Xiphos 1.0 Assembly Instructions

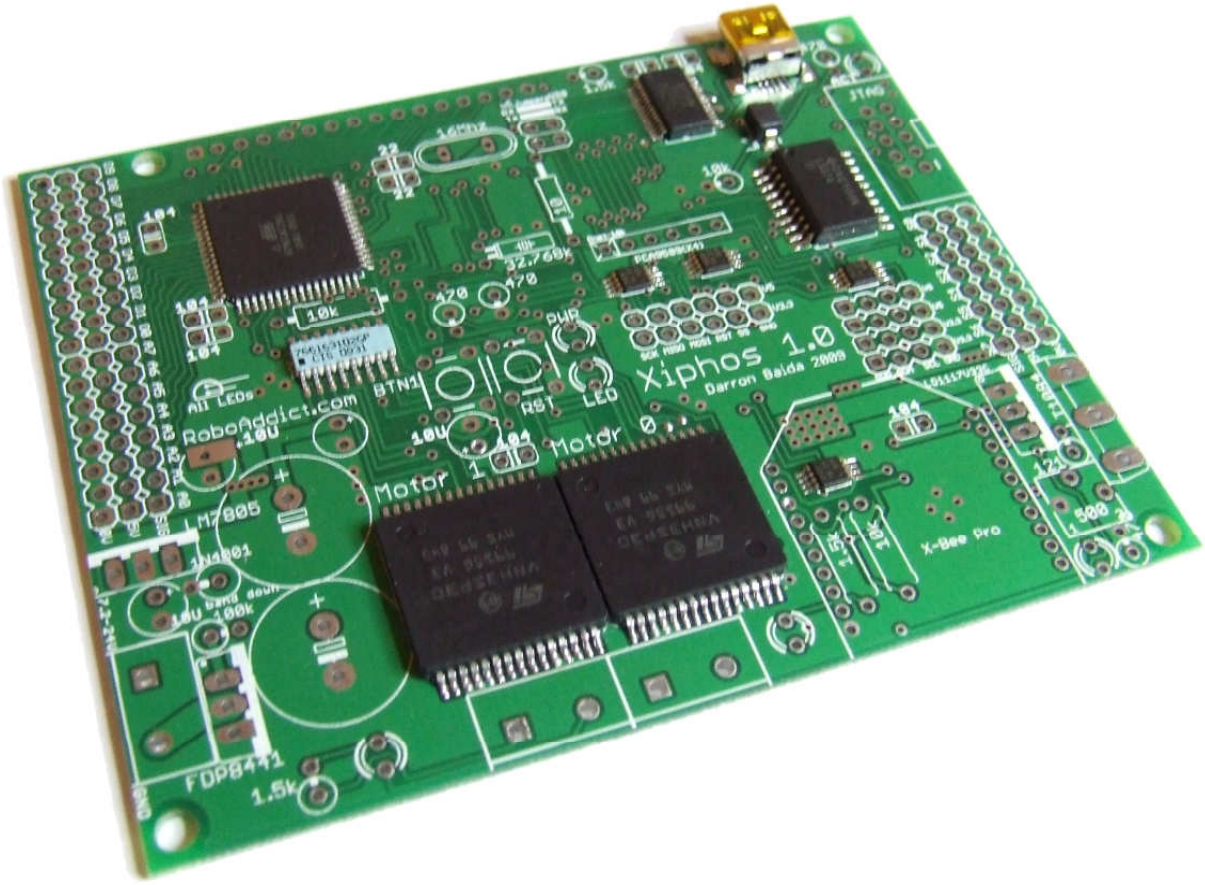
As you can see, all surface mount components have been soldered for you so only the through-hole components are left for you to assemble. You will need the following tools.

Safety glasses - Put them on before beginning.
Soldering Iron
Solder
Damp sponge – kitchen sponge is fine as long as it's not the scrubber kind
Desolder wick (you never know)
Small Philips(cross head) and flat head screwdrivers
Small diagonal cutters
Multimeter – Resistance(ohms) and voltage features will be used.

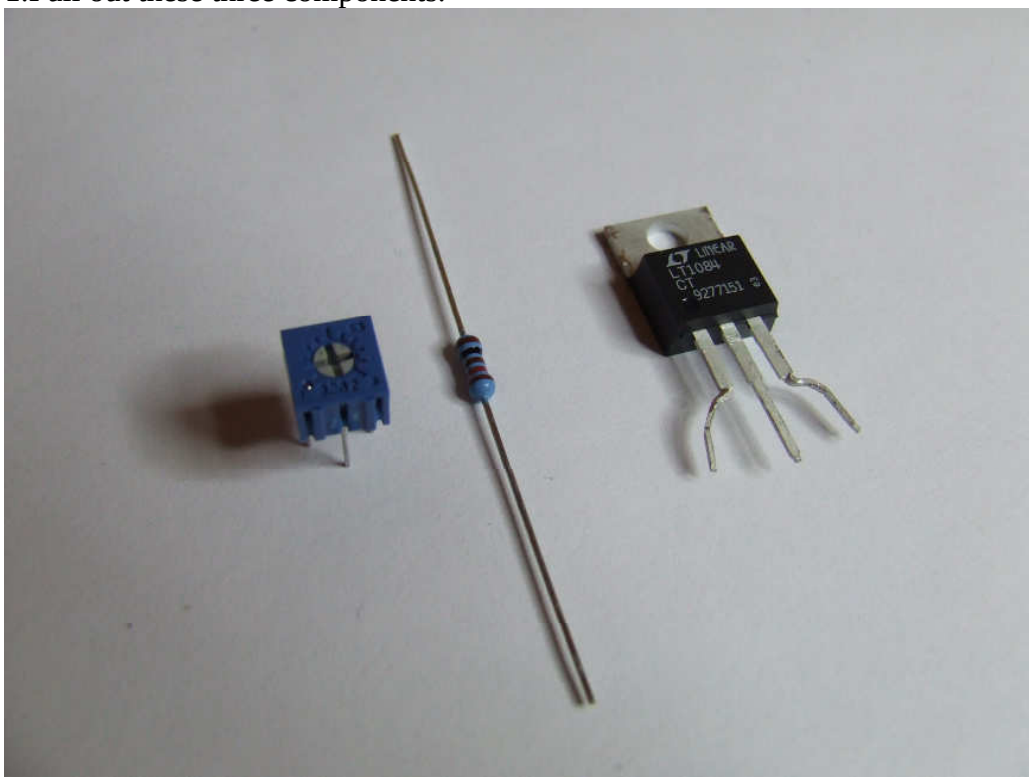
Things you may want
Rubbing alcohol with acid brush and chem wipes to clean flux
Grabber leads for multimeter

The first portion of assembly requires a little more than just soldering but it can be accomplished by even the most novice user and it may be quite educational. So, don't be intimidated! If you have never soldered before, or it's been awhile, there are lots of good instructional videos on YouTube and similar sites that you may want to view before beginning.

