

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.

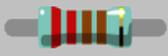
Some steps are not obvious, so even if you're an experienced DIYer, please take the time to read the steps thoroughly before starting.

If this is your first project, please read this article before you start assembling the kit:

www.befaco.org/howto/

MAIN PCB (With the three ICs pre-soldered to it)

OPEN MAIN BOARD BAG A

RESISTORS 			
Qty	Value	Code	Name on PCB
10	680R	Blue, gray, black, black, brown	R1, R2, R8, R14, R15, R23, R25, R55, R62, R65
10	100k	Brown, black, black, orange, brown	R5,R16,R19,R20,R21,R22,R26,R31,R32,R45,
7	10k	Brown, black, black, red, brown	R27, R30, R47, R49, R51, R56, R64
6	15k	Brown, green, black, red, brown	R24, R36, R53, R54, R60, R66
5	56k	Green, blue, black, red, brown	R9, R11, R12, R13, R18
4	1M	Brown, black, black, yellow, brown	R3, R4, R6, R7
3	1k	Brown, black, black, brown, brown	R35, R39, R42
3	20k	Red, black, black, red, brown	R44, R46, R68
2	560k	Green, blue, black, orange, brown	R43, R50
2	68k	Blue, gray, black, red, brown	R48,R10
1	2M	Red, black, black, yellow, brown	R38
1	470k	Yellow, violet, black, orange, brown	R37
1	330K	Orange, orange, black, orange, brown	R29
1	270k	Red, purple, black, orange, brown	R28
1	150k	Brown, green, black, orange, brown	R33
1	120k	Brown, red, black, orange, brown	R52
1	47k	Yellow, violet, black, red, brown	R67
1	36k	Orange, blue, black, red, brown	R63
1	30k	Orange, black, black, red, brown	R59
1	27k	Red, violet, black, red, brown	R61
1	18k	Brown, gray, black, red, brown	R34
1	12k	Brown, Red, black, red, brown	R17
1	3k	Orange, black, black, brown, brown	R40
1	2.7k	Red, violet, black, brown, brown	R57
1	470 Ohm	Yellow, violet, black, black, brown	R58
1	220 Ohm	Red, red, black, black, brown	R41

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
2	1N4148	D1, D2
2	2.4V	D3, D4

OPEN THE ICS BAG

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.

Next place the ICs in their respective sockets (again taking note of their orientation - the notch or dot on the top of the IC must match that of the socket and silkscreen).

Qty	Value	Name on PCB
3	TL072	IC3, IC4, IC7
1	TL074	IC5
1	4053N	IC6
1	PT2399	IC8

OPEN MAIN BOARD BAG B

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
21	100nF	104	C1, C2, C5, C6, C9, C10, C11, C14, C17, C18, C19, C22, C26, C28, C30, C35, C36, C38, C39, C42, C43
10	10p	10	C3, C4, C7, C8, C12, C13, C24, C25, C31, C40
2	560p	561	C33, C37
2	4.7n	4n7 (Polyester)	C27, C44
1	100p	101	C20
1	10nF	10nk	C34
1	150nF	.15 or 154	C21



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
2	1 μ F	1 μ F	C15, C41
2	4.7 μ F	4.7 μ F	C23, C32
1	10 μ F	10 μ F	C16
1	47 μ F	47 μ F	C29



TRANSISTORS

Make sure they are positioned correctly as indicated by the silkscreen outline on the PCB.

Qty	Value	Name on PCB
2	2n3904	Q1, Q2
1	2n3906	T1



TRIMMERS

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



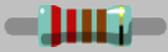
MALE PIN HEADER

Place and solder the male pin header at "COMPONENTES" where the silkscreen indicates (it is the shorter pins that you are soldering).

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 (this is a big one!)? Maybe you could call someone you haven’t talked to in a while or do something useful like debate politics on facebook or look at videos of cats being jerks?

CONTROL PCB

OPEN CONTROL BOARD BAG A

RESISTORS 			
Qty	Value	Code	Name on PCB
10	100k	Brown, black, black, orange, brown	R103, R104, R107, R108, R109, R111, R114, R130, R133, R134
4	82k	Gray, red, black, red, brown	R116, R122, R124, R125
4	56k	Green, blue, black, red, brown	R106, R115, R119, R123
4	1k	Brown, black, black, brown, brown	R126, R127, R132, R136
3	33k	Orange, orange, black, red, brown	R131, R135, R137
3	68k	Blue, gray, black, red, brown	R105, R112, R117
2	1M	Brown, black, black, yellow, brown	R128, R129
2	6.2k	Blue, red, black, brown, brown	R100, R110
2	15k	Brown, green, black, red, brown	R101, R120
2	680k	Blue, gray, black, orange, brown	R102, R118
1	47k	Yellow, violet, black, red, brown	R121
1	270k	Red, purple, black, orange, brown	R113

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-

DIODES 		
Solder the diodes observing its polarity . The black or white line on the diode (which indicates the cathode - the negative side) must match the white line on the diode symbol on the PCB silkscreen.		
Qty	Value	Name on PCB
4	4.7V	D100, D101, D102, D103
2	1N4148	D105, D106
2	1N5817 (Black ones)	D108, D109
2	3V	D104, D107



ICs

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

Next place the ICs in their respective sockets (again taking note of their polarity - the mark or “notch” on the front of the IC must match that of the socket and silkscreen).

Qty	Value	Name on PCB
2	TL072	IC100, IC101



CAPACITORS

Qty	Value	Code	Name on PCB
6	100nF	104	C100, C101, C102, C103, C104, C105



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
2	10 μ F	10 μ F	C106, C107



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
2	2N3904	T101, T102
2	2N3906	T100, T103



POWER CONNECTOR

Solder the power connector at “EPOWER”, ensuring it is facing out from the edge of the PCB. The small arrow on the connectors must be on the side with the thick white line.

FEMALE PIN HEADER	
Place the female pin headers at the position "CONTROL" and solder. It is the short pins you are soldering.	

OPEN CONTROL BOARD BAG B

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 switches. 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.

OPEN MINI-JACKS BAG

MINI-JACKS		
Place the mini-jacks on the PCB ensuring they are on the side with the silkscreen side but don't solder them until the front panel is in place and with all nuts screwed to it. This way it's easier to solder them in the right position. Keep in mind that the front panel holes are quite narrow and it is almost impossible to place it with all the components already soldered.		
Caution: the switch nuts and the jack nuts looks the same but they are not and will not fit in each others' thread so don't mix them!.		
POTENTIOMETERS		
Now place the potentiometer on the PCB. Do not place them all the way down, leave them loose and... don't solder them yet!		
Qty	Type	Name on PCB
5	Single (3pin) 100K	DRY/WET, FEEDBACK, FX_RETURN, IN_TO_DLY, TIME

TOGGLE SWITCHES

Remove the two nuts and the tabbed washer from the toggle switches (if they are still present). Discard one nut and the tabbed washer, but keep one nut for securing to the front panel later. Place the toggle switches on the PCB but **don't solder them yet**.

Qty	Type	Name on PCB
3	Single two position	GATE_1, GATE_2, GATE_3

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) **Switches and** C) **Pots**
- Ensuring all of the above parts are flush with the panel then you can finally **solder** them!
- Connect the **main PCB** to the **control PCB** by threading the 4x M3 screws through the main PCB and securing them to the 4 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 VCAs to prevent the CV signal from leaking into the audio signal.

For this procedure we will use an audio cable to 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. Set "**FEEDBACK**" to minimum, "**TIME**" to fast position and set the three switches in the down position.

Next attach the power connector. We will use a mono audio cable to connect to our test points: the jack tip (the signal) and jack sleeve (GND). You will need to turn the volume up after connecting as the signal is quite low. Be careful when connecting/disconnecting to prevent damaging your speakers.

- **CV IN calibration.**

1 - Plug an oscillator into **IN VOL CV**. Set the **IN VOL** pot to max and **DRY/WET** pot to wet position.

Connect an audio cable to **TP1** and **GND**. Turn the trimmer above **TP1** until you find the setting with the least presence of the oscillator.

2 - Plug an oscillator into **RET VOL CV**. Set the **RET VOL** pot to max and **DRY/WET** pot to wet position. Connect an audio cable to **TP2** and **GND**. Turn the trimmer above **TP2** until you find the setting with the least presence of the oscillator.

- **DRY/WET Calibration.**

Connect an oscillator in **DRY/WET CV**.

1 - Set the **DRY/WET** Pot to dry position.

Connect an audio cable to **TP3** and **GND**. Turn the trimmer above **TP3** until you find the setting with the least presence of the oscillator.

2 - Set the **DRY/WET** Pot to wet position.

Connect an audio cable to **TP4** and **GND**. Turn the trimmer above **TP4** until you find the setting with the least presence of the oscillator.

ENJOY YOUR NEW BEFACO MODULE!