

Dual Boot: MX Linux & Windows – Installation Guide

Dual Boot is also know as 'Install alongside Windows Boot Manager' in other distributions.

Dual Booting is an option to keep your existing Windows installation rather than replacing it with MX Linux. Both OS can be run and have full access to all the PC's resources and peripherals.

1.0 Introduction

Windows being the first installed Operating System is the preferred method. This document applies to all editions of: Windows 8, Windows 10 & Windows 11, and MX Linux 21 & 23.

No operating System found!

The Boot Order **has to be set** such that the disk in the Hard Drive group that has the EFI partition (where MX Linux Installer put it) is the one booted. The firmware NVRAM holds the 'path' to the Grub boot code. This 'path' is a combination of physical drive and partition info.

1.1 What is Secure Boot?

Secure Boot was introduced in 2012 as a security standard to help ensure that a PC boots-up with software that is trusted. This feature addition was brought about to shield PC firmware from the greatly increasingly common Malware attacks on PC firmware.

You will need the Windows BitLocker Recovery Keys if you try to disable Secure Boot before you proceed. Mostly a Windows 11 only consideration. More details are later in document.

1.2 UEFI is the BIOS v2 for PCs

BIOS is still used as it is easier to say than UEFI Firmware.¹ Older PC's Firmware is quite often referred to as BIOS. Firmware is used in place of BIOS throughout this document. So, what's the big change? Support for larger drives, enhanced security and a mouse-able interface are some of the top reasons tech experts often mention.

1.3 Can MX Linux 23 Dual Boot with Secure Boot Off?

Can MX 23?...yes! There will be some Windows 11 programs that will refuse to run with Secure Boot turned off. Windows 10 does work with Secure Boot turned On or Off. Windows 11 depending on installation method **may** boot with Secure Boot – Off. (as of October 2023).

Windows 11 BitLocker may not work - scenarios

With Secure Boot Off and BitLocker (Windows Drive Encryption) Enabled, you will need to

¹ <https://www.howtogeek.com/56958/htg-explains-how-uefi-will-replace-the-bios/>

manually enter your Recovery Key every time you boot up. Windows 11 Hello will not work.

TPM

TPM is short for Trusted Platform Module. BitLocker Drive Encryption requires a TPM, either a discrete module or in Firmware. TPM is a local database store of security and certificate information. This excludes older PCs (factory-made prior to Windows 8) from using Windows (BitLocker) encryption.

1.4 Add a second disk drive?

Some PCs may have a space for adding a second disk drive. Solid State Drives aka SSD should be considered for this as this will result in a very significant performance boost. Leaving the existing Windows installation on its own drive has a stability advantage, especially for Windows 10.

1.5 How much space for who?

Windows 10 & 11 disk space requirement - At a minimum Windows 10 requires 50 Gb of free disk space and Windows 11 requires 60 Gb of free space. Windows will refuse to install on less free space. There are current methods to bypass this but Microsoft is hinting a Spring 24 release *may* block them.

MX Linux requires minimum of 6 Gb free space with 20 Gb recommended disk space. MX 23 KDE edition installed weighs in at around 11 Gb.

So, how much disk space is enough? MX Linux comes with many of the most commonly needed programs already preinstalled. A lot of additional programs may take an addition 5 Gb to 10 Gb with some of the large program suites (Programming IDE, Steam, Video Editing, etc) each individually taking 10 Gb or more.

Data Sharing area between Windows & Linux

Consider implementing a data sharing area between Windows and MX Linux when you are setting up Dual Boot. Use FAT32, ExFAT or NTFS format. Most USB drive come as FAT32.

Suggested name: DualData

- Create a 3rd partition that is visible to both after the Windows disk partition.
- Setup a Cloud Storage account: Google Drive, OneDrive, DropBox, Mega, etc.
- Purchase external Thumb drive or SSD hard drive caddy to exchange files.

1.6 Home Drive

Keeping the Home directory in MX Linux on a separate partition *can* improve the reliability and ease of subsequent MX Linux upgrades. This also makes backing up and recovery easier. This is highly recommended.

Selecting 'Preserve /home' for the Root partition during the MX linux installation preserves the contents of the /home directory while deleting everything else of the previously installed OS.

NOTE: The 'Preserve /home' option can only be used when /home is on the same hard drive partition as the root partition.

2.0 Summary of how-to steps:

- **Windows settings changes:**
 - Create a Windows 'Recovery Disk' - can be DVD or USB.
 - Backup your BitLocker **and** Windows Keys.
 - Disable BitLocker in Windows (if enabled).
 - Disable Windows Fast Startup.
 - Defragment Hard Drive.
 - Shrink Windows C drive partition.
 - Create the new partition for MX Linux.
 - Create a (optional) data sharing partition.
- **PC Firmware settings changes:**
 - Set a Supervisor/Admin password (if needed).
 - Turn off CSM/Legacy/BIOS Boot. May exist in **two** (or more) places.
 - Change SATA controller mode to 'AHCI' (from RAID/RST/Optane).
 - Disable/Turn OFF Secure Boot.
 - Change the Boot Order to USB drive first (Disks).
 - Fast Boot - Turn off/set to thorough if present.
 - Enable USB Boot ability (off by default on some PCs).
- **Install MX Linux.**
 - Prepare MX boot USB – GPT preferred.
 - Install MX Linux on the new partition.
 - Un-check** *'Automatically reboot the system when the installer is closed!'*
 - Run MX Boot Repair from Live USB.
 - Run 'Repair GRUB configuration file' and close the program.
 - Reset the 'UEFI Boot Order' with MX Boot Options. Reboot.

3.0 Preparing Windows for Dual Booting

Several preparation steps are needed prior to running the MX Linux Installer.

It is imperative that ALL steps are DONE and IN ORDER!

3.1 Back up important user data to free up space

After Defragmentation has finished there still may not enough free space on your hard drive. Try to move lesser used files off the PC hard drive. Alternately you may need to uninstall lesser used programs or Windows Features/Options.

3.2 Backup your Windows License Key

To get the Windows Key copy/paste the output of below to a text file:

Windows Admin CMD: 'wmic path SoftwareLicensingService get OA3xOriginalProductKey'

In Linux: 'sudo strings /sys/firmware/acpi/tables/MSDM'

Backup these keys in some place other than the current PC!

3.3 Create a Recovery USB Drive for Windows 11:

- In the search box on the taskbar type 'Create a recovery drive' and then select it.
- When the tool opens **make sure to select Back up system files.**
- Then select Next.
- Connect a USB drive to your PC
- Select it, and then select Next.
- Select Create.

This will take some time to complete. Over an hour is not unusual.

Label 'Windows Recovery USB' and then store this USB in a safe place.

3.4 Disable BitLocker

BitLocker **must be Disabled** if Enabled **before** doing any Hard Drive reconfiguration tasks.

- **Windows 11 Pro** - BitLocker is enabled and should be disabled.
- **Windows 11 Home** - Microsoft has started force enabling BitLocker (as of 2Q 2023).
- **Windows 10** - **at the time of writing has BitLocker is not enabled.**

Note: there are **TWO** Recovery Keys... **The first one** is for your Device. **The 2nd one** is for the locked hard disk. Chose the second one if the hard disk is BitLocked.

3.41 Procedure to locate the BitLocker Keys

- 1) Create a Microsoft Online account if you do not already have one. Go to:
<https://onedrive.live.com/about/en-us/signin/>
- 2) Log into your Microsoft Online account and locate the BitLocker Recovery Keys:
 - Click 'Devices'.
 - Click 'See Details'.
 - Click 'BitLocker Data Protection'.
 - Click 'Manage Recovery Keys'.

Write the Key down, copy the Recovery Keys to a safe location.

NOT on this PC! Also print the Recovery Keys out.

If your PC is logged into via a PIN you may not be able to login to your Windows account. You will need to set an Online Password for that account on the PC.

You will also need the BitLocker Recovery Keys if you try to disable/turn Off Secure Boot before you turn off BitLocker.

How to change windows 11 pin to password

To change your password or PIN, go to Start > Settings > Accounts > Sign-in options.

Select PIN (Windows Hello), and then select Change PIN.

Select Password then select Change.

3.42 Procedure to disable BitLocker

Go to Settings in Windows and turn off BitLocker.

1. Click the Windows Start Menu button.
2. In the search box, type "Manage BitLocker."
3. Press Enter or click the Manage BitLocker icon in the list.

Business users: Keys are stored in Active Directory or Azure user profile.

3.5 Check Hard Drive for surface errors

1. In Windows File Explorer right-click on 'This PC'.
2. Left click the C drive.
3. Right click and select 'Properties'.
4. In the pop-up select the 'Tools' tab.
5. Click on 'Check' in the 'Error checking' section.
6. In the pop-up click 'Scan drive'. Windows will restart and at the bottom of the screen a row of text will appear below the rotating circle of dots. Similar to this below.

Fixing (C:) Stage 2: 27% (226414 of 822896); Total: 34% ETA 0:00:49

Once completed you will receive a summary of your hard drive health. In rare cases where a lot of errors are found and corrected it is recommended to run a second scan.

3.6 Defragmenting the Hard Drive

Note: for mechanical hard drives only, NOT SSD drives!

1. In Windows File Explorer right-click on 'This PC'.
2. Left click the C drive.
3. Right the C drive click and select 'Properties'.
4. In the pop-up click the 'Tools' tab.
5. Click on 'Optimize' in the 'Optimize and defragment drive' section.
6. In the pop-up click 'Optimize'.

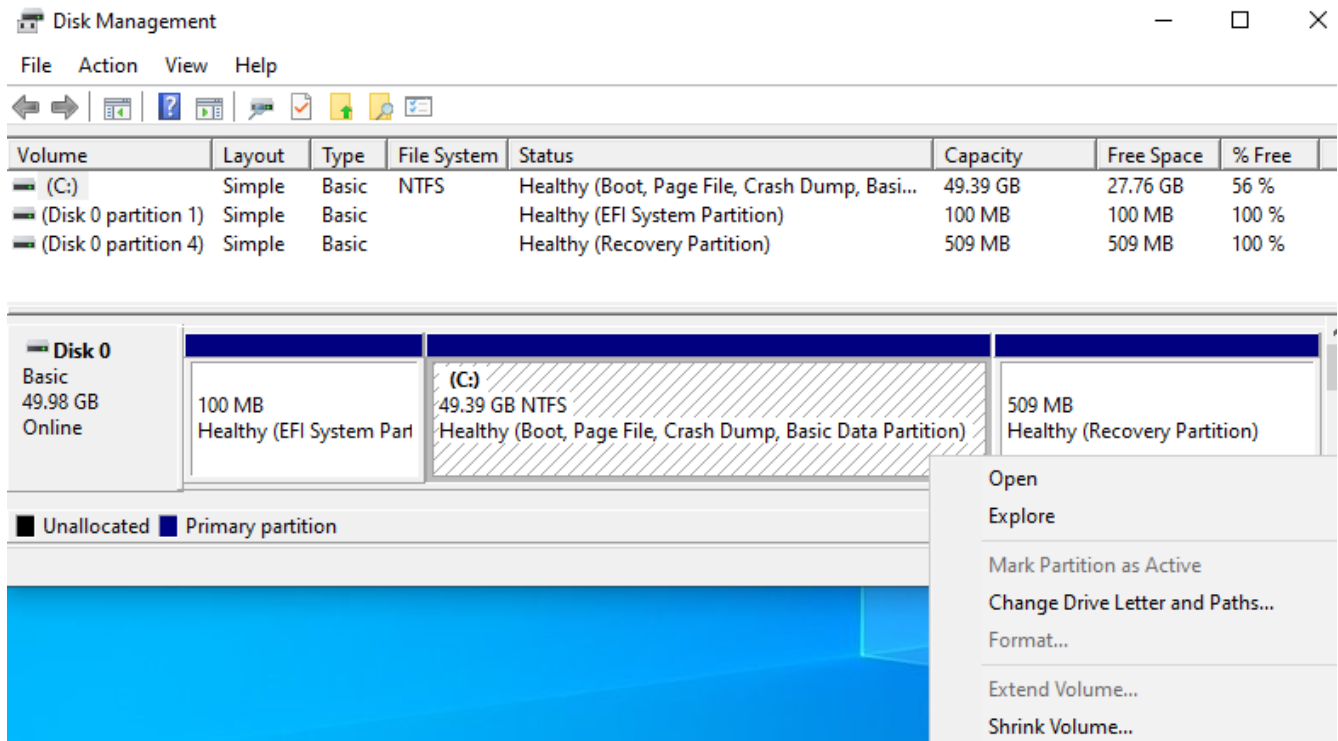
Once completed you will receive a summary of your hard drive fragmentation.

3.7 Freeing space for Linux on the Windows Drive C

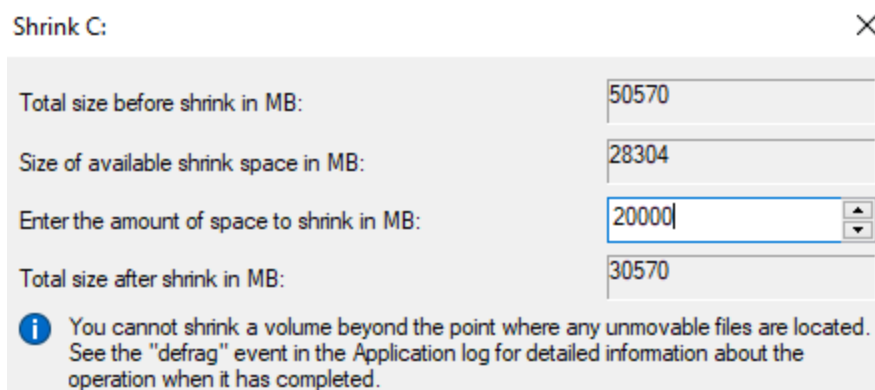
MX Linux needs a minimum of 8.5 Gb of free space and preferably 20 Gb is recommended.

3.71 Shrinking C drive

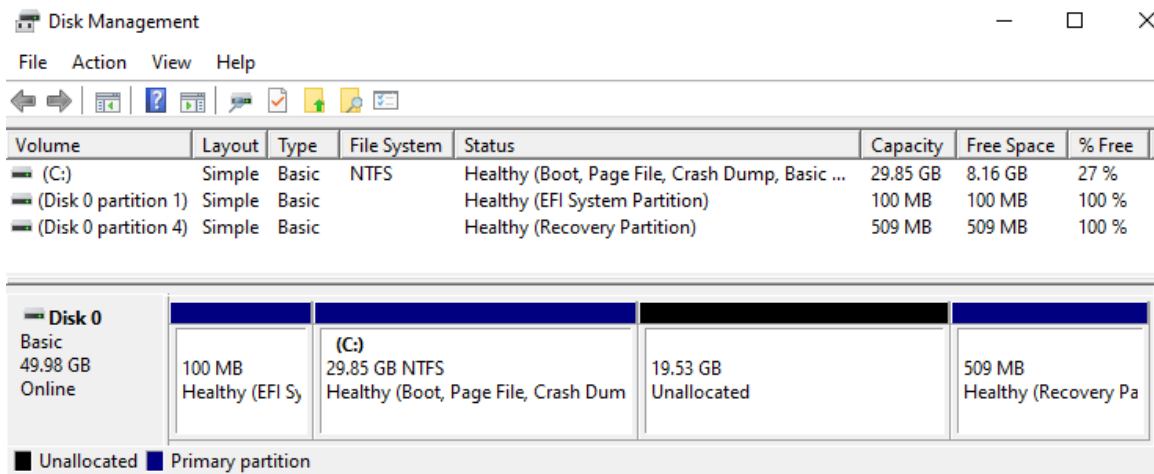
Right click on the Windows Start Menu and select 'Disk Management'.



To do the resizing right click on the (C:) drive and select “Shrink Volume...”

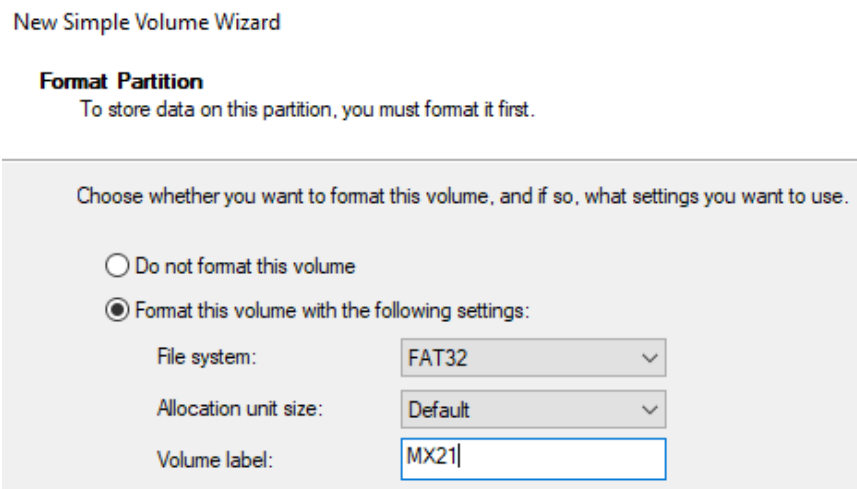


- Type in 20,000 in the whit box for a new size of 20 Gb.
- Click the 'Shrink' button.



3.72 Creating the new partition for MX Linux

- Right click in the newly created free space (black bar with 'Unallocated' showing)
- Select 'Basic Volume'.
- As the wizard run skip assigning a drive letter.
- Give it a Label and leave 'Format partition' selected. Example below.



Make note of the size shown and volume Label of this new partition. You will use it to identify the drive where you will install MX Linux later.

3.8 Turn off Windows Fast Startup

To turn off Windows 11 Fast Startup:

1. Left click the start button and type CMD in the search box.
2. Right-click the search result Run as Admin.
3. Type `powercfg /hibernate off` and press enter. See footnote below²

To turn off Windows 10 Fast Startup:

1. Left click the Windows start button and click the gear icon.
2. Go to 'Power & sleep' and then click on 'Additional power settings'.
3. In the left pane click on 'Choose what the power buttons do'.
4. Next, at the top click the 'Change settings that are currently unavailable' link.
5. Under the 'Shutdown settings' section, uncheck the 'Turn on Fast Startup'.

Note: Recent updates of Windows now require an additional steps to get this setting in step 5 above to appear.

- Left click the start button and type CMD in the search box.
- Right-click the search result 'Run as Admin'.
- Type `'powercfg /hibernate off'` and press enter.

Check again and see if the option to uncheck Fast Startup is available.

Click 'Save changes' to apply these changes.

'Restart' your PC...do NOT select 'Shut down' and power back on!

NOTE: on some PCs not turning this **OFF** will interfere with the WiFi functionality in MX Linux. Windows Update *may* turn it back on!

2 How to Disable/Enable Fast Startup on Windows 11-
<https://techcommunity.microsoft.com/t5/windows-11/how-to-disable-enable-fast-startup-on-windows-11/m-p/3712330>

4.0 PC firmware (BIOS) changes to allow Dual-Boot

A few settings in this section are unlocked/made visible in the 'advanced mode' (MSI & others). Many times there are menu selections under major topics that become unhidden once and admin password is entered and saved.

4.1 Set the Supervisor Password

Many new PCs are requiring (Acer & other brands too) a non blank Supervisor/Admin Password for the MX Grub EFI files to be 'trusted'.³

Grub may NOT appear in 'Boot Order' at first; after a restart it usually does.

4.2 PC motherboard Firmware Changes

4.21 Accessing your PC's Firmware

[List of PC brands with their corresponding hot-keys](#)

Windows 11:

1. Click Start Button and click the Settings (gear) icon.
2. type in search 'UEFI'.
3. Click on 'Change advanced startup options'.
4. Under 'Advanced startup' click 'Restart now' and again 'Restart now'.
The PC will restart in UEFI mode.
5. Click 'Troubleshoot' and then 'Advanced options'.
6. Click 'UEFI Firmware Settings' and then click 'Restart'.

Windows 10 and Windows 8:

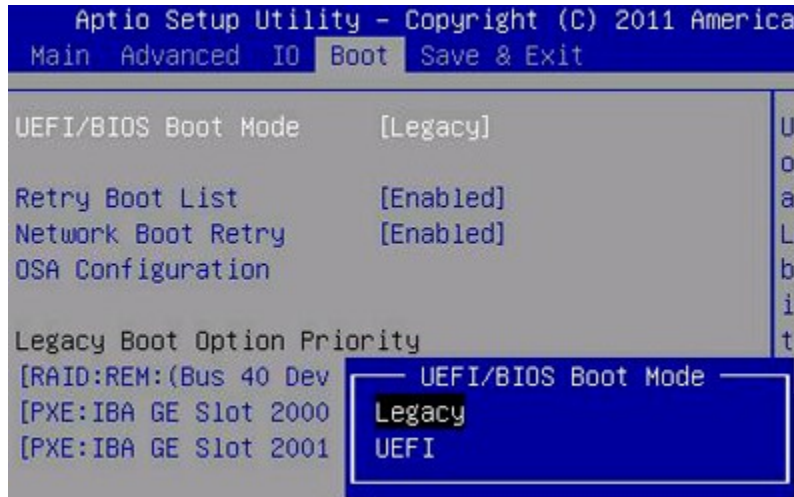
1. Click the Start Button and then click Settings aka the gear icon.
2. Search on 'Reset this PC' and click it.
3. In 'Advanced Startup' click 'Restart now'. The PC will restart in UEFI mode.
4. After it restarts click 'Troubleshoot' and then click 'Advanced Options'.
5. Click 'UEFI Firmware Settings' and then click 'Restart'.

³ <https://ubuntuforums.org/showthread.php?t=2297947&p=13369742#post13369742>

4.22 Turn off CSM/Legacy/BIOS Boot

This forces the PC into 'UEFI Only' Boot Mode. If this is left ON it can cause several boot problems.

The white text below is highlighted indicating a menu will come up if you press enter.



In a few rare cases CSM/Legacy/BIOS needs to be turned off in **TWO** places: 'Boot Mode' (default) and 'Boot fallback' aka LEGACY+UEFI. Dell refers to Advanced Boot Options.

Boot Mode Select – MSI

[LEGACY+UEFI] is the default. Enables both Legacy BIOS boot mode and UEFI BIOS boot mode. This used to allow boot when UEFI boot fails. **Turn Off – set to UEFI [only].**

This may need to Disabled / turned Off to resume showing the Grub Boot menu at bootup.

4.23 Turn off Secure Boot

In the 'Security' section 'Disable' or turn 'Off' in the 'Secure Boot'.

On some PCs 'Custom' needs to be selected to allow the configuration of secure boot settings and make manual changes. This setting may be located in the Security section.

NOTE: Starting in 2022 for Secured-core PCs⁴ it is a Microsoft requirement for the 3rd Party Certificate to be disabled by default. (Lenovo) Extra step(s) are needed to allow MX Linux to boot (Debian signed Kernel required) with secure boot enabled.⁵

4 <https://learn.microsoft.com/en-us/windows-hardware/design/device-experiences/oem-highly-secure-11>

5 https://download.lenovo.com/pccbbs/mobiles_pdf/Enable_Secure_Boot_for_Linux_Secured-core_PCs.pdf

Windows WHQL Support

Under **Windows OS Configuration**. Enables the support for Windows 10 or disables for other operating systems. **Disable/Turn OFF**. This setting may also be found under **OS Type**. Set the **OS Type > Other OS** (rather than Windows UEFI mode).

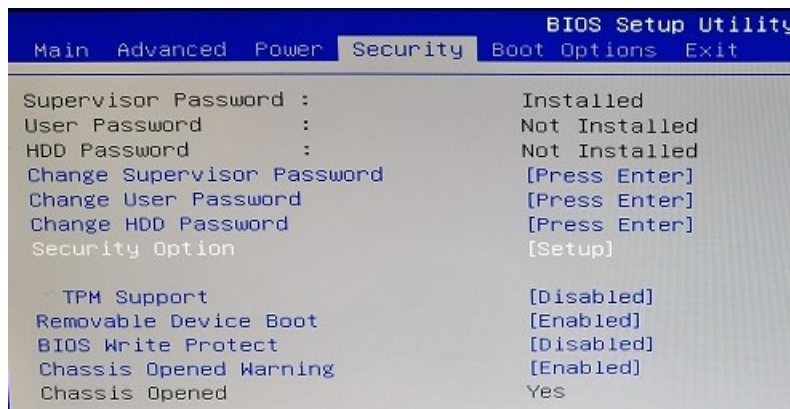
When left enabled the Windows Boot Loader entry in the UEFI Boot Order may be forced/locked to the top when 'Windows WHQL Support' is Enabled. (Windows Hardware Quality Labs aka WHQL).

Secure Boot [Standard] or [Custom] - MSI

Set to **Custom** – this allows the user to configure the Secure Boot settings and manually load the secure keys. Standard has Microsoft hard-coded Windows settings.

4.24 USB Configuration/USB Emulation

USB Configuration (Dell & others) allows you to enable or disable the USB controller for PC booting. In the example below ensure 'Removable Device Boot' is 'Enabled'.



Below shows a Dell Dimension 9200 PC that has Boot From USB set to 'No Boot' aka disabled. Many PCs have 'USB Booting' disabled by default as a security measure.

USB for FlexBay

This field enables and disables the internal USB for FlexBay.

- **Off** — Internal USB for FlexBay is disabled.
- **On** — Internal USB for FlexBay is enabled.
- **No Boot** — Internal USB for FlexBay is enabled but not bootable.

The factory default setting is **No Boot**.

NOTE: This USB option appears only if a FlexBay device is installed.

Enable Boot Support at a minimum; enabling both is more functional desirable.

4.25 Turn off Fast Boot (aka Quick Boot)

Fast Boot aka 'Quick Boot' is used to reduce your PC's motherboard startup time. It will disable more devices to speed up system boot time. So, when Fast Boot is enabled, you may not be able to boot from a USB flash drive.

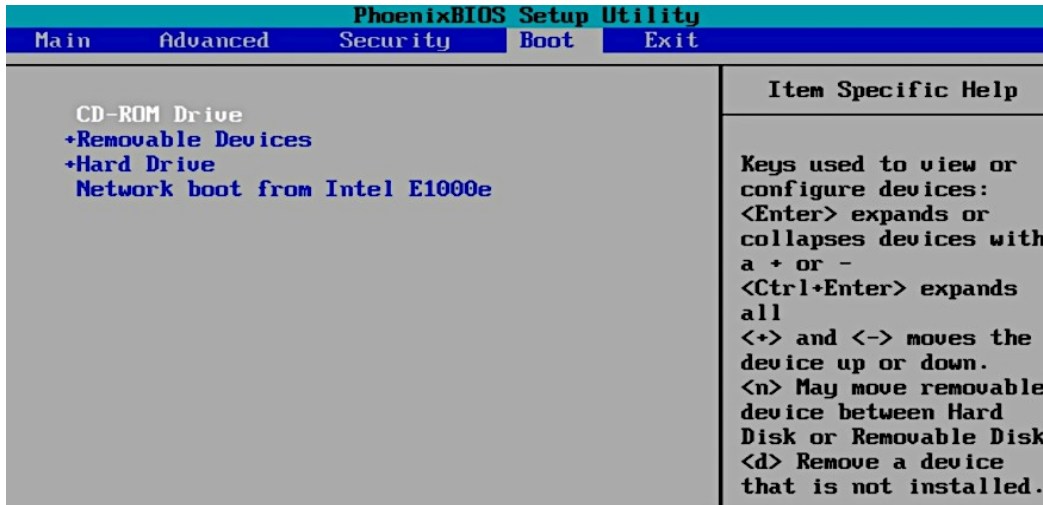
With Fast Boot enabled: Boot from Network, Optical WiFi and secondary USB outlets may be disabled. So, they may not be available until an Operating System fully loads.

These settings *may* have several functional levels or just on/off. Frequently seen are: Minimal (often the default), Thorough, and Auto.

Set Fast Boot to 'OFF' / 'Disabled' or 'Thorough' if 'OFF' is NOT an option.

4.26 Reset Boot Order/Priority/Boot Sequence

Navigate to the place where 'Boot Order' is set. UEFI PCs list Hard Drives as choices.



Above shows the hardware boot order one might see for installation. Hard Drive **MUST** be on top after MX Linux is installed.

Note:

- BIOS specific help screen: place 'Removable Devices' above the 'Hard Drive'.
- On a UEFI PC the hard drives would be listed individually to be selected.
- Sometimes listed as 'UEFI hard drive BBS priority'.⁶

Boot Sequence (UEFI) - Allows you to change the order in which the computer attempts to find an operating system. The options are:

- *Windows Boot Manager*

⁶ BIOS Boot Specification/Sequence

- *Boot List Option-UEFI* - what we want!

HP additional configuration requirement

1. Go to boot configuration.
2. Add a 'Customized Boot'.
3. Point 'Customized Boot' to \EFI\MX\grubx64.efi
4. Change UEFI boot order with 'Customized Boot' on top.

Boot Sequence (BIOS only PC)

Allows you to change the order in which the computer attempts to find an operating system. All the options are selected.

- Diskette Drive
- Internal HDD
- USB Storage Device
- CD/DVD/CD-RW Drive

UEFI Boot Path Security Allows you to control whether the system prompts the user to enter the Admin password when booting to a UEFI boot path.

