THANKS FOR CHOOSING ONE OF OUR KITS!

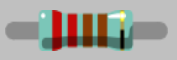
This manual has been written taking into account the common issues that we often find people experience in our workshops. The order in which the components are placed on the board is meant to make assembly as easy as possible.

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/
You will be soldering both boards at the same time.

GOOD LUCK!

RESISTORS



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

Qty	Value	Code	Name on PCB
18	10k	Brown, black, black, red, brown	R8, R9, R13, R14, R17, R18, R21, R22, R23, R24, R117, R118, R120, R121, R124, R125, R128, R129
16	100k	Brown, black, black, orange, brown	R104, R105, R108, R109, R110, R111, R112, R113, R114, R115, R122, R123, R126, R127, R132, R133
4	47 OHM	Yellow, purple, black, gold, brown	R1, R2, R25, R26
4	220 OHM	Red, red, black, black, brown	R3, R4, R39, R40
4	1k	Brown, black, black, brown, brown	R100, R101, R102, R103
4	3k	Orange, black, black, brown, brown	R36, R37, R51, R52
4	4.7k	Yellow, purple, black, brown, brown	R11, R12, R43, R44
4	15k	Brown, green, black, red, brown	R33, R34, R116, R119
4	47k	Yellow, purple, black, red, brown	R7, R10, R130, R131
2	470 OHM	Yellow, purple, black, black, brown	R41, R42
2	680 OHM	Blue, gray, black, black, brown	R31, R32
2	820 OHM	Gray, red, black, black, brown	R27, R28
2	5.6k	Green, blue, black, brown, brown	R47, R49
2	7.5k	Purple, green, black, brown, brown	R35, R38
2	27k	Red, purple, black, red, brown	R48, R50
2	33k	Orange, orange, black, red, brown	R29, R30
2	43k	Yellow, orange, black, red, brown	R106, R107
2	82k	Gray, red, black, red, brown	R45, R46
2	270k	Red, purple, black, orange, brown	R19, R20
2	470k	Yellow, purple, black, orange, brown	R5, R6
2	910k	White, brown, black, orange, brown	R15, R16

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
6	1N4148	D1, D2, D5, D6, D7, D8
2	1N5817	D3, D4

FERRITE

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.

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.

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).

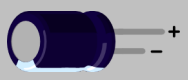
Qty	Value	Name on PCB
2	NE5532	IC1, IC2
1	LM13700N	IC3
2	TL074P	IC100, IC101

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	100n	104	C1, C2, C15, C16, C17, C18, C21, C24, C100, C101, C104, C105, C106, C107
4	220p	221k or n22	C19, C20, C23, C26
6	1nF	1nkf	C9, C10, C22, C25, C102, C103
2	3.3nF	3n3K	C5, C6

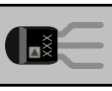
ELECTROLYTIC CAPACITORS



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
4	10uF	10uF	C3, C4, C7, C8
2	33uF	33uF	C13, C14
2	220uF	220uF	C11, C12

TRANSISTORS



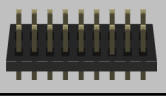
Be sure they are orientated correctly. The curved and flat sides of the silkscreen outline of the transistor on the PCB must match that of the transistor's body.

Qty	Value	Name on PCB
6	2N3906	T1, T2, Q9, Q10, T100, T101
2	BF244C	Q8, Q7

SOCKET CONNECTORS

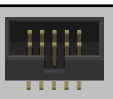
Place and solder the socket connectors on the control board over the silkscreen markings at positions "SV1", "SV3", "SV4" and solder to the PCB. Check they all are perfectly straight.

PIN HEADERS



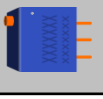
Place and solder the pin headers on the main board where the silkscreen indicates "SV2", "SV5", "SV6" (it is the shorter pins that you are soldering).

POWER CONNECTOR



Solder the power connector at "POWER IN", 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.

TRIMMERS



Solder the two 100k trimmers at "CUTOFF_INIT_A" & "CUTOFF_INIT_B" ensuring the screw is facing away from the edge of the PCB.

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, 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.

MINI-JACKS

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

Now place the potentiometer on the PCB. Do not place them all the way down, leave them loose but... **don't solder them yet!**

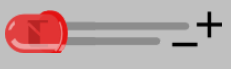
Qty	Type	Name on PCB
8	Single (3pin) 100K	CUTOFF_A, CUTOFF_ATT_A, CUTOFF_ATT_B, CUTOFF_B, RES_INIT_A, RES_INIT_B, VOL_IN_1, VOL_IN_2

TOGGLE SWITCHES

Place the toggle switches onto the PCB where the silkscreen indicates but **don't solder them** until they are secured to the front panel.
Remove both nuts and the tabbed washer. Keep the knurled washer on the switch. You will need only one nut for securing the switch to the front panel.

