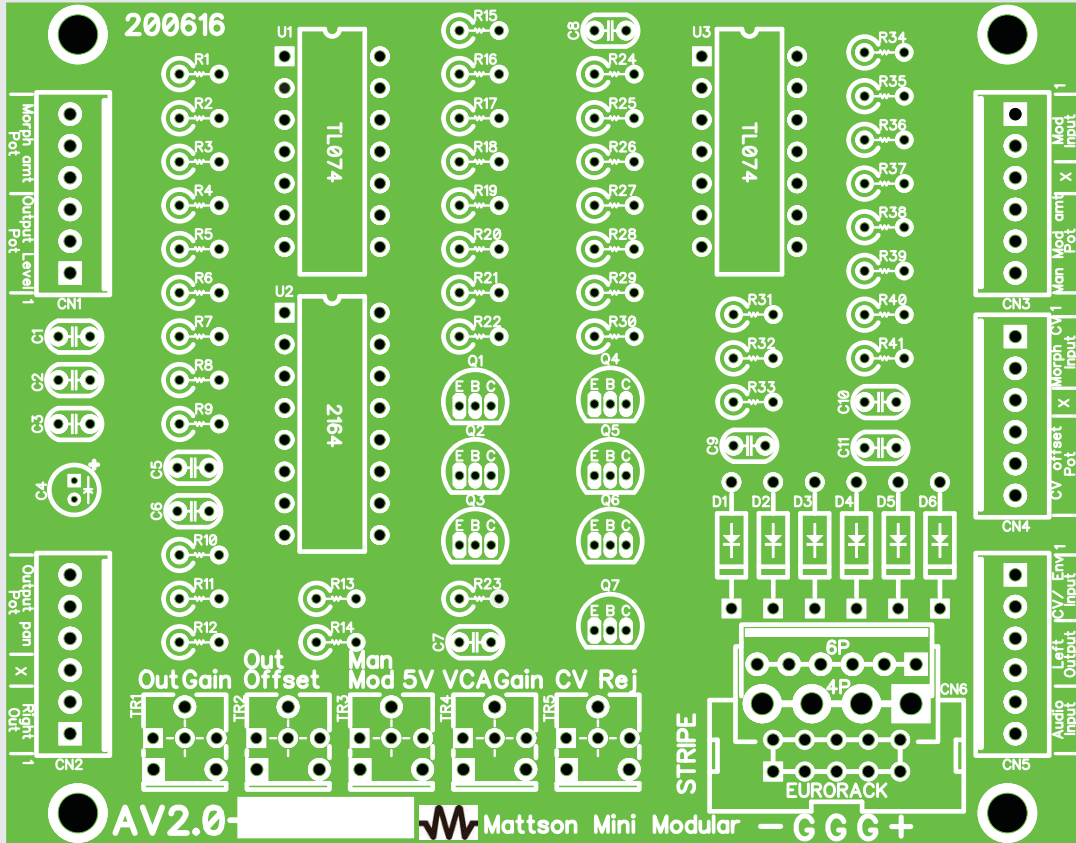


# Mattson VCA 2 DIY Board assembly

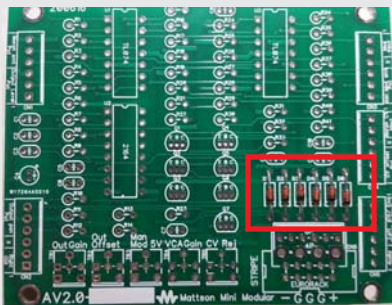
Page 1

I hereby swear that I have read and understand the Mattson Builders notes before starting this awesome project.



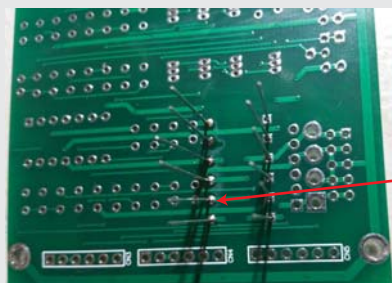
Refer to this graphic for parts placement

## Diodes



Note that diodes are directional devices and the striped band on one end of the diode has to be matched with the stripe on the diode graphic on the board.

