DRP/BXP/RKP Series Windows 10 IoT Enterprise LTSC 2021 Manual

Version 1.3, November 2025

www.moxa.com/products

DRP/BXP/RKP Series Windows 10 IoT Enterprise LTSC 2021 Manual

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1. Introduction

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.

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.

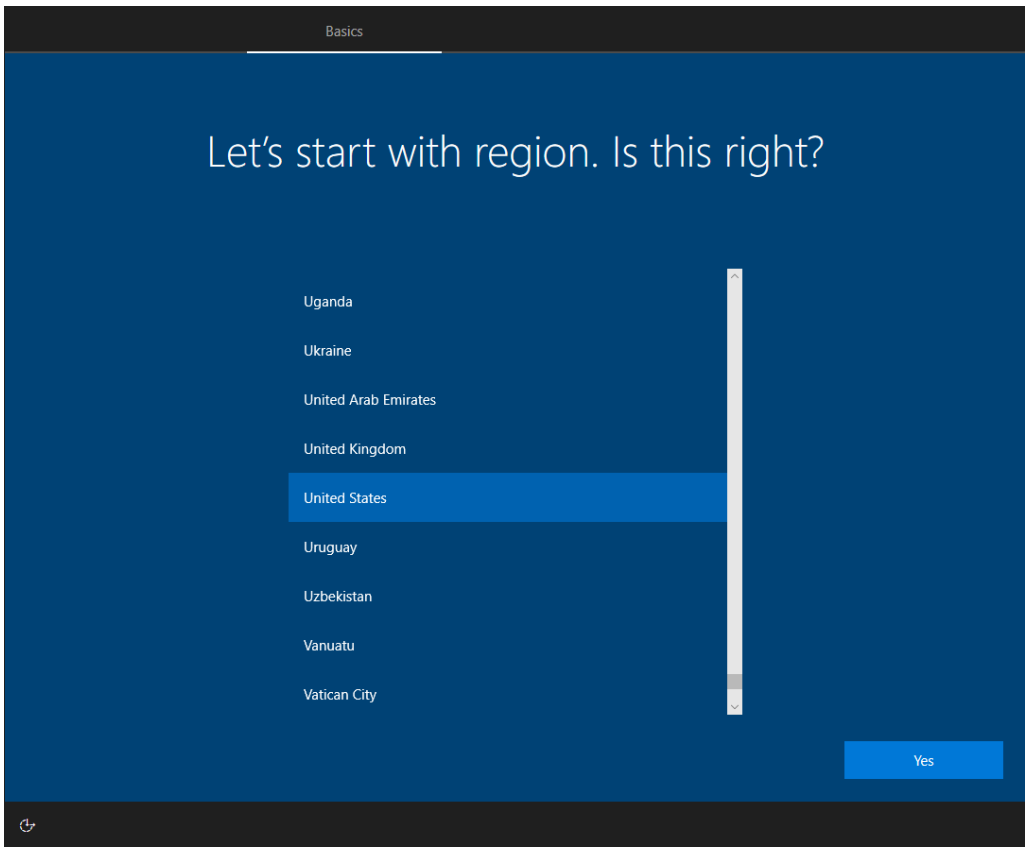
2. System Initialization

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.

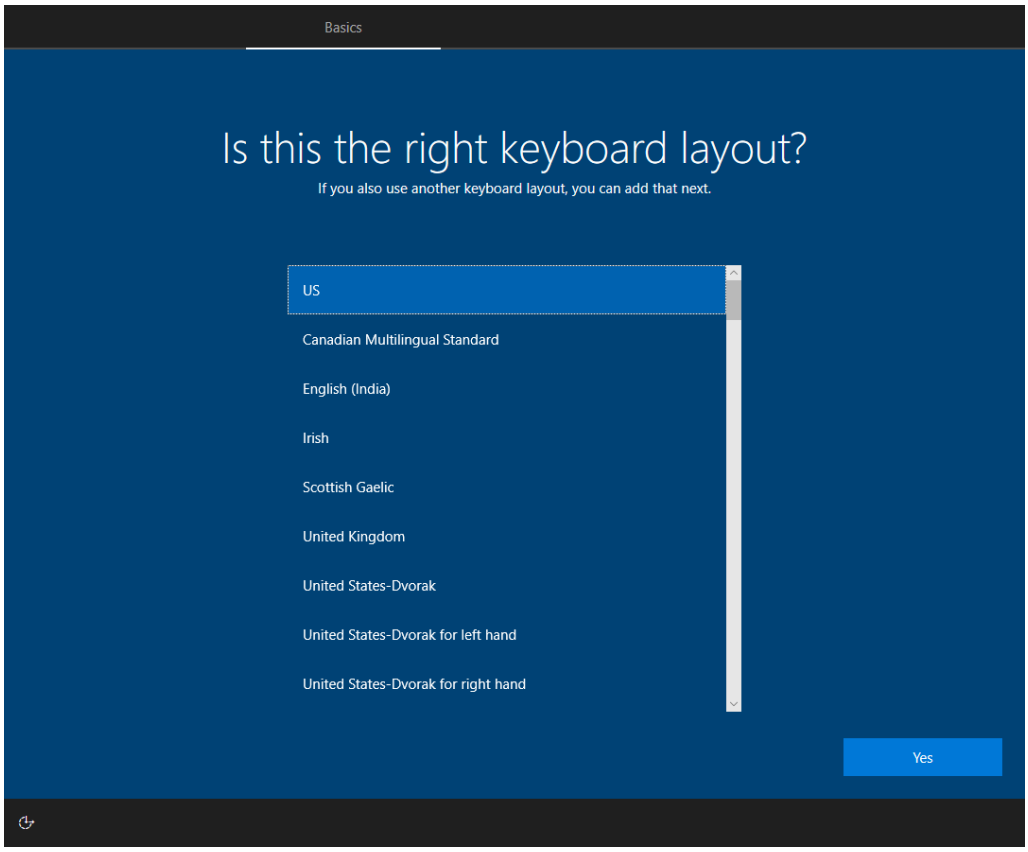
Initializing User Settings

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

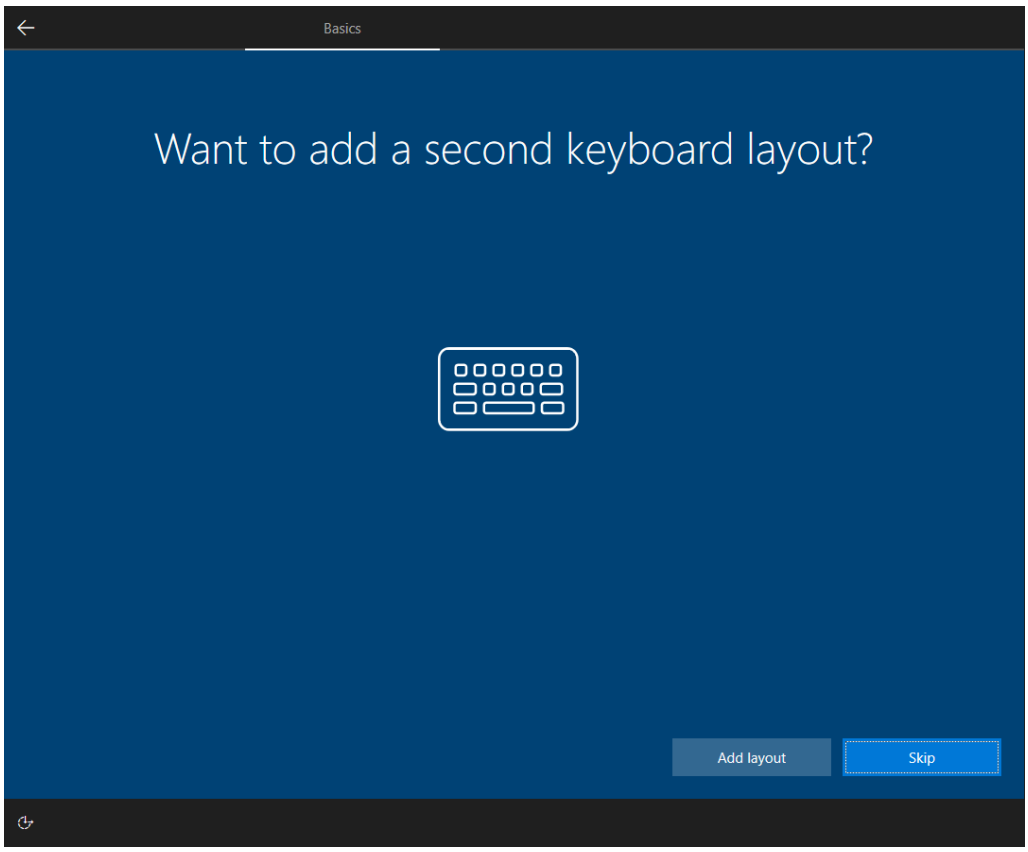
1. Select a region.



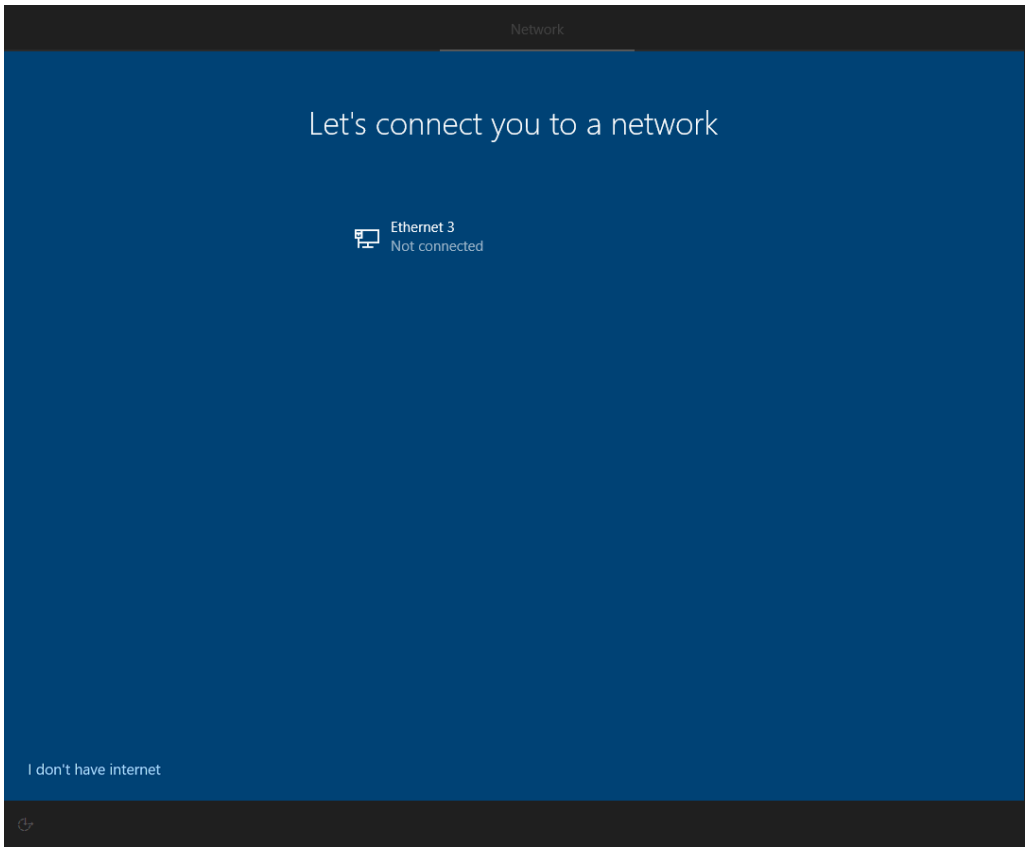
2. Select a keyboard.

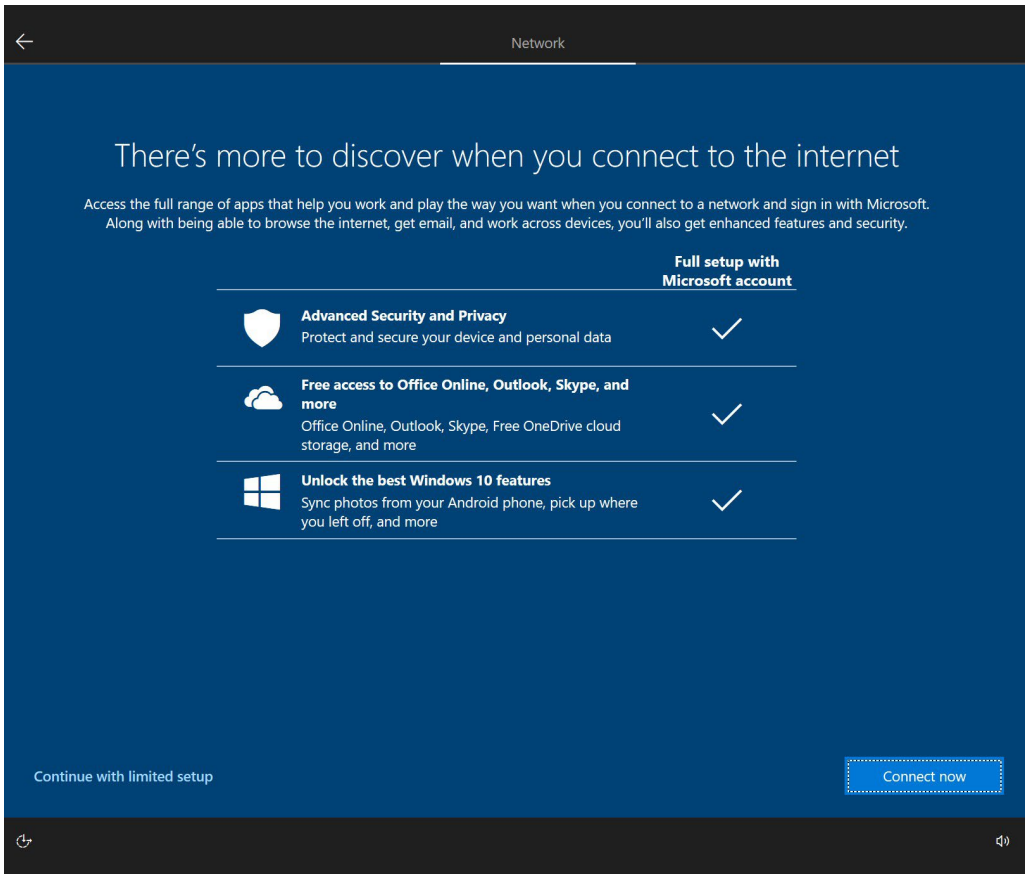


3. Select a second keyboard.

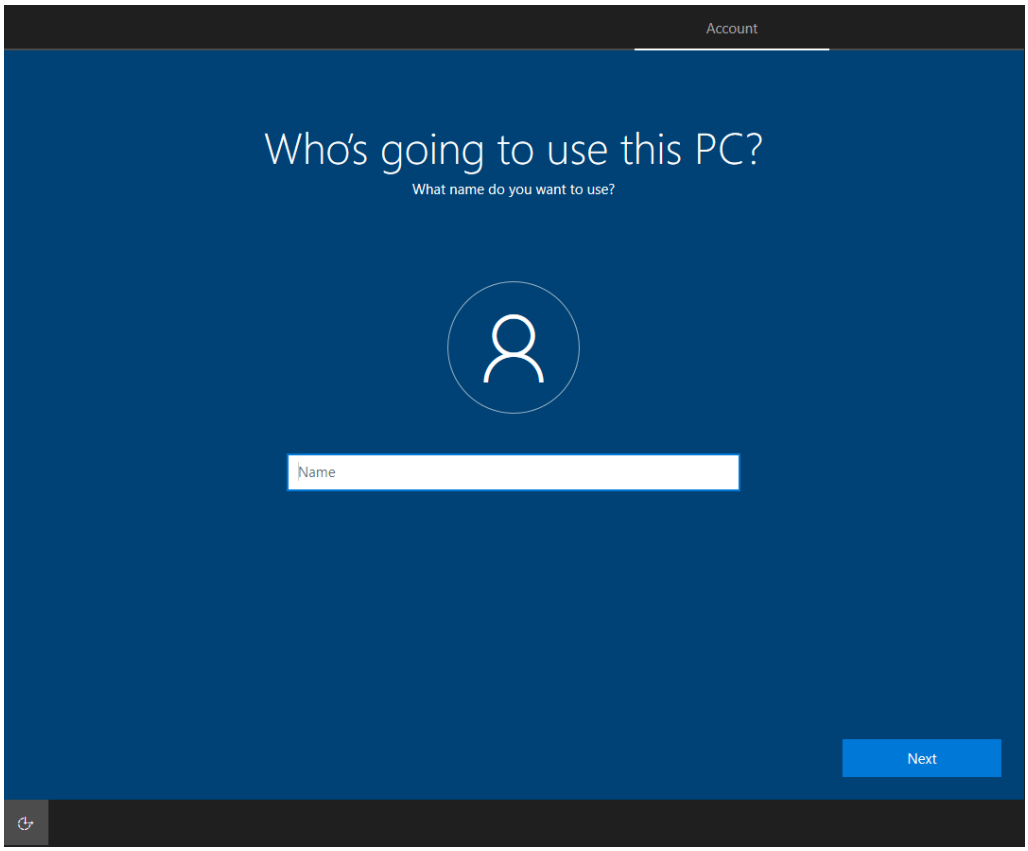


4. Connect to a network or continue with limited setup.

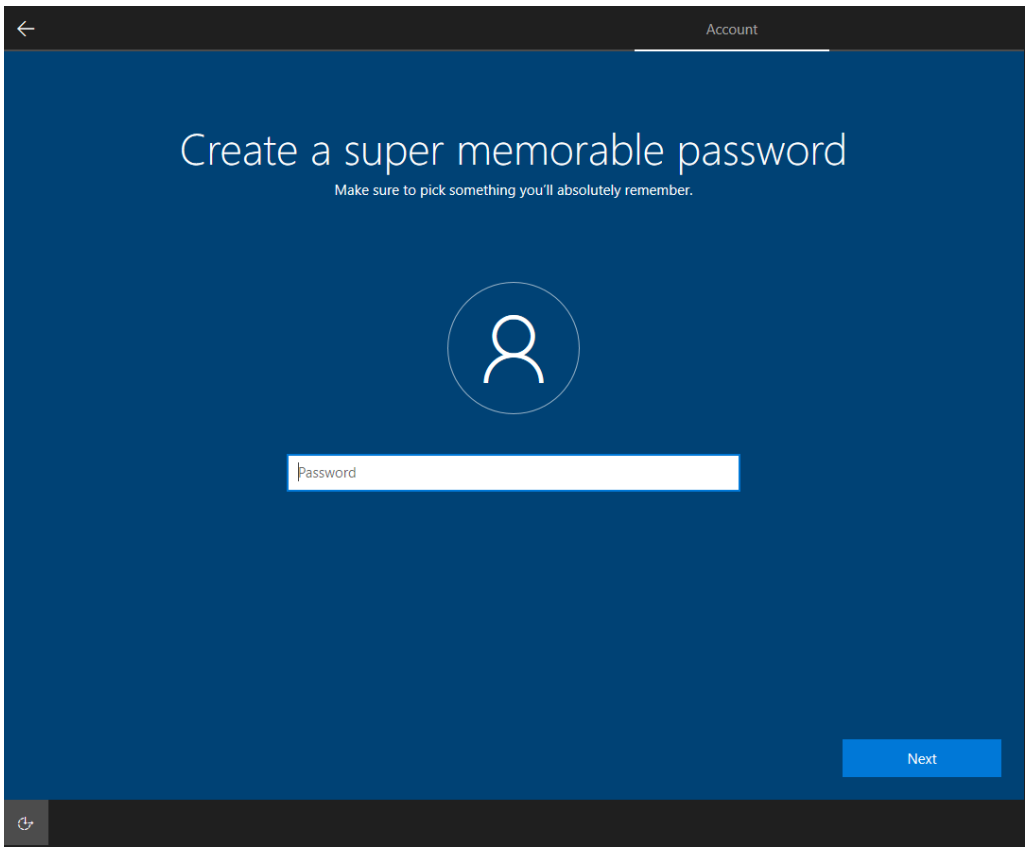




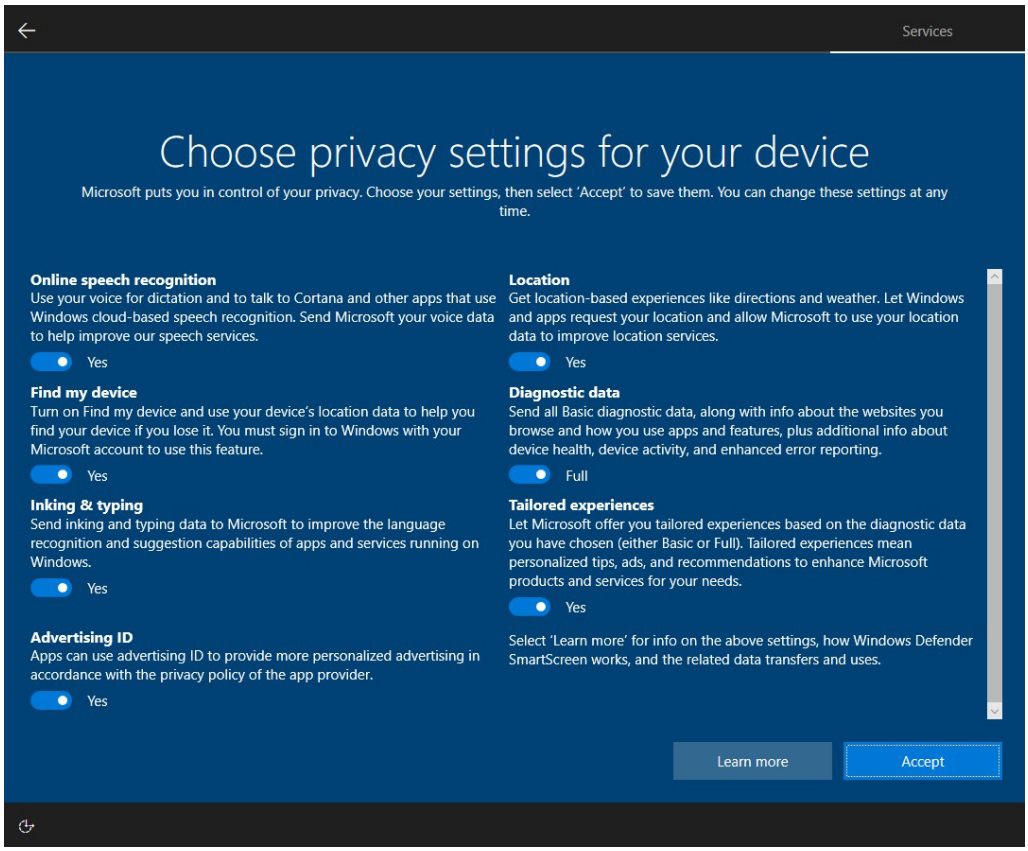
5. Sign in to or create a local account or a Microsoft account (MSA).



6. Set a password.

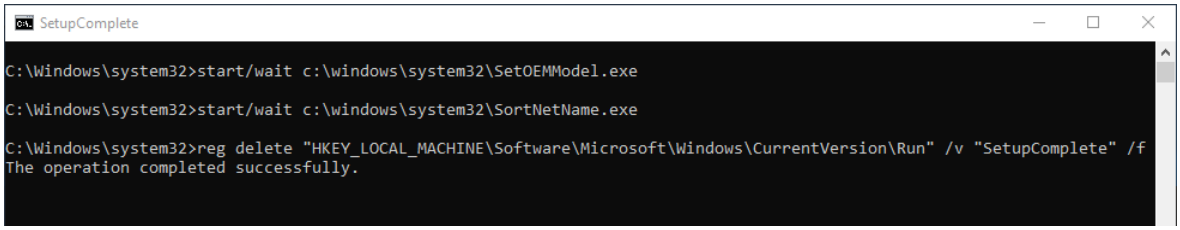


7. Choose your privacy settings.



Initializing the System

After the OOBE 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.



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.

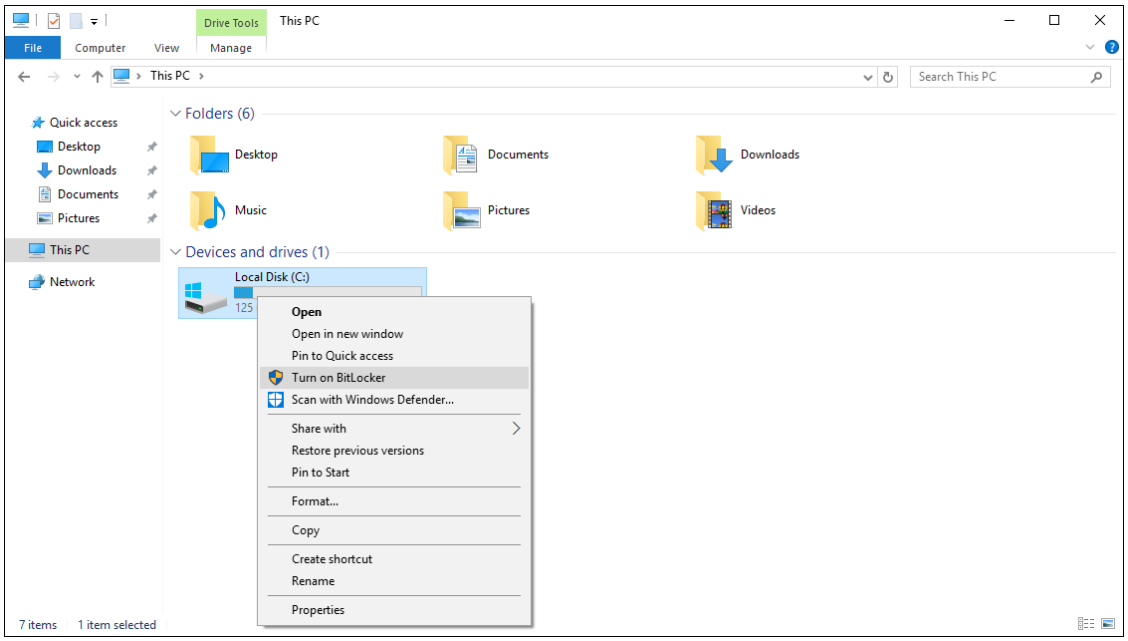
For more information about BitLocker, go to:

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

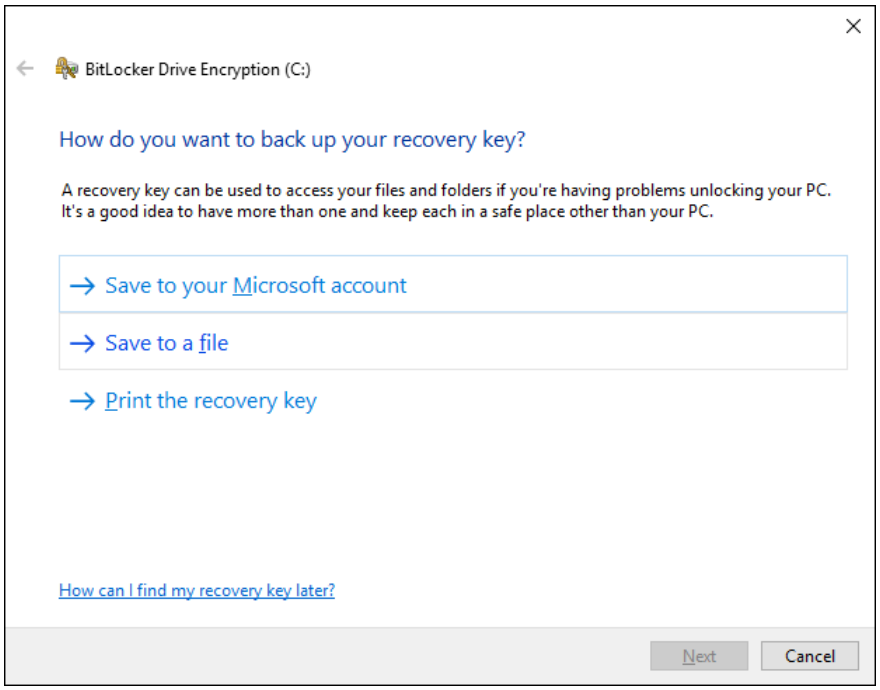
This chapter describes the BitLocker setup process.

Enabling the BitLocker

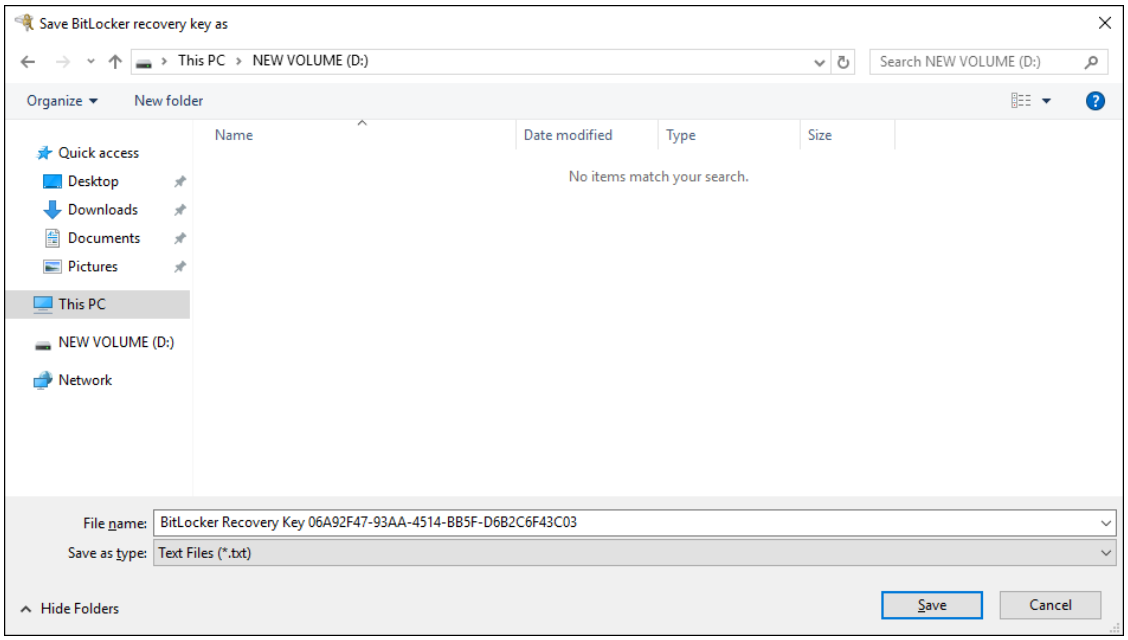
1. In the **Windows Devices and drives**, right-click on the drive and select **Turn on BitLocker**.



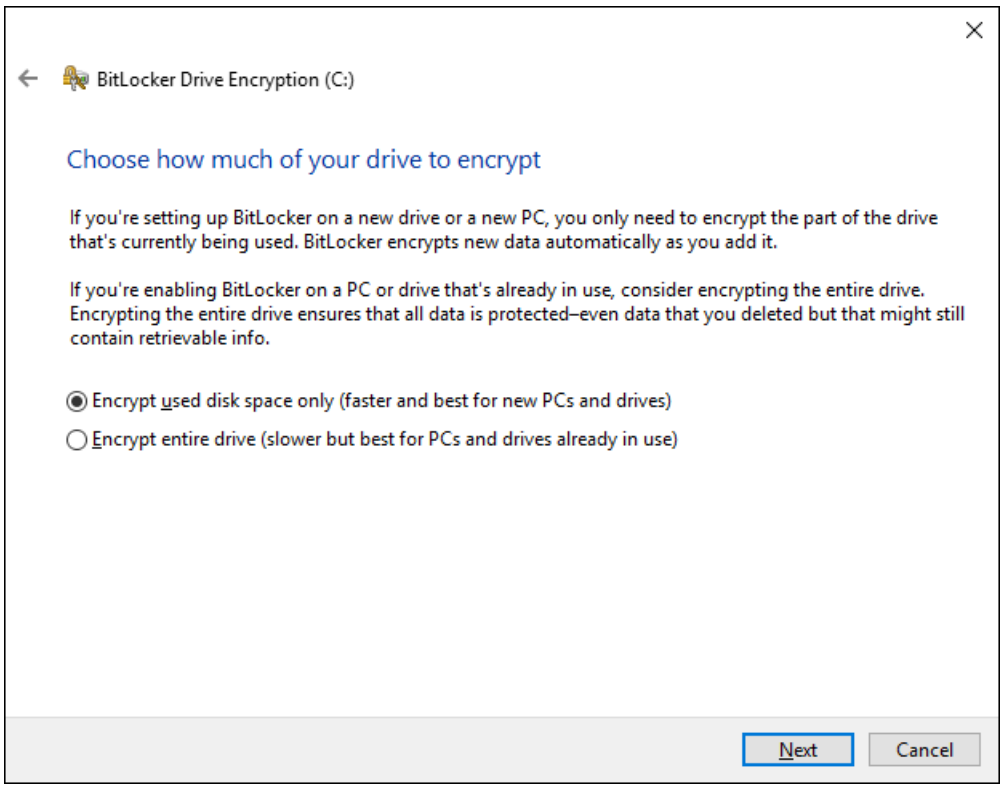
2. Select an option to back up the recovery key. For example, select **Save to a file**.

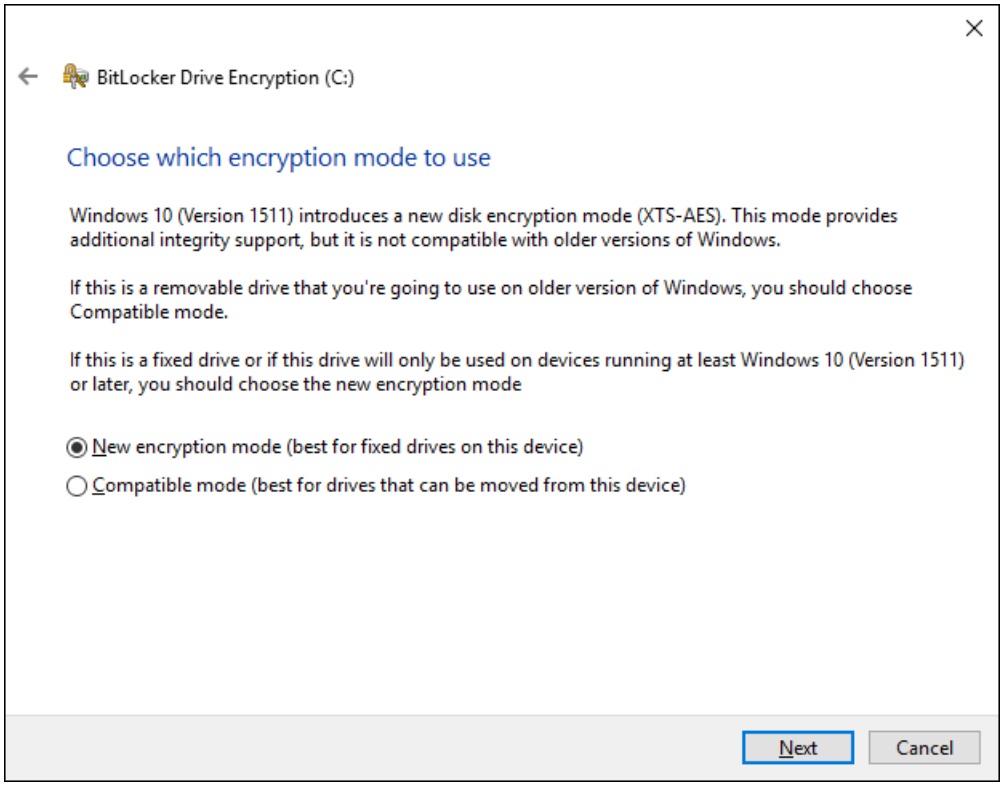


3. Select the path to store the file in.

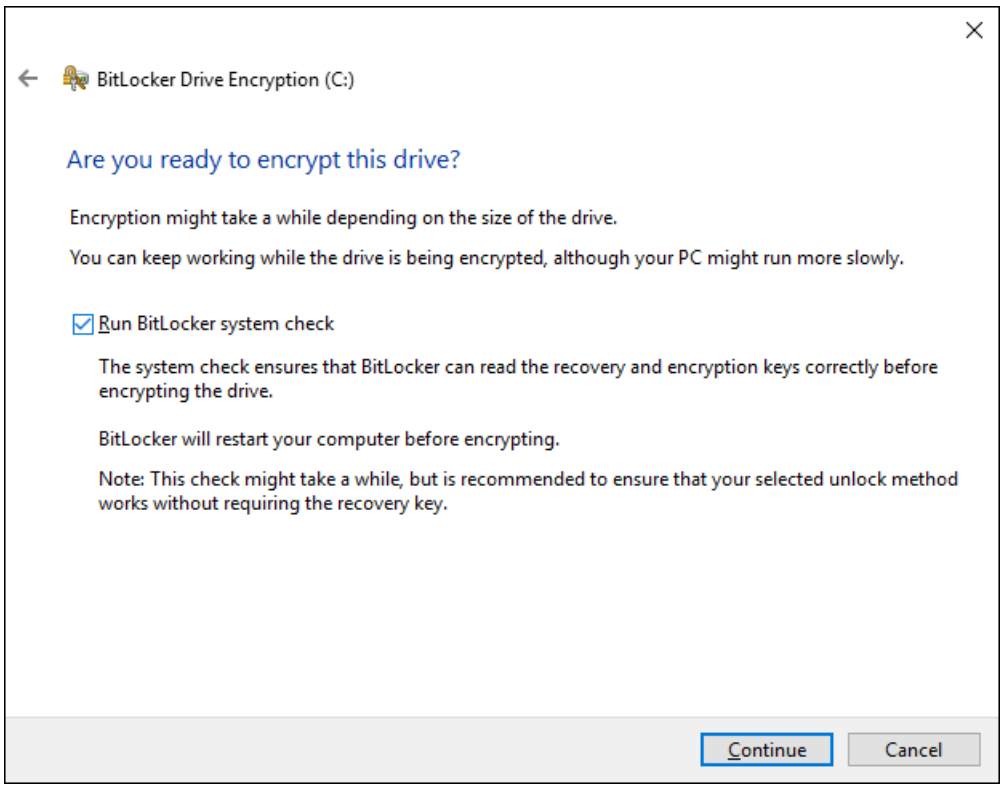


4. Follow the onscreen instructions to specify the drive encryption options.

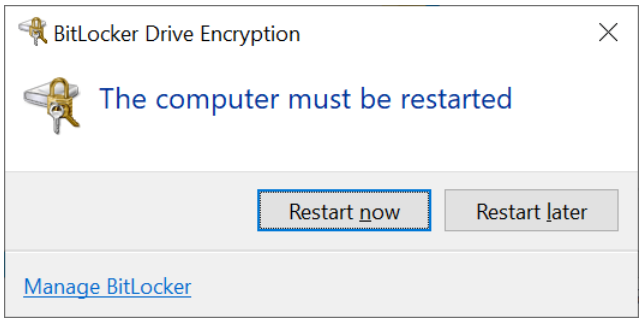




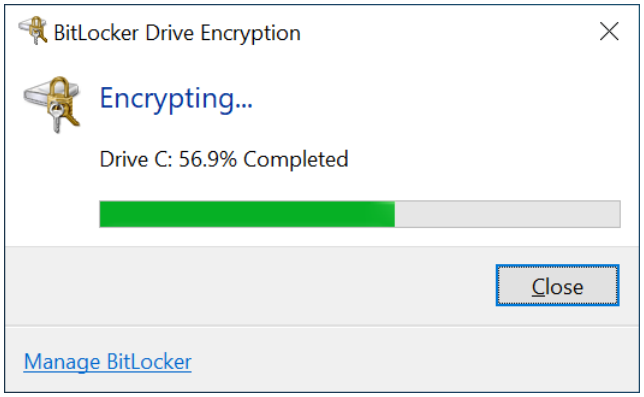
5. Click **Continue**.



6. Restart the computer.

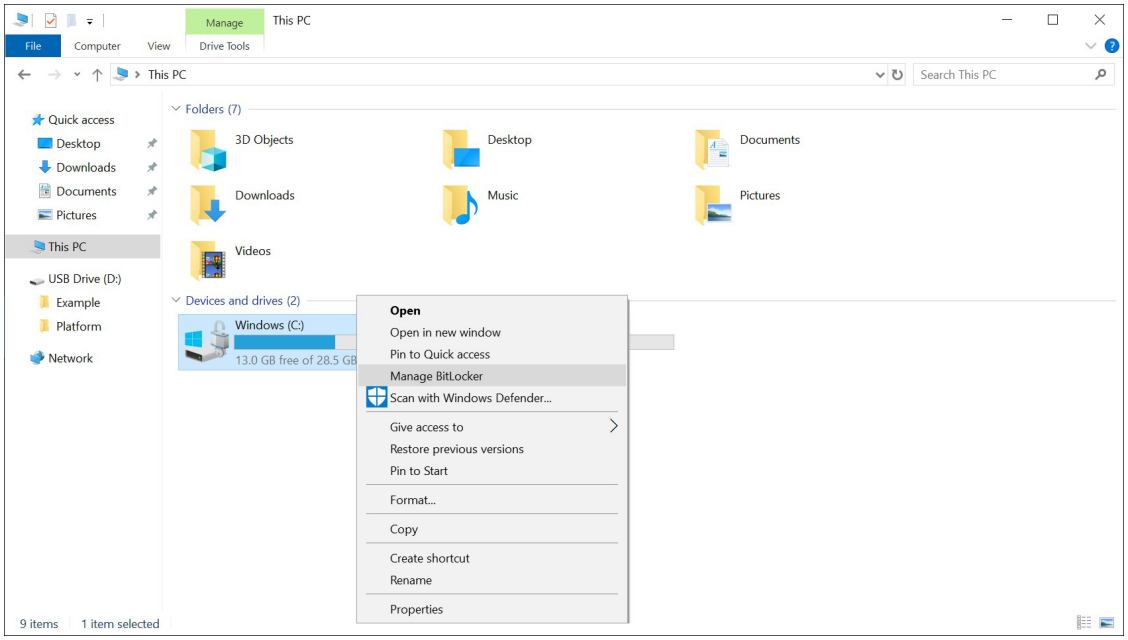


7. Wait for the encryption process to complete and then click **Close**.

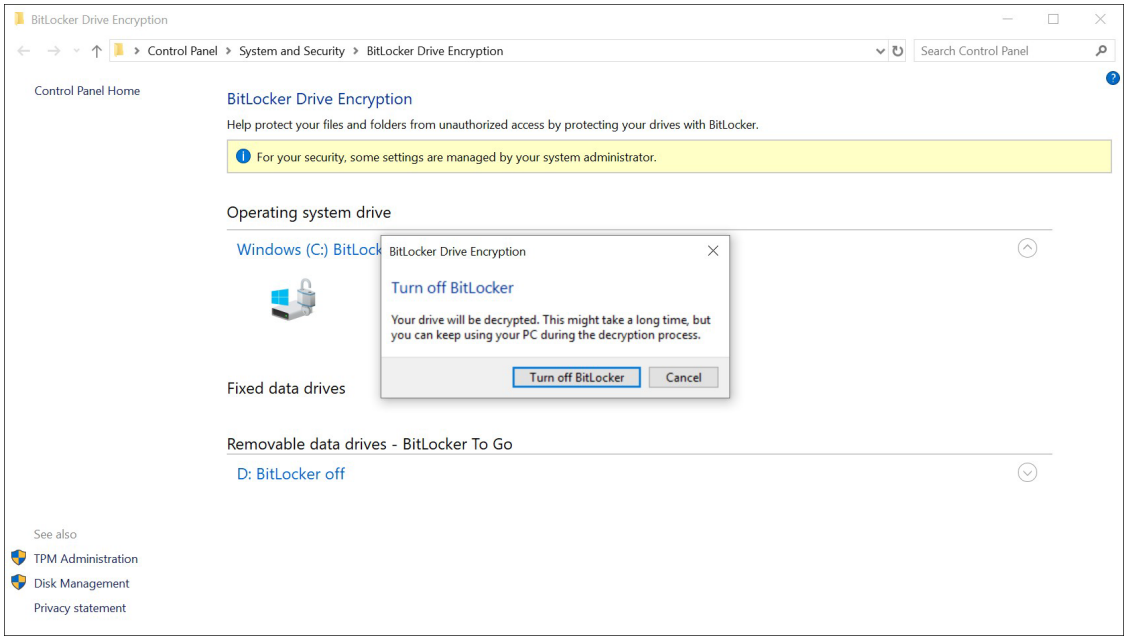


Disabling the BitLocker

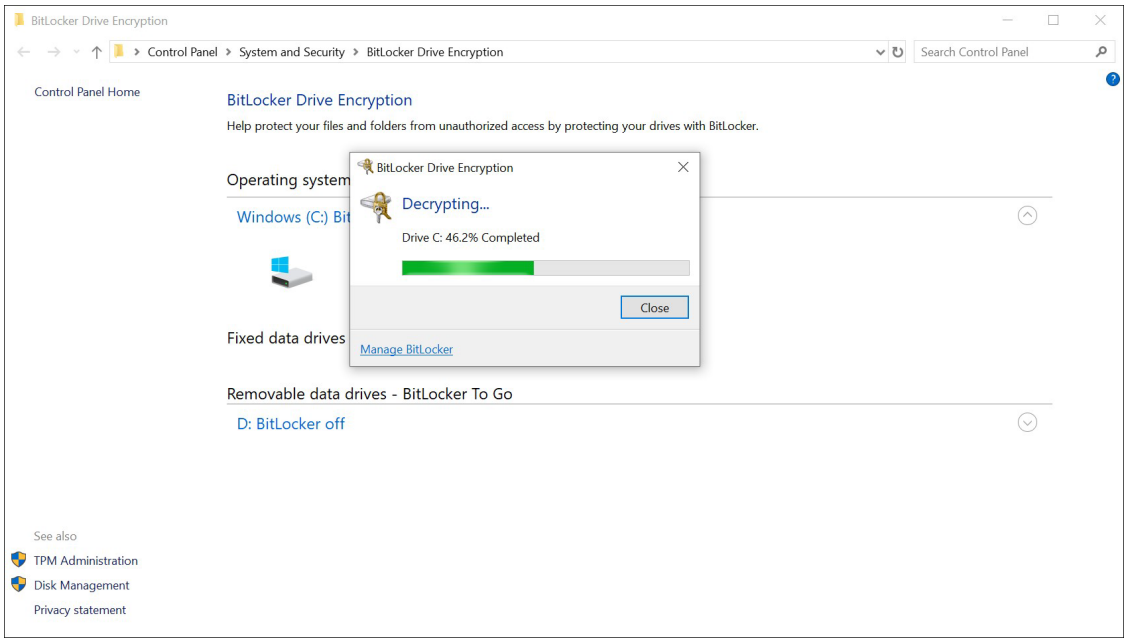
1. In the **Windows Devices and drives**, right-click on the drive and select **Manage BitLocker**.

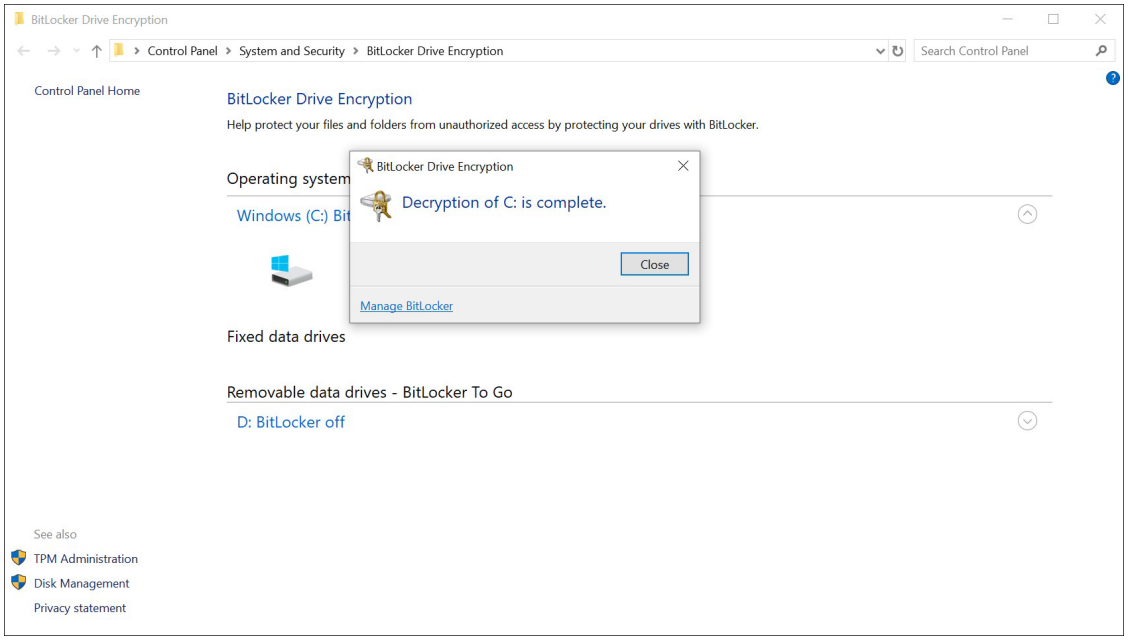


2. Click on **Turn off BitLocker**.

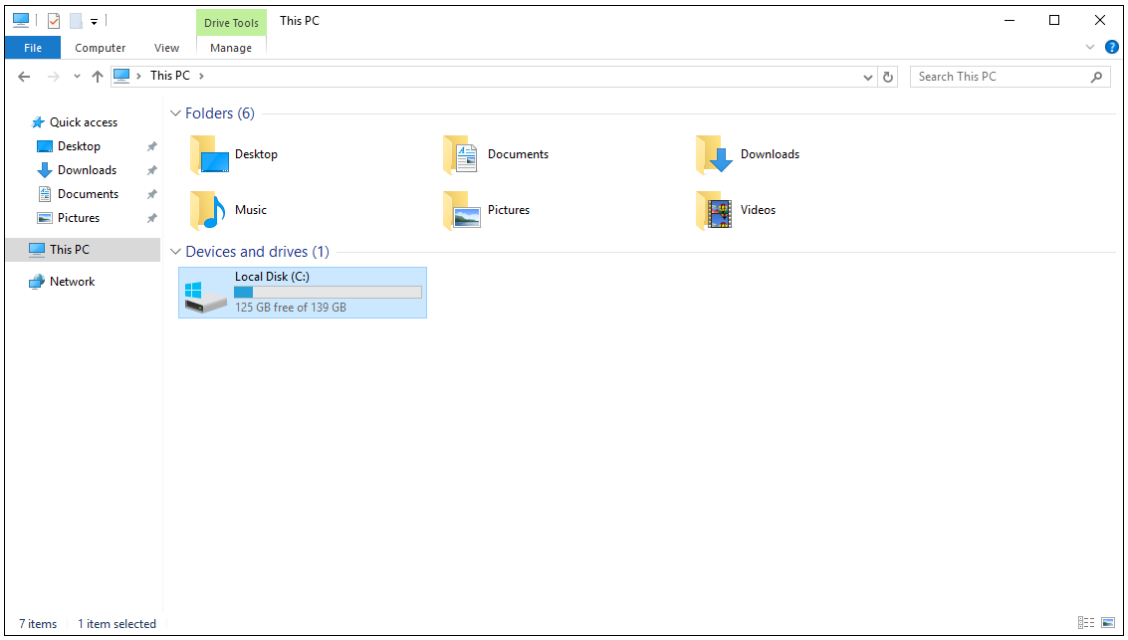


3. Wait for the decryption process to complete and click **Close** to exit the program.





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.

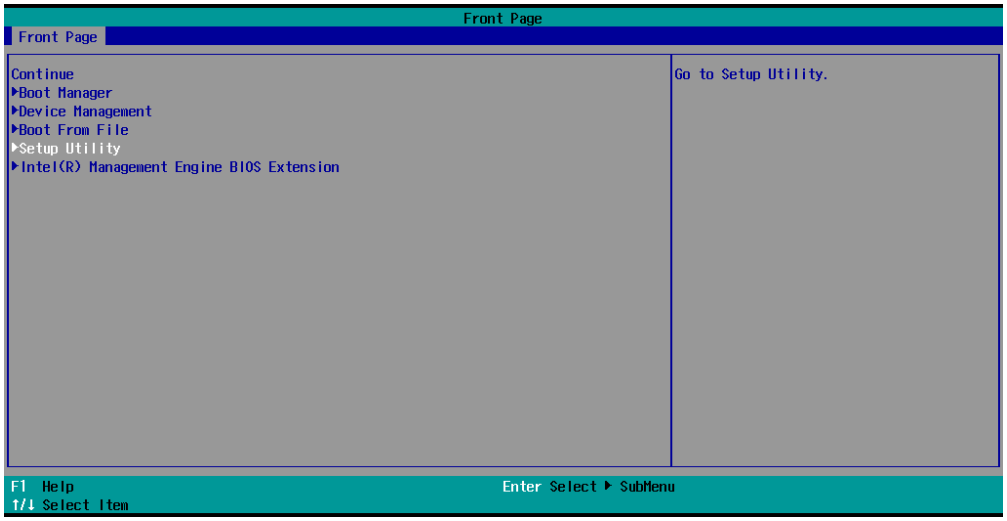
This chapter describes the setup process for Intel® RAID (Intel® RST) and SW RAID.

NOTE

- The RAID function is only supported for the RKP-C110 Series (including 2HV models) and RKP-C220 Series.
- When configuring Intel® RAID, drives must be of the same type to form a RAID array. SSDs (SATA-based) can only be grouped with other SSDs, while NVMe drives must be grouped exclusively with other NVMe drives. Mixing different types of storage devices (e.g., SATA SSDs with NVMe SSDs) in the same RAID volume is not supported..

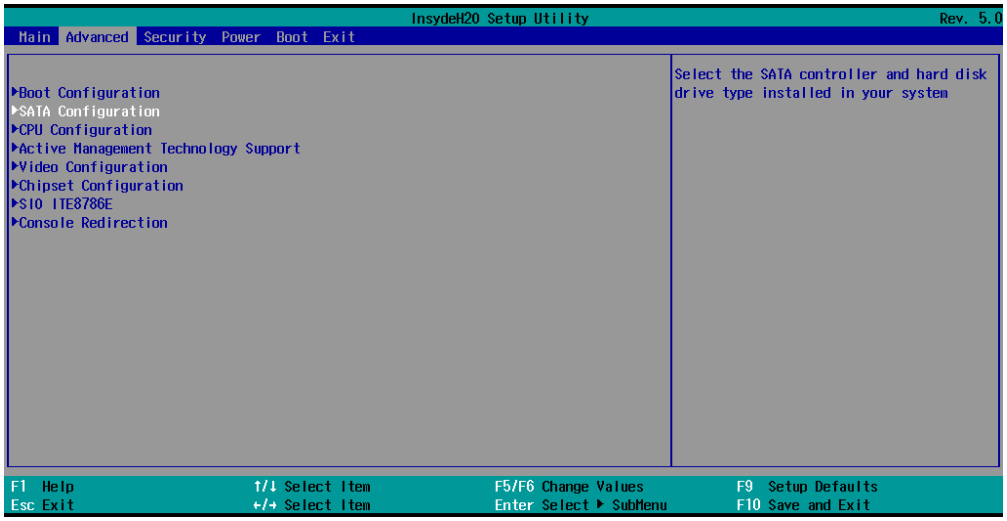
Intel® RAID—Changing the RAID Mode

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



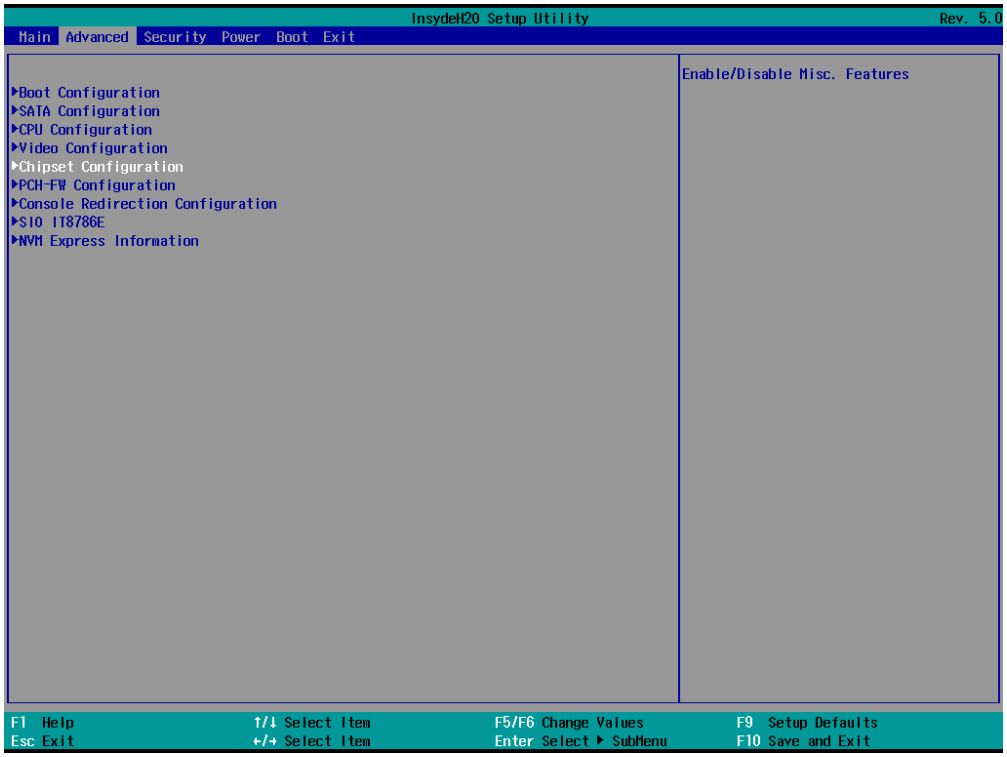
3. **RKP-C110 Series:**

   Select the **SATA Configuration** option.

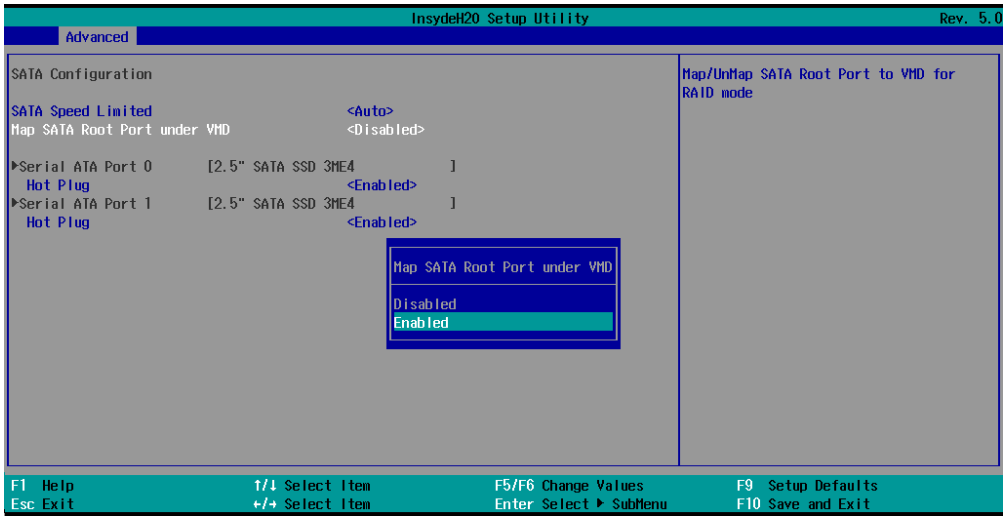


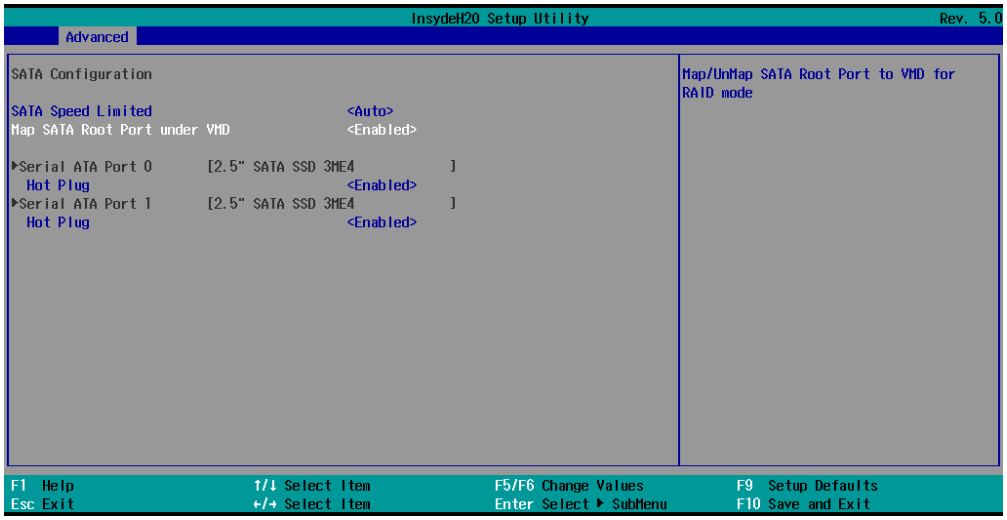
RKP-C220 Series:

Select the **Chipset Configuration** option.



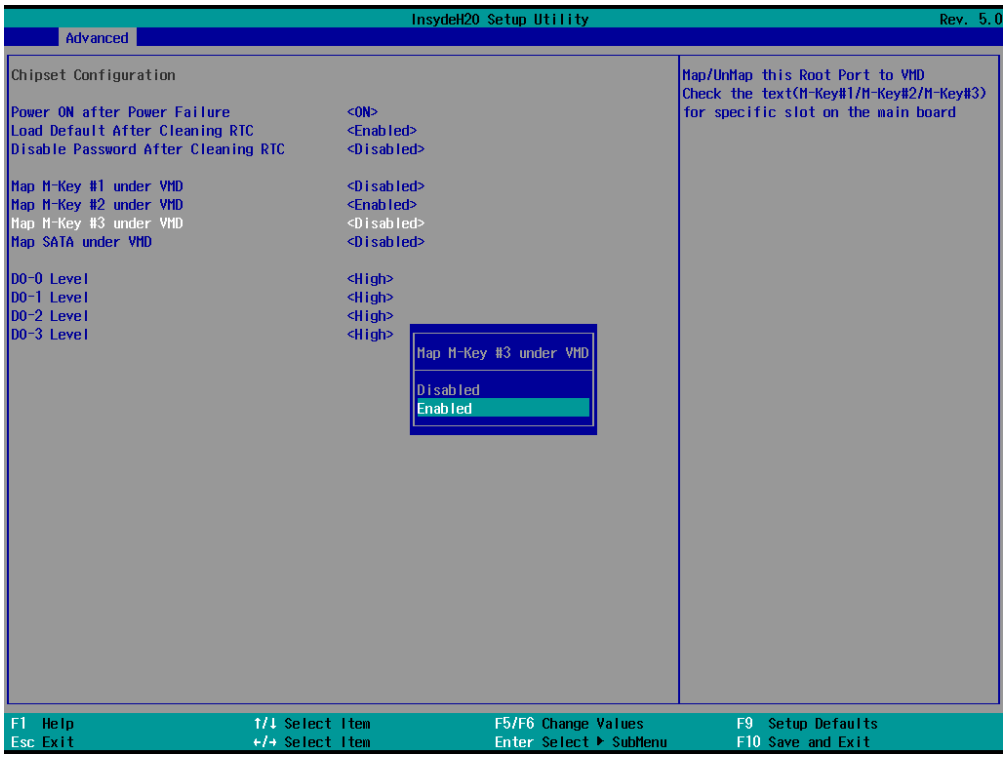
4. **RKP-C110 Series:**
   a. Select the **Map SATA Root Port under VMD** and **Enable** this option.
   b. Enable the **Hot Plug** function on all ports.

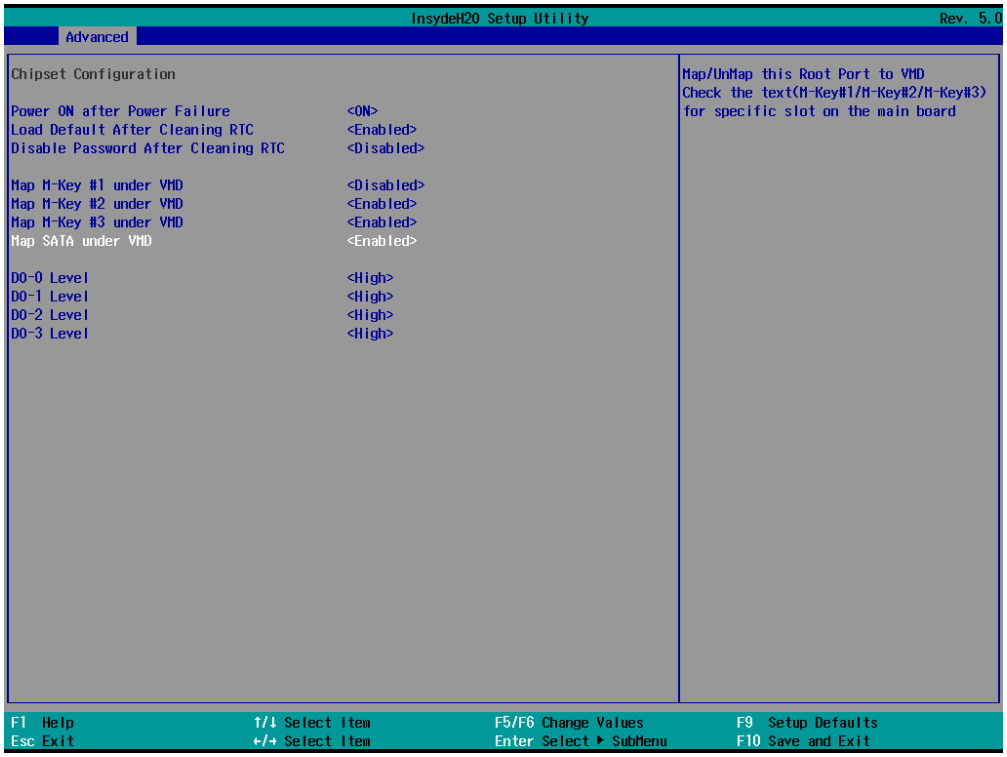




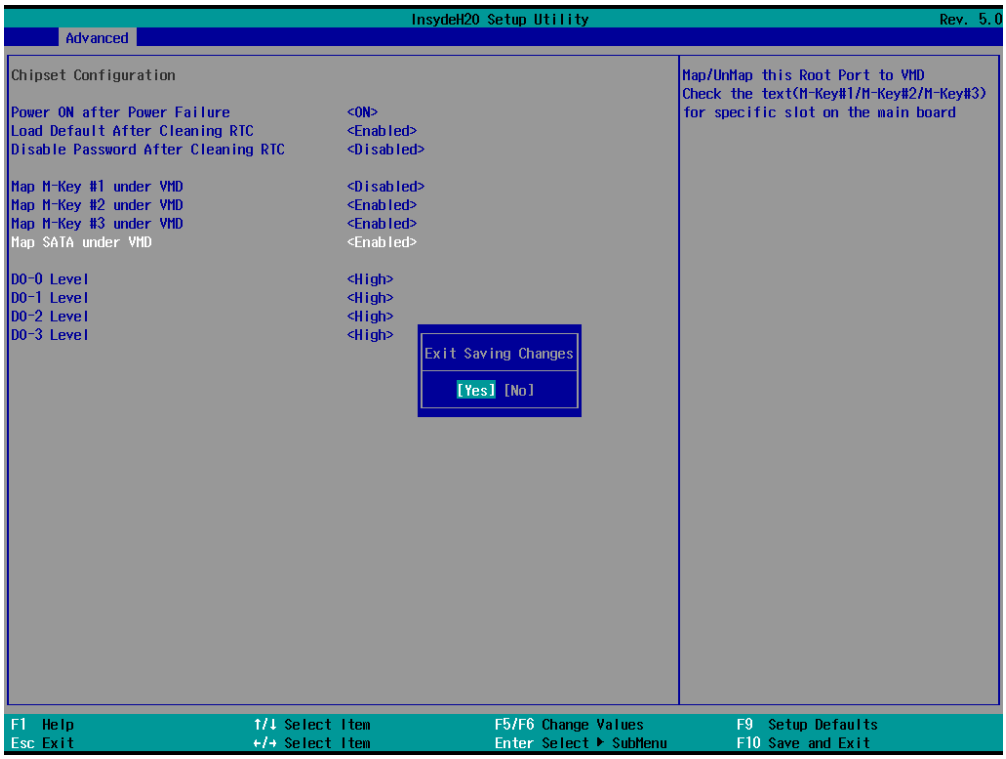
RKP-C220 Series:

Enable **Map XXXX** under **VMD**.





5. Press **F10** and then select **Yes** to save the settings.

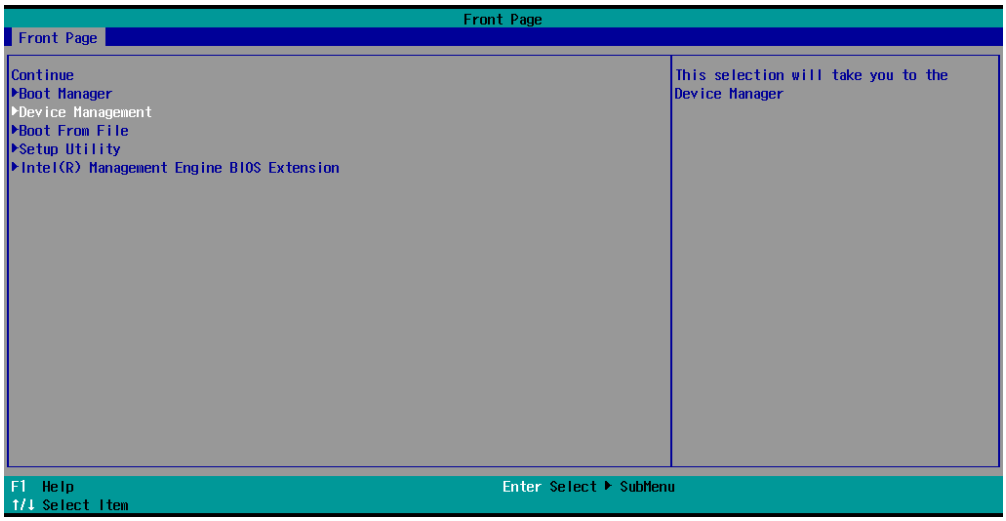


Intel® RAID—Creating a RAID Disk in BIOS

NOTE

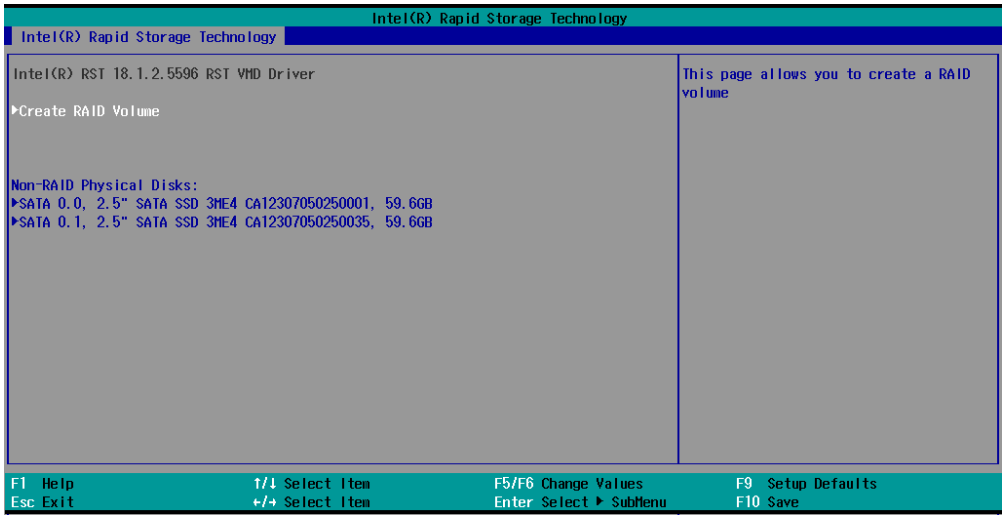
When configuring Intel RAID, drives must be of the same type to form a RAID array. SSDs (SATA-based) can only be grouped with other SSDs, while NVMe drives must be grouped exclusively with other NVMe drives. Mixing different types of storage devices (e.g., SATA SSDs with NVMe SSDs) in the same RAID volume is not supported.

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

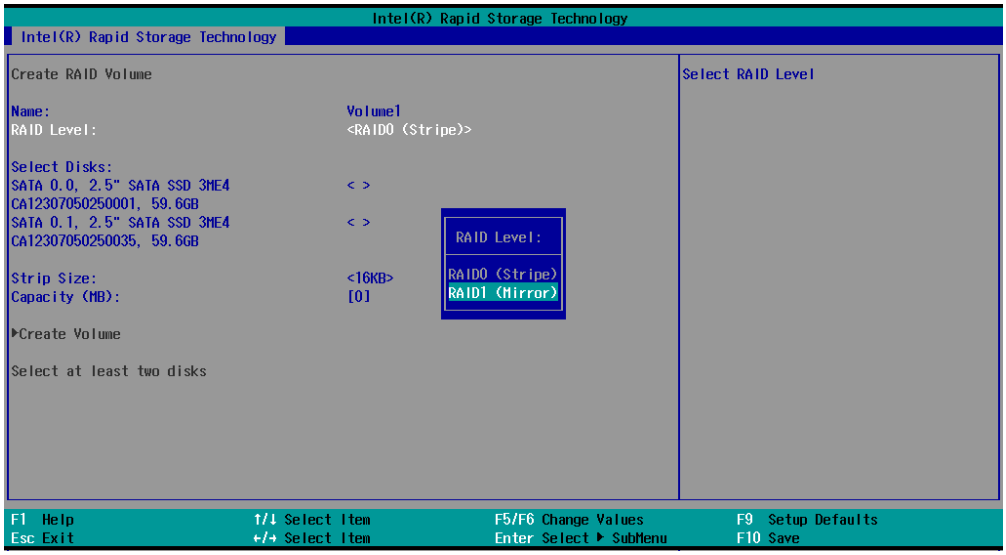


3. Select **Intel® Rapid Storage Technology**.

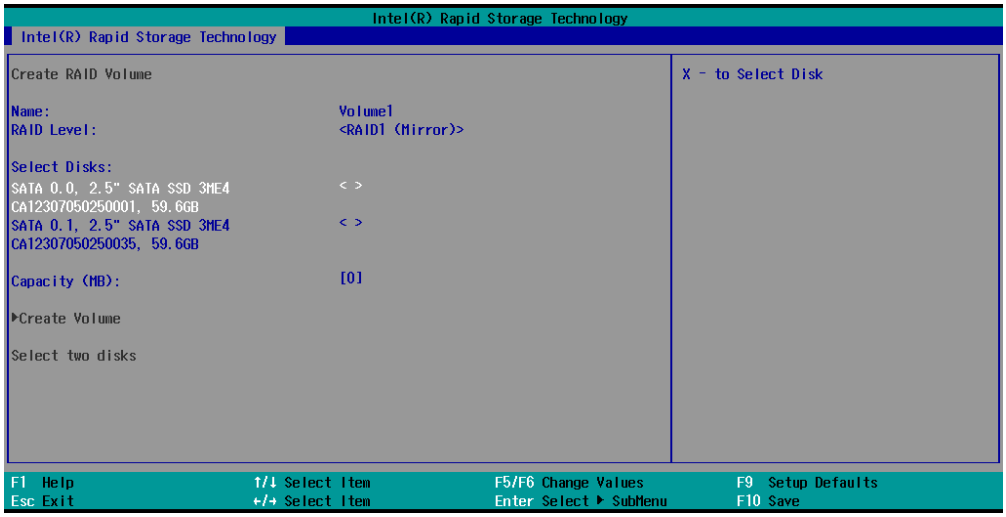
4. Select **Create RAID Volume**.



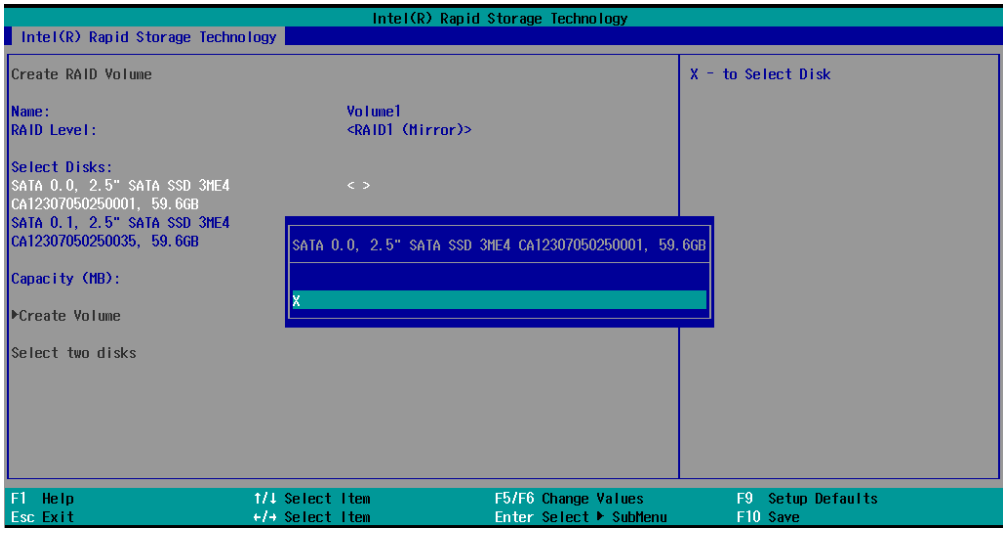
5. Select the **RAID Level** option and then press **Enter** to select the raid level; for example, **RAID1(Mirror)**.



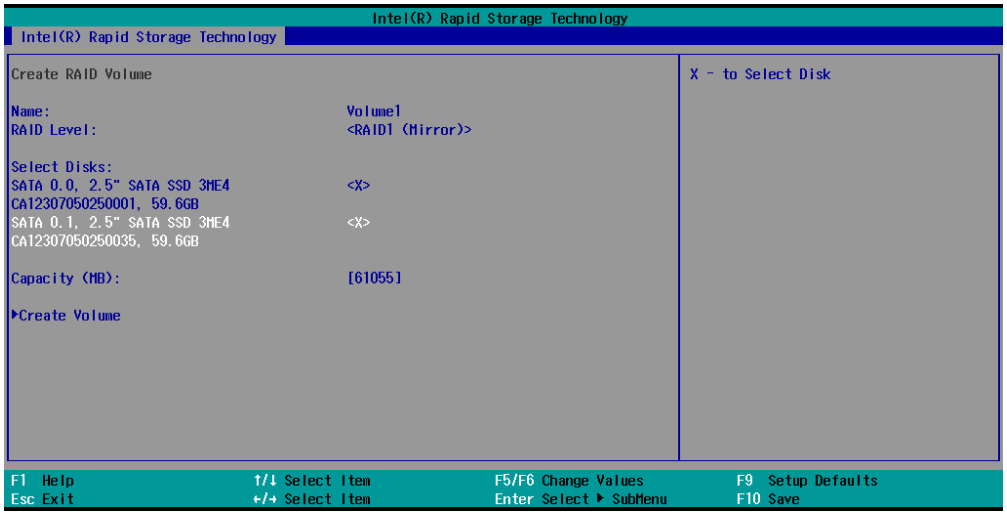
6. Select the target disk.



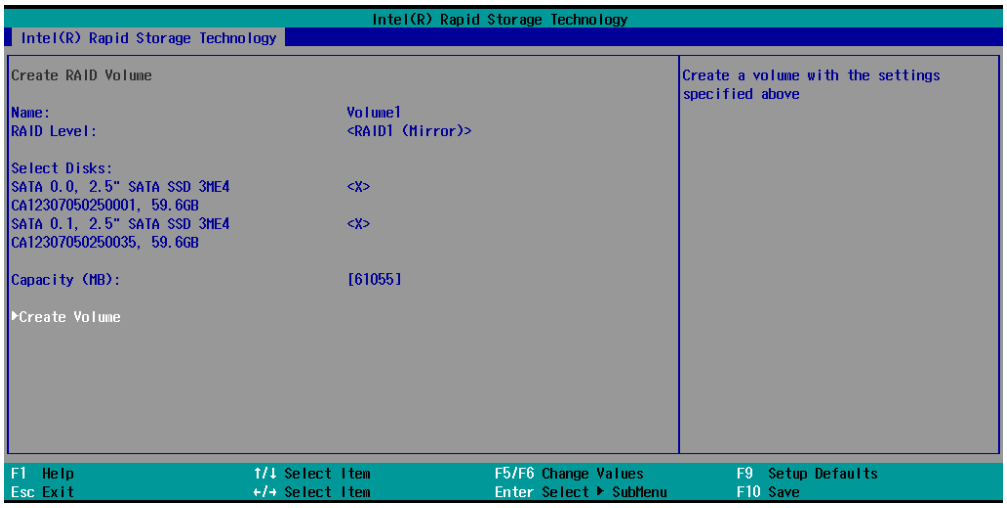
7. Enter **X** and then press **Enter**.



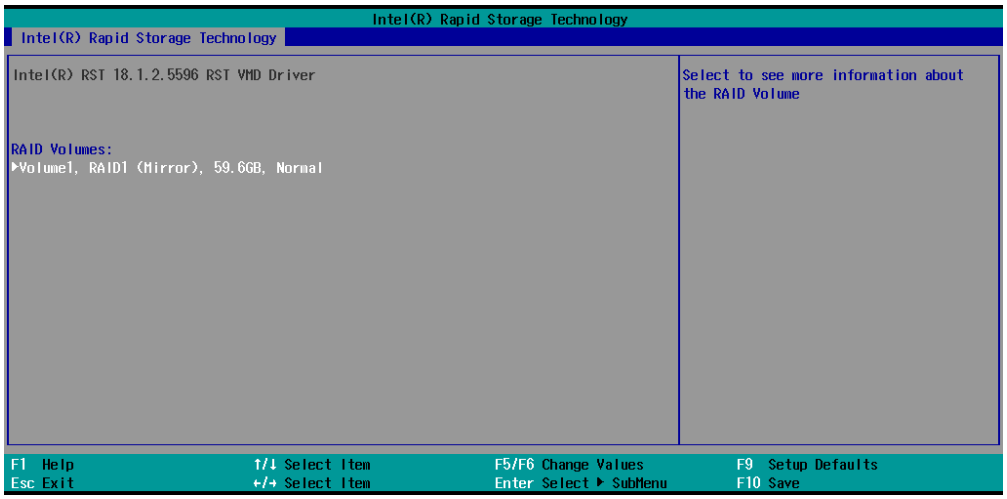
The disk is marked with an **X** next to it to indicate its selection.



8. Select the **Create Volume** option.



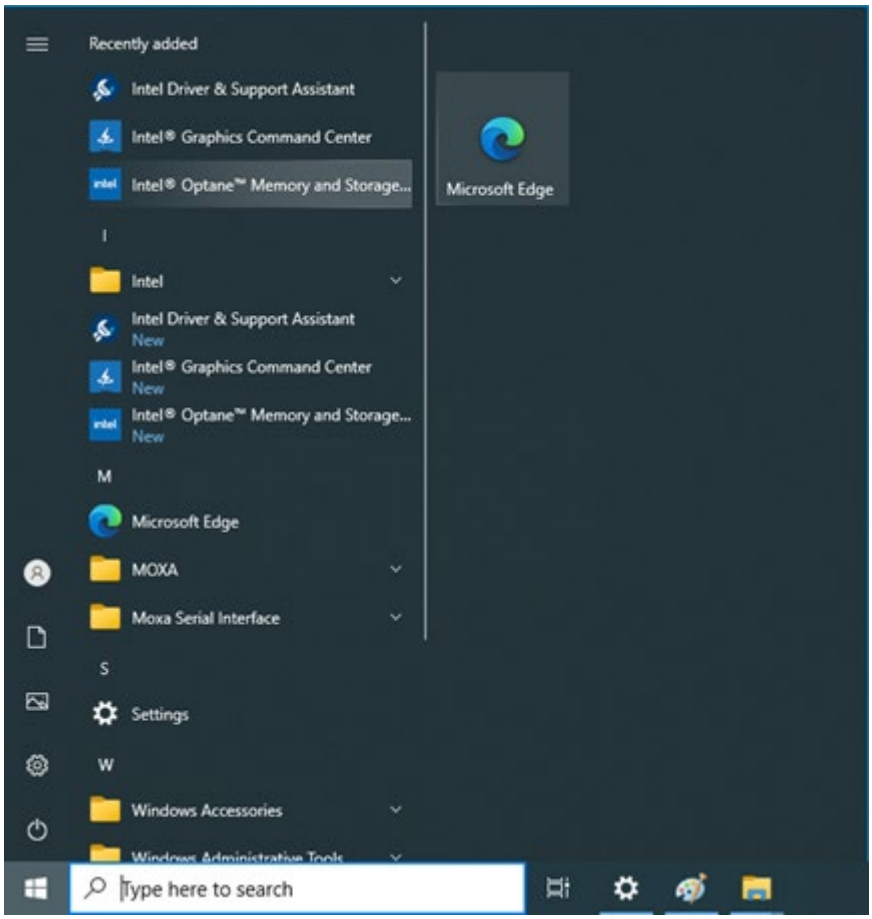
9. A RAID volume is created based on the settings specified.



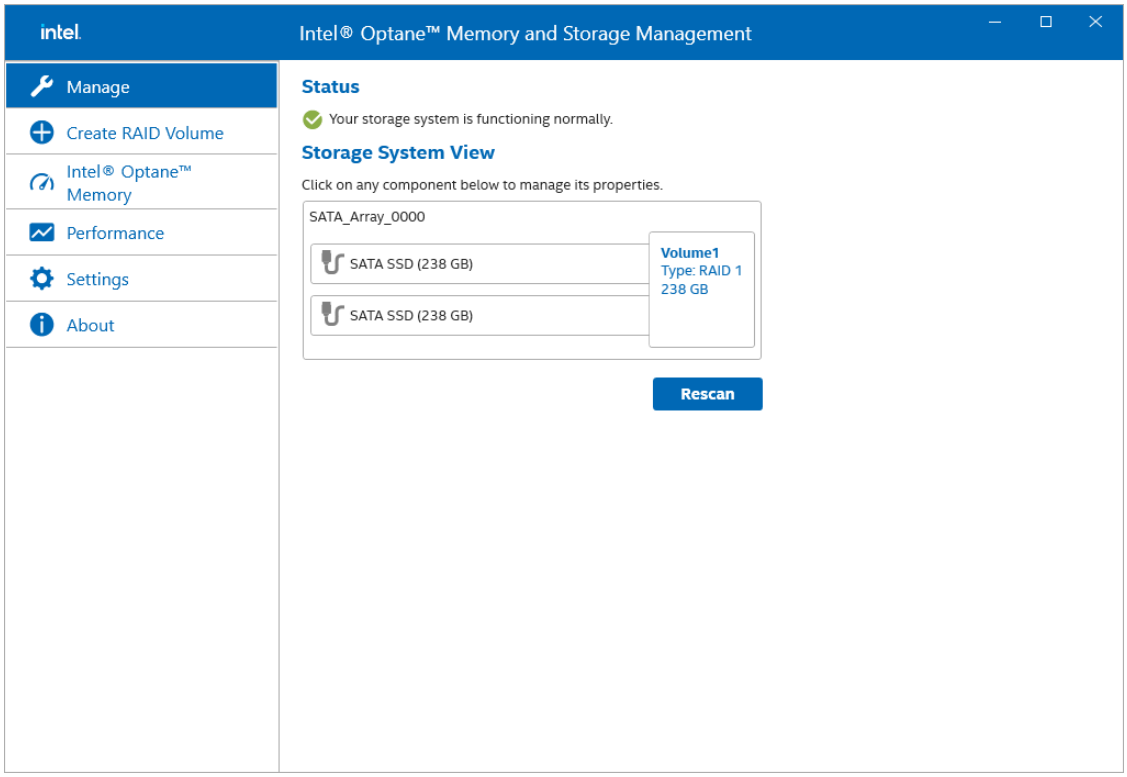
10. Press **F10** to save the settings.

Intel® RAID—Replacing a Disk

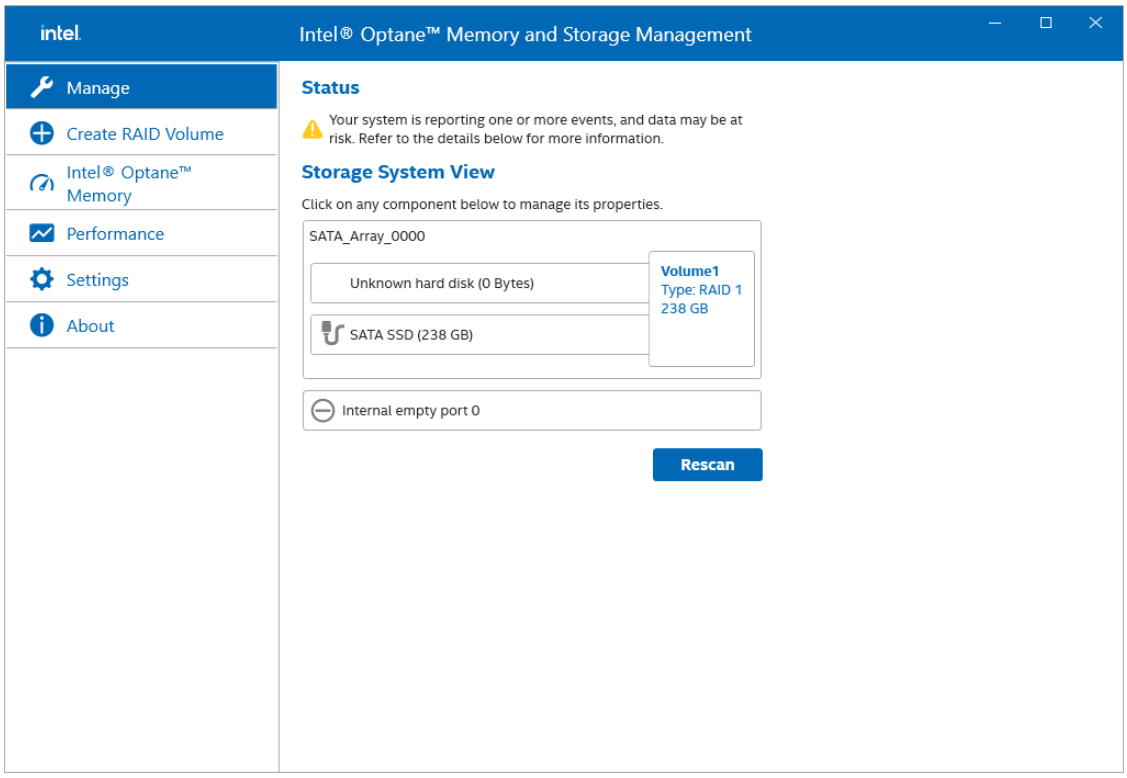
1. Run **Intel® Optane™ Memory and Storage Management** from the Windows start menu.



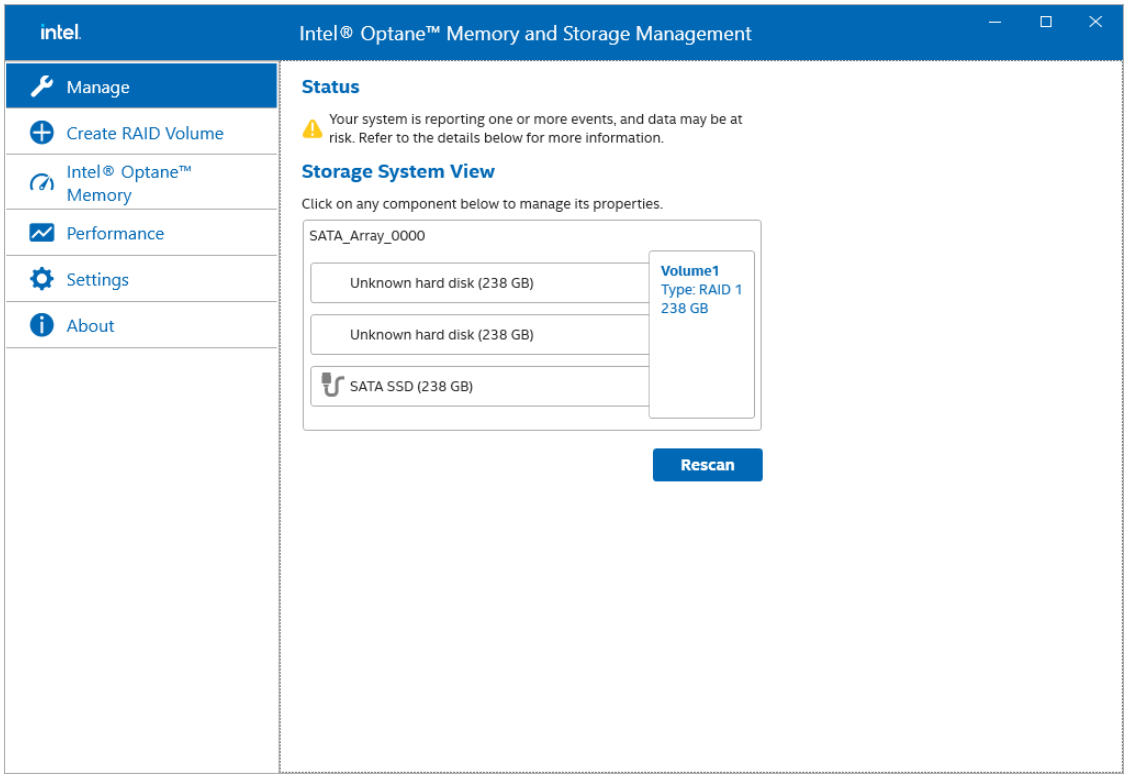
2. Physically unplug the target SSD from the computer.



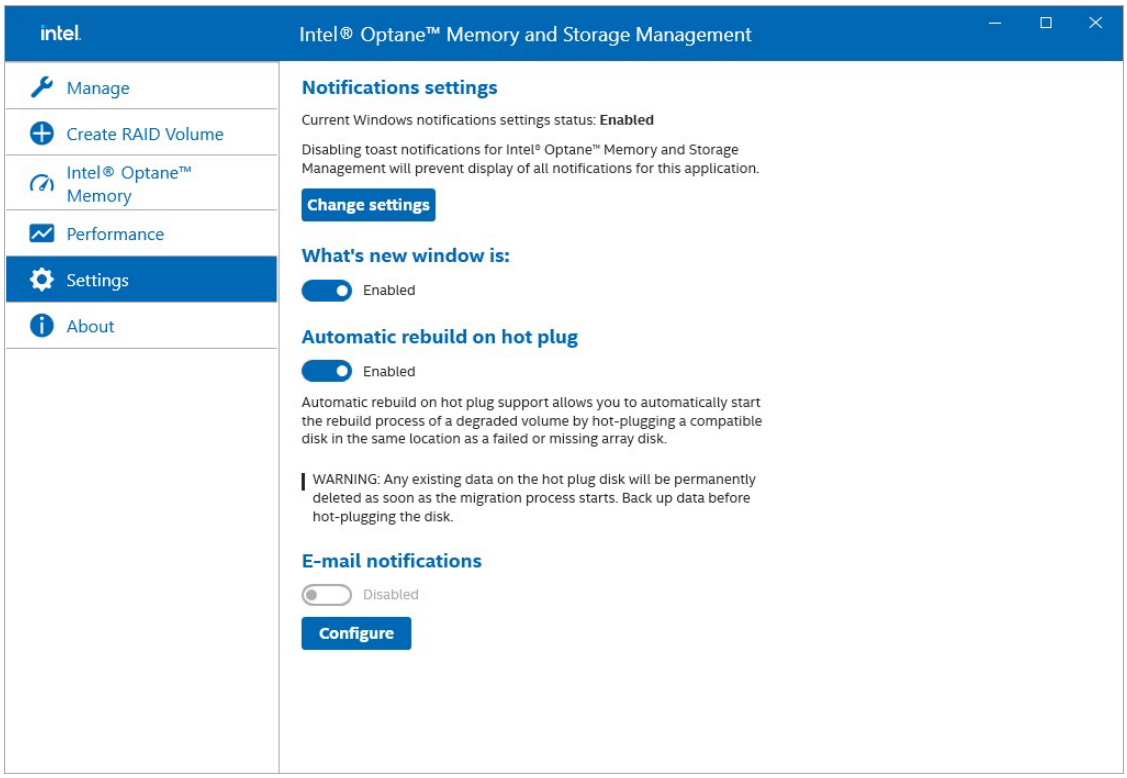
The status of the SSD that is unplugged will change to **Unknown hard disk (0 Bytes)** as shown here:



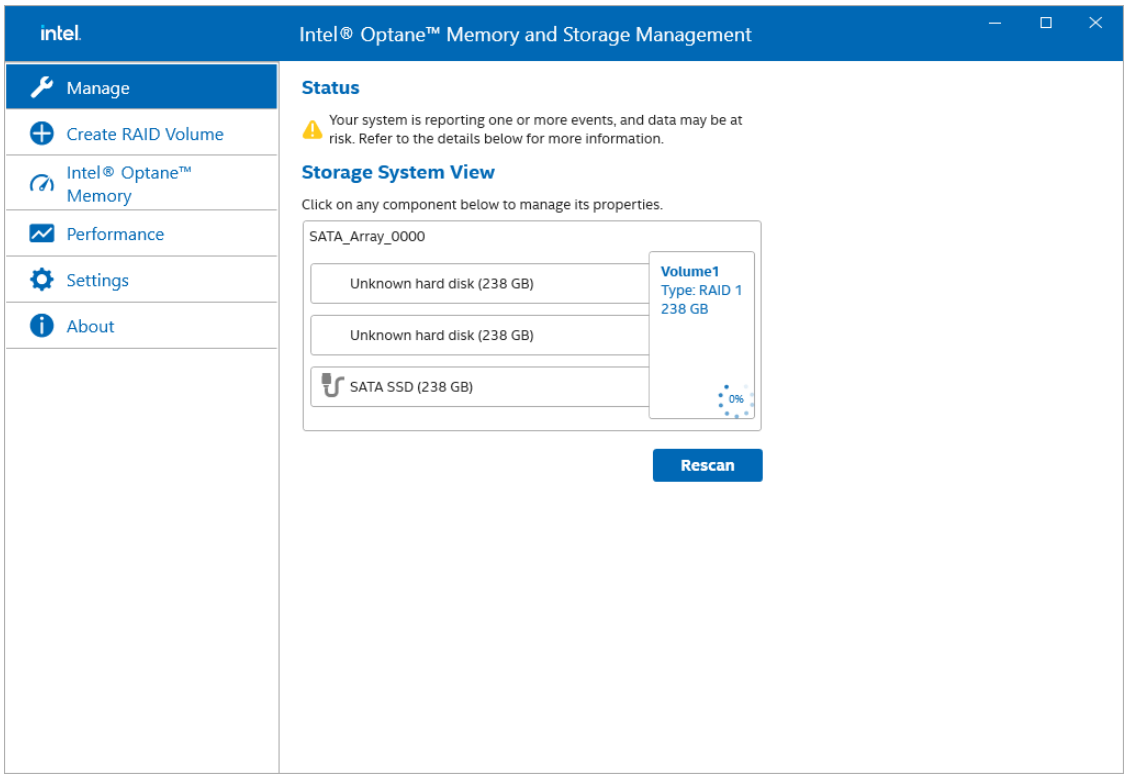
3. Install the new SSD in the same location.

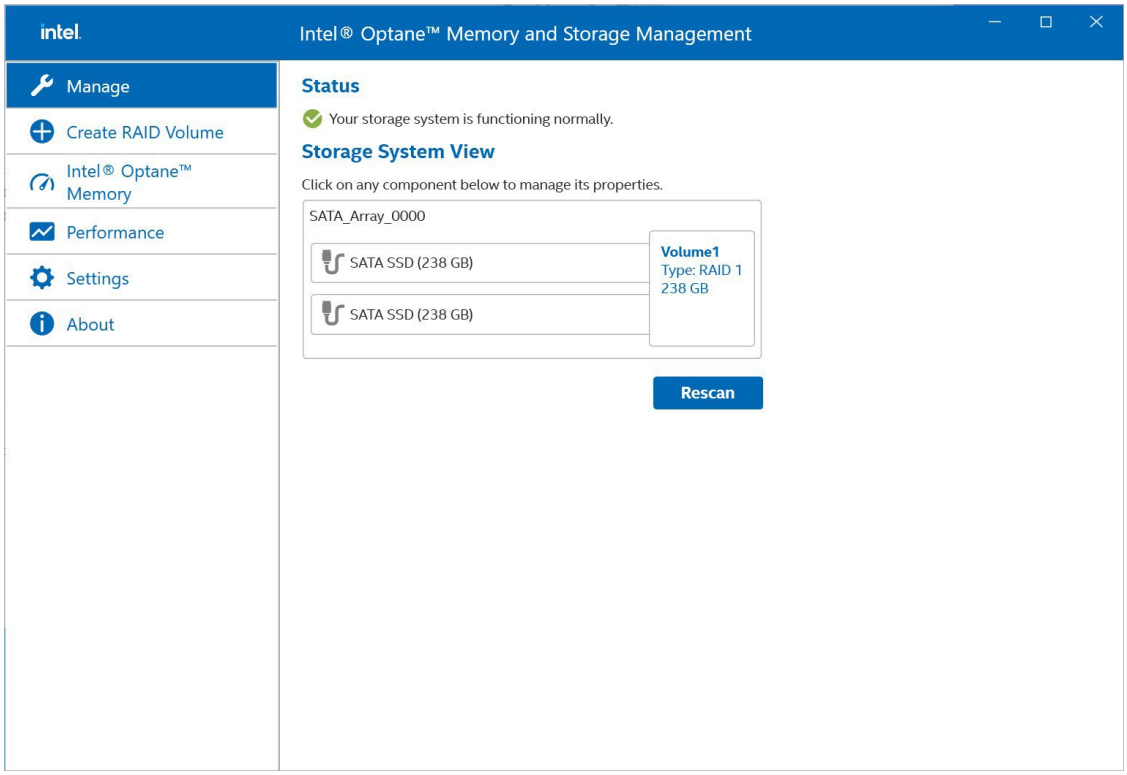


4. Click **Settings** and enable **Automatic rebuild on hot plug**.



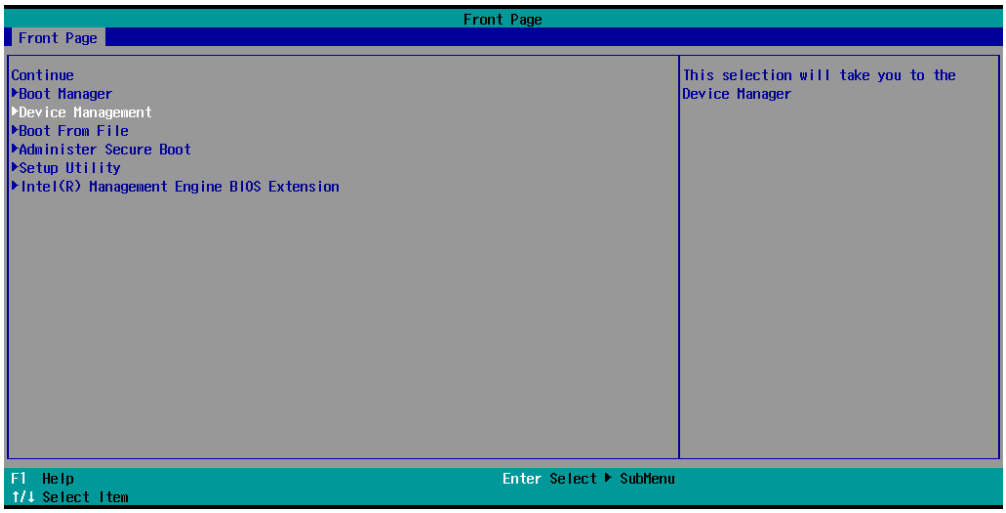
5. The system will start rebuilding the storage volume.
Wait for the rebuild process to complete.



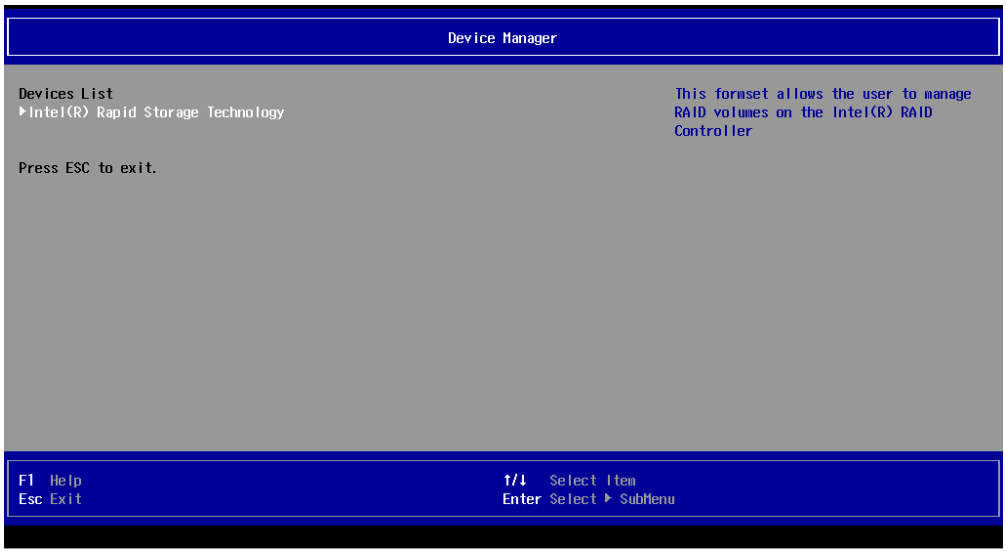


Intel® RAID—Removing a RAID Volume From the BIOS

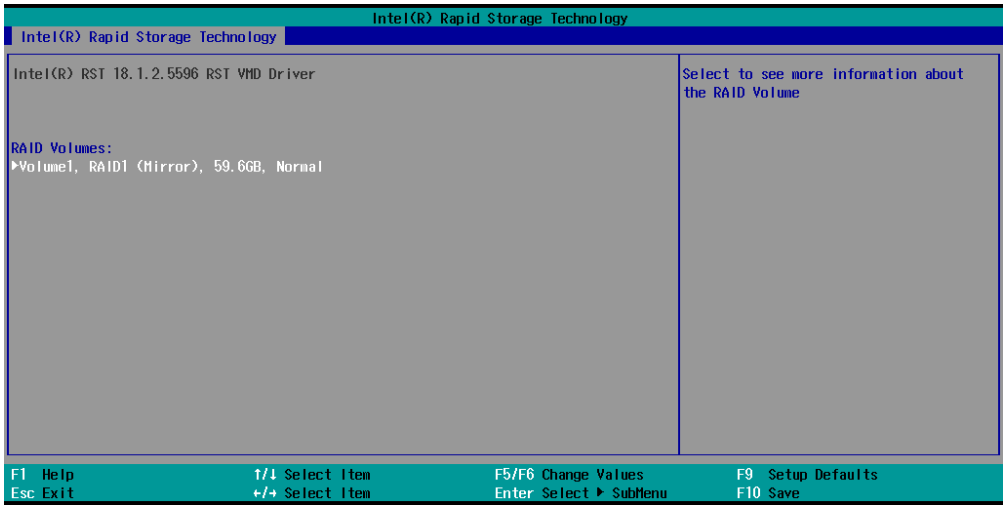
1. Power on the computer and press **F2** to enter the BIOS menu.
2. Select **Device Management**.



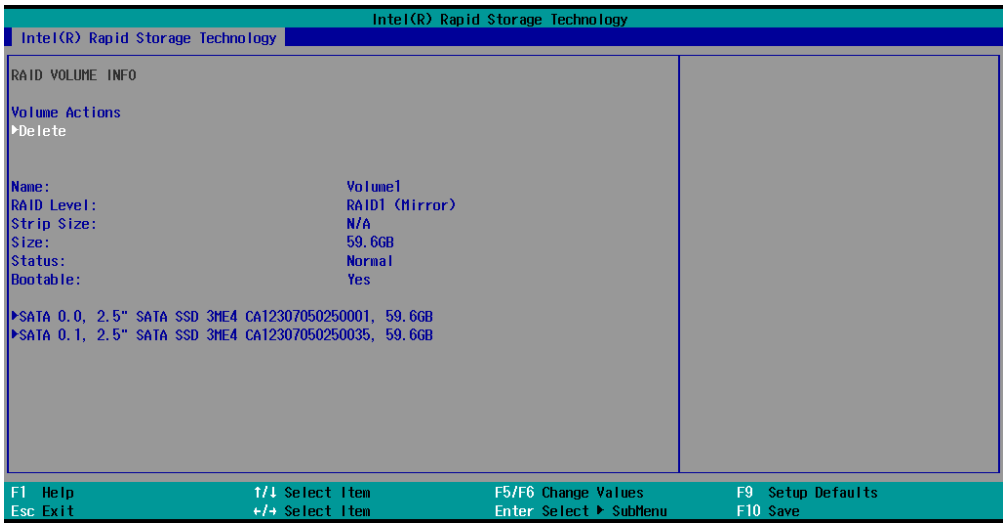
3. Select the **Intel® Rapid Storage Technology** option.



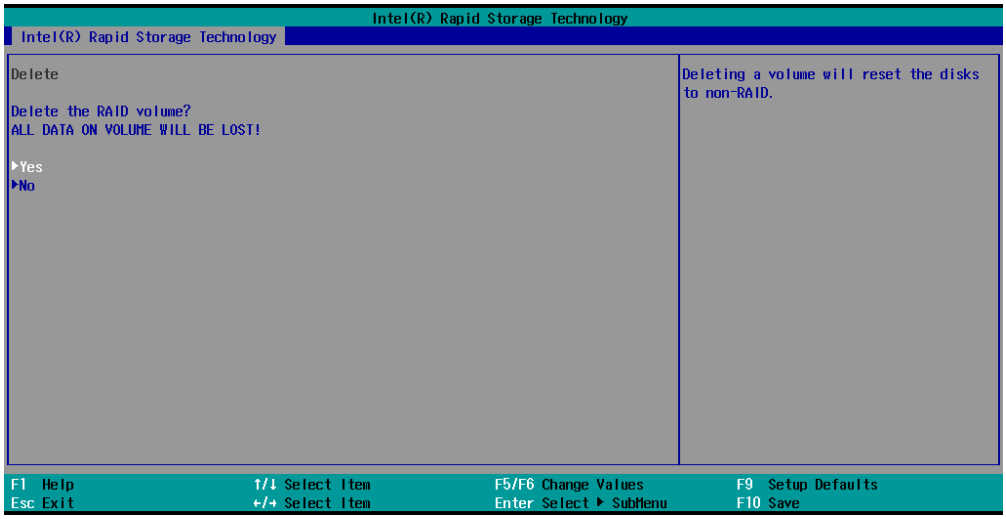
4. Select the RAID volume that you want to remove.



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



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



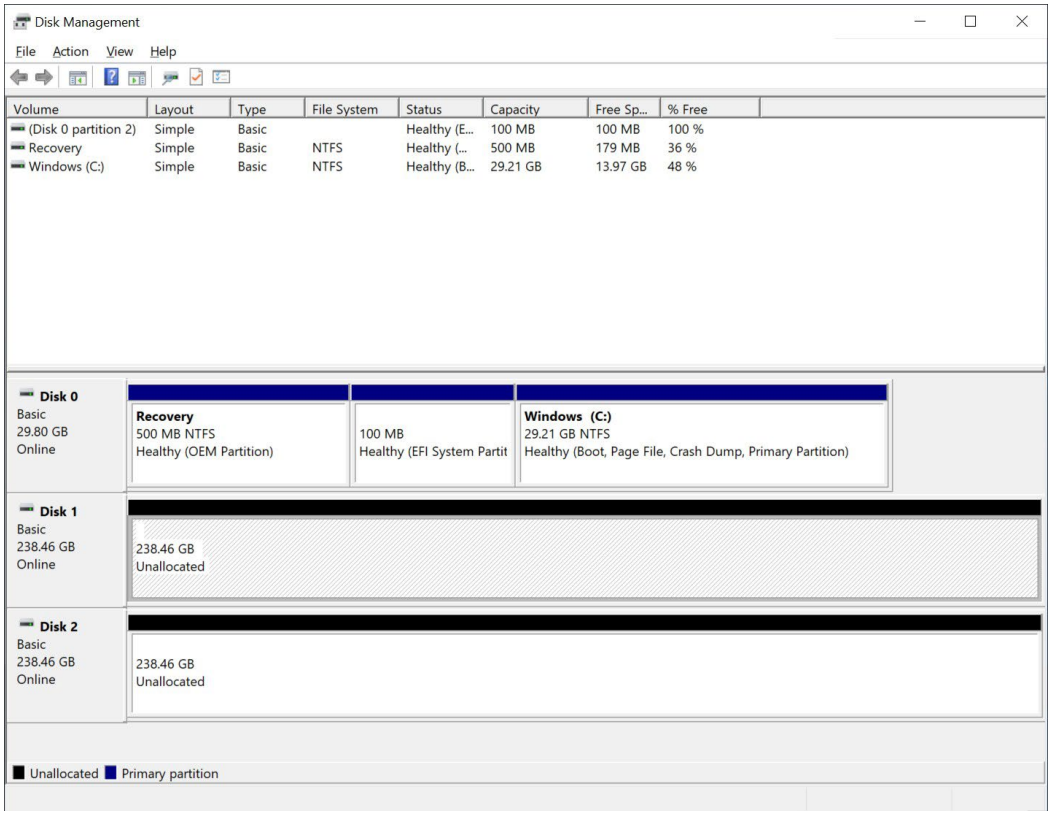
7. Press **F10** to save the settings.

SW RAID—Creating the RAID 0 or RAID 1 From Disk Management

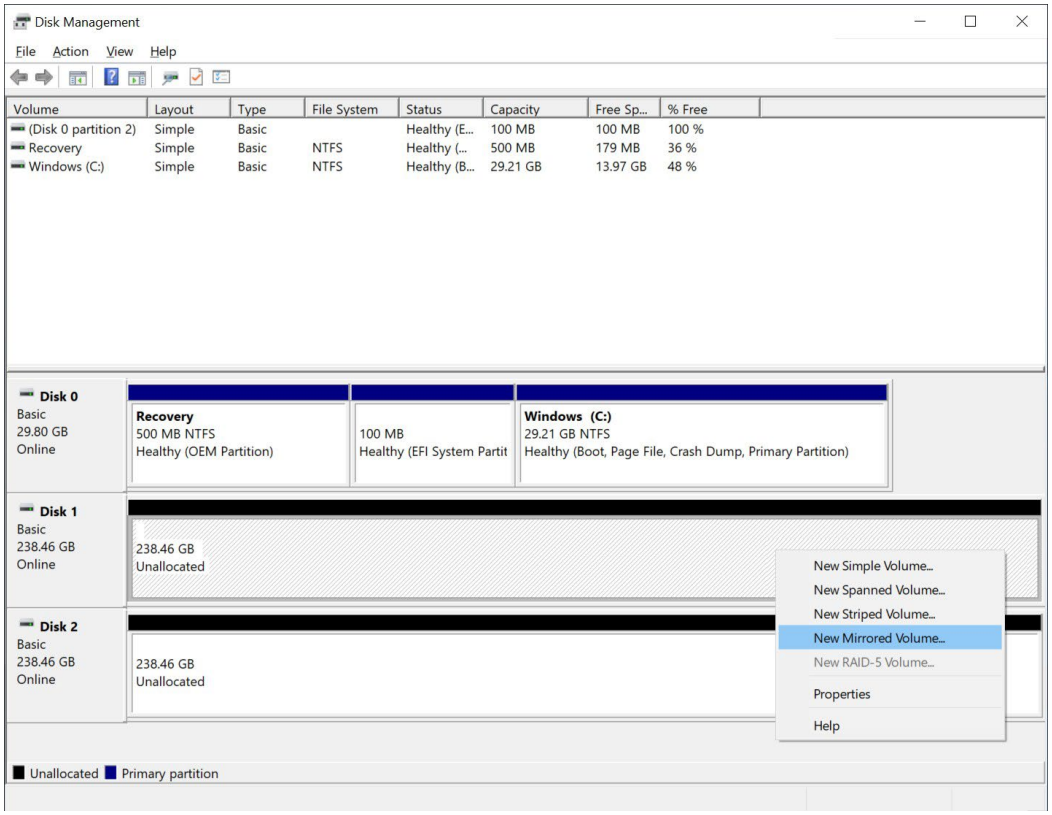
NOTE

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

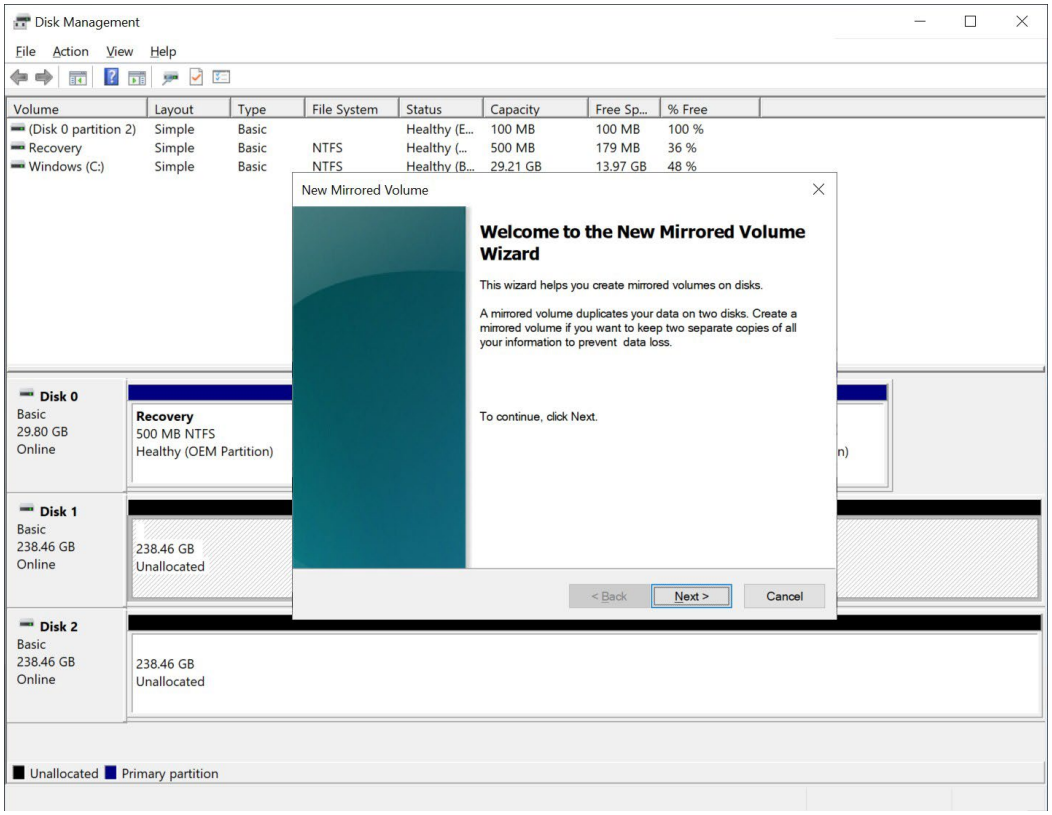
1. Run **Disk Management**.
   All connected disks should have the disk status **Unallocated**. If the disk status is not **Unallocated**, you can right-click on the disk and select **Delete Volume**.



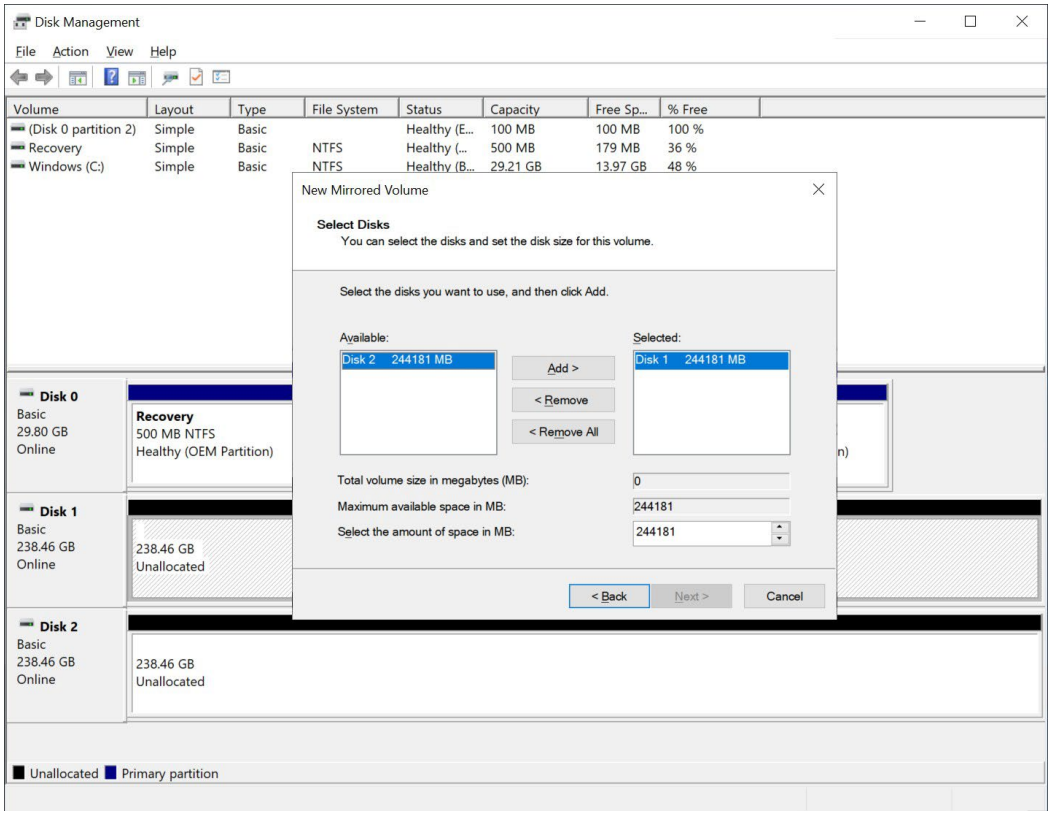
2. Right-click the target disk. Select the target volume type. For example: **RAID1(Mirror)**.



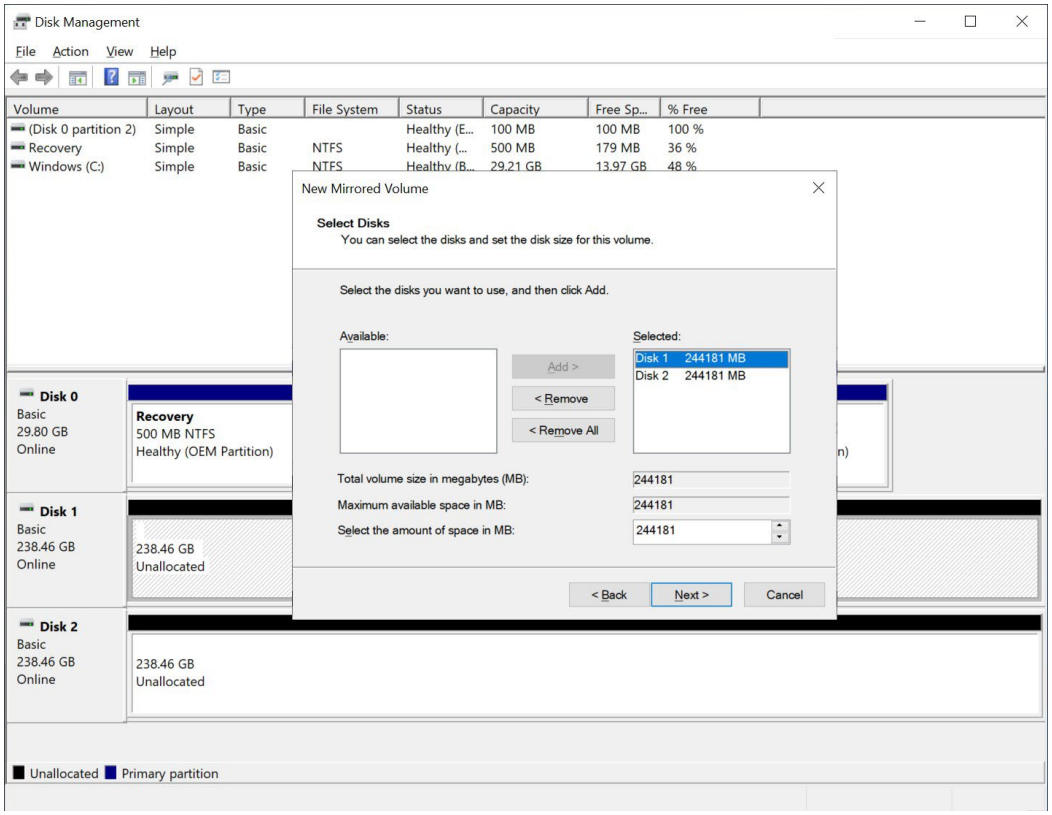
3. To continue, click **Next**



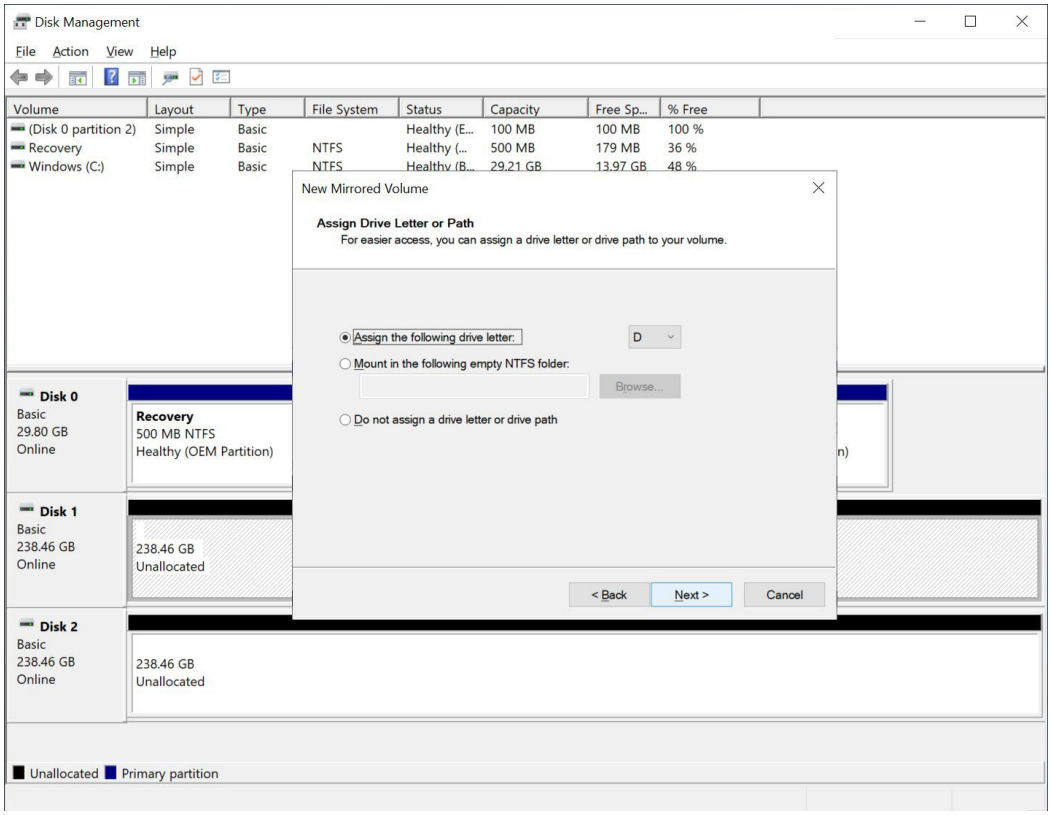
4. Select the disks you want to use, and then click **Add**.



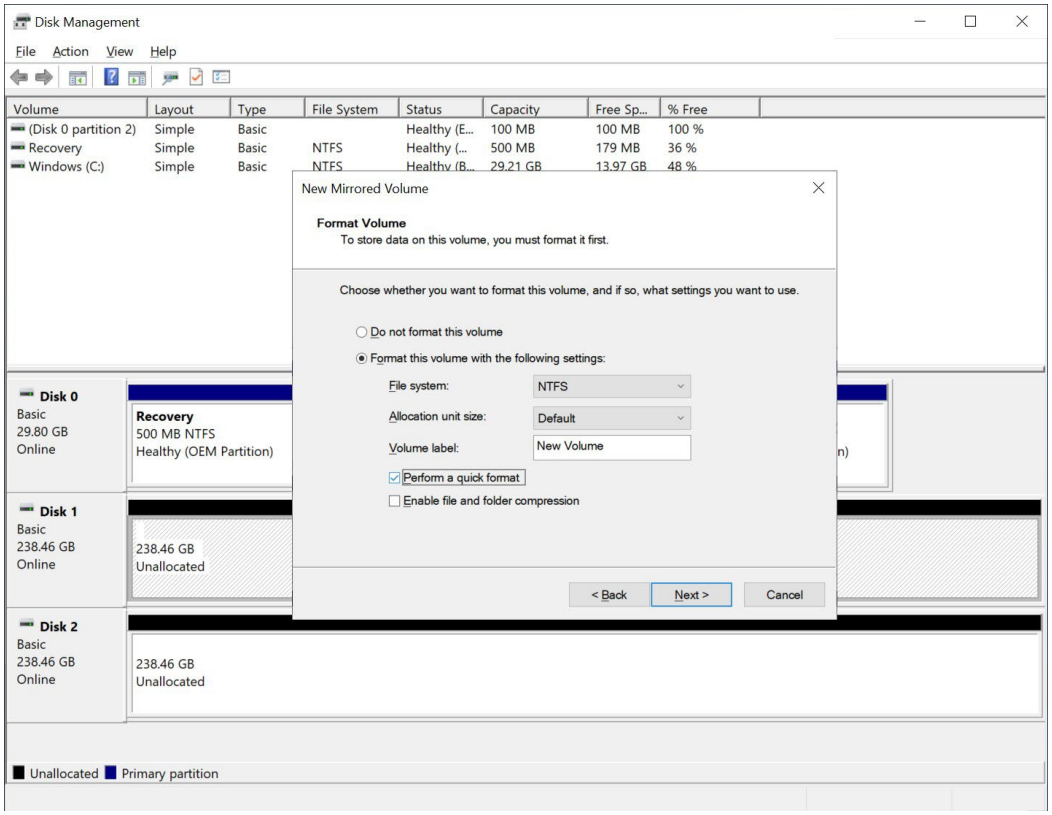
5. Click **Next**.



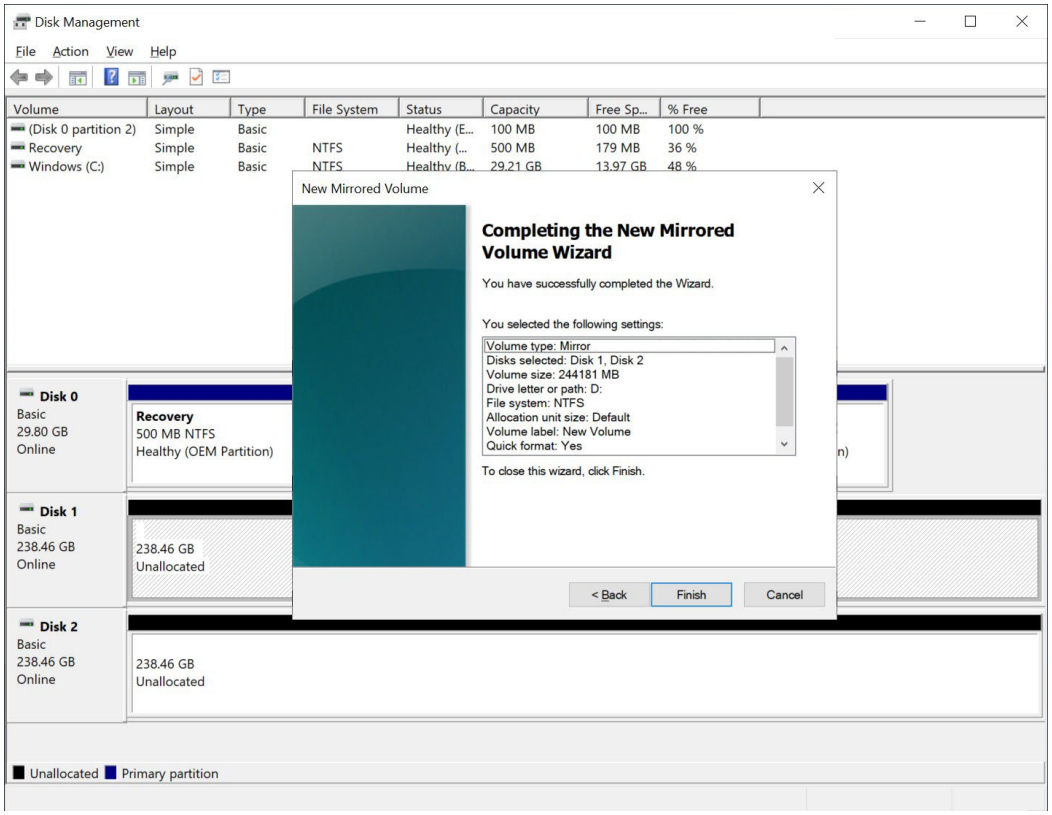
6. Assign the drive letter, click **Next**



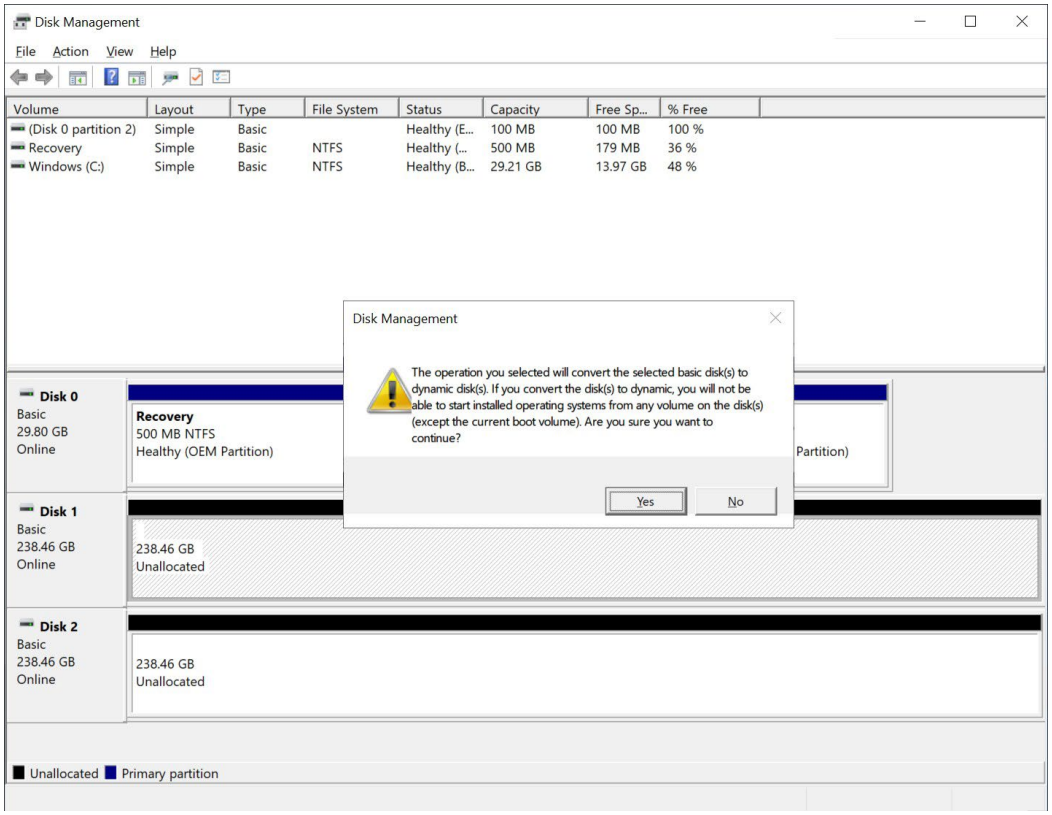
7. Format the volume using **Quick Format**, click **Next**.



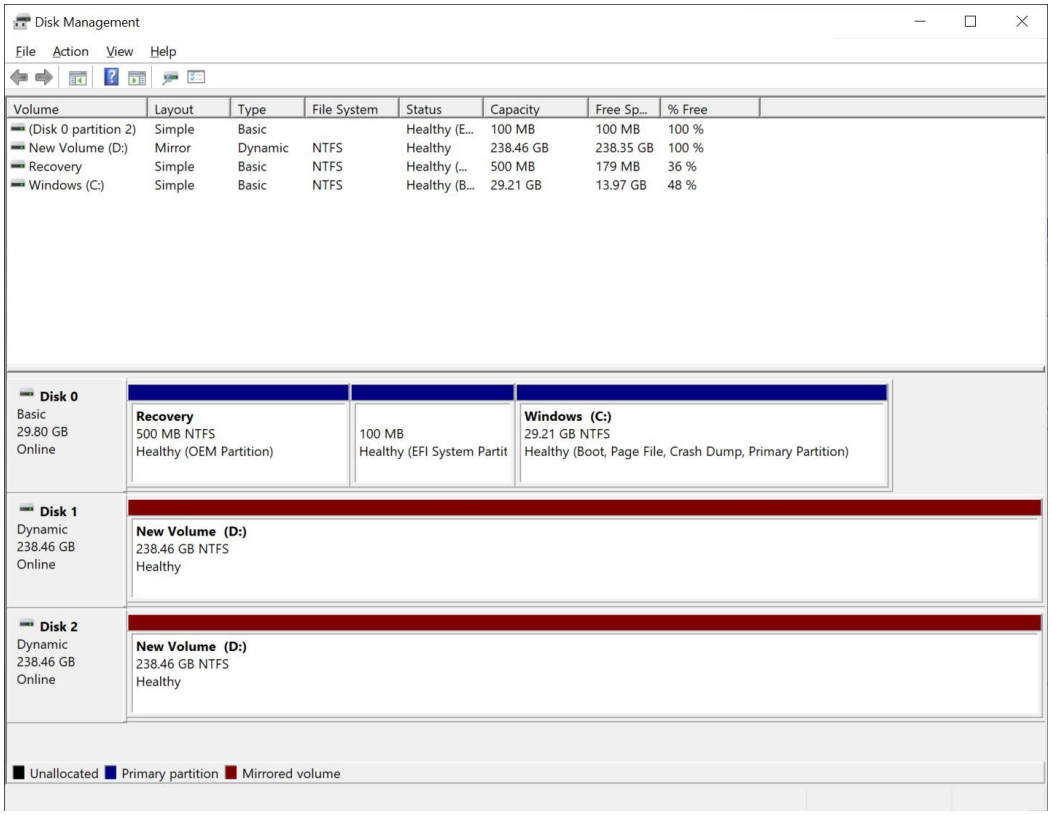
8. Checking the RAID1(Mirror) information. Click **Finish** to create the RAID1 volume.



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

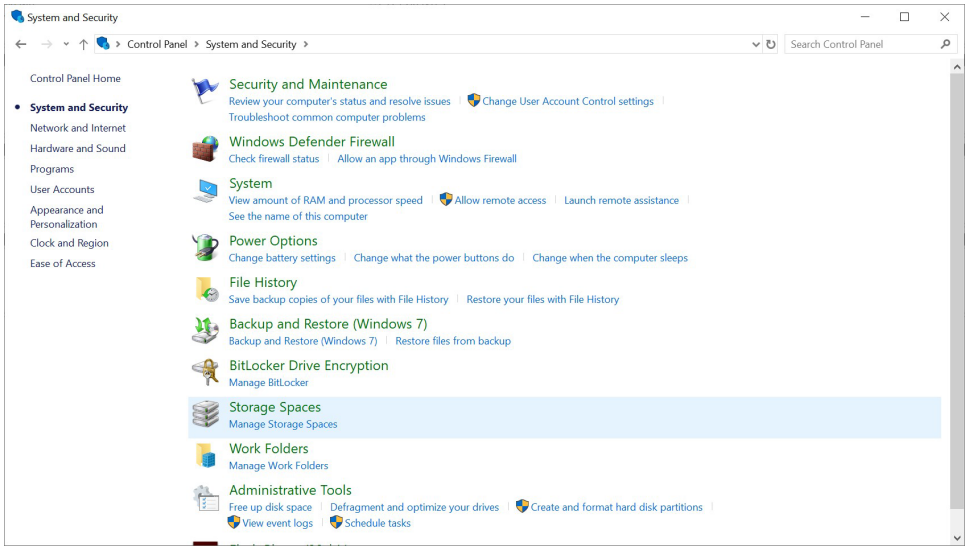


10. Checking the RAID1(Mirror) information from disk management.

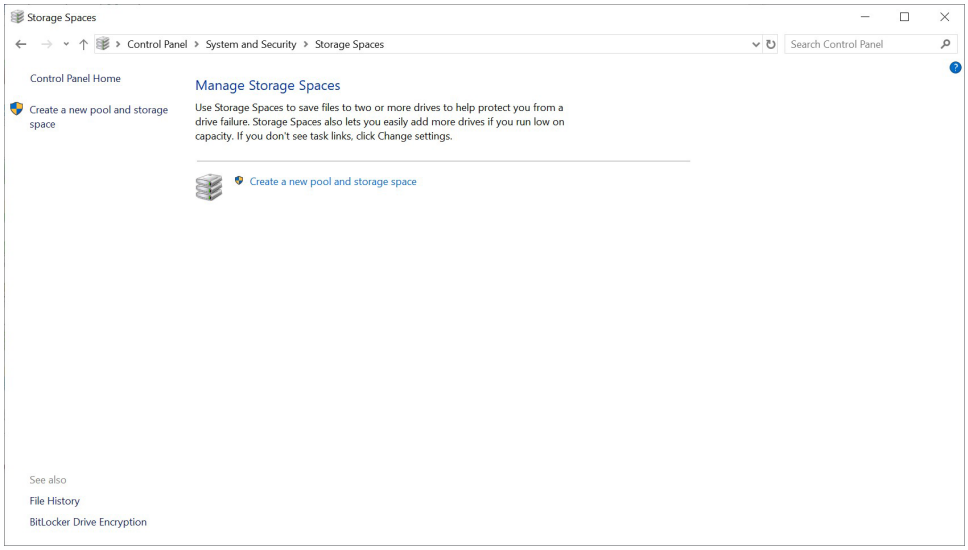


SW RAID—Creating the RAID 5 From Storage Spaces

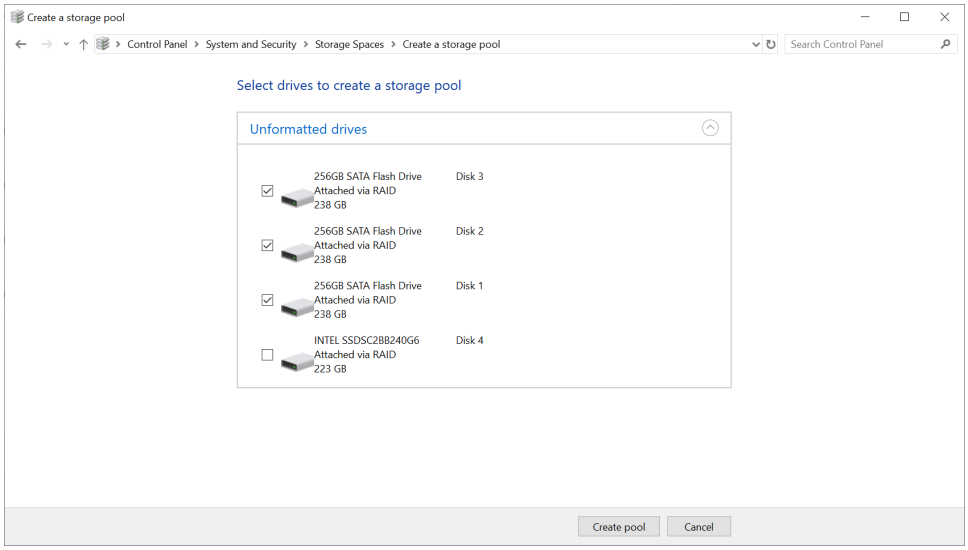
1. Open **Control Panel > System and Security**, run **Storage Spaces**.



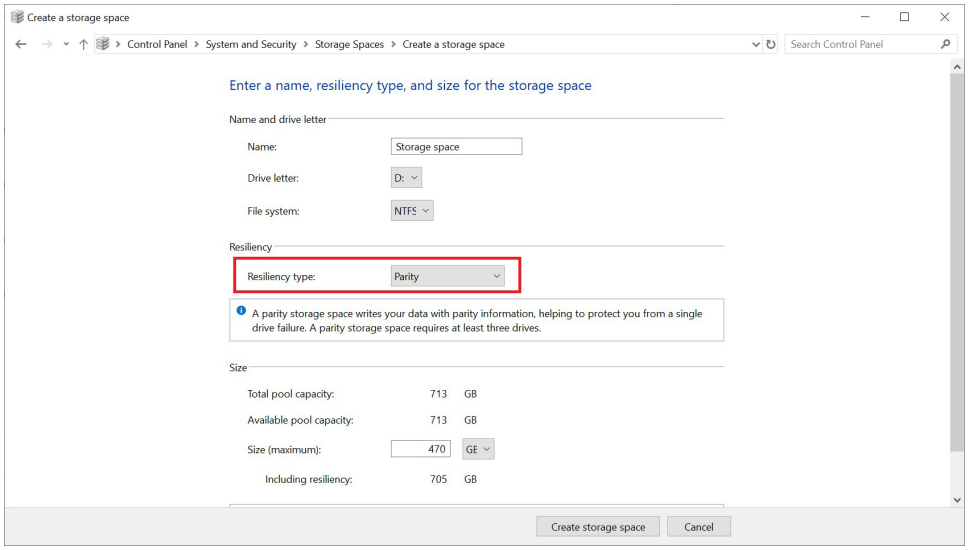
2. Click **Create a new pool and storage space**.



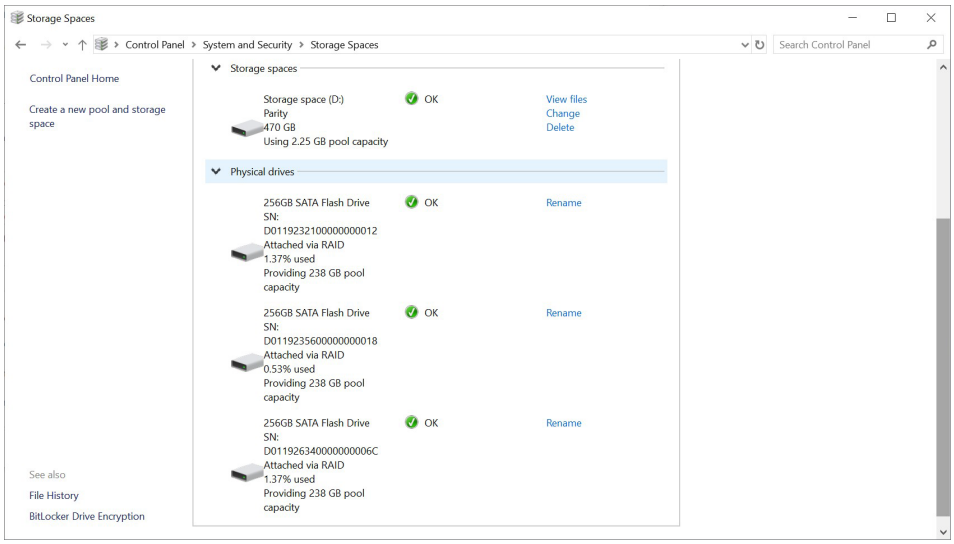
3. Select target drives to create a storage pool. RAID 5 requires at least three disks. Click **Create pool**.



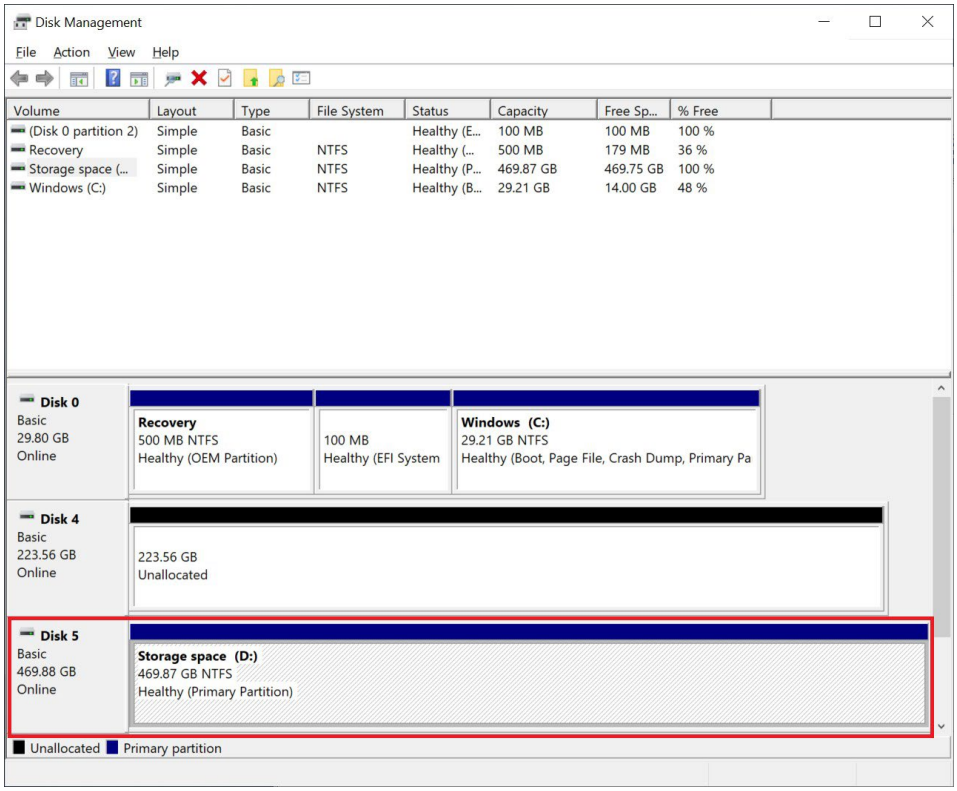
4. Changing the **Resiliency type** to **Parity**. Click **Create storage space**.



5. Checking the RAID 5 volume status.

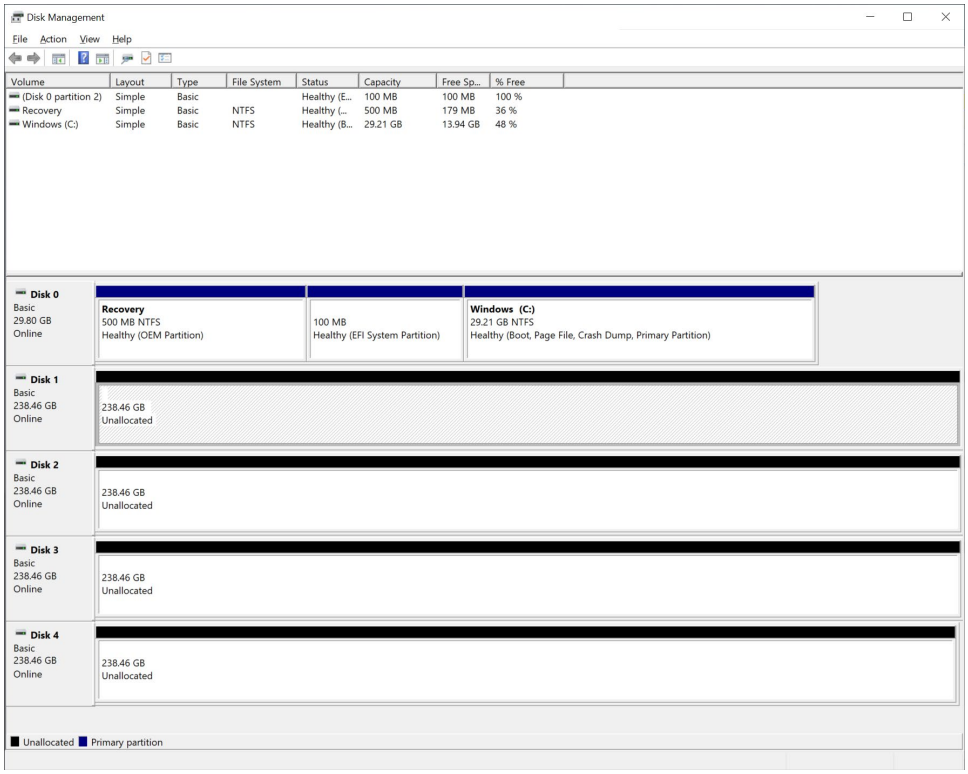


6. Checking the storage space from disk management.

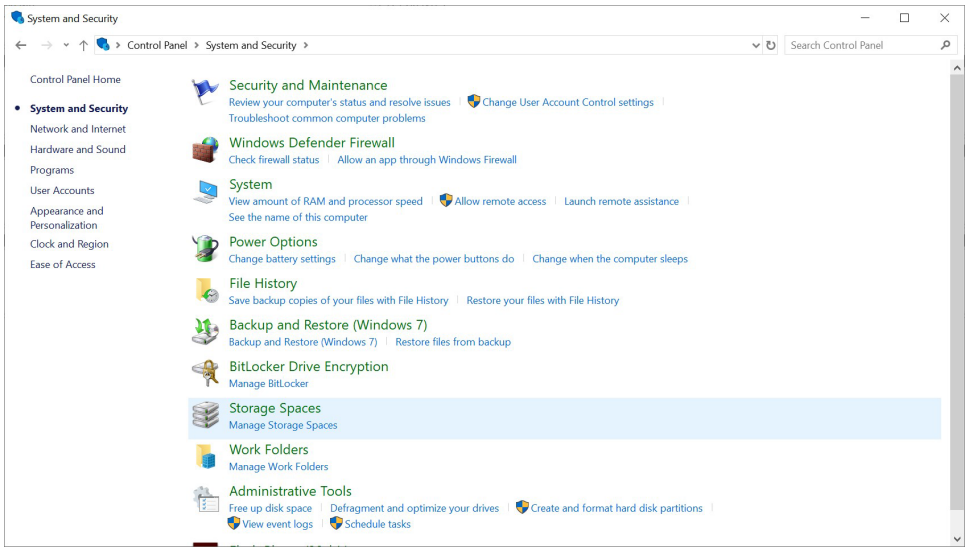


SW RAID—Creating the RAID 10 From Storage Spaces

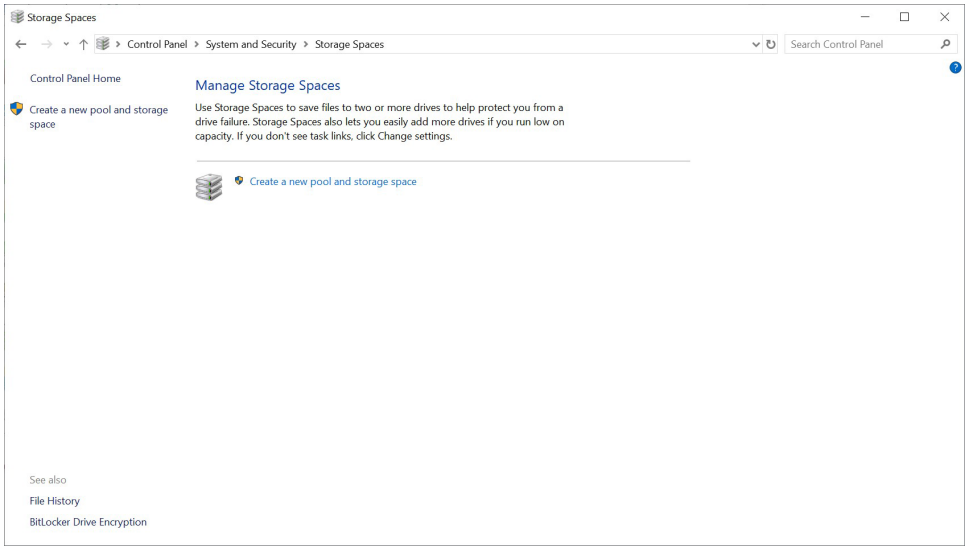
1. Run the **Disk Management**. Connecting the new disks and checking all the disk status are **Unallocated**. If the disk status is not **Unallocated**, you can right-click the target disk and select **Delete Volume**.



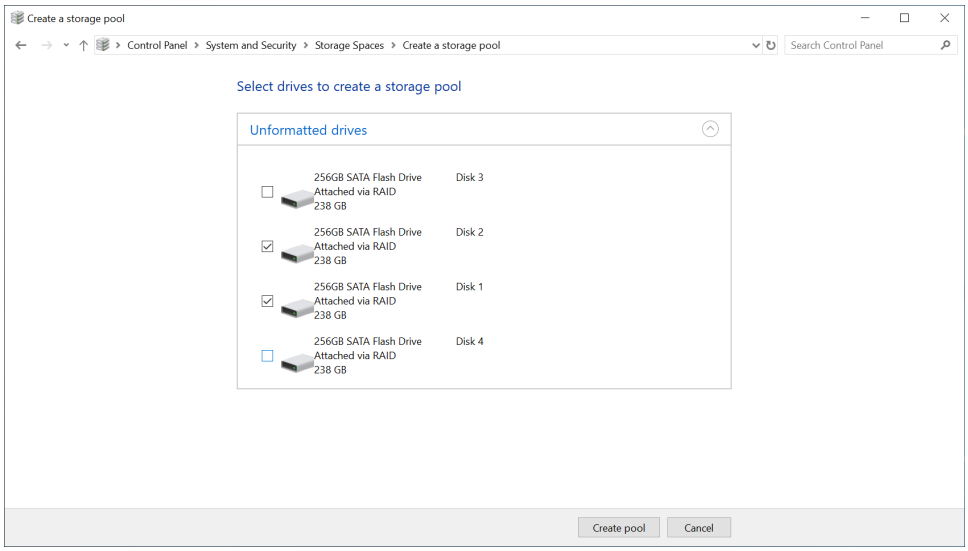
2. Open **Control Panel > System and Security**, run **Storage Spaces**.



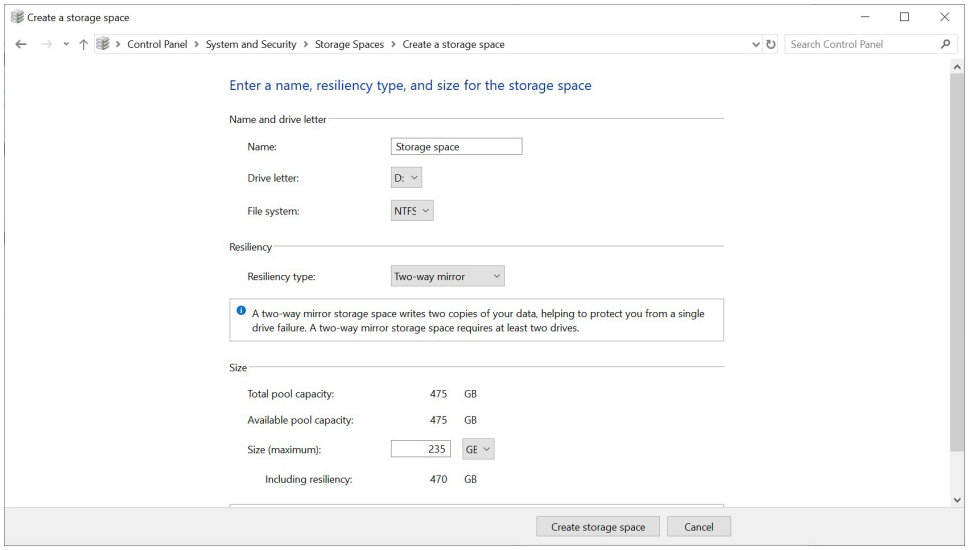
3. Click **Create a new pool and storage space**.



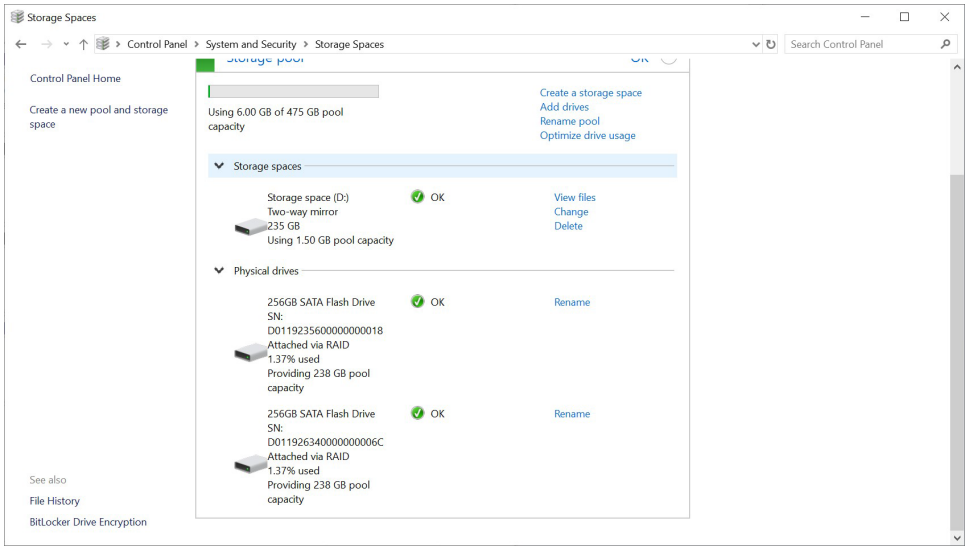
4. RAID 10 requires at least four disks. Select **Disk 1** and **Disk 2** to create a storage pool. Click **Create a pool**.



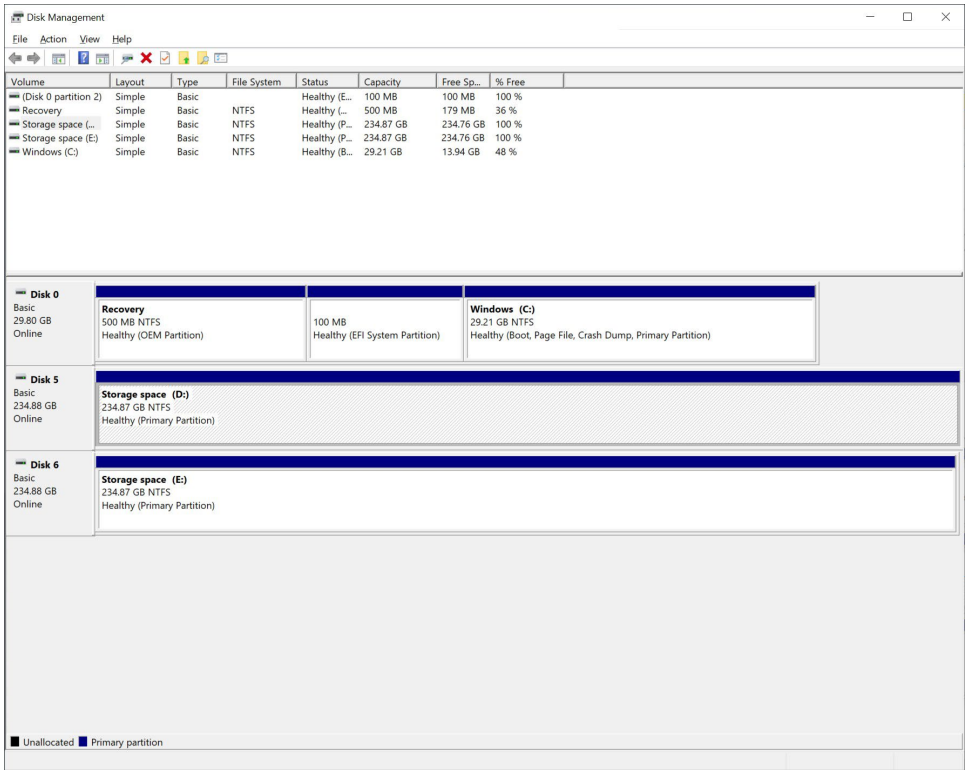
5. Changing the **Resiliency type** to **Two-way mirror**. Click **Create storage space**. Follow the step 4 to run the same steps on **Disk 3** and **Disk 4**.



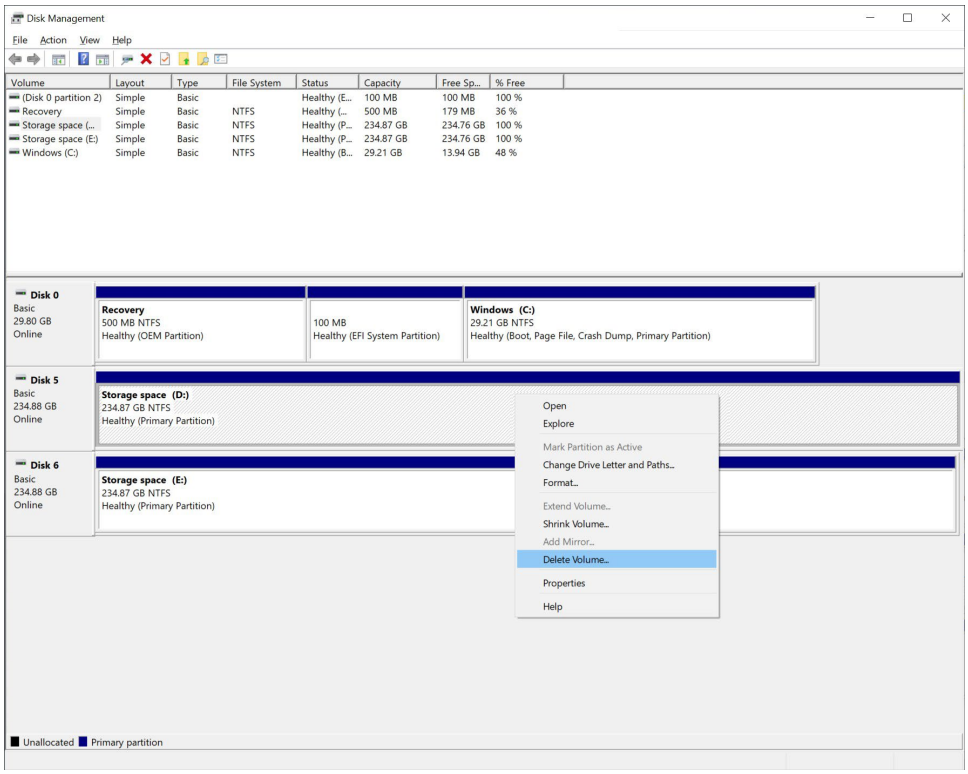
6. Checking the storage space status.



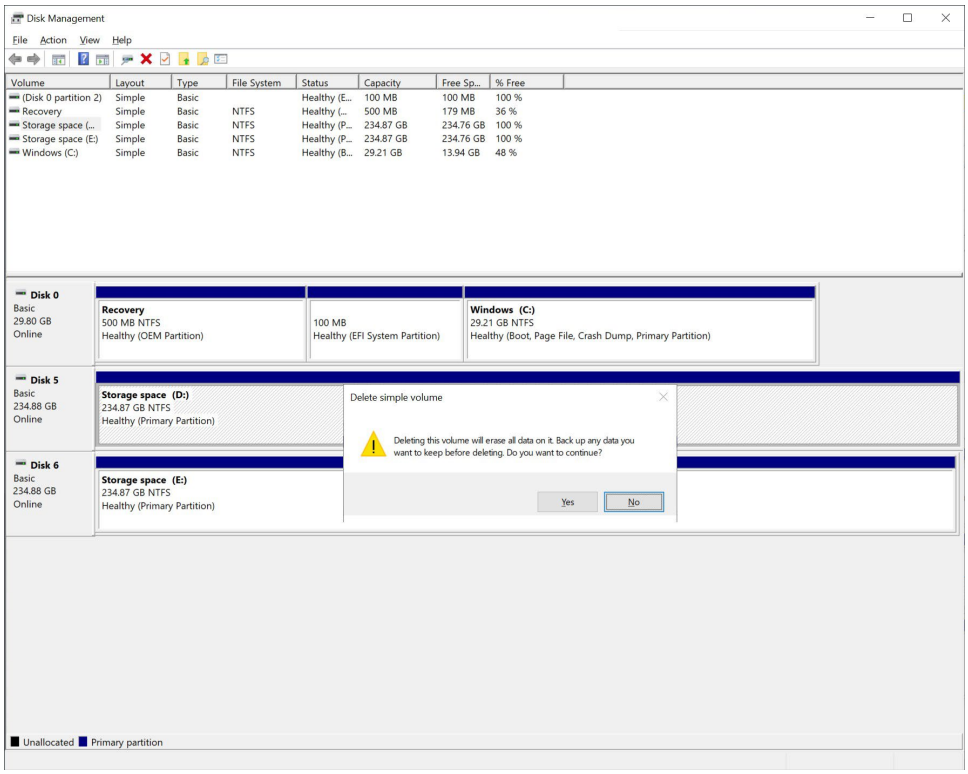
7. After the creating steps, the **Storage space (D:)** and **Storage space (E:)** will be shown on **Disk Management**.



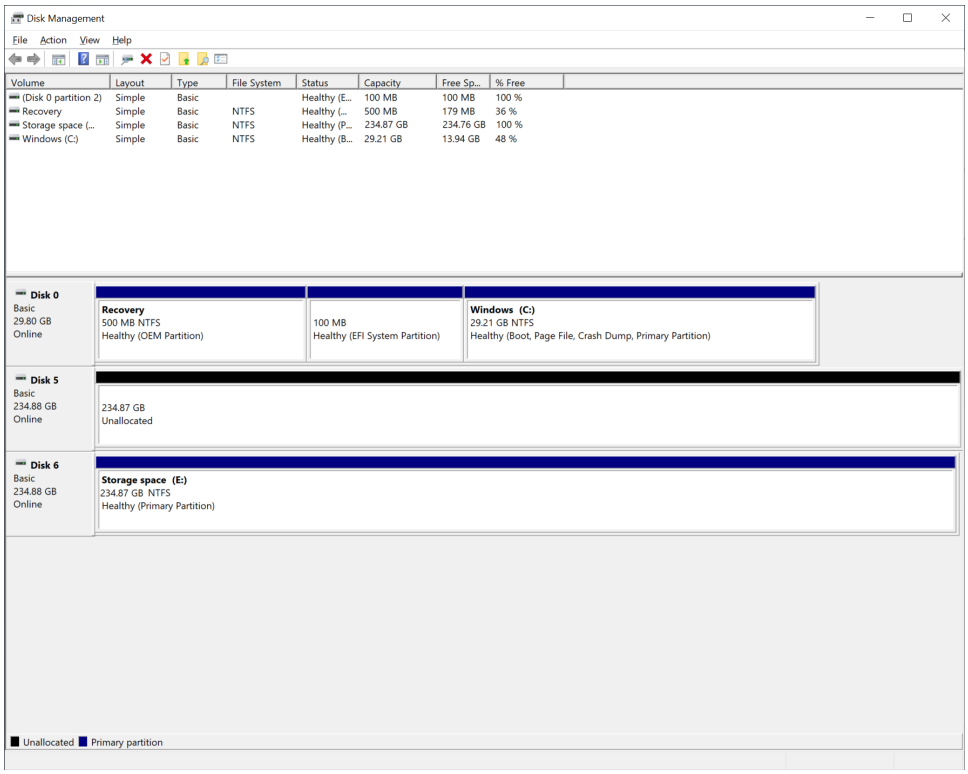
8. Right-click the **Storage space (D:)**, select **Delete Volume**.



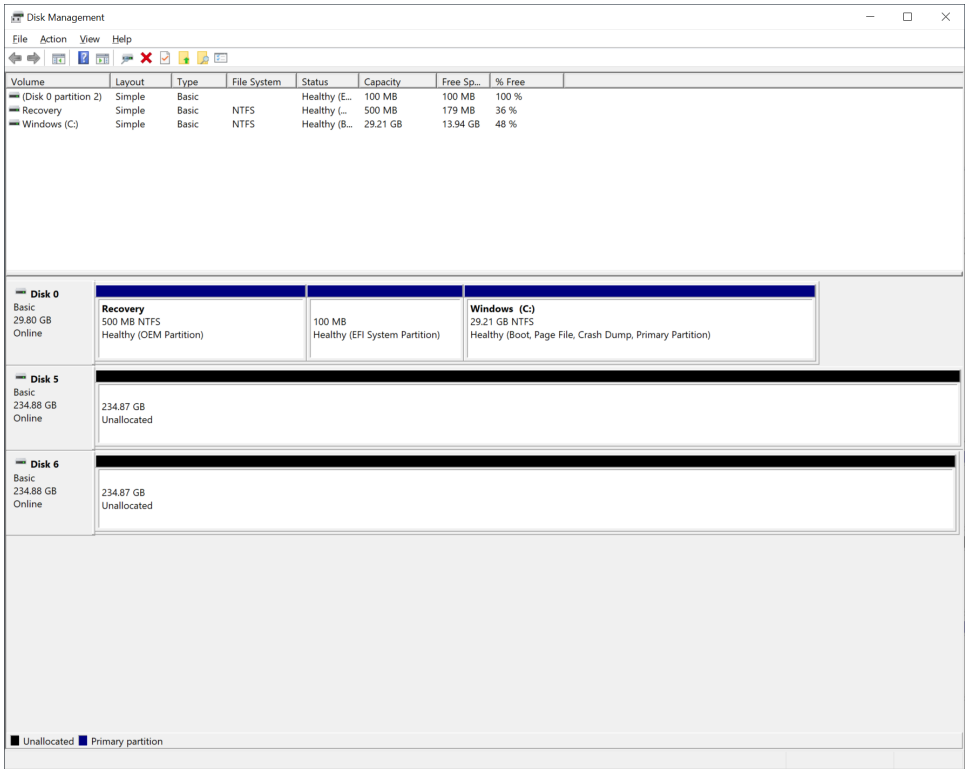
9. The warning messages are shown on screen, click **Yes** to delete the volume.



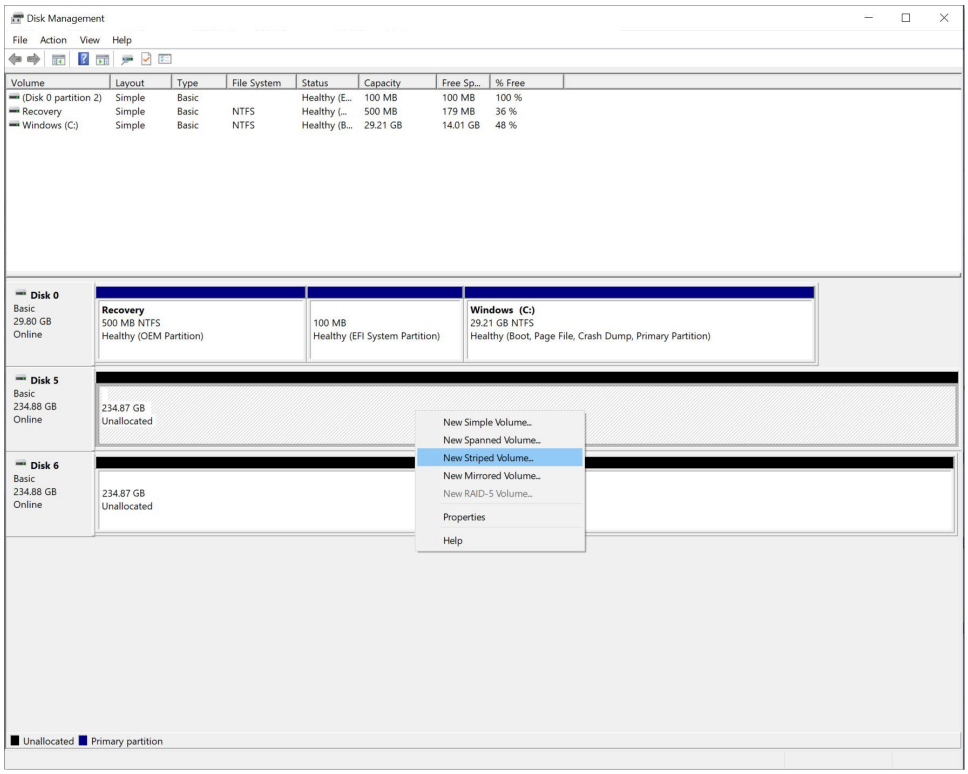
10. The storage space status will change to **Unallocated**, and run the same steps on **Storage space (E:)**.



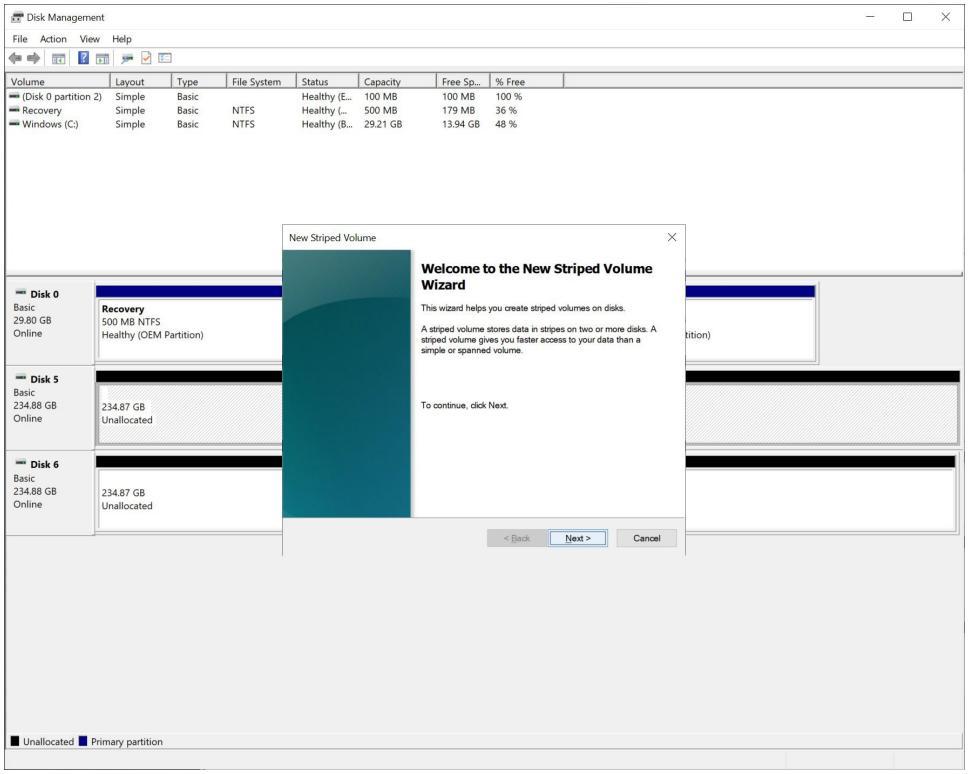
11. All the storage space status are **Unallocated**.



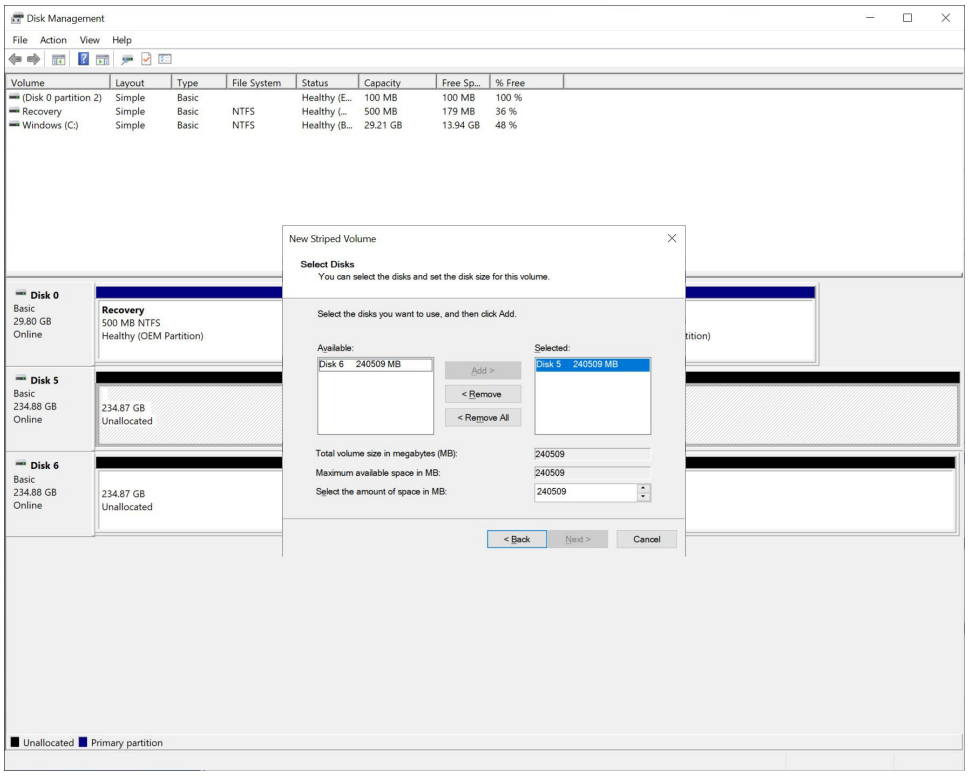
12. Right-click on the **Disk 5**, select **New Striped Volume**.



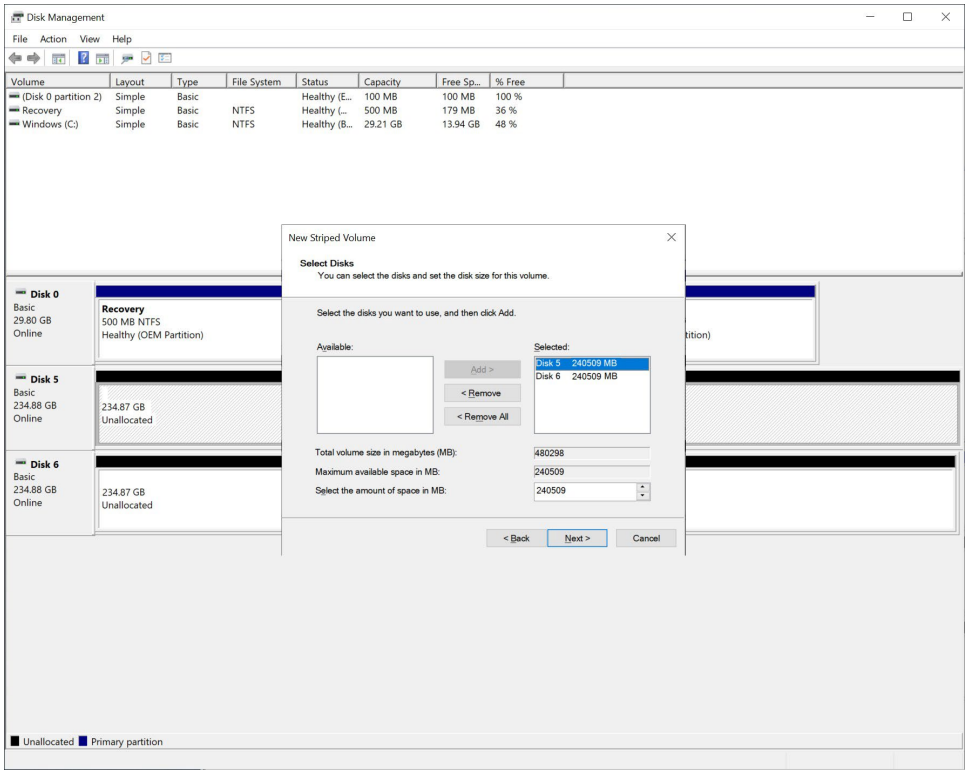
13. To continue, click **Next**.



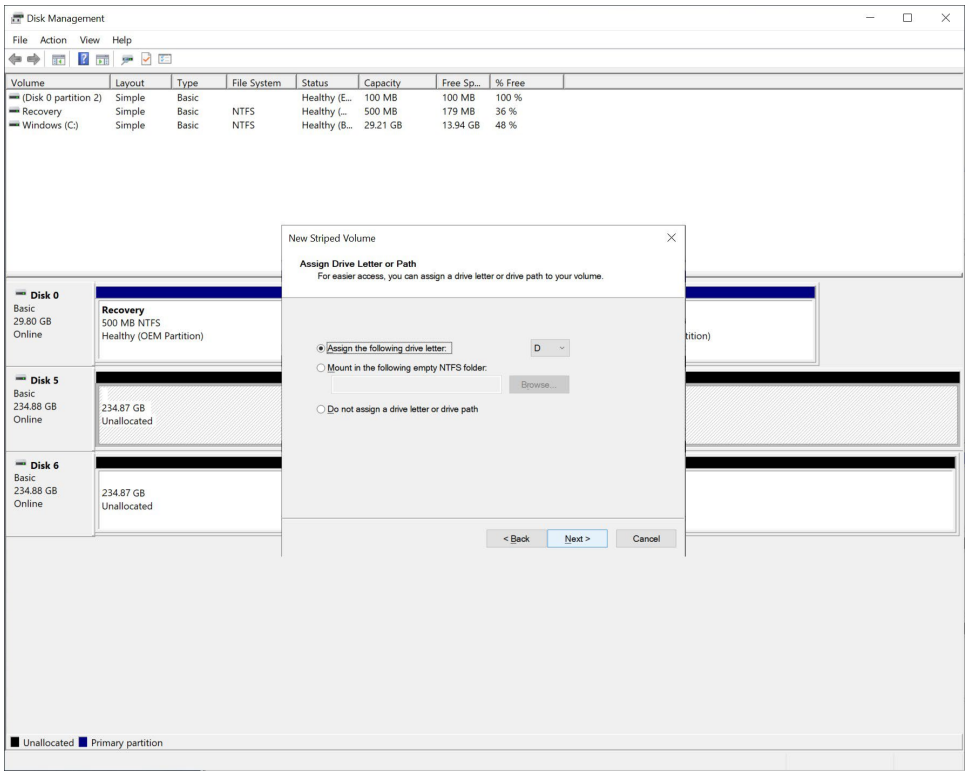
14. Select the disks you want to use, and then click **Add**.



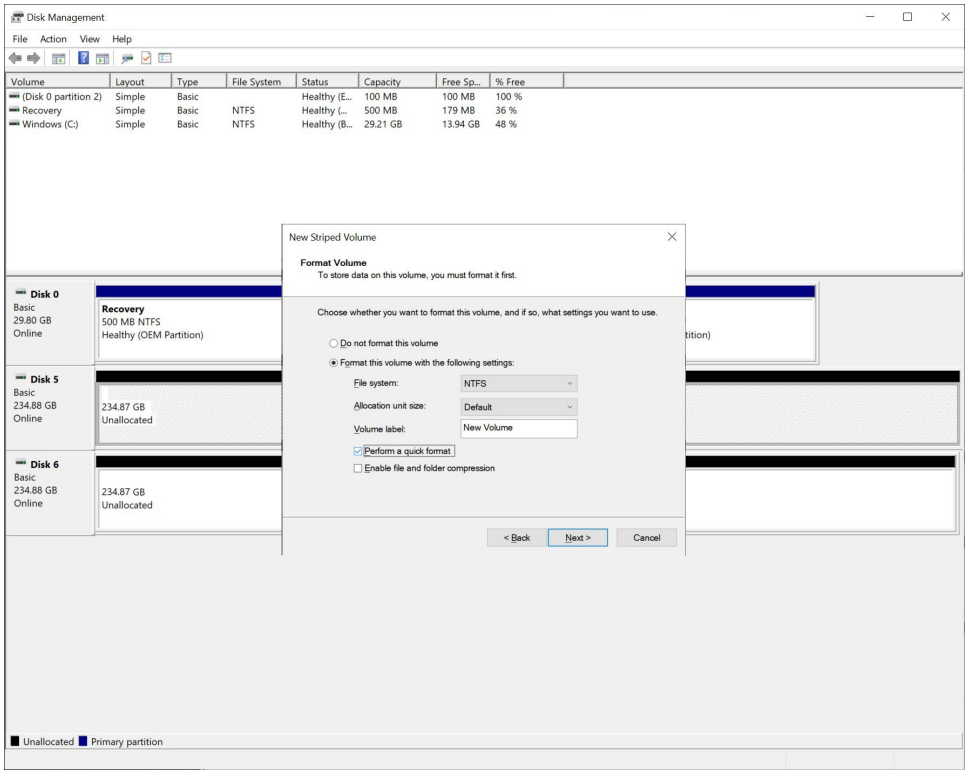
15. Click **Next**.



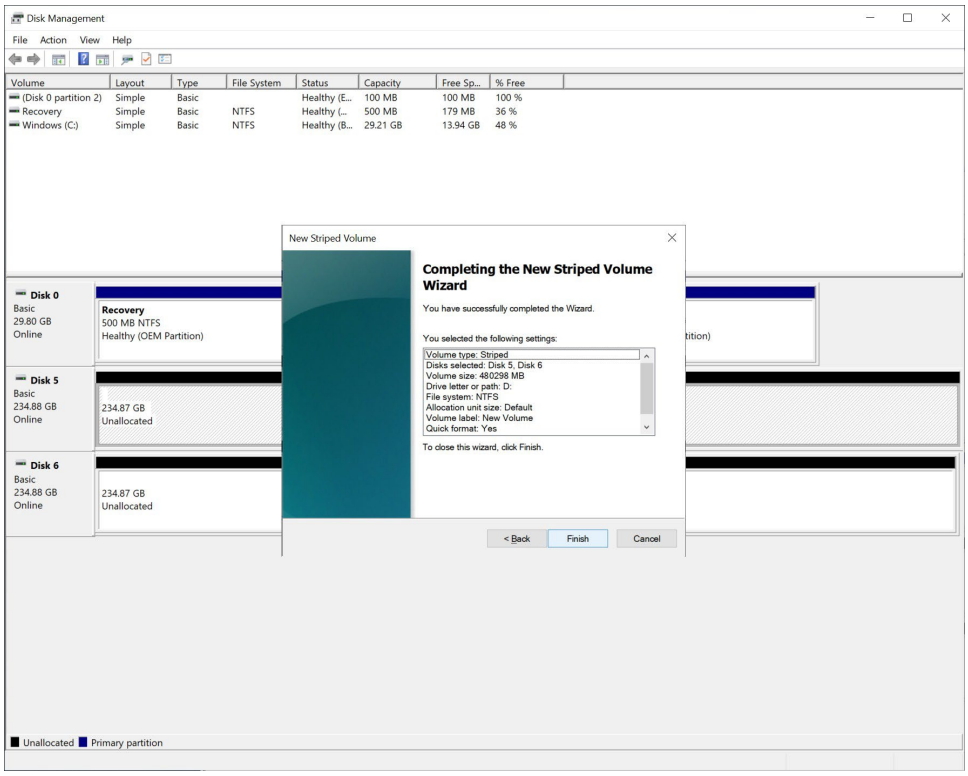
16. Assign the drive letter, click **Next**.



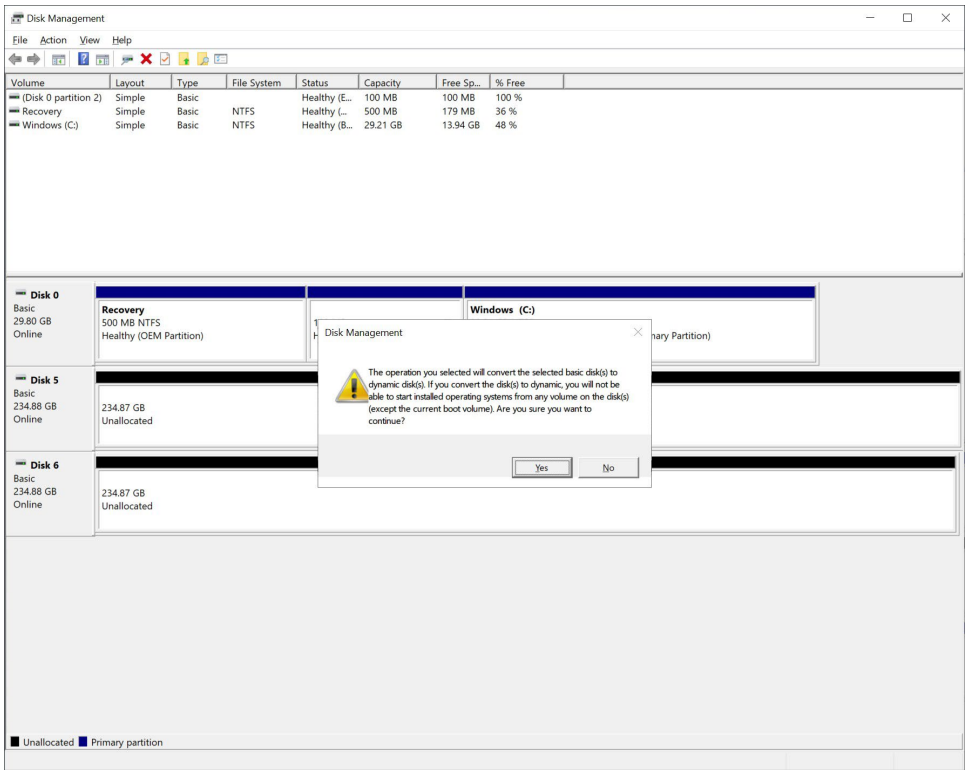
17. Format the volume using the **Quick Format**, click **Next**.



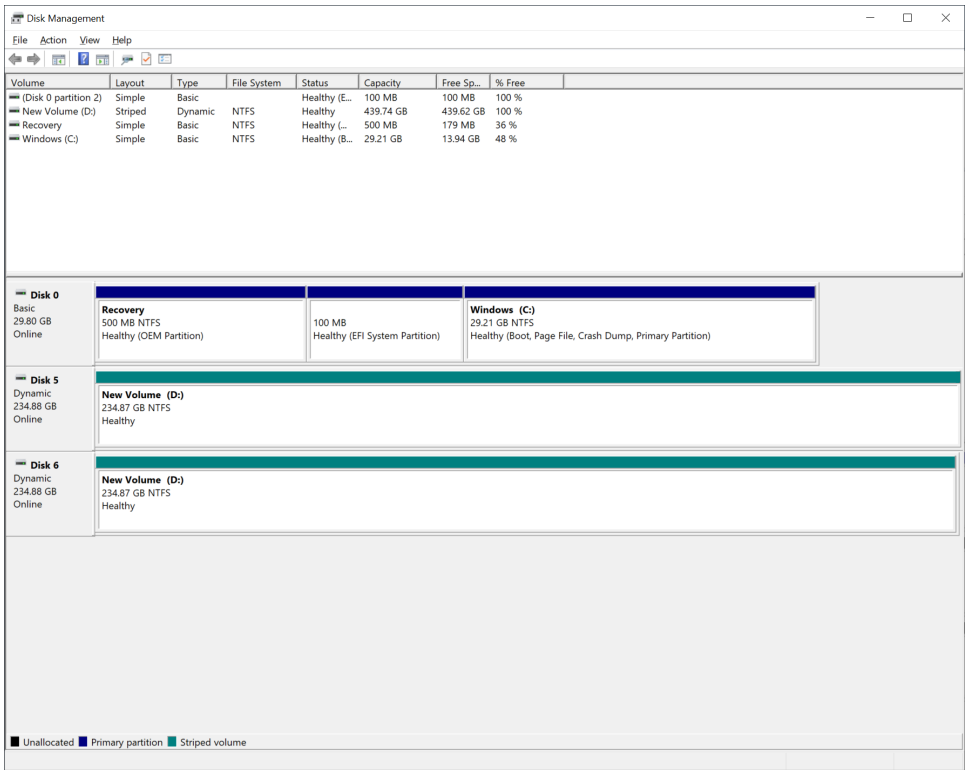
18. Checking the volume information. Click **Finish** to create the striped volume.



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



20. Checking the striped volume 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.

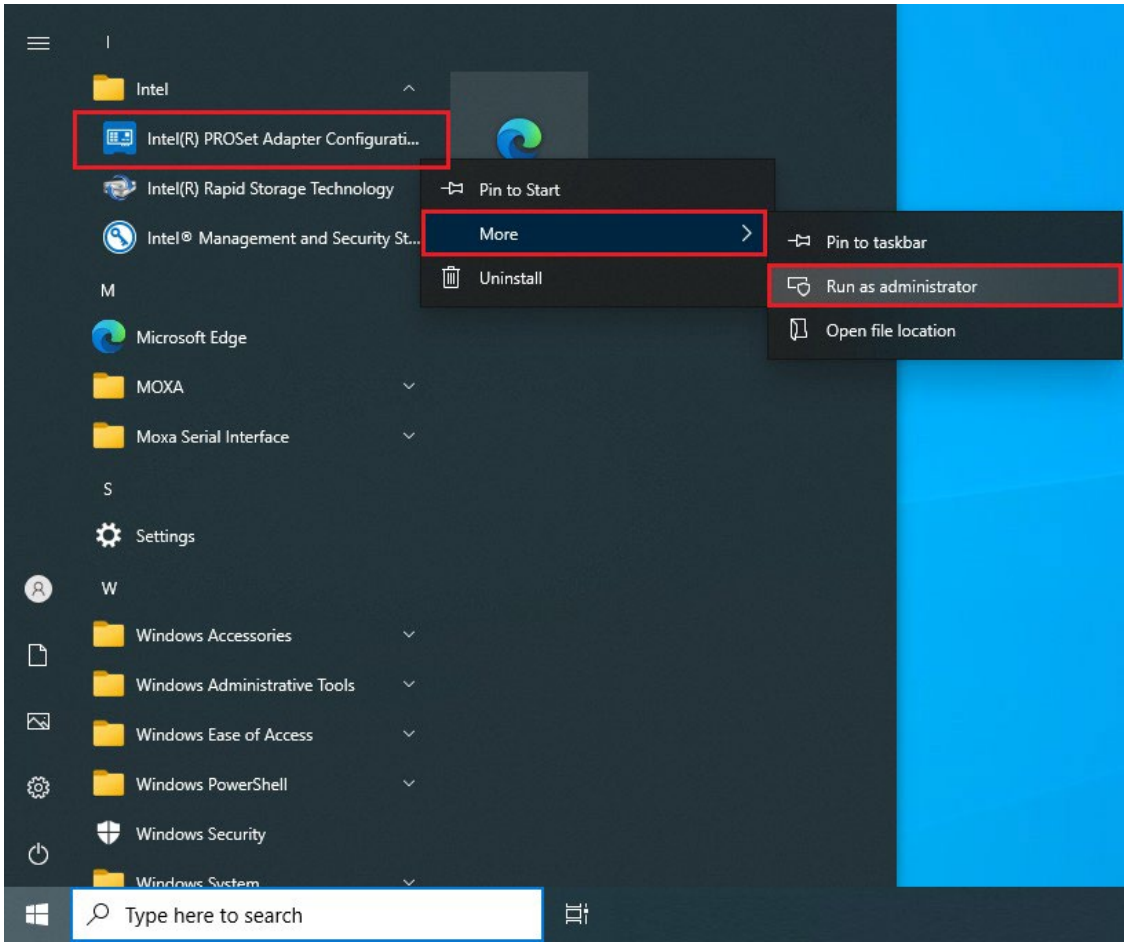
For more information about Teaming : https://learn.microsoft.com/en-us/previous-versions/windows/it-pro/windows-server-2012-r2-and-2012/hh997031(v=ws.11)

Intel® Net Team

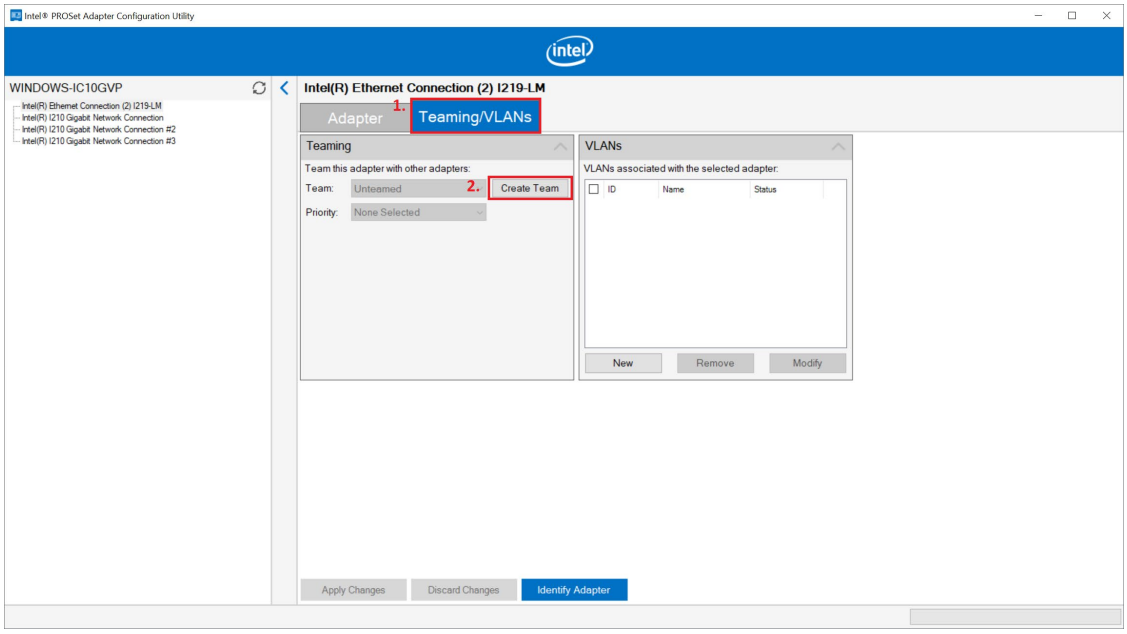
This chapter describes the setup process for the Intel® Teaming function.

Creating an Intel® Net Team

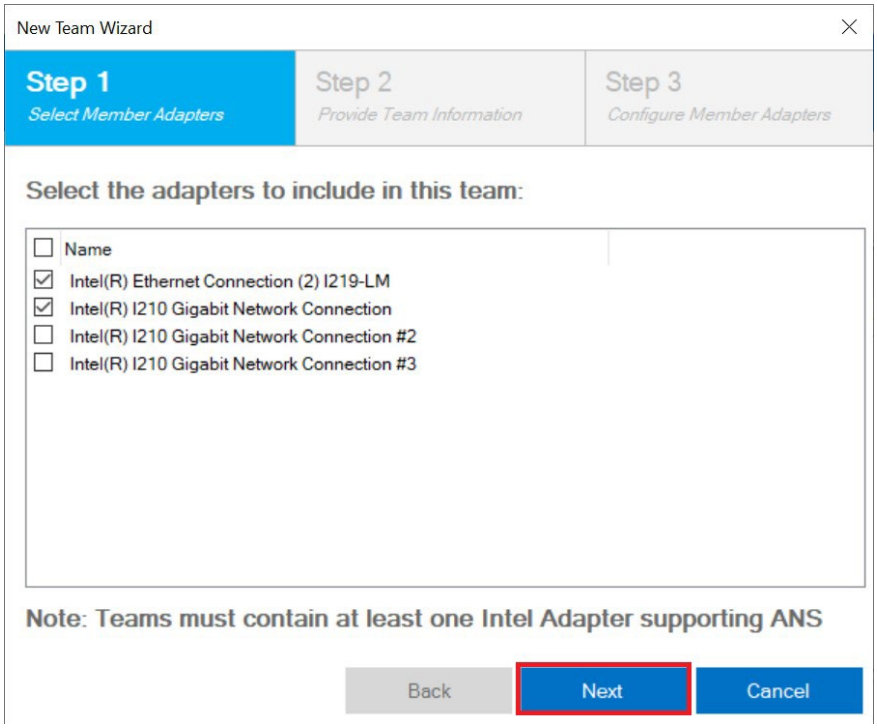
1. Run **Intel® PROSet Adapter Configuration Utility** as administrator.



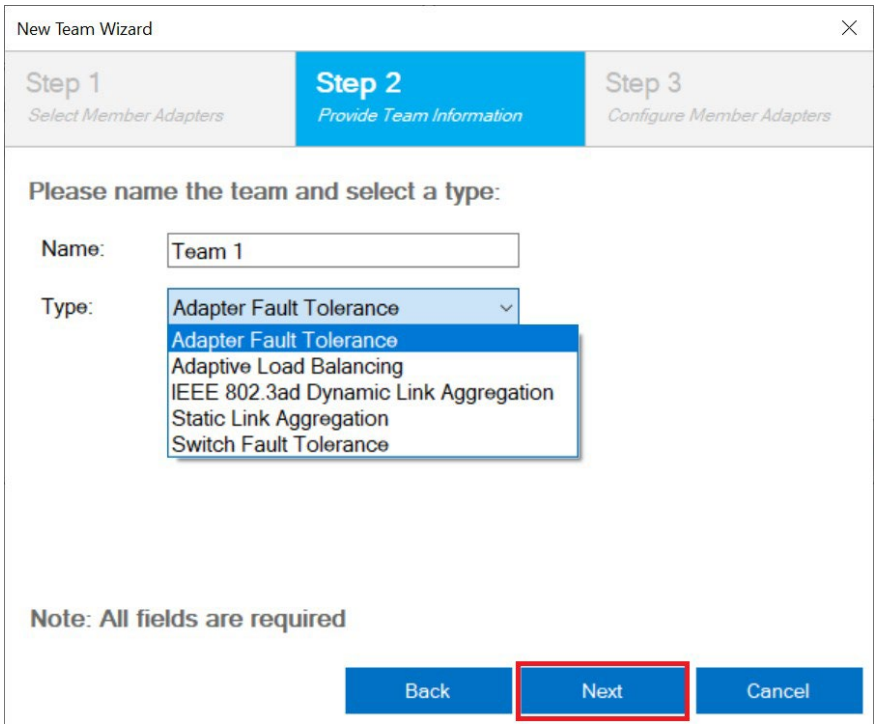
2. In the **Teaming/VLANs** tab, click **Create Team**.



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



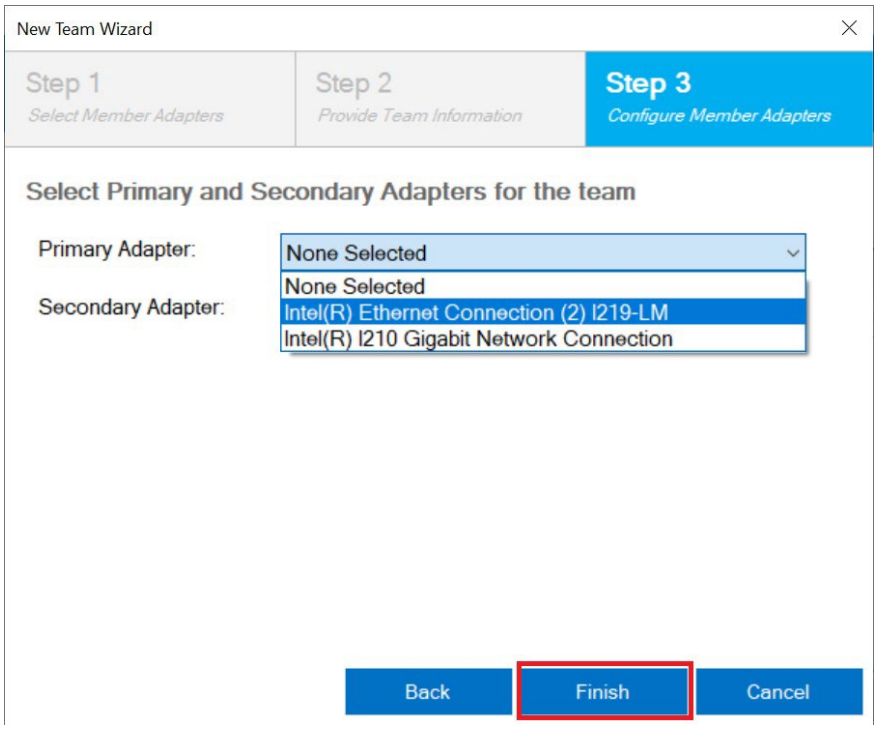
4. Name the team and select a team type. Click **Next** to continue.



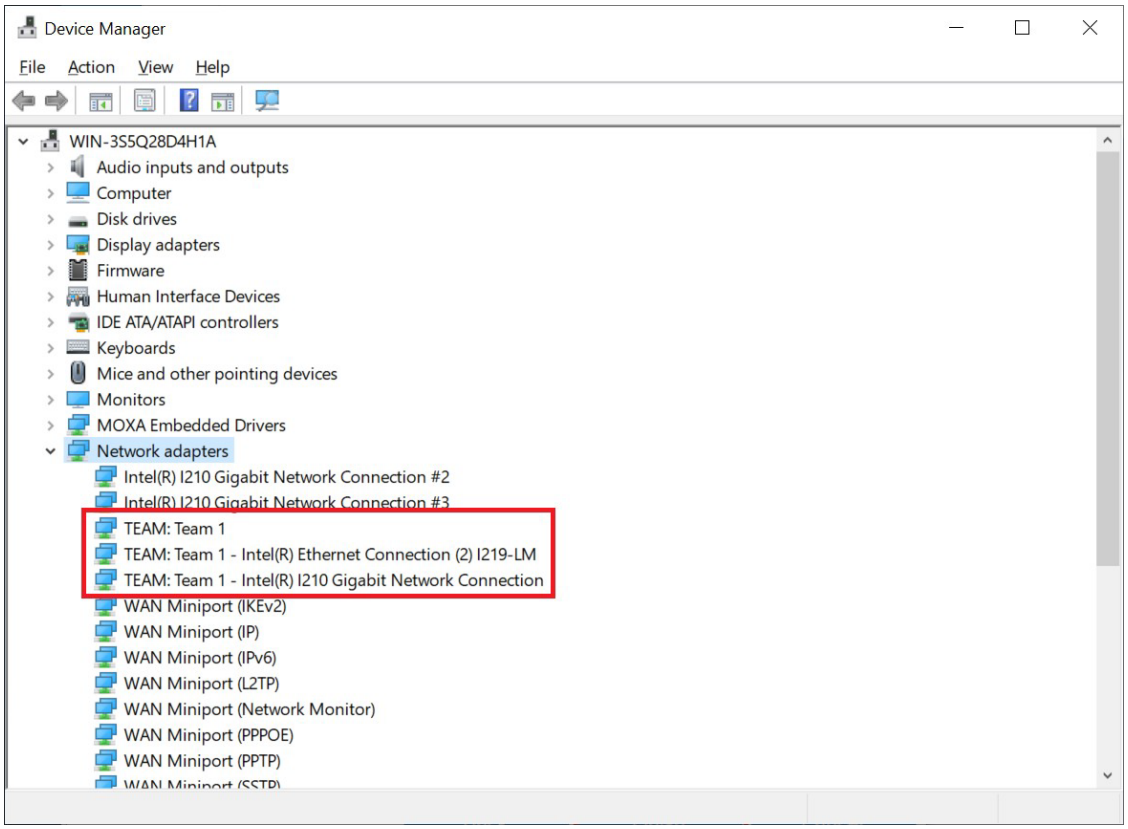
NOTE

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.



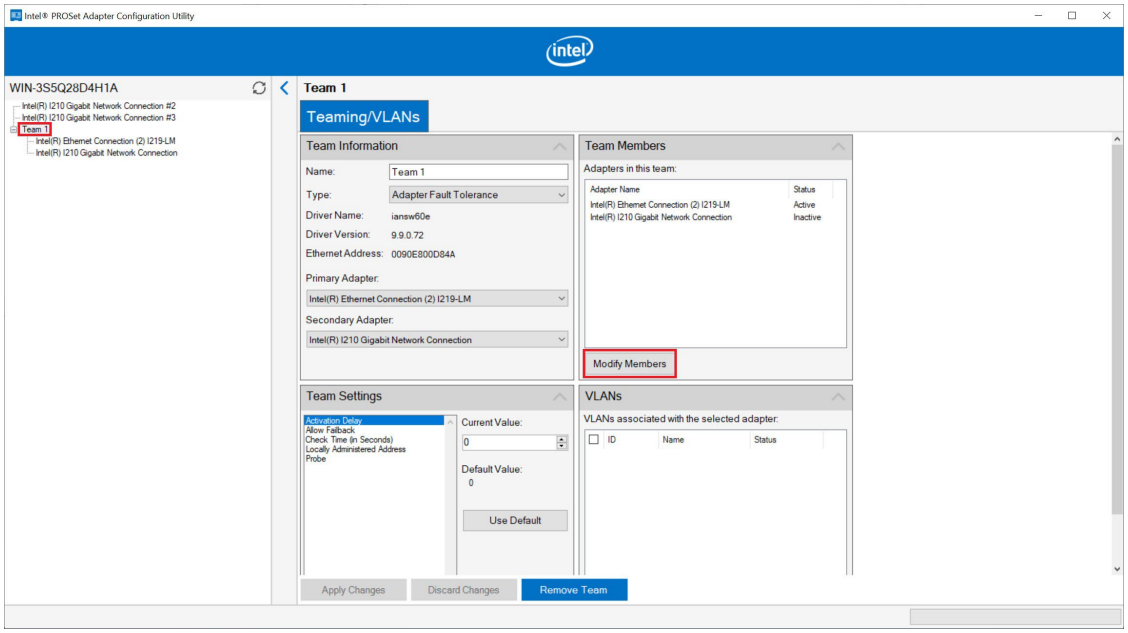
6. Check the **Network adapters** in the **Windows Device Manager**.



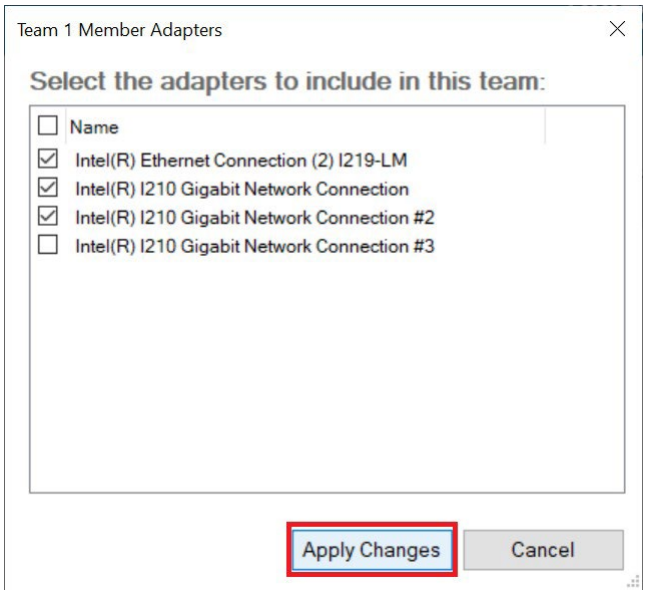
Modifying an Intel® Net Team Member

Adding an Intel® Net Team Member

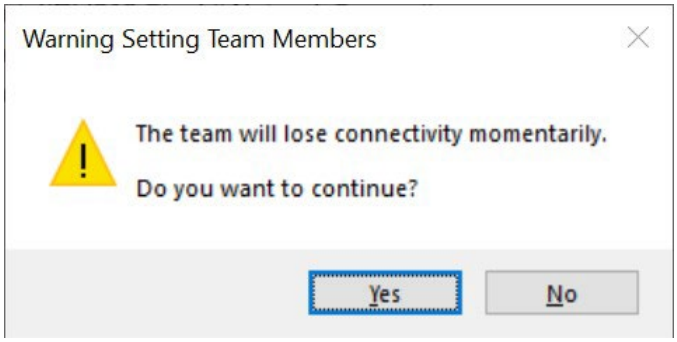
1. Select an Intel® Net team and click **Modify Members**.



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



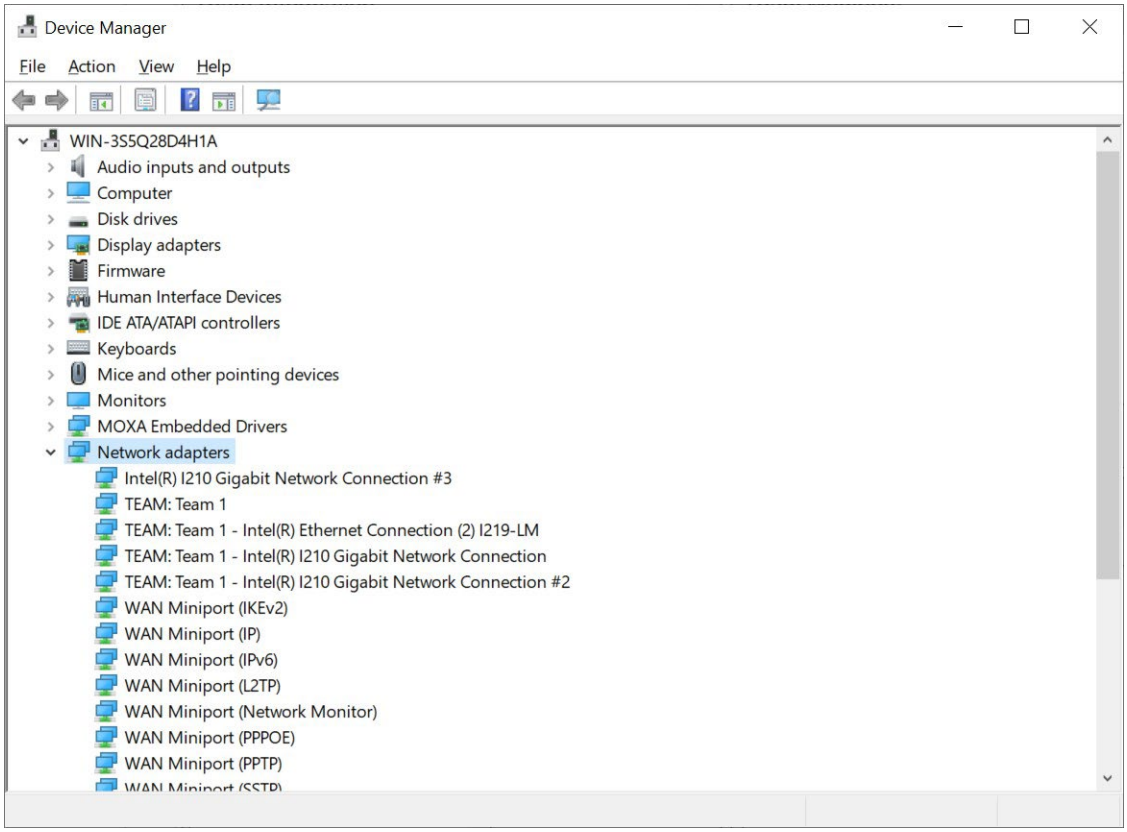
3. Click **Yes** to continue.



NOTE

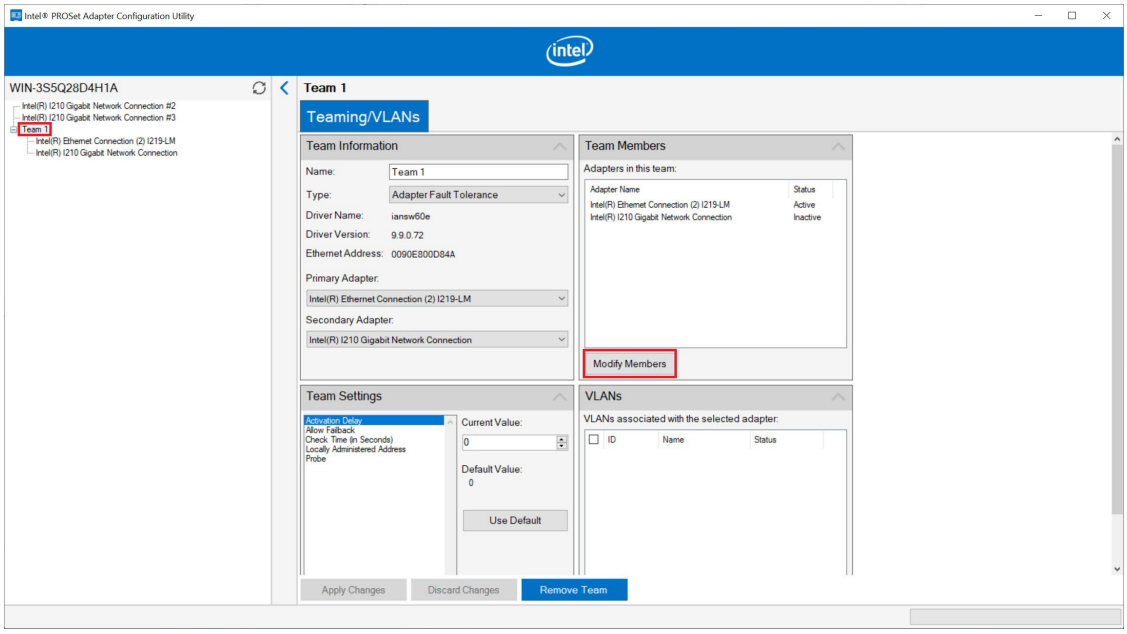
Modifying team members will cause the members to momentarily lose connectivity.

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

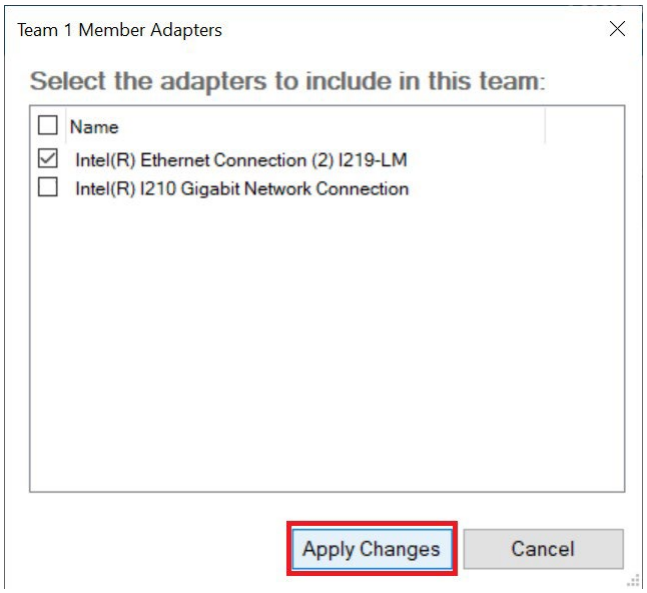


Removing an Intel® Net Team Member

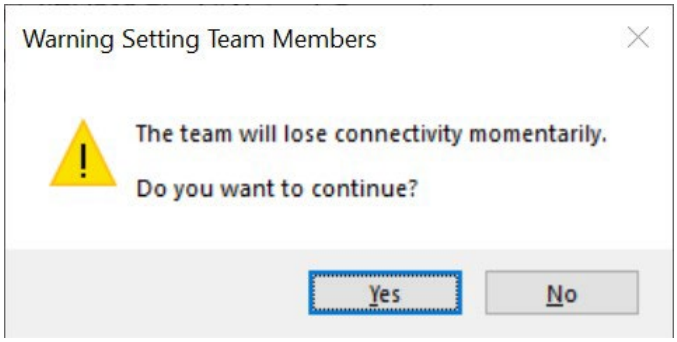
1. Select an Intel® Net team and click **Modify Members**.



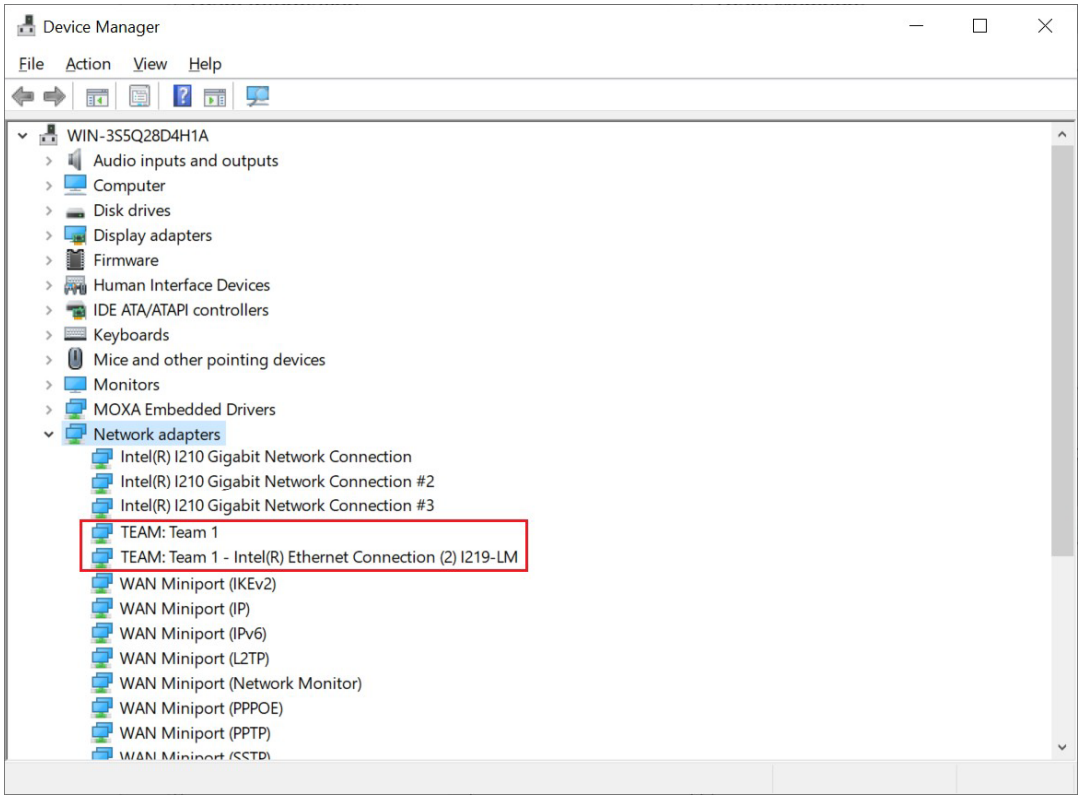
2. Uncheck the adapters you want to remove in this team and click **Apply Changes**.



3. Click **Yes** to continue.

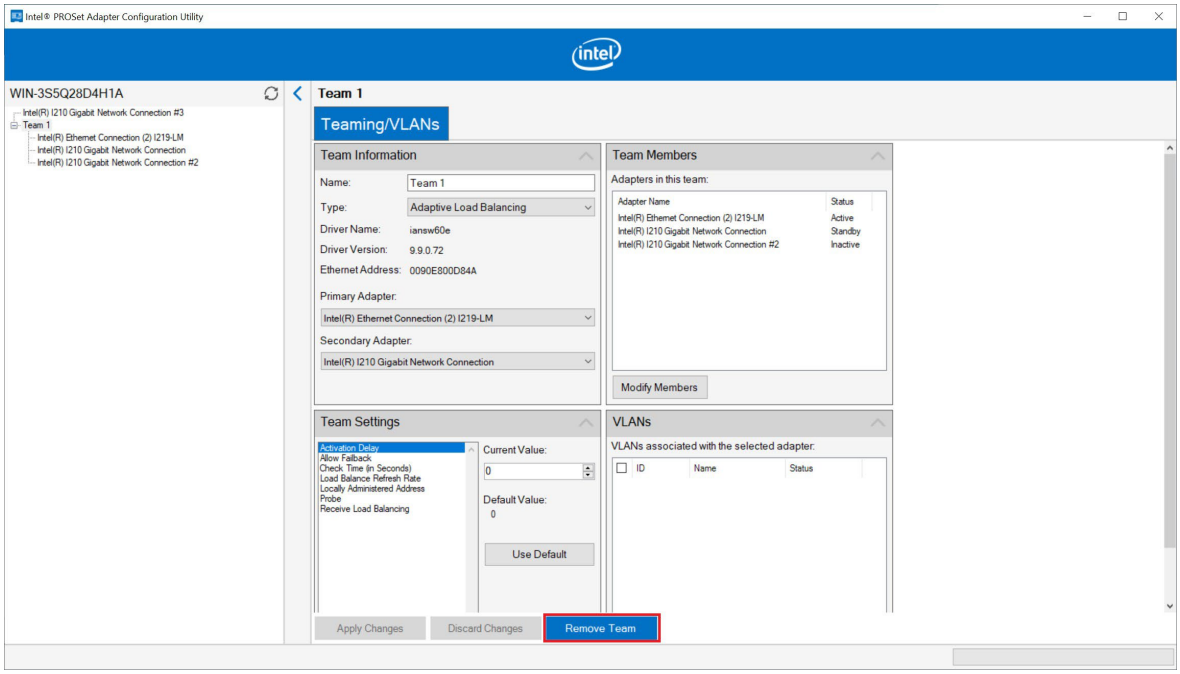


4. Check the **Network adapters** in the **Windows Device Manager**.



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 whether 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

NOTE

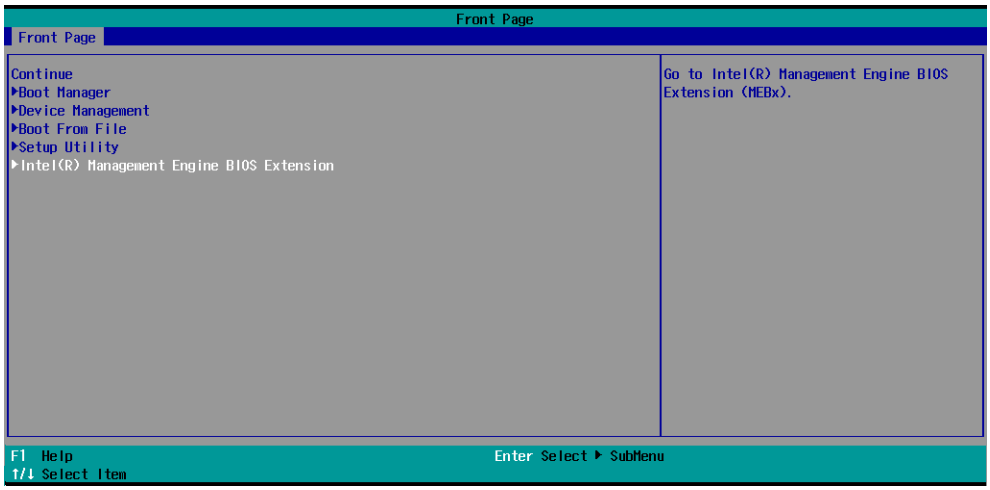
Intel® AMT is not supported in models with Intel® Celeron®, Intel® Core™ i3, and Intel Atom® processors.

Applicable Series

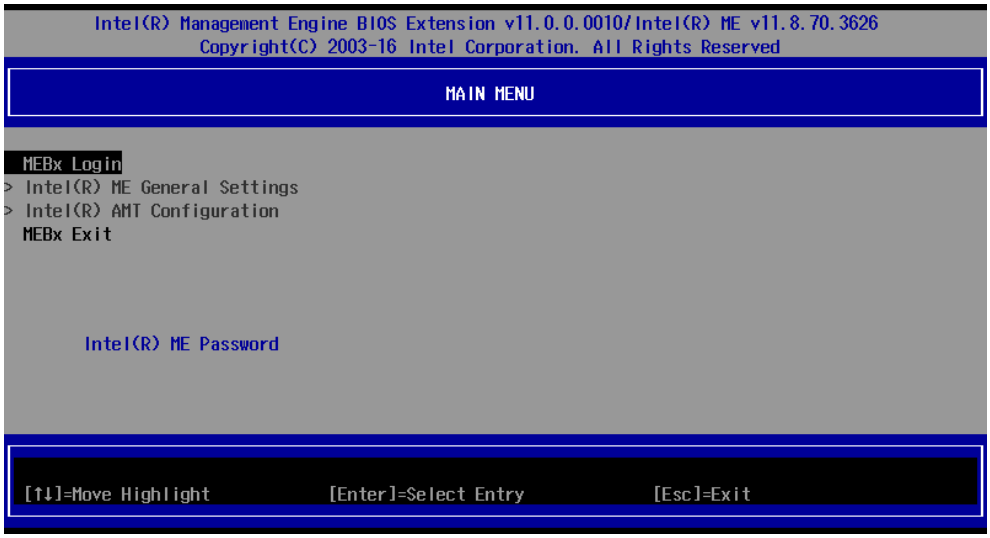
- BXP-C100 Series
- DRP-C100 Series
- RKP-C110 Series
- RKP-C220 Series

Turning on Intel® AMT on PC

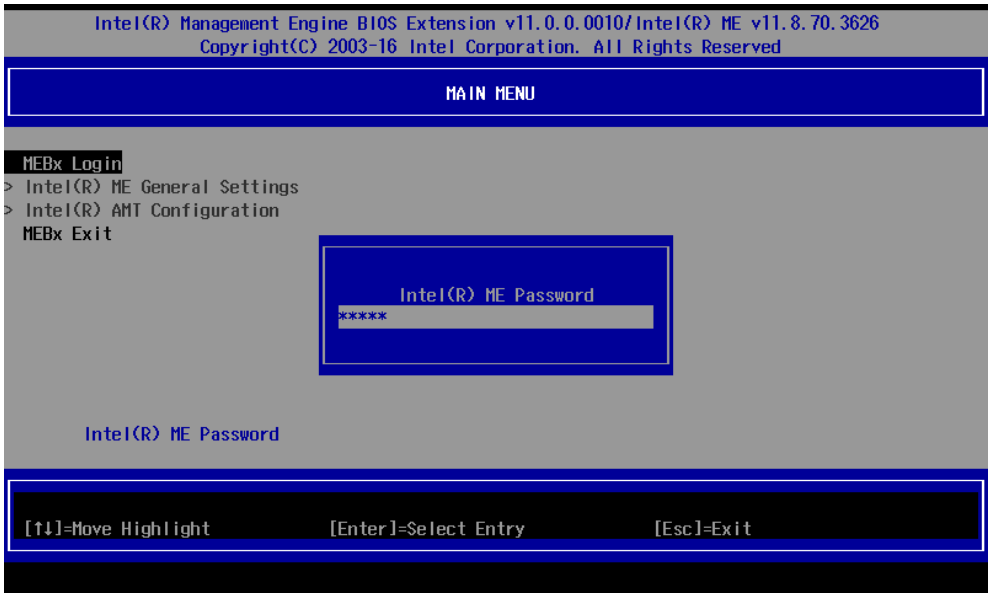
1. Power on the computer and press **F2** to enter the BIOS menu.
2. Select **Intel(R) Management Engine BIOS Extension**.



3. Select **MEBx Login**.



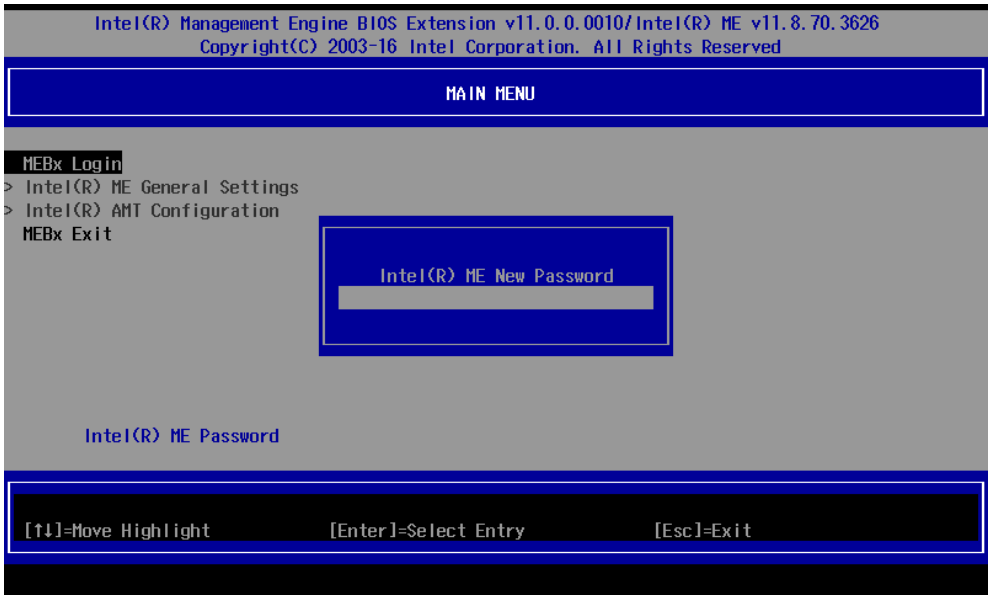
4. Enter the Intel® ME default password **admin**.



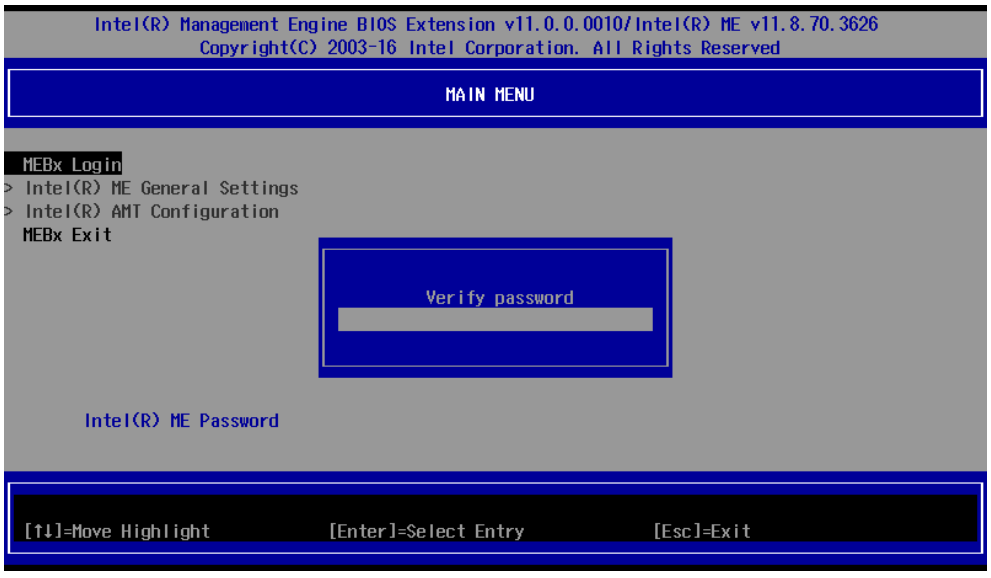
5. Enter a new password.

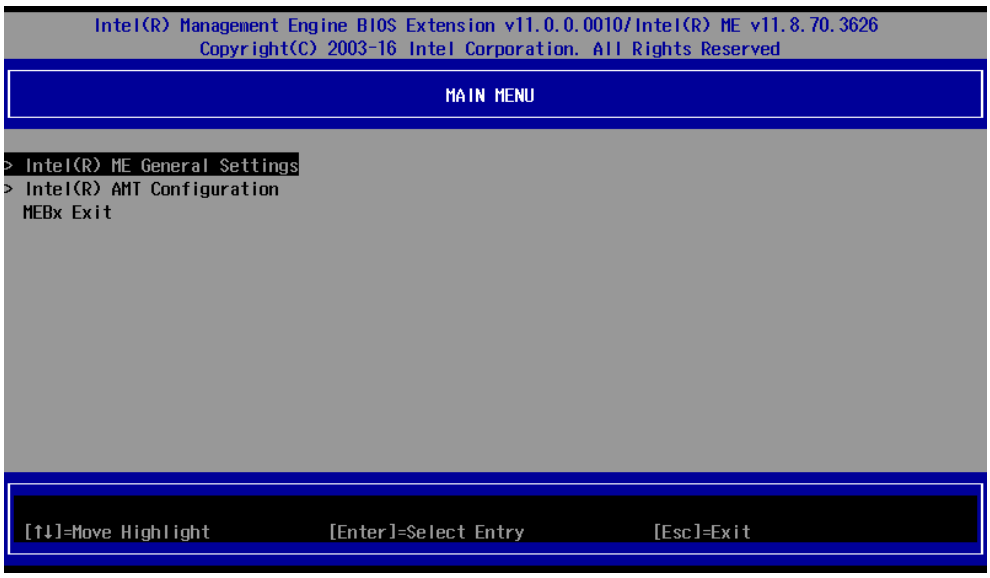
   The Intel® MEBX password must meet the following requirements for strong passwords:

   - **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').

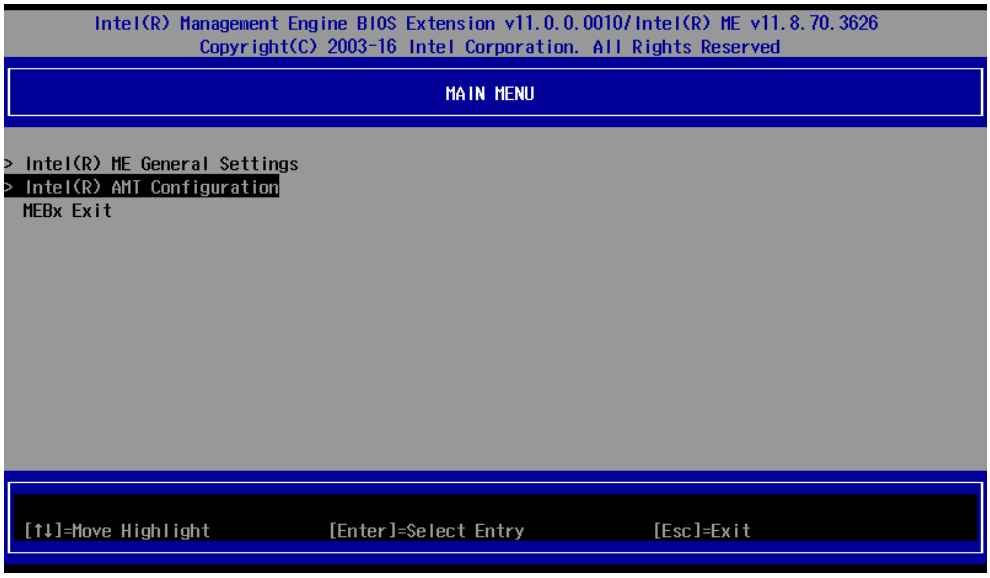


6. Verify password and login MEBx.

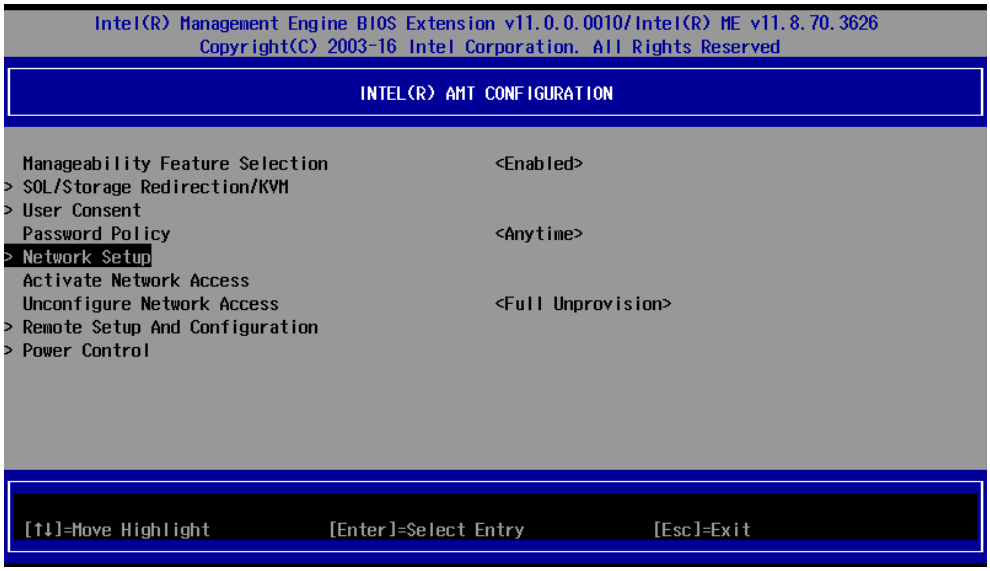




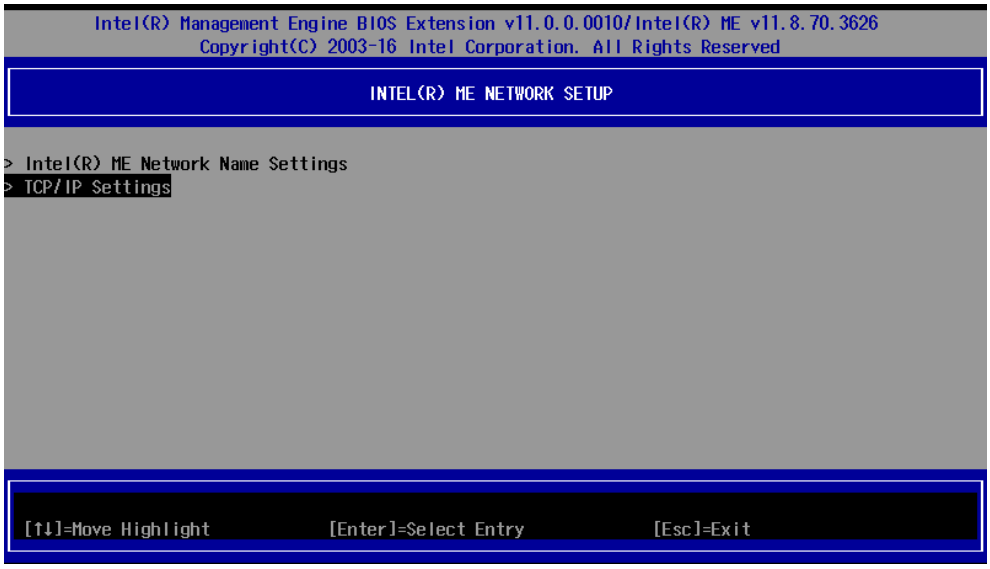
7. Select **Intel(R) AMT Configuration**.



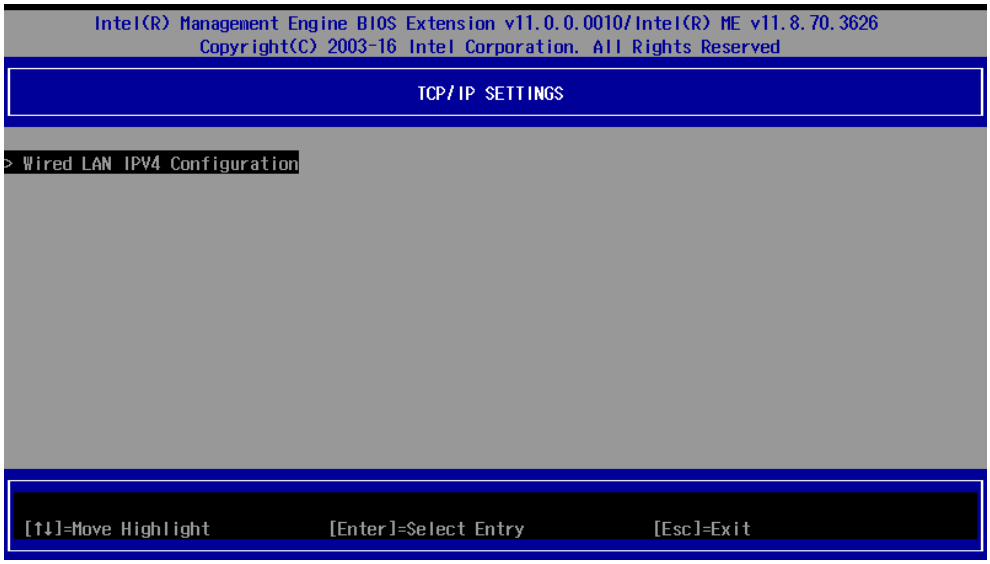
8. Select **Network Setup**.



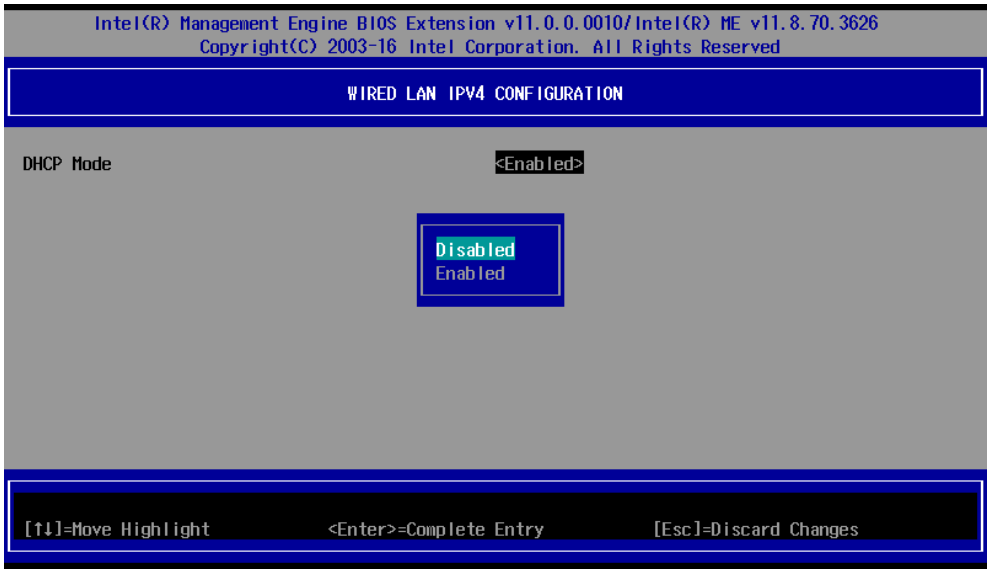
9. Select **TCP/IP Settings**.



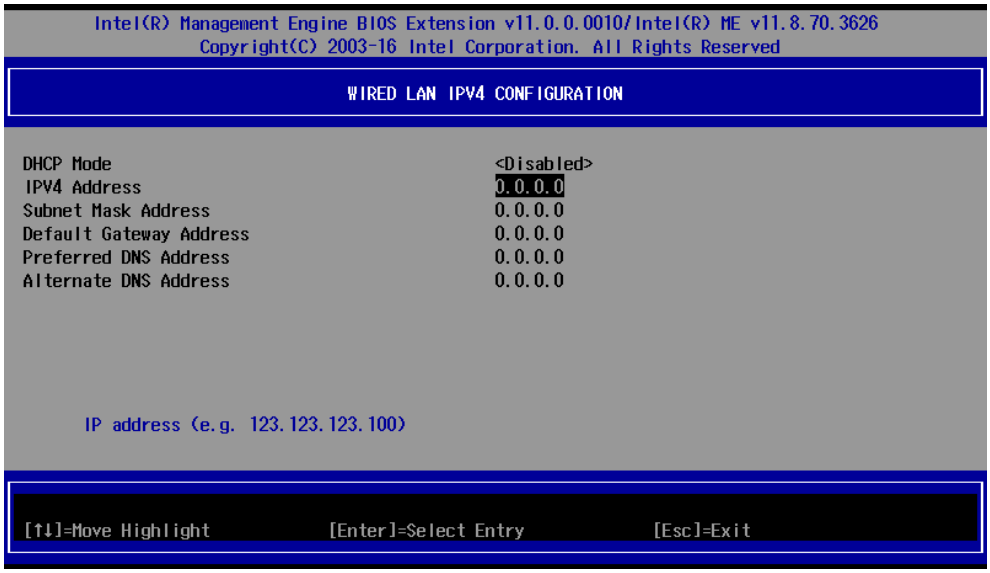
10. Select **Wired LAN IPV4 Configuration**.



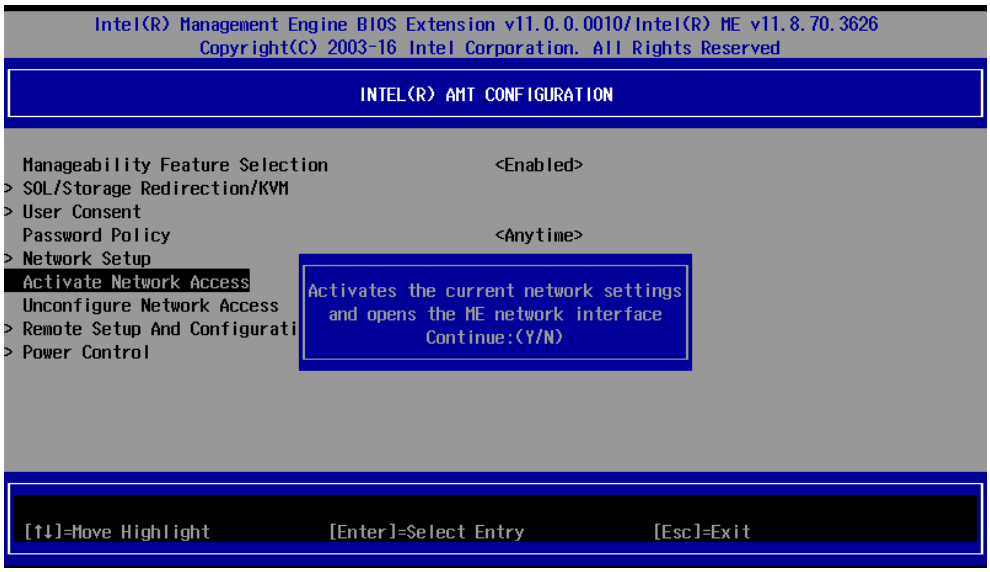
11. Select **DHCP Mode** and disable DHCP mode.



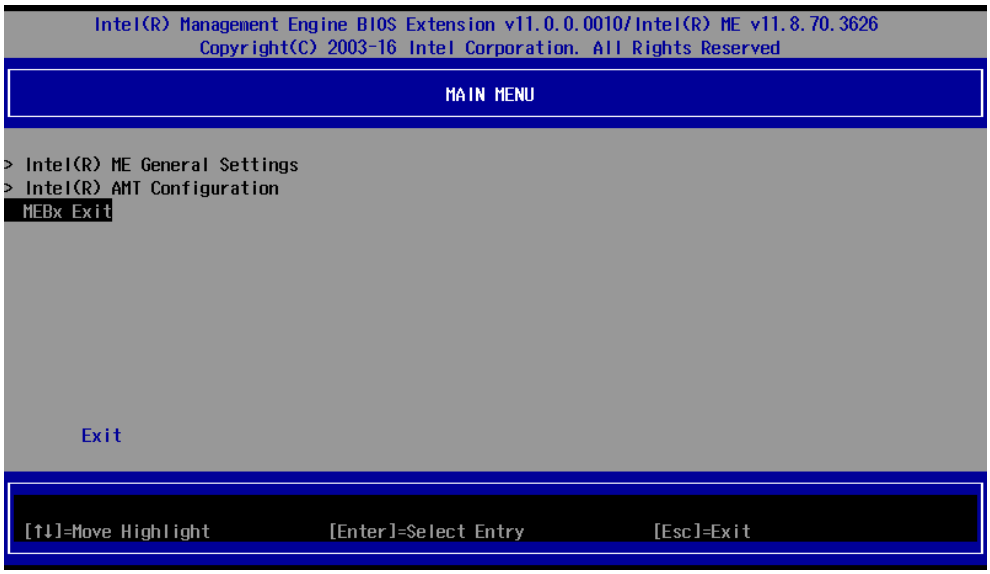
12. Enter the network settings for Intel® Active Management Technology.



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

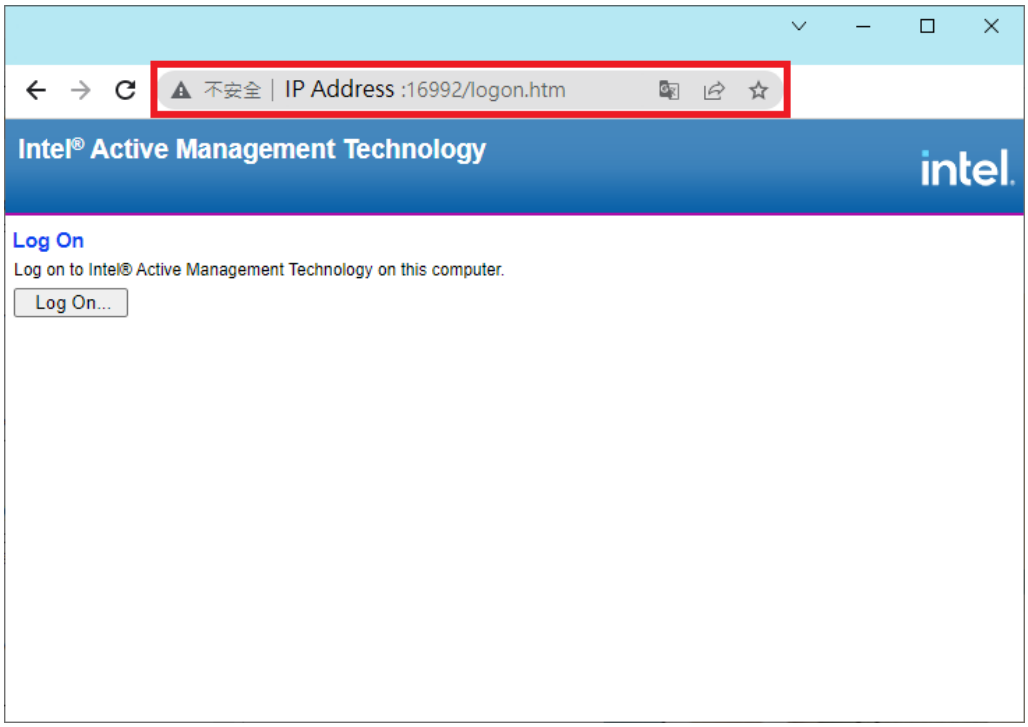


14. Back to the main menu. Select **MEBx Exit** to finish the **Intel® Active Management Technology** configuration.

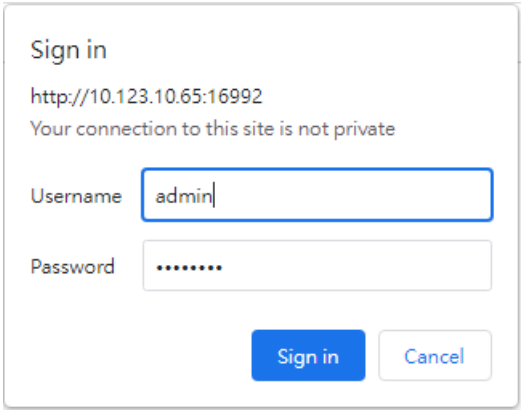


Accessing Intel® AMT From the Website

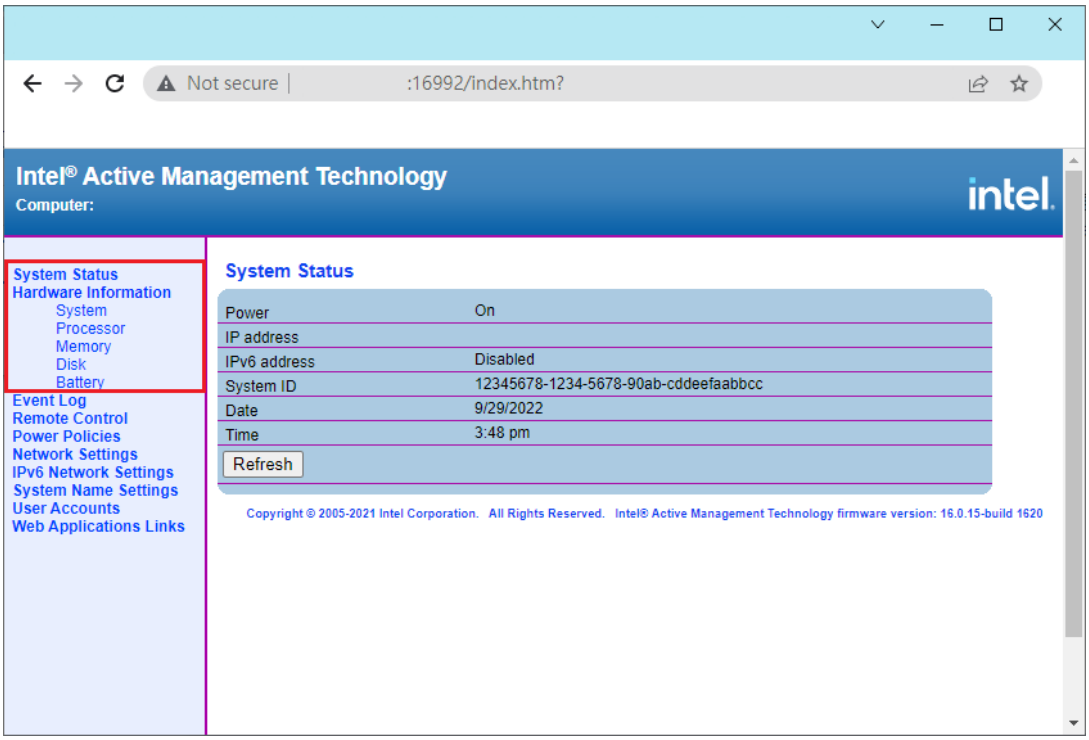
1. Open the web browser and enter **Intel® AMT IP Address:16992** (e.g.: 192.168.1.1:16992).



