The bottom row of pins are for Encoder Quadrature which we are not currently using. If we got with a Arduino Mega, Spider, or non-arduino microcontroller that can handle a lot of I/O I can make a new schematic with labels for those pins. Until then ignore them :D!

Each motor channel is labeled, you will decide which motors go to which channel and how to control them using code. There is no right or wrong way to do them and the motors cables only plug in with correct polarity.

Top row is important. All of the ground pins can be tied together, or at least just jumper them all to a common ground port on the breadboard. This allows us to use one arduino ground pin for all grounding.

PWM pins control speed. These will be wired to the arduino PWM pins you are using for speed control. You can connect these up in two ways: two channels per side (two pins on Arduino) or one channel per motor (four arduino pins).

Two pins: Speed on each side controlled independently. Uses less I/O but can only skid steer.

Four pins: Speed on each motor controlled individually, uses more I/O but can skid steer and smoothe steer.

We were using 2-pin method before, so my recommendation for that method is ch1 & ch2 be one side and ch3 & ch4 be the other side. Wire ch1/2 PWM pins together and wire ch3/4 PWM pins together. Doing this allows each side’s speed to be controlled independently.

Keep in mind PWM capable pins on the Arduino are marked with a ~ next to them. You must use one of these pins to drive the PWM pins on the motor board.

DIR pins control direction. 1 is forward, 0 is backward. You need each of these on their own arduino pin. You can use digital or analog pins for these and just digitalWrite 1 or 0 to them accordingly in code. One nuance to keep in mind is that forward on each motor is the direction it is attached in. ie. North facing motor will move north when a 1 is written to it and a south facing motor will move south when a 1 is written. This means to move forward either a North of 1 and a south of 0 need to be written or a south of 1 and a North of 0 (depending on which end you designate as “front”). Do this for each side!

Unlabeled pin (next to DIR) is current. This is used to read current draw from each motor. We’re not using it for anything, leave it disconnected.

Vbat = screw terminal for battery. Polarity matters, negative side to - terminal and positive side to + terminal.

+5v (Vcc) = screw terminal for logic voltage. Connect arduino +5v to + terminal and arduino GND to - terminal.