Insert diodes **D1-D6** -1N914 Or 1N4148. Diodes D4-D6 form a full wave bridge rectifier to prevent reverse voltage issues.. Actually, if V+ and V- are reversed, these will put the voltages in the correct polarity so, you won't even know you reversed it. This works if the 4P or Euro 10P are reversed. If the 6P is reversed, all power pins hit non-connected pins. So, you just parked it...



Once all of the diodes are placed in the proper locations in the proper orientation, solder them to the board.

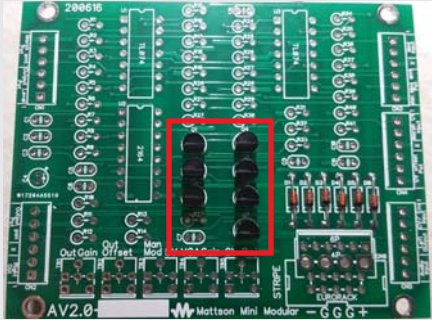
I like to solder one side of each and check to make sure they're against the board. Then, solder the opposite leads.

Clip the excess leads when all of the leads are soldered.

# Mattson VCA 2 DIY Board assembly

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## Transistors

Transistors are 3-legged devices with a round body that have a flat side. When inserting, **align the flat side with the flat on the graphic.**

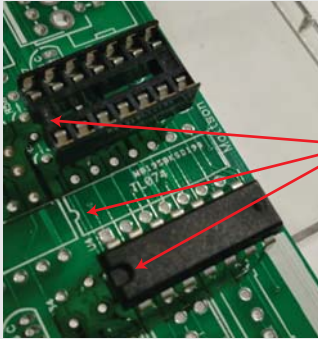
Place **Q1 through Q7**- 2N3904 NPN transistors onto the board. If possible, try to match **Q1 & Q2, Q3 & Q6** and **Q4 & Q5** in pairs.

Verify the correct component type and orientation. Flip the board and solder the pads.

Be very careful not to bridge the pads with solder. They won't work if you do. The pads are close together and minimal solder is required.

Clip the leads.

4



Notch examples only- NOT the VCA

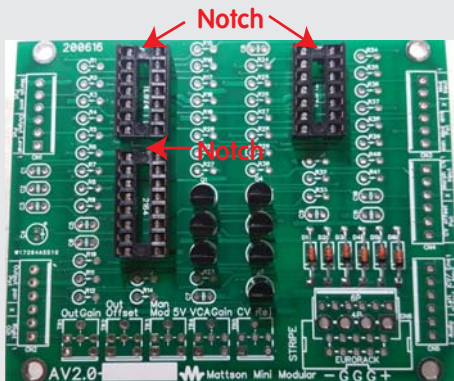
## IC socket orientation

The IC sockets, IC graphics and ICs all have an orientation notch to indicate the proper placement position

Some ICs will have just a small circular indent off center in a corner near pin 1. That is the "notch" end of the IC. Some ICs have a big notch and a small, circular indent centered on the other end. Ignore the small indent and follow the large notch.

Please make sure they're lined up properly. A majority of ICs have symmetrically opposing power pins. If the IC is reversed, its power polarity is reversed and will kill the IC in an instant. Not good. Heads up!

5



## IC socket install

Locate the **1, 16-pin** and the **2, 14-pin IC sockets**. Insert them into the board in the **U1-U3** locations. (align the notches...)

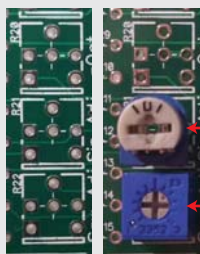
**Make sure the pins fit in all of the holes and aren't bent.**

Flip the board and verify that every IC socket pad has a pin in it before soldering. Then, solder the sockets. Verify that every socket pad is occupied with a pin while soldering.

I usually solder opposing corners to hold them and check to see if they're seated before soldering the other pins. if not, putting a small bit of pressure on a raised corner while heating the pin will seat it. Don't burn your finger!

It's not necessary to clip the leads. They're short.

6



Bourns 3306 F

3362 F, U, P

## A word about the trim pot pads

The trim pot patterns each contain six pads. Only three will be used for each trim pot.

The pads were designed to accept either Bourns 3306 F series trim pots or Bourns 3362 F, U and P series trim pots.

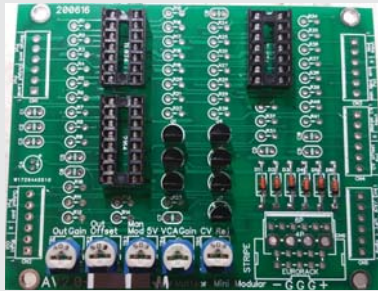
Each have different pinout patterns, but will fit properly within the trim pot outline. Just make sure that pin 1 is on the left as shown.

Note that the pin 1 pads are square.

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## Trim pots (single turn)

Insert Trim pots **TR1-TR5**. Verify the proper value of each before installing. Ensure that the trim pot Pin 1 is inserted into one of the square pads and that the trim pot is installed within the square component outline.

**TR4 - 10K (code 103)**

**TR1-TR3, TR5 - 50K (code 503)**

Once all of the above listed trim pots are placed in the proper locations in the proper orientation, solder them to the board.

Clip the excess leads.

8

## Initial trim pot settings

Center all of the trim pot settings. That should get them close.

9



## Capacitors- ceramic

Locate the following 11 ceramic capacitors. Insert them into the proper pads.

**C1, C5: 100pF (Code 101)**

**C2: 0.47uF (Code 474)**

**C3, C6: 560pF (Code 561)**

**C7: 0.01uF (Code 103)**

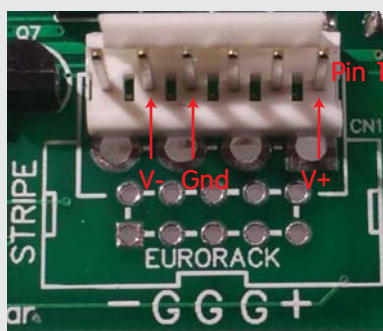
**C8: 15pF (Code 15).**

**C9, C10, C11: 0.1uF (Code 104)**

These caps aren't polarized. I like to orient them where it's easiest to see their value code when installed. Ignore the resistors in the pic. I decided it's easier to install the ceramic caps before the resistors.

**Electrolytic capacitor C4 will be installed later**

10

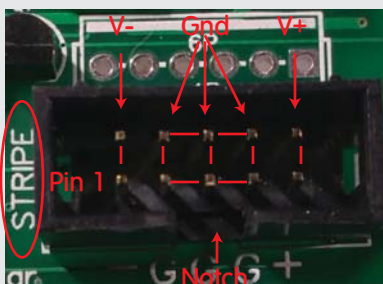


6-pin header

## (6-pin or Euro power if using these options)

If you have chosen to use the **+/-15V, 6-pin power header (Dotcom or MMM)** or the **+/-12V, 10-pin (Eurorack)** power header, Locate the position of the chosen connector on the multi-power pad and install it as shown.

Pay attention to the orientation. Backward power is not good. However, there is a bridge rectifier (D3-D6) that sorts it all out if the power is reversed. The circuit won't notice and carry on like nothing was wrong for the 10-pin or 4-pin headers. The 6-pin is designed so that if the power connector is reversed, the power pins connect to pins that don't connect to anything. Trim pin 2 on the 6-pin if it will be used with a Dotcom system.



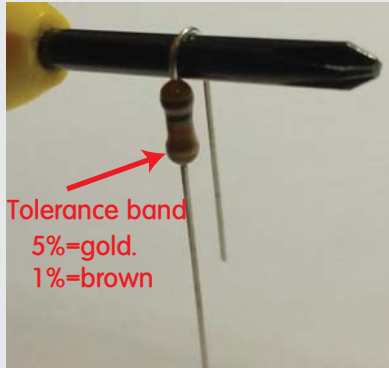
10-pin header

If you plan on using the **4-pin power header**, (most 5U), skip this step. It will be installed later.

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## A word about resistors

Because of the board density of this project, the resistors are all end mounted on the PC board. As mentioned in the builder notes, it helps to use a small screwdriver shaft or pen cartridge to use as a bending jig.

