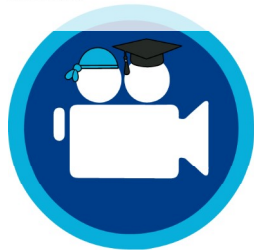


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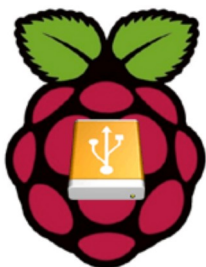
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Properly Mount USB Storage on Raspberry Pi



This guide will show you how to properly mount storage drives on Minibian, Raspbian and Raspbmc. Many guides use a simpler, less robust method that can cause issues if you use multiple USB storage devices. I will walk you through mounting USB sticks and USB hard drives on your Raspberry Pi running Raspbian. This will enable you to use

your external USB storage for media, games or whatever your Pi's heart desires for Kodi (XBMC) or a home media server.

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Updated for Raspbian Jessie with nofail to prevent system halts for systemd so your hard drive being absent will not stop the boot sequence on your Raspberry Pi.

Updated January 5th, 2016 to set future permissions (thanks manne!)

If you are trying to figure out which hardware would work best for you, consider reading the [Pi benchmarks](#).

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Pi Unit	Processor	RAM	RAM Bus	Network	WiFi	USB	SATA	Cost
Raspberry Pi 3	1.2 GHz ARMv8 Quad Core	1 GB DDR2	450 MHz	100 Mbit	Yes	4	No	\$35
Raspberry Pi 2	900 MHz ARMv7 Quad Core	1 GB DDR2	450 MHz	100 Mbit	No	4	No	\$35.00
Raspberry Pi	700 MHz ARMv6 Single Core	512 MB SDRAM	400 MHz	100 Mbit	No	4	No	\$25
Banana Pi	1 GHz ARMv7 Dual Core	1 GB DDR3	432 MHz	Gigabit	No	2	Yes	\$36.99
Banana Pi Pro	1 GHz ARMv7 Dual Core	1 GB DDR3	432 MHz	Gigabit	Yes	2	Yes	\$45.00

Mount External USB Hard Drive on Raspberry Pi

I am assuming you only have 1 external hard drive connected to the Pi. If so then it should be attached to /dev/sda1 – additional drives will use /dev/sdb1 and /dev/sdc1 etc. If you have multiple external hard drives you will need separate mount points for each drive (e.g. /mnt/usbstorage1 and /mnt/usbstorage2).

See [hard drive deals](#) on Amazon. Remember you can [power a 2.5" hard drive](#) with a model B+ and Raspberry Pi 2.

Prepare the Mount Point

First make a directory in which to mount the USB drive

```
sudo mkdir /mnt/usbstorage
```

Make pi the owner of the mounted drive and make its permissions read, write and execute for it







```
sudo chown -R pi:pi /mnt/usbstorage
sudo chmod -R 775 /mnt/usbstorage
```

Set all future permissions for the mount point to pi user and group (explanation can be found [here](#))

```
sudo setfacl -Rdm g:pi:rwX /mnt/usbstorage
sudo setfacl -Rm g:pi:rwX /mnt/usbstorage
```

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Determine the USB Hard Drive Format

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You also need to know the file system the drive is formatted with

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```
sudo blkid
```

You will see something like this. Again it is the sda1 line we are interested in. Note the `TYPE="exfat"` at the end, you will need this for the fstab file. It is easiest to copy it now and paste it after running nano in the next step.

```
/dev/mmcblk0p1: SEC_TYPE="msdos" LABEL="boot" UUID="787C-2FD4" TYPE="vfat"
/dev/mmcblk0p2: UUID="3d81d9e2-7d1b-4015-8c2c-29ec0875f762" TYPE="ext4"
/dev/sda1: LABEL="HTPCGuides" UUID="BA8F-FFE8" TYPE="exfat"
```

Update your repositories if your hard drive is **anything but** ext4 as the TYPE above

```
sudo apt-get update
```

Now mount the usb stick in there. If it is NTFS you will need to install some utilities first

```
sudo apt-get install ntfs-3g -y
```

If the drive is exfat install these utilities

