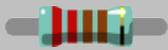**BEFACO**

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.

This is a quite complex build. If you are not an experienced DIYer you might find yourself in trouble. Some steps are not obvious, and some components tricky to solder, so even if you're an experienced DIYer please read the steps thoroughly before starting.

HAVE FUN!

MAIN PCB (L shape with 6,5" jacks)
OPEN MAIN BOARD BAG A

	RESISTORS		
Qty	Value	Code	Name on PCB
12	100k	Brown, black, black, orange, brown	R2, R3, R6, R10, R14, R15, R17, R18, R19, R23, R27, R30
6	75R (1/8w)	Purple, green, black, black, brown	R4, R5, R13, R25, R28, R29
6	130k	Brown,orange, black, orange, brown	R8, R9, R12, R16, R22, R24
4	1k	Brown, black, black, brown, brown	R1, R7, R20, R21
4	20k	Brown, black, black, red, brown	R35, R36, R41, R44
2	68k	Blue, grey, black, red, brown	R11, R26
2	24k	Red, yellow, black, brown, brown	R43, R46
2	6k8	Blue, grey,black,brown, brown	R42, R45
2	10k	Brown, black, black, red, brown	R38, R39
2	180R	Brown, grey, black, black, brown	R37, R40
4	75R (1/4w)	Purple, green, black, black, brown	R31, R32, R33, R34

	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, D3, D4, D7, D8
2	1N5231	D5, D6
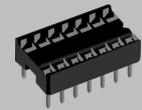
IC SOCKETS

First **place the sockets** (taking care to orientate them properly – the notch on one end of the socket should match the image on the silkscreen) and solder them into their correct positions.
Save spare sockets for later, as they will be used in control board.

Qty	Value	Name on PCB
7	2x4 pin	IC1, IC2, IC3, IC4, IC5, IC6, IC7
1	2x8 pin	IC8
2	2x9 pin	IC9, IC10

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
15	100nF	104	C2, C3, C4, C7, C8, C9, C12, C13, C14, C19, C21, C22, C23, C24, C29
6	10pF	10	C5, C6, C10, C16, C17, C18
4	100pF	101	C1, C11, C15, C20

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	C25, C26, C27, C28

MALE PIN HEADERS

Place and solder the Male Pin Header on the silkscreen side. It is the shorter pins that you are soldering.

1	2x10	JPB

ICs

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 notch.
Keep remaining ICs for later as they will be placed in control board.

Qty	Value	Name on PCB
5	TL072	IC1, IC2, IC3, IC4, IC5
2	NE5532	IC6, IC7
2	LM3915N	IC9, IC10
1	4053N	IC8

Good one. Main board is finished. Do you think a 15 minute break would better prepare you for the rest of the build (this is a big one!)?

CONTROL PCB
OPEN CONTROL BOARD BAG A

RESISTORS

Qty	Value	Code	Name on PCB
18	27k	Red, purple, black,red, brown	R202, R204, R205, R207, R218, R219, R221, R222, R223, R224, R231, R232, R243, R244, R245, R246, R252, R254
18	36k	Orange, blue, black, red, brown	R216, R217, R225, R226, R227, R228, R229, R230, R235, R236, R237, R238, R271, R273, R278, R279, R283, R284
13	100k	Brown, black, black, orange, brown	R208, R209, R214, R215, R253, R263, R268, R270, R272, R276, R277, R281, R282
9	10k	Brown, black, black, red, brown	R213, R234, R242, R248, R251, R257, R258, R269, R275
8	15k	Brown, green, black, red, brown	R259, R261, R262, R264, R265, R267, R286, R287
6	68k	Blue, grey, black, red, brown	R210, R233, R241, R249, R256, R274
6	20k	Red, black, black, red, brown	R211, R239, R240, R247, R255, R280
6	75R	Purple, green, black, black, brown	R200, R201, R203, R206, R212, R220
2	75k	Purple, green, black, red, brown	R266, R285
1	130k	Brown, orange, black,orange, brown	R250
1	1M	Brown, black, black, yellow, brown	R260

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
1	1N4148	D200
2	1N5817	D201, D202

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	FERRITE+, FERRITE-	

IC SOCKETS		
First **place the sockets** taking care to orientate them properly – the notch on one end of the socket should match the image on the silkscreen. Then solder the socets.		
Qty	Value	Name on PCB
8	2x4 pin	IC200, IC201, IC202, IC203, IC204, IC205, IC206, IC207

OPEN CONTROL BOARD 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
18	100nF	104	C201, C203, C207, C208, C209, C210, C215, C216, C217, C219, C220, C222, C224, C225, C227, C230, C233, C234
8	10pF	10	C200, C202, C205, C206, C223, C226, C231, C232
7	100pF	101	C204, C211, C212, C218, C221, C228, C229

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	C213, C214

FEMALE PIN HEADERS		
Place the female pin headers on the silkscreen side.		
1	2x10	JPA

COMMUNICATION PORTS

Solder **X200** and **X201** IDC connectors , ensuring the position is correct: it must be soldered at silkscreen side, same side as the rest of components and properly oriented.
X200 location notch faces up and **X201** notch faces right.
Take extra care on orientation here, as it will be hard to fix after pots are soldered.
Place the jumper between pins 5 and 6 on **X201** as pictured:

ICs

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
8	TL072	IC200, IC201, IC202, IC203, IC204, IC205, IC206, IC207

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.

