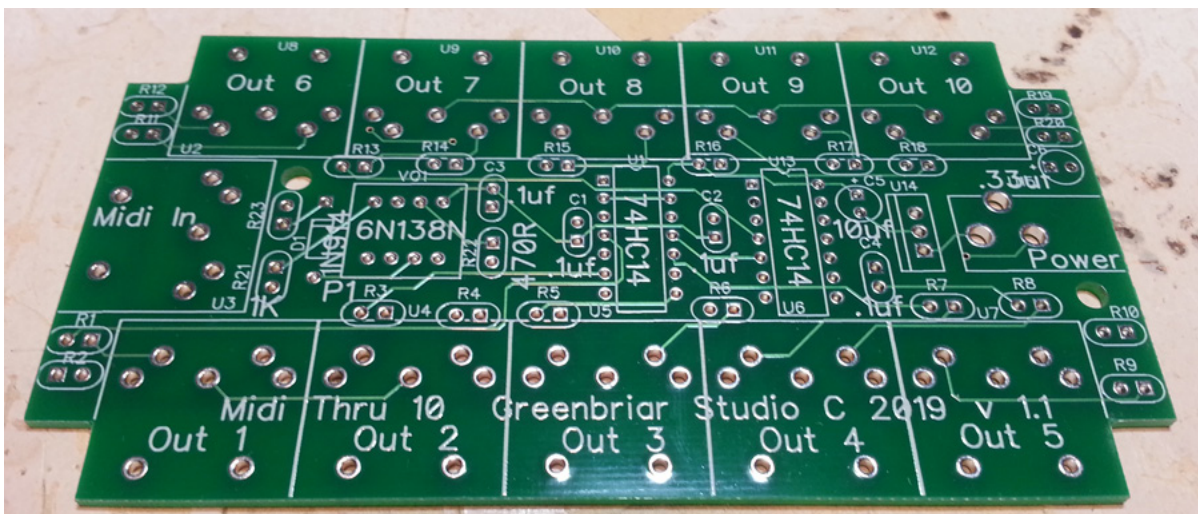


# Greenbriar Studio Midi Thru 10 Kit Assembly



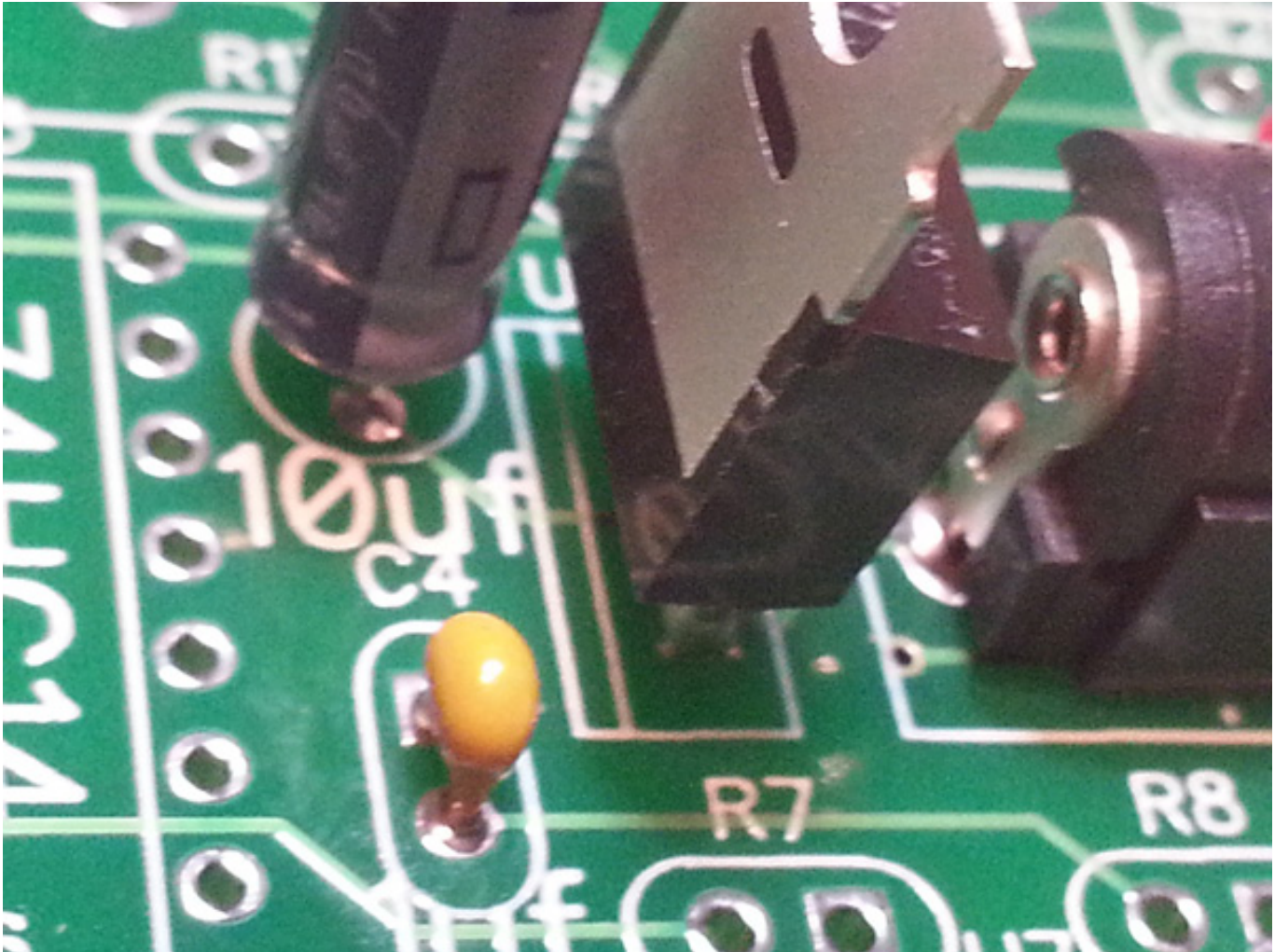
Midi Thru 10 is a One In, Ten Out Midi Thru box powered by a 9 volt Arduino compatible power supply. While this unit will echo all messages coming into the Midi In to all 10 Midi Outs, it can not drive Midi bus powered devices as our other devices can. So the outs should be plugged directly to your keyboards. You can use this with Midi Solutions products by either using them up stream ( hooking an output from a Midi Solutions box to the Midi In) or if they must be downstream from this box, by hooking an output to the input of their power box then on to other Midi Solutions boxes. I just use any needed extra splitters first, then this unit to go to my keyboards. Midi bus powered devices actually violate the Midi standard and my devices all have their own power, as what they do requires it, but I also use Midi solution boxes of all sizes in my rigs. I built this as I just needed some bigger and more affordable thru boxes.

The Midi Thru 10 kit is a thru hole parts only kit - no surface mount soldering required. All parts for this kit are mounted to the top side (some of my products use parts soldered to both sides). You can solder the parts in any order you wish, but I will describe below how I do it for those who may not have assembled many boards.



The only tools needed are a soldering iron, solder, wire cutters to clip leads, some masking tape and a phillips head screwdriver to assemble the box. You also need either a dremel tool with a cutoff wheel or 3/8 and 3/4 drill bits to cut the access holes or slots in the box.

My first step is to put on all the power supply parts and then check the voltage to make sure it is working correctly before I add the rest of the parts. The power supply consists of five parts - the power jack, the three pin 7805 5v regulator and three capacitors, 10uf, .33uf and .1 uf. Three of these parts must be oriented correctly to work! The 10uf and .33uf caps must have the + end matched to the hole marked with the +. On the cap, the - side is marked with the long stripe containing the - sign. The .1 cap is not directional. Also the 7805 regulator

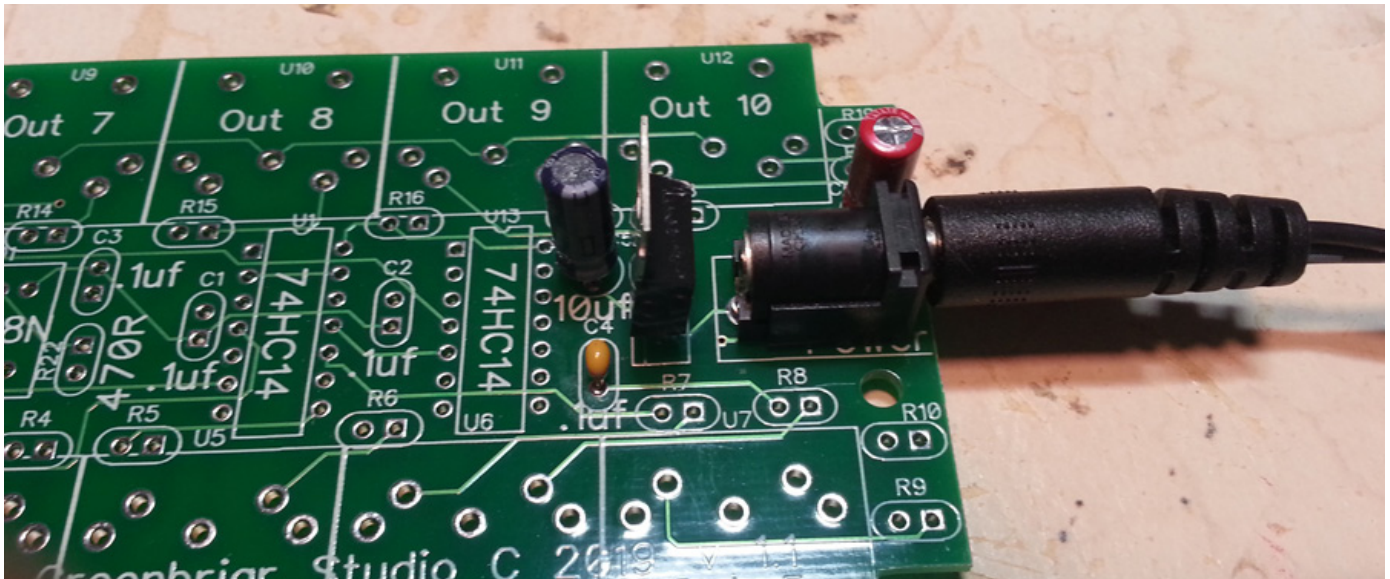


(with the small heat sink) must go the right way. The board is marked with the side the heat sink plate should be on. Note that the regulator 'faces' the power jack.

I add these five parts first and then solder them and clip the leads.

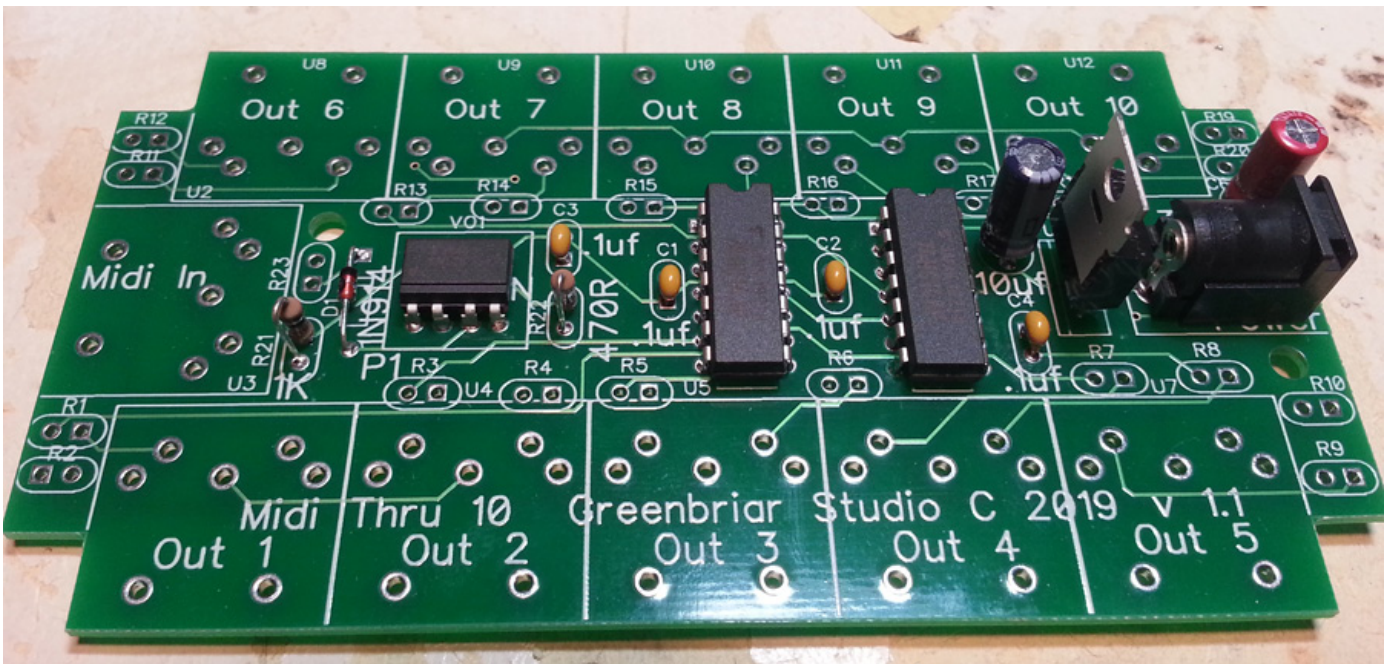
If you have never built a circuit board before, one of the easiest ways is to push all the components through, and as you go, spread the wires apart on the back to keep them from falling out. Turn the board over, solder each part and then clip the wires close to the back of the board.

Since the power socket is heavy and lower than the other parts, I just use a piece of masking tape to hold it correctly in place to solder it. Make sure it is at right angles to the edge of the board and make sure to fill in the three holes completely with solder. The holes are rather large as the power jacks can have a large range of pin sizes depending on where I get them.



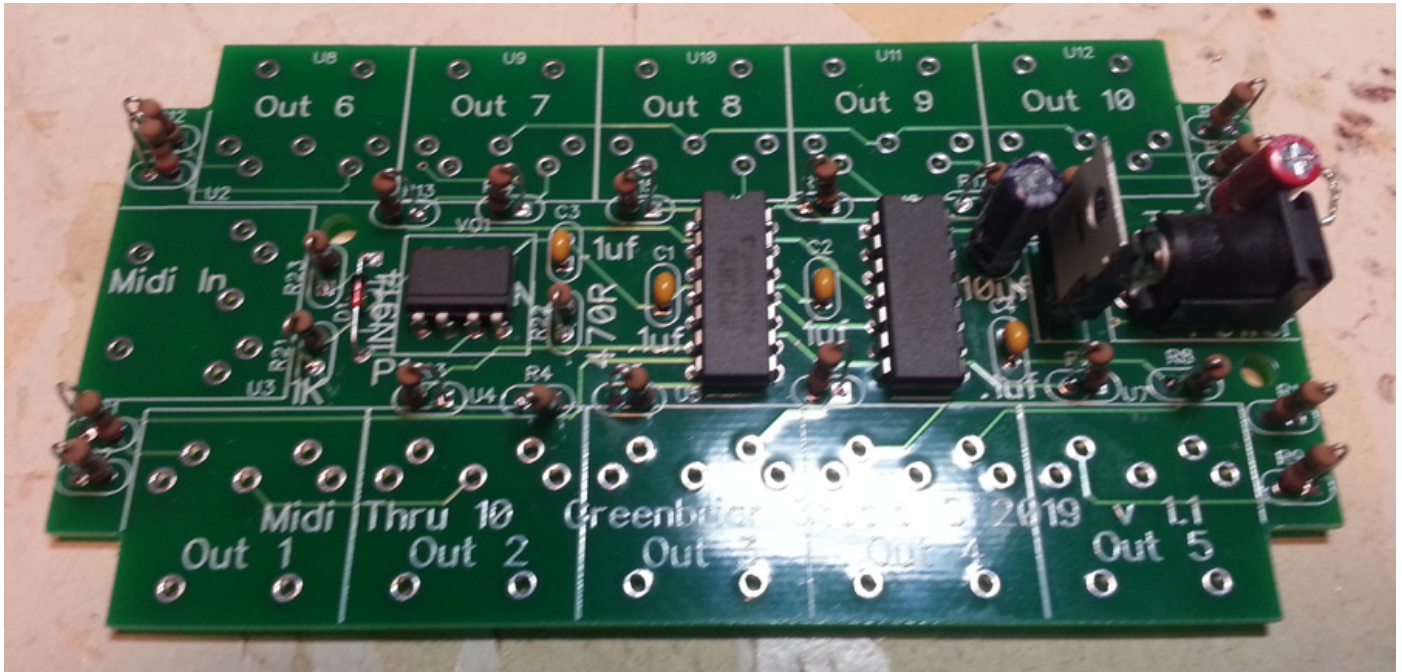
Once those parts are on, I go ahead and plug it in and test for the correct 5 volts. The heat sink on the regulator is ground and the top right hole on the 74HC14 is +5. If this measures correctly, time to add the rest of the components.

I add the rest in several groups. First I add the three ICs and their support parts, which consists of the three additional .1 uf caps, the one diode (bar on diode must match the circuit board) and the two special value resistors - 1K and 470 ohm. I do this as all of the rest of the resistors (the ones with no value given) are all the same, 220 ohm, and this prevents me from putting one in the wrong place. Note the P1 for the 6N138 to show where pin 1 goes.

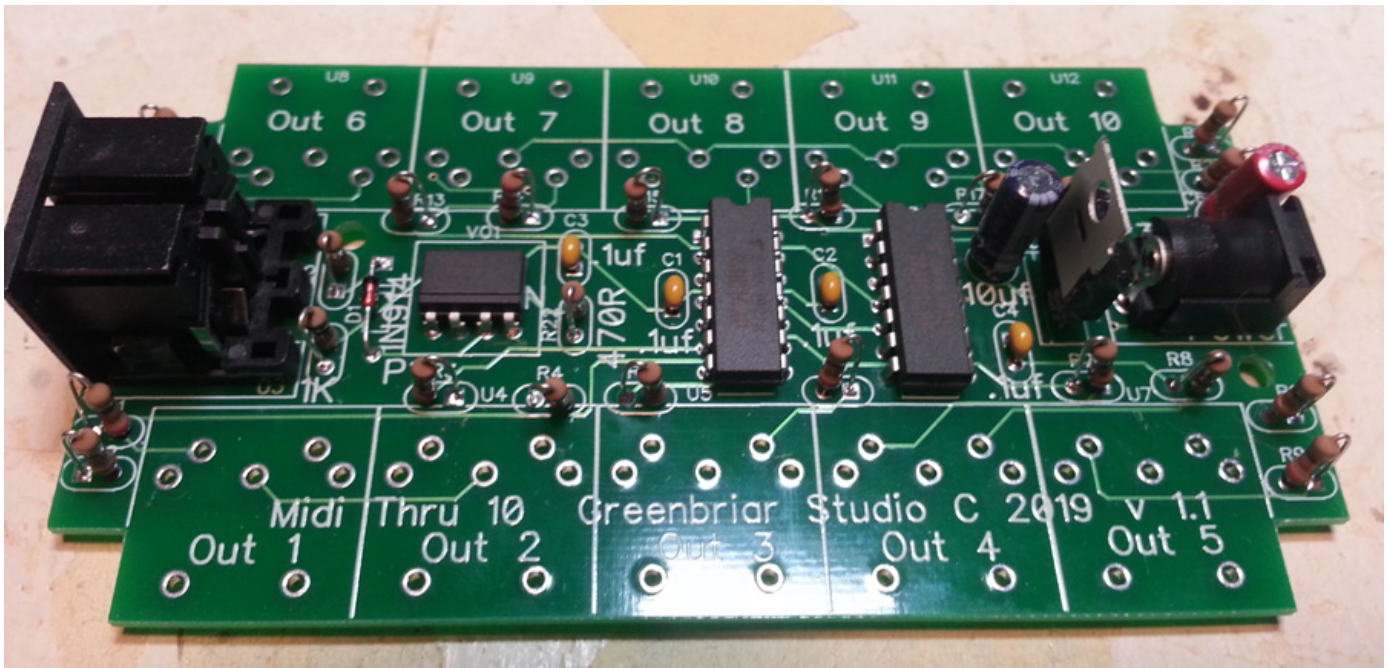


Note that the two resistors are placed on end, so to speak. In order to get ten outputs into as compact a box as possible, all the resistors are placed by folding one lead back along the resistor body and placing it on the board standing up from the board.

Now add the remaining 21 220 ohm resistors, also placed on end. As you place these, bend them in a bit towards the center of the board, as the fit between them and the midi jacks is very close.

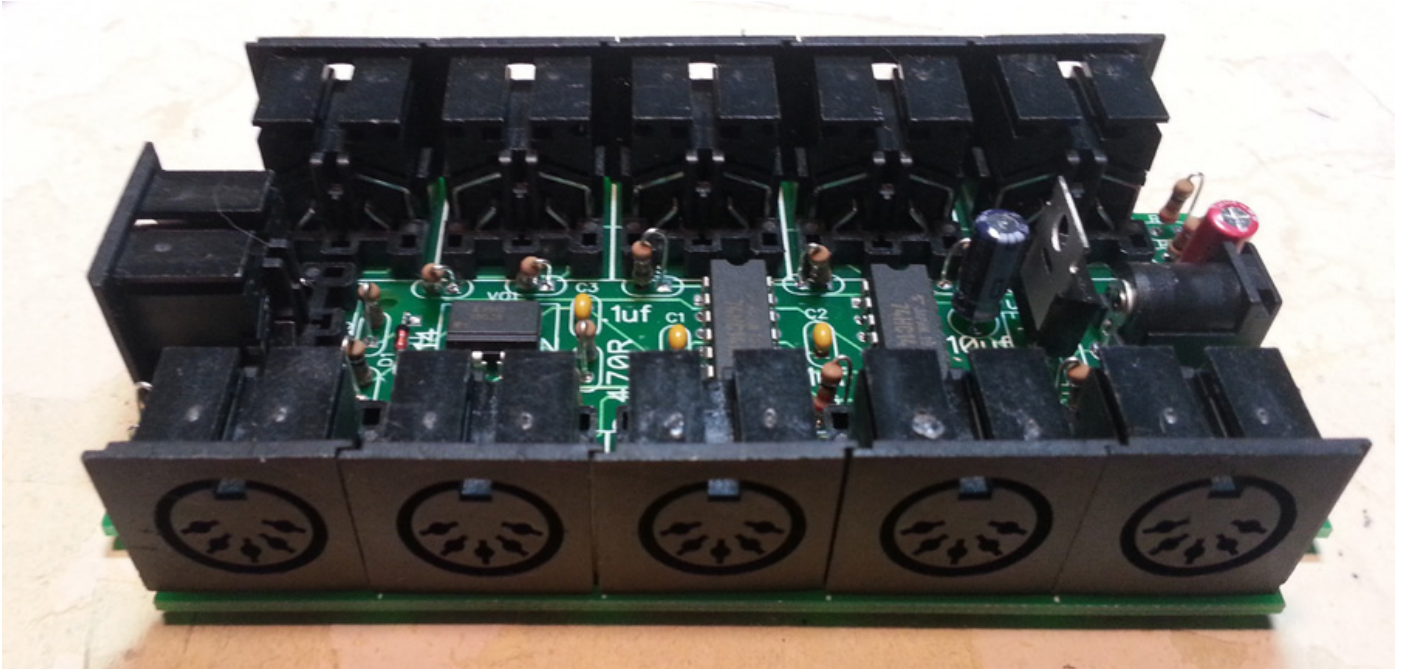


Once those are soldered and clipped, we add the jacks. I add the Midi In jack first as this lets the board sit balanced upside down with the Midi In jack on one end and the Power regulator on the other.



The last step is to add the Midi Out jacks. I add them one side at a time. I place all five into the board (check the pins, especially the two mounting only pins at the edge as these are frequently a little bent when I receive them) they should overlap and fit together. Bend back any resistors, if needed, to allow the plugs to sit correctly against the board. (You can file the back of the plugs also, if needed.) I then use some masking tape to hold them in place so I can flip them over to solder.

With seven pins, if you soldered them all and then find the jack was not seated correctly, it is a pain to fix. So I first solder one of the two edge pins of each jack, then check how they are seated to the board, then one of the five main pins and check again. At this point, if something is crooked, it is easy to use the soldering iron



to heat one pin and then reseal the jack. Now I solder the remaining pins. Do the same for the five jacks on the other side and you are done.

Before you fire it up, check all pins carefully to make sure you didn't miss soldering any. Then plug in the power and test.

The only issue that I have had with building these is missing soldering a pin.

A blank box, the same as I use on the completed units, is included with the kits. I mount the board to the lid. Before doing this I file the ends of each row of five midi jacks to remove some of the overlap built in, and a little of the pcb, if needed, until it drops easily into the box. The pc board just fits into the box and the overhang of the jacks will rub against the box. It can be forced in, but then is very hard to remove, so I file it down to make it easy to remove the cover.

There is a small plastic protrusion sticking up from the lid that I clip off. I then mark and drill two 1/8 holes in the lid and bolt on the board, nut on the outside, and grind or file the bolt flush to the nut. And add the rubber feet. Now you just need holes in the cover.

The main work with the box is to either drill round holes (I use forstner bits in a drill press) or you can just cut rectangular holes with a dremel cutoff wheel to allow access to the midi plugs and power plug.

Once the box fits on allowing access to all the jacks, screw on the lid and the unit is complete.

Midi Thru 10 is also available as a completed and tested unit.

