Automatic Breadboard Wire Cutter v1.0

User Guide

A picture containing indoor, wall, floor, sitting

Description automatically generated

ITP 348 Final Project

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Device Schematic:

A close up of a device

Description automatically generated

A picture containing indoor, wall

Description automatically generated

The wire cutter is designed with a companion app found at <https://bbwirecutter.onlosant.com/environment>

First, go to [https://bbwirecutter.onlosant.com/](https://bbwirecutter.onlosant.com/t) to login. Use the login credentials:

**Email:** test.user.ql6ywimkba@example.com  
**Password:** ql6ywimkba

Then, add environment to the URL.

Upon Logging in, you should see this interface:

A screenshot of a computer screen

Description automatically generated

Queue Job: Enter the lengths of wire to cut, in breadboard units, in the box. Each wire length should be separated by a space. For example, to cut 3 wires of length 3, 5, and 10, it should be entered like so:A screenshot of a computer

Description automatically generated

To send to the cutter, ensure the cutter is plugged in to the computer and the status led is breathing blue (<https://docs.particle.io/tutorials/device-os/led/photon/>)

Then, press the button labeled “Send to Cutter”. The cutter should begin immediately.

Queue: You should see the lengths you sent show up in the Queue below, followed by “End of Job”. Lengths sent all at once (with 1 button press) are clustered into the same job. Multiple jobs can be queued, but the cutter will only cut 1 job at a time.

State: The status of the cutter can be seen in the indicator on the right. There are 5 normal states:

*Waiting for Job*: the cutter is idle, waiting for a job to begin working. The indicator is blue.

*Cutting*: The cutter is currently cutting the job at the top of the queue. The indicator is green.

*Waiting for Pickup*: The cutter has finished a job, and is waiting for it to be picked up. The indicator is yellow.

*Waiting for Table Return*: The user has picked up the wire table to pick up a job, and the cutter is waiting for the table to be returned. The indicator is orange.

*Low Wire Stock*: The cutter is low on wire. The indicator is red.

The cutter will not begin or continue a job if the wire stock is low. Replace the stock to continue. To pick up a job, the wire table must be completely lifted off the base. Successful pickup is indicated by the status switching to *Waiting for Table Return*, upon which the user must replace the table fully in its embedded position. Successful table return is indicated by the status changing from *Waiting for Table Return* to either *Cutting* or *Waiting for Job.*

Jobs can be entered manually as demonstrated, but the cutter is designed to be used with the circuit diagram software fritzing (<https://fritzing.org/home/>). Once a diagram has been developed in fritzing, zoom out the view enough to see the entire circuit. Then, select View>Hide All Layers, followed by View>Wires Layer. Only the wires should be visible. Save the view as an SVG by selecting File>Export>As Image>SVG. Repeat this process to save an SVG of just the Breadboard Layer: View>Hide all Layers, View>Breadboard Layer, File>Export>As Image>SVG. The file wire\_reader.py is a python script that can read these SVG’s. Ensure that python is installed (<https://www.python.org/>). Then, run wire\_reader.py from the command line/terminal with the files as input as shown (brackets not included):

python wire\_reader.py <wire\_file.svg> <breadboard\_file.svg>

The output should be a list of lengths, space-delimited. This list can be directly copied and pasted into the Lengths input of the web application to be cut.