

BLiSo - Buttons, Lights, Sound

For the Raspberry Pi

Introduction

Thank you for purchasing this small module, designed to make exploring the GPIO port safe and easy. Hopefully the information provided in this document will be all that you need, however I welcome comments, questions and constructive criticism via email at colin@circuitsurgery.co.uk

Description

This is a small add-on board designed to fit directly onto the GPIO port of the Raspberry Pi. The purpose is to allow programming practice with the LED's showing the status of output pins and the buttons giving input ability. There are a total of nine LED lights, eight buttons and a piezo sounder on the reverse of the board. With the exception of the ninth LED, all are connected to an individual I/O port of the processor. The ninth LED shares a port with a button and can be selected by moving a link on the board. The port that is connected to the button or LED is configurable as a PWM port and naturally if practicing with that mode the LED is required to visualise the effects.

Getting Started

It is recommended that the included nylon pillar is fitted before installing the BLiSo onto the Raspberry Pi. This will give support to the board when the buttons are pressed and prevent damage to the GPIO pins. From the underside of the board and with the long edges of the base parallel to the bottom edge of the BLiSo, push the end of the pillar through the hole near the bottom right corner of the BLiSo until it clicks into place.

The BLiSo is installed onto the Raspberry Pi by simply pressing the header of the BLiSo onto the GPIO port. Note that the support pillar will sit nicely onto a version 2 model B Raspberry Pi board but there may be different component layouts for other versions of the Raspberry Pi which will require modification of the base of the pillar to suit.

When the Raspberry Pi is switched on, you may see the leftmost two LEDs illuminate and possibly even some others. This is normal and once you start programming the GPIO ports they will display correctly.

Programming

The first thing to note about the buttons is that those pins are held high (logic "1") and when the button is pressed the pin is taken low. So when read by the software all the buttons will show "True" and when pressed will show "False".

A simple test program for the BLiSo board may be downloaded from <http://www.circuitsurgery.com/sw/blisotest.py>

This *blisotest* script requires "wiringpi2-python" to be installed. Note that this is the Python-wrapped version of the software, necessary for this Python script.

Assuming you haven't already installed the wiringpi software, and if you are as yet unfamiliar with the Raspberry Pi, here are the steps that need to be taken to install the correct version of wiringpi for use with the test script.

1. Before installing "wiringpi2-python" you will need to install "python-dev" and "python-setuptools":
From the command line prompt, type:-
sudo apt-get install python-dev python-setuptools
Wait until the packages have been installed
2. Download the wiringpi2-python software, type:-
git clone https://github.com/WiringPi/WiringPi2-Python.git
3. Change to the wiringpi folder (careful with the capitalisation!):-
cd WiringPi2-Python
4. Run the setup script:-
sudo python setup.py install

With the "wiringpi2-python" now installed, you may return to the folder where "blisotest.py" is located and run the script as a super-user:-

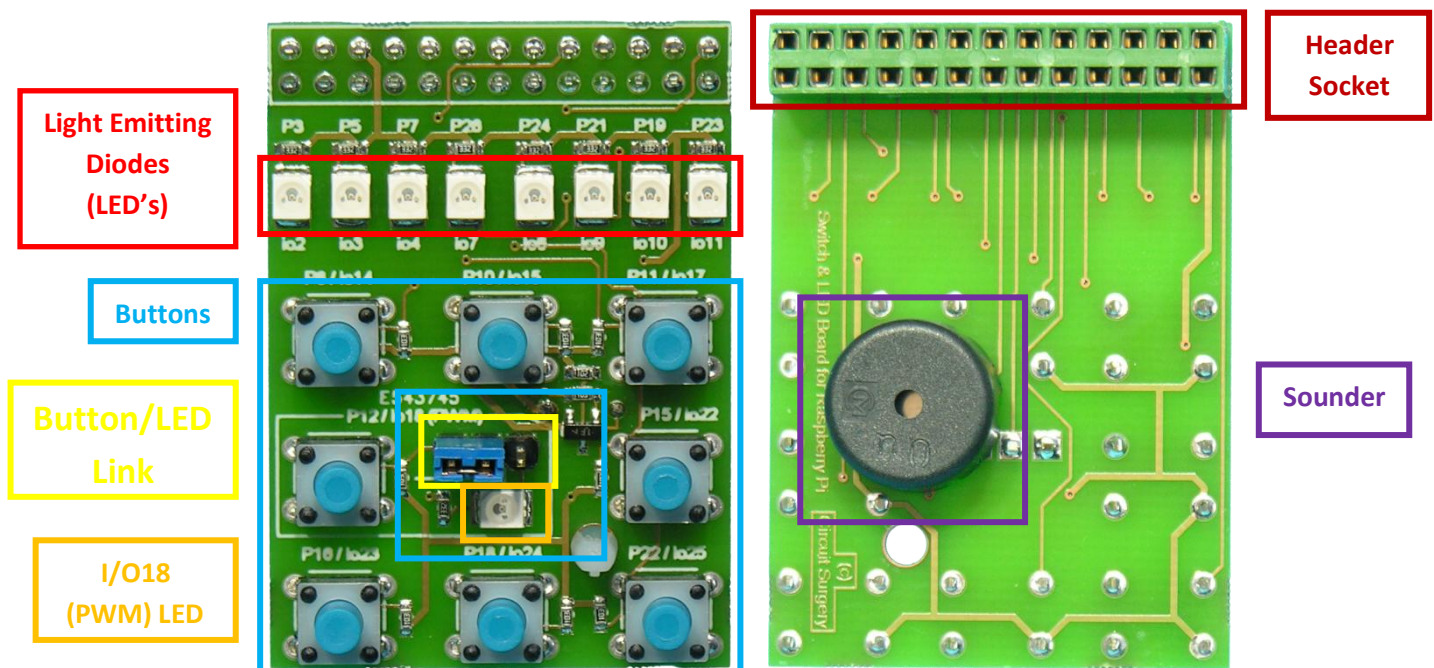
sudo python blisotest.py

This will now run through the test routine, displaying all the LED's, checking for button presses, show the effects of PWM on the ninth LED and finally give the sounder a quick warble!

The Board

TOP

BOTTOM



Pin 12 – GPIO 18

This pin may be configured either as a normal i/o or as a PWM (Pulse Width Modulation) output. For that reason, the link in the centre of the board allows you to select either the button or the LED for connection to that port. Moving the link to the left selects the button, and to the right selects the LED for a visual display of any PWM signal that may be programmed.

The Sounder

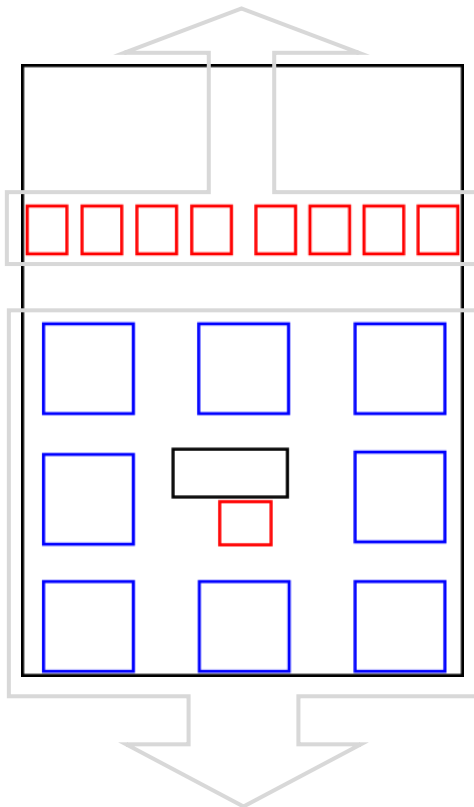
The piezo sounder mounted on the underside of the BLiSo is connected to pin 13 / GPIO 27. This is not a buzzer, and simply switching it on will have no effect! A signal of 4kHz (the resonant frequency of the sounder) needs to be applied to pin 13 (GPIO 27) to get it to make a sound. In other words its volume will be greatest when it receives a signal that changes between on & off (high/low) 4000 times per second.

Connections

TOP

LEDs

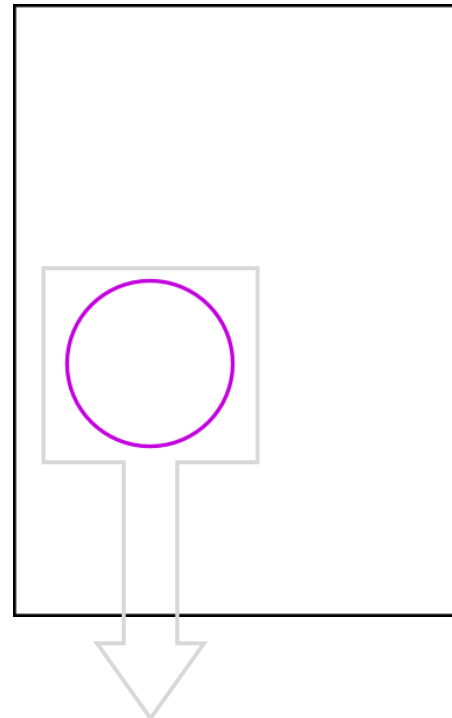
Pin Number		3	5	7	26	24	21	19	23
GPIO Port	Rev.1	0	1	4	7	8	9	10	11
	Rev.2	2	3	4	7	5	9	10	11



Buttons

Pin 8 GPIO 14	Pin 10 GPIO 15	Pin 11 GPIO 17
Pin 12 GPIO 18	 P 12/G 18	Pin 15 GPIO 22
Pin 16 GPIO 23	Pin 18 GPIO 24	Pin 22 GPIO 25

BOTTOM

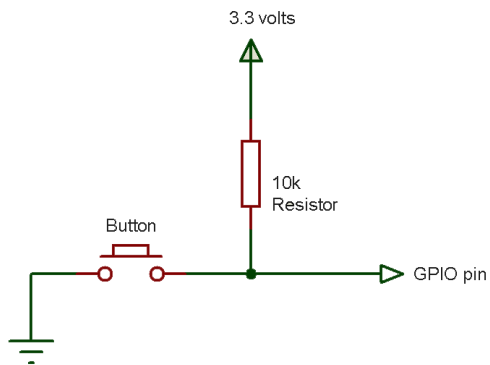


Sounder

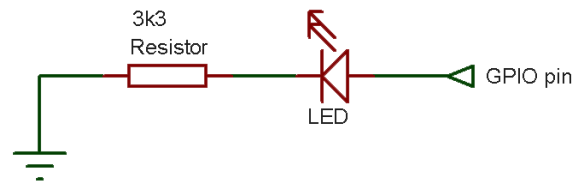
Pin 13 GPIO 27 (Rev.1-GPIO 21)

Circuit Diagrams

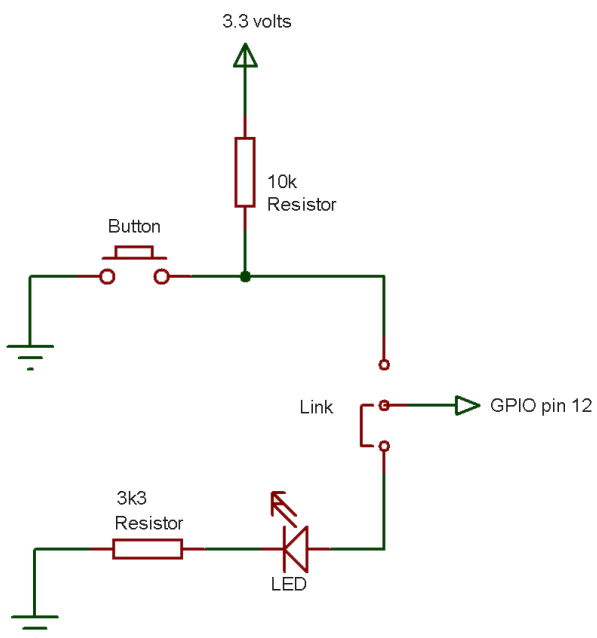
Below are the connection diagrams of the LED's, Buttons, Sounder and Button/LED PWM.



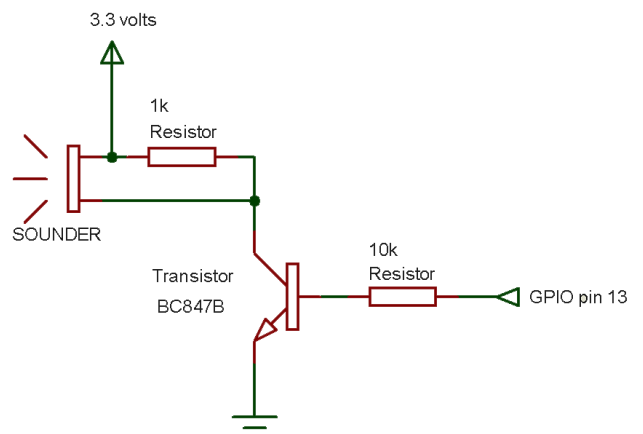
Button



LED



Button/LED Link arrangement



Sounder