How to Build an E-waste Watering Can

by **SillyInventor** on June 6, 2015

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Intro: How to Build an E-waste Watering Can

This instructable came out of a project to teach a group of middle school students at RPI. Some of the work is available on the E-Waste Makerspace: http://e-wastetomakerspace.wikispaces.com/E-Waste+...

The purpose of this lesson was to:

- Expose students to concepts of pollution, e-waste, re-use, botany, and experimentation.
- Give students an understanding of basic electronics and to empower them to create things.
- Get kids interested in STEM fields.

The materials you will need are:

- A trashed computer tower (plunder an e-waste recycling bin)
- A 12-16V power supply - also e-waste
- Some wire
- Two DPDT relays that have coil input 5V &<40mA
- An Arduino & power supply
- A moisture sensor (though you could make your own)
- Some waste water or soda bottles
- (optional) waste surgical tubing
- A plant

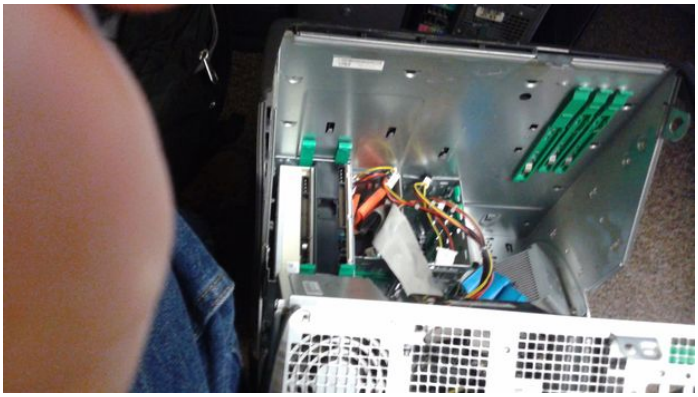
Step 1: Getting the CD Drives Out

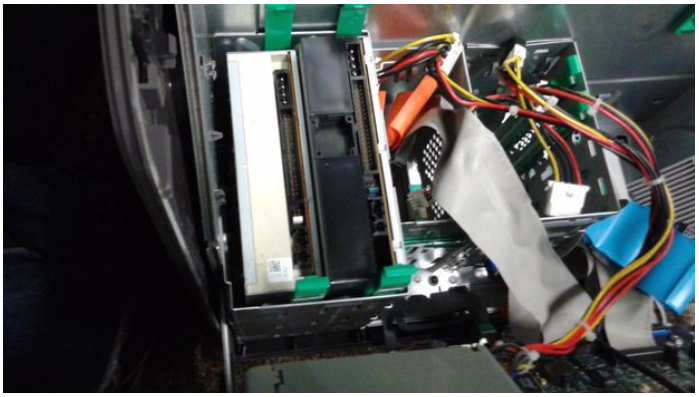
E-Waste stands for electronics waste. It's what we call all the old phones, computers, and cables that get thrown away. These electronics are filled with toxic chemicals that are hard to recycle, so they get shipped to other countries where they burn the electronics releasing all of the toxins.

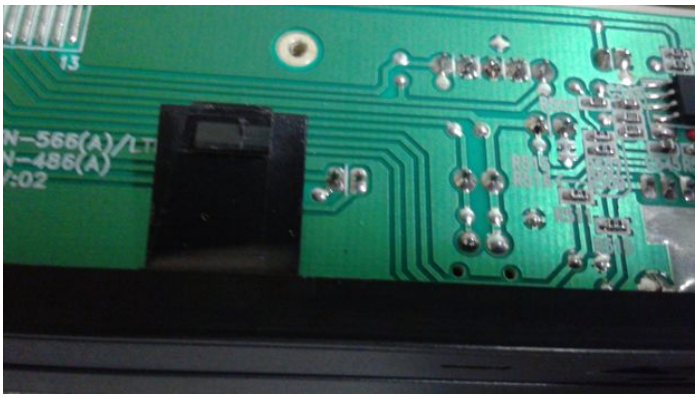
One way to fix this is, instead of simply burning the broken computers, reuse the parts that aren't broken. Let's recover some CD drives that are perfectly fine from discarded computers. Press the top and bottom button to open up a Dell computer tower. Then find the CD drive.
Make sure to disconnect any cables. Press the green tabs on the side in and pull them out.

Now to gain access to the motor, start by removing the screws on the bottom lid.

Identify the two leads that connect to the motor in the front. If you're not sure which ones are the motor, you can pop off the green circuit board and look for where the motor connects. Now that we have our CD drive, let's make sure it works. Take the power supply and apply positive to one side, and negative to the other. Try switching the wires. Hopefully you test this out beforehand and know all your CD drives are good, although they almost always are. Keep in mind that CD drives are far more reliable when they open right side up, so if it's moving but not opening, that could be the cause.







