# /// MVCA Build Guide

Thank you for choosing one of my products! Please read and follow this build guide carefully, even if you are an experienced DIYer. The Assembly order has been designed to make the build process as straightforward as possible.

Disclaimer:
Assembly is done entirely at your own risk. Fruku cannot be held responsible for any damage, injury, or malfunction that may occur during the build process.

PCBs for reference:
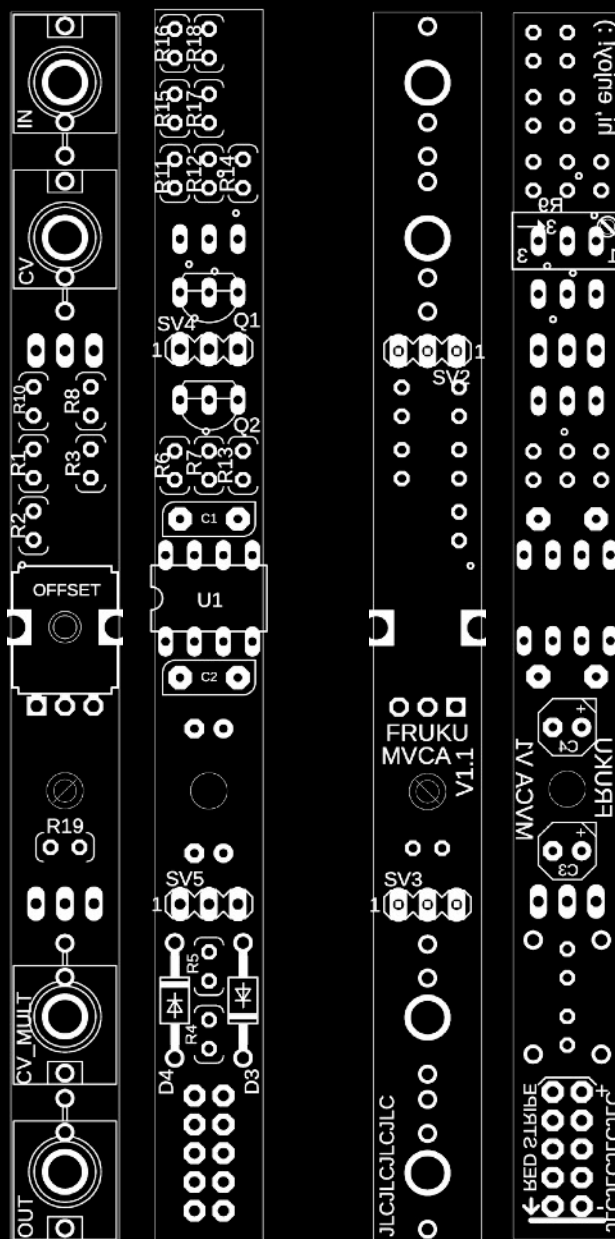
/// Resistors

Start with soldering the resistors, these need to be placed **"standing up"**. Make sure the "bend" is as **low** as possible (see picture). The values of the resistors are written on the tape. If you are unsure, use a Multimeter to check the value. Check the **BOM** file, there you will find which resistor values correspond to the part numbers written on the PCB.
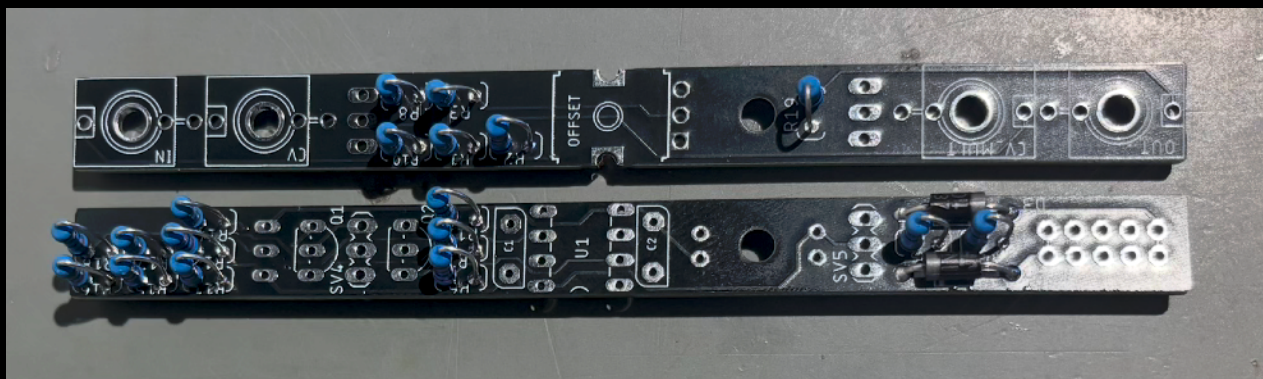

