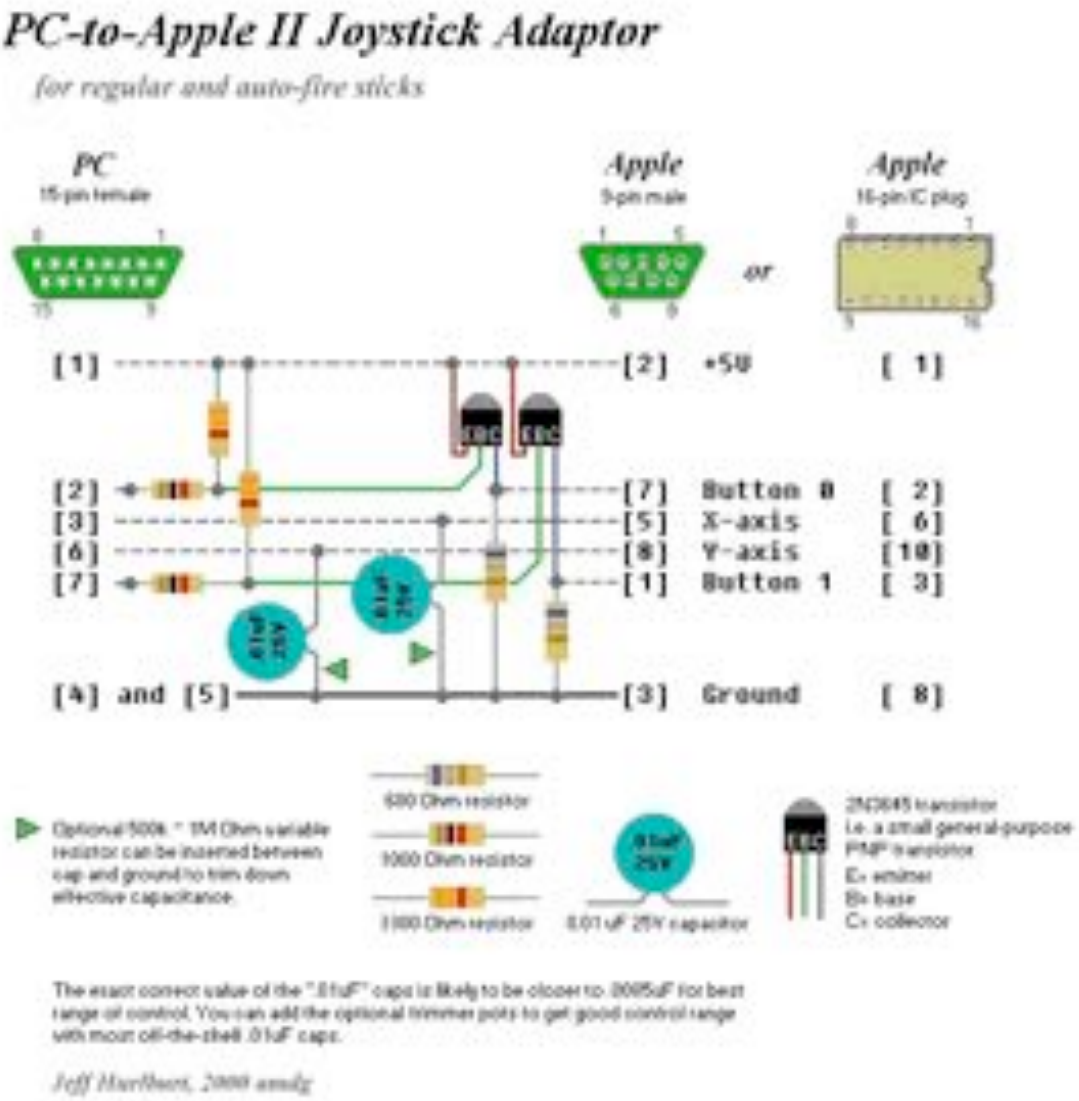
Welcome to the overly detailed assembly instructions for the Apple IIc to IBM Joystick adapter.

This is a very easy to assemble project. The hardest part is getting the connectors on straight and if they are crooked it will still work just fine.

This project is based on the schematic done by Jeff Hurlburt. The only thing I've done is a small board layout. Its all thru-hole parts and is small enough that you can use it to retrofit an existing joystick. I've found room in the IBM version of Kraft and Gravis joysticks without any problem.

For reference, here is the original schematic as found on the net.

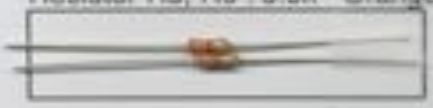


IBM Joystick to Apple IIc Adapter Parts List

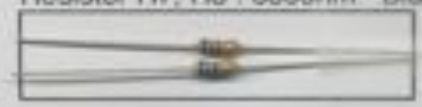
Resistor R3, R4 : 1k - Brown/Black/Red



Resistor R5, R6 : 3.3k - Orange/Orange/Red



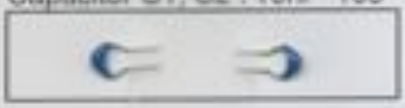
Resistor R7, R8 : 680ohm - Blue/Grey/Brown



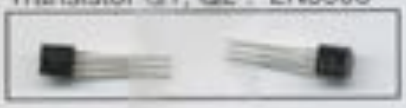
Trimmer X, Y : 500k - 504



Capacitor C1, C2 : 10nf - 103



Transistor Q1, Q2 : 2N3906



DB15 connector

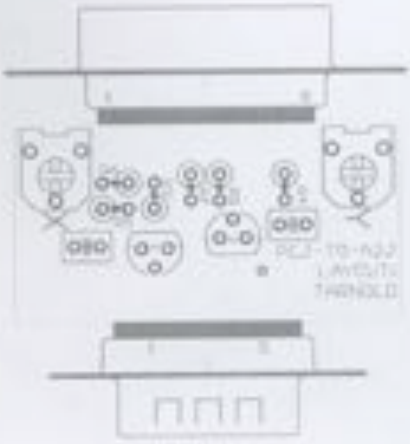


DB9 connector



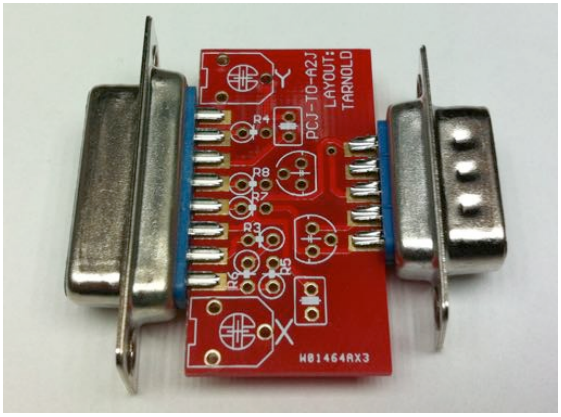
PC Board



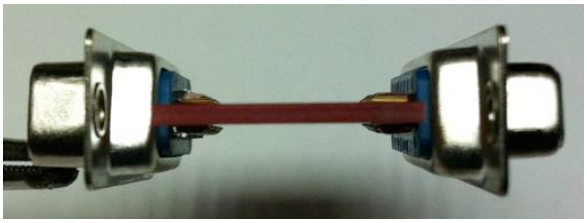


Tools and supplies you will need:
1. Soldering iron.
2. Solder.
3. Flush cut wire cutters.
4. Solder removal stuff if you expect to make any mistakes.

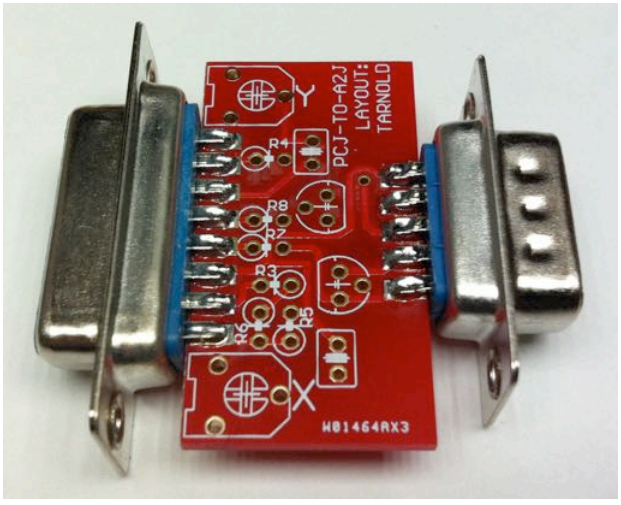
Lets start assembly by putting on the connectors. The board slips between the rows of solder cups on the back of the connectors. You can't put them on wrong as the number of pads differs from top to bottom.