Qty	Type	Name on PCB
3	Single two position	LINK, LO-HI_SELECT_1, LO-HI_SELECT_2

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	LED1, LED2

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** C) **Pots and** D) **Push buttons.**

- 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 and the **caps** on the switches

- 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

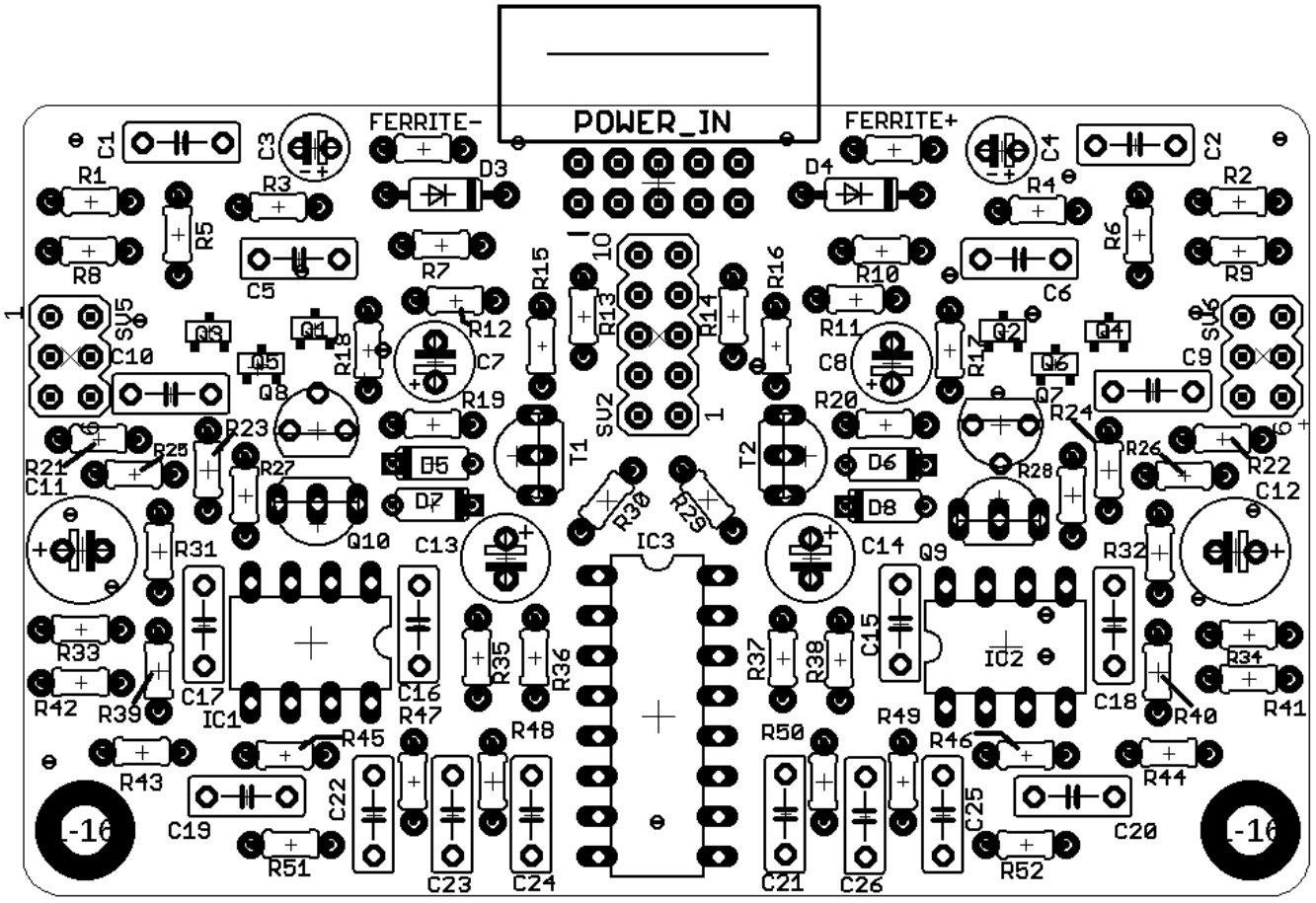
CALIBRATION

For the filters to work properly they need to be calibrated. To do this we have to adjust the potentiometers "CUTOFF_INIT_A" and "CUTOFF_INIT_B".

The procedure is the same for both:

1. Connect the system to the power supply.
2. Turn the Resonance pot to max and the Cutoff to the middle.
3. Connect a frequency meter, tuner or oscilloscope to the output of the filter.
4. Move the "CUTOFF_INIT_A" or "CUTOFF_INIT_B" (depending on which filter are you adjusting) until you can measure 500Hz at output or B4+20 cents.

ENJOY YOUR NEW BEFACO MODULE!


