ShrimpKey: Conductive Keyboard

This project demonstrates how to build a substitute for the MakeyMakey USB conductive keyboard.

Because it is constructed directly from component parts, it is cheaper and arguably more educational than a MakeyMakey. You can build the project by combining a Shrimp with a handful of resistors and diodes, a hacked USB cable and some jumper wires or crocodile clips.

Learning Outcomes

This project introduces the concept of a voltage divider. It demonstrates how a pull up resistor ensures an unambiguous signal from a voltage divider circuit.

From this starting point, advanced learners will be able to create their own button keypads, use potentiometers to control circuit behaviour, sense light levels using Light Dependent Resistors, Temperature and Acceleration Sensors using these key principles of analog electronics.

It also demonstrates the fundamentals of the Universal Serial Bus (USB). The circuit appears to laptops or tablets as a USB keyboard. The circuit proves that with just 2 wires connected and controlled in a suitable way, (plus power and ground wires) it's possible to emulate a device conforming to the USB Human Interface Device (HID) keyboard standard. Advanced learners will experiment with emulating different USB devices.

Build Process

As with all [@ShrimpingIt](http://shrimping.it) projects, the build should begin by following the instructions to build and program Blink.

Once your Shrimp is blinking, you can then proceed through the following builds. . .

1) Minimal Conductive Sensor

2) Minimal USB Keyboard

- add the minimum components for the circuit to be able to emulate a USB keyboard.
- upload code so that the circuit 'types' the phrase `Hello World!` every 10 seconds.
- plug the hacked USB cable into a computer, launch a suitable application, and see the typing appear on the screen

3) Minimal Conductive USB Keyboard

- add a single pull up resistor a ground wire and a contact wire
- Upload code which senses a human body making a circuit between the ground wire and the contact wire causes the USB Keyboard to 'type' the number 1
- plug the USB cable into a computer, launch a suitable application, and see the typing appear on the screen

4) ShrimpKey: Full Conductive Keyboard

- add the remaining 15 pull up resistors to create a total of 16 conductive sensors, making it possible to create compelling interactive demonstrations like the MakeyMakey demos below.