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- PROFILES
- STORES
- SUPPORT
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DIY Solar

Solar-Powered Automated Garden

Luke Iseman, June 24th, 2009

I created an automated gardening system called [Garduino](#) to monitor soil moisture and automatically water plants, provide supplemental sunlight and warn me when soil temperature drops below 50 degrees Farenheit. Using, Voltaic's solar panels and battery pack, you can make your Arduino-based gardening even more sustainable by eliminating the need for grid-based power.

Step 1: Parts

[3 1.3 Watt Voltaic Solar panels](#): \$90

[Voltaic Jet Pack battery](#): \$75

Or, you can get the battery pack, 3 1.3-watt panels, and a bookbag by purchasing [the \\$199 Converter bag](#)

[3/4 inch sprinkler valve](#): \$12

Pipe tape, to make sprinkler valve connections secure

[Arduino Duemanilove](#): \$35

[Garduino Shield, basic version](#): \$20. See [this page](#) for assembly instructions.

[Irrigation tubing and soaker hose](#): \$9

[DC Car Charger](#): \$4, or your electronics junkpile

[Male USB-B cable](#): \$7, or your electronics junkpile

Tools:

Leatherman-style multitool

Multimeter

Step 2: Create Your Irrigation Tubing Setup

When soil moisture gets too low, the Arduino will open the sprinkler valve and water the plants. In this step, we're creating the irrigation system to run along the bases of our plants.

Connect irrigation tubing to the sprinkler valve, using soaker hose or sprinkler heads where you'd like water to be emitted. Then, connect the other end of your irrigation tubing to your garden hose. Plumbing tape will help seal up any drips.

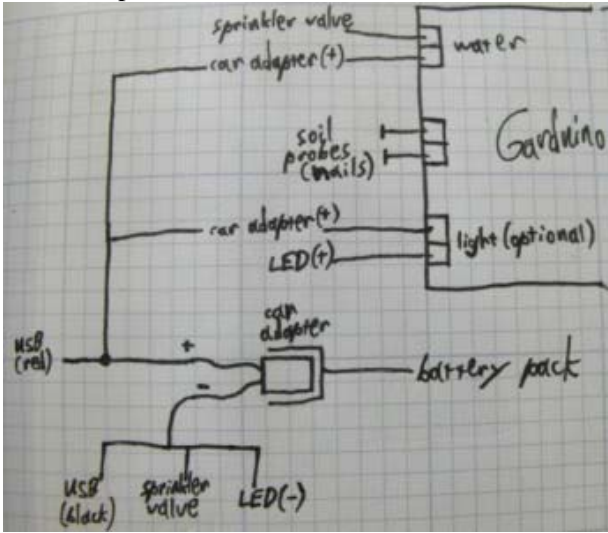




Step 3: Splice Auto Adapter to Connect Multiple Devices

Because we're powering both the sprinkler valve and the Garduino from the Jet Pack battery, we need to splice our adapters together. I chose to cut a male auto adapter and male USB cable to connect both devices to the battery pack. I used a multimeter to determine the positive and negative leads from the male auto adapter. For standard USB cables, red is positive and black is ground. I connected a few LEDs as the lighting; this is only serving as an indicator of how much more time my plants could use light rather than any meaningful supplement. For more serious lighting, you can either connect to a grid-powered outlet as in the original garduino or charge a larger battery and power your lighting with an inverter / 12-volt LED grow light.

Once completed, the connections will look like this schematically:

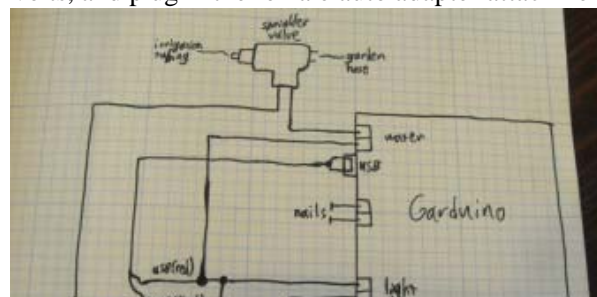


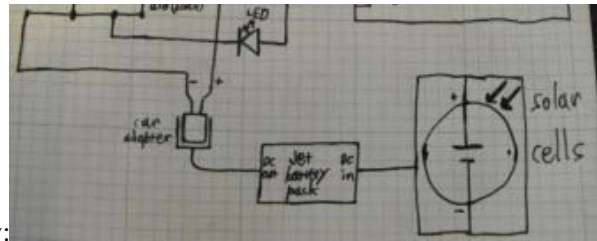
And like so in the real world:



Step 4: Attach Solar Panels and Battery Pack

Attach your battery pack to the solar panels, set the voltage to 7.2 volts, and plug in the female auto adapter attachment.





Here's what your completed setup should look like, schematically:

Step 5: Optional Solar Panel Setup

If you want to create a more-permanent setup, you can mount your solar panels and add a shelf for the electronics. I used old pallet wood and screws to create this panel mount:



I also added a plastic bag for water resistance, used 2 wires to extend the photocell to the "roof," and placed the electronics on the shelf with the sprinkler valve on the ground. I angled the panels to face the sun and can adjust the angle depending on the season.



Step 6: Garden Away!

Good luck garduino-ing, and be sure to share any improvements you make!

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One Response so far

1. [Looking for Solar DIY Projects? Voltaic's Got 'em... : Sustainablog](#) Says:

[July 3rd, 2009 at 3:56 pm](#)

[...] about keeping your garden watered? Luke Iseman's Garduino monitors soil moisture, and waters when [...]

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