



# Bright Pi v1.0 Assembly Instructions

When you purchased your Bright Pi v1.0 kit, you should have received an anti-static bag with some components in it which will require soldering together in order to get the Bright Pi up and running and connected to your Raspberry Pi (or other single board computer or I2C enabled microcontroller). Below we have put together some simple assembly instructions to get you up and running with the Bright Pi v1.0.

## **Kit contents**

Inside the anti-static bag you should have received the following items:

- 1 x Bright Pi PCB (with LED driver chip pre-assembled)
- 4 x bright white LEDs in small ziploc bag (high quality Cree LEDs)
- 8 x bright IR LEDs (high quality LITEON LEDs)
- 1 x right angle header
- 1 x 4 way header cable, 20cm length
- 3 x M2 x 12mm nylon bolts
- 12 x M2 nylon nuts (to use as spacers as well)
- 3 x stickers
- 1 x info card

There are only three types of component that need to be soldered to the board – the bright white LEDs, the bright IR LEDs and the right angle 4 pin header connector. The location of the LEDs on the PCB is marked out with black circular arrows. The cathode of the LEDs (short leg) needs to be on the same side as the arrows point to on the PCB. As noted above, the four LEDs in a separate bag are the bright white ones, these are intended to go in the four corner spots around the edge (bottom left, top left, top right, bottom right). All of the other 8 LED locations should be filled with the IR LEDs. We would recommend soldering the IR LEDs first (as they are in the centre) and then the white ones around the edge last.

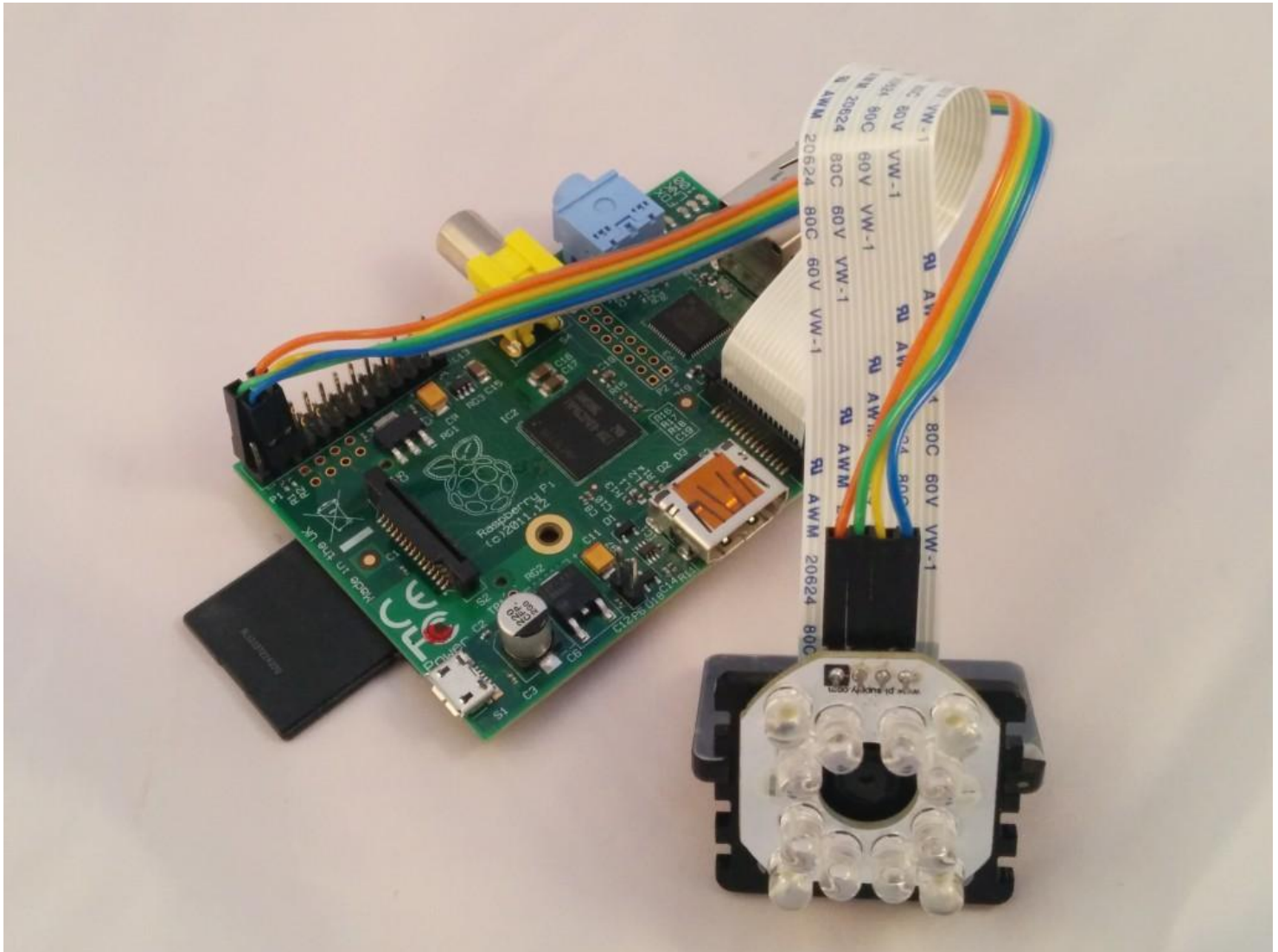
If you mix up which are the bright white and IR LEDs at any point, it is quite easy to tell the different between the two by simply looking down the centre of the LED from the top. As in the below picture you will notice that the white LEDs at each corner have a slight yellow tinge in the centre of the LED:



You can solder the header connector on whichever side you wish to on the board, however we recommend soldering the connector the opposite way to the LEDs (i.e. perform the soldering on the top side of the board, as shown in the above picture).

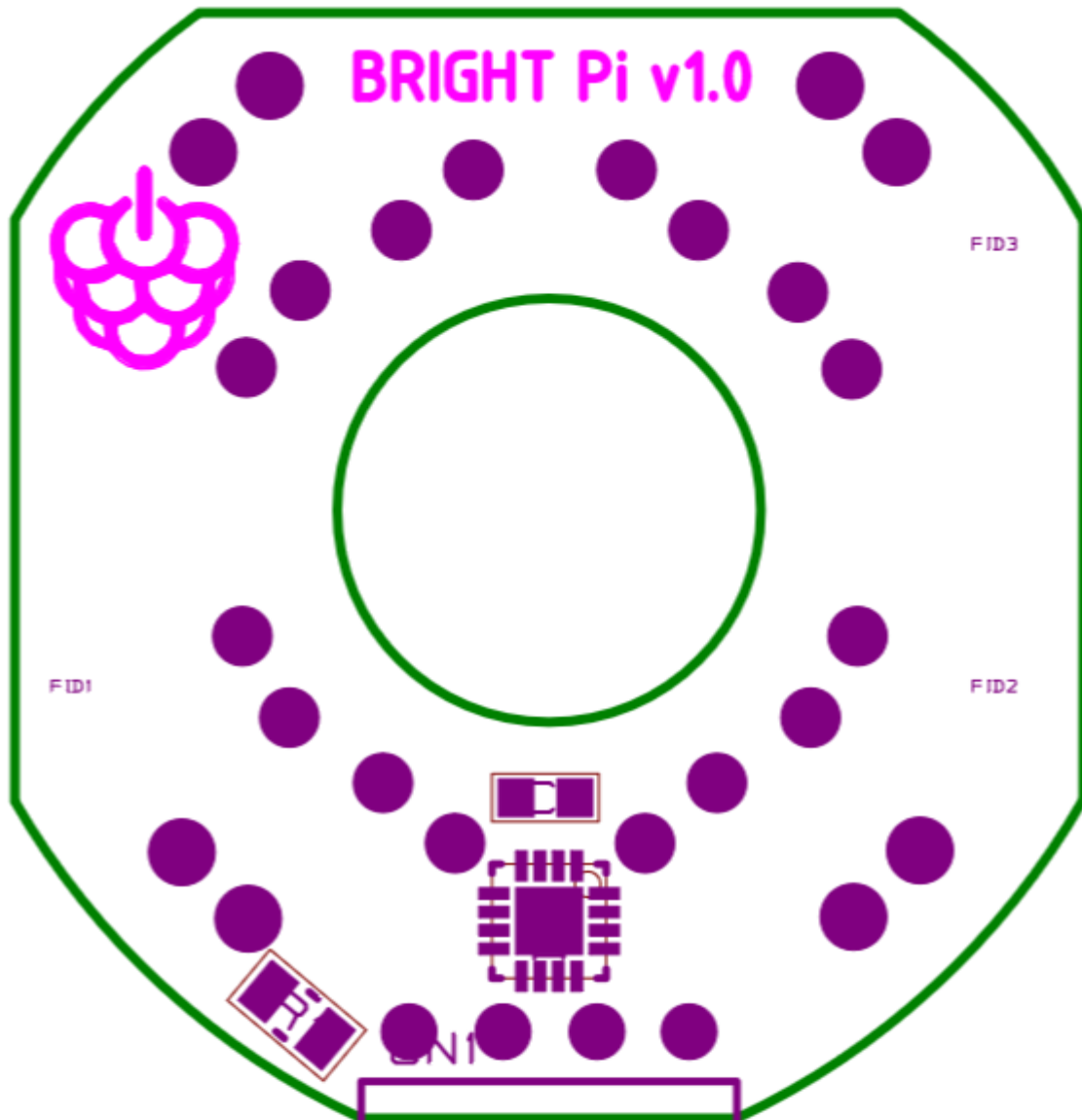
The soldering of this board is fairly straightforward, there are just a fair few components to solder so if you are an absolute beginner at soldering it may take you up to half an hour to complete. Experienced soldering gurus could easily complete the

entire job in under 10 minutes. Please be careful when soldering the bottom middle IR LEDs not to touch any of the joints of the small surface mount resistor or LED driver chip as this could damage the operation of the board.



Once you have finished soldering the board you are ready to connect the board up to the Raspberry Pi (or other I2C enabled main board) in order to start using the Bright Pi in your project. On the picture above you will see a square black mark on the PCB. That is the GND pin, which connects to physical pin 6 on the Raspberry Pi (this is the same for model A, B or B+). Moving along the header connector the next connector is the 5V feed which you should connect to physical pin 4 on the Raspberry Pi. The next pin along is the SCL pin for I2C communications which connects to physical pin 5 on the Raspberry Pi and finally the last pin on the header connector is the SDA pin for I2C communications which connects to physical pin 3 on the Raspberry Pi. The full pinout can also be seen on the image below (but please note this is a BOTTOM view of the Bright Pi (i.e. from the side with the LED driver chip and surface mount resistors mounted):

# BRIGHT Pi v1.0



FID1

FID3

FID2

SN1

SDA  
+5V  
SCL  
GND



# Bright Pi v1.0 Code Examples

To get the Bright Pi working on the Raspberry Pi, you need to enable I2C. You can find a great guide on setting up I2C on the Adafruit website.

Once I2C is all set up, then from command line to turn only all white LEDs on:

```
sudo i2cset -y 1 0x70 0x00 0x5a
```

To turn only all IR LEDs on:

```
sudo i2cset -y 1 0x70 0x00 0xa5
```

To turn all LEDs on:

```
sudo i2cset -y 1 0x70 0x00 0xff
```

Then you need to turn the gain up to full using:

```
sudo i2cset -y 1 0x70 0x09 0x0f
```

Then you need to turn brightness of individual LEDs up. For white:

```
sudo          i2cset          -y          1          0x70          0x02          0x32
sudo          i2cset          -y          1          0x70          0x04          0x32
sudo          i2cset          -y          1          0x70          0x05          0x32
sudo i2cset -y 1 0x70 0x07 0x32
```

For IR:

```
sudo          i2cset          -y          1          0x70          0x01          0x32
sudo          i2cset          -y          1          0x70          0x03          0x32
sudo          i2cset          -y          1          0x70          0x06          0x32
sudo i2cset -y 1 0x70 0x08 0x32
```

If you need to turn all the LEDs off:

```
sudo i2cset -y 1 0x70 0x00 0x00
```

The above instructions assume you have a Rev 2 (or newer) Raspberry Pi. If you are using an original Rev 1 Model B Raspberry Pi then you will need to change the “-y 1” part to “-y 0” as the Rev 1 Model B Raspberry Pis (with 256 MB of RAM) use I2C port 0, whereas the newer models use I2C port 1.

That’s it really! You can vary brightness either by changing overall gain down, or by changing each individual LEDs brightness down. This can be done from within Python too and we will make guides up for this very soon. We are also intending to create an easy to use Python library as well as hopefully introducing support in Scratch.

For those that would like a bit more information about the exact operation of the pre-assembled LED driver chip on the board, it is a Semtech SC620 part. You may notice from the datasheet that there are only 8 controllable channels on this driver chip, and 12 LEDs in total. Each white LED is individually controllable, whereas the IR LEDs are controllable in banks of two. The banks of two IR LEDs correspond to the two LEDs closest to each white LED at the corner.