How to Make A 2-Wheeled, IR-Controlled, Arduino-Compatible Robot

by **gearsngenes** on May 1, 2015

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Intro: How to Make A 2-Wheeled, IR-Controlled, Arduino-Compatible Robot

This instructable is about how you can make your own robot so that:

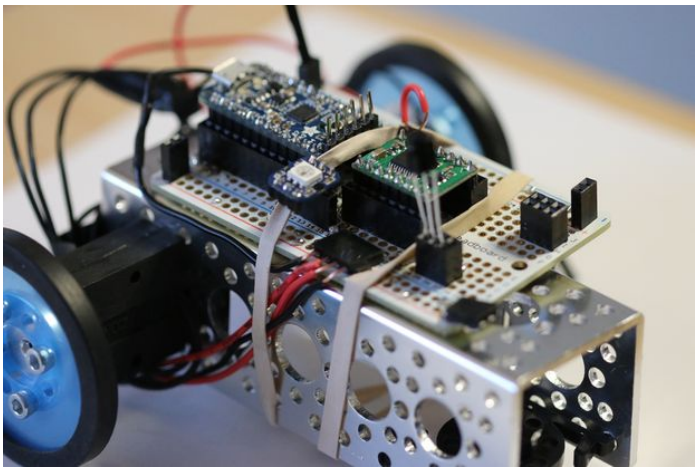
-It is controlled by an IR remote

-You are able to access and modify the code to your heart's content

-You can change the robot chassy to any size or shape you choose

-We can promote entrepreneurship and maker spirit throughout the engineering community

That's enough pep-talking! Follow along so you can see what you need to construct your robot.



Step 1: Meet the Parts (MP)

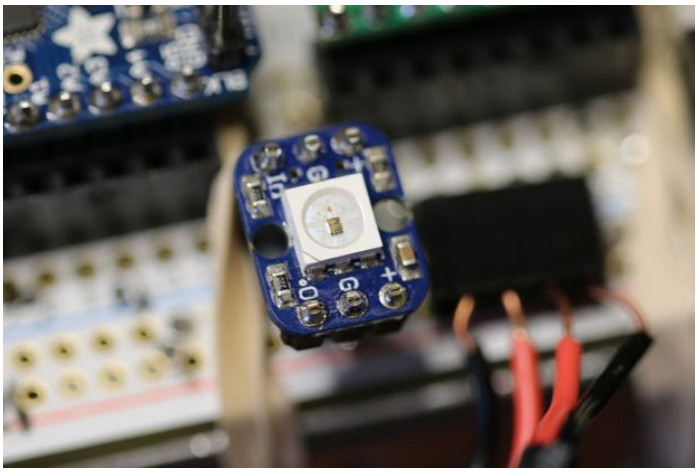
Ever heard of Arduino Uno? If not, it's this easily programmable microcontroller which allows you to construct cool products. If you have no experience, come back to this page after learning about arduino uno.

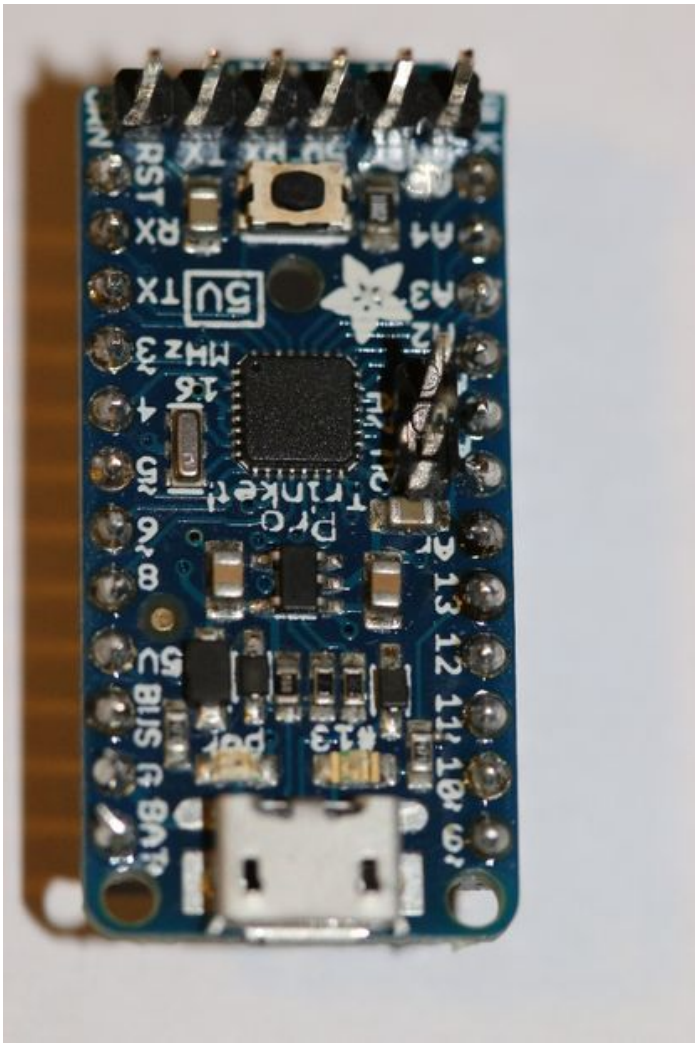
For those of you who do know about it, we'll be working with a close cousin of it, Adafruit pro-trinket, 5 volts. It can run on exactly the same code as an uno, so no new IDE needs to be installed. The blue PCB you see is the pro-trinket. This is basically your robot's brain.

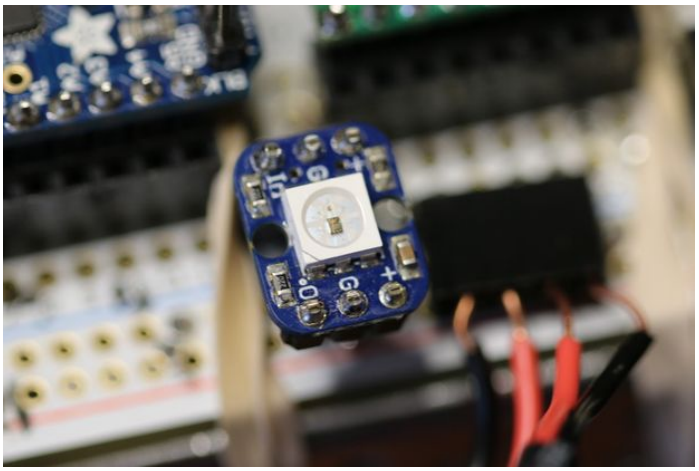
As for what your motors will be controlled by, meet the TB66FNG H-bridge. This guy allows your motors to move in two directions each, back and forth.

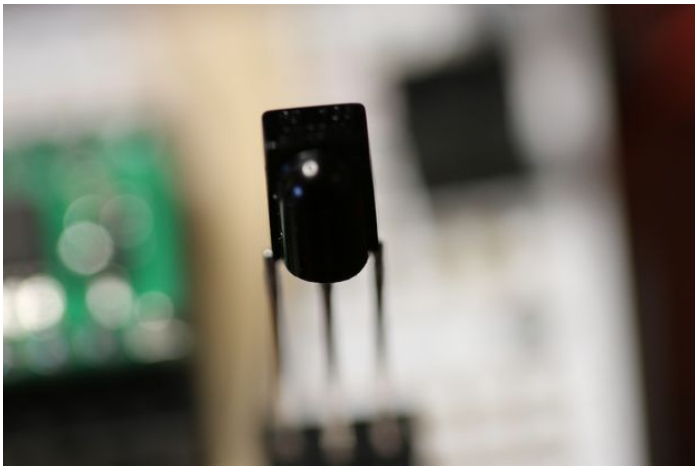
To allow our robot to receive commands from our remote, we will use this little black bulb, called an IR sensor. It interprets the code that the remote gives and sends that code to the Trinket. When a certain signal is given, it tells the robot to move in a certain direction.

Another touch to this motherboard (4th prototype by the way) is the neopixel. It is our indicator of which direction our robot is moving in. When you are modifying this code, the neopixel is a perfect tool for debugging any problems. We defaulted our code so green is forward; red is back; yellow is left; and blue is right. These color choices are optional.









File Downloads

Motherboard4 Fritz.fzz (58 KB)
[NOTE: When saving, if you see .tmp as the file ext, rename it to 'Motherboard4 Fritz.fzz']

Step 2: Where To Buy? (WTB)

Buying the parts is very difficult when designing projects from scratch, so we're leaving the sources down below for you to purchase.

