

Setup Raspberry Pi in headless mode

Headless Mode means system runs without any primary input and output such as keyboard or monitor. The system won't use desktop environment and therefore GUI applications will not run.

`#pi #headless`

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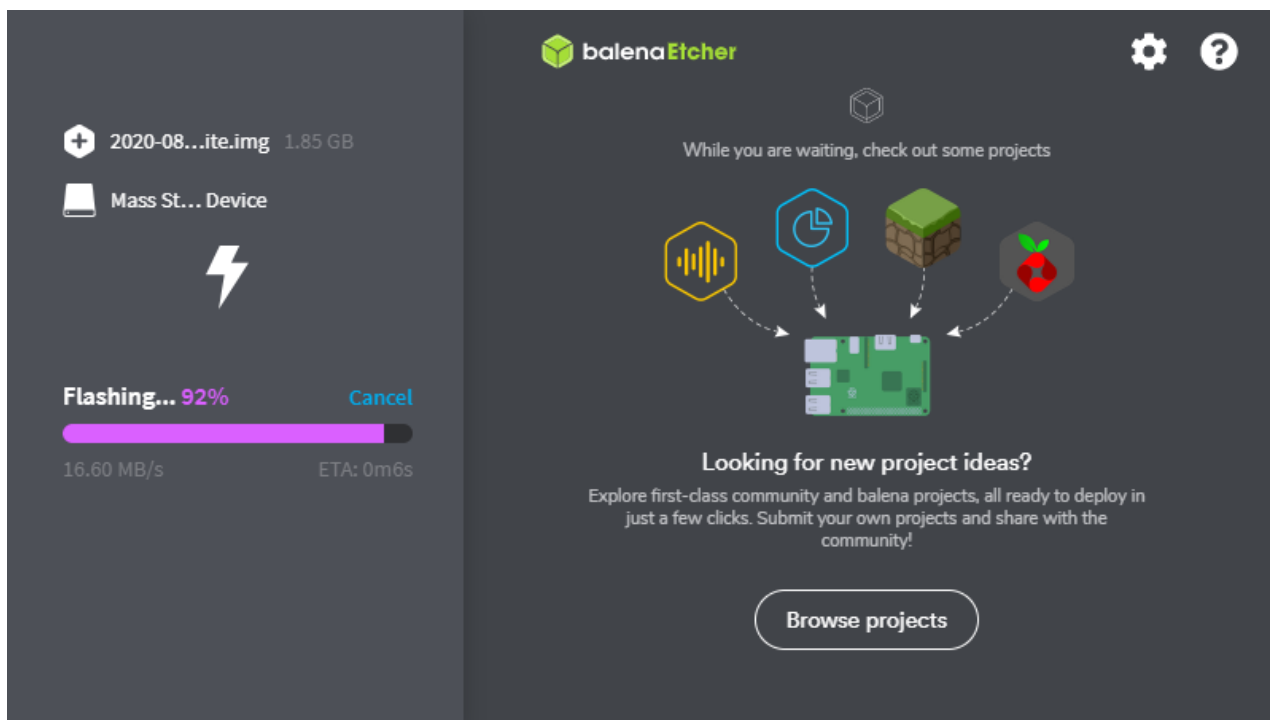
1. Download OS Image

Official images for recommended operating systems are available to download from the Raspberry Pi website [download page](#).

Headless Mode is available in the *Raspberry Pi OS Lite* version, please follow the guide in the official download page.

2. Burn Image to SDCard

The application *balenaEtcher* from [Balena](#) is a very good image writer that will write OS image to SDCard. Download and install it, then run it. Just follow the guided steps.



Etcher is writing OS image

After copying the image to a SDCard, File Explorer may have trouble seeing the content of that SDCard. A simple fix is to pull the SDCard out then plug it back in. It should appear with a partition named **boot**.

3. Enable SSH

For security reasons, `ssh` is no longer enabled by default. To enable it, place a blank text file called `ssh` in the root of the boot partition on the SDCard.

4. Add Wifi Network Info

To add network info, create a text file called `wpa_supplicant.conf` and place that in the root of the boot partition on SDCard too.

wpa_supplicant.conf

```
country=US
ctrl_interface=DIR=/var/run/wpa_supplicant GROUP=netdev
update_config=1

network={
    ssid="NETWORK-NAME"
    psk="NETWORK-PASSWORD"
}
```

Name	Date modified	Type
LICENCE.broadcom	5/27/2020 11:22 AM	BROADCOM
ssh	11/27/2020 10:06 ...	File
start.elf	8/20/2020 6:56 AM	ELF File
start_cd.elf	8/20/2020 6:56 AM	ELF File
start4db.elf	8/20/2020 6:56 AM	ELF File
start4x.elf	8/20/2020 6:56 AM	ELF File
wpa_supplicant.conf	11/27/2020 10:07 ...	CONF File

Added `ssh` and `wpa_supplicant.conf` in boot partition

5. Login to RPi

Power RPi up and wait for the power led gets stable. Use any Network Scanner to detect the IP of the RPi. A plugin on [MobaXterm](#) can be used too.

IP address range: . . . --> Start scan

IP Address	Name	SSH	RDP	VNC	FTP	Telnet	Rlogin	HTTP	Other ports
192.168.1.1		X	X	X	X	X	X	✓	Deep scan 🔍
192.168.1.217		X	X	X	X	X	X	X	Deep scan 🔍
192.168.1.198	raspberrypi	✓	X	X	X	X	X	X	Deep scan 🔍

Scan for RPi IP

For the official Raspberry Pi OS, the default user name is `pi`, with password `raspberrypi`, on the host `raspberrypi`.

```
~ $ ssh pi@raspberrypi
pi@raspberrypi's password:
Linux raspberrypi 5.4.51+ #1333 Mon Aug 10 16:38:02 BST 2020 armv6l

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.

/usr/bin/xauth:  file /home/pi/.Xauthority does not exist

SSH is enabled and the default password for the 'pi' user has not been changed.
This is a security risk - please login as the 'pi' user and type 'passwd' to set a new
password.

pi@raspberrypi:~ $
pi@raspberrypi:~ $ █
```

Login on `ssh` to RPi

Review Network Settings

This command should list the network connection in the first line for `wlan0`:

```
iwconfig
```

This command should show info for `wlan0`:

```
ifconfig
```

This command should list the `wlan0` network with details:

```
iwlist wlan0 scan
```

To edit or review the wifi settings, run this command:

```
sudo nano /etc/wpa_supplicant/wpa_supplicant.conf
```

Connect to an other Wifi network

Open the `wpa-supplciant` configuration file in nano:

```
sudo nano /etc/wpa_supplicant/wpa_supplicant.conf
```

Go to the bottom of the file and add the following:

```
network={  
    ssid="NETWORK-NAME"  
    psk="NETWORK-PASSWORD"  
}
```

Reconfigure the interface with:

```
wpa_cli -i wlan0 reconfigure
```

Verify whether it has successfully connected using `ifconfig wlan0`

6. Update system

(optional)

To get the latest version of RPi OS and its packages, please update the system by entering below commands:

```
sudo apt-get update  
sudo apt-get upgrade -y
```

7. Expand Filesystem

(optional)

To use all of available space on the SDCard, expand the filesystem by running:

```
sudo raspi-config
```

Select **Advanced Options > Expand Filesystem**

Then reboot the system.

8. Others

(optional)

Please read the [Save Power](#) post.

Show who is logged on and what they are doing

Use `w` command from `procps` package.

```
08:53:52 up 2:21, 2 users, load average: 0.02, 0.06, 0.07
USER      TTY      FROM          LOGIN@      IDLE   JCPU   PCPU WHAT
pi        pts/0    fe80::1936:b4d4: 06:34      0.00s  1.54s  0.05s w
pi        pts/1    fe80::1936:b4d4: 06:34      2:18m  0.74s  0.74s -bash
```