

MPC-2120 Windows Embedded Standard 7 User's Manual

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www.moxa.com/product

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MPC-2120 Windows Embedded Standard 7 User's Manual

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Introduction

Thank you for buying Moxa's MPC-2120 panel computer. The MPC-2120 comes with the Windows Embedded Standard 7 software platform, providing a simple and familiar development environment for various industrial applications.

□ **Software Components**

Software Components

The software components of the Windows Embedded Standard 7 (WES7), which is pre-installed on the MPC-2120 computer, are listed in the following table:

Windows Embedded Standard 7**Core OS:**

- 64-bit support
- Remote Client
- Remote Procedure Call

Applications and Services Development:

- .Net Framework 3.5
- Remote Desktop Protocol 7.1
- COM OLE Application Support
- COM+ Application Support
- MSMQ

Internet Services:

- Internet Explorer 8.0
- IIS 7.0

File Systems and Data Store:

- Windows Data Access Components
- Windows Backup and Restore

Diagnostics:

- Common Diagnostic Tools
- Problem Reports and Solutions

Graphics and Multimedia:

- MPEG DTV-DVD Audio Decoder (MPEG-2, AAC)
- MPEG Layer-3 Audio Codecs(MP3)
- MPEG4 Decoders
- Windows Media Video VC-1 (WMV) Codecs
- DirectX and Windows Device Experience
- Photo Viewer
- Remote media streaming
- Windows Media Player

Management:

- Group Policy Management
- Windows Management Instrument (WMI)
- Windows Update

Networking:

- Extensible Authentication Protocol (EAP)
- Internet Authentication Service
- Telnet Server
- Bluetooth
- Domain Services
- Network Access Protection
- Network and Sharing Center
- Quality of Service
- Remote Access Service (RAS)
- Telephony API Client
- Windows Firewall
- Wireless Networking

Security:

- Credential Roaming Service
- Credentials and Certificate Management
- Windows Authorization Manager (AZMAN)
- Windows Security Center
- Active Directory Rights Management
- Security Base
- Encrypted File System (EFS)

Embedded Features:

- Enhanced Write Filter (EWF)
- File-Based Write Filter (FBWF)
- Message Box Default Reply
- Registry Filter
- WSDAPI for .NET

Embedded Self-Health Diagnostic Software:

- SNMP-based remote scripting layer for monitoring, reporting, and control

System Initialization

This chapter describes how to initialize the system settings on the MPC-2120 computer when you boot up the computer for the first time.

The following topics are covered in this chapter:

□ **Overview**

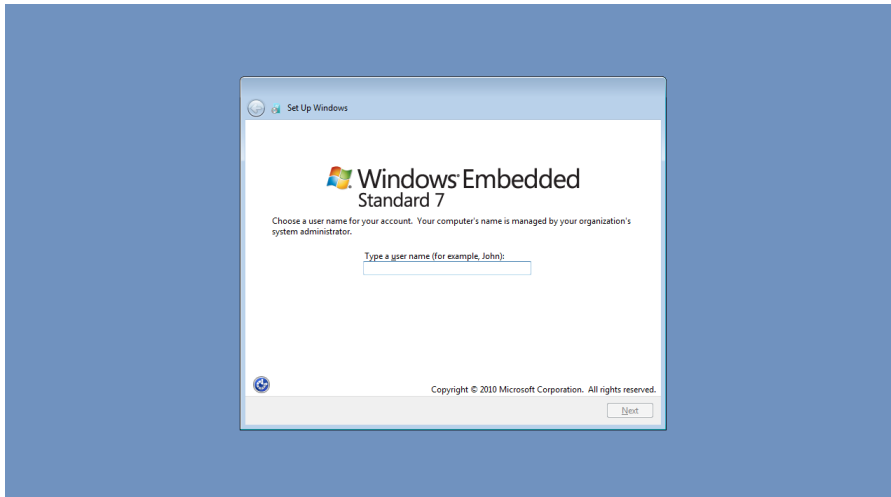
- Initializing User Settings

Overview

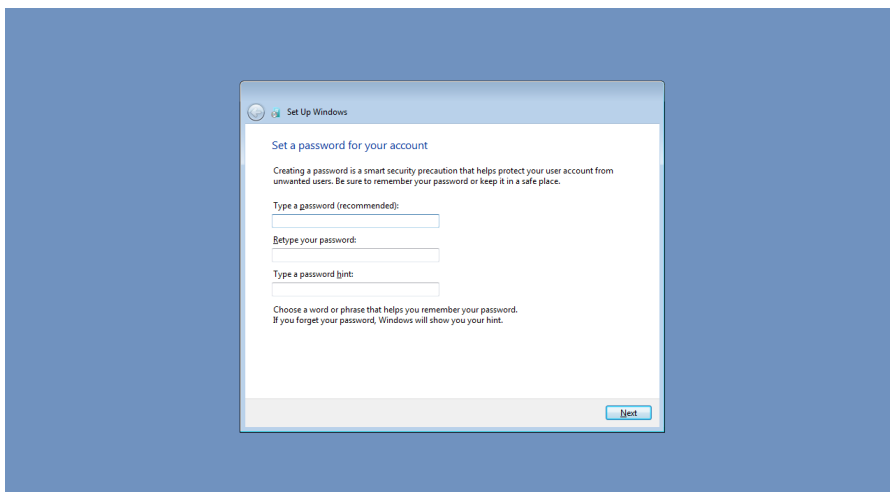
A setup wizard will guide you through the system initialization process when you boot up the MPC-2120 computer for the first time.

Initializing User Settings

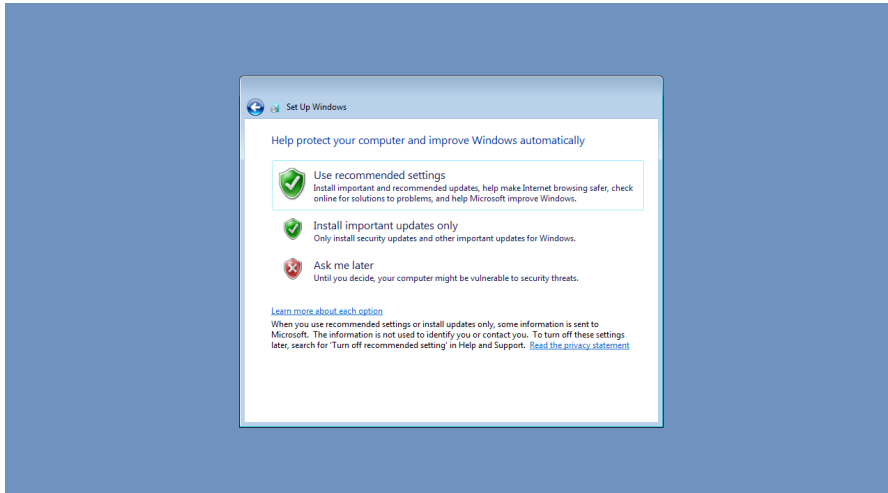
1. In the **Set Up** Window, enter a user name for this computer and click **Next**.



2. Type in a password and retype the password to confirm it.
In addition, you can also specify a password hint that the system should display in case you forget your password.
If you do not want to set a password, leave it blank and click **Next**.



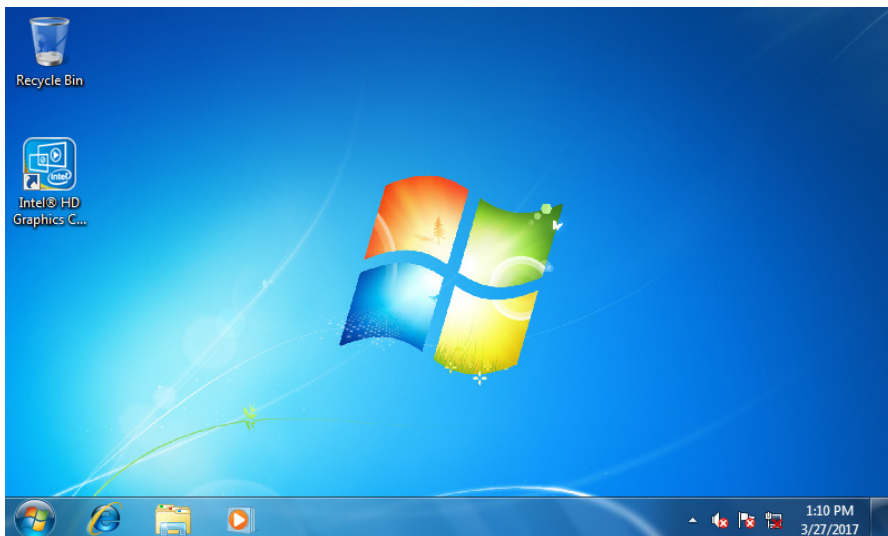
3. Select a windows update method.



4. Select your computer's current location.
Windows will automatically apply the correct network settings based on your selection.



5. Start using the MPC-2120 embedded computer.



Configuring the Serial Interface

This chapter describes how to configure the serial interface on the MPC-2120 computer.

The following topics are covered in this chapter:

- **Overview**
- **Configuring Serial Interface Mode**

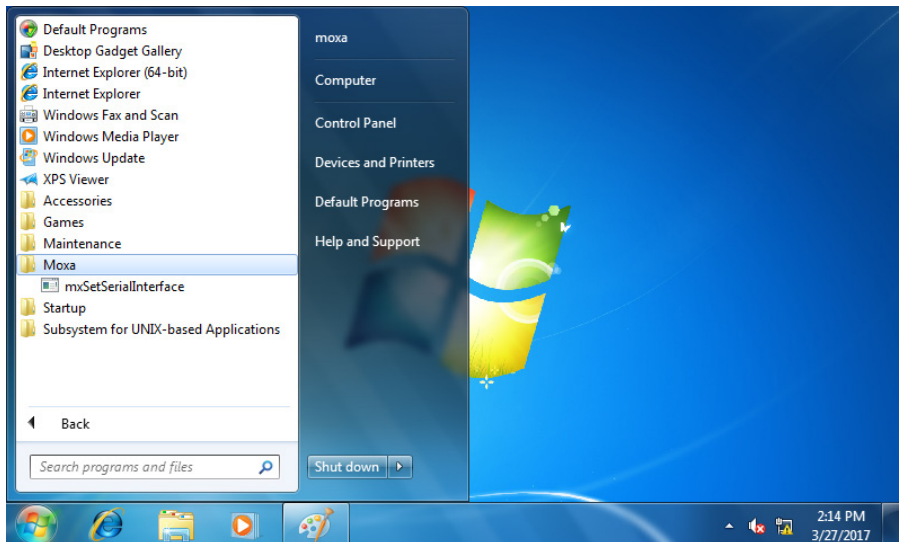
Overview

The MPC-2120 supports the serial modes **RS232**, **RS485-2-wire**, and **RS422/RS485-4-wire**. These modes can be configured both as COM1 and COM2 interfaces.

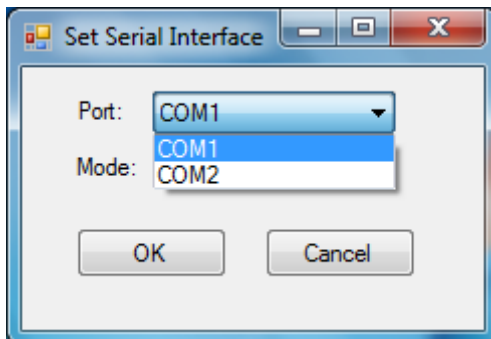
Configuring Serial Interface Mode

Follow these steps to change the serial interface mode.

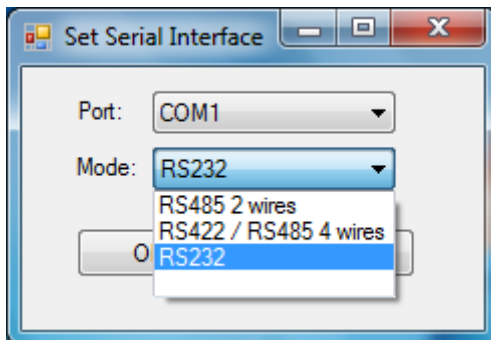
1. From the Start menu, Click **All apps >Moxa >mxSetSerialInterface**.



2. Select the port for which you want to set the mode.



3. Select the mode that you want to set for the selected port.



4. Click **OK**.

Enabling Embedded Filters

This chapter describes how to enable and operate the embedded filters on the MPC-2120 computer.

