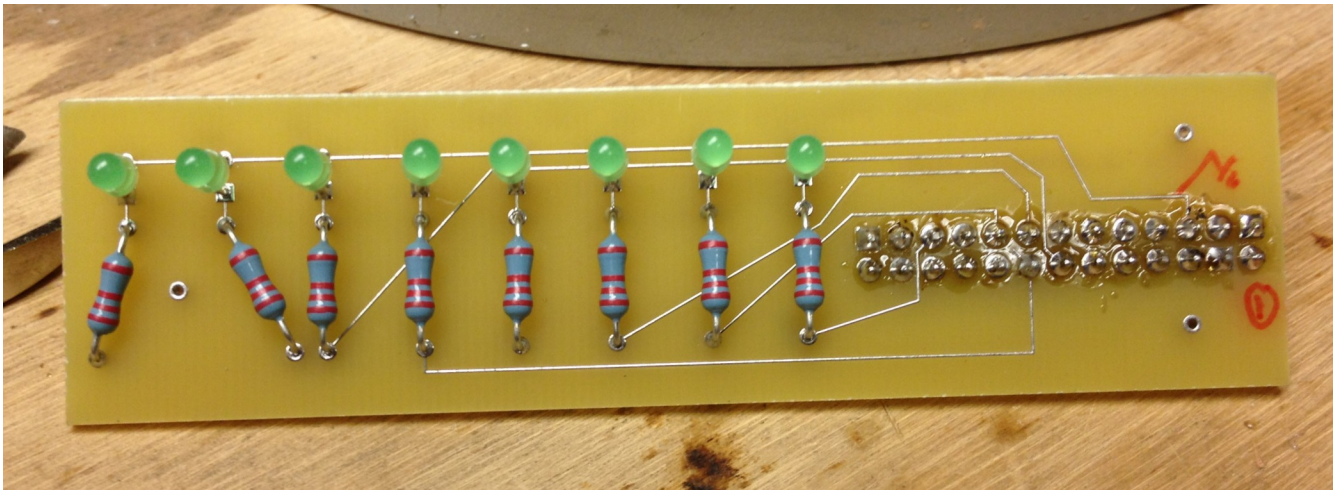
The GPIO LED board for Raspberry Pi



Assembly and User Documentation

applies to GPIO LED board rev 3

Document Revision 29 April 2013

Introduction

The Raspberry Pi is an excellent experimenter's Linux platform. Not only do you get a full Linux system, but it has a number of pin outs that can sense and control other devices.

The RPi board has a standard 26 pin connector called the GPIO. All the pins you need to run some LEDs are in this connector. The question is how to get those pins to your LEDs. The GPIO LED board solves that problem.

Once assembled you can connect the GPIO LED board to your Raspberry Pi and start using software to turn the LEDs on and off. A good place to start is the Webiopi application that is available for free in the Raspberry Pi Store application on your RPi desktop.

The GPIO LED board is also a compatible plug in to the Shrimpware Bread Box.

www.shrimpware.com/breadbox

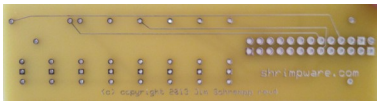
Be sure to check our web site for updates and links to information about the GPIO LED board:

www.shrimpware.com/GPIOLED

We hope you have fun with your new toy!
Jim Schrempp

Parts List

In your kit you should have:

		Description	Qty
1.		GPIO LED printed circuit board	1
2.		3mm LED	8
3.		2.2k ohm resistor	8
4.	 	26 pin board connector or 13-pin board headers	1 or 2
5.		26 conductor ribbon cable	1
6.		26 pin ribbon cable connector	2