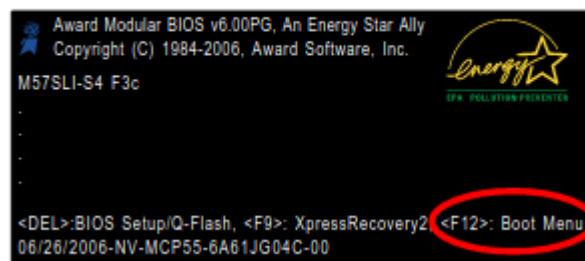
Choose one of these options: Always, Except Internal HDD—**Default**

4.27 Enable the F12/ESC/F9 Boot Override Menu

There are some PC brands or models that have the ESC (Acer/Asus), F9 (HP), F12 (Dell) or other key to display a 'one time Boot Menu'. This menu *may* be disabled by default on *some* PCs.

Enable/Turn ON the F12 this menu if it exists in your PC firmware.

Select boot sequence for onboard (or add-on cards) device.



Exit the Firmware settings and select 'Save Changes and Restart'.

4.28 SATA Controller Mode - Changing Windows from RAID/RST to AHCI

NOTE:

- You cannot change out of RAID if your system has Intel Optane Memory in use.
- It is required to disable Optane to change the SATA mode from Raid (RST) to AHCI.⁷
- On some motherboards these settings may be under 'Advanced Windows OS configuration.'

Disabling Intel Optane memory (Dell)

- On the taskbar, click the search box.
- Type Intel Rapid Storage Technology.
- Click Intel Rapid Storage Technology.
- On the Intel Optane memory tab, click Disable to disable the Intel Optane memory.

The MX Linux Installer program may not see SSD Hard Drives if the motherboard Firmware has the SATA Controller 'Mode' set to 'RAID' mode or 'RST' mode (aka IRST/RST/Optane). The PC's motherboard SATA Controller's Mode **must** be set to 'AHCI' Mode.

Windows most likely was installed when the SATA controller mode was set to RAID. Changes must be made before changing the controller's mode to AHCI.

Disable the VMD Controller - ASUS

To turn RST OFF in MAIN BIOS: press Ctrl Key and S simultaneously (with the Caps Lock Key ON). This will bring up VMD Controller aka VMD Configuration Settings underneath F 12 Boot Menu.⁸

Disable the VMD Controller

Warning: If you have BitLocker enabled, save your Recovery Keys elsewhere (or write it on paper) **before** attempting to change the SATA mode to AHCI. You will need it for Safe Mode boot. Alternately disable BitLocker before performing this change.

Also Know As – Intel **V**olume **M**anagement **D**evice. This was the original.

Above are many captures of brand specific 'marketing spins' of the VMD feature used by many manufacturers but renamed for reasons only they know why.

⁷ Intel RST <https://help.ubuntu.com/rst/>

⁸ Resolve Missing SATA Mode Operation on Asus Laptops https://youtu.be/yL73D_m2Y3o?si=pbWdTyzMFYwXlcRD

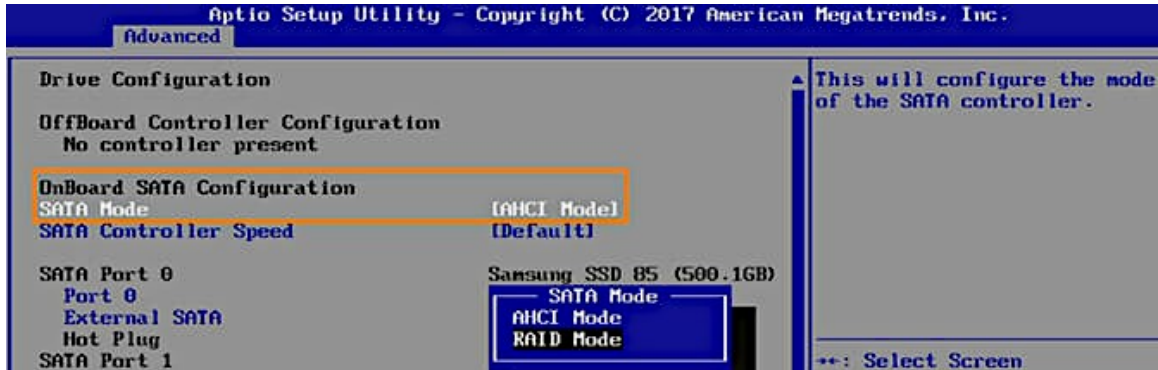
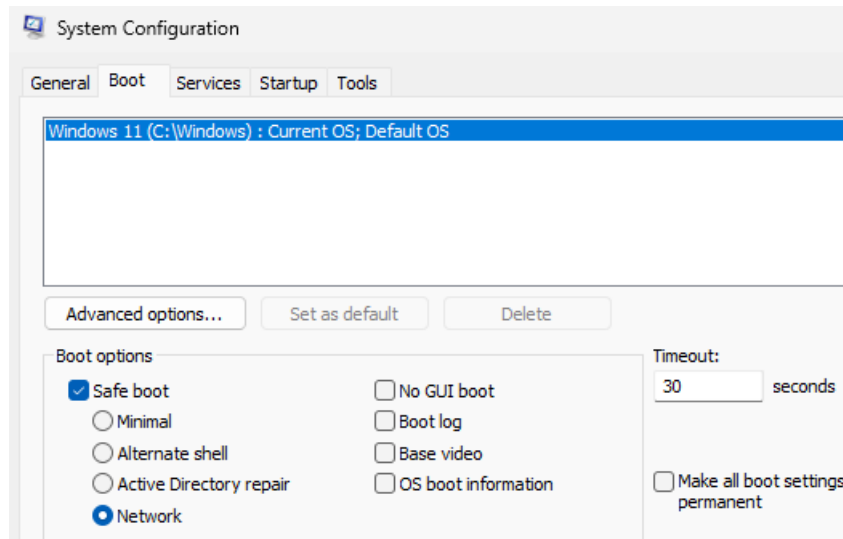


Figure is an example - your PC could be different.

Using MSConfig to Change Windows SATA Controller to AHCI mode

- Type 'msconfig' in the search box and press enter.



- Click 'Run as Administrator'. Select the 'Boot' tab and check 'Safe boot'.
- Check 'Network' then click 'Apply' and 'OK'.
- Reboot PC.
- Enter the firmware and change the SATA Controller 'Mode' from 'RAID/RST' to 'AHCI'.
- Save changes and exit. Windows will boot into Safe Mode again.
- Once in Safe Mode, run MSconfig as Administrator.

- Select the 'Boot' tab and UN-check 'Safe boot'.
- Reboot. Click 'Apply' and 'OK'.

Windows will the restart in normal mode with the AHCI drivers enabled.

To verify AHCI mode is set (in Windows 10/11)

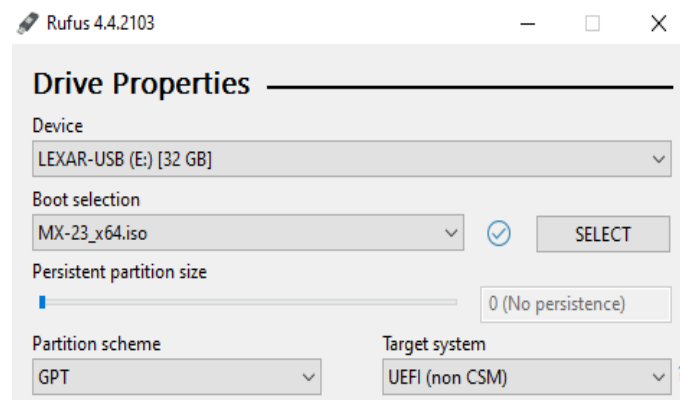
- Open Device Manager and expand IDE ATA/ATAPI Controller.
- Left click Standard SATA AHCI Controller.
- Right click and then left click on Properties.
- Select the Driver tab.
- Click Driver Details.
- The 'Driver files:' shows: 'C:\Windows\system32\DRIVERS\storageahci.sys'.

5.0 Installing MX Linux on the new partition

It is recommended to Make the MX Linux USB on Windows using a 'partition aware' burner program such as 'Rufus' or 'Balena Etcher' or 'UNetbootin'.

5.0.1 Rufus

Change 'Partition scheme' to GPT. The 'Target system' will change to 'UEFI (non CSM)'.

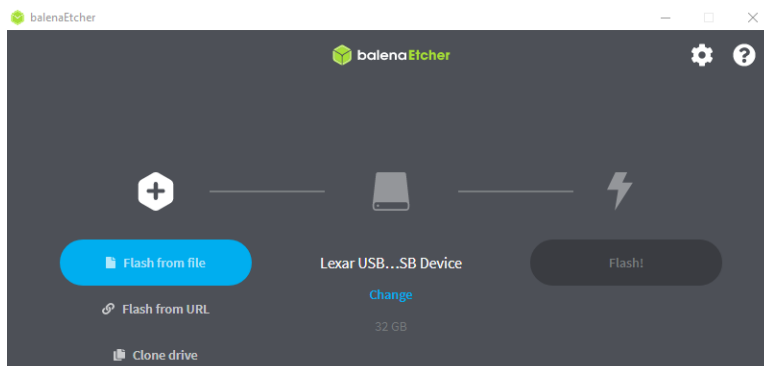


Accept the option 'Write in ISO Image mode...' and click OK.

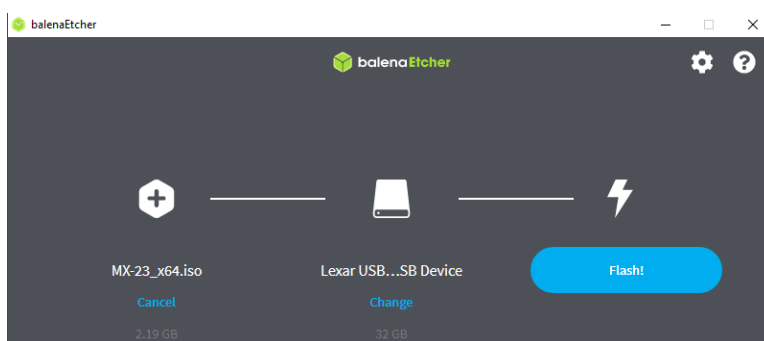
Detailed instructions for Rufus.⁹

5.0.2 *balena Etcher*

Etcher has detected a USB is present (Lexar USB...SB Device) as shown in the center.



Choose 'Flash from file' and select the MX Linux ISO from where it was downloaded.



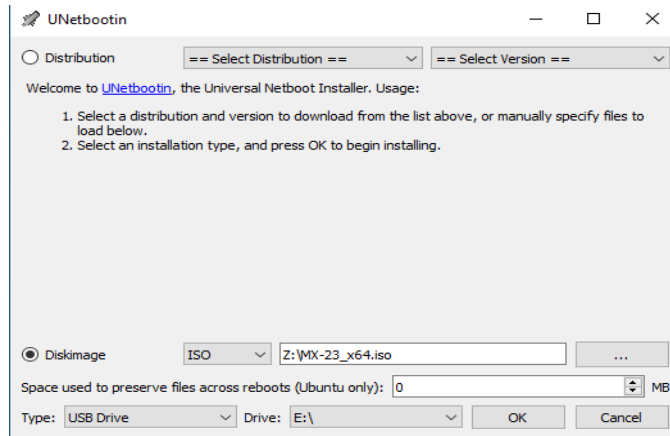
Click 'Flash!'.

Note: Etcher makes the USB as an iso9660 drive that should universally boot.

5.0.3 *UNetbootin*

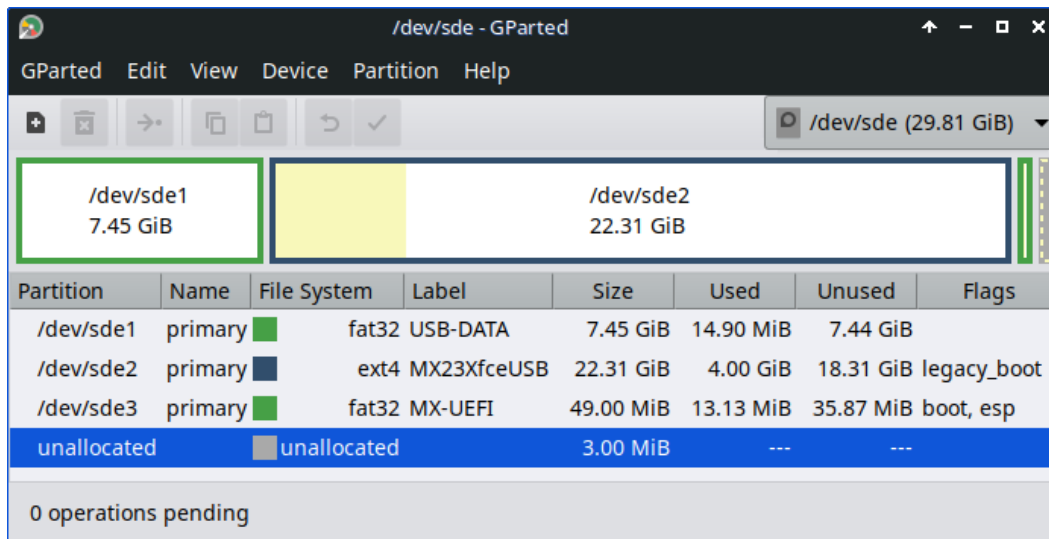
You should insert the USB drive prior to opening UNetbootin.

⁹ **How to Burn an ISO File to a USB Drive** - The free Rufus tool can be used to 'burn' an ISO image to a USB flash drive. <https://www.lifewire.com/how-to-burn-an-iso-file-to-a-usb-drive-2619270>



- Select the ISO file.
- Choose the USB drive you want to write to.
- Click on the 'OK' button to start the process.

After being made with 'MX Live USB Maker' program three partitions result.



The USB-DATA partition can store needed files like printer drivers & this guide.

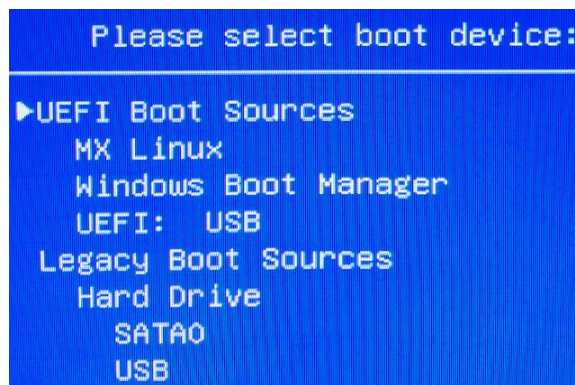
5.0.4 BEFORE You Start Installing MX Linux

Using section 2.0 ‘Summary of How-to steps’ as a checklist:

- PC is in ‘UEFI ONLY’ mode; I.E. not CSM/Legacy - see section 4.22.
- Verify Secure Boot is Off/Disabled.
- Both boot USB and target hard drive are in GPT format mode.
- Take notes on where MX Linux is to be install and where the EFI/ESP is located.
- Test boot with the MX installation USB and verify **ALL** major functions work.¹⁰

5.1 Booting and installing MX Linux

- Insert the LiveMedium USB in the fastest available USB port (blue) and restart the PC.
- After the PC powers on tap the ESC, F9 or F12 key to bring up the Boot Menu.
- Alternately on some PCs you may need to instead use the F2, F8, F10 or F9 key.
- Some PCs *may* offer TWO options to boot; if offered always take the one labeled UEFI



- Click the Install MX Linux on the Welcome Screen or desktop.
- Ensure that the MX Installer automatically selects ‘Customize the disk layout’.

