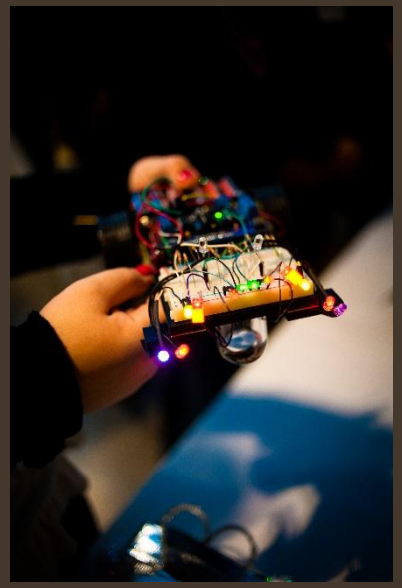
ChickTech Robotics Workshop

Oregon State University, Corvallis

August 23-24, 2014



What is a robot?

- Doesn’t have to look like a person
- A machine that carries out tasks. The tasks can be programmed in advance, or the robot will perform tasks as a reaction to its environment.
- Everyday examples:
  - ATMs
  - Vending machines
  - Washing machines

Parts of a robot

- Controller – The brains of the robot that makes decisions. Can be programmed to tell the robot what to do
- Motors – Drive the robot's motion.
- Sensors – Eyes and ears of the robot, take information from the environment to help the robot make decisions.
- Power supply – Powers the robot – for example, batteries.

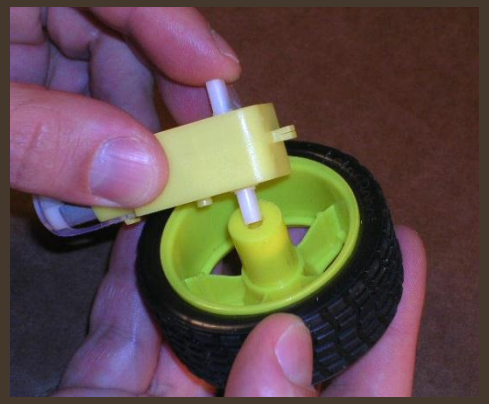
About Soldering

- Solder is a metal “glue” used to join other metals together
- Solder conducts electricity
- Solder is usually a combination of tin and other metal(s) like lead, copper, silver
- Melting temperature is around 350-400°F
- Soldering iron is very hot!

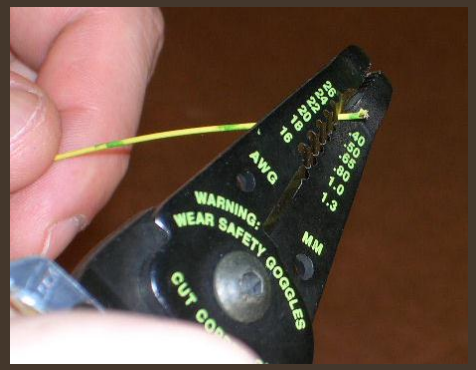
  It will melt plastic.

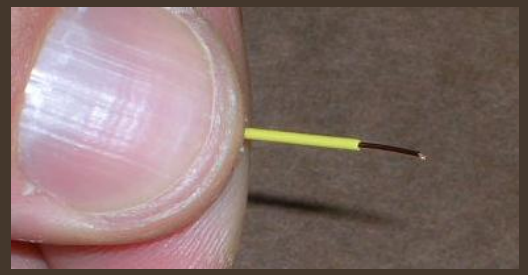
Soldering Wires to Motors

Attach 1 wheel to each motor

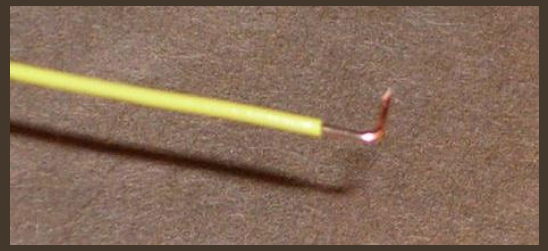


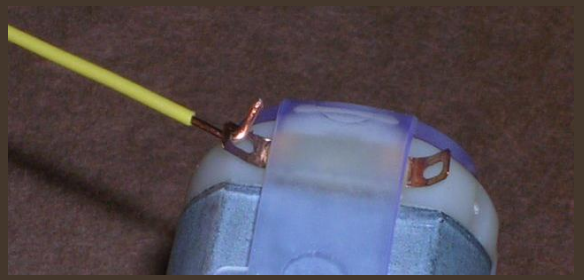
Cut 4 pieces of wire, about 7 inches long each. Strip about ¼ inch off each end.





