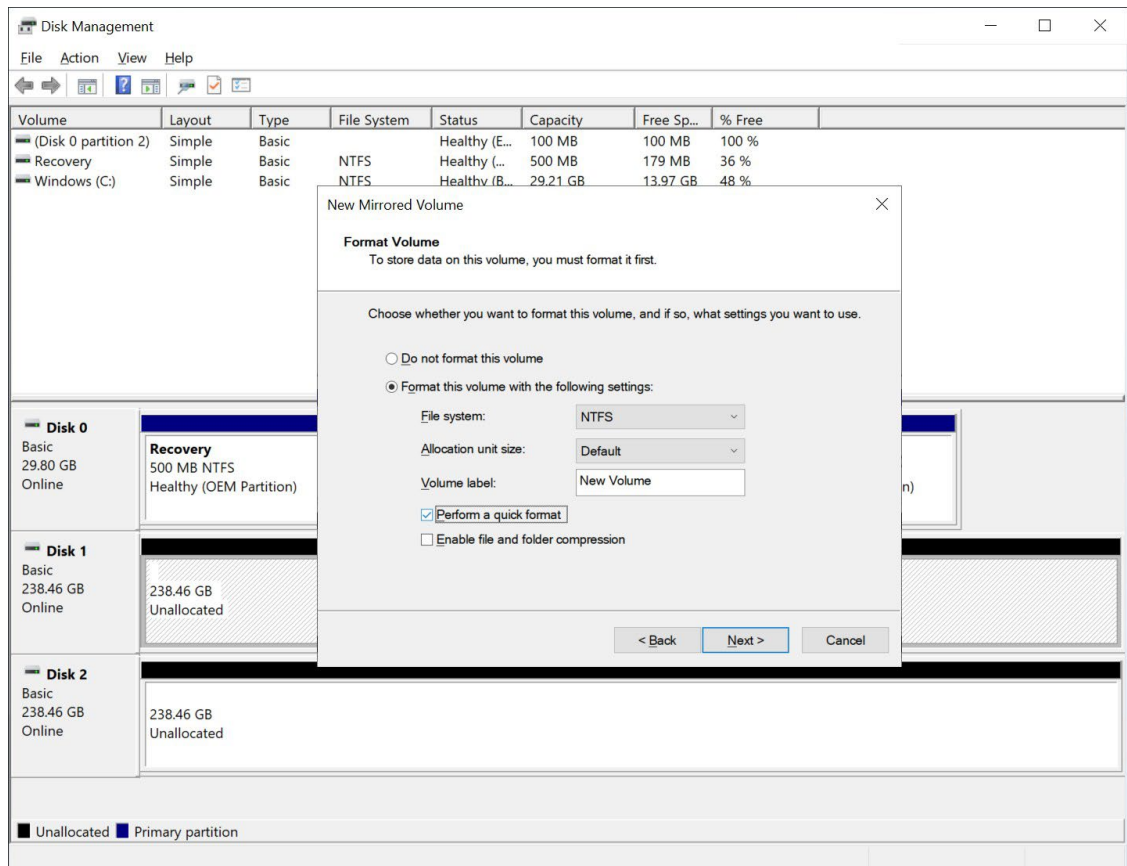




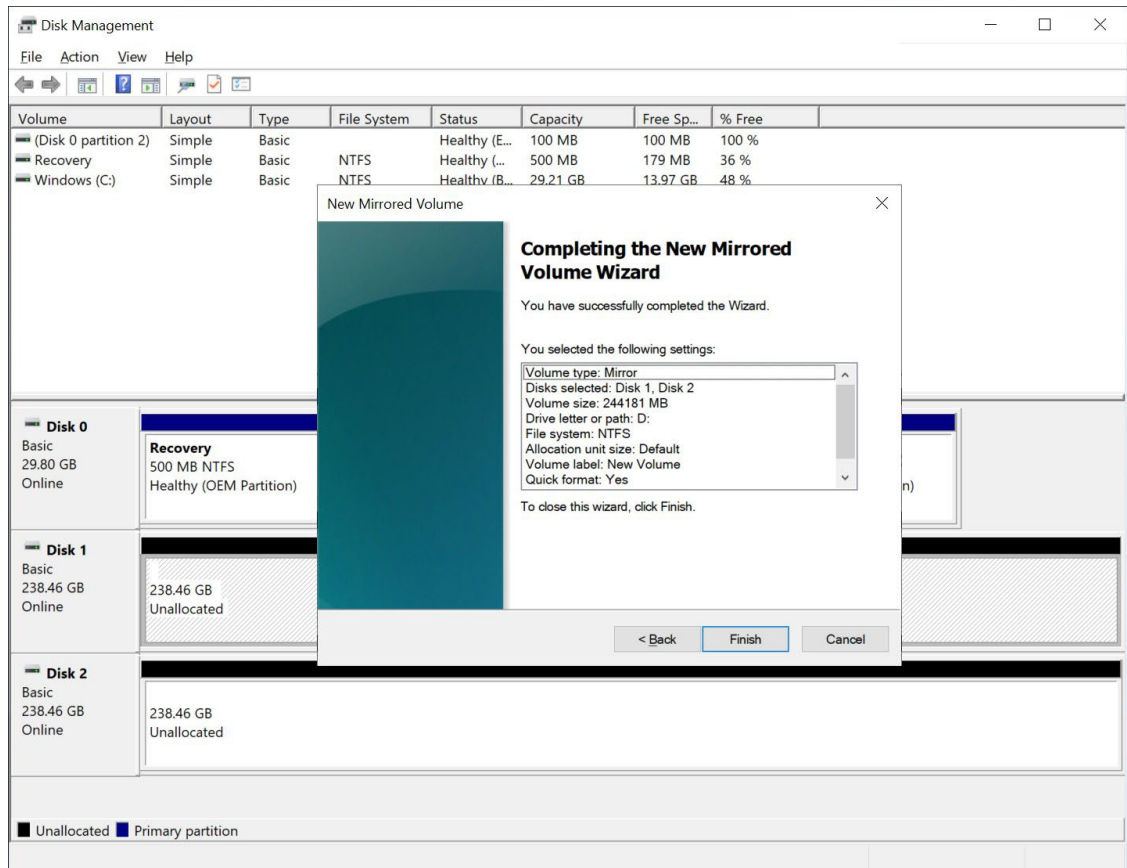
6. Assign the drive letter, click **Next**



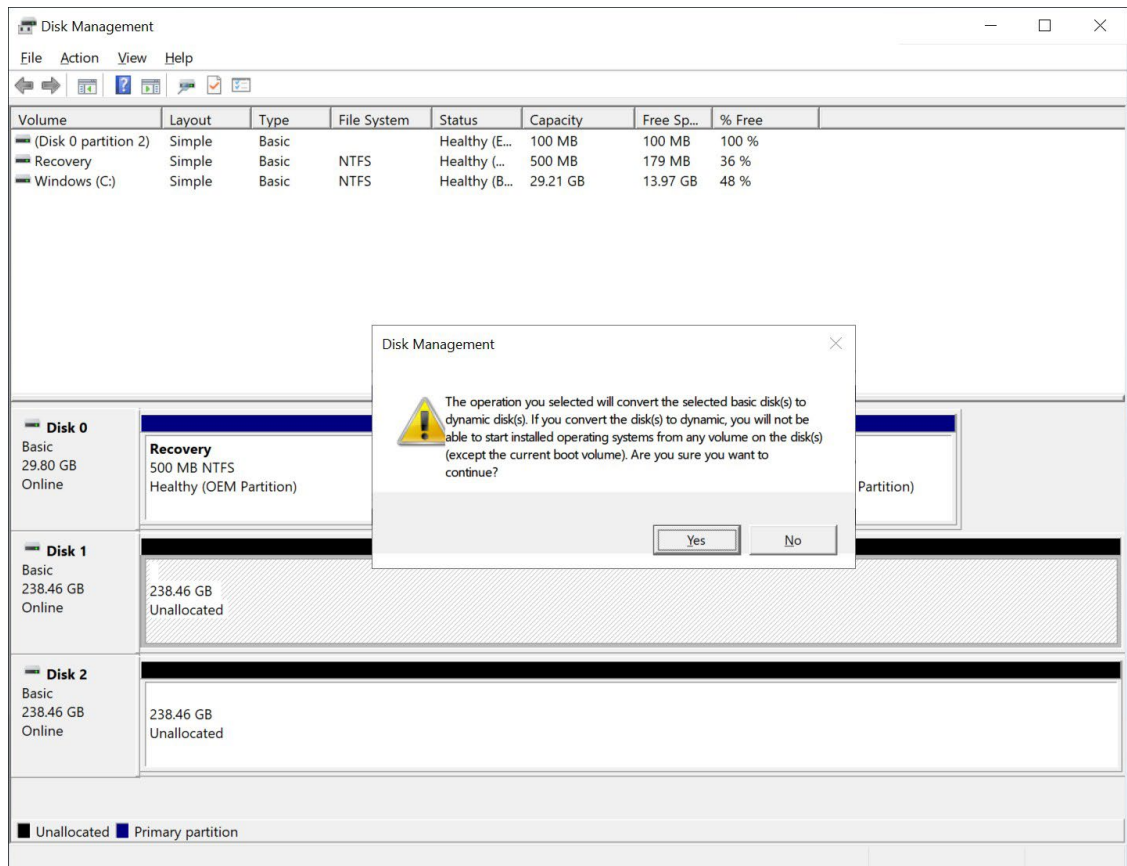
7. Format the volume using **Quick Format**, click **Next**.



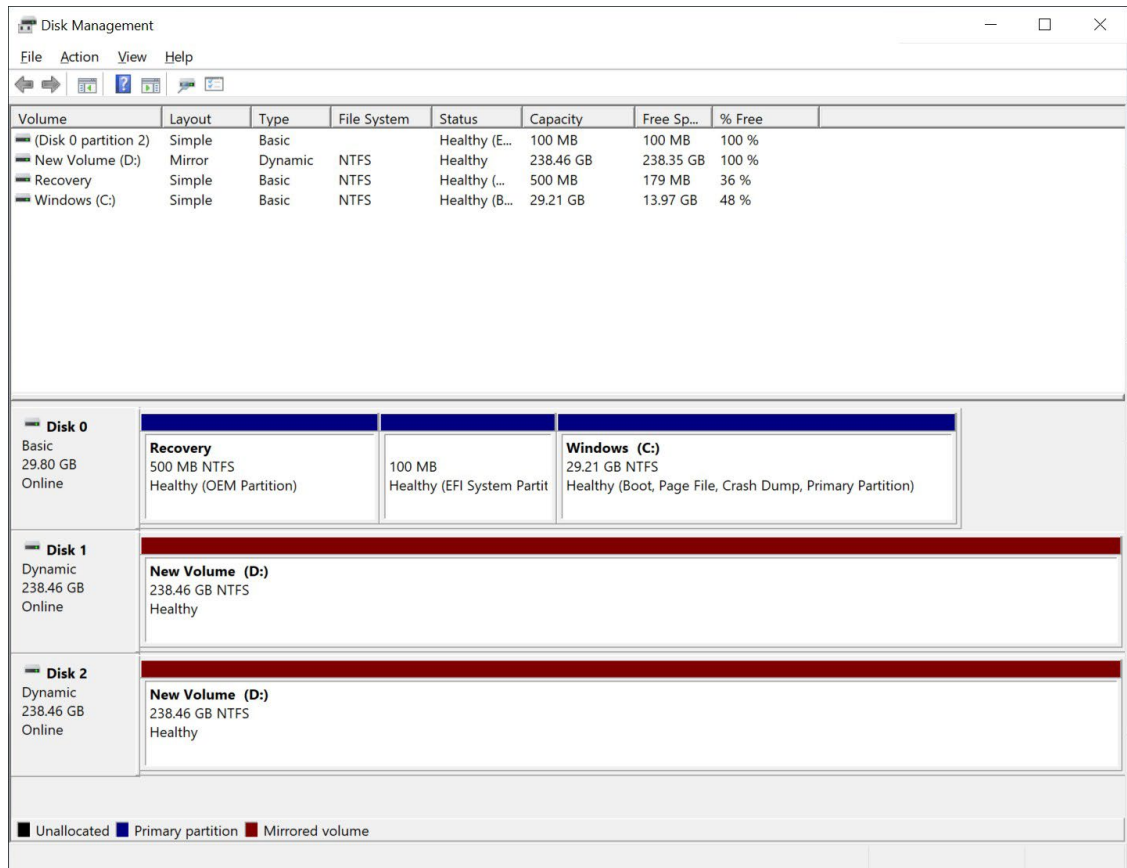
8. Checking the RAID1(Mirror) information. Click **Finish** to create the RAID1 volume.



9. System will show the warning message about SW RAID volume, click **Yes** to continue.



10. Checking the RAID1(Mirror) information from disk management.



# 5. Teaming

NIC Teaming, also known as load balancing and failover (LBFO), allows multiple network adapters on a computer to be placed into a team for bandwidth aggregation or traffic failover to prevent connectivity loss in the event of a network component failure.

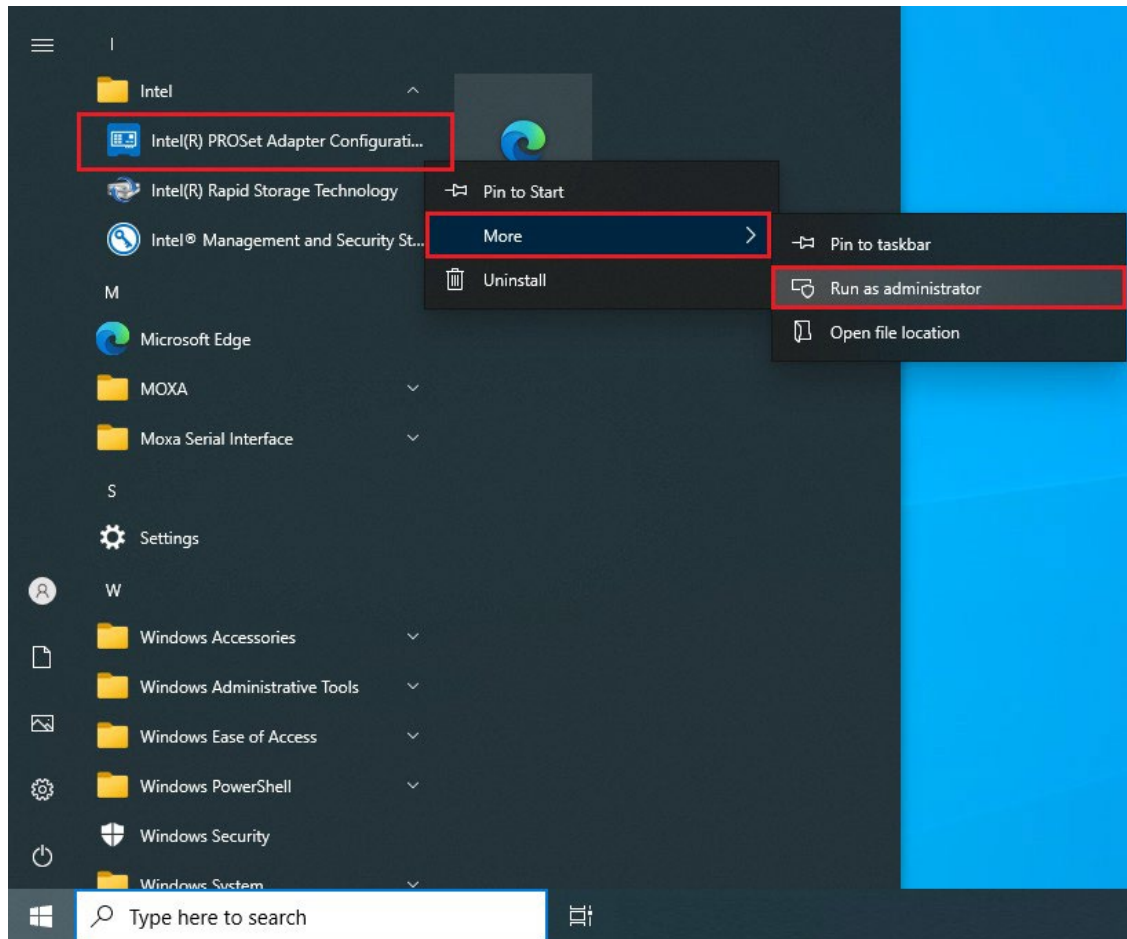
For more information about Teaming : [https://learn.microsoft.com/en-us/previous-versions/windows/it-pro/windows-server-2012-r2-and-2012/hh997031\(v=ws.11\)](https://learn.microsoft.com/en-us/previous-versions/windows/it-pro/windows-server-2012-r2-and-2012/hh997031(v=ws.11))

## Intel® Net Team

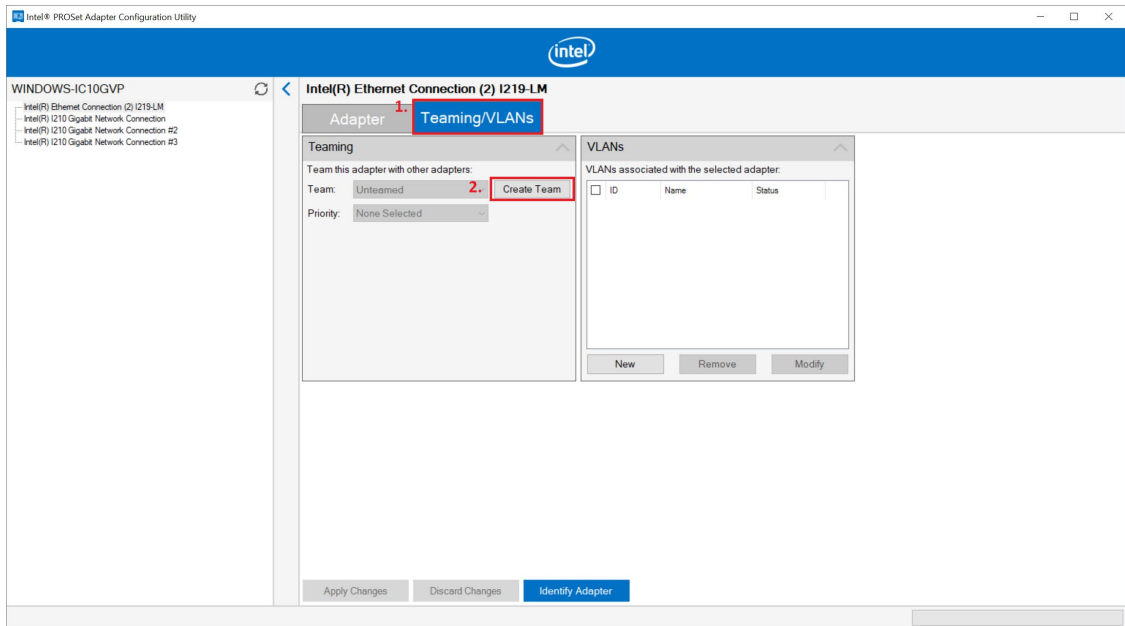
This chapter describes the setup process for the Intel® Teaming function.

### Creating an Intel® Net Team

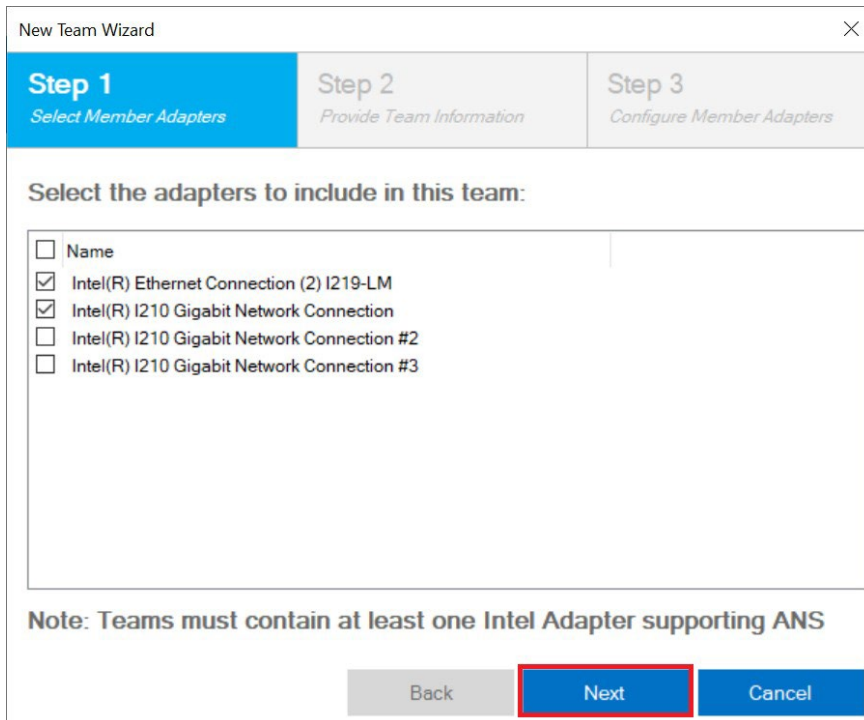
1. Run **Intel® PROSet Adapter Configuration Utility** as administrator.



2. In the **Teaming/VLANs** tab, click **Create Team**.



3. Select the adapter to include in this team and click **Next**.  
An Intel® ANS team can contain a maximum of eight members.



4. Name the team and select a team type. Click **Next** to continue.

New Team Wizard

Step 1 *Select Member Adapters* | **Step 2 *Provide Team Information*** | Step 3 *Configure Member Adapters*

Please name the team and select a type:

Name:

Type:

- Adapter Fault Tolerance
- Adaptive Load Balancing
- IEEE 802.3ad Dynamic Link Aggregation
- Static Link Aggregation
- Switch Fault Tolerance

Note: All fields are required

Back | **Next** | Cancel

● **NOTE**

You cannot use an Intel® AMT enabled adapter in a Dynamic Link Aggregation (DLA) team or in a Static Link Aggregation (SLA) team.

5. Select the primary and secondary adapters for the team and click **Finish** to create an Intel® Net team.

New Team Wizard

Step 1 *Select Member Adapters* | Step 2 *Provide Team Information* | **Step 3 *Configure Member Adapters***

Select Primary and Secondary Adapters for the team

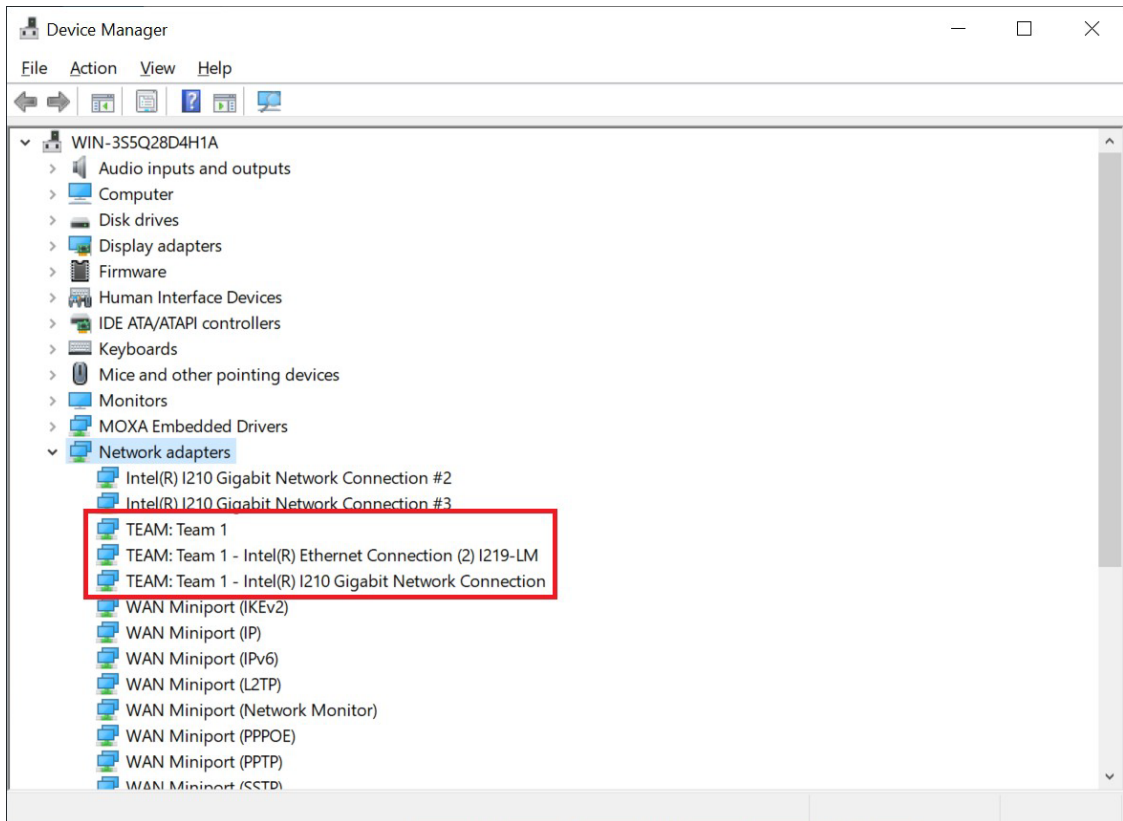
Primary Adapter:

Secondary Adapter:

- None Selected
- Intel(R) Ethernet Connection (2) I219-LM
- Intel(R) I210 Gigabit Network Connection

Back | **Finish** | Cancel

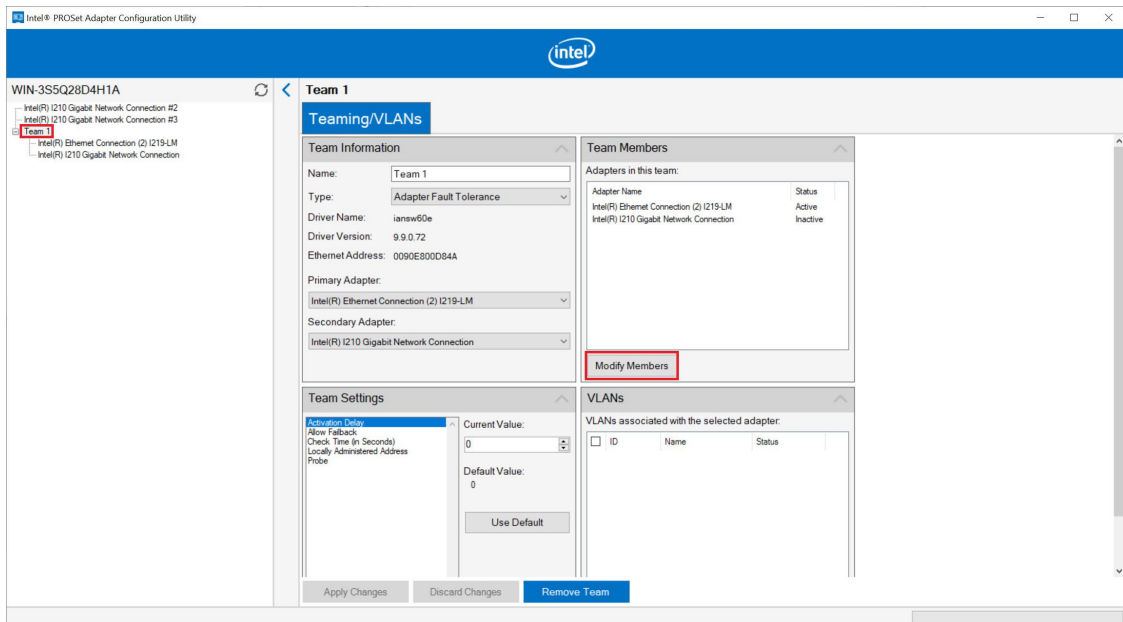
6. Check the **Network adapters** in the **Windows Device Manager**.