Here is your new board Xiphos board with only the surface mount components assembled.

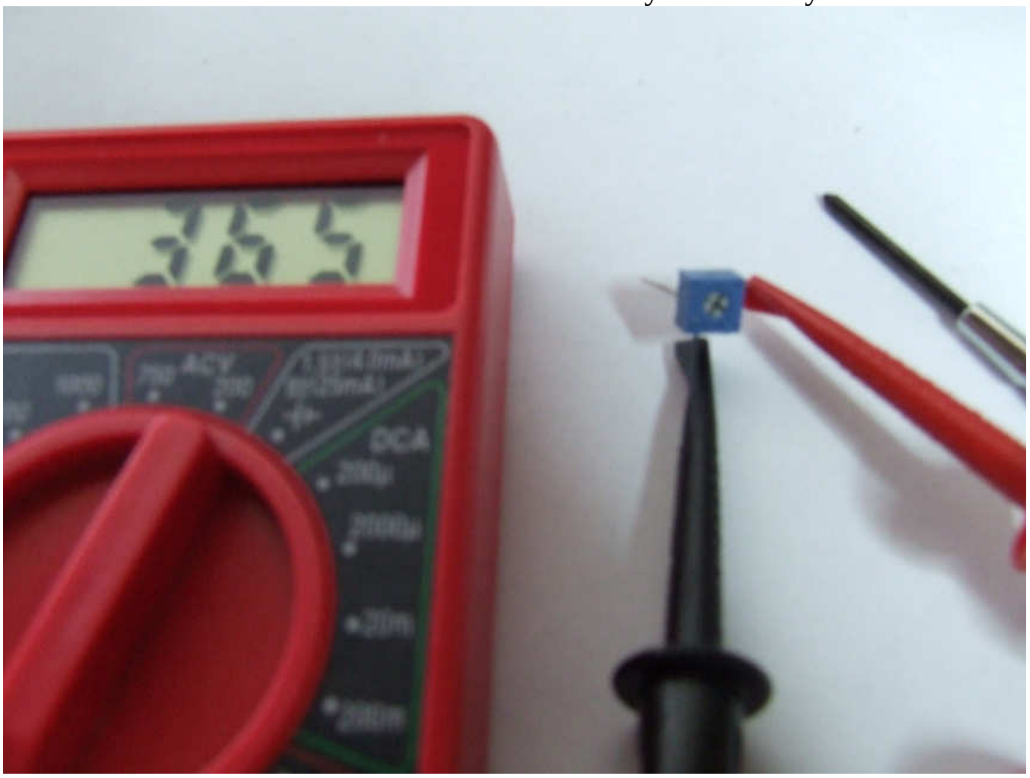


1.Pull out these three components.

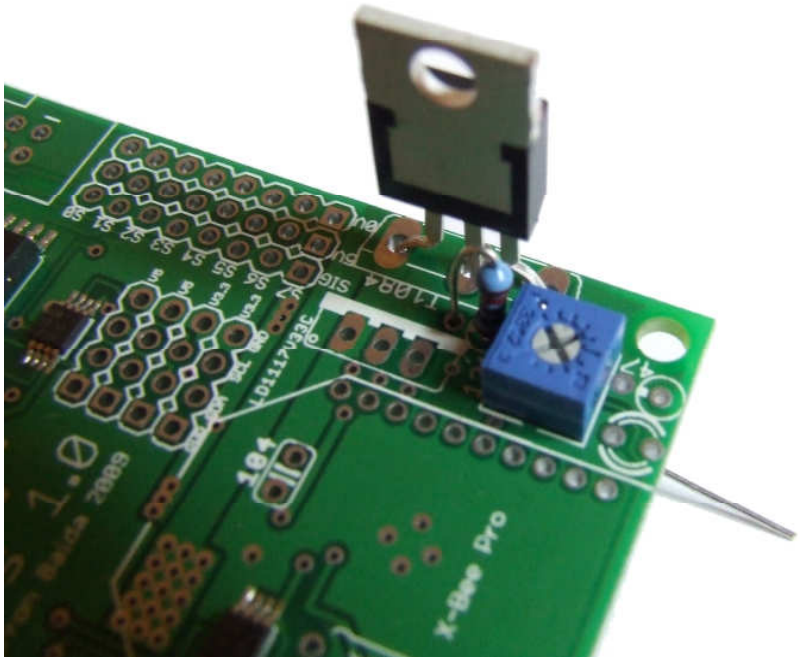


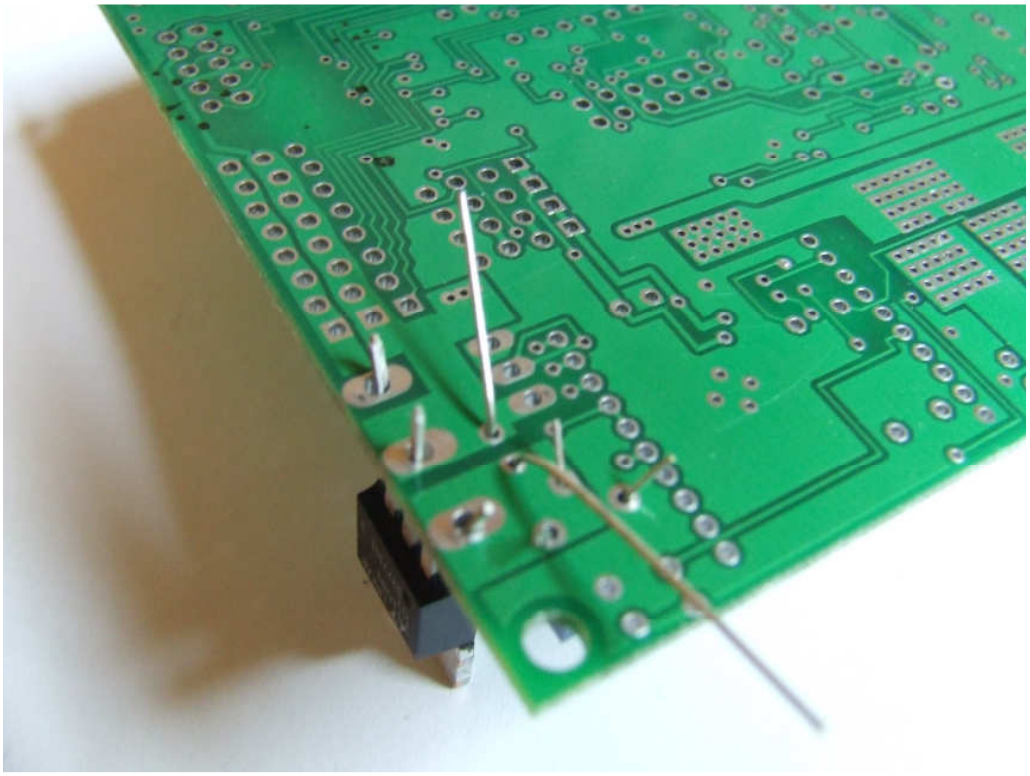
Left to right these are a 500ohm potentiometer(pot), a 121Ohm(brown-red-brown-black-brown) which is rated to 1% precision. On the right is a high current 5V regulator (LT1084).

