

Sophomore Clinic

ENGR 01-202 5, CRN 20686

Building your Microcontroller

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Topics

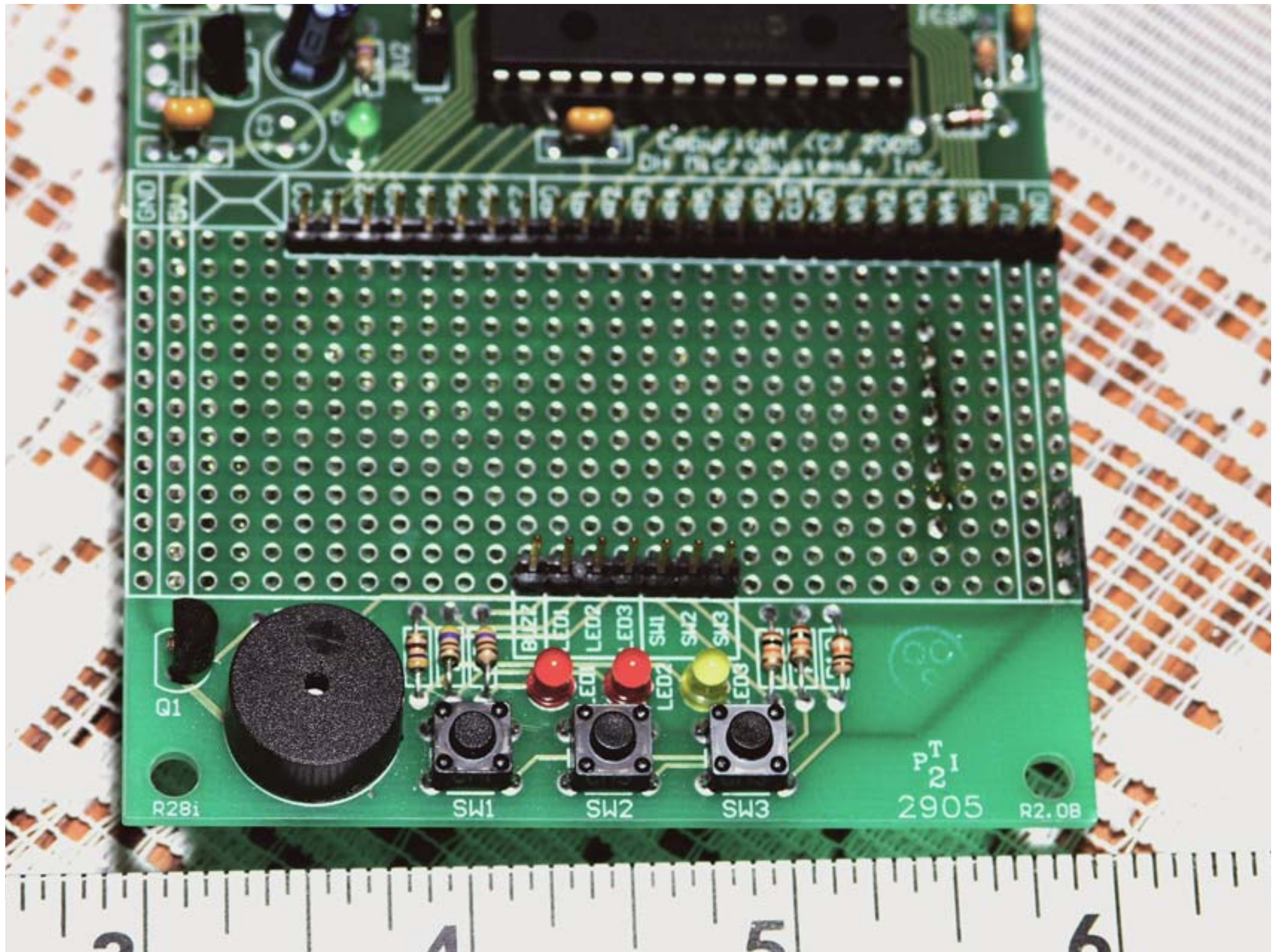
- The PIC project Board
 - Capabilities
 - Additions
- The H-bridge
 - Capabilities
 - Building the H-bridge board
- Building the H-Bridge
- Soldering Examples
- The Finished Product

The PIC Project Board

- 28-pin PIC 16F876A
- 5 Volt regulator
- 9 Volt power connector with jumper disconnect
- Six-pin programmer connector
- Separate input-output output capability
 - Three LEDs
 - Buzzer
 - Three pushbuttons
- Solderable Interconnect Field

