Motor Driver PCB Assembly

The order that you place and solder parts on the PCB makes a large difference in how difficult the board is to complete. This guide uses the reference design from last year to demonstrate a reasonable ordering that will help you avoid squeezing the soldering iron into tight places between already placed components.

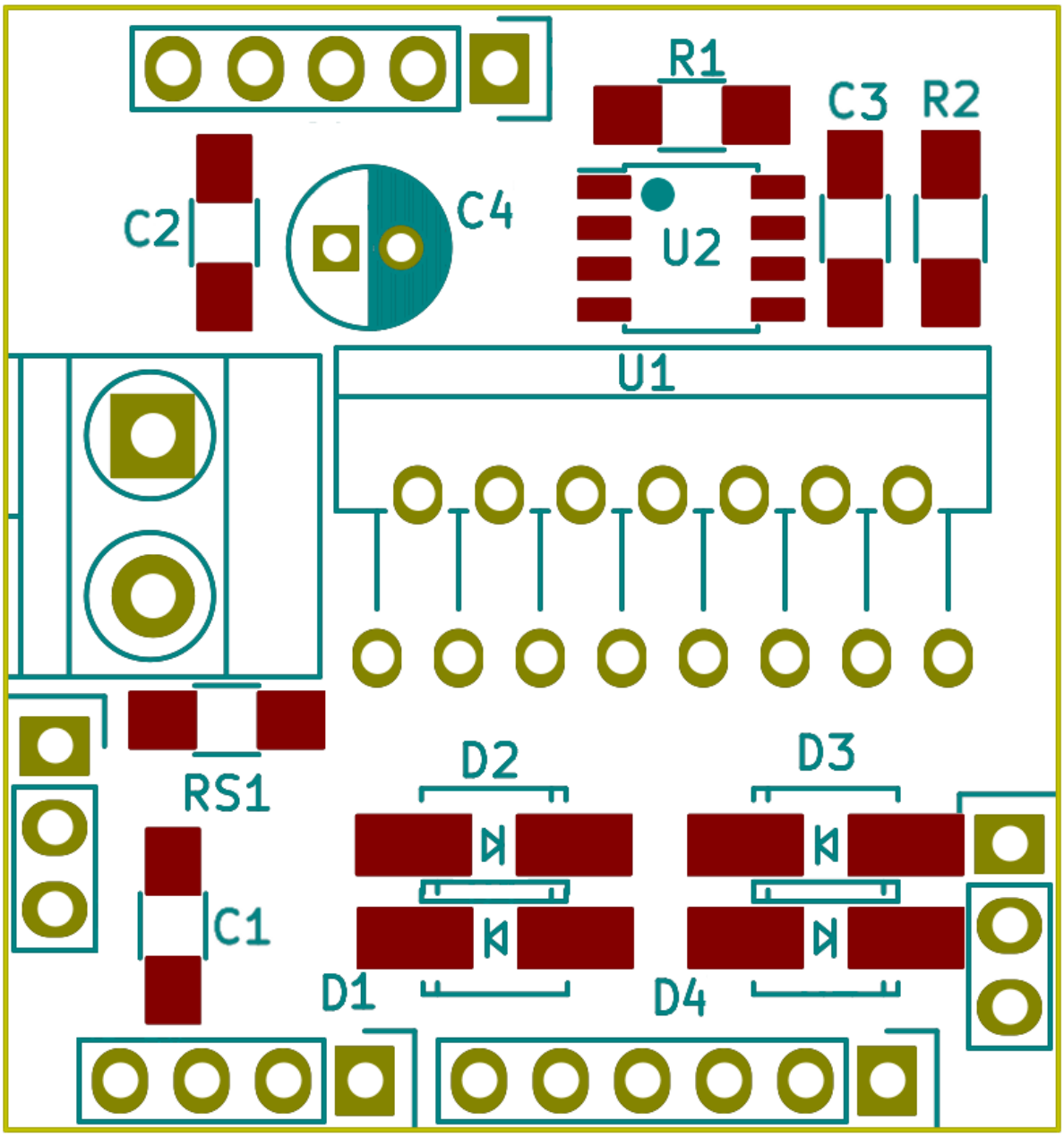
When assembling these boards you have the option of using either a soldering iron or solder paste and hot air. Your TA should give you a demonstration on how to use these techniques during your lab section.

Bill of Materials

Can be purchased as the motor kit in the stockroom.