WARNING: **SCREWING IT UP FROM HERE WILL RUIN YOUR DAY, GETTING YOU ON A DESOLDERING RAMPAGE, MAKING YOU FEEL MISERABLE AND CAUSE A BUNCH OF KITTENS TO COMMIT SUICIDE. BE CAREFUL. WE MEAN IT.**

MECHANICAL 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.

In order to avoid problems with potentiometers we need to make sure the right height is set. Please remind to use the washers and follow soldering procedure.

OPEN MINI-JACKS AND SWITCHES BAG

MINI-JACKS
Place the mini-jacks on the PCB ensuring they are on the side with the silkscreen but **don't solder them!** Also **keep minijack nuts apart**, as they are similar to switch ones but different!

SWITCHES		
Place the switches in their right places. **But do not solder them yet!** Leave one nut on place so the switches will have the right height. No need to use washers.		
6	Two circuits two position	1, 2, 3, 4, 5, 6
3	Mini. Two circuits two position	S1, S2, S3

SOLDERING MINI-JACKS AND SWITCHES
We will solder first minijacks and switches. As minijacks are the easiest to place, they will help placing switches and setting the right height to help with pots later on. Place the front panel and screw **only** minijacks. Make sure they are sitting flat against the PCB and panel. **Then solder them.** Once minijacks are screwed and soldered they will set the right height and position for the rest of mechanicals. At this point, **screw all switches and solder them.** Remove the front panel to place potentiometers.

OPEN POTS BAG

POTENTIOMETERS			
Place the potentiometer on the PCB. Do not place them all the way down, leave them loose and… **don't solder them yet!** Do not forget to **use the washers.**			
Qty	Type	Code	Name on PCB
2	Dual B10k	103	PFL/MASTER, PHONES
21	Dual B100k	104	GAIN_M1, GAIN_M2, GAIN_M3, GAIN_M4, GAIN_M5, GAIN_M6, GAIN_M7, GAIN_M8, GAIN_M9, GAIN_M10, GAIN_M11, GAIN_M12, GAIN_M13, GAIN_M14, GAIN_M15, GAIN_M16, GAIN_M17, GAIN_M18, GAIN_M19, GAIN_M20, GAIN_M21

FRONT PANEL	
At this point we have all mechanical components in place and ready for final attach of the front panel. Before doing so, fill this check list (DO IT! We are watching you):	
X	
	Are communication ports properly soldered? (big's notch facing up, small facing right)
	Did you removed nuts and washers from the switches?
	Did you placed washers on the pots?
	Are all pot legs straight and properly in place? (no legs bent or whatsoever)
	Are you sure no pot have been placed all the way down so they are touching the board?
	Is jumper placed in pins 5 and 6 from X201?

If all check items have been marked, attach the **front panel** adjusting the parts one by one until it fits. At this point a pair of fine tweezers can be helpful.

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

TIP: Soldering pots beneath expansion port is pretty hard. Use fine tip soldering and extra care on these ones! It might be helpful to rise plastic a bit, solder and putting it back in place.

     - Make sure everything is flush against the panel and all pots end up all aligned (It's easy to spot like this pots not screwed flat against the panel)

     - Solder all pots **except potentiometer's locating legs.** This will allow you to debug easier if you made any mistake. Solder them only when module is finished and working.

ASSEMBLING BOTH BOARDS TOGETHER

First we will place the components we are missing from main board. Then assemble boards together to make them fit and finally solder them all.

LEDs

Place the LEDs onto main PCB minding its polarity, but **don't solder them** until the front panel is in place. This is the only way to solder them the right position.

Qty	Type	Name on PCB
2	Red LED	LED1, LED2
4	Yellow LED	LED3, LED4, LED5, LED6
8	Green LED	LED7, LED8, LED9, LED10, LED11, LED12, LED13, LED14

6.5" JACKS

Place all 6,5" jacks in place at main board at silkscreen side at LEFT_OUT, OUT1, OUT2, OUT3, OUT4, OUT5, OUT6, PHONES, RIGHT_OUT, **but do not solder them.**

Connect the **Main PCB** to the **Control PCB,** making the pins match and jacks fit on their panel holes. The main PCB should be orientated so that the component side is facing towards the front panel and jacks match their holes.
Screw the Jacks to the panel, so both boards are parallel and flat. **Thread the M3 screws through the Main PCB** securing them to the spacers. Then **solder 6.5" jacks.**

Next, adjust the **LEDs** so that they are flush with the panel and solder them. Placing some tape over the Led holes, might help to keep all of them at the right distance.

To finish up, put the knobs in place and switch caps.

SOLDER POTS LOCATION LUGS **AFTER TESTING THE MODULE.**

ENJOY YOUR NEW BEFACO MODULE!

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Divertido es lo contrario de aburrido, no de serio.
Chimo Bayo