2.With all numbers on the face of the potentiometer facing you, connect or hold probes to the bottom and right leads. It is ok to bend these leads out temporarily. If you don't have grabber leads, have a friend hold them connected. Social interaction is included at no cost. With your multimeter in ohm mode, tune the potentiometer to 365ohms and make sure it still reads that when you remove your screwdriver.



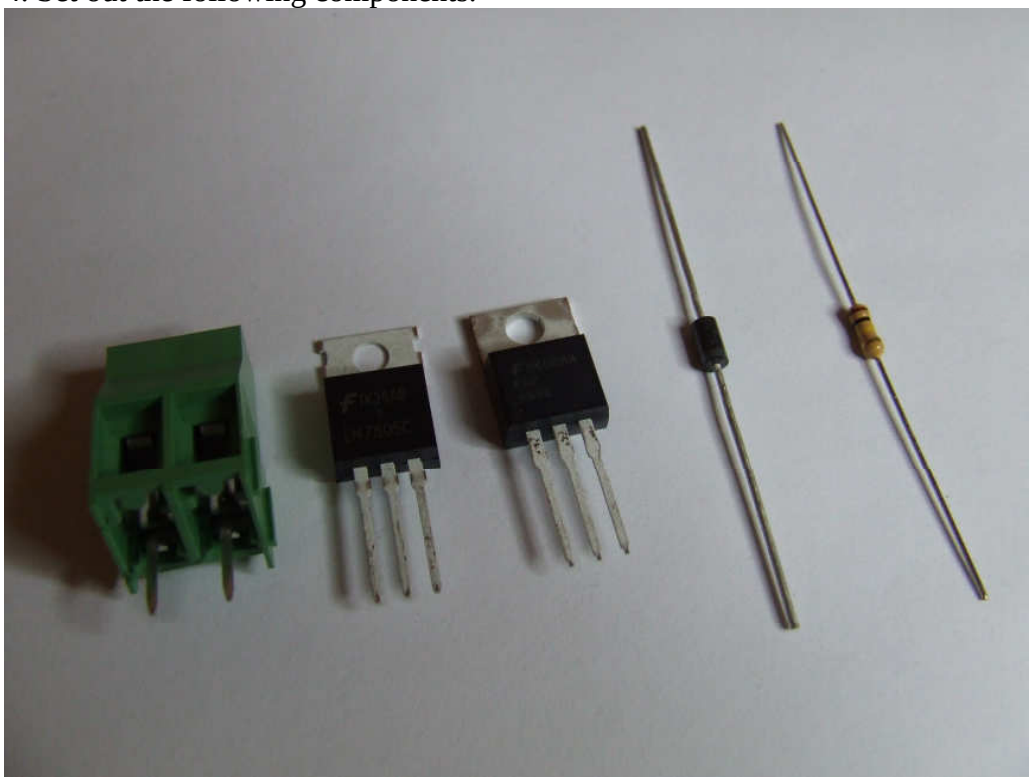
3. Insert these three components into the board as shown and solder in place. For the resistor, fold one lead (doesn't matter which) to be parallel with the other.





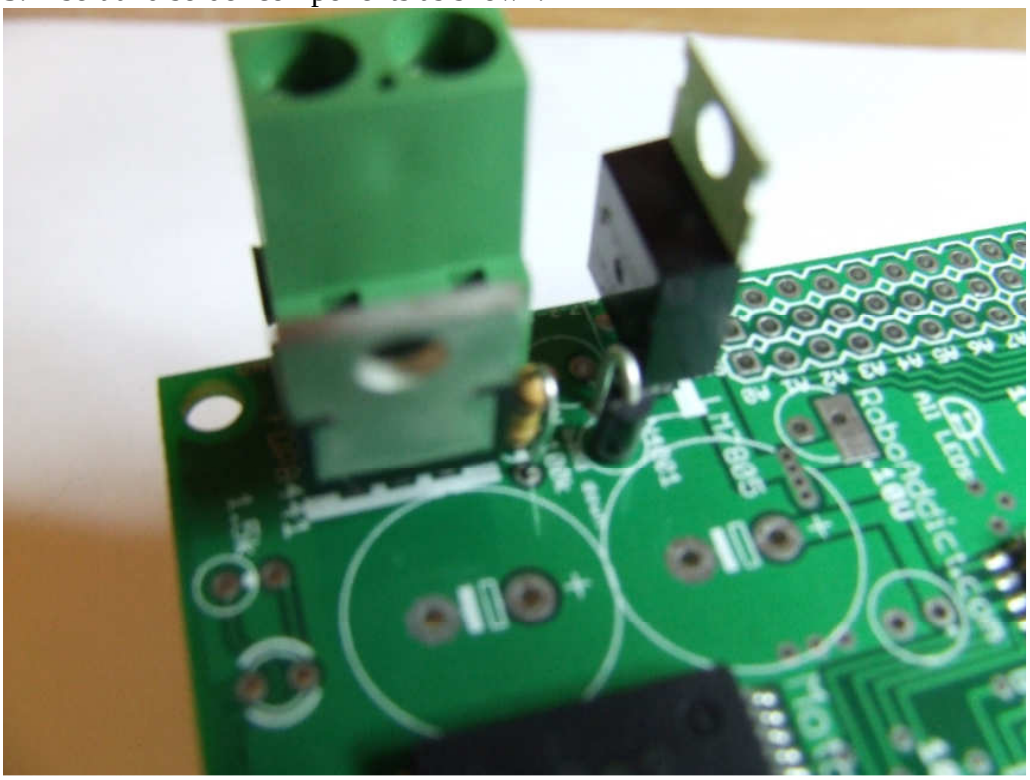
Note: When soldering, bend leads outward gently to keep them in place. After soldering, clip leads with diagonal cutters. Keep safety glasses on! Leads often go flying.

