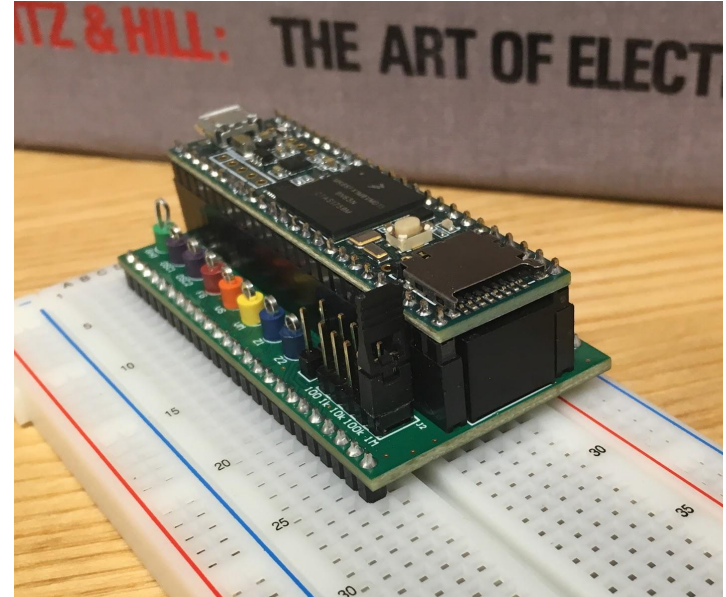


Welcome to your new Winterlab board!

This user manual will help you get a feel for how to setup your board and start making some measurements.

Setting up the board

1. Mounting the board on the breadboard
 - a. Attach your WinterLab board to your solderless breadboard as pictured:
 - b. Make sure that the orientation is correct (that the double row of pins is on the outside of the breadboard, as these pins are for power and ground and will cause a destructive short if mis-connected)
2. Plugging in the board:
 - a. The Winterlab board attaches to your computer via microUSB cable
 - b. The LED on the board will light up when a connection has been made.







Setting up the board: software

1. Download the WinterLab user interface software from the link provided. (Presumably already done, if you are reading this guide). Make sure to choose the one that matches your operating system!
2. Unzip the folder
3. Inside the main folder, there is a 'winterlab' folder (which contains the program files). Inside this folder is a 'winterlab' executable file. Double click this to run the program. Note: you have to have the WinterLab board connected for the software to function fully.
4. Optional: make a shortcut to the executable so you don't have to dig so deep in the folders next time.

Name

- WinterLab_v20190131_linux.tar.gz
- WinterLab_v20190131_win64.rar
- WinterLab_v20190131_mac.zip

	resource.cpython-35m-x86_64-linux-gnu.so	15.4 kB	Unknown
	_ssl.cpython-35m-x86_64-linux-gnu.so	118.7 kB	Unknown
	termios.cpython-35m-x86_64-linux-gnu.so	25.0 kB	Unknown
	winterlab	4.8 MB	Program

Setting up the board: updating the software

Occasionally, we will release updates for the WinterLab software. To keep your version up to date:

1. Download the new executable file from the dropbox link provided.
2. Navigate to your winterlab folder, then into the 'Program Files' folder.
3. Replace the 'winterlab' executable there with the new one you just downloaded
4. Optional: you may wish to create a new shortcut to the program, as the previous one will be out of date.

