THANKS FOR CHOOSING ONE OF OUR KITS!

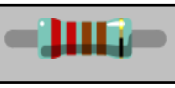
This assembly guide has been designed taking into account the common issues that we often find people experience in our workshops. The order in which the components are placed on the board is meant to make assembly as easy as possible.

Some steps are not obvious, so even if you're an experienced DIYer, please take the time to read the steps thoroughly before starting. You will be soldering both boards at the same time.

If this is your first project, please read this article before you start assembling the kit:
www.befaco.org/howto/

GOOD LUCK!

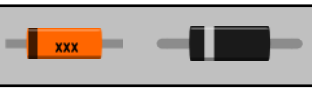
RESISTORS



Color code can be difficult to identify, we strongly recommend to use a **multimeter.**

Qty	Value	Code	Name on PCB
19	100k	Brown, black, black, orange, brown	R1, R4, R7, R8, R20, R26, R27, R41, R42, R44, R45, R55, R56, R57, R58, R105, R106, R108, R118
10	10k	Brown, black, black, red, brown	R5, R9, R11, R13, R16, R23, R24, R111, R117, R119
8	56K	Green, blue, black, red, brown	R25, R30, R34, R35, R48, R49, R109, R110
6	680 Ohm	Blue, gray, black, black, brown	R31, R32, R39, R40, R43, R46
6	1M	Brown, black, black, yellow, brown	R33, R36, R37, R38, R113, R115
5	1k	Brown, Black, Black, Brown, Brown	R100, R114, R116, R120, R121
4	15k	Brown, green, black, red, brown	R28, R29, R47, R50
3	680k	Blue, gray, black, orange, brown	R51, R54, R103
2	10 Ohm **1W**	Brown, black, black, gold, brown.	R17, R18
2	6.2k	Blue, red, black, brown, brown	R52, R53
2	43k	Yellow, orange, black, red, Brown	R21, R22
2	47k	Yellow, violet, black, red, brown	R102, R104
2	68k	Blue, gray, black, red, brown	R59, R60
2	270k	Red, violet, black, orange, brown	R2, R12
1	180 Ohm	Brown, Gray, Black, Black, Brown	R112
1	1.8k	Brown, gray, black, brown, brown	R101
1	2.2k	Red, red, black, brown, brown	R14
1	82k	Gray, red, black, red, brown	R3
1	120k	Brown, red, black, orange, brown	R10
1	180k	Brown, gray, black, orange, brown	R6
1	220k	Red, red, black, orange, brown	R15
1	330k	Orange, orange, black, orange, brown	R107
1	430k	Yellow, orange, black, orange, brown	R19

DIODES



Solder the diodes **observing their polarity**. The black or white line on the diode must match with the white line on the diode symbol on the PCB silkscreen.

Qty	Value	Name on PCB
8	1N4148	D1, D2, D4, D6, D7, D100, D101, D102
4	4V7	D8, D9, D10, D11
2	1N5817	D12, D13
2	3V	D3, D5
1	5V1	D103

FERRITE

Solder the two ferrite beads using a recycled resistor leg passed through each ferrite and proceed as if it were a resistor. Ferrite beads don't have polarity.

Qty	Name on PCB
2	FERRITE+, FERRITE-

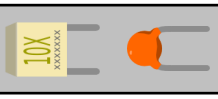
ICs

First **place the sockets** (taking care to orientate them properly – the notch or dot on one end of the IC should match the image on the silkscreen) and solder them into their correct positions.

Don't place the ICs yet. Wait to do it at the end of the build after place the rest of the parts.

Qty	Value	Name on PCB
3	TL072	IC1, IC101, IC102
2	LM13700	IC3, IC4
1	TL074	IC2
1	LM3914N	IC100

CAPACITORS



Identifying capacitors can be quite tricky. Codes stated are indicative, please take a look at this guide for help identifying capacitors: http://www.wikihow.com/Read-a-Capacitor

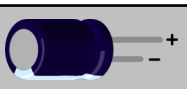
Qty	Value	Code	Name on PCB
14	100nF	104	C1, C3, C8, C9, C11, C12, C17, C18, C21,C22, C102, C103, C107, C108
9	10pF	10	C6, C7, C10, C13, C14, C15, C16, C101, C105
1	2.2nF **Polyester**	2n2K	C5
1	47nF **Polyester**	47nK	C100

TRANSISTORS

Be sure they are orientated correctly. The curved and flat sides of the silkscreen outline of the transistor on the PCB must match that of the transistor's body.