4. Set out the following components.



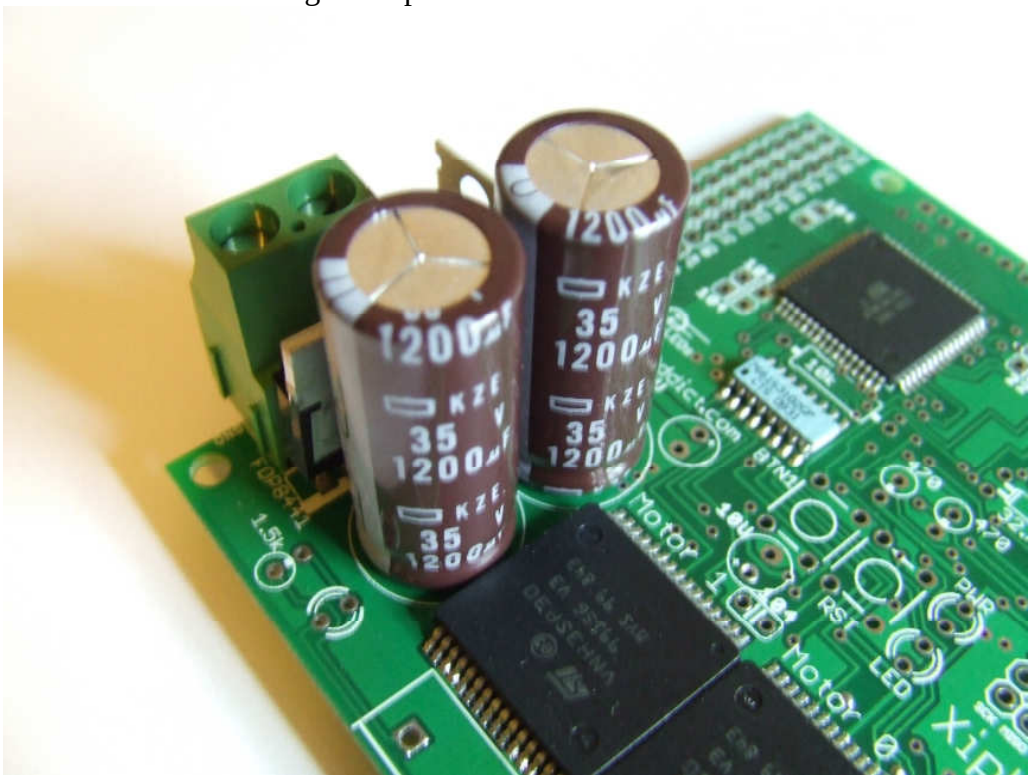
(left to right):Terminal connector, LM7805 low current 5V regulator, FDP8441 MOSFET, 1N4001 diode, 100k resistor(brown-black-yellow-gold)

5. Insert and solder components as shown.

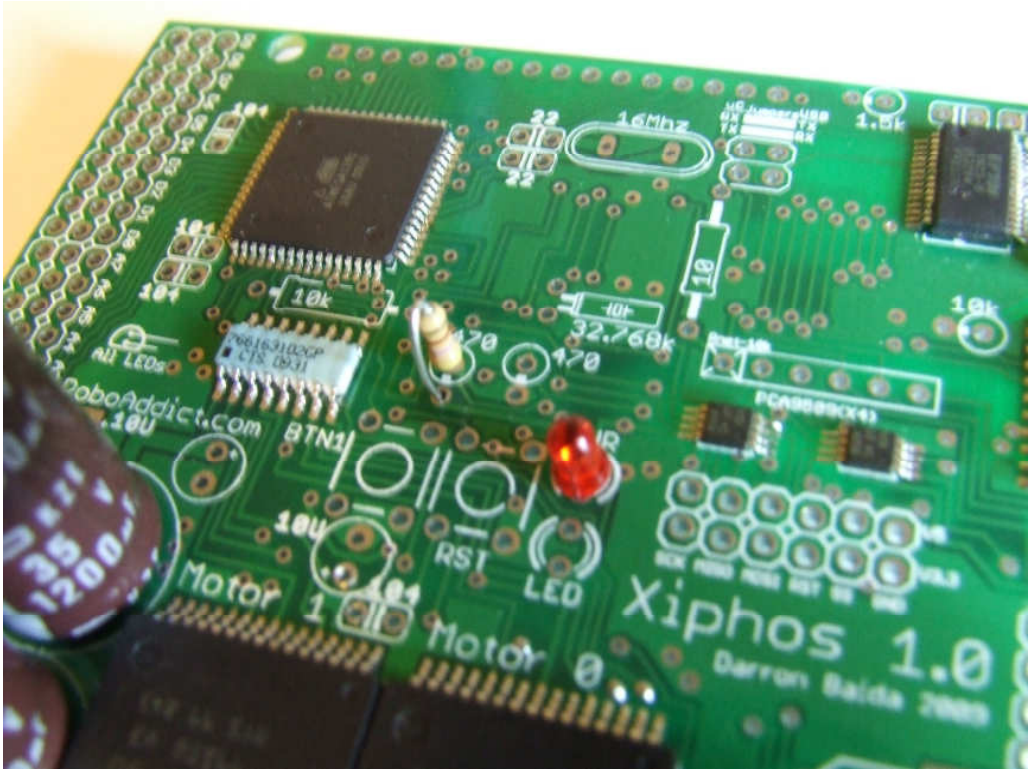


Note: pay attention to board indicators for position and orientation. Also, insert all of these components before soldering.

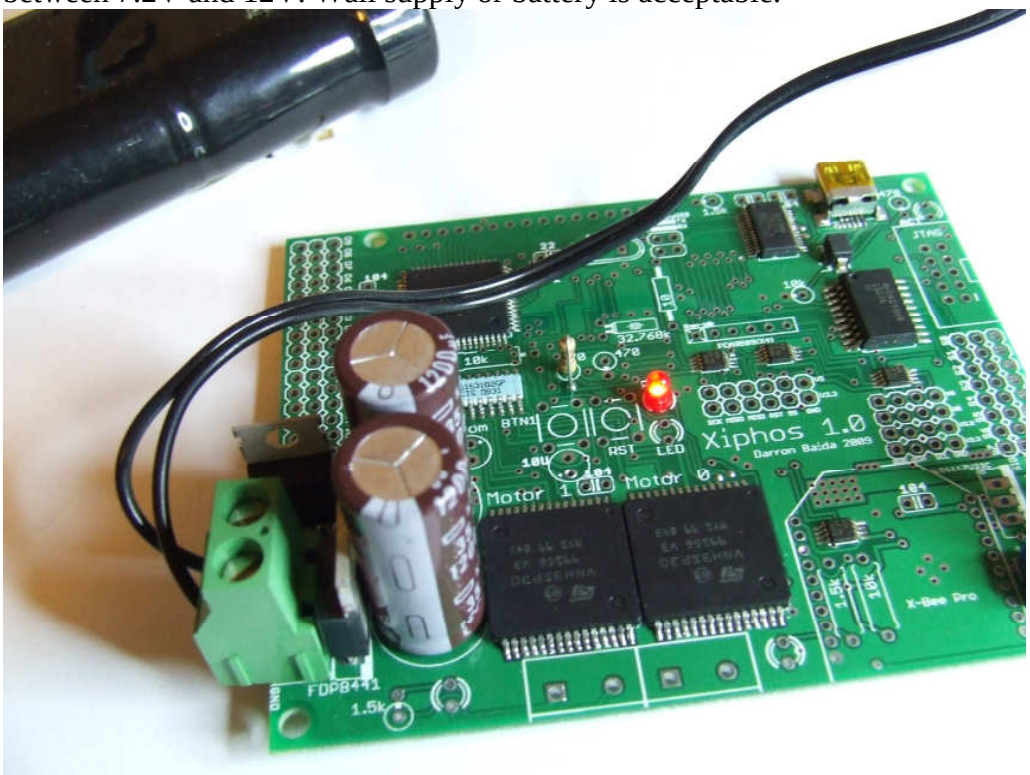
6. Insert and solder the giant capacitors.



