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## ASSEMBLY MANUAL

### FOR

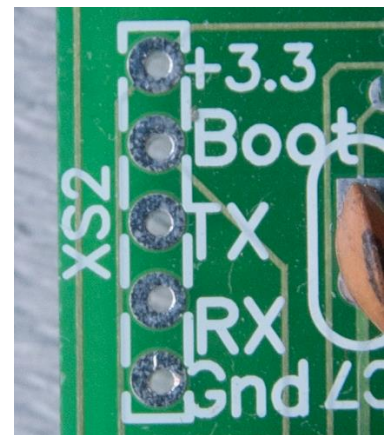
# MAKUYA

## IV-26-4v4 CLOCK

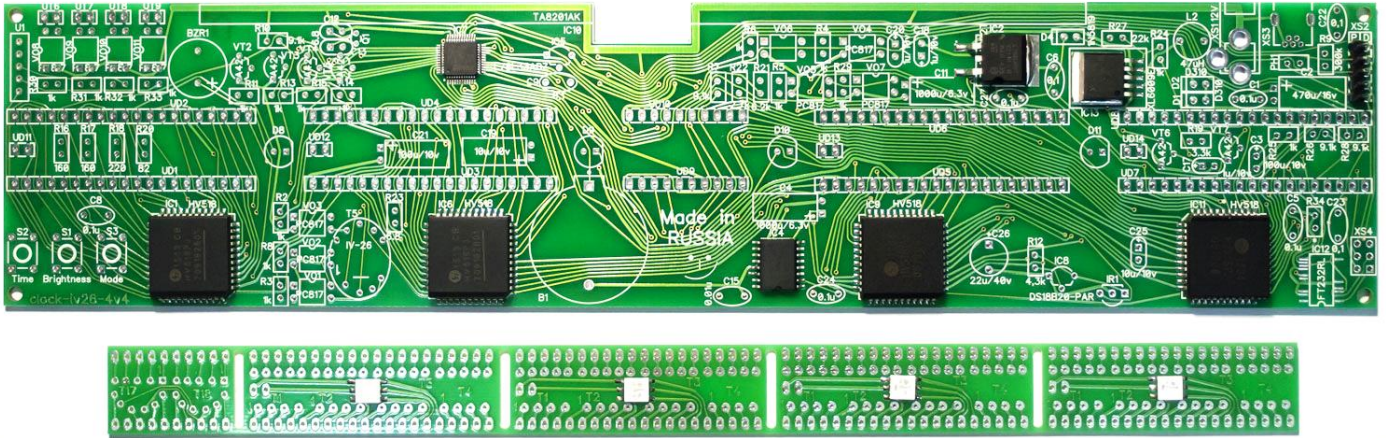
Be very careful with static electricity. If clock not work after build its mean that they been damaged by static electricity in process of assemble.

Check resistance between +3.3 and GND pins of XS2.

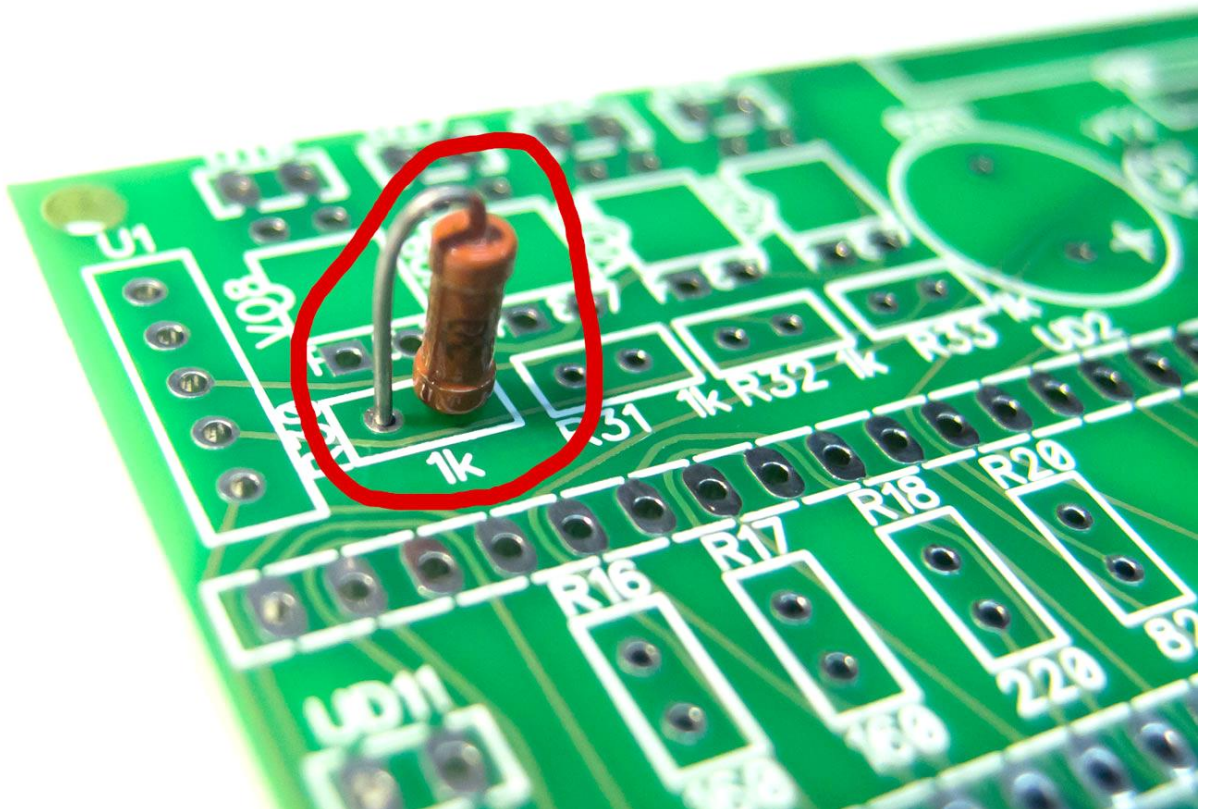
The resistance should be not lower 1kOhm.



1) You have a PCB with ICs:

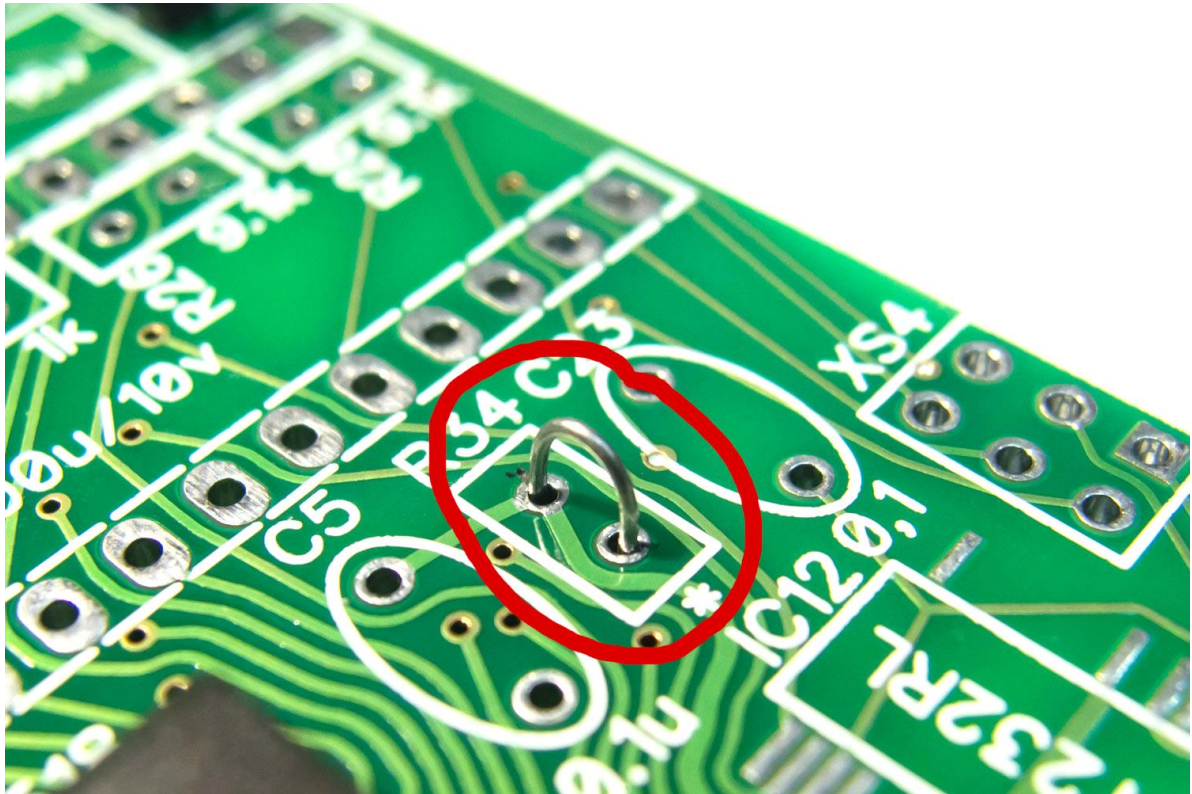


2) Place all resistors vertical.





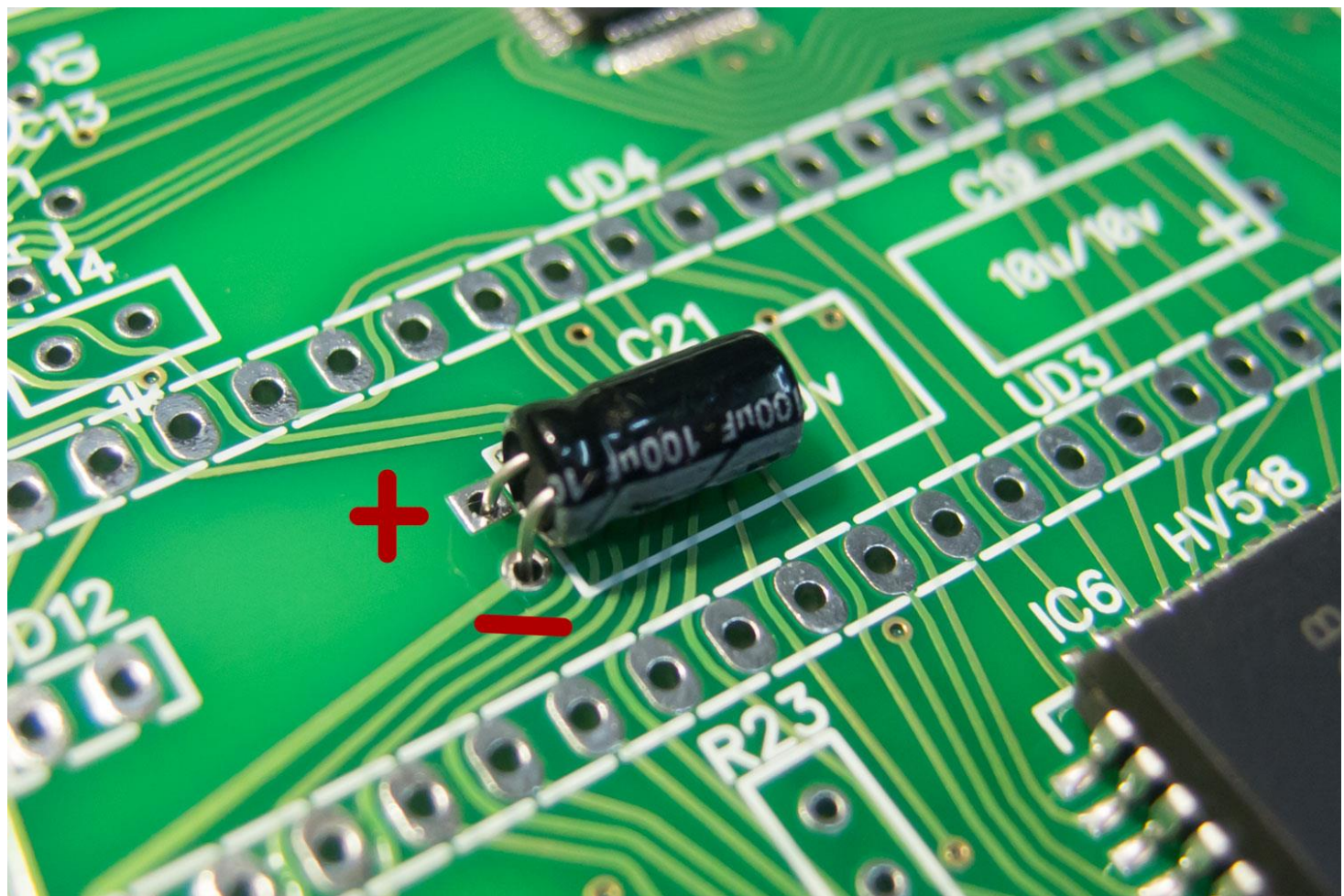
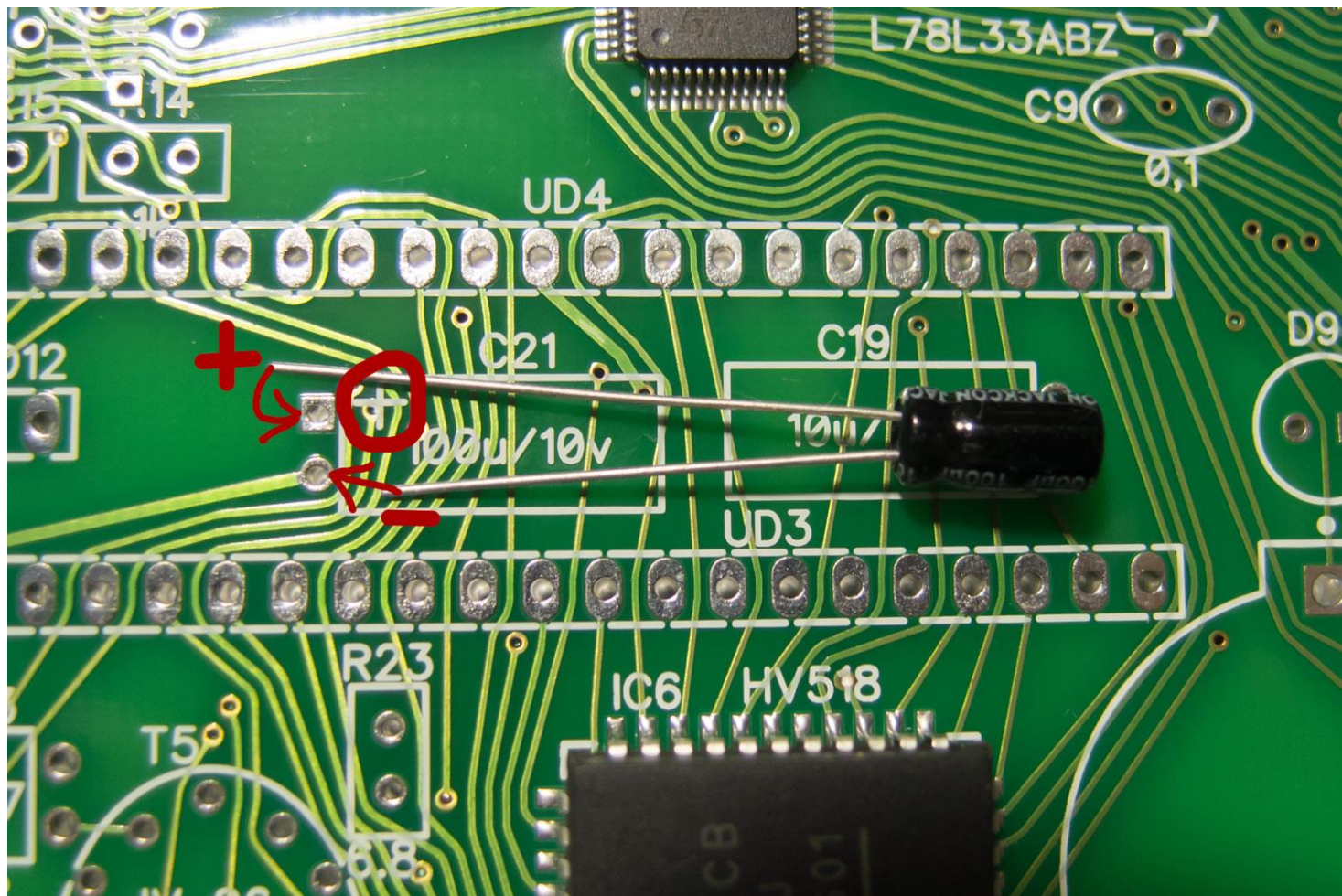
3) Solder wire instead R34.



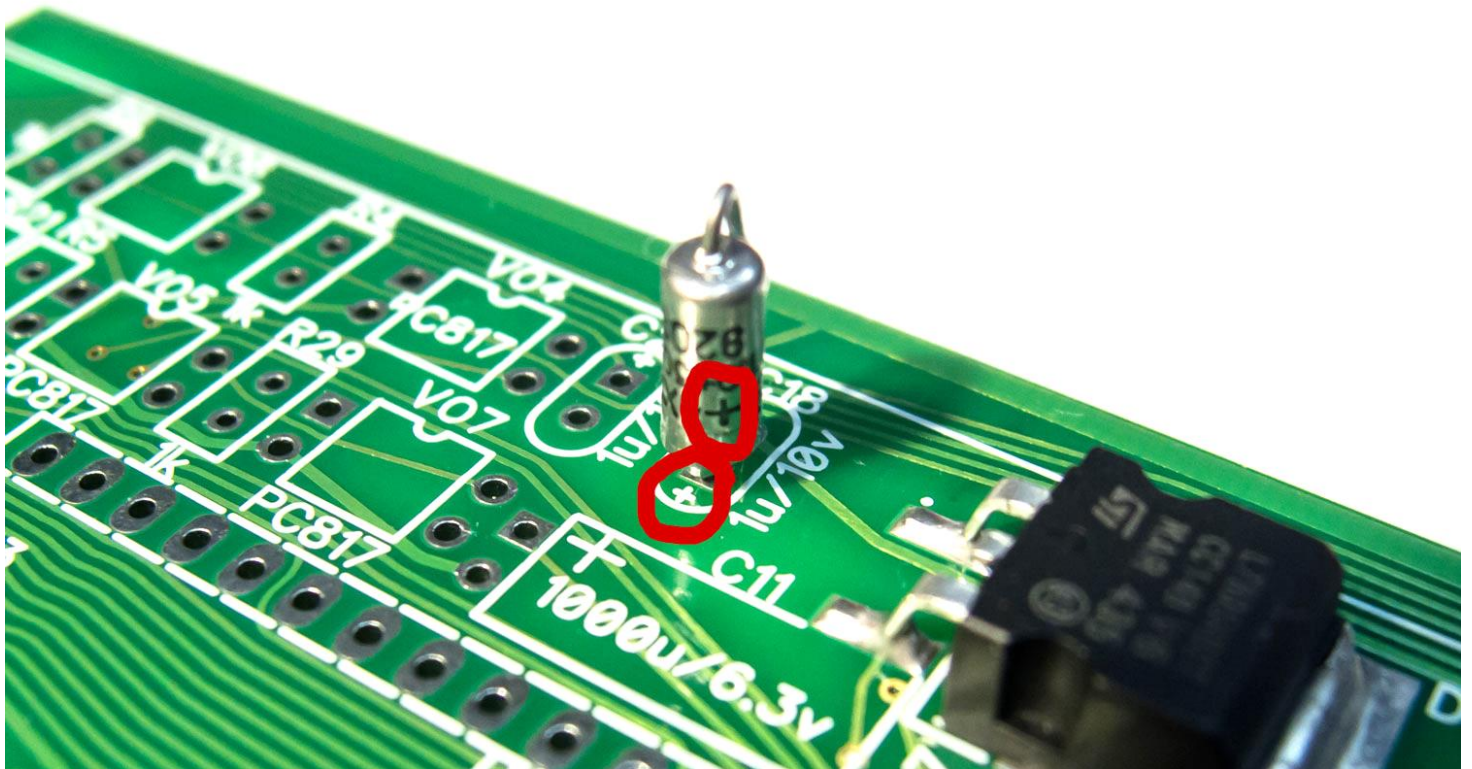
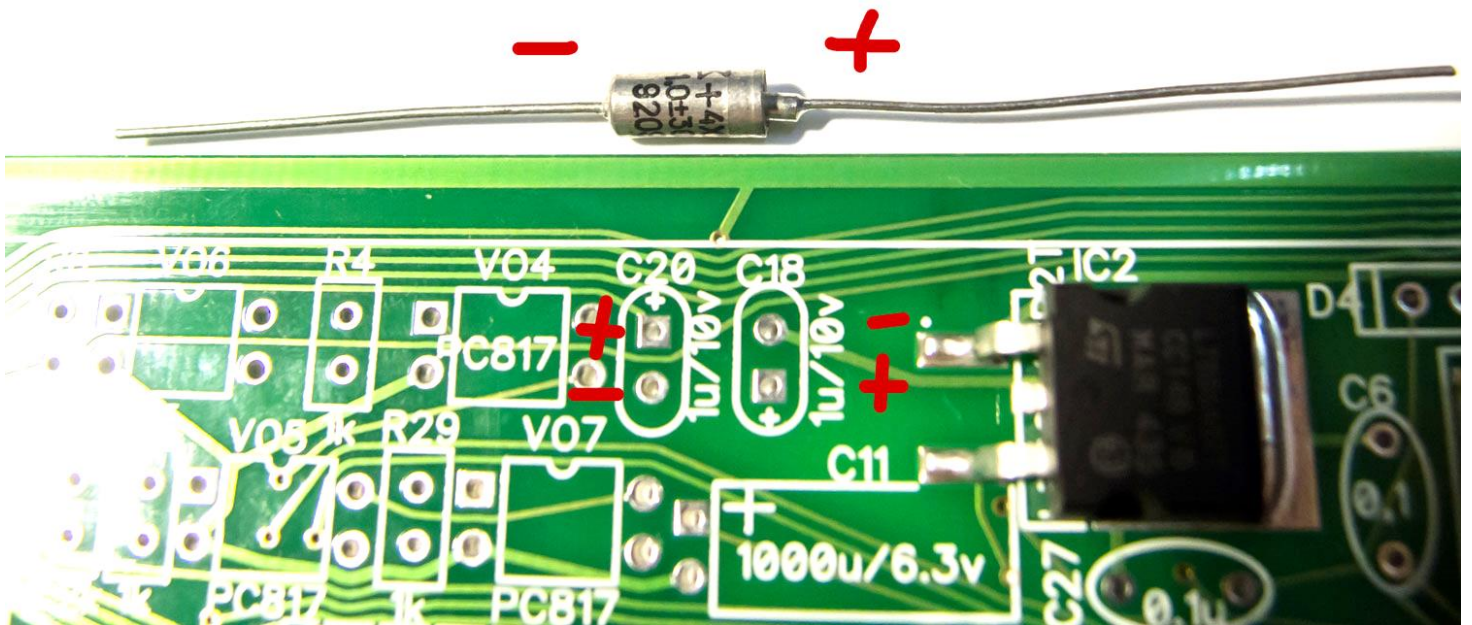
4) Place all capacitors. Be careful with polarity!