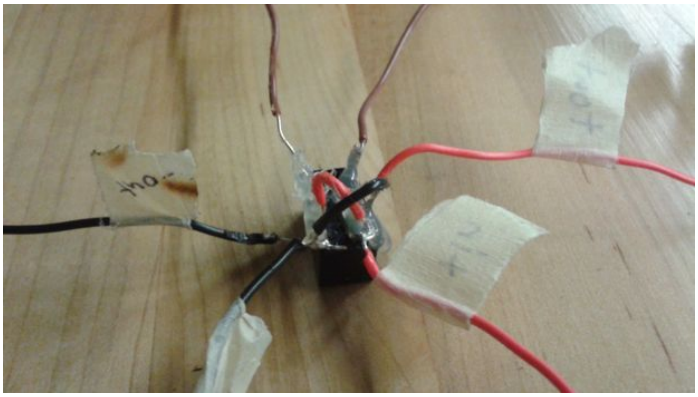
Step 2: Control your CD drive from Arduino

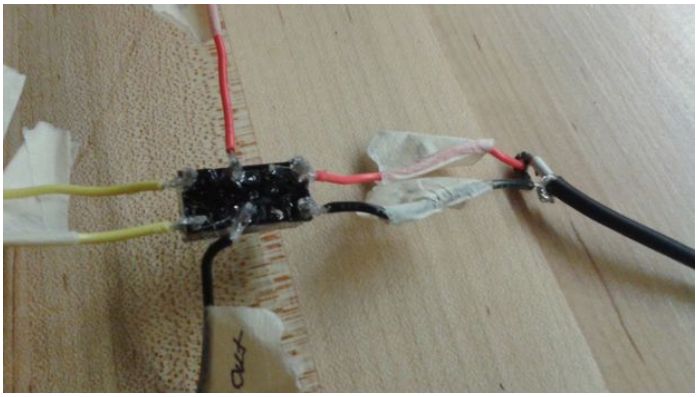
Now that you have your working CD drive, let's make this computer controlled. As a note, It's recommended that the Relays be soldered with leads together before handing them to the students.

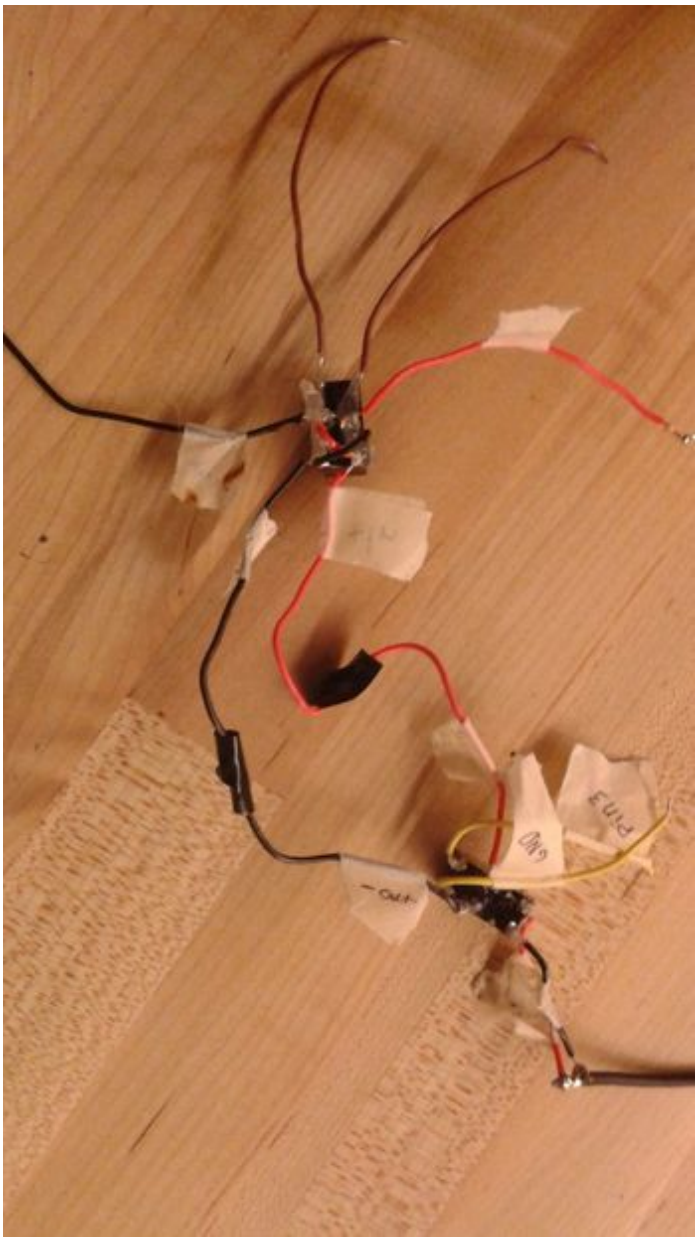
Solder wires to the relay coil. Then put the other wire into the gnd spot. Tap one signal pin to ground and one to 5V. You should hear a clicking sound as the relay turns on.