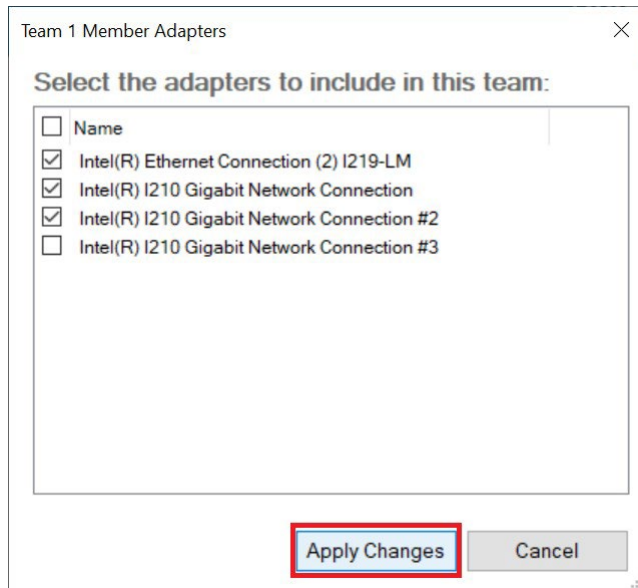
## Modifying an Intel® Net Team Member

### Adding an Intel® Net Team Member

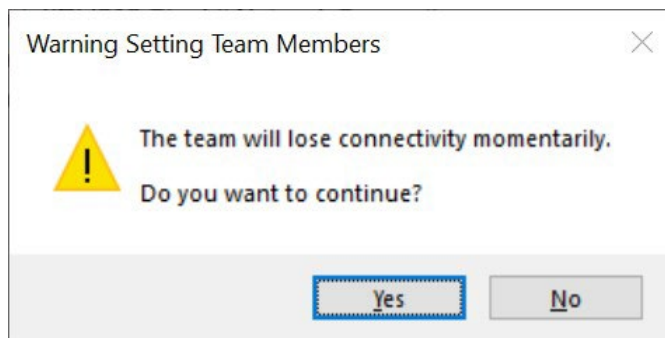
1. Select an Intel® Net team and click **Modify Members**.



2. Select the adapters to include in this team and click **Apply Changes**.



3. Click **Yes** to continue.

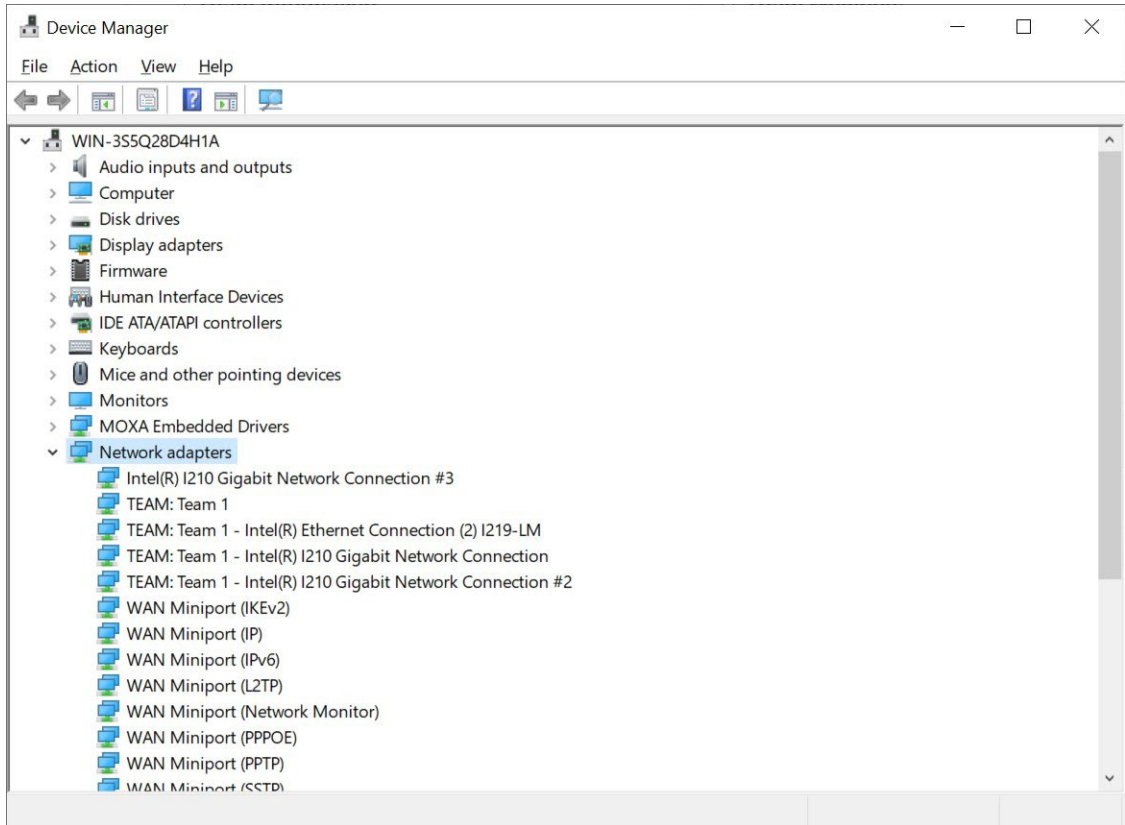


● **NOTE**

Modifying team members will cause the members to momentarily lose connectivity.

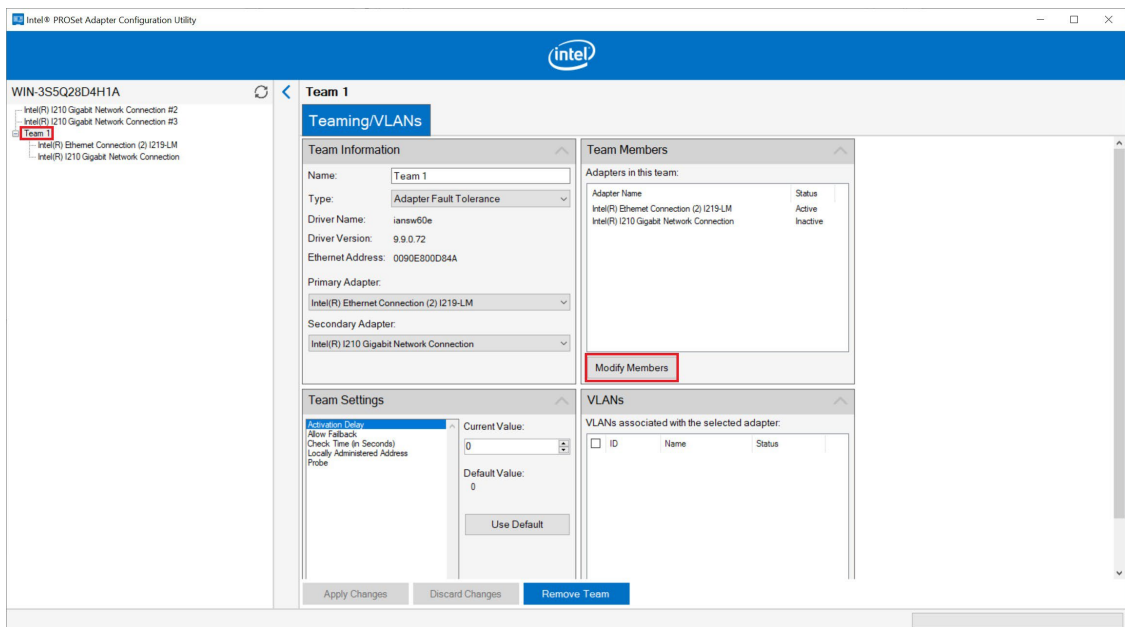


4. Check the **Network adapters** in the **Windows Device Manager**.

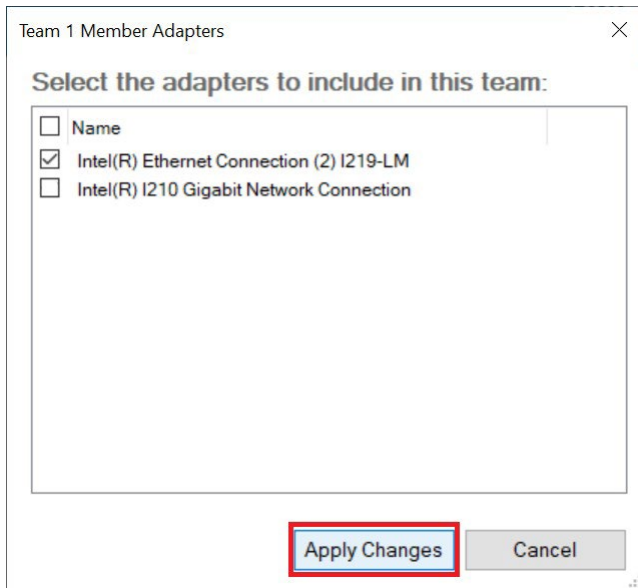


## Removing an Intel® Net Team Member

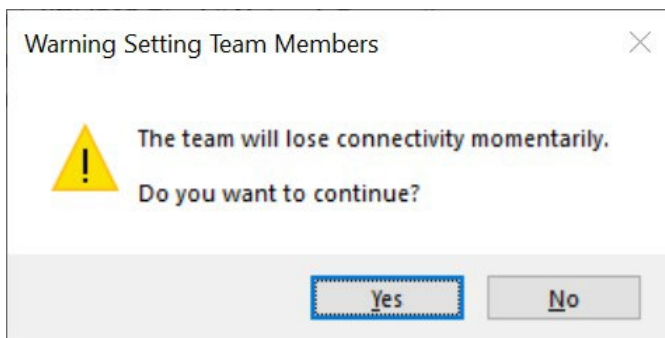
1. Select an Intel® Net team and click **Modify Members**.



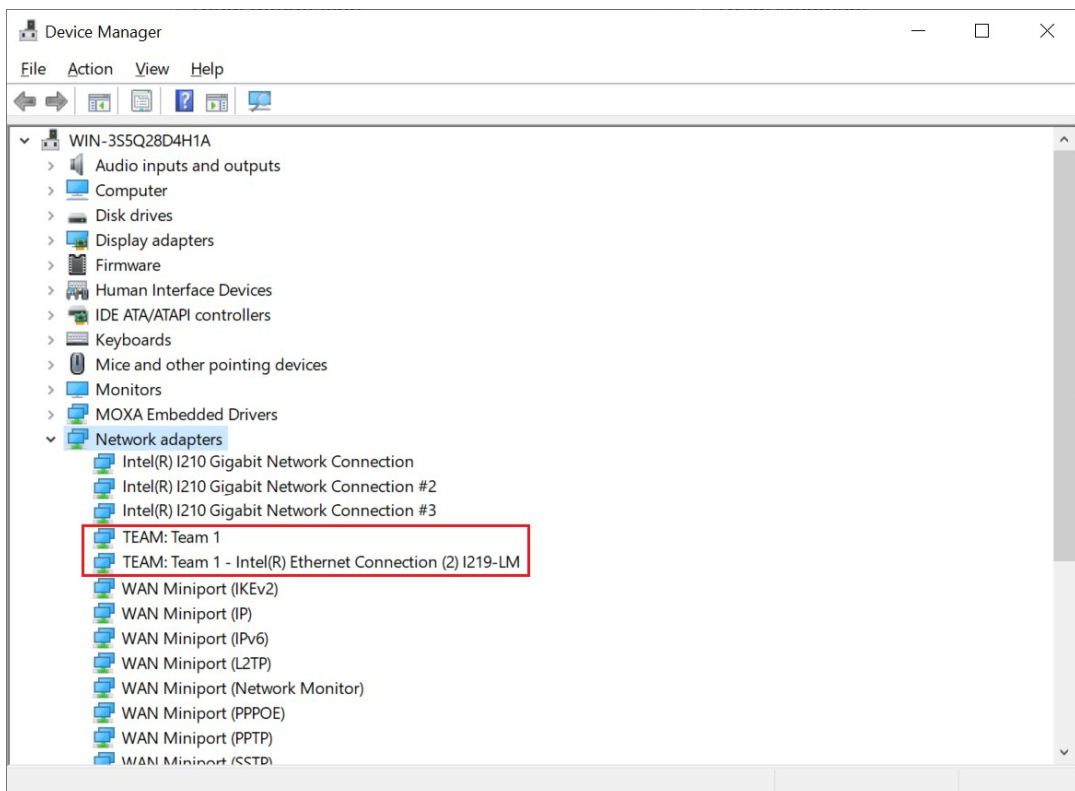
2. Uncheck the adapters you want to remove in this team and click **Apply Changes**.



3. Click **Yes** to continue.

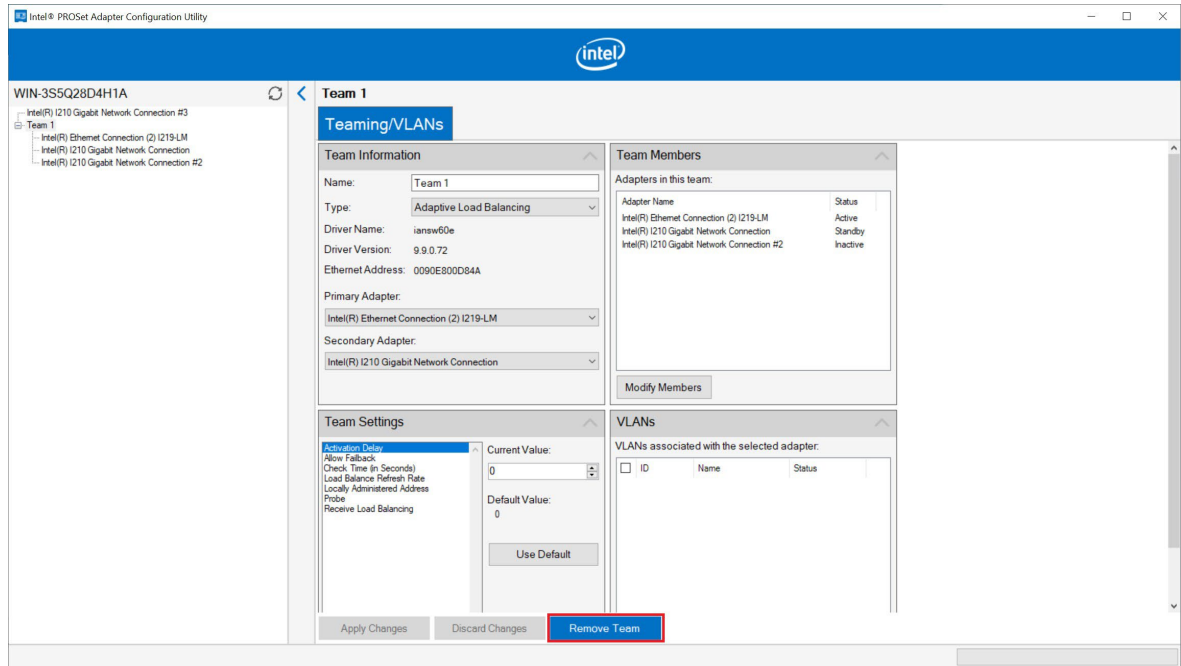


4. Check the **Network adapters** in the **Windows Device Manager**.



# Removing an Intel® Net Team

Select an Intel® Net team and click **Remove Team** to remove the specified Intel® ANS team.



# 6. Intel® Active Management Technology

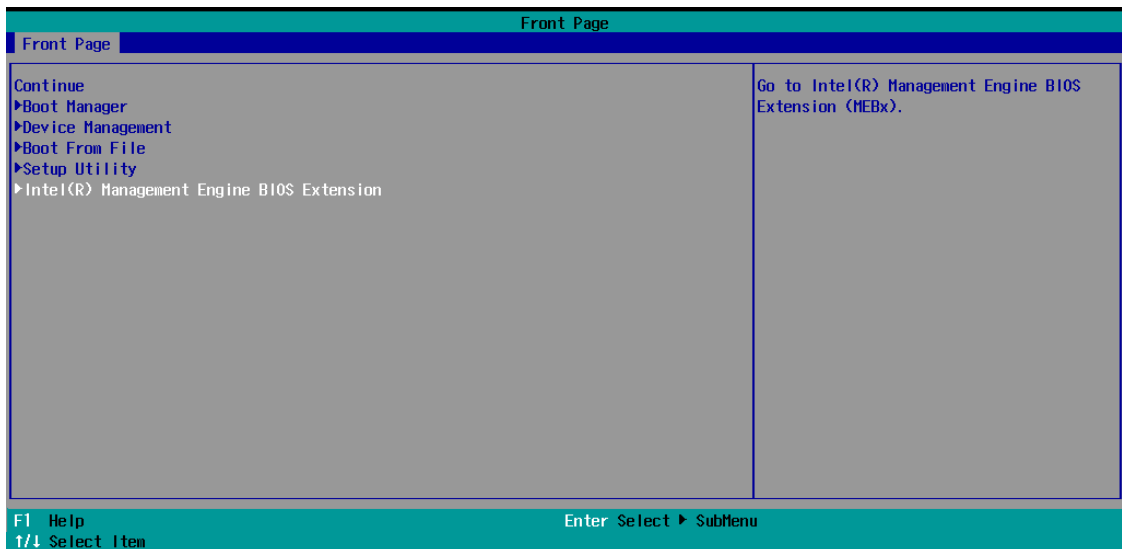
Intel® AMT is part of the Intel® vPro technology offering. Platforms equipped with Intel® AMT can be managed remotely, regardless of its power state or if it has a functioning OS or not. The Intel® Converged Security and Management Engine (Intel® CSME) powers the Intel® AMT system. As a component of the Intel® vPro platform, Intel® AMT uses several elements in the Intel® vPro platform architecture.

This chapter describes the setup process for the Intel® Active Management Technology. For more information about Intel® Active Management Technology :

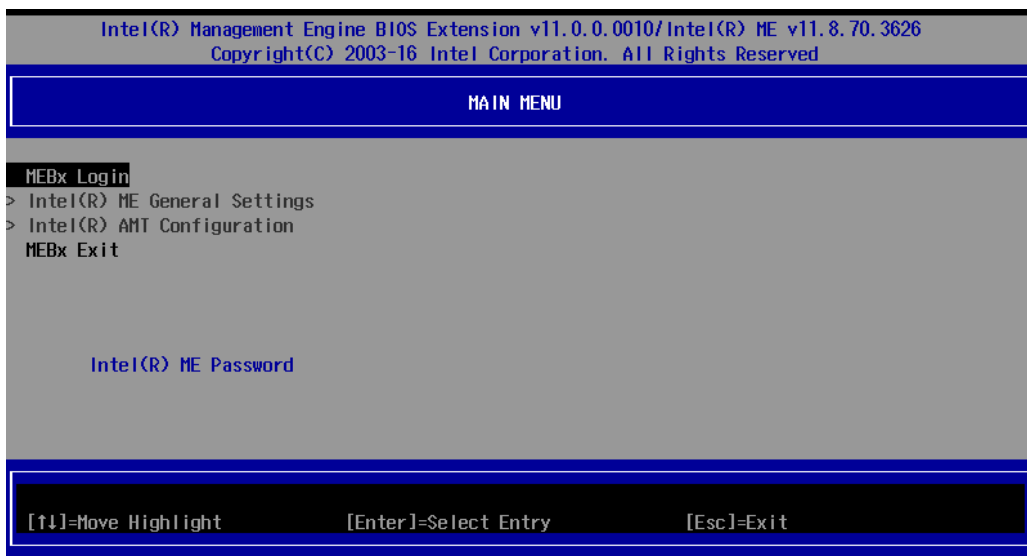
<https://www.intel.com/content/www/us/en/developer/articles/guide/getting-started-with-active-management-technology.html?wapkw=AMT>

## Turning on Intel® AMT on PC

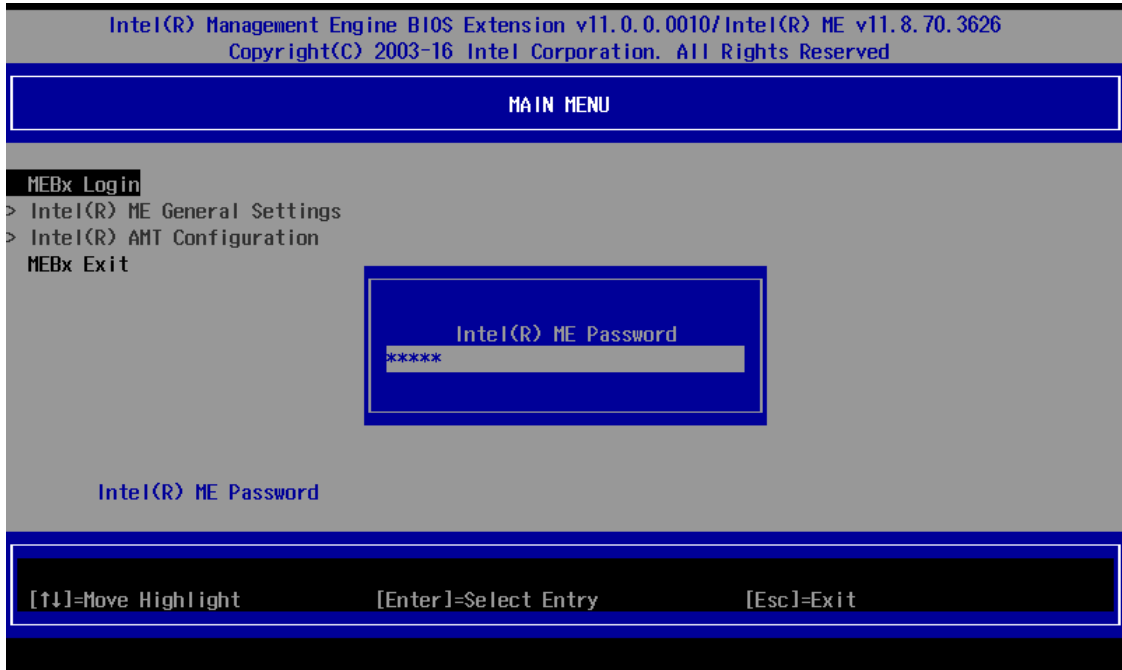
1. Power on the computer and press **F2** to enter the BIOS menu.
2. Select **Intel(R) Management Engine BIOS Extension**.



3. Select **MEBx Login**.



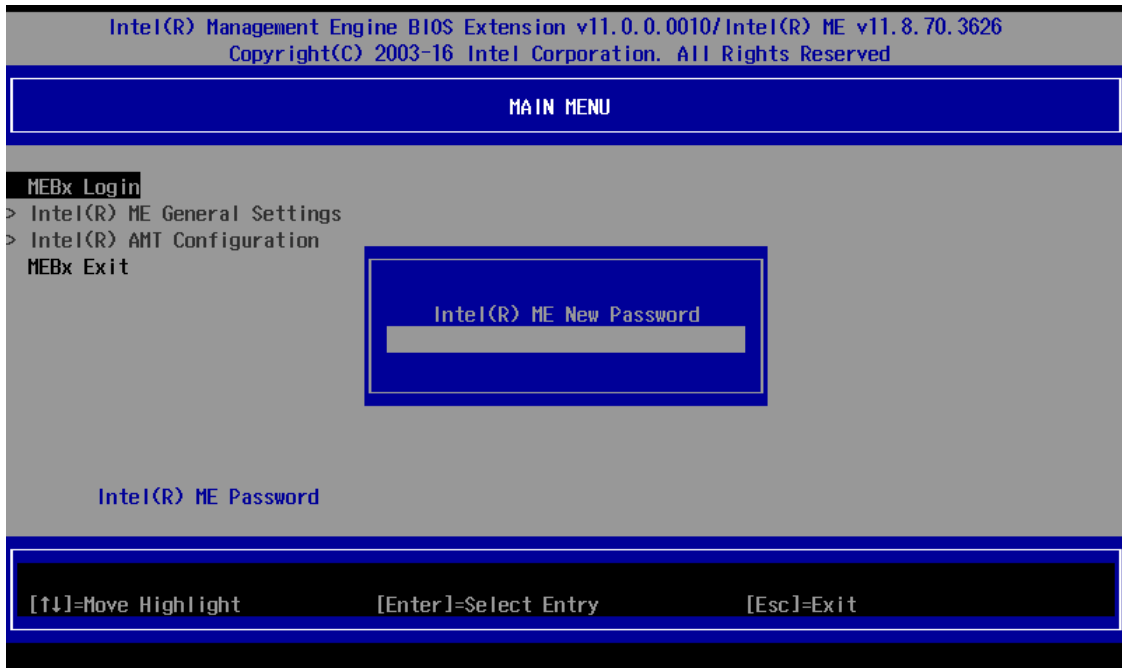
4. Enter the Intel® ME default password **admin**.



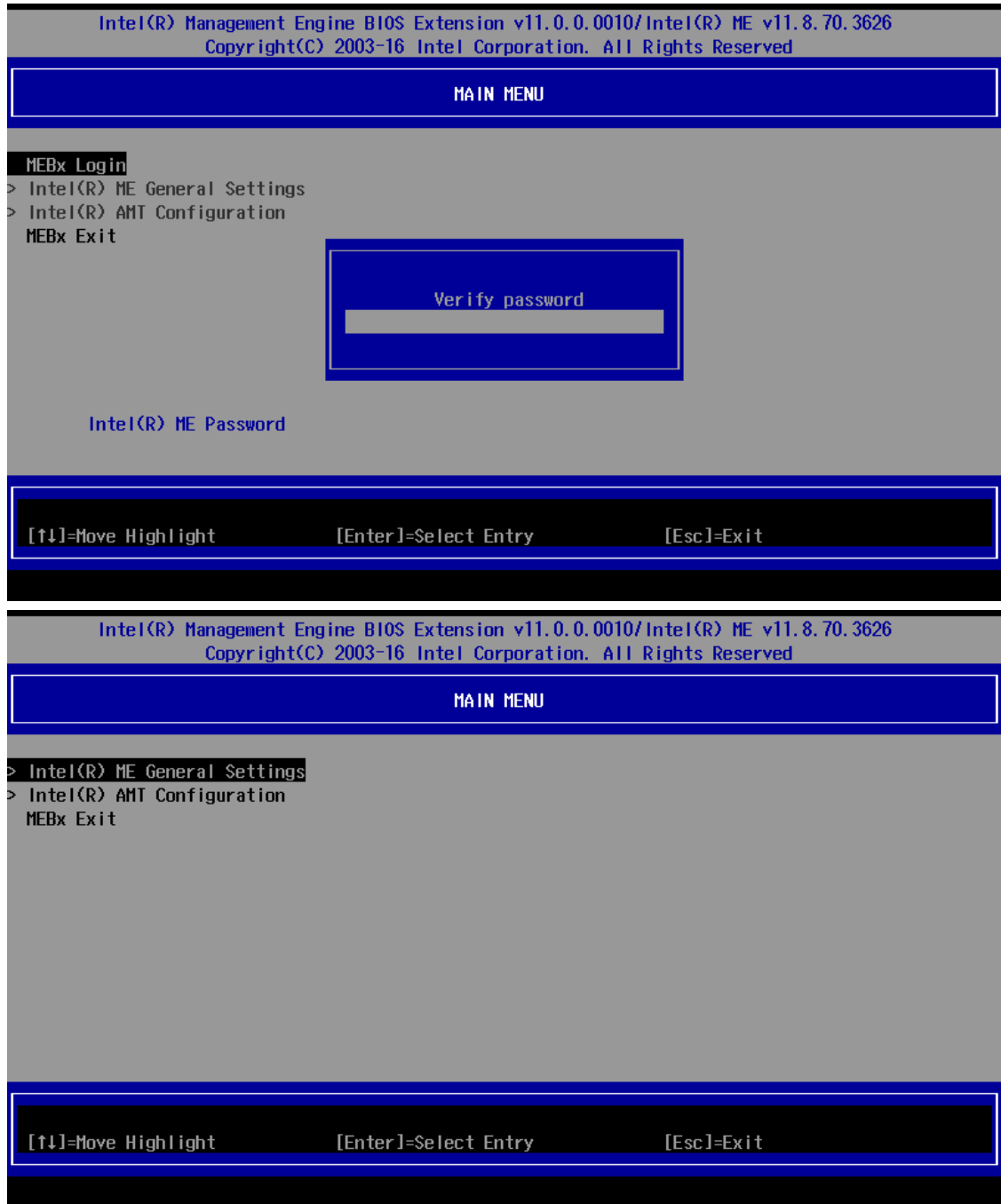
5. Enter a new password.

