

Greenbriar Studio Midi Assigner MK 2 Kit Assembly

The Midi Assigner MK 2 is an update of the previous Midi Patcher and Midi Assigner products. It retains all of the features of the previous models. The new additions are -

- Moved to a microprocessor with more RAM and added it to the main board so that we could offer it as a kit as well as a completed unit.
- Added an on board power supply (also to make it a single board product).
- And added a second Midi In port allowing us to have a built in two port midi merger so that it can be connected to two devices without requiring an external midi merger, such as a keyboard and sequencer, or a keyboard and your computer for patch updates, etc. The two Midi In ports are identical for everything except firmware update.

The Midi Assigner MK 2 kit is a mostly thru hole parts kit - but there are two SOIC 8 surface mount memories included. A detailed how to solder them is included below. And note that parts for this kit are mounted on both sides of the board.



Assembled Assigner Kit

it for those who may not have assembled many boards.

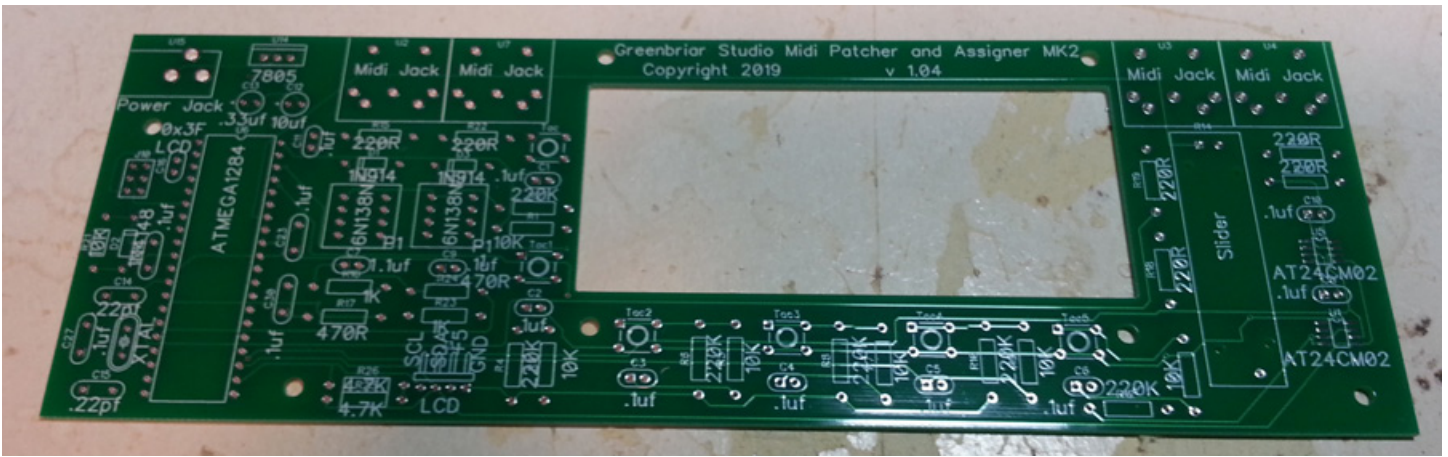
The basic tools needed are a soldering iron, solder, wire cutters to clip leads and some masking tape. For the surface mount chips, you will also need - a fine point for your soldering iron (such as Weller ST7 ST Series Conical Solder Tip Hobbyist for WP25, WP30 and WP35 Irons, 0.31”), thin solder (60/40 Tin/Lead Sn60Pb40 with Flux Rosin Core 0.023 Inch/0.6mm) both available from Amazon, and single sided scotch tape. Solder braid is handy if you mess up and bridge surface mount pins. I have some, but have yet to need it. Plus a volt-meter will allow you to test the power supply.

All parts needed are included, except a housing - the PCB, all electronic parts, push button caps, the LCD, a 120v wall power supply (these are an Arduino compatible power supply, so they are easy to find or change out to other voltages) and four bolts to mount the LCD, long enough to mount to an enclosure with spac-



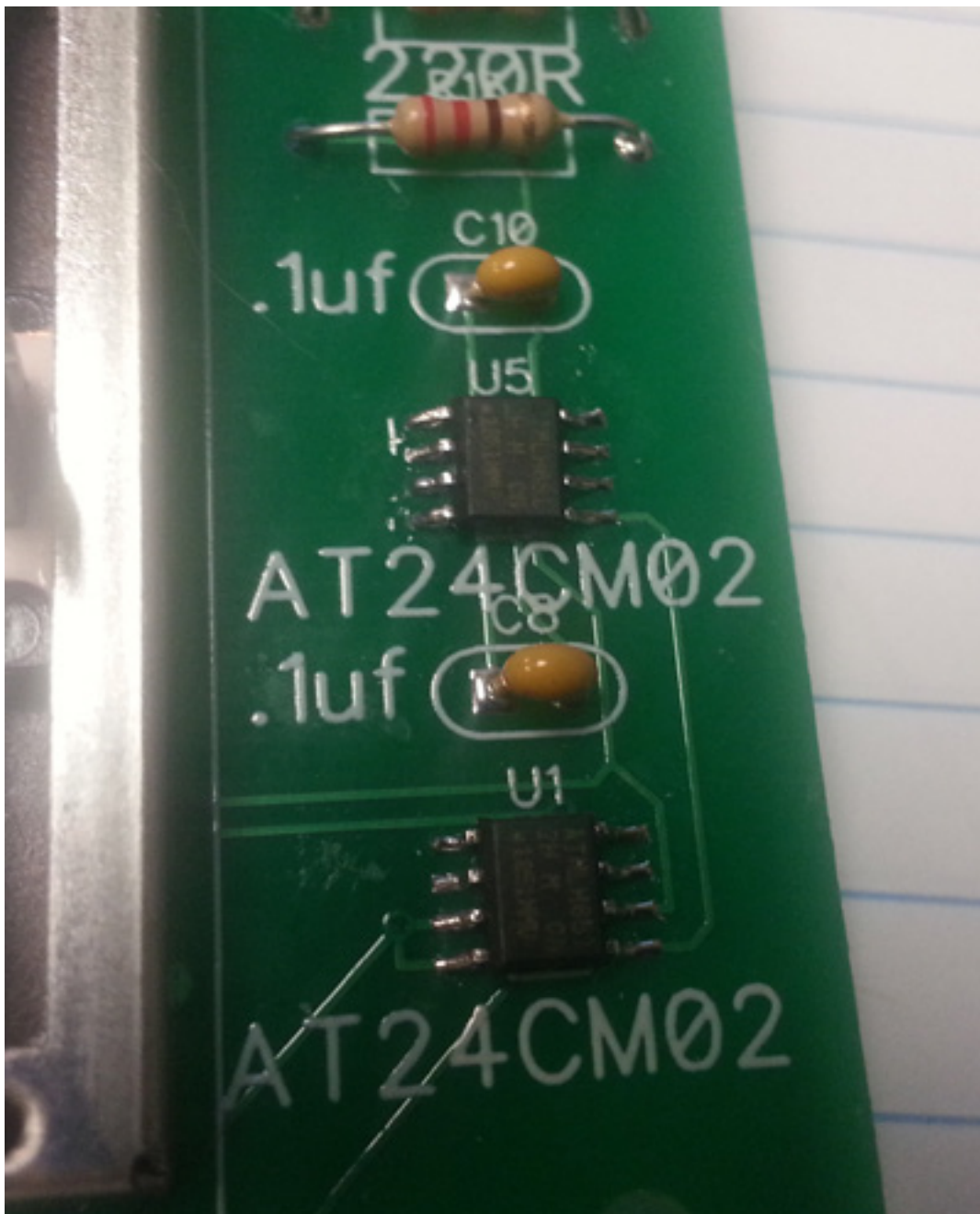
ers, if you wish.

All parts are in a bag and are marked, as needed. All resistors have their value written on the tape that holds them, and diodes have a piece of masking tape with the part number on it, so you can tell which is which.



Only the .1 uf capacitors are not marked.

The board comes bare. I suggest you solder the two surface mount memory chips first, while the board is empty and will sit flat on your work surface.



The real trick with these tiny guys is just getting them into position. I have to use a magnifier headset to be able to tell where the 1 pin is. They are usually marked with a small dot on the plastic, but you can also tell by the writing on the chip. If you are looking at the chip, with pins up and down, so that the writing is right side up, pin 1 is lower left.

After trying several different approaches, I finally ended up just using about an inch and a half of single sided clear scotch tape to place the part. I apply the tape almost across the entire face of the chip, with one set of legs sticking out to the right, the 1 pin top left. Note the notch on the PCB for the chip direction. Pin 1 is top left.

With the chip on the tape, I can place it exactly centered on the pads and then press the tape to the board above and below the chip. I then solder just one pin, the top right. Then remove the tape and add the second chip. I then solder down the right side, so I'm working away from the already soldered pins, then turn the board around 180 degrees and do the same down the other side. Now hold it up to the light and you will be able to easily see if any pins got connected to each other by solder.

Unlike a surface mounted microprocessor with pins on all four sides, these are pretty easy to put on.

I generally add and solder all the resistors and small capacitors next. 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.



Here the board has all the resistors and capacitors, plus I have added the diodes and the crystal.

Be careful to set the diodes the right way. The end with the black bar is marked on the PCB. Do not add the two round capacitors near the power jack yet, they go on the bottom of the board. I add all the parts that go on the top first.

Parts that go on the back of the board - the power jack, the midi connectors, the 7805 voltage regulator and the two power supply caps. If these were on the top, you would not be able to mount the board with the buttons, slider or LCD useable through the enclosure top.

Note - the midi jacks are wired to go on the back. If installed on the top, they will not work.

I now add the two 6N138 ICs - note the P1 that shows where pin 1 goes. They are mounted top DOWN, backwards to the memory chips direction.

Now add the tactile switches. I do this by seating them, flipping the board over and then solder only one pin of each switch. Then checking from the front to make sure that they didn't move and are still seated flush. It is easy to correct a misalignment if only one pin is soldered, but very difficult if all pins are already soldered. We will do the same thing later with the midi jacks.



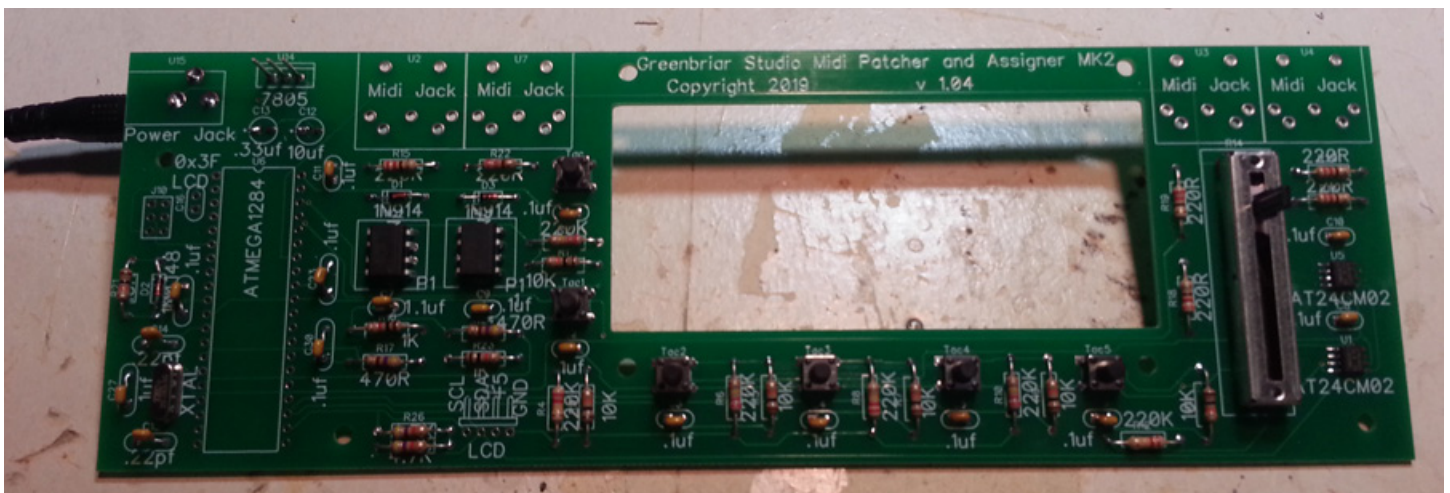
Now add the slider, it will snap into the PCB. Solder it.

We now have all the parts on the top of the PCB except for the microprocessor. Before I add that, I add the parts on the bottom of the board and test the power supply.

I add the power jack next and use masking tape to hold it in place. I also only solder one pin, then make sure it is at right angles to the edge of the board. The holes are large for this part, as the jacks can have very different size mounting pins. But make sure to fill the holes in with solder so it is securely attached to the PCB.

In addition to the ICs and the diodes, three parts of the power supply section must be oriented the right way. The 7805 on the PCB shows which direction the heat sink goes. Use that to see which pin goes where. When you rotate this over to the back of the board, the heat sink will now face towards the front of the board, towards the microprocessor. And make sure to add the two large capacitors with the + side to the hole marked on the board. These caps have their negative side marked with a stripe with a large - on it. I don't clip the 7805 leads yet, I leave them to test the voltages.

To test - plug in the power supply to the jack. The center of the three pins sticking up from the 7805 is



ground. The pin to the left should read 9 or 10 volts from the wall power supply and the pin to the right should read 5 volts. If it does, unplug it and clip the 7805 leads.

Now add the four midi jacks. Again, I only solder one of the two edge pins, check the fit, solder one of



the back pins, check again to make sure they are seated correctly and then solder the remaining pins.

Now add the microprocessor, pin 1 is top left as indicated on the PCB.

Last is the LCD. There are four holes to attach one end on the socketed wires to. Strip the ends of the wire and I tin the ends with a little solder so the wires don't separate when I try to put them through the holes. Once soldered and trimmed, attach them to the LCD. The wires are in the same order on the board as on the LCD and they are marked on both ends.

If your LCD is marked as an address 3F, it needs the jumper by the processor closed. The LCDs come in two different address locations and I keep getting some of each, so I added the jumper so it will configure



correctly. And I test each LCD before putting them in a kit. If it is marked to use the jumper, just fold and stick a cut off piece of resistor wire in the two holes and solder.

Before you power it up for the first time, carefully check all solder joints on the back, especially the crystal and two 22 pf cap connections. If one of these is not connected, the processor will not run. Other bad connections can effect the switches or midi jacks. If you see the patch number constantly changing, the slider is not connected. Move it to see if it has any connection.

You will also see a 6 pin connector by the microprocessor and LCD jumper. Nothing goes there. It is only used to attach a hardware programmer on a special board used to program the bootloader to each microprocessor. The actual program is loaded by the boot loader through Midi In A (left most midi jack). So the boot-loader has been tested in every microprocessor.

The processor is already programmed so once the LCD is attached and you power it up, you should see the screen come up showing bank 0 patch 0 and a blanked out name. That is because the memory is blank and needs to be formatted. To format it, unplug the unit and then hold down the Page button (white button in the completed picture) and keep it held down while pluggin it back in. It will ask if you want to reformat the memory. Push the left most of the bottom buttons for yes. It will take a few minues to complete. You are now ready to set up patches, either directly with the panel buttons, or using the Mac or PC on screen editor. See the hardware and editor manuals for more information.