```
sudo apt-get install exfat-utils -y
```

For all drive types mount the usb with this command, -o insures pi is the owner which should avoid permission issues

```
sudo mount -o uid=pi,gid=pi /dev/sda1 /mnt/usbstorage
```

If you get an error use this syntax

```
sudo mount -t uid=pi,gid=pi /dev/sda1 /mnt/usbstorage
```

If the mount -t command returns an error then use this syntax

```
sudo mount uid=pi,gid=pi /dev/sda1 /mnt/usbstorage
```

If you are getting **this drive is already mounted errors** then you are probably using a distro which automounts the drives which you can either continue using but then you should remove the /etc/fstab entries. You will have to uninstall the



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automounting software if you want to mount using the method in this guide.

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Remove the automounting software with this command
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```
sudo apt-get remove usbmount --purge
```

Automount the USB Hard Drive on Boot

/mnt/usbstorage will be the folder in which you store your media. We want it to be automounted on boot. The best way to do this is through the UUID. Get the UUID by using this command

```
sudo ls -l /dev/disk/by-uuid/
```

You will see some output like this. The UUID you want is formatted like this XXXX-XXXX for the sda1 drive. If the drive is NTFS it can have a longer format like
UUID="BABA3C2CBA3BE413". Note this UUID, for me it is BA8F-FFE8

```
total 0
lrwxrwxrwx 1 root root 15 Jan  1  1970 3d81d9e2-7d1b-4015-8c2c-29ec0875f762 -> ..
lrwxrwxrwx 1 root root 15 Jan  1  1970 787C-2FD4 -> ../../mmcblk0p1
lrwxrwxrwx 1 root root 10 Oct 26 21:10 BA8F-FFE8 -> ../../sda1
```

Now we will edit fstab to mount the USB by UUID on boot

```
sudo nano /etc/fstab
```

Add the line in red to the bottom, replace XXXX-XXXX with your UUID and exfat with your type if it is different (e.g. ntfs, vfat, ext4). You may or may not need the quotation marks wrapped around the UID, you do not need quotation marks wrapped around the file system type (ext4, vfat, NTFS etc).

The umask 0002 sets 775 permissions so the pi user and group can read, write and execute files on the external USB drive. To completely eliminate permission issues you can set the umask to 0000 which equals 777 permissions so anybody can read, write and execute. Note that 777 permissions are considered a security risk.

If you have issues here then try replacing uid=pi,gid=pi with just the word defaults (typical for ext4). You can also try replacing the UUID with the /dev/sda1 line.

This is an example for exfat

```
/dev/mmcblk0p1 /boot vfat defaults 0 2
/dev/mmcblk0p2 / ext4 errors=remount-ro,noatime 0 1
UUID=XXXX-XXXX /mnt/usbstorage exfat nofail,uid=pi,gid=pi 0 0
```



for NTFS, note that it is ntfs and not ntfs-3g

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```
/dev/mmcblk0p1 /boot vfat defaults 0 2
/dev/mmcblk0p2 / ext4 errors=remount-ro,noatime 0 1
```

```
UUID=XXXX-XXXX /mnt/usbstorage ntfs nofail,uid=pi,gid=pi 0 0
```

for ext4 **using uid and gid is not recommended** so use at your own risk as it could cause issues (thanks mk2soldier).

```
/dev/mmcblk0p1 /boot vfat defaults 0 2
/dev/mmcblk0p2 / ext4 errors=remount-ro,noatime 0 1
```

```
UUID=XXXX-XXXX /mnt/usbstorage ext4 nofail,uid=pi,gid=pi 0 0
```

If you get any errors you can replace uid=pi,gid=pi with defaults **or** remove it entirely

```
/dev/mmcblk0p1 /boot vfat defaults 0 2
/dev/mmcblk0p2 / ext4 errors=remount-ro,noatime 0 1
```

```
UUID=XXXX-XXXX /mnt/usbstorage ext4 nofail,defaults 0 0
```

For using /dev/sda1 and defaults if you have troubles with UUID

```
/dev/mmcblk0p1 /boot vfat defaults 0 2
/dev/mmcblk0p2 / ext4 errors=remount-ro,noatime 0 1
```

```
/dev/sda1 /mnt/usbstorage ext4 nofail 0 0
```

Now test the fstab file works

```
sudo mount -a
```

If you didn't get errors reboot, otherwise try the suggestions above to get it working then `mount -a` again until it succeeds

```
sudo reboot
```

You should be able to access the mounted USB drive and list its contents

```
cd /mnt/usbstorage
ls
```

Every time you reboot, the drives will be mounted as long as the UUID remains the same. If you delete the partitions or format the USB hard drive or stick the UUID changes so bear this in mind. You can always repeat the process for additional hard drives in the future.



Now you can manage the hard drive power using these guides since it will not spin down automatically on Linux

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If you have multiple hard drives you will have to make separate mount points (e.g. /mnt/usbstorage2) for each drive's partition

Fix Raspberry Pi 2 Mounting Issues

Thanks to Jake for bringing this to my attention. Apparently there is a bug in the Pi 2 that messes up automounting. You can fix it by creating a delay.

Open up the /boot/cmdline.txt file

```
sudo nano /boot/cmdline.txt
```

Add this line to the bottom, you can increase this delay if necessary

```
rootdelay=5
```

Hit Ctrl+X, Y and Enter to save and exit, then reboot to see if it automounts now.
If the Raspberry Pi hard drive still does not automount we can use rc.local (thanks Julian)

```
sudo nano /etc/rc.local
```

Add this lines before the exit line

```
sleep 30  
sudo mount -a  
exit
```

Ctrl+X, Y and Enter to save

Reboot again to test

```
sudo reboot
```

USB Hard Drive Model	Capacity	USB Speed	Amazon Price
Western Digital My Passport Ultra Portable Hard Drive	1 TB	USB 3.0	\$56.99
Western Digital My Passport Ultra Portable Hard Drive	2 TB	USB 3.0	\$86.00



If you want to now remotely access your Raspberry Pi USB hard drive over a network then use [Samba](#) or [NFS](#) shares

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Name

**Johanness** • 2 years ago

holly shit this is not working here at all my external hd not mounting and cannot display the roms installed...

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**Mike - WP Bullet** Mod → Johanness • 2 years ago

Sounds like you may need a new AC Adapter with some more power
Johanness :)

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**Johanness** → Mike - WP Bullet • 2 years ago

what? this is not even make sense. I'm using retropie, it mount it but cannot display roms properly...

^ | v • Reply • Share ›

**Mike - WP Bullet** Mod → Johanness • 2 years ago

Normally when there is something wrong after following this tutorial it is because the hard drive does not have enough power, please see this link <https://www.raspberrypi.org...>

^ | v • Reply • Share ›

**Mick O'Neill** • 3 years ago

Mike you absolute BOSS! :)

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**Mike - WP Bullet** Mod → Mick O'Neill • 3 years ago

Happy to help Mick!

^ | v • Reply • Share ›

**paulfitzsimons** • 3 years ago

Fantastic guide, thanks, very clear :)

^ | v • Reply • Share ›

**Mike - WP Bullet** Mod → paulfitzsimons • 3 years ago

Glad it worked for you Paul :)

^ | v • Reply • Share ›

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**Micah Benjamin Faulkner** • 3 years ago

Okay, so I messed up pretty good, I think.

I had a drive that was failing that had my media on it. The drive had a partition called sda4 that I dd'ed over to a new hard drive.

However, the syntax I used (I assume) was wrong and now there is no partition on the new drive, it's just called sda (with no sda1 or anything beneath it).

I seem to be able to access that 1tb of data okay...but the drive is really 2tb. I can't figure out how to partition it correctly to fix this error.

Any idea what should be done here?

Thanks in advance!

Micah

^ | v • Reply • Share ›

**Mike - WP Bullet** Mod → Micah Benjamin Faulkner • 3 years ago

Hi Micah,

sda1, sda2 etc are just placeholders for hard drives on linux (usually

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175ZkZkzsqu6WKUsCcDdGv6E117KG6VTb