

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.

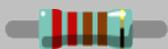
If this is your first project, please read this article before you start assembling the kit

www.befaco.org/howto/

ENJOY!

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

OPEN MAIN BOARD BAG A

			
RESISTORS			
Qty	Value	Code	Name on PCB
12	680R	Blue, gray, black, black, brown	R1, R2, R8, R11, R15, R16, R24, R26, R55, R62, R69, R71
10	10k	Brown, black, black, red, brown	R12, R19, R28, R31, R52, R56, R58, R60, R61, R68
10	100k	Brown, black, black, orange, brown	R5, R17, R20, R21, R22, R23, R27, R32, R33, R46
8	15k	Brown, green, black, red, brown	R18, R25, R40, R51, R57, R59, R63, R65
6	47k	Yellow, violet, black, red, brown	R9, R10, R13, R14, R53, R64
5	1M	Brown, black, black, yellow, brown	R3, R4, R6, R7, R54
4	1k	Brown, black, black, brown, brown	R36, R39, R43, R50
4	20k	Red, black, black, red, brown	R35, R45, R47, R67
1	220R	Red, red, black, black, brown	R38
1	2.7k	Red, violet, black, brown, brown	R72
1	3k	Orange, black, black, brown, brown	R37
1	18k	Brown, gray, black, red, brown	R48
1	30k	Orange, black, black, red, brown	R70 (Place and solder with FERRITE+)
1	33k	Orange, orange, black, red, brown	R42*
1	36k	Orange, blue, black, red, brown	R66
1	120k	Brown, red, black, orange, brown	R34
1	130k	Brown, orange, black, orange, brown	R29
1	150k	Brown, green, black, orange, brown	R30
1	470k	Yellow, violet, black, orange, brown	R41
1	560k	Green, blue, black, orange, brown	R49
1	4.7M	Yellow, violet, black, yellow, brown	R44

* there is a MOD at the end of the build involving this resistor. Take a look!



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	1N5222 (BZX550 2V4)	D3, D4
2	1N5817 (Black ones)	D6, D7



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-

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
2	TL072	IC3, IC4
1	TL074	IC6
1	4053N	IC7
1	PT2399	IC8

* Save spare sockets and ICs for the other board

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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
22	100nF	104	C1, C2, C5, C6, C9, C10, C11, C14, C17, C18, C19, C22, C23, C28, C33, C34, C35, C37, C39, C41, C47, C48
6	47p	47	C3, C4, C7, C8, C12, C40
5	560p	561	C26, C30, C31, C42, C44
2	100p	101	C13, C20
2	4.7n	4n7 (Polyester)	C24, C29
1	1nF	102	C25
1	10nF	10nk	C38
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	1µF	1µF	C15, C43
2	4.7µF	4.7µF	C27, C36
2	10µF	10µF	C45, C46
2	100µF	100µF	C16, C32

ICs 		
This IC looks very much like a Transistor as it has 3 legs. Make sure it is positioned correctly as indicated by the silkscreen outline on the PCB.		
1	LM317	IC5

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
1	BC546	Q3



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).



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.

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
13	100k	Brown, black, black, orange, brown	R101, R103, R104, R112, R115, R116, R118, R119, R127, R128, R131, R133, R138
5	1k	Brown, black, black, brown, brown	R100, R125, R126, R136, R137
4	1M	Brown, black, black, yellow, brown	R102, R105, R129, R130
3	33k	Orange, orange, black, red, brown	R132, R134, R135 (place and solder same time as R138 - 100k)
3	82k	Gray, red, black, red, brown	R122, R123, R124
2	47 OHM	Yellow, violet, black, gold, brown	R109, R110
2	560 OHM	Green, blue, black, black, brown	R107, R111
2	15k	Brown, green, black, red, brown	R113, R114
2	120k	Brown, red, black, orange, brown	R106, R117
1	47k	Yellow, violet, black, red, brown	R120
1	56k	Green, blue, black, red, brown	R121
1	200k	Red, black, black, orange, brown	R108



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
3	1N4148	D100, D101, D103
1	1N5231	D102



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
1	TL072	IC101
1	TL074	IC100



CAPACITORS

Qty	Value	Code	Name on PCB
4	100n	104	C100, C101, C102, C103



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
4	2N3906	T100, T101, T102, T103



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, SPEED

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

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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, “**SPEED**” 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 TO DLY CV**. Set the **IN TO DLY** 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 **FX RETURN CV**. Set the **FX RETURN** 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!

BONUS TRACK.

You can Modify your Crush delay to make it less crush and more delay. To do so follow these instructions

- Change R42 to 2M
- Lift Pin13 at IC7 from the socket
- Lift Pin5 at IC8.
- Wire these two legs as pictured.