The following topics are covered in this chapter:

▣ **Enhanced Write Filter**

- Overview
- Enabling Enhanced Write Filter

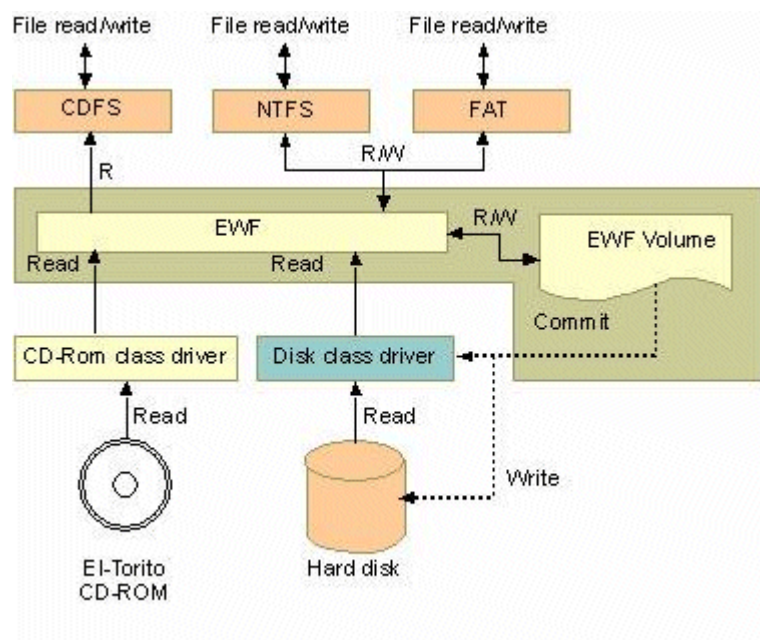
▣ **File-Based Write Filter**

- Overview
- Configuring File-Based Write Filters (FBWF)

Enhanced Write Filter

Overview

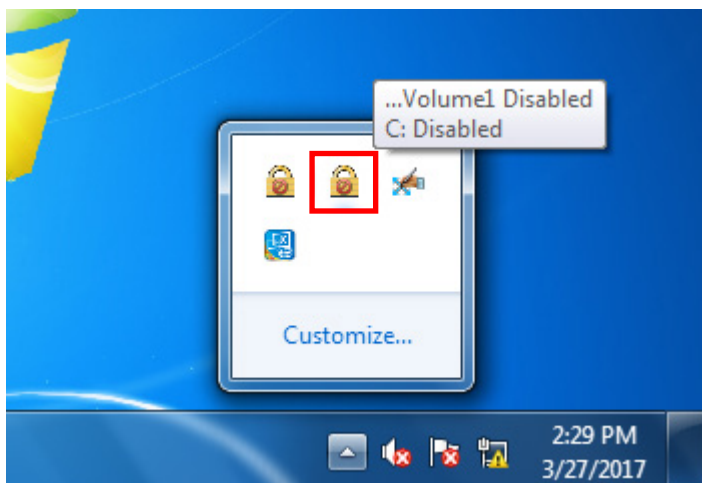
Enhanced Write Filter (EWF) provides a means for protecting a volume from writes. This allows the operating system (OS) to boot from write-protected hard disks. Data written to a EWF-protected volume (the **Hard disk** in the following figure) is redirected to an overlay (**EWF Volume** in the following figure). Because the EWF prevents direct writes to the hard disk, it can protect the hard disk from sudden power cut. The data is cached in the overlay and made available as part of the volume. This gives the appearance that the volume is writeable. The overlay is an independent storage location, which exists in random access memory (RAM). If desired, the data stored in the overlay may be committed to the protected volume. Refer to the following figure for the overview of the EWF structure.



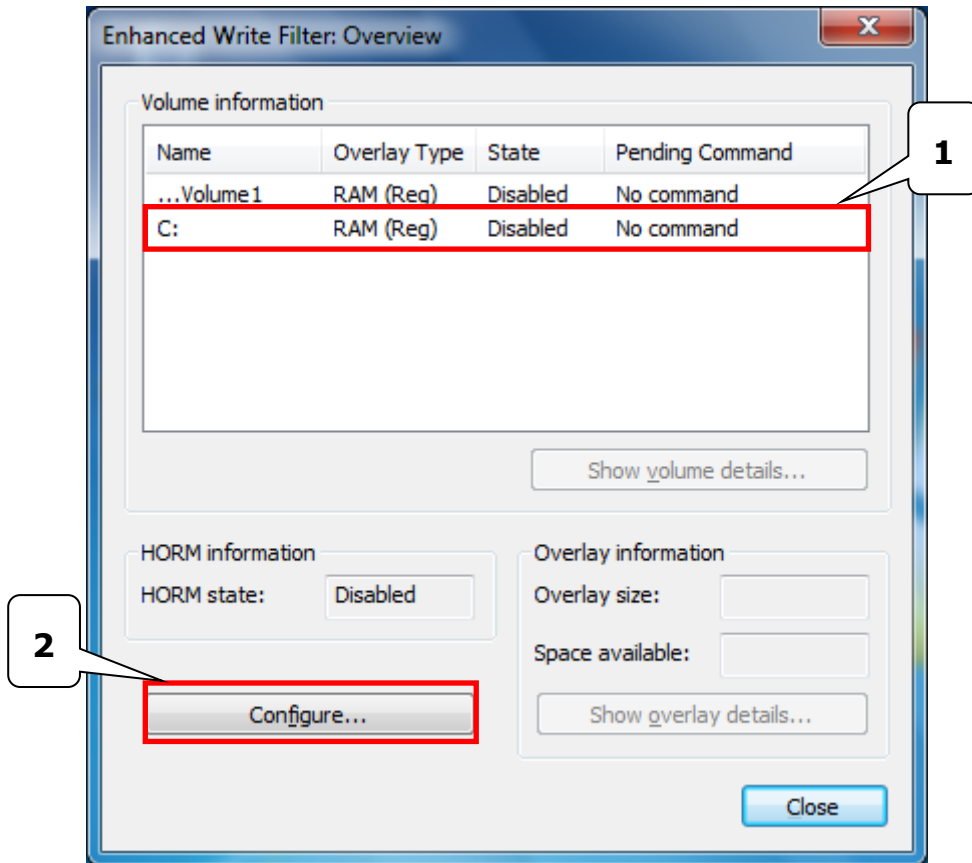
Enabling Enhanced Write Filter

Follow these steps to enable the Enhanced Write Filter (EWF):

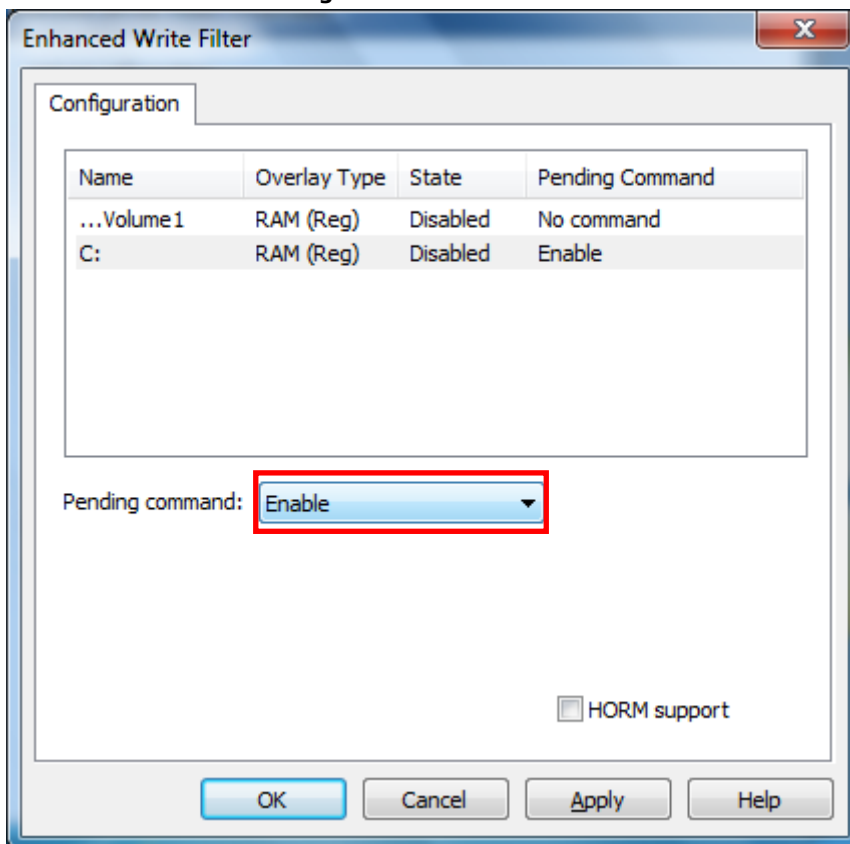
1. Open the EWF by right-clicking on a lock icon in the system tray.



- 2. In the **Volume information** table, select the volume and click **Configure**.

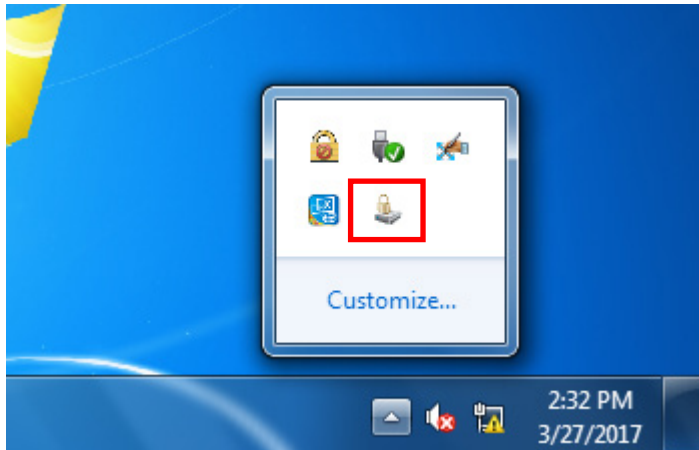


- 3. Select **Enable** in the **Pending command** field.

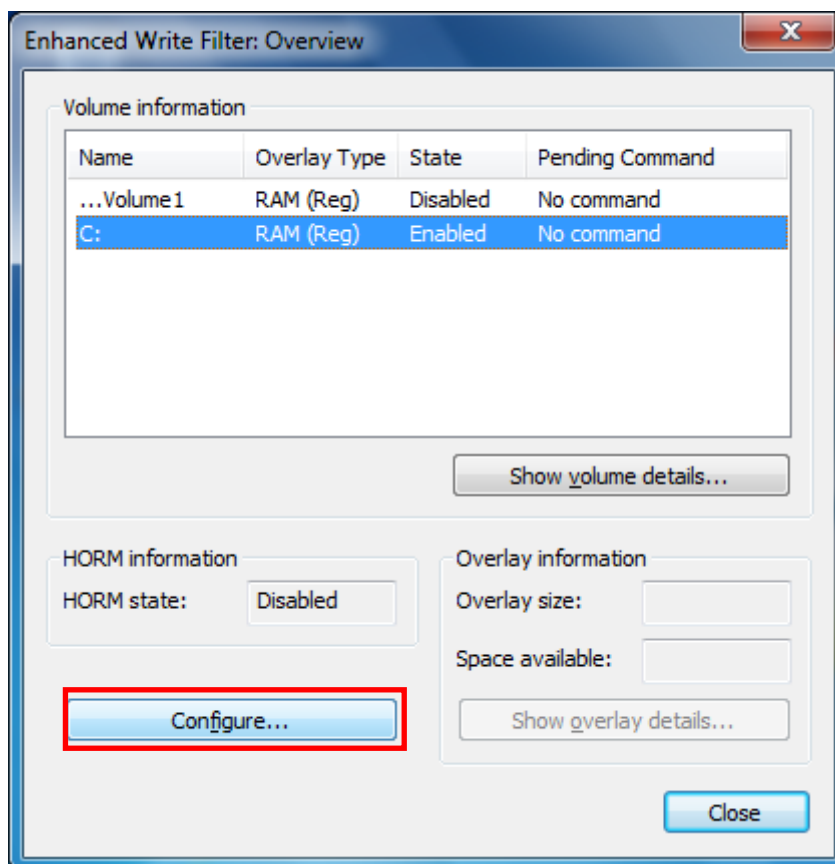


- 4. Reboot the system.

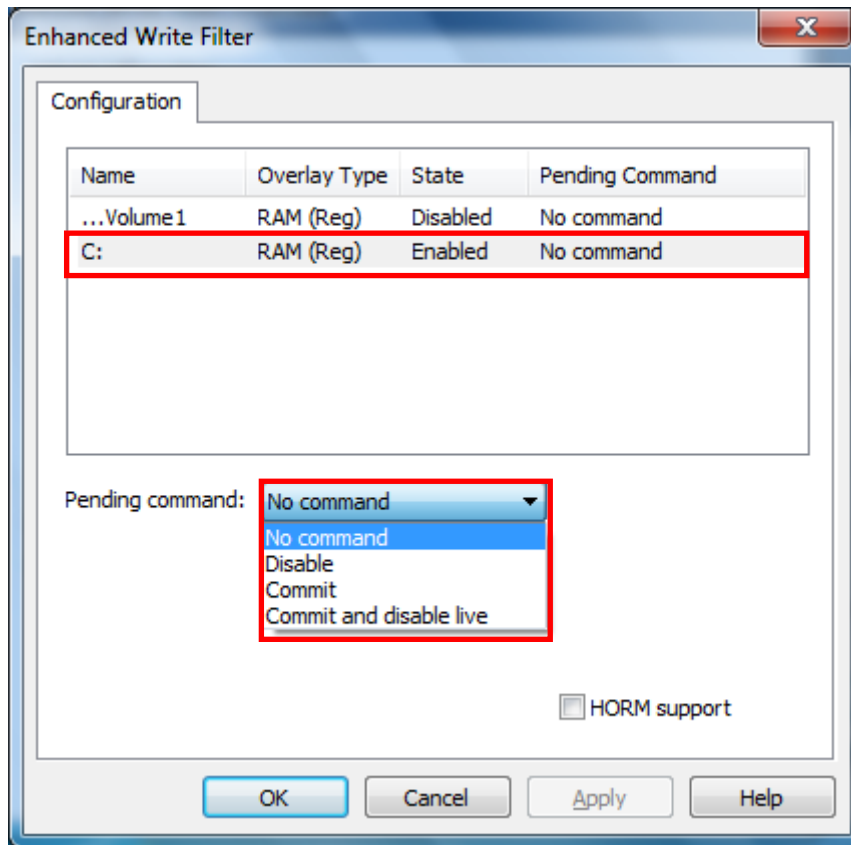
- After the system has rebooted, check to confirm that the EWF icon has changed to a locked state (as shown below)



- Right-click on the icon to open the EWF configuration window and click **Configure**.



7. Select a volume and a **Pending Command** as per your requirement



8. Click **OK** or **Apply**.

File-Based Write Filter

Overview

According to Microsoft:

File-Based Write Filter (FBWF) allows the Windows Embedded platform to maintain the appearance of read and write access on write-sensitive or read-only storage. FBWF makes read and write access transparent to applications.

