

V2406C Windows Software User's Manual

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V2406C Windows Software User's Manual

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System Initialization

In this chapter, we describe how to initialize the system settings on the V2406C computer 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.

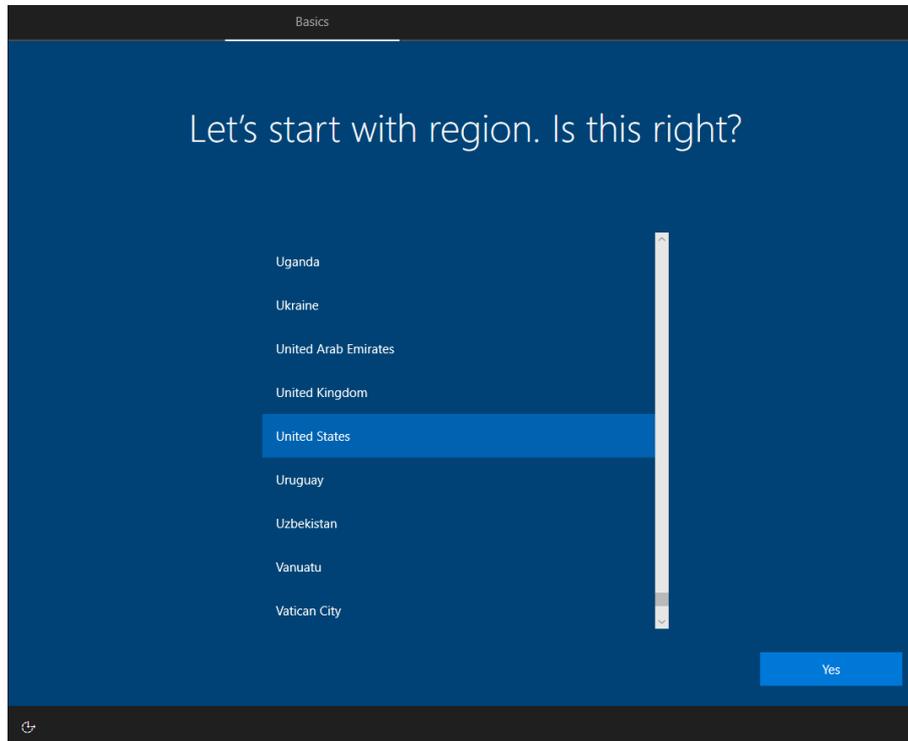
The following topics are covered in this chapter:

- ❑ **Initializing User Settings**
- ❑ **Initializing the System**

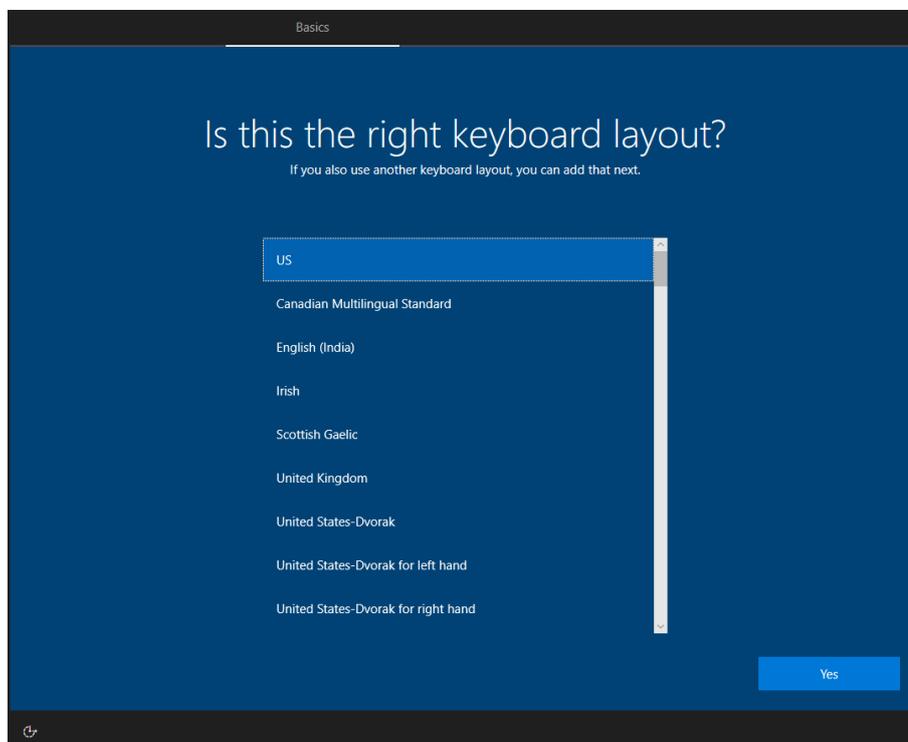
Initializing User Settings

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

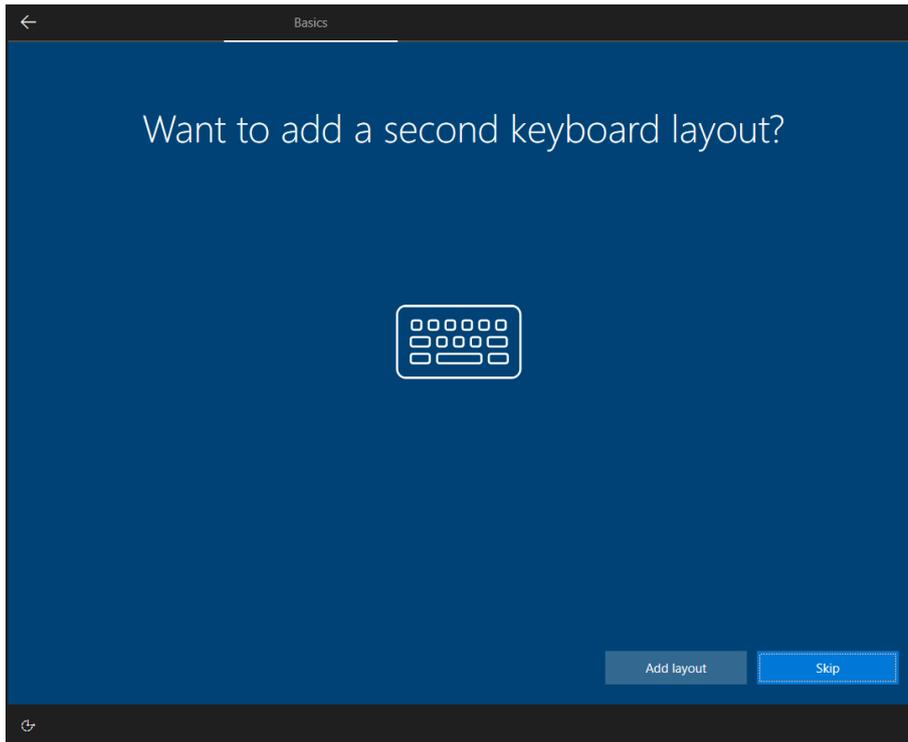
1. Select a region.



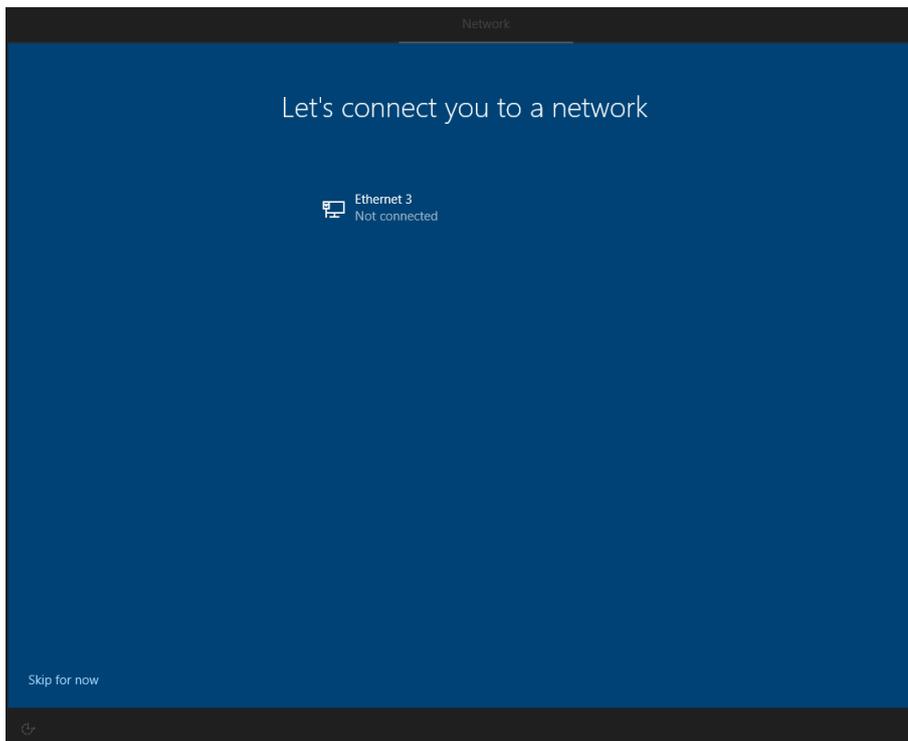
2. Select a keyboard.

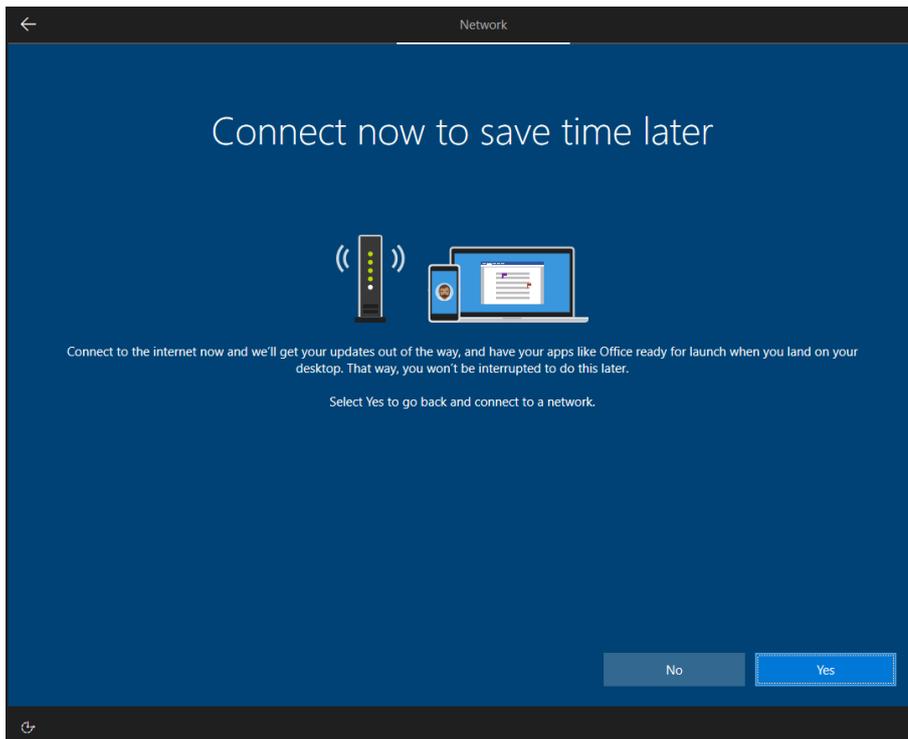


3. Select a second keyboard.

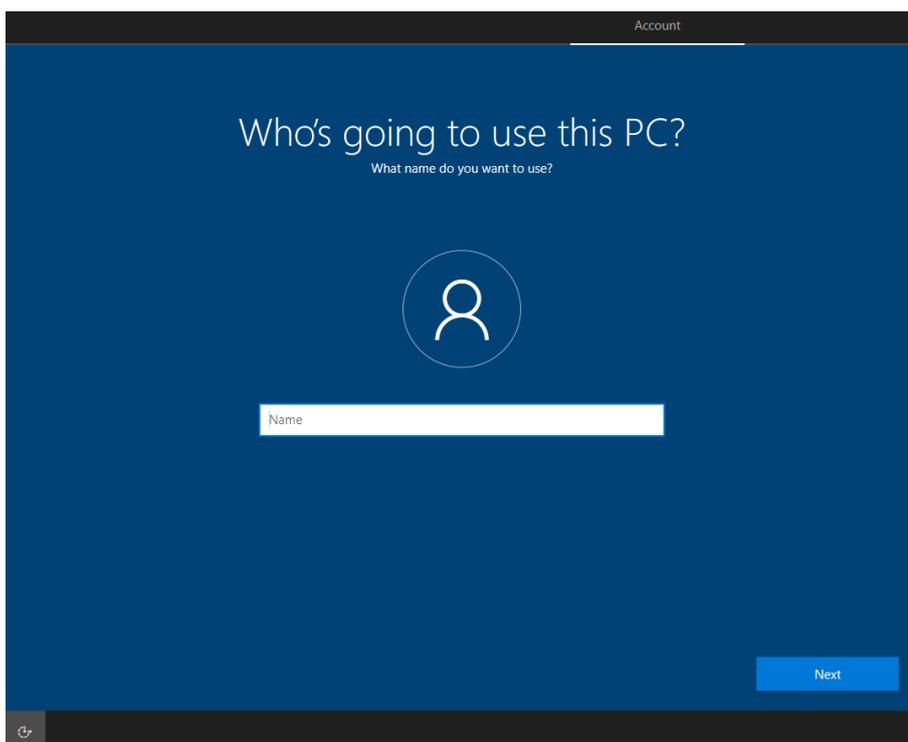


4. Connect to a network.

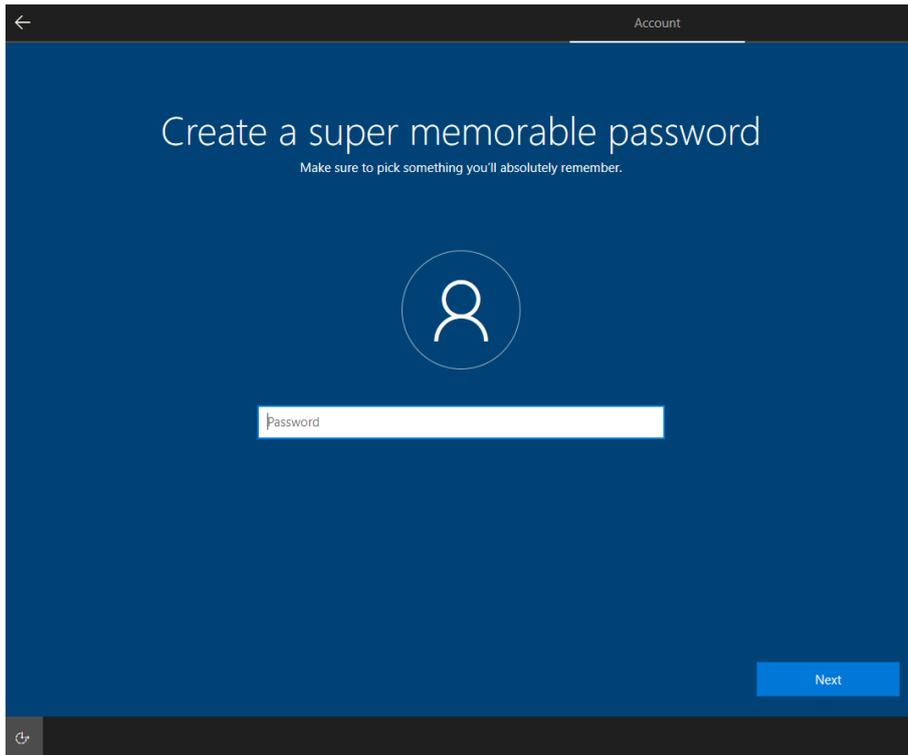




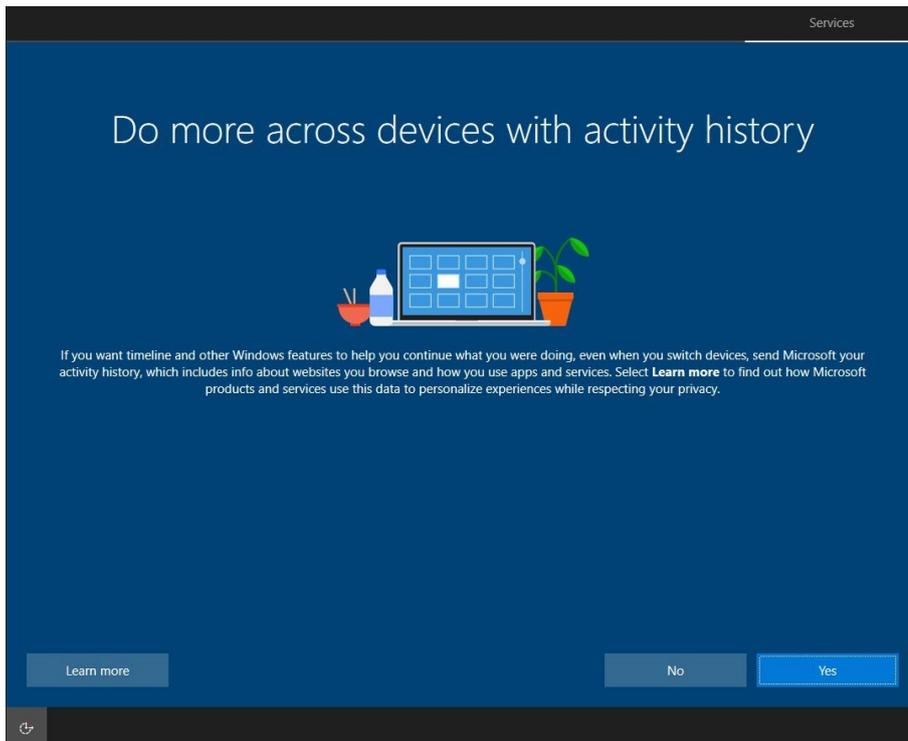
- 5. Sign in to or create a local account or a Microsoft account (MSA).



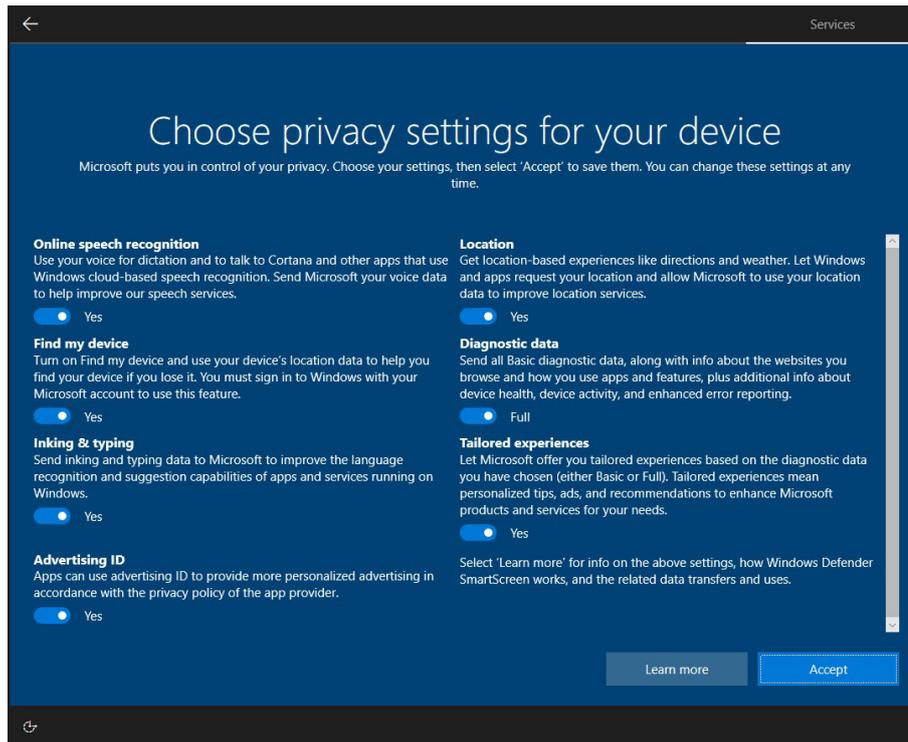
- 6. Create a password.



- 7. Do more across device with activity history.



8. Choose your privacy settings.



Initializing the System

1. When you sign in to the system for the first time, the Windows Command Processor will run and show the message **Do you want to allow this app to make changes to your device?** Click **Yes**.



2. Wait until the process is complete.

```
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.
```

After the process completes, the system initialization is done.

2

BitLocker

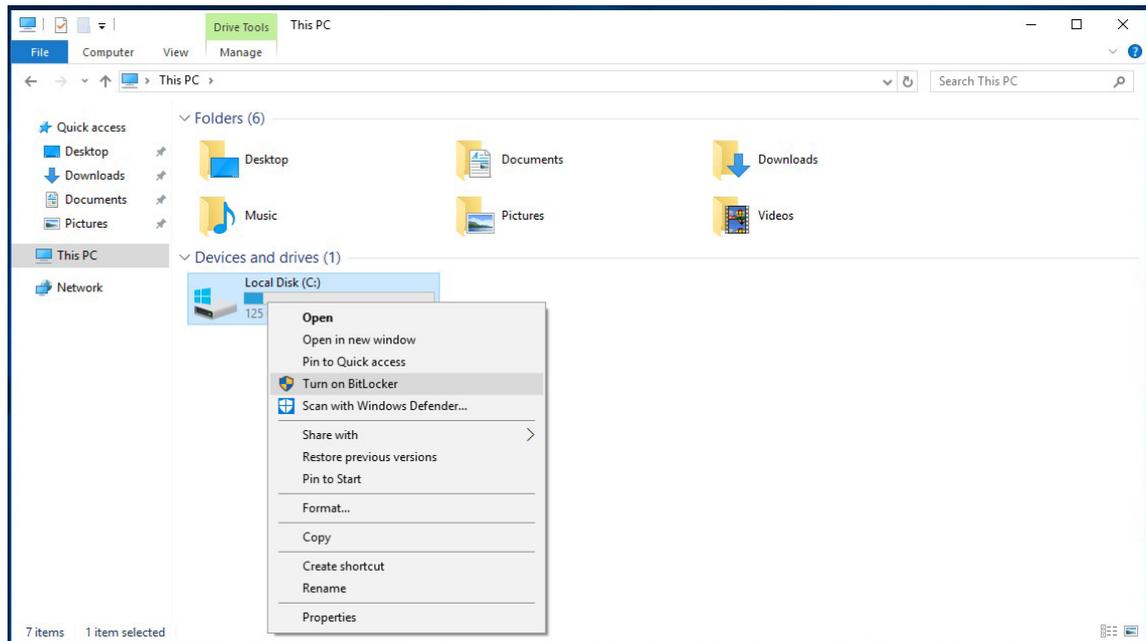
This chapter describes the BitLocker setup process.

The following topics are covered in this chapter:

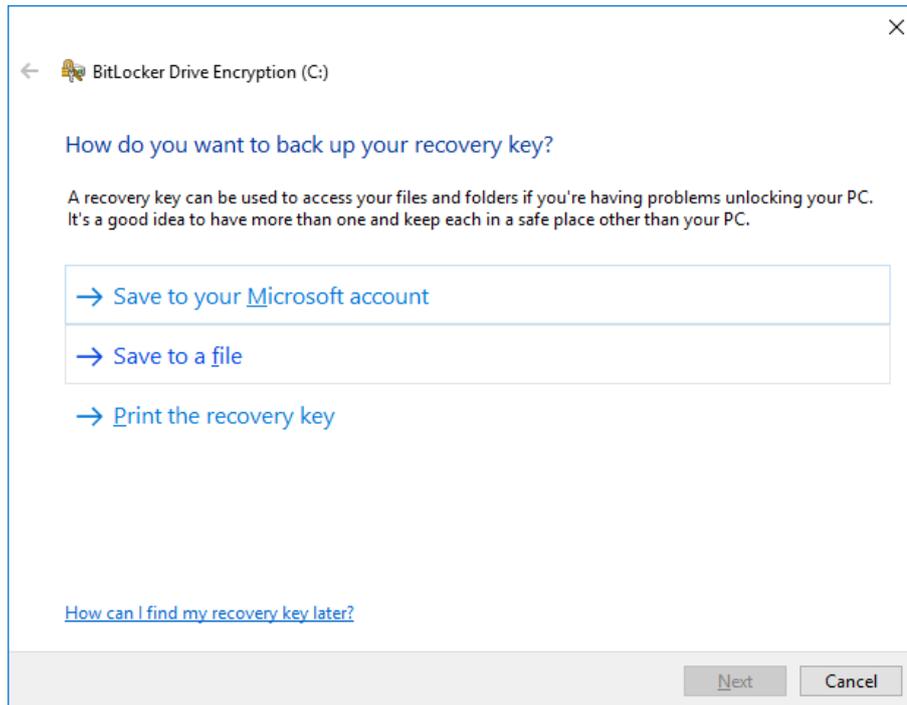
- ❑ **Enabling the BitLocker**
- ❑ **Disabling the BitLocker**

Enabling the BitLocker

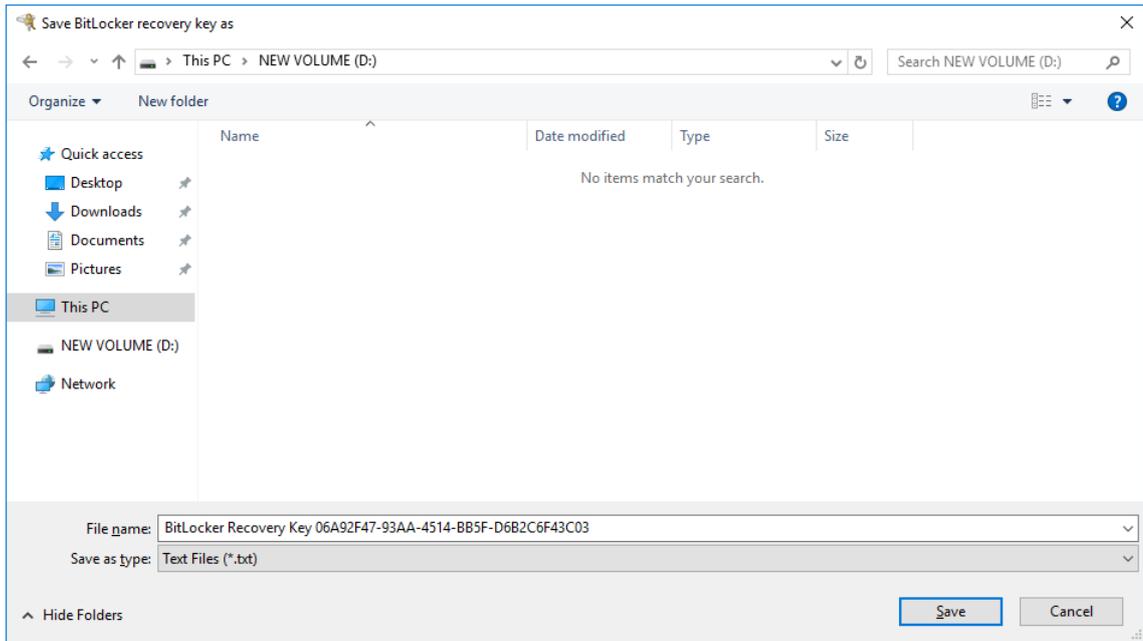
1. In the **Windows Devices and drives**, right-click on the drive and select **Turn on BitLocker**.



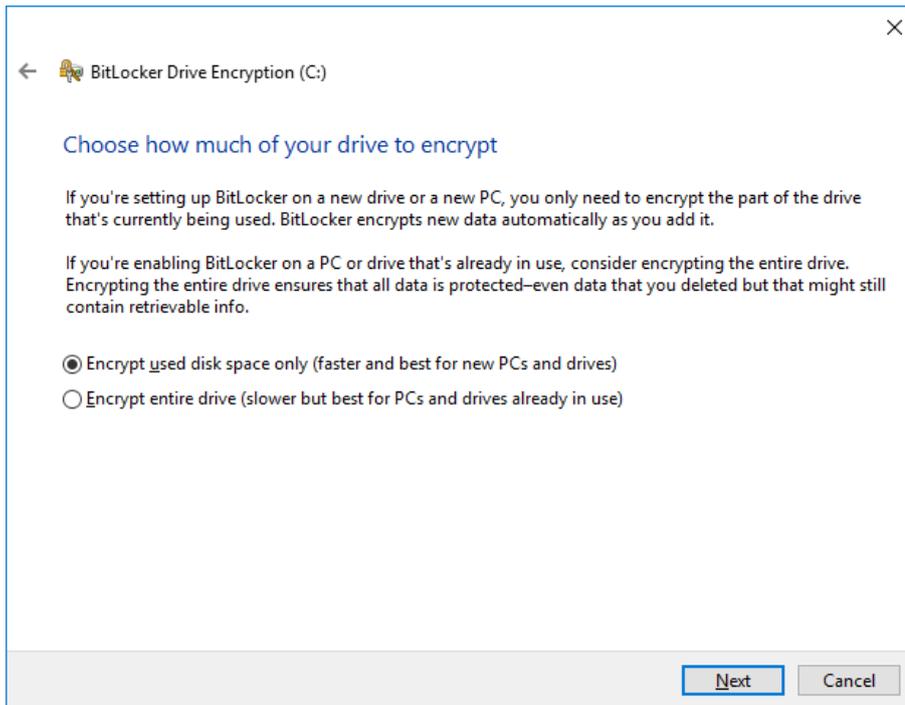
2. Select an option to back up the recovery key.
For example, select **Save to a file**.

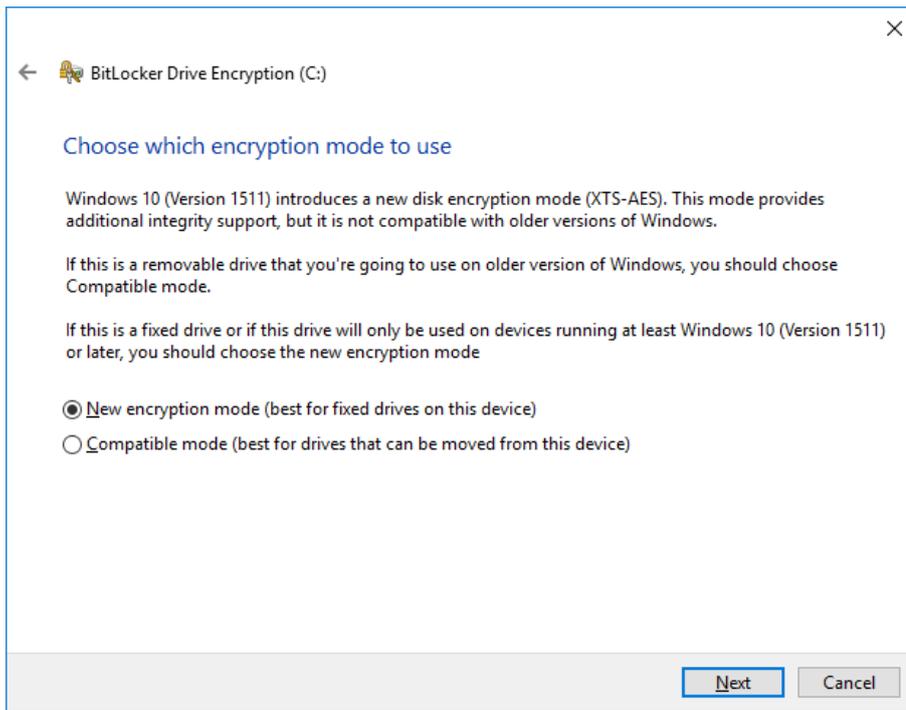


3. Select the path to store the file in.

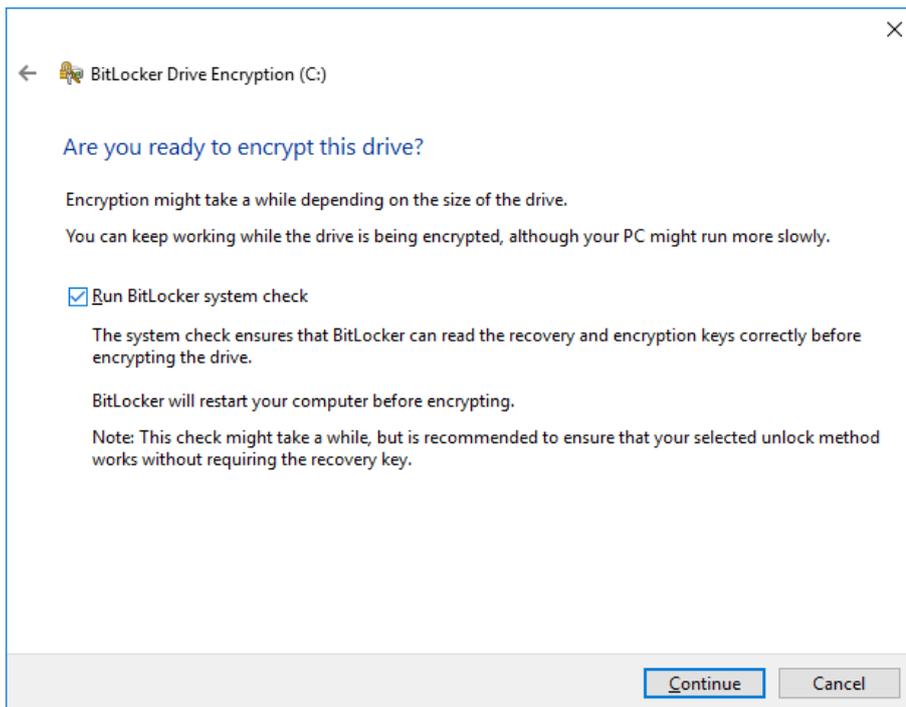


4. Follow the onscreen instructions to specify the drive encryption options.





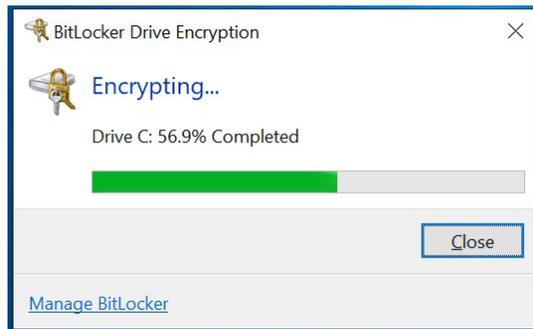
5. Click **Continue**.



6. Restart the computer.

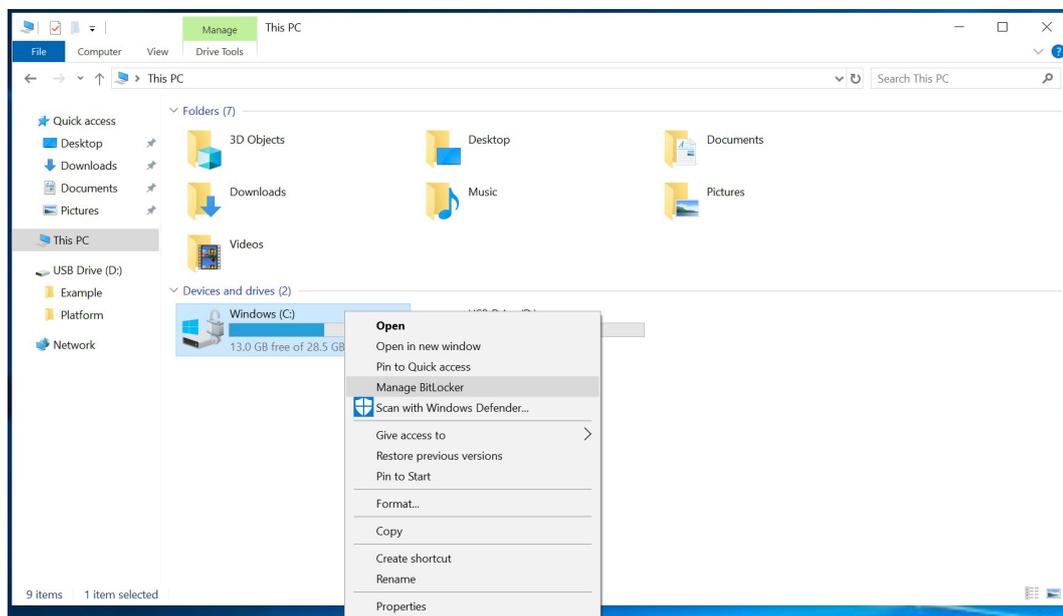


7. Wait for the encryption process to complete and then click **Close**.

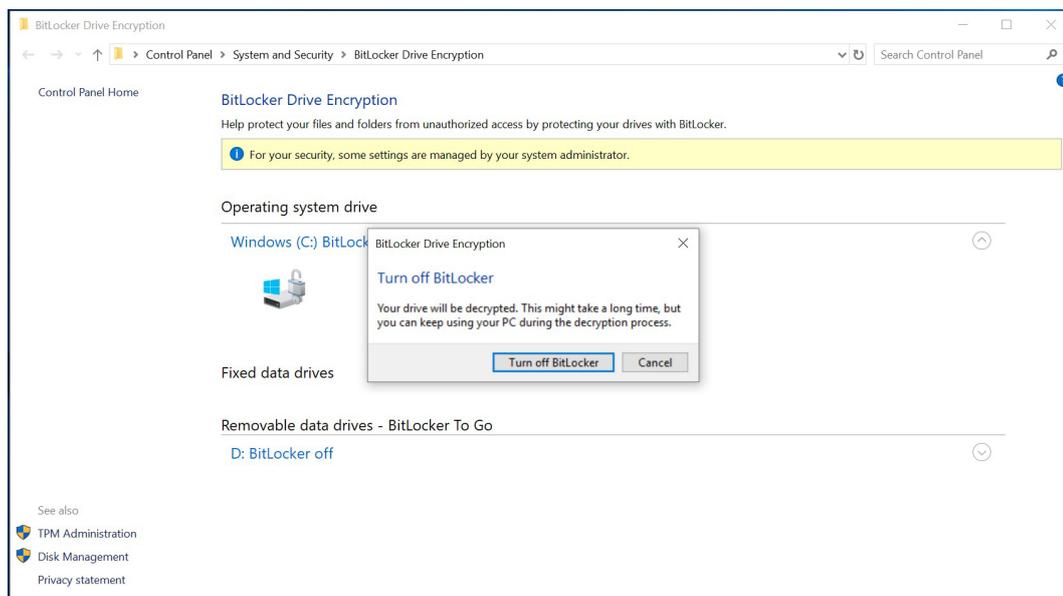


Disabling the BitLocker

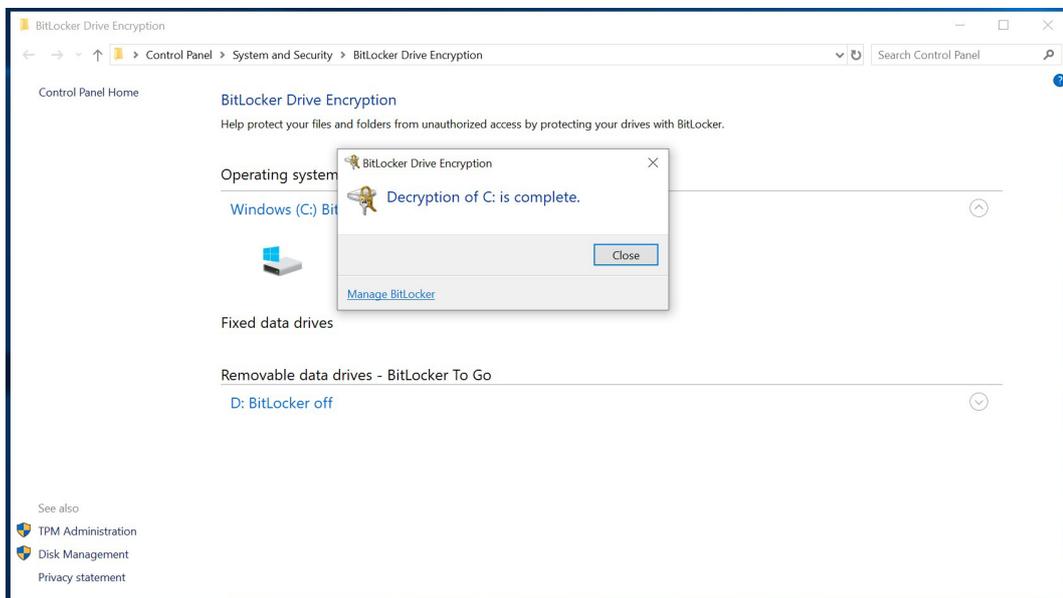
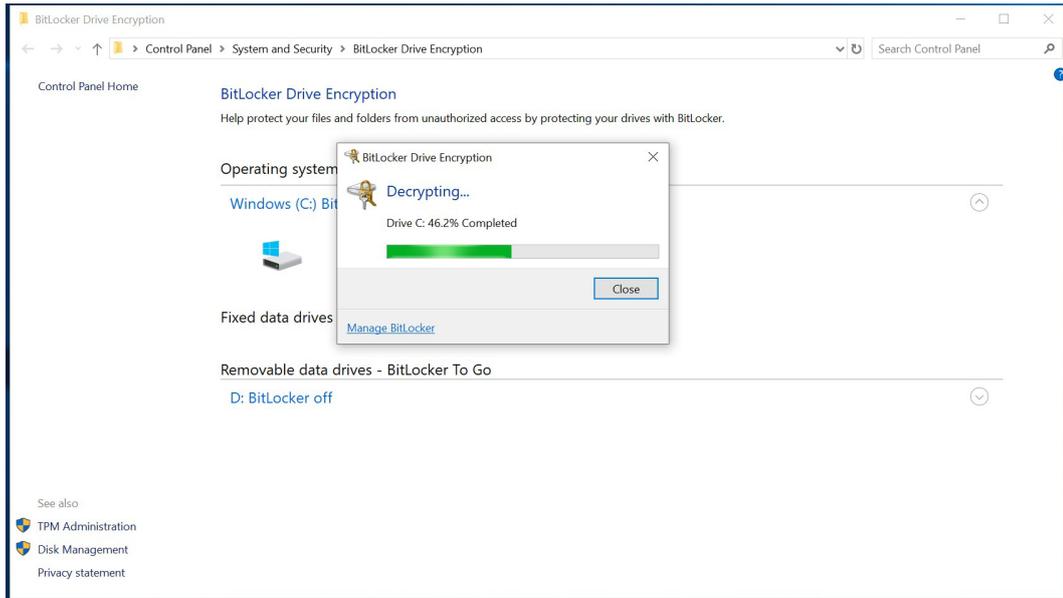
1. In the Windows Devices and drives, right-click on the drive and select **Manage BitLocker**.



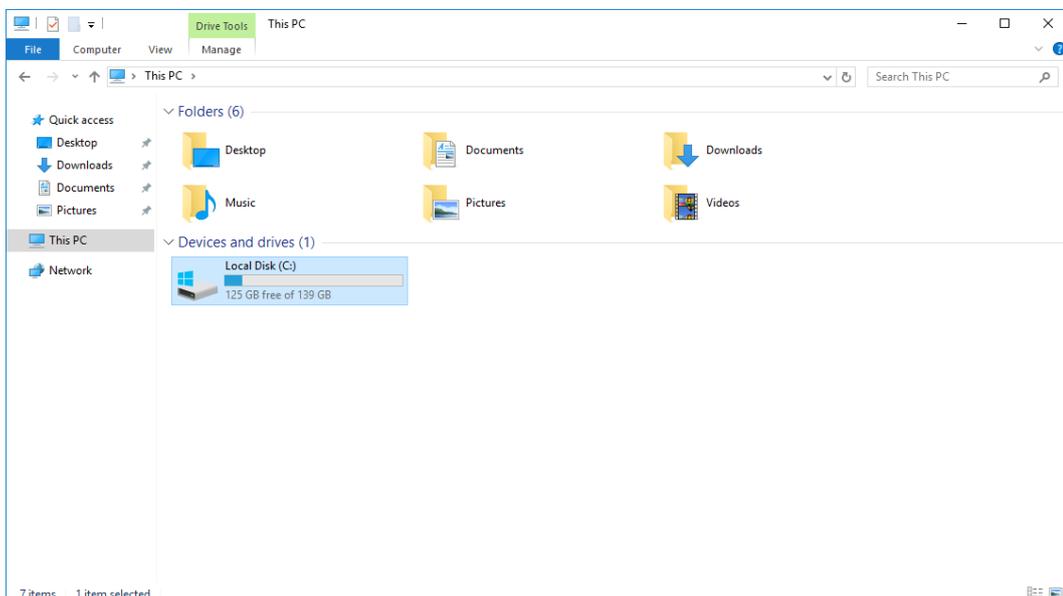
2. Click on **Turn off BitLocker**.



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.



Configuring RAID

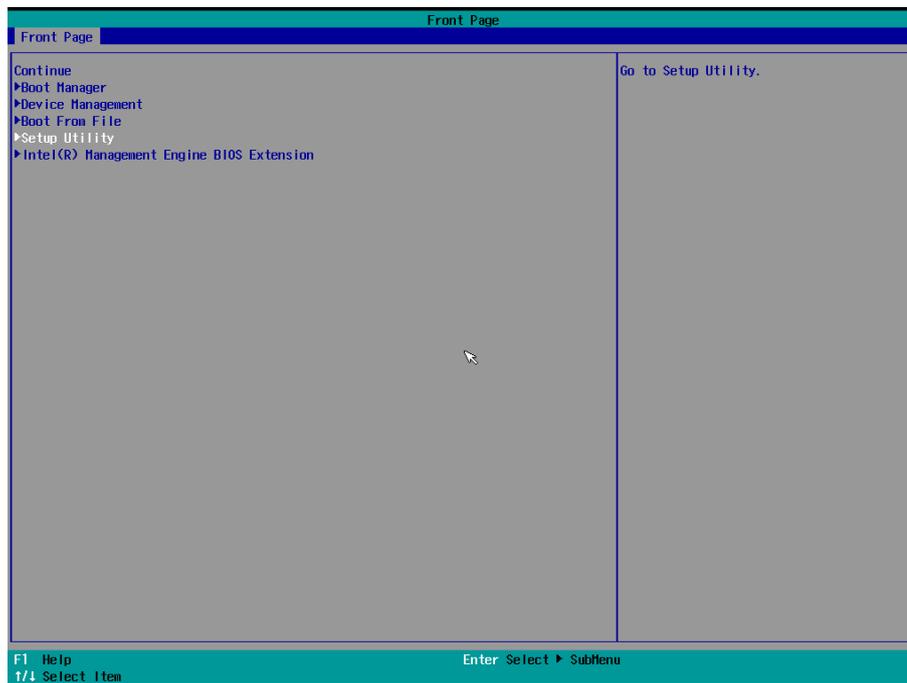
This chapter describes the setup process for RAID.

The following topics are covered in this chapter:

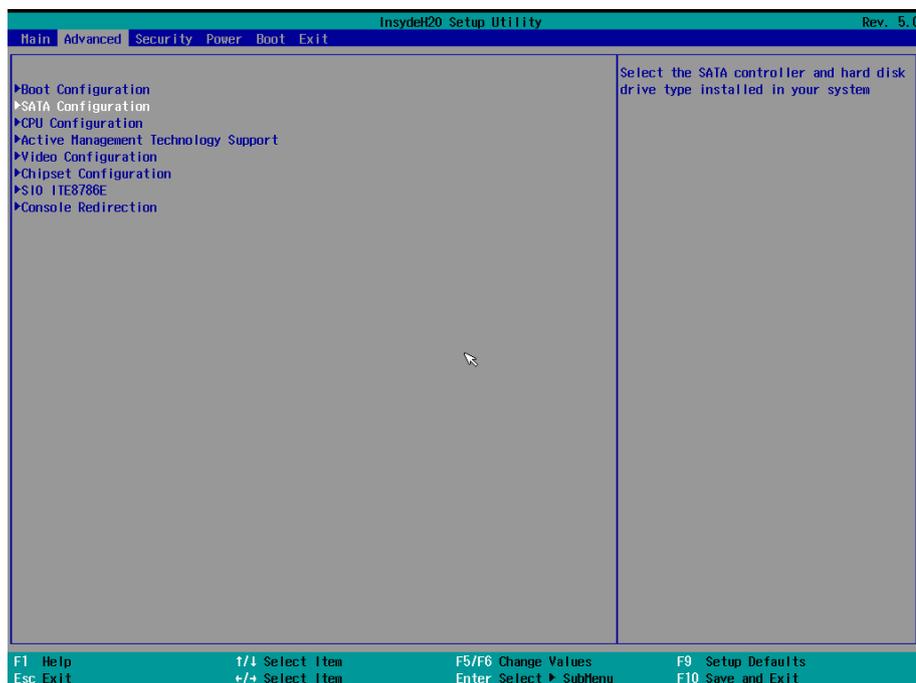
- ❑ **Changing the RAID Mode**
 - Changing the SATA Mode From AHCI to RAID
- ❑ **Creating a RAID Disk in the BIOS**
- ❑ **Replacing a Disk**
- ❑ **Removing a RAID Volume From the BIOS**

Changing the RAID Mode

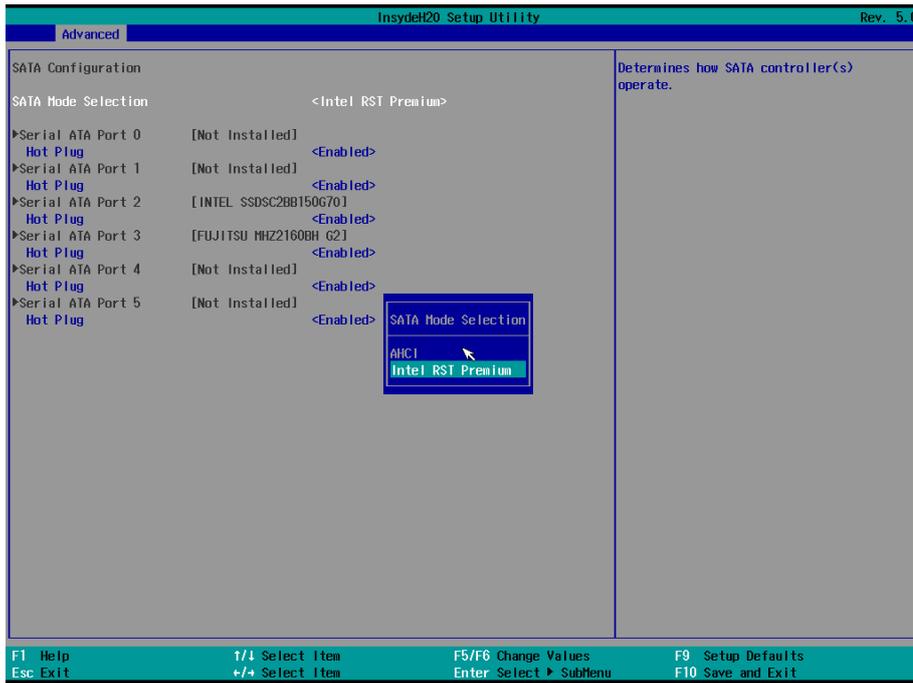
1. Power on the computer and press **F2** to enter the BIOS menu.
2. Select the **Setup Utility** option.



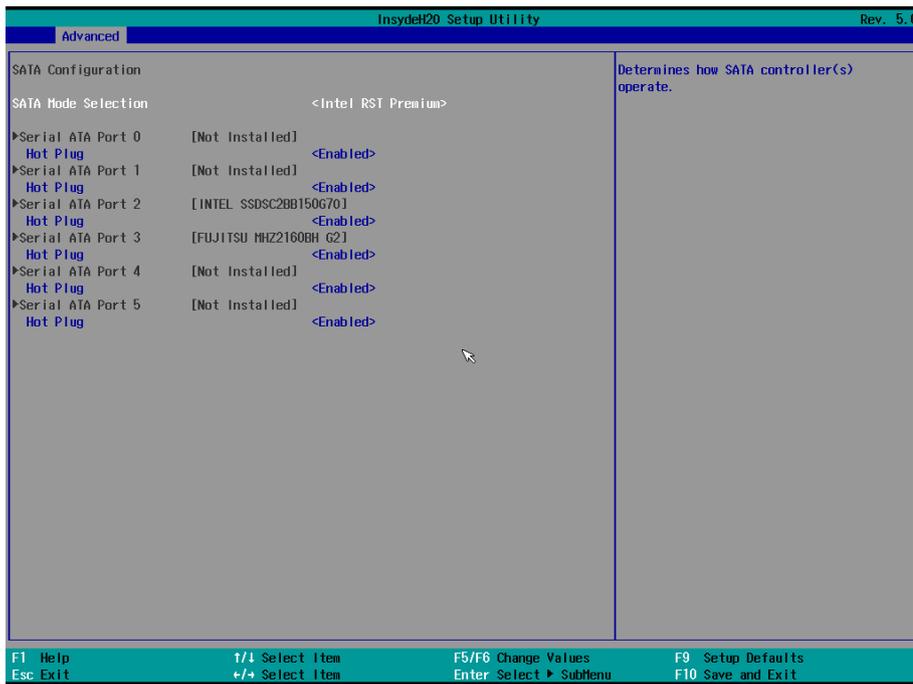
3. Select the **SATA Configuration** option.



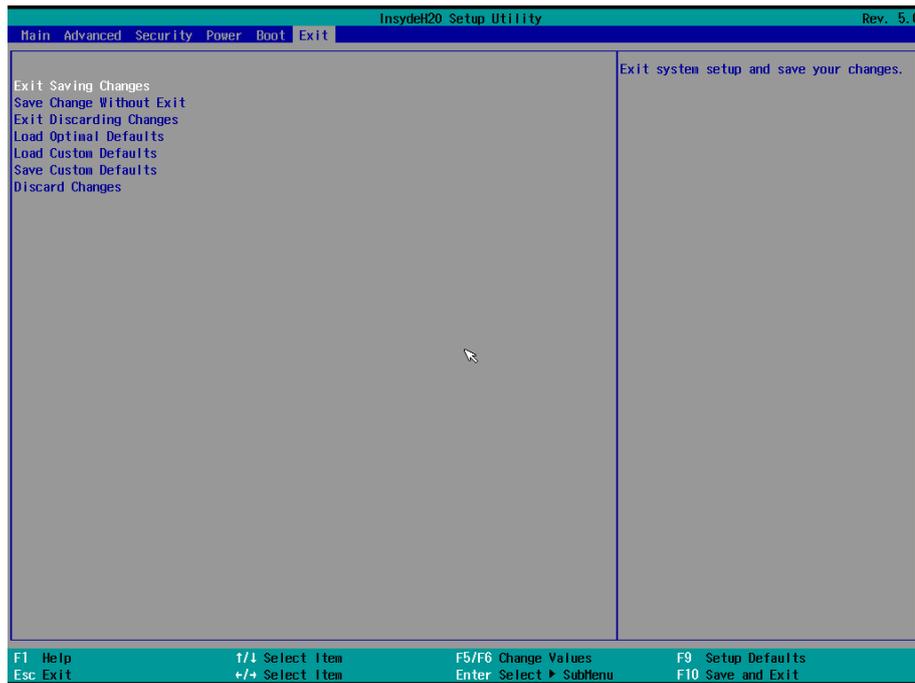
4. Select the **SATA Mode Selection** followed by the **Intel RST Premium** option.
5. Enable the **Hot Plug** function on all ports.



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



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

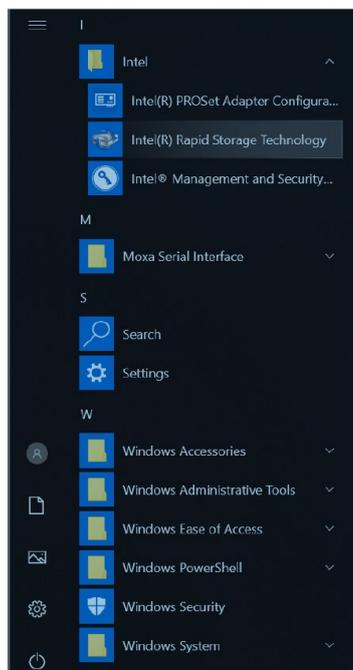


Changing the SATA Mode From AHCI to RAID

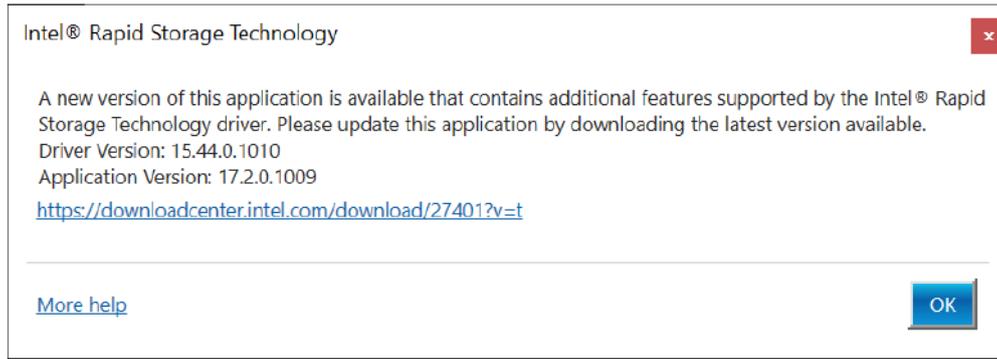
The Moxa OS image is created using the AHCI mode. If you need to set up the RAID mode in the default Moxa OS image, you must reinstall the Intel® Rapid Storage Technology (RST) driver.

To reinstall the Intel® RST driver, do the following:

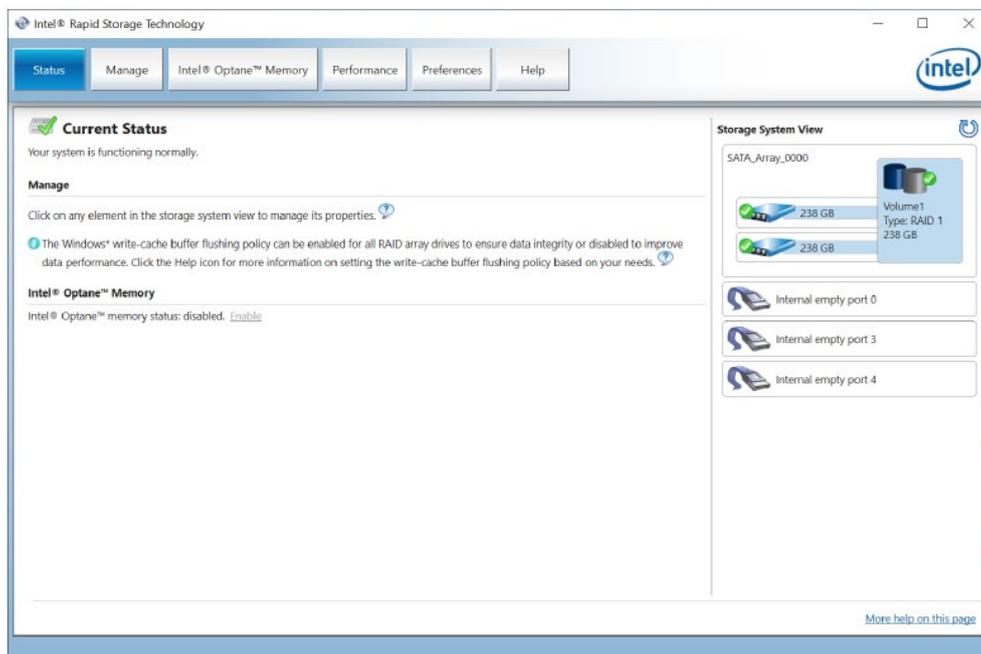
1. Run the **Intel® Rapid Storage Technology** tool.



If the system displays the following message, you must reinstall the Intel® RST driver.

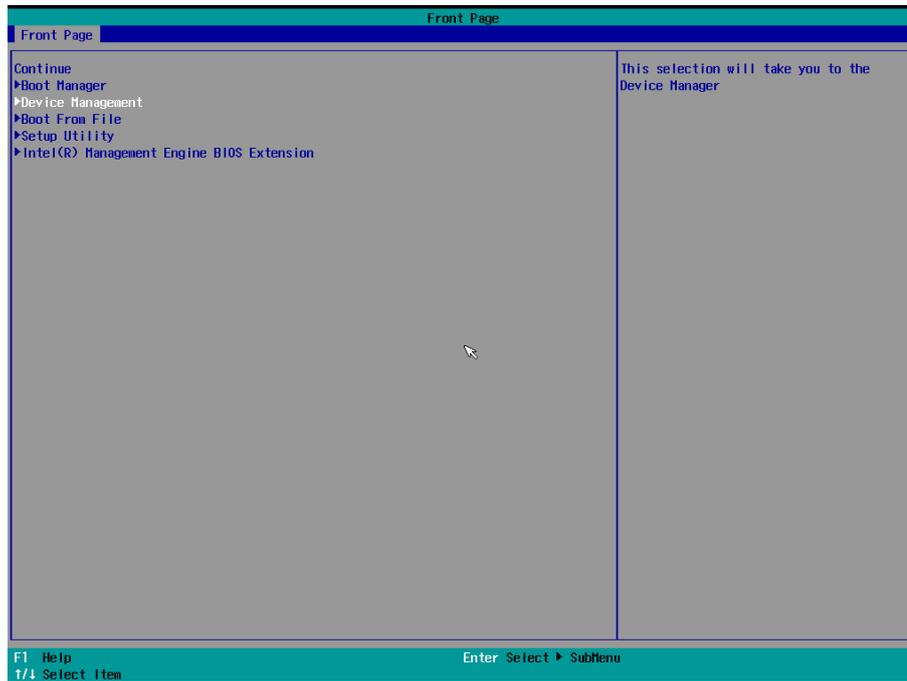


2. Uninstall the current Intel® RST driver.
3. Download the latest driver from Moxa's website or Intel's driver download page.
4. Install the latest Intel® RST driver.
5. Run the Intel® Rapid Storage Technology tool to see the current disk status.



Creating a RAID Disk in the BIOS

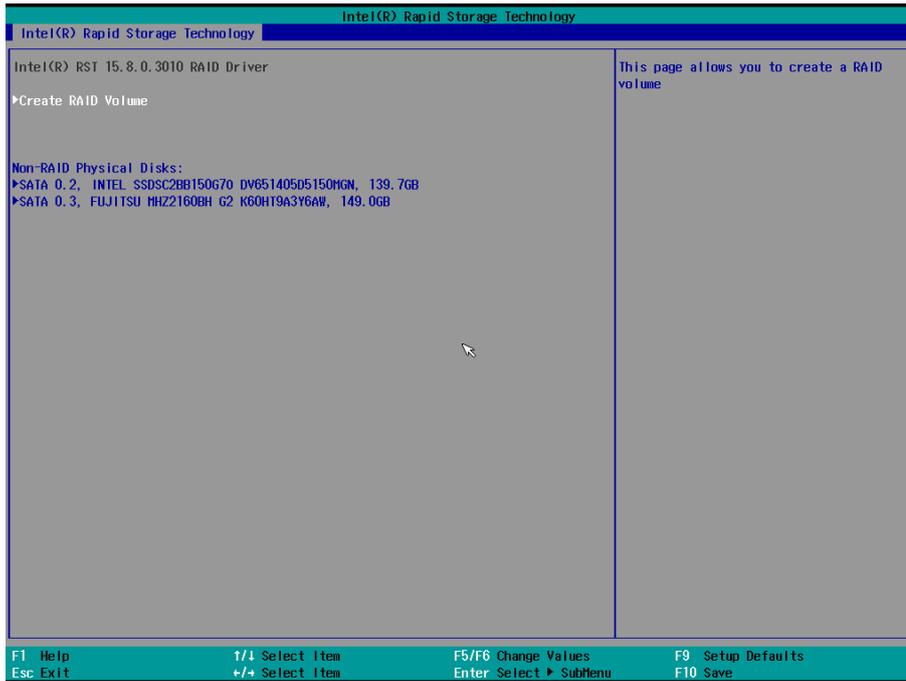
1. Power on the computer and press **F2** to enter the BIOS menu.
2. Select the **Device Management** option.



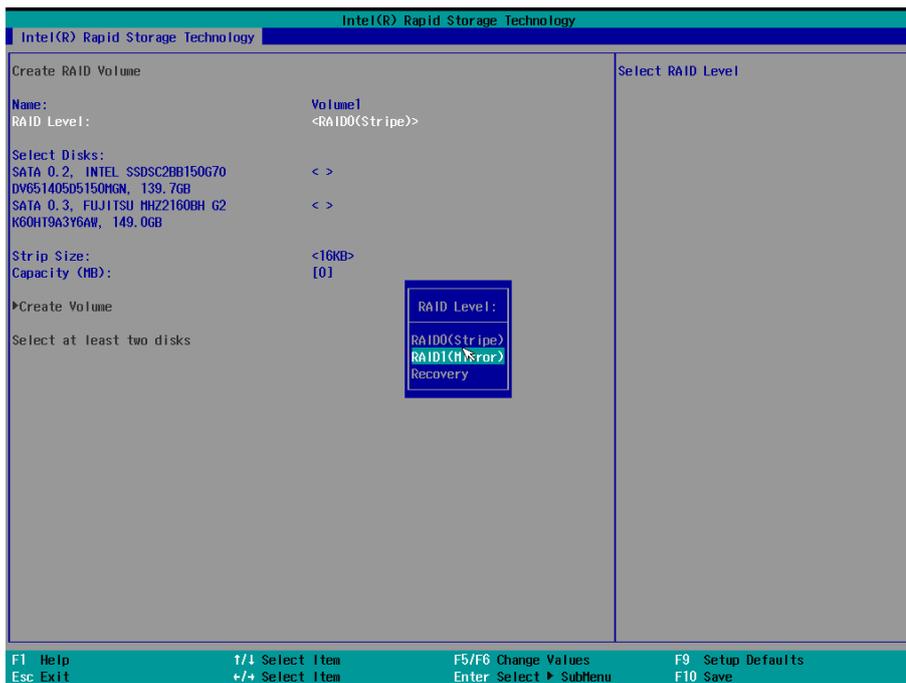
3. Select **Intel® Rapid Storage Technology**.

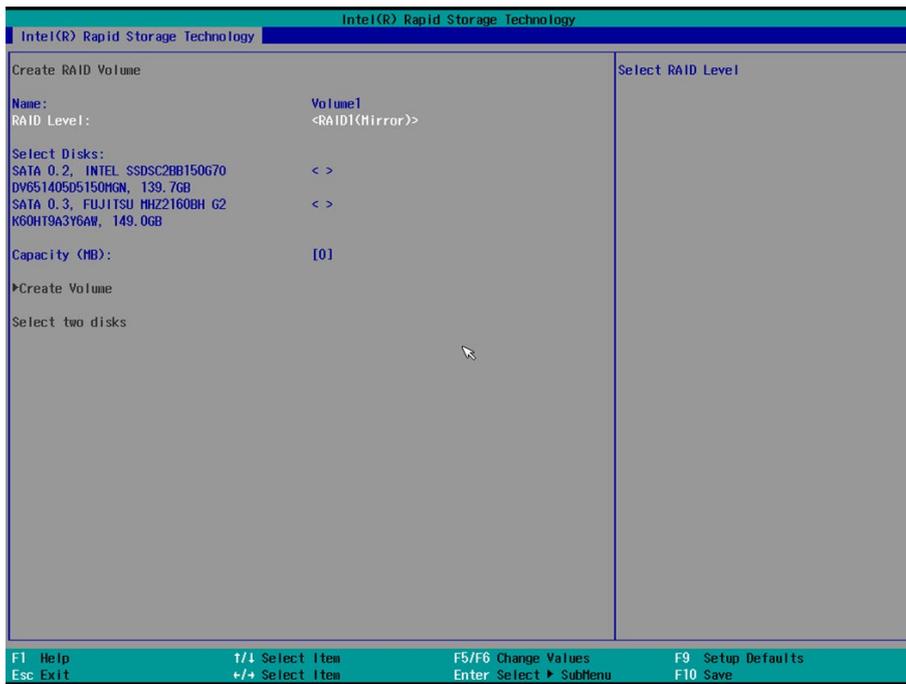


4. Select **Create RAID Volume**.

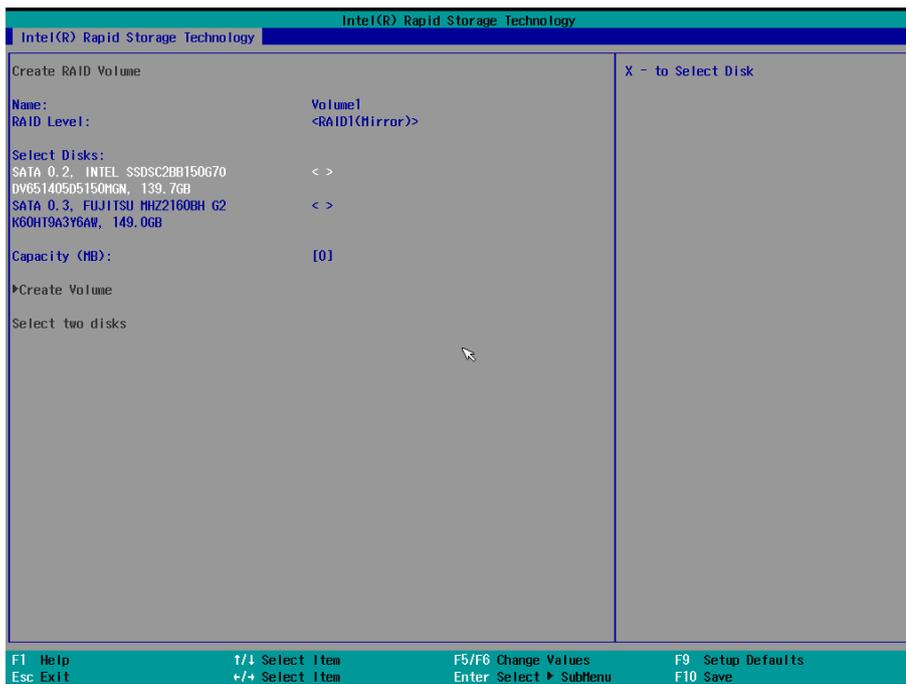


5. Select the **RAID Level** option and then press **Enter** to select the raid level; for example, **RAID1(Mirror)**.

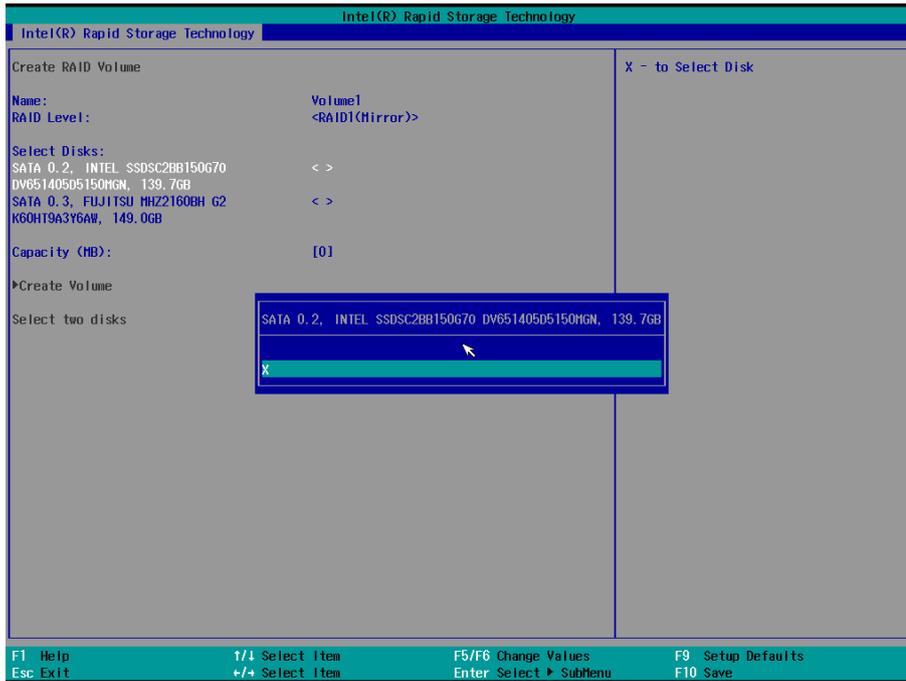




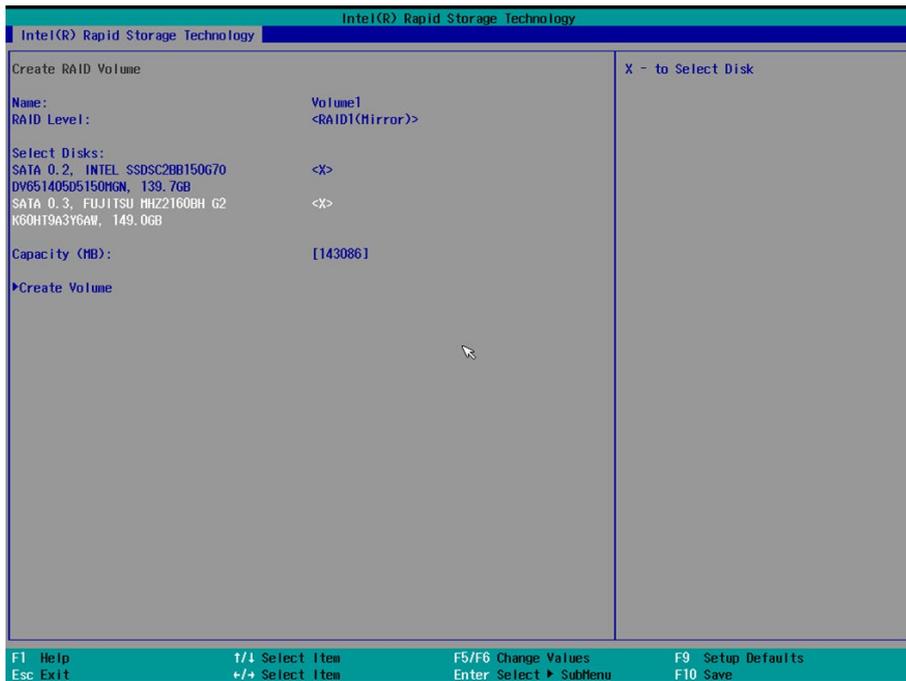
6. Select the disk.



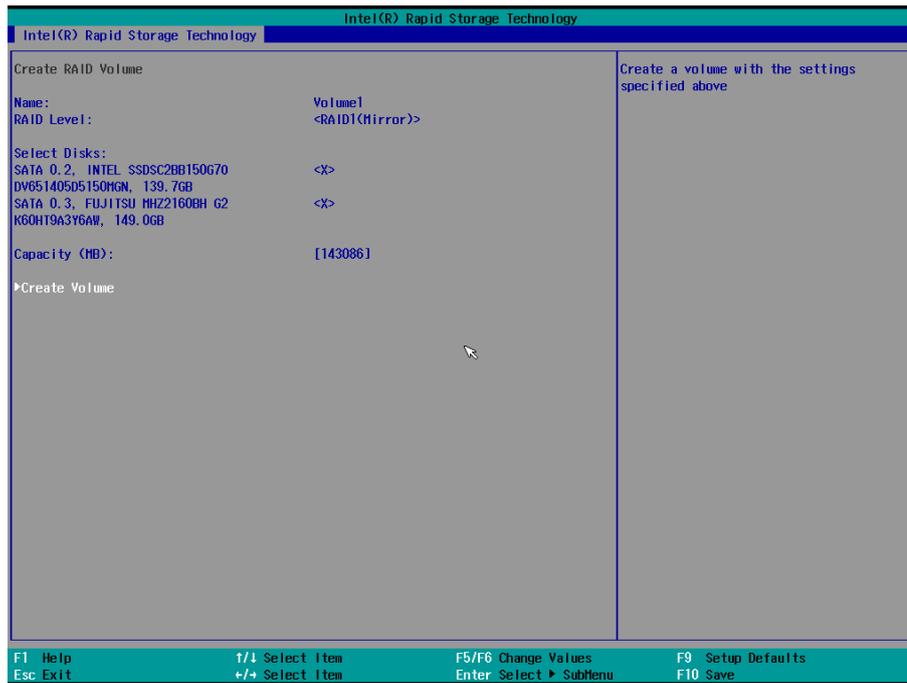
7. Enter x and then press **Enter**.



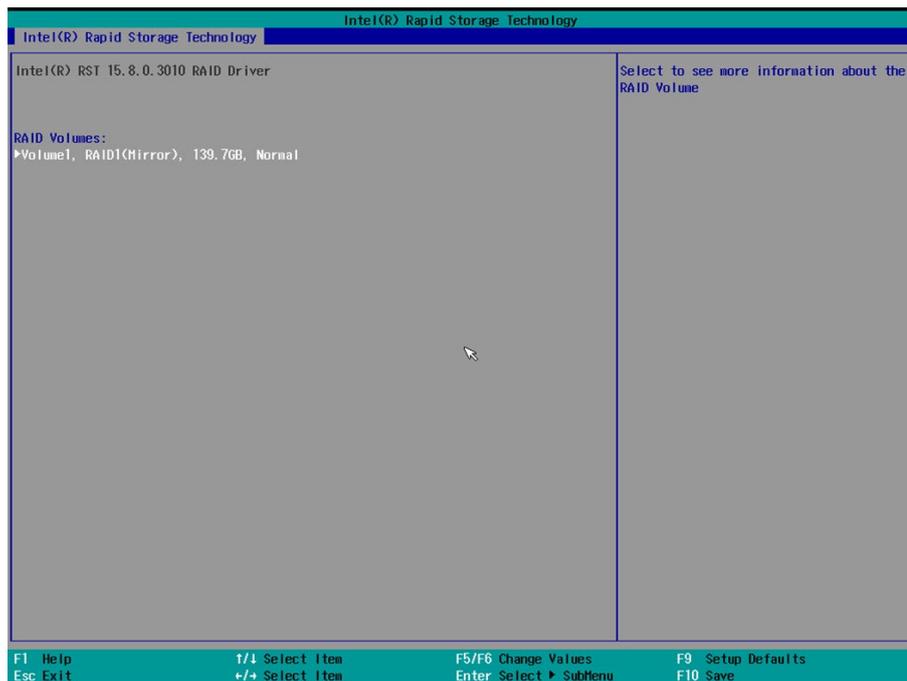
The disk is now marked with an x next to it to indicate the selection.



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



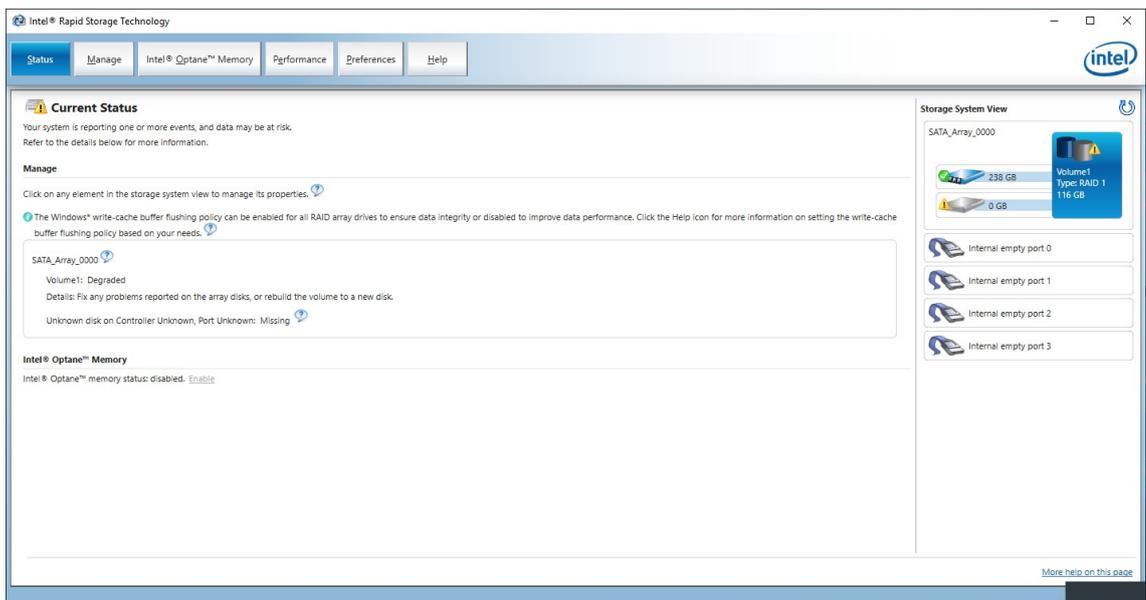
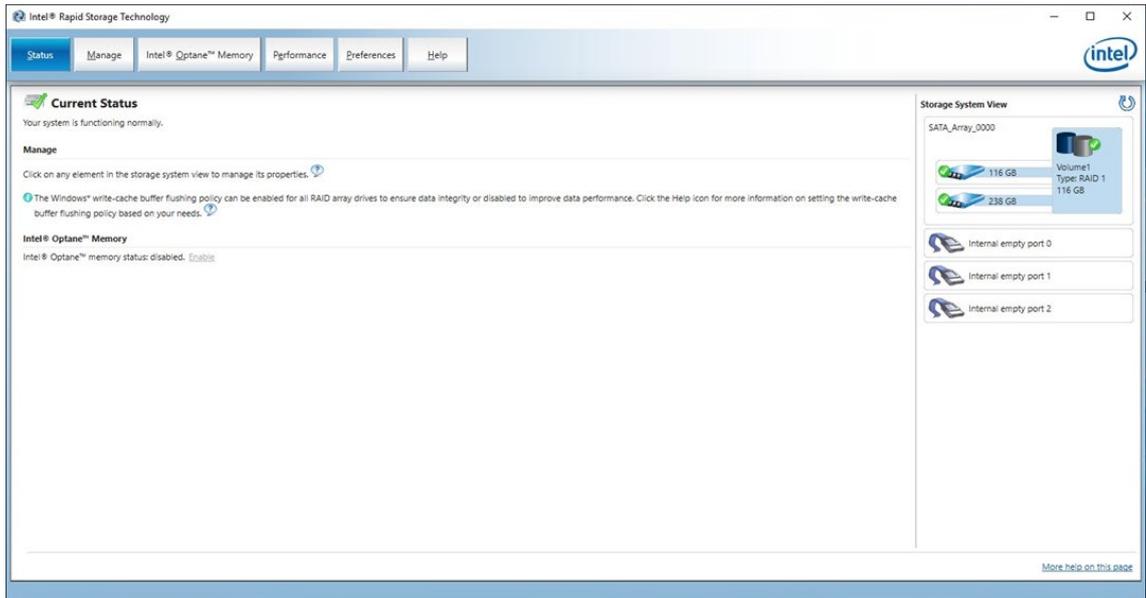
A RAID volume is created based on the settings specified.



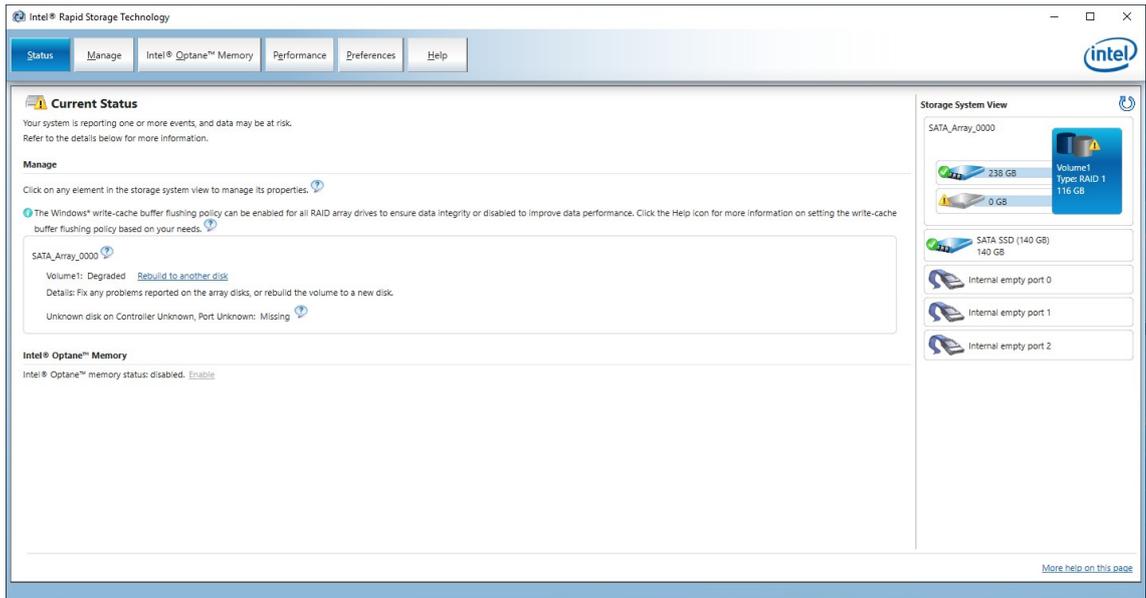
9. Press **F10** to save the settings.

Replacing a Disk

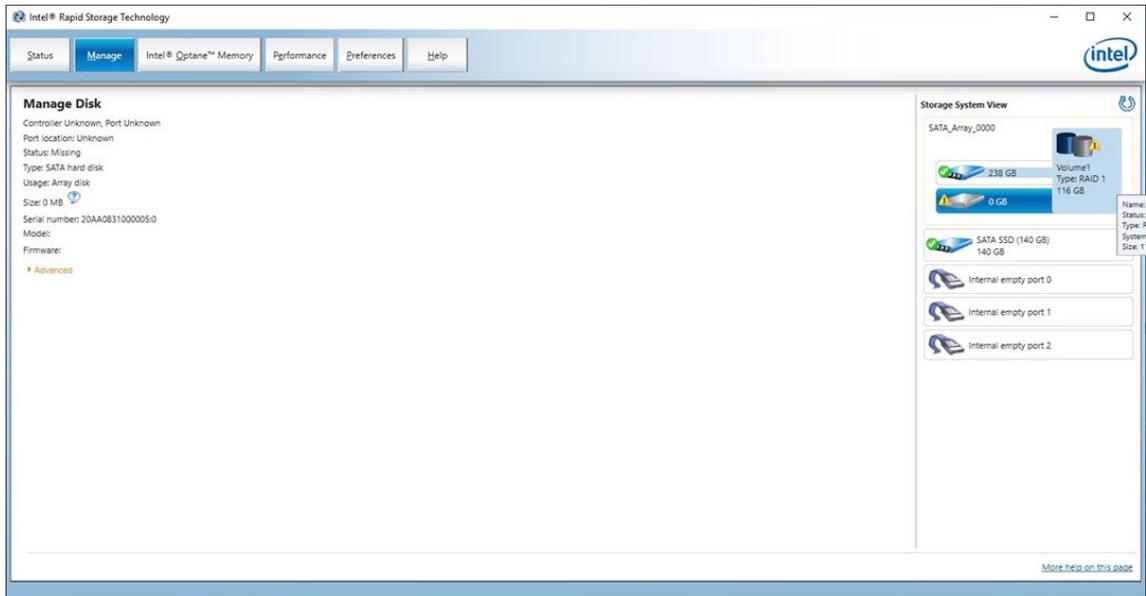
1. Unplug the current SSD.



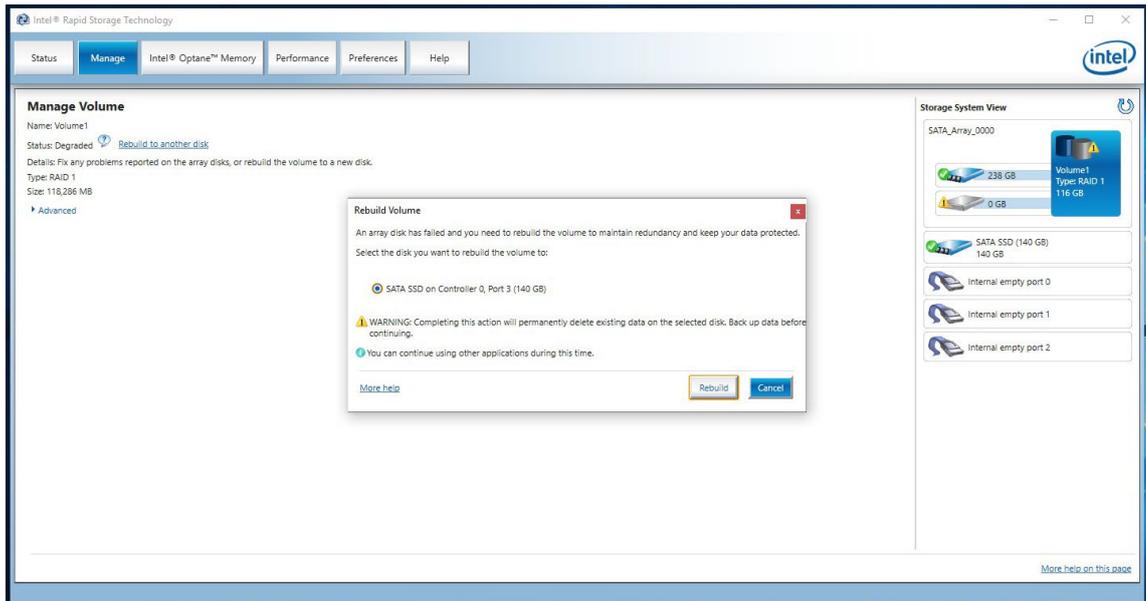
2. Install the new SSD.



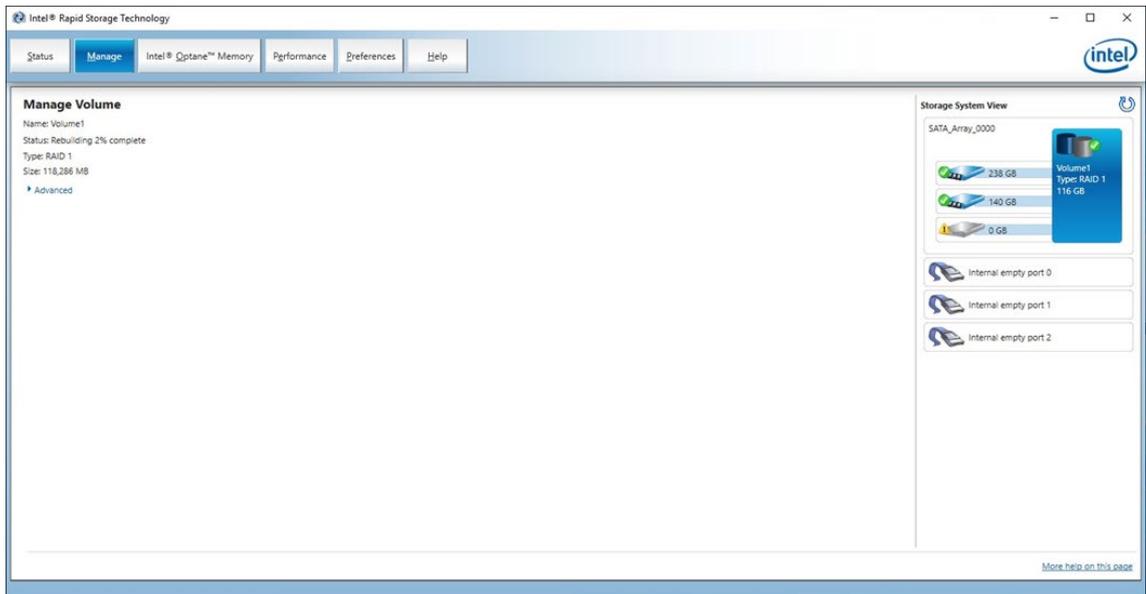
3. Click on the **Manage** tab.

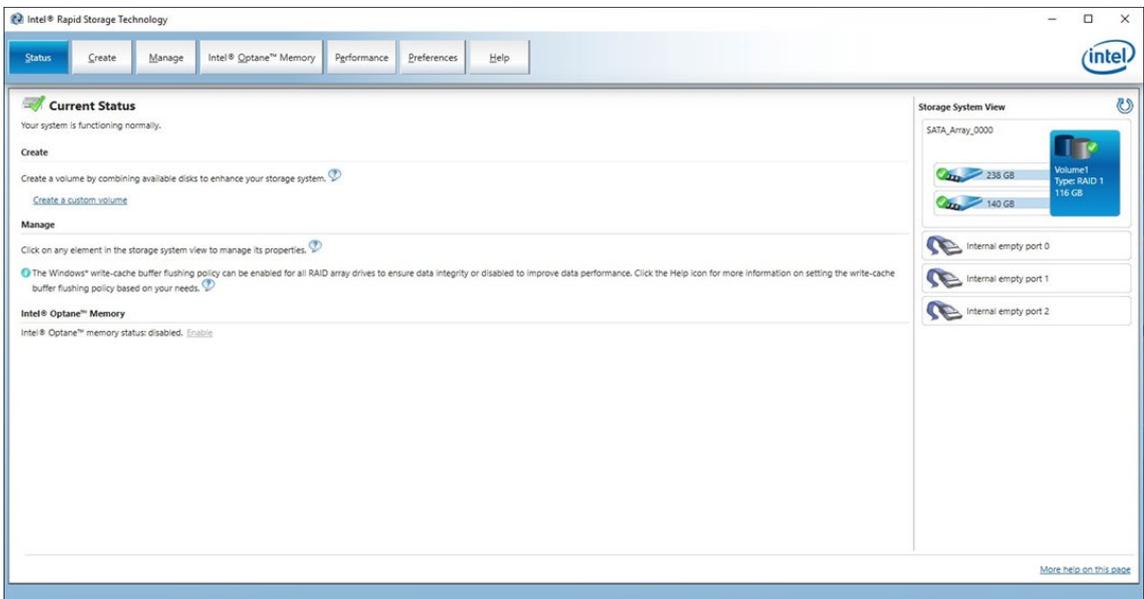
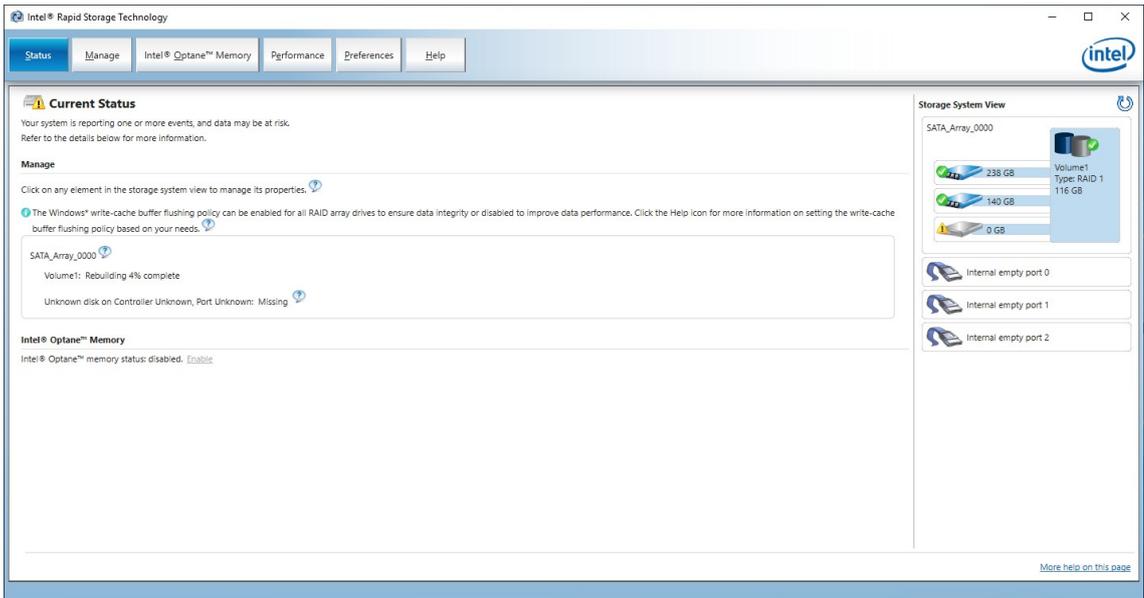


- Select the new SSD and then click **Rebuild**.



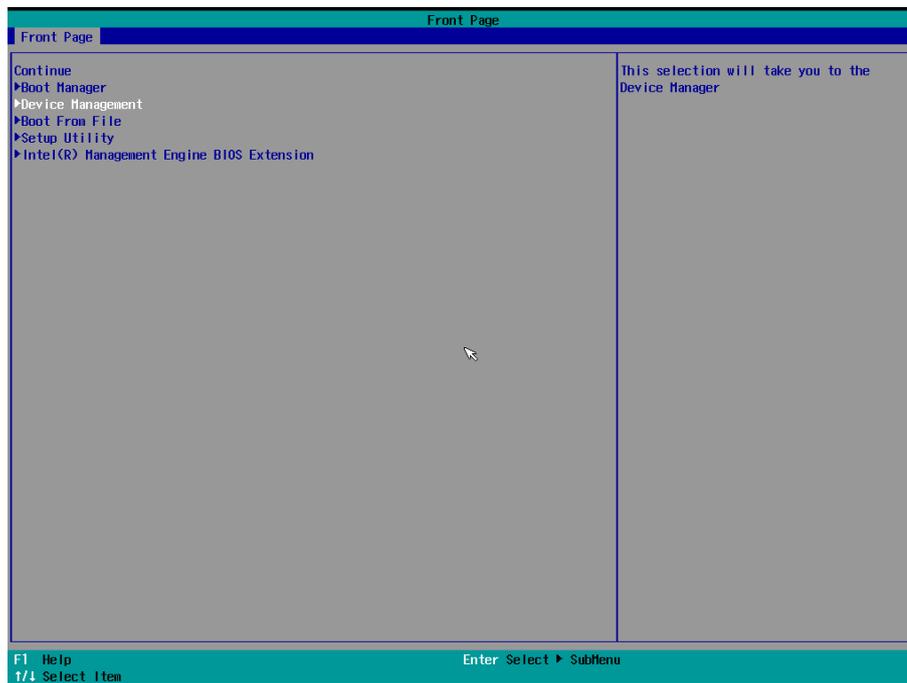
- Wait for the rebuild process to complete.



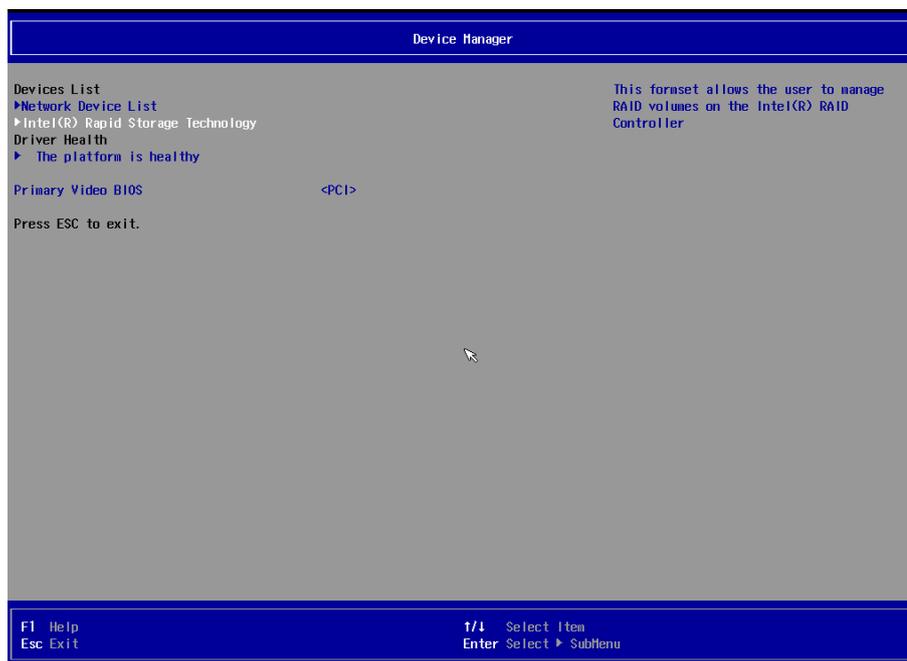


Removing a RAID Volume From the BIOS

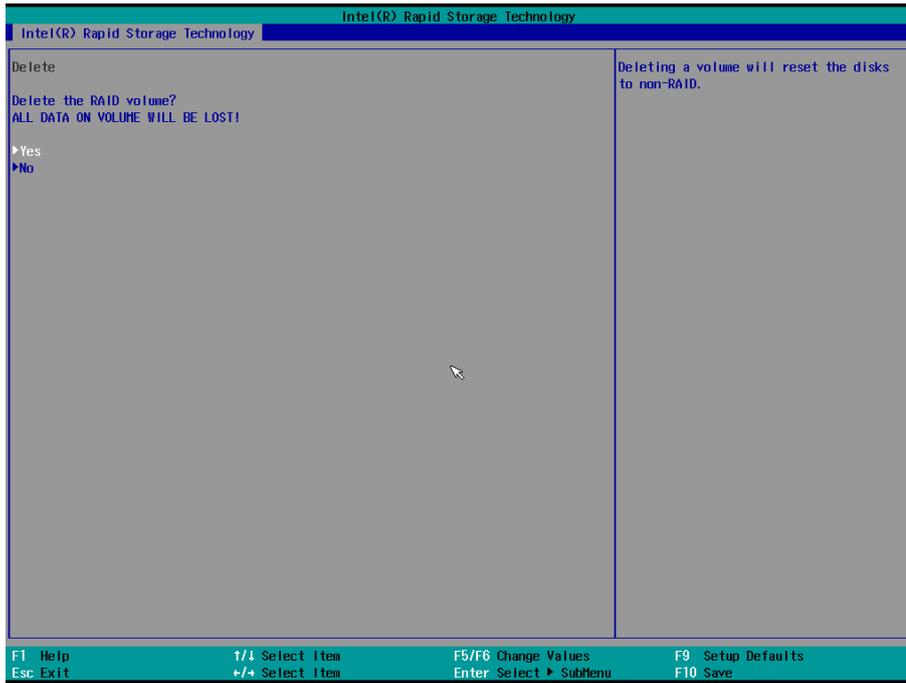
1. Power on the computer and press **F2** to enter the BIOS menu.
2. Select **Device Management**.



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



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



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

4

Teaming

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

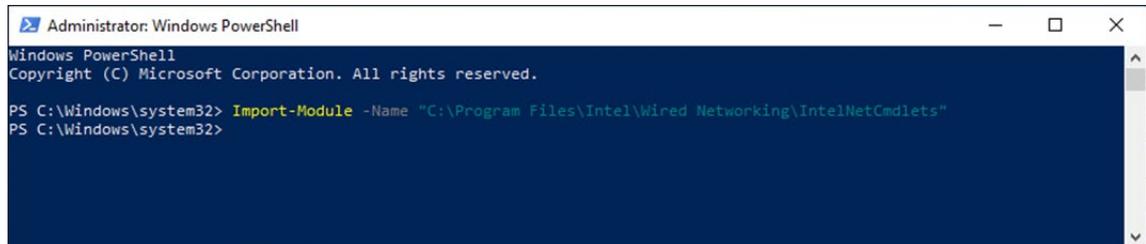
The following topics are covered in this chapter:

- ❑ **Creating an Intel® Net Team**
- ❑ **Adding a New Intel® Net Team Member**
- ❑ **Removing an Intel® Net Team Member**
- ❑ **Removing an Intel® Net Team**

Creating an Intel® Net Team

1. Run the **Windows PowerShell** console as an **Administrator**.
2. Run the following command:

```
Import-Module -Name "C:\Program Files\Intel\Wired Networking\IntelNetCmdlets"
```

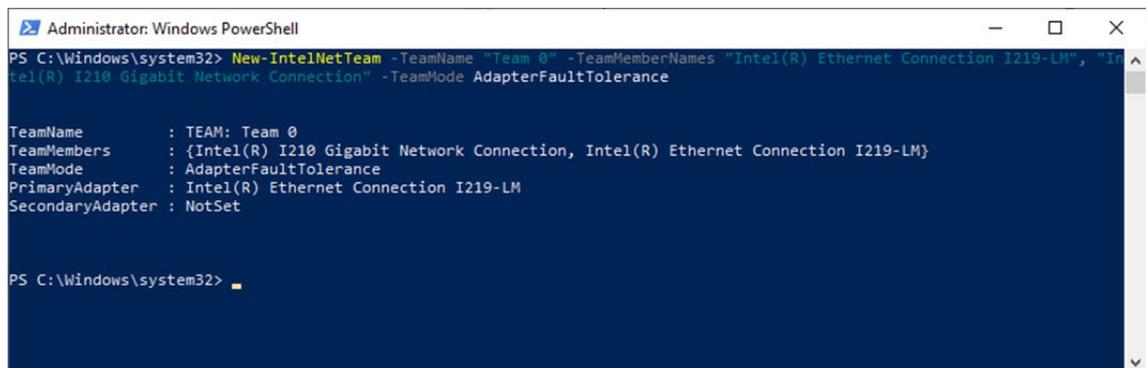


```
Administrator: Windows PowerShell
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

PS C:\Windows\system32> Import-Module -Name "C:\Program Files\Intel\Wired Networking\IntelNetCmdlets"
PS C:\Windows\system32>
```

3. Run the **New-IntelNetTeam** command.

This command creates a new Intel ANS team consisting of one or more adapters. A team may consist of both Intel and non-Intel adapters. Adapter objects obtained using the **Get-IntelNetAdapter** command can be passed to the **New-IntelNetTeam** command using the **TeamMembers** parameter.

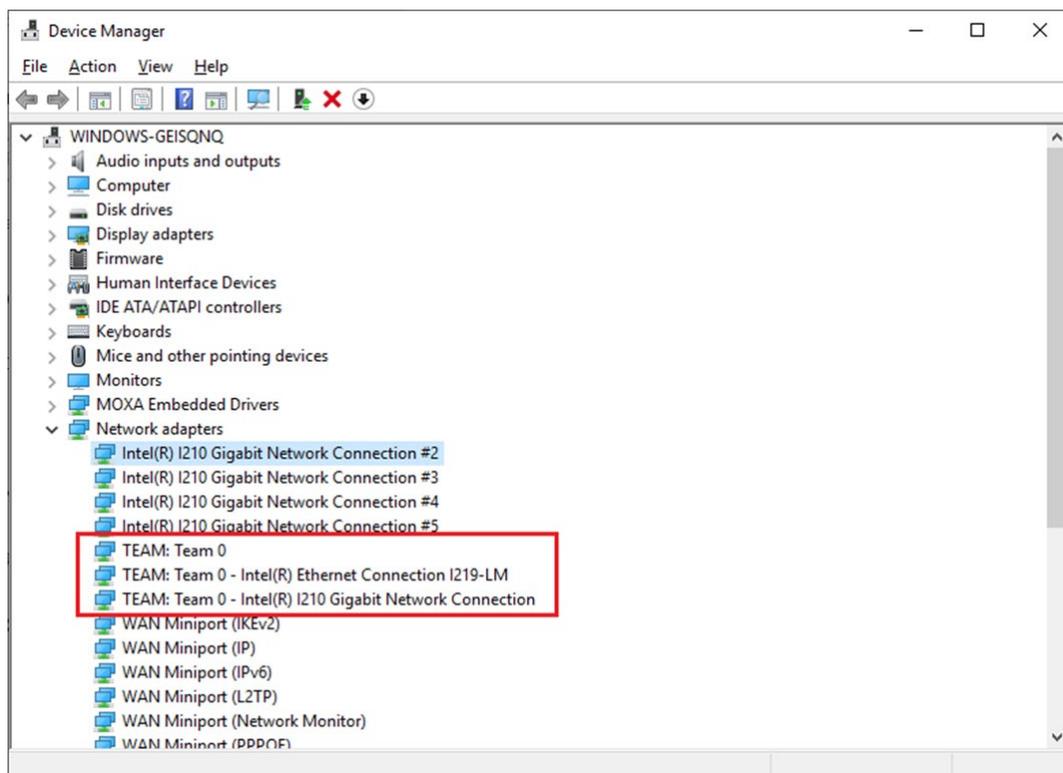


```
Administrator: Windows PowerShell
PS C:\Windows\system32> New-IntelNetTeam -TeamName "Team 0" -TeamMemberNames "Intel(R) Ethernet Connection I219-LM", "Intel(R) I210 Gigabit Network Connection" -TeamMode AdapterFaultTolerance

TeamName       : TEAM: Team 0
TeamMembers    : {Intel(R) I210 Gigabit Network Connection, Intel(R) Ethernet Connection I219-LM}
TeamMode       : AdapterFaultTolerance
PrimaryAdapter : Intel(R) Ethernet Connection I219-LM
SecondaryAdapter : NotSet

PS C:\Windows\system32>
```

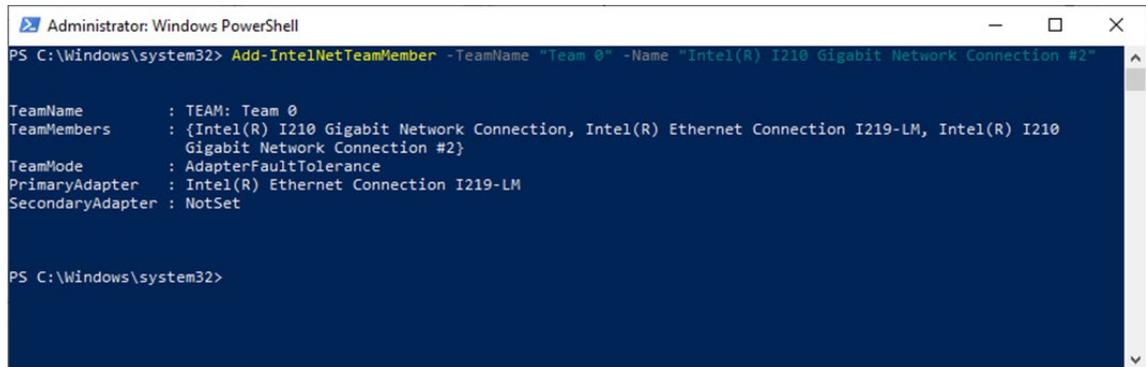
4. Check the Network adapters in the **Windows Device Manager**.



Adding a New Intel® Net Team Member

1. Run the `Add-IntelNetTeamMember` command.

This command adds a new team member to an existing Intel® Advanced Network Services (Intel® ANS) Team. The new team member's name can be piped to this command or passed to it using the adapter name. An Intel® ANS team can contain a maximum of eight members.

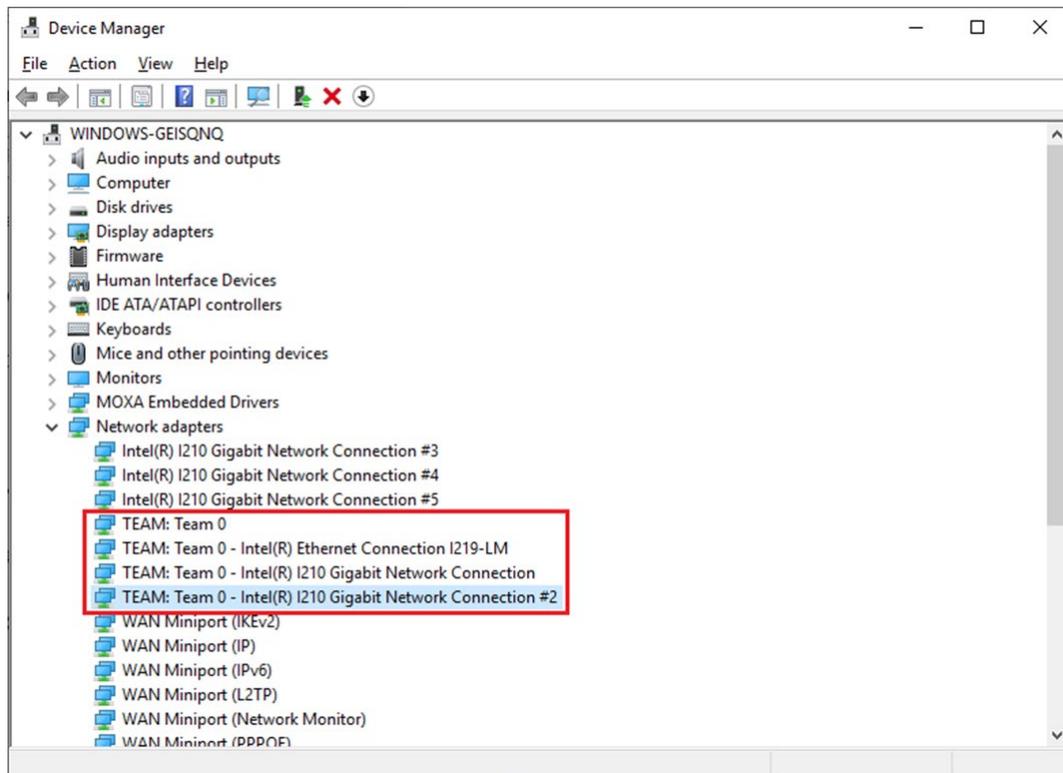


```
Administrator: Windows PowerShell
PS C:\Windows\system32> Add-IntelNetTeamMember -TeamName "Team 0" -Name "Intel(R) I210 Gigabit Network Connection #2"

TeamName       : TEAM: Team 0
TeamMembers    : {Intel(R) I210 Gigabit Network Connection, Intel(R) Ethernet Connection I219-LM, Intel(R) I210
                Gigabit Network Connection #2}
TeamMode       : AdapterFaultTolerance
PrimaryAdapter : Intel(R) Ethernet Connection I219-LM
SecondaryAdapter : NotSet

PS C:\Windows\system32>
```

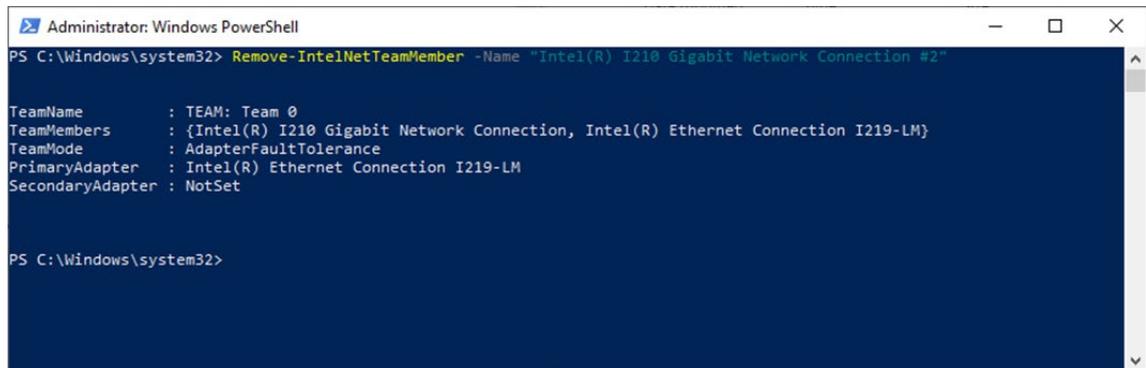
2. Check the Windows Device Manager to confirm the network adapter status.



Removing an Intel® Net Team Member

1. Run the `Remove-IntelNetTeamMember` command.

This command removes a team member from an Intel ANS team. The team member's name to be removed can be piped to this command or passed to it.

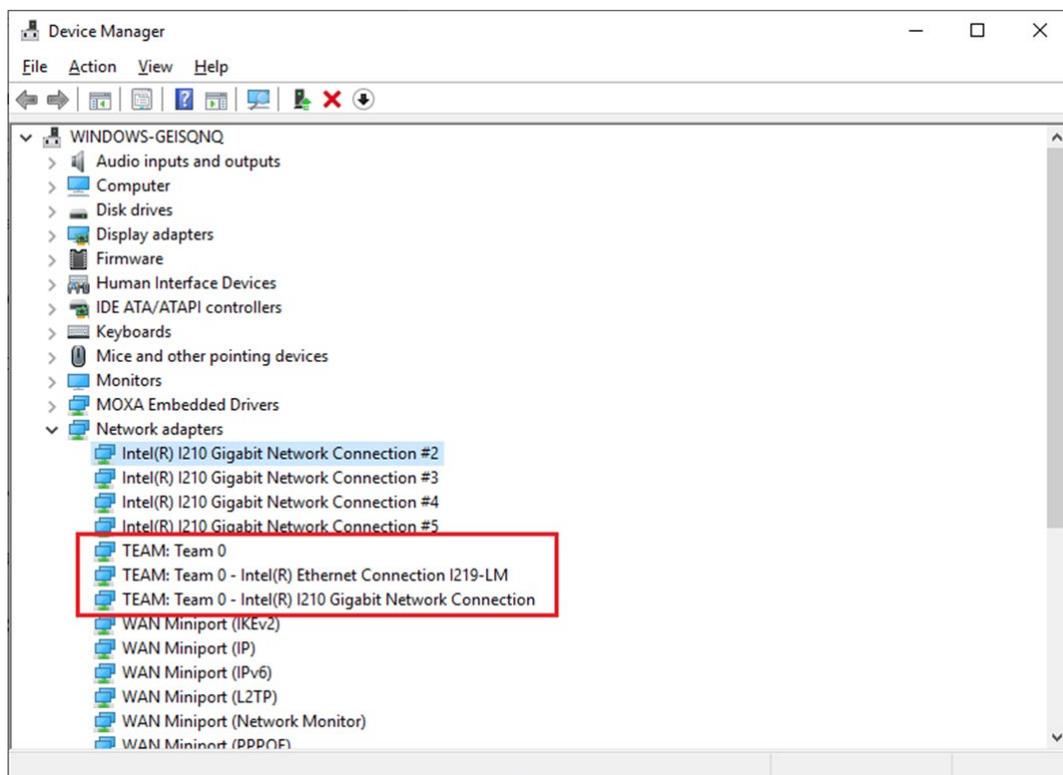


```
Administrator: Windows PowerShell
PS C:\Windows\system32> Remove-IntelNetTeamMember -Name "Intel(R) I210 Gigabit Network Connection #2"

TeamName      : TEAM: Team 0
TeamMembers   : {Intel(R) I210 Gigabit Network Connection, Intel(R) Ethernet Connection I219-LM}
TeamMode      : AdapterFaultTolerance
PrimaryAdapter : Intel(R) Ethernet Connection I219-LM
SecondaryAdapter : NotSet

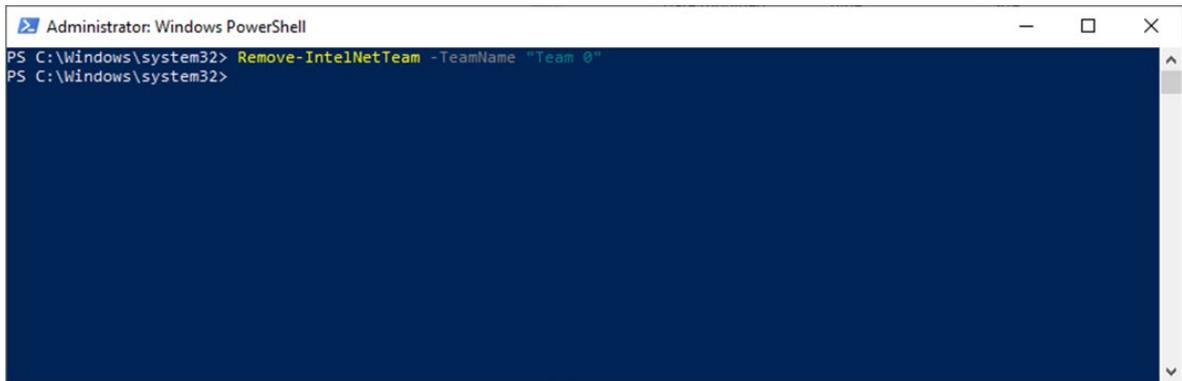
PS C:\Windows\system32>
```

2. Check the Windows Device Manager to confirm the network adapter status.



Removing an Intel® Net Team

Run the **Remove-IntelNetTeam** command. This command removes the specified Intel ANS team.



```
Administrator: Windows PowerShell
PS C:\Windows\system32> Remove-IntelNetTeam -TeamName "Team 0"
PS C:\Windows\system32>
```

Unified Write Filter

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

To use the UWF, you must first install the feature and enable (optionally configure) it.

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.

The following topics are covered in this chapter:

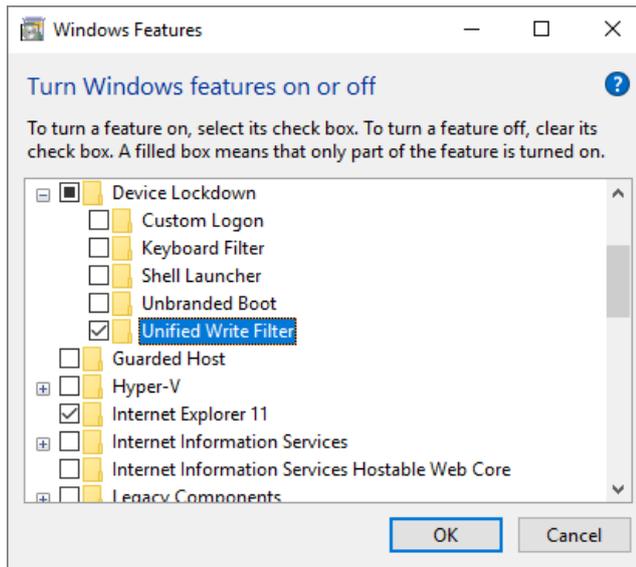
- **Turning on UWF on a Running PC**
- **Installing UWF Using WMI**

Turning on UWF on a Running PC

1. 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**.

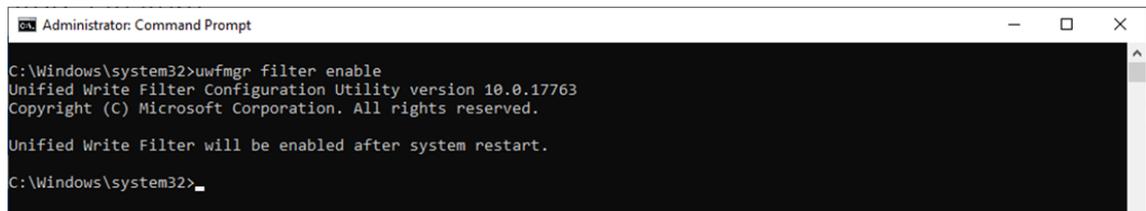
Windows searches for the required files and displays a progress bar. Once the files are found, Windows applies the changes. When the changes are complete, a message to this effect is displayed.

- d. Click **Close**.



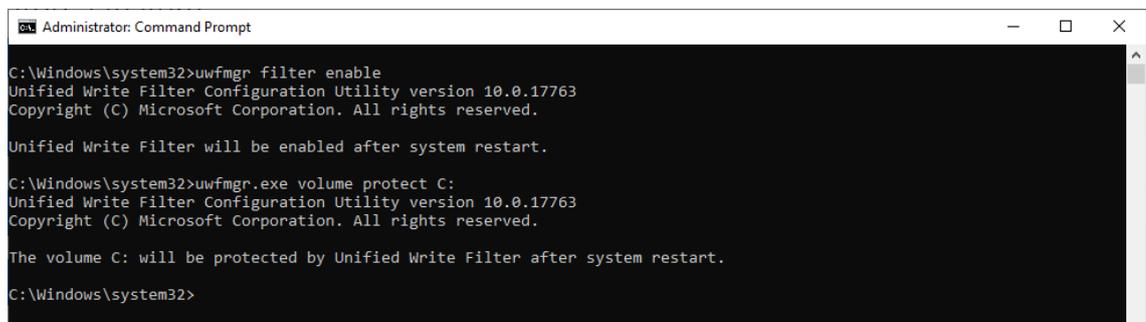
2. Enable the following filter as an Administrator:

```
cmd uwfmgr filter enable
```



3. Enable write protection for a drive:

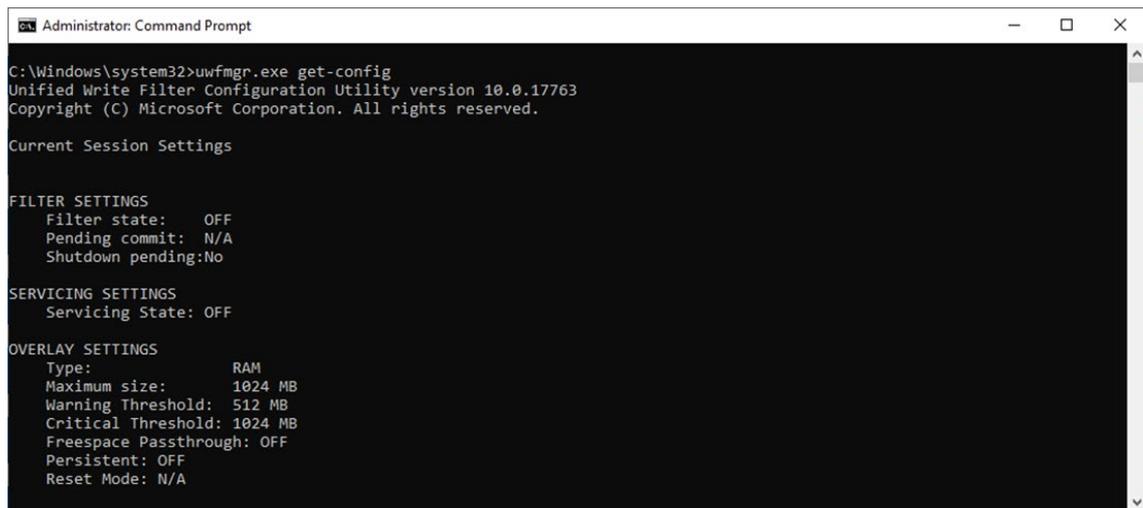
```
cmd uwfmgr.exe volume protect C:
```



4. Restart your computer.

5. Confirm that UWF is running:

```
cmd uwfmggr.exe get-config
```



```
Administrator: Command Prompt
C:\Windows\system32>uwfmggr.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:    OFF
  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, uwfmggr.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 have to 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 restart; the changes are saved in registry entries for use in the next session. Dynamic configuration changes occur immediately and persist after a device restart.

Disk Hot Swap Function

This chapter describes the setup process for the disk hot swap function.

The following topics are covered in this chapter:

❑ **Setting Up the Disk Removal Policy**

❑ **Setting Up the Drive Actions**

- Default Actions

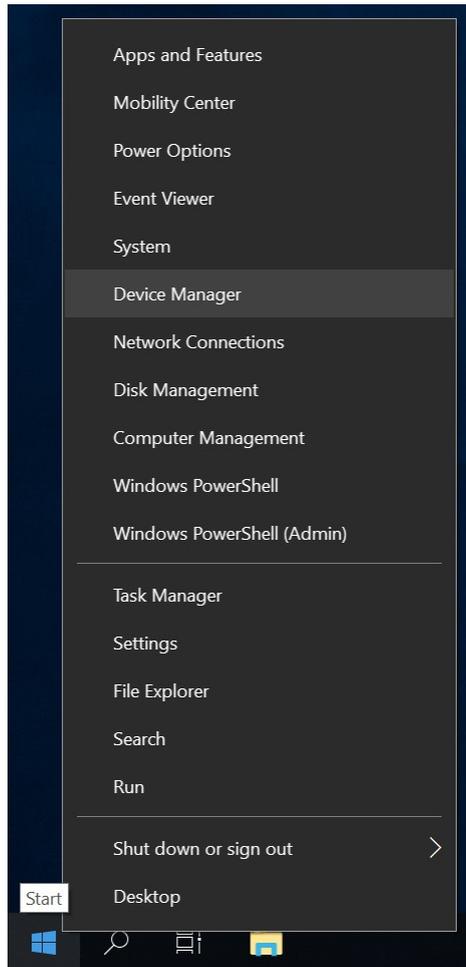
❑ **Unmounting and Mounting Disks**

- Unmounting a Disk Drive
- Mounting a Disk Drive

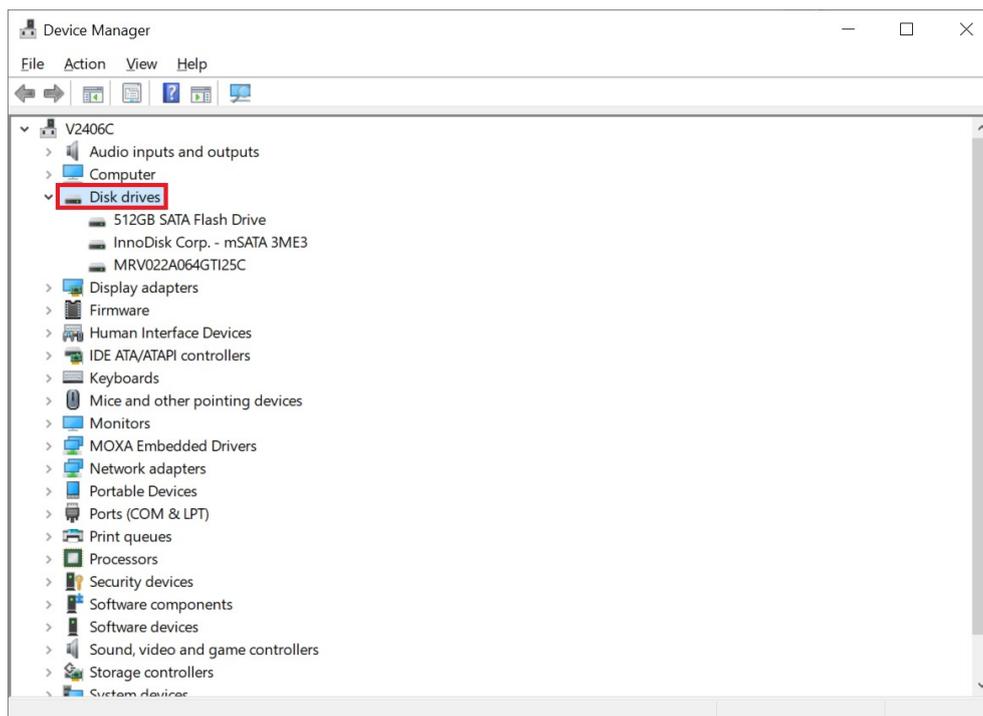
❑ **Hot Swap Function Notifications**

Setting Up the Disk Removal Policy

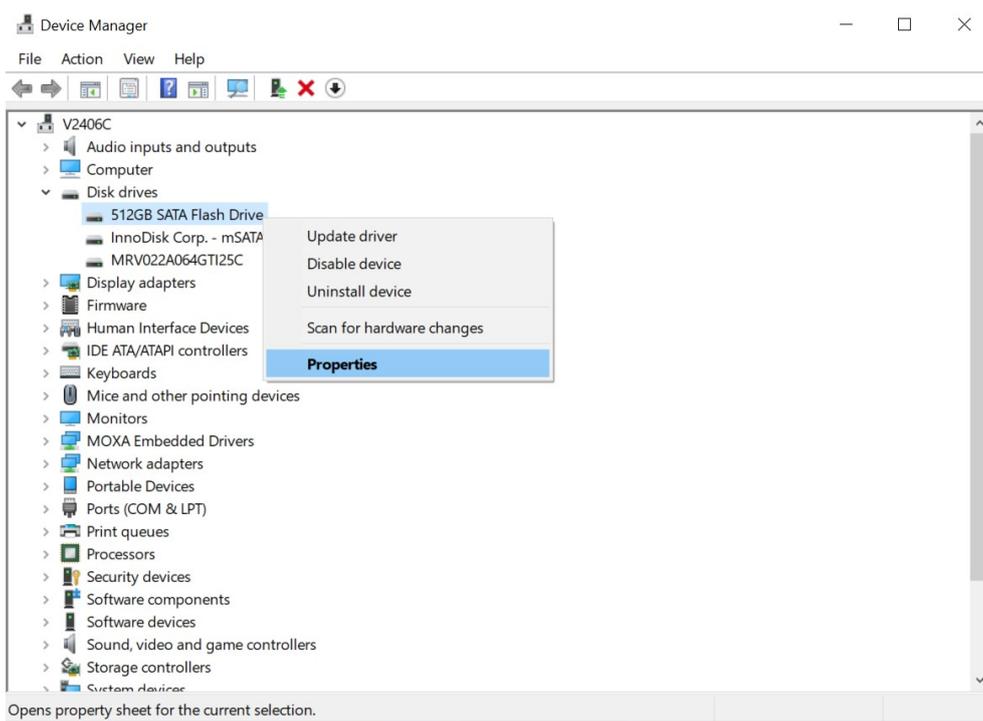
1. Right-click on the Windows Start icon and select **Device Manager**.



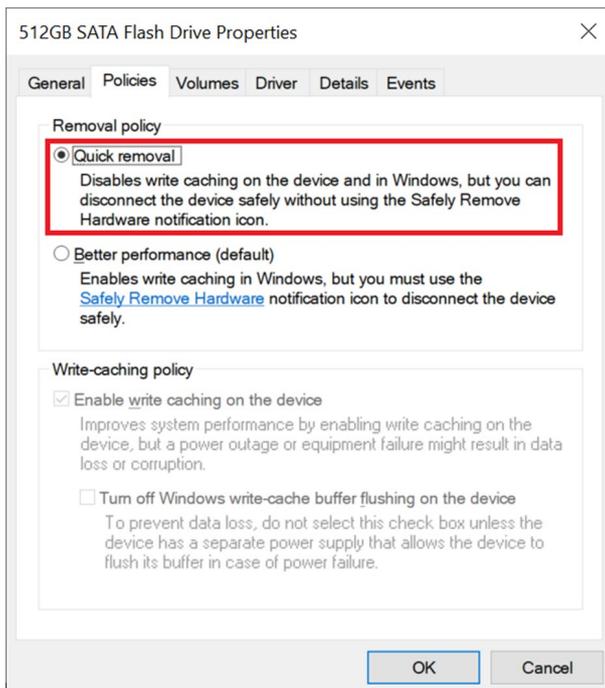
2. Expand the **Disk drives** node.



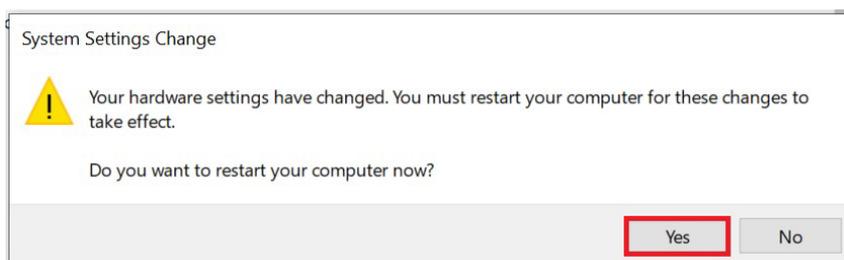
3. Right-click on the target drive and select **Properties**.



4. In the **Policies** tab, select **Quick removal** and click **OK**.

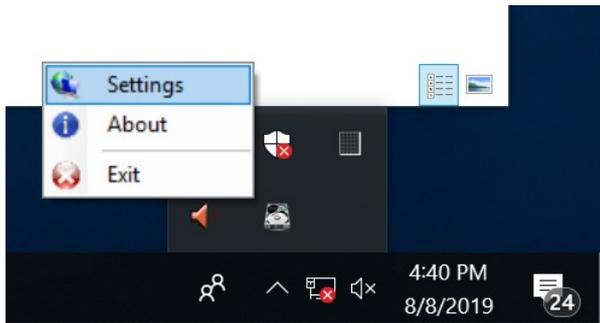


5. Click **Yes** to restart the computer and apply the new settings.

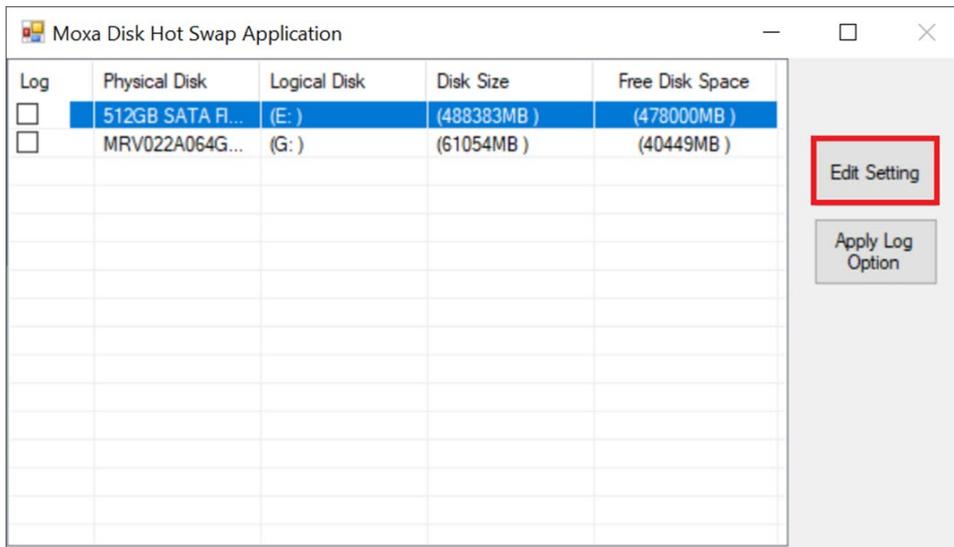


Setting Up the Drive Actions

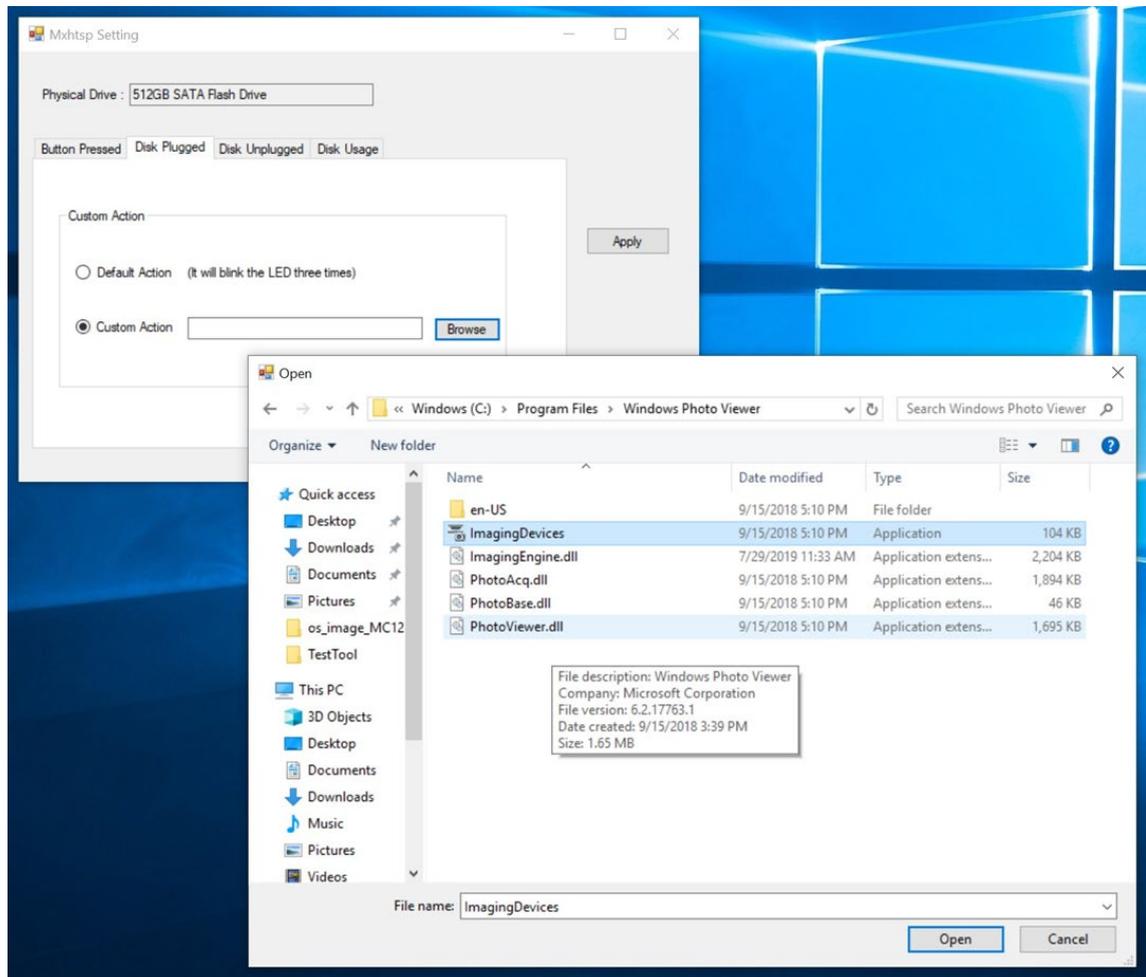
1. Right-click on the Disk Hot Swap application icon on the Windows taskbar and select **Settings**.



2. Select the target drive and click **Edit Setting**.



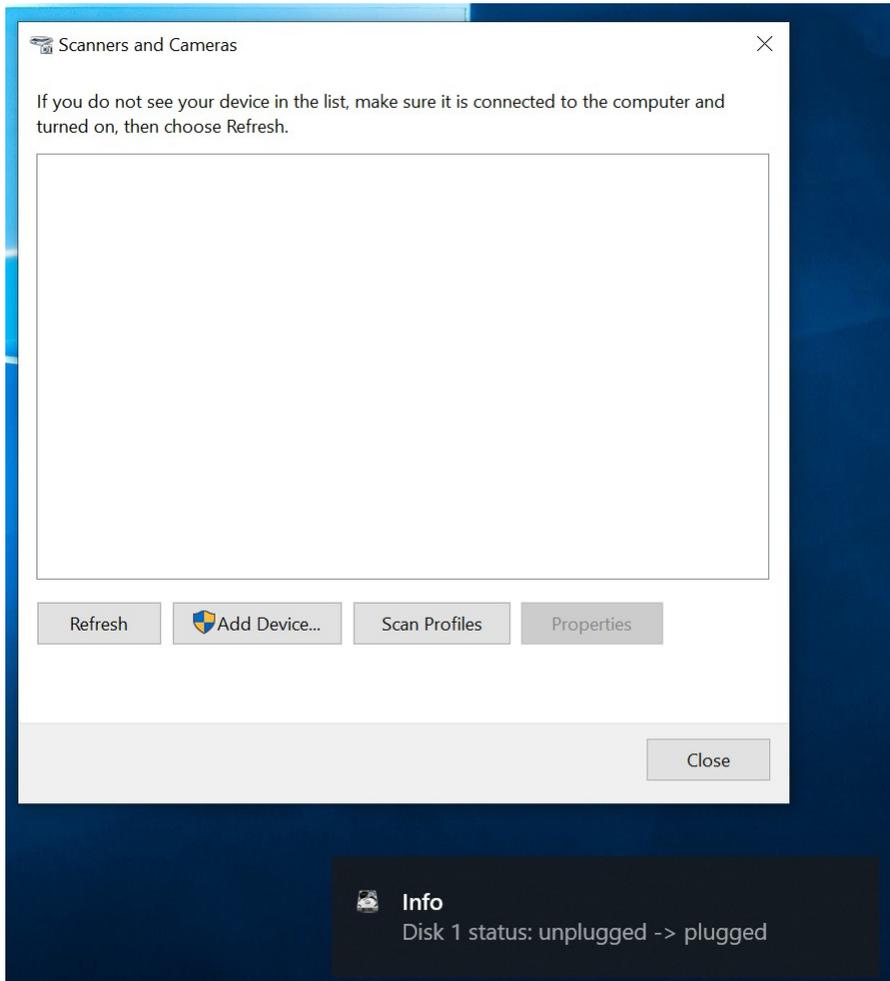
3. Open an event tab (**Button Pressed**, **Disk Plugged**, **Disk Unplugged**, or **Disk Usage**) and select **Custom Action**.
4. Associate the application that you want to run as the custom action when the event is triggered. The application will run in the background. The new settings will take effect the next time you run the **Disk Hot Swap** program.

**IMPORTANT!**

The action for the **Button Pressed** event is triggered only when the button is pressed for more than 3 seconds.

Example

The **Scanners and Cameras** application is run after the event **Disk Plugged** is triggered. A notification message pops up to indicate the change in status of the device.



Default Actions

If you do not configure a **Custom Action**, the following default actions are triggered by the events.

1. **Button Pressed:** Disk unmount procedure is triggered when the button is pressed for over 3 seconds.
2. **Disk Plugged:** The disk drive list in the Windows Device Manager is refreshed after a few seconds.
3. **Disk Unplugged:** The disk drive list in the Windows Device Manager is refreshed after a few seconds.
4. **Disk Usage:** A notification on the disk usage is displayed.

This event is triggered if on **Check Disk Usage**, the disk usage is equal to or higher than the disk usage threshold.

Unmounting and Mounting Disks

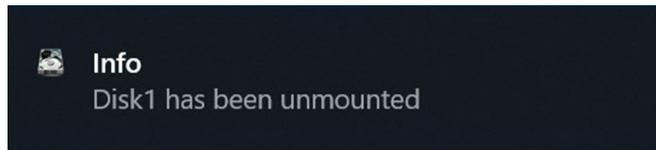
Unmounting a Disk Drive

1. Press the button of the target disk for more than three seconds.

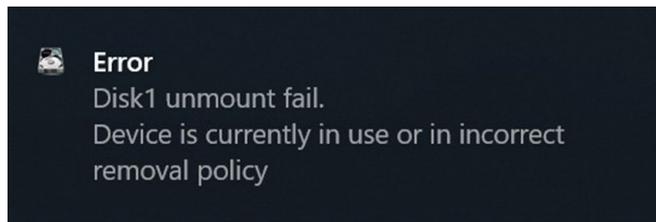
The disk unmount procedure will start after the **Button is pressed** notification is displayed.



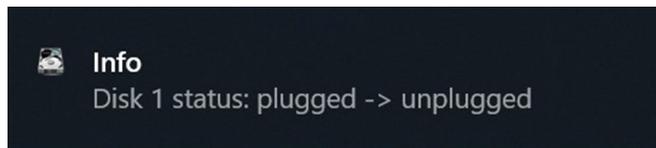
2. The **Disk has been unmounted** notification is displayed after the disk has been successfully unmounted.



If the disk unmount process fails, you will see the following message. Ensure that the target disk removal policy is set to **Quick removal** and the target disk is not busy before triggering the unmount process again.



3. After the disk has been unmounted, unplug the disk from your computer after you see the following notification.

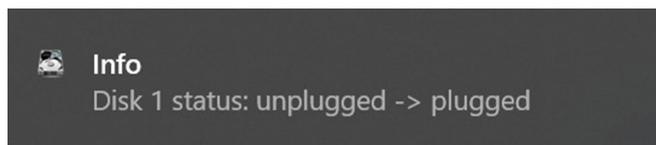


This completes the disk unmounting process.

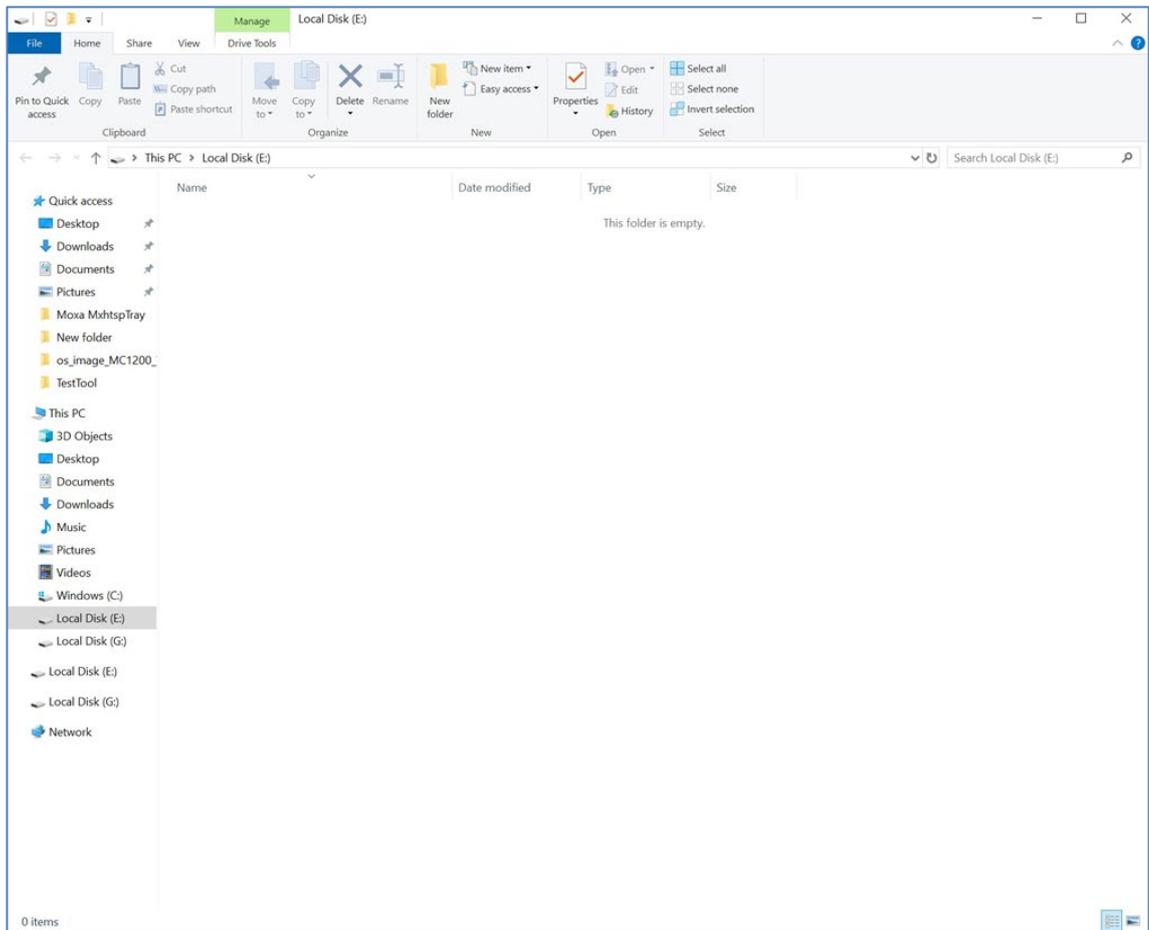
Mounting a Disk Drive

1. Insert the disk into the computer.

The following notification is displayed.



2. The disk folder will open automatically after the disk is successfully mounted.



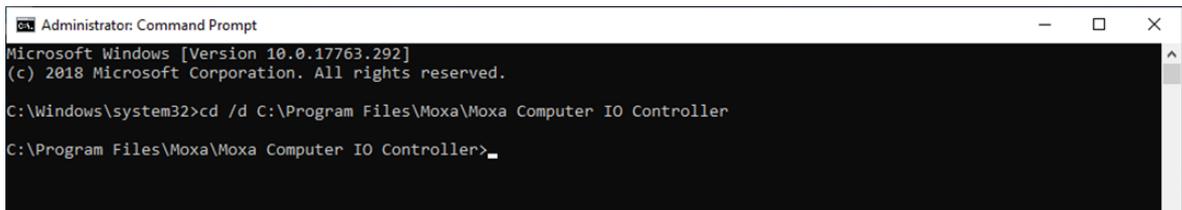
Hot Swap Function Notifications

Notification Type	Notification Content	Description
Info	Button is pressed	Displayed when a button is pressed for more than 3 seconds.
Info	Disk has been unmounted	Displayed after a disk is successfully unmounted.
Info	Disk status: unplugged -> plugged	Displayed after a disk is plugged into the computer.
Info	Disk status: plugged -> unplugged	Displayed after a disk is unplugged from the computer.
Info	Partition is over usage, execute user program	Displayed when the disk usage is over a predefined threshold. A user-specified program is run after this event is triggered.
Info	Partition is over usage, use system default action	Displayed when the disk usage is over a predefined threshold. A user-specified program is run after this event is triggered.
Error	Disk unmount fail. Device is currently in use or in incorrect removal policy	Displayed when disk unmount process fails; disk is in busy state or the removal policy is incorrect.
Error	Invalid handle	Displayed when an internal error occurs.
Application	Starting Moxa Disk Hot Swap Application	Displayed when the Moxa Disk Hot Swap application starts up.
Application	Stopping Moxa Disk Hot Swap Application	Displayed when the Moxa Disk Hot Swap application stops running.

Moxa IO Controller Utility

This chapter describes how to use the Moxa IO Controller utility.

To use the Moxa IO Controller utility, first install the utility and enable the utility to configure the DIO, UART mode, and SIM 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>_
```

The following topics are covered in this chapter:

- ❑ **Setting the DIO Status**
- ❑ **Setting the UART Mode**
- ❑ **Setting the SIM Status**

Setting the DIO Status

Type the command `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.

```
Administrator: Command Prompt
C:\Program Files\Moxa\Moxa Computer IO Controller>mx-dio-ctl --help
mx-dio-ctl 1.0.1903.0
Copyright (C) 2019 Moxa Inc. All rights reserved.
USAGE:
Get value from DIN port 1:
  mx-dio-ctl -i 1
Get value from DOUT port 1:
  mx-dio-ctl -o 1
Set DOUT port 2 value to HIGH:
  mx-dio-ctl -m 1 -o 2

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

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

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

Example:

```
Administrator: Command Prompt
C:\Program Files\Moxa\Moxa Computer IO Controller>mx-dio-ctl -i 0
DIN port 0 status: 1

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

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

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

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

Setting the UART Mode

Type 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 Computer IO Controller>mx-uart-ctl --help
mx-uart-ctl 1.0.1903.0
Copyright (C) 2019 Moxa Inc. All rights reserved.
USAGE:
Get uart mode from port 2:
  mx-uart-ctl -p 2
Set port 1 to mode RS-422:
  mx-uart-ctl -m 2 -p 1

-p          Required. -p <#port index> (Start from 0)
-m          -m <#uart mode>
            0 --> set to RS232 mode
            1 --> set to RS485-2W mode
            2 --> set to RS422 mode

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

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

Example

```
Administrator: Command Prompt
C:\Program Files\Moxa\Moxa Computer IO Controller>mx-uart-ctl -p 0
Current uart mode is RS232 interface.

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

Current uart mode is RS485-2W interface.

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

Setting the SIM Status

Type the `mx-sim-ctl --help` command to see instructions on using this utility and follow the onscreen instructions to get or set the status of the SIM card.



IMPORTANT!

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

```
Administrator: Command Prompt
C:\Program Files\Moxa\Moxa Computer IO Controller>mx-sim-ctl.exe --help
mx-sim-ctl 1.0.1906.0
Copyright (C) 2019 Moxa Inc. All rights reserved.
USAGE:
Get sim slot from sim 1:
  mx-sim-ctl -i 1
Set sim 1 to slot 1:
  mx-sim-ctl -i 1 -m 1

-i          Required. -i <#SIM port index> (Start from 0)

-m          -n <sim slot>
            0 --> SIM slot 0
            1 --> SIM slot 1

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

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

Example

```
Administrator: Command Prompt
C:\Program Files\Moxa\Moxa Computer IO Controller>mx-sim-ctl.exe -i 0
SIM 0 slot: 1

C:\Program Files\Moxa\Moxa Computer IO Controller>mx-sim-ctl.exe -i 0 -m 0
SIM 0 slot: 0

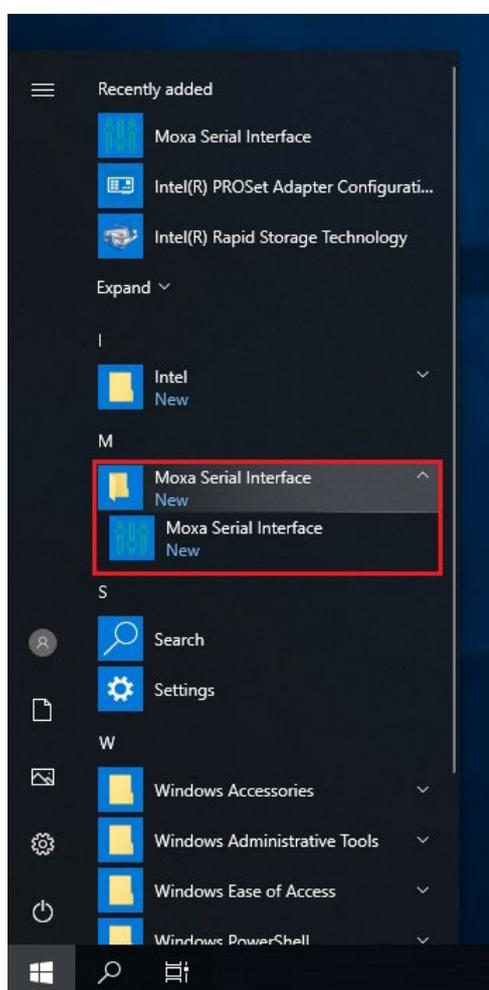
C:\Program Files\Moxa\Moxa Computer IO Controller>
```

Moxa Serial Interface Utility

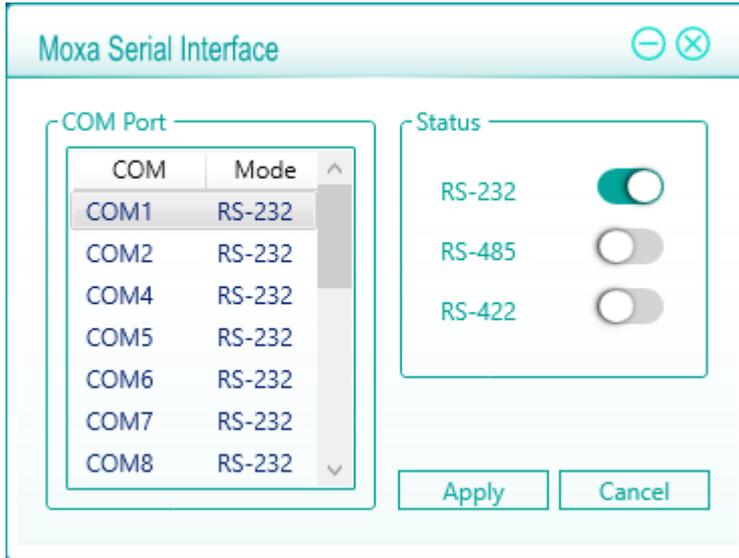
In this chapter, we describe how to use the Moxa Serial Interface utility to set the UART mode in your computer's serial interface.

Setting the UART 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.



This chapter describes how to use the IO Control API.

The following topics are covered in this chapter:

▣ **Downloading the API**

▣ **mxgio**

- GetDinStatus
- GetDoutStatus
- SetDoutStatus

▣ **mxsp**

- GetUartMode
- SetUartMode

▣ **mxwdg**

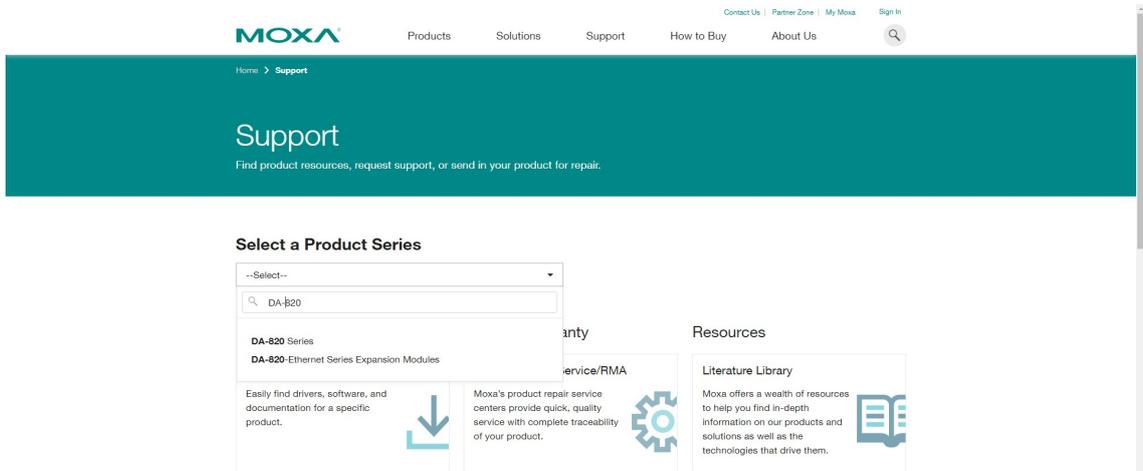
- mxwdg_open
- mxwdg_refresh
- mxwdg_close

▣ **mxsim**

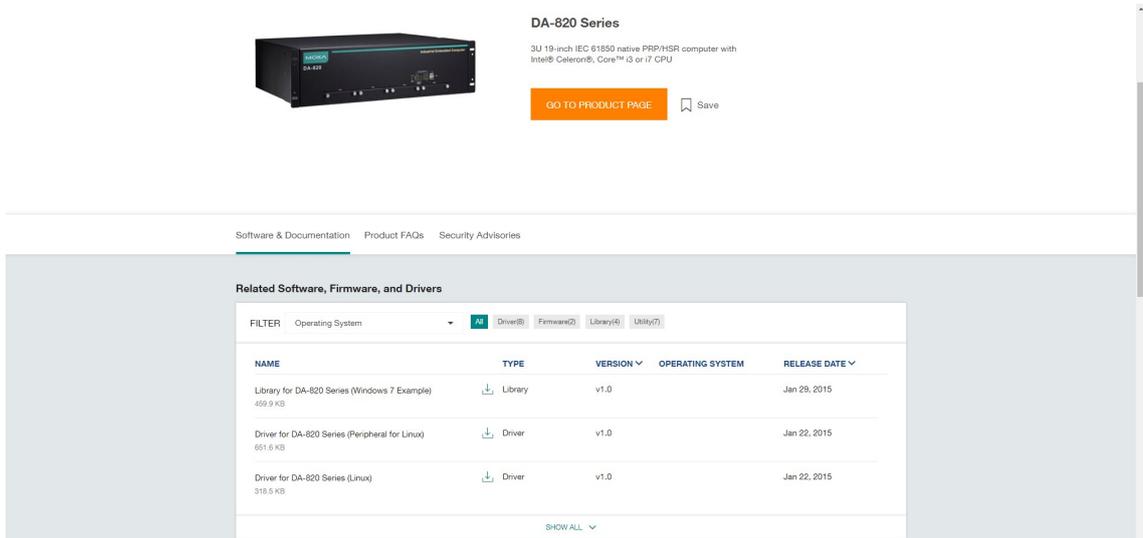
- GetSIMSlot
- SetSIMSlot

Downloading the API

1. Access the Moxa support page: <https://www.moxa.com/en/support>
2. Select the product series (example: DA-820).



3. Download the related files.



mxdgio

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

- GetDinStatus
- GetDoutStatus
- SetDoutStatus

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 by the **DIO_STATUS** function.

Name	Value	Meaning
LIB_INITIALIZE_FAIL	-1	The mxdgio library initialization failed. Can't 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[<i>ModelName</i>].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 by the **DIO_STATUS** function.

Name	Value	Meaning
LIB_INITIALIZE_FAIL	-1	The mxdgio library initialization has failed. Cannot open the 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[<i>ModelName</i>].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 by the **DIO_STATUS** function.

Name	Value	Meaning
LIB_INITIALIZE_FAIL	-1	The mxdgio library initialization failed. Can't open json profile.
PORT_OUTOF_INDEX	-2	Target port index is out of range.
SET_STATUS_ERR	-3	Set the status fail. Status is defined with a bad format.

Requirements

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

mxsp

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

- GetUartMode
- SetUartMode

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.

Error codes

The following error codes can be retrieved by the **UART_STATUS** function.

Name	Value	Meaning
LIB_INITIALIZE_FAIL	-1	The mxsp library initialization failed. Can't 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[<i>ModelName</i>].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.

Return Value

Returns 0 if the UART mode is successfully set.

Error codes

The following error codes can be retrieved by the **UART_STATUS** function.

Name	Value	Meaning
LIB_INITIALIZE_FAIL	-1	The mxsp library initialization failed. Can't open json profile.
PORT_OUTOF_INDEX	-2	Target port index is out of range.
SET_STATUS_ERR	-3	Set the status fail. Status is defined with a bad format.

Requirements

Name	Items
Header	mxsp.h
Library	mxsp.lib
DLL	mxsp.dll
Profile	MxspProfile[<i>ModelName</i>].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 at which the watchdog timer is refreshed; the unit is seconds.

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

mxsim

The mxsim library operates on the SIM slot index and consists of the following:

- GetSIMSlot
- SetSIMSlot

GetSIMSlot

Syntax

```
int GetSIMSlot(int port);
```

Description

Gets the SIM card slot index number.

Parameters

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

Return Value

The SIM card slot number; 0 for SIM 0 slot, 1 for SIM 1 slot.

Error codes

The following error codes can be retrieved by the **SIM_STATUS** function.

Name	Value	Meaning
LIB_INITIALIZE_FAIL	-1	The mxsim library initialization failed. Can't open json profile.
PORT_OUTOF_INDEX	-2	Target port index is out of range.

Requirements

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

SetSIMSlot

Syntax

```
int GetSIMSlot(int port);
```

Description

Sets the SIM card slot index.

Parameters

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

slot: The SIM card slot of a SIM number; 0 is SIM 0 slot, 1 is SIM 1 slot .

Return Value

Returns 0 if the SIM card slot of the SIM number is successfully set.

Error codes

The following error codes can be retrieved by the **SIM_STATUS** function.

Name	Value	Meaning
LIB_INITIALIZE_FAIL	-1	The mxsim library initialization failed. Can't open json profile.
PORT_OUTOF_INDEX	-2	Target port index is out of range.
SET_STATUS_ERR	-3	Set the status fail. Status is defined with a bad format.

Requirements

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

10

Windows Recovery

This chapter describes the setup process of the Windows Recovery function.

The following topics are covered in this chapter:

- ❑ **Preparing the USB Device**
- ❑ **Booting From a USB Recovery Disk**
- ❑ **System Image Backup**
- ❑ **Restoring the System From an Image File**

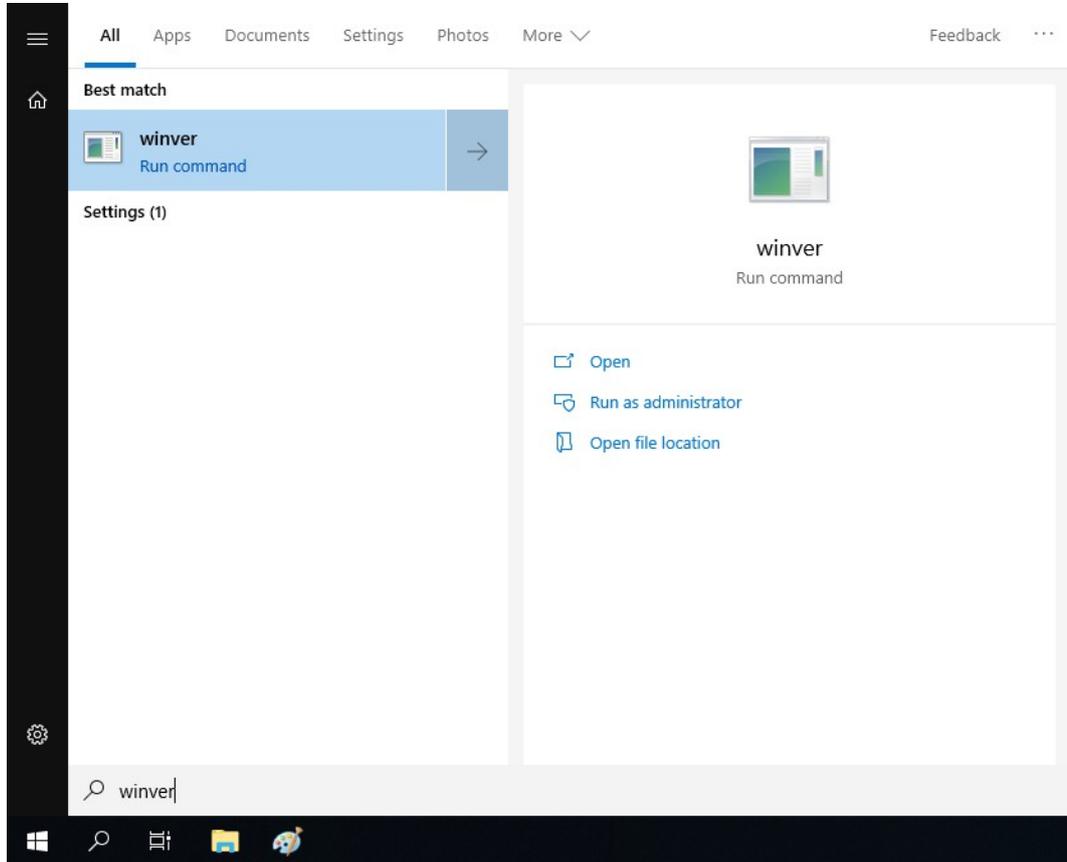
Preparing the USB Device

1. Ensure that your computer has the Diskpart **version 10.0.17134.0 or higher** installed.

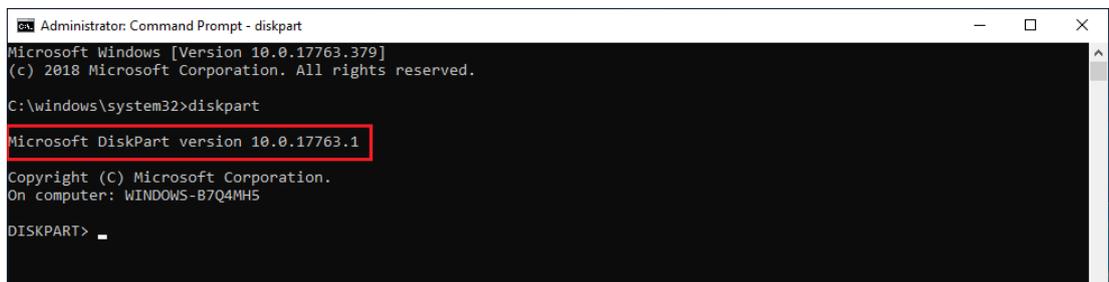
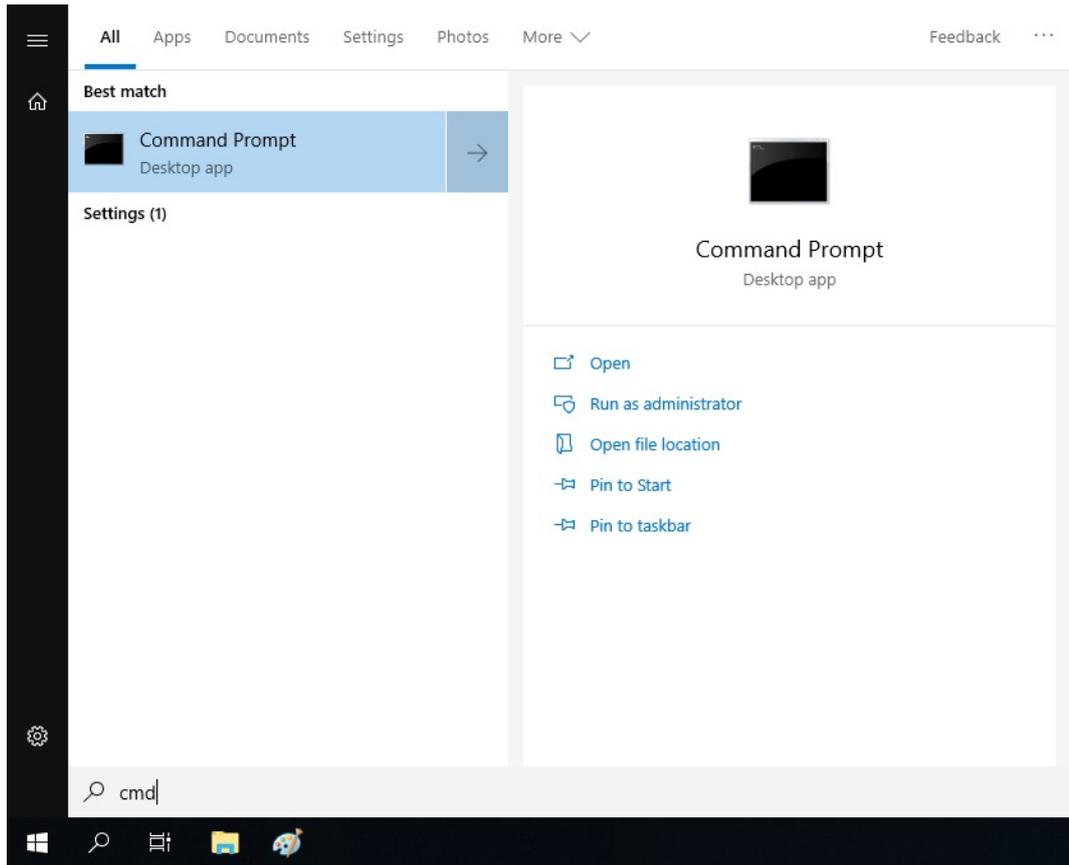
You can check the version of the Diskpart tool using the following methods:

- a. In the Windows start menu, type **winver** to check the OS build.

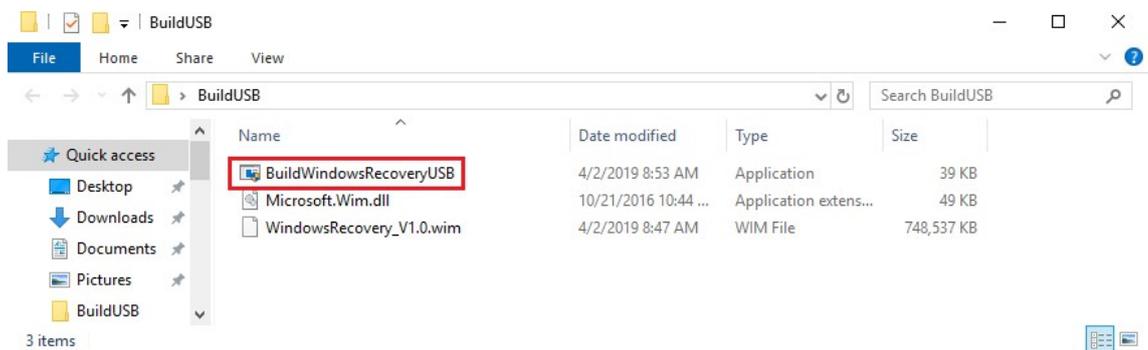
The OS version should be 1803 or higher and the corresponding OS build will be 17763 or later.



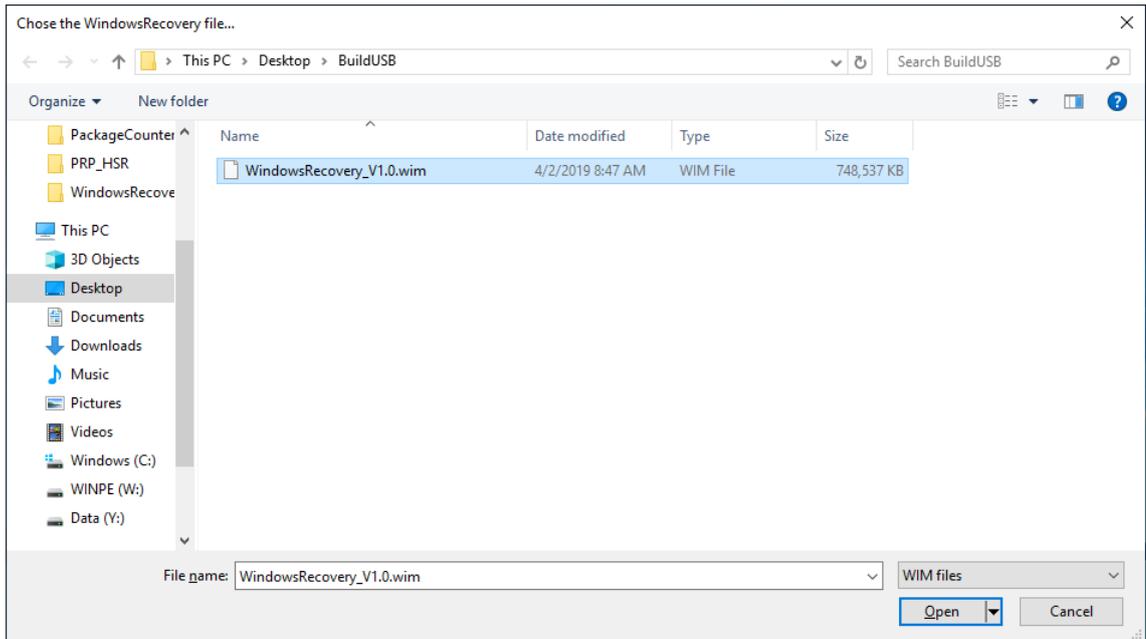
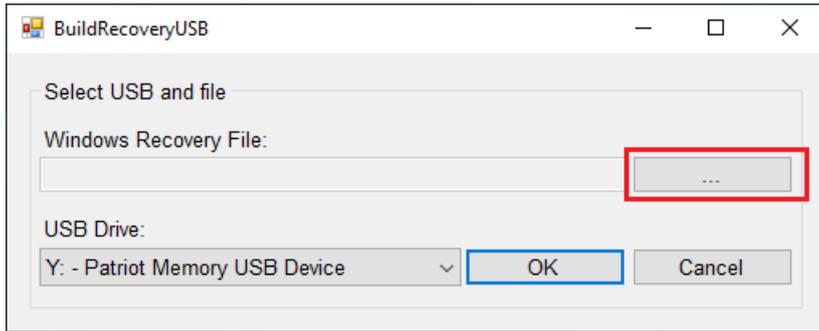
- b. Run the command line as an **Administrator** and type **diskpart** to check the diskpart version.



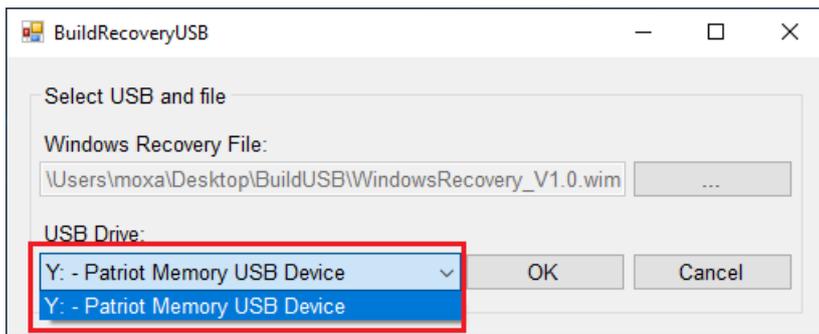
2. Run the **BuildWindowsRecoveryUSB.exe** program from the **<USB drive>\recovery** folder.



3. Click on the "... " button to select the *.wim file from the <USB drive>\recovery folder.



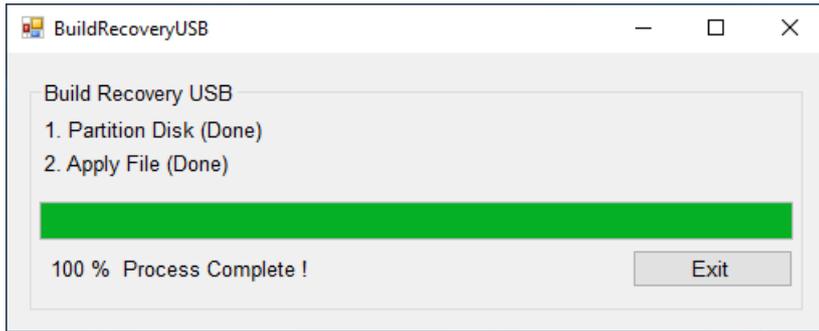
4. Select the **USB Drive** option and click **OK**.



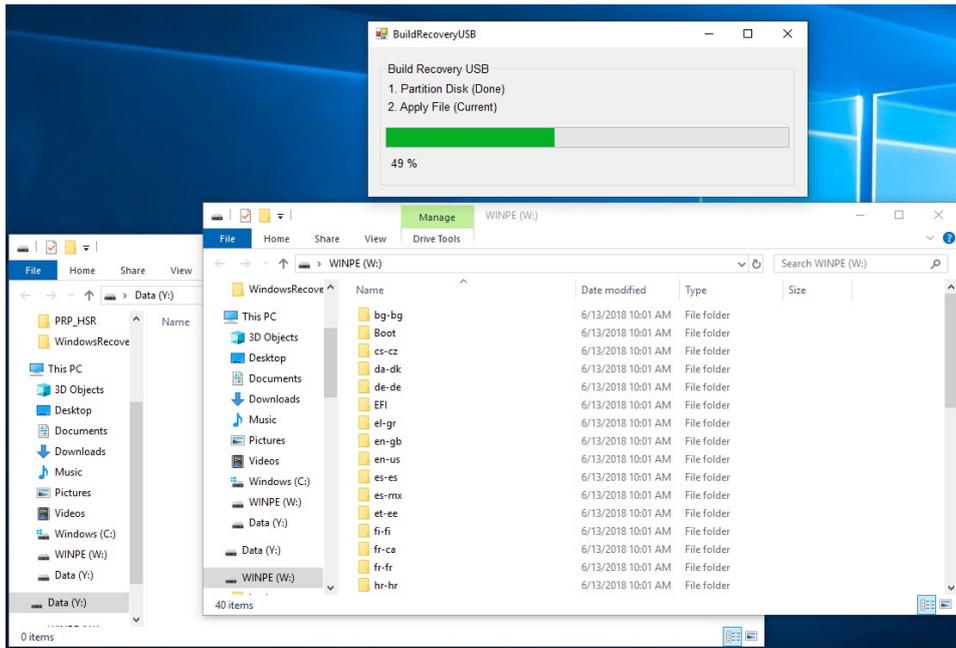
The program will format the USB disk. Two volumes are created on the USB disk and the boot file is copied to the USB disk.

NOTE Additional pop-up windows may open during this process. You can close these windows after the process is completed.

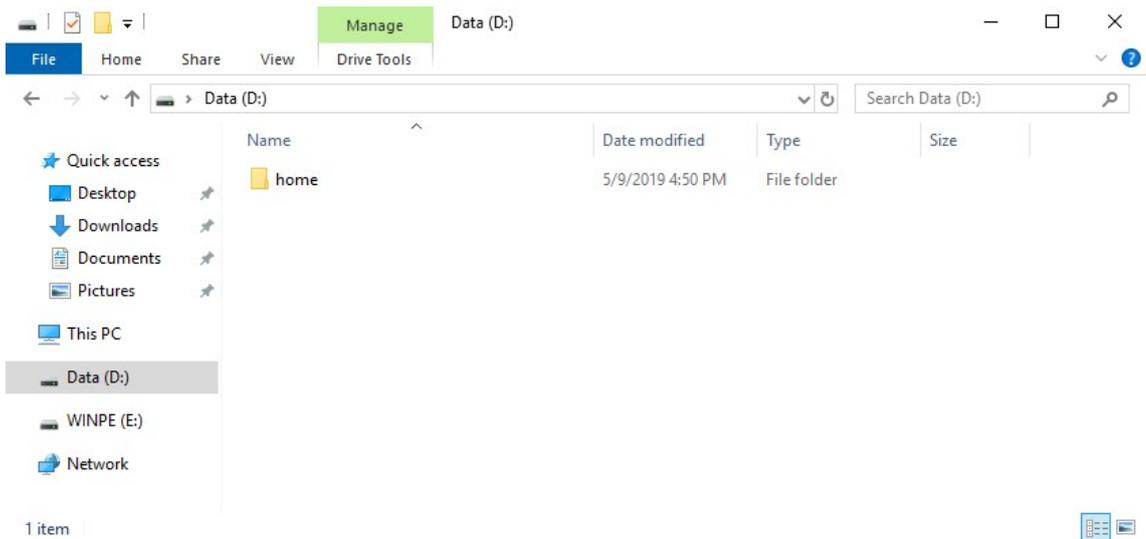
5. Click **Exit** to close the program.



After the process is completed, two volumes are created on the USB disk, as follows:

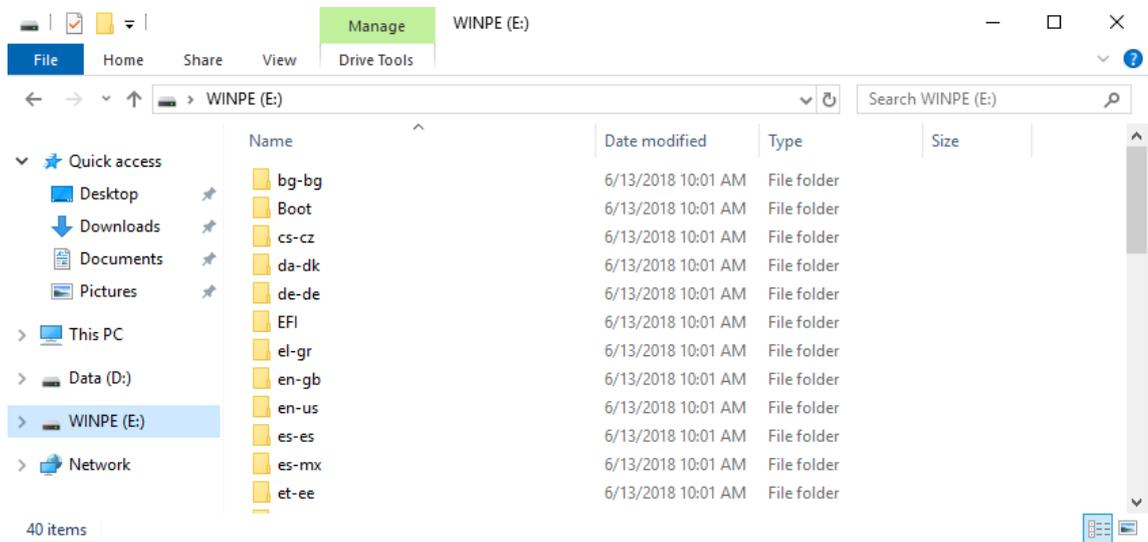


a. The first volume includes a **home** folder, which can be used to store the OS image.

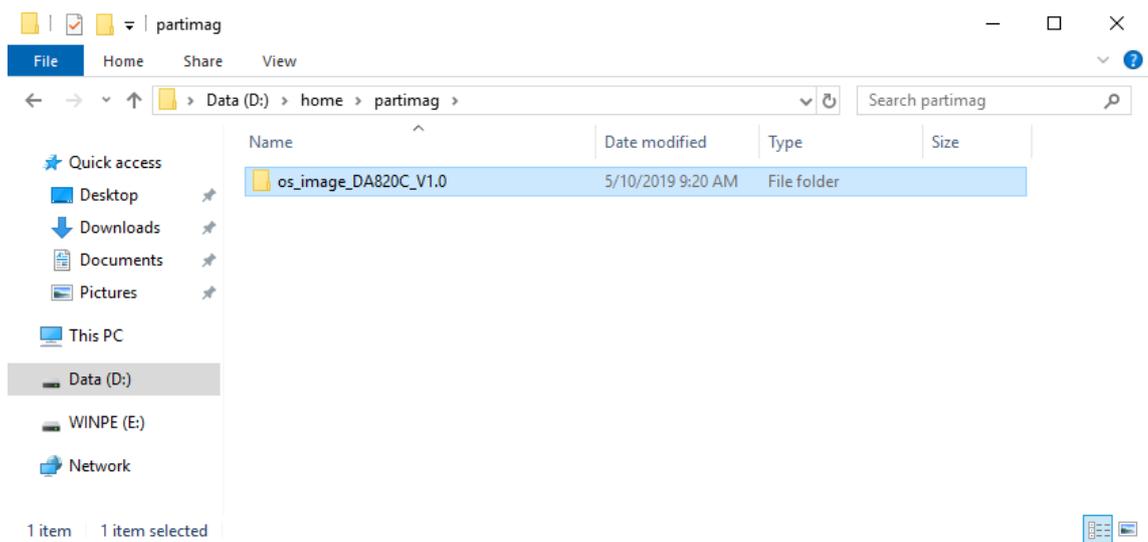


- b. The second volume includes multiple folders that contain data that is required for booting into WinPE to run the recovery program.

NOTE This volume may not be visible in systems running Windows 7 or Windows 10 versions prior to 1803.



6. Copy the **os_image_ModelName** directory from the **<USB drive>\recovery** folder to the **\home\partimag** folder on the USB drive.

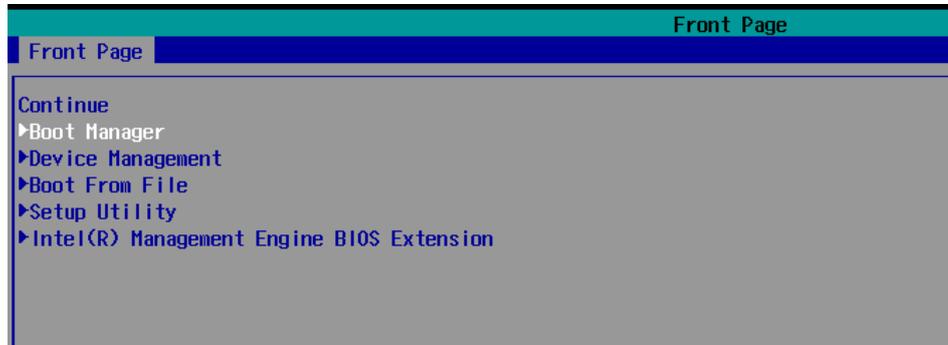


The USB disk is now ready for use in the recover process.

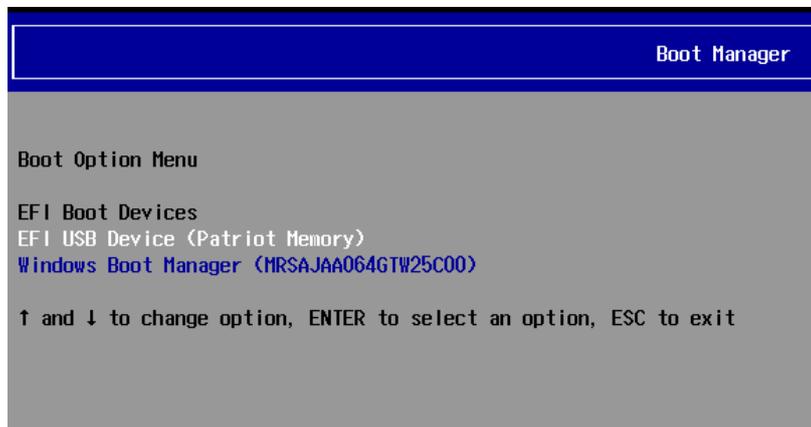
Booting From a USB Recovery Disk

To boot up from a USB recovery disk, do the following:

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



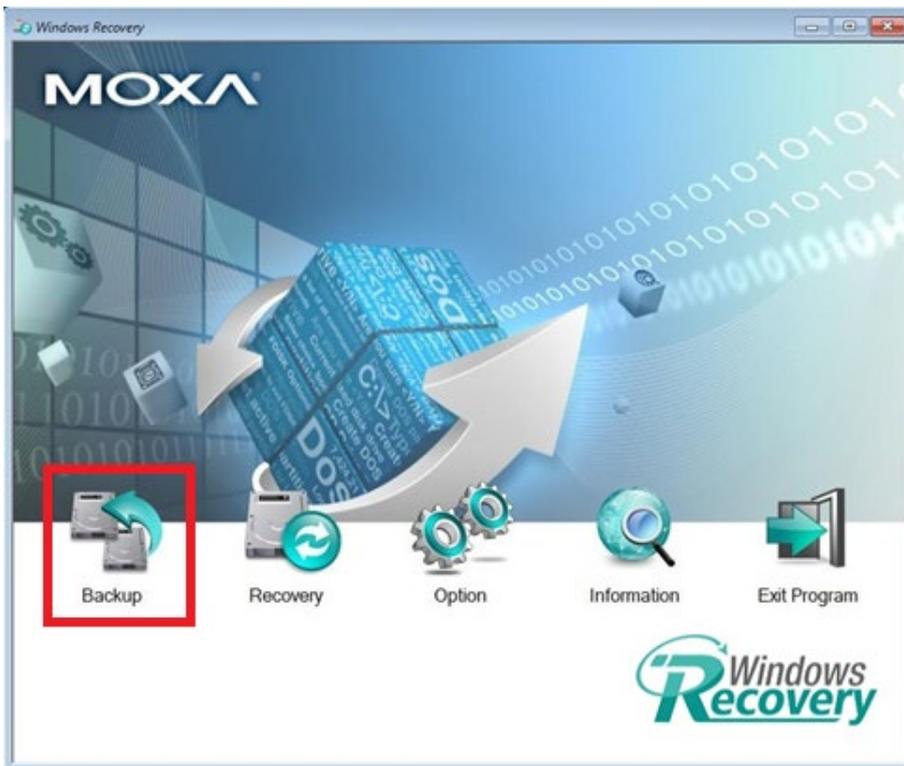
3. Select the **EFI USB Device** option and press **Enter** to continue to boot from the USB device.



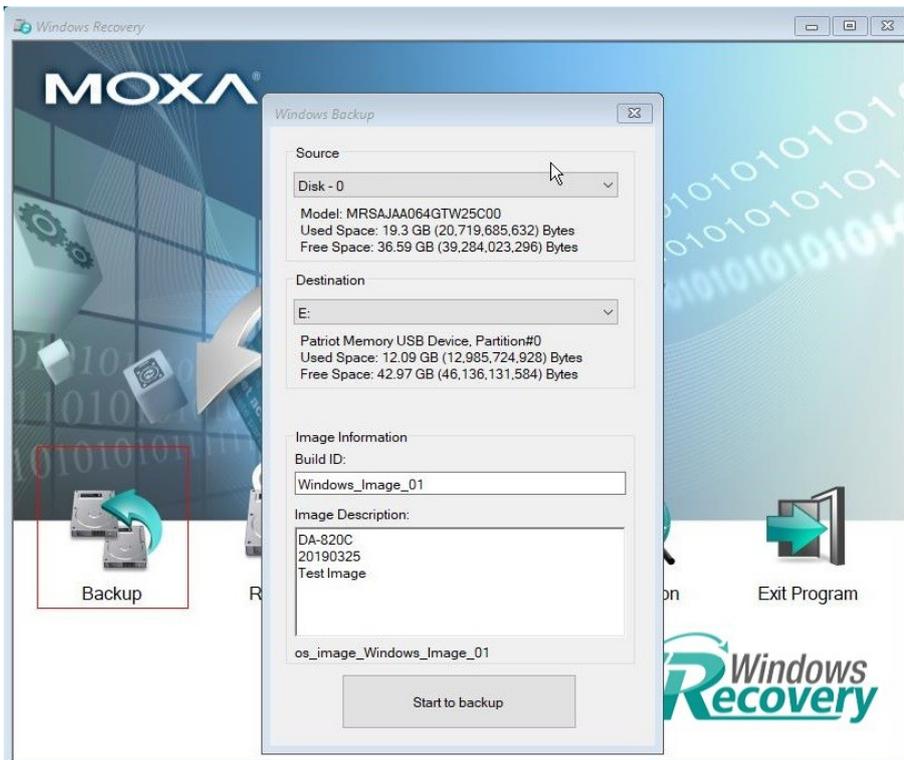
System Image Backup

To back up the system image on to a USB disk, do the following:

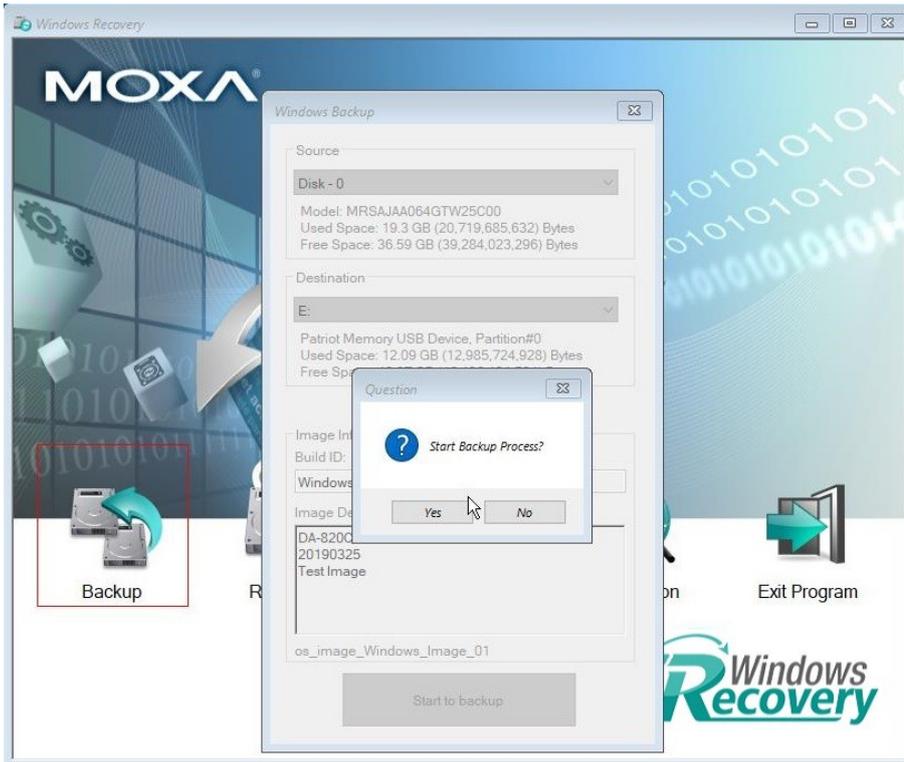
1. Boot the system from the USB disk.
You will see the **Windows Preinstallation Environment (WinPE)** and the **Windows Recovery** utility.
2. In the **Windows Recovery** utility, click on the **Backup** icon.



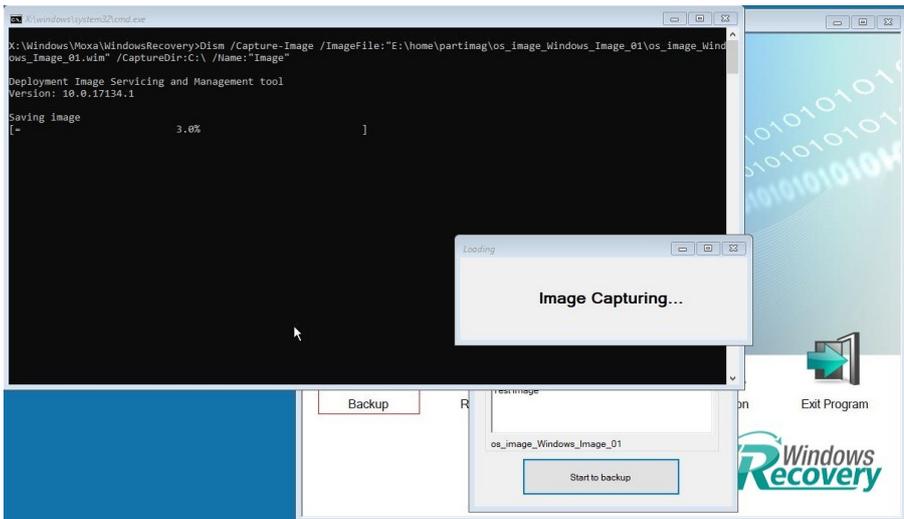
3. Select the **Source** disk to backup and the **Destination** USB to store the OS image.
4. Specify a **Build ID** and an **Image Description** for the image file.
5. Click **Start to backup**.



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



7. Wait for the backup process to finish.



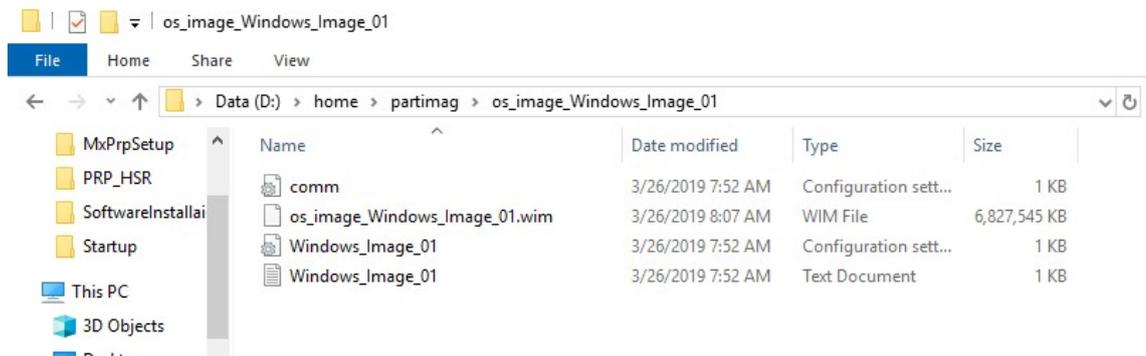
8. After the backup process is completed, click **OK**.



9. Click on the **Shutdown** button in the **Windows Recovery** utility and then click **OK**. The utility will shut down the computer.



The OS image is saved in the USB disk in the **home\partimag** folder. The backup information and the image files can be found in the **os_image_*** folder.



Restoring the System From an Image File

To restore the system image from a USB disk, do the following:

1. Boot the system from the USB disk.

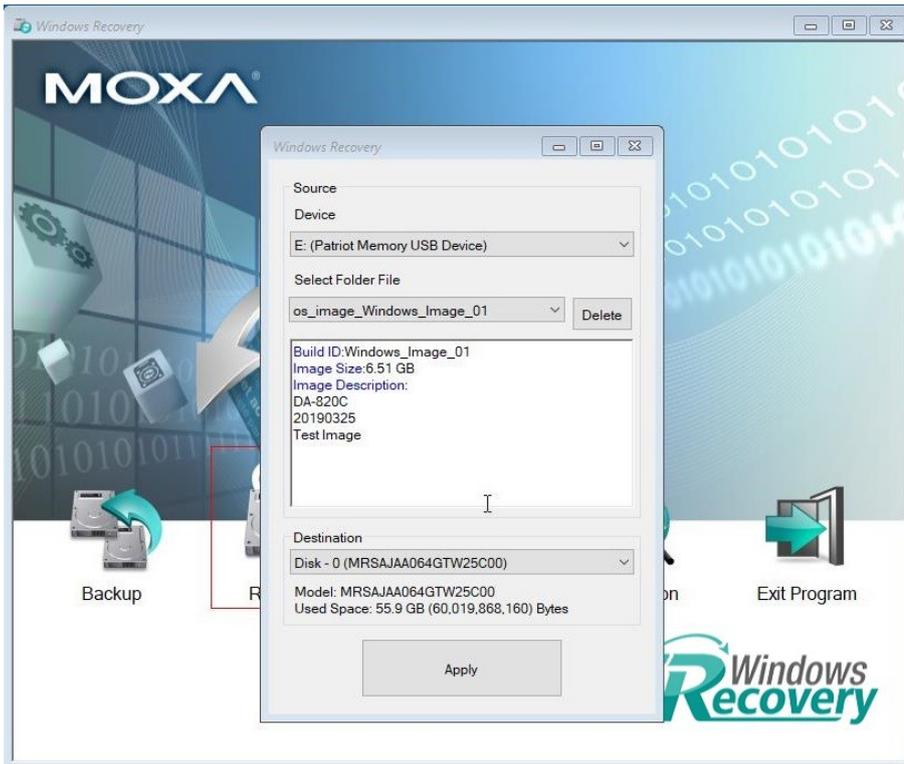
You will see the **Windows Preinstallation Environment (WinPE)** and the **Windows Recovery** utility.

2. In the **Windows Recovery** utility, click on the **Recovery** button.

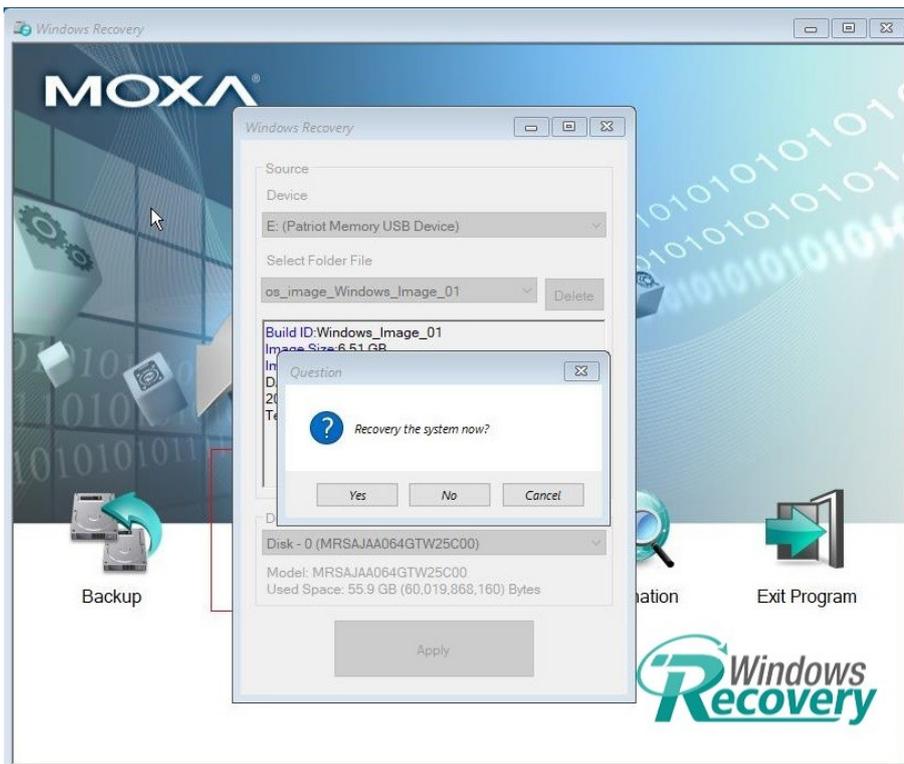


3. Select the **Source** USB device and the folder for the image file and select the image information.

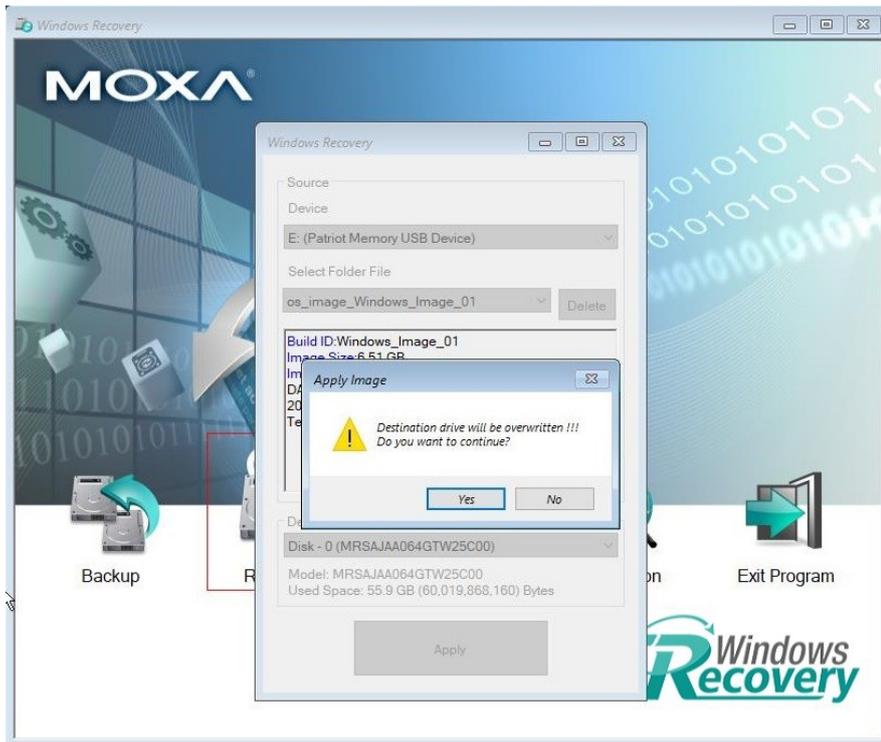
- 4. Select the **Destination** disk to restore the system image to and click **Apply**.



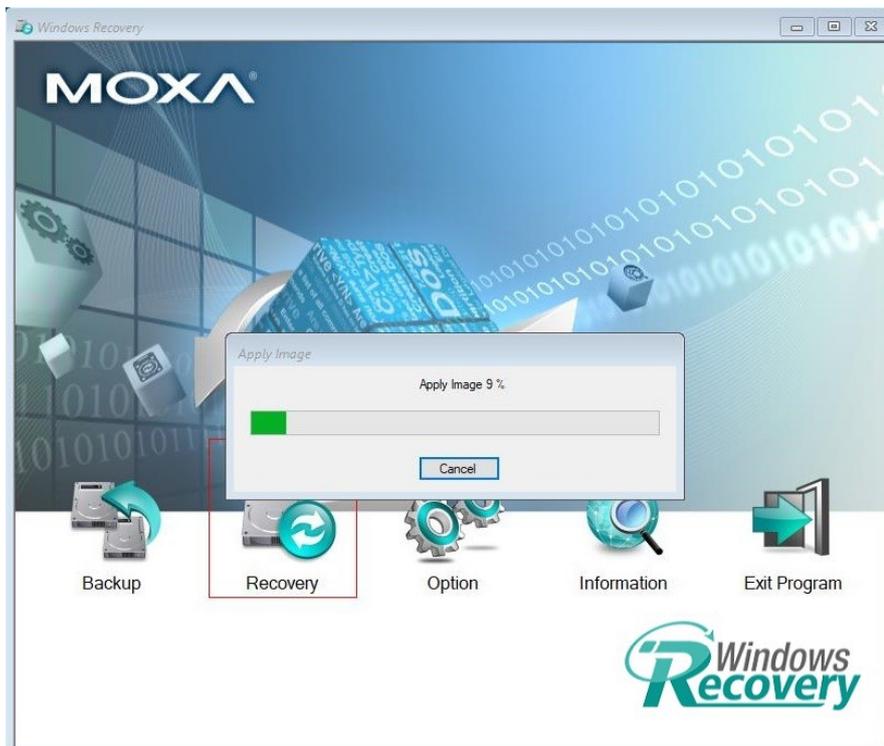
- 5. Click **Yes** to start the recovery process.



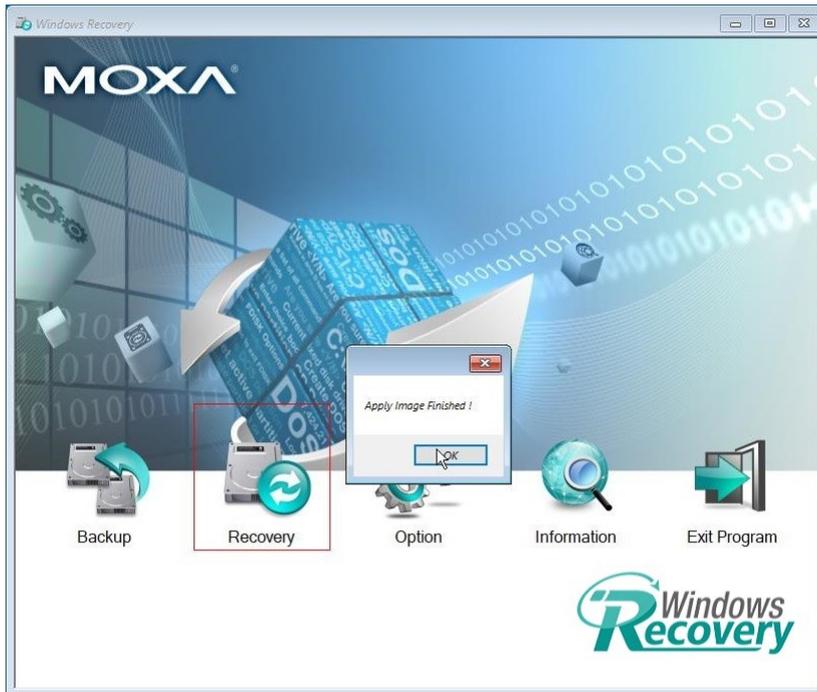
6. Click **Yes** to confirm.



7. Wait for the restore process to complete.



8. Click **OK**.



9. Click on the **Shutdown** button and then click **OK**.
The utility will shut down the computer.



10. Reboot the computer.



IMPORTANT!

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