7. Insert and solder power LED (red) and 470ohm power led resistor (yellow-violet-brown-gold) paying attention to LED orientation legend on board.



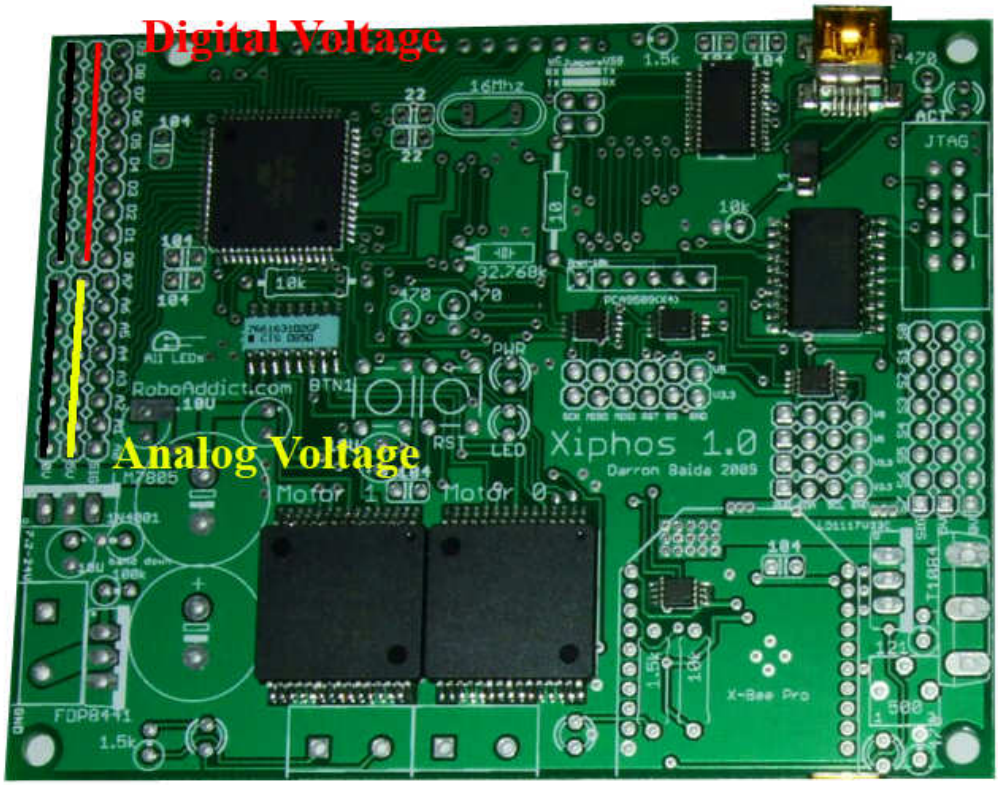
8. Before beginning the next step be aware of this: When applying power, the power LED should come on immediately. If it does not, immediately disconnect power because something is wrong. Power board with between 7.2V and 12V. Wall supply or battery is acceptable.

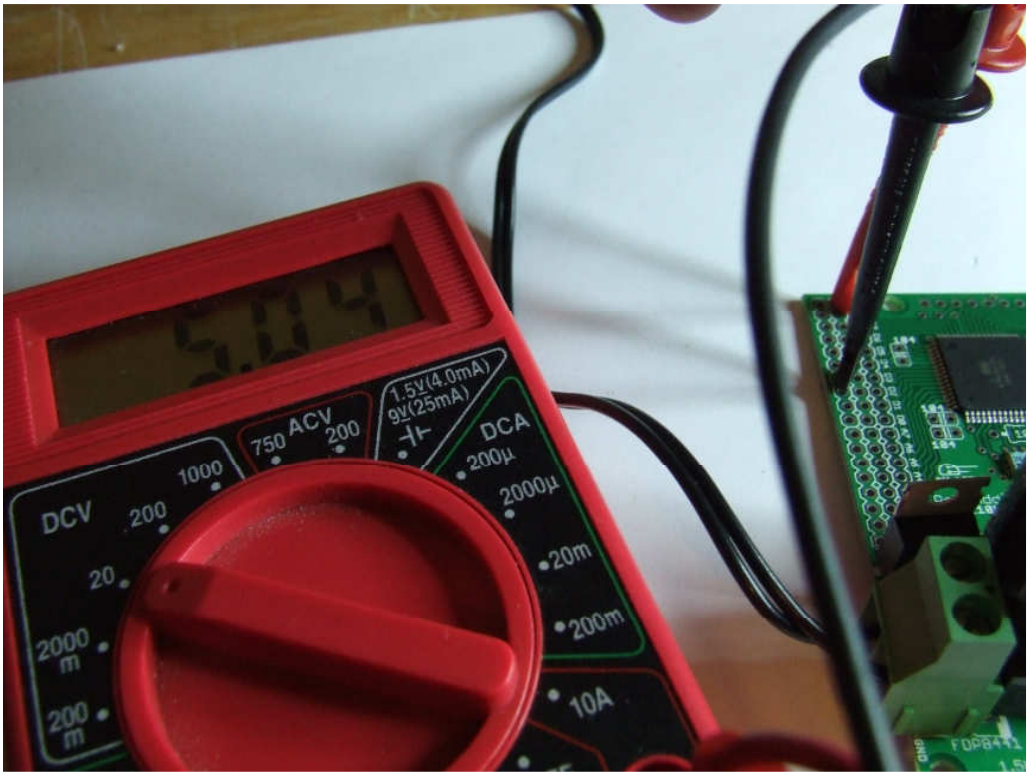


If LED fails to light, disconnect power and check polarity of your battery, the battery's voltage, orientation of all components and that all currently directed are soldered well. Do not continue assembly until LED is brightly lit and no component is significantly hotter than room temperature.