Qty	Value	Name on PCB
5	2N3904	T3, T4, T7, T100, T101
4	2N3906	T1, T2, T5, T6
1	BC517	Q1
1	BC516	Q2

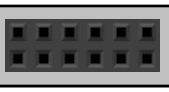
ELECTROLYTIC CAPACITORS



Values are written on the side of the capacitor. Mind their polarity (The long leg of the capacitor is the positive (+)).

Qty	Value	Code	Name on PCB
6	10µF	10µF	C2,C4, C19, C20, C104, C106

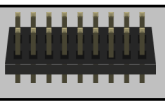
SOCKET CONNECTORS



Place the socket connectors on the silkscreen side of the control board . Please make sure **they are straight.**

1	2x2	JP101
1	2x3	JP100
1	2x4	JP102

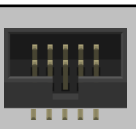
PIN HEADERS



Place and solder the pin headers on the silkscreen side of the main board. It is the shorter pins that you are soldering and long ones will connect the boards. Please make sure **they are straight.**

1	2x2	JP2
1	2x3	JP1
1	2x4	JP3

POWER CONNECTOR



Place the power connector at "POWER" at silkscreen side, ensuring it is facing out from the edge of the PCB.

TRIMMERS
Solder the four 100k trimmers at Offset 1, 2, 3, 4 with the screw facing out from the edge of the PCB.

RCA CONNECTORS
Solder the RCA connectors on the PCB where the silkscreen indicates. Use the white one for “OUT” and red for “IN”.

Buen trabajo! You’ve already made it quite far through the build. How are your focus and energy levels? Do you think a 15 minute break would better prepare you for the rest of the build? Maybe you could call someone you haven’t talked to in a while or go for a nice walk? Maybe do something useful like debate politics on facebook or look at videos of cats being jerks?

FADERS	
Solder the faders on the PCB where it is indicated by the silkscreen (on the reverse side to the smaller components).	
Qty	Name on PCB
2	VOL1, VOL2

SPACERS
Secure the spacers onto Control PCB (through the holes with silver outlines) with the main body of the spacer on the component side, and the nut on the opposite.

FRONT PANEL COMPONENTS MOUNTING TIPS:

Now we will proceed to mount the jacks, potentiometers and LEDs. This part of the assembly is CRITICAL. Please take your time and read the following instructions carefully.

These components must **NOT** be soldered until they are placed on the PCB and fully attached to the front panel.

There are two reasons for this:

> The height of the panel components are not all the same. Because of this, if not attached properly before soldering, they will not stay properly seated against the panel. This might cause mechanical stress reducing their life expectancy and in the worst case cause them to break.
> The second reason is that it is very difficult to align the components to the holes if the panel is not positioned prior to soldering. In the case of the LEDs, they are almost impossible to set to the correct height without reference to the front panel.

MINIJACKS

Place all the mini-jacks onto the PCB ensuring they are on the silkscreen side, but **don't solder yet**.

Caution: the switch nut and the jack nuts look the same, but they are not equally sized and will not fit in each others' thread, so make sure to keep them separate!

POTENTIOMETER

Place the potentiometers on the PCB. Do not place them all the way down, as it should be the same heigh as minijacks and ... **don't solder it yet!**

Qty	Type	Name on PCB
2	Single (3pin) 100K	HPF, MIX

LEDs

Place the LEDs onto the PCB, minding their polarity, but **don't solder them** until the front panel is in place. This is the only way to solder them in the right position. They are to be placed on the same side as the slider potentiometers.

The long leg is the positive and the short the negative. On the PCB the square pad indicates the negative side and there is a + symbol to indicate the positive.