Name



Updated Executables



WinterLab_v20190131_linux.tar.gz



Winterlab_v20190131_win64.rar



resource.cpython-35m-x86_64-linux-gnu.so

15.4 kB

Unknown



_ssl.cpython-35m-x86_64-linux-gnu.so

118.7 kB

Unknown



termios.cpython-35m-x86_64-linux-gnu.so

25.0 kB

Unknown

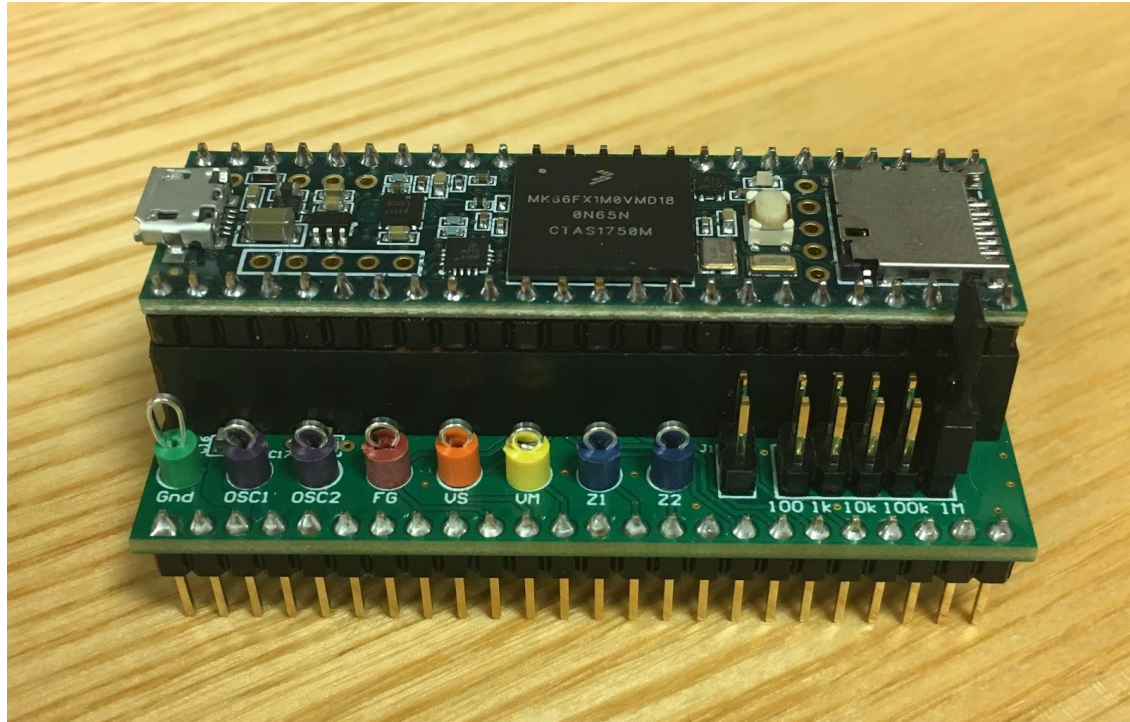


winterlab

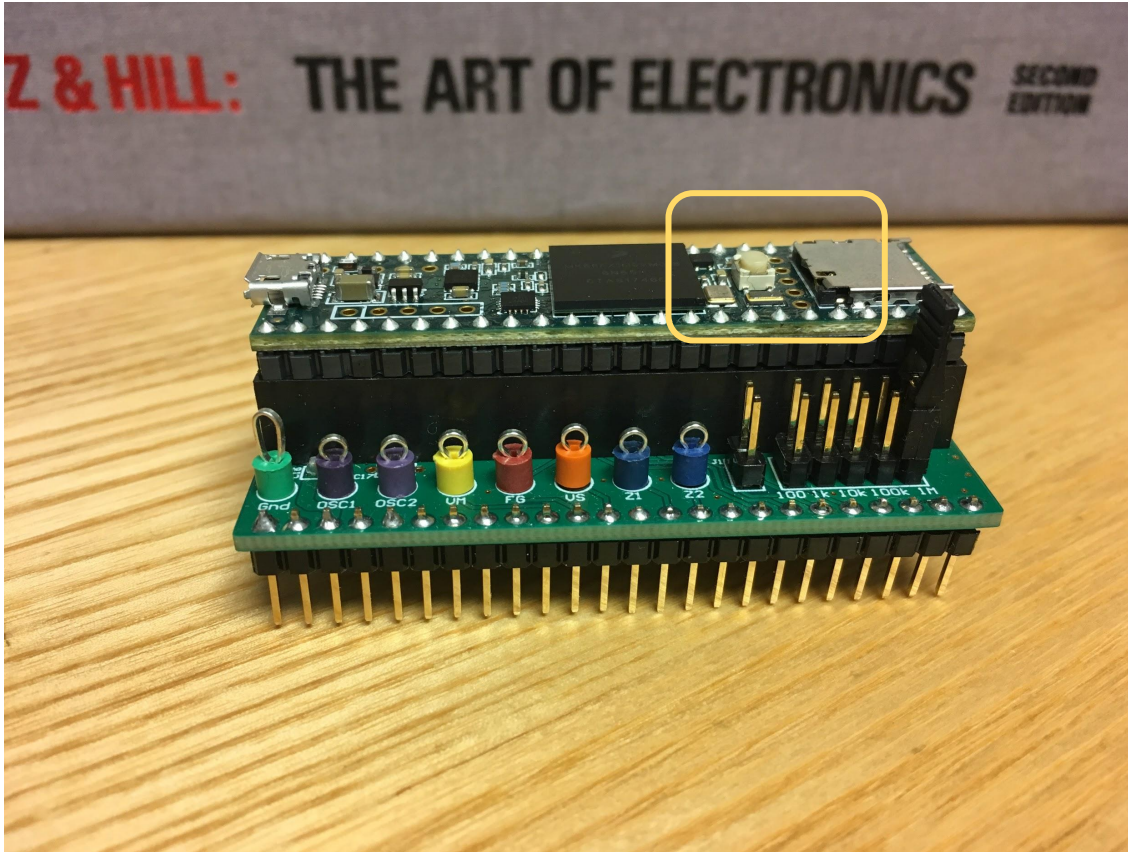
4.8 MB

Program