POWER_IN
FERRITE-
FERRITE+
C1
C2
C3
C4
C5
C6
C7
C8
C9
C10
C11
C12
R1
R2
R3
R4
R5
R6
R7
R8
R9
R10
R11
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D3
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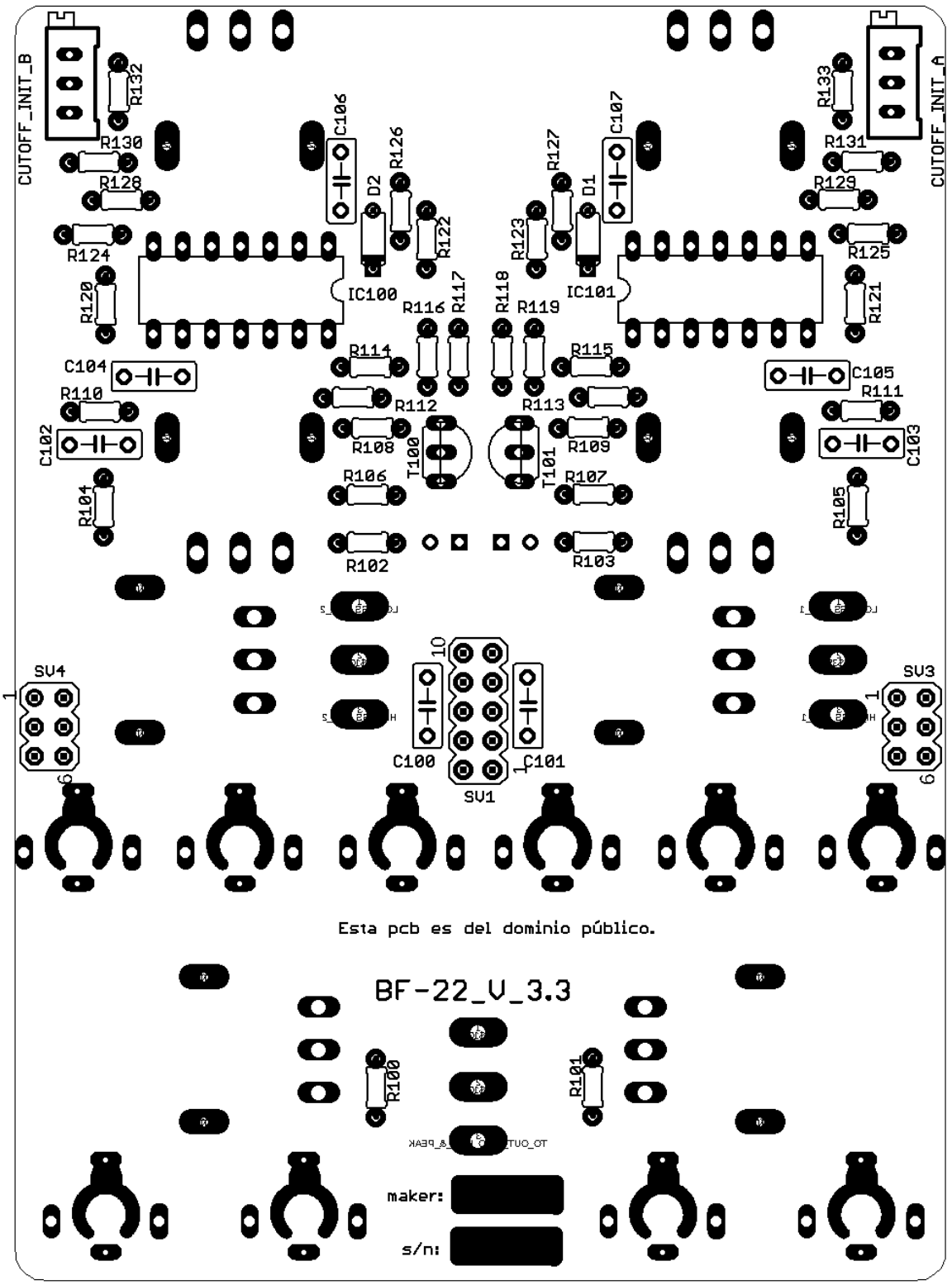
Q1
Q2
Q3
Q4
Q5
Q6
Q7
Q8
Q9
Q10
T1
T2
IC1
IC2
IC3
C13
C14
C15
C16
C17
C18
C19
C20
C21
C22
C23
C24
C25
C26
SV2
SV5
SV6


CUTOFF_INIT_B
CUTOFF_INIT_A
R132
R130
R128
C106
D2
R126
R122
R124
R120
IC100
R116
R117
C104
R110
C102
R114
R112
R108
T100
R106
R104
R102
R133
R131
R129
C107
D1
R127
R123
R125
R121
IC101
R118
R119
C105
R111
C103
R115
R113
R109
T101
R107
R105
R103
SV4
SV3
C100
C101
SV1
Esta pcb es del dominio público.
BF-22_V_3.3
R100
R101
maker:
s/n: