CANAKIT RASPBERRY PI 4
QUICK-START GUIDE
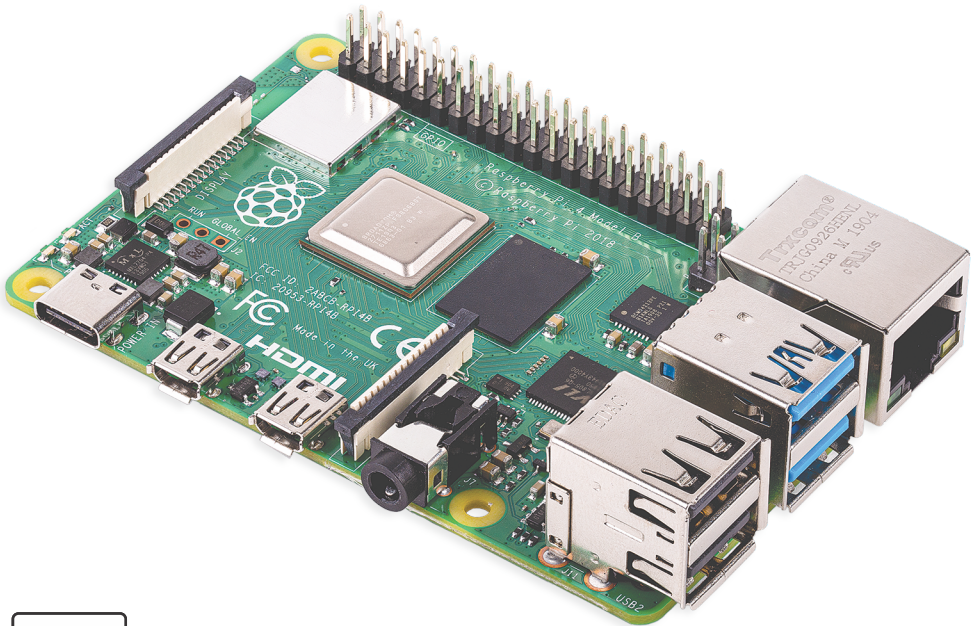
PI4
REVISION 4.0

CanaKit™

Congratulations on your purchase from CanaKit and welcome to the exciting world of the Raspberry Pi! To setup your new Raspberry Pi, you will typically need the following items:

- MicroSD card (pre-loaded with NOOBS* recommended)
- 3A **USB-C** power adapter
- **Micro** HDMI cable
- Monitor or TV with HDMI input
- Keyboard and mouse
- [Optional] Case to hold and protect your Raspberry Pi
- [Optional] Set of heat sinks to keep the Raspberry Pi running cool
- [Optional] Cooling fan for high performance usage
- [Optional] Ethernet cable for connection to a wired network
- [Optional] USB MicroSD card reader for use on your PC or Mac in case you need to re-program the MicroSD card.

* NOOBS is designed to make it easy to select and install operating systems for the Raspberry Pi without having to worry about manually imaging your MicroSD card.

If you purchased one of CanaKit's Raspberry Pi Starter Kits, it will include many of the above items depending on the specific kit. For a complete selection of CanaKit Raspberry Pi boards, kits and accessories, visit your favorite CanaKit retailer or our website at:

www.canakit.com/raspberry-pi

facebook.com/CanaKitCorp

@canakit

CANAKIT WARRANTY REGISTRATION

Your purchase comes with a CanaKit Limited Warranty. In order to take advantage of this warranty, you must activate it within 30-days of purchase by registering at:

www.canakit.com/warranty

UPDATES

The Raspberry Pi and corresponding software is constantly evolving with frequent changes and revisions. Therefore, some screen-shots shown in this guide may look different depending on the specific version of the software. For the latest version of this guide, please refer to:

www.canakit.com/pi

SUPPORT & RESOURCES

At CanaKit, we would like to ensure your complete satisfaction. If you purchased a kit from us, please inspect the contents of your kit and do not hesitate to contact us should you have any issues. You can reach us at:
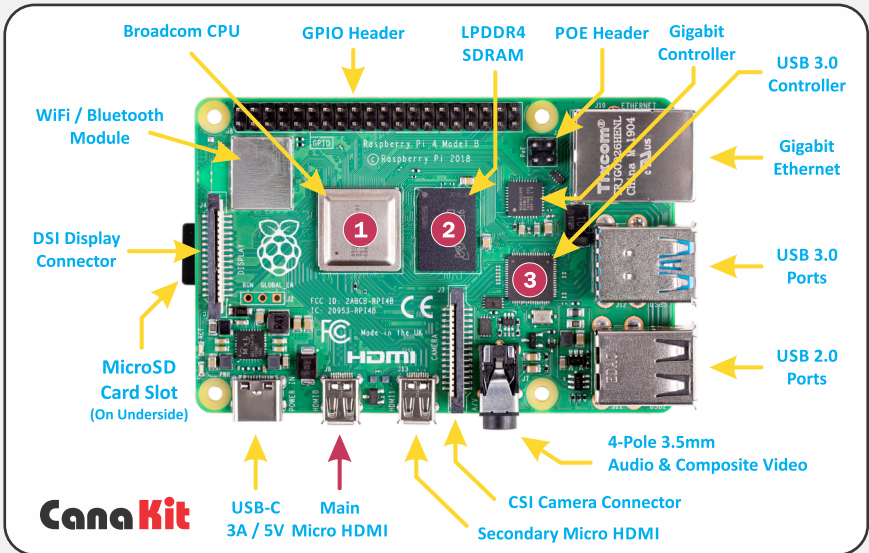
help@canakit.com

To learn more about the Raspberry Pi, refer to the Raspberry Pi Foundation Resources page at:

www.canakit.com/pi-resources

For Raspberry Pi related technical support, a great place to start is the official Raspberry Pi Foundation forums at:

www.canakit.com/pi-forums

GETTING STARTED

Broadcom CPU — GPIO Header — LPDDR4 SDRAM — POE Header — Gigabit Controller — USB 3.0 Controller — WiFi / Bluetooth Module — Gigabit Ethernet — DSI Display Connector — USB 3.0 Ports — MicroSD Card Slot (On Underside) — USB 2.0 Ports — USB-C 3A / 5V — Main Micro HDMI — CSI Camera Connector — Secondary Micro HDMI — 4-Pole 3.5mm Audio & Composite Video

1. If you have a case, start by installing the Raspberry Pi inside the case. To avoid damaging your MicroSD card, do NOT insert the card until the board is installed in the case. You can find video instructions for CanaKit cases at:

www.canakit.com/pi-case

2. Optionally, if you would like to use heat sinks to keep the Raspberry Pi running cool, first peel off the protective film from the bottom of each heat sink and then press each one firmly onto the corresponding chip. The larger square heat sink should be placed on the Broadcom CPU **(1)**, the rectangular one on the SDRAM chip **(2)**, and the smaller square one on the USB 3.0 Controller **(3)**. See the three numbered locations in figure above.

3. Also optionally, if you intend to use your Raspberry Pi for high performance applications, you may add a CanaKit cooling fan if your case supports it (e.g. when using a CanaKit Raspberry Pi 4 case). In this case, connect the red and black wires to the GPIO header pins 4 and 6 as indicated below. You may also choose to operate the fan at a slower speed for a quiet operation. In this case, connect the red wire to pin 1 instead.
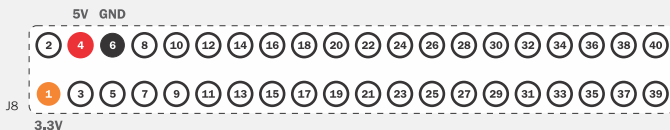
4. Insert a MicroSD card pre-loaded with NOOBS version 3.1.0 or later into the MicroSD card slot **on the bottom side** of the Raspberry Pi. If you don't have a pre-loaded MicroSD card you can find instructions on how to make one in Appendix 1 and 2 (Page 12 and 13).

5. Connect a keyboard and mouse to the USB ports.

6. Connect a HDMI monitor or TV to the Raspberry Pi using a **Micro** HDMI cable connected to the **Main** Micro HDMI port (labeled HDMI0). Ensure you have connected the cable to the HDMI0 port **(port nearest to the USB-C power port)** and that your monitor or TV is turned on and the correct input is selected. If you use the secondary port, you will not see anything on the screen when the Raspberry Pi starts to boot.

7. Once all connections have been made, connect the 3A USB-C power adapter to the board. When the power is connected, the Raspberry Pi will start to boot and you should be presented with the following menu.
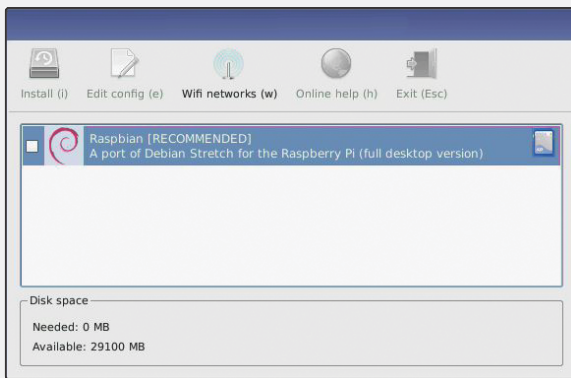
NOTE: If the device stops at the rainbow splash screen as shown to the right, or there is nothing displayed, ensure you are using Raspberry Pi 4 compatible software such as NOOBS 3.1.0 or later. Refer to the troubleshooting section on Page 14.
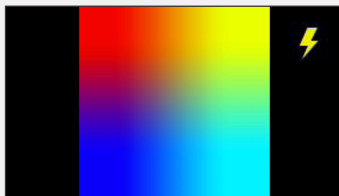
TIP: Once an Operating System has been installed, the NOOBS menu will no longer appear. If you need to get back to the NOOBS menu, press and hold the SHIFT key on your keyboard when turning on the Raspberry Pi.

8. If you intend to use an Operating System other than Raspbian, connect the Raspberry Pi to your network using an ethernet cable. You can also connect to your WiFi network by clicking "Wifi networks".   Once an Internet connection is detected, you will be presented with additional choices of Operating Systems to install.

9. Select "Raspbian" or your choice of Operating System(s) from the menu. Click "Install" to begin the installation process.

10. NOOBS will now start the installation of the selected Operating System(s). This process will take a few minutes and you will see a message indicating the installation has completed. Press OK and the Raspberry Pi will reboot.

11. Once the Raspberry Pi has re-started, follow the Operating System setup wizard to set initial system configuration parameters.

RASPBIAN BUSTER

Buster is the latest release of Raspbian at the time of writing and it comes loaded with many applications. The first time you start your Raspberry Pi with Raspian, it will automatically start the setup wizard to set system configuration parameters, such as default WiFi Country (required for WiFi operation), Password, Hostname, Locale, Timezone and Keyboard Layout. If you need to change any of these settings, you may access the Raspberry Pi Configuration tool found under the Preferences entry of the Main Menu.
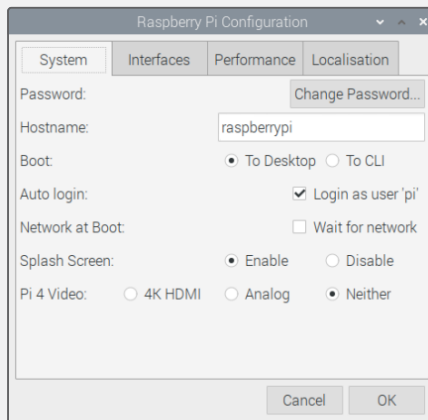
SHUTTING DOWN THE RASPBERRY PI

Like any computer, it is very important that the Raspberry Pi be shutdown properly so that the MicroSD card File System is not corrupted. If you are in the graphical desktop interface, you can simply click "Menu" and then select "Shutdown". On the other hand, if you are in the command line interface, you can type the following command:

```
sudo shutdown -h now
```

RASPBIAN WIFI CONFIGURATION

You may connect to a WiFi network by clicking on the network icon on the top right of the desktop. This should bring up a list of available WiFi networks.
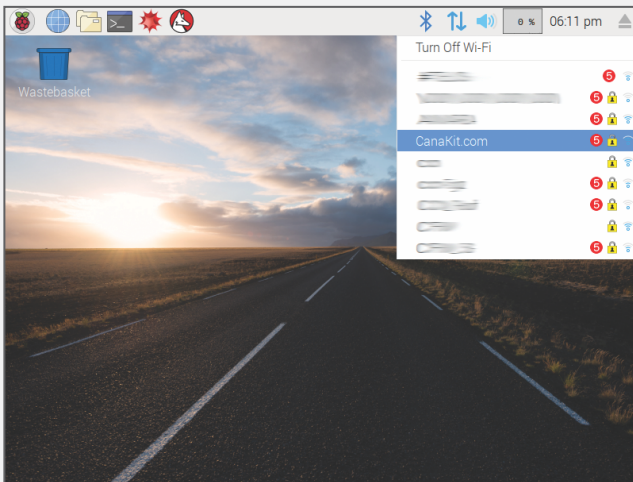
Select your desired network and you will be prompted for the network password. Once a successful connection is made, the network icon will change to a WiFi signal icon. Clicking the icon will now show the currently selected network with a green checkmark besides it. Hovering the mouse over the icon will show your current IP address.

Getting Started with Electronics

As well as being a fully functional computer, the Raspberry Pi is a great tool to introduce yourself to the world of electronics. Through the use of the General Purpose Input/Output (GPIO) port of the Raspberry Pi, you can connect to the external world and create electronic projects very easily.

Two simple examples are shown in this guide to get you started. The first example allows the Raspberry Pi to simply blink an LED. The second example allows the Raspberry Pi to control an LED through a push-button switch. For these examples, you will require the following components:

- Small prototyping breadboard
- 4 pieces of male-to-female jumper wires
- 1 piece of male-to-male jumper wire
- An LED
- A 220 Ohm Resistor
- A 10K Ohm Resistor
- A push-button switch

If you purchased a kit such as the CanaKit Raspberry Pi Ultimate Kit, you will already have these components; otherwise, they can be purchased separately from your favorite CanaKit retailer.
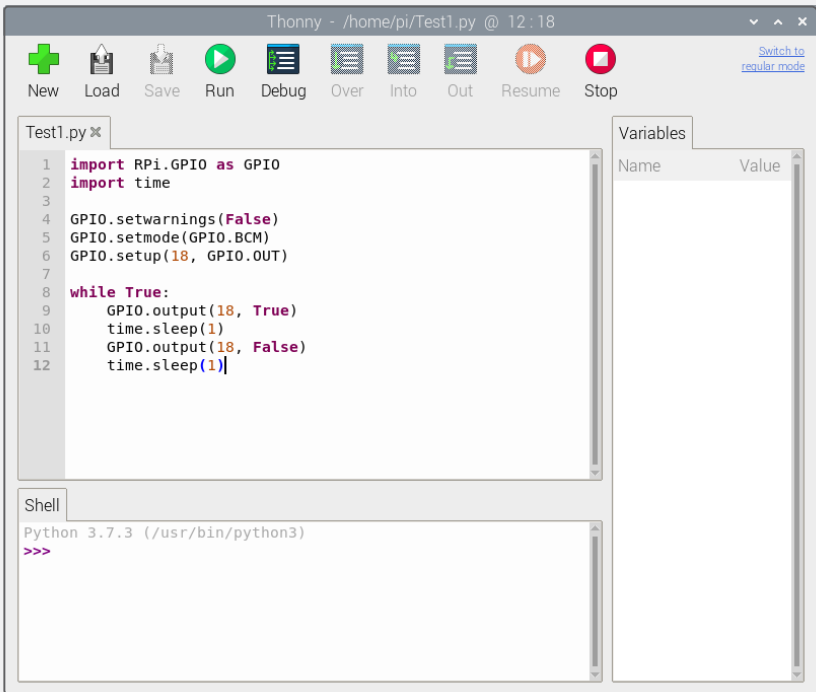
Important Notes

You must shut down your Raspberry Pi and disconnect the power before making any connections between the GPIO port and your electronic circuit. Failure to do so can damage your Raspberry Pi.

Care must be taken to ensure the electronic circuit that you connect to the Raspberry Pi is correct and all connections are done with correct polarity. Failure to connect electronic circuits properly to the GPIO port can damage your Raspberry Pi. It is therefore important to double check all connections before applying power to the Raspberry Pi.

GPIO PORT AND PYTHON

The General Purpose Input/Output (GPIO) port of the Raspberry Pi can be controlled in various ways but the examples in this guide will use the Python 2 programming language. In order to run the code for each example, follow these steps:
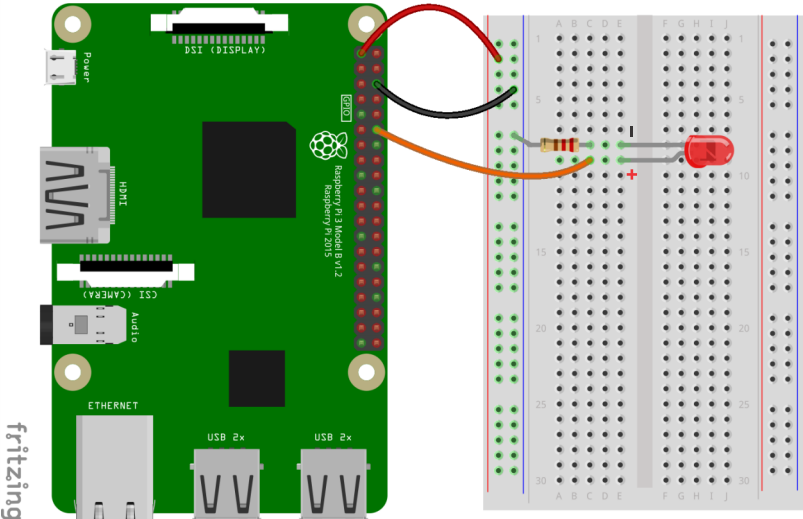
1. From the main menu in Raspbian, choose Programming -> Thonny Python IDE.

2. In the main code area, type the example code exactly as it appears. Note that the Python language is case sensitive, so ensure every character is typed exactly as shown in each example.

3. Save your file by clicking the "Save" button and finally click "Run" to run your code. If there were no errors in your code, the program will now be executed.

BLINKING AN LED

To blink an LED, use three male-to-female jumper wires and a 220 Ohm resistor (red, red, brown) to connect the LED to the GPIO port as shown below.

Note that it is important for the LED to be connected with correct polarity or it will not light up and you may damage the LED. The longer leg of an LED is called the Anode (+) and the shorter leg is called the Cathode (−). In this example, the shorter leg (Cathode) is to be connected to the resistor.
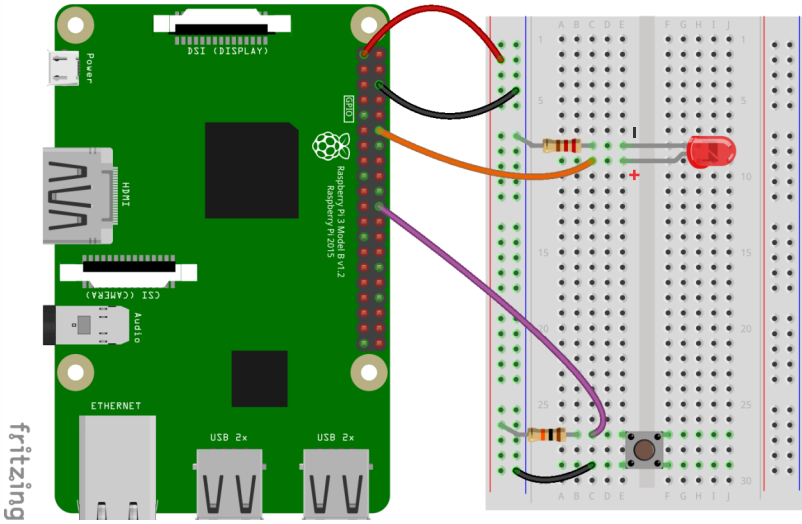


```python
import RPi.GPIO as GPIO
import time

GPIO.setwarnings(False)
GPIO.setmode(GPIO.BCM)
GPIO.setup(18, GPIO.OUT)

while True:
    GPIO.output(18, True)
    time.sleep(1)
    GPIO.output(18, False)
    time.sleep(1)
```

CONTROLLING THE LED WITH A BUTTON

This example builds upon the previous example by adding a push-button switch that will control the LED. Use an additional male-to-female jumper wire, a male-to-male jumper wire, and a 10K Ohm resistor (brown, black, orange) to connect the push-button switch to the GPIO port.


```python
import RPi.GPIO as GPIO
import time

GPIO.setwarnings(False)
GPIO.setmode(GPIO.BCM)
GPIO.setup(18, GPIO.OUT)
GPIO.setup(25, GPIO.IN)

while True:
    if GPIO.input(25):
        GPIO.output(18, False)
    else:
        GPIO.output(18, True)
```

MORE PROJECTS

For more projects using the Raspberry Pi GPIO port, please visit:

www.canakit.com/pi-projects

GPIO REFERENCE

Use the guide below to easily identify each of the 40-pins of the GPIO port.
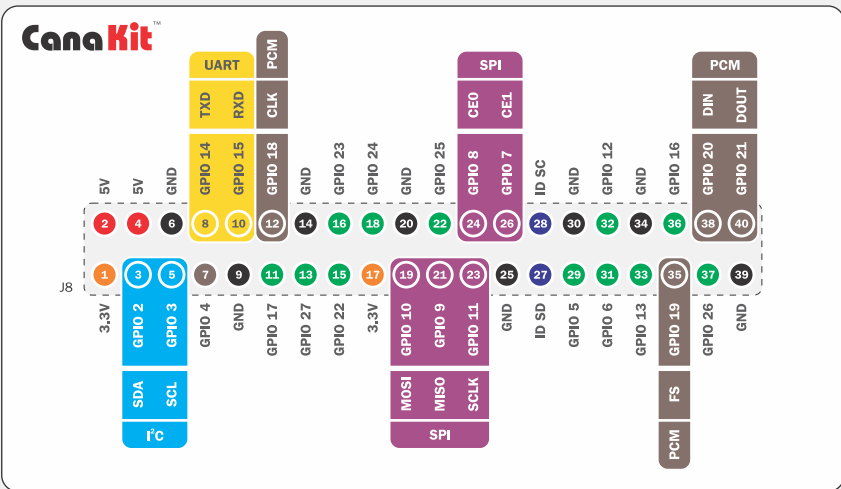
NOOBS (New Out Of Box Software) is an operating system installation manager for the Raspberry Pi and is designed to make it easy to install select operating systems for the Raspberry Pi without having to worry about manually imaging your MicroSD card.

If you don't have a pre-installed NOOBS MicroSD card, or if you need to re-install NOOBS, follow the instructions below.

To install NOOBS to a MicroSD card, first you must ensure the memory card is properly formatted. If using Windows, ensure to format the MicroSD card using the correct tool as follows:

• When formatting cards 32 GB or smaller, use the tool called "SD Memory Card Formatter" found at:

www.canakit.com/tools/sdformatter

• When formatting cards 64 GB or larger, use the tool called "FAT32 Format" found at:

www.canakit.com/tools/fat32format

On Linux or Mac OS you can use the standard formatting tools already built-in. On a Mac, this means using the Disk Utility application.

When formatting, always ensure the correct drive is selected so that you do not accidentally format a different drive.

Once the MicroSD card is formatted properly, download, unzip and simply copy-paste **the contents inside** the NOOBS ZIP file onto the MicroSD card. You can download the latest version of NOOBS at:

www.canakit.com/downloads/noobs

If you would like to install an operating system image that is not available through NOOBS, the easiest way is to use a great utility called Etcher to image your MicroSD card. Etcher is available for Windows, Mac and Linux.

**1.** Download and install the appropriate version of Etcher from:

www.canakit.com/tools/etcher

2. Download your OS image. Care must be given to ensure you download an OS image compatible with your specific Raspberry Pi board version. For example, an OS image designed for the Raspberry Pi 3 may not work on a Rasppbery Pi 4.

3. Run Etcher and select the OS image you downloaded.

4. Attach your MicroSD card to your computer. Etcher should detect it and select it automatically, **but ensure the correct drive is selected.**

5. Click Flash. Etcher will automatically format the card before writing and verifying the image.
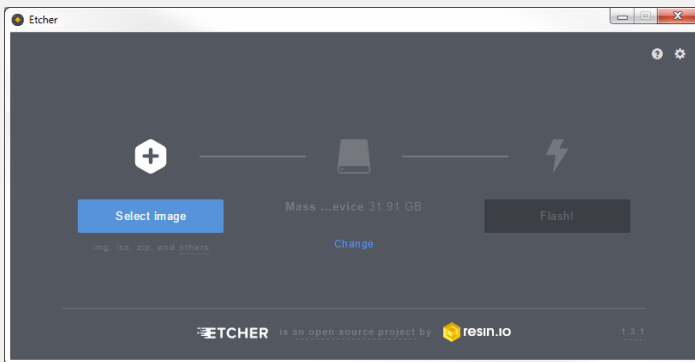
TROUBLESHOOTING

Problem: I see a rainbow splash screen but the Raspberry Pi does not boot.
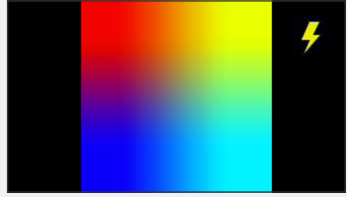
Solution: Ensure your monitor or TV is connected to the Main (HDMI0) Micro HDMI port (the one closest to the USB-C power port). Also ensure you are using Raspberry Pi 4 compatible software such as NOOBS 3.1.0 or later. Note that if you take your Micro SD card from an older model Raspberry Pi, it may not work on the Raspberry Pi 4.

Problem: I see the red power light illuminated on the board, but there is no other activity and nothing is displayed on my screen.

Solution: First ensure your monitor or TV is connected to the Main (HDMI0) Micro HDMI port (the one closest to the USB-C power port).

Second, check that the MicroSD card is fully seated all the way in the MicroSD card slot of the Raspberry Pi board itself. Note that the device may NOT be able to boot if using the card through a USB card reader dongle plugged into a USB port.

Third, ensure the card is properly formatted with compatible software such as NOOBS as explained in Appendix 1 (Page 12) , or another compatible operating system as explained in Appendix 2 (Page 13) in order to be able to boot. Special formatting is required for cards that are 64GB or larger.

Finally, if the Raspberry Pi will still not boot, it is possible but rare that the device EEPROM has become corrupted. Follow the recovery instruction on the Raspberry Pi website at the following link for more information:
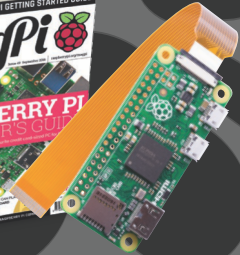
www.canakit.com/pi/recovery

If you have a problem not listed above, please visit **www.canakit.com/pi** for more troubleshooting guides or email us for assistance:

help@canakit.com

CanaKit™

PI4
REVISION 4.0