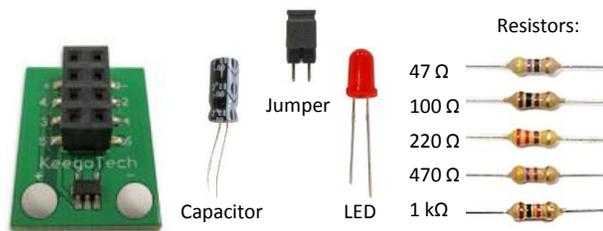


Getting Started:

Make sure you've got everything:



MudWatt™ Hacker Board

If you're curious how all the components of the Hacker Board work, please visit our forum at: keegotech.com/forum.

Blinker Mode:

- 1) Connect the MudWatt to the first two pins on the Hacker Board (Cathode (red) to '+' and Anode (green) to '-').
- 2) Connect pin 1 to pin 2 using the jumper.
- 3) Connect the Capacitor's long end to pin 3 and its short end to pin 4. You may need to bend the wires so that they fit snugly.
- 4) Connect the LED's long end to pin 5 and its short end to pin 6. You may need to bend the wires so that they fit snugly.



That's it! You should start seeing the light blink after a few days, once your MudWatt has developed a healthy community of microbes!

Hacking the MudWatt:

We encourage our customers (the Keegoites) to use the Hacker Board to experiment with powering other devices. For ideas on different hacks or to submit your story of your own hack, please visit our forum at: keegotech.com/forum.

Maximizing Power: The Art of Potentiometry

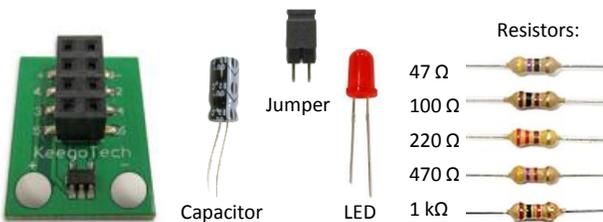
Microbial Fuel Cells (MFCs) generate maximum power when they are subjected to an external resistance that is equal to its own internal resistance. The rest of this booklet will teach you how to find your MudWatt's internal resistance and maximize its power generation using the MudWatt™ Hacker Board.

An MFC's internal resistance is a function of the ability of ions to diffuse through the mud from anode to cathode. The lower this internal resistance, the more power the MFC will produce. There are many ways to decrease this resistance, such as adding electrolytes (salts) to the mud.

To find the internal resistance of your MudWatt™, as well as its maximum power output, you will need to perform a technique called "potentiometry" (also referred to as a "Sweep"). This involves measuring the voltage output and calculating the power of your MudWatt™ over various resistances. When you plot your Power vs. Resistance, you will see a power curve as shown on the next page, with the max power being produced at the value of your internal resistance (R_i).

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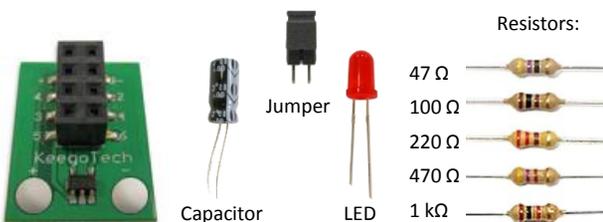
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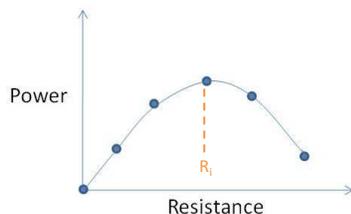
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You can calculate the power output by using ohm's law :

$$P = V^2/R$$

P = Power (Watts)
 V = Voltage (Volts)
 R = Resistance (Ohms)



Performing a Sweep:

- 1) To begin the sweep, switch the electronics panel to Open Circuit mode by taking out all components from pins 1 - 6.
- 2) After 30 minutes, check the voltage across the two Test Pads using any voltmeter (black to “-”, and red to “+”). Record the voltage and the resistance (the resistance is infinite under Open Circuit mode).
- 3) Place a resistor between pin 1 and pin 4. Step 2 for the 5 different resistors provided with the hacker board.
- 4) Enter the data you've collected at:
keegotech.com/community/datashare

Monitoring your MudWatt™:

Watch your MudWatt's power grow and stabilize by performing a Sweep on it every week for the next two months.

Thank You!

With the data collected and submitted by you and your fellow Keegoites, we hope to uncover trends and peculiar behaviors of microbial fuel cell technology. In this way, we aim to catalyze the development of this technology in the hope that someday MFCs will be a viable option in providing affordable and reliable energy for those who would benefit greatly from it. Developed by the public, for the public. All hail the Keegoites!



MudWatt™ Hacker Board

User Guide

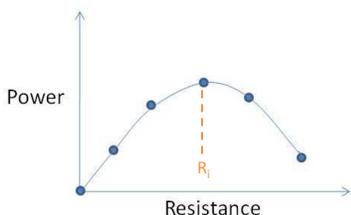


This paper is Green Seal and Green-E Certified

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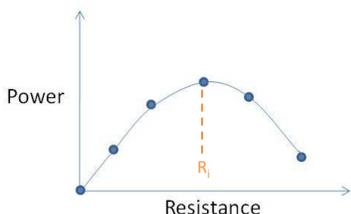


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