You Will Need to Supply

A Raspberry Pi

Tools You Will Need

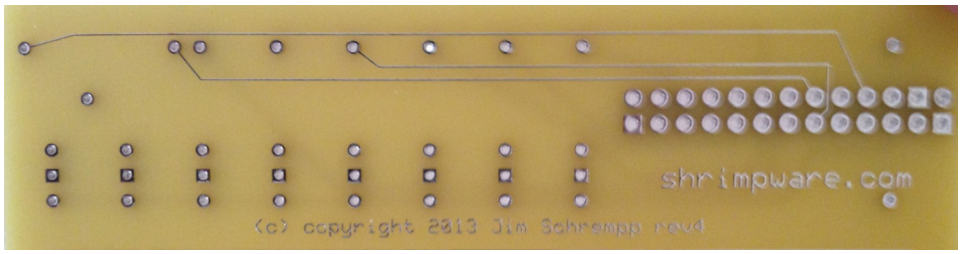
Long Nose Pliers
Wire Cutters
Soldering Iron and solder
Hammer (be gentle!)

Step 1 – Mount the Connector

You will need:

- 26 pin board connector

Place the circuit board on the table in front of you with the Shrimpware name facing up as shown.



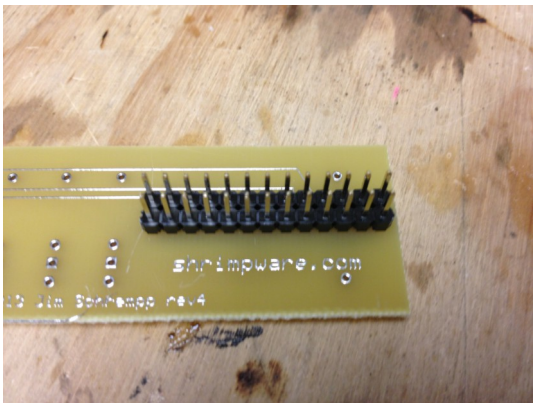
Hold the connector in your hand and note that it has an open space on one side. Orient the connector so that the open space is facing away from you.

Insert the connector into the board.

This is the correct orientation. Now solder the connector in place.

Option:

You may have received two sets of single line header pins instead of the connector. In this case...



Locate the ribbon cable 13x2 connector. Insert the long end of the header pins into the connector; this will hold the header pins in the correct position for soldering.

Place the short end of all 26 header pins into the circuit board. Now solder in place.

When the solder has cooled, gently pull the ribbon cable connector off of the pins.

Step 2 – Mount the Resistors

You will need

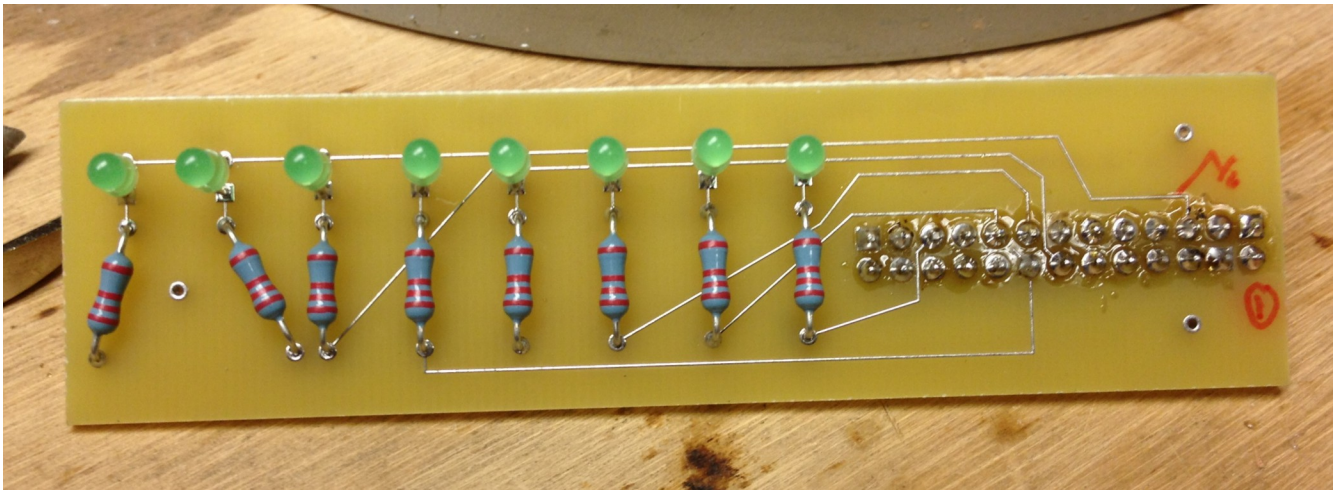
- 8 resistors

Turn the board over so that the connector is on the bottom. We will place the resistors on the

OPPOSITE side of the board from the connector.

Locate the holes for the 8 resistors as shown in the photo.

Bend the wires for the resistors, place them in the holes, and solder them in place.



Note, some boards have a slightly different configuration for the 1 resistor position. For the side of the resistor away from the LED, use the hole that has a circuit trace going to it. The hole without a circuit trace is to assist in manufacturing.

Step 3 – Mount the LEDs

You will need

- 8 LEDs

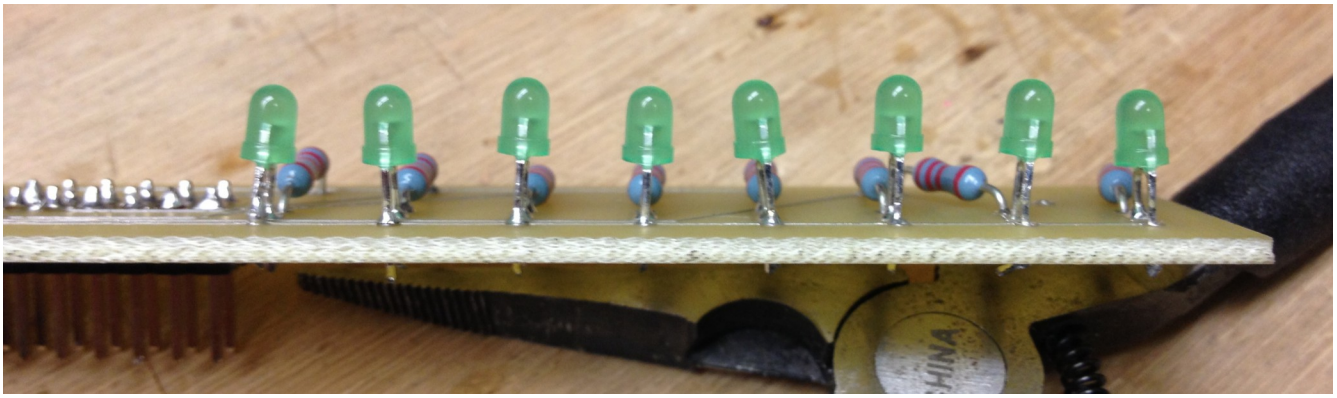
The LEDs will go on the circuit board on the OPPOSITE side from the connector.

Place the circuit board on the table in front of you as shown in the photo.

Locate the 8 pairs of holes.

Note that each LED has two leads, one of them slightly longer than the other. The shorter lead is the (-) lead. The (-) lead MUST go in the top most hole of each pair. If you look at the traces on the PCB you will see that one hole at each of the LEDs locations is connected together. This is the hole for the (-) lead of the LEDs.

If you plan to use your GPIO LED board with the Shrimpware Bread Box, then you need to mount each LED slightly above the PCB. Look carefully at the photo below to see how the LEDs are mounted to be just a bit higher than the resistors. Also note that the PCBs are mounted at an equal height from the board. This is not hard to do, but requires patience. Just take your time and you will be able to do it.



Step 4 – Assemble the Cable

You will need:

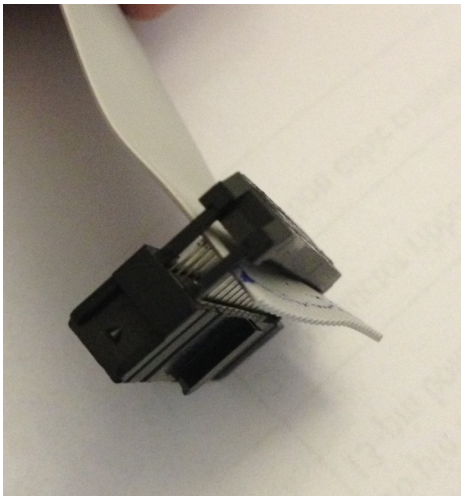
- 26 conductor ribbon cable
- 2 ribbon cable connectors

This step is, in some ways, the most delicate task.