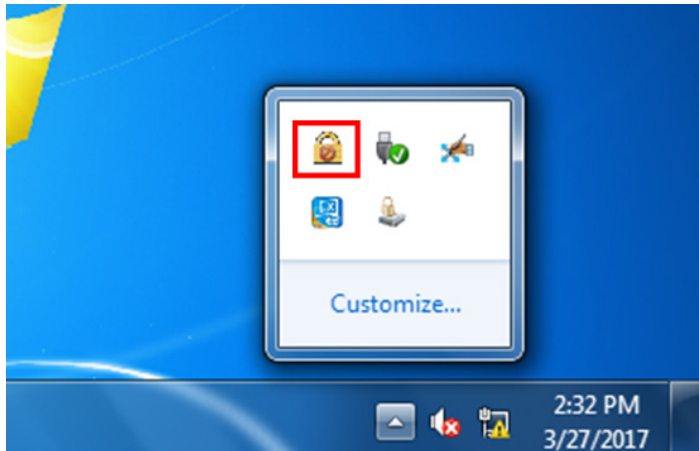
Writing to storage media may be undesirable or impossible in embedded devices. FBWF redirects all writes targeted for protected volumes to a RAM cache called an overlay. Used in this context, an overlay is similar to a transparency overlay on an overhead projector. Any change made to the overlay affects the picture as seen in the aggregate, but if the overlay is removed, the underlying picture remains unchanged.

FBWF provides the advanced feature than EWF to let user specify the directory to write the data to disk drive directly, in our default setting, the default directory is under c:\temp, which means you can read/write the data into disk without commit action.

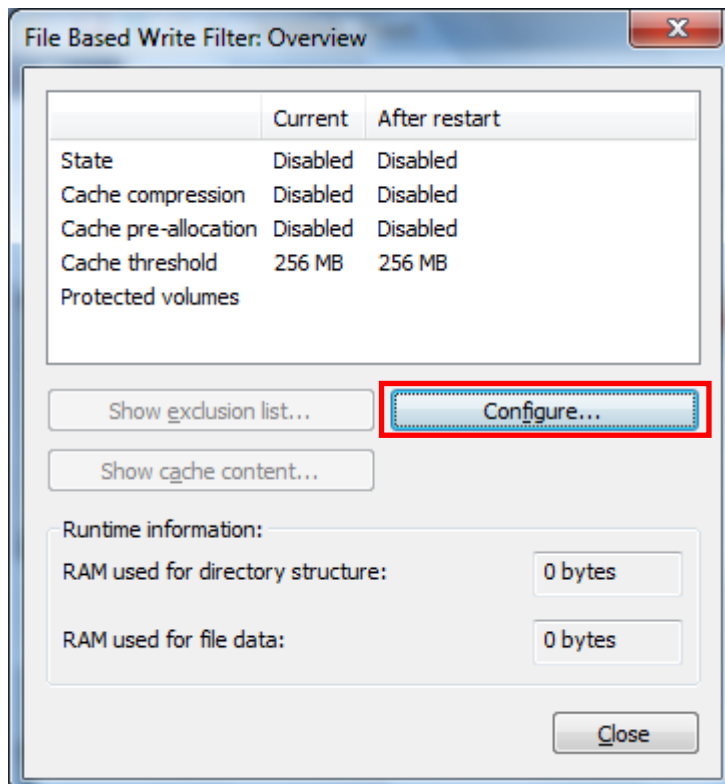
Configuring File-Based Write Filters (FBWF)

To enable FBWF, do the following:

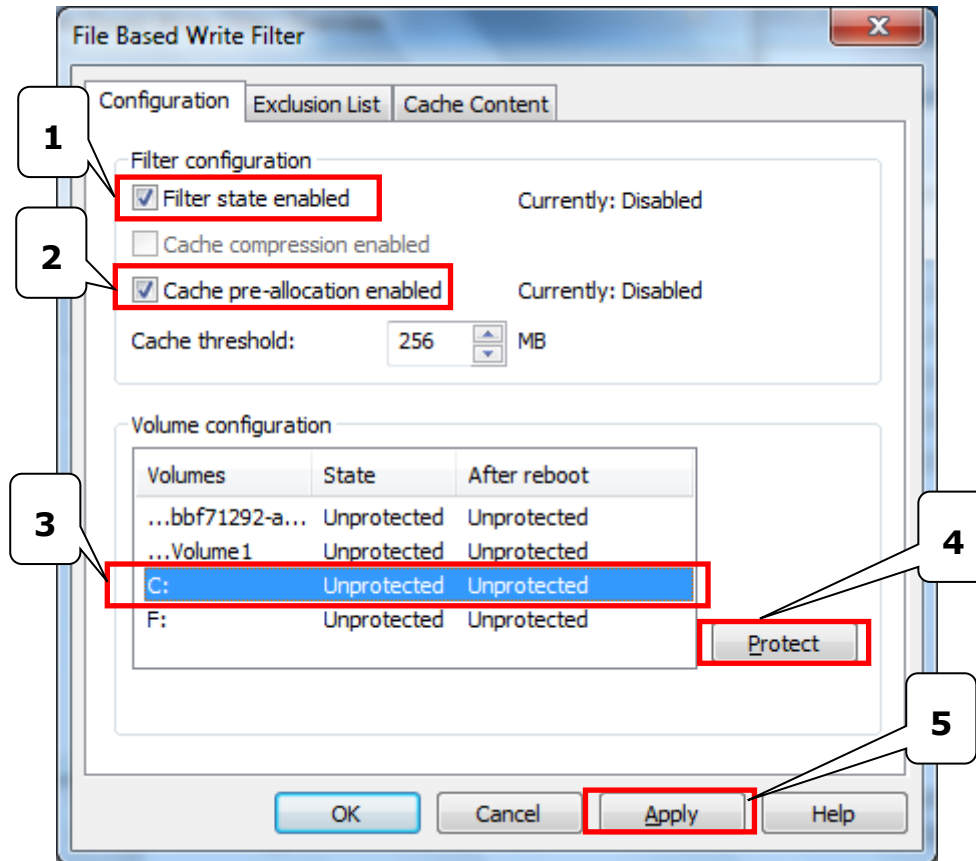
1. Right-click on the lock icon in the system tray.



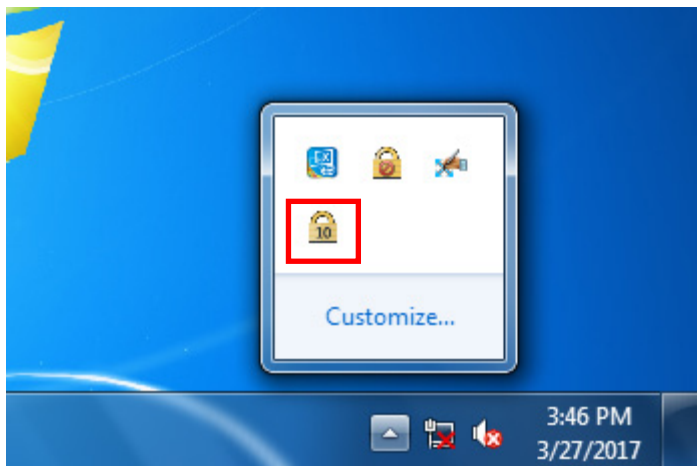
2. Click **Configure**.



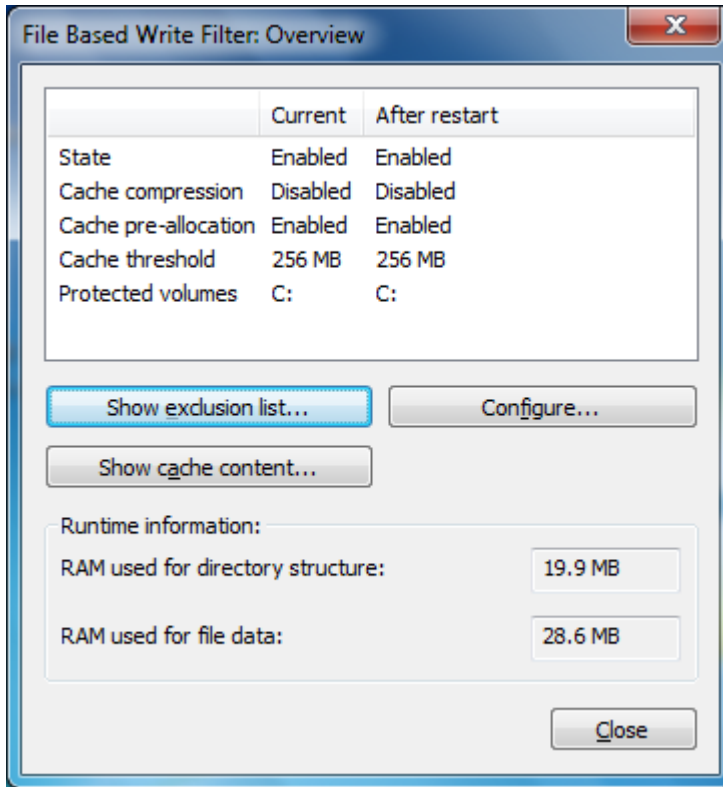
- In the **Configuration** tab, check the **Filter state enabled** and **Cache pre-allocation enabled** boxes. Select the volume **C:**, click **Protect** and then click **Apply**.



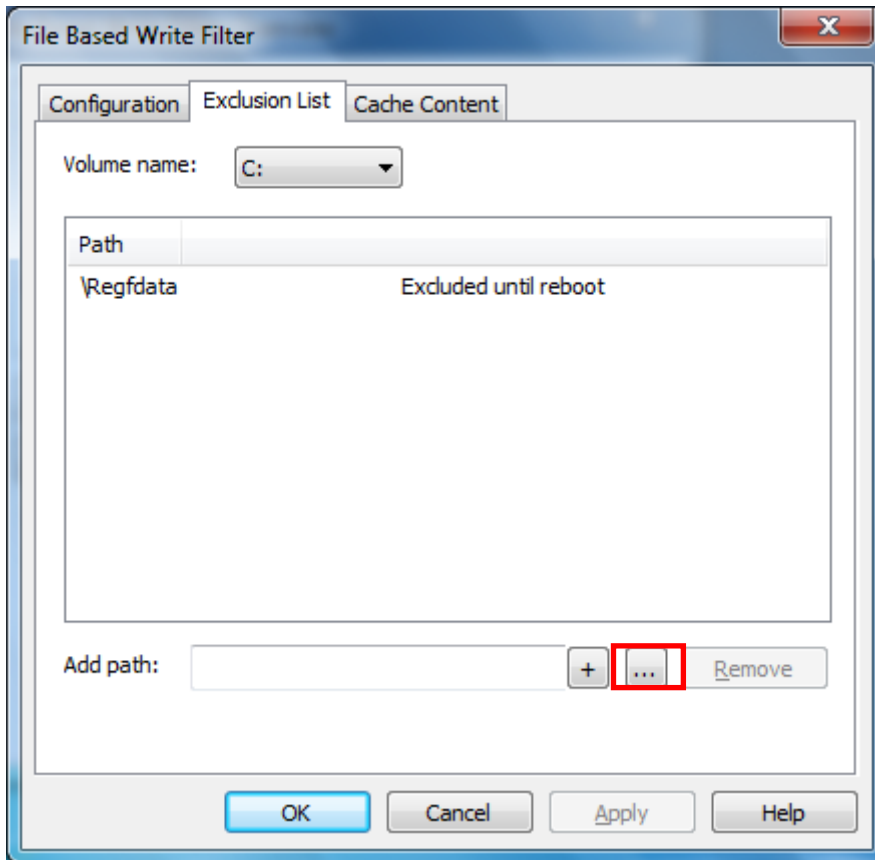
- Reboot the system
- After the system has rebooted, right-click on the lock icon in the system tray.



