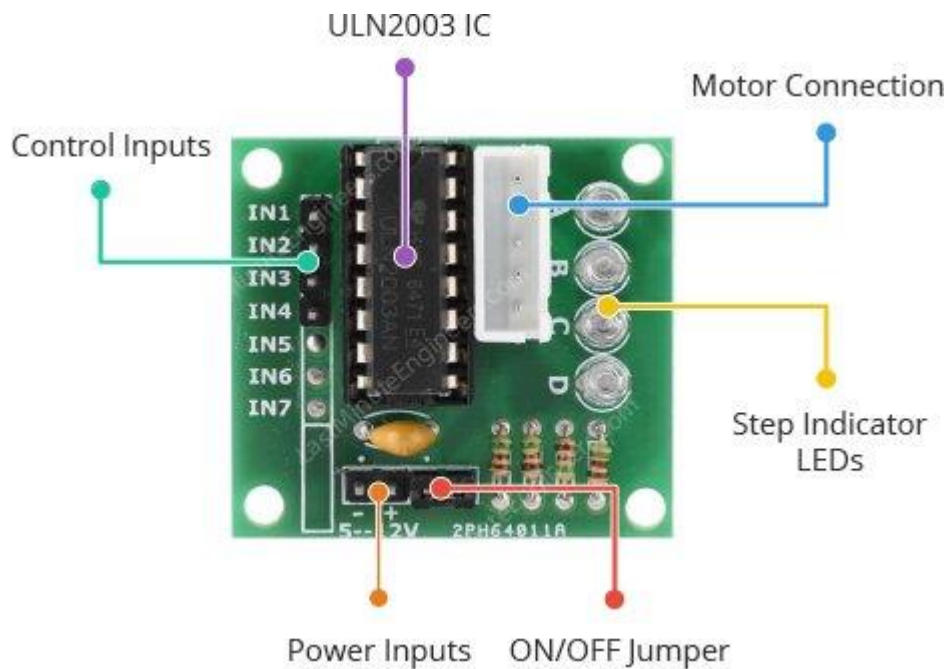# The ULN2003 Driver Board

The ULN2003 is one of the most common motor driver ICs, consisting of an array of 7 Darlington transistor pairs, each pair is capable of driving loads of up to 500mA and 50V. Four out of seven pairs are used on this board.


The board has a connector that mates the motor wires perfectly which makes it very easy to connect the motor to the board. There are also connections for four control inputs as well as power supply connections.

The board has four LEDs that show activity on the four control input lines (to indicate stepping state). They provide a nice visual when stepping.

The board also comes with an ON/OFF jumper to isolate power to the stepper Motor.

ULN2003 Stepper Driver Board Pinout

The pinouts of the ULN2003 stepper driver board are as follows:
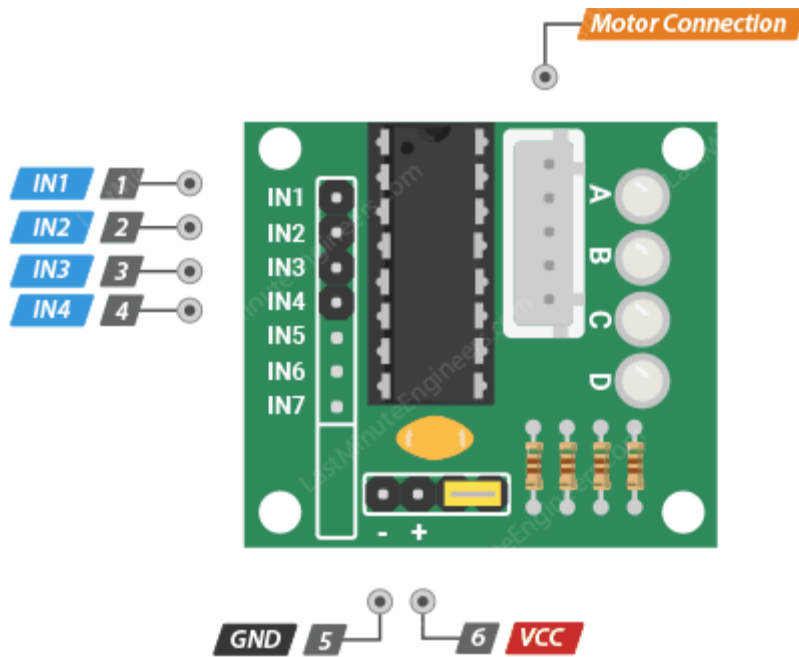
ULN2003 Driver Pinout

IN1 – IN4 pins are used to drive the motor. Connect them to a digital output pins on the Arduino.

