

## THANKS FOR CHOOSING ONE OF OUR KITS!

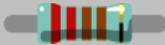
This manual has been written taking into account the common issues that we often find people experience in our workshops. The order in which the components are placed on the board is meant to make assembly as easy as possible.

Some steps are not obvious, so even if you're an experienced DIYer please read the steps thoroughly before starting. You will be soldering both boards at the same time.

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/)

## GOOD LUCK!

RESISTORS 			
Color code can be difficult to identify, we strongly recommend to use a <b>multimeter</b> .			
Qty	Value	Code	Name on PCB
42	100k	Brown, black, black, orange, brown	R6, R8, R9, R10, R11, R14, R15, R18, R23, R24, R26, R28, R30, R32, R33, R34, R35, R37, R38, R41, R42, R48, R49, R54, R56, R57, R59, R61, R69, R80, R81, R85, R110, R111, R112, R115, R120, R121, R128, R131, R148, R149
22	10k	Brown, black, black, red, brown	R17, R21, R22, R31, R46, R55, R60, R63, R66, R67, R71, R75, R82, R83, R84, R87, R116, R117, R122, R124, R145, R147
15	1k	Brown, black, black, brown, brown	R79, R88, R100, R101, R102, R103, R105, R106, R118, R119, R123, R125, R134, R135, R140
10	2k2	Red, red, black, brown, brown	R43, R44, R45, R47, R104, R107, R108, R109, R136, R137
8	110k	Brown, brown, black, orange, brown	R2, R3, R50, R51, R113, R114, R126, R127
7	4K7	Yellow, violet, black, brown, brown	R70, R73, R77, R78, R129, R130, R139
6	560k	Green, blue, black, orange, brown	R1, R4, R12, R27, R72, R74
6	1M	Brown, black, black, yellow, brown	R19, R36, R39, R40, R65, R76
4	22k	Red, red, black, red, brown	R68, R86, R132, R133
4	24k	Red, yellow, black, red, brown	R138, R142, R143, R146
4	3M	Orange, black, black, yellow, brown	R13, R16, R20, R29
2	180k	Brown, gray, black, orange, brown	R53, R64
2	470k	Yellow, violet, black, orange, brown	R58, R62
2	4M7	Yellow, violet, black, yellow, brown	R141, R144
1	20k	Red, black, black, red, brown	R52
1	75k	Violet, green, black, red, brown	R25
1	10M	Brown, Black, Black, Green, brown	R5

DIODES 		
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.		
Qty	Value	Name on PCB
27	1N4148 (orange)	D1, D2, D3, D4, D5, D6, D7, D8, D9, D10, D11, D12, D13, D14, D15, D16, D17, D18, D19, D20, D21, D24, D25, D100, D101, D102, D103
2	1N5817 (black)	D22, D23

FERRITE 	
To solder the two ferrite beads use a recycled resistor leg passed through each ferrite and proceed as if it were a resistor. Ferrite beads don't have polarity. Leave some space between the ferrites and the board, so that there is sufficient room to comfortably fit the power connector later.	
Qty	Name on PCB
2	FERRITE+, FERRITE-

ICs 		
First <b>place the sockets</b> (taking care to orientate them properly – the notch 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 on the top of the IC must match that of the socket and silkscreen).		
Qty	Value	Name on PCB
8	TL074	IC1, IC2, IC3, IC4, IC5, IC6, IC7, IC8

**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?**

## CAPACITORS

Identifying capacitors can be quite tricky. **Codes stated are orientative**, please take a look at this guide for help identifying capacitors: <http://www.wikihow.com/Read-a-Capacitor>

Qty	Value	Code	Name on PCB
20	100n	104	C3, C4, C5, C7, C8, C12, C13, C14, C17, C18, C19, C21, C25, C26, C27, C28, C31, C32, C102, C103
2	100p	101/100	C20, C22
2	560p	561	C10, C11
4	10n Polyester	10nK	C106, C107, C108, C109
2	47n Polyester	47nK	C100, C101
2	470n Polyester	.47K	C104, C105
2	2n2	WIMA 2200	C15, C16



## 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
8	2n3904	T1, T2, T3, T4, T100, T101, T102, T103,
2	2n3906	T104, T105



## 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	C29, C30



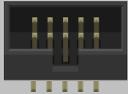
## SOCKET CONNECTORS

Place the Socket connectors at positions "TO\_CON\_A" and "TO\_CON\_B" on the control board and solder. Double check they all are perfectly straight. **Cut them flush to the PCB to make room for the faders.**



## PIN HEADERS

Place and solder the Pin Header on the silkscreen side at "CON\_A" and "CON\_B" on the main board. It is the shorter pins that you are soldering. Double check they all are perfectly straight.