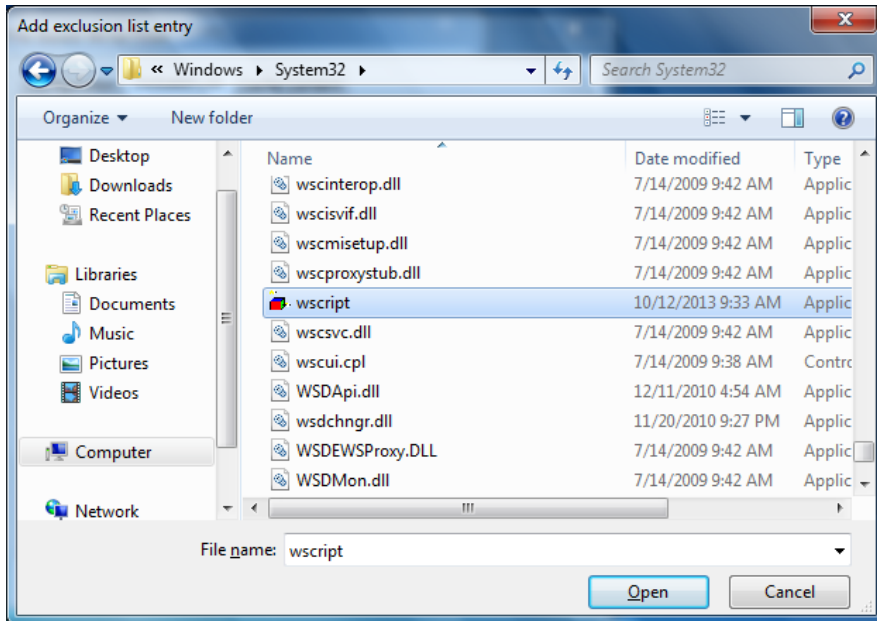
- 6. Click **Configure**



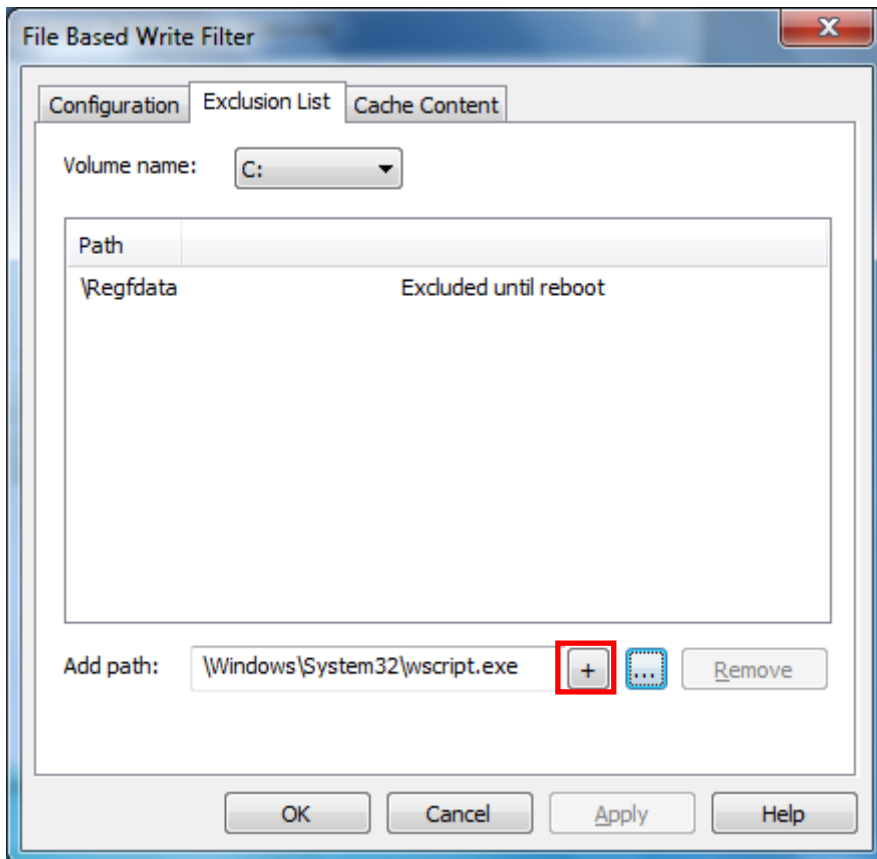
- 7. Open the **Exclusion List** tab and click on the browse button



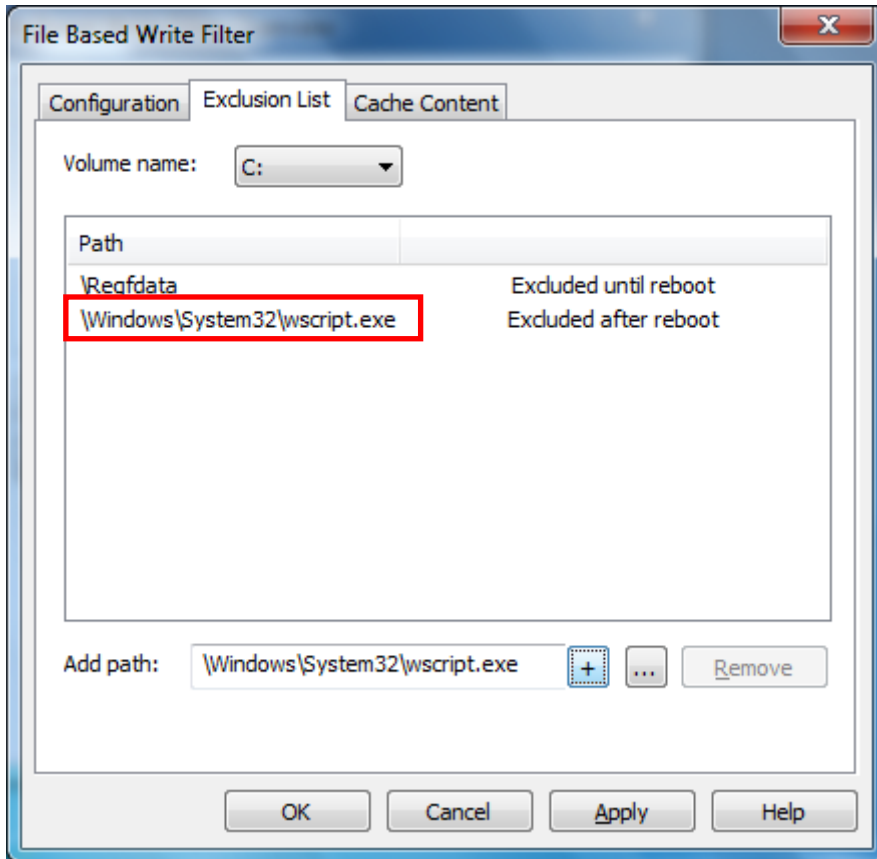
- 8. Select the file (for example, *wscript.exe*) that you want to exclude from the protection list.



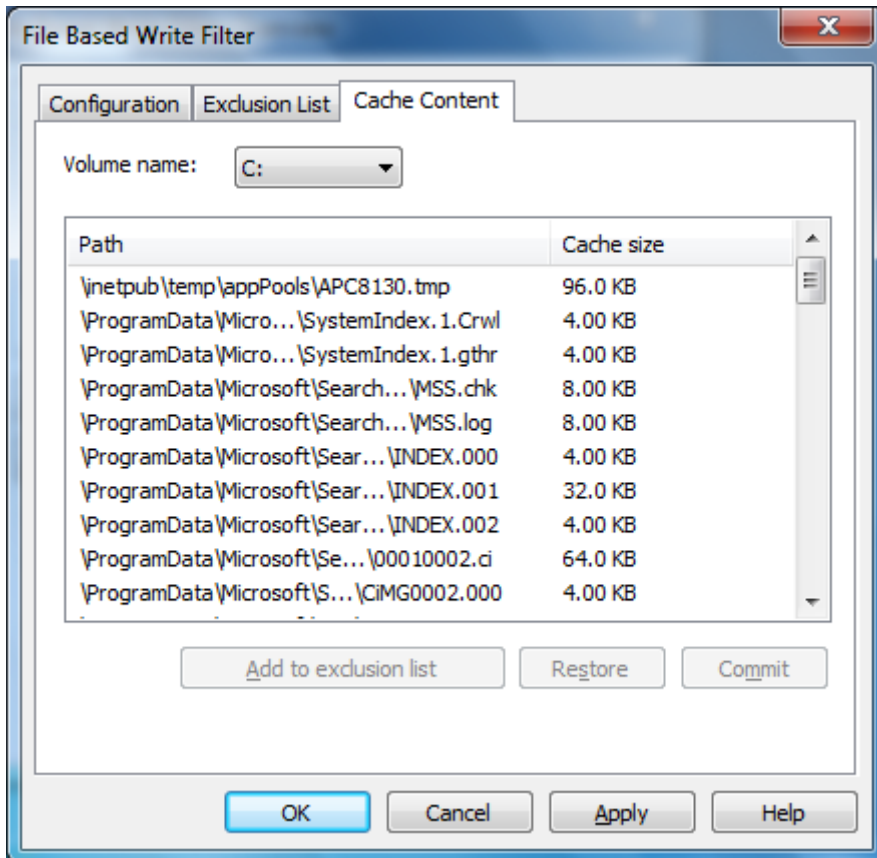
- 9. Click the + button to add the file path to the list.



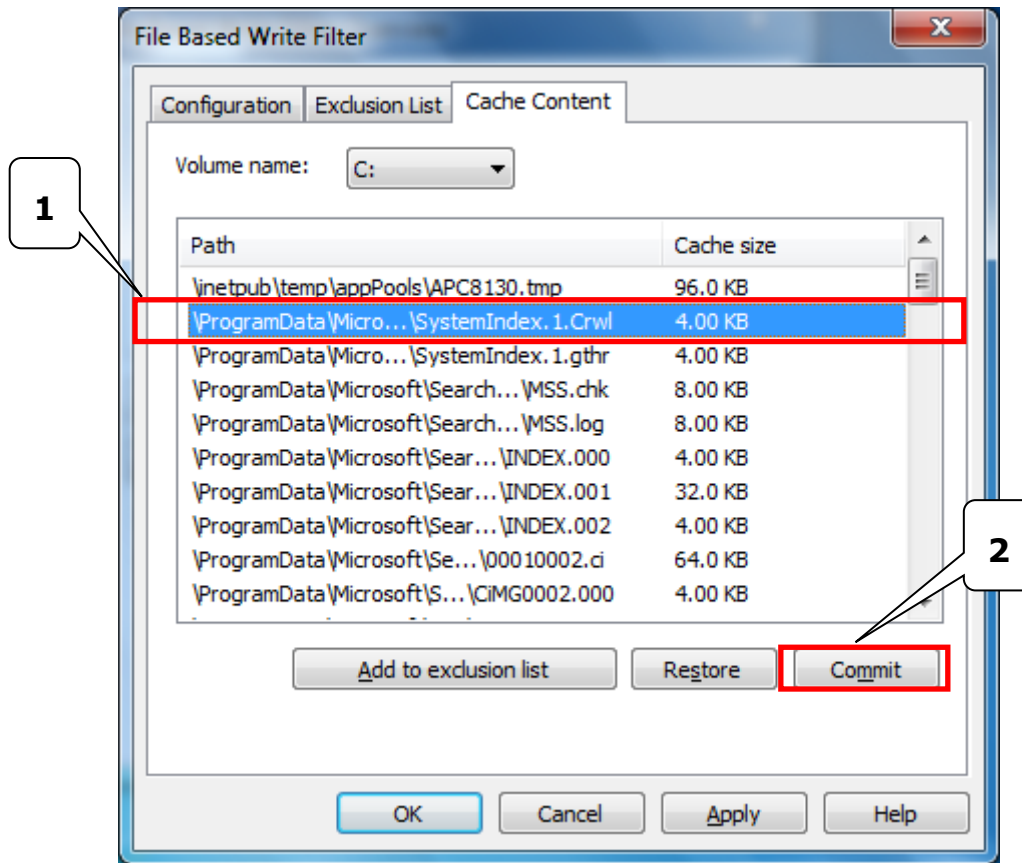
10. Confirm that the file path has been added to the exclusion list.



11. Open the **Cache Content** tab



12. Select the file that you want to save to the physical disk and click **Commit**.



13. Reboot system for the settings to take effect.

This chapter describes how to use the OSD utility on the MPC-2120 computer. The OSD utility will display a bar indicating the brightness of the screen when you press the display buttons.

The following topics are covered in this chapter:

- ▣ **OSD**

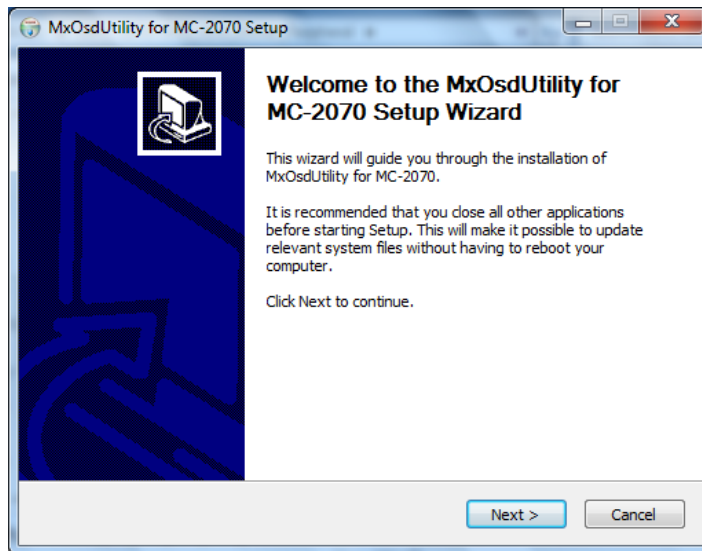
OSD

The MPC-2120 computer provides an OSD utility for displaying the brightness bar on the screen. The executable for the OSD utility is available at:

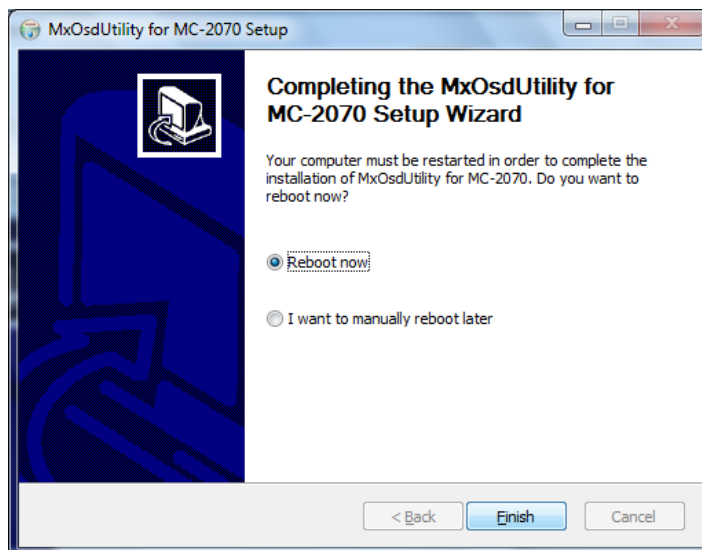
\driver\MPC-2120-W7E_V1.0_Driver_Peripheral folder

To install and use the OSD utility:

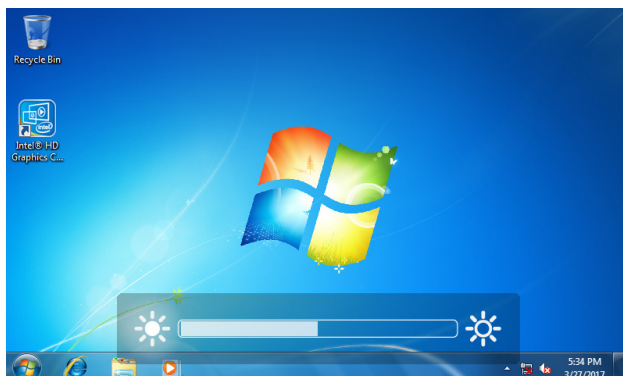
1. Run the OSD utility executable file.