Now take your second relay and solder two wires to the coil, two to the output, and two to the far input (normally off). Try testing your switch again with the ground and 5v from your arduino. You should hear that same clicking sound. Then you can solder the inputs to the power supply.

Now connect the input pins to the output of the other relay. And solder the final output to the CD drive's motor's input. Now connect the signal pins to the Arduino grounds and pins 2 & 3. With this you can control the CD drive power. Congratulations, you've now built a CD drive opener.



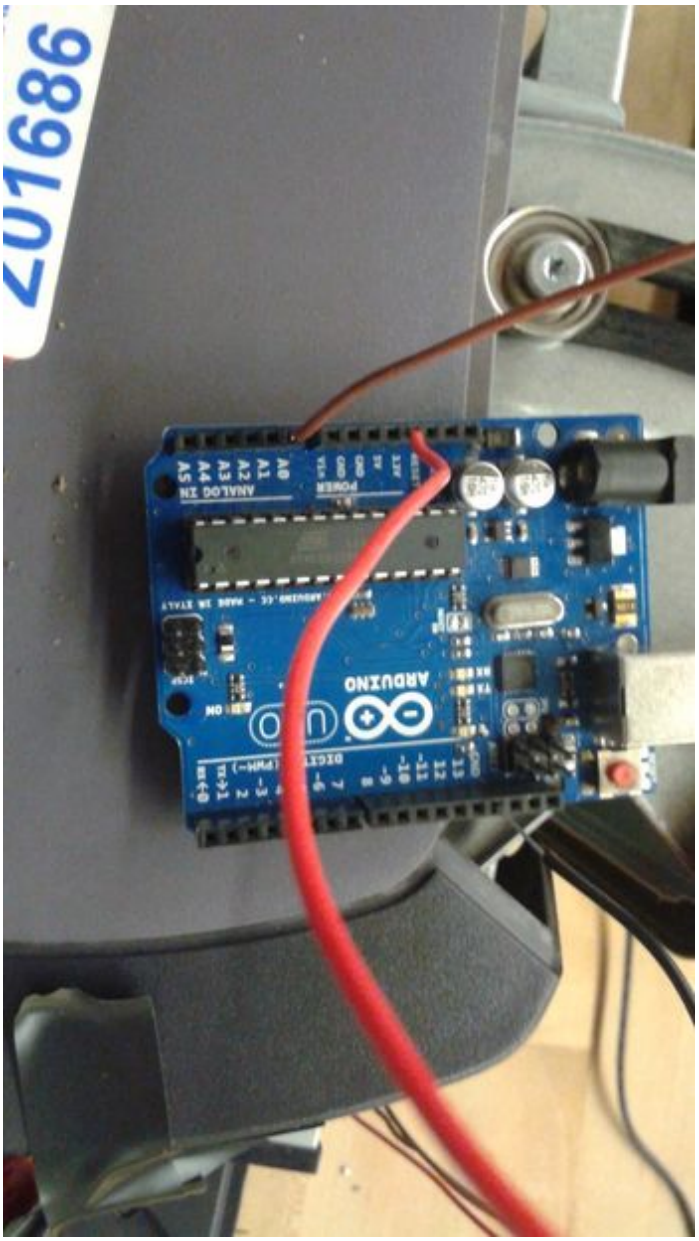




Step 3: Hook up your Moisture Sensor

Cut and strip the wires of your moisture sensor. Plug the yellow or blue wire into the analog pin 0. Plug the red into the 3.3v, and the black into gnd.

Now check the analog output of this particular function. with our Arduino. You can upload the arduino code to the Arduino to both find the moisture sensor readings and control the system with the moisture sensor.



File Downloads

E-Waste CD Drive Openner.ino (1 KB)
[NOTE: When saving, if you see .tmp as the file ext, rename it to 'E-Waste CD Drive Openner.ino']

Step 4: Controlling Water Supply

There are innumerable ways to use the CD drive to clamp the water, and typically this is a good problem to leave to the students. Consider asking them to draw what they want and then help them put it together. The most common and easiest is to put a tube from a reservoir above the CD drive down to the plant, and then pinch it with the CD Drive.

Some other ideas included: Using the motion to kink the tube, tipping a cup, and pressing the lever of a watering hose.

Related Instructables

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