THANKS FOR CHOOSING ONE OF OUR KITS!

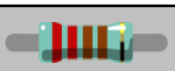
This manual has been written taking into account the common issues that we often find people experience in our workshops. The order in which the components are placed on the board is meant to make assembly as easy as possible.

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/

HAVE FUN!

RESISTORS



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

Qty	Value	Code	Name on PCB
8	10k	Brown, black, black, red, brown	R1, R4, R16, R17, R19, R23, R25, R26
7	100k	Brown, black, black, orange, brown	R2, R6, R12, R13, R18, R21, R22
3	120 Ohm	Brown, red, black, black, brown	R14, R29, R30
3	1k	Brown, black, black, brown, brown	R11, R20, R27
3	1k8	Brown, gray, black, brown, brown	R15, R28, R31
2	200k	Red, black, black, orange, brown	R3, R7
2	1M	Brown, black, black, yellow, brown	R8, R10
1	3k9	Orange, white, black, brown, brown	R5
1	4k7	Yellow, violet, black, brown, brown	R24
1	5k6	Green, blue, black, brown, brown	R9

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.

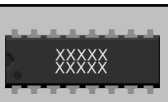
Qty	Value	Name on PCB
4	BAT48 (small blue ones)	D10, D11, D12, D13
2	1N5817 (black)	D15, D16
1	4.7V Zener	D14

FERRITES

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.

Qty	Name on PCB
2	F1, F2

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 position.
Place the ICs in their respective sockets 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	DG408DJ	IC4, IC5
1	ATMEGA328P	IC6
1	TL072	IC1

CAPACITORS

Identifying capacitors can be quite tricky. **They look similar please check the codes.** 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
10	100nF	104	C2, C4, C7, C8, C9, C10, C11, C12, C15, C16
2	22pF	220	C5, C6
1	150n	.15k	C13
1	10nF	10nk	C1

CRYSTAL OSCILLATOR

This component does not have polarity.

Qty	Value	Name on PCB
1	16MHz	Q5

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
5	2n3904	Q2, Q3, Q4, Q6, Q7
1	2n3906	Q1

Voltage Regulators..."Transistor Looking" ICs

This Regulator ICs look like transistors (but they are not) This shape is better known as TO-92 Package. Used mostly for transistors but also many other devices.
Watch Polarity!

Qty	Value	Name on PCB
1	79L05	IC2
1	78L05	IC3

ELECTROLYTIC CAPACITORS

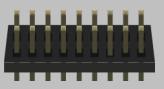
Values are written on the side of the capacitor. Mind their polarity (The long leg of the capacitor is the positive (+)).
C14 and C17 Fit tight, place it together to make the space for both.

Qty	Value	Code	Name on PCB
3	10uf	10uf	C3, C14, C17

DIP SWITCH

Solder the DIP switch at SW2. This switch will set the range of Address CV IN (0-5v or 0-10v)

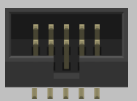
PIN HEADERS



Place and solder the Pin Headers on the silkscreen side.
It is the shorter pins that you are soldering. Double check they all are perfectly straight.

1	2X5	EXPANSION_PORT

POWER CONNECTOR



Solder the power connector, taking care of notch orientation

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. Reply to those unread messages or prove someone wrong in Internet, for example. Mechanical parts are really delicate and will need your full attention.

FADERS	
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). Ensure they are totally straight. Other wise they will touch the panel slots. If necessary, cut the pins of all components underneath, until the surface is sufficiently flat (taking care of not destroy the solder joints)	
Qty	Name on PCB
8	S1, S2, S3, S4, S5, S6, S7, S8

FRONT PANEL COMPONENTS MOUNTING TIPS:

Now we will proceed to mount mechanical parts to panel. 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.

POTENTIOMETERS		
Now place the potentiometer on the PCB but... **don't solder it yet!**		
Qty	Type	Name on PCB
2	Single (3pin) B10k	ADDRESS_P, MULT_P

ROTARY ENCODER		
Screw the hex nut onto the encoder and screw it down flat. (This will keep the encoder at the correct height when you screw it to the panel) Then place it on the PCB according to the drawing, but again ... **don't solder it yet!**		
Qty	Type	Name on PCB
1	Encoder	SW1

MINI-JACKS
When opening this bag, be careful not to mix jack nuts with pott nuts. They are similar but different! Place the mini-jacks on the PCB ensuring they are on the side with the silkscreen but **don't solder them until the front panel is in place 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.

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
9	D2, D3, D4, D6, D8, D9, D1, D5, D7

TOGGLE SWITCH

Sometimes the toggle switch is a tight fit with the front panel, so before placing the switch check if it fits comfortably through its hole on the front panel. If yes proceed to place the switch like normal. But If its tight with the panel, then screw the switch through the hole. Make it straight vertically, and then attach the front panel, making sure the switch sits correctly into its soldering points.

Orientation of the switch doesn't matter this time because this one is symmetric.

Qty	Type	Name on PCB
1	Single two position, (ON)-OFF-(ON)	PLAY_SW

FRONT PANEL

Attach the **front panel** adjusting the parts one by one if necessary until it fits. At this point a pair of fine tweezers can be helpful.

To Finish:

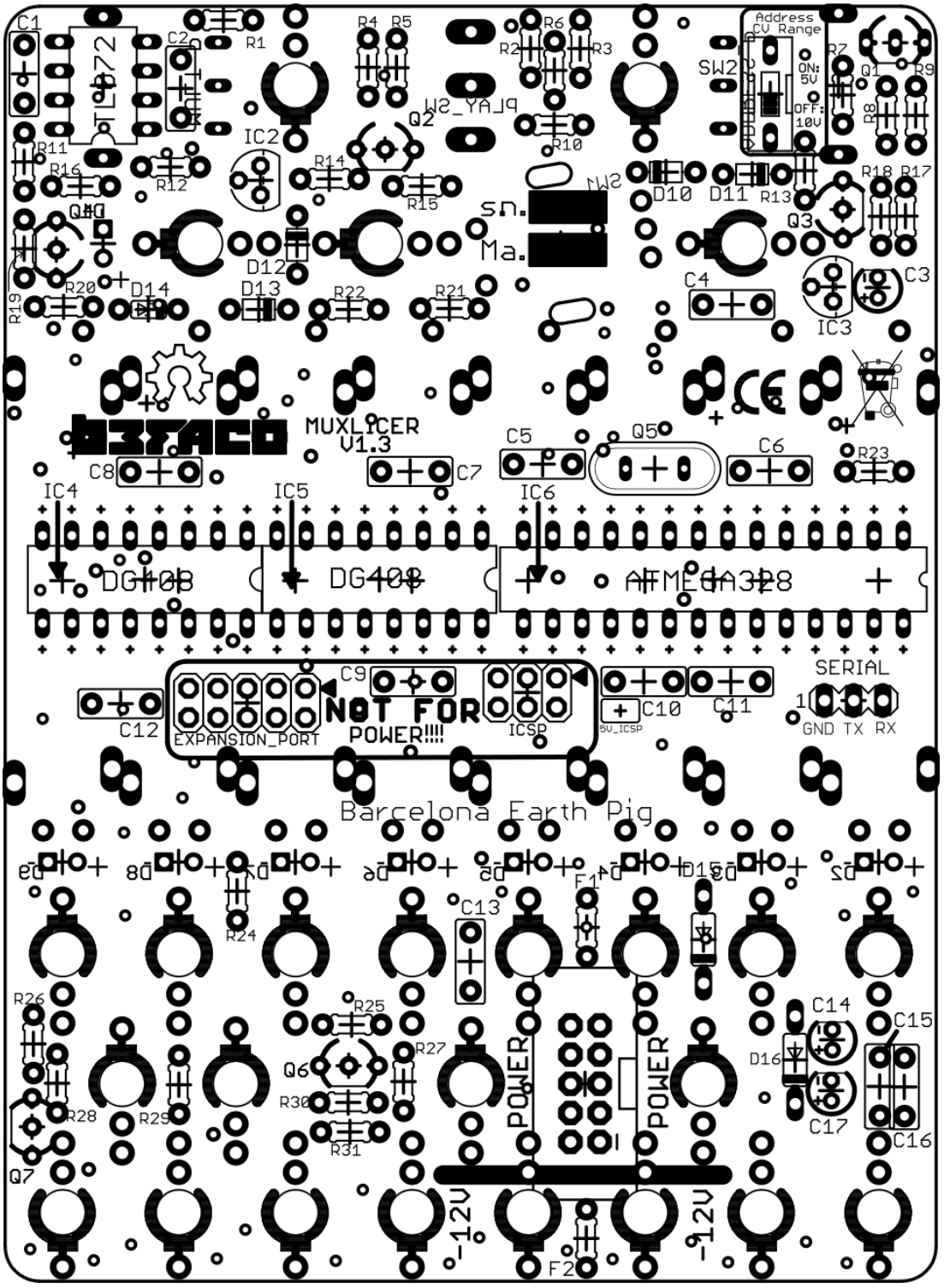
- Screw in the parts in this order: A) **Mini-jacks** B) **Pots.**

- Ensuring all of the above parts are flush with the panel and both PCB and panel are perfectly parallel. Then you can **finally solder** them!

- Put the **knobs** on the potentiometers and the red caps on the 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.

ENJOY YOUR NEW BEFACO MODULE!


C1
C2
R1
R4 R5
R6
R2
R3
Address
CV Range
ON:
5V
OFF:
10V
SW2
R7
Q1
R9
R8
PLAY_SW
Q2
R10
IC2
R11
R16
R12
R14
R15
SW1
D10
D11
R13
R18 R17
Q4
Q3
sn.
Ma.
D12
R20
D14
D13
R22
R21
C4
C3
IC3
R19
MUXLICER
V1.3
C5
Q5
C6
R23
C8
C7
IC4
IC5
IC6
DG408
DG408
ATMEGA328
C9
NOT FOR
POWER!!!!
EXPANSION_PORT
ICSP
C10
C11
5V_ICSP
SERIAL
GND TX RX
C12
Barcelona Earth Pig
D9
D8
D7
D6
D5
D4
D3
D2
F1
D15
C13
R24
R26
R25
R27
Q6
R30
R31
R28
R29
Q7
POWER
POWER
C14
C15
D16
C17
C16
-12V
-12V
F2