For the neopixel, IR sensor, and Pro-trinket 5V, go to https://www.adafruit.com/ . You will also have to go here to get a board called a perma proto, which is like a thin bread board, except you have to permanently solder your circuit on to this.

For the H-bridge, and female headers, you will need to go to https://www.pololu.com/ . Female headers, the black items seen in the second picture, are useful for attaching your major components to your perma proto without permanently soldering in your expensive parts, that way if something goes bad, you can easily remove it.

As for the actual body, seen in the 3rd image, you can view this video to see how to construct it.

To purchase it, go to https://www.servocity.com/html/actobitty_2_wheel_r... . PS, this place is great for purchasing robotic parts to make your own chassies.

To sum up what you will need here are all the parts in their given quantities:

1 pro-trinket 5v

1 tb66 h-bridge

1 Ir sensor

1 neopixel

1 half length perma proto

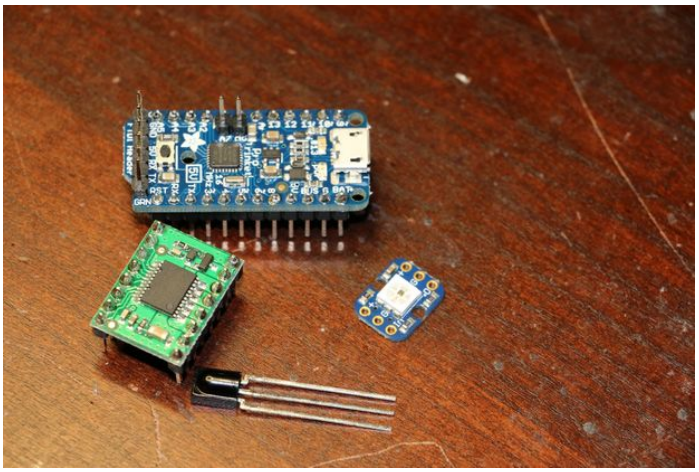
4 2*2 female headers, for you to attach to the power rails marked in red and blue

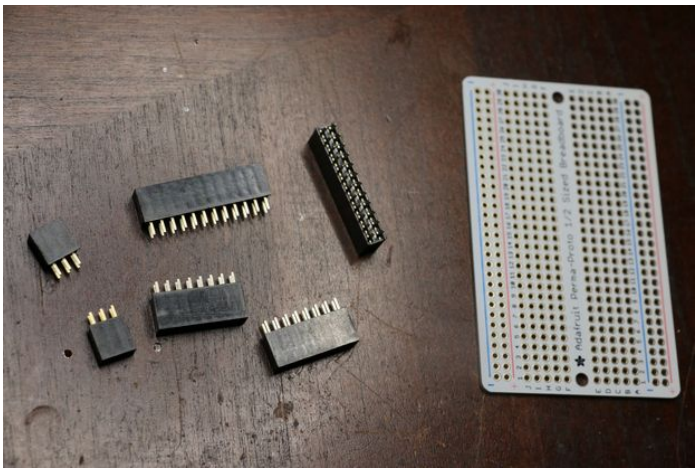
2 12*2 female headers, these will be for the trinket

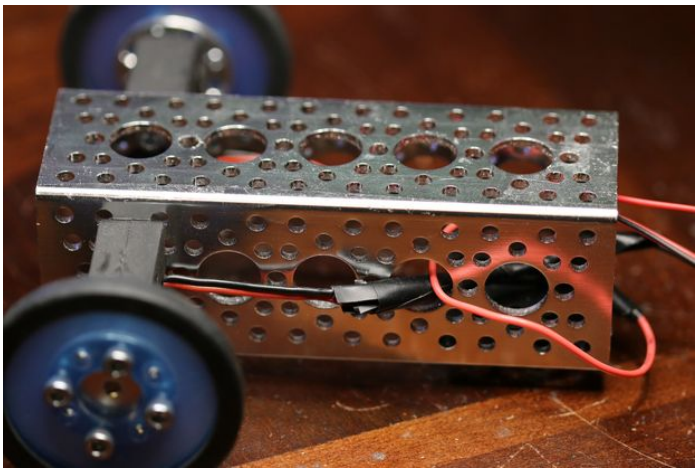
2 8*2 female headers, these are for the h-bridge