Pick up the connectors and note that they each have a lug (a bump) in the middle of one side. You'll see that this lug makes it so the cable will only go in the board connector in one way. (If you have a kit with header pins it is still important to get the orientation of the cable connector correct.)

Now look at one of the connectors. DO NOT SNAP THE CABLE CONNECTOR TOGETHER. If you already have, then you need to buy more. (Available from www.jameco.com as part #746288-6)

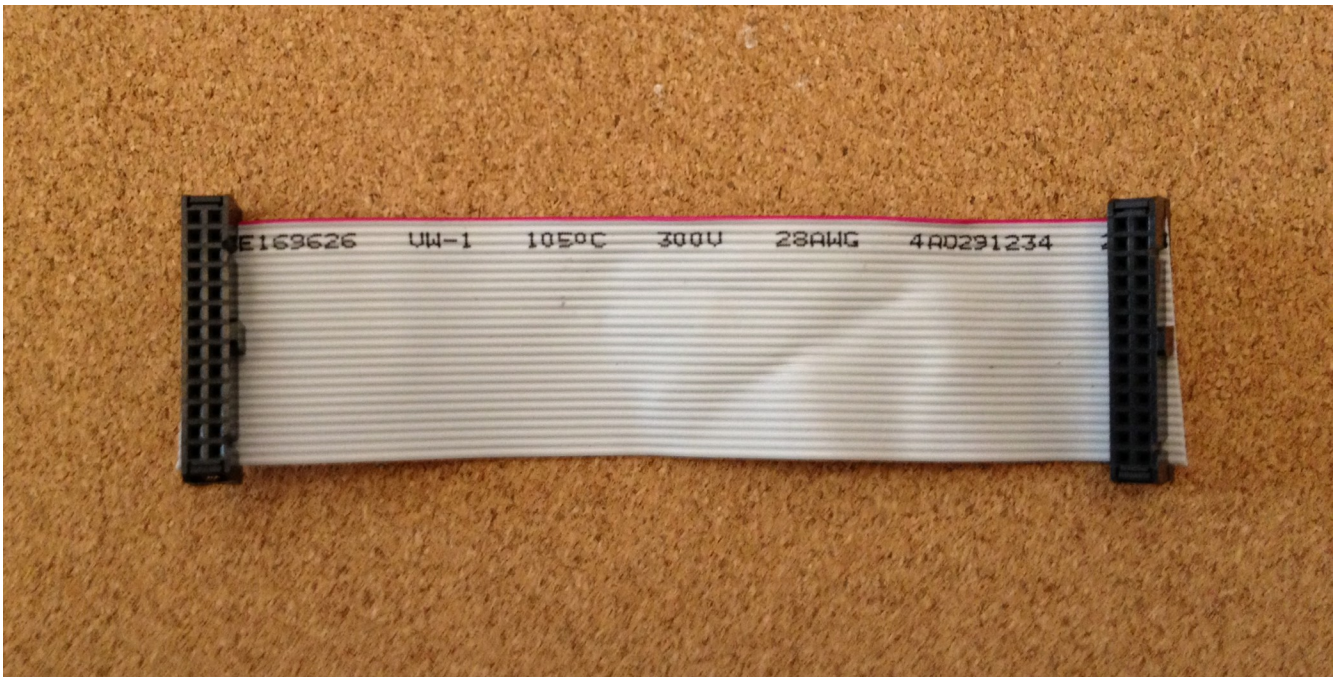
Lay the parts in front of you. Lay the cable right to left, red stripe at the top. On the right side place one connector with the bump to the right, pin insertion side down.



Now gently pull up the retaining clip of the connector so that the ribbon cable can be inserted. Push the retaining clip down just a bit, but don't penetrate the cable. Keep the cable in the connector at right angles, this is important.

With a hammer, give the retaining clip a solid direct tap. Hard enough to seat the retaining clip, but not so hard that you damage it.

Lay the ribbon cable in front of you again, with the red stripe at the top. Position the other cable connector on the other end of the cable, in the same orientation as the connector that is already on the cable. Both bumps to the right, both with pin insertion side down.



Now place the second connector on the cable and hammer it in place too.

Step 5 – Test It

You will need:

- The assembled GPIO LED board
- A Raspberry Pi with Webiopi installed

Before connecting the GPIO LED board to your Raspberry Pi you need to carefully inspect it. Look at each solder pad and make sure that there is no solder crossing between pads. This is particularly important at the 26 pin connector. Any solder that bridges two pins is a possible way to permanently damage your Raspberry Pi.

If you have an ohm meter you can test the resistance between the ground pin and the 5vdc pin; there should be infinite resistance. Also check between the ground pin and the 3.3vdc pin; there should be infinite resistance too. If either of these tests fail you should not connect you GPIO LED board to you Raspberry Pi.

Once you are sure that the GPIO LED board is correctly assembled, connect the ribbon cable to the 26 pin connector. In the photo see that the red stripe is near the edge of the GPIO LED board and that the bump (unseen) is at the LED side of the board.

On the Raspberry Pi, the other end of the cable attaches to the 26 pin GPIO connector. On the RPi the red stripe also goes towards the edge of the Raspberry Pi.

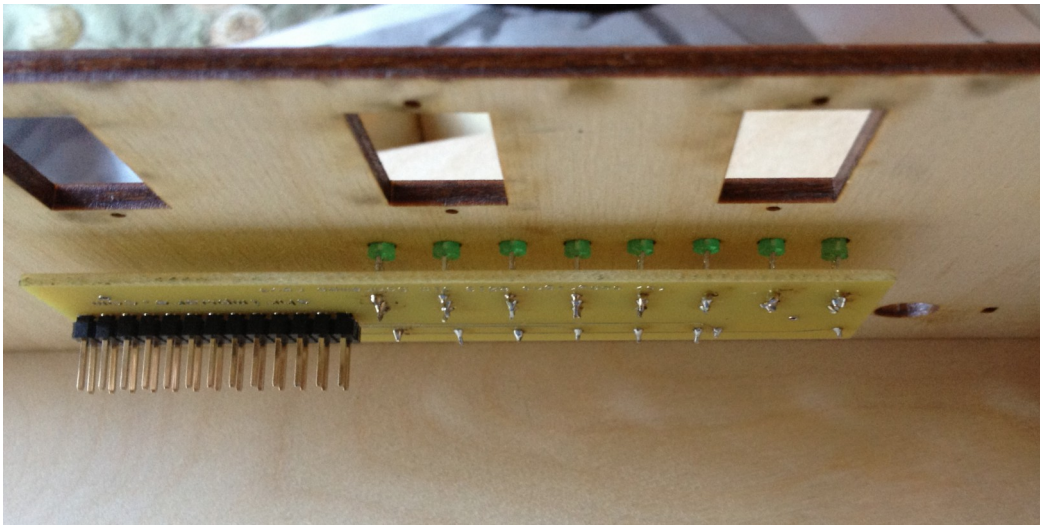
Now open a remote desktop to your RPi and bring up the Raspberry Pi store application. Download the free Webiopi application. When it is installed, go to My Software tab in the RPi store and double click the Webiopi application. In a minute this will bring up the Webiopi control page.

On the page click to make the pins OUT. Then click the little square of each pin and see the corresponding LED light up, or go out.

Ta-da!

Option – GPIO LED and the Breadbox

If you have purchased a Breadbox by Shrimpware.com then you may want to mount your GPIO LED board on it. The LEDs for this board press fit into the holes in the breadbox. This photo shows how the LED board fits the breadbox.



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