GND is a common ground pin.

VDD pin supplies power for the motor. Connect it to an external 5V power supply. Because the motor draws too much power, you should NEVER use the 5V power from your Arduino to power this stepper motor.

Motor Connector This is where the motor plugs into. The connector is keyed, so it only goes in one way.

Wiring 28BYJ-48 Stepper Motor and ULN2003 Driver to Arduino

Now that we know everything about the motor, we can begin hooking it up to our Arduino!

Start by connecting the power supply up to the ULN2003 driver.

Note that it is possible to directly power the stepper motor from the Arduino. However, this is not recommended; as the motor may induce electrical noise onto its power supply lines and this could damage the Arduino.
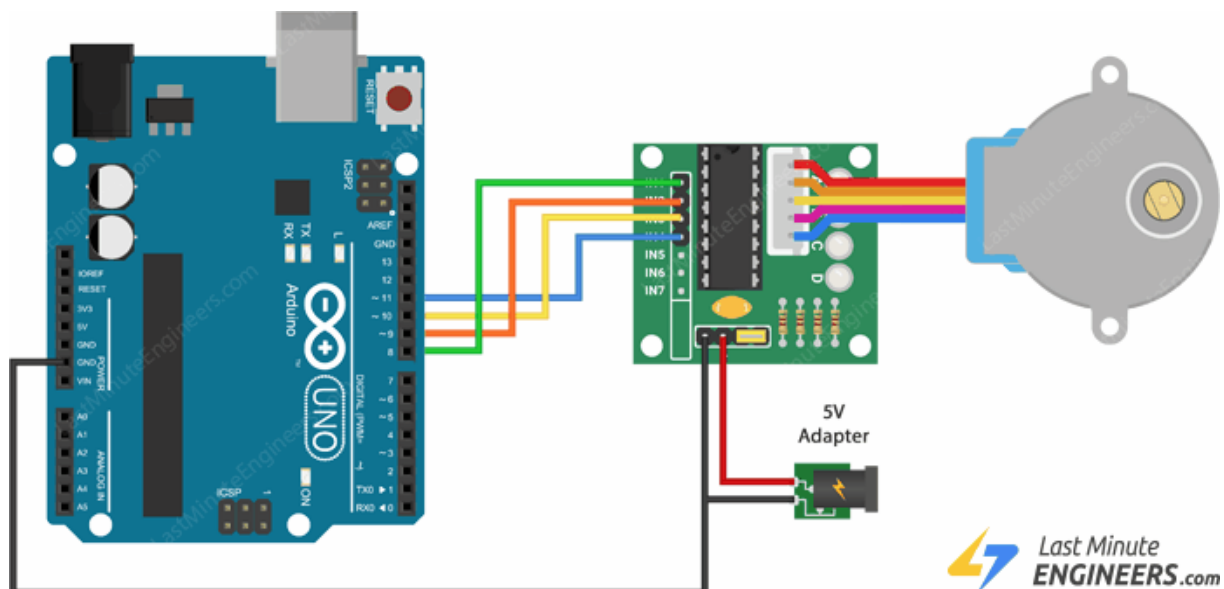
So, use a separate 5V power supply to power your stepper motors.

Next connect the ground from that power supply to the arduino's ground. This is very important so that we establish the same voltage reference between the two.

Now connect the driver board's IN1, IN2, IN3, IN4 to the Arduino digital pins 8, 9, 10, and 11 respectively.

Finally, hook the motor cable from the stepper motor up to the driver board.

When you're done you should have something that looks similar to the illustration shown below.