2 3*2 female headers, one for the neopixel, one for the sensor

1 actobitty kit, constructed

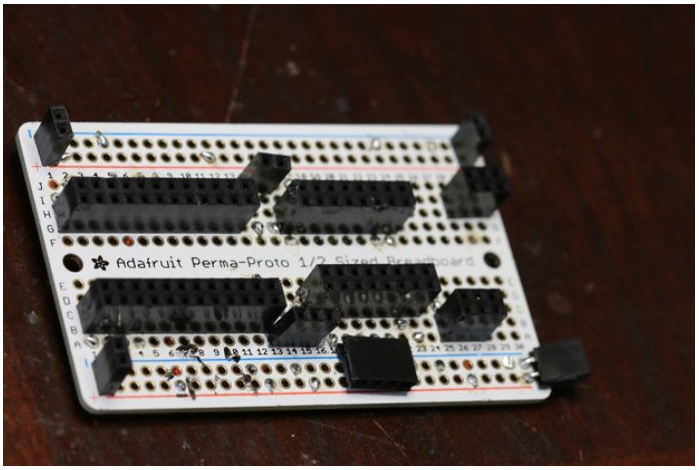






Step 3: Solder the Body

When you are beginning your construction of your motherboard, you want to design it such that you arrange the female headers the right distance from each other. Experiment before fully soldering. Afterword, plan your arrangement. PLAN, PLAN, PLAN! Then you can solder. The picture above shows the general arrangement of the major female headers. This is not the only way to arrange them, but when constructing this, we found this the most convenient.



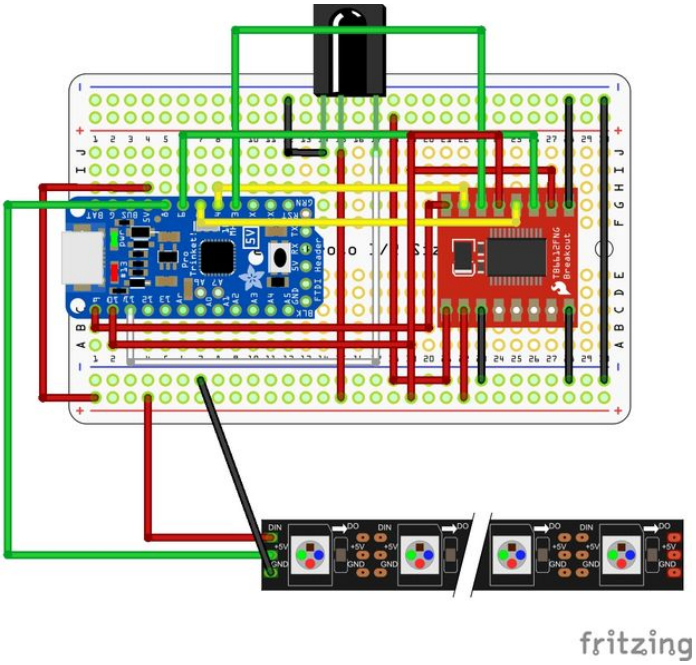
Step 4: Wiring

Wiring. Nobody is really ever good with that. Unless... of course you have a lot of experience. And it is not fun! Any who, the image above will show you a fritz image of what the circuit should look like. Beware, it does not exactly look neat, so I am leaving the original fritz for you to edit or observe yourself so you do not show confusion. However, it will only download properly if you have fritz downloaded already. Use this image to solder the wires to the proper places exactly! To learn about which pin goes to where, here is a set of instructions.

When you look on a datasheet of this h bridge, you will see 4 names called Ain1 and 2, Bin1 and 2, Ao1 and 2, and Bo1 and 2. All the Bs relate to one motor, as do all the As. Each in or input has a particular pin on the trinket that it is assigned. Ain1 goes to pin 3 on the Trinket. Ain2 goes to pin 4 on the Trinket. Bin1 goes to pin 5 and Bin2 goes to pin 6. Simple.

Here is a link to an image of the arrangement of the pins:

https://www.pololu.com/picture/view/0J4621



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Step 5: Coding And Beyond (CAB)

Once you have finished all of the previous steps to constructing your robot's "brain", you then take your completed project, attach it to the chassy, using rubber bands or Velcro, and insert the code. You can get our code, which has been tested several, several times, on guithub.com and download it into your robot. The remote you will also have to get from Adafruit, but once you do, place in the battery and you're ready to roll. Here is where you can get the code:

https://github.com/gearsngenes/IRDriven2WheelRobot

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