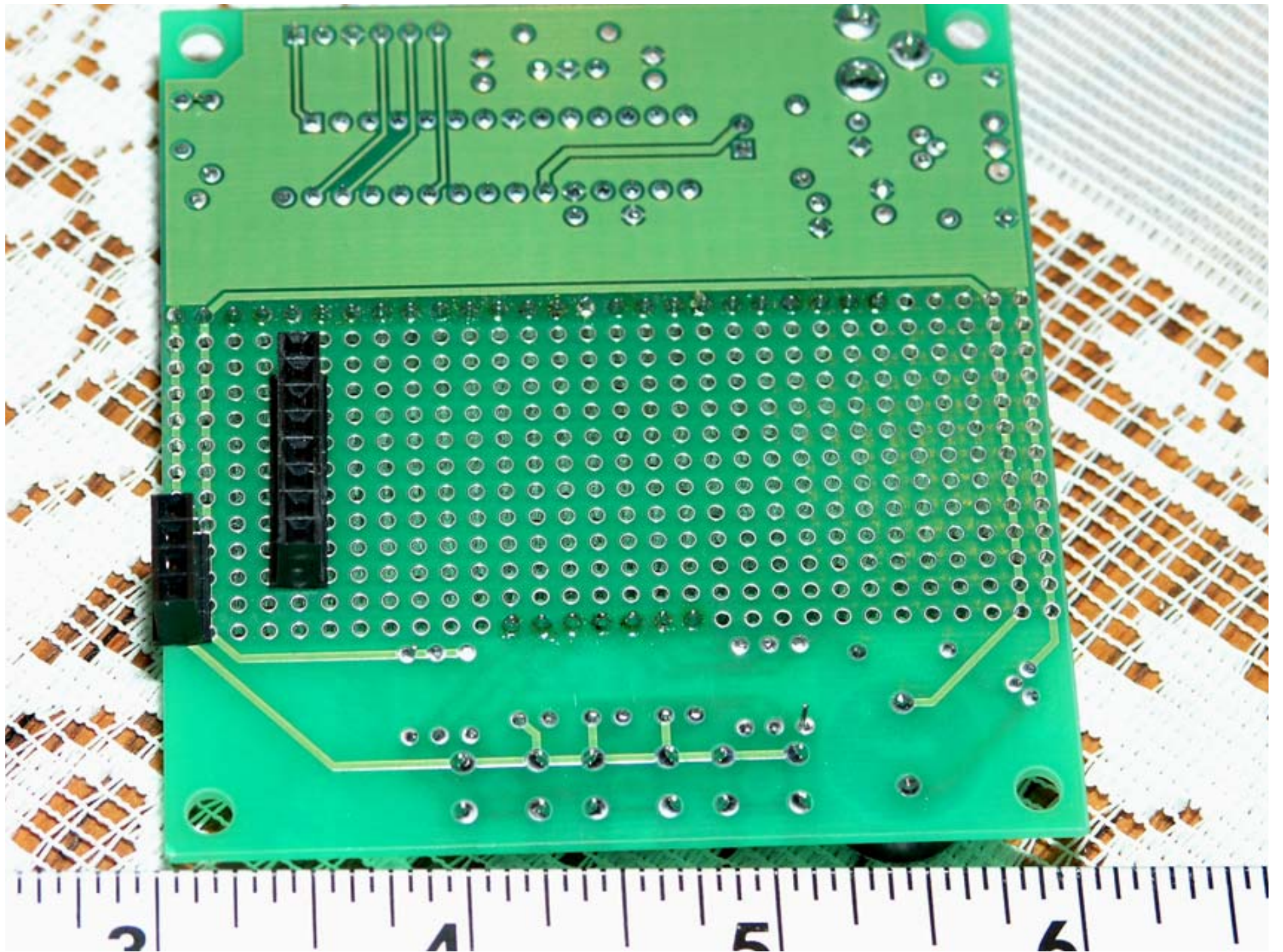
Additions to the Project Board

- Connectors for the PIC I/O Pins
 - End two pins provide access to 5 Volts regulated and ground
 - Programmable I/O PIC pins
 - Pins RA0-RA5
 - Pins RB0-RB7
 - Pins RC0-RC7
- Connectors for on-board I/O
 - Buzzer
 - LEDs
 - Pushbuttons