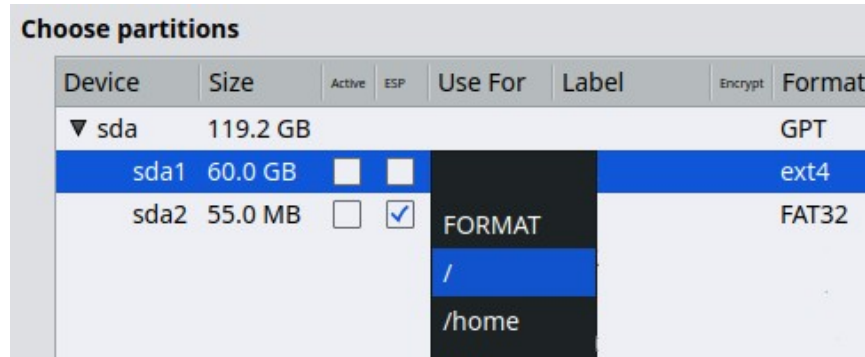
5.2 Root partition selection

The MX Linux Installer needs you to select where to place root. In the listing of Devices:

- Select the new partition in the ‘Device’ column you had created for MX Linux.
This highlights it blue.

¹⁰ WiFi connects and gives internet, monitor can be setup, etc.

- Click in the 'Use For' entry to change it from blank to / aka the Root partition.



5.3 EFI System Partition

Your system uses an **Extensible Firmware Interface (EFI)** Boot Loader as a part of UEFI boot. This partition is also known as the ESP and it is required for the PC to boot.

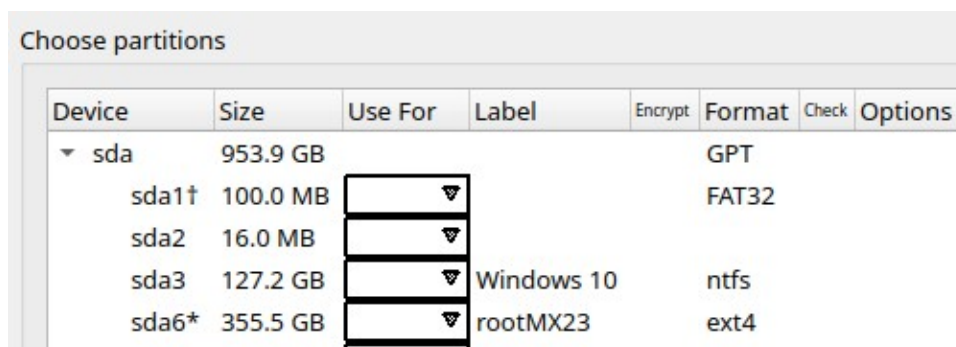
This partition is required to be formatted with a FAT32 file system **AND** marked as an ESP partition. Windows 11 requires the EFI to be at least 100 Mb in size (50 Gb for Windows 10).

5.3.1 Choosing the EFI location

A critical aspect of Dual Boot setup is the MX Linux Installer needs to know which partition to install the EFI portion of the boot files. Below shows that the existing EFI partition is sda1.

How do I know this? The Format column shows 'FAT32' for sda1.

If 'label' is blank **please** add EFI. This may save troubleshooting time in the future.



Note in the above example the 'Format' column says GPT for 'Device' sda.

5.3.2 How to tell the MX Linux Installer where to place it's EFI data.

At the "Customize the disk layout" installation step:

- Left click to choose your EFI partition (Format - FAT32).
- Click the down arrow pull-down and select 'ESP'.

| Device | Size | Format | Mount Point |
|--------|----------|--------|-------------|
| sda | 953.9 GB | | |
| sda1† | 100.0 MB | --- | |
| sda2 | 16.0 MB | | |
| sda3 | 127.2 GB | FORMAT | Window |
| sda6* | 355.5 GB | ESP | rootMX2 |
| sda4 | 194.6 GB | /boot | MX21 |

- The Format will be changed to 'Preserve (FAT32)' by the MX Linux Installer to ensure that the Windows EFI data is kept.

NOTE: When using multiple disks drives, IE one for MX Linux and one for Windows you can have an EFI partition on the second drive, IE one on BOTH of the drives, for Linux resiliency.¹¹

DO NOT REBOOT!

NOTE: On the last step of the MX Installer uncheck 'Automatically reboot at the end of installation process'

5.4 Restore Windows to the Grub menu

In 2023 a Grub security update created a bit of internet chatter on this topic. The MX developers have already set `GRUB_DISABLE_OS_PROBER="false"`(from "true").

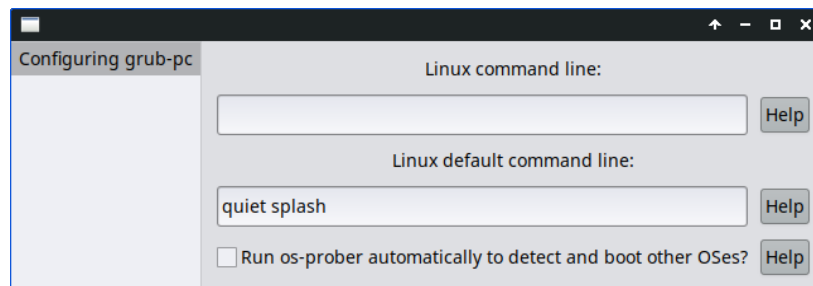
Easy fix to try first - Run the command 'sudo update-grub' to add Windows to the GRUB menu. Older versions or other distributions may not have a fix similar to the MX one.

Note: When running the above if 'Windows Boot Loader' does NOT appear (MX 21 and other distros) an extra step may be needed.

¹¹ Having 2 EFI partitions on a single drive can cause confusion.

5.4.1 Getting OS_Prober to run always

- Run 'sudo dpkg-reconfigure grub-pc'.
- Check 'Run os-prober automatically to detect and boot other OSes?' and click Next.



NOTE: The example above is Xfce. Other 'Desktop Environments' (KDE & Fluxbox) may differ slightly. Leave the 'Linux default command line:' as is (it may be blank). You may have to click through 1-2 other screens to reach this question.

- Run 'sudo update-grub' again.

As that runs a line saying 'Windows Boot Loader' should now be seen. Reboot & verify.

5.4.2 Two other methods

To add a custom GRUB menu entry for Windows add **ONE** of the below:

First method:

1. Open the file '40_custom' in the '/etc/grub.d/' folder.
2. Ensure that you replace hd0,1 (from 'parted print') with your actual Windows installation location.

```
menuentry "Windows 10" {  
    insmod ntfs  
    set root=(hd0,1) # Modify this to match your Windows partition  
    chainloader +1  
}
```

3. Save the file. Then run the command 'sudo update-grub' to add Windows to the GRUB menu.

Second method:

Ensure that you replace the:

1. Path after 'chainloader' matches the a path to your actual bootmgfw.efi file location.
2. Set the 'fs-uuid' shown (32DC-956D) to the one from the ESP ('lsblk -f') in your PC.

```
# name: custom.cfg
# file: /boot/grub/custom.cfg
menuentry 'Windows' {
  insmod fat
  insmod chain
  insmod part_gpt
  search --no-floppy --set=root --fs-uuid 32DC-956D
  chainloader /EFI/Microsoft/Boot/bootmgfw.efi
}
```

3. Run the command 'sudo update-grub' to add Windows to the GRUB menu.
4. Save the file as 'custom.cfg' in the '/boot/grub/' folder.
5. Reboot. At the Grub boot menu a new choice 'Windows' will appear last in the list.