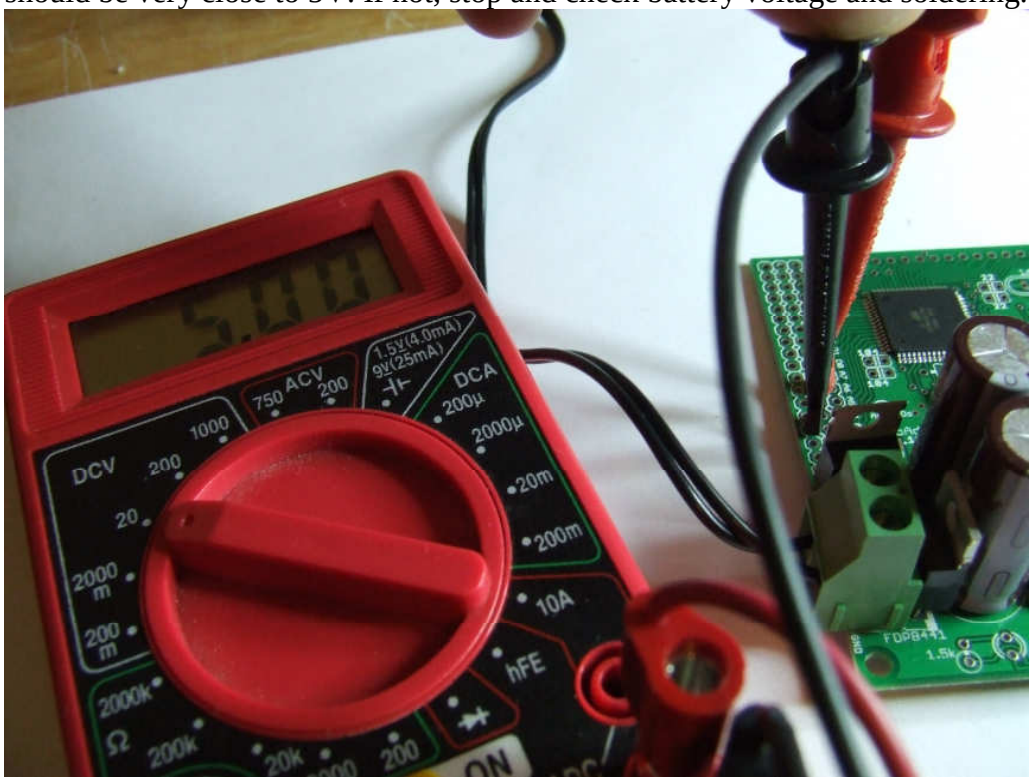
So, the LED is on, you're doing great!

9. Measure digital supply voltage. This is conveniently available in the digital I/O grouping of pins. It’s not exactly 5V! (probably not) but should be kind of close. If not, stop and check battery voltage and soldering.

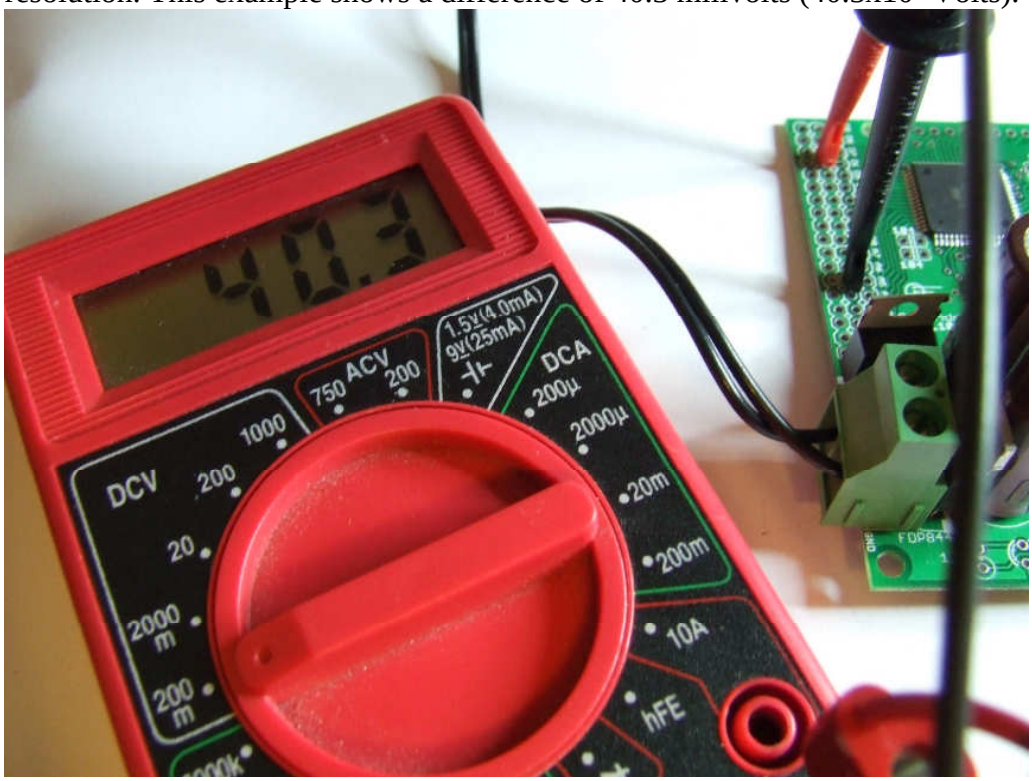




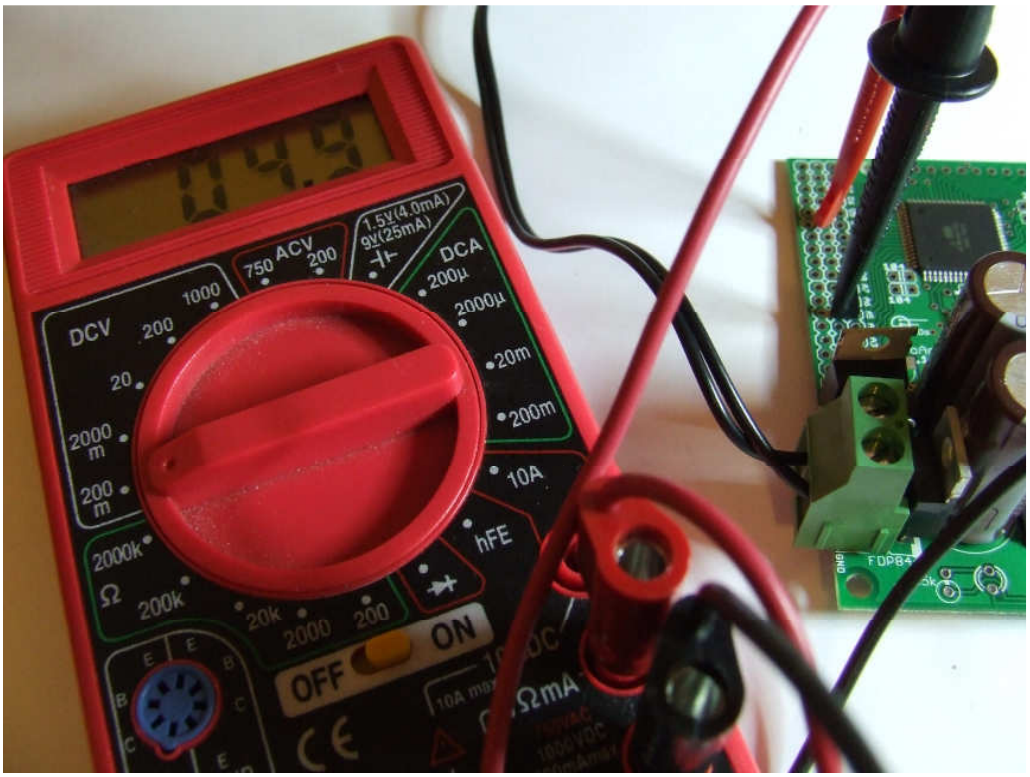
10. Measure analog supply voltage. This is conveniently available in the analog input grouping of pins. It should be very close to 5V. If not, stop and check battery voltage and soldering.