The WinterLab board

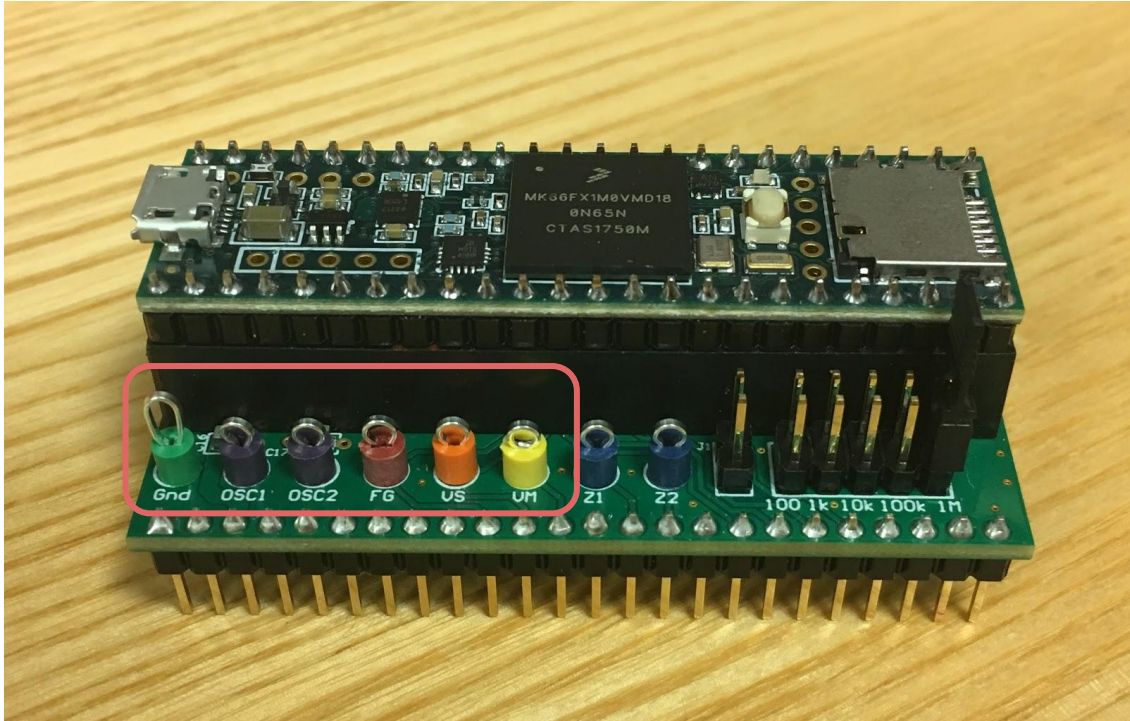


The WinterLab board



WARNING: the button on top of the board is a RESET button; pushing it will close its connection and require restarting the program. It may also delete the board's firmware and you will have to reinstall it. This is not difficult to do, but does require a bit of extra work, and so should be avoided!