The Intel® MEBX password must meet the following requirements for strong passwords:

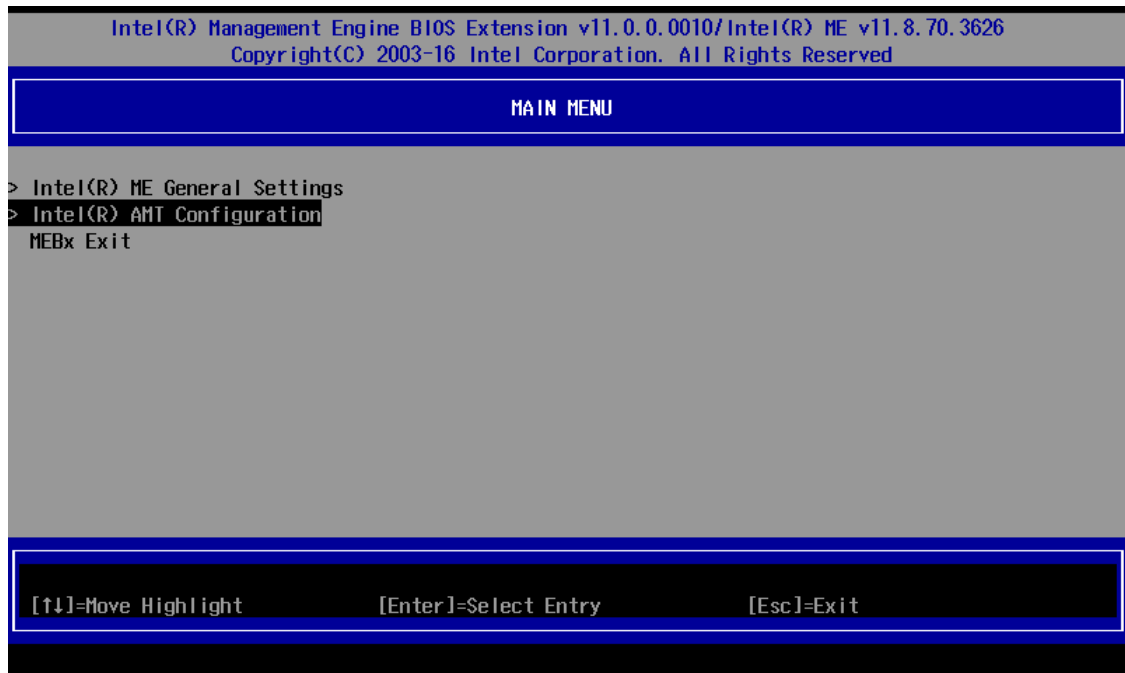
- > **Password Length:** At least 8 characters, and no more than 32.
- > **Password Complexity:** Password must include the following:
  - At least one digit character ('0', '1', ... '9')
  - At least one 7-bit ASCII non alphanumeric character (e.g., '!', '\$', ';'), but excluding ':', ',' and "" characters.
  - At least one lower-case letter ('a', 'b'...'z') and at least one upper case letter ('A', 'B'...'Z').



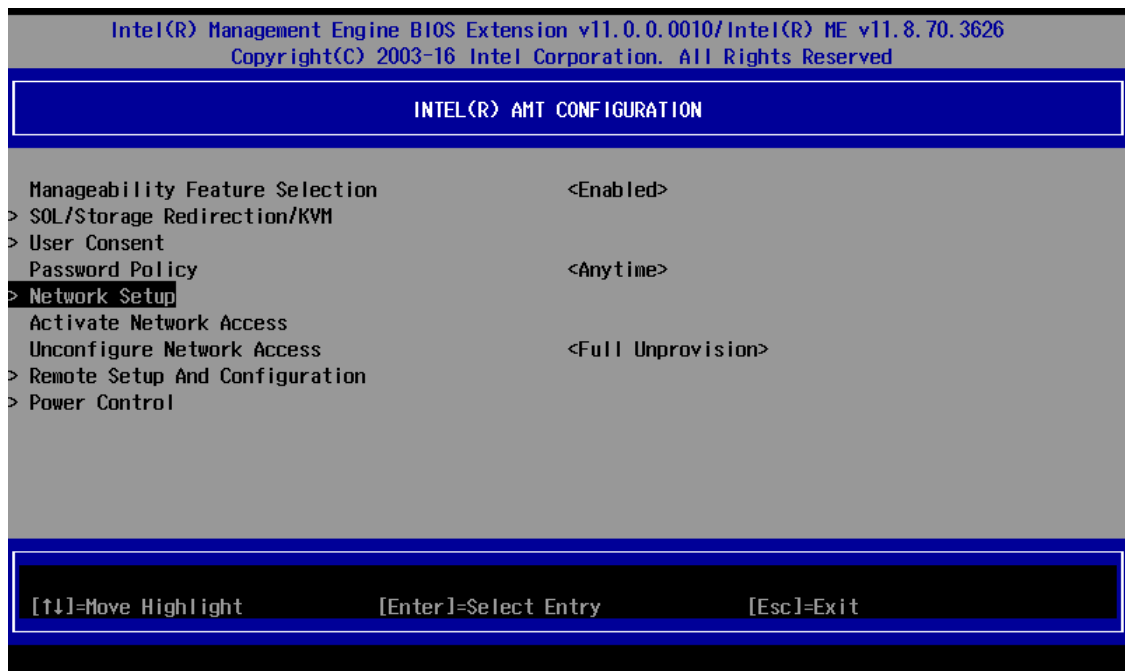
6. Verify password and login MEBx.



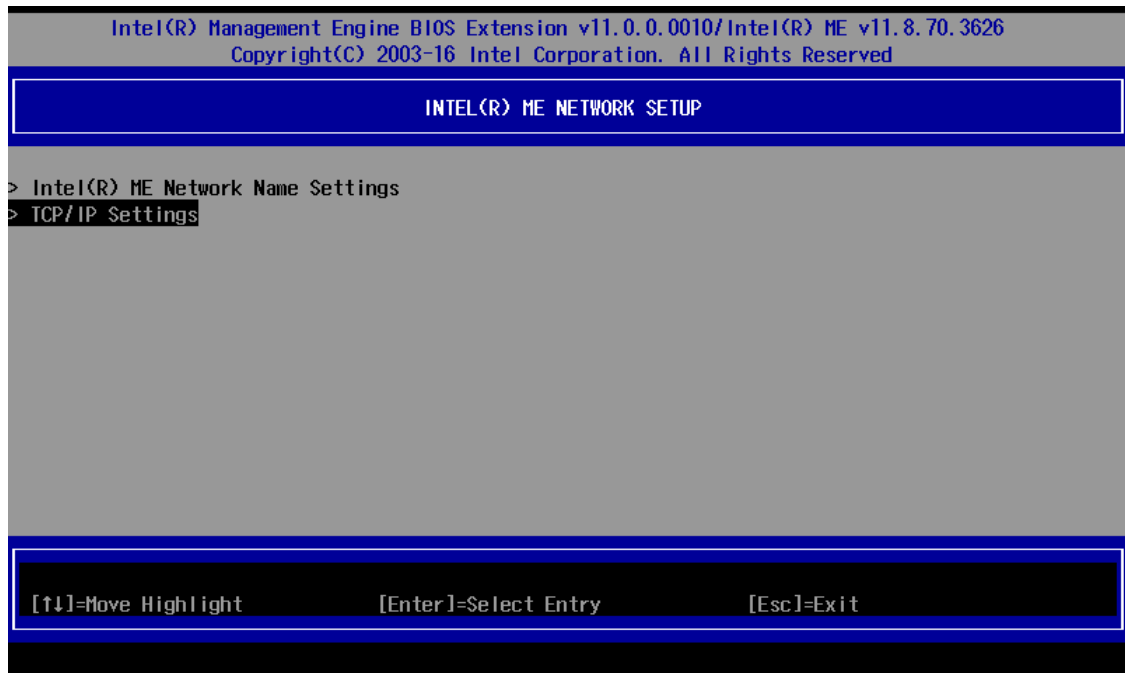
7. Select **Intel(R) AMT Configuration**.



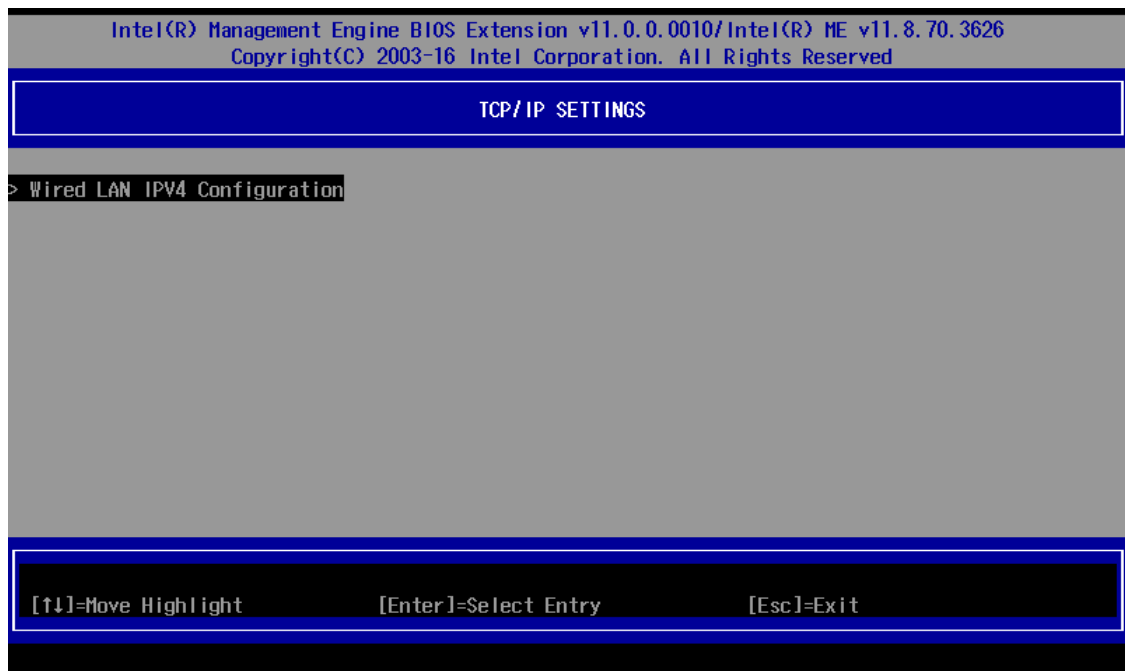
8. Select **Network Setup**.



9. Select **TCP/IP Settings**.

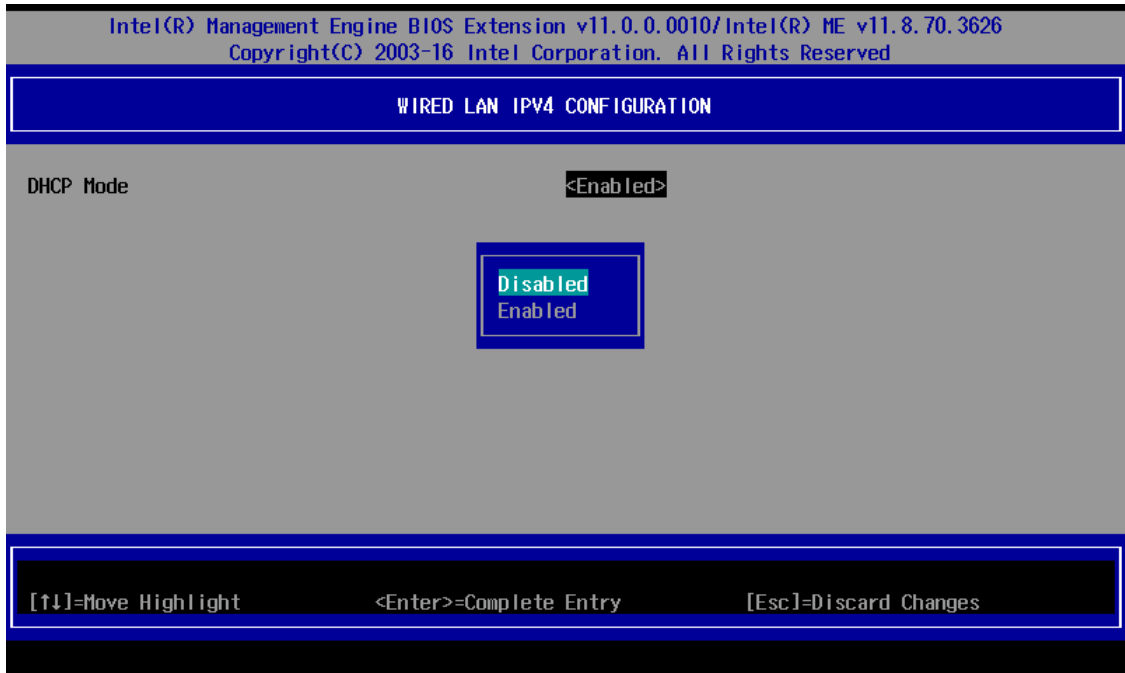


10. Select **Wired LAN IPV4 Configuration**.

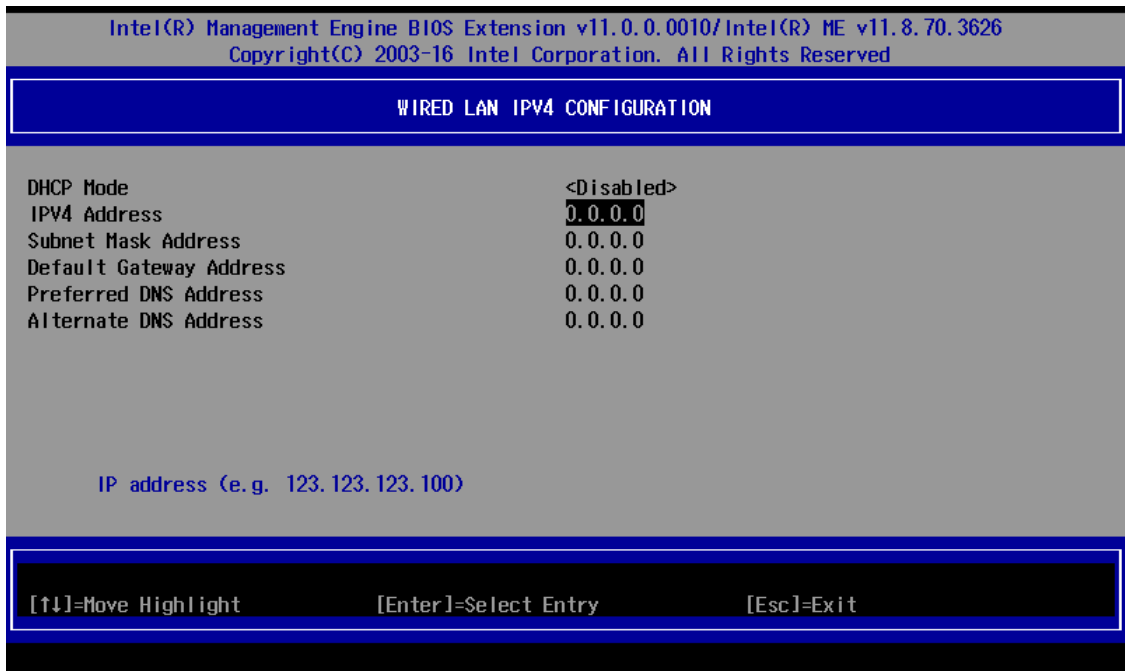




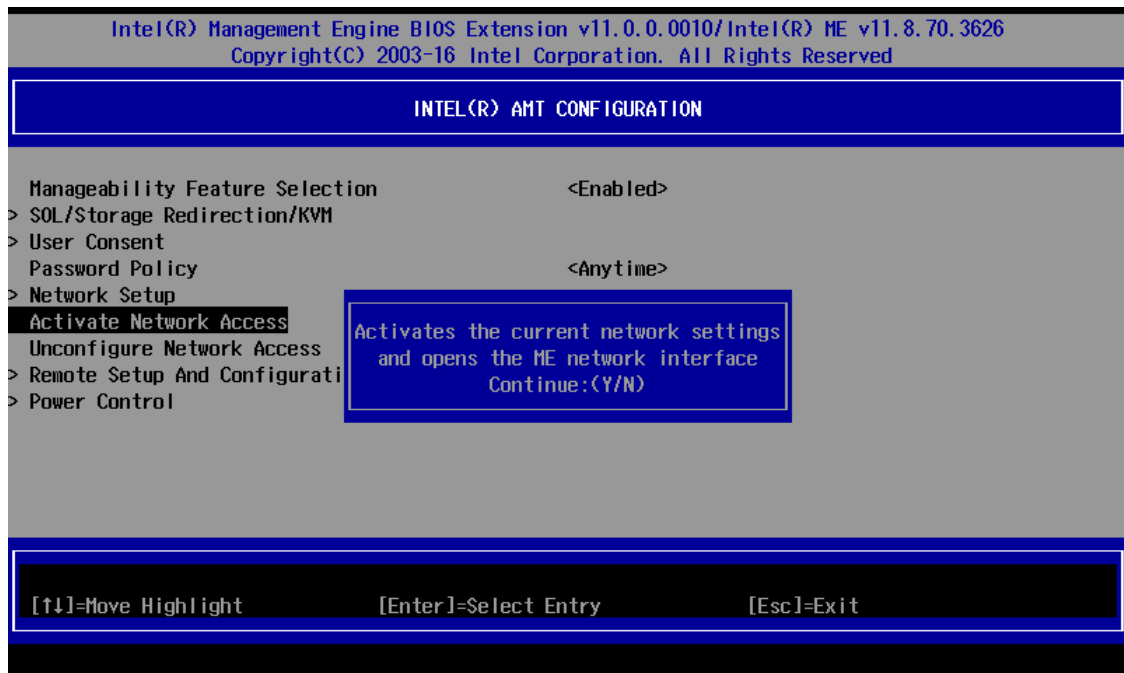
11. Select **DHCP Mode** and disable DHCP mode.



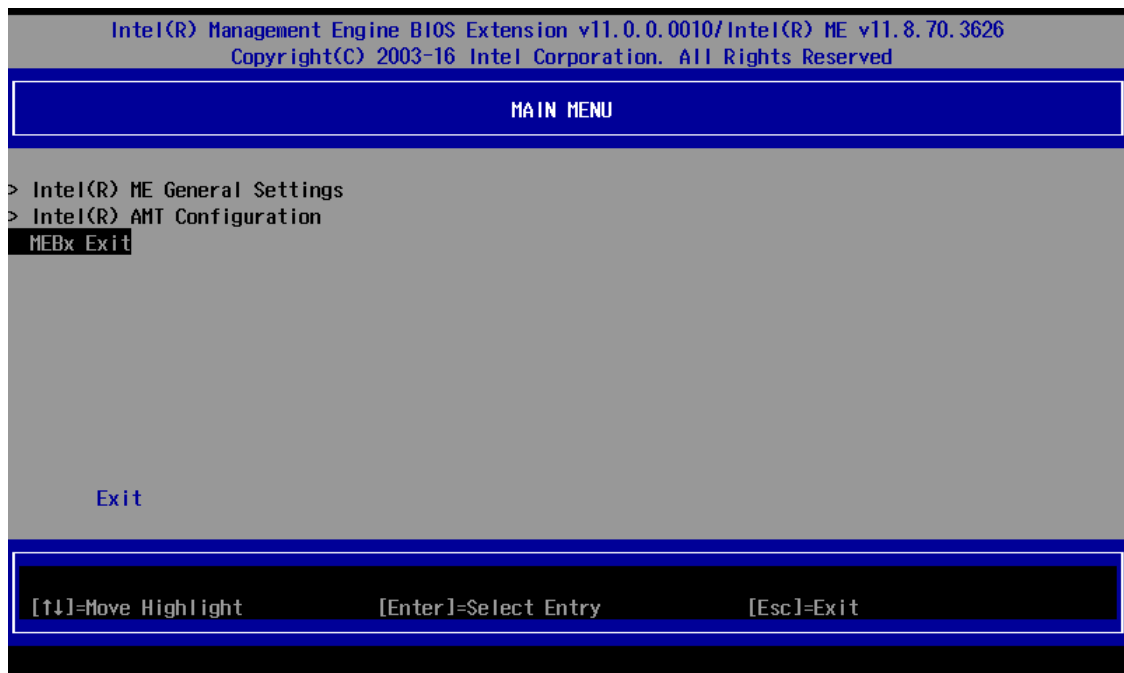
12. Enter the network settings for Intel® Active Management Technology.



13. Back to the **Intel(R) AMT Configuration** page. Select **Activate Network Access**. Enter **Y** to continue.

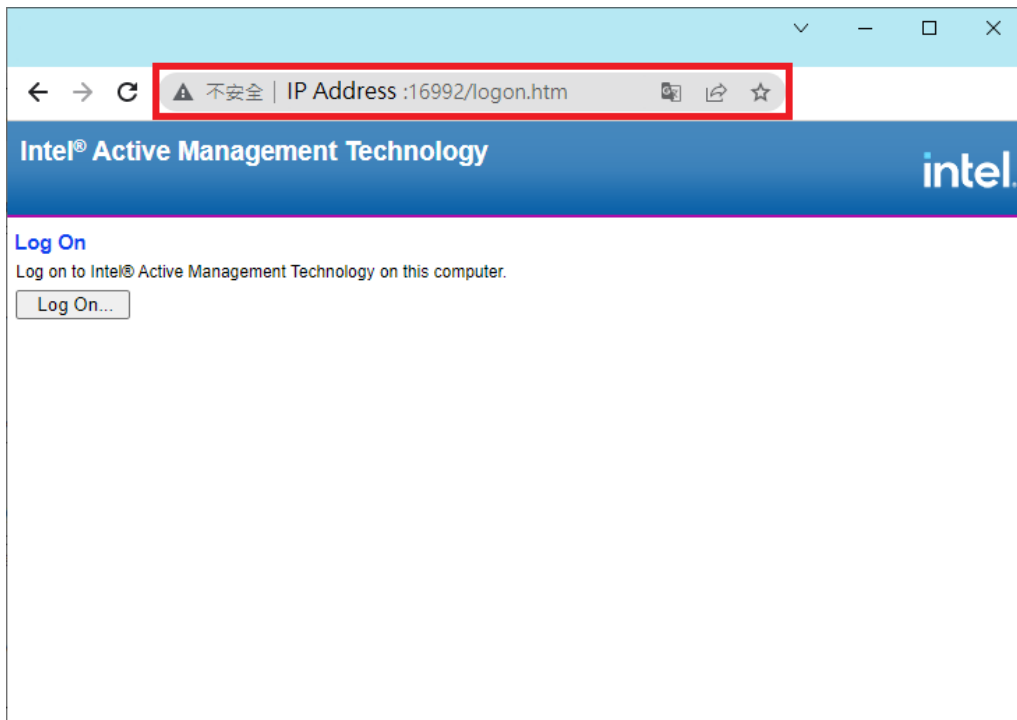


14. Back to the main menu. Select **MEBx Exit** to finish the **Intel® Active Management Technology** configuration.

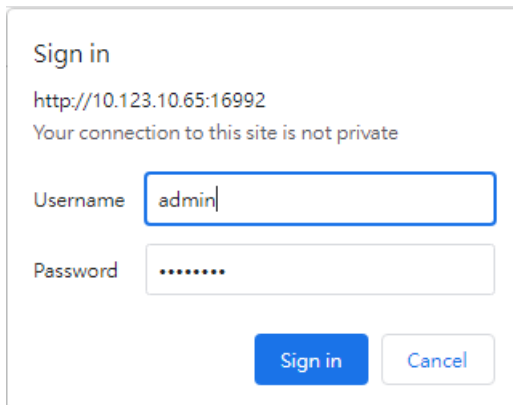


# Accessing Intel® AMT From the Website

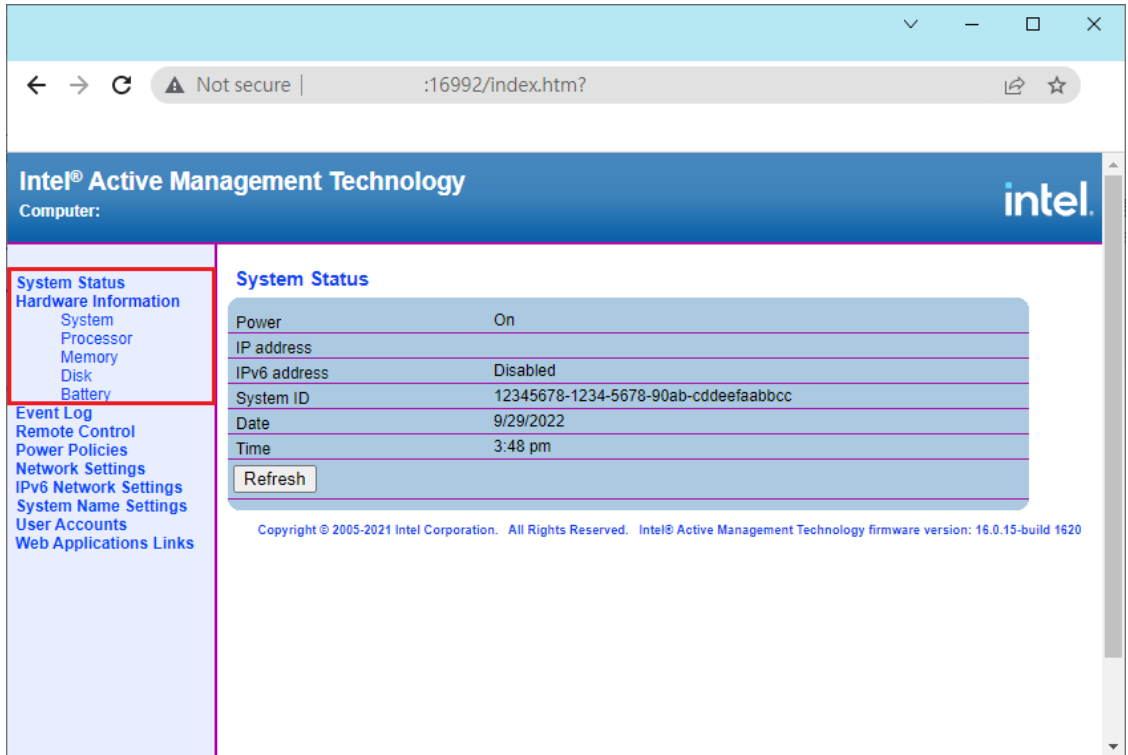
1. Open the web browser and enter <Intel® AMT IP Address>:**16992** (e.g.: 192.168.1.1:16992).



