

# Disks

- Disk & Partition Management
- Verifying Disk Health

# Disk & Partition Management

## Disk Management

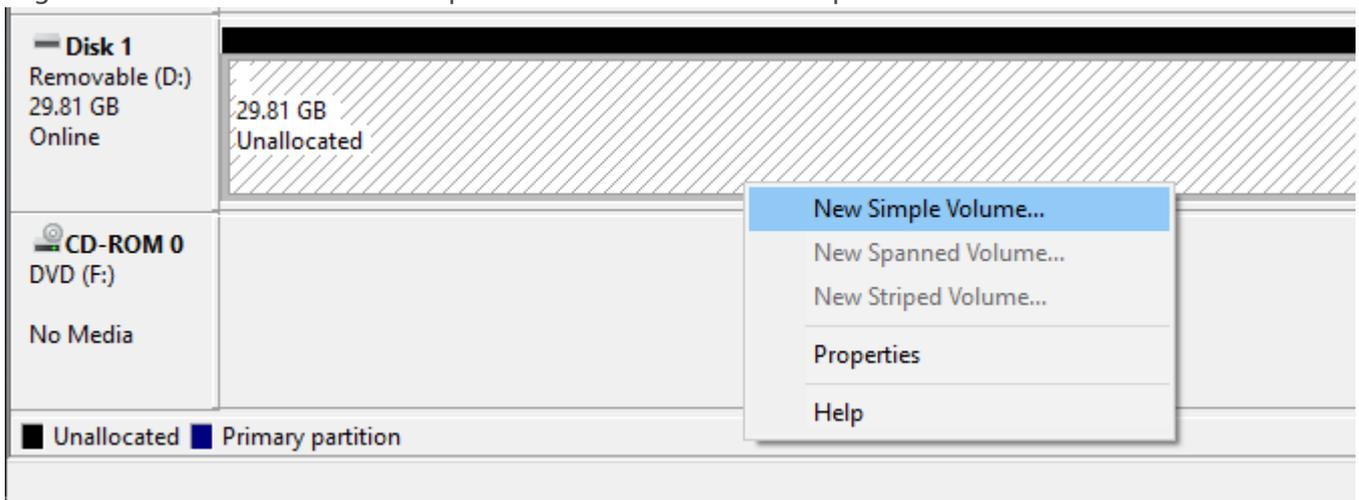
You can open disk management by pressing Win+R and typing `diskmgmt.msc`.

Disk management can only be run from an installed copy of Windows, and has limits on what partitions and disks can be edited. For a more robust solution, consider using `diskpart` or `gparted`.

## Creating a new partition

New partitions can only be created from unallocated space.

1. Right click on the unallocated space and choose "New Simple Volume".



2. By default, the size will be the entire unallocated space. Most of the time, this is fine.

New Simple Volume Wizard



### Specify Volume Size

Choose a volume size that is between the maximum and minimum sizes.

Maximum disk space in MB:	30524
Minimum disk space in MB:	8
Simple volume size in MB:	30524

3. You can assign you

New Simple Volume Wizard

### Assign Drive Letter or Path

For easier access, you can assign a drive letter or drive path to your partition.

Assign the following drive letter: E

Mount in the following empty NTFS folder:  Browse...

Do not assign a drive letter or drive path

< Back   Next >   Cancel

may cause issues.

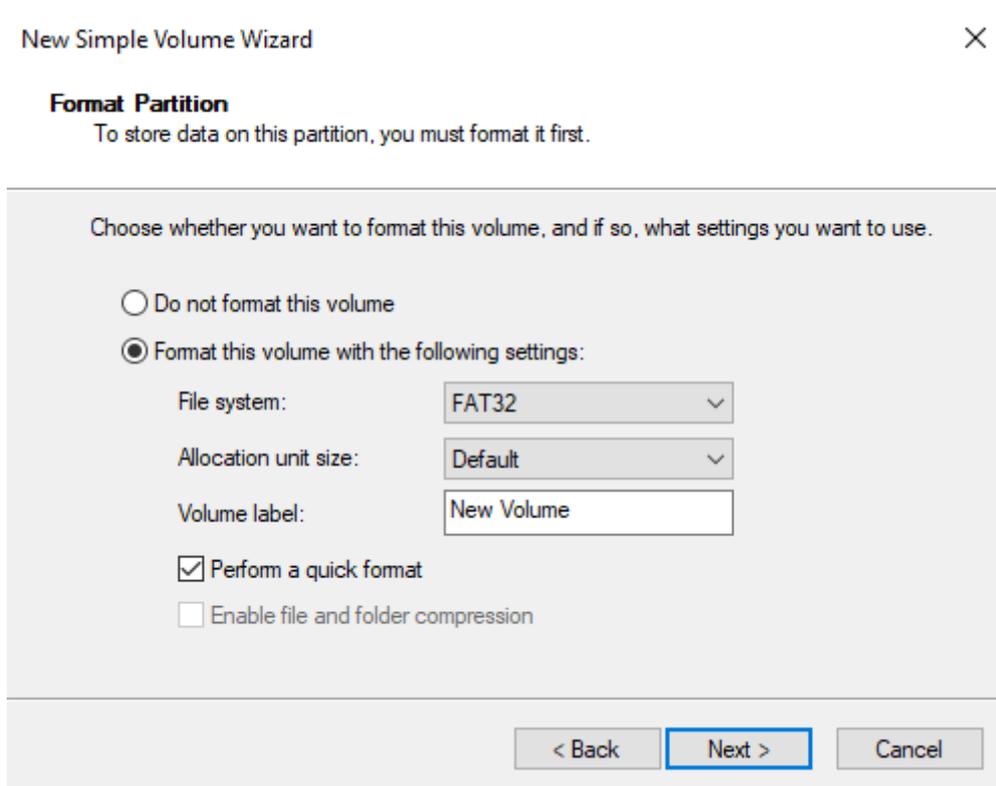
4. For file system, there are 3 options (you may have less depending on your drive).

Fat32: Designed to be used with smaller USB drives, 32GB or less in size.

exFat: Designed to be used with all USB drives, can replace Fat32.

NTFS: Designed to be used with hard drives and SSDs of all sizes, internal and external.

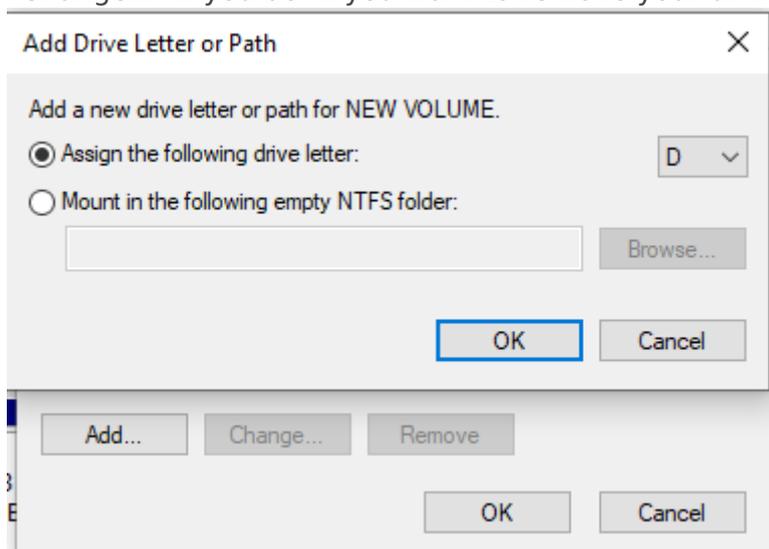
Label can be whatever you would like it to be, it will be displayed in explorer.



## Changing drive letter, file system, or label.

### Editing drive letter

1. Right click on an existing partition and choose "Change Drive Letter and Paths...".
2. On the open dialog choose "Add..." if you don't have a drive letter, and choose "Change..." if you do. If you want to remove your drive letter, choose "Remove".

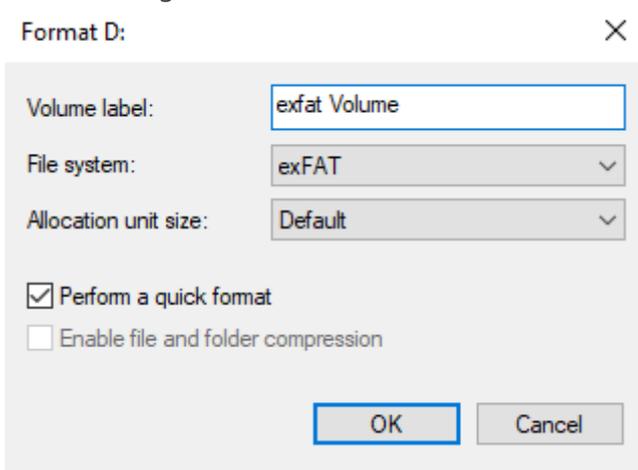


### Changing file system

Note: This is a destructive action, all data on the drive will be deleted.

1. Right click on an existing partition and choose "Format...".

2. Most of the time, leaving allocation unit size at default and quick format selected will work. When choosing a file system, reference this:  
Fat32: Designed to be used with smaller USB drives, 32GB or less in size.  
exFat: Designed to be used with all USB drives, can replace Fat32.  
NTFS: Designed to be used with hard drives and SSDs of all sizes, internal and external.



## Changing drive label.

1. Right click on an existing partition and choose "Properties".
2. From this menu, you can change your drive label to anything you would like

## Deleting a partition

1. Right click on an existing partition and choose "Delete Volume..."
2. Click "Yes" to delete the partition. You will loose all data on this partiton.

# Diskpart

Diskpart is a command line tool that doesn't have as many restrictions as disk manager. It is still limited on `C:\`, and not a good tool for partition manipulation. This tool can be run from the windows installation media, allowing it to operate on `C:\`

This is going to guide you through wiping a disk and creating a single empty partition using the entire drive. This will not securly erase your data, see [wiping disks](#) for instructions on how to do that.