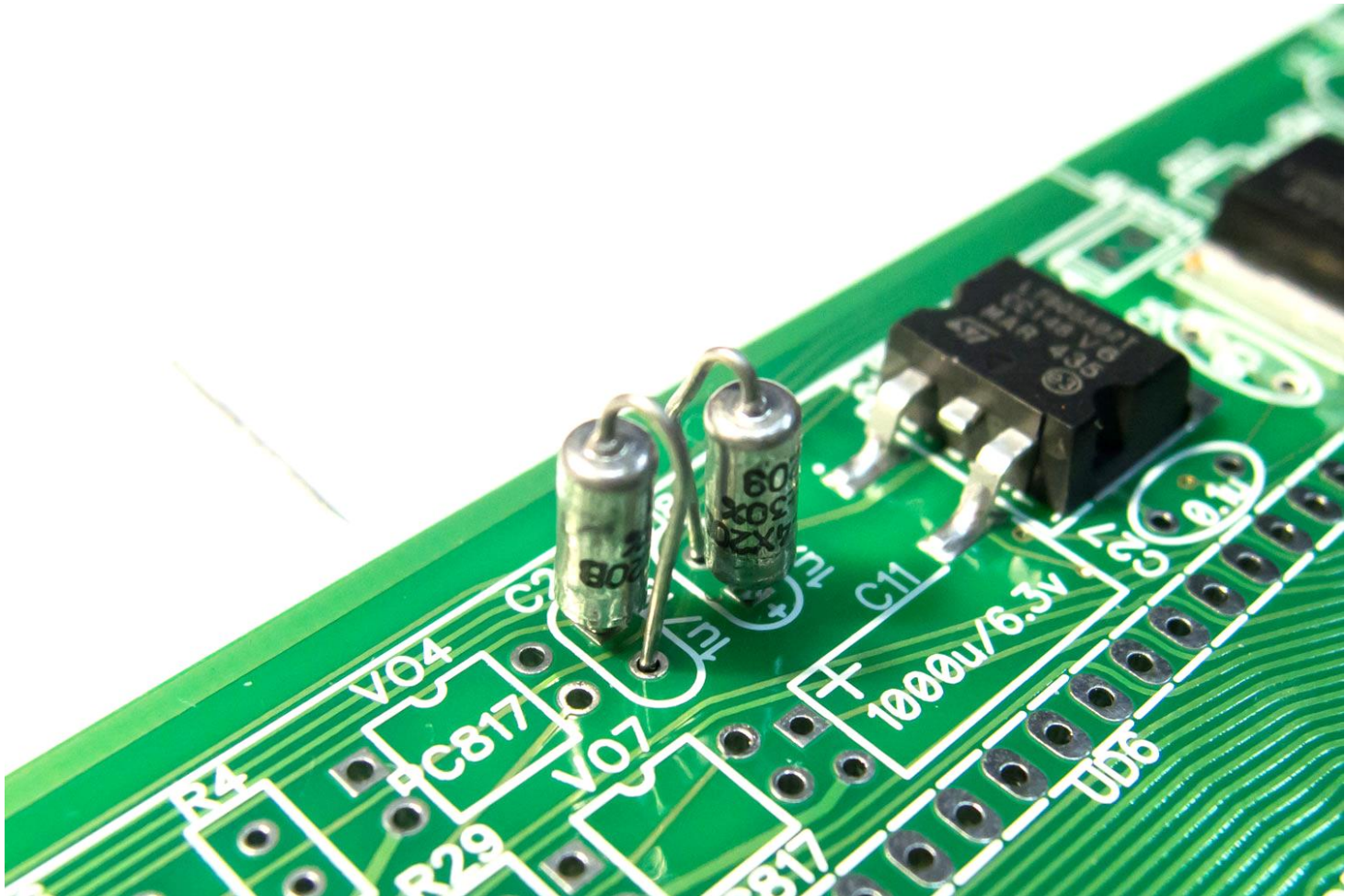
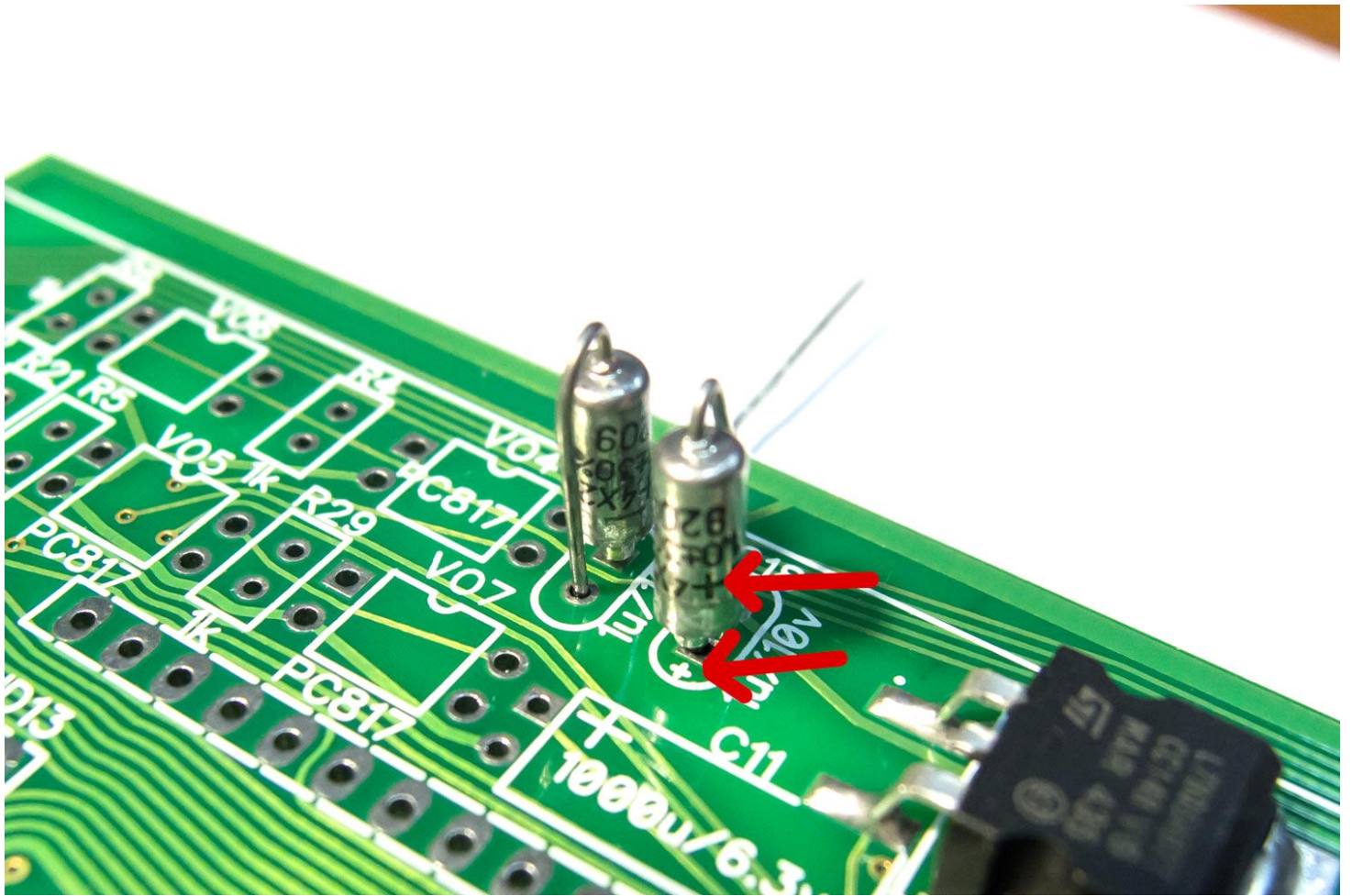




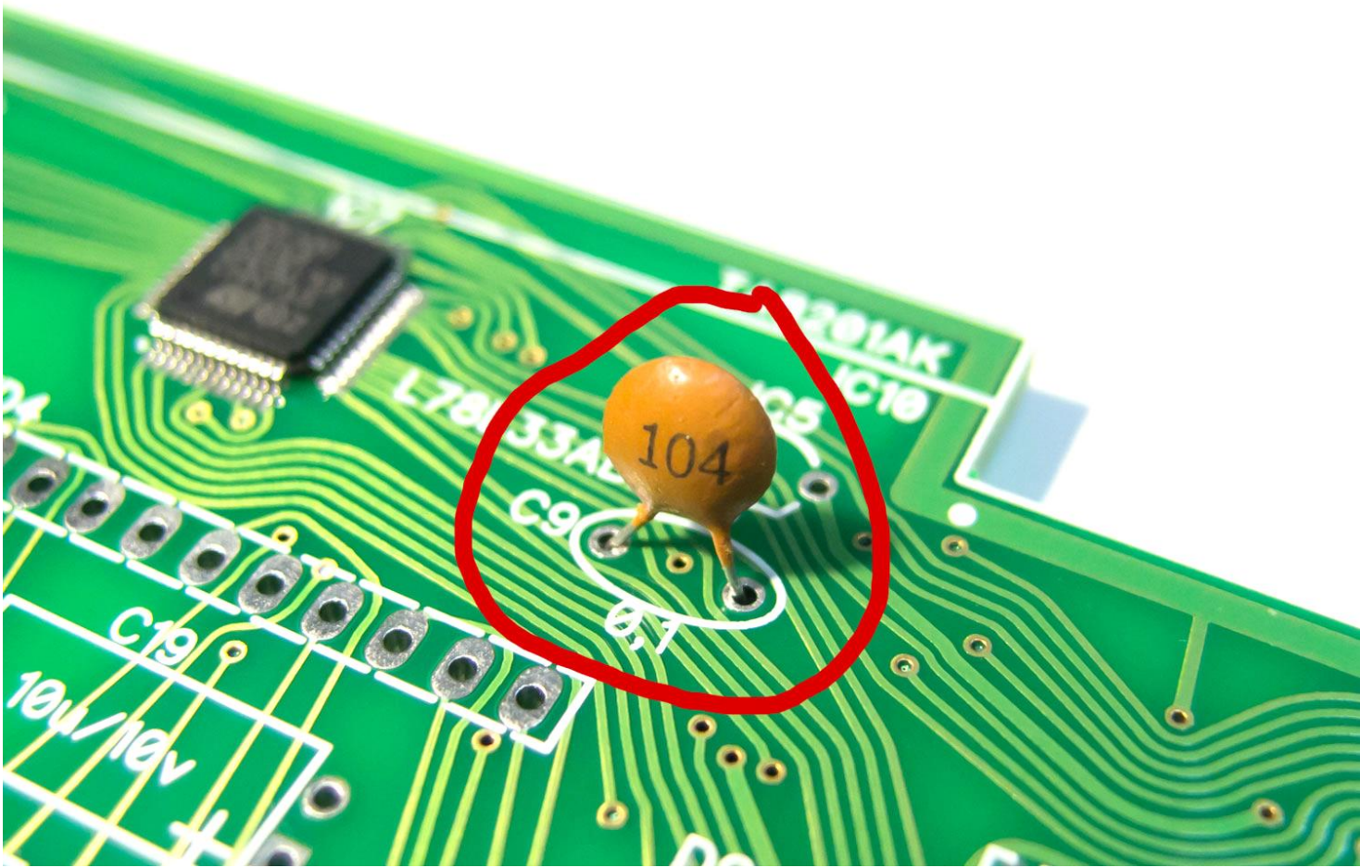




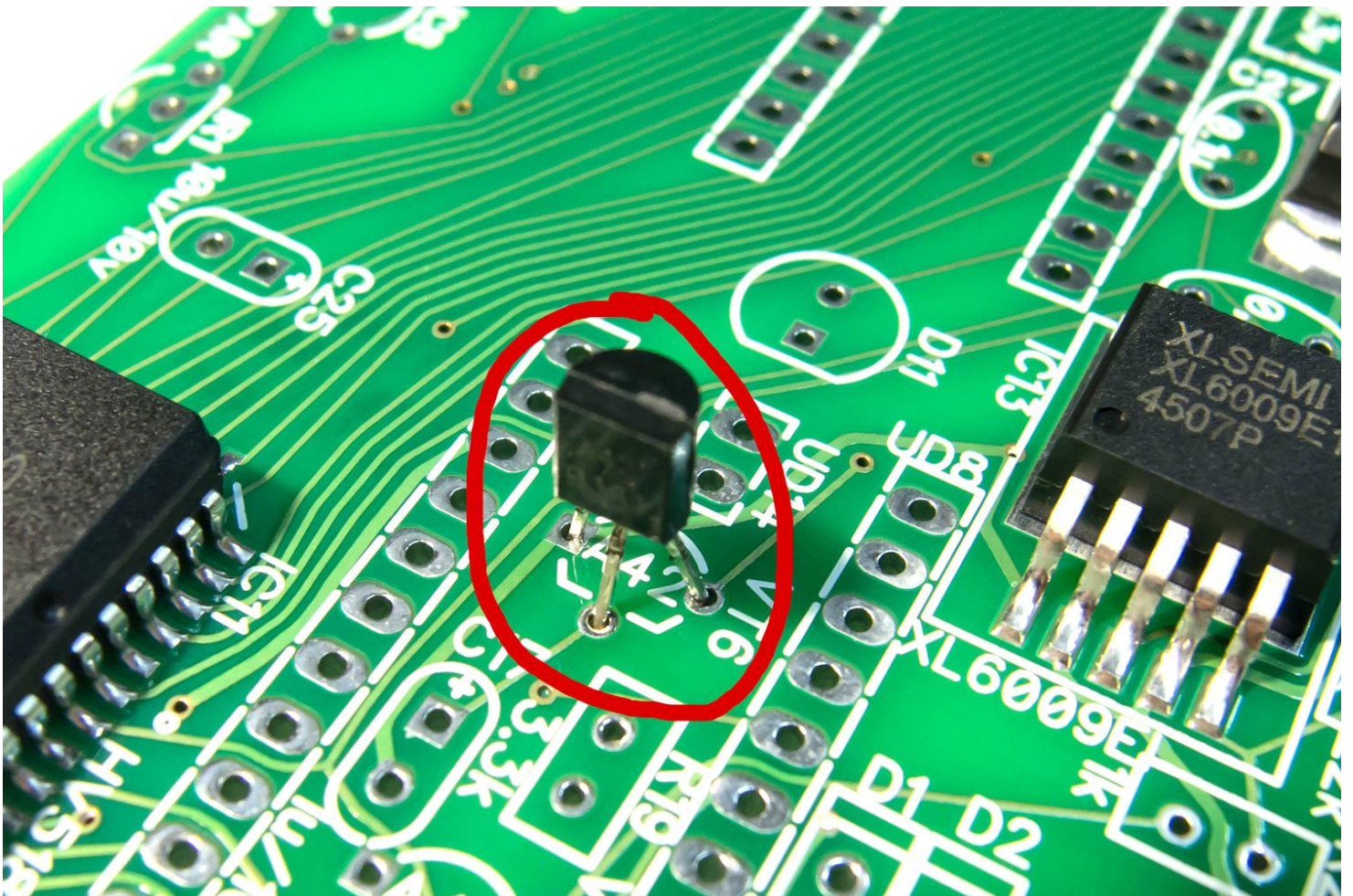




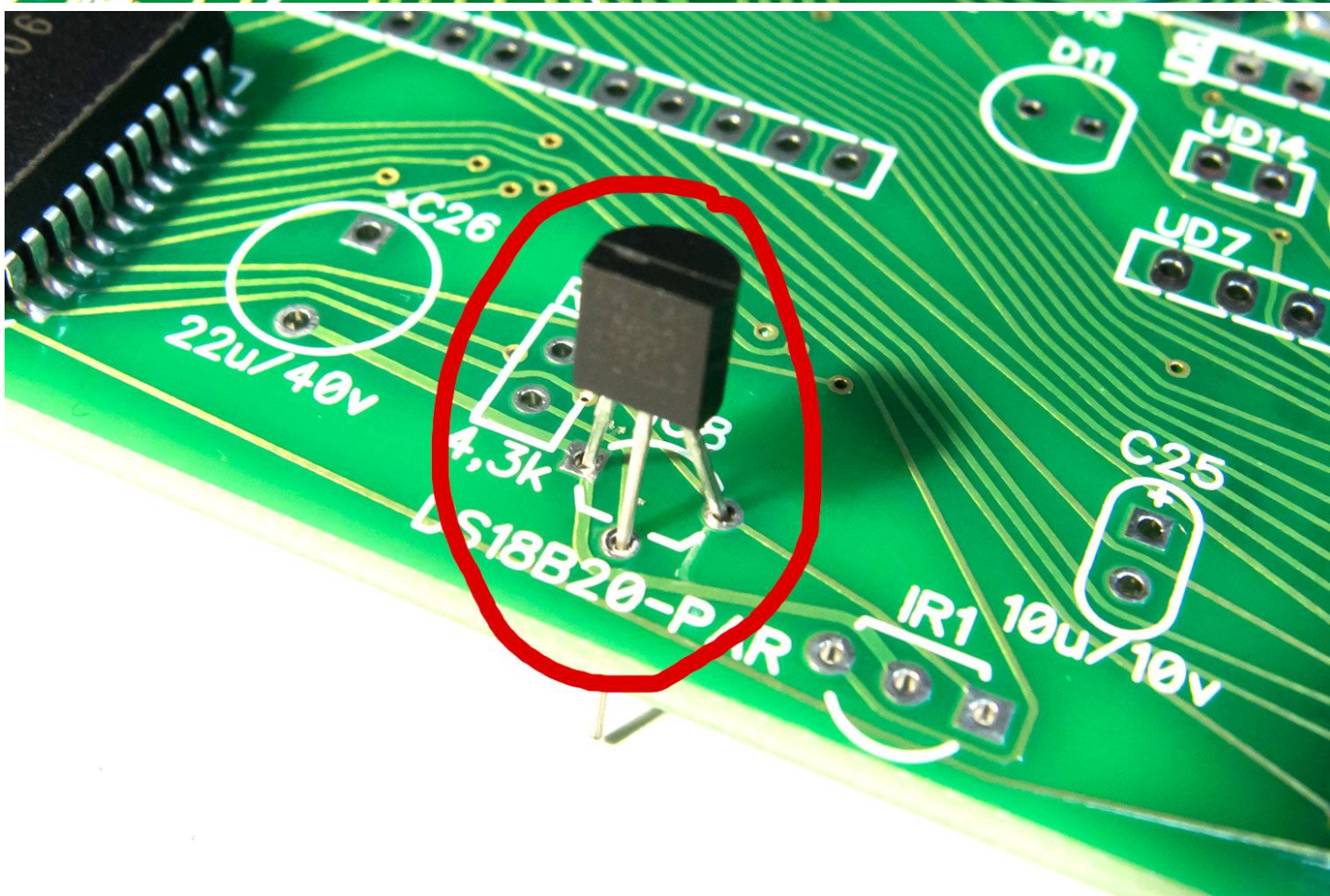
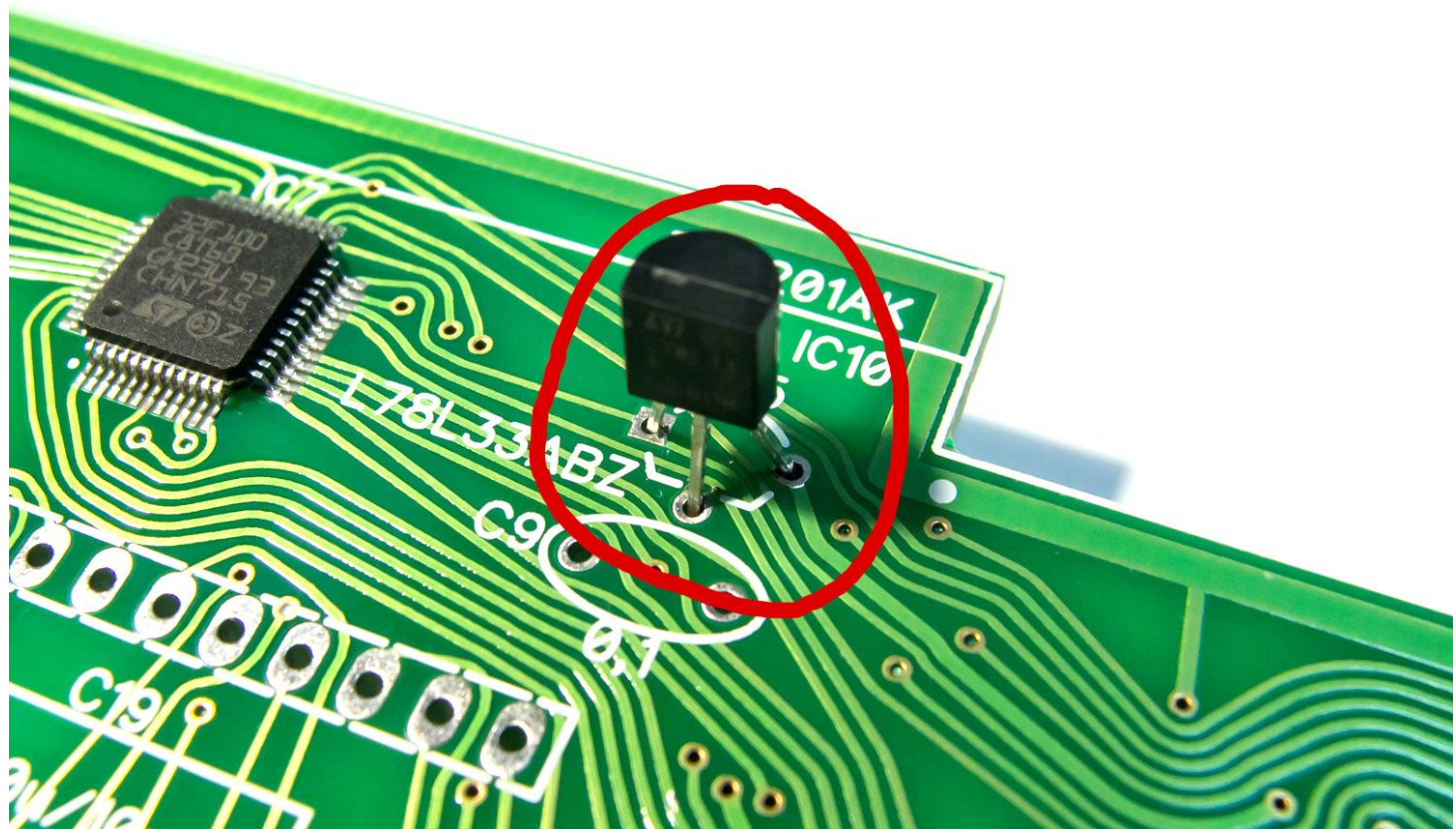




5) Place all transistors, 3.3v stabilizer and temperature sensor:

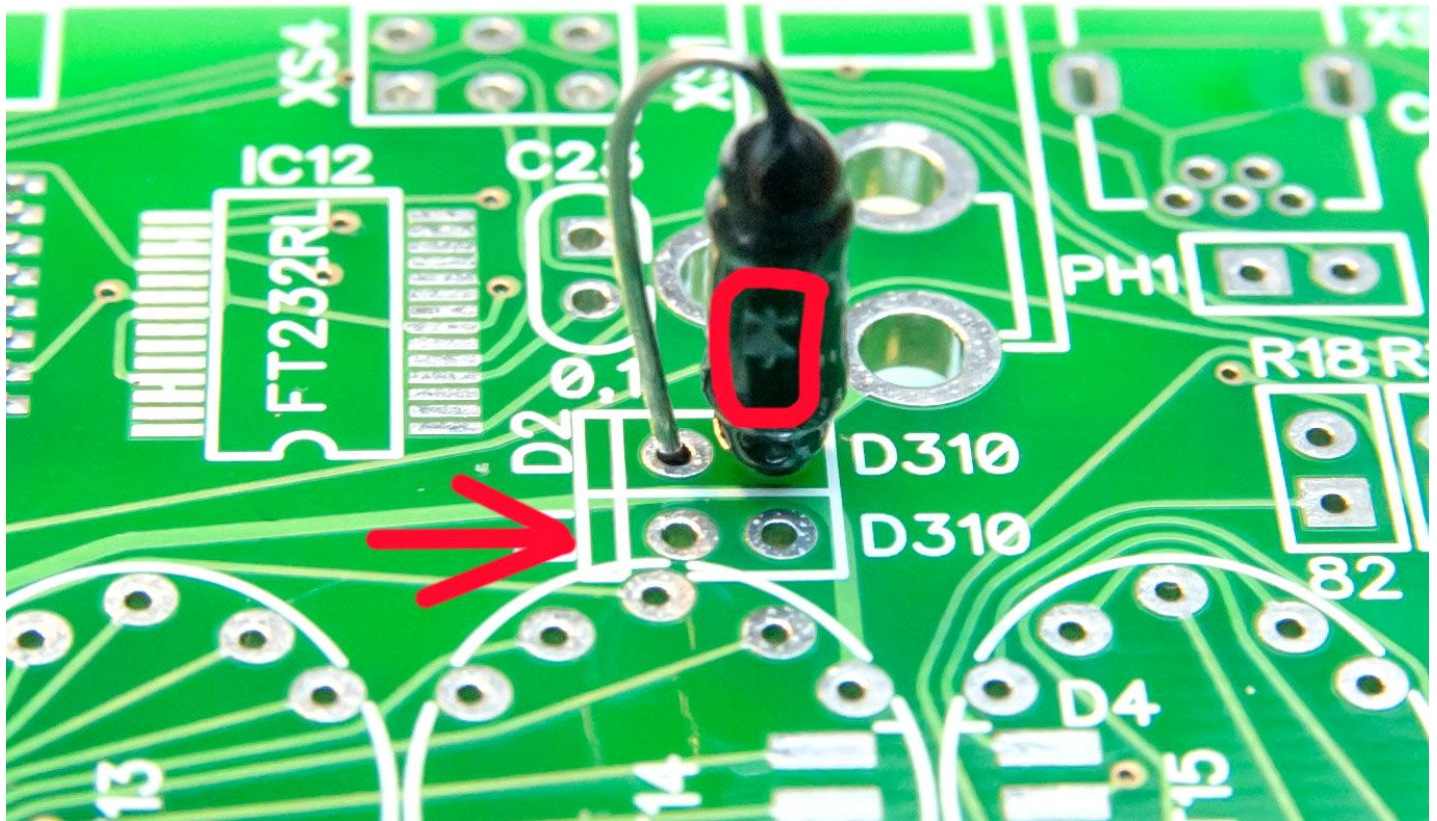




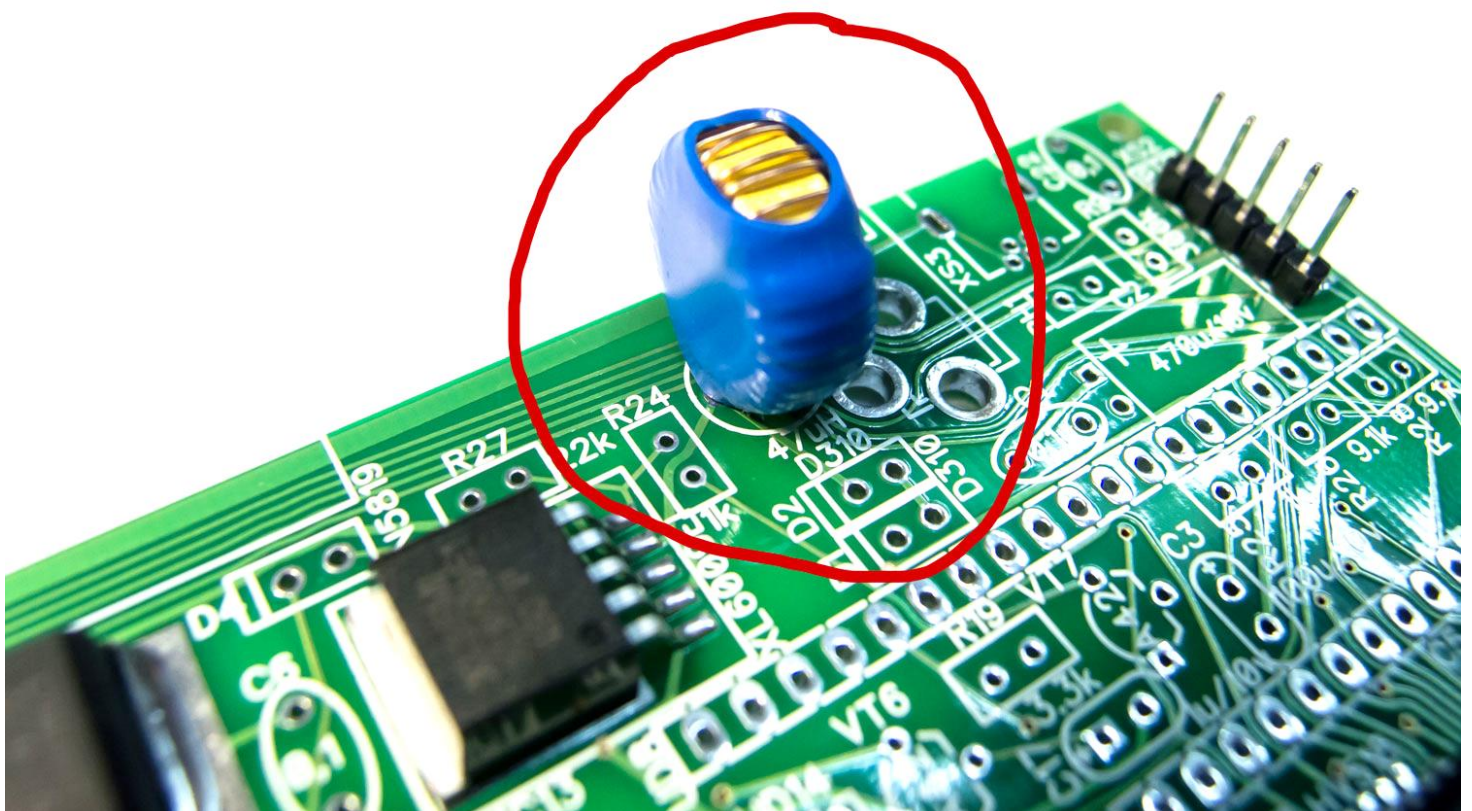




6) Place diodes and be careful with polarity:

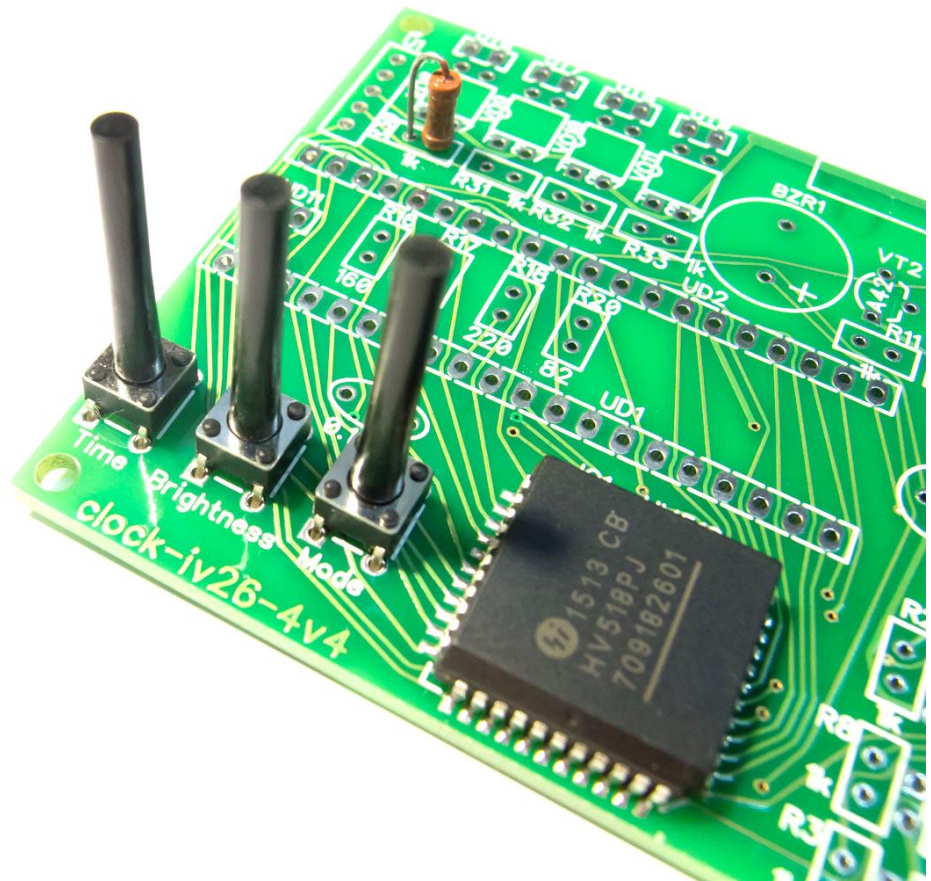


7) Place inductor:

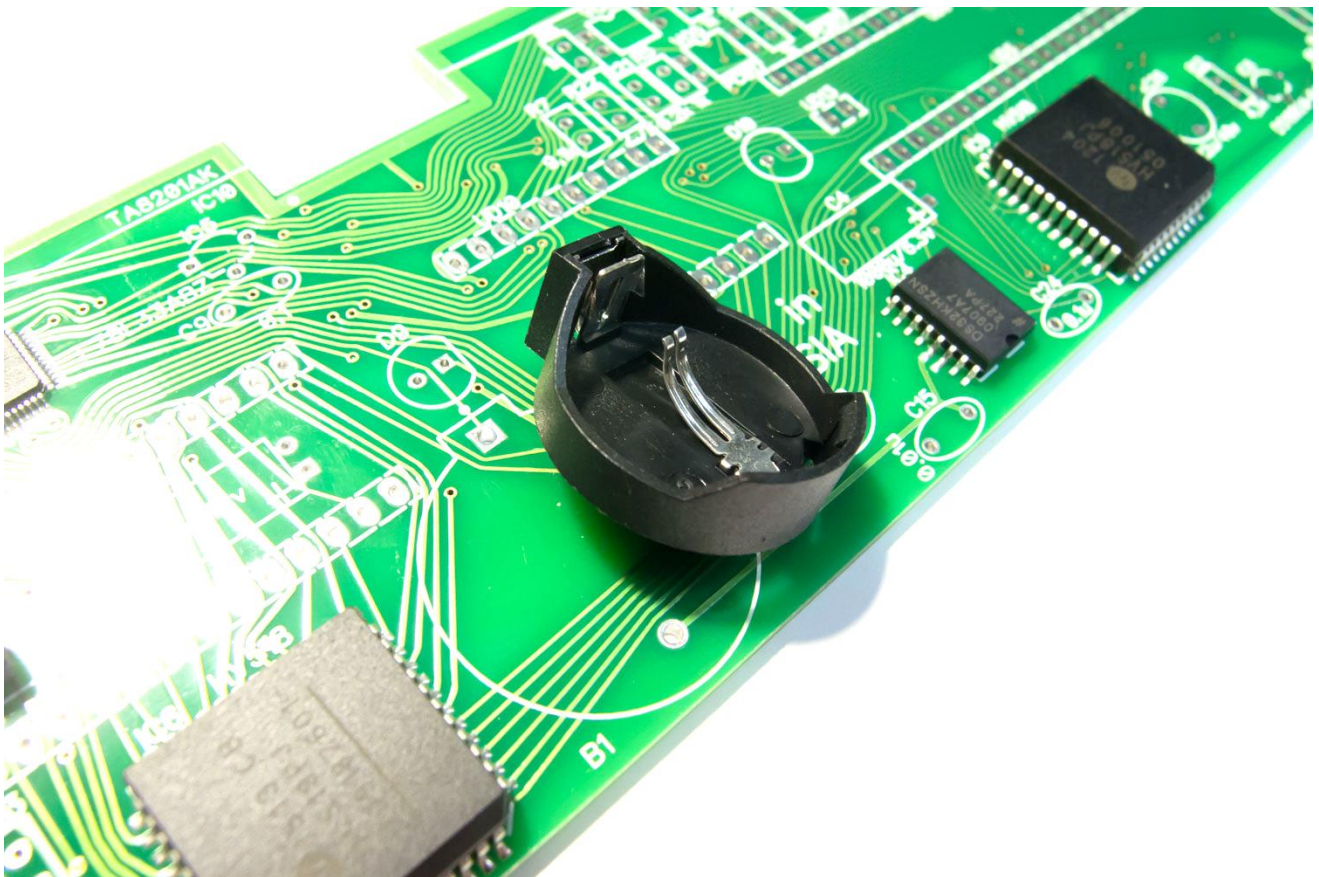




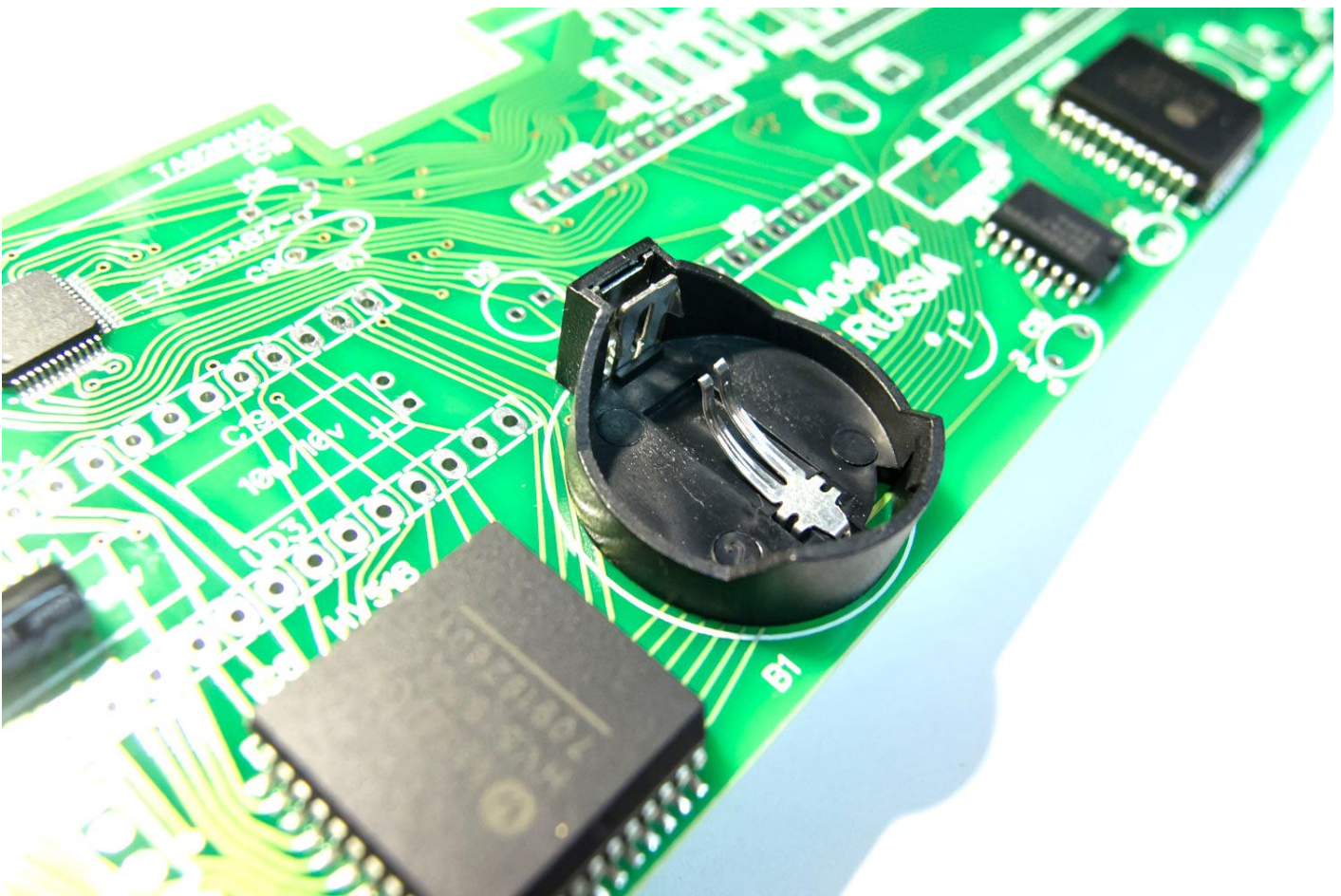
8) Place 3 buttons:



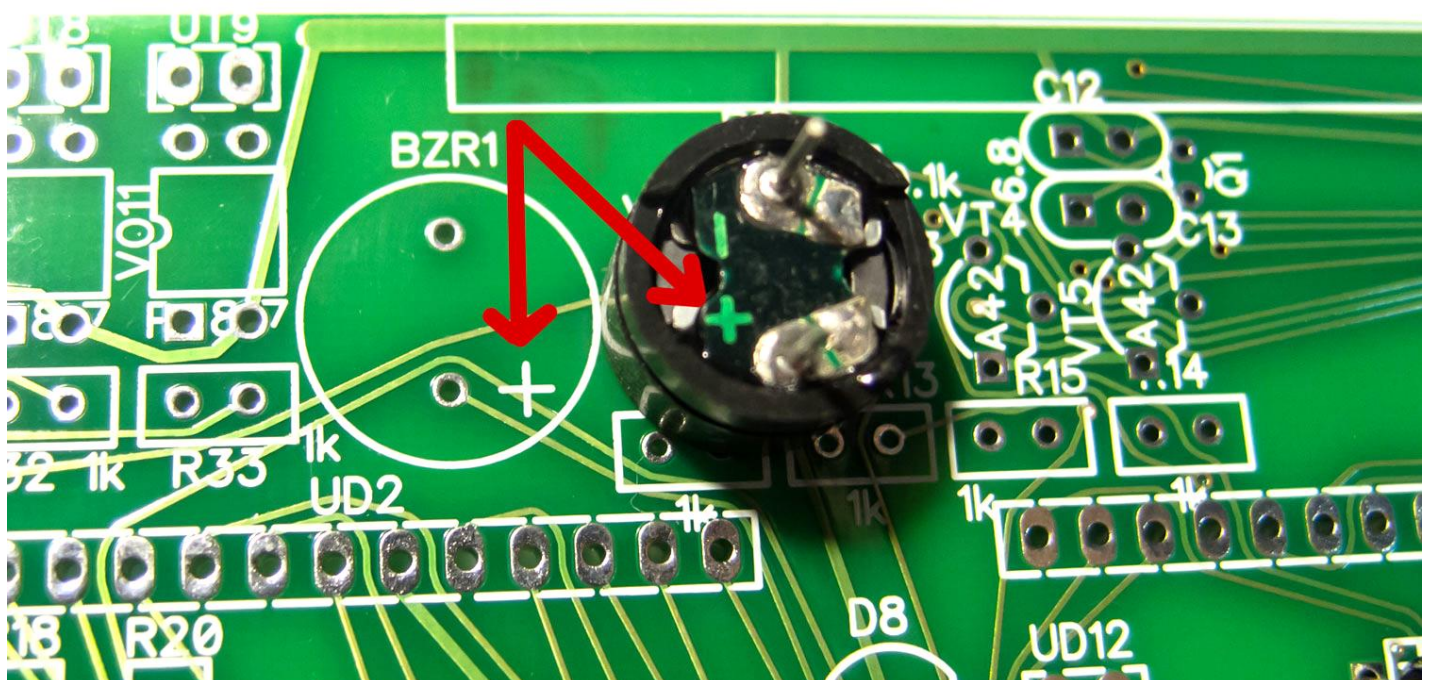
9) Place battery holder and insert battery when clock will be fully assembled:



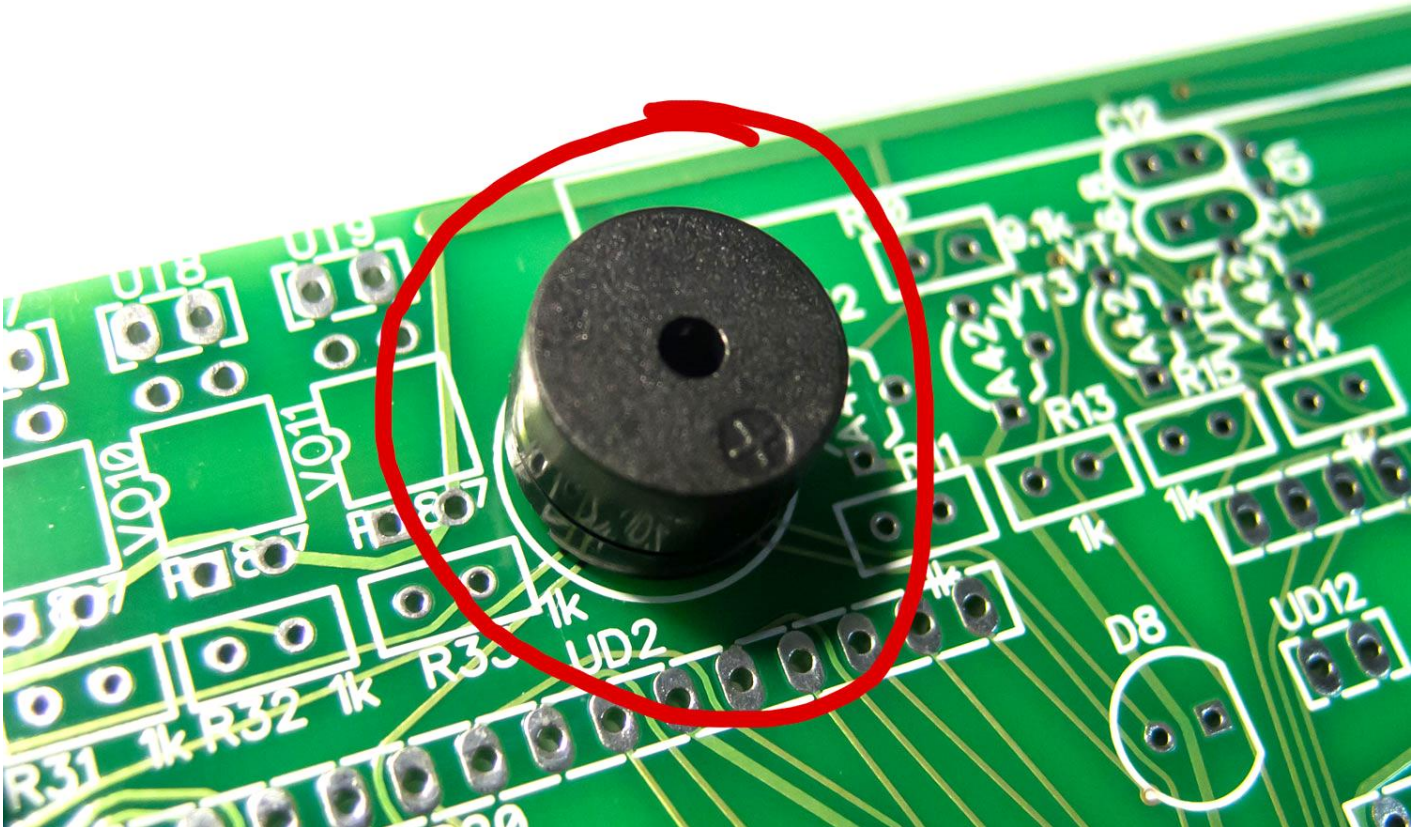




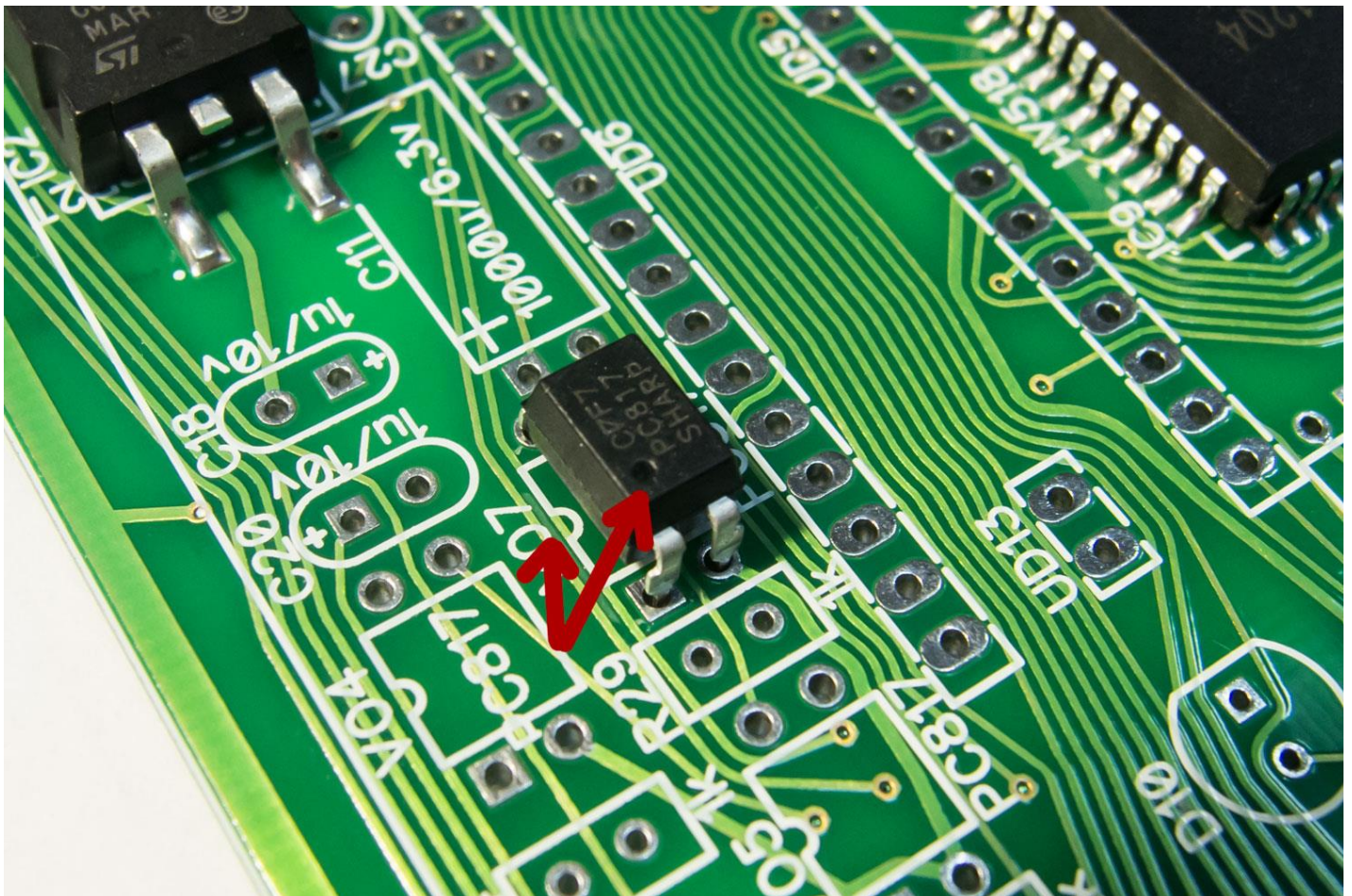
10) Place buzzer and be careful with polarity:



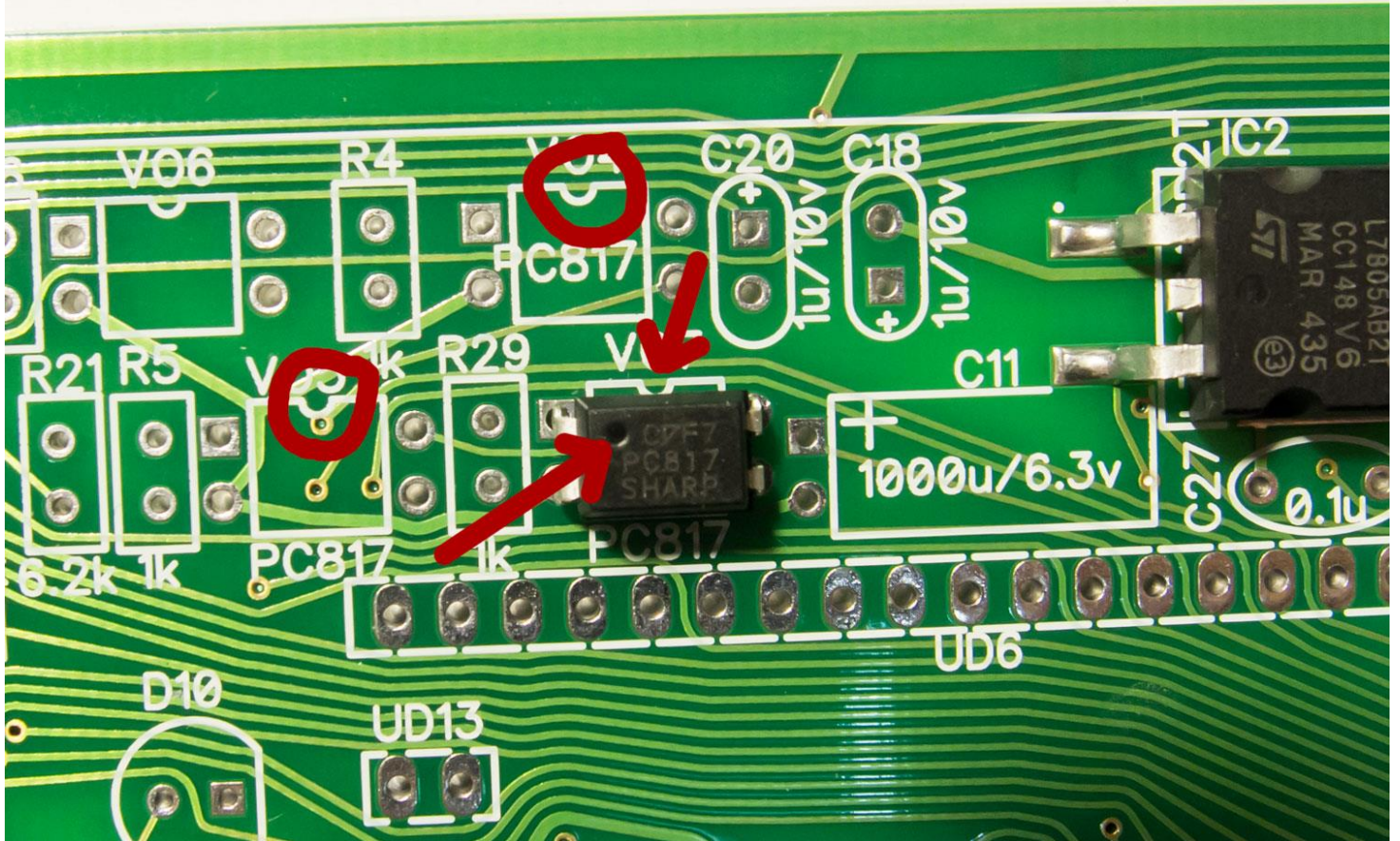




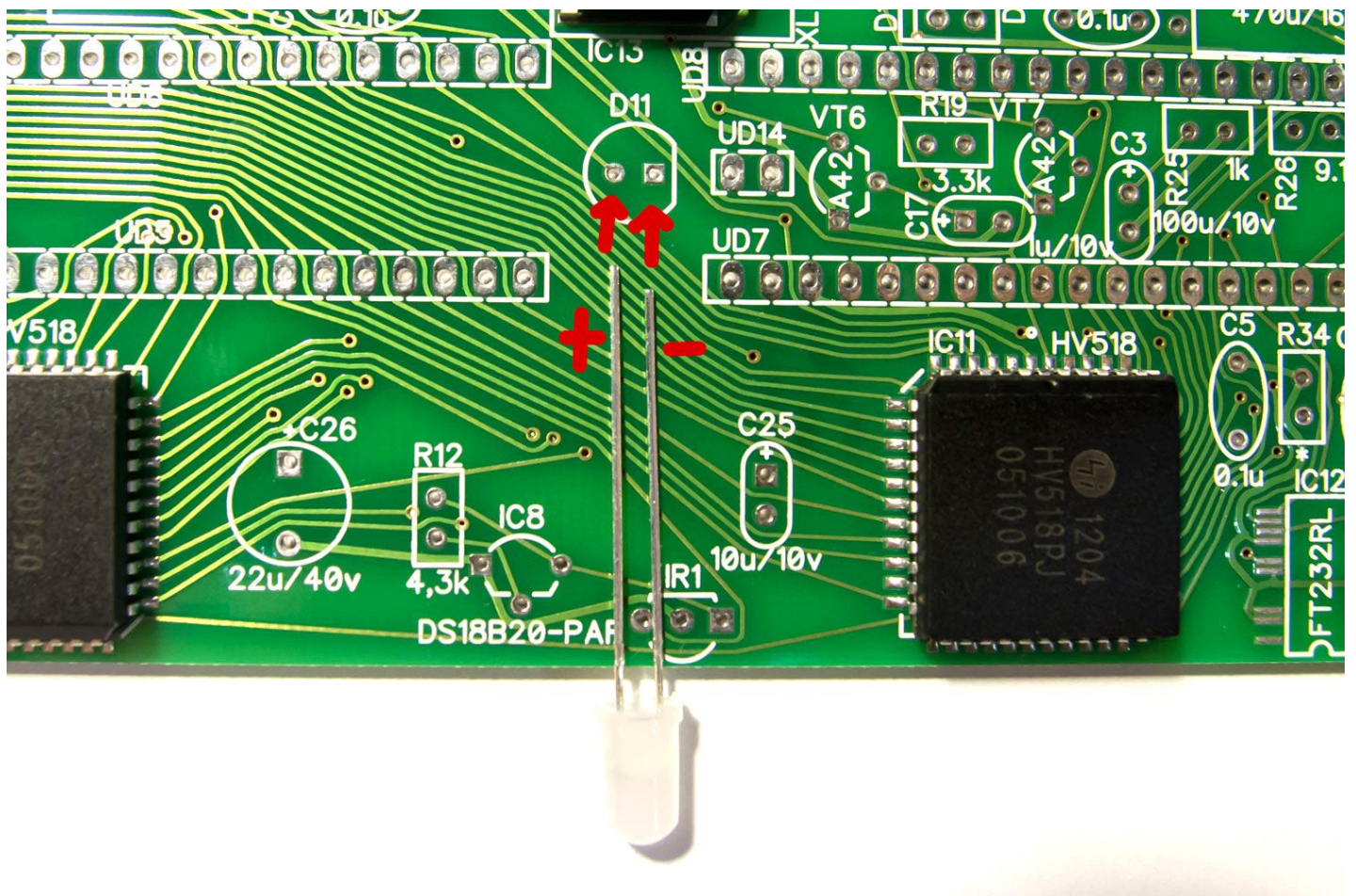
11) Install all optrons and be careful with keys:







12) Prepare and install leds:

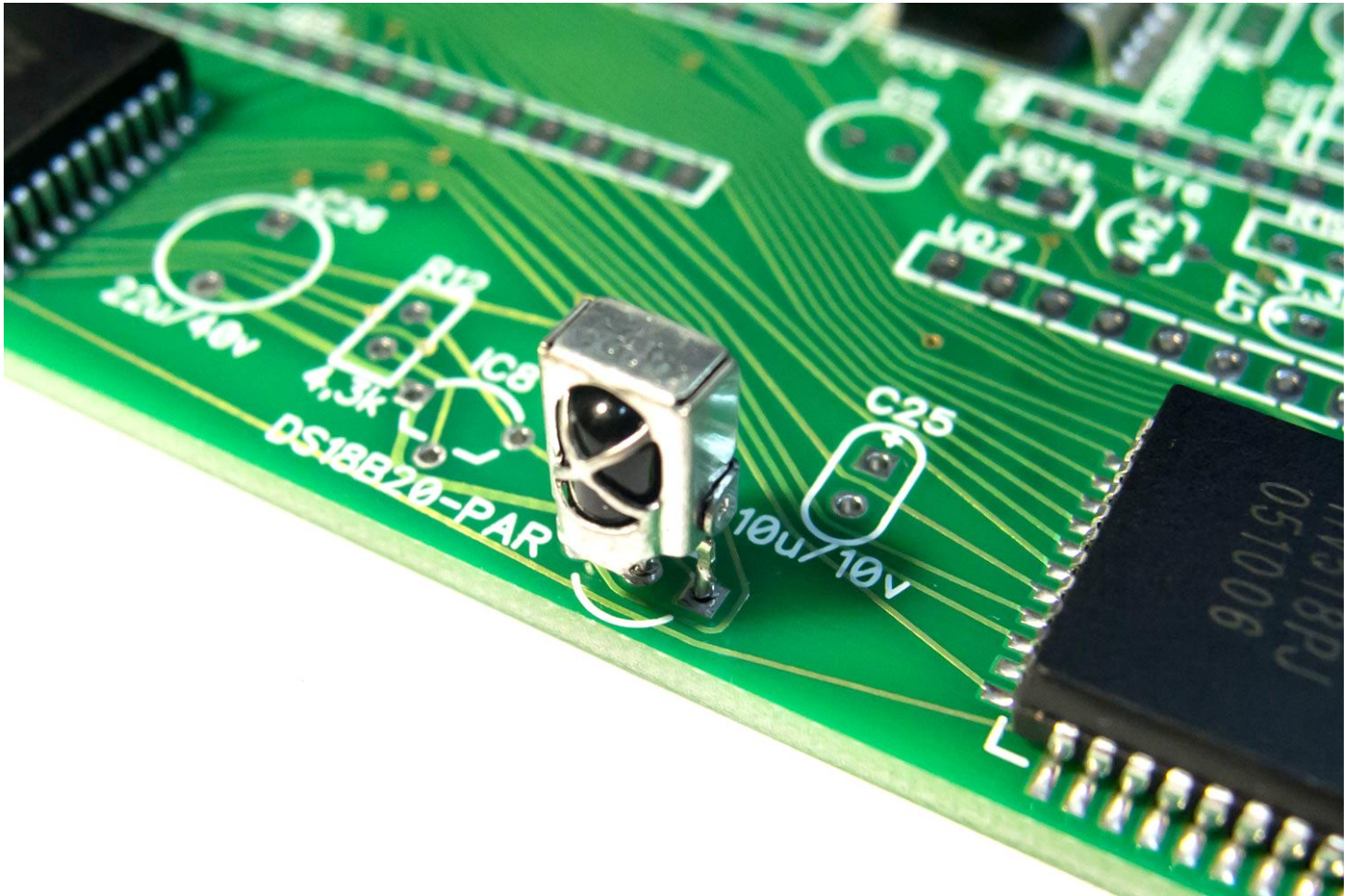




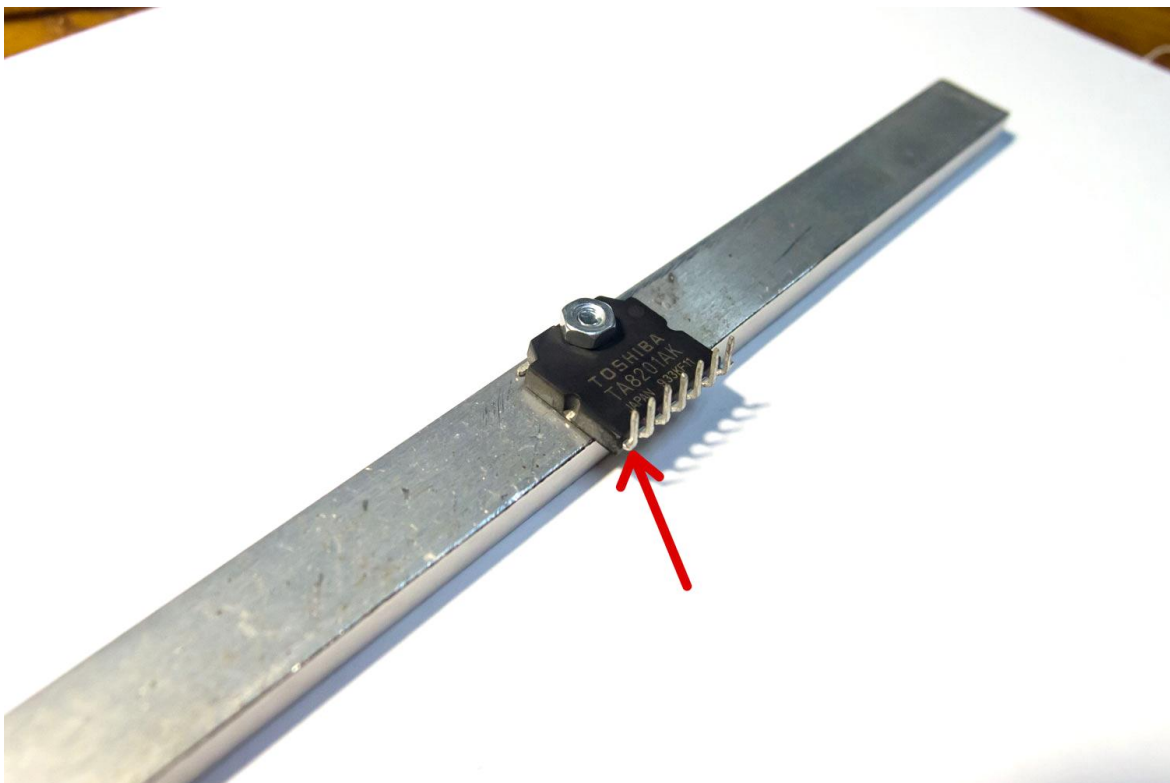




13) Install infrared receiver.



14) Now, install TA chip. Bend pins and stick double side adhesive tape on back of chip. Fix radiator to chip. Solder TA chip to PCB and:

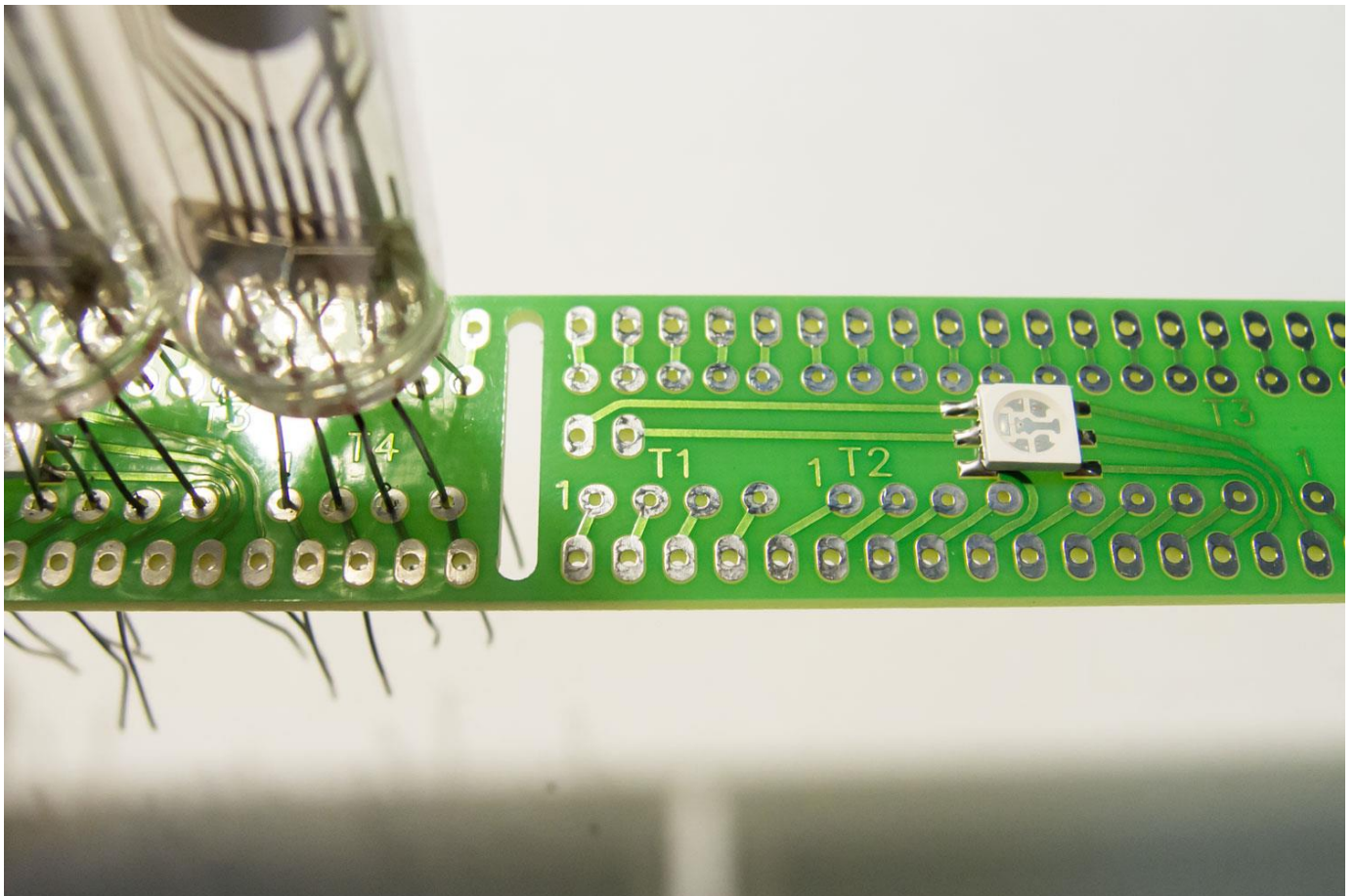
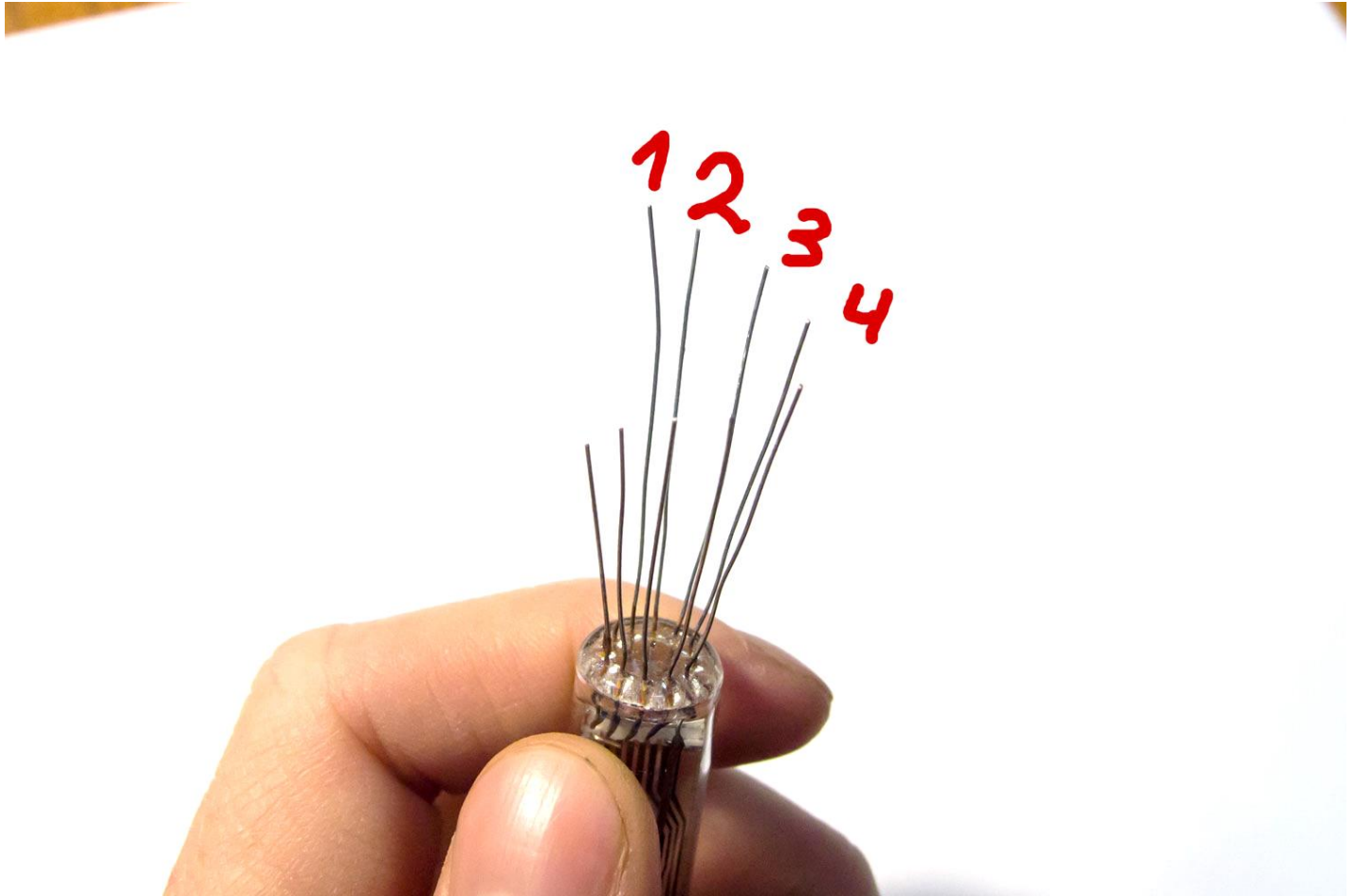






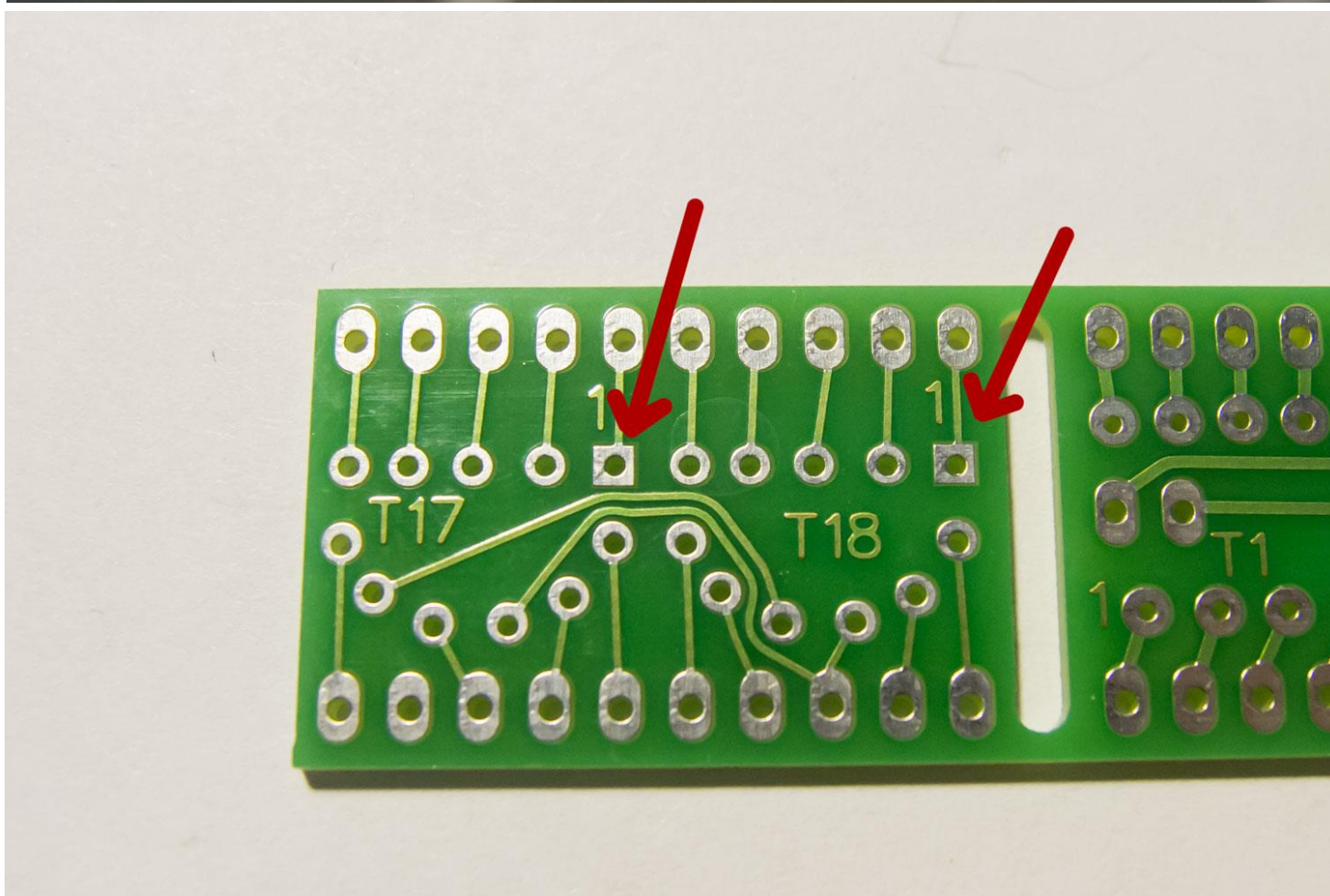
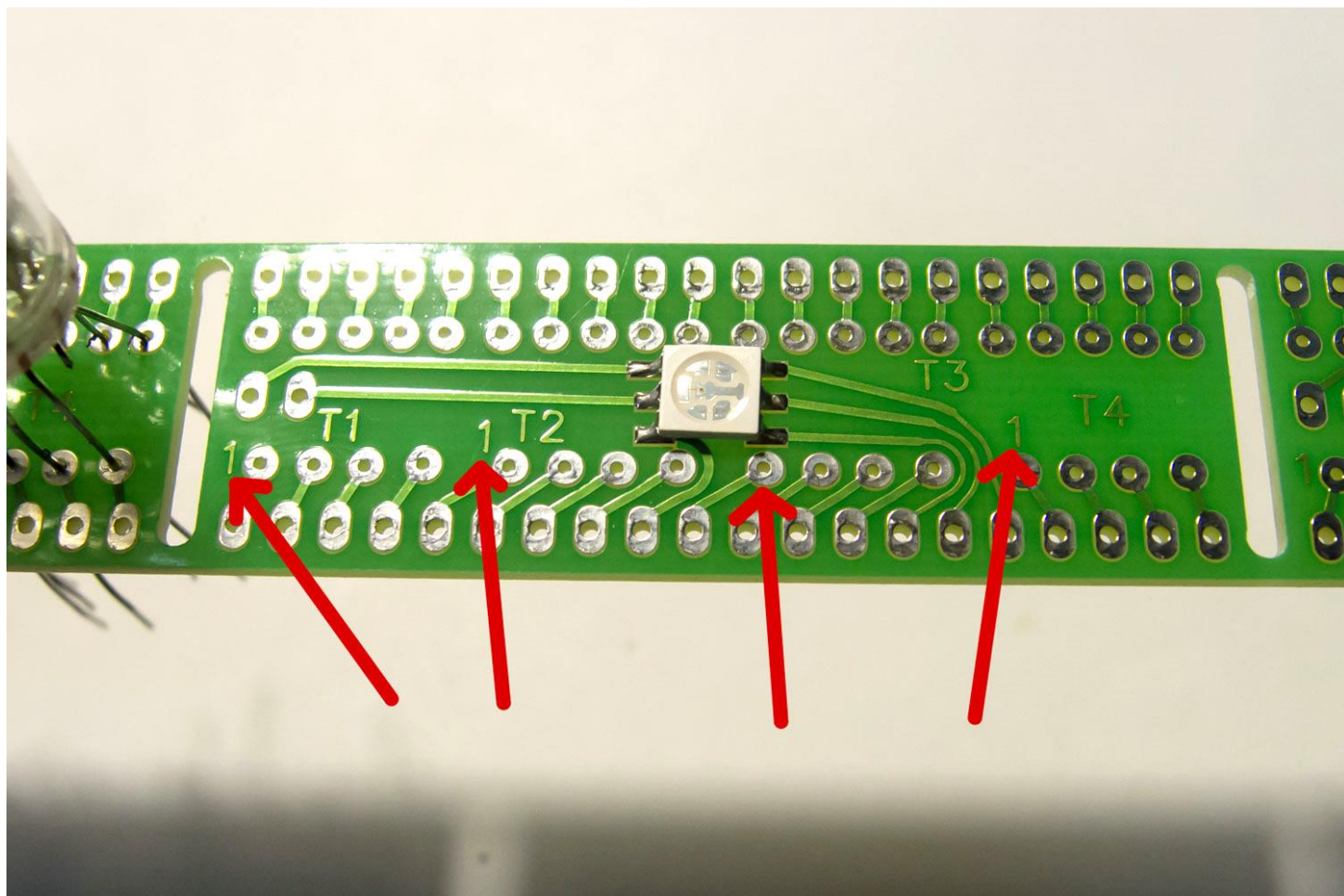


15) Prepare the IV-26 tubes. The numeration start from longest pin of tube and go on clockwise. Longest pin – the first pin.



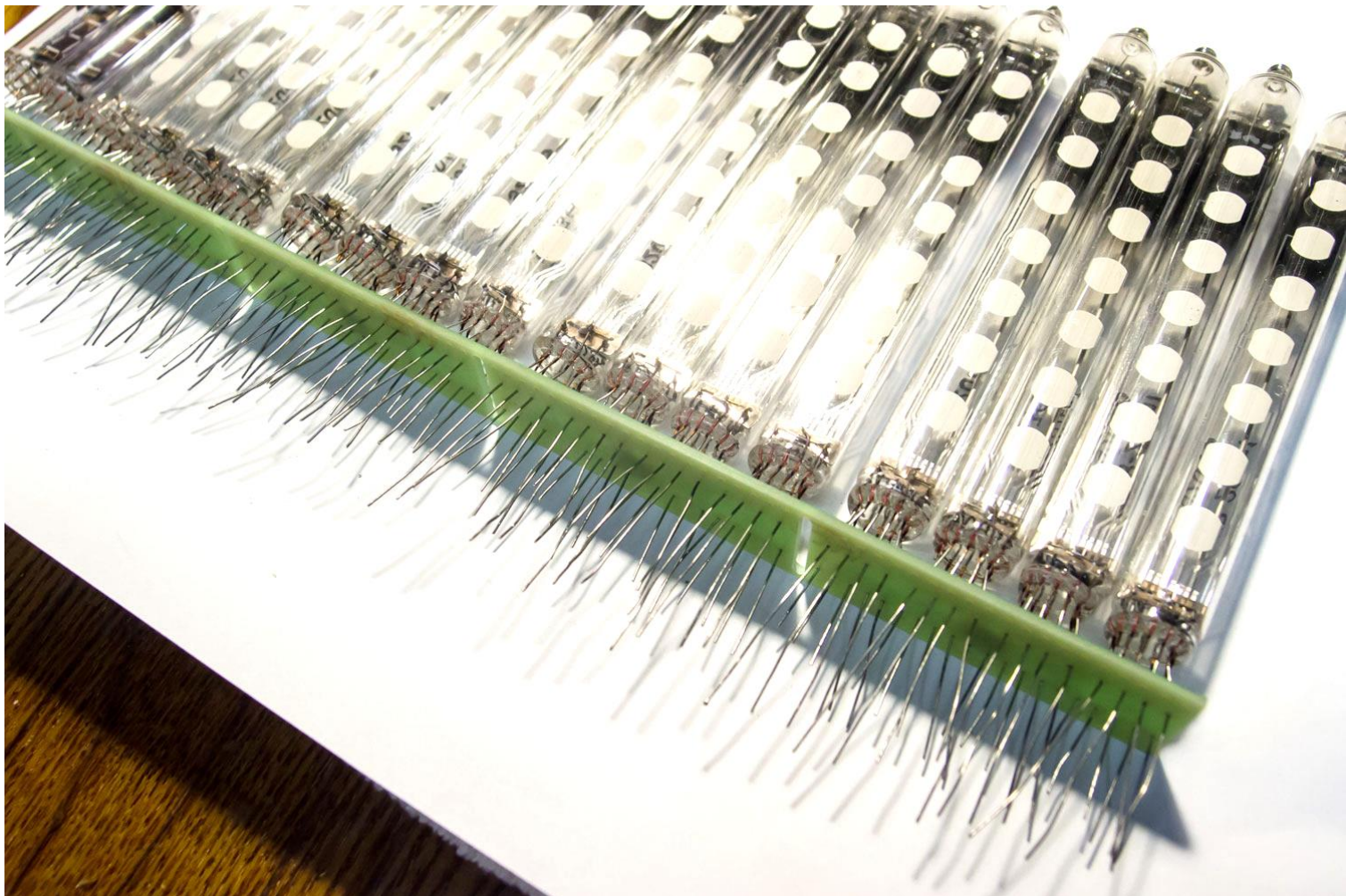
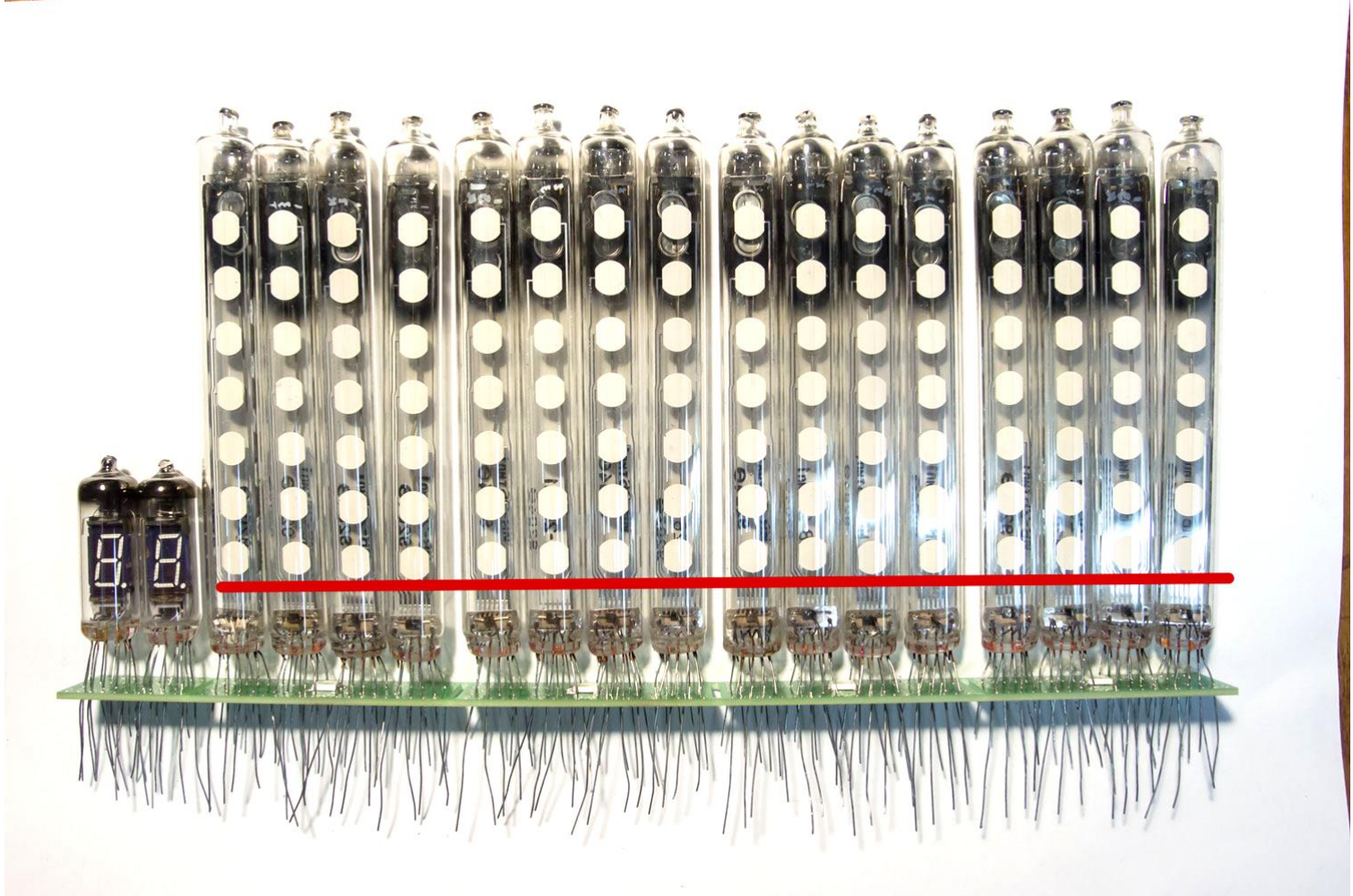


First pin on PCB marked digit "1".



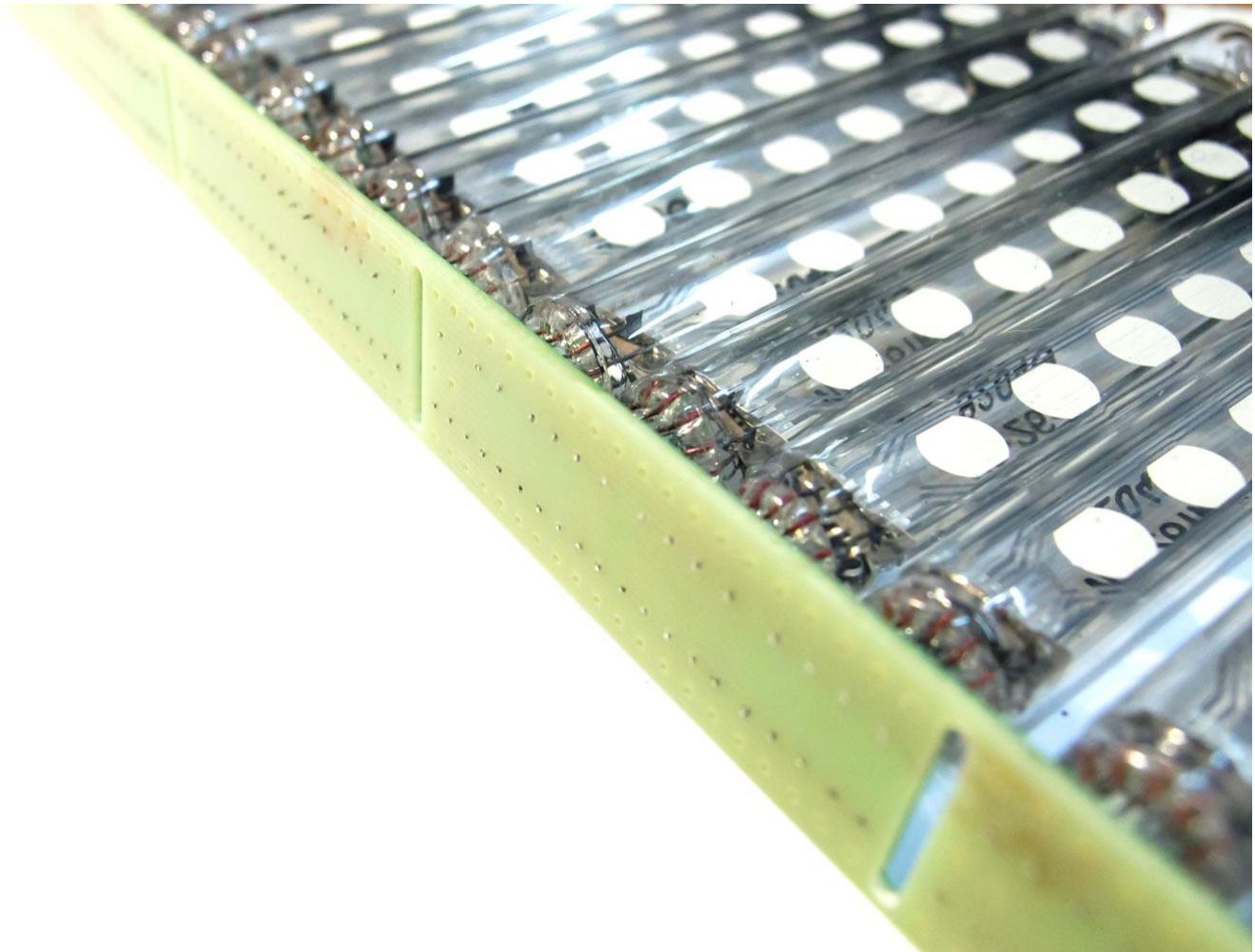
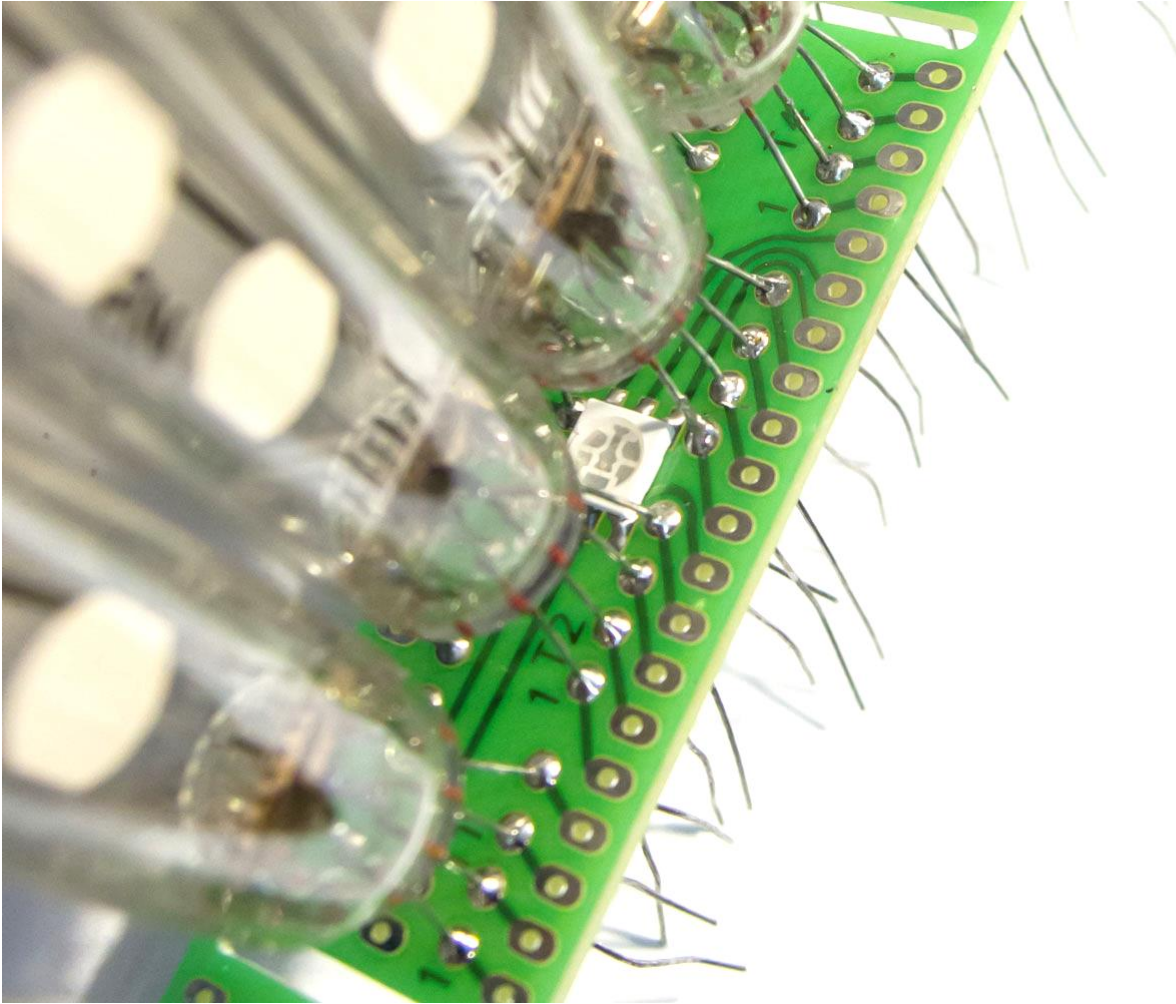


Insert all tubes in small PCB and install them on similar high.



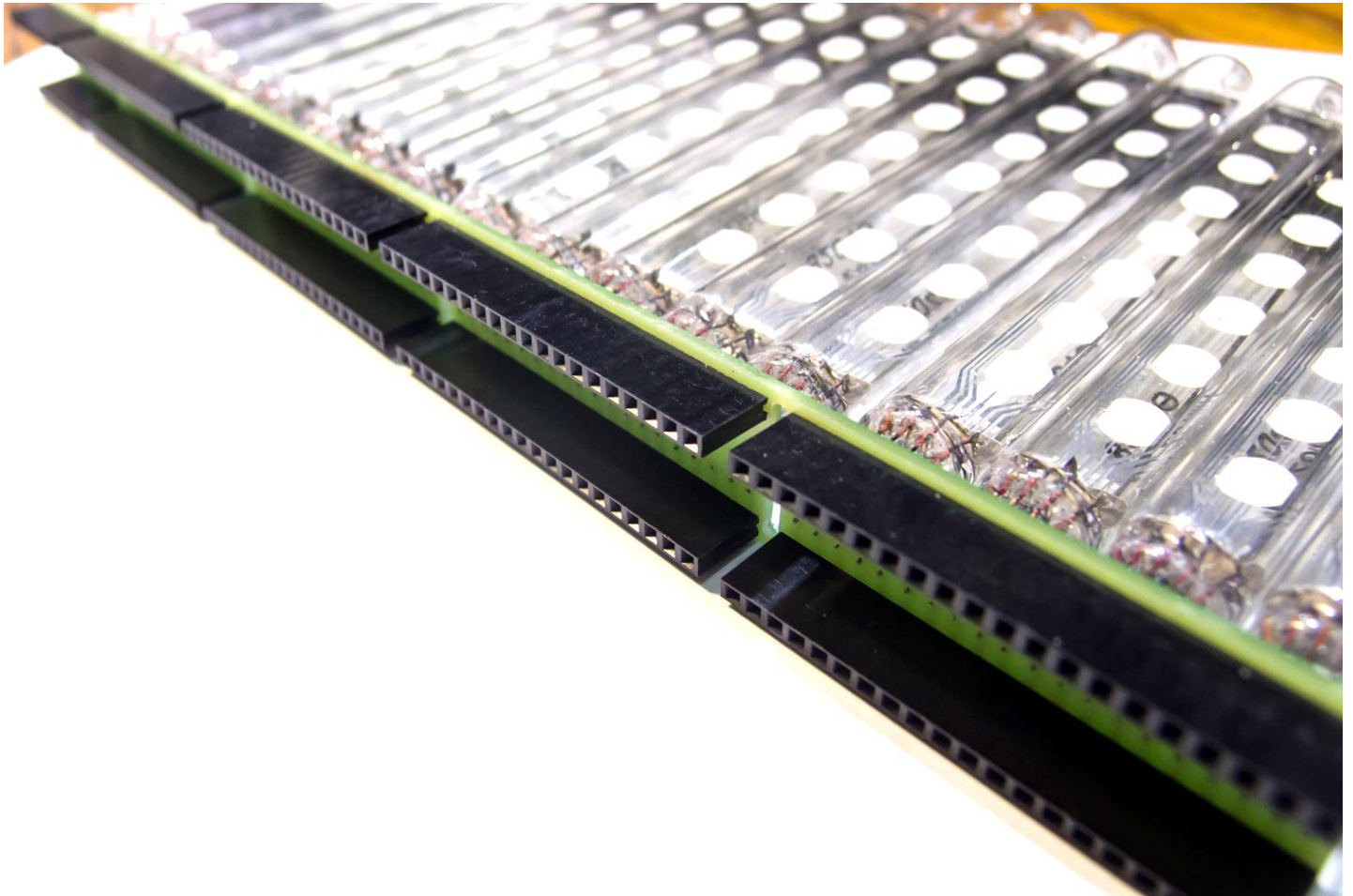


Solder all tubes and cut tubes pins on another side of PCB.

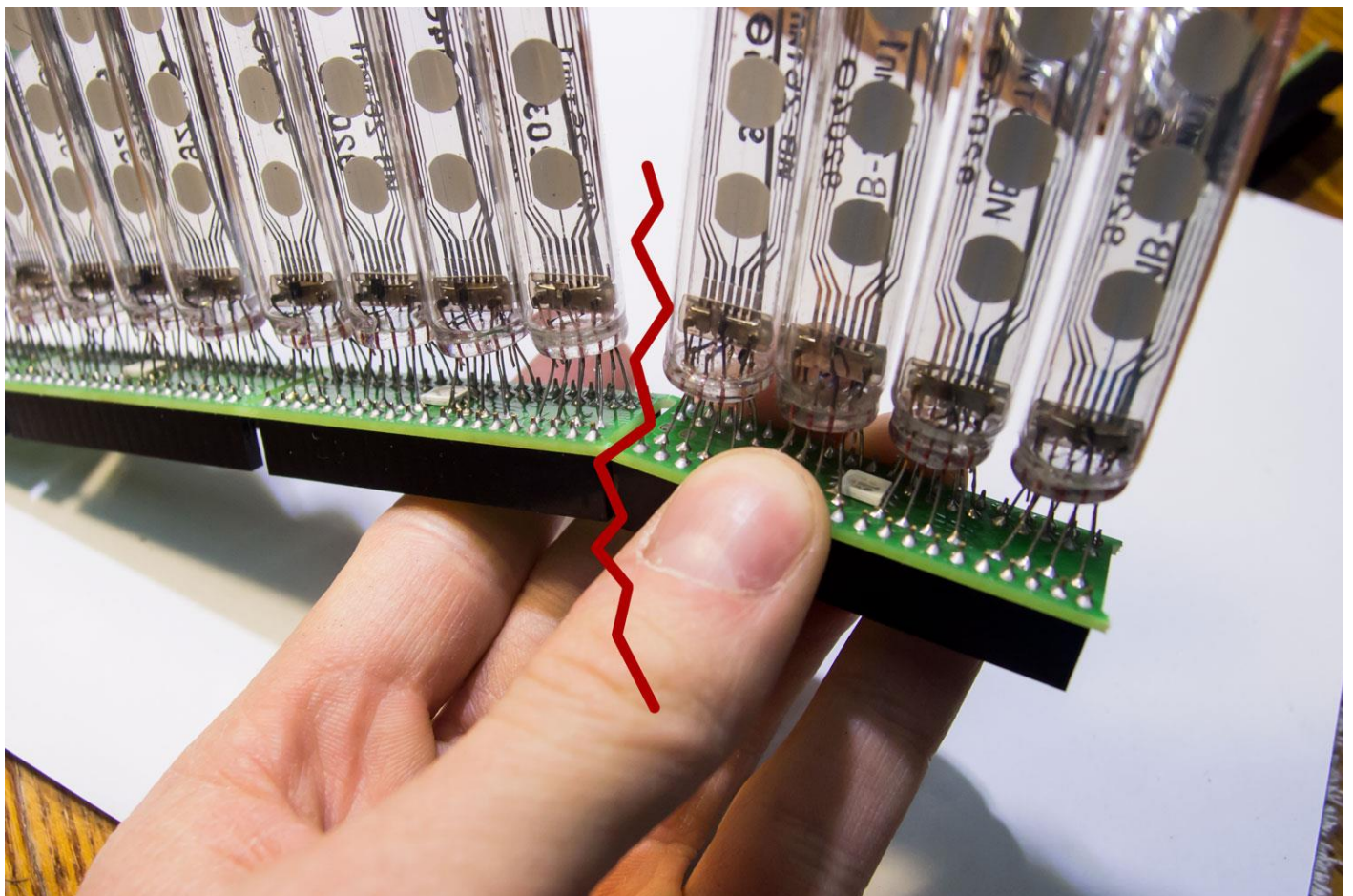




16) Install and solder 20-pin and 10-pin sockets.

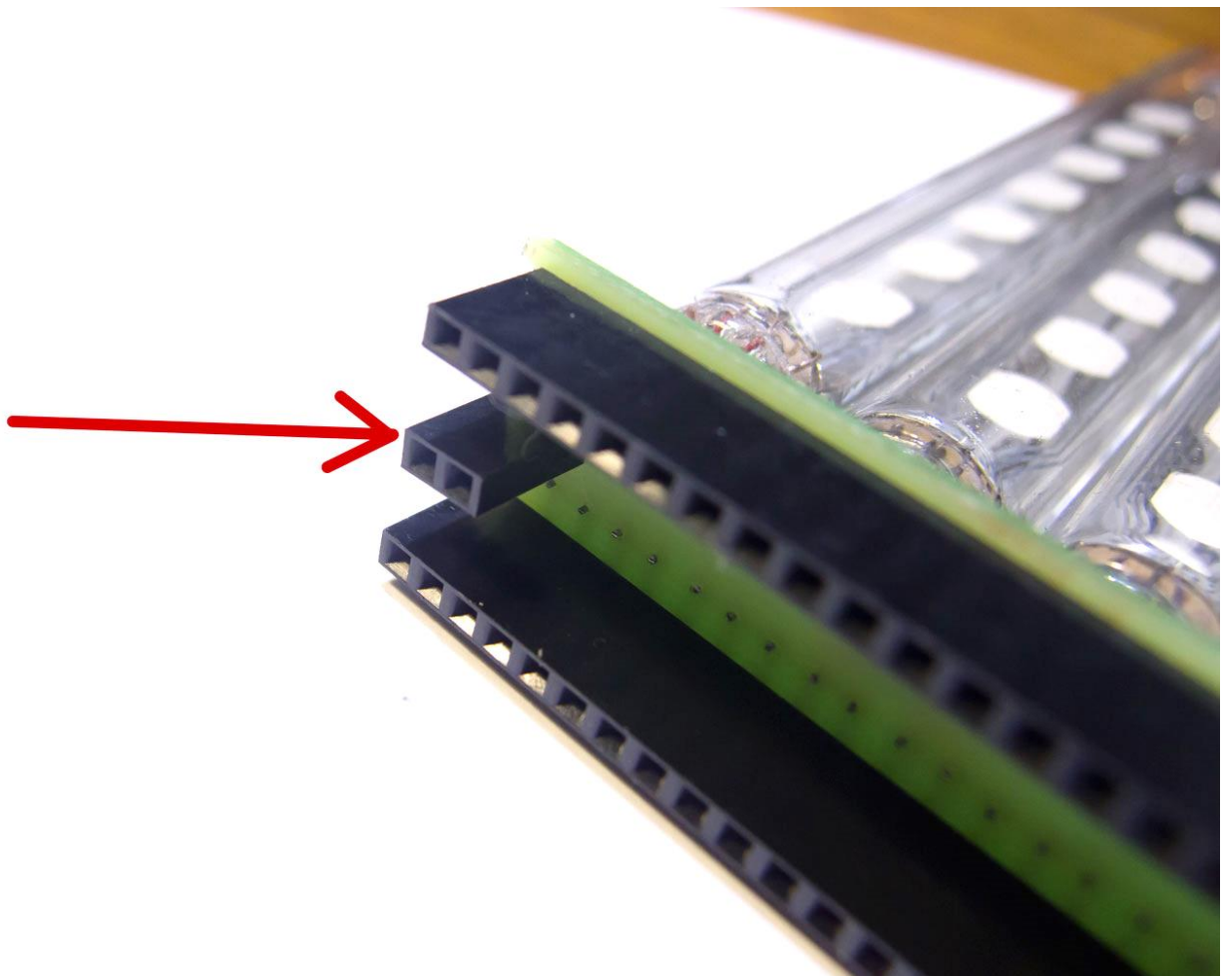
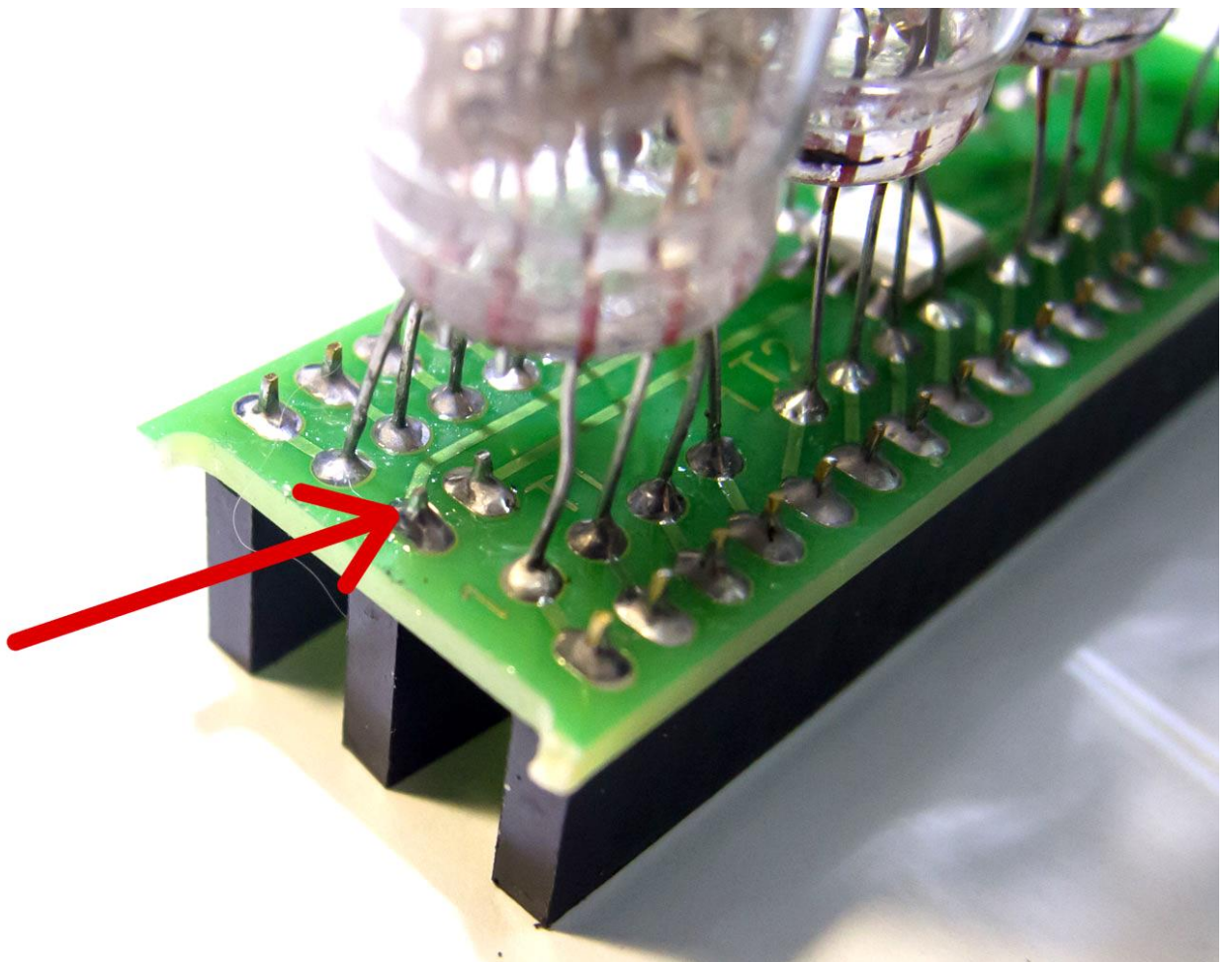


17) Bend and separate modules.



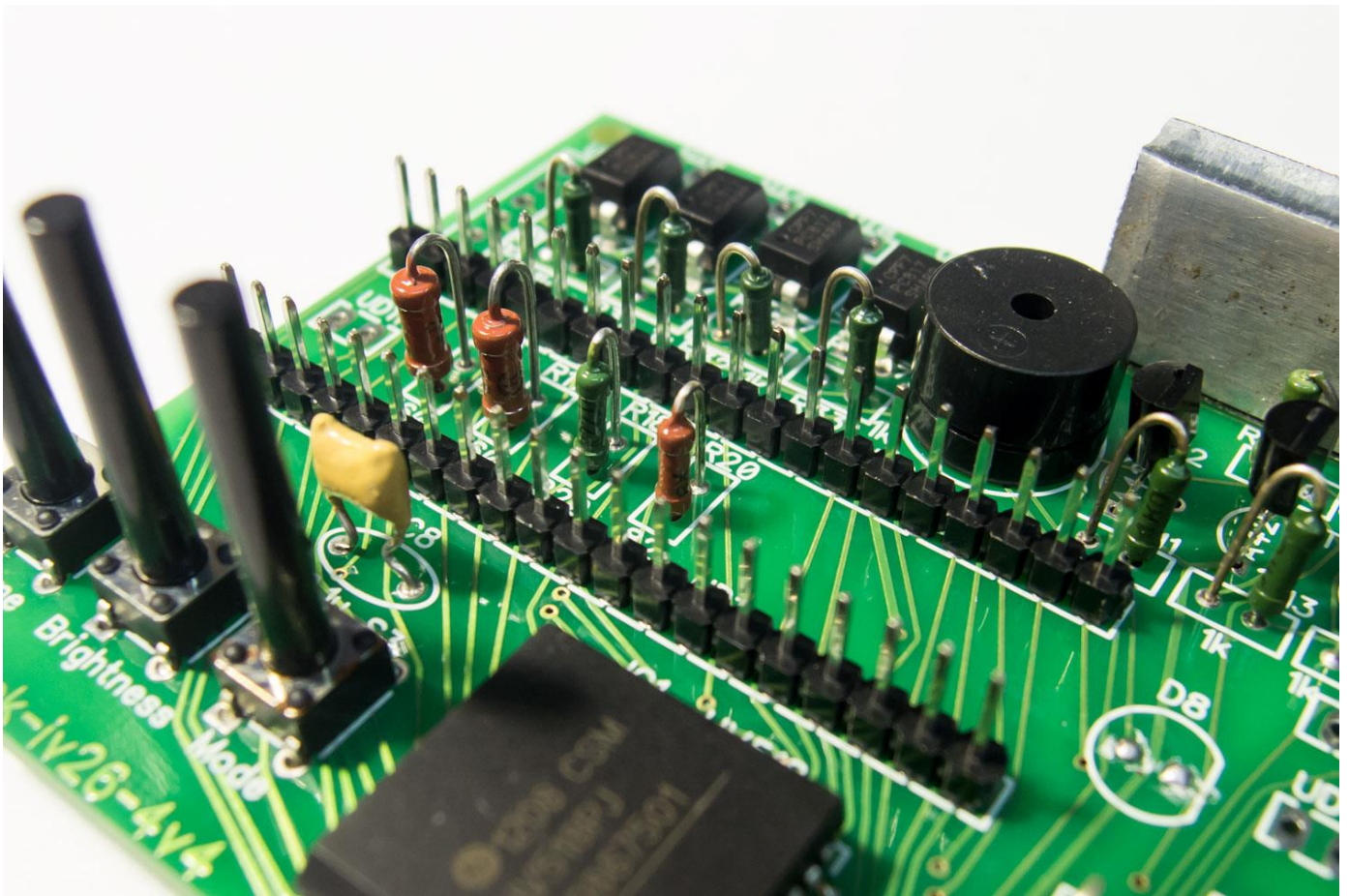
18) Solder 2-pin sockets.





19) Install 2-pin, 10-pin and 20-pin sockets to main PCB.



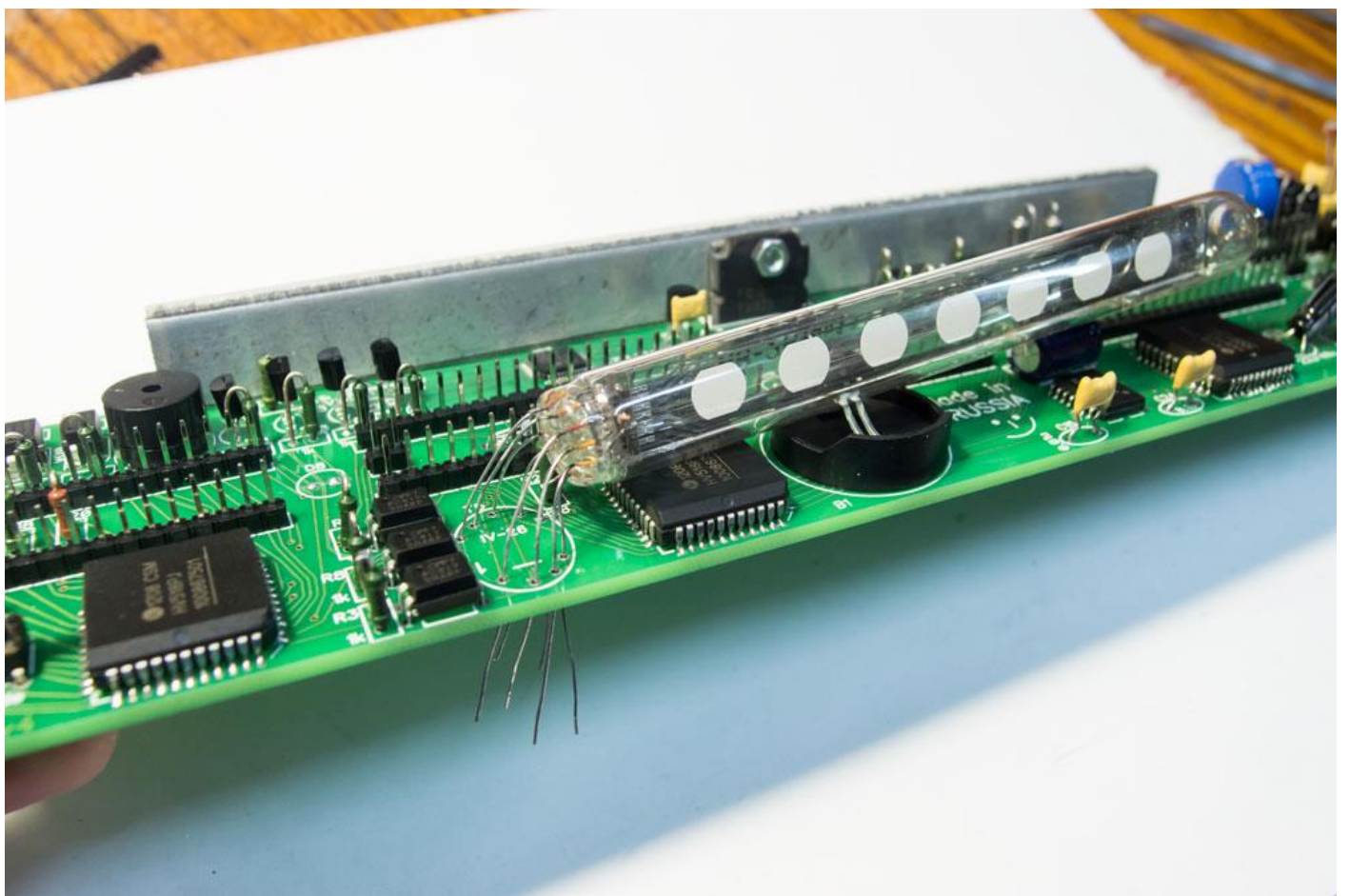
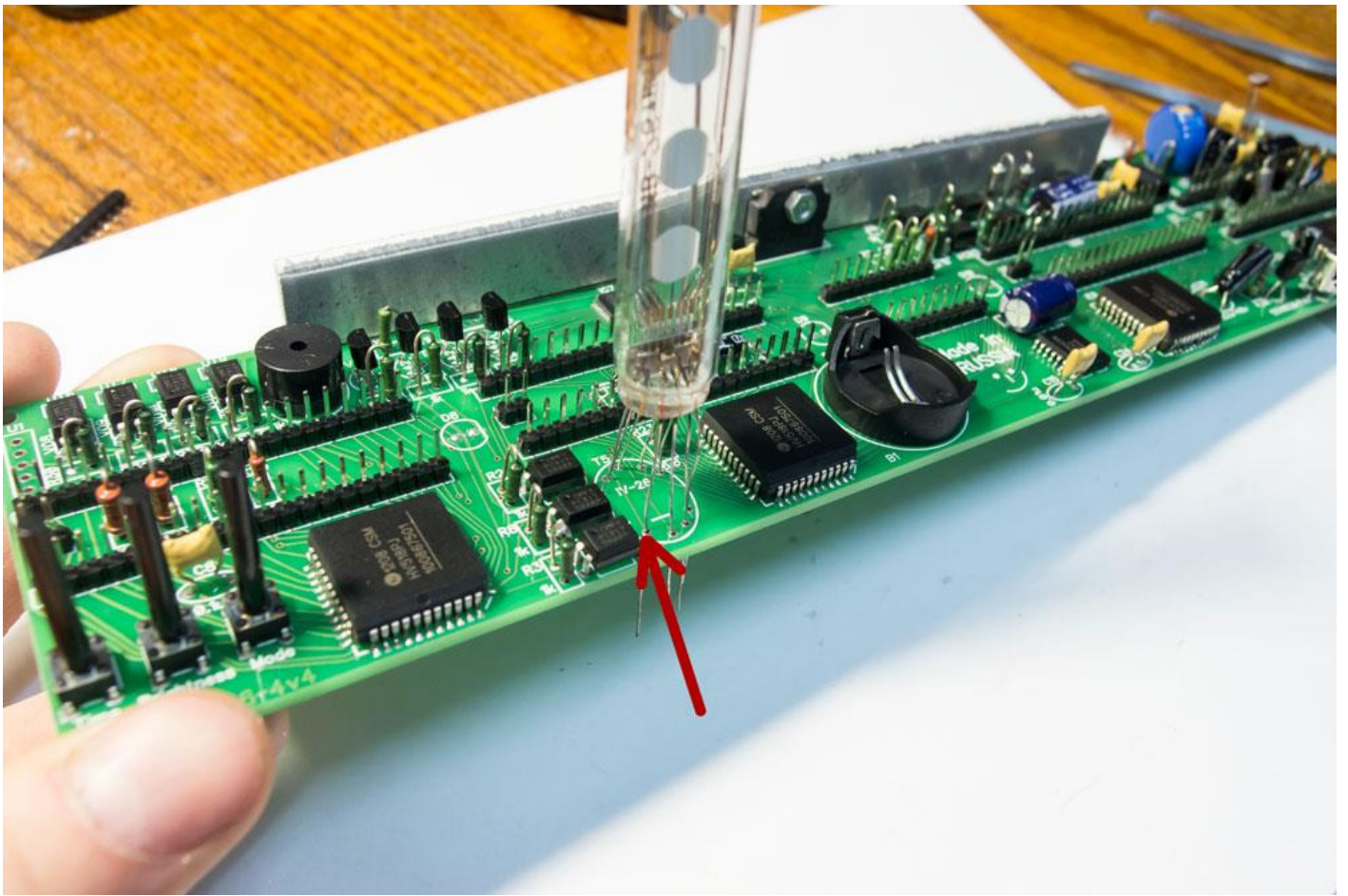


20) At now, you have completely assembled board.



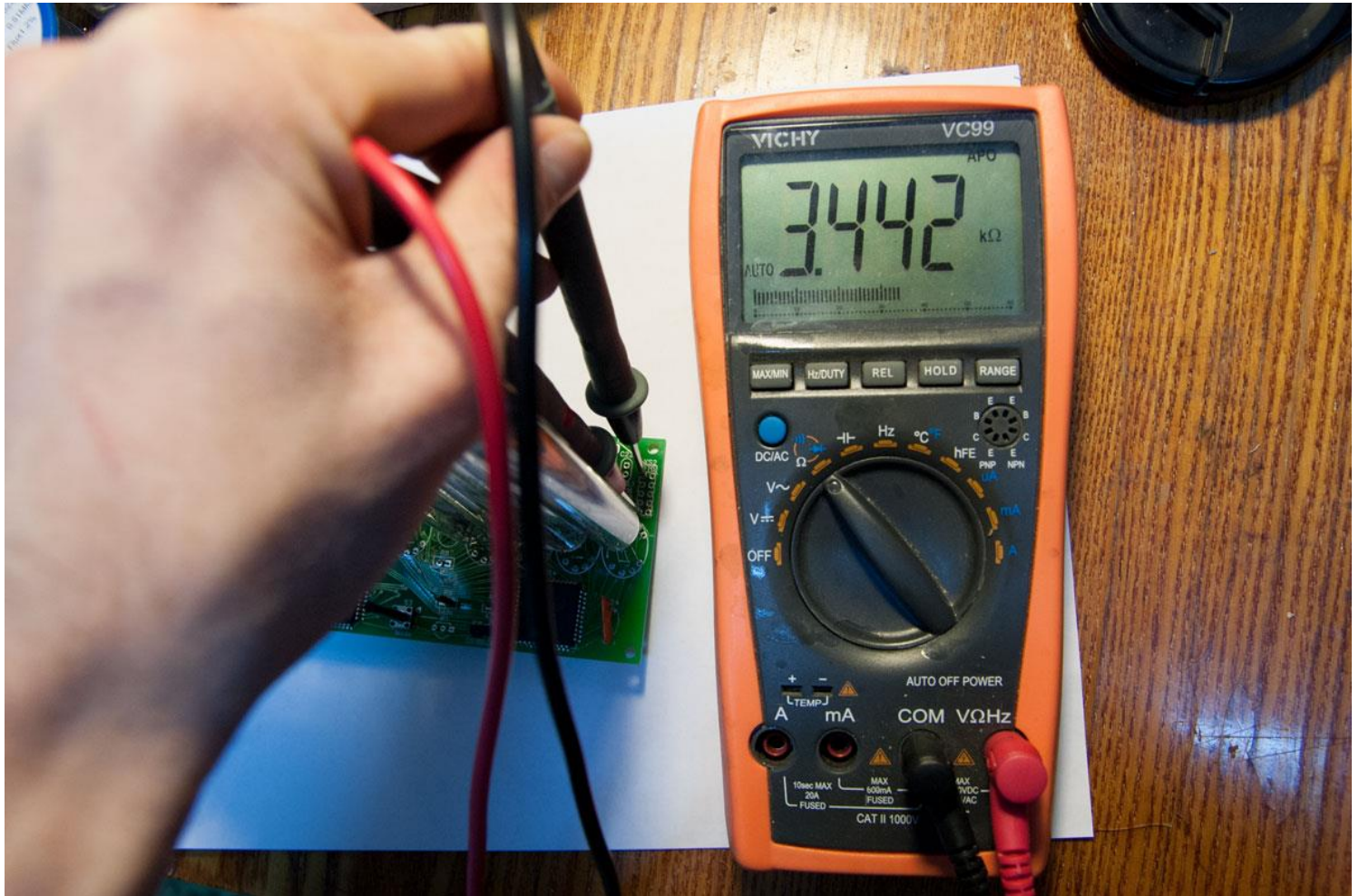
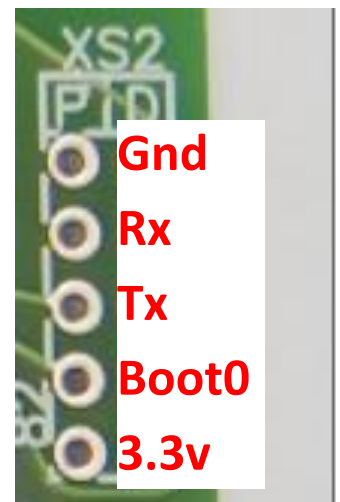
21) Last thing – one IV-26 tube. Insert it in holes on PCB and bend tube to right.





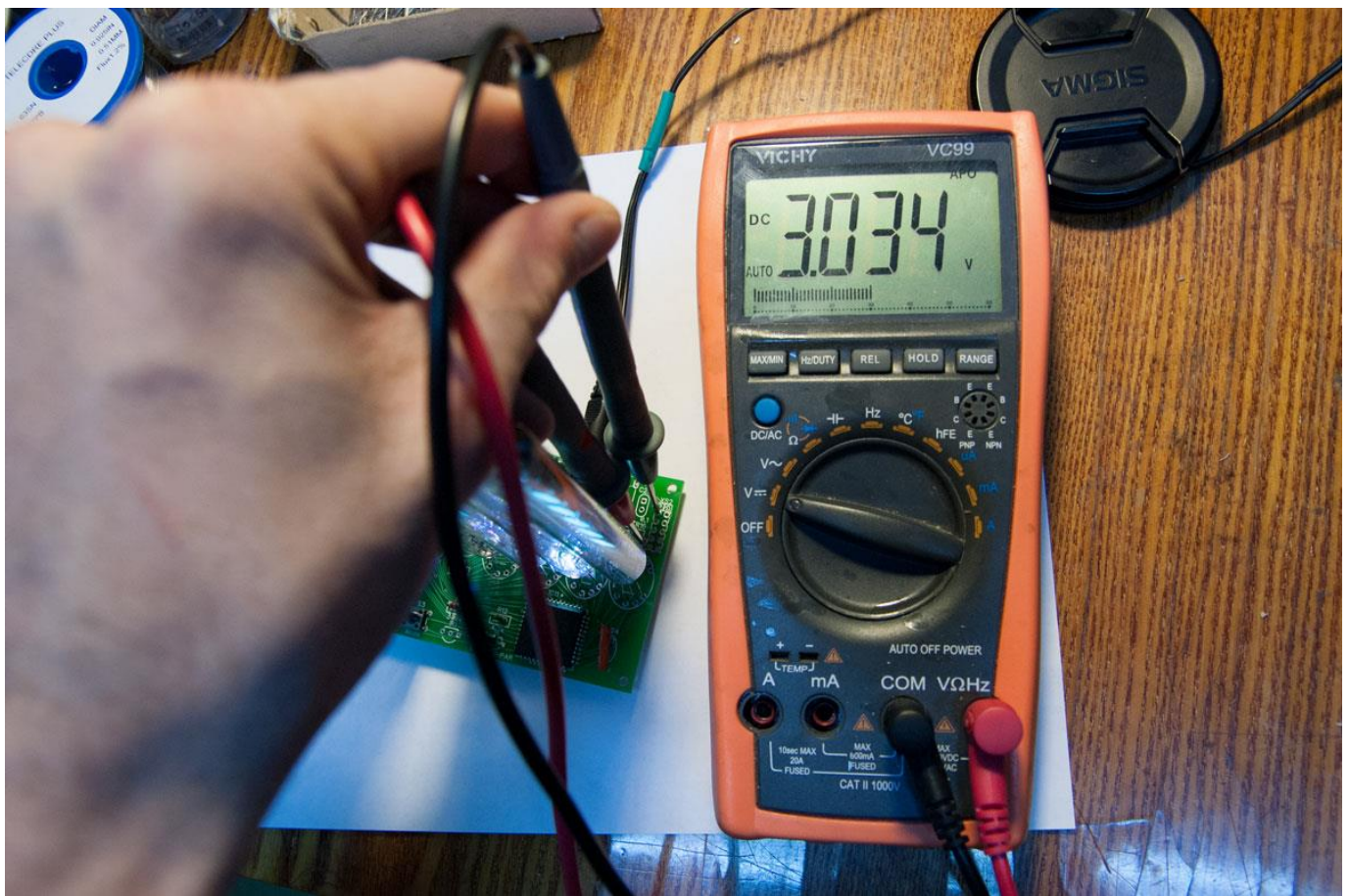


22) Then check the resistance between GND and +3.3V pins of XS2 again. It should be  $\sim 3\text{k}\Omega$ . However, not lower  $1\text{k}\Omega$ .



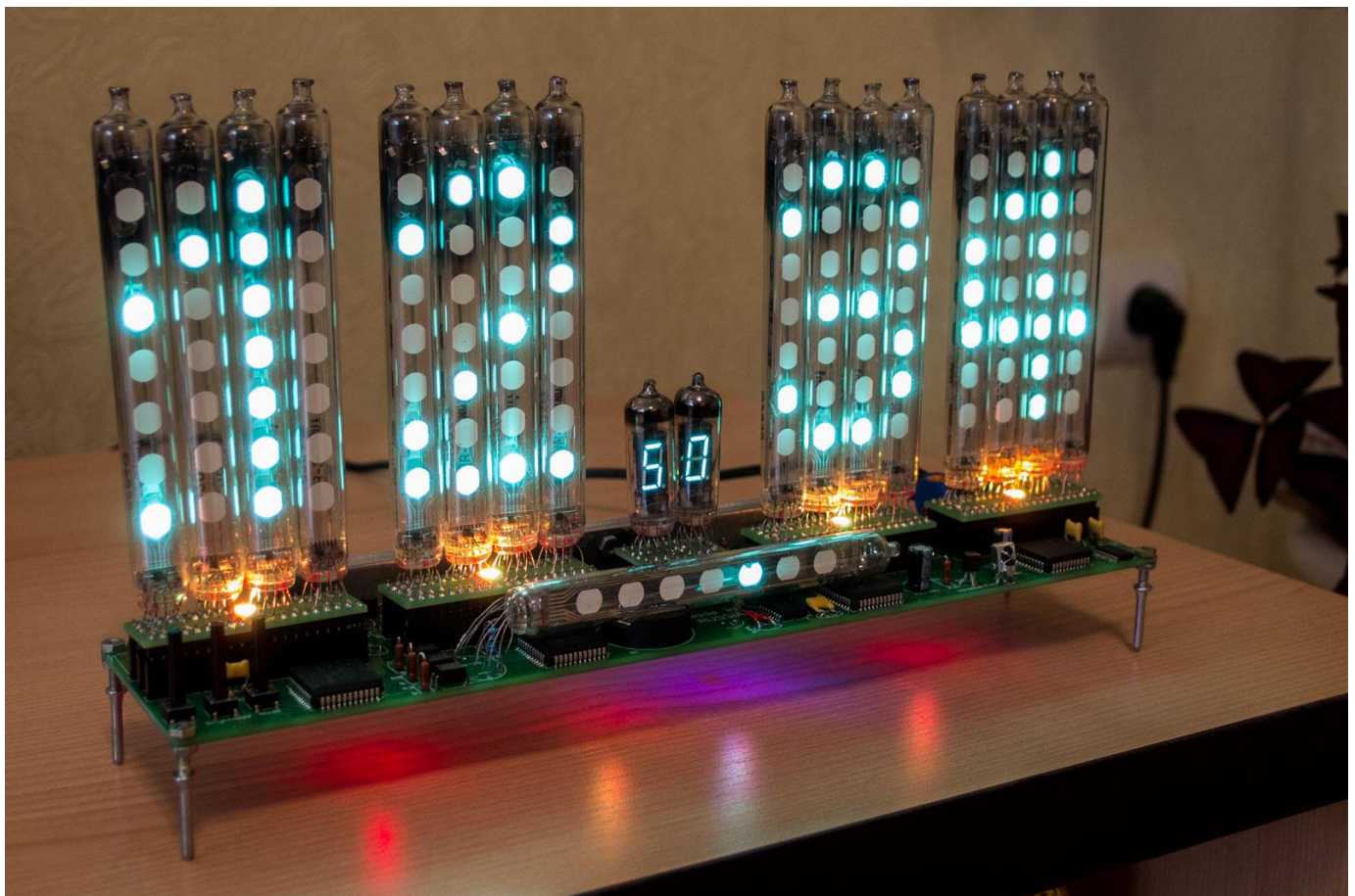
23) Then plug 12V DC adapter. The clock will start to work. Tubes and leds will glowing. If it not happens, check the 3.3V on XS2 between GND and +3.3 pins.



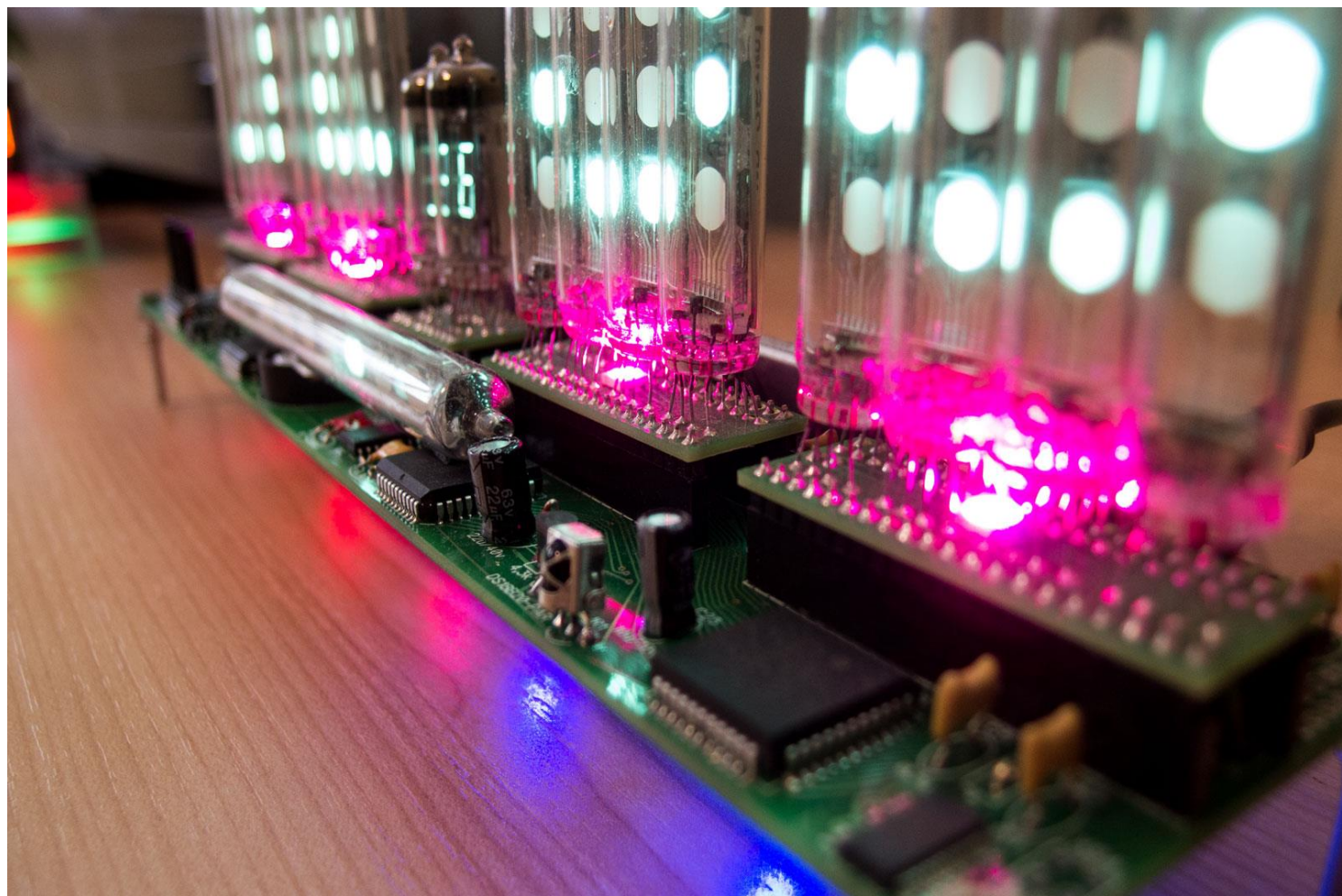
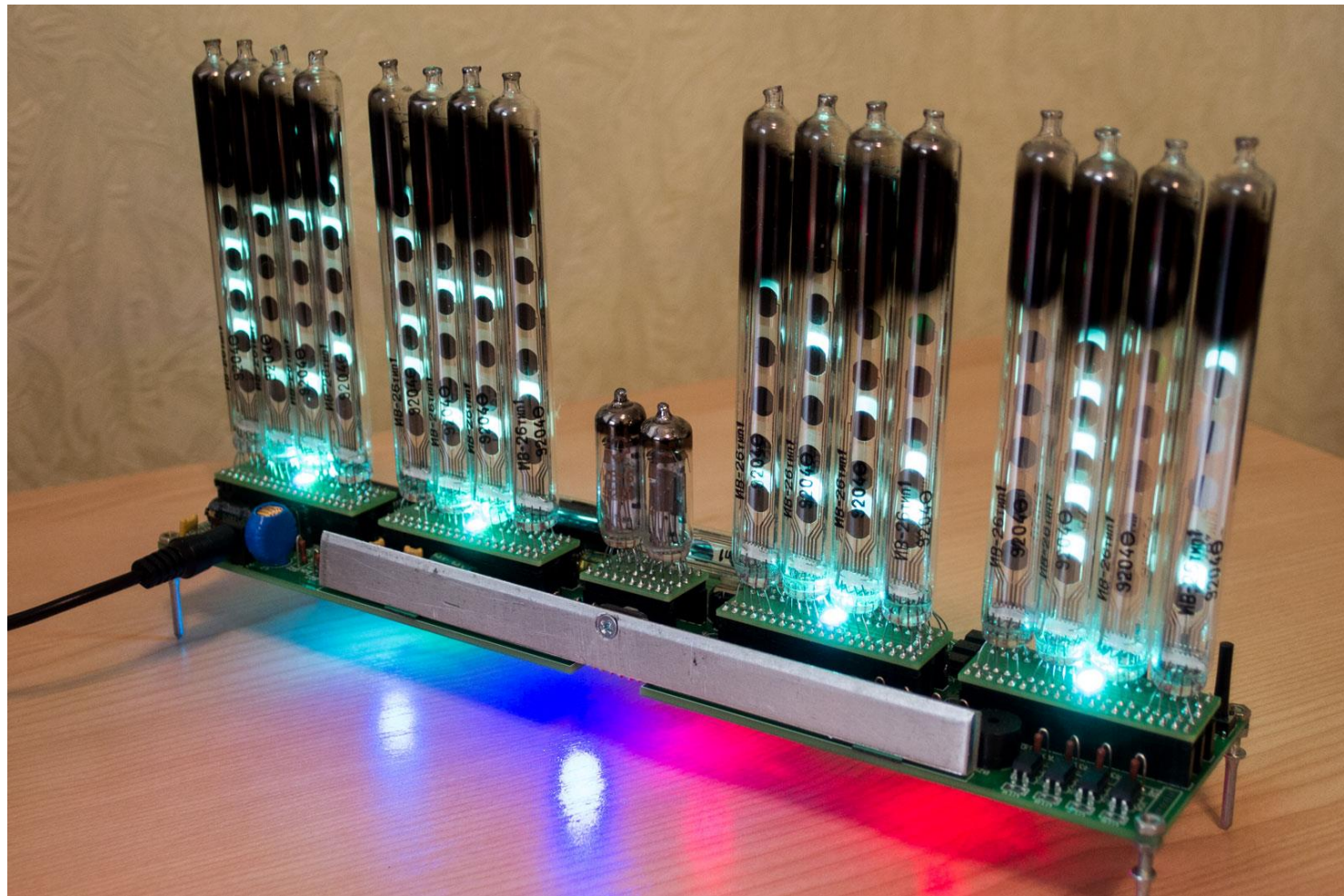


24) After all clock should work.