Inputs

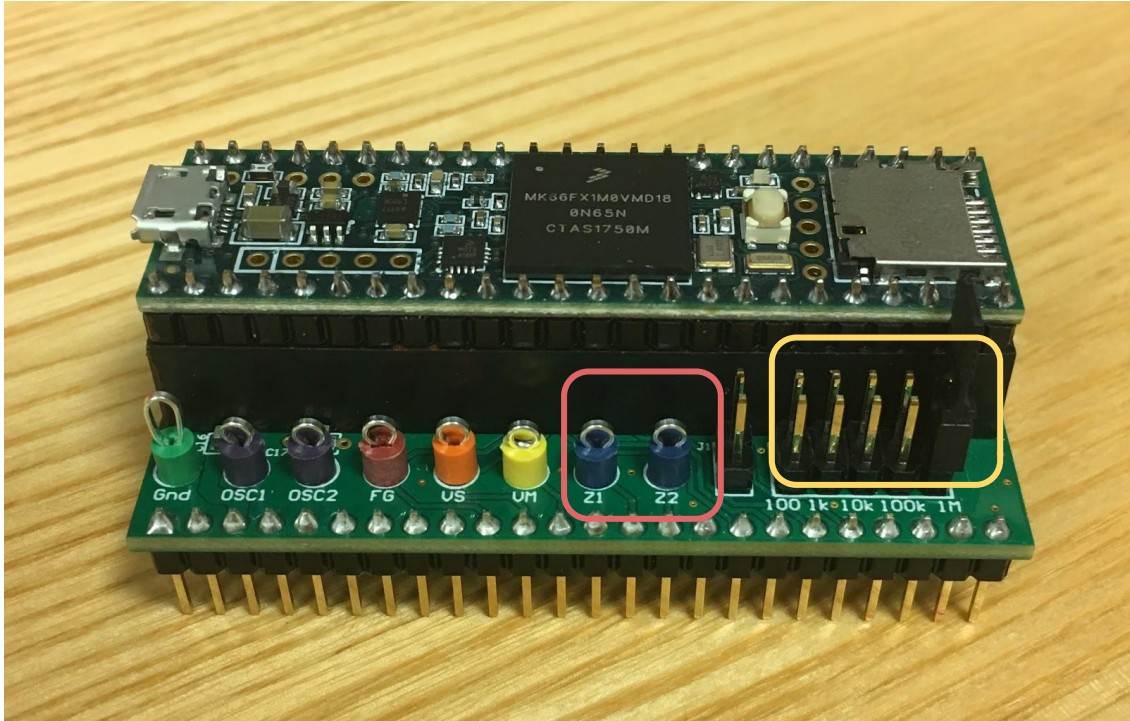


The small hooks you see along the side of the board are the INPUTS. In order from left to right, they are:

- GND: ground
- OSC1: oscilloscope channel 1
- OSC2: oscilloscope channel 2
- FG: function generator
- VS: voltage source
- VM: voltmeter input

To use these inputs, connect one end of a grabber cable to the hook, and the other to a circuit element or wire.

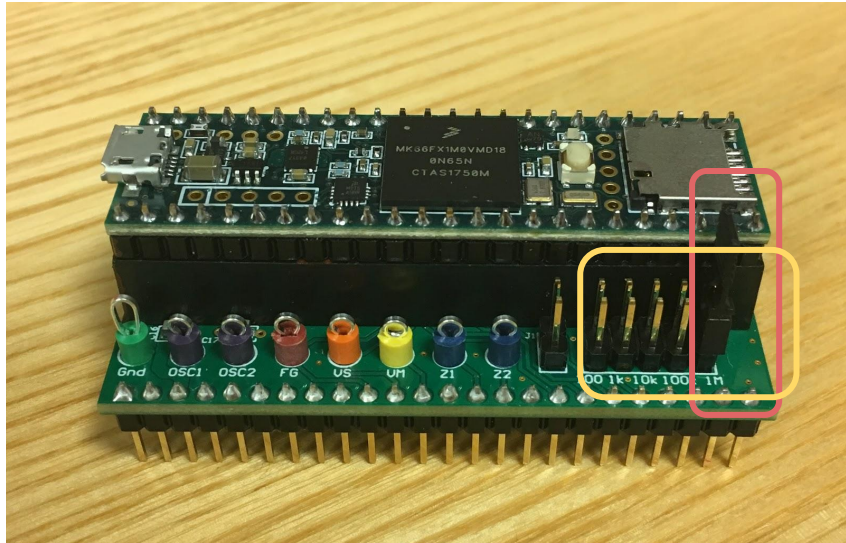
Inputs: Impedance Measurements



The rightmost hooks in the red rectangle are the inputs to the MULTIMETER, which you can use to measure resistances or capacitances. To do so, attach one grabber cable to each hook, and the other end of each on either side of the component you want to measure. Then, in the software, press the button for the type of impedance you wish to measure.

In the yellow rectangle is the RANGE selector. To make effective measurements, the MULTIMETER has to be in the right RANGE setting. More on this on the next page.

Inputs: Impedance Measurements



The black object highlighted by the red rectangle is a jumper; when placed over the pair of wires, it makes a connection between them. Use this to set the RANGE. Each range setting is labelled below the jumper position. These labels match the RANGE labels in the Winterlab software.

When you make a measurement with the multimeter, always make sure the RANGE you have on the board matches the one you have selected in the program! Otherwise, the measurement will be wrong.

Essentially, the RANGE decides what size of component value you can measure.



The WinterLab program



This is the interface through which you can control the WinterLab board. Its features are:

- The oscilloscope
- The function generator
- The multimeter
- The voltage source

Uploading new firmware to the WinterLab board

The firmware is the program that runs on the WinterLab board to control its functioning. You are free to change this program as you like (though be advised that afterward, it may not work as you expect!). To do so, you will need two pieces of software on your computer:

- the [Arduino IDE \(integrated design environment\)](#)
- [Teensyduino](#), an extension allowing the Arduino IDE to be used to reprogram the board

Follow the instructions on both host websites to install the programs.



Uploading new firmware to the WinterLab board

Once you have installed both programs, you can write your own code (called a 'sketch') to upload to the board, or edit the code that is provided with it.

To upload the code to the board, press the button highlighted in red.

Note: all sketches must be located in a folder bearing the same name. The sketch that comes with the WinterLab board requires that the configuration file, 'pdb.h' (included with the sketch), be also inside this folder.