Use pliers to bend end of wire, hook into terminal on motor and squeeze closed with pliers

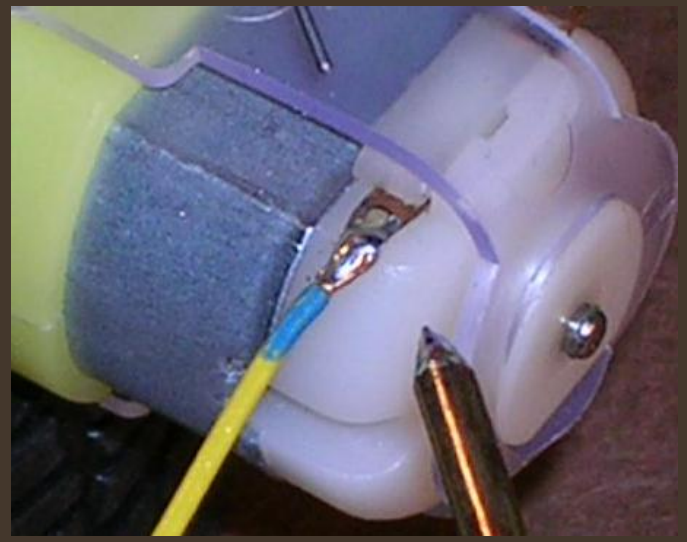




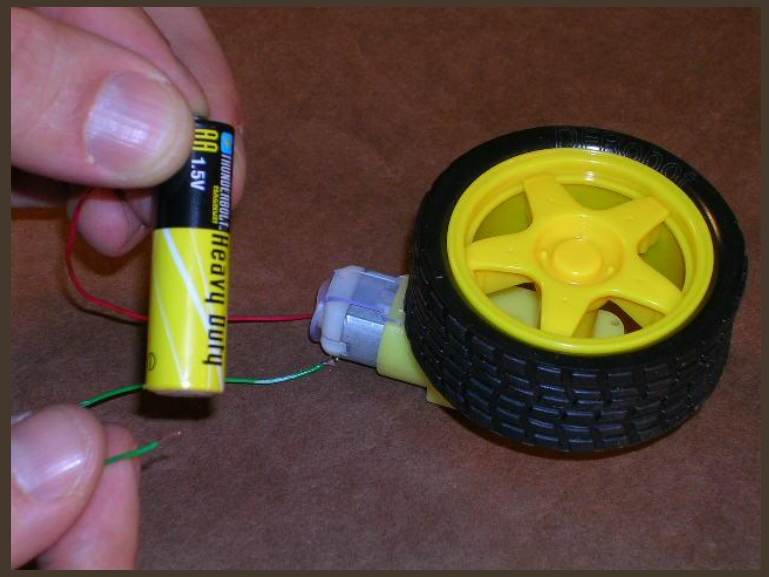
Soldering Wires to Motors Continued

Before soldering:

After soldering:



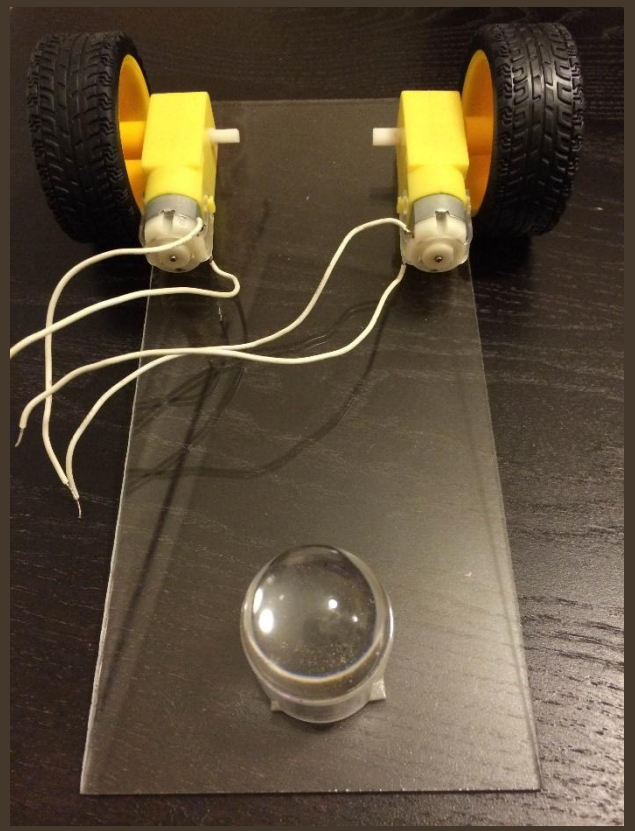
To check your soldering:
Touch the wires to each end of a AA battery. Wheel should move!