11. Measure voltage between digital and analog voltage. Set your multimeter to a lower range for better resolution. This example shows a difference of 40.3 milivolts ($40.3x10^{-3}$Volts).



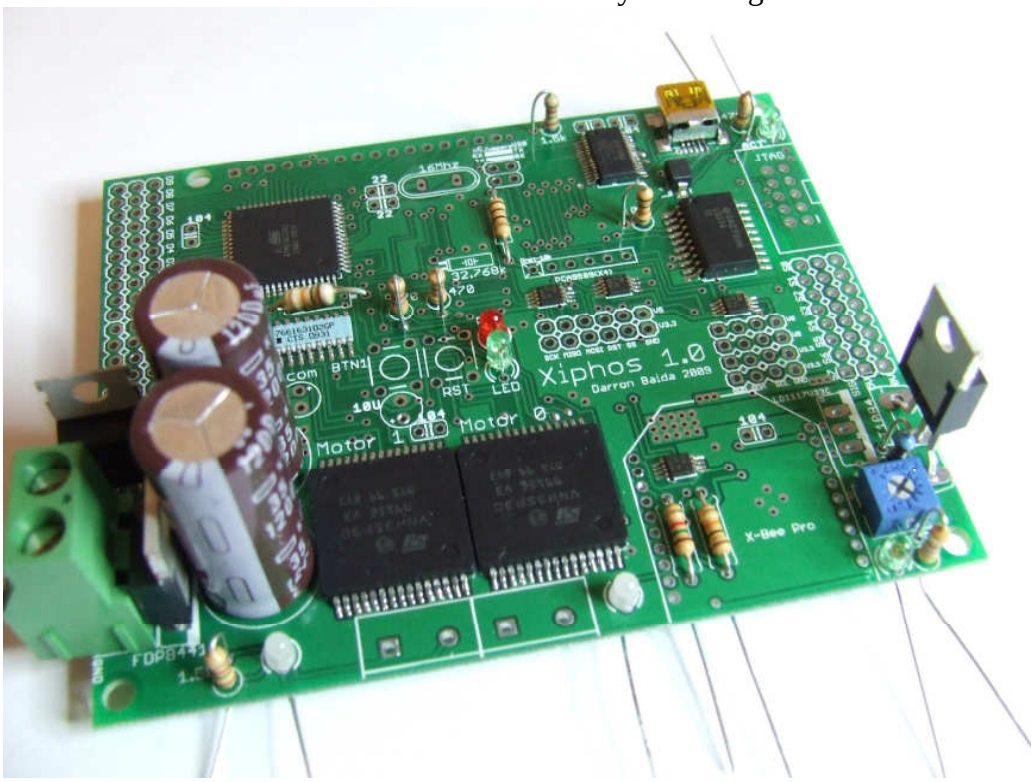
12. This is the last difficult step. While measuring the difference between the analog and digital supply voltages… VERY slowly apply pressure to turning the potentiometer to make this difference go to zero. It will take only a tiny movement to tune. Less than 10milivolts (0.01Volts) is a fine place to stop tuning. Example shows 4.9milivolts.



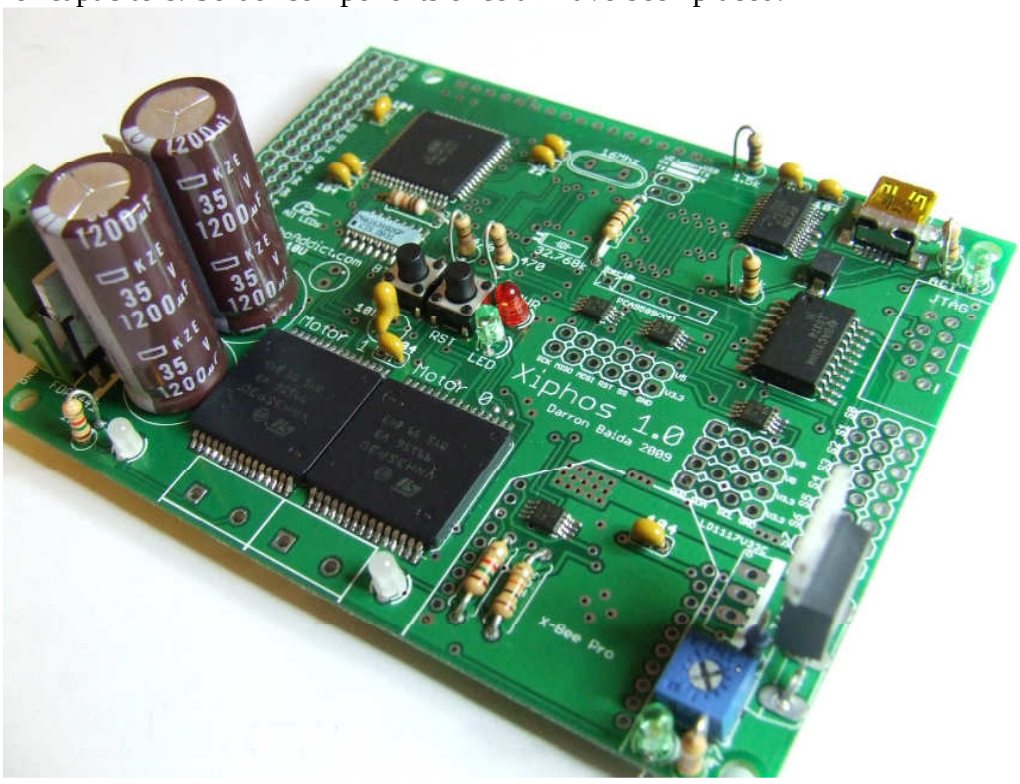
The order of soldering from this point forward is subjective so feel free to continue on your own if desired.

