

## 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:

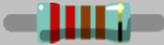
[www.befaco.org/howto/](http://www.befaco.org/howto/)

This project has one main board and two control ones. Control boards are identical so you will need to follow the instructions twice.

## GOOD LUCK!

## MAIN PCB

### OPEN MAIN BOARD BAG A

RESISTORS 			
Qty	Value	Code	Name on PCB
3	100k	Brown, Black, Black, Orange, Brown	R1, R5, R8
3	1k	Brown, Black, Black, Brown, Brown	R4, R7, R10
2	10k	Brown, Black, Black, Red, Brown	R2, R9
2	220k	Red, Red, Black, Orange, Brown	R3, R6

FERRITE 	
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	F1, F2

DIODES 		
Qty	Value	Name on PCB
Solder the diodes <b>observing their polarity</b> . The black or white line on the diode must match with the white line on the diode symbol on the PCB silkscreen.		
2	1N5817	D1, D2



**ICs**

First **place the socket** (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 it into its correct position.  
 Next place the IC in its socket (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	IC1, IC2



**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
5	100n	104	C2, C3, C7,C8, C10
2	47p	47	C6, C9
2	220n	220n	C5, C11



**ELECTROLYTIC CAPACITORS3**

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	C1, C4



**MALE PIN HEADERS**

Place and solder the Male Pin Header on the silkscreen side at “JP1” & “JP2”. It is the shorter pins that you are soldering.



**POWER CONNECTOR**

Solder the power connector over the silkscreen marked as “POWER” Beware this connector is placed at botom of the PCB. Make sure that the small triangle on the connector is on the same side as the thick white line on the silkscreen.

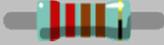
## CONTROL PCBs

We are going to assemble the two small PCBs at the same time. They are exactly the same and following part names apply to them both.

### OPEN CONTROL BOARD BAG A

In this bag you have components for both small board. So you will have 2x for every component you see in the instructions.

We strongly recommend you assemble both at the same time to keep track of the components.

			
RESISTORS			
Qty	Value	Code	Name on PCB
1	470	Yellow, Purple, Black,Black, Brown	R102
2	1k	Brown, Black, Black, Brown, Brown	R103, R105
1	100k	Brown, Black, Black, Orange, Brown	R104
1	22k	Red, Red, Black, Red, Brown	R106

		
TRANSISTOR		
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
1	2n3904	Q100


FEMALE PIN HEADER
Place the female pin headers at the position "JP100" and solder.

**Good job! You just finished to solder components to the boards and are about to start the final assembly!**

**As next steps are critical, it will require all your attention! How are your focus and energy levels? Do you think a 15 minute break would better prepare you for the rest of the build?**

**Youtube is an endless source of procrastination, easy laughs and brain disconnection in general. Try searching for "absolutely no words" or the classic "treat your mother right"**

## FRONT PANEL COMPONENTS MOUNTING TIPS:

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

These components must NEVER 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 before soldering. In the case of the LEDs, they are almost impossible to set to the correct height without reference to the front panel.

The procedure we will follow will be:

- Placing mechanicals to both control boards.
- Place these boards to front panel.
- Place the jacks in main board, then assemble main board to both control ones, making sure they are flat and parallel. Then screw the jacks and solder.

So let's go for it! Remember all these steps will be performed **on both control boards**.

LED 		
Place the LED onto control PCBs (at silkscreen side) minding its polarity, but <b>don't solder it</b> until the front panel is in place. This is the only way to solder it in the right position.		
Negative is the square pad marked at silkscreen with a – symbol.		
Qty	Type	Name on PCB
1	LED	LED

## OPEN CONTROL BOARD BAG B

MINIJACKS
Place all the mini-jacks onto the PCBs ensuring they are placed over the silkscreen markings, and sitting on the PCB flat, but <b>don't solder them yet</b> .

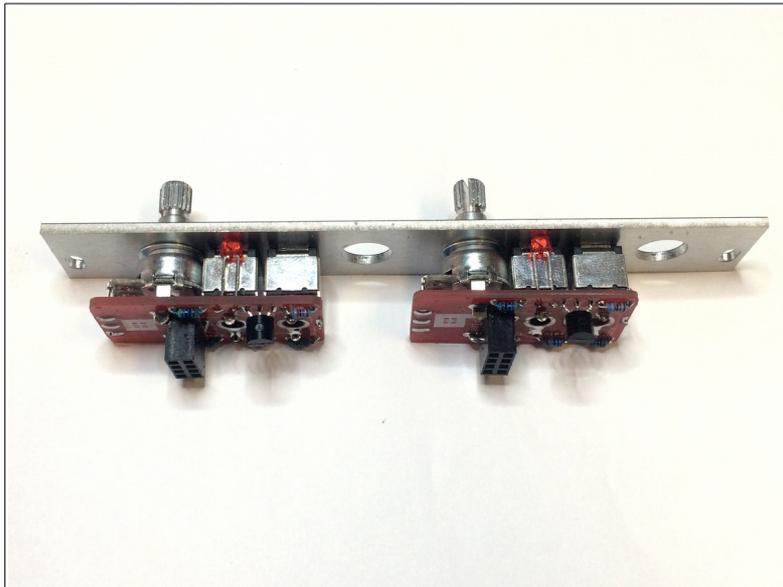
POTENTIOMETERS		
Now place potentiometers on the PCB over the silkscreen markings (same side as LED) Do not put it all the way down, leave it loose so it will be easy to make it flat against the PCB. Place washer first so it will stay under the panel... <b>Don't solder them</b> .		
Qty	Type	Name on PCB
1	Single	GAIN

## FRONT PANEL

Attach both control boards to 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**
- Make sure all of the above parts are flush with the panel then **solder them!**
- Next, adjust the **LED** so that it is flush with the panel and solder it.



## 6,5mm JACKS and final assembly

Place both jacks onto main PCB ensuring they are placed over the silkscreen markings, but **don't solder yet**. Attach main board to control boards. Jacks are fitting tight, but with care they will fit perfectly. Then screw both jack to front panel and solder them.



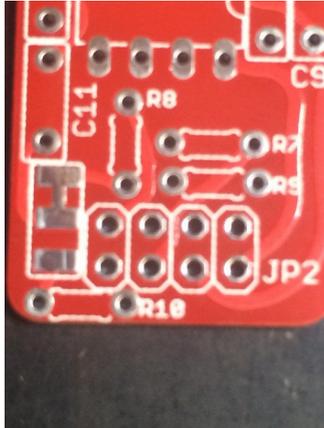
**ENJOY YOUR NEW BEFACO MODULE!**

## BONUS TRACK

Second channel of INamp could be configured so the 6,5" jack is routed to the output. Like this we can configure the module as a Send return interface with external pedals or use it as a single preamp with an attenuated output.

In order to do so follow these steps:

- Locate jumper pads between C11 and R10 at main board.



Cut the trace connecting upper and middle pad and solder central and bottom one.

- Bridge C11 with a resistor leg or wire.

With these changes second channel 6,5" Jack will be linked with the output. **Give it a try.**

There is another change that can be performed here. You can change **R6** to 47k and **R9** to 1k to decrease gain on the channel to make attenuation easier.

**R5** is the resistor bringing signal from channel one to the second. If you want to remove the normalization, remove this resistor.

Both Inamp channels are made around two inverting amplifier stages. The value for the resistor can be changed to have a different response. Take a look to Wikipedia article about op amps to know a bit more about the matter:

[http://en.wikipedia.org/wiki/Operational\\_amplifier\\_applications](http://en.wikipedia.org/wiki/Operational_amplifier_applications)