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

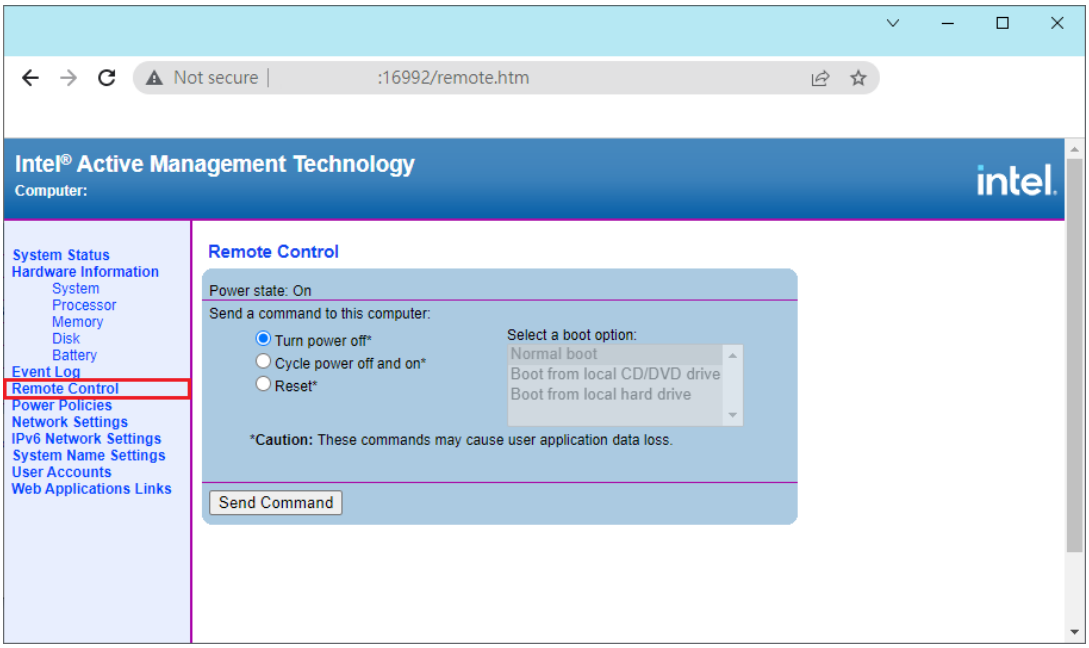


   a. After signing in, you can check the system status and hardware information of your managed device.

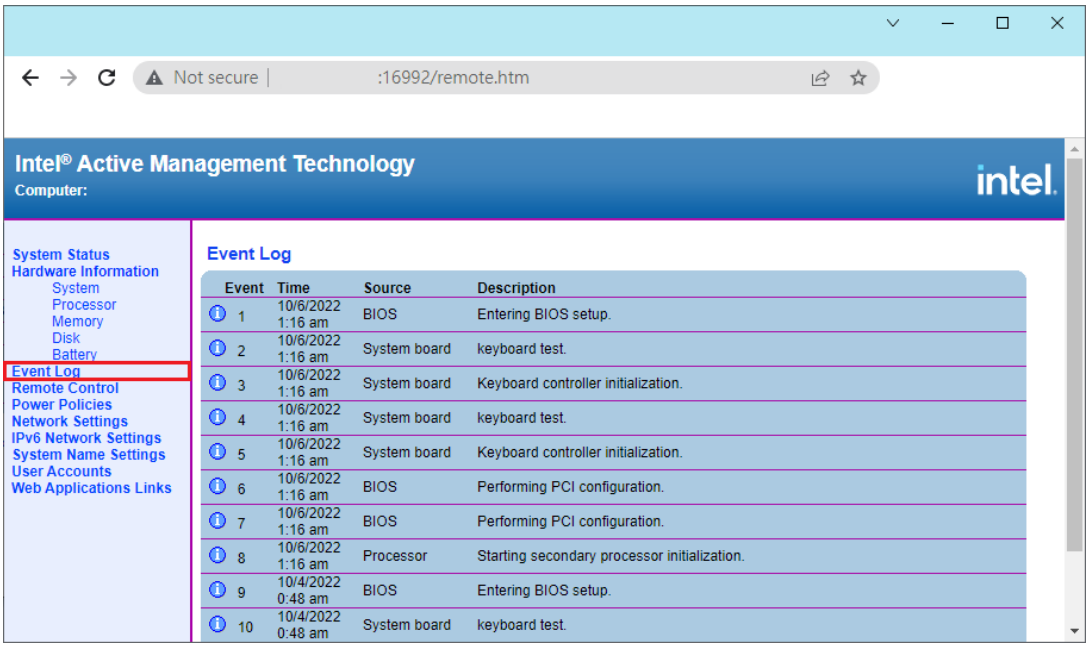


b. The Intel® AMT website provides the basic remote power control feature for the managed device. Advanced remote power control and the remote KVM feature require a management tool that supports Intel® AMT, such as Intel® Endpoint Management Assistant (Intel® EMA) or the third-party tool MeshCommander.

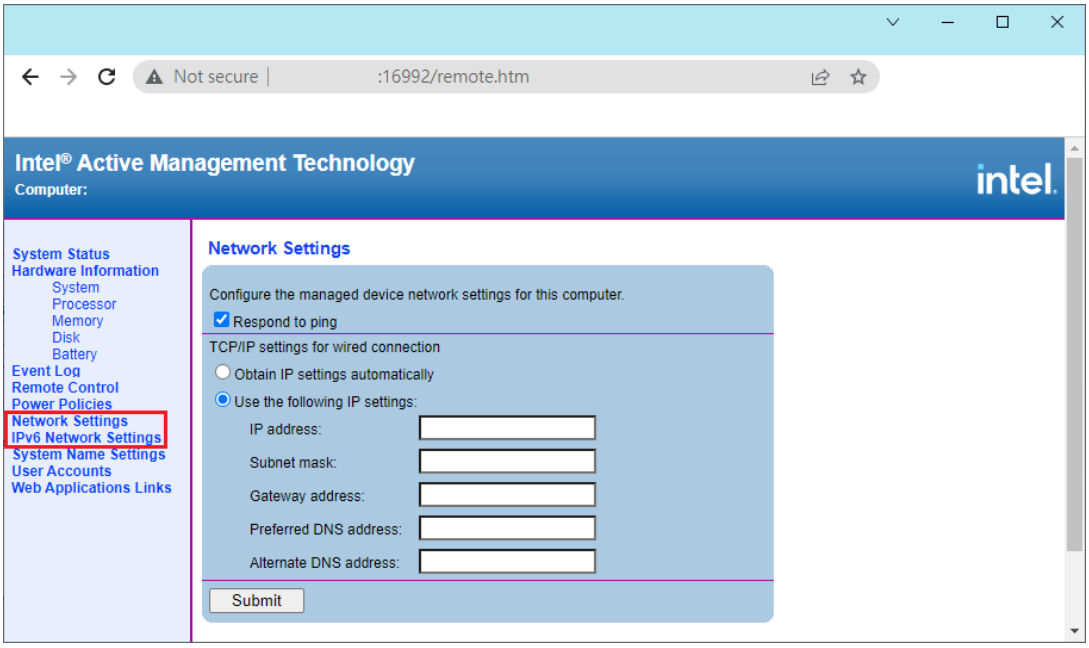
Please refer to the official documentation of the selected tool for installation and usage instructions.



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.



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



NOTE

The AMT management tool can also be used to remotely manage devices.

7. Unified Write Filter

Unified Write Filter (UWF) is an optional 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 schools, 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, and 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.

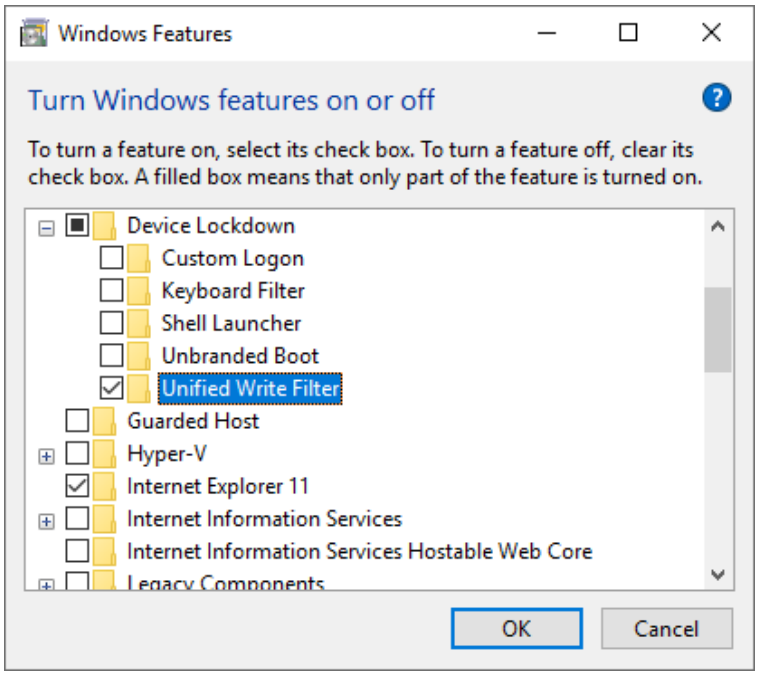
The first time you enable UWF on your device, UWF makes the following changes to your system to improve its performance:

- **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.**

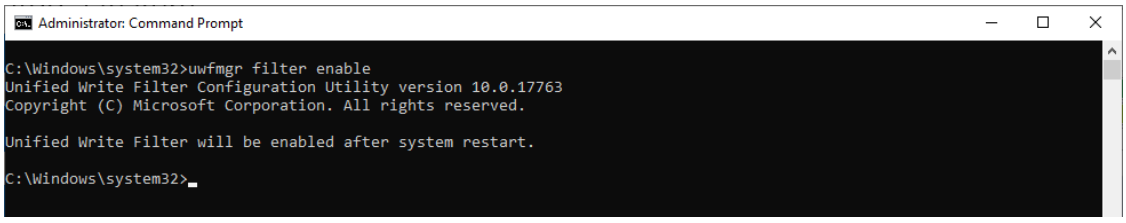
After UWF is enabled, you can select a drive that you want to protect and start using UWF. UWF can help you manage PCs and devices remotely using WMI.

Turning on UWF on a Running PC

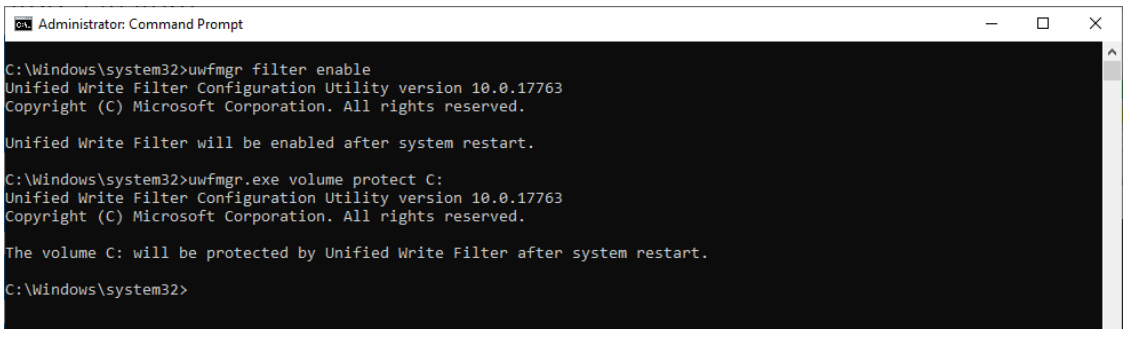
- Install UWF.
  a. In the Windows **Start** window, type **Turn Windows features on or off**.
  b. Open the **Windows Features** window and expand the **Device Lockdown** node.
  c. Select **Unified Write Filter** and click **OK**.
  d. Windows searches for the required files and displays a progress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



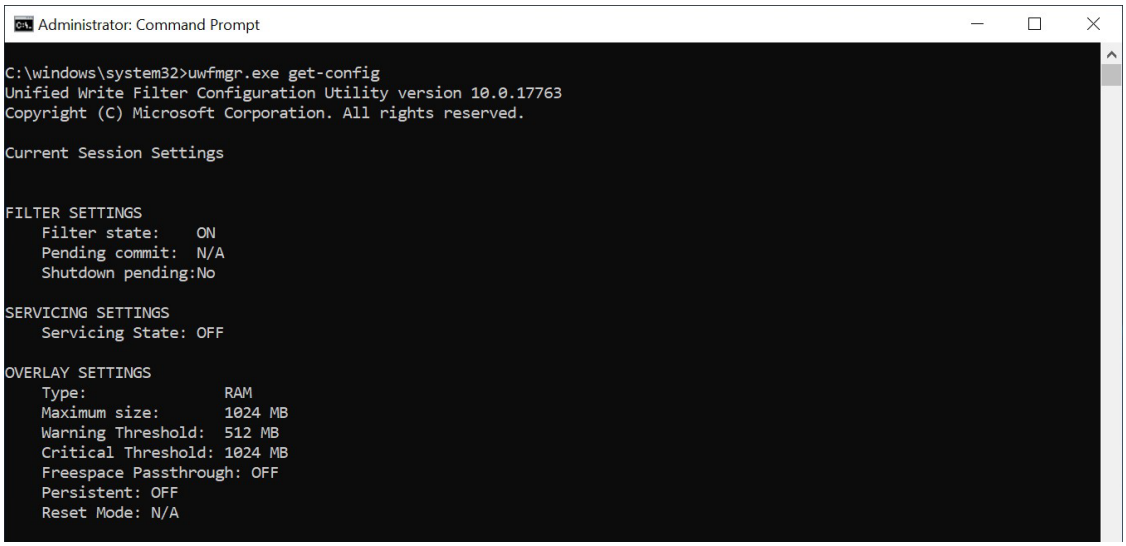
- Enable write protection for a drive:
  cmd uwfmgr.exe volume protect C:



- Restart your computer.

- Confirm that UWF is running:

  cmd uwfmgr.exe get-config



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.

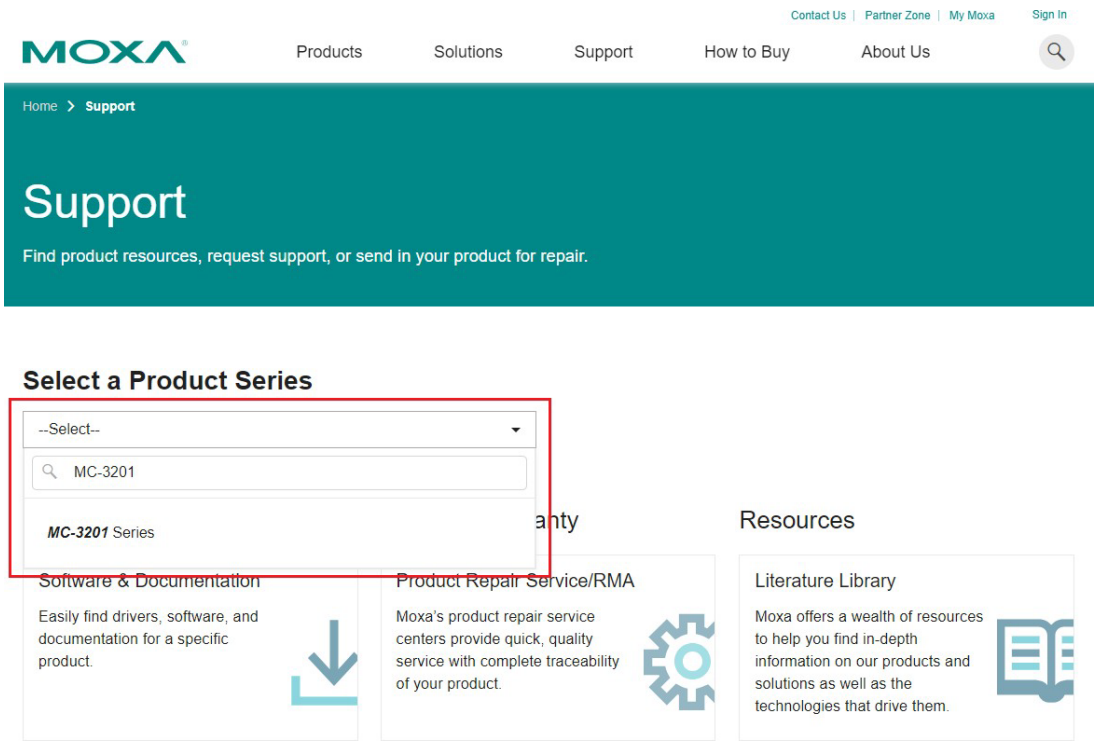
IMPORTANT

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.

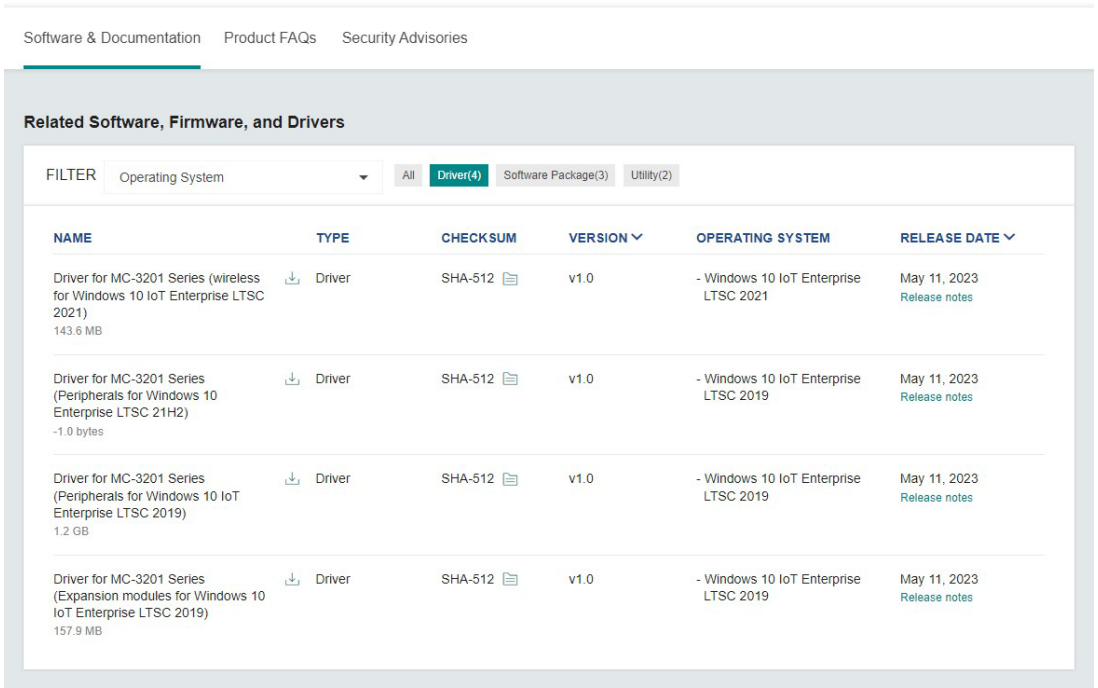
After the device is restarted, UWF maintains configuration settings for the current session in a registry. UWF automatically excludes these registry entries from its filter. Static configuration changes do not take effect until after a device restarts; the changes are saved in registry entries for use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



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**.



9. Utility

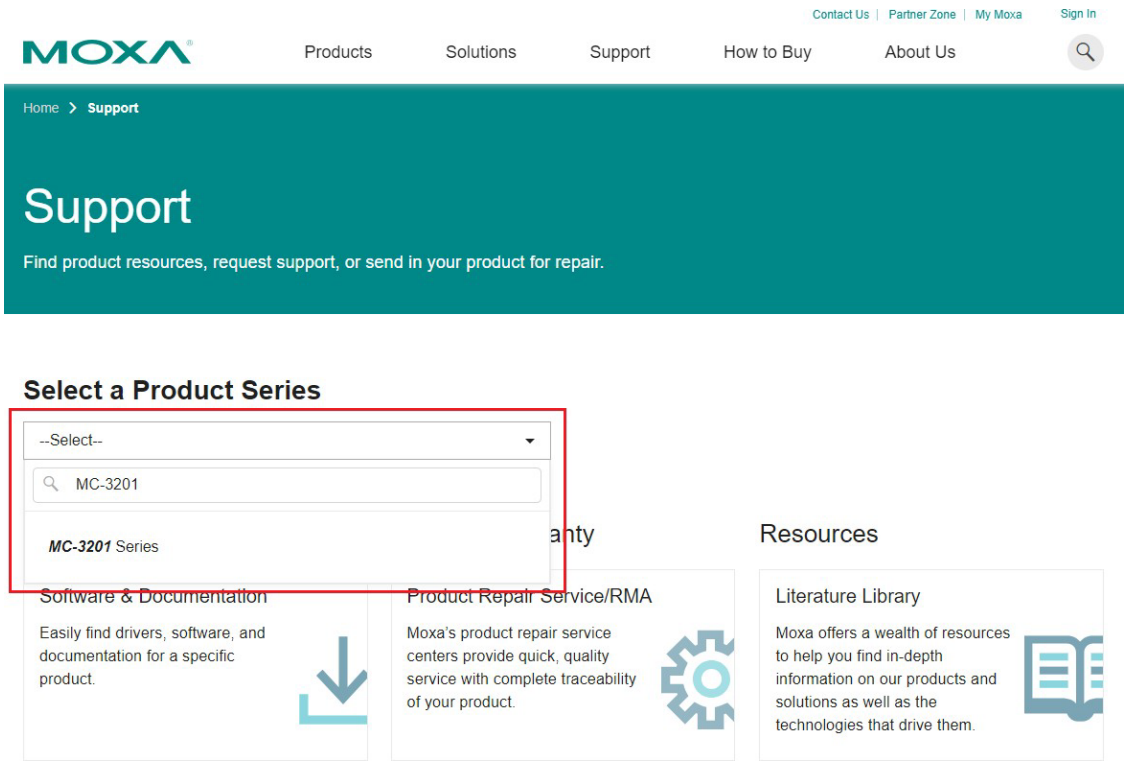
This chapter describes the usage of the following:

- **Moxa IO Controller Utility**
- **Serial Interface Utility**
- **Moxa Sort Net Name Utility**
- **Moxa CAN Port Sort 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 have installed 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).



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

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

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 Release notes
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 Release notes

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

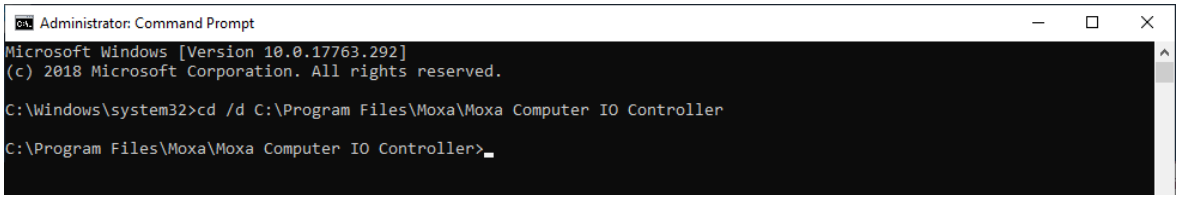
Moxa IO Controller Utility

Moxa IO Controller Utility is used to control the peripheral I/Os as well as the interfaces of expansion modules on the device. This section describes how to use the Moxa IO Controller utility and covers the following:

- Setting the DIO status
- Setting the UART mode
- Setting the PCIe slot power status (only BXP-A101 Series)
- Setting the PCIe reset pin status (only BXP-A101 Series)

Use the pre-installed utility or install the MoxaIOControllerSetup utility from the Moxa support page. 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.

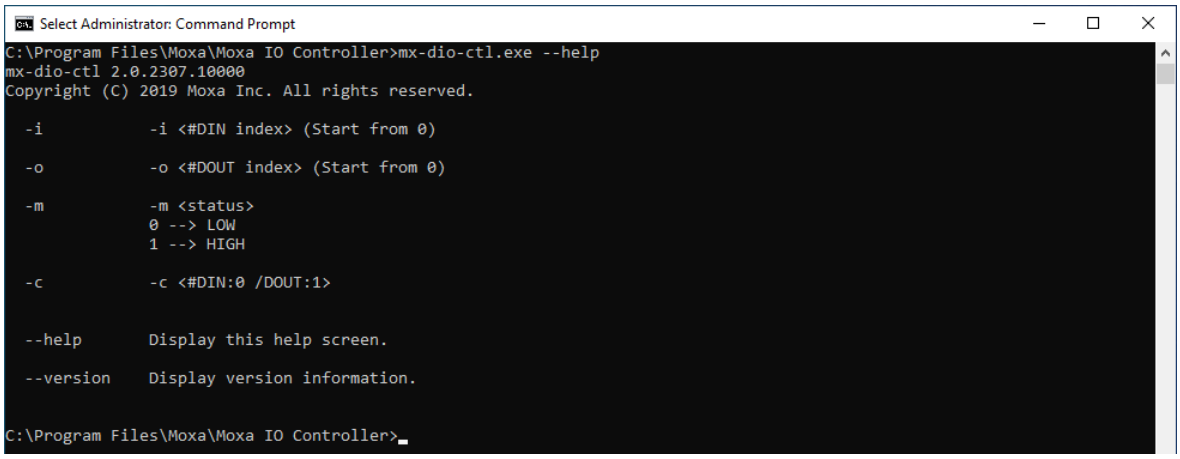


Setting the DIO Status

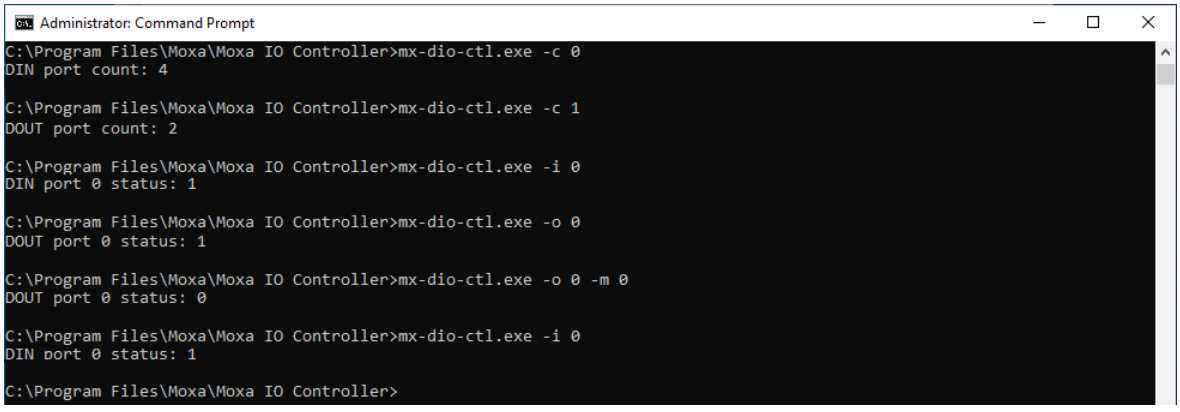
Run the **mx-dio-ctl --help** command to see the instructions on using this utility and follow them to get or set the DIO status.

IMPORTANT

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



Example:

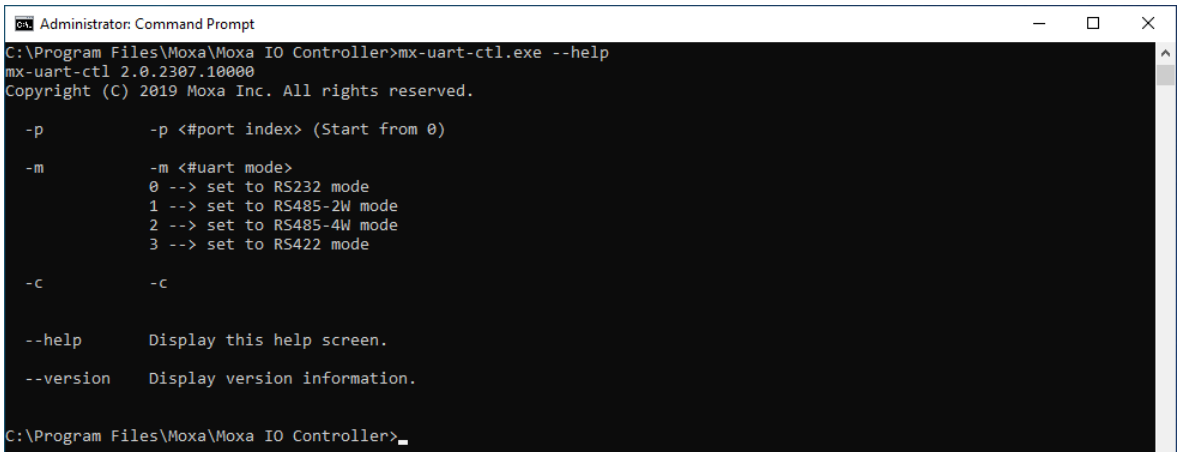


Setting the UART Mode

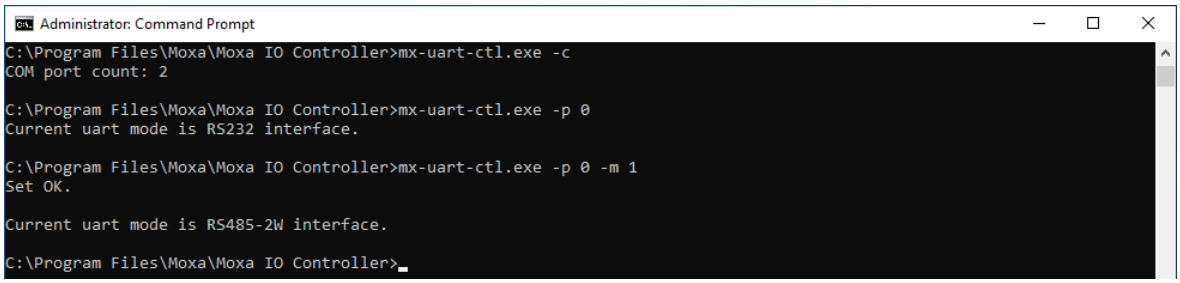
Run the **mx-uart-ctl --help** command to see instructions on using this utility and follow the onscreen instructions to get or set the UART mode.

IMPORTANT

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



Example:

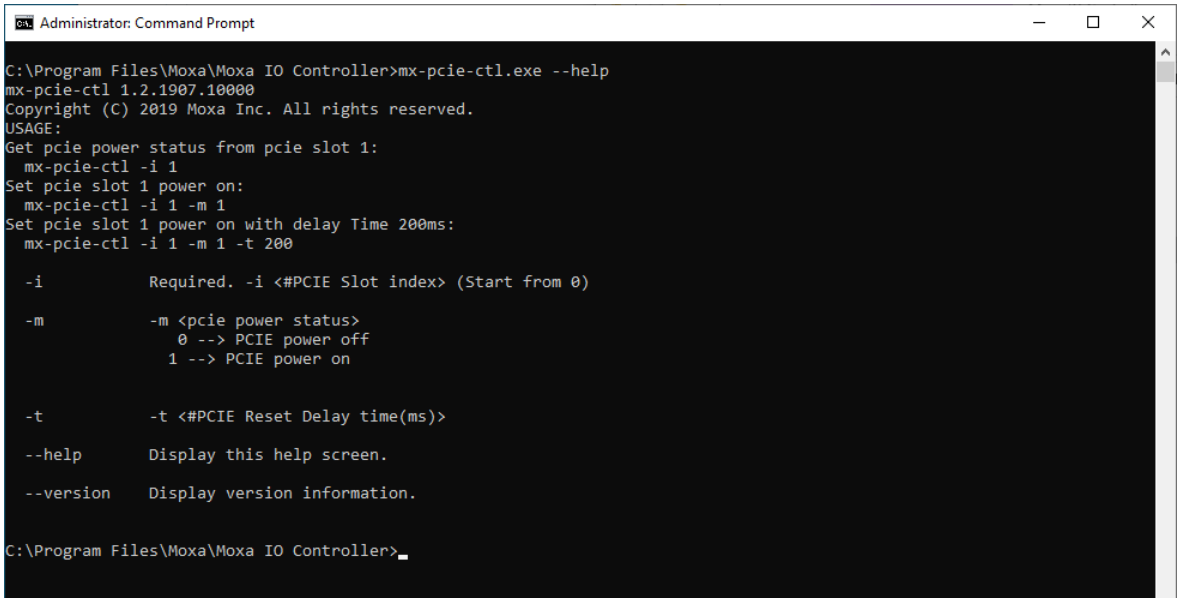


Setting the PCIe Slot Power Status (only for BXP-A101 Series)

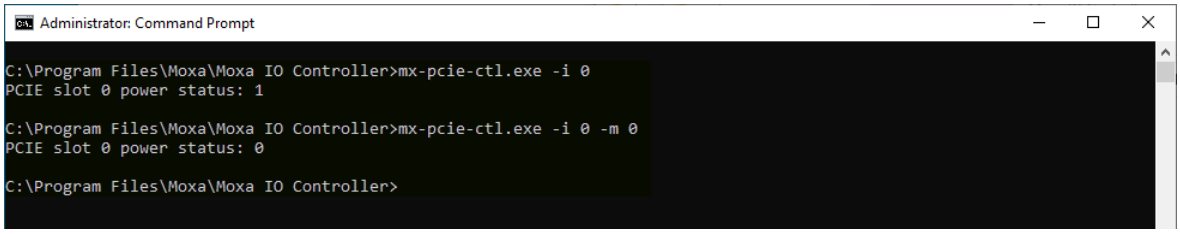
Run the **mx-pcie-ctl --help** command to see instructions on using this utility and follow the onscreen instructions to get or set the status of the PCIE slot power.

IMPORTANT

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



Example:

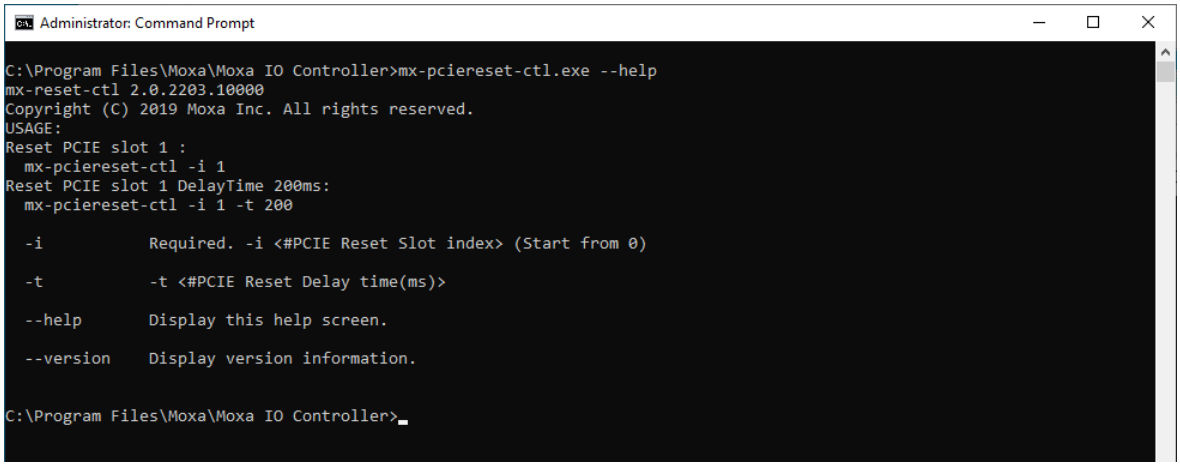


Setting the PCIe Reset Pin Status (only for BXP-A101 Series)

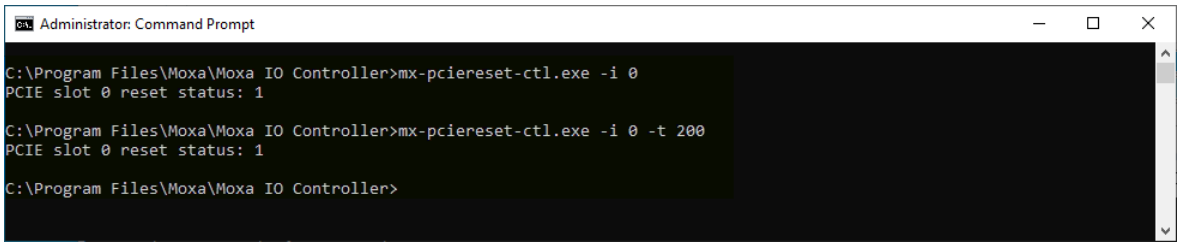
Run the **mx-pciereset-ctl --help** command to see instructions on using this utility and follow the onscreen instructions to get or set the PCIE reset pin status and delay time.

IMPORTANT

The PCIe reset pin index starts from 0. Even though the console output starts at 1, the index still starts at 0.



Example:

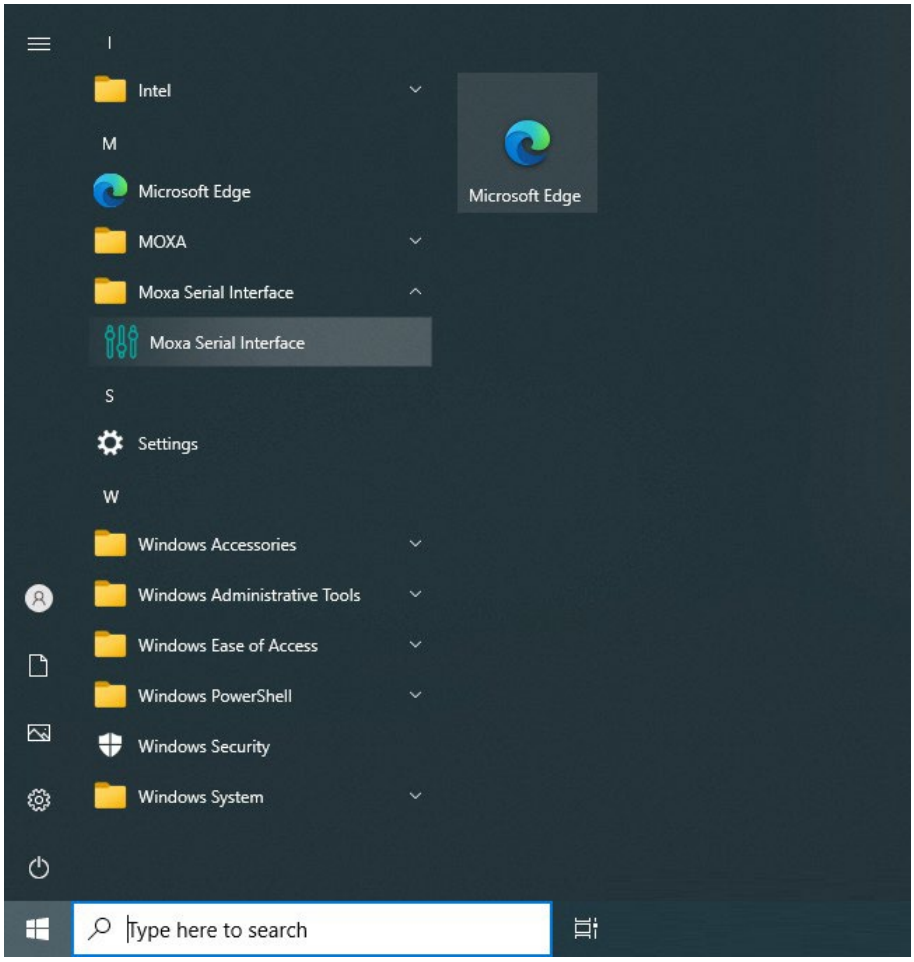


Moxa Serial Interface Utility

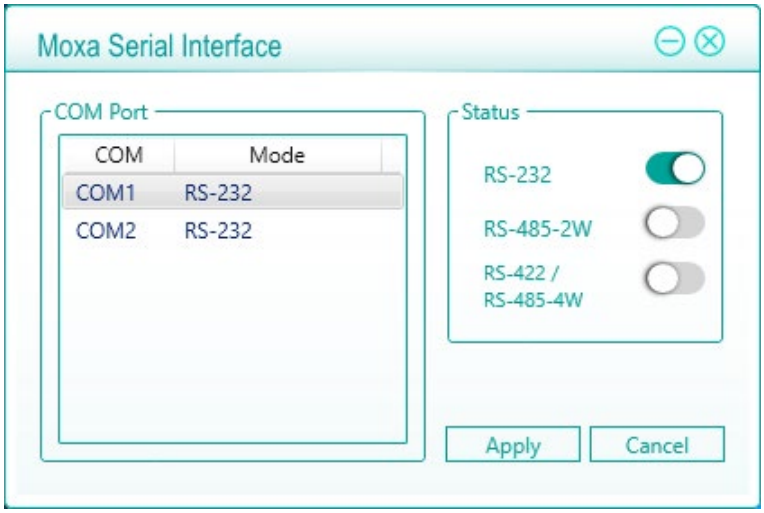
In this section, we describe how to use the Moxa Serial Interface utility to set the UART mode in your computer's serial interface.

Setting the Serial Port Mode

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



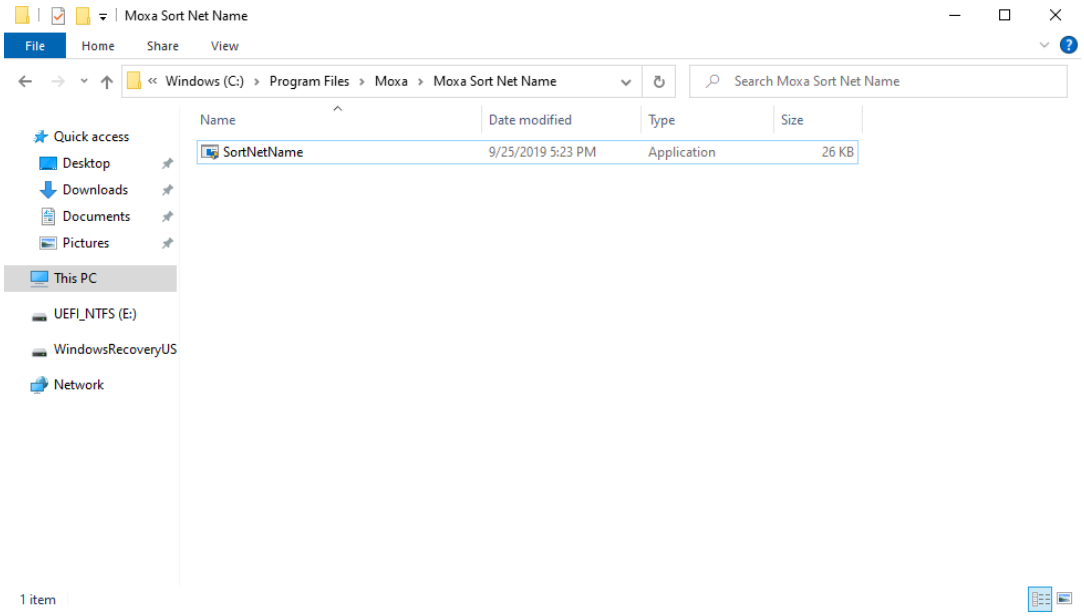
3. Select the target COM port and UART mode and click **Apply** to save the settings.



Moxa Sort Net Name Utility

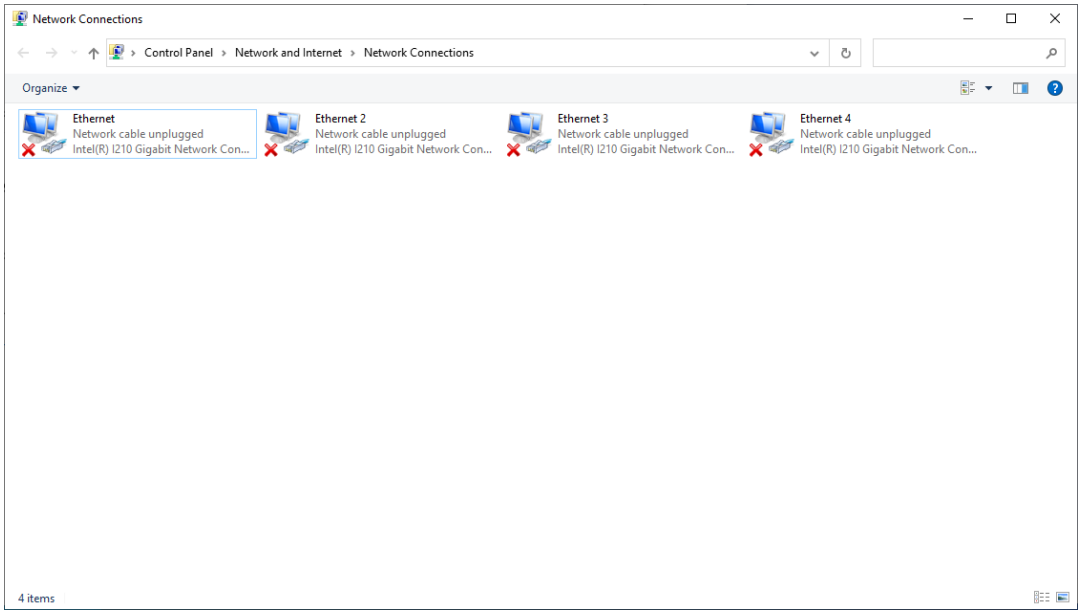
In this section, we describe how to use the Moxa Sort Net Name utility to rename Ethernet adapter for mapping physical LAN port order on chassis.

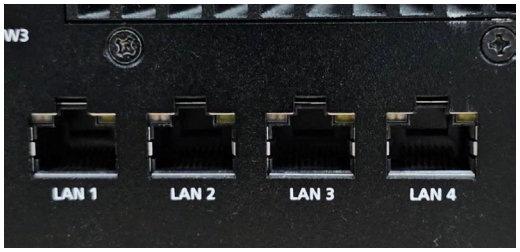
1. Install the **Moxa Sort Net Name** utility.
2. After the installation process is complete, run the **SortNetName.exe** from **C:\Program Files\Moxa\Moxa Sort Net Name** as an Administrator.



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).

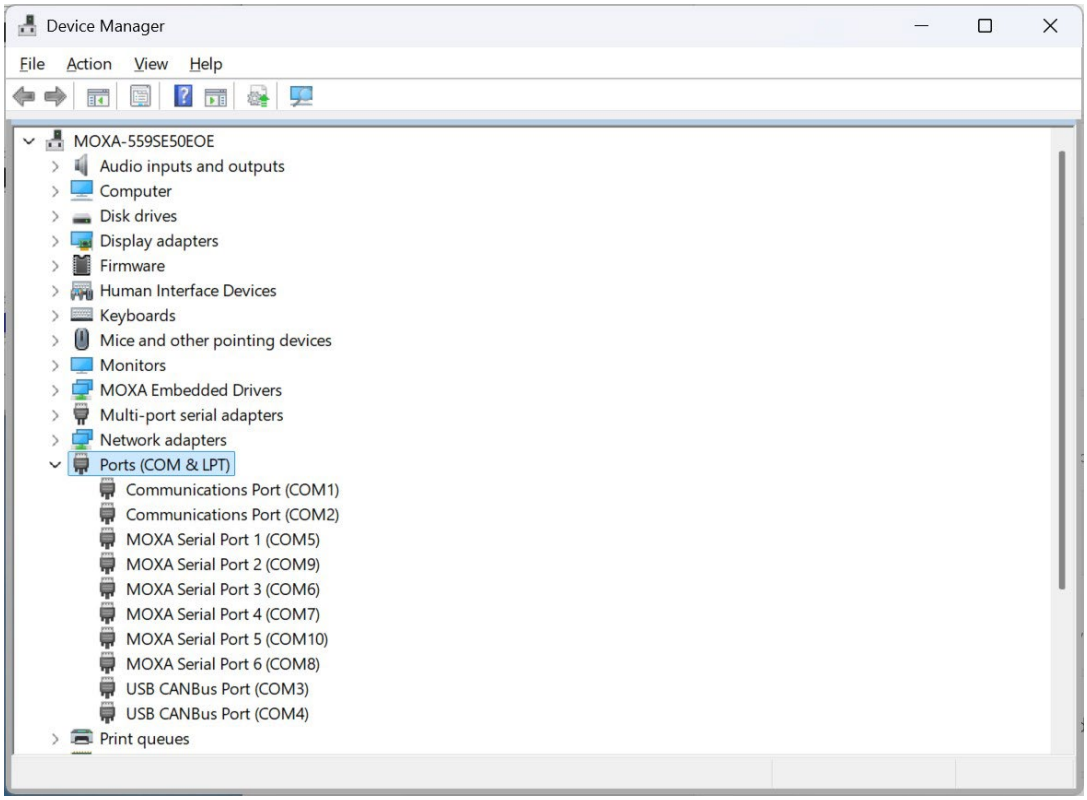




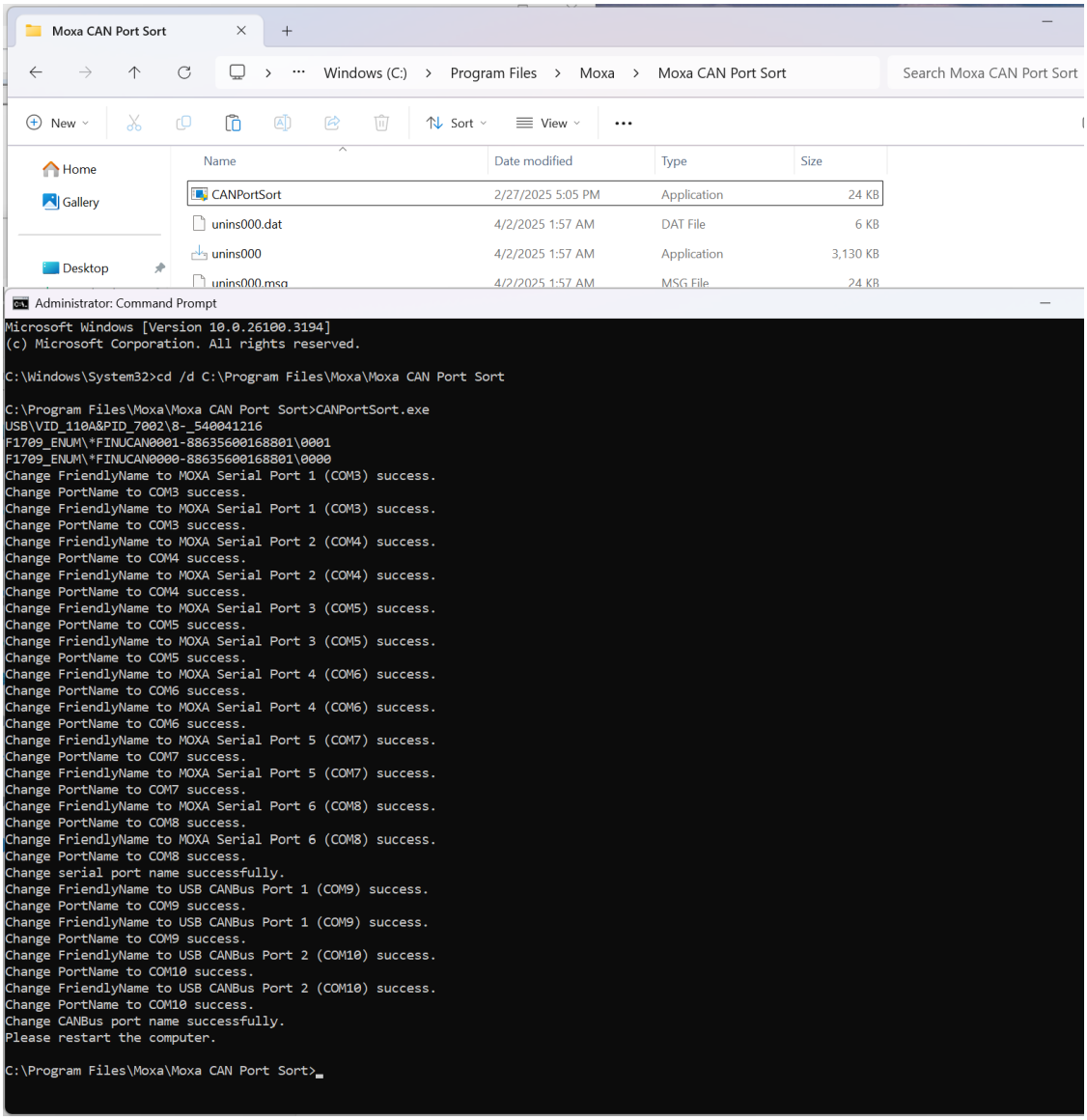
Moxa CAN Port Sort Utility (only for RKP-C220 Series)

In this section, we describe how to use the Moxa CAN Port Sort utility to assign COM port numbers for mapping the physical CAN ports to the UART port order on the chassis (compatible with the 6-COM 2-CAN model).

1. Use the pre-installed utility or install the **MoxaCANPortSort** utility from the Moxa support page.
   The initial COM port number assigned may differ from the chassis.



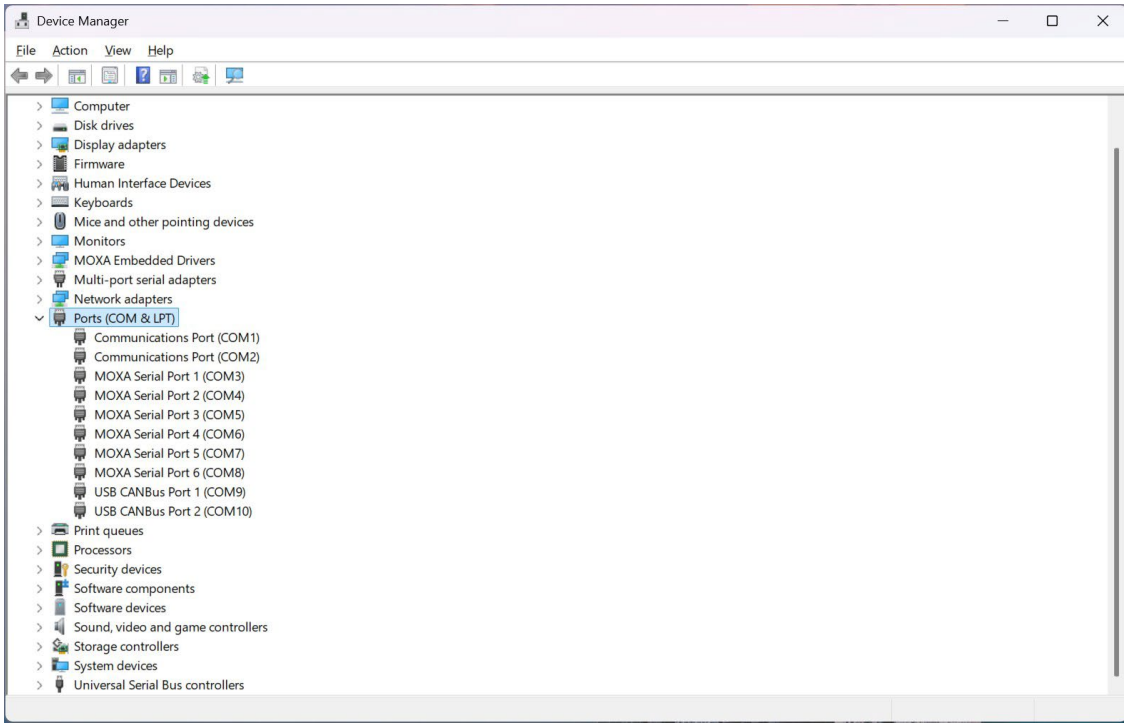
2. Run the **CANPortSort.exe** as an Administrator from **C:\Program Files\Moxa\Moxa CAN Port Sort**.



3. Wait for the process to complete to then assign the COM port numbers.

4. Restart the computer.

   The order of the CANBus ports and UART ports will correspond to the order of labels on the chassis.

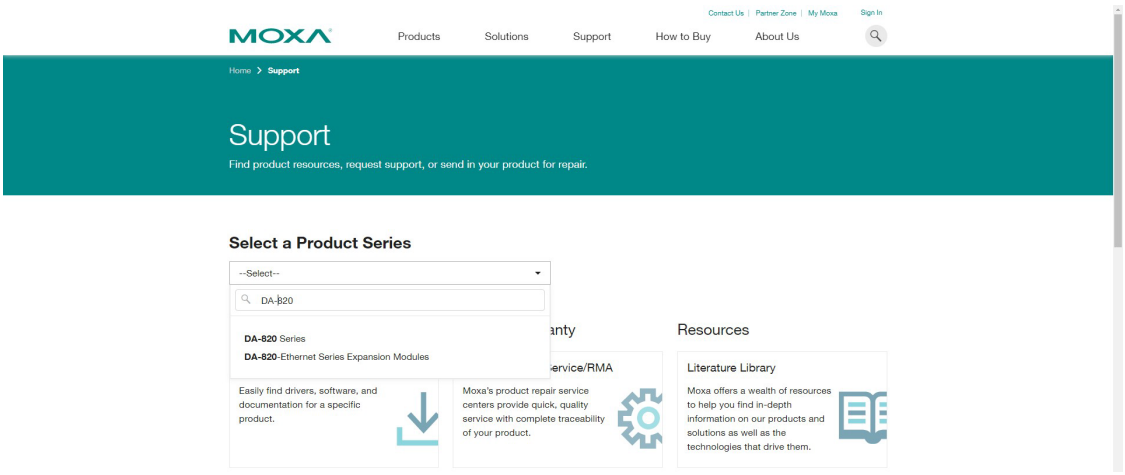


10. IO Control API

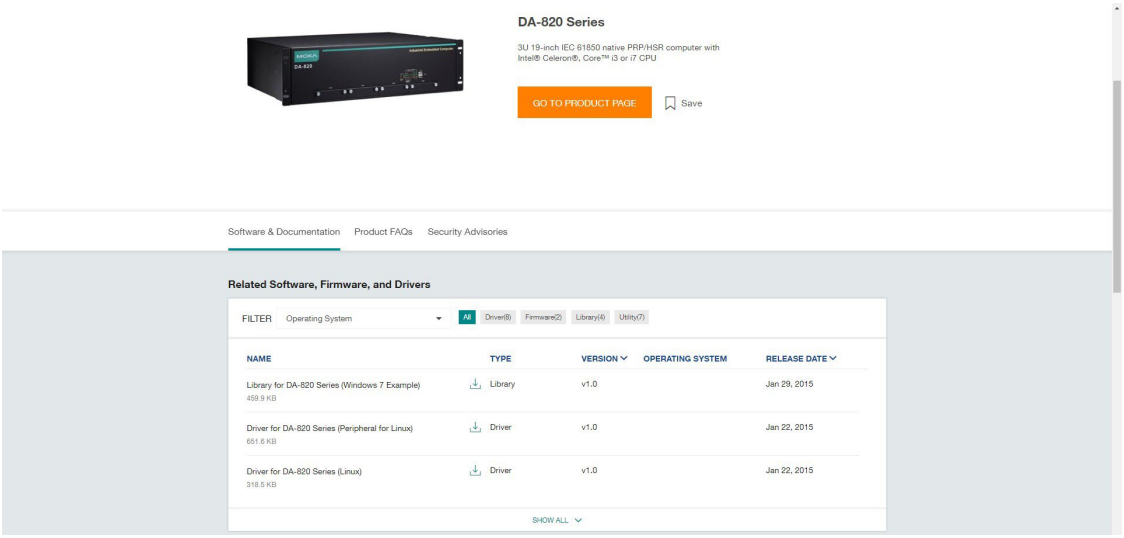
This chapter describes how to use the IO Control API.

Downloading the API

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



3. Download the related files.



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 json profile.

Requirements

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

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 mxdgio 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	mxdgio.h
Library	mxdgio.lib
DLL	mxdgio.dll
Profile	MxdgioProfile[*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.

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

Requirements

Name	Items
Header	mxsp.h
Library	mxsp.lib
DLL	mxsp.dll
Profile	MxspProfile[*ModelName*].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, 2 for RS-485-4W, and 3 for RS-422.

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, 2 for RS-485-4W, and 3 for RS-422.

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

mxpcie (only for BXP-A101 Series)

The mxpcie library operates on the power of PCIE slot and consists of the following:

- **GetPCIESlotStatus**
- **SetPCIESlotStatus**
- **SetPCIESlotStatusWithReset**

GetPCIESlotStatus

Syntax

```
int GetPCIESlotStatus(int port);
```

Description

Gets the PCIE slot power status.

Parameters

port: The index of the PCIE slot; starts at 0.

Return Value

The status of a PCIE slot power; 0 for OFF, 1 for ON.

Error codes

The following error codes can be retrieved using the **PCIE_STATUS** function.

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

Requirements

Name	Items
Header	mxpcie.h
Library	mxpcie.lib
DLL	mxpcie.dll
Profile	MxpcieProfile[*ModelName*].json

SetPCIESlotStatus

Syntax

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

Description

Sets the PCIE slot power status.

Parameters

port: The index of the PCIE slot; starts at 0.

status: The status of the PCIE slot power; 0 for OFF, 1 for ON.

Return Value

Returns 0 if the PCIE slot power is successfully set.

Error codes

The following error codes can be retrieved using the **PCIE_STATUS** function.

Name	Value	Meaning
LIB_INITIALIZE_FAIL	-1	The mxpcie 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 with a bad format.

Requirements

Name	Items
Header	mxpcie.h
Library	mxpcie.lib
DLL	mxpcie.dll
Profile	MxpcieProfile[*ModelName*].json

SetPCIESlotStatusWithReset

Syntax

```
int SetPCIESlotStatusWithReset(int port, int status, int time);
```

Description

Sets the PCIE slot power status and PCIE slot reset pin turn ON and OFF.

Parameters

port: The index of the PCIE slot; starts at 0.
status: The status of the PCIE slot power and PICE reset pin; 0 for OFF, 1 for ON.
time: The delay time between PCIE slot reset pin turn ON and OFF.

Return Value

Returns 0 if the PCIE slot power and PCIE reset pin are successfully set.

Error codes

The following error codes can be retrieved using the **PCIE_STATUS** function.

Name	Value	Meaning
LIB_INITIALIZE_FAIL	-1	The mxpcie 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 with a bad format.

Requirements

Name	Items
Header	mxpcie.h
Library	mxpcie.lib
DLL	mxpcie.dll
Profile	MxpcieProfile[*ModelName*].json

mxpciereset (only for BXP-A101 Series)

The mxpciereset library operates on the PCIE reset pin status and consists of the following:

- **GetRESETSlotStatus**
- **SetRESETSlotStatus**

GetRESETSlotStatus

Syntax

```
int GetRESETSlotStatus(int port);
```

Description

Gets the PCIE slot reset pin status.

Parameters

port: The index of the PCIE slot; starts at 0.

Return Value

The status of a PCIE slot reset pin; 0 for OFF, 1 for ON.

Error codes

The following error codes can be retrieved using the **RESET_STATUS** function.

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

Requirements

Name	Items
Header	mxpciereset.h
Library	mxpciereset.lib
DLL	mxpciereset.dll
Profile	MxpcieresetProfile[*ModelName*].json

SetRESETSlotStatus

Syntax

```
int SetRESETSlotStatus(int port, int time);
```

Description

Sets the PCIE slot reset pin ON/OFF cycle and delay time.

Parameters

port: The index of the PCIE slot; starts at 0.

time: The delay time between PCIE slot reset pin turn ON and OFF.

Return Value

Returns 0 if the PCIE slot reset pin is successfully set.

Error codes

The following error codes can be retrieved using the **RESET_STATUS** function.

Name	Value	Meaning
LIB_INITIALIZE_FAIL	-1	The mxpciereset 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 with a bad format.

Requirements

Name	Items
Header	mxpciereset.h
Library	mxpciereset.lib
DLL	mxpciereset.dll
Profile	MxpcieresetProfile[*ModelName*].json

mxwdg

The mxwdg library operates on the watchdog 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

Name	Items
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.

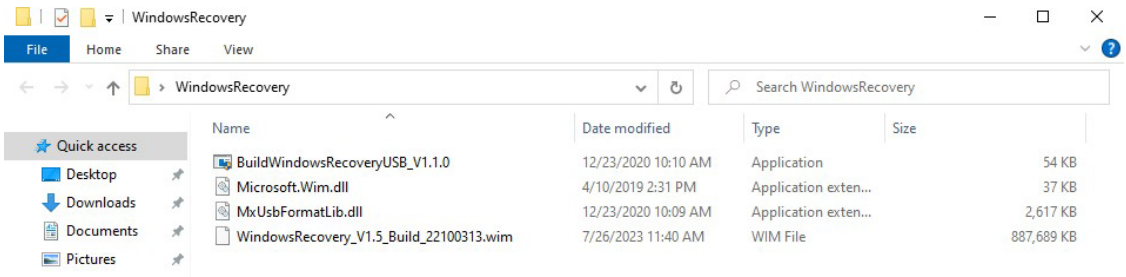
- **WindowsRecovery**

WindowsRecovery

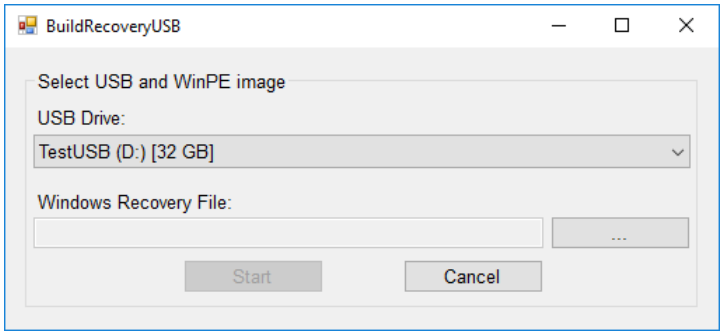
WindowsRecovery is an OS image backup and restore program for system deployment, backup, and recovery. You will first need to create a WindowsRecovery USB disk. This WindowsRecovery disk can only be used to boot a **UEFI BIOS** machine.

Preparing the USB device

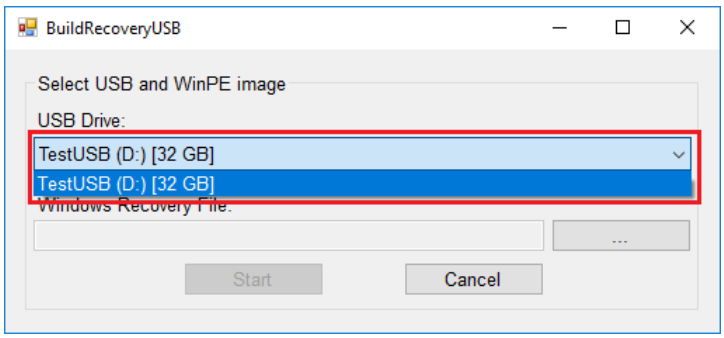
1. Contact a Moxa technical staff and get the required file.



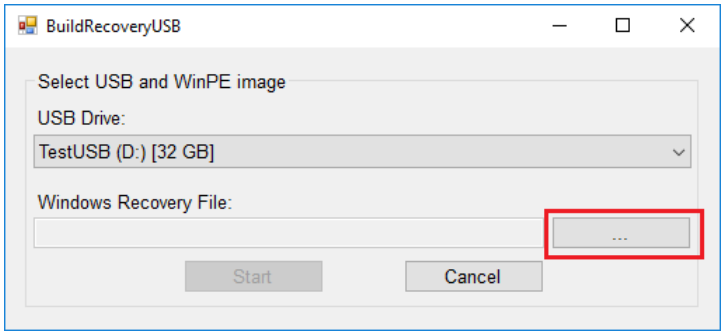
2. Run the **BuildWindowsRecoveryUSB_V1.1.0.exe**.

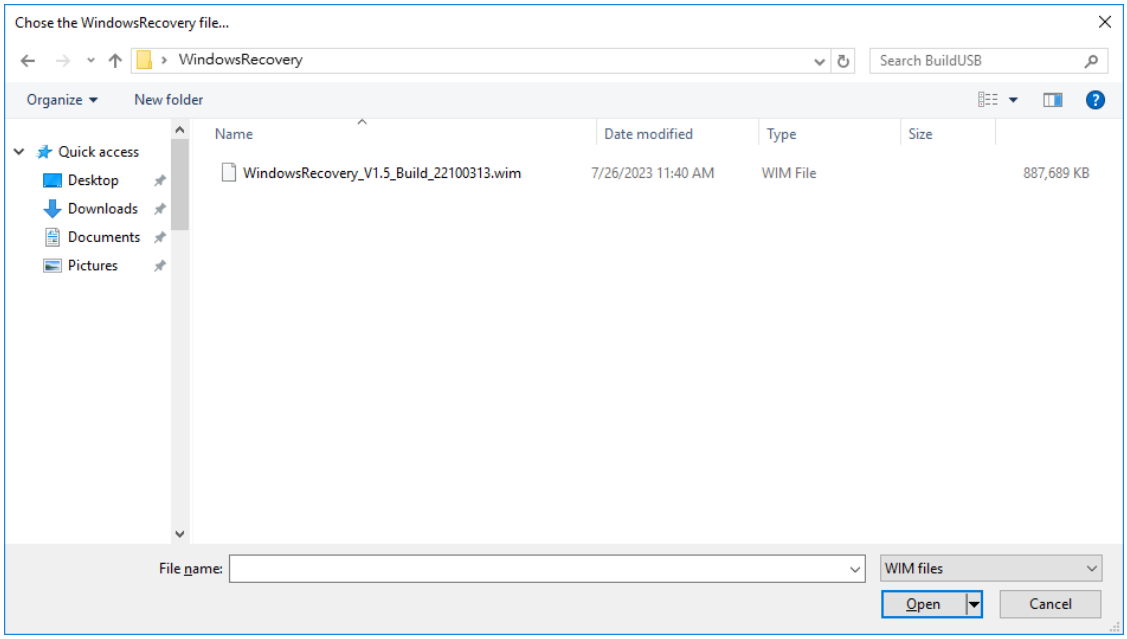


3. Select the USB drive to format.

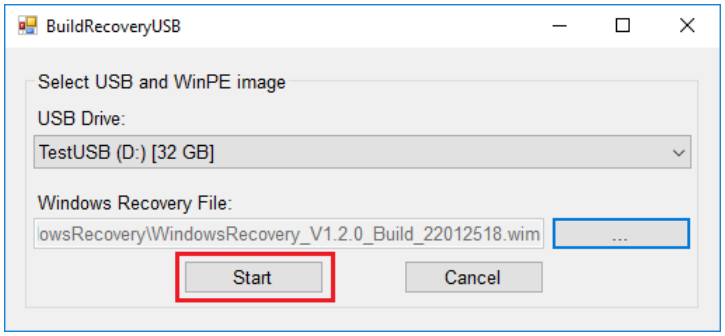


4. Click **...** to select a **.wim** file from the folder.

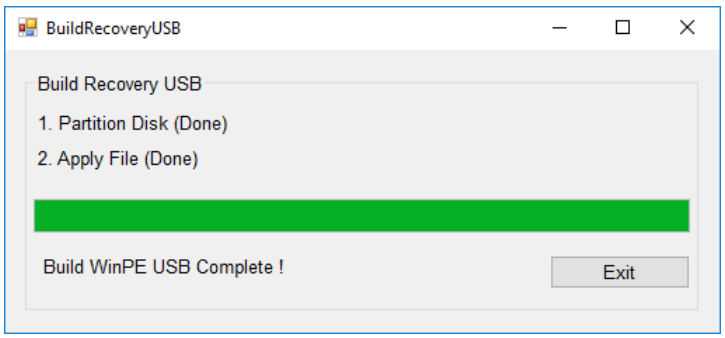




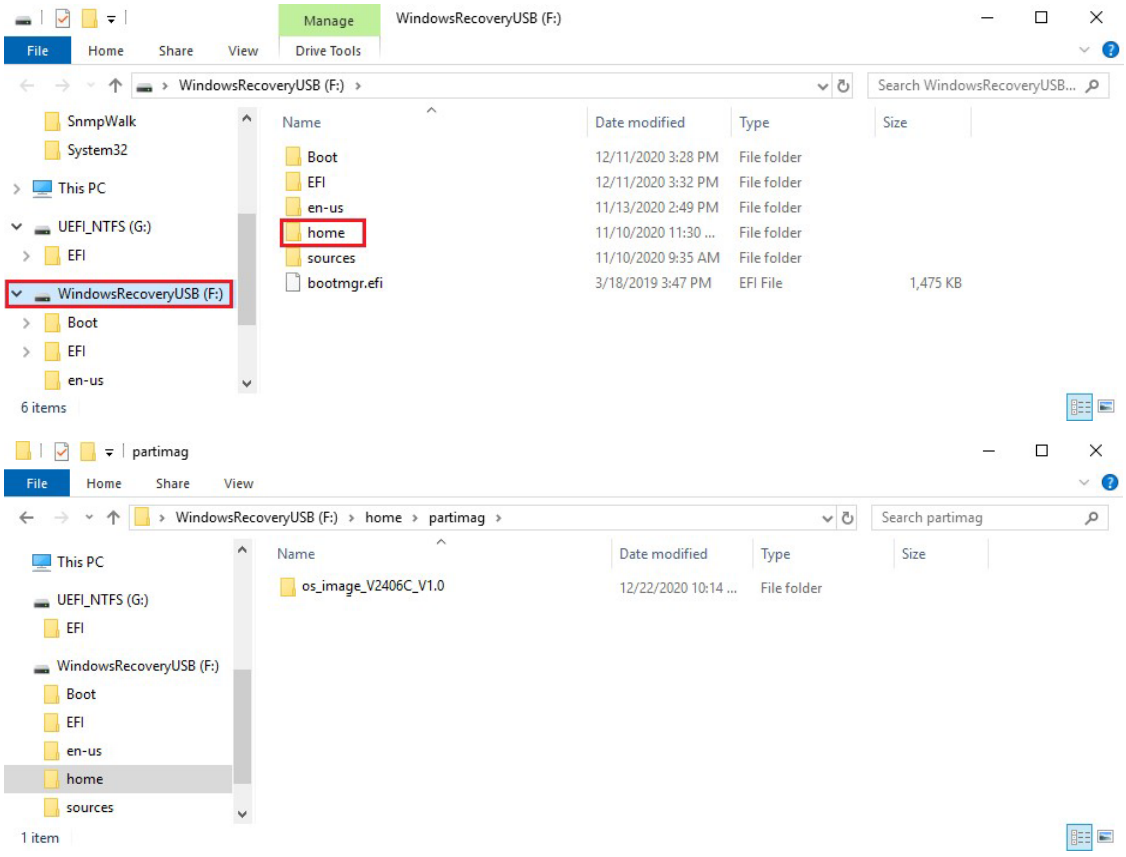
5. Click **Start** and make sure the selected USB disk is formattable. Click **Yes** to start creating the recovery USB.



6. 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.

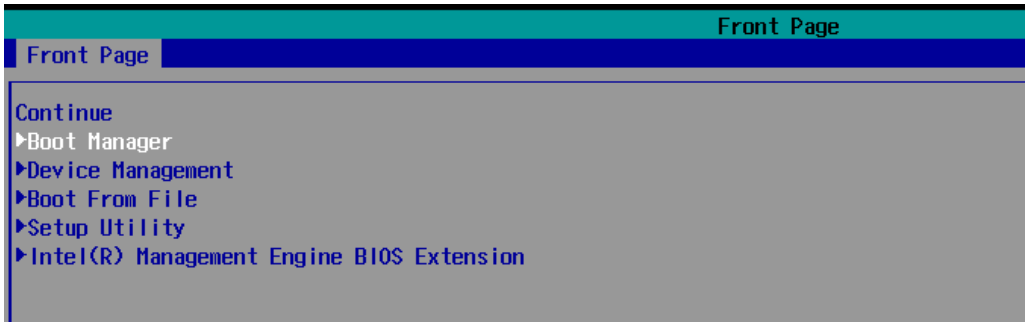


7. To create a recovery USB disk with the Windows 10 image, copy the **os_image_ModelName** directory to the **\home\partimag** folder in the USB drive.

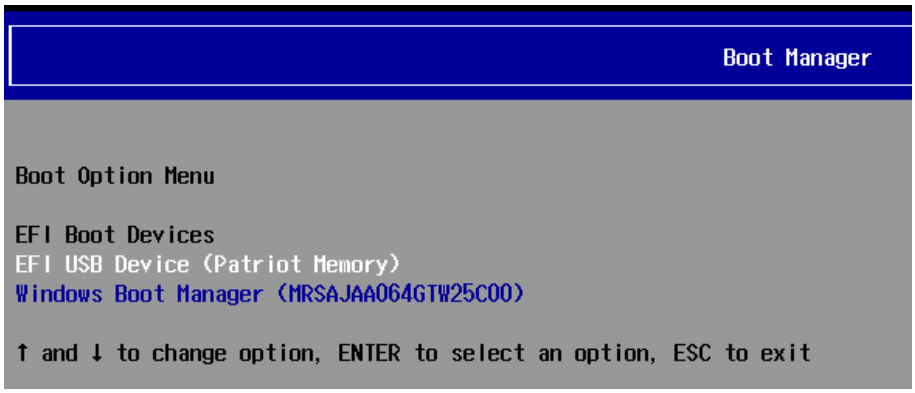


Booting From the USB Disk

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.

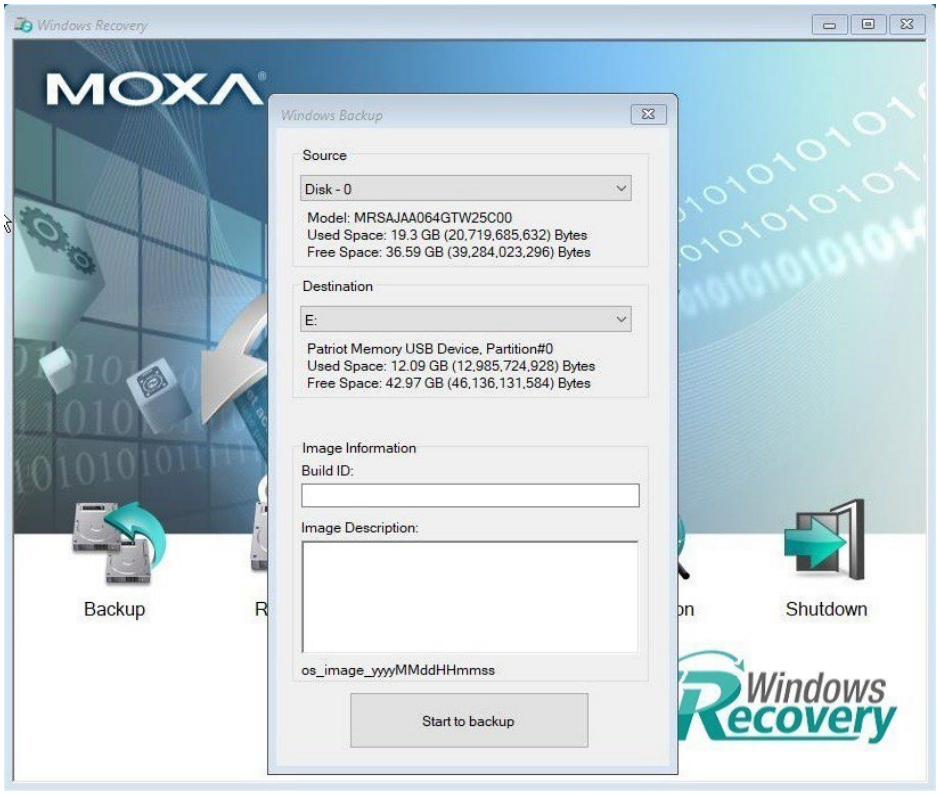


System Image Backup

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

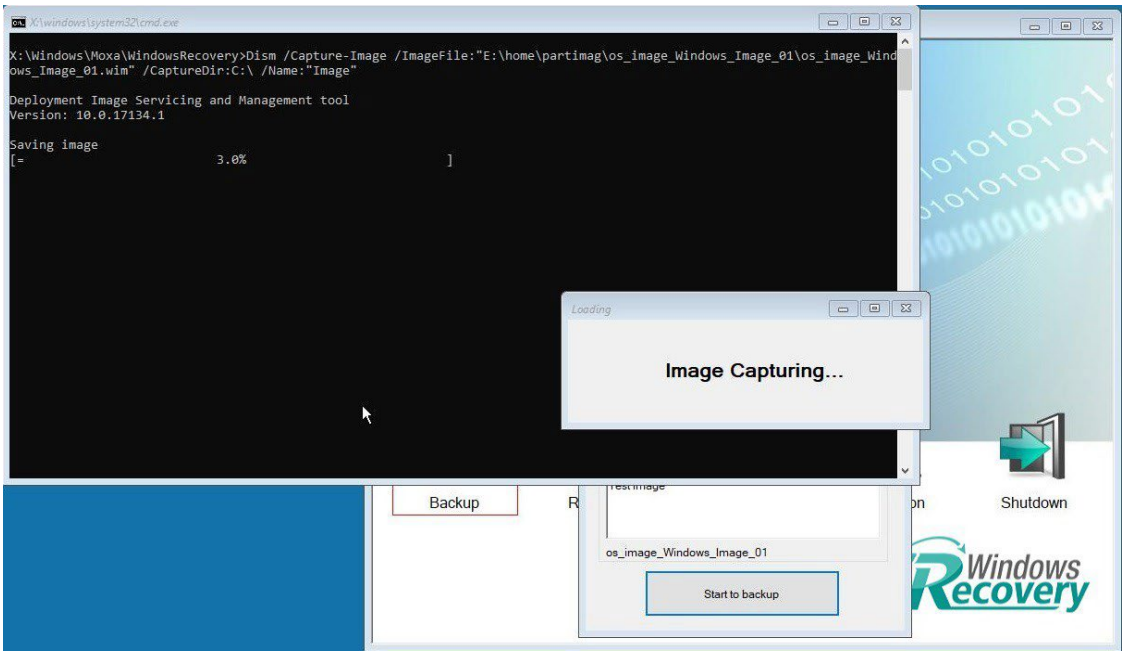
1. Click **Backup**.

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.

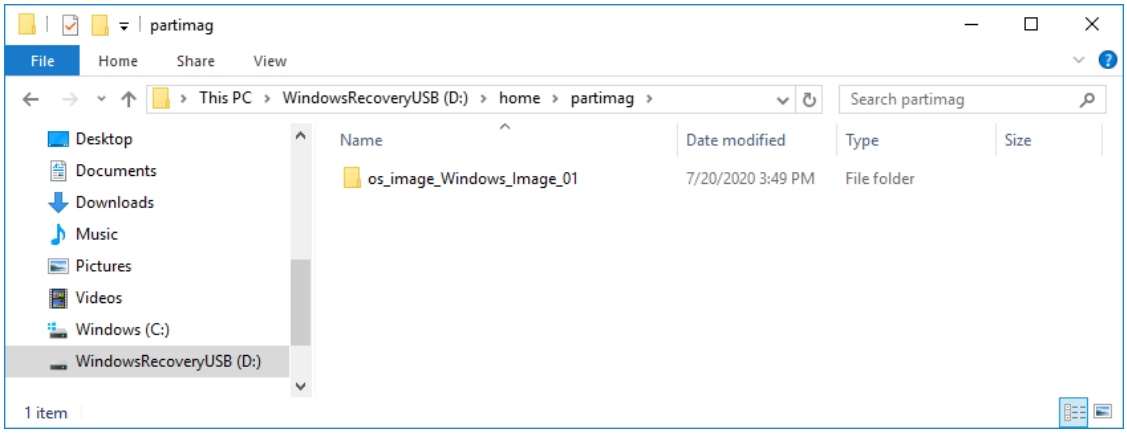
4. Wait for the backup process to complete.



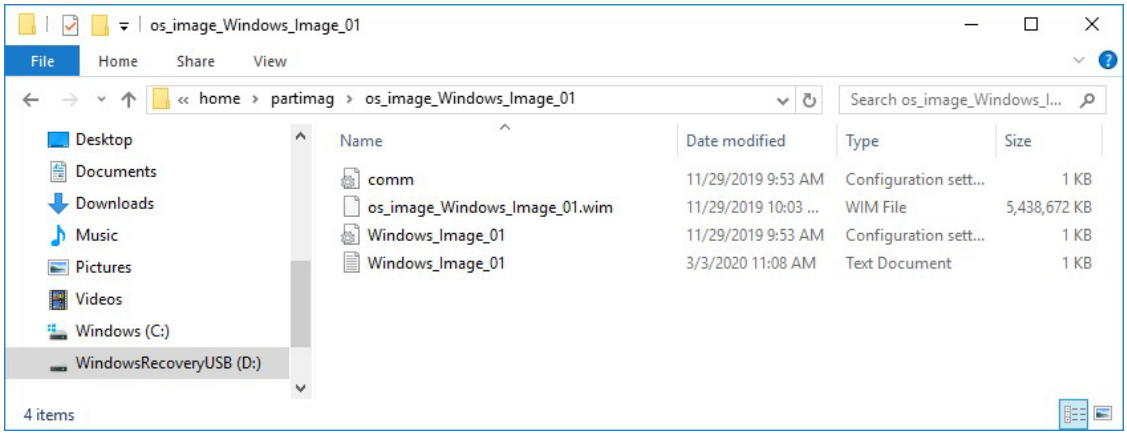
5. When the process is done, click **OK**.

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**.

NOTE

If dual operating systems are required, we recommend first restoring the images to the destination drive with the PCIe interface (if available).

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**.

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 initialized during the first bootup process. Do not turn off or shut down the computer while the system is restarting.