

This document contains tips I have found useful when populating the Omega Race repro board.

Overall, my strategy is to install the thinnest components first. That allows the work surface to push the components against the surface of the board during installation.

Another helpful general guideline is to install groups of like-valued components at the same time. Conversely, solder in a component before you place too many others – if they fall out and get mixed up some of them are hard to identify. If you go line by line you can also cross off the item as you finish it and not forget which component/value you're doing.

The reprOR map is a PDF document that you can search to help locate a component's placement. If you just can't seem to find where it goes, you can search for D201 for example and your PDF viewer should highlight and center the text in your window.

So following those guidelines, I start with the diodes. For all diodes note the orientation – the band on the part goes over the stripe on the silkscreen of the board. Unpack, install and solder all four 1N4004s for D111-D114. Depending on particular diodes, the leads may be pretty thick but will fit in the holes, although you may want to trim them down so they don't have as far to go upon insertion and so the adhesive from the ends is skipped. I solder one leg of each and then go back so each one has time to cool down.

Next comes the 1N4148 diodes in eight places – solder and trim.

It only takes a few seconds extra, so I install the 1N4736 at D108 and solder before doing the 1N4738s at D109 and D110 (the original board and silkscreen has 1N959B for D109 and D110 but the 1N4738s have been verified as equivalent substitutes).

Next comes the non-electrolytic capacitors since they're small. Go through the ones that are in singles or doubles. I took the time to solder each unique value since I'd rather be safe than sorry with a magnifying glass.

Note that C210 may be physically different from other caps – mine was glass and looks a bit like a diode but it's a 0.001uF cap.

C101 goes in a compact space near S6. Actually the space is just right – it's the rest that are oversized. Skip the pair of 10pF disc capacitors at C201 and C204 for now as they'd just get bent over – do them as almost the very last component on the board (go by height).

After all the different-valued caps it's time for the mass of 0.01uF caps spread all over the board. They were denoted by a C# while these are all CP# from 301 to 369. Note that CP356 and CP364 are installed in compact spaces like C101. If you're using the parts kit note that CP344 and CP345 are not in the list but they do exist and are needed on the board, and that you may have one extra cap when you're done.

Time for that intimidating bundle of resistors. The first thing I did was to sort them into groups – not worrying yet about the value. I got 13 piles of multiple resistors, with 12 singles left over.

Next, using a multimeter or color band chart, I arranged the singles in order from least (22Ω) up to greatest ($56K\Omega$). Note that these are all the $\frac{1}{4}$ watt resistors – the 82Ω $\frac{1}{2}$ watt and pair of 270Ω $\frac{1}{2}$ watt resistors are bigger and go in after all the rest. Do not do what I did and use the big $\frac{1}{2}$ watt resistors where the little $\frac{1}{4}$ watt 270Ω resistors should be!

Even though resistors are easier to identify, I still installed one at a time to be sure I got the right one in the right place (because that would not be easy to identify), and crossed each one off the list as I went (as I clipped the leads).

You should be left with five pairs of resistors. Put them in order and then install.

Now you have the bunches (3 or more) of resistors left. Find their values and install one bunch at a time, trim, cross off the list. I worked in order from smaller to larger groups.

It gets easier as you go since there are fewer places to look! When you get to the four big groups, if you take care of either the $1K\Omega$ or $10K\Omega$ first, the final three will be easier to do by sight since they are completely different numerically.

Last resistors are the larger wattage ones previously mentioned. Also install the choke (L101) at this time.

Install the four voltage regulators by lining up the mounting bolt hole and marking the legs where they need to be bent, then bend them to 90° angle and install them. Be sure they go in the right place.

Next (in height order) are the chips that get soldered directly to the board. Watch out for the fact that a 7432 is not the same as a 74LS32, and the 74S04 is not the same as the 74LS04. Also make sure the pin 1 notch is facing the right way (matches silkscreen)! Skip the chips that are destined for sockets.

I installed in groups of three so as not to heat up a chip too much. First I soldered two pins on the diagonally opposing corners of the chip to secure it. If you find it's not flat it's still easy to fix. Once three neighboring chips are in place solder pin A2, B2, C2 and then A3, B3, C3 and so on until all the pins are done. It may be superstition but again to keep it from getting too hot I do one pin of a chip and then let it rest while I do a pin on the two others before coming back to the next pin.

Now it's time to do the sockets. I follow the same procedure as chips, including checking for flat installation and minimizing overheating but doing a few at a time.

Continue with the remaining miscellaneous components:

LED – note orientation

Headers at J5, J6: these you'll have to hold in place until one pin is soldered. You'll need to pull out the remnant of the keying pin which should come out easily with some pliers.

SIP resistors RM1, RM2, RM3: will also need to be held in place for the first pin.

Edge connector: the holes seem kind of large for the pins but that's what the manufacturer called for. Be sure the housing is flat against the board so there is no mechanical stress on the copper when the daughter card is plugged in.

Crystal: personal preference if it's mounted tight against the board or with $1/8''$ or so of slack so it will bend over instead of breaking if bumped.

10K pots at VR1 and VR2: large holes so hold them in place, flat, and tight.

2N4403 transistor Q102: the one unique one nearest L101. Note the orientation and pre-bend the legs. I bent the middle leg back (away from the flat) to 90° and then measure and bent it down to go in the hole as with the Vregs.

2N3904 transistors Q103, Q205, Q206: pre-bend as above and be sure they end up in the right places using the map PDF to verify as the silkscreen is obscured by the holes and solder mask.

2N3906 transistors Q101, Q201-Q204: as above.

Electrolytic capacitors: each position does have its positive lead labeled on the silkscreen. and finally those disc capacitors at C201 and C204: no polarity.