Recommended soldering order

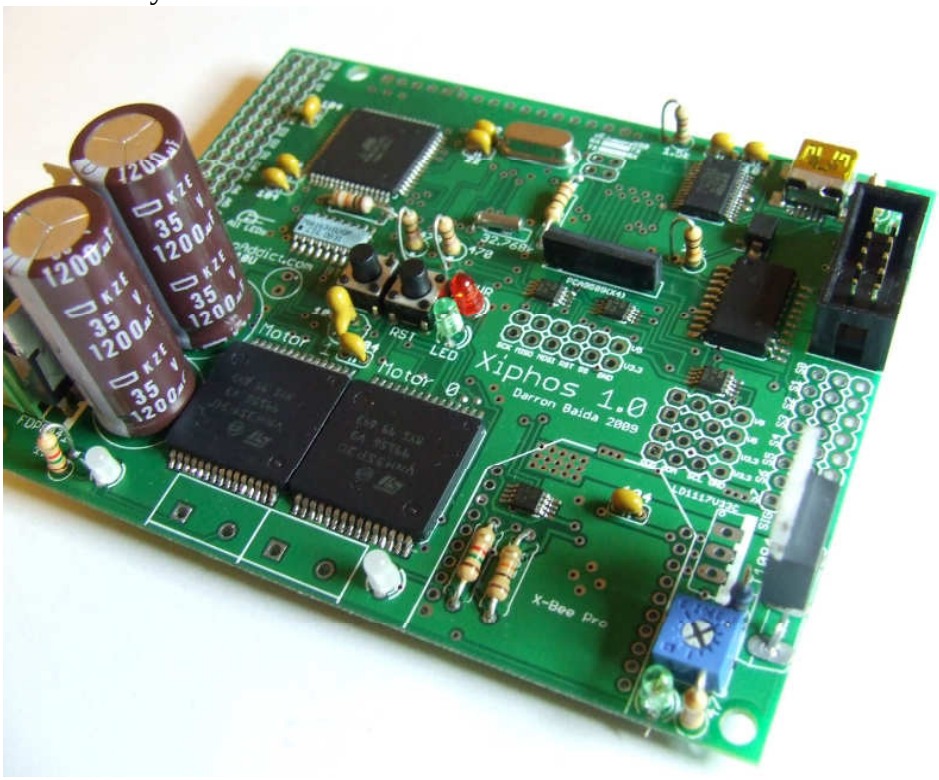
Place all resistors and LEDs, remembering to observe LED orientation printed on board. Once all are placed, solder. A chart of resistor values can be found by searching online for “Resistor color code”.



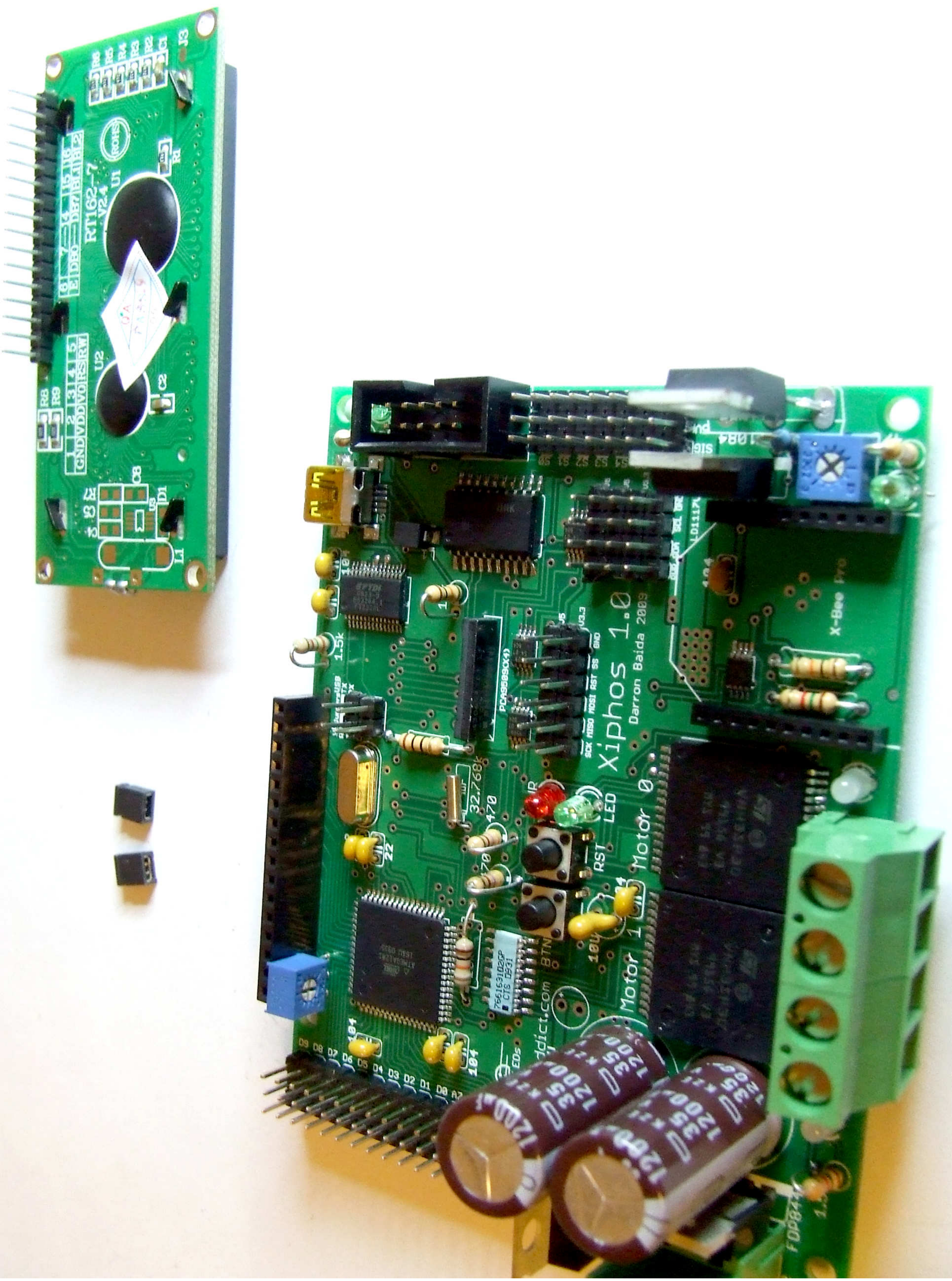
Place all capacitors and buttons. Notice that the 10u capacitors have a “+” on one lead, as does one hole on the board. There will be two open capacitor positions. These are not necessary for normal operation of Xiphos. However capacitors may be added in certain applications. Also note that 22 and 220 both mean 22pico Farads for capacitors. Solder components once all have been placed.



Place and solder the two crystals, resistor bus (square on the part goes with “X” on the board), JTAG header and 3.3V regulator. Note that the crystals should be soldered quickly and not have excessive heat transferred into them or they will not function.



Place and solder remaining components.
Notes: The potentiometer requires a slight bend. The terminals should be slid together before placing on the board. Plan ahead how to cut headers so they remain in continuous pieces that are easier to solder. The jumpers can be used to align and hold header pins.


RT162-7
V2.4
Xiphos 1.0
Darron Baida 2009
Motor 0
Motor 1
Motor
RST
LED
BTN
X-Bee Pro
PCA9506(X4)
32.768k
FDP8441

Post soldering

Place jumpers horizontally as shown in the diagram on the board.

Turn LCD potentiometer 90degrees clockwise. This may take a small bit of adjusting later to achieve desired contrast.

Place LCD on Xiphos Board.

Power board with 7.2V to 12V and press RST button. LCD should read “Xiphos 1.0” on the top line and count down from 9 in 1 second increments on the lower line. Xiphos is now ready to receive your first program.

Congratulations on your successful assembly!