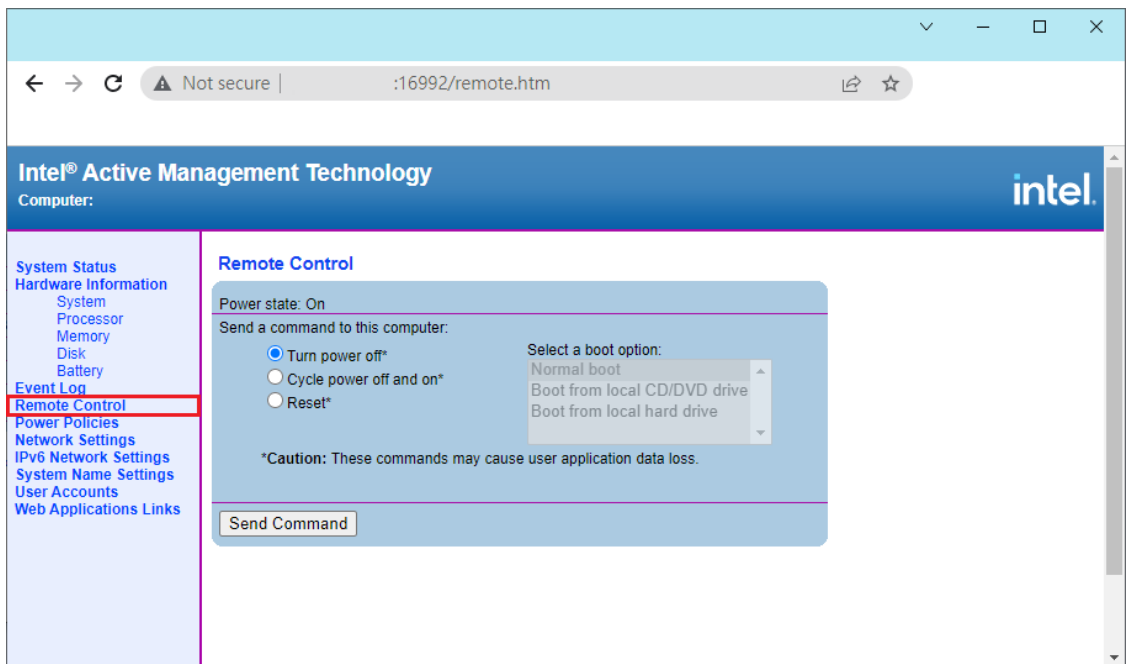
2. In the **Sign in** box, enter the **Username** and **Password** for Intel® AMT. The default **Username** is **admin**.



- a. After signing in, you can check the system status and hardware information of your managed device.



- b. The Intel® AMT website provides the basic remote power control feature for the managed device. The advanced remote power control and the remote KVM feature, refer to the following.



- c. The Event Manager deals with internal alerts that occur in both the host platform and the Intel® AMT device, regardless of the power state.

Event	Time	Source	Description
1	10/6/2022 1:16 am	BIOS	Entering BIOS setup.
2	10/6/2022 1:16 am	System board	keyboard test.
3	10/6/2022 1:16 am	System board	Keyboard controller initialization.
4	10/6/2022 1:16 am	System board	keyboard test.
5	10/6/2022 1:16 am	System board	Keyboard controller initialization.
6	10/6/2022 1:16 am	BIOS	Performing PCI configuration.
7	10/6/2022 1:16 am	BIOS	Performing PCI configuration.
8	10/6/2022 1:16 am	Processor	Starting secondary processor initialization.
9	10/4/2022 0:48 am	BIOS	Entering BIOS setup.
10	10/4/2022 0:48 am	System board	keyboard test.

- d. You can configure the managed device network settings via the web GUI.

Configure the managed device network settings for this computer.

Respond to ping

TCP/IP settings for wired connection

Obtain IP settings automatically

Use the following IP settings:

IP address:

Subnet mask:

Gateway address:

Preferred DNS address:

Alternate DNS address:

# Access Intel® AMT Using the Intel® Manageability Commander

1. Download and install the latest version of **Intel® Manageability Commander** from Intel.com.

Intel® Manageability Commander

ID	Date	Version
18796	7/27/2022	2.3 (Latest) ▾

Introduction

Intel® Manageability Commander is a lightweight console used to connect with and utilize the features of Intel® Active Management Technology (Intel® AMT).

Available Downloads

[Download IMCInstaller-2.3.0.msi](#)

Microsoft Windows\*

Size: 41.3 MB

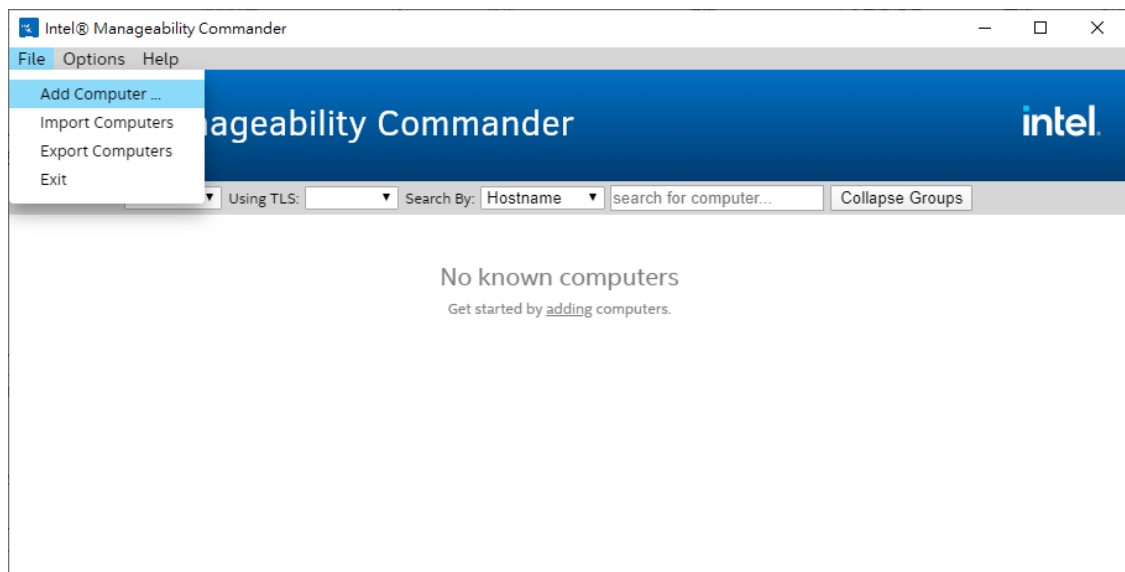
SHA1:  
8DC4636674397E75CE57A03BEE593DD5152  
BDF73

Documentation

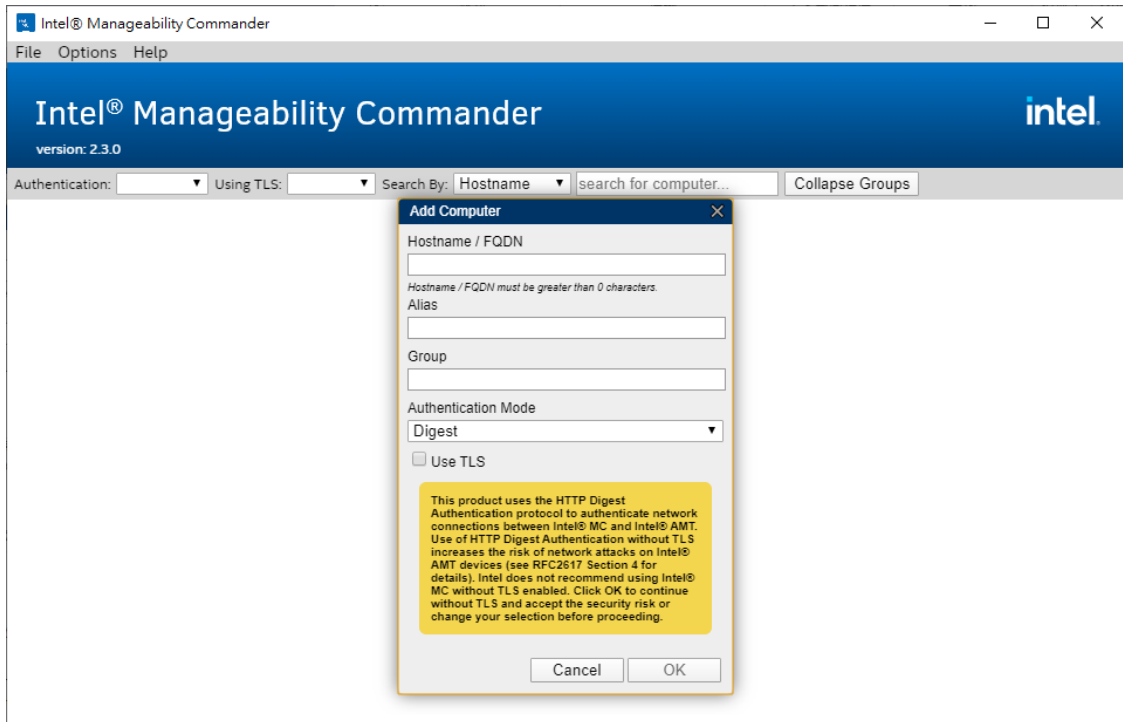
[Release Notes](#) (Intel Manageability Commander Release Notes.pdf)

[User Guides](#) (Intel Manageability Commander User Guide.pdf)

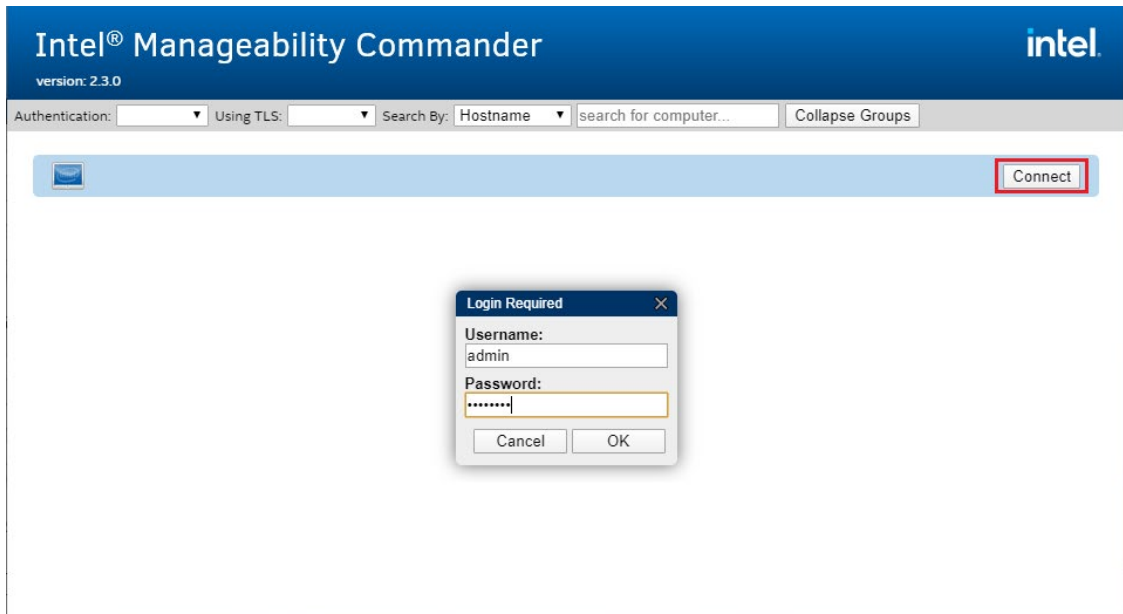
2. Execute the **Intel® Manageability Commander** as administrator. Select **File > Add Computer...**

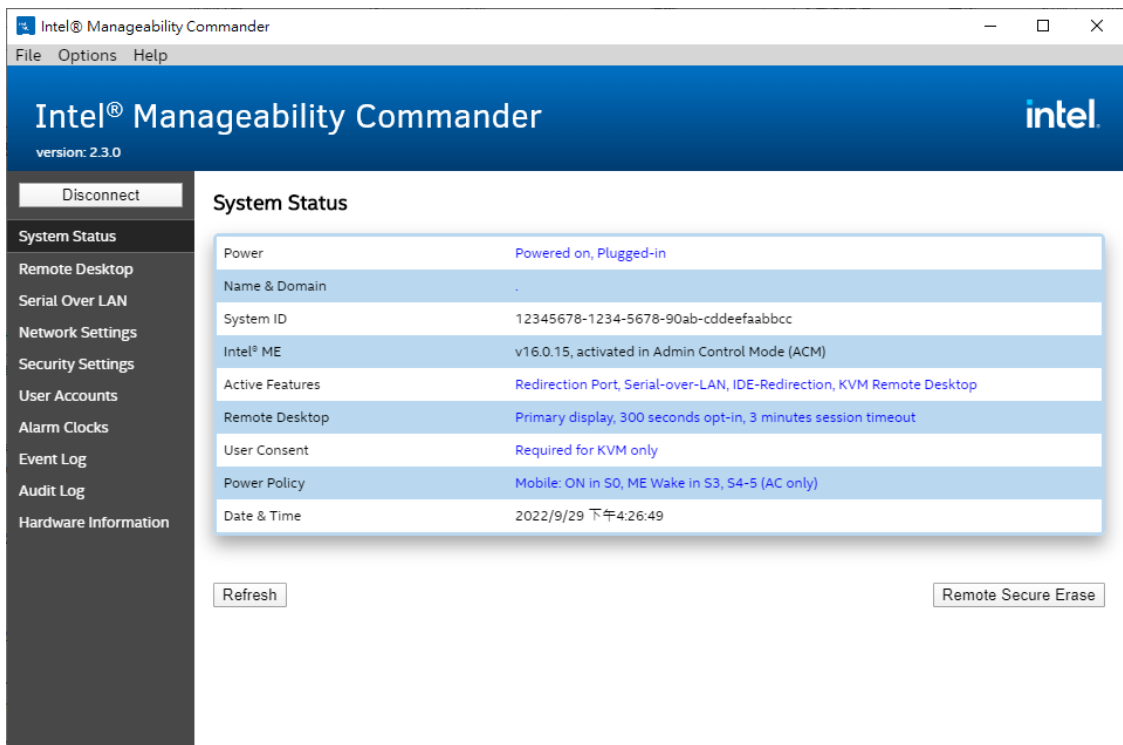


3. Enter the hostname, alias, and group. The hostname is the IP address of managed device Intel® AMT. The alias and group could keep empty value if not used. Click **OK** to apply settings.



4. Select **Connect** and enter the **Username** and **Password** of Intel® AMT. The default **Username** is **admin**.



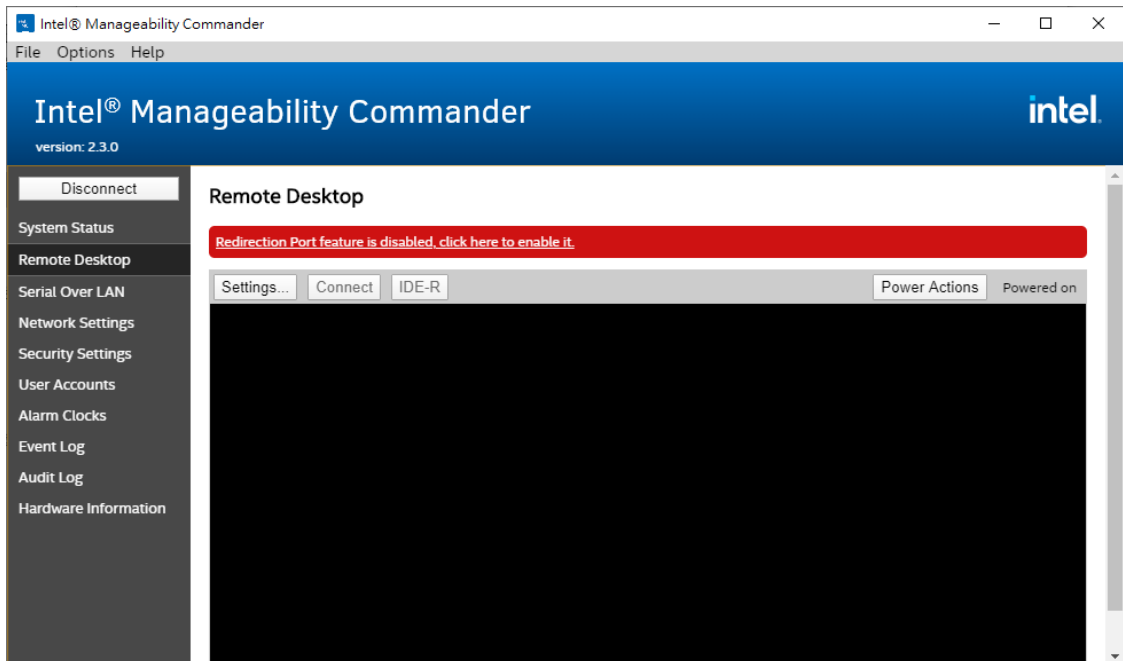


## Remote Desktop

Intel® Manageability Commander provides a remote KVM function.

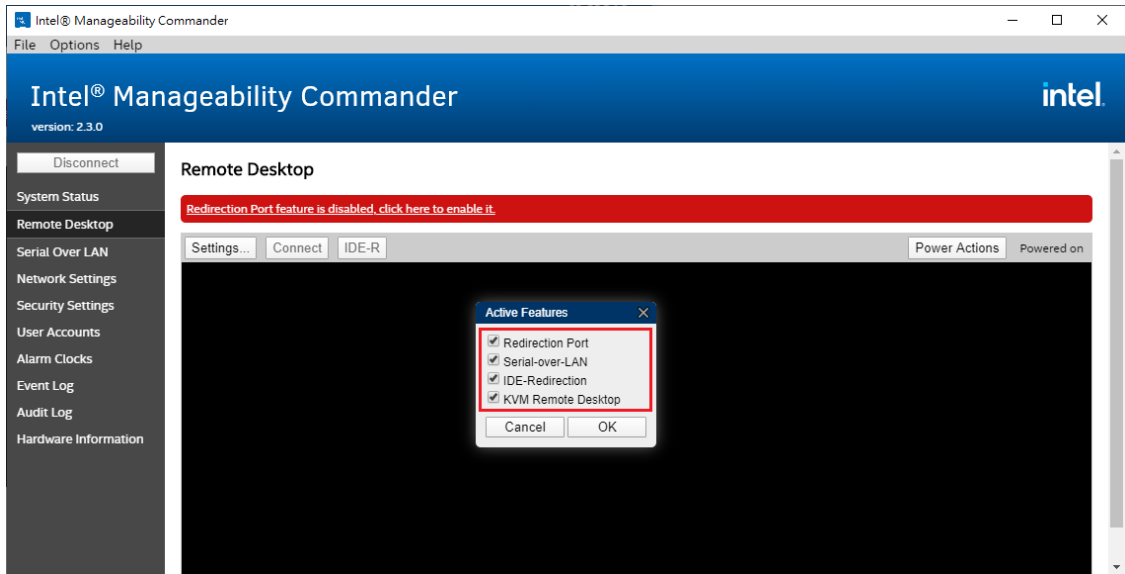
To connect to a managed device, do the following:

1. Select **Remote Desktop**.  
The redirection port feature is disabled when the remote function is activated for the first time. Click **Yes** on the warning message to enable it.

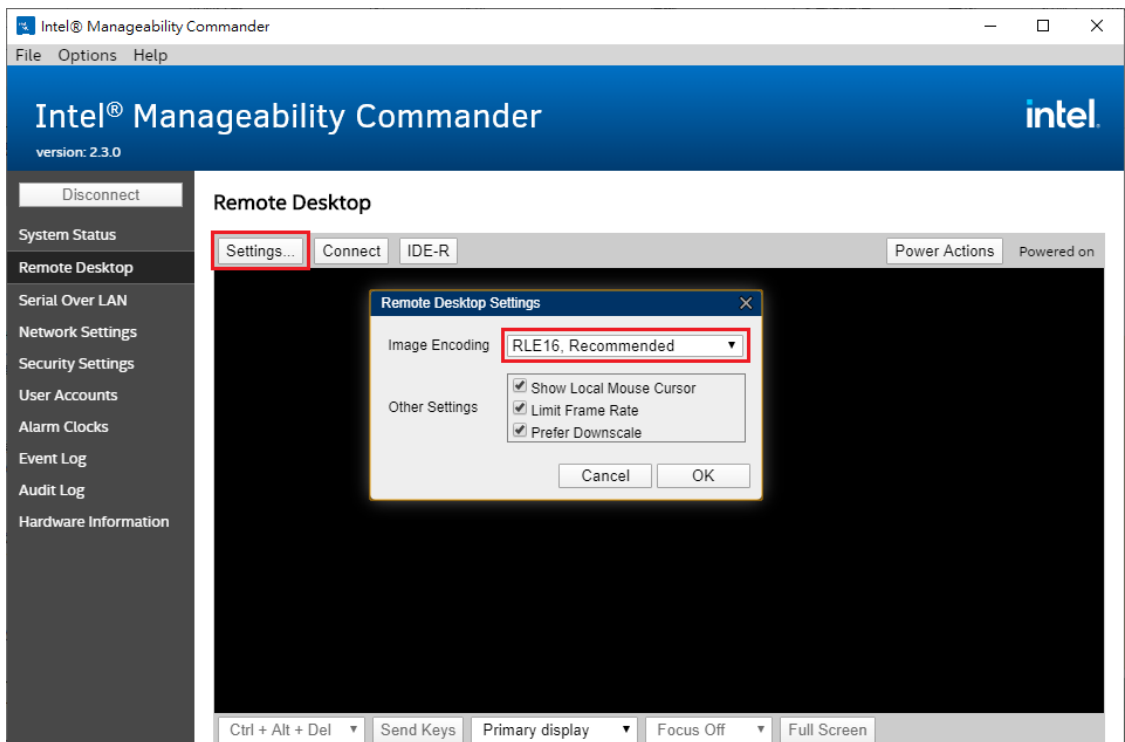




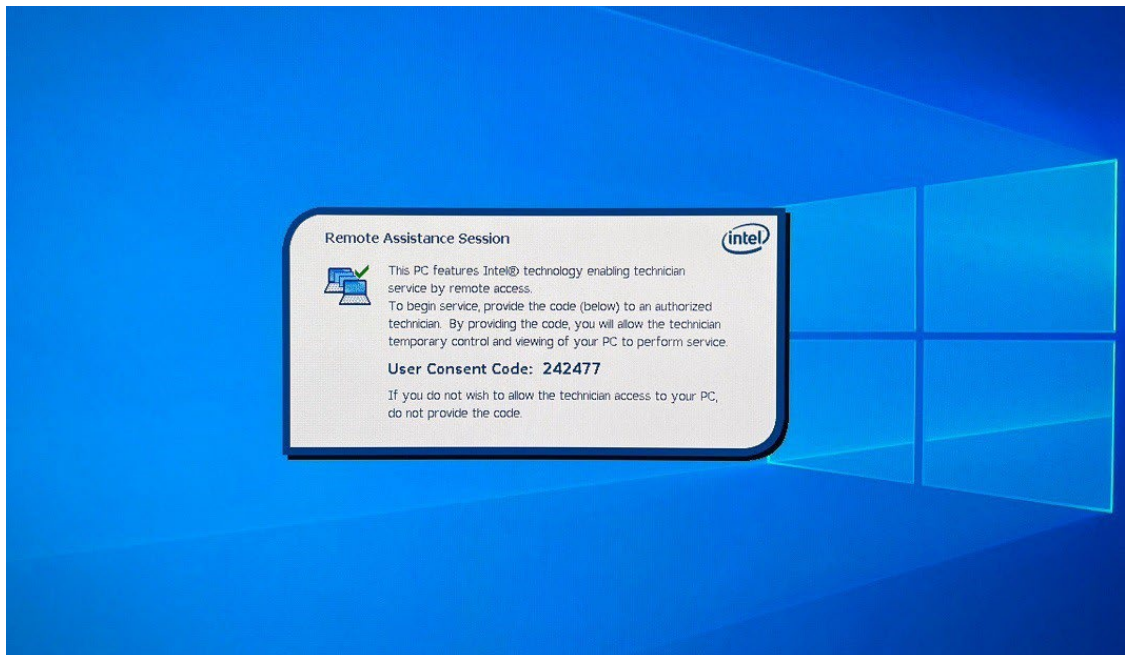
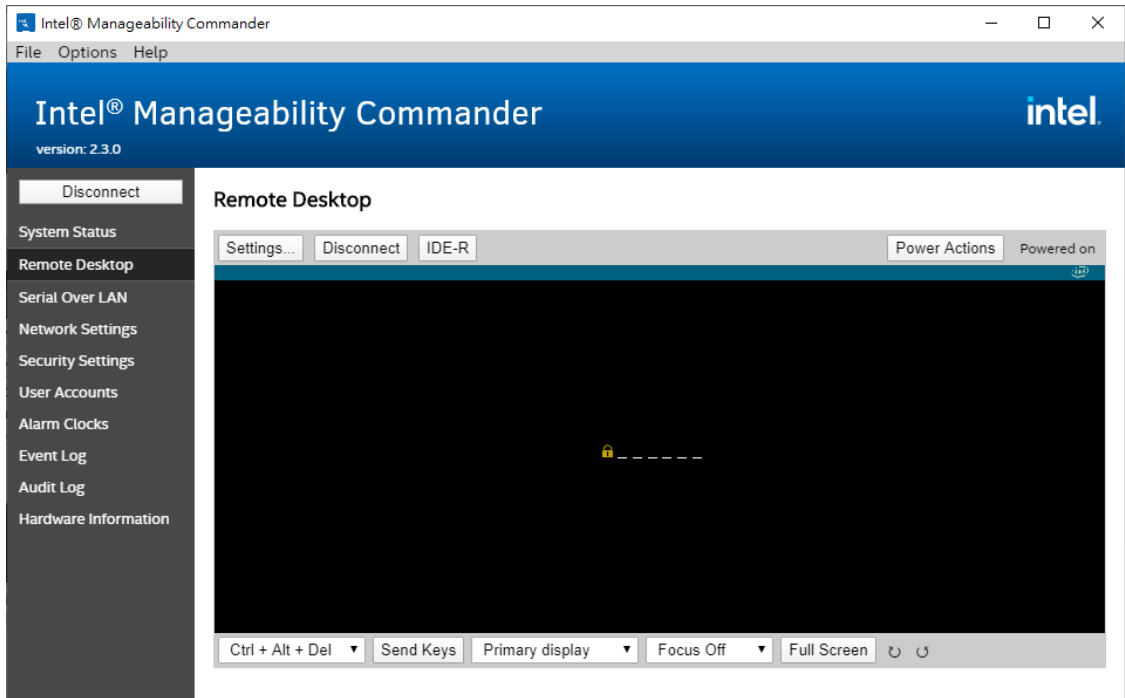
2. Enable all features. Click **OK** to apply settings.



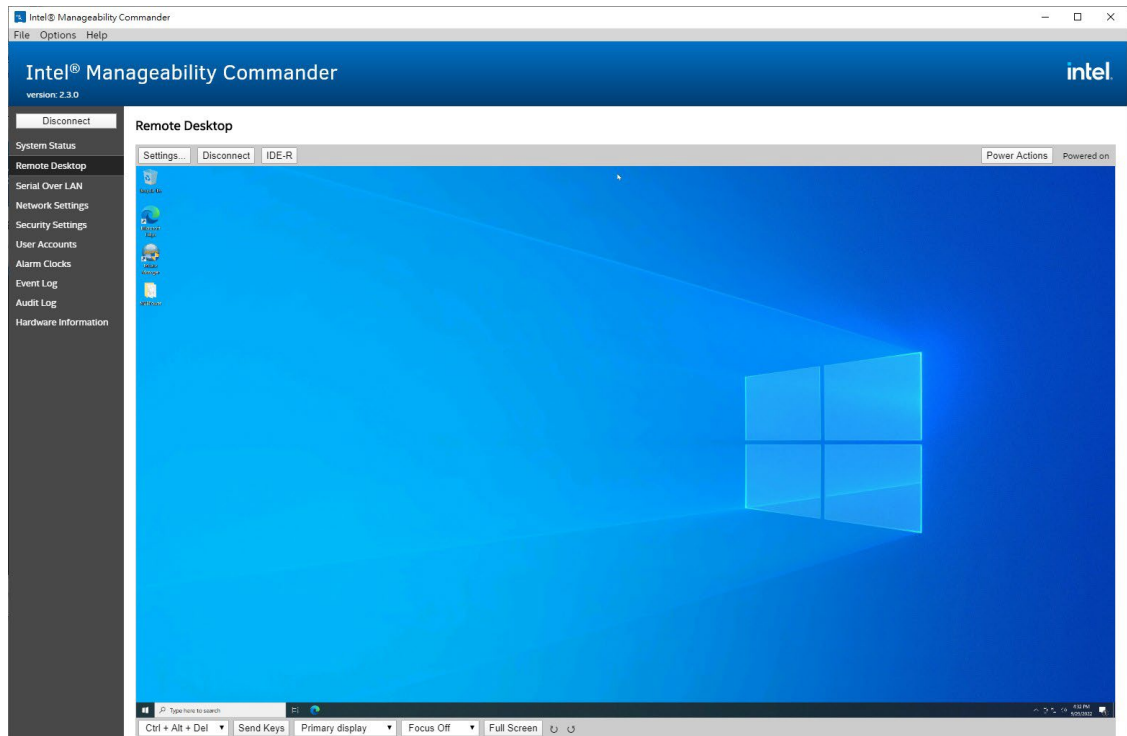
3. Click **Settings...**, Change the **Image Encoding** to **RLE16, Recommended**. Click **OK** to apply settings.



4. Click **Connect** and enter the **User Consent** code.  
The **User Consent** code is provided on the client-side as a sprite on the Intel® AMT device's display. This sprite is generated by Intel® GPU and is not available to the OS. This is a 6-digit code that the technician will use when making a connection that requires user consent, such as an Intel® KVM connection.

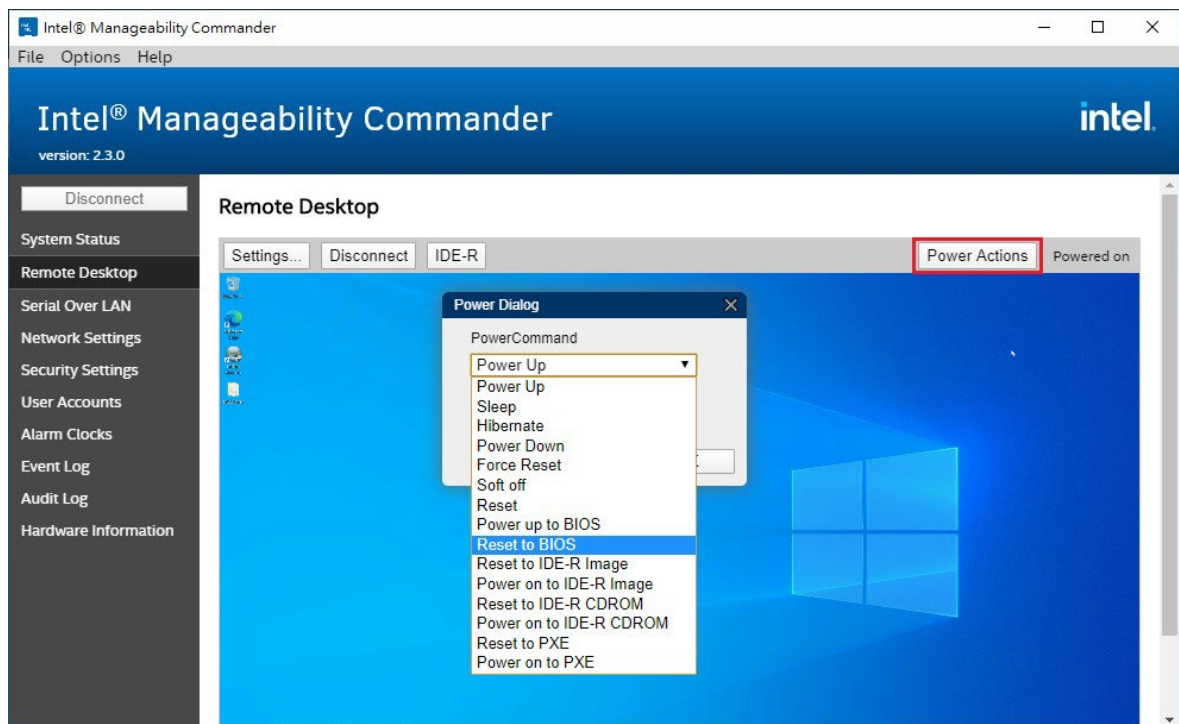


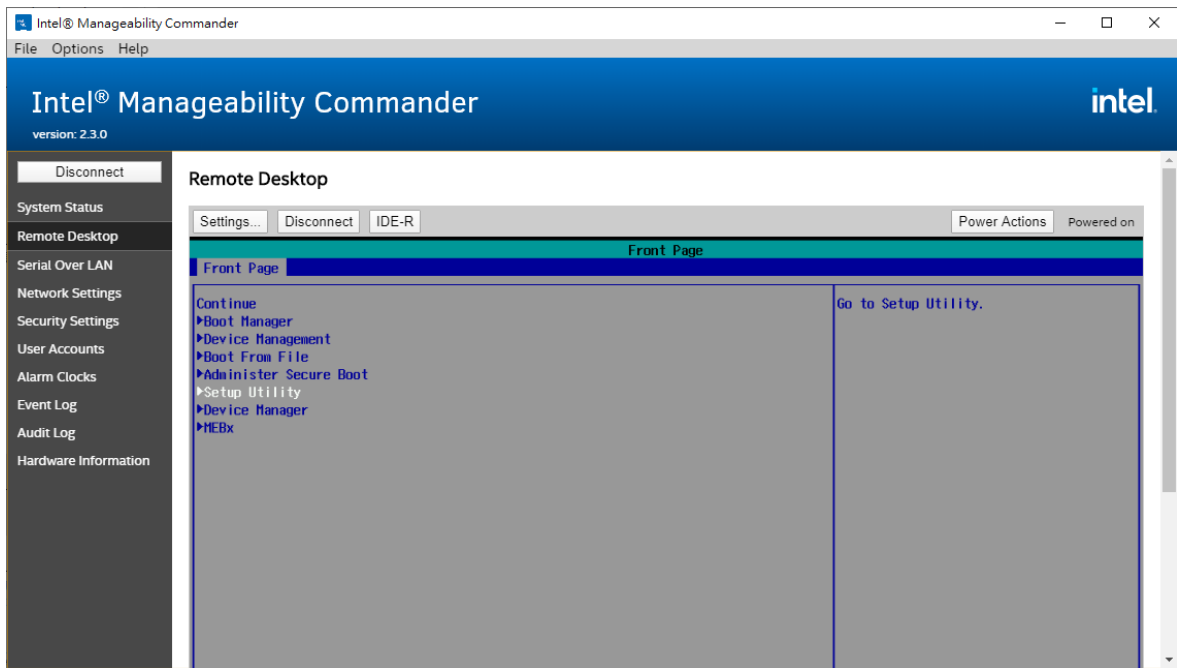
5. The Intel® AMT device authenticates the **User Consent** code following which you can run the remote desktop function.



## Advanced Power Control

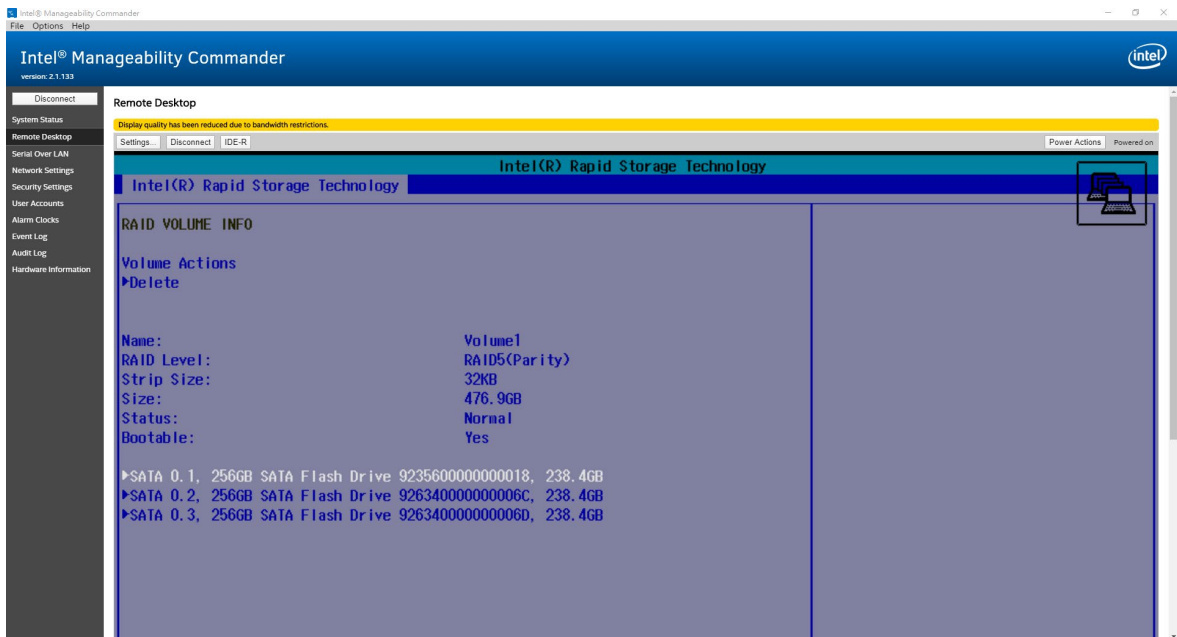
Intel® Manageability Commander provides the advanced power control features. Click **Power Action** to control managed device. For example, reset the device power and boot to the BIOS menu. With the advanced power control features, such as **RAID Configuration**, **Boot Manager**, and **OS Recovery**, you can configure the BIOS settings and manage the device more easily..





## Remote RAID Configuration

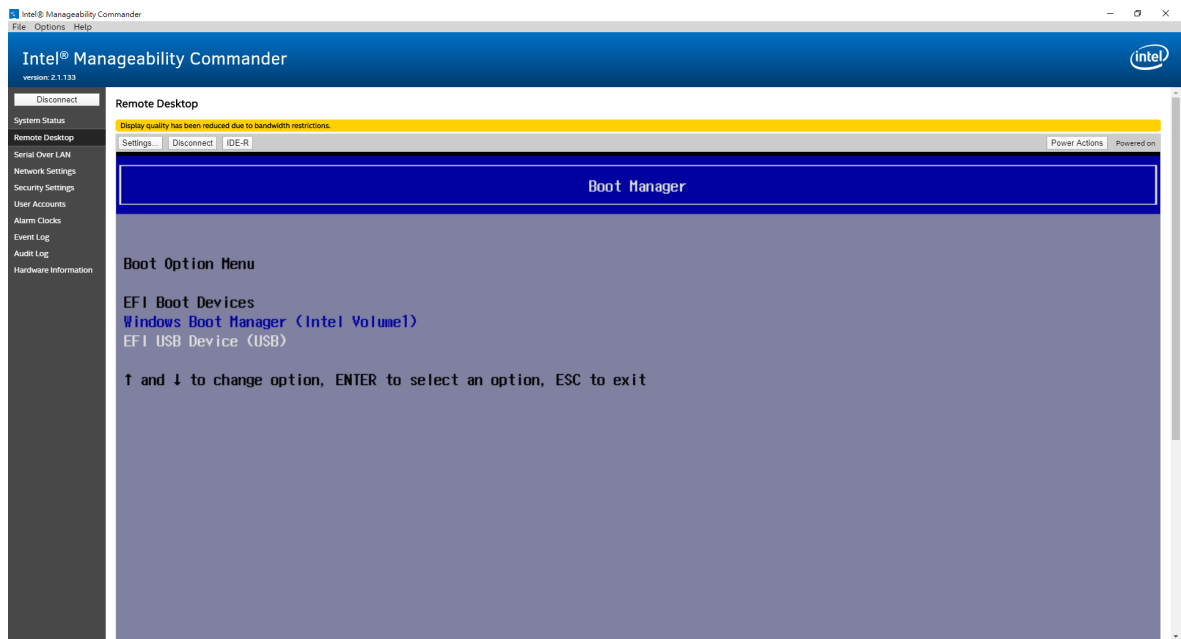
Reset to BIOS menu and select **Setup Utility** option. Reference **Chapter 4 Configuring RAID** to configure the RAID settings.



# Remote Boot Manager

Reset to BIOS menu and select **Boot Manager**.

You can select the bootable USB disk to back up the OS image or use a bootable disk, which includes recovery image, to recover the OS.

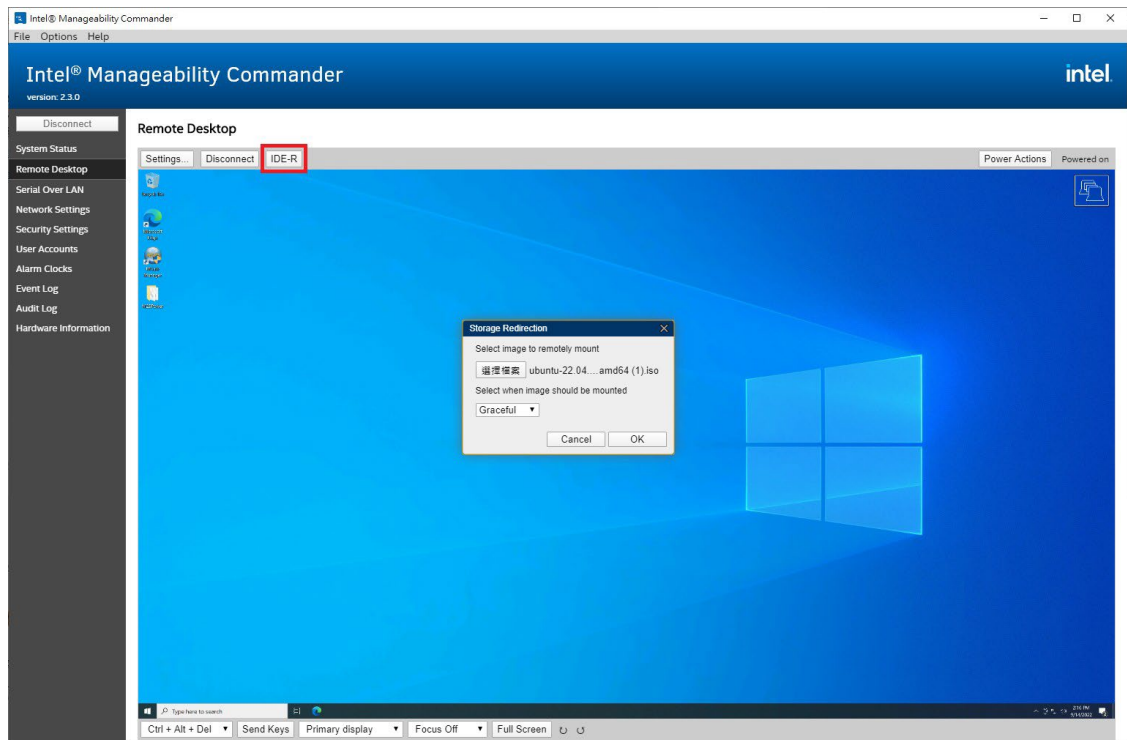


# Remote Mounting of Recovery Image

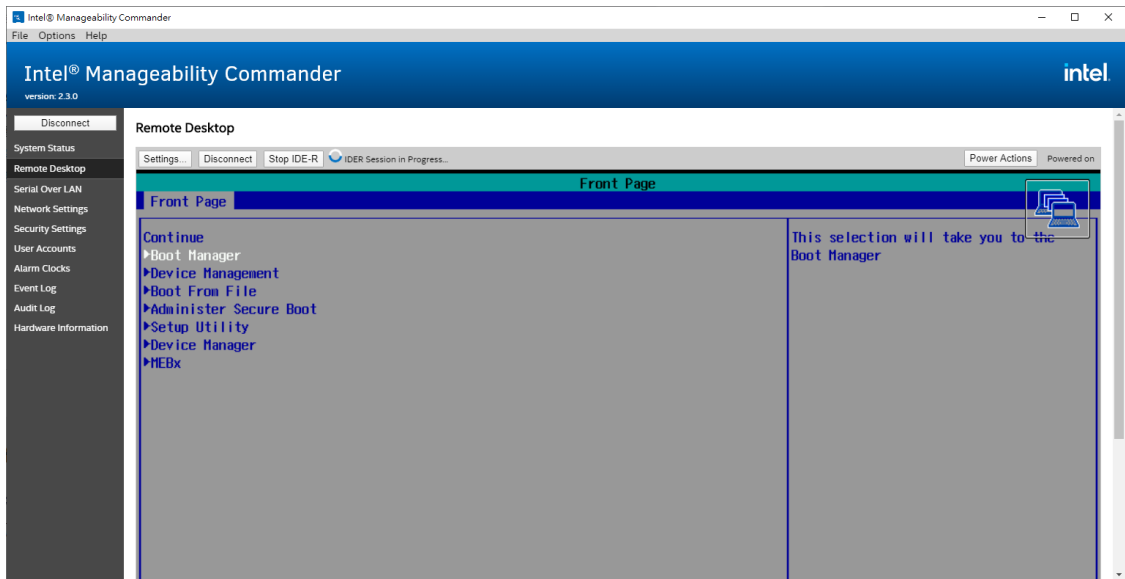
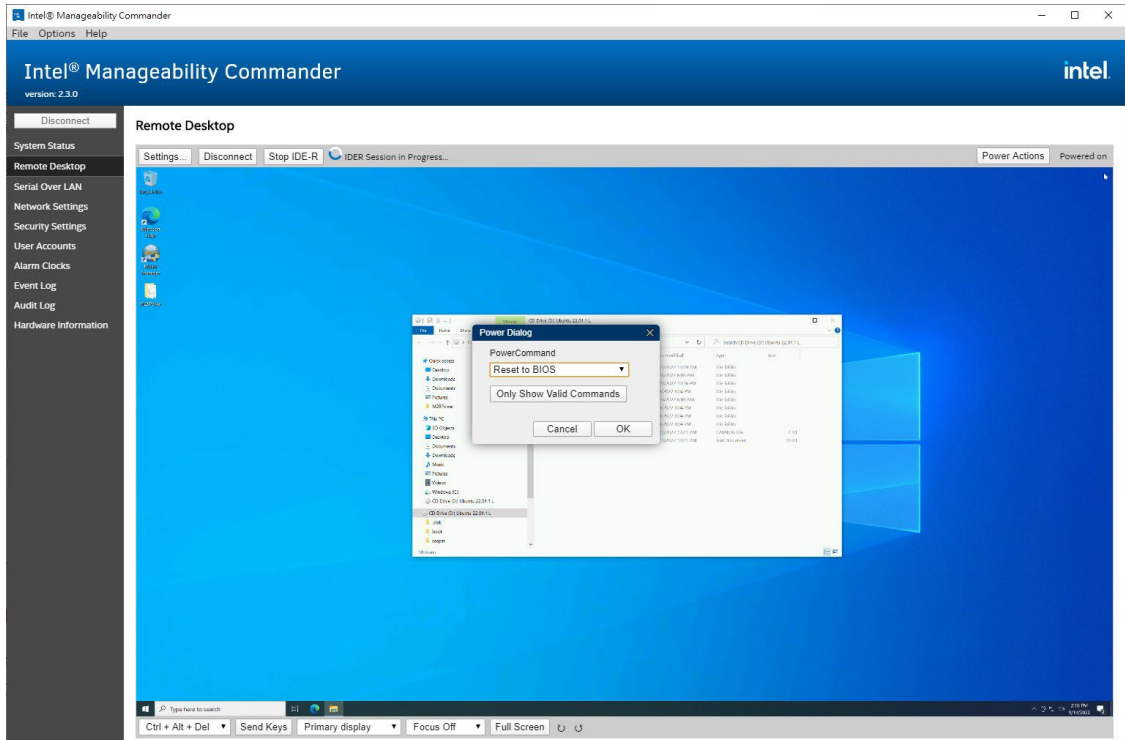
A recovery image can be remotely mounted on to a device.

Do the following, to remotely install a recovery image on a device.

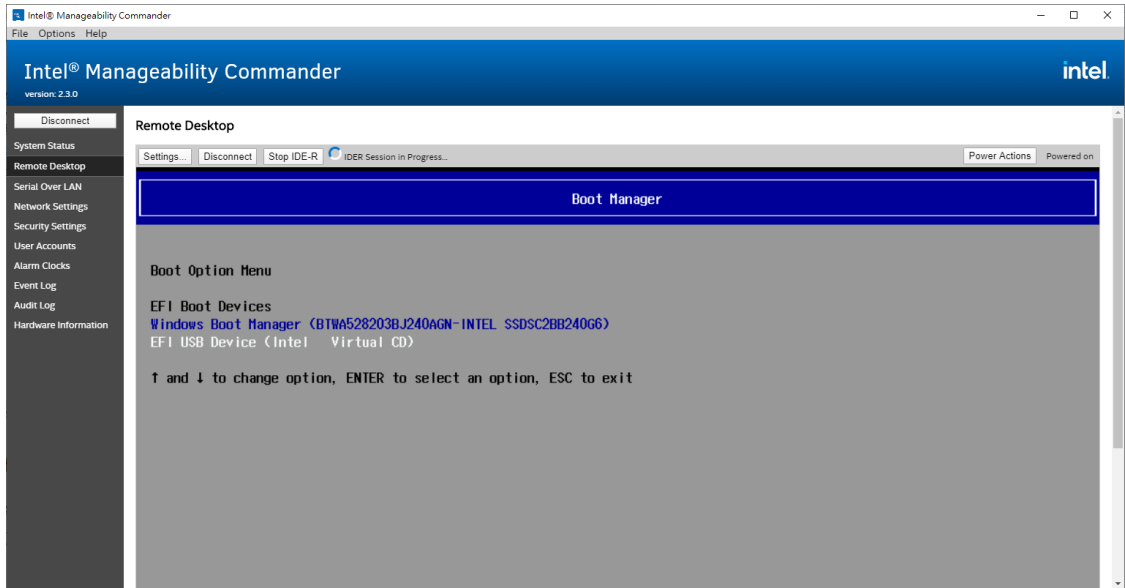
1. Click **IDE-R** option and select the target image.



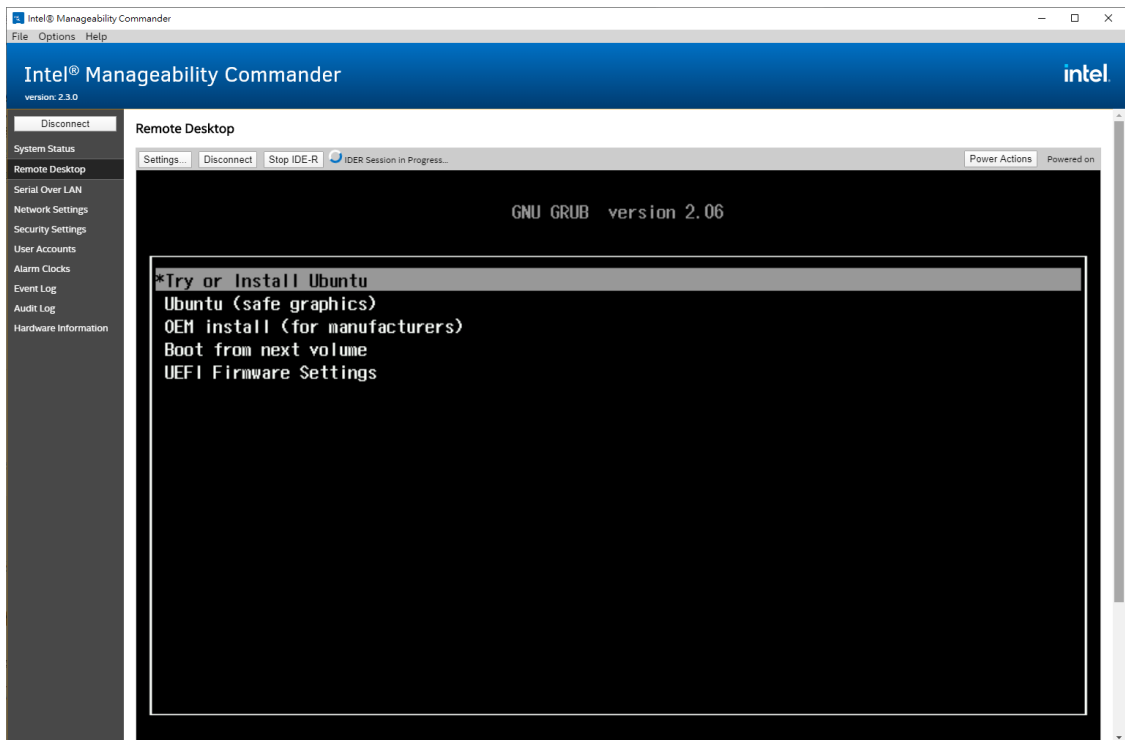
2. Reset to BIOS menu and select **Boot Manager**.



3. Select **Intel Virtual CD** to boot to mount image.

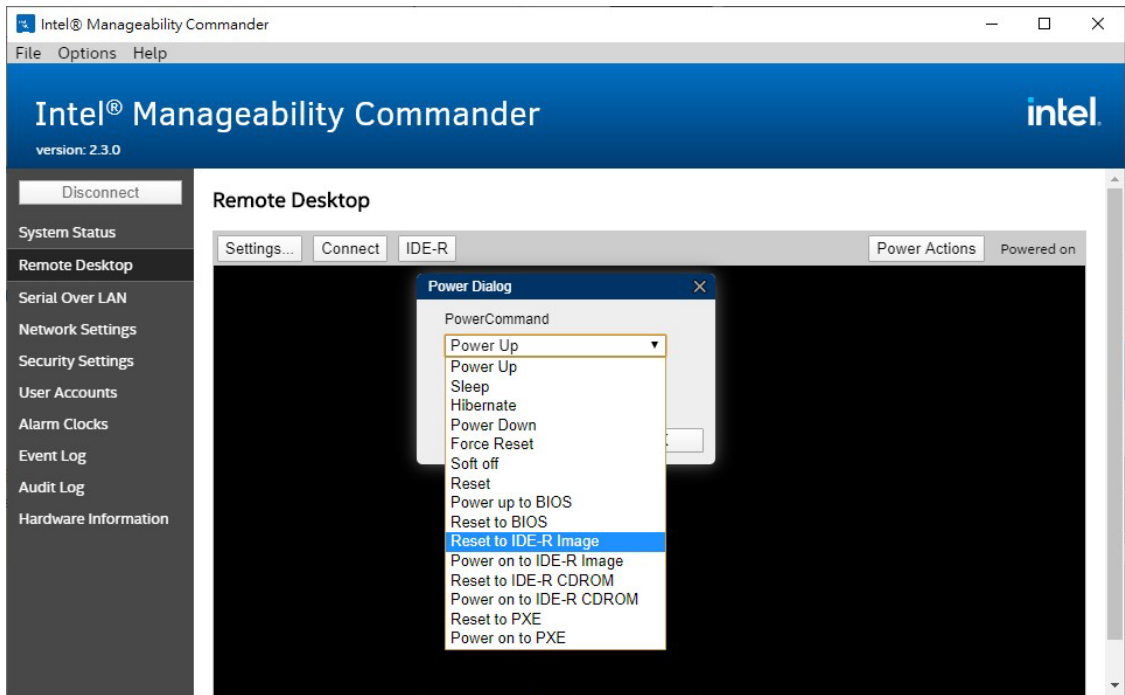


4. Following the steps to recovery image.



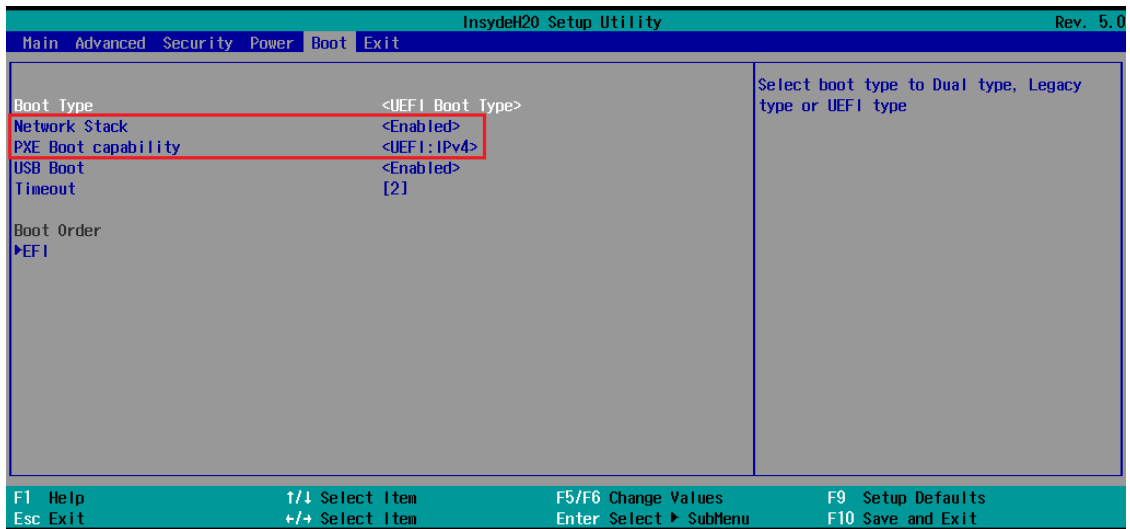
● **NOTE**

The power action can be used to reset directly to the IDE-R image.



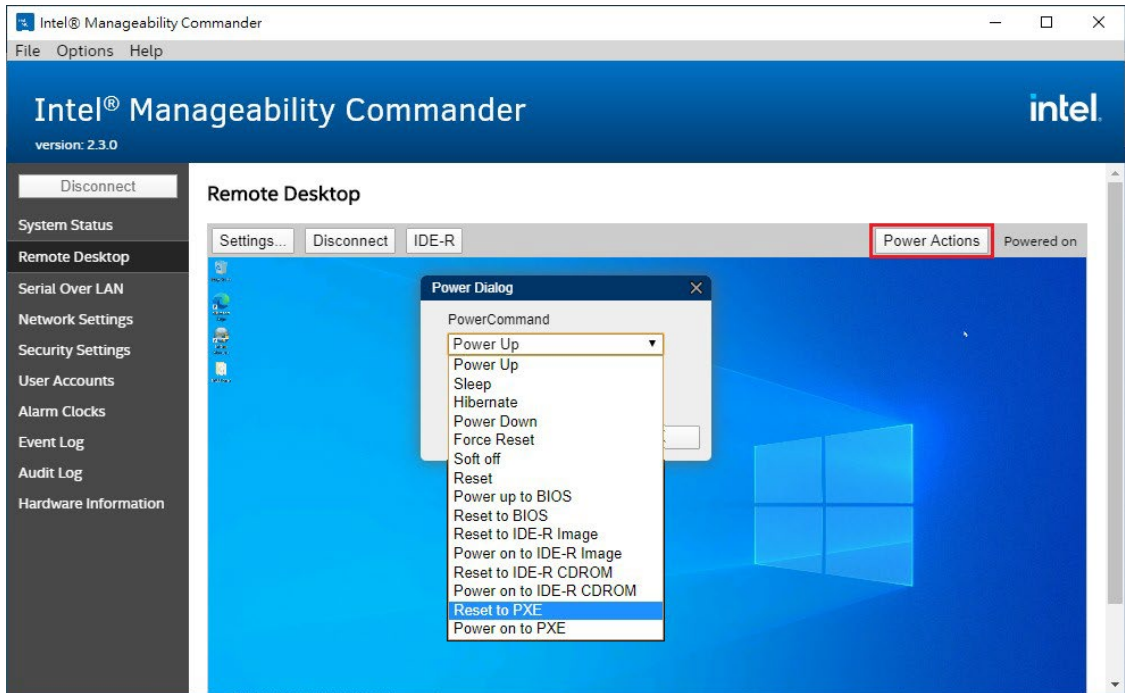
## Resetting to PXE

1. Enable the **Network Stack** and **PXE Boot capability** from BIOS menu of managed device.

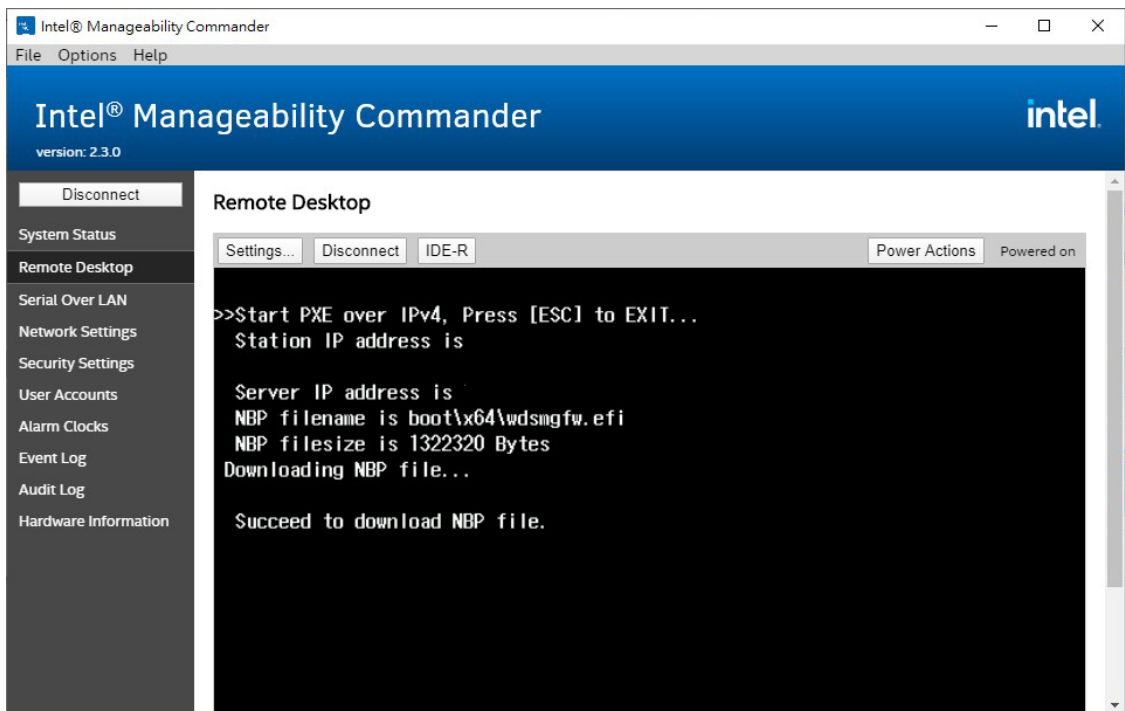




2. Click **Power Actions** and select **Reset to PXE**.



3. The managed device will boot to PXE.



# 7. Unified Write Filter

---

Unified Write Filter (UWF) is an optional Windows 10 feature that helps to protect your drives by intercepting and redirecting any writes to the drive (app installations, settings changes, saved data) to a virtual overlay. The virtual overlay is a temporary location that is usually cleared during a reboot or when a guest user logs off.

UWF provides a clean experience for thin clients and workspaces that have frequent guests, like school, library, or hotel computers. Guests can work, change settings, and install software. After the device reboots, the next guest receives a clean experience. It increases security and reliability for kiosks, IoT-embedded devices, or other devices where new apps are not expected to be frequently added.

This chapter describes how to use the Unified the Write Filter (UWF).

To use the UWF, you must first install the feature and enable it; the default is disable.

The first time you enable UWF on your device, UWF makes the following changes to your system to improve its performance:

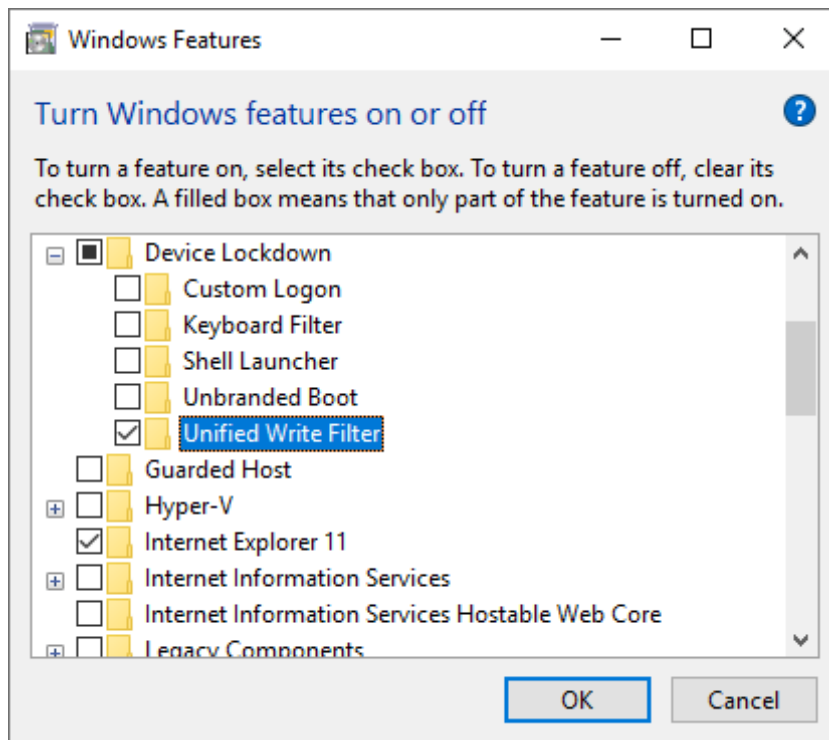
- **Paging files are disabled.**
- **System restore is disabled.**
- **SuperFetch is disabled.**
- **File indexing service is turned off.**
- **Fast boot is disabled.**
- **Defragmentation service is turned off.**
- **BCD setting bootstatuspolicy is set to ignoreallfailures.**

After UWF is enabled, you can select a drive that you want to protect and start using UWF. UWF can help you manage PCs and devices remotely using WMI.

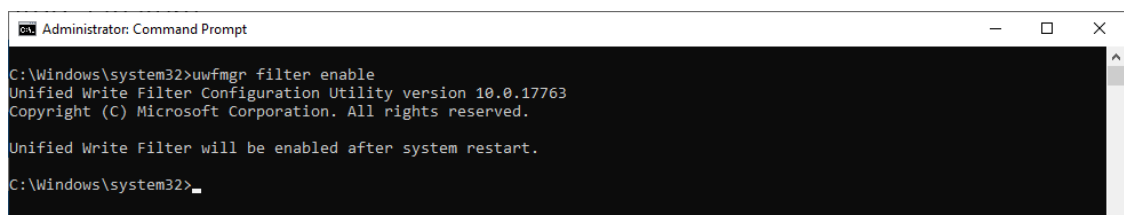
# Turning on UWF on a Running PC

- Install UWF.
  - a. In the Windows **Start** window, type **Turn Windows features on or off**.
  - b. Open the **Windows Features** window and expand the **Device Lockdown** node.
  - c. Select **Unified Write Filter** and click **OK**.
  - d. Windows searches for the required files and displays a progress bar.

Once the files are found, Windows applies the changes. When the changes are complete, a message to this effect is displayed.
  - e. Click **Close**.



- Enable the following filter as an Administrator:  
**cmd uwfmgr filter enable**



- Enable write protection for a drive:  
**cmd uwfmgr.exe volume protect C:**

```
Administrator: Command Prompt
C:\Windows\system32>uwfmgr filter enable
Unified Write Filter Configuration Utility version 10.0.17763
Copyright (C) Microsoft Corporation. All rights reserved.

Unified Write Filter will be enabled after system restart.

C:\Windows\system32>uwfmgr.exe volume protect C:
Unified Write Filter Configuration Utility version 10.0.17763
Copyright (C) Microsoft Corporation. All rights reserved.

The volume C: will be protected by Unified Write Filter after system restart.

C:\Windows\system32>
```

- Restart your computer.
- Confirm that UWF is running:

**cmd uwfmgr.exe get-config**

```
Administrator: Command Prompt
C:\windows\system32>uwfmgr.exe get-config
Unified Write Filter Configuration Utility version 10.0.17763
Copyright (C) Microsoft Corporation. All rights reserved.

Current Session Settings

FILTER SETTINGS
  Filter state: ON
  Pending commit: N/A
  Shutdown pending: No

SERVICING SETTINGS
  Servicing State: OFF

OVERLAY SETTINGS
  Type: RAM
  Maximum size: 1024 MB
  Warning Threshold: 512 MB
  Critical Threshold: 1024 MB
  Freespace Passthrough: OFF
  Persistent: OFF
  Reset Mode: N/A
```

# Installing UWF Using WMI

If you have already installed Windows on your computer and you do not want to use a provisioning package, you can configure UWF by using Windows Management Instrumentation (WMI) providers.

To turn on UWF using WMI, use the **UWF\_Filter** function, specifically the **UWF\_Filter.Enable** method in one of the following ways:

- Use the WMI providers directly in a PowerShell script
- Use the WMI providers directly in an application
- Use the command line tool, uwfmgr.exe

---

## ● NOTE

You must restart your computer after you turn on or turn off UWF for the changes to take effect.

---

You can also change the settings after you turn on UWF. For example, you can move the page file location to an unprotected volume and re-enable paging files.

---

## ● IMPORTANT

If you add UWF to your image by using SMI settings in the unattend.xml file, turning on UWF only sets the bootstatuspolicy BCD setting and turns off the defragmentation service. You must manually turn off the other features and services if you want to increase the performance of UWF.

---

After the device is restarted, UWF maintains configuration settings for the current session in a registry. UWF automatically excludes these registry entries from its filter. Static configuration changes do not take effect until after a device restarts; the changes are saved in registry entries for use in the next session. Dynamic configuration changes occur immediately and persist after a device restarts.

# 8. Driver

Moxa provides verified drivers for all devices on the official website. Go to (<https://www.moxa.com/en/support>) and search for your device (e.g., MC-3201).

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Home > Support

## Support

Find product resources, request support, or send in your product for repair.

### Select a Product Series

--Select--

MC-3201

MC-3201 Series

Software & Documentation

Product Repair Service/RMA

Literature Library

From the **Software & Documentation** page, filter by **Driver** and download the driver package. The driver packages are categorized by OS version, with separate sections for **Peripheral** and **Expansion modules**.

Software & Documentation Product FAQs Security Advisories

### Related Software, Firmware, and Drivers

FILTER Operating System All Driver(4) Software Package(3) Utility(2)

NAME	TYPE	CHECKSUM	VERSION	OPERATING SYSTEM	RELEASE DATE
Driver for MC-3201 Series (wireless for Windows 10 IoT Enterprise LTSC 2021) 143.6 MB	Driver	SHA-512	v1.0	- Windows 10 IoT Enterprise LTSC 2021	May 11, 2023 <a href="#">Release notes</a>
Driver for MC-3201 Series (Peripherals for Windows 10 Enterprise LTSC 21H2) -1.0 bytes	Driver	SHA-512	v1.0	- Windows 10 IoT Enterprise LTSC 2019	May 11, 2023 <a href="#">Release notes</a>
Driver for MC-3201 Series (Peripherals for Windows 10 Enterprise LTSC 2019) 1.2 GB	Driver	SHA-512	v1.0	- Windows 10 IoT Enterprise LTSC 2019	May 11, 2023 <a href="#">Release notes</a>
Driver for MC-3201 Series (Expansion modules for Windows 10 IoT Enterprise LTSC 2019) 157.9 MB	Driver	SHA-512	v1.0	- Windows 10 IoT Enterprise LTSC 2019	May 11, 2023 <a href="#">Release notes</a>

# 9. Utility

This chapter describes the usage of the following:

- **Moxa IO Controller Utility**
- **Serial Interface Utility**
- **Moxa Sort Net Name Utility**

## Where to Find the Utility

The utilities will be preinstalled in the device if the Windows 10 OS is provided by Moxa. If you install Windows 10 by yourself, go to <https://www.moxa.com/en/support> to download the utilities.

On the support page, search for your device (e.g., MC-3201).

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## Support

Find product resources, request support, or send in your product for repair.

### Select a Product Series

--Select--

MC-3201

**MC-3201 Series**

**Software & Documentation**  
Easily find drivers, software, and documentation for a specific product.

**Product Repair Service/RMA**  
Moxa's product repair service centers provide quick, quality service with complete traceability of your product.

**Literature Library**  
Moxa offers a wealth of resources to help you find in-depth information on our products and solutions as well as the technologies that drive them.

From the **Software & Documentation** page, filter by **Utility** and download the installation \*.zip file.



### MC-3201 Series

Compact computers with 11th Gen Intel® Core™ processor, designed for IIoT, AI, and marine applications, -20 to 55°C operating temperature

[GO TO PRODUCT PAGE](#)

Save

[Software & Documentation](#) [Product FAQs](#) [Security Advisories](#)

#### Related Software, Firmware, and Drivers

NAME	TYPE	CHECKSUM	VERSION	OPERATING SYSTEM	RELEASE DATE
Utility for MC-3201 Series (Windows 10 IoT Enterprise LTSC 2021) 5.9 MB	Utility	SHA-512	v1.0	- Windows 10 IoT Enterprise LTSC 2021	May 11, 2023 <a href="#">Release notes</a>
Utility for MC-3201 Series (Windows 10 IoT Enterprise LTSC 2019) 5.1 MB	Utility	SHA-512	v1.0	- Windows 10 IoT Enterprise LTSC 2019	May 11, 2023 <a href="#">Release notes</a>

## Dependent Packages

- Dependent packages must be installed before the utility is installed; you will need to install the **dependent packages** to ensure the smooth operation of the utility.  
Use the following links to download and install the packages.
- Microsoft Visual C++ Redistributable:  
<https://learn.microsoft.com/en-us/cpp/windows/latest-supported-vc-redist?view=msvc-170>
- Microsoft .NET Framework 4.8:  
<https://support.microsoft.com/en-us/topic/microsoft-net-framework-4-8-offline-installer-for-windows-9d23f658-3b97-68ab-d013-aa3c3e7495e0>

## Moxa IO Controller Utility

Moxa IO Controller Utility is used to control the peripheral I/Os as well as the interfaces of expansion modules on the device.

You can use the preinstalled utility or download and install the utility from <https://www.moxa.com/en/support>.

To use the Moxa IO Controller utility, first install the utility and enable the utility to configure the DIO and UART mode settings. After the installation process is complete, run the Windows command prompt as an Administrator and change the path to C:\Program Files\Moxa\Moxa Computer IO Controller.

```
Administrator: Command Prompt
Microsoft Windows [Version 10.0.17763.292]
(c) 2018 Microsoft Corporation. All rights reserved.

C:\Windows\system32>cd /d C:\Program Files\Moxa\Moxa Computer IO Controller
C:\Program Files\Moxa\Moxa Computer IO Controller>
```

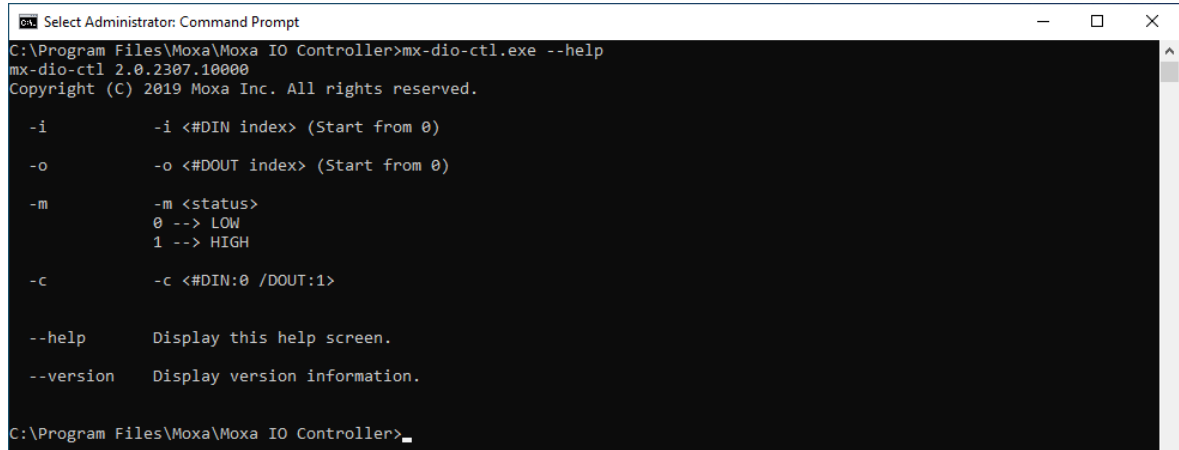


# Setting the DIO Status

Run the **mx-dio-ctl --help** command to see the instructions on using this utility and follow them to get or set the DIO status.

## ● IMPORTANT

The DIN and DOUT indices start at 0. Even though the console output starts at 1, the indices still start at 0.



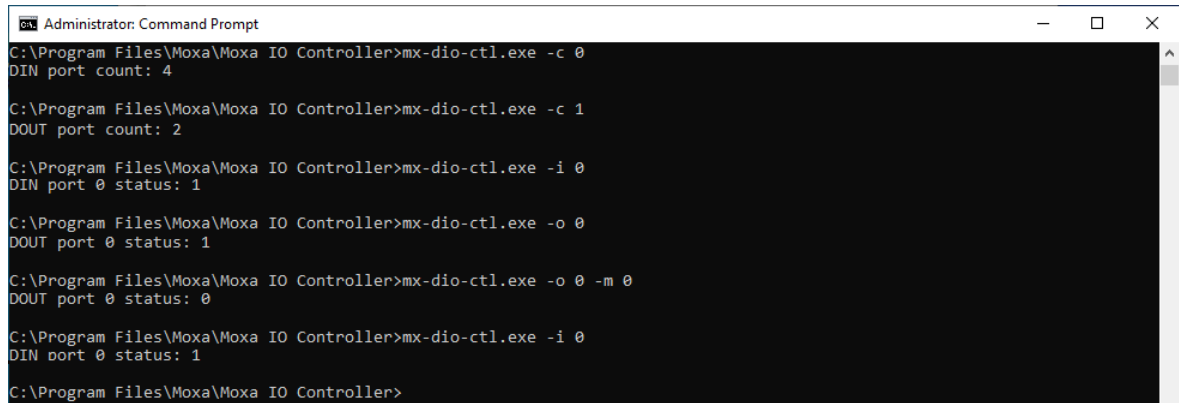
```
Select Administrator: Command Prompt
C:\Program Files\Moxa\Moxa IO Controller>mx-dio-ctl.exe --help
mx-dio-ctl 2.0.2307.10000
Copyright (C) 2019 Moxa Inc. All rights reserved.

-i          -i <#DIN index> (Start from 0)
-o          -o <#DOUT index> (Start from 0)
-m          -m <status>
            0 --> LOW
            1 --> HIGH
-c          -c <#DIN:0 /DOUT:1>

--help     Display this help screen.
--version  Display version information.

C:\Program Files\Moxa\Moxa IO Controller>
```

## Example:



```
Administrator: Command Prompt
C:\Program Files\Moxa\Moxa IO Controller>mx-dio-ctl.exe -c 0
DIN port count: 4

C:\Program Files\Moxa\Moxa IO Controller>mx-dio-ctl.exe -c 1
DOUT port count: 2

C:\Program Files\Moxa\Moxa IO Controller>mx-dio-ctl.exe -i 0
DIN port 0 status: 1

C:\Program Files\Moxa\Moxa IO Controller>mx-dio-ctl.exe -o 0
DOUT port 0 status: 1

C:\Program Files\Moxa\Moxa IO Controller>mx-dio-ctl.exe -o 0 -m 0
DOUT port 0 status: 0

C:\Program Files\Moxa\Moxa IO Controller>mx-dio-ctl.exe -i 0
DIN port 0 status: 1

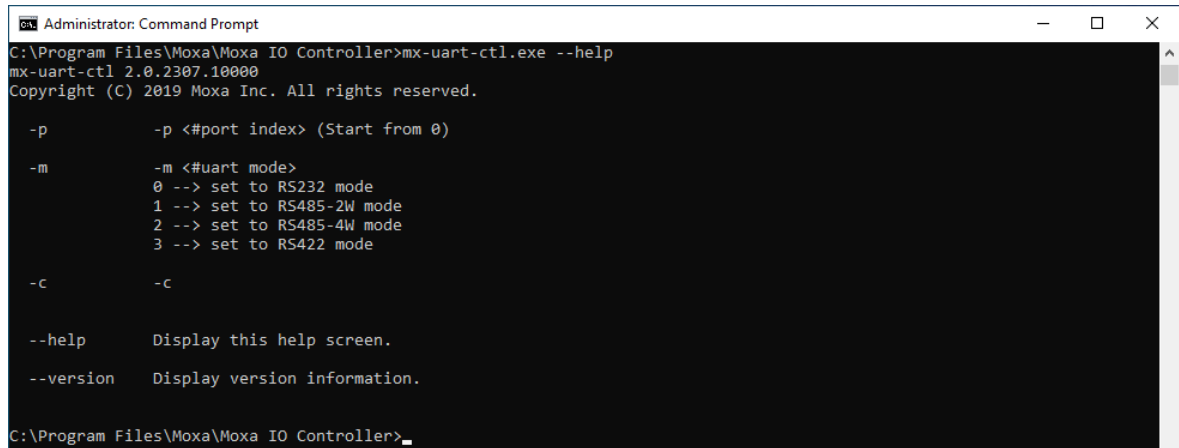
C:\Program Files\Moxa\Moxa IO Controller>
```

## Setting the UART Mode

Run the **mx-uart-ctl --help** command to see instructions on using this utility and follow the onscreen instructions to get or set the UART mode.

### ● IMPORTANT

The UART index starts from 0. Even though the console output starts at 1, the index still starts at 0.



```
Administrator: Command Prompt
C:\Program Files\Moxa\Moxa IO Controller>mx-uart-ctl.exe --help
mx-uart-ctl 2.0.2307.10000
Copyright (C) 2019 Moxa Inc. All rights reserved.

-p          -p <#port index> (Start from 0)

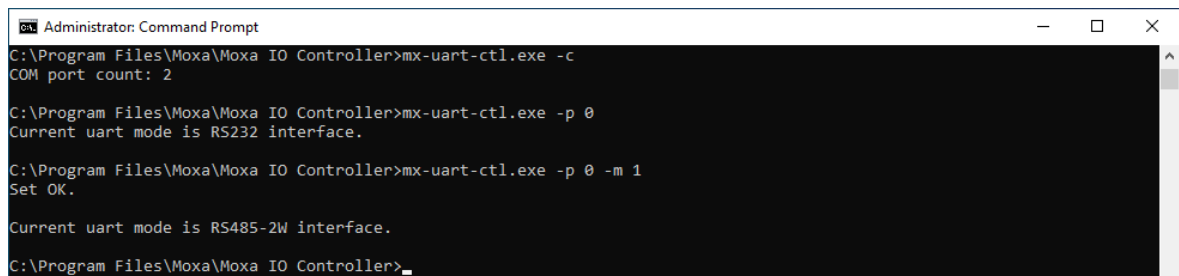
-m          -m <#uart mode>
            0 --> set to RS232 mode
            1 --> set to RS485-2W mode
            2 --> set to RS485-4W mode
            3 --> set to RS422 mode

-c          -c

--help     Display this help screen.
--version  Display version information.

C:\Program Files\Moxa\Moxa IO Controller>
```

### Example:



```
Administrator: Command Prompt
C:\Program Files\Moxa\Moxa IO Controller>mx-uart-ctl.exe -c
COM port count: 2

C:\Program Files\Moxa\Moxa IO Controller>mx-uart-ctl.exe -p 0
Current uart mode is RS232 interface.

C:\Program Files\Moxa\Moxa IO Controller>mx-uart-ctl.exe -p 0 -m 1
Set OK.

Current uart mode is RS485-2W interface.

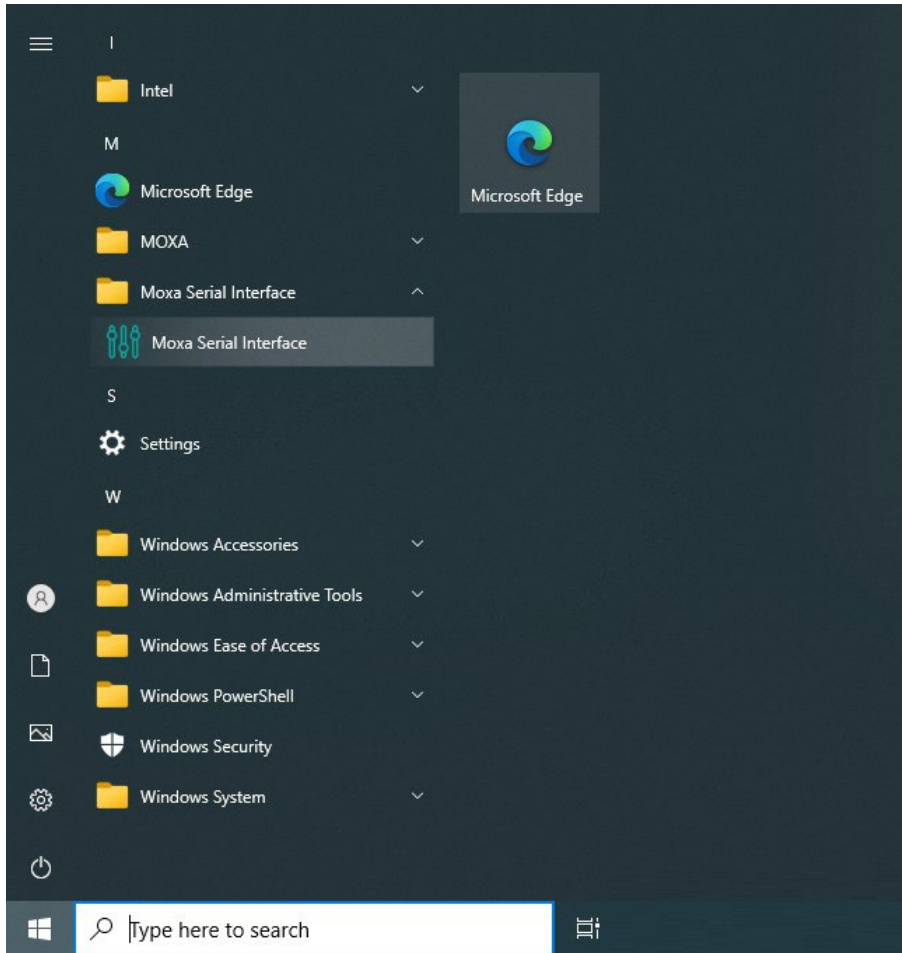
C:\Program Files\Moxa\Moxa IO Controller>
```

# Moxa Serial Interface Utility

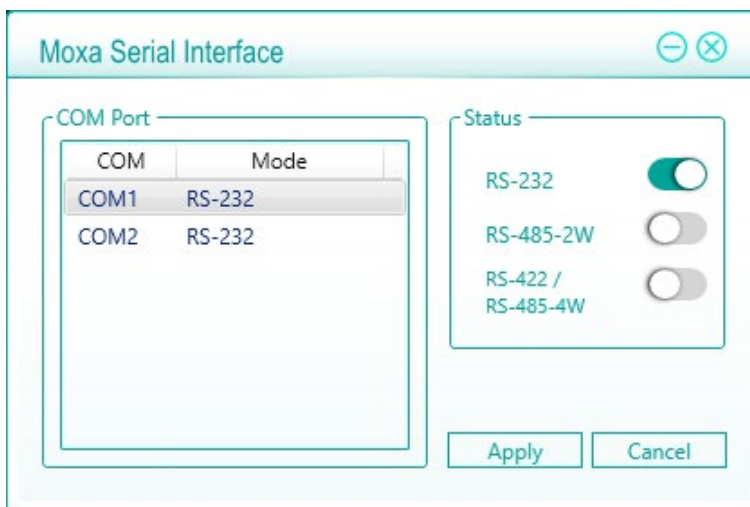
In this section, we describe how to use the Moxa Serial Interface utility to set the UART mode in your computer's serial interface.

## Setting the Serial Port Mode

1. Install the Moxa Serial Interface utility.
2. From the Windows Start menu, run the **Moxa Serial Interface utility**.



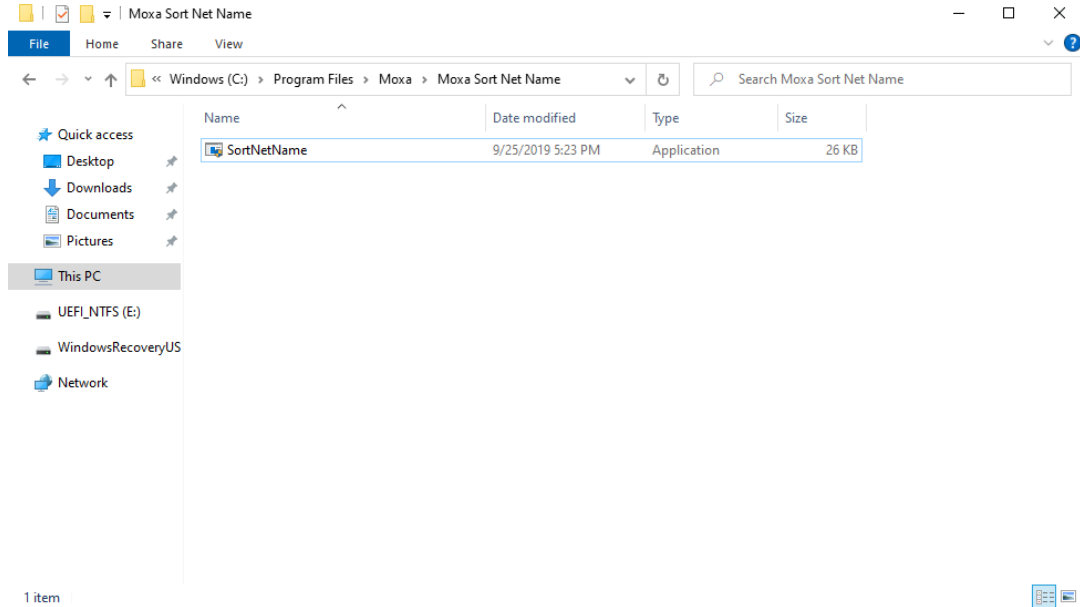
3. Select the target COM port and UART mode and click **Apply** to save the settings.



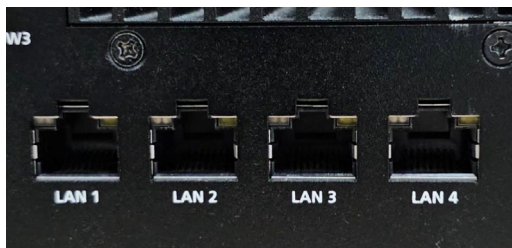
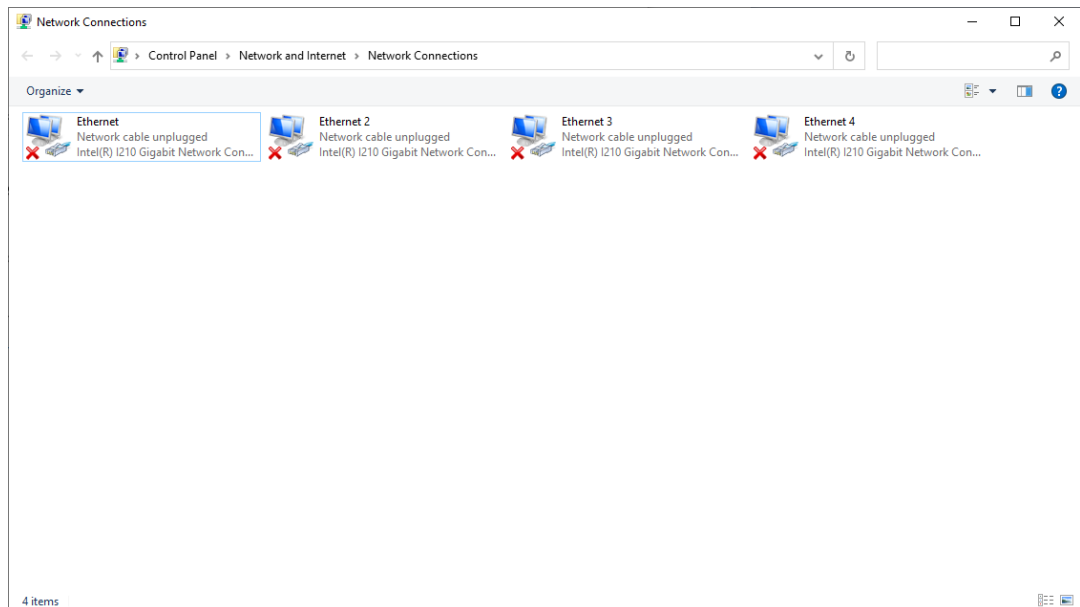
# Moxa Sort Net Name Utility

In this section, we describe how to use the Moxa Sort Net Name utility to rename Ethernet adapter for mapping physical LAN port order on chassis.

1. Install the **Moxa Sort Net Name** utility.
2. After the installation process is complete, run the **SortNetName.exe** from **C:\Program Files\Moxa\Moxa Sort Net Name** as an Administrator.



3. If you want to rename the Ethernet adapter, wait for the installation process to complete. The order of the Ethernet adapter will correspond to the order of the label (e.g., **LAN 2** of the computer is mapped to **Ethernet 2** in Windows).



# 10. IO Control API

This chapter describes how to use the IO Control API.

## Downloading the API

1. Go to <https://www.moxa.com/en/support>.
2. Select your product series (e.g., DA-820).

The screenshot shows the Moxa website's support page. At the top, there is a navigation bar with links for Products, Solutions, Support, How to Buy, and About Us. Below this is a teal header with the word 'Support' and a sub-header 'Find product resources, request support, or send in your product for repair.' The main content area features a 'Select a Product Series' section with a dropdown menu. The dropdown is open, showing 'DA-820' as the selected option. Below the dropdown, there are three columns of content: 'Downloads' with a download icon, 'Service/RMA' with a gear icon, and 'Resources' with a book icon.

3. Download the related files.

The screenshot shows the Moxa product page for the DA-820 Series. On the left is a photograph of the DA-820 device. To the right, the product name 'DA-820 Series' is displayed above a brief description: '3U 19-inch IEC 61850 native PRP/HSR computer with Intel® Celeron®, Core™ i3 or i7 CPU'. Below this is an orange 'GO TO PRODUCT PAGE' button and a 'Save' icon. The page also features a navigation bar with 'Software & Documentation', 'Product FAQs', and 'Security Advisories'. The main content area is titled 'Related Software, Firmware, and Drivers' and includes a filter dropdown set to 'Operating System'. Below the filter is a table with columns for NAME, TYPE, VERSION, OPERATING SYSTEM, and RELEASE DATE. The table lists three items: a Library for DA-820 Series (Windows 7 Example), a Driver for DA-820 Series (Peripheral for Linux), and a Driver for DA-820 Series (Linux). Each row has a download icon and a 'SHOW ALL' button at the bottom.

NAME	TYPE	VERSION	OPERATING SYSTEM	RELEASE DATE
Library for DA-820 Series (Windows 7 Example) 499.9 KB	Library	v1.0		Jan 29, 2015
Driver for DA-820 Series (Peripheral for Linux) 651.6 KB	Driver	v1.0		Jan 22, 2015
Driver for DA-820 Series (Linux) 318.5 KB	Driver	v1.0		Jan 22, 2015

# Supported Series

## mxdgio

- **BXP-A100 Series**
- **BXP-C100 Series**
- **RKP-A110 Series**
- **RKP-C110 Series**

## mxsp

- **BXP-A100 Series**
- **BXP-C100 Series**
- **DRP-A100 Series**
- **DRP-C100 Series**
- **RKP-A110 Series**
- **RKP-C110 Series**

## mxwdg

- **BXP-A100 Series**
- **BXP-C100 Series**
- **DRP-A100 Series**
- **DRP-C100 Series**
- **RKP-A110 Series**
- **RKP-C110 Series**

# mxdgio

The **mxdgio** library operates on the digital I/Os and consists of the following:

- **GetDinCount**
- **GetOutCount**
- **GetDinStatus**
- **GetDoutStatus**
- **SetDoutStatus**

## GetDinCount

### Syntax

```
int GetDinCount();
```

### Description

Get the numbers of a digital input port.

### Parameters

N/A.

### Return Value

The numbers of the digital input port.

### Error codes

The following error codes can be retrieved using the **DIO\_STATUS** function.

Name	Value	Meaning
LIB_INITIALIZE_FAIL	-1	The mxdgio library initialization failed. Cannot open the json profile.

### Requirements

Name	Items
Header	mxdgio.h
Library	mxdgio.lib
DLL	mxdgio.dll
Profile	MxdgioProfile[ <i>ModelName</i> ].json

# GetDoutCount

## **Syntax**

```
int GetDoutCount();
```

## **Description**

Get the numbers of a digital output port.

## **Parameters**

N/A.

## **Return Value**

The numbers of the digital output port.

## **Error codes**

The following error codes can be retrieved using the **DIO\_STATUS** function.

Name	Value	Meaning
LIB_INITIALIZE_FAIL	-1	The mxdgio library initialization failed. Cannot open json profile.

## **Requirements**

Name	Items
Header	mxdgio.h
Library	mxdgio.lib
DLL	mxdgio.dll
Profile	MxdgioProfile[ModelName].json

# GetDinStatus

## **Syntax**

```
int GetDinStatus(int port);
```

## **Description**

Gets the status of a digital input port.

## **Parameters**

*port*: The index of the digital input port; starts at 0.

## **Return Value**

The status of the digital input port; 0 for low and 1 for high.

## **Error codes**

The following error codes can be retrieved using the **DIO\_STATUS** function.

Name	Value	Meaning
LIB_INITIALIZE_FAIL	-1	The mxdgio library initialization failed. Cannot open json profile.
PORT_OUTOF_INDEX	-2	Target port index is out of range.

## **Requirements**

Name	Items
Header	mxdgio.h
Library	mxdgio.lib
DLL	mxdgio.dll
Profile	MxdgioProfile[ModelName].json



# GetDoutStatus

## **Syntax**

```
int GetDoutStatus(int port);
```

## **Description**

Gets the status of a digital output port.

## **Parameters**

*port*: The index of the digital output port; starts at 0.

## **Return Value**

The status of the digital output port; 0 for low and 1 for high.

## **Error codes**

The following error codes can be retrieved using the **DIO\_STATUS** function.

Name	Value	Meaning
LIB_INITIALIZE_FAIL	-1	The mxduino library initialization failed. Cannot open json profile.
PORT_OUTOF_INDEX	-2	Target port index is out of range.

## **Requirements**

Name	Items
Header	mxduino.h
Library	mxduino.lib
DLL	mxduino.dll
Profile	MxduinoProfile[ModelName].json

# SetDoutStatus

## **Syntax**

```
int SetDoutStatus(int port, int status);
```

## **Description**

Sets the status of a digital output port.

## **Parameters**

*port*: The index of the digital output port; starts at 0.

*status*: The status of the digital output port; 0 for low and 1 for high.

## **Return Value**

Returns the value 0 if the digital output status is successfully set.

## **Error codes**

The following error codes can be retrieved using the **DIO\_STATUS** function.

Name	Value	Meaning
LIB_INITIALIZE_FAIL	-1	The mxduino library initialization failed. Cannot open json profile.
PORT_OUTOF_INDEX	-2	Target port index is out of range.
SET_STATUS_ERR	-3	Status setting failed or is defined using a bad format.

## **Requirements**

Name	Items
Header	mxduino.h
Library	mxduino.lib
DLL	mxduino.dll
Profile	MxduinoProfile[ModelName].json

# mxsp

The mxsp library operates on the serial port and consists of the following:

- **GetUartCount**
- **GetUartMode**
- **SetUartMode**

## GetUartCount

### **Syntax**

```
int GetUartCount();
```

### **Description**

Gets the numbers of the UART port.

### **Parameters**

N/A

### **Return Value**

The numbers of the UART port.

### **Error codes**

The following error codes can be retrieved using the **UART\_STATUS** function.

<b>Name</b>	<b>Value</b>	<b>Meaning</b>
LIB_INITIALIZE_FAIL	-1	The mxsp library initialization failed. Cannot open json profile.

### **Requirements**

<b>Name</b>	<b>Items</b>
Header	mxsp.h
Library	mxsp.lib
DLL	mxsp.dll
Profile	MxspProfile[ <i>ModelName</i> ].json

# GetUartMode

## **Syntax**

```
int GetUartMode(int port);
```

## **Description**

Gets the status of the UART port.

## **Parameters**

*port*: The index of the UART port; starts at 0.

## **Return Value**

The mode of a UART interface; 0 for RS-232, 1 for RS-485-2W, and 2 for RS-422/RS-485-4W.

## **Error codes**

The following error codes can be retrieved using the **UART\_STATUS** function.

Name	Value	Meaning
LIB_INITIALIZE_FAIL	-1	The mxsp library initialization failed. Cannot open json profile.
PORT_OUTOF_INDEX	-2	Target port index is out of range.

## **Requirements**

Name	Items
Header	mxsp.h
Library	mxsp.lib
DLL	mxsp.dll
Profile	MxspProfile[ModelName].json

# SetUartMode

## **Syntax**

```
int SetUartMode(int port, int mode);
```

## **Description**

Sets the status of the UART port.

## **Parameters**

*port*: The index of the UART port; starts at 0.

*mode*: The mode of a UART interface; 0 for RS-232, 1 for RS-485-2W, and 2 for RS-422/RS-485-4W.

## **Return Value**

Returns 0 if the UART mode is successfully set.

## **Error codes**

The following error codes can be retrieved using the **UART\_STATUS** function.

Name	Value	Meaning
LIB_INITIALIZE_FAIL	-1	The mxsp library initialization failed. Cannot open json profile.
PORT_OUTOF_INDEX	-2	Target port index is out of range.
SET_STATUS_ERR	-3	Status setting failed or is defined using a bad format.
NOT_SUPPORT_MODE	-4	Target mode is not supported for this port.

## **Requirements**

Name	Items
Header	mxsp.h
Library	mxsp.lib
DLL	mxsp.dll
Profile	MxspProfile[ModelName].json

# mxwdg

The mxwdg library operates on the relay output and consists of the following:

- **mxwdg\_open**
- **mxwdg\_refresh**
- **mxwdg\_close**

## mxwdg\_open

### **Syntax**

```
PVOID mxwdg_open(unsigned long time);
```

### **Description**

Initializes the watchdog timer.

### **Parameters**

*time*: The interval in seconds at which the watchdog timer is refreshed.

### **Return Value**

Returns the pointer to the watchdog handle; returns -1 on failure to initialize the watchdog timer.

### **Requirements**

Name	Items
Header	mxwdg.h
Library	mxwdg.lib
DLL	mxwdg.dll

## mxwdg\_refresh

### **Syntax**

```
int mxwdg_refresh(PVOID fd);
```

### **Description**

Refreshes the watchdog timer.

### **Parameters**

*fd*: The handle of the watchdog timer.

### **Return Value**

Returns 0 on success; otherwise, the function has failed.

### **Requirements**

Name	Items
Header	mxwdg.h
Library	mxwdg.lib
DLL	mxwdg.dll

# mxwdg\_close

## **Syntax**

```
void mxwdg_close(PVOID fd);
```

## **Description**

Disables the watchdog timer.

## **Parameters**

*fd*: The handle of the watchdog timer.

## **Return Value**

This function does not return a value.

## **Requirements**

<b>Name</b>	<b>Items</b>
Header	mxwdg.h
Library	mxwdg.lib
DLL	mxwdg.dll

# 11. System Backup and Restore

This chapter describes the usage of the following for system backup and restoration.

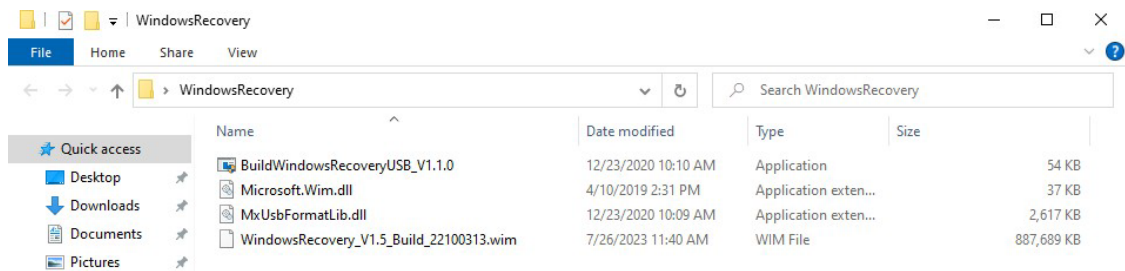
- **WindowsRecovery**

## WindowsRecovery

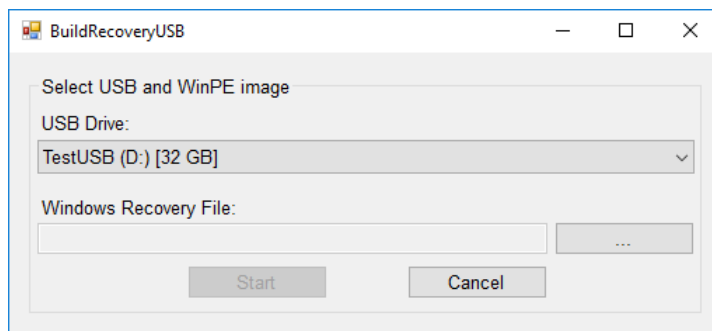
WindowsRecovery is an OS image backup and restore program for system deployment, backup, and recovery. You will first need to create a WindowsRecovery USB disk. This WindowsRecovery disk can only be used to boot a **UEFI BIOS** machine. This chapter describes the setup process of the Windows Recovery function.

## Preparing the USB device

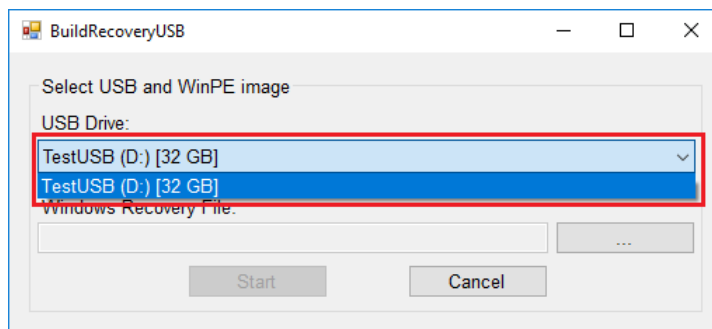
1. Contact a Moxa technical staff and get the required file.



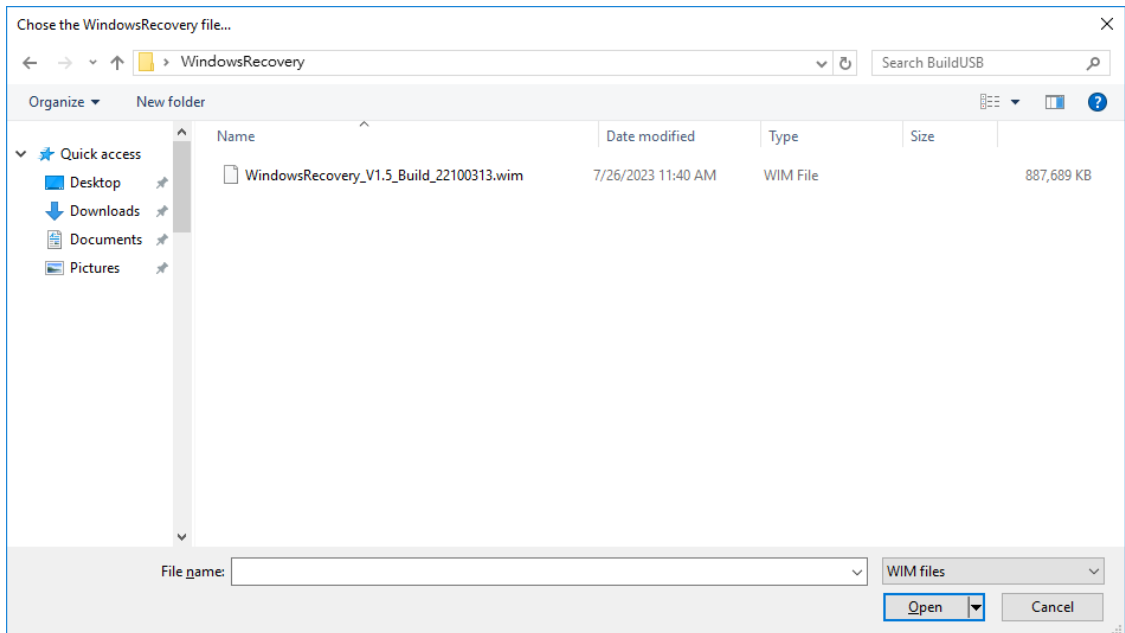
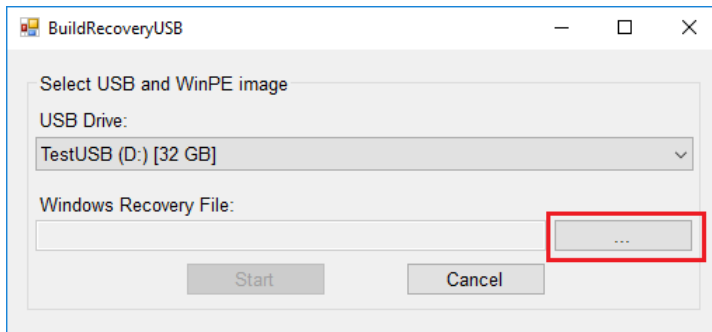
2. Run the **BuildWindowsRecoveryUSB\_V1.1.0.exe**.



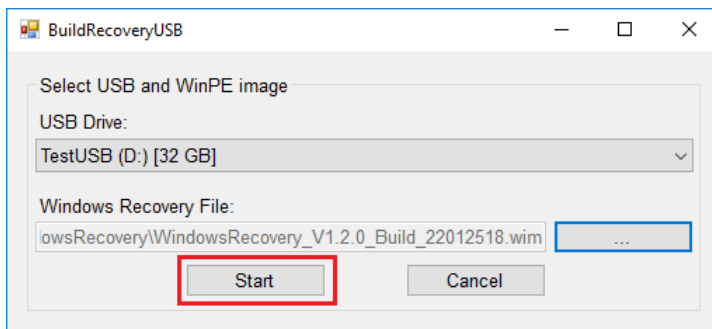
3. Select the USB drive to format.



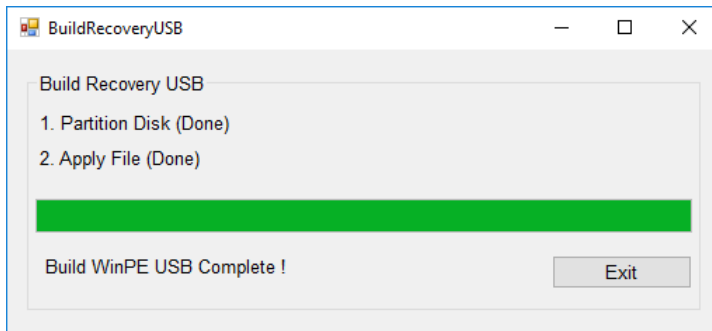
4. Click ... to select a .wim file from the folder.



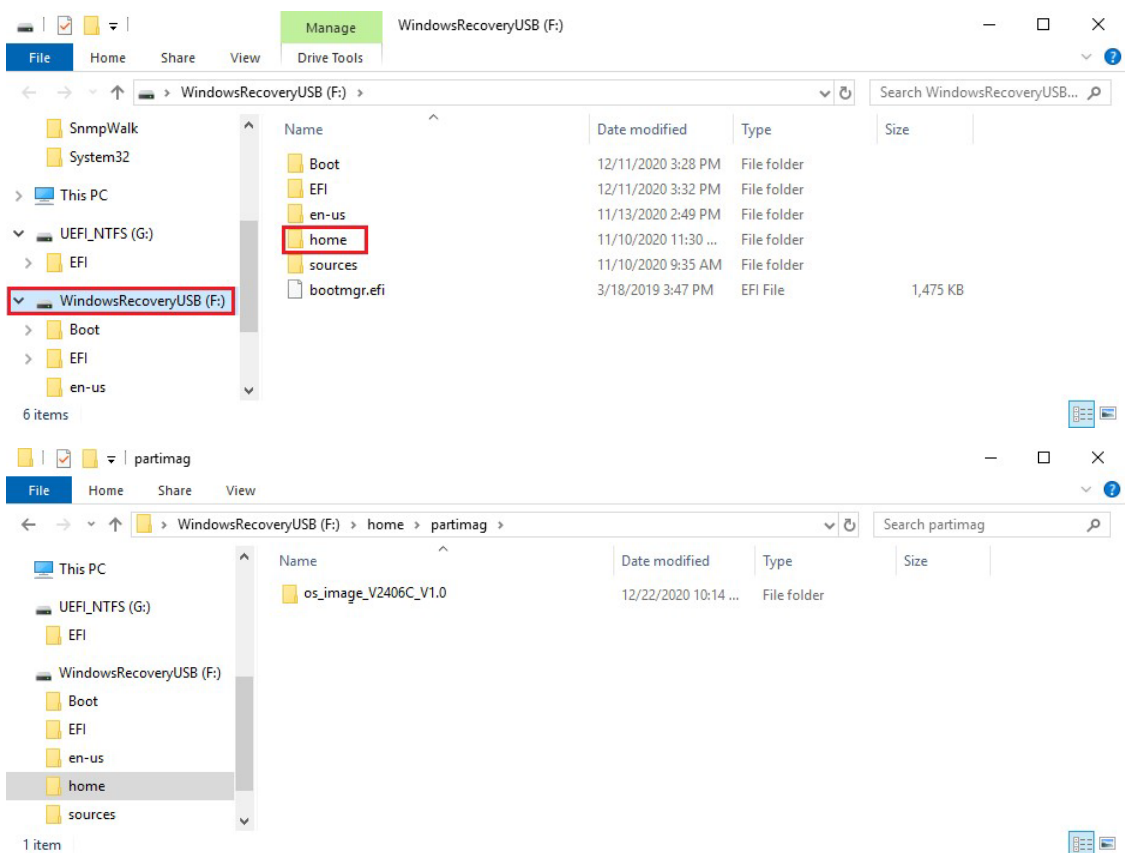
5. Click **Start** and make sure the selected USB disk is formattable. Click **Yes** to start creating the recovery USB.



- Wait for the process to finish.  
The program will format the USB device and create a UEFI bootable volume and a WinPE volume. You may see additional windows about folder information; do not close these. You can close the windows after the process finishes.



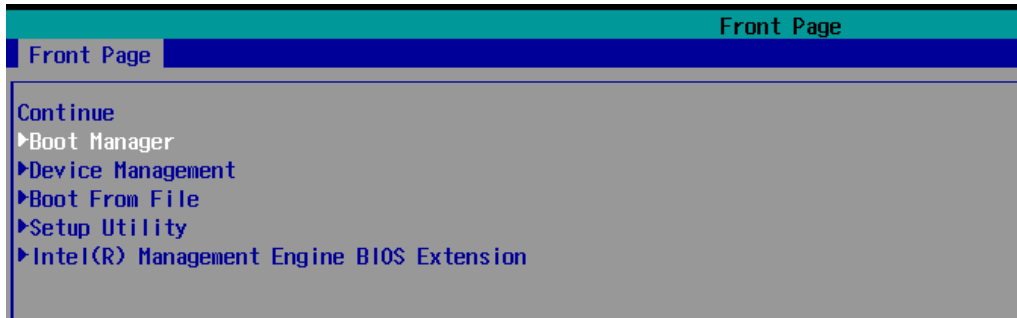
- To create a recovery USB disk with the Windows 10 image, copy the **os\_image\_ModelName** directory to the **\home\partimag** folder in the USB drive.



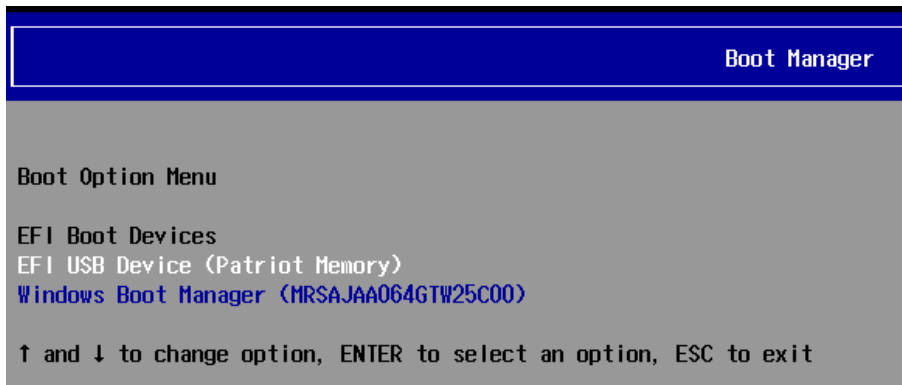


# Booting From the USB Disk

1. Turn on the computer and press **F2** when you hear the beep sound to enter the BIOS setup menu, select **Boot Manager** and press **Enter** to continue.



2. Select the **EFI USB Device** on the computer and press **Enter** to continue to boot from the USB device.



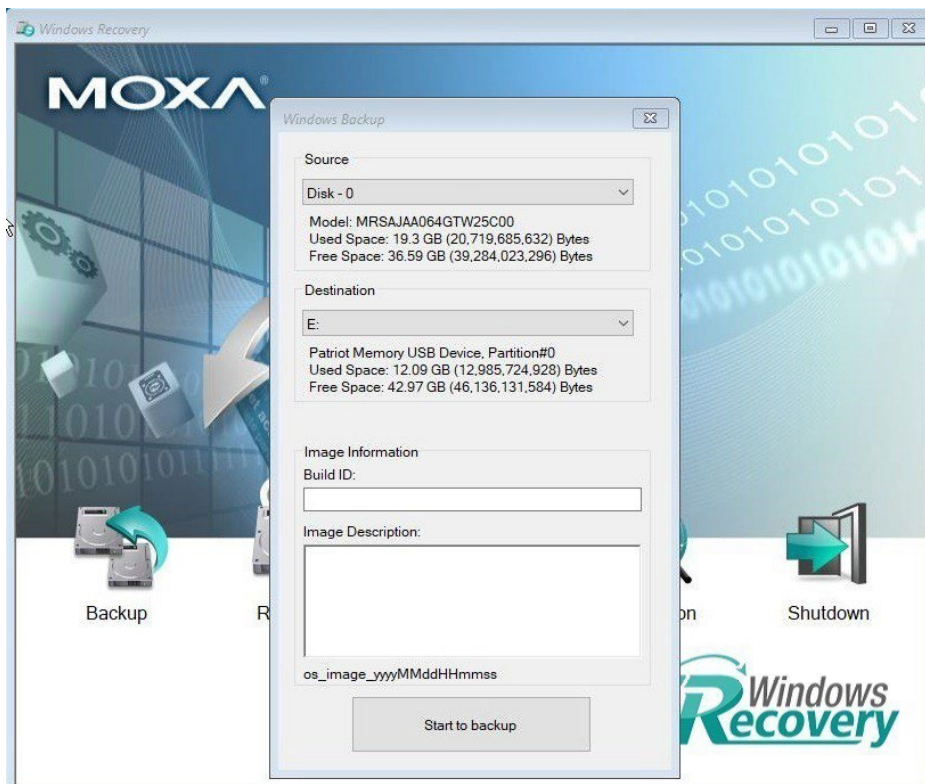
# System Image Backup

To back up the image from the USB disk, run **Windows Preinstallation Environment(WinPE)** and the **Windows Recovery utility** will display. Follow these steps.

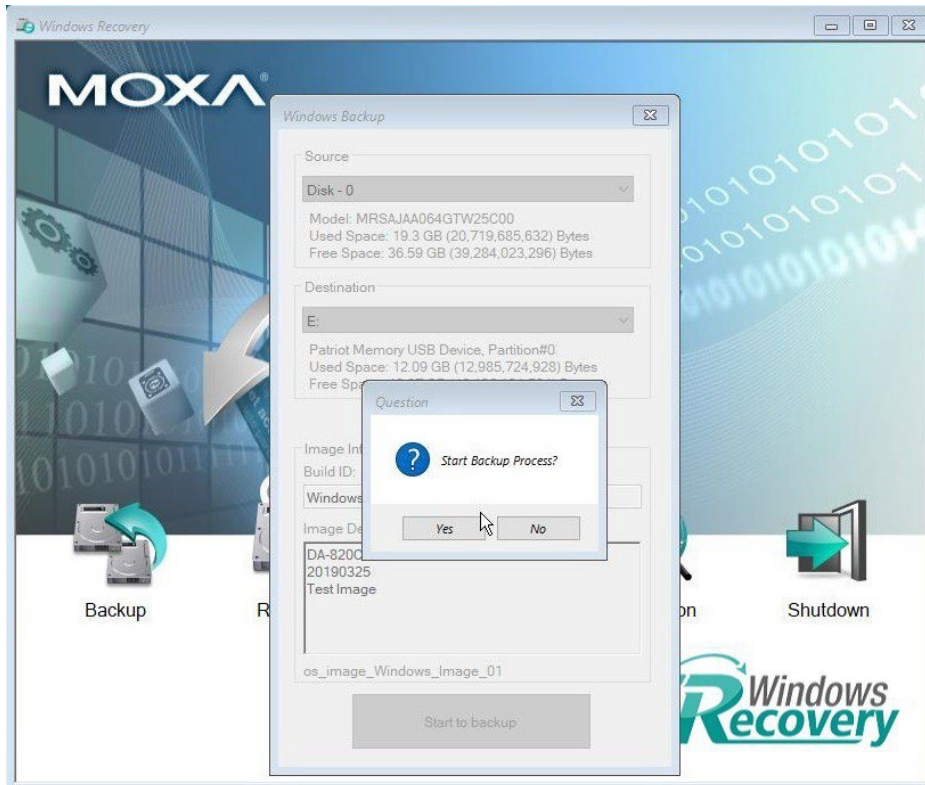
1. Click **Backup**.



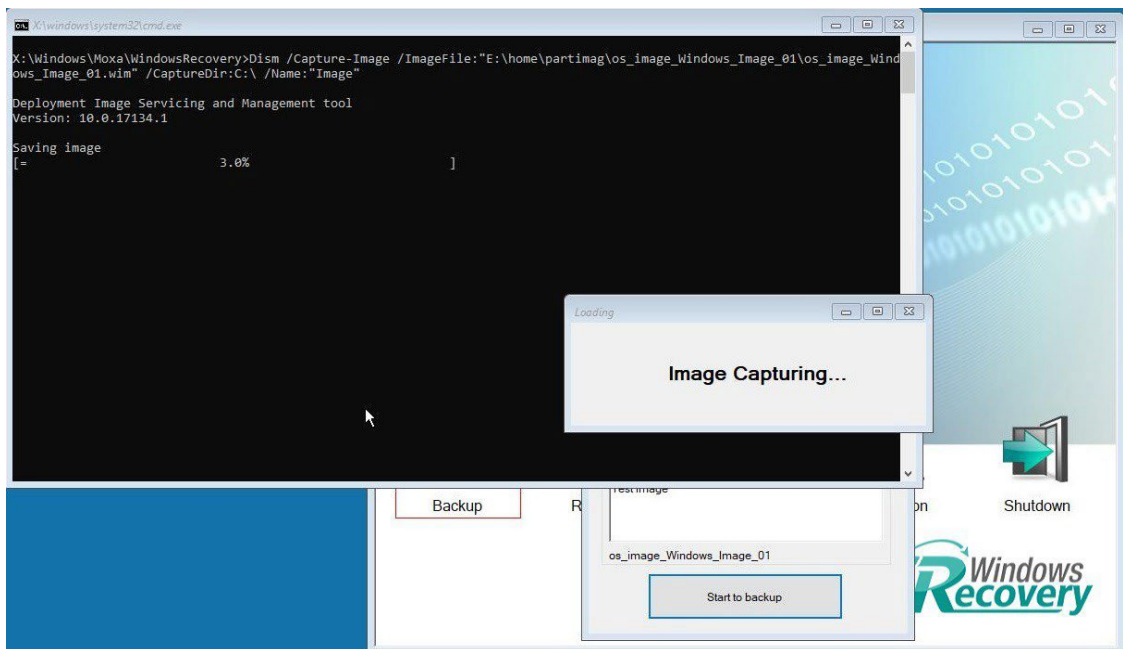
2. Select the **Source disk** to backup and **Destination USB** to store the OS image, also give an image name and description. Click **Start to backup**.



3. Click **Yes** to continue.



4. Wait for the backup process to complete.



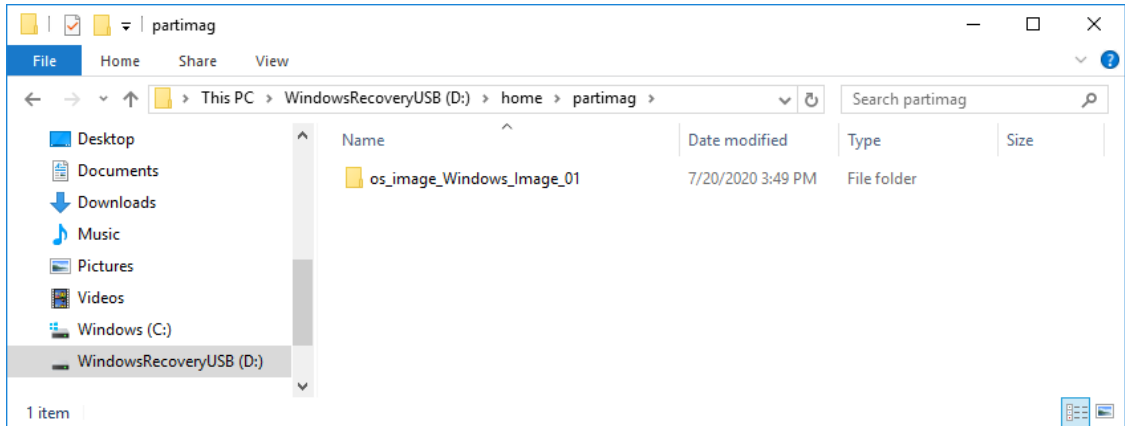
5. When the process is done, click **OK**.



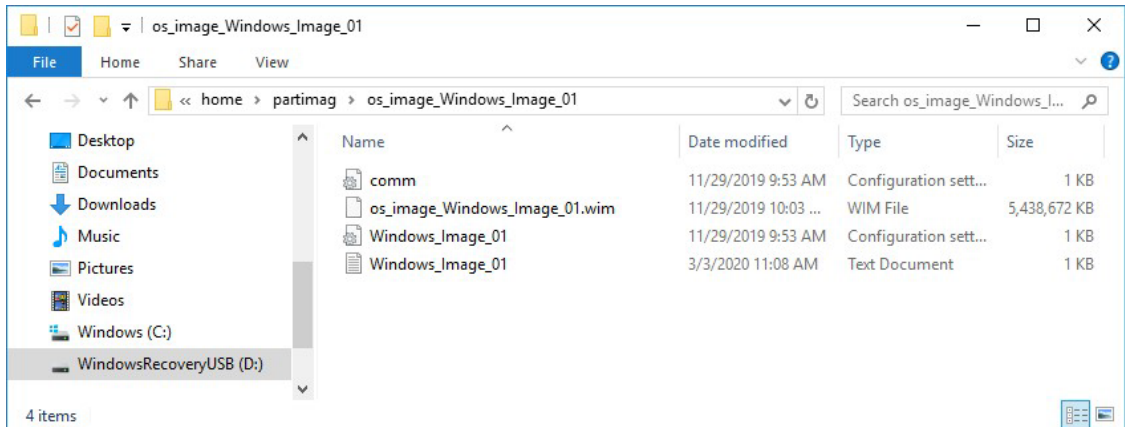
6. Click **OK**, the computer will shut down.



7. The OS image will be saved in the USB disk at **home\partimag**.



8. In the **os\_image** folder you can view the backup information and the image files.



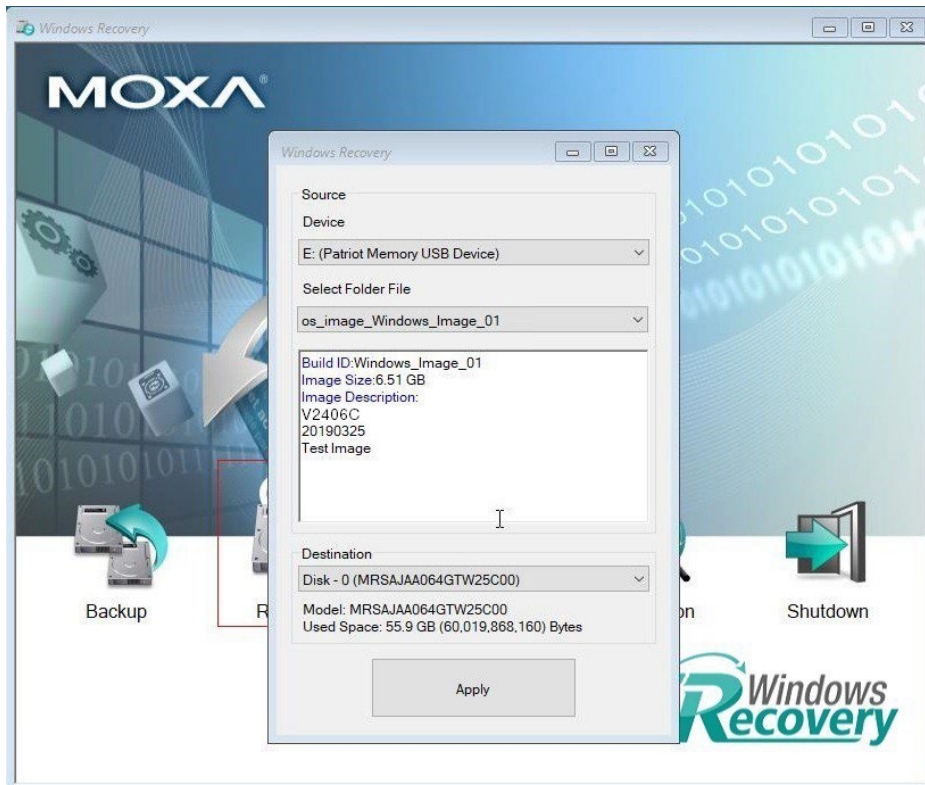
# Restoring the System From a Backup

To restore the image, run the **Windows Preinstallation Environment(WinPE)** and the **Windows Recovery utility** will display. Follow these steps.

1. Click **Recovery**.



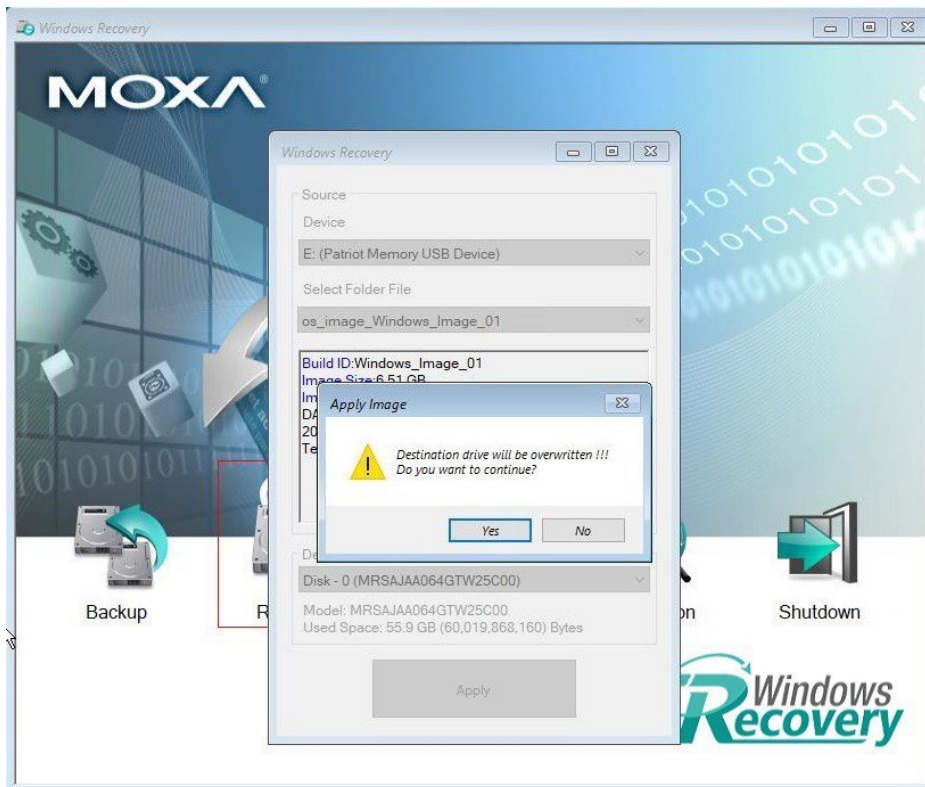
2. Select the **Source USB Device, Image Folder File** and check the image information, select the **Destination Disk** to restore. Click **Apply**.



3. Click **Yes** to continue the process.



4. Click **Yes** to overwrite the destination drive.



5. Wait for the process to complete.



6. Click **OK**.





7. Click **OK**, the system will shut down.



## ● NOTE

When you restart the computer, you will need to wait about 5 minutes for the computer to go through two cycles of the reboot process. The system configuration files will be initiated during the first boot-up process. Do not turn off or shut down the computer while the system is restarting.