1. To open diskpart, you will need an elevated command prompt. Just type `diskpart` and diskpart will load.

- To identify your disk, type `list disk`, then type `select disk X` where X is the disk number. (Choosing the wrong disk will cause data loss)

```
Administrator: Command Prompt - diskpart
Microsoft Windows [Version 10.0.19042.964]
(c) Microsoft Corporation. All rights reserved.

C:\WINDOWS\system32>diskmgmt.msc

C:\WINDOWS\system32>diskpart

Microsoft DiskPart version 10.0.19041.964

Copyright (C) Microsoft Corporation.
On computer: DESKTOP-09NM792

DISKPART> list disk

   Disk ###  Status              Size               Free               Dyn  Gpt
   -----  -
   Disk 0    Online              465 GB             1024 KB
   Disk 1    Online              29 GB              29 GB              *

DISKPART> _
```

- To wipe all partitions from your disk, type `clean`
- For disk type and partition structure, most cases will want basic and GPT. If this disk needs to be read on older systems, use MBR instead of GPT. Run `convert basic` and `convert gpt`.
- To create the raw partition, run `create primary partition`. If you picked MBR, you must run `active` after creating the partition.

6. Run `detail disk` and `list partition` to ensure that your disk looks correct and you have both the partition and volume selected. You should have a star next to the volume and partition.

If either the partition or volume is missing, type `exit`, reconnect your drive and start over.

If the partition or volume isn't selected (you can tell by the star on the right), type `select partition X` or `select volume X`.

```
C:\> Administrator: Command Prompt - diskpart
DISKPART> create partition primary

DiskPart succeeded in creating the specified partition.

DISKPART> detail disk

Lexar USB Flash Drive USB Device
Disk ID: {3F477A2D-14D2-40E7-A4E5-56D074751A2F}
Type      : USB
Status    : Online
Path      : \
Target    : \
LUN ID    : 0
Location Path : UNAVAILABLE
Current Read-only State : No
Read-only : No
Boot Disk : No
Pagefile Disk : No
Hibernation File Disk : No
Crashdump Disk : No
Clustered Disk : No

  Volume ###  Ltr  Label           Fs      Type          Size      Status       Info
  -----  ---  -----
* Volume 4                RAW       Removable    29 GB     Healthy

DISKPART> list partition

  Partition ###  Type          Size      Offset
  -----
* Partition 1    Primary      29 GB     1024 KB

DISKPART>
```

7. To format the partition, type `format fs={FileSystem}`. For what file system to use, reference the following:

Fat32: Designed to be used with smaller USB drives, 32GB or less in size.

exFat: Designed to be used with all USB drives, can replace Fat32.

NTFS: Designed to be used with hard drives and SSDs of all sizes, internal and external.

You can also add a label at this stage, by adding `Label=label` to your command.

If you are using NTFS and want to enable file compression, add `Compress` to your format command.

Adding `Quick` to the end of your command will significantly speed up the format time.

A full format command will look something like `format fs=fat32 Label=Drive Quick`. This will do a quick format with a label of "Drive" and file system of fat32.

8. To assign a drive letter to the new partition, run `assign letter=X` where X is the letter you choose.
9. Type `exit` to close diskpart. Your drive is formatted.

# Gparted

This is used via a Linux live environment.

Gparted has the advantage of working on almost any disk, when in Windows you cannot operate extensively on your main `C:\` drive but Gparted is booted from its own media and not running on `C:\` so it does not have this restriction.

Gparted can be downloaded from [here](#) and you can read [How to use gparted](#)

# Verifying Disk Health

## Definitions

S.M.A.R.T. - this is a monitoring system included in disk drives(HDDs and SSDs). Its primary function is to detect and report various indicators of drive reliability and health.

Sectors - these are sections of your hard drive that store data. Your hard drive has many many sectors.

## Important SMART Values

If you ever read a SMART report from any of the below tools it is useful understanding the common ones that you want to watch for.

### Current Pending Sector Count

When a sector is detected as bad it will be counted and the disk will attempt to move it. This value can go up and down as the disk moves or recovers sectors.

[More info](#)

### Reallocated Sectors Count

When detected as bad your disk will attempt to move a sector. If it is moved successfully this count will go up.

[More info](#)

### Uncorrectable Sector Count

This count goes up when the disk is not able to recover and move a sector. This indicates lost data.

## Crystal Disk Info

Crystal disk is the simplest way to get a reading on SMART within Windows. [Download the application](#) then run it to view every disk in the machine.

If a disk shows up as Yellow 'Caution' or Red 'Bad' we recommend replacing it.

## Hard Disk Sentinel

[Download](#)

## SEAGATE (SeaTools)

Bootable

[Info](#)

[Download](#)

## Windows Application

[Info](#)

[Download](#)

## SmartmonTools

For a GUI solution see [here](#)

You can check SMART in Linux using smartmonTools. The quick steps to get a report in Ubuntu are: (replace X with your desired disk)

```
sudo apt install smartmontools
sudo smartctl -a -d ata /dev/sdX
```

[More Info](#)