Qty	Name on PCB
4	LED4, LED5, LED6, LED7 Green
2	LED2, LED3 Yellow
1	LED1 Red
1	Duoled

FRONT PANEL

Attach the **front panel** adjusting the parts one by one if necessary until they fit. At this point a pair of fine tweezers can be helpful.

To finish:

- Secure the parts to the panel in this order: A) **Mini-jacks** B) **Pots.**

- Ensuring all of the above parts are flush with the panel then you can finally **solder** them!

- Next, adjust the **LEDs** so that they are flush with the panel and solder them.

- Connect the **main PCB** to the **control PCB** by threading the 2x M3 screws through the main PCB and securing them to the 2 spacers. The main PCB should be orientated so that the component side is facing towards the front panel.

- Put the **knobs** on the potentiometers and the red end-**caps** on any switches/faders

- Connect the **power ribbon cable**: The red wire (-12V) on the power ribbon cable corresponds to pin number one on the male power connector. The number one pin is indicated with a small triangle on the male power connector and a white line on the main PCB. A white or black line (or "-12v") marked on your power bus normally indicates the corresponding pin.

CALIBRATION

We are now going to calibrate the offset of the module's VCAs to prevent the CV signal from leaking into the audio signal.

For this procedure we will use an audio cable connected to a sound system (not headphones) to listen to how much CV signal is leaking into our audio path. We will then use the trimmers to reduce this leakage to a minimum.

Start by unplugging all cables from the front panel. Next, make sure your power connector is attached to the module. With the volume on your system turned all the way down, connect **"MIX"** to your sound system.

- "CV IN" calibration.
1 - Plug an oscillator into **"IN 1 CV"**. Set the fader above the input to max and the **"DRY/WET"** pot to the wet position. Slowly turn up the volume of your audio system until you begin to hear the bleed of the oscillator. If you do not hear anything, move onto the next step (after checking all your connections). If you hear the oscillator, turn the trimmer above **TP1** until you find the setting with the least presence of the oscillator.

2 - Plug an oscillator into **"IN 2 CV"**. Set the fader above the input to max and the **"DRY/WET"** pot to the wet position. Slowly turn up the volume of your audio system until you begin to hear the bleed of the oscillator. If you do not hear anything, move onto the next step (after checking all your connections). If you hear the oscillator, turn the trimmer above **TP2** until you find the setting with the least presence of the oscillator.

- "DRY/WET" Calibration.
This will be an iterative procedure between DRY and WET positions. We will set each of them to get the minimal signal leakage, going back and forth until we get the best result.

Connect an oscillator to **"MIX CV".**

1 - Set the **"DRY/WET"** Pot to the dry position.
Turn the trimmer above **TP3** until you find the setting with the minimum volume of the oscillator in your audio system.

2 - Set the **"DRY/WET"** Pot to wet position.
Turn the trimmer above **TP3** until you find the setting with the minimum volume of the oscillator in your audio system.

3 - Repeat steps 1 and 2 until you get the minimum volume of the oscillator in your audio system in both scenarios.

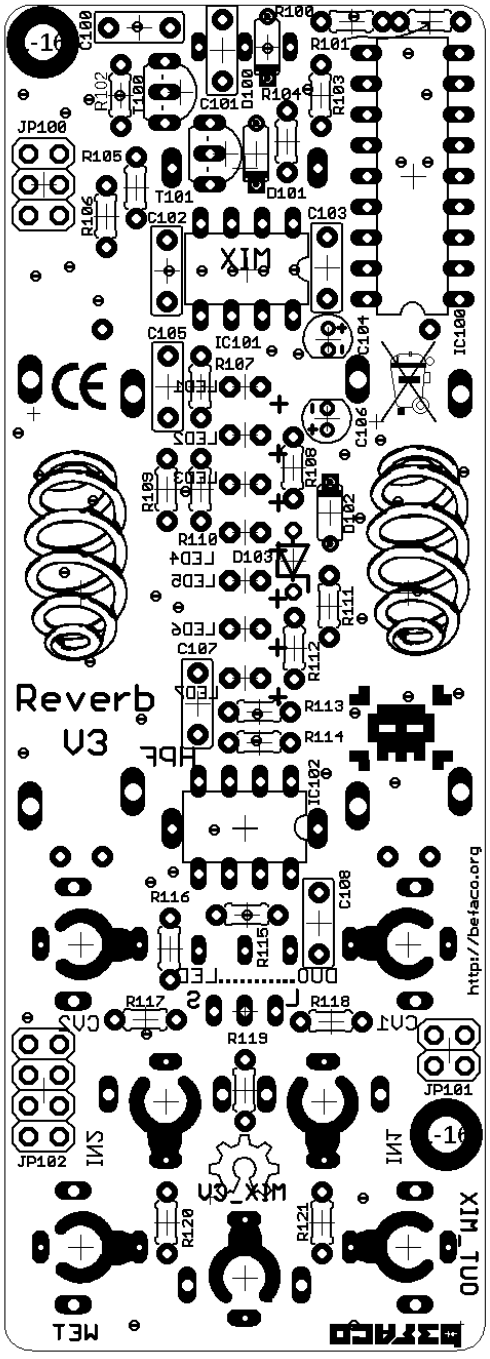
4- Move the **"DRY/WET"** potentiometer to check if you get a louder leakage in any position. If so, gently tweak **TP3** and **TP4** until you get rid of it or minimize it.

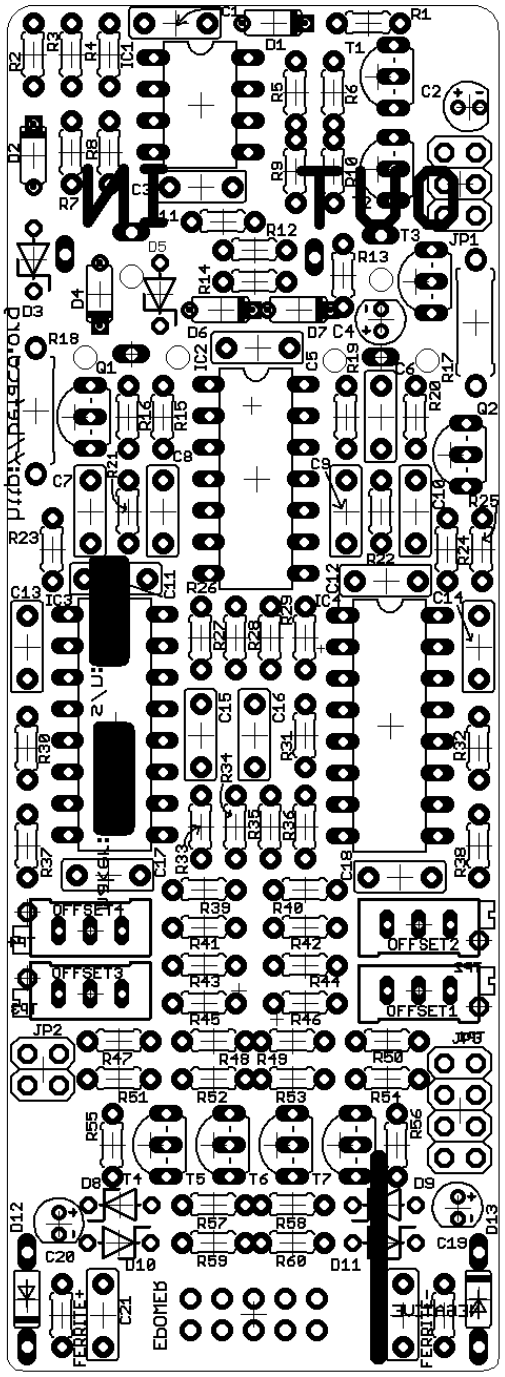
CONNECTING TO THE REVERB TANK

WARNING: DO NOT CONNECT THE SPRING REVERB MODULE TO THE TANK WHILE THE MODULE IS POWERED. DISCONNECT THE POWER FROM YOUR MODULE BEFORE YOU ATTEMPT TO CONNECT THE REVERB TANK!

RCA-OUT on the PCB (White connector) ---> IN on Reverb Tank (White connector)

RCA-IN on the PCB (Red connector) ---> OUT on Reverb Tank (Red connector)





ENJOY YOUR NEW BEFACO MODULE!