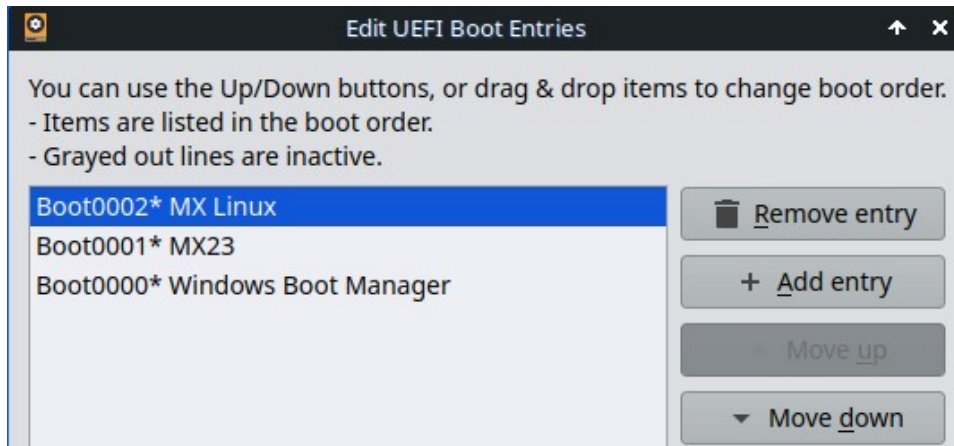
5.5 UEFI boot entries order in NVRAM – a must do!

- Run MX Boot Options:
- click 'Manage UEFI Boot Options'.
- move the MX entry to ABOVE the 'Windows Boot Manager' entry.

It is known that a Windows 10/Windows 11 'Windows Updates' will place the 'Windows Boot Manager' above the MX Linux Grub entry thereby remove the Grub [dual] boot menu.¹²

Note: not doing this step will result in Windows only with no Dual Boot menu!

¹² See <https://forums.linuxmint.com/viewtopic.php?t=411008>

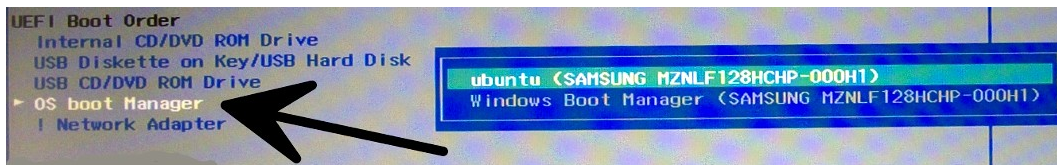


Above shows 'Windows Boot Manager' moved to be in third position. As shown the boot order is: Boot0002, Boot0001, Boot0000.

OS Boot Manager - HP

This HP firmware places an entry 'OS Boot Manager' within hardware 'UEFI Boot Order' entries. This, when navigated to via arrow becomes highlighted (white below). Press enter to see the selections in the sub-menu it presents.

In the example below 'ubuntu' is the Linux entry to be selected; 'Windows Boot Manager' was selected initially on entry to this sub-menu.



Arrow to the correct item and press enter to accept your choice.

6.0 Post Installation Tasks

What follows are some optional tasks that may be of interest.

6.1 Common Issues

From the man page: "The Linux kernel accepts certain 'command-line options' or 'boot time parameters' at the moment it is started. In general this is used to supply the kernel with information about hardware parameters that the kernel would not be able to determine on its own, or to avoid/override the values that the kernel would otherwise detect."

6.1.1 Black or blank screen

Display distortions and even a blank screen are sometimes seen. To fix go to the "Advanced Options" on Welcome Screen select nomodeset (failsafe nomodeset) then finish booting.

Some PCs need, instead of quiet splash: `acpi_osi=Linux acpi_backlight=vendor` or `pci=noms`.

Some laptops may just have backlight set way down, press f key to make it brighter

You can use the F12 key in the boot loader to see a menu of what boot options are selected by your current menu choices.

Boot codes not listed in these menus must be added manually. More boot parameters: <https://mxlinux.org/wiki/system/boot-parameters/>

Also see MX Linux 23 User Manual - Troubleshooting, section 2.6

6.2 Incorrect Windows Time In Dual Boot and turn on Time Sync

Windows assumes Local Time and Linux expects UTC. Making Linux use local time the same way Windows does is a good option. There are two ways to address this time difference. Do **NOT** do both!!!

1) **LINUX**: Change the time setting for Linux: <https://mxlinux.org/wiki/help-files/date-time/>

2) **WINDOWS**: perform the following steps (may cause issues with some 3rd party apps):

- Open Regedit on Windows and navigate to:
- `HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\TimeZoneInformation\`
- Right-click the "TimeZoneInformation" key
- Select "New" => DWORD (32-bit) Value. (or QWORD on 64-bit systems)
- Name your new value RealTimeIsUniversal
- Double-click the RealTimeIsUniversal value you've just created, set its value to 1
- Click "OK" to exit Regedit.

Right click time

Left click Adjust date/time

Turn OFF "Set Time Automatically"

6.3 Grub Boot Menu disappears

The 'Windows Features Update' many times [often bi-annually] will insert itself as the first entry in your PC Motherboard's UEFI firmware listings. This will cause the PC to boot directly into Windows with no MX Linux Grub Boot Menu being presented to you.

First, check if the Grub Menu entry is present in your PC's Motherboard UEFI list is still present in the one time boot menu (F9 or F12. Reboot the PC and go to Boot Order. If the Grub Menu entry is there move it to the top with MX Boot Options.

If the entry is missing .go to section 5.4.0 in this guide.

6.4 Manually Creating a Boot File Path in UEFI Bios

Restart your computer. Repeatedly tap the BIOS key at the PC's logo screen to enter BIOS.

Expand the 'General' section. Expand 'Boot Sequence'. Under 'Boot List Option' make sure 'UEFI' is selected. Navigate to 'Secure Boot Enable'. Clear the check box next to 'Secure Boot Enable'.

Expand the General section and navigate to 'Boot Sequence'. Click on 'Add Boot Option'. Create a new entry. In 'Boot Option Name' type 'Windows Boot Manager' or the name of the Linux distribution being installed.

Click the ... button.

- **Windows** - navigate to '\EFI\Boot\bootx64.efi' and then click 'OK'.
- **Linux** - navigate to '\EFI\MX23\grubx64.efi' and then click 'OK'.

1. The folder name of 'MX23' may be named differently.

2. Case of file names may differ from above. Do NOT alter.

Click on 'OK' to save changes. Press 'exit' to restart the system.

NOTE: This editing of these Boot File Paths can also be done in MX Boot Options.

6.5 No Grub menu with an Ubuntu/Mint based distro

Make these 2 changes to the `/etc/default/grub` file. Below is before changes.

```
GRUB_TIMEOUT_STYLE=hidden
GRUB_TIMEOUT=0
```

- Change timeout to some number that is not zero.
- Change `Grub_Timeout_Style=hidden` to `#Grub_Timeout_Style=hidden`.

```
#GRUB_TIMEOUT_STYLE=hidden
GRUB_TIMEOUT=10
```

- Run `sudo update-grub` to make these changes permanent.

A grub menu should now be displayed after a reboot.

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Please direct **ALL** support requests to the MX Linux Forum -- <https://forum.mxlinux.org>