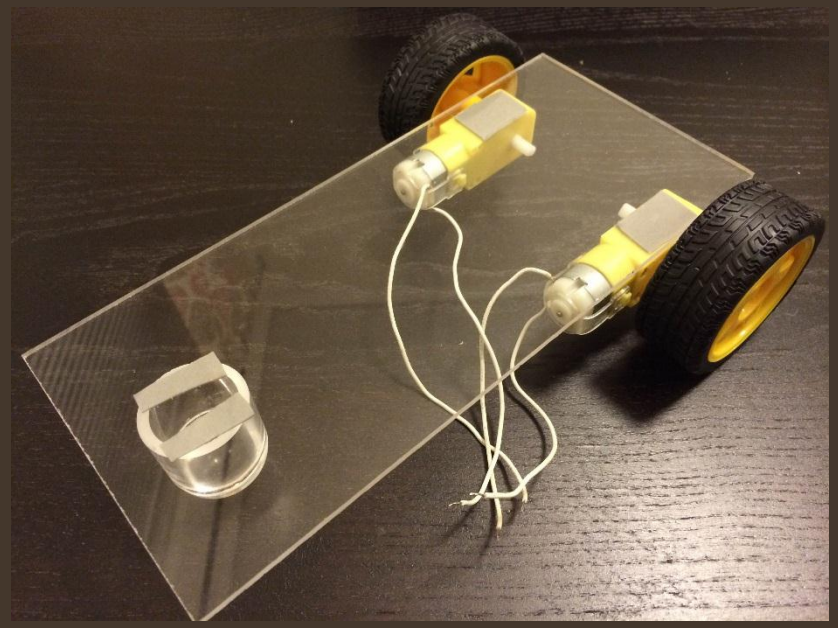


- Don’t hold the soldering iron on the terminal too long – the plastic will melt

Mounting the Motors and Slider

Use foam tape to mount the slider and the motors to the chassis

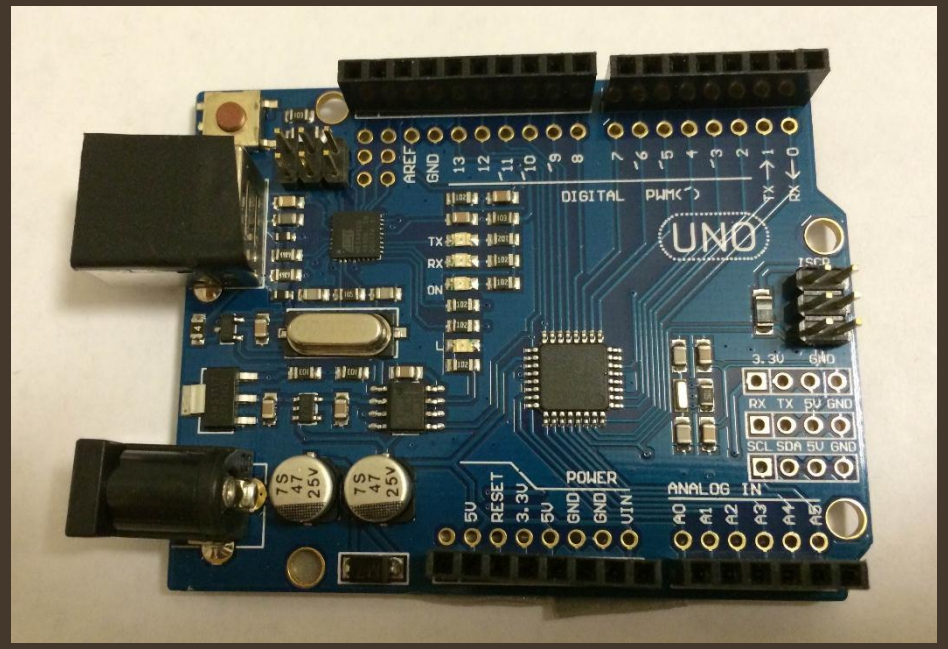




Wheels and slider are both mounted to the underside of the robot

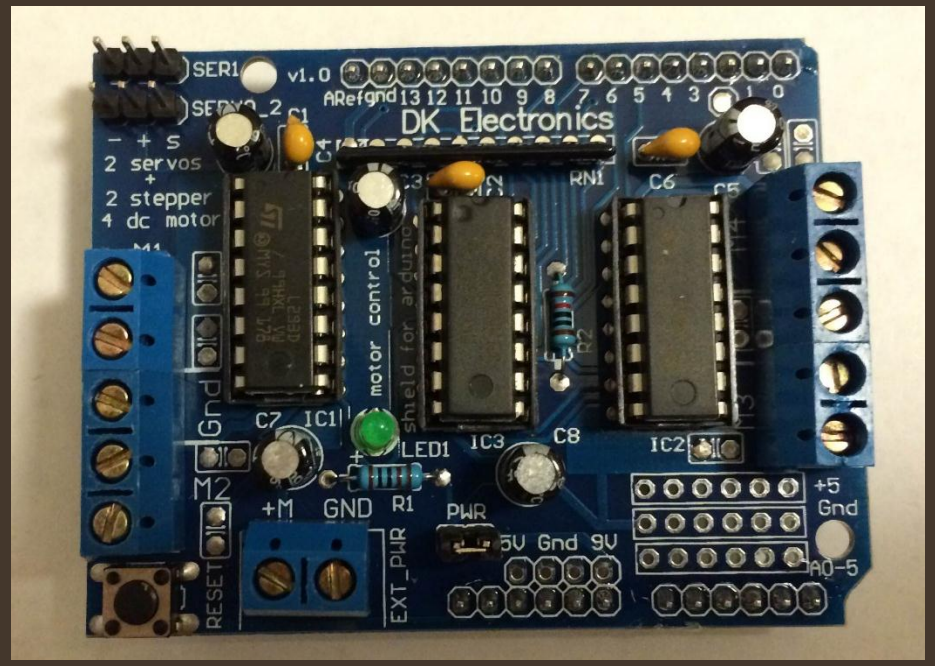
What Controls the Motors?

