THANKS FOR CHOOSING ONE OF OUR KITS!

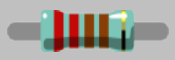
This manual has been written taking into account the common issues that we often find people experience in our workshops. The order in which the components are placed on the board is meant to make assembly as easy as possible.

Thisis a pretty dense build, 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/

Or Take a look to our youtube channel:
https://www.youtube.com/user/Befacosynth/videos
You will be soldering both boards at the same time.

OPEN BAG A

RESISTORS



Qty	Value	Code	Name on PCB
18	100k	Brown, black, black, orange, brown	R12, R24, R26, R31, R39, R55, R58, R72, R81, R85, R88, R100, R206, R207, R213, R216, R220, R225
13	1k	Brown, black, black, brown, brown	R200, R201, R203, R205, R208, R211, R218, R221, R222, R223, R228, R229, R230
13	47k	Yellow, violet, black, red, brown	R13, R33, R41, R60, R73, R92, R103, R104, R105, R106, R107, R108, R109
12	1M	Brown, black, black, yellow, brown	R15, R21, R42, R51, R74, R93, R202, R204, R212, R217, R224, R226
12	220R	Red, red, black, black, brown	R18, R22, R23, R27, R44, R54, R63, R75, R83, R84, R97, R99
12	680R	Blue, gray, black, black, brown	R11, R14, R20, R32, R40, R50, R52, R59, R61, R71, R89, R95
8	10k	Brown, black, black, red, brown	R4, R7, R37, R65, R70, R91, R110, R111
6	1.5k	Brown, green, black, brown, brown	R1, R5, R46, R53, R57, R96
6	15k	Brown, green, black, red, brown	R10, R30, R38, R49, R80, R87
6	33k	Orange, orange, black, red, brown	R17, R34, R43, R62, R82, R98
6	56k	Green, blue, black, red, brown	R16, R19, R45, R66, R77, R102
6	68k	Blue, gray, black, red, brown	R209, R210, R214, R215, R219, R227
6	82k	Gray, red, black, red, brown.	R25, R28, R56, R76, R86, R101
6	680k	Blue, gray, black, orange, brown	R9, R29, R47, R48, R78, R79
6	820k	Gray, red, black, orange, brown.	R3, R8, R36, R67, R69, R94
6	10M	Brown, black, black, green, brown	R2, R6, R35, R64, R68, R90

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 (orange)	D1, D2, D3, D4, D5, D8
2	1N5817 (black)	D6, D7

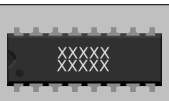
FERRITE

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.

Qty	Name on PCB
2	FERRITE+, FERRITE-

OPEN IC's FOAM

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.

Place the ICs in their respective sockets at the end of the build of this board (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
6	LF412	LF412

OPEN 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
34	100nF	104	C6, C7, C8, C9, C10, C11, C16, C17, C18, C20, C26, C27, C28, C29, C30, C31, C32, C33, C38, C40, C42, C43, C200, C203, C204, C205, C206, C208, C209, C212, C213, C214, C215, C216
12	100pF	101	C1, C2, C3, C4, C13, C14, C21, C22, C23, C24, C35, C39
12	22pF	22	C5, C12, C15, C19, C25, C34, C201, C202, C207, C210, C211, C217
2	47pF	47	C41, C44

ELECTROLYTIC CAPACITORS

Values are written on the side of the capacitor. Mind their polarity (The long leg of the capacitor is the positive (+)).

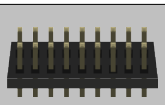
Qty	Value	Code	Name on PCB
2	10uf	10uf	C36, C37

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
12	2n3906	T1, T2, T3, T4, T5, T6, T7, T8, T9, T10, T11, T12

PIN HEADERS

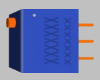


Place and solder the Male Pin Header on the Main Board silkscreen side at TO_CON_1, TO_CON_2, TO_CON_3. It is the shorter pins that you are soldering.
Double check they all are perfectly straight or it would make assembly of both boards quite difficult.

SOCKET CONNECTORS

Place and solder the socket connectors on the control board at positions A_CON_200, A_CON_201, A_CON_202 and solder. Double check they all are perfectly straight or it would make assembly of both boards quite difficult.

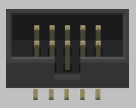
TRIMMERS

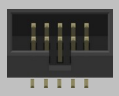


Solder the 100k trimmers at OFFSET1, OFFSET2, OFFSET3, OFFSET4, OFFSET5, OFFSET6 on the PCB with the screws facing the edge of the PCB.

MINI SLIDE SWITCH

Place and solder the mini slide switch at the position on the PCB marked MIX.
This switch selects if channel 6 will act as a mixer of all channels or independent.

POWER CONNECTOR 
Solder the power connector at “POWER” ensuring it is facing out from the edge of the PCB.

EXPANSION CONNECTOR 
Solder the remaining IDC connector (the 16 pin black box) at “VCA_CON” on the PCB where the silkscreen indicates. Ensure the small black triangle on the connector matches the triangle image and thick black line on the silkscreen. **WARNING:** This connector would make difficult the positioning of a potentiometer.

OPEN BAG C

SPACERS
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.

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 Whatsapp messages or prove someone wrong in internet, for example. Mechanical parts are really delicate and will need your full attention.

FRONT PANEL COMPONENTS MOUNTING TIPS:

Now we will proceed to mount mechanical parts. 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.

OPEN MINI-JACKS BAG

MINI-JACKS
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.

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!**
Beware that expansion connector will make hard to solder EXPLOG6 and VOL6. Pay special attention to these ones.

Qty	Type	Name on PCB
12	Single (3pin) B100k	EXPLOG1, EXPLOG2, EXPLOG3, EXPLOG4, EXPLOG5, EXPLOG6, VOL1, VOL2, VOL3, VOL4, VOL5, VOL6

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 paralel. Then you can **finally solder** them!

- Cut the excess legs off the mini jacks.

- Connect the **Main PCB** to the **Control PCB 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 **knobs** on the potentiometers.

- 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

We are now going to calibrate the offset of the VCAs to prevent the CV signal from leaking into the audio signal.

For this procedure we will use an audio cable to connect to a sound system (not headphones) to listen to how much CV signal is leaking into our audio path. We will then use the trimmers to reduce this leakage to a minimum.

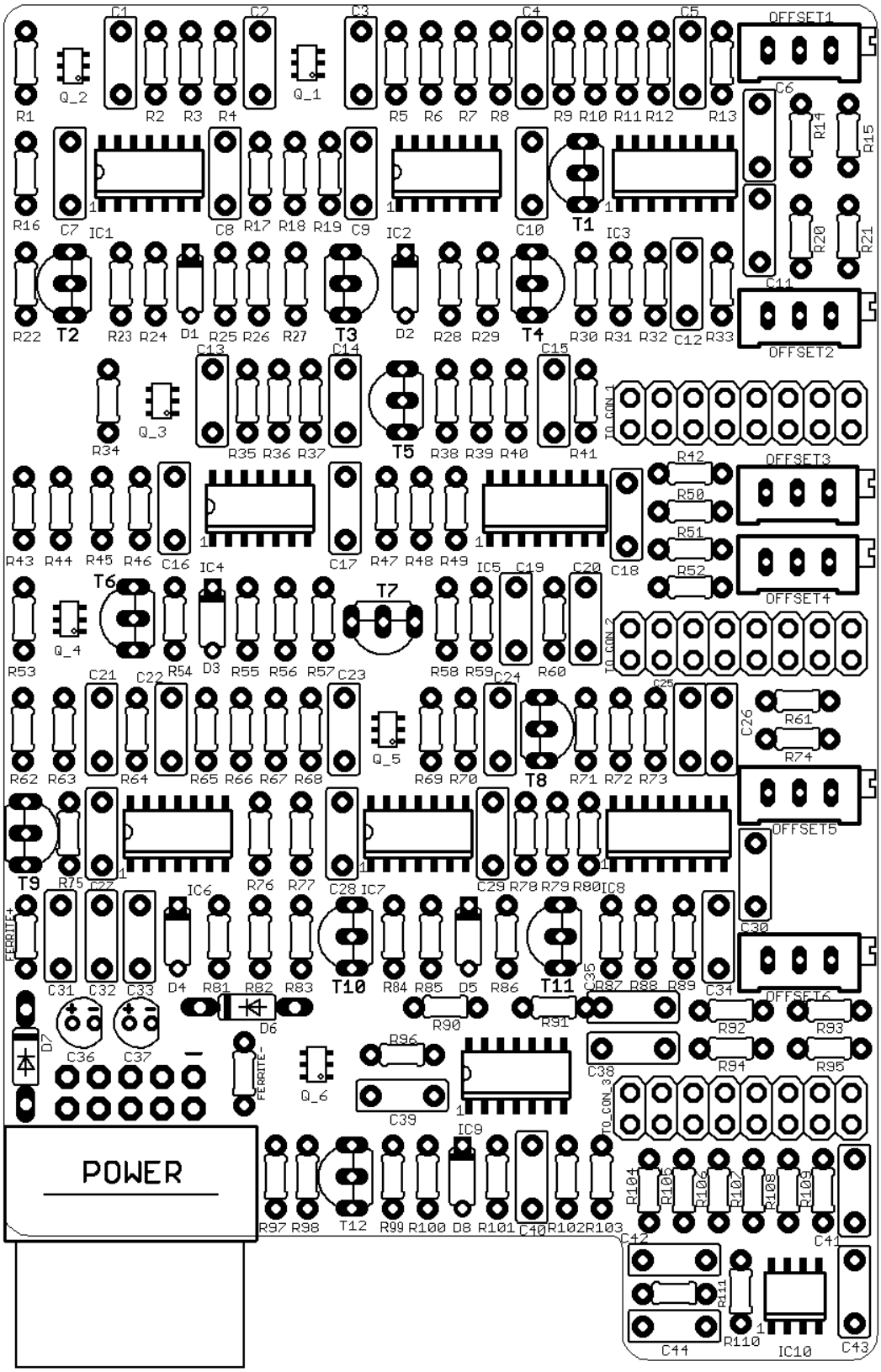
Start by unplugging all cables from the front panel. Next, make sure your power connector is attached to the module.

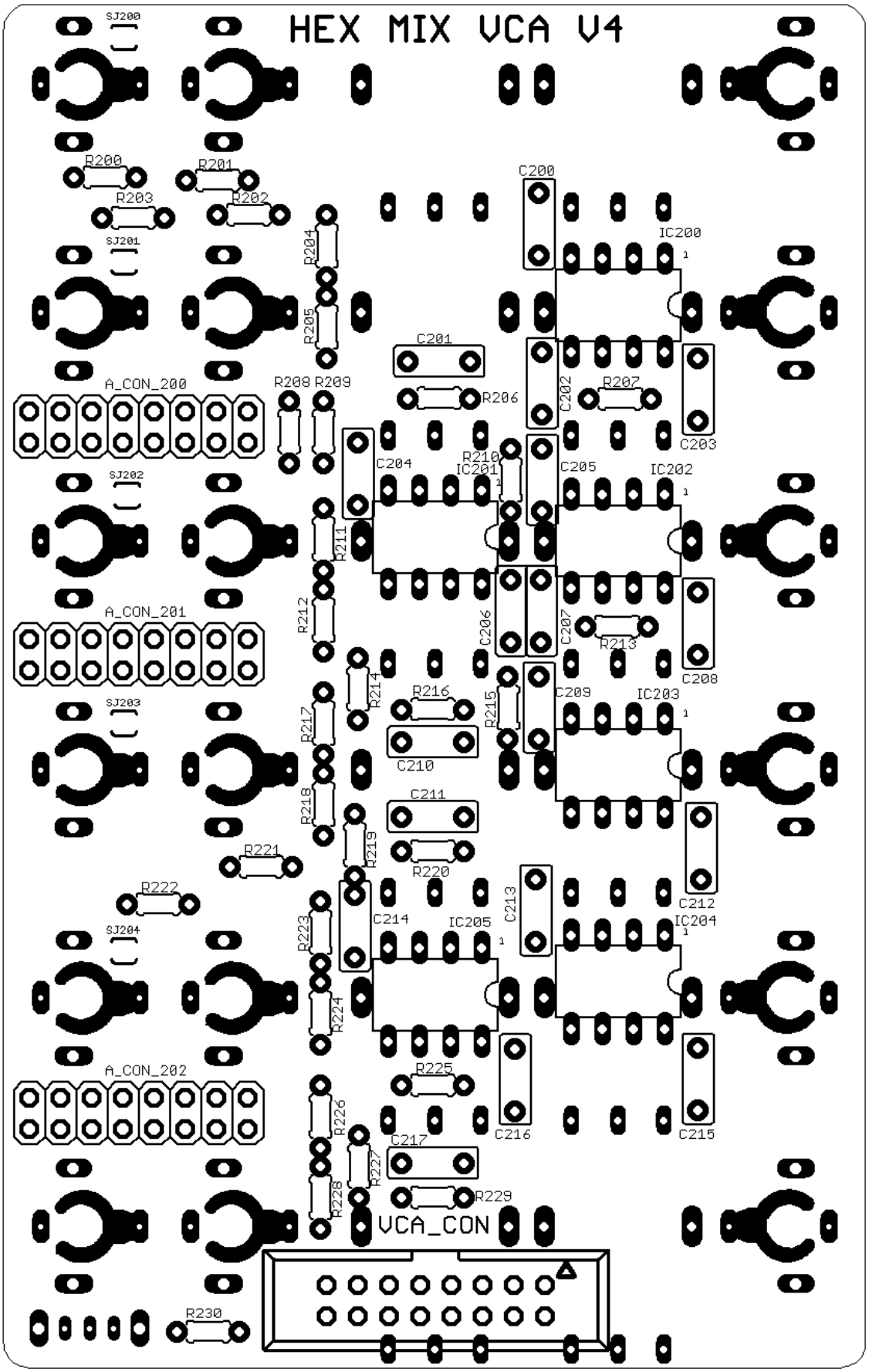
Set all "**LEVEL"** knobs to maximum and all **"CURVE"** knobs to their middle position.

- Plug an oscillator into **CV 1** and speaker system to OUT1. Turn the trimmer at silkscreen marking OFFSET1 until you find the setting with the least presence of the oscillator.

- Repeat the above procedure for **CV 2 – CV 6** (for each VCA change to the appropriate trimmer, i.e., CV2 = trimmer at OFFSET2 and output)**.**

ENJOY YOUR NEW BEFACO MODULE!


POWER
OFFSET1
OFFSET2
OFFSET3
OFFSET4
OFFSET5
OFFSET6
TO_CON_1
TO_CON_2
TO_CON_3
FERRITE+
FERRITE-


HEX MIX VCA V4
SJ200
SJ201
SJ202
SJ203
SJ204
R200
R201
R202
R203
R204
R205
R206
R207
R208
R209
R210
R211
R212
R213
R214
R215
R216
R217
R218
R219
R220
R221
R222
R223
R224
R225
R226
R227
R228
R229
R230
C200
C201
C202
C203
C204
C205
C206
C207
C208
C209
C210
C211
C212
C213
C214
C215
C216
C217
IC200
IC201
IC202
IC203
IC204
IC205
A_CON_200
A_CON_201
A_CON_202
VCA_CON