I like to bend the lead furthest from the tolerance band end so that all of the resistors face the same direction. When mounted tolerance-band-down, it makes it much easier after construction to scan the resistor values from the top-down. It really hurts trying to adjust to reading them when the orientations alter randomly. Of course, the electrons don't care what direction they face.



The resistor silkscreen has a circle where the base (tolerance band) is placed and a small resistor symbol pointing toward the associated pad for the bent lead.

The resistor reference number is usually above the silkscreen symbol.

There are 41 resistors in this project.

I have broken them down into 2 groups. One group of 22, 5% resistors (including two 1% resistors) and a group of 19, 5% resistors.

You may wish to break it into smaller groups prior to soldering if it makes the task easier for you.



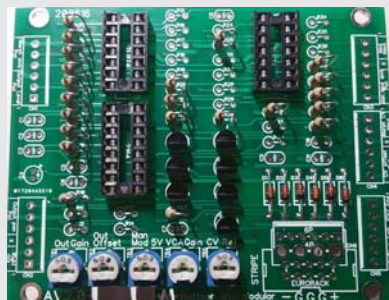
After stuffing a group of resistors, I bend the short leg at an angle to hold the resistors onto the board.

This also gets them out of your way, allowing you to solder all of the longer legs. It makes it easy since they're in neat rows.

After soldering the long legs, I clip the soldered leads, turn the board over and check that they're all seated against the board. (reflow while pushing on the resistor to re-seat).

Then, I line up the resistors neatly before soldering the short legs. Only because I'm OCD about it and it looks prettier...

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## Resistors 5% (and two 1%) group 1

Look at the BOM and place the Group 1 resistors in their proper space. Ensure that R38 and R39 are 3k3 1% or matched within a few ohms.

Solder as above. Or, however you usually do it.

The picture shows the PC board with the Group 1 resistors installed.



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### Resistors 5% group 2

Continue with the Group 2, 5% resistors.

**Phew!** Done with the resistors.

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Neg (-) lead

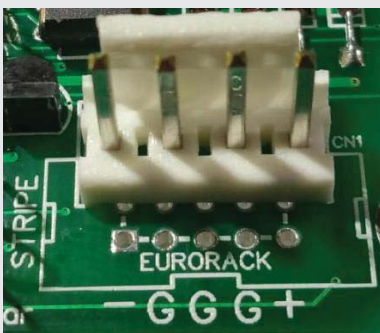
### C4: Electrolytic capacitor

**C4: 10uF Electrolytic.** Locate C4 and install it in its location near the top of CN2. Before soldering the leads to the board, consider that this capacitor is polarized. It will pop loudly if installed backward and release the smoke that the manufacturer worked so hard to stuff into the cylinder....

**The silkscreen marks the location of the positive (+) lead pad. But, the manufacturers make a big black stripe with a (-) symbol to locate the capacitors negative lead.**

Obviously, the (-) marked lead doesn't go into the (+) marked pad.....

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### (4-pin power connector if using this option)

If you chose to install the **4-pin power header** instead of the 6-pin or 10-pin headers, install it now as shown.

Pay attention to the locking ramp position.  
Solder it to the board.

If you chose none of these options, you can just solder your power leads directly to the proper pads.

**If you have already installed a power connector, skip this step.**

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### ICs

#### U1-U3: ICs.

Now it's time to install the Integrated Circuits. Or, ICs.

All of the notches/pin-1 indents point away from the power connector pad.

If you don't have an IC inserter, you may have to bend the pins inward slightly. I do it by holding the IC at each end, putting the leads flat on the work bench and gently rock the IC to bend the pins in just a touch.

Then, repeat with the other side.

Make sure the pins line up and fit in the socket prior to seating the IC into the socket.

**VERIFY** after seating that the pins all socketed and didn't bend flush to the bottom of the IC.

No connection=it won't work.....

**U1, U3: TL074**, 14-pin.

**U2: V2164**, 16-pin.

**Congratulations, you have finished installing all of the board components. Now, double check your work, component orientation, part values, look for solder connections that may be messed up, raise a toast to the good solder connections and.....**

**Go to Panel Component wiring**