Arduino board



- Brains of the robot
- We will program the Arduino with our computers
- Open source
- Says “UNO” on it

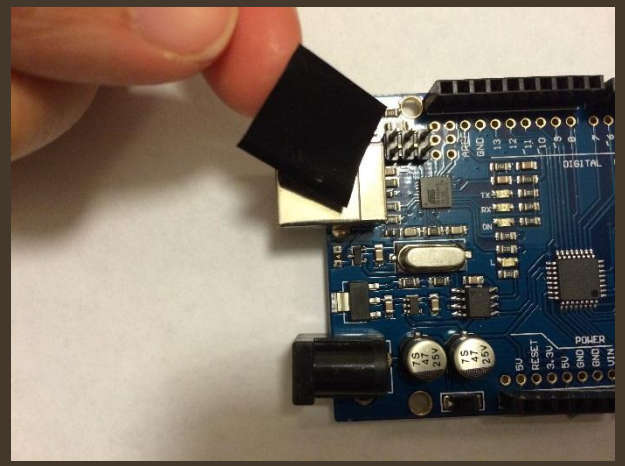
Motor controller

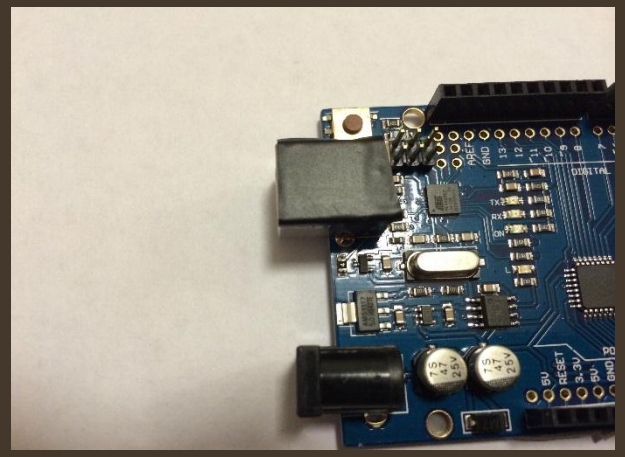


- Sends power to the motors
- Arduino by itself cannot send enough power to run the motors
- Says “DK Electronics” on it

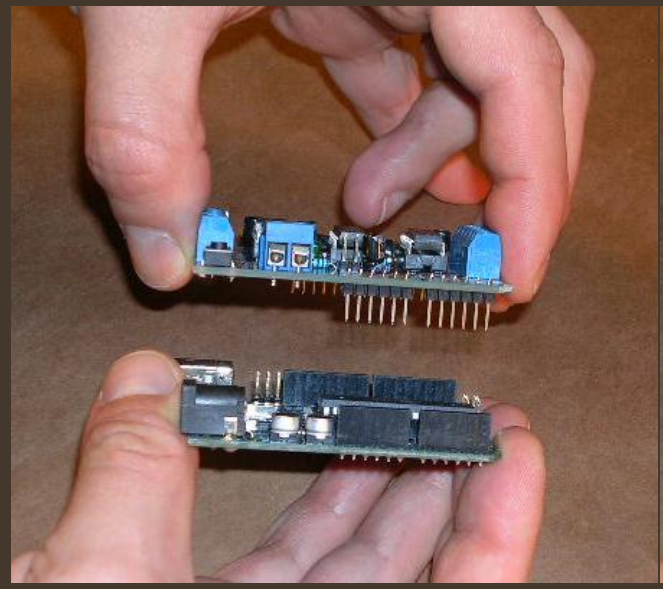
Assemble Arduino & Motor Controller

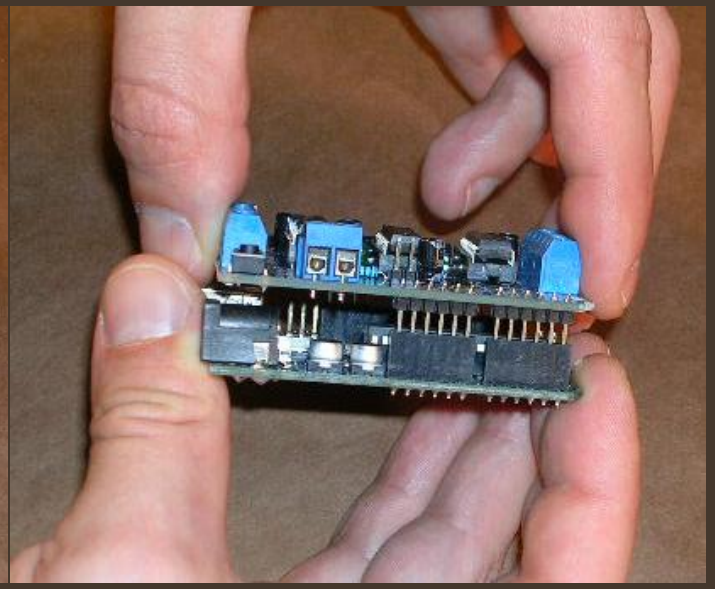
Put tape over cable input on Arduino





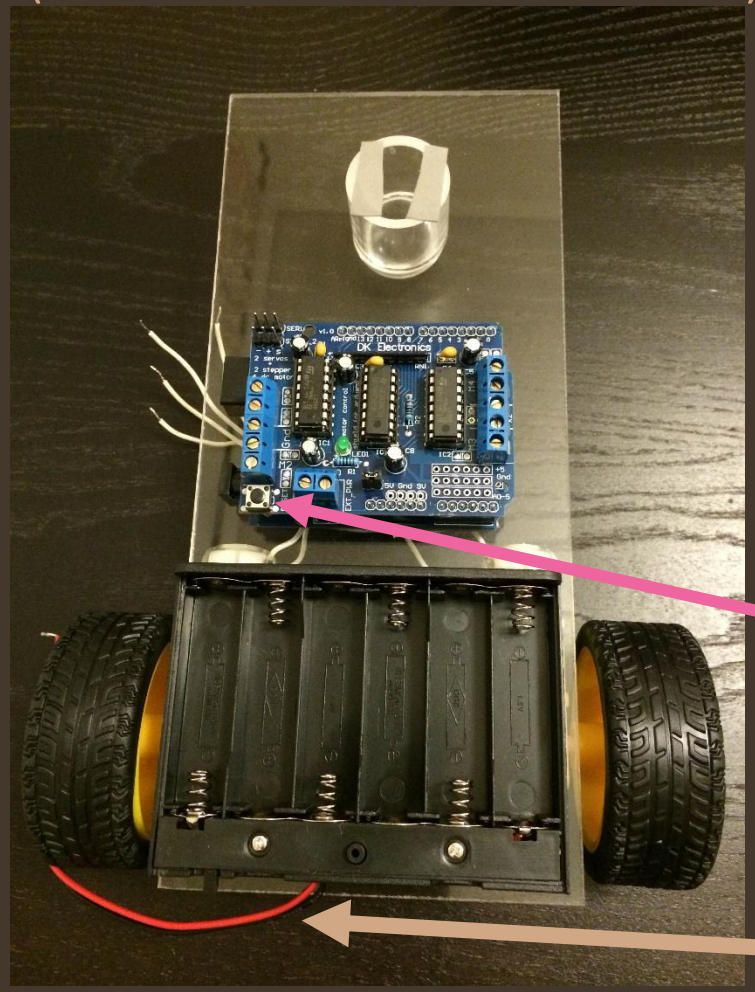
Press the boards together – motor controller on top





Attach Battery Holder & Controllers

Boards and battery holder go on TOP of chassis
(wheels and slider are on bottom)



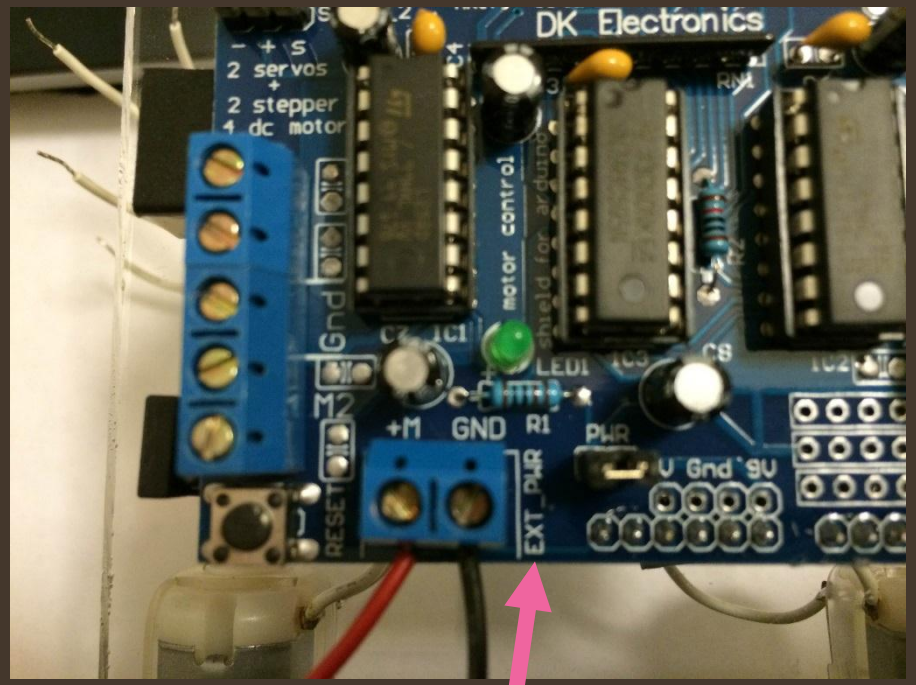
Boards go next to the battery holder

Button on board is next to battery holder

Battery holder goes between the wheels

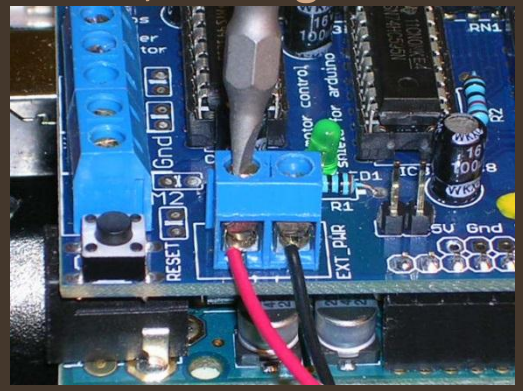
Battery holder wires coming off the end

Wire Power to the Motor Controller



The power connector is marked by “EXT_PWR”

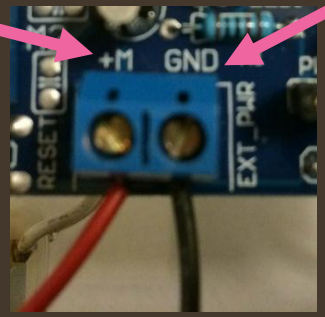
Loosen screws with screwdriver, stick in wires, and tighten screws



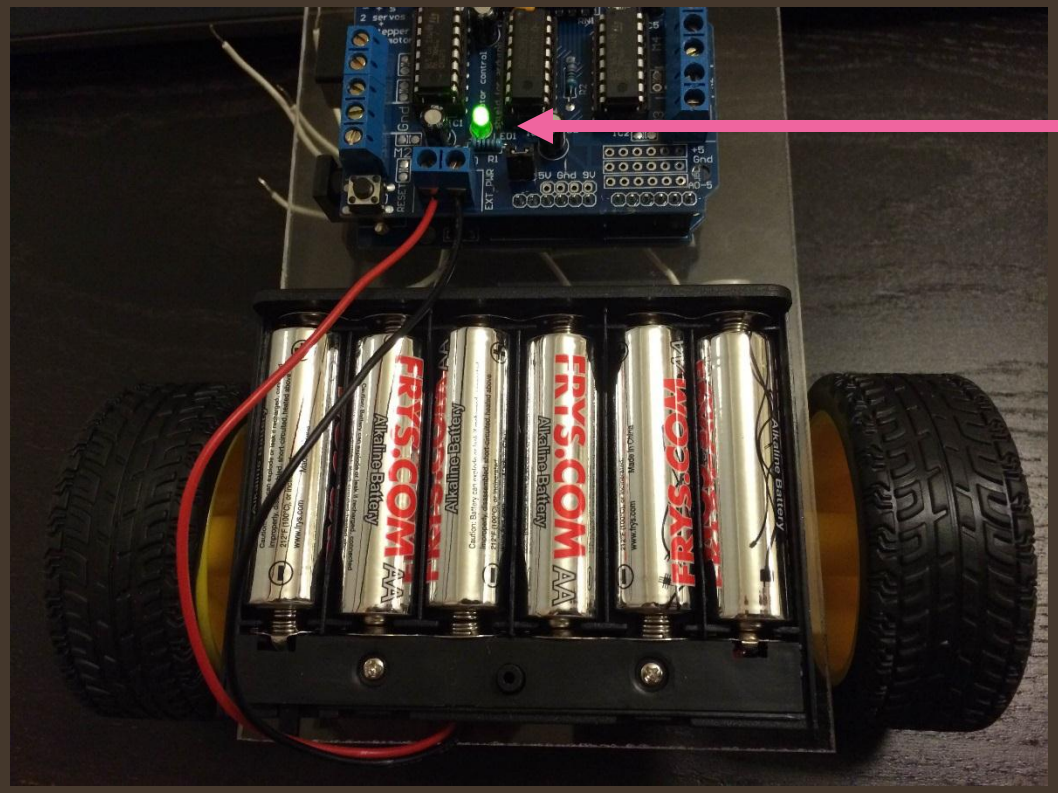
Tug on wires to make sure they are firmly attached

+M is for red wire

GND is for black wire



Battery Installation and Power Check



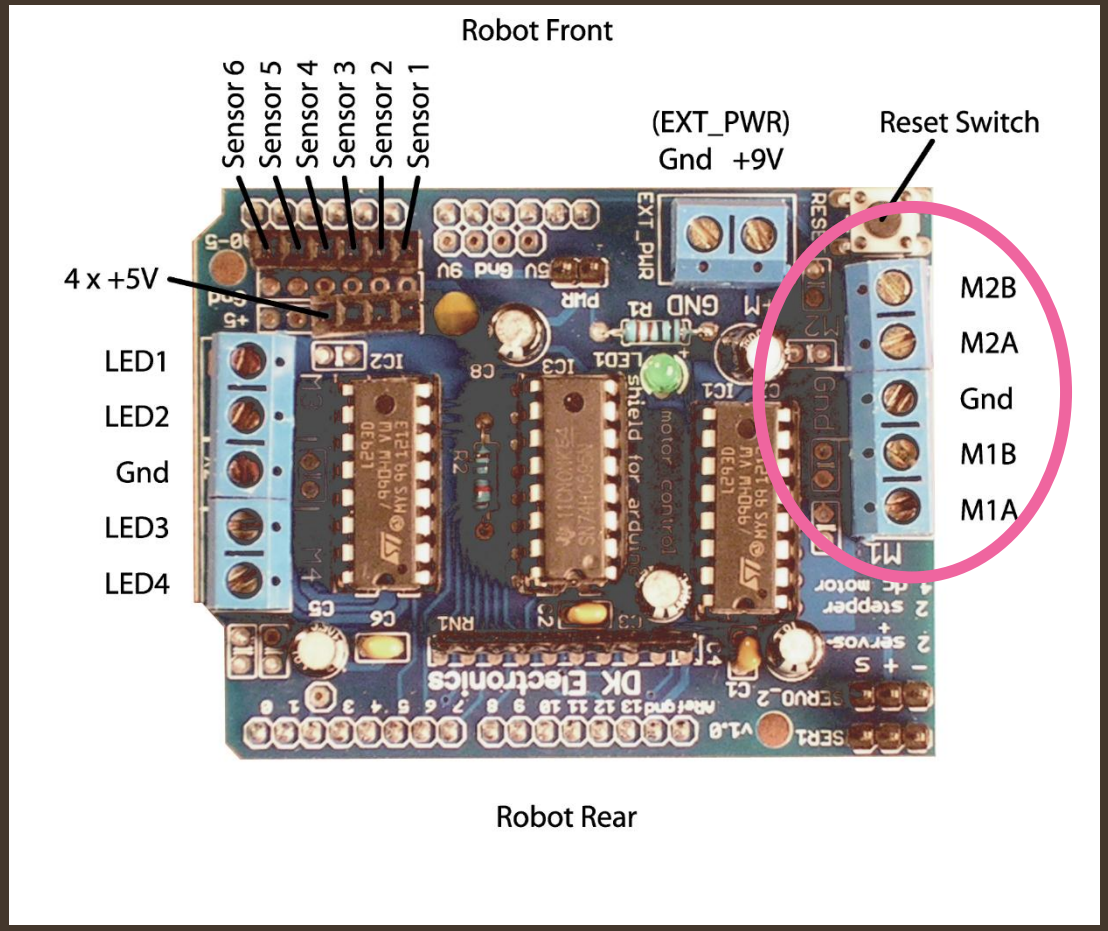
Light goes on when power is supplied

1. Turn on/off switch on battery holder to OFF

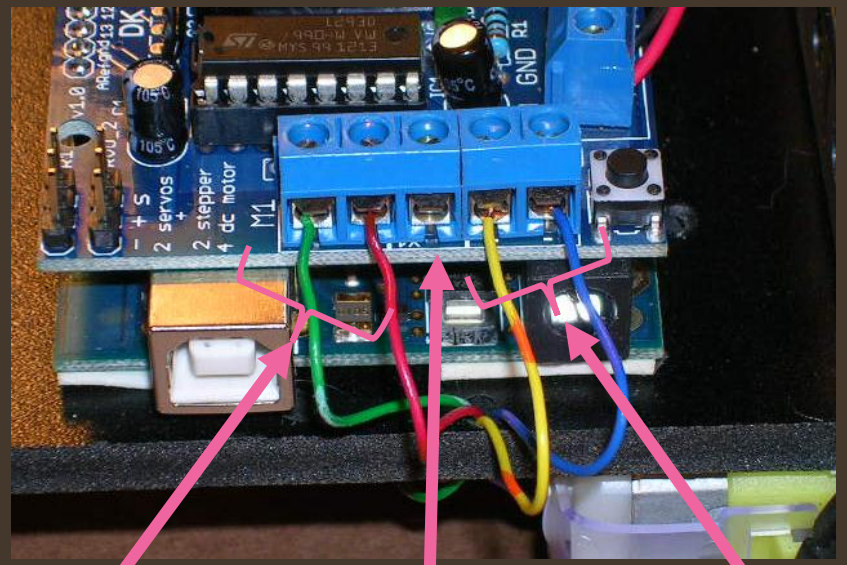
2. Install 6 AA batteries – make sure to follow + and – on the battery holder

3. Turn switch to ON – make sure green light on motor controller goes on

Motor Wiring



Motor connectors are labeled with “M1” and “M2”

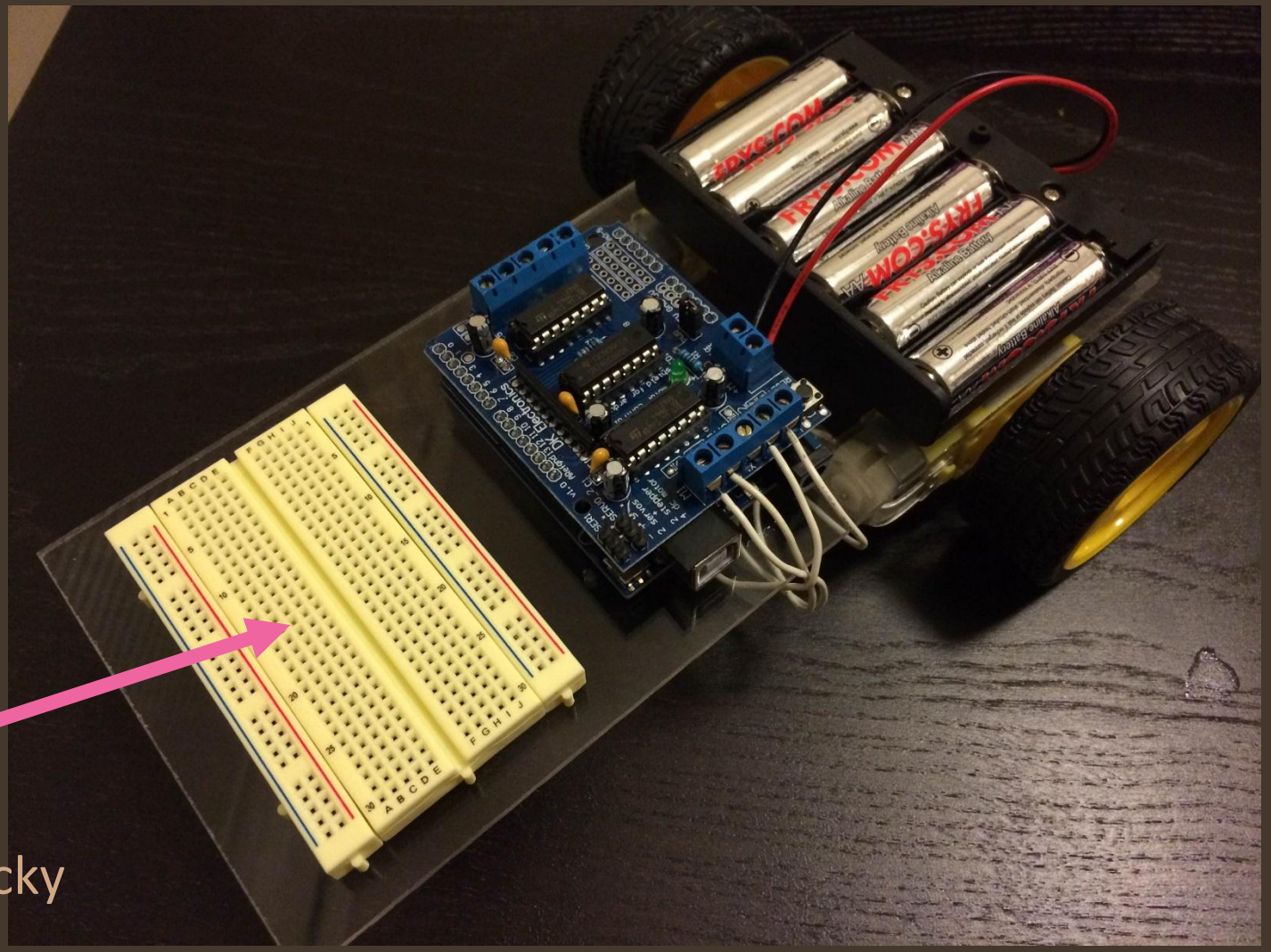


Connect wires from one motor into M1A and M1B

Wires from other motor go into M2A and M2B

Center connector is empty

Completing Assembly



Add the breadboard (already has sticky back)

Robot is finished! Load program onto robot and test.