

THANKS FOR CHOOSING ONE OF OUR KITS!

This manual has been written 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 read the steps thoroughly before starting.

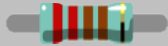
If this is your first project, please read this article before you start assembling the kit

www.befaco.org/howto/


ENJOY!

MAIN PCB (The small one)

OPEN MAIN BOARD BAG A



RESISTORS			
Qty	Value	Code	Name on PCB
27	100k	Brown, black, black, orange, brown	R1, R2, R11, R12, R19, R20, R21, R22, R23, R24, R25, R27, R28, R29, R30, R31, R32, R33, R34, R35, R36, R37, R38, R40, R41, R42, R48
4	1M	Brown, black, black, yellow, brown	R13, R14, R46, R50
4	560	Green, Blue, black, black, brown	R4, R7, R15, R18
3	1k	Brown, black, black, brown, brown	R45, R49, R51
2	10k	Brown, black, black, red, brown	R39, R43
2	47k	Yellow, violet, black, red, brown	R16, R52
2	30k	Orange, black, black, red, brown	R5, R6
2	20k	Red, black, black, red, brown	R9, R10
2	200k	Red, black, black, orange, brown	R3, R8
2	300k	Orange, black, black, orange, brown	R44, R47
1	43k	Yellow, orange, black, red, Brown	R17
1	150k	Brown, green, black, orange, Brown	R26
1	33k	Orange, orange, black, red, brown	R53



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
25	1N4148 (orange color)	D1, D2, D3, D4, D5, D6, D7, D8, D9, D10, D11, D12, D13, D14, D15, D16, D17, D18, D19, D20, D21, D22, D23, D24, D25
2	1N5230B Zener 4.7v	Z1, Z2

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).

MAIN PCB

Qty	Value	Name on PCB
2	TL074	IC3, IC4
1	LM13700	IC2
1	DG419D	IC8
4	TL072	IC1, IC5, IC6, IC7

CONTROL PCB (These ICs will be placed later)

2	TL072	IC101, IC102
1	LM393	IC100

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
18	100n	104	C1, C2, C102, C103, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C16, C17, C18, C19
1	10n	103	C15
2	10p	10	C13, C14


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	Code	Name on PCB
2	2N3906	T1, T2

MALE PIN HEADERS

Place and solder the male pin headers at C_A_2, C_A_4, C_B_2, C_B_4 where the silkscreen indicates (it is the shorter pins that you are soldering).

TRIMMERS		
		
Solder the trimmers to the PCB where it is indicated by the silkscreen.		
Qty	Code	
4	10k	CAL_A1, CAL_A2, CAL_B1, CAL_B2

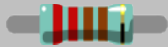
Buen trabajo! You’ve already made it quite far through the build. How are your focus and energy levels? Do you think a 15 minute break would better prepare you for the rest of the build?


Maybe you could call someone you haven’t talked to in a while or do something useful like watching videos of cats? Try “harmonizator no cat” on Youtube for example!


[CONTINUED ON THE NEXT PAGE]

CONTROL PCB


OPEN CONTROL BOARD BAG A

RESISTORS 			
Qty	Value	Code	Name on PCB
17	100k	Brown, black, black, orange, brown	R101, R106, R108, R111, R115, R118, R119, R120, R121, R122, R123, R124, R125, R126, R127, R128, R129
2	1M	Brown, black, black, yellow, brown	R102, R110
2	10M	Brown, black, black, green, brown	R100, R131
2	82K	Grey, red, black, red, brown	R103, R113
2	10k	Brown, black, black, red, brown	R105, R107
2	43k	Yellow, orange, black, red, brown	R116, R117
2	120k	Brown, red, black, orange, brown	R104, R114
1	1k	Brown, black, black, brown, brown	R130
1	1k8	Brown, gray, black, brown, brown	R112
1	4k7	Yellow, violet, black, brown, brown	R109

DIODES 		
Qty	Value	Name on PCB
Solder the diode 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.		
2	1N5817 (black color)	D100, D101
1	1N4148	D102

FERRITES 	
Qty	Name on PCB
Solder the two ferrite beads by using a recycled resistor leg passed through each ferrite and proceed as if it were a resistor. Ferrite beads don't have polarity.	
2	F100, F101

[CONTINUED ON THE NEXT PAGE]




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).

2	TL072	IC101, IC102
1	LM393	IC100



CAPACITORS


Qty	Value	Code	Name on PCB
6	100n	104	C104, C105, C106, C107, C108, C109



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	10uf	10uf	C100, C101




Place the female pin headers over the silkscreen markings at positions C_A_1, C_A_3, C_B_1, C_B_3 and solder.

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.



POWER CONNECTOR

Solder the power connector at "POWER1", 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.

FRONT PANEL COMPONENTS MOUNTING TIPS

Now we will proceed to mount the jacks, potentiometer, switches 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.

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.

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
2	LED_A, LED_B

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
4	Single B100k	ATT_A, ATT_B, FOLD_A*, FOLD_B

*** FOLD_A POSITIONING LEG MIGHT BE HARD TO SOLDER. IT MIGHT BE EASIEST TO SOLDER THIS LEG FROM THE FRONT OF THE PCB**

OPEN MINI-JACKS BAG

MINI-JACKS

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

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) Pot**
- 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** using the pin headers and by threading the M3 screws through the main PCB and securing them to the spacers. The main PCB should be orientated so that the component side is facing towards the front panel.
- Put the **knobs** on the potentiometers.

CALIBRATION

We are now going to calibrate the VCA offsets and the internal analog switch to ensure the noise floor is at a minimum.

A VCA OFFSET

- 1) Turn both channels' waveform level knobs so that they are at zero.
- 2) Turn both of the attenuverter level knobs to maximum.
- 3) Generate a square wave at ~1kHz and connect it to channel A's CV attenuverter input. Channel A's CV input is internally connected to Channel B's so the signal will go to both.
- 4) Connect the output of Channel A to your monitors.
- 5) Listen to the output sound and slowly adjust trimmer CAL A1 until any noise is at a minimum.
- 6) Connect the output of Channel B to your monitors.
- 7) Listen to the output sound and adjust CAL B1 until any noise is at a minimum.

B ANALOG SWITCH

- 1) Now take your square wave and connect it to the CHOPP gate input and connect your monitors to CHOPP OUT
- 2) Adjust the trimmer at CAL A2 until any noise is at a minimum.
- 3) Adjust the trimmer at CAL B2 until any noise is at a minimum.
- 4) Repeat steps 2 & 3 until you get the minimum noise.

ENJOY YOUR NEW BEFACO MODULE!