2. After completing the installation process, reboot the MPC-2120 computer.



3. Press the display buttons to changes the brightness.
A bar indicating the brightness level is displayed on the screen.



6

Examples

This chapter describes how to use the example programs provided in the "**Example**" folder to enable the watchdog function, monitor and control the UART (serial) interface, and monitor and control the DIO states in the MPC-2120 computer.

The following topics are covered in this chapter:

- ❑ **Watchdog**
- ❑ **Serial Interface**
- ❑ **DIO**

Watchdog

Download the MPC-2120's software libraries from the MPC-2120 product page on Moxa's website. The watchdog scripts are available in the **\Example\Watchdog** folder.

To enable the watchdog function and to test it, do the following:

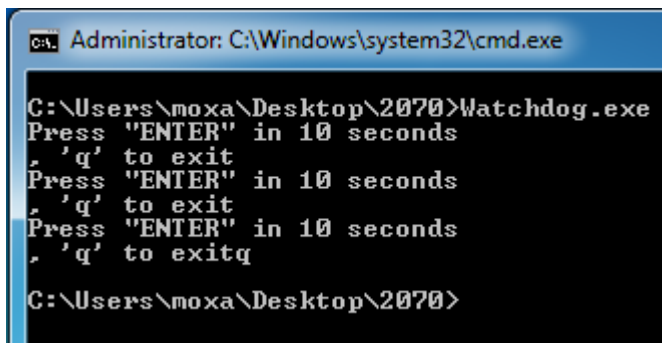
1. Create a folder, **C:\programs\example** and copy the following files from the MPC-2120 software library to the folder.

```
\MPC-2120*_Example\Library\x64\mxdwg\mxdwg.dll
\MPC-2120*_Example\Library\x64\MxGeneralIo\mxGeneralIo.dll
\MPC-2120*_Example\x64\Release\Watchdog\Watchdog.exe
```

2. Run the **Watchdog.exe** program.

You must press the **Enter** key every 10 seconds to prevent the system from rebooting.

3. To stop the watchdog function, press **q** to exit the program.



```
Administrator: C:\Windows\system32\cmd.exe
C:\Users\moxa\Desktop\2070>Watchdog.exe
Press "ENTER" in 10 seconds
'q' to exit
Press "ENTER" in 10 seconds
'q' to exit
Press "ENTER" in 10 seconds
'q' to exitq
C:\Users\moxa\Desktop\2070>
```

Serial Interface

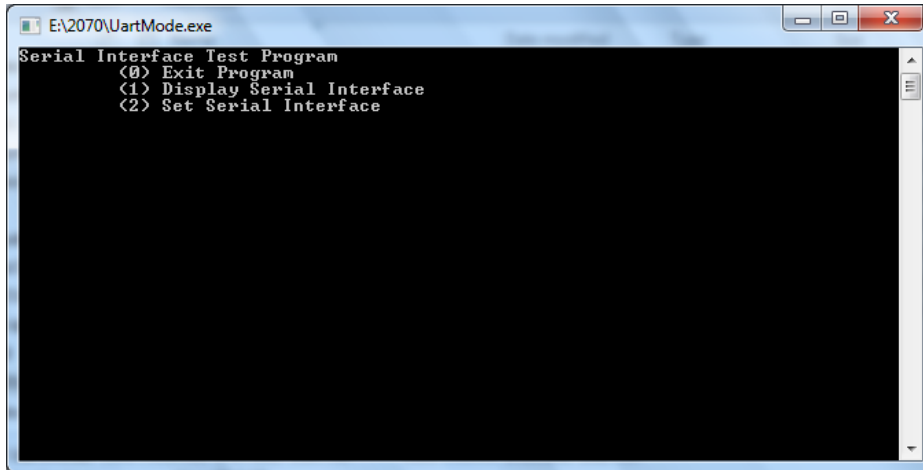
Download the MPC-2120's software libraries from the MPC-2120 product page on Moxa's website. The serial interface scripts are available in the **\Example\UartMode** folder. These scripts help check the status of the UART interface and control the UART mode.

To enable the serial interface scripts and to test them on your MPC-2120, do the following:

1. Create a folder **C:\programs\example** and copy the following files from the MPC-2120 software library to the folder.

```
\MPC-2120*_Example\Library\x64\mxsp\mxsp.dll
\MPC-2120*_Example\Library\x64\MxGeneralIo\mxGeneralIo.dll
\MPC-2120*_Example\x64\Release\UartMode\ UartMode.exe
```

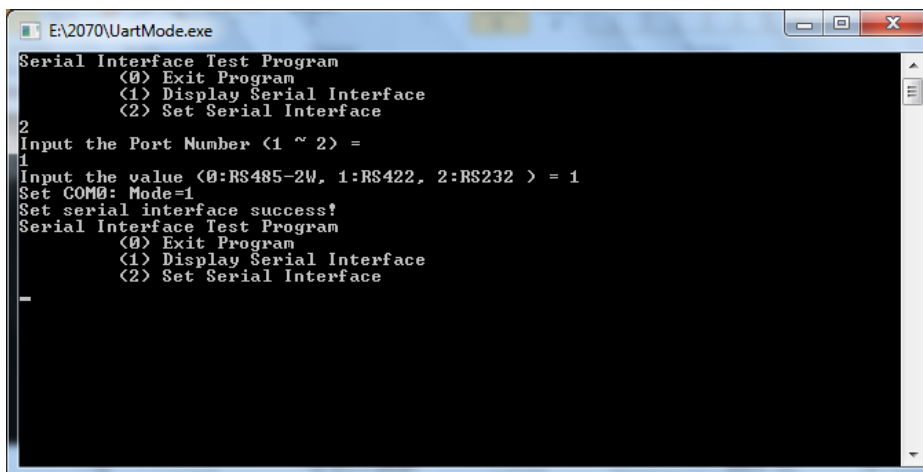
- Run the **UartMode.exe** program.



```

E:\2070\UartMode.exe
Serial Interface Test Program
  <0> Exit Program
  <1> Display Serial Interface
  <2> Set Serial Interface
  
```

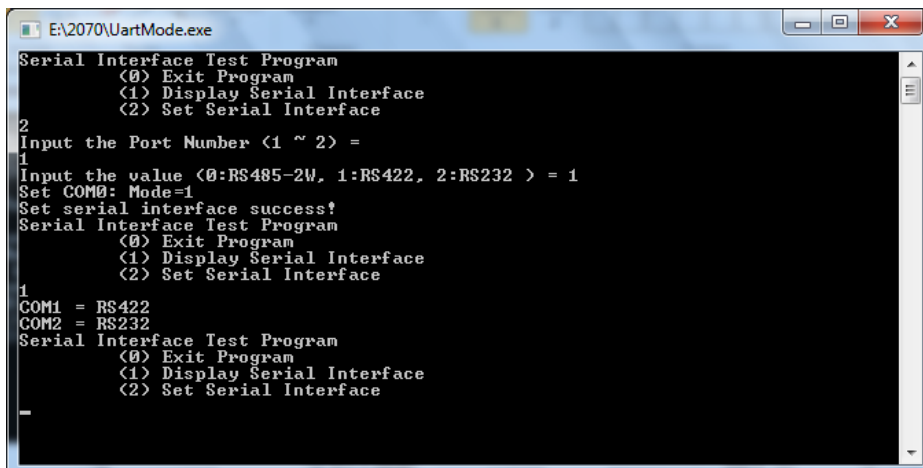
- To set the serial interface, type **2** and follow the on-screen instructions.



```

E:\2070\UartMode.exe
Serial Interface Test Program
  <0> Exit Program
  <1> Display Serial Interface
  <2> Set Serial Interface
2
Input the Port Number <1 ~ 2> =
1
Input the value <0:RS485-2W, 1:RS422, 2:RS232 > = 1
Set COM0: Mode=1
Set serial interface success!
Serial Interface Test Program
  <0> Exit Program
  <1> Display Serial Interface
  <2> Set Serial Interface
  
```

- To display the current serial interface settings, type **1**.



```

E:\2070\UartMode.exe
Serial Interface Test Program
  <0> Exit Program
  <1> Display Serial Interface
  <2> Set Serial Interface
2
Input the Port Number <1 ~ 2> =
1
Input the value <0:RS485-2W, 1:RS422, 2:RS232 > = 1
Set COM0: Mode=1
Set serial interface success!
Serial Interface Test Program
  <0> Exit Program
  <1> Display Serial Interface
  <2> Set Serial Interface
1
COM1 = RS422
COM2 = RS232
Serial Interface Test Program
  <0> Exit Program
  <1> Display Serial Interface
  <2> Set Serial Interface
  
```

DIO

Download the MPC-2120's software libraries from the MPC-2120 product page on Moxa's website. The DIO scripts are available in the **\Example\DIO** folder. These scripts help check the DIO status and control the DIO states, switching them between high and low states.

To enable the DIO scripts and to test them on your MPC-2120, do the following:

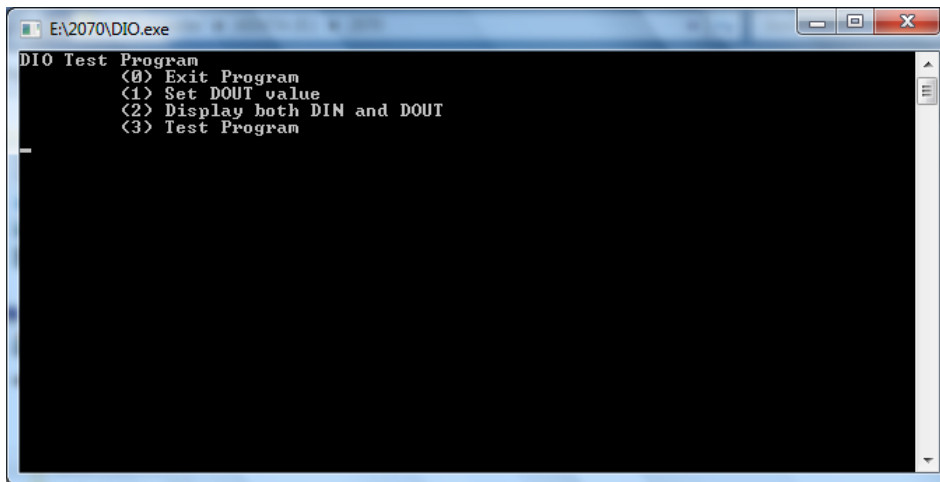
1. Create a folder, **C:\programs\example** and copy the following files from the MPC-2120 software library to the folder.

```
\MPC-2120*_Example \Library\x64\mxgpio mxgpio.dll
```

```
\MPC-2120*_Example \Library\x64\MxGeneralIo\mxGeneralIo.dll
```

```
\MPC-2120*_Example\x64\Release\DIO\DIO.exe
```

2. Run the **DIO.exe** program.



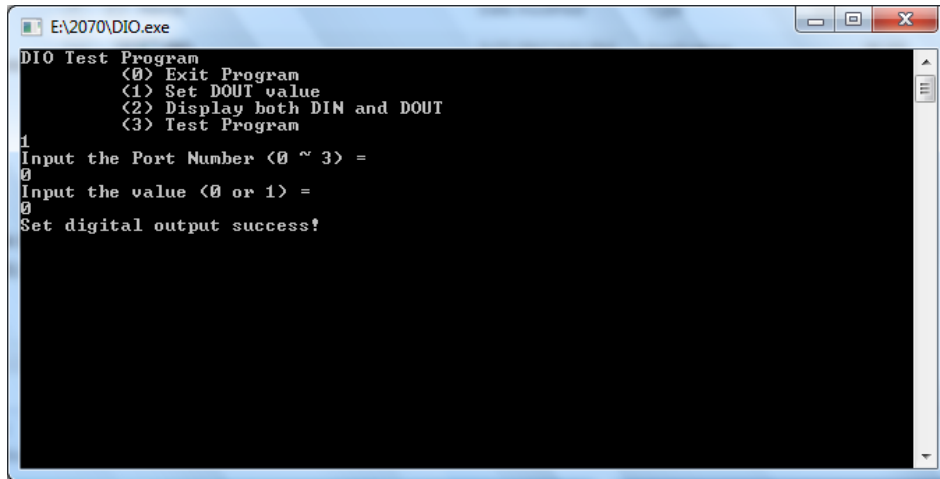
```
E:\2070\DIO.exe
DIO Test Program
  <0> Exit Program
  <1> Set DOUT value
  <2> Display both DIN and DOUT
  <3> Test Program
```

3. To display the current status of the DIOs, type **2** and follow the on-screen instructions.



```
E:\2070\DIO.exe
DIO Test Program
  <0> Exit Program
  <1> Set DOUT value
  <2> Display both DIN and DOUT
  <3> Test Program
2
Din0 = 1 , Dout0 = 1
Din1 = 1 , Dout1 = 1
Din2 = 1 , Dout2 = 1
Din3 = 1 , Dout3 = 1
```

4. To set a digital input value, Type **1** and follow the on-screen instructions. Enter the target port and value.

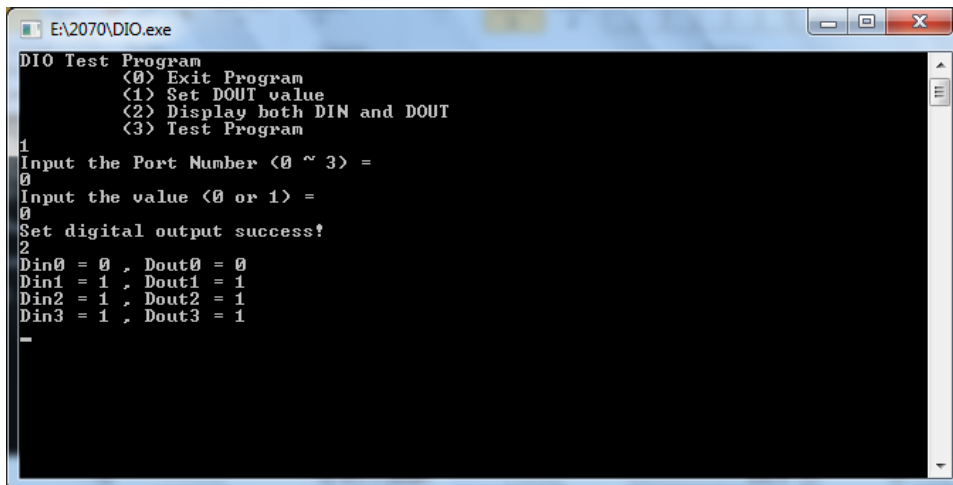


```

E:\2070\DIO.exe
DIO Test Program
  <0> Exit Program
  <1> Set DOUT value
  <2> Display both DIN and DOUT
  <3> Test Program
1
Input the Port Number <0 ~ 3> =
0
Input the value <0 or 1> =
0
Set digital output success!