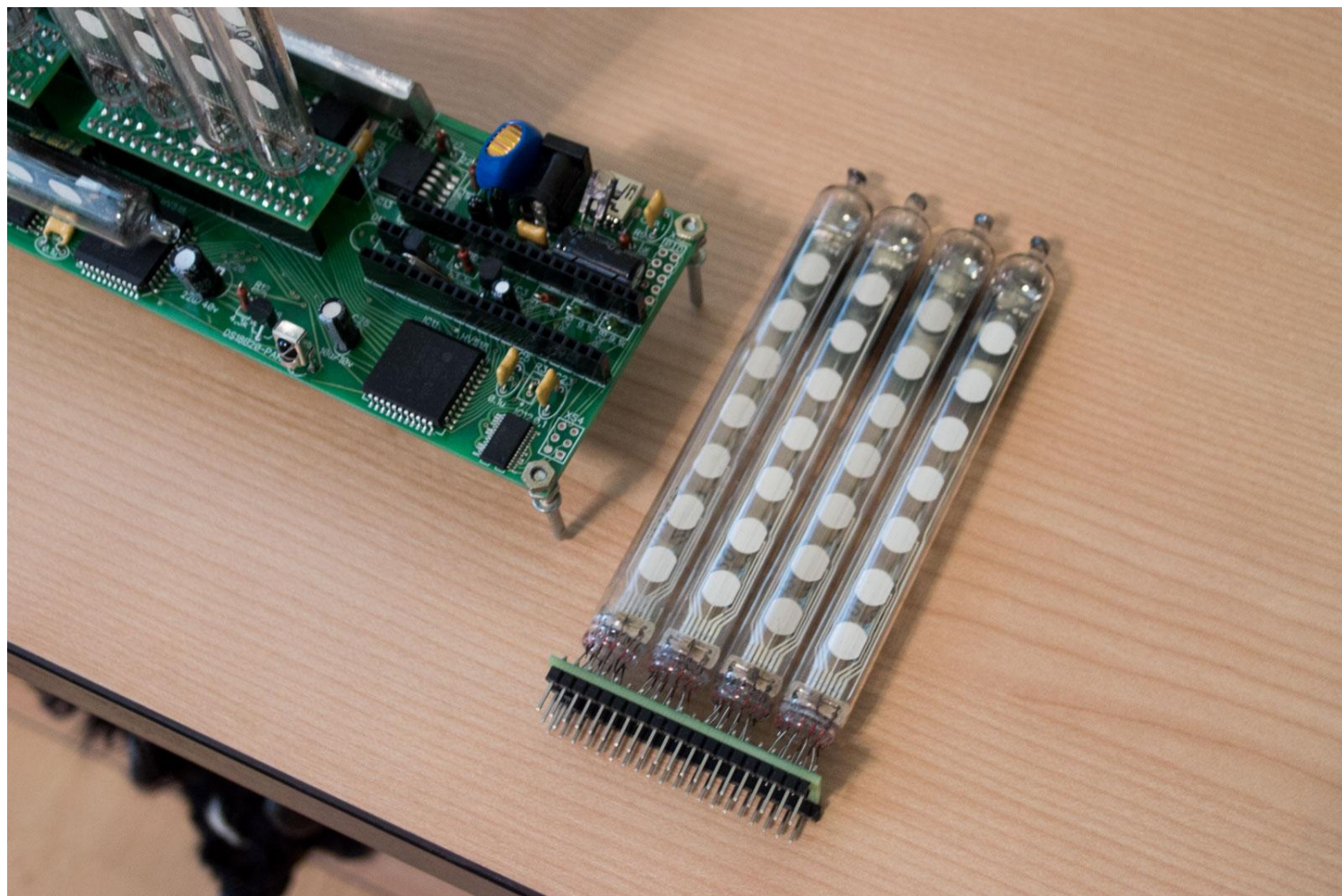
25) Insert modules with tubes in sockets and you will have completely assembled clock.











CONGRATULATIONS!



# SPECIFICATION

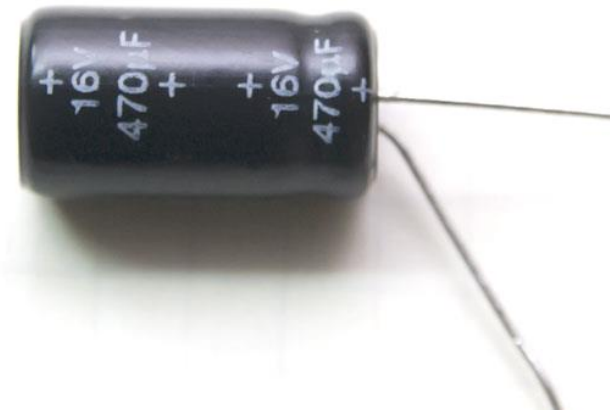
Please note, that elements in kit can be a little different. If you doubt value of element, check it with multimeter.

**IF VALUE OF ELEMENT IN SPECIFICATION AND ON PCB IS DEFFERENT, PLEASE USE VALUES FROM SPECIFICATION AND SCHEMATIC.**

Label	Value	Qty. pcs	Photo
B1	Bat. socket CR2032		
BZR1	Buzzer		
C1,C5-C9 C22-C24,C27	0.1uF	9	



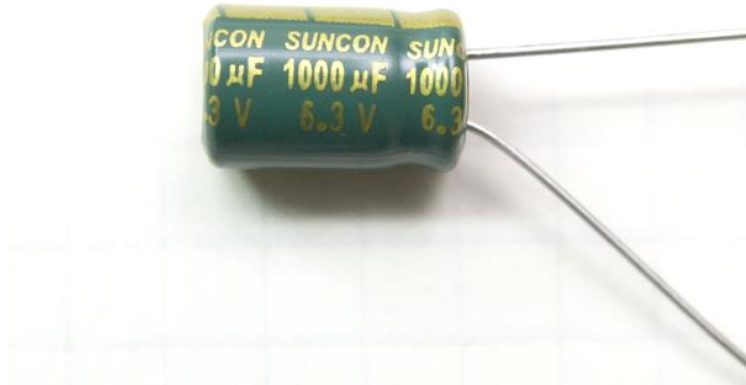
C2	470uF/16v	
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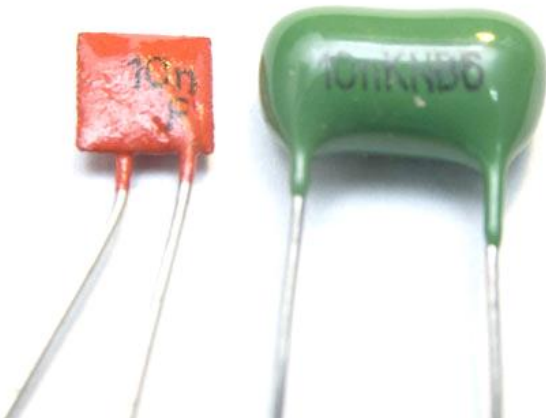
C3,C21	100uF/10v	2
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C4, C11	1000uF/6.3v	2
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C15	10nF	
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C17,C18,C20

1uF/25v

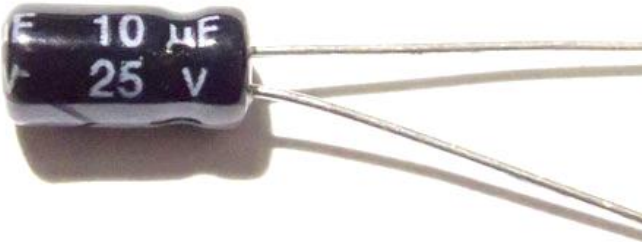
3



C19,C25

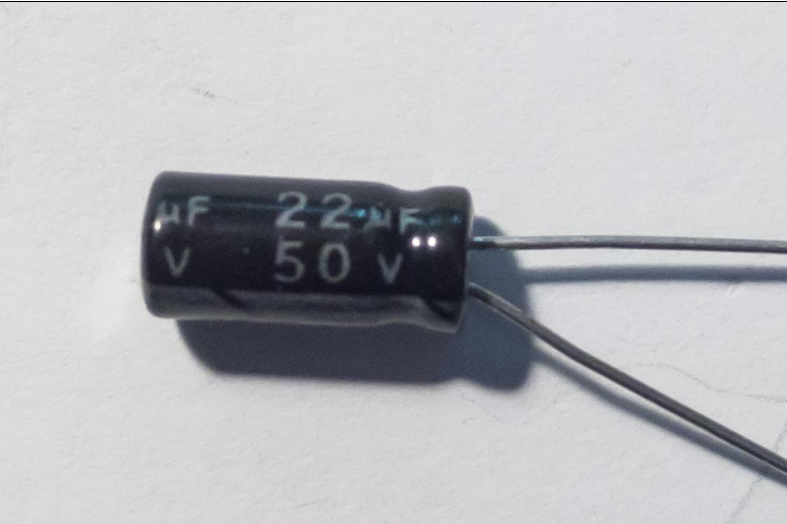
10uF/25v

2







C26

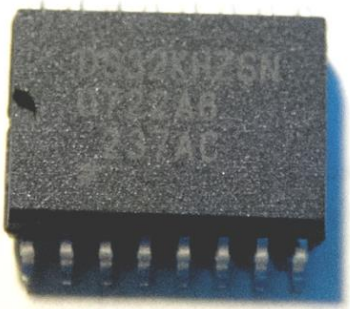

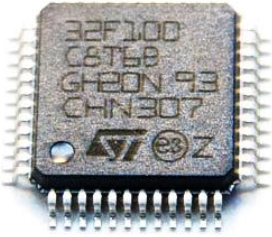

22uF/50v




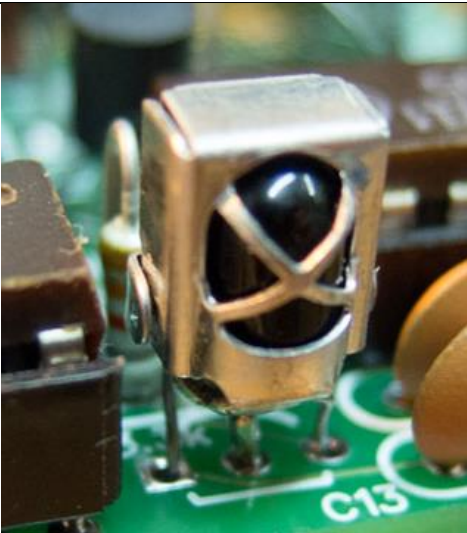
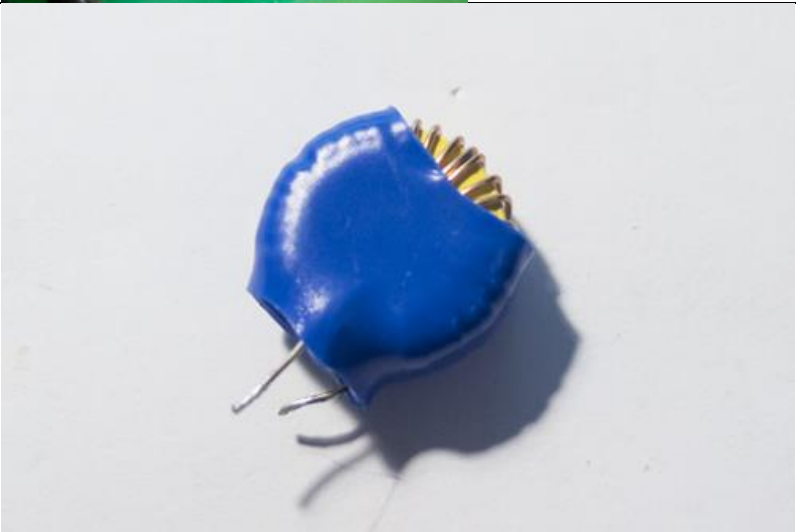


D1	D310	2	
D4	1N5819		
D8-D11	LED Auto	4	
IC1,IC6 IC9,IC11	HV518	4	
IC2	L7805ABD2T		







IC4	DS32kHz	
IC5	L78L33ABZ	
IC7	STM32F100C6T	
IC8	DS18B20-PAR	



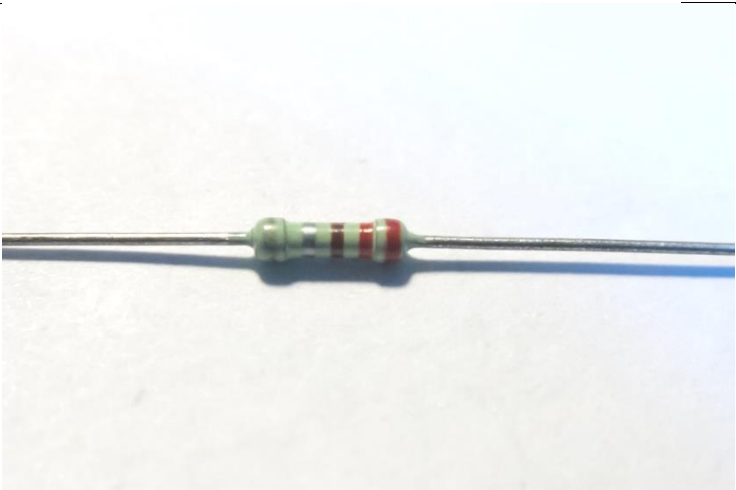



IC10	TA8201AK		
IC12	FT232RL		<b>NOT USES</b>
IC13	XL6009EI		
IR1	IR-sensor		
L2	47uH		


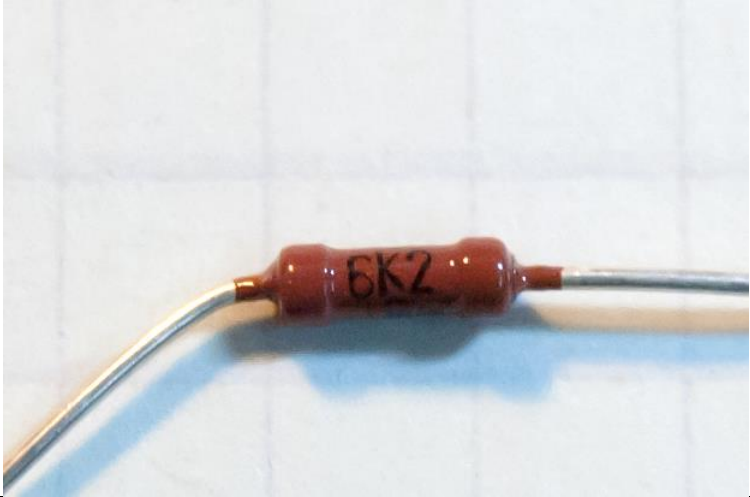



PH1	SF2-1		
R2- R6,R8,R11 R13- R15,R24,R25 R29-R33	1k	17	
R7,R10, R26,R28	9,1k	4	
R9	300k		





R12	4,3k		
R16,R17	150/160	2	
R18	220		
R19	3.3k		



R20	82		
R21	6.2k		
R22	2.7k		
R23	6.8		
R27	22k		
R34	*		
S1-S3	Buttons	3	



T5	IV-26 tubes	17	
	IV-6 tubes	2	
UD1-UD8	20-pin female socket	8	
UD9,UD10	10-pin female socket	2	
UD11-UD14	2-pin female socket	4	
	20-pin male socket	8	
	10-pin male socket	2	
	2-pin male socket	4	



VO1-VO11

PC817

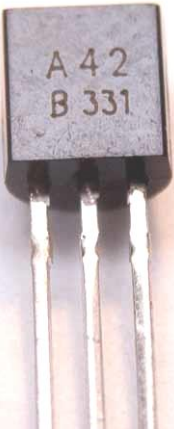
11



VT2-VT7

A42

6



XS1

Power plug

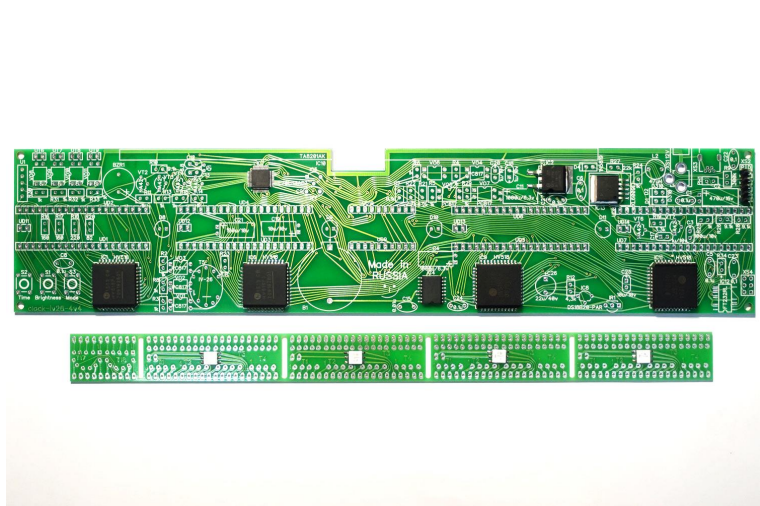


Battery

CR2032



PCBs



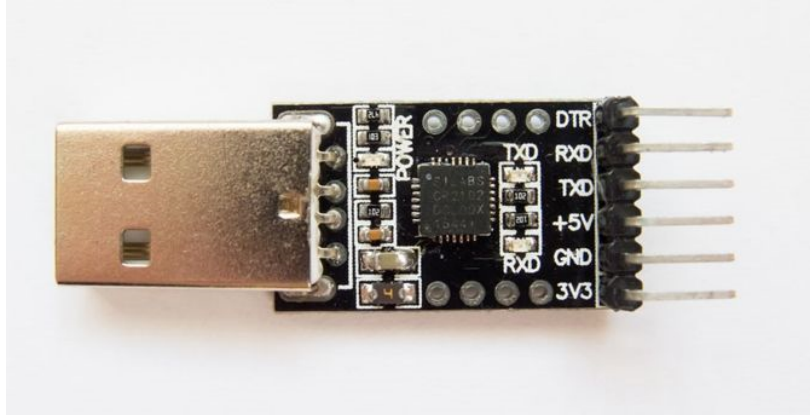
Remote control



Radiator



Programmer



Case



Screws

8



Power  
adapter

12V, 1A



[www.Kama-Labs.com](http://www.Kama-Labs.com)

\*\*\* Marusya \*\*\*

Assembled my own hands 😊



# Thanks for purchase!!!

## Features:

- \* 17x Soviet IV-26 VFD tubes (made in 1980-90)
  - \* 2x IV-6 VFD tubes
  - \* Lifetime tubes 15-20 years
  - \* 4mm plastic case
  - \* Unique smooth routing of PCB
- \* 32bit STM32F100C8 processor
  - \* 12/24h time mode
  - \* Fade leading zero
  - \* 1 Alarm
- \* Tubes can be OFF at night by timer and by RC
  - \* Full functional IR remote control
- \* USB connection to PC. (for firmware update or you can write your own)
  - \* IV-26 tubes work in static mode
- \* Double Multicolour adjustable led glow (4x independent random color leds and 4x RGB led)
- \* Automatic brightness of tubes, RGB leds and autoleds
  - \* 6 modes of switch digits
  - \* Thermometer
  - \* Temperature C° or F°
  - \* Correction of temperature
  - \* Accurate to +/- 1 minute/year
- \* Date in format DD.MM.YY or MM.DD.YY
  - \* RGB led (6 colors of backlight)
- \* Backup battery. Data is no lost when power off
  - \* 3 buttons
- \* Power source - DC 12V barrel plug 5.5mm/2.1mm ( "+" inside, "-" outside)
  - \* Consuming current - no more 500mA
  - \* Noiseless work
- \* Dimensions of the clock - 280mm(11in) x 62mm(2.44in) x 125mm(4.92)
- \* Dimensions of the clock in plastic case - 315mm(12.4in) x 95mm(3.74in) x 155mm(6.1)

## Button function:

Short click = ~0.5 sec.

Long click = ~1 sec

**First Button:** Short click - show: date, alarm, temperature

Long click - time setup

**Second Button:** Short click - change brightness of tubes

Long click - parameters setup

**Third Button:