<b>POWER CONNECTOR</b>	
Solder the power connector at "POWER" ensuring it is facing out from the edge of the PCB.	

<b>TRIMMERS</b>	
Solder the two 10k trimmers at "SYMETRY_A" and "SYMETRY_B" with the screws facing the edge of the PCB.	

<b>FADERS</b>	
Solder the faders onto the PCB at the positions indicated by the silkscreen on the opposite side of the board to most of the components (but the same side as the two trimmer potentiometers you previously soldered).	
Qty	Name on PCB
4	FALL_POT, FALL_POT_B, RISE_POT, RISE_POT_B

<b>SPACERS</b>
Secure the spacers onto the 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.

**Bravo! You're nearly at the end, but the next part is critical and takes a good bit of concentration. If you're feeling a bit strained a break would definitely help. Did you know that if you click the 1<sup>st</sup> lowercase link in the main text of any wikipedia article, and repeating the process in subsequent articles, you will usually end up on the Philosophy page?**

**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.

<b>MINI-JACKS</b>
Place the mini-jacks on the PCB ensuring they are on the side with the silkscreen but <b>don't solder them until the front panel is in place</b> , 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.

POTENTIOMETERS		
Place the potentiometers 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
2	Dual (6pin) 10K	SHAPE_A, SHAPE_B
1	Single (3pin) 1M	CROSSFADER

SWITCHES		
Remove the two nuts and the tabbed washer from the toggle switches. Discard one nut and the tabbed washer, but keep one nut for securing to the front panel later. Place the four toggle switches on the PCB but <b>don't solder them yet</b> .		
You will know which ones are the two and three position switches because when switching, two will have just two positions it can rest in and the other two will have a third rest position (in the center).		
Remove and discard the nut and the washer from the push button. Fit the push button onto the PCB but again... <b>don't solder it yet</b> .		
Qty	Type	Name on PCB
2	Single two position	CYCLE_A, CYCLE_B
2	Single three position	RANGE_1, RANGE_2
2	Push Button	M_TRIG_A, M_TRIG_B

LEDs	
Place the LEDs onto the PCB minding their polarity, but <b>don't solder them</b> 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
9	F_A_LED, F_B_LED, LED_A, LED_A>B, LED_B, LED_MAX, LED_MIN, R_A_LED, R_B_LED



FRONT PANEL
Attach the <b>front panel</b> adjusting the parts one by one if necessary until it fits. At this point a pair of fine tweezers can be helpful.
To Finish:
- Screw in the parts in this order: A) <b>Mini-jacks</b> B) <b>Switches</b> C) <b>Pots</b> D) <b>Push buttons</b>
- Ensuring all of the above parts are flush with the panel then you can <b>finally solder</b> them!
- Next, adjust the <b>LEDs</b> so that they are flush with the panel and solder them.
- Connect the <b>main PCB</b> to the <b>control PCB</b> by threading the 2x M3 screws through the main PCB and securing them to the 2 spacers. The main PCB should be orientated so that the component side is facing towards the front panel.
- Put the <b>knobs</b> on the potentiometers and the red end- <b>caps</b> on the switches/faders.

**CALIBRATION**

Sometimes, due to the tolerance of the potentiometer, the response of the **SHAPE** pot may not be quite symmetrical. If this is the case, adjust **SYMETRY\_A** and **SYMETRY\_B** trimmers as required.

To do this:

1. Connect the Rampage's **OUT A** to an oscilloscope. A software oscilloscope on your computer is fine but in this case the signal needs to be attenuated to avoid clipping. If attenuation is needed you can use the **MAX OUT** in place of **OUT A** and adjust the amplitude with the **BALANCE** pot
2. Set **RANGE** switch A to MID (bottom position).
3. Set the **CYCLE** Switch A to CYCLE (Top position).
4. Push the manual trigger A (**TRIGG**) button, to put your rampage into oscillation.
5. Set **RISE** and **FALL** faders at minimum.
6. Turn the **SHAPE A** pot to the center (so you have a perfect triangle wave on your scope). Check if rise and fall times are equal. If so you are done. If not go to the next step.
7. Turn the **SYMETRY\_A** trimmer and try to match (as much as possible) the rise and fall times.
8. Repeat the previous steps for **SYMETRY B**.

**ENJOY YOUR NEW BEFACO MODULE!**

