

# Getting started with your Raspberry Pi Maker PCB

## Required component summary:

1x printed circuit board (PCB)	4x 1k $\Omega$ resistors
1x red LED	2x 330nF capacitors
1x amber LED	1x Thermistor 10k $\Omega$ NTC
1x green LED	1x Phototransistor
1x RGB LED	2x tactile buttons
6x 470 $\Omega$ resistors	1x passive buzzer
3x JST sockets + plugs with leads	1x USB type B micro socket
1x 1row x 6P female yellow header	3x 1row x 5P female green headers
1x 1row x 4P female blue header	3x 1row x 3P female black headers
1x 1row x 7P female black header	1x 2row x 20P female black header
2x 1row x 3P male black header	1x + 1x 1row x 2P male black header + jumper
2x 3D printed PCB 'stands' + 4x 6mm M2 self-tap screws	2x 3D printed Raspberry Pi 'stands' + 4x 6mm M2 self-tap screws

The aim of this evolving project is to provide access to an expanding library of example code to allow a digital maker to explore and control many different components and devices.

This is achieved by using a custom PCB with a set of defined components, listed above, to assemble a populated module that can connect to any of the family of Raspberry Pi single board computers (SBCs) with 2x20 GPIO pins.

Example software is available to download to Raspberry Pi SBCs along with a "*Raspberry Pi Maker PCB Usage Documentation*" PDF providing assembly and detailed usage instructions, along with other support documents.

Whilst any model of 2x20 GPIO pin Raspberry Pi is OK, if a new Pi is being purchased the Raspberry Pi5 or Pi400 with at least 2GB of memory is recommended as well as a SD card that is at least 32GB. You should also be using the latest Bookworm version of the operating system. If you have an earlier operating system version, you should carry out an update or create/install a new SD card before installing the Raspberry Pi software and documentation detailed overleaf, for the use of this Maker PCB.

## Software & documentation download:

To get started with a Raspberry Pi, you need to set up and configure your Pi with a screen, keyboard plus mouse and connect it to the internet, but this is not covered here as other publicly available resources can help you do this.

With your Raspberry Pi started in 'Desktop' mode and connected to the Internet, a usage document (PDF) for the Kit as well as other support documents and all the software for each project and method can be downloaded to your Raspberry Pi by running the following commands in an opened 'Terminal' window.

N.B. the \$ sign in the command lines below signifies the prompt character in your terminal application, which you do not need to type.

First run the following command to download an initial control script where you substitute your username for YOURUSERNAME:

```
$ wget -O /home/YOURUSERNAME/RPi_maker_PCB5.sh https://onlinedevices.org.uk/dl1389  
(take great care to type this correctly and if you get an error then recheck it)  
-O above is an upper case letter O and the last set of characters are lower case DL1389
```

You then run the following two commands to prepare and run the downloaded control script, which when run will then download all the files and store them on your Raspberry Pi in a main folder and various subfolders starting at /home/YOURUSERNAME/RPi\_maker\_kit5, as well as installing the various libraries/modules needed by the software examples.

```
$ chmod +x RPi_maker_PCB5.sh  
$ ./RPi_maker_PCB5.sh
```

The downloaded documentation files provide you with very detailed information on the various ways that the populated PCB can be used.

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Only 5V DC power supplies, 5V rechargeable battery banks, or 4xAA battery packs should be connected to the PCB's separate 'power bus'. In addition the 'power bus' should only be interconnected to the PCB's main 5V power line, using the 'jumper' connection point, if the supply to the 'power bus' is at a safe level for the Raspberry Pi.

Only approved 5V DC power supplies should be used to power a Raspberry Pi, please refer to any Regulatory Compliance and Safety Information provided with your Raspberry Pi.

For each of the projects/methods described in the main documentation for the Raspberry Pi you should ensure that the Pi is not powered when connecting the PCB to the Raspberry Pi.

Assembling a complete PCB is a significant soldering task for which some experience at soldering is needed, but with some adult supervision, this Maker project is aimed at ages 10 and above. However, with an adult carrying out the soldering of components onto the PCB, ages as young as 7 should be able to run the projects, although at this early age not all the physics and maths associated with the projects may be fully understood.