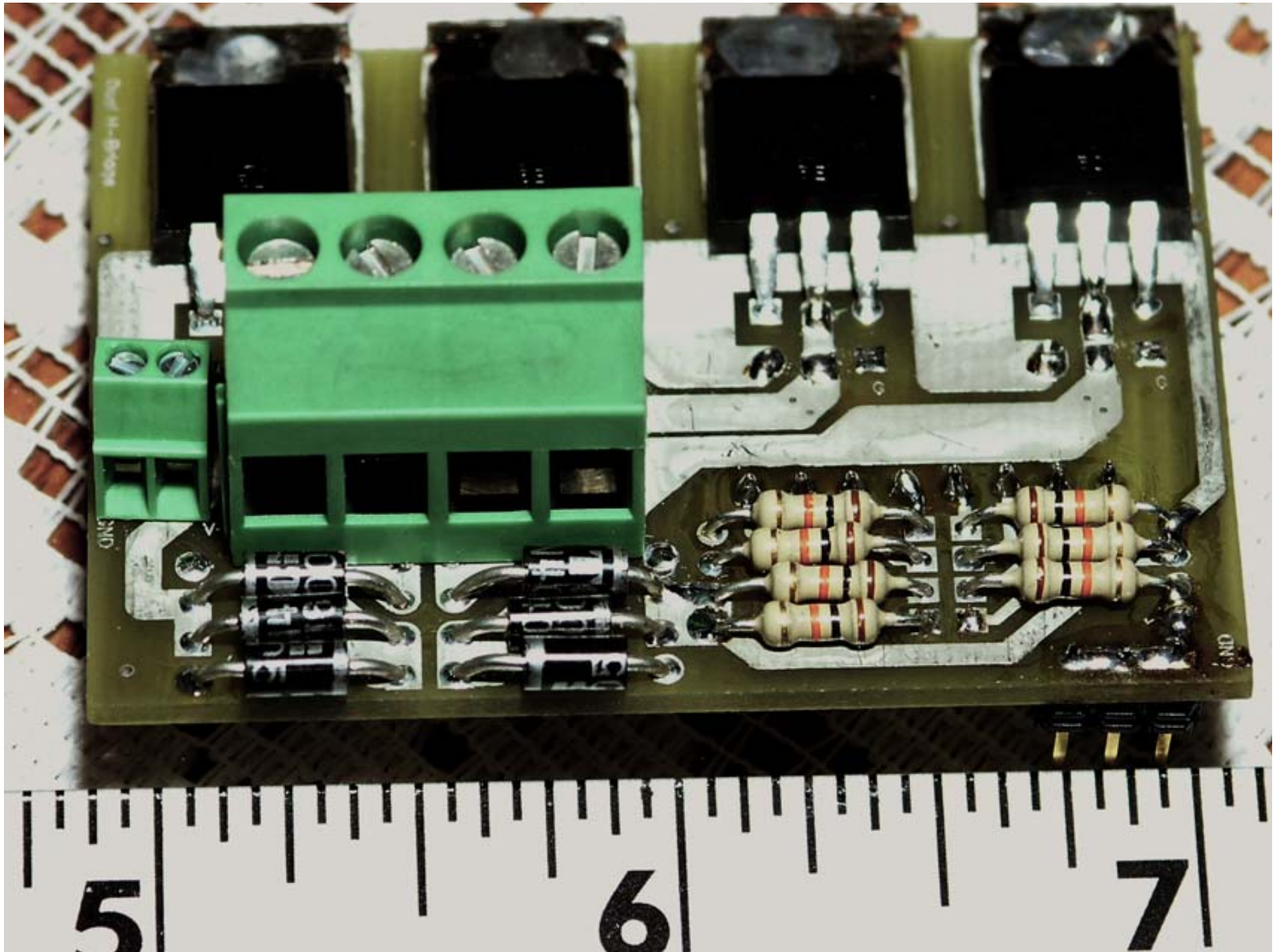
On the Bottom of the PIC Board

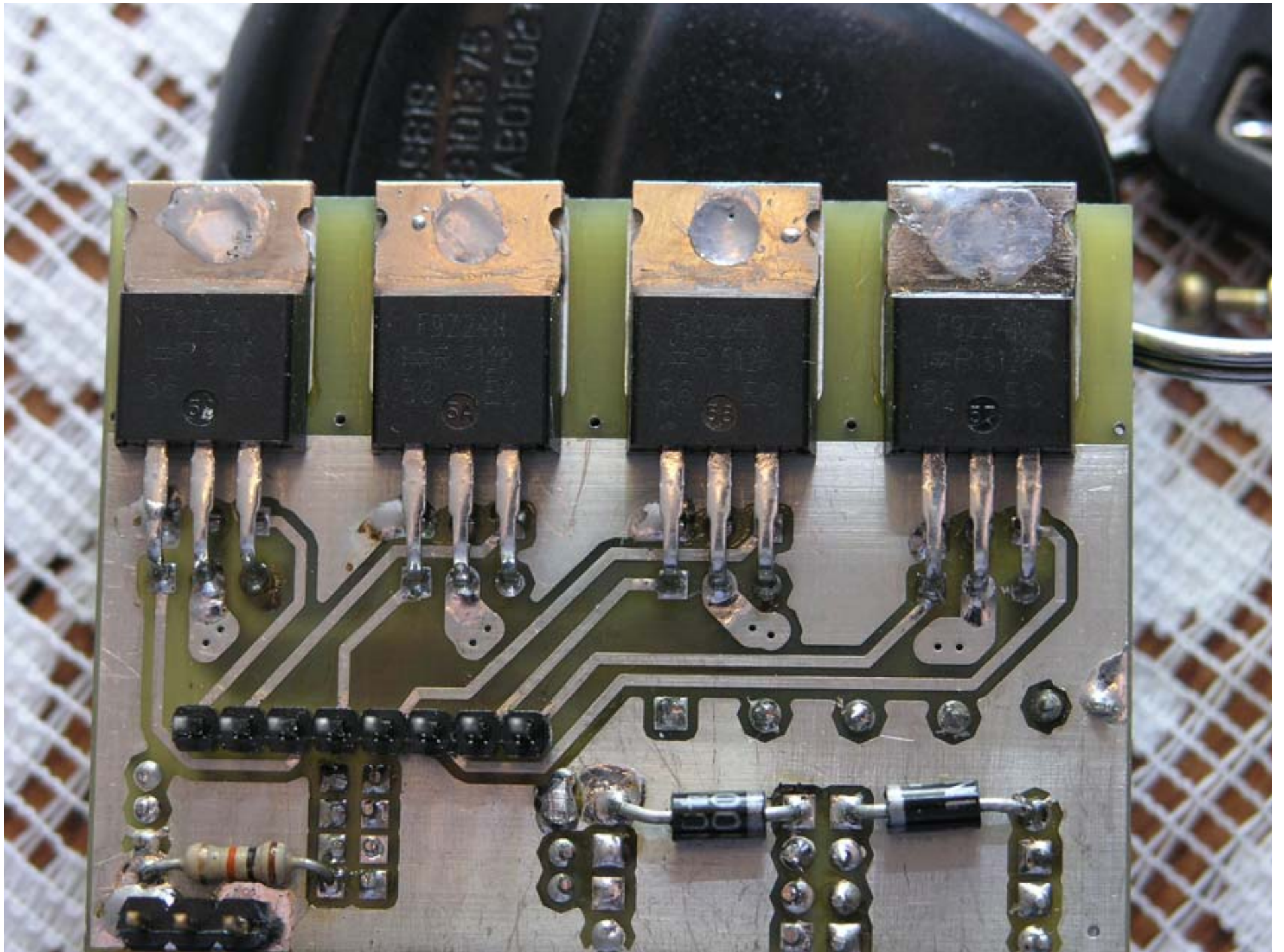
- Add two connectors
 - Three-pin ground
 - Eight-pin H-bridge control lines
- Purposes
 - Allows direct connection of H-bridge board
 - Provides simple connections between the two boards



The H-Bridge Board

- Contains two H-bridges
 - Four high power MOSFETs each
 - Drive two DC motors from 5 Volts
 - Each motor is bidirectional
 - Controlled directly by PIC
- Supplied with only MOSFETs mounted
- You add
 - Connectors
 - Four diodes, four resistors
 - Screws holding MOSFET pairs together





Solder the Connectors First

- The job is easiest if you put the “handles” on first
- The components can get in the way of mounting the connectors if they are put on first
- Put the small green connector on first because the others will be in the way
- Add the components last
- Use of the board is simplest if the wires go in the side of the connectors away from the MOSFETs

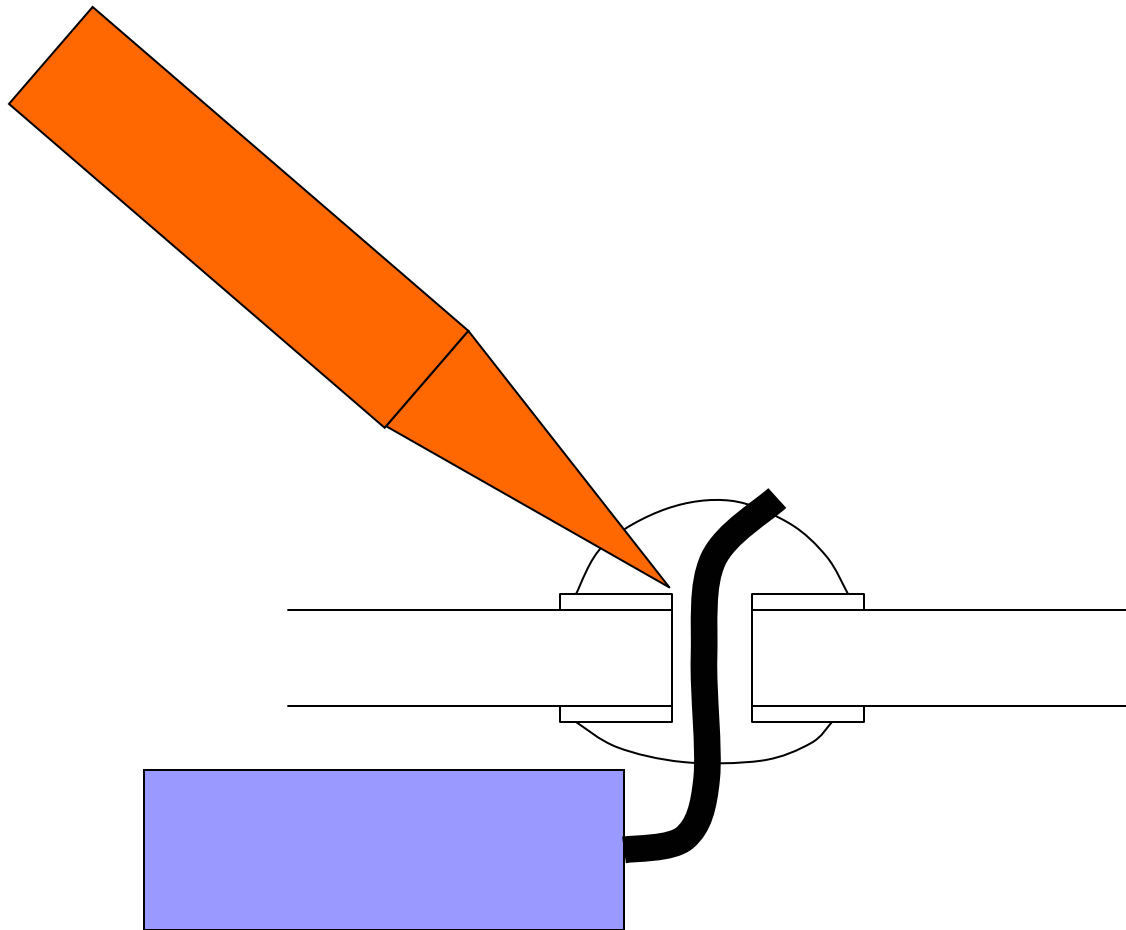
Mounting the Components

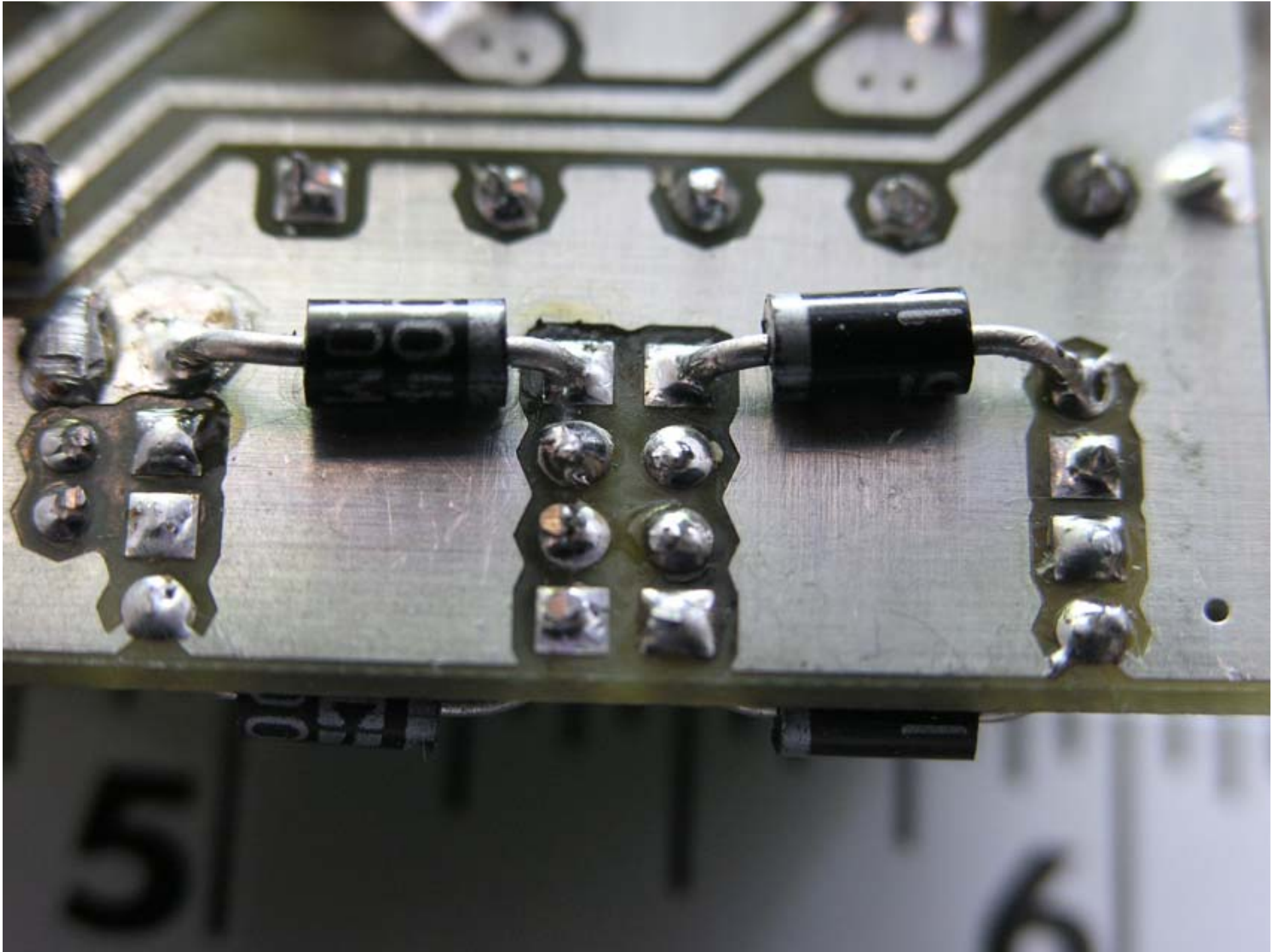
- At least one of the resistors and two of the diodes must go on the “back” side of the H-bridge board to make room for the connectors
- The Diodes
 - Cathode is the end with the silver band
 - Mounting of the diodes with the band in the proper direction is critical
- Sample shows heat sinks soldered together—
use screws instead

Basic Soldering Principles

- Touch the soldering iron to the foil on the board and the wire to be soldered
- Feed the solder against the foil and the wire on the other side of the wire
- Use no more solder than absolutely necessary to wet the wire and the foil surrounding the wire

The Soldering Concept

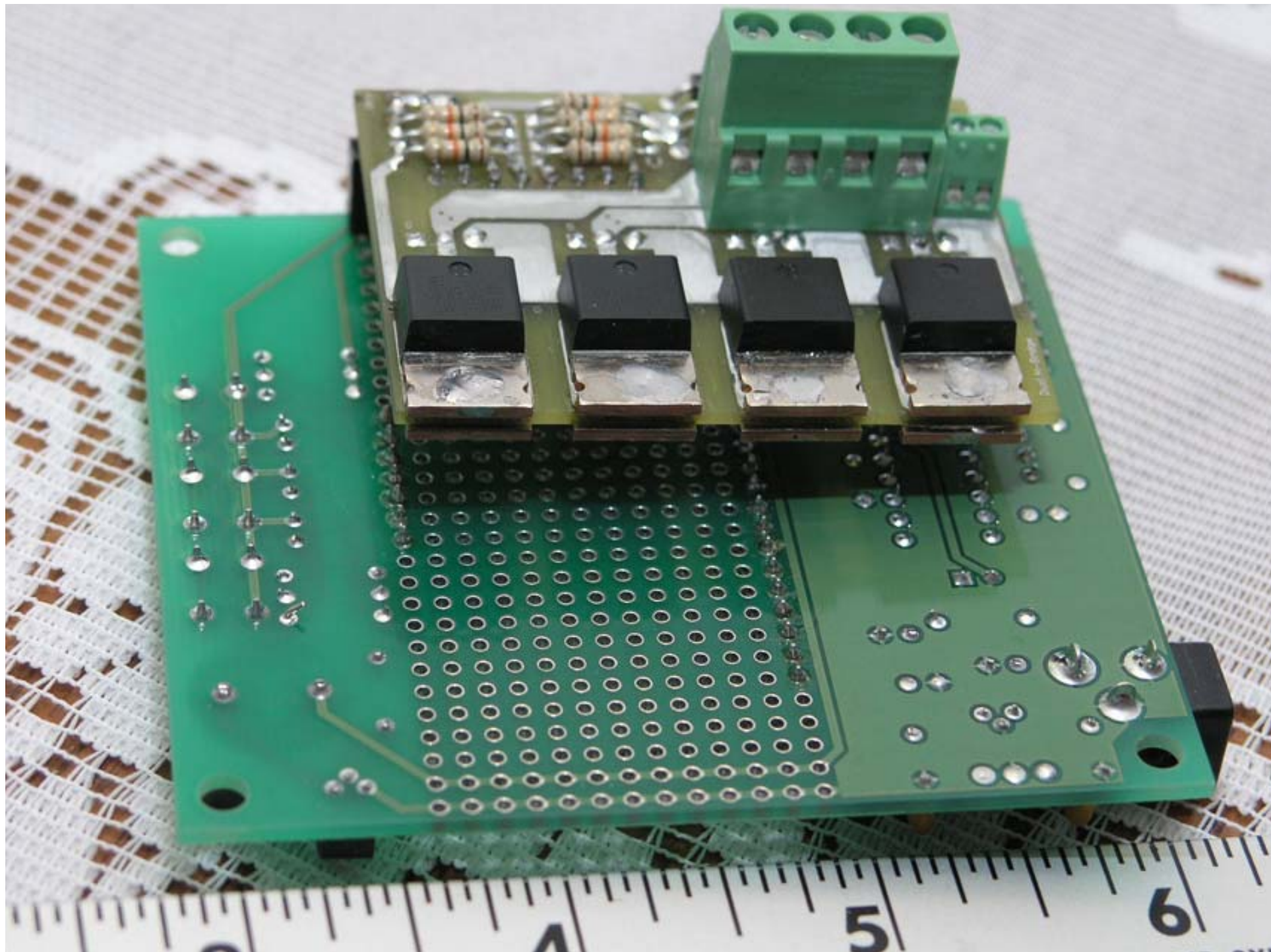


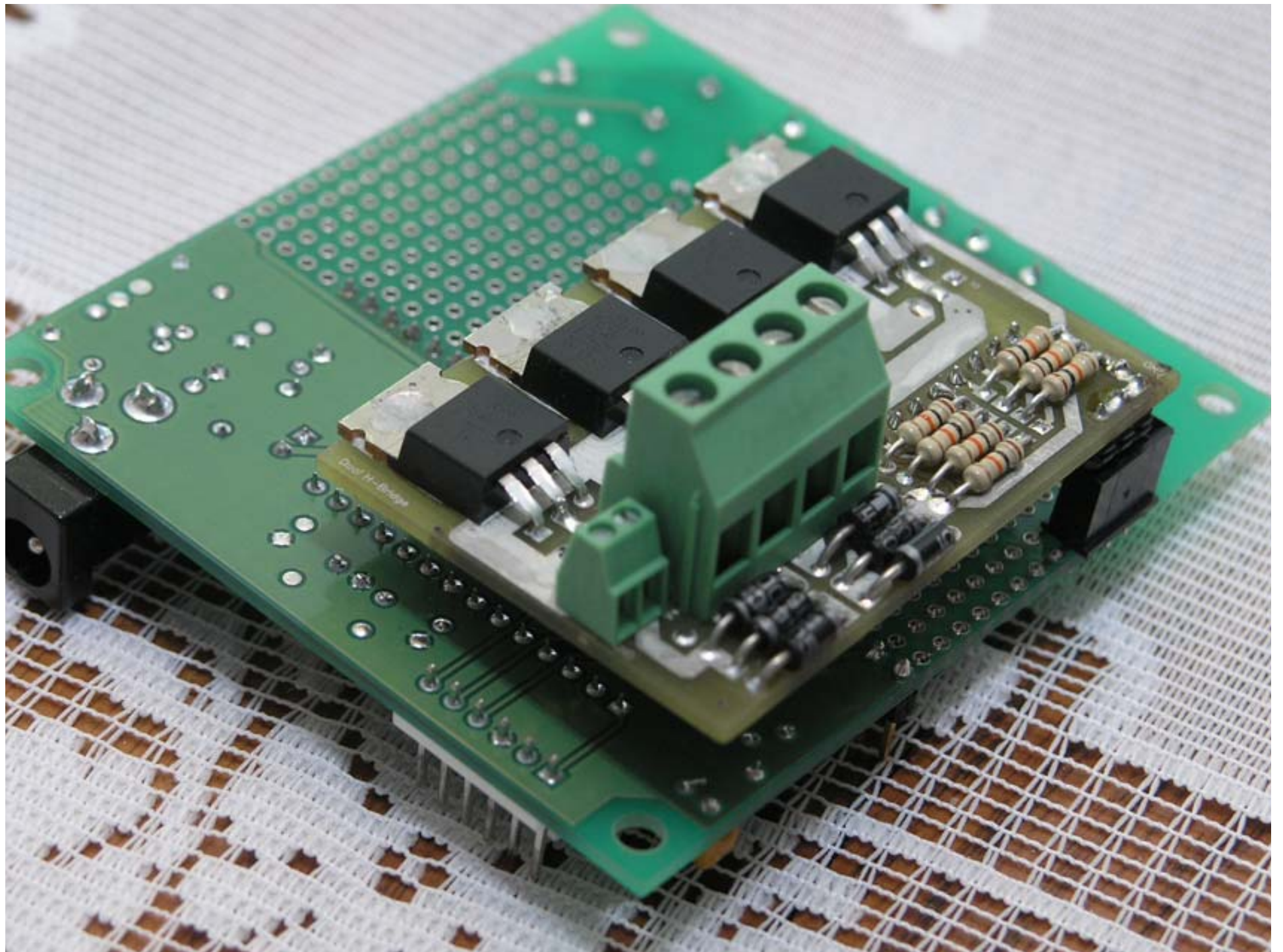


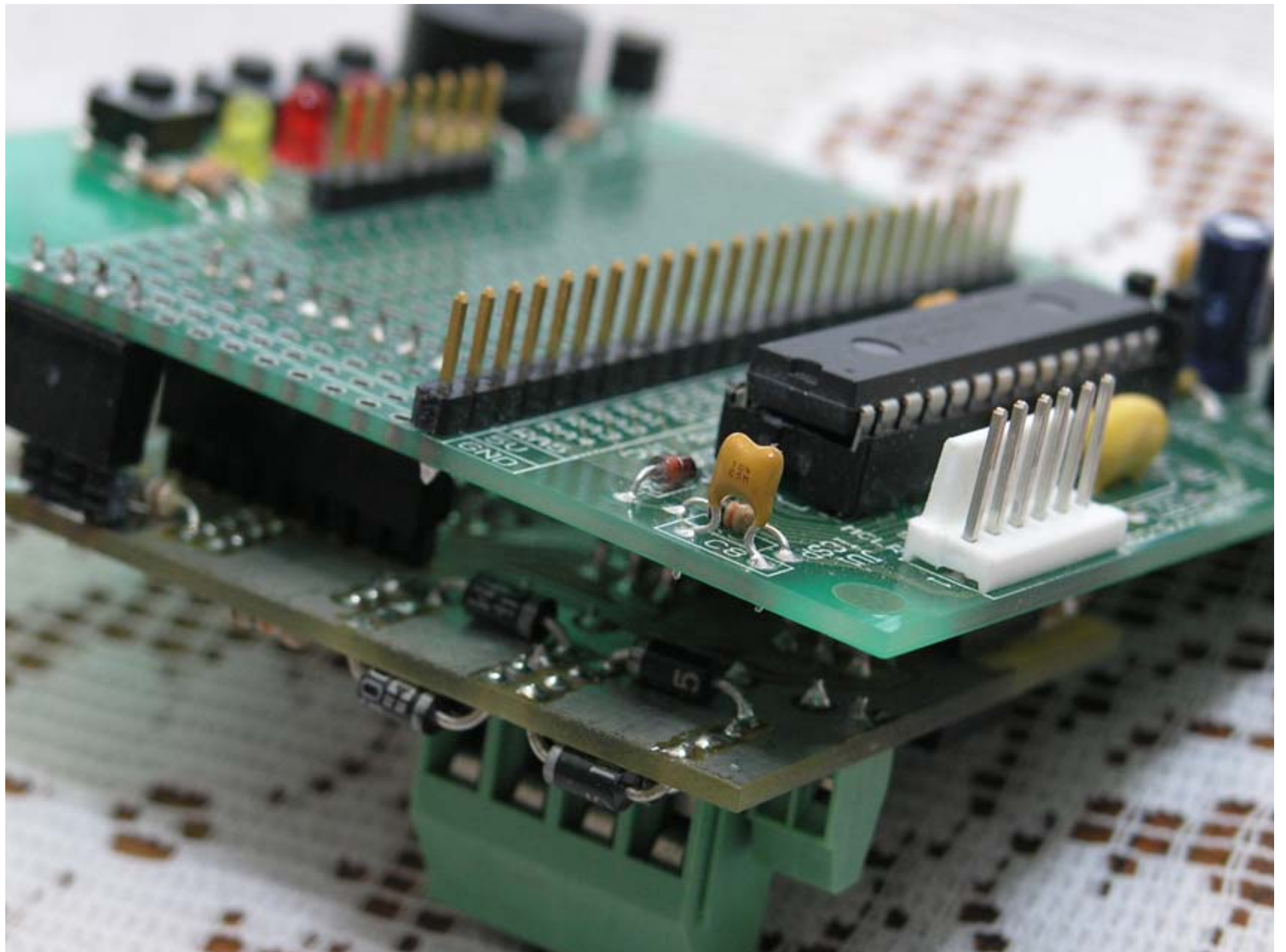


The Finished Product

- ***Phil will test each of the boards before you apply power to it.***
- When completed, the bottom of the H-bridge board will plug into the bottom of the PIC project board
- The assembly will be mounted by the four corners of the PIC board.







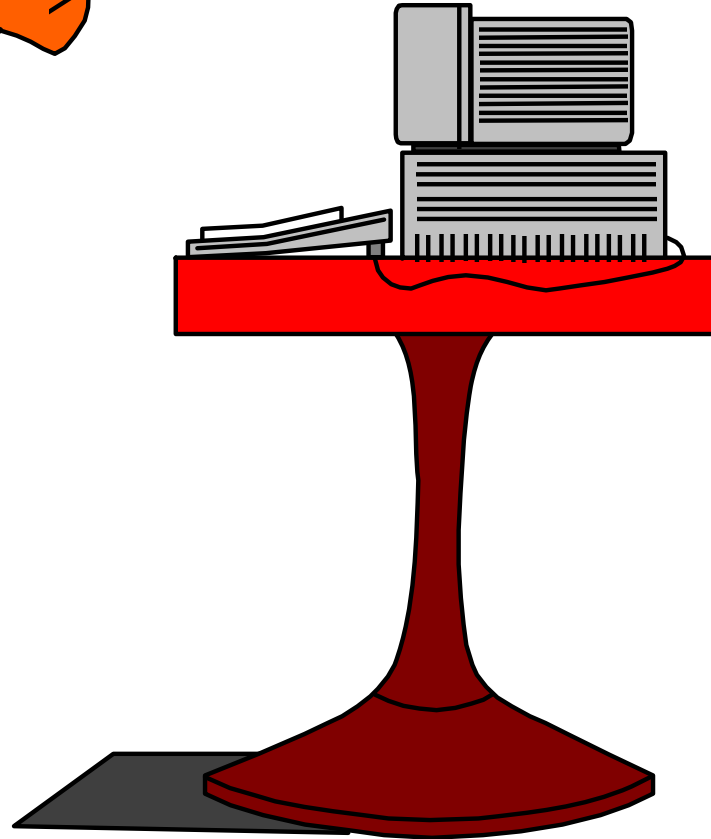
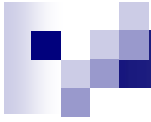
Building the Board

■ Work

- Soldering the components
- Checking the work
- Fixing short circuits by removing solder bridges

■ Reward

- Your computer and high power H-bridge for your project



What's Next

- Using the Compiler
 - CCS C Compiler for PIC
 - CCS Home Page: <http://www.ccsinfo.com/>
- Sample Code Next Week
 - C Program
 - Runs with CCS C Compiler on 16F876A
 - Uses pushbuttons, analog input