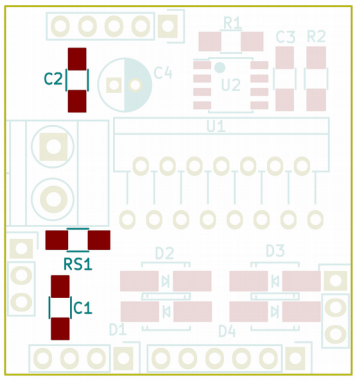
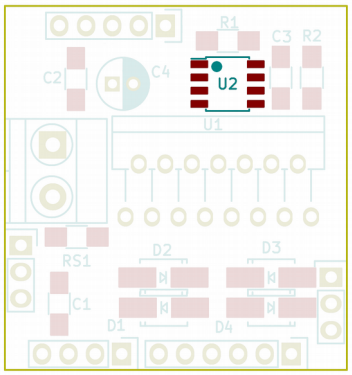
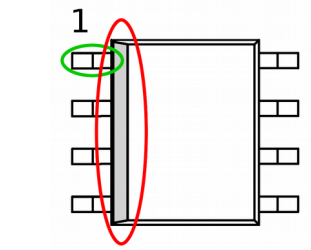
Description	Quantity	PCB Designation
CAPACITOR ALUM 1uF RADIAL	1	C4
CAPACITOR 0.1uF (1206 SMD)	3	C1, C2, C3
RESISTOR 0.04 OHM (1206 SMD)	1	RS1
RESISTOR 10K OHM (1206 SMD)	2	R1, R2
DIODE SCHOTTKY (SMD)	4	D1, D2, D3, D4
L298N (Motor Driver)	1	U1
LM75A (Temp Sensor)	1	U2
CONNECTOR TERM BLOCK 2POS 5.08MM PCB	1	Big power connector
CONNECTOR HEADER 0.100" 40POS		Break up into pieces for the multiple headers

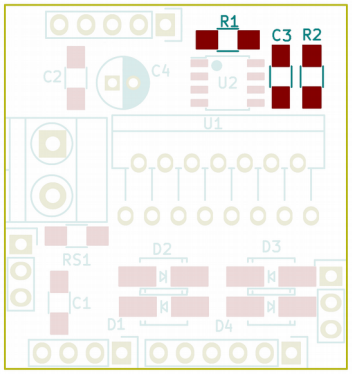
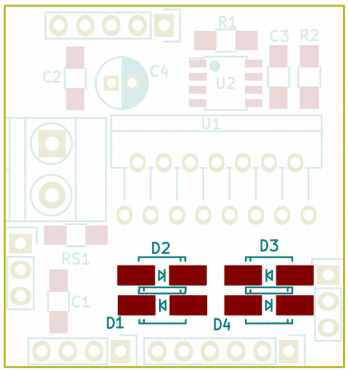
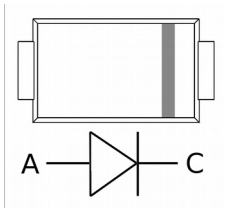
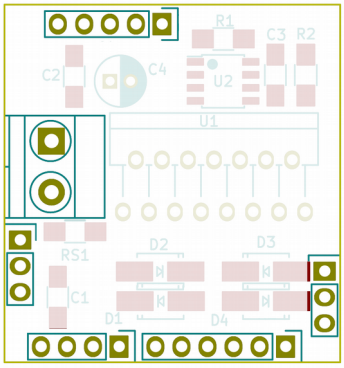
Component Positions

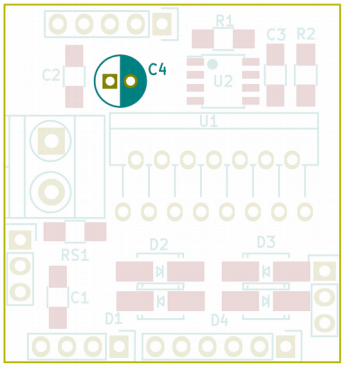
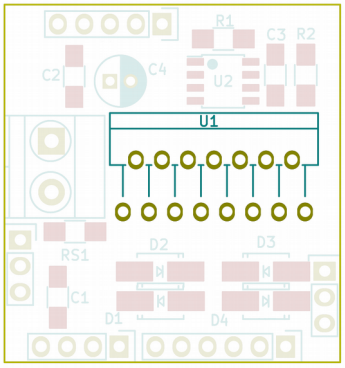


Assembly Guide

Here is a recommended ordering of part placement that will help you avoid trying to squeeze between already placed components. While the exact ordering isn't important, a general rule of thumb is to start with surface mount parts before through-hole and work either from the center or an edge of the board outward.

	Start with the small resistors and capacitors that aren't nearby anything else. You will probably want to start with C1 & C2 if you are unfamiliar with soldering, the capacitors are fairly inexpensive if you accidentally destroy them You will want to solder C1 before soldering RS1 if you are using the iron. (means RS1 isn't in the way) If you are using paste the order isn't important.
 	Solder U2 before the surrounding components. Otherwise it will be difficult to get the iron onto the pins without hitting and burning the other parts. Pin1 should be aligned to the dot shown in the image. Pin 1 is indicated on the chip package by a beveled edge. You will probably want to use an iron to solder the chip, it will be difficult to place solder paste such that it doesn't bridge/short adjacent pins.

	After completing U2, solder the surrounding components.
 	Solder the four diodes, making sure that the anode-cathode orientation matches the symbols shown on the board. The diodes have a line printed on the top of their package, this indicates the cathode of the device. You will probably want to use solder paste since these devices are too close together to easily use the iron.
	Solder the header pins and screw terminal. It may be helpful to use masking tape to hold the headers in place while the board is flipped over for soldering.

	Solder the large electrolytic capacitor, similar to the diodes this component must be placed in the correct orientation. The capacitor has a white stripe on the side of the case, this indicates the negative lead and should be placed in the hole with the filled in silkscreen. (white silkscreen on board, shown in these images as cyan)
	Because the U1 motor driver is the tallest component it is easiest if it is soldered last.