After soldering the resistors your boards should look like this:
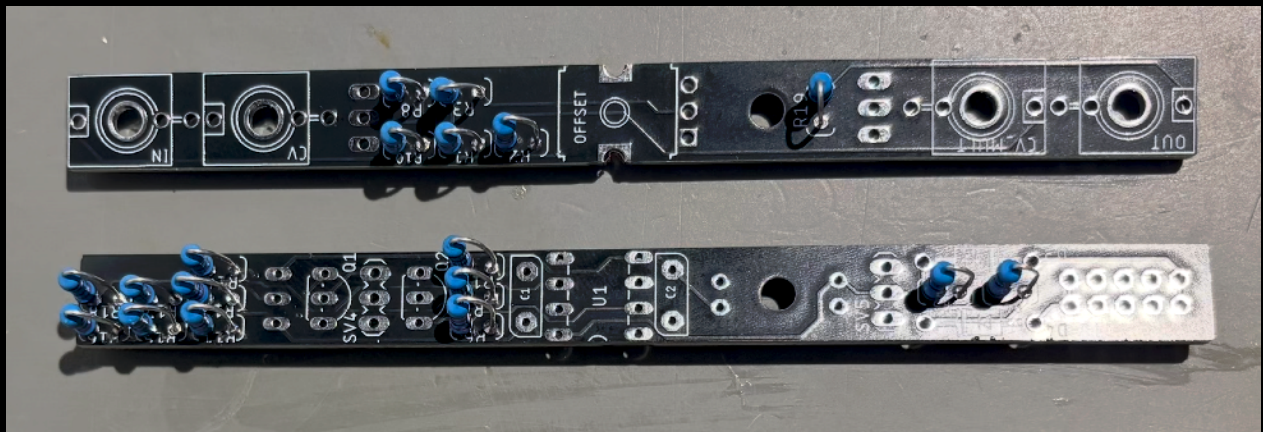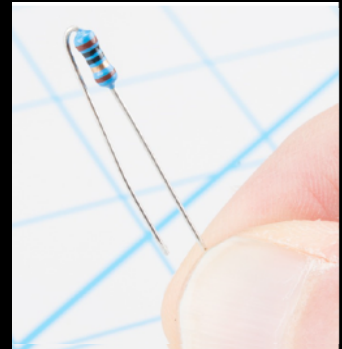
/// Diodes

Now solder the diodes, look at the **BOM** for the values and placements. Diodes are **polarized** so please take notice of the **positive** and **negative** side.
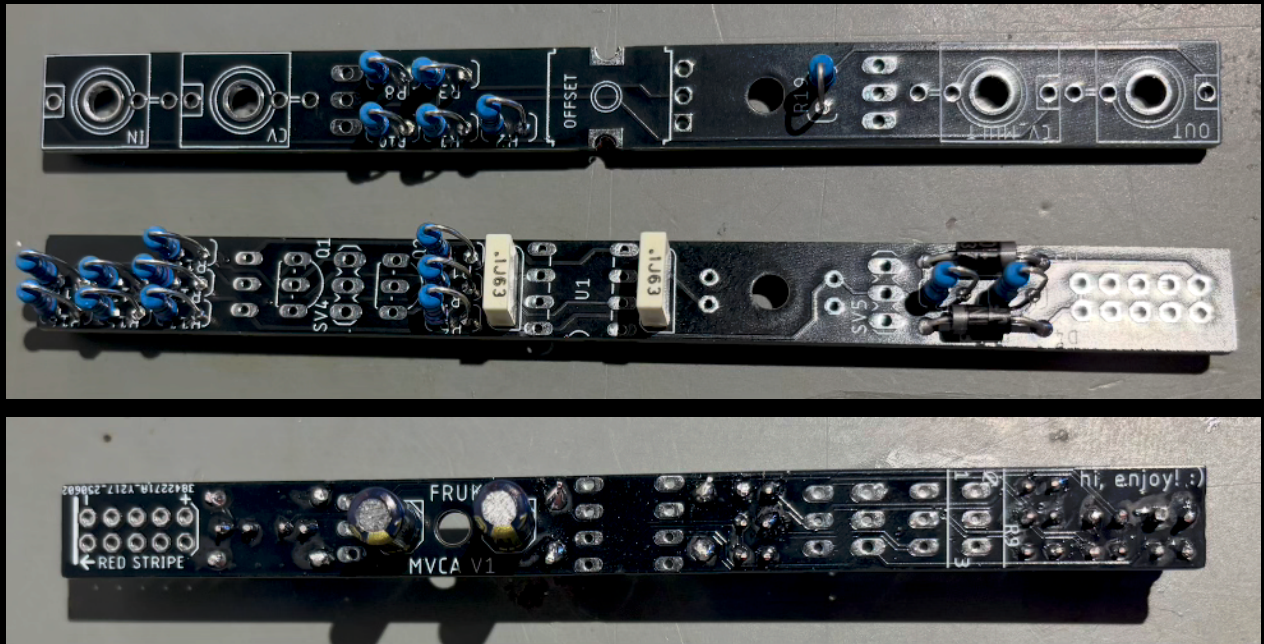
After soldering the diodes your board should look like this:

/// Capacitors

Now solder the capacitors, look at the **BOM** for the values and placements. Please take notice of the **positive** and **negative** side with the **electrolytic** capacitors. The electrolytic capacitors need to be placed on the **bottom** side of the PCB.
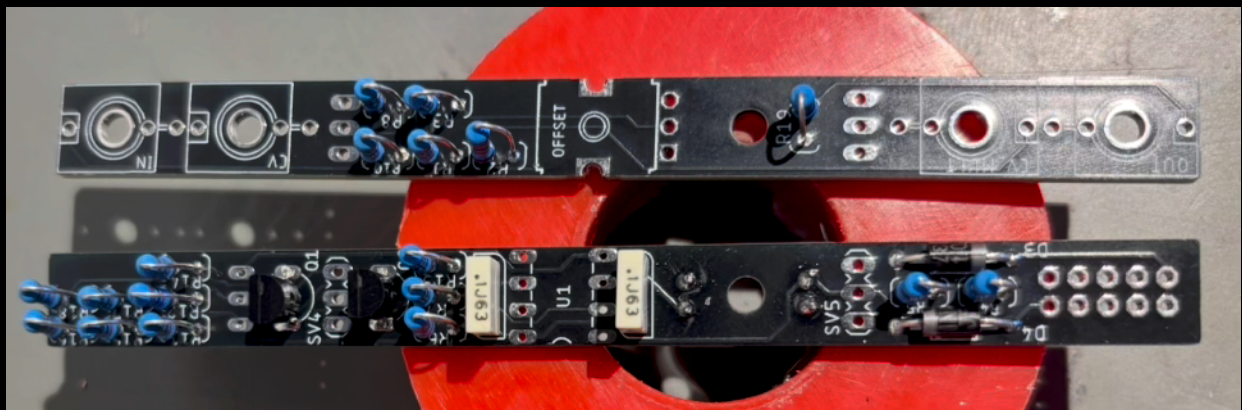
After soldering the capacitors your board should look like this:

/// Transistors

Now solder the transistors, look at the **BOM** for the values and placements. Please take notice of the **orientation**, the transistor part should match the silkscreen on the PCB.
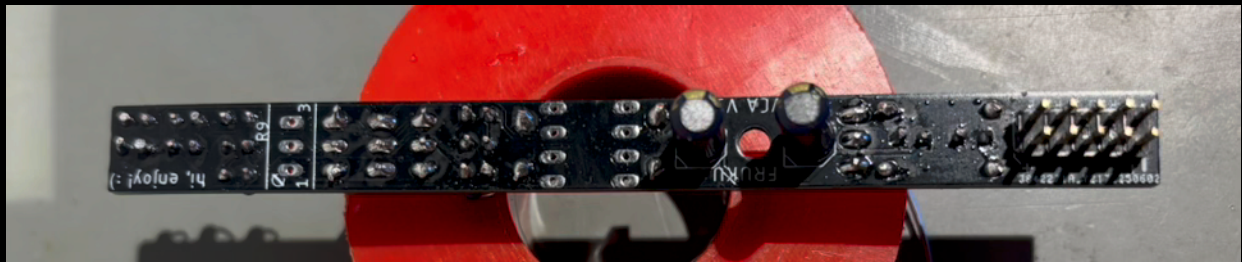
After soldering the transistors your board should look like this:

/// Power Header

Insert the 10 pin power header into place. Solder one pin and check if the header is aligned flat to the PCB. If not, slightly press down on the header and reheat the pin, it should slide into place. Now solder all remaining pins.

After soldering the power header your board should look like this:

/// Pin Headers

Insert the female and male 3 pin headers into place, look at the **BOM** for the placements.

Solder one pin and check if the header is aligned flat to the PCB. If not, slightly press down on the header and reheat the pin, it should slide into place. Now solder all remaining pins.

Repeat this step for all pin headers.

After soldering the pin headers your boards should look like this:
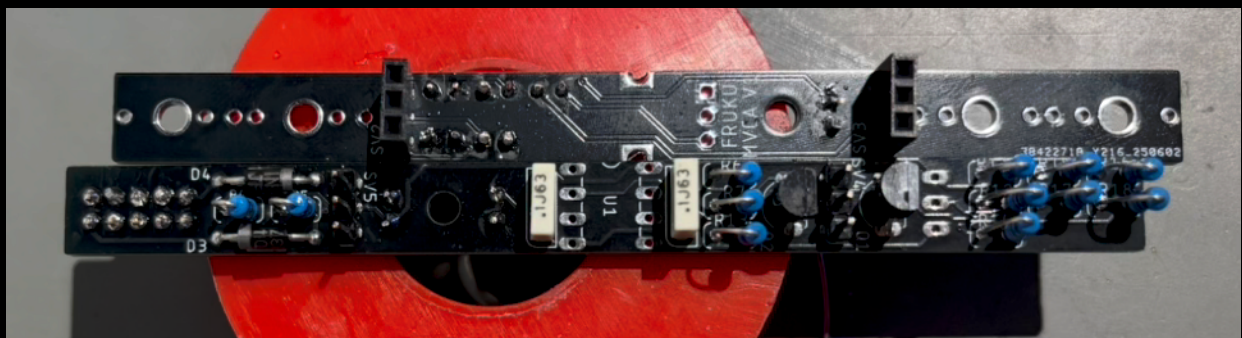
/// Trimmer Potentiometer

Now solder the trimmer potentiometer to the **back** of the PCB, look at the **BOM** for the value and placement. Please take notice of the **orientation**, the trimmer potentiometer part should match the silkscreen on the PCB.

After soldering the trimmer potentiometer your board should look like this:

/// IC

Please **don't** use an IC socket because this will make the module too wide.

Take the IC out of the foam. Usually the IC doesn't have its legs bend far enough to fit in the PCB, so bend the legs to **90** degrees using a **flat** surface.

Then insert it while taking care that the **notch** (or **dot**) matches the notch on the **silkscreen** of the PCB. When you are **sure** you have placed the IC in the correct **orientation** you can solder it in place.

/// Potentiometer & Jack Sockets

Insert the potentiometer on the top side of the PCB, look at the **BOM** for the values and placements, also insert the jack sockets. **Do not** solder yet! Now place the front panel over the potentiometer and jack sockets and use a few nuts from the jack sockets to hold the front panel in place.

Now solder the potentiometer and jack sockets.

After soldering the potentiometer and jack sockets your board should look like this: (front panel removed)
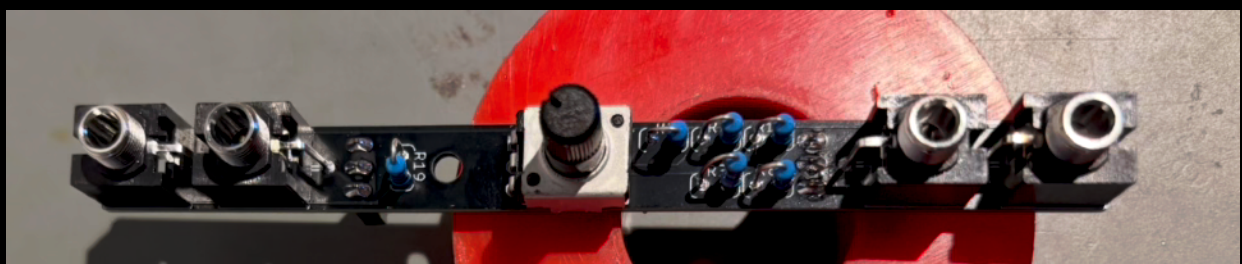
/// PCBs

Now connect both PCBs through previously soldered pin headers. Optionally, you can use the hardware (listed in the **BOM**) to secure the two PCBs together.

/// Testing

As a last check, look over the PCB and check the soldering, check for shorts and polarity.

Insert the power cable while holding the back of the PCB and connect it to your modular system.
Turn on the power. Check if nothing blows! If all is well, proceed: **Patch** :)

/// Trimming

With an Oscilloscope
After assembling and testing the module, adjust the trimmer carefully.
Use an oscilloscope to monitor the output signal and fine-tune the trimmer until the waveform's midpoint (the average value of the signal) is exactly aligned with the 0 V reference line.

Without an Oscilloscope
If you don't have access to an oscilloscope, you can still adjust the trimmer approximately: Connect a multimeter set to **DC voltage mode** across the output. Turn the "OFF." knob fully clockwise, make sure you have no audio and cv input patched. Slowly turn the trimmer until the multimeter reading is as close to **0 V DC** as possible. This won't let you see the actual waveform, but it ensures the signal is centered around 0 V.

/// Troubleshooting

If the module does not work, check the **orientation** of the ICs, electrolytic capacitors, transistors and diodes. Check your **soldering**. It should be perfect, like in this picture:

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