```

5. After you have successfully set a digital output, type **2** to check the DIO status.

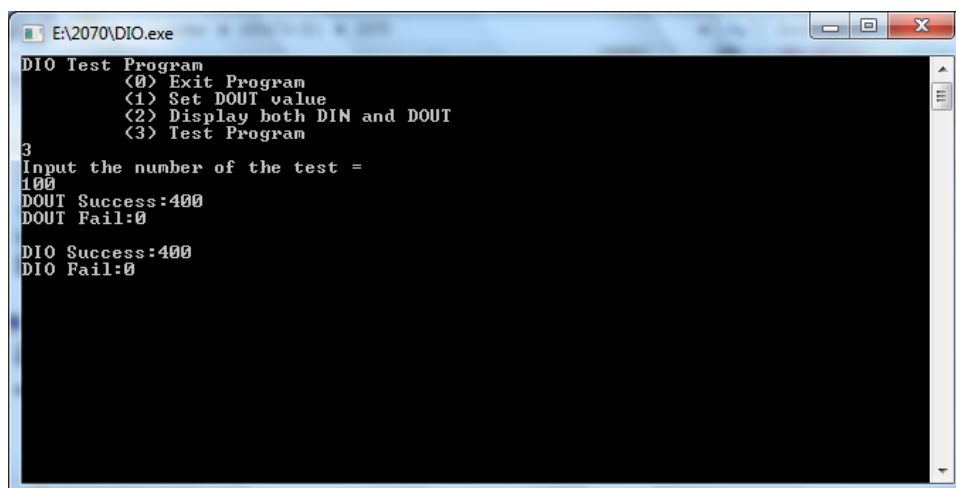


```

E:\2070\DIO.exe
DIO Test Program
  <0> Exit Program
  <1> Set DOUT value
  <2> Display both DIN and DOUT
  <3> Test Program
1
Input the Port Number <0 ~ 3> =
0
Input the value <0 or 1> =
0
Set digital output success!
2
Din0 = 0 , Dout0 = 0
Din1 = 1 , Dout1 = 1
Din2 = 1 , Dout2 = 1
Din3 = 1 , Dout3 = 1
-

```

6. Type **3** to execute the test program. Enter the number of test (example, 100). After the test program runs, a report is generated as shown in the following screen (100 times * 4 ports).



```

E:\2070\DIO.exe
DIO Test Program
  <0> Exit Program
  <1> Set DOUT value
  <2> Display both DIN and DOUT
  <3> Test Program
3
Input the number of the test =
100
DOUT Success:400
DOUT Fail:0
DIO Success:400
DIO Fail:0

```

System Recovery

The MPC-2120 ready-to-run embedded computers are a Windows Embedded Standard 7 software platform. This chapter describes the recovery process in the event of system instability.

The following topics are covered in this chapter:

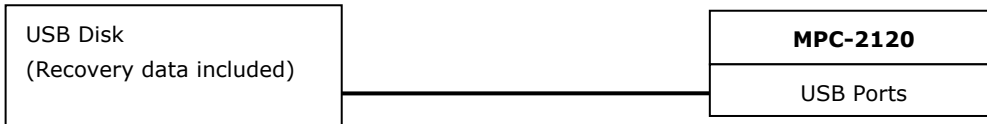
- ❑ **Recovery Environment**
- ❑ **Recovery Procedure**
- ❑ **Saving the System to the USB Drive**

Recovery Environment

The environment includes a MPC-2120 panel computer and a bootable USB disk with the recovery programs and system image file.

The hardware used includes a PC, a MPC-2120 computer, and a USB disk with the recovery programs.

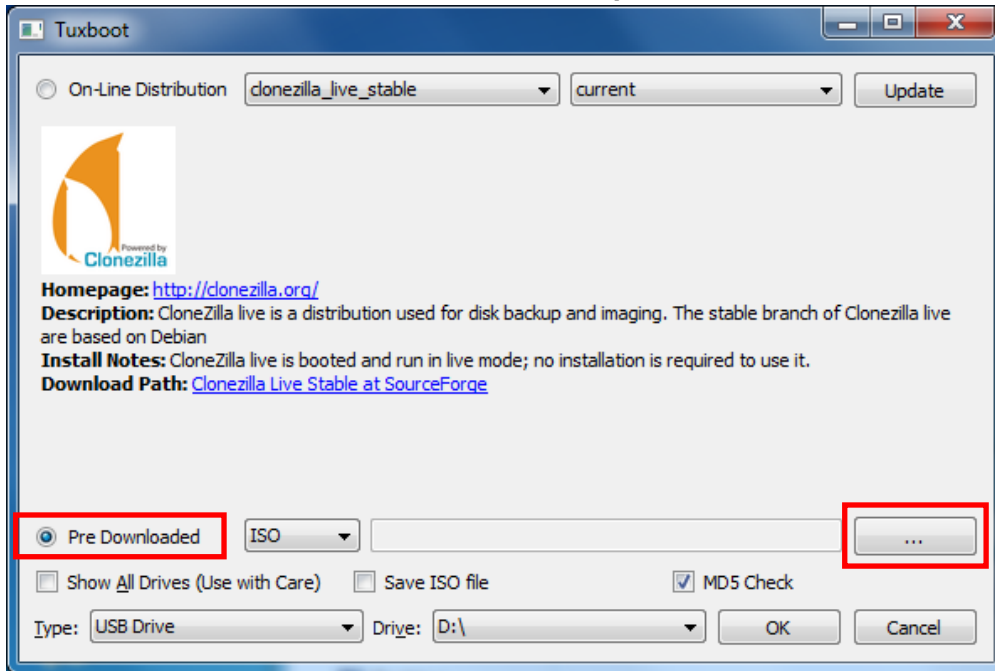
NOTE The USB disk should be at least 5GB.



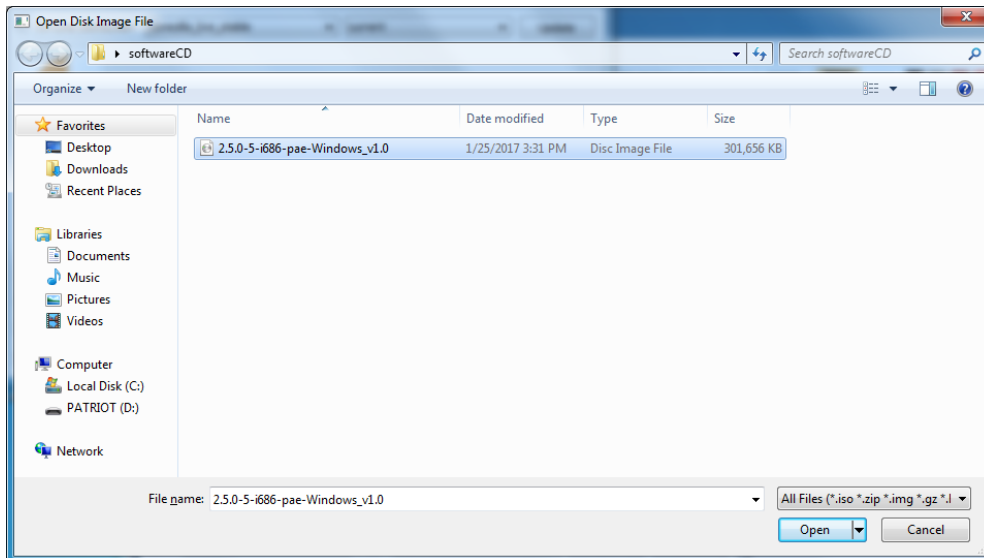
Recovery Procedure

Step 1: Prepare your USB drive

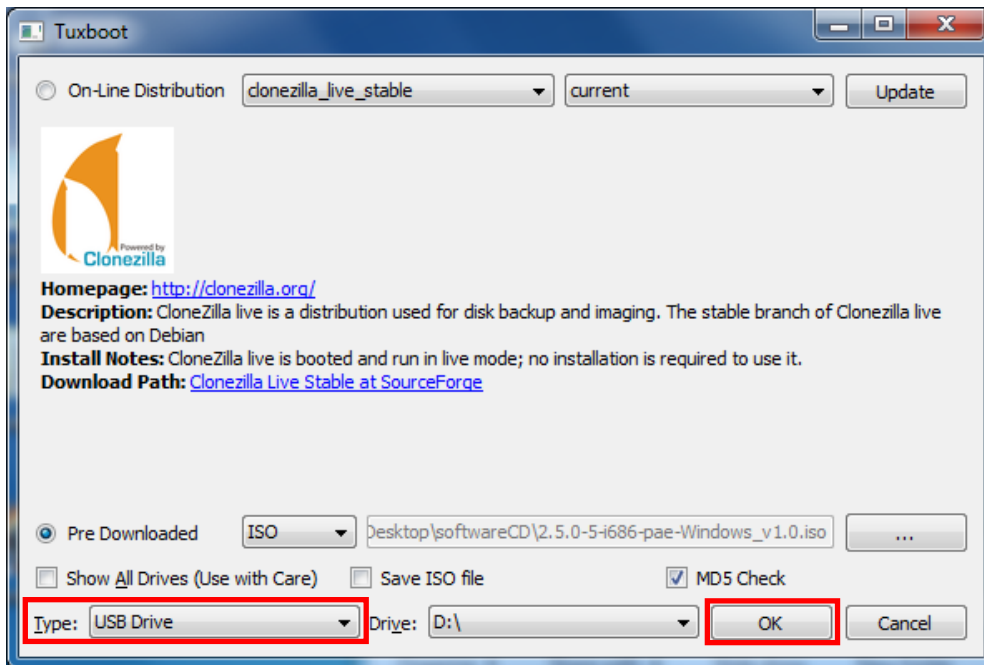
1. Execute **tuxboot-windows-23.exe** from the **\recovery** folder and select the **Pre Download** option.



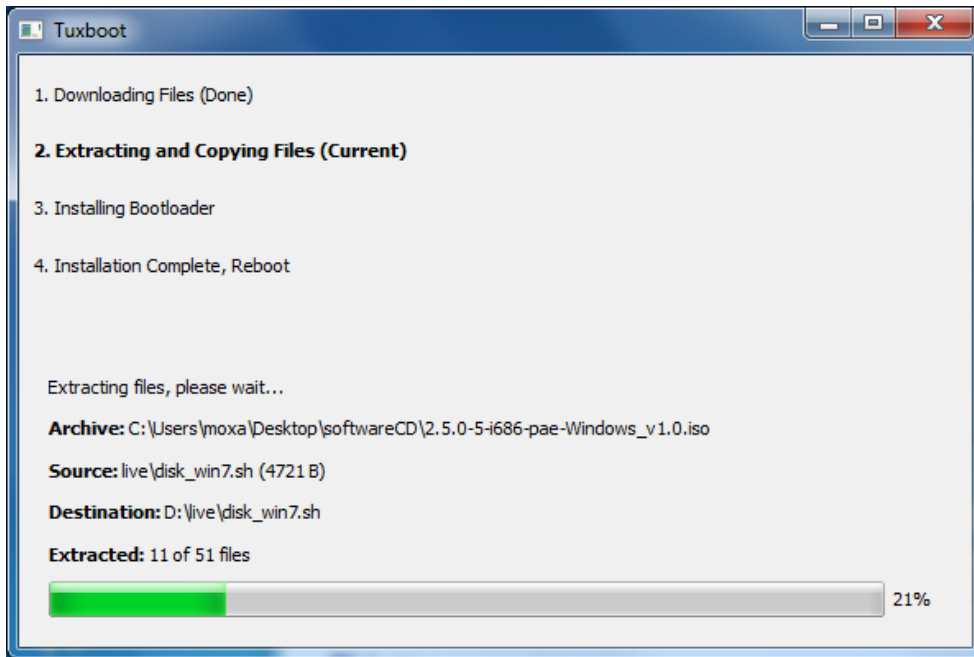
- 2. Click on "..."/> to browse to and select the ISO file from the \recovery folder.