The only trick here is getting the whole assembly to be flat. I do this by slipping the connectors on then solder 1 pin of each, then view it from the end and burn my fingers while adjusting it a little.



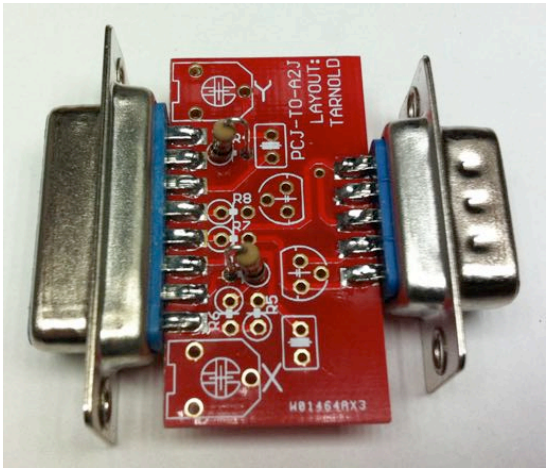
After it looks straight, just solder the rest of the pins taking care not to bridge any of them with solder.



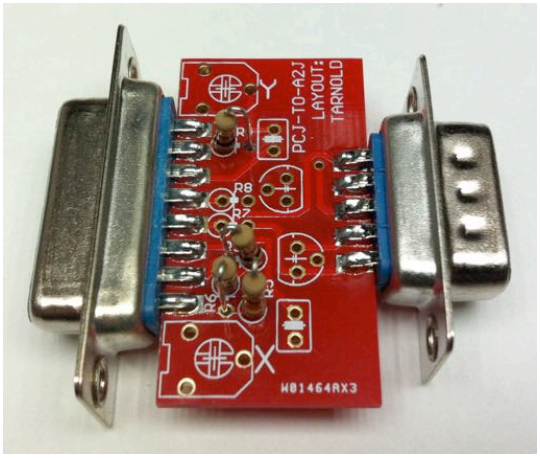
Now lets do the resistors. Grab R3 and R4 and bend the leads as shown. All the resistors will be done like this.



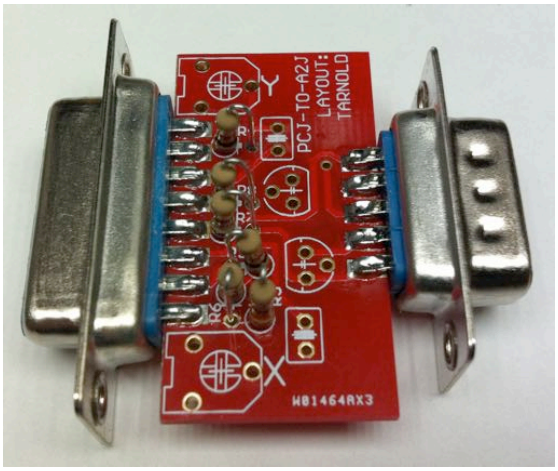
Now insert R3 and R4 into their locations on the board. The body of the resistor goes in the hole with the circle. If you look carefully you will see a small line that shows where the other pin goes. Its hard to see due to the density. You may be able to see it better on the board layout on the parts list page, otherwise you can just cheat and follow the photos. Once they're in the right holes, spread the legs a little so they don't fall out and solder them.



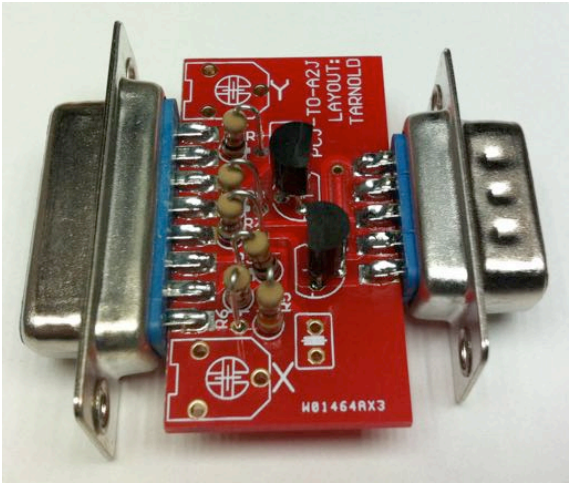
Repeat for R5 and R6



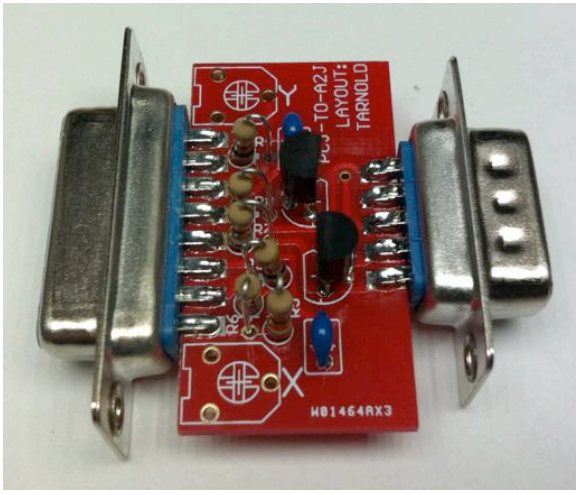
And now R7 and R8



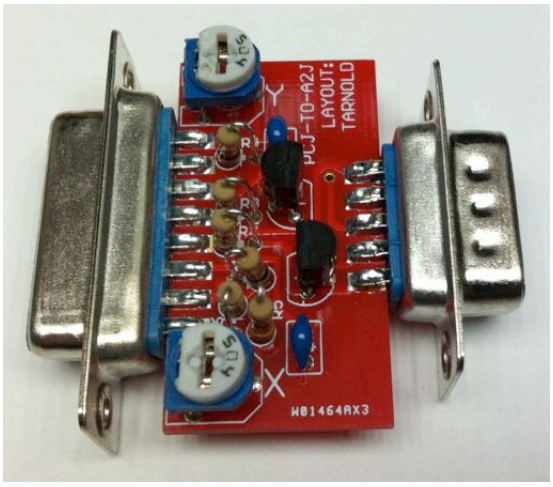
Now install the transistors. Flat side of the transistor to flat marked on the board.



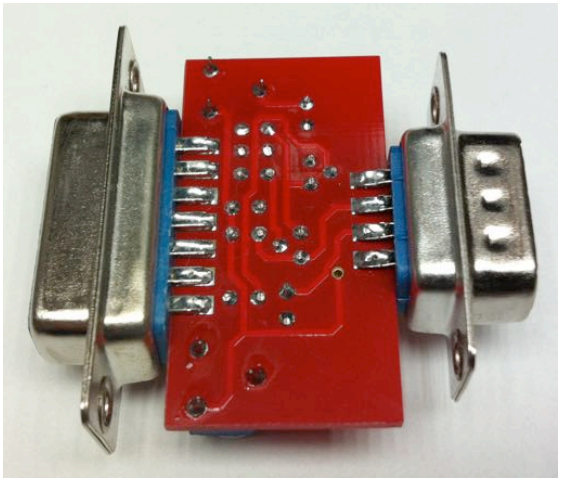
And also the capacitors.



The final parts to install are the trimmers. They just pop in and are soldered in place like everything else. And now its complete. I would center both trimmers so you have a good starting point.



The back of the board so should look something like this



And thats it!

Plug the IBM Style joystick into the DB15 connector, plug the 9pin into your computer and test with your favorite game. You'll center the joystick using the adjustments on the joystick itself, and if you notice that the range seems limited you adjust the trimmers a bit. When I say limited, if you can't get full top to bottom range after centering, try adjusting the trimmer. Same for left to right. I found that centered worked “Good enough” for games like Loderunner but if you are trying out a drawing program or something you may need to tweak them.

I can be found on the Facebook Apple II Enthusiasts group or you can reach me via email tom@philosophyofsound.com.

Parts List :

C1, C2	.01uf	Ceramic Capacitor
Q1,Q2	2N3906	PNP Transistor
R3, R4	1K Resistor	
R5,R6	3.3k Resistor	
R7, R8	680ohm Resistor	
X, Y	500k Trimmer Resistor	
X1	Male DB9 Connector	
X2	Female DB15 Connector	