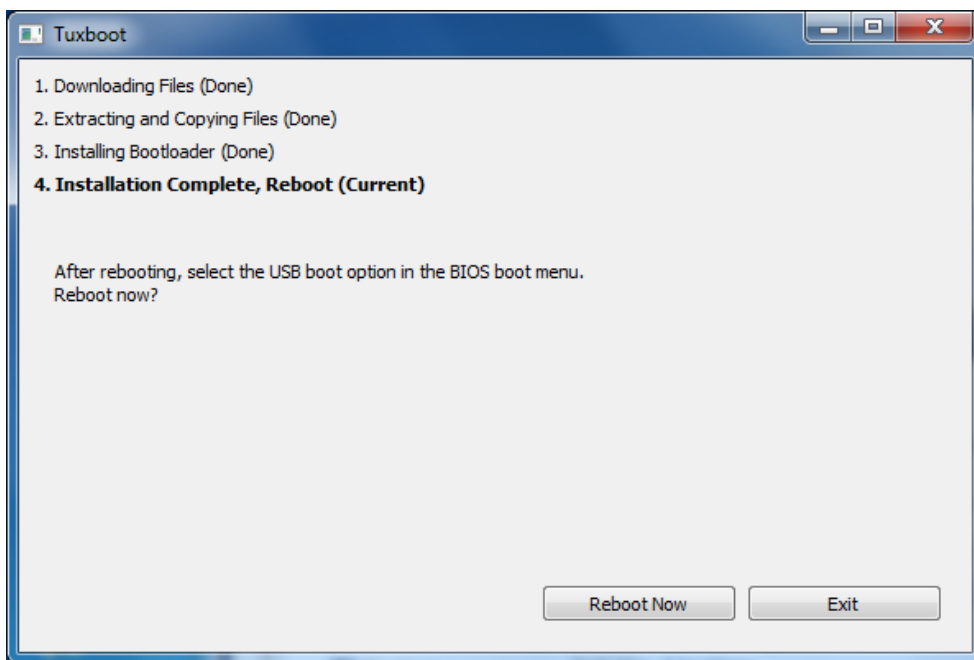
- 3. Select **USB Drive** type, select a **Drive**, and then click **OK** to continue.



- 4. The boot files will be copied to your USB drive.



- 5. When finished, click **Exit** to stop the program.

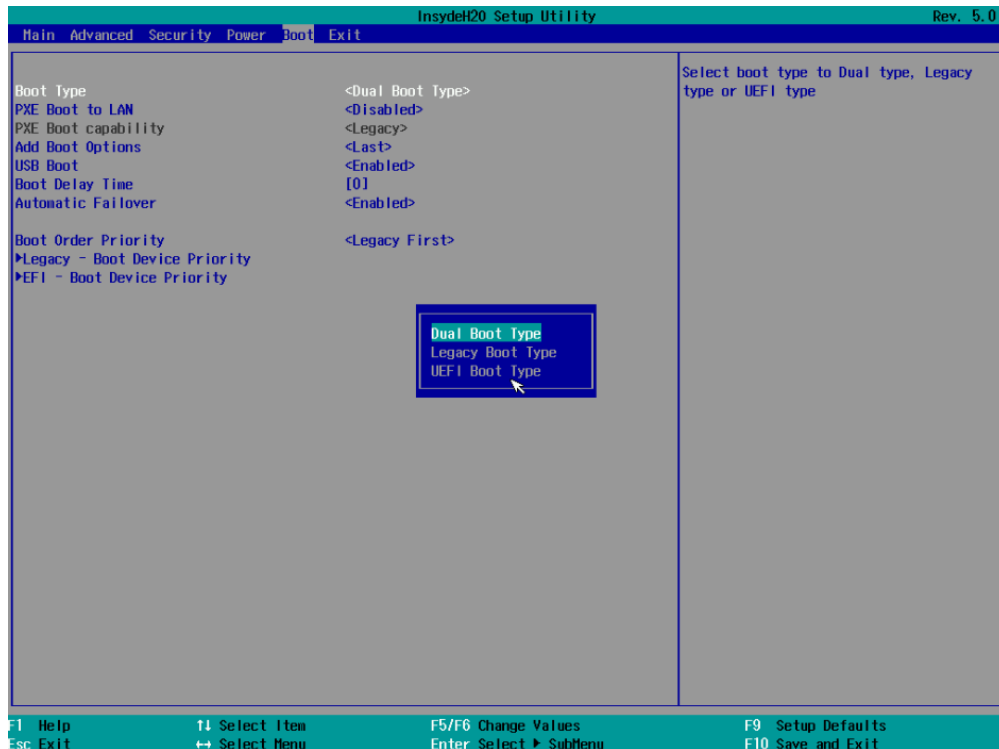


- 6. Manually copy the `\recovery\os_image` folder to the `\home\partimag\` folder on the USB drive.

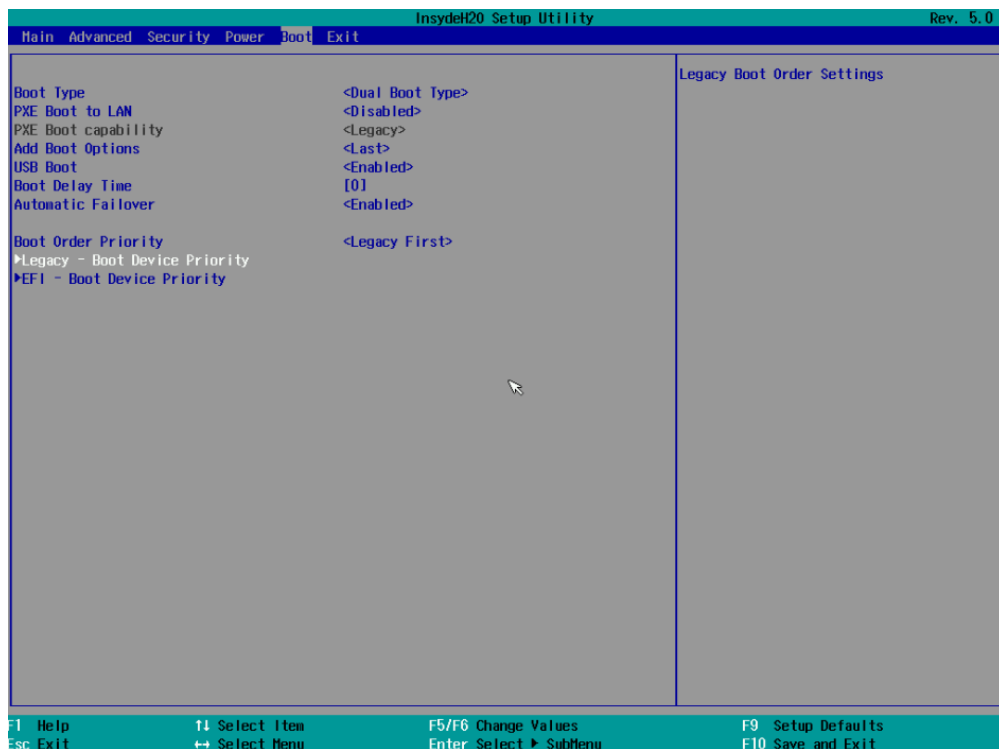
Step 2: Change the BIOS Settings

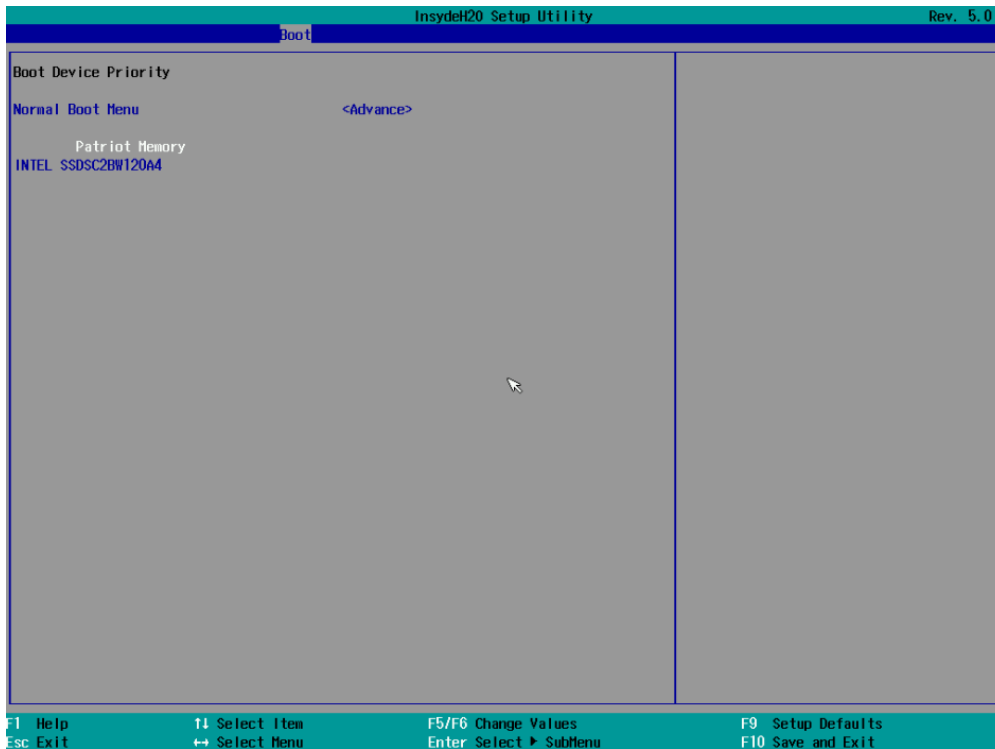
You will need to change the BIOS settings to boot from the USB disk.

1. Turn on the computer and press **F2** when you hear the beep sound to enter the BIOS setup menu. Select the **Boot** tab and then select the **Boot Type** option. Change the value to "**Dual Boot Type**".



2. When you insert the USB device which has the recovery image, the **Boot Order Priority** will create **Legacy – Boot Device Priority** and **EFI – Boot Device Priority** options. Enter the **Legacy – Boot Device Priority** option and then press "+" to move the USB device to the first boot device position.





WARNING

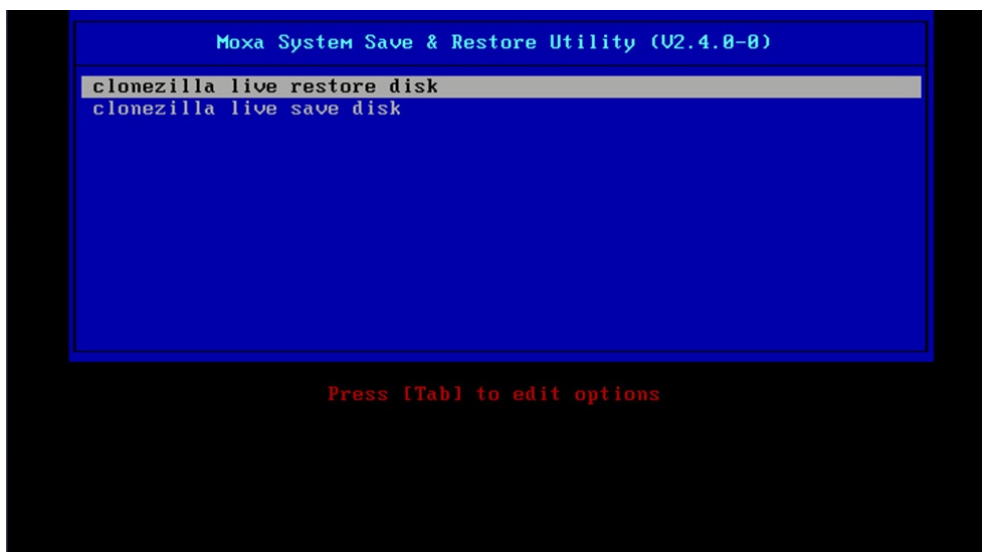
An incorrect boot priority order will lead to recovery failure.

3. Press **F10** and then press **Enter** to save and exit BIOS setup.

Step 3: Restore the system from the USB drive

Connect the USB disk to any one of MPC-2120's USB ports and then reboot the computer. The system will boot from the USB disk and the Pre-installation Environment. After which, you will enter the Moxa System Save & Restore Utility.

1. In the utility window, select **clonezilla live restore disk** and press the <SPACE> key to continue, or wait for 30 seconds for the system to boot automatically.



- 2. Wait for the USB drive boot process to finish.

```
Changed type of partition 'Linux' to 'HPFS/NTFS/exFAT'.

Command (m for help): Partition number (1,2, default 2):
The bootable flag on partition 1 is disabled now.

Command (m for help): The partition table has been altered.
Calling ioctl() to re-read partition table.
Syncing disks.

Disk /dev/sda: 111.8 GiB, 120034123776 bytes, 234441648 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disklabel type: dos
Disk identifier: 0xb3f533c8

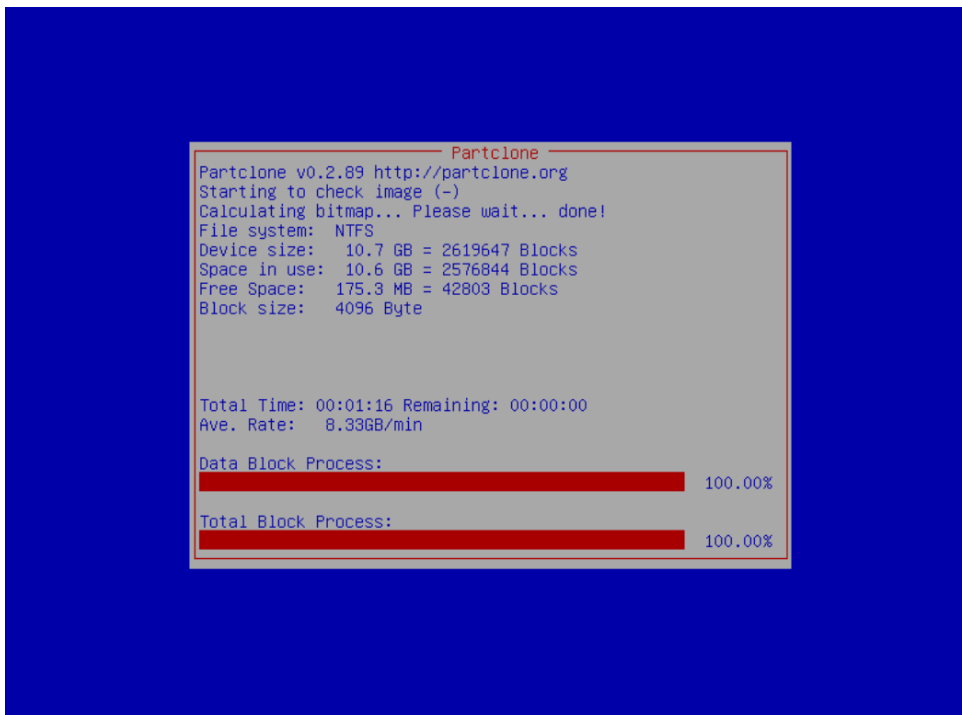
Device     Boot  Start      End  Sectors  Size Id Type
/dev/sda1          2048   206847    204800   100M  7 HPFS/NTFS/exFAT
/dev/sda2          206848 234441647 234234800 111.7G  7 HPFS/NTFS/exFAT

Disk /dev/sdb: 29.5 GiB, 31708938240 bytes, 61931520 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disklabel type: dos
Disk identifier: 0x2941c7f0

Device     Boot  Start      End  Sectors  Size Id Type
/dev/sdb1  *    8064 61931519 61923456 29.5G  c W95 FAT32 (LBA)

Disk /dev/loop0: 253 MiB, 265224192 bytes, 518016 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
```

- 3. Wait for the process to finish.

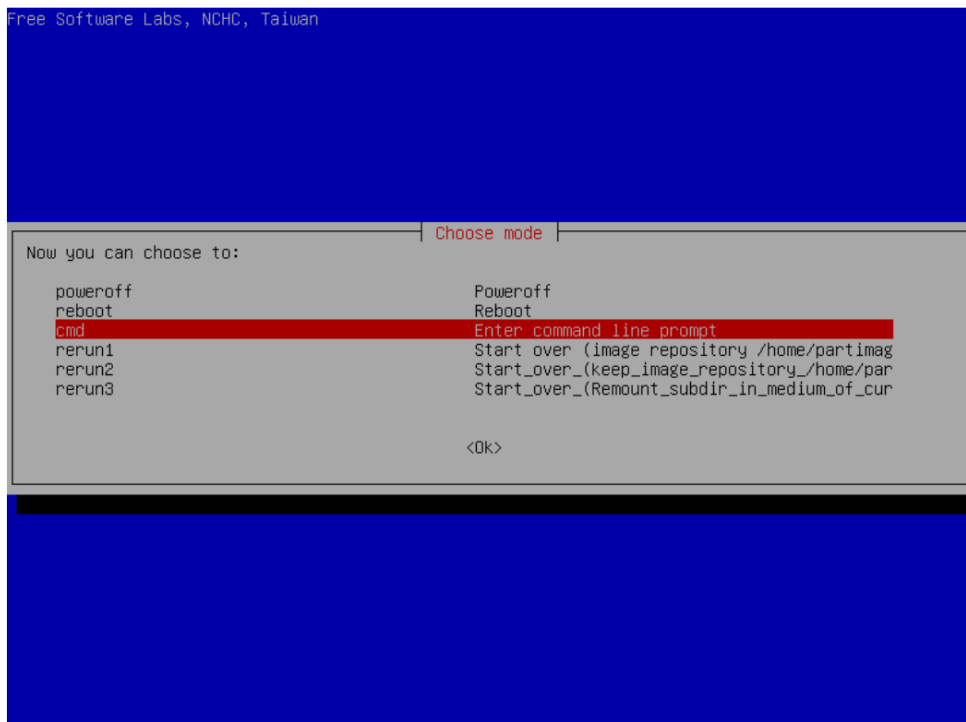


```
Partclone
Partclone v0.2.89 http://partclone.org
Starting to check image (-)
Calculating bitmap... Please wait... done!
File system: NTFS
Device size: 10.7 GB = 2619647 Blocks
Space in use: 10.6 GB = 2576844 Blocks
Free Space: 175.3 MB = 42803 Blocks
Block size: 4096 Byte

Total Time: 00:01:16 Remaining: 00:00:00
Ave. Rate: 8.33GB/min

Data Block Process: 100.00%
Total Block Process: 100.00%
```

4. Select **(0) Poweroff** to power off the computer.

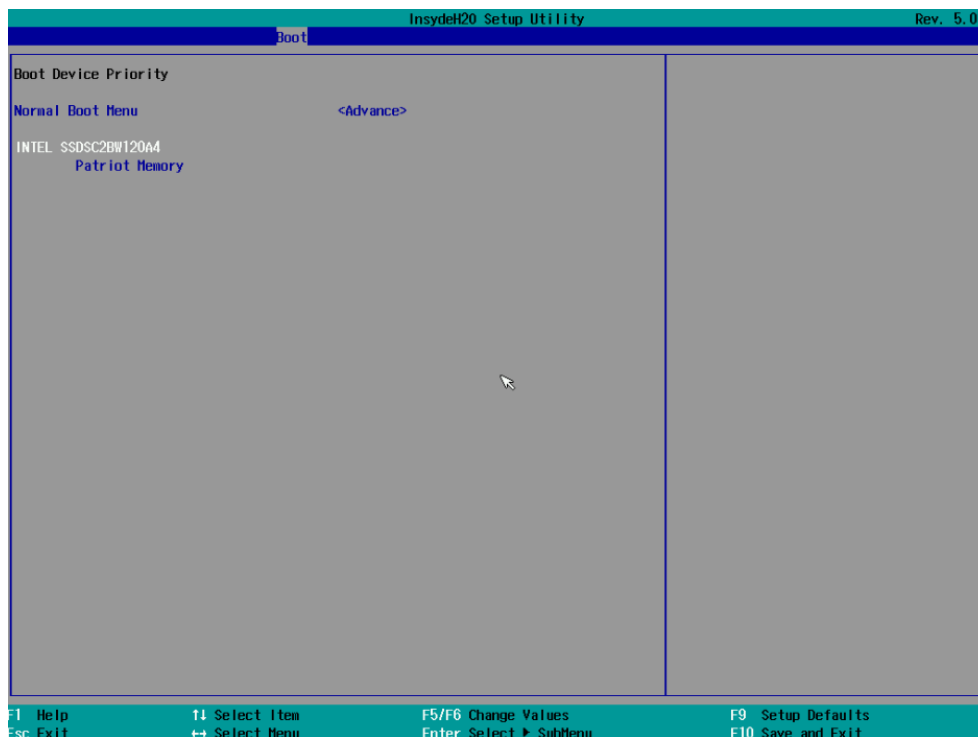


5. Remove the USB drive after the computer has been powered off.

Step 4: Change the BIOS Settings to Boot from the Original Disk

Now you will need to change the boot priority so that it can boot from the original disk. As the system reboots, press **F2** to enter the BIOS setup menu then select the **Boot** tab.

1. Enter the **Legacy – Boot Device Priority** option and then press "+" to move the original disk to the first boot device position. Make sure the hard disk has first boot priority.



2. Press **F10** and then press **Enter** to save settings and exit BIOS settings.

Step 5: Reboot the Computer

You need to wait about 10 to 15 minutes for the system to restart two times automatically, since the system configuration files will be initiated while booting up for the first time. **Do not turn off the computer or shut down the computer** while the system is restarting; otherwise, the IIS service will be terminated. When the operating system has successfully launched, you will need to restart your computer so that the new settings can be activated.

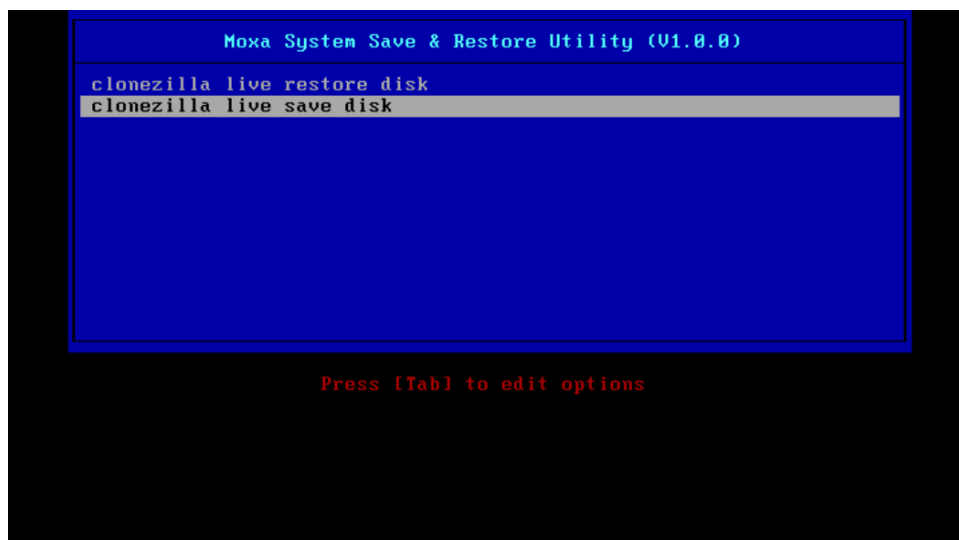


Saving the System to the USB Drive

You may also save the current system to the USB drive for system recovery in case the system crashes. Before saving the system to the USB drive, we suggest you remove all files under `\home\partimag\` on the USB drive. In addition, change the BIOS settings to make the USB drive the first boot priority.

When the system has been launched, take the following steps.

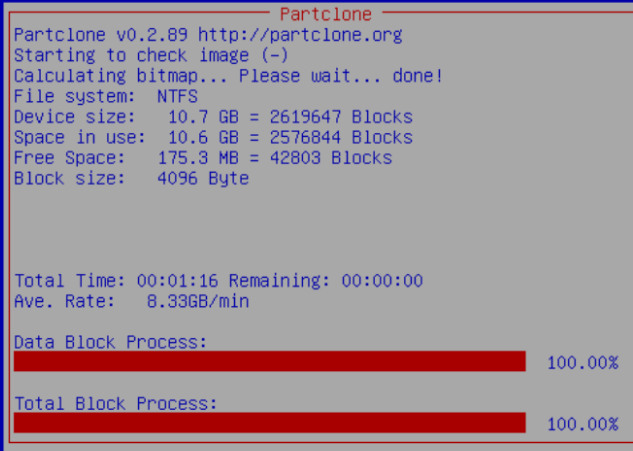
1. Select **clonezilla live save disk**.



2. Enter **y** to continue.

```
perl: warning: Falling back to a fallback locale ("en_US.UTF-8").  
Selected device [sda] found!  
/usr/share/drbl/sbin/ocs-functions: line 2184: warning: setlocale: LC_ALL: cannot change locale (en)  
The selected devices: sda  
*****  
/bin/bash: warning: setlocale: LC_ALL: cannot change locale (en)  
Activating the partition info in /proc... done!  
Selected device [sda] found!  
/usr/share/drbl/sbin/ocs-functions: line 2184: warning: setlocale: LC_ALL: cannot change locale (en)  
The selected devices: sda  
Searching for data/swap/extended partition(s)...  
/usr/share/drbl/sbin/ocs-functions: line 4146: warning: setlocale: LC_ALL: cannot change locale (en)  
Excluding busy partition or disk...  
Unmounted partitions (including extended or swap): sda1 sda2  
Collecting info... done!  
The data partition to be saved: sda1 sda2  
Activating the partition info in /proc... done!  
Selected device [sda1] found!  
Selected device [sda2] found!  
/usr/share/drbl/sbin/ocs-functions: line 2184: warning: setlocale: LC_ALL: cannot change locale (en)  
The selected devices: sda1 sda2  
Getting /dev/sda1 info...  
/usr/share/drbl/sbin/ocs-functions: line 4010: warning: setlocale: LC_ALL: cannot change locale (en)  
/usr/share/drbl/sbin/ocs-functions: line 4027: warning: setlocale: LC_ALL: cannot change locale (en)  
Getting /dev/sda2 info...  
/usr/share/drbl/sbin/ocs-functions: line 4010: warning: setlocale: LC_ALL: cannot change locale (en)  
/usr/share/drbl/sbin/ocs-functions: line 4027: warning: setlocale: LC_ALL: cannot change locale (en)  
*****  
The following step is to save the hard disk/partition(s) on this machine as an image:  
*****  
Machine:  
sda (120GB_INTEL_SSDSC2BW12_INTEL_SSDSC2BW120A4_CVDA451305GM1207GN)  
sda1 (100M_ntfs_System_Reser(In_INTEL_SSDSC2BW12)_INTEL_SSDSC2BW120A4_CVDA451305GM1207GN)  
sda2 (111.7G_ntfs(In_INTEL_SSDSC2BW12)_INTEL_SSDSC2BW120A4_CVDA451305GM1207GN)  
*****  
-> "/home/partimag/os_image".  
Are you sure you want to continue? (y/n) y_
```

3. Wait for the process to finish.



The screenshot shows a terminal window with the Partclone utility. The window title is "Partclone". The output displays the following information:

```
Partclone v0.2.89 http://partclone.org  
Starting to check image (-)  
Calculating bitmap... Please wait... done!  
File system: NTFS  
Device size: 10.7 GB = 2619647 Blocks  
Space in use: 10.6 GB = 2576844 Blocks  
Free Space: 175.3 MB = 42803 Blocks  
Block size: 4096 Byte
```

Below this information, there are two progress bars:

Total Time: 00:01:16 Remaining: 00:00:00
Ave. Rate: 8.33GB/min
Data Block Process: 100.00%
Total Block Process: 100.00%

4. Select **(0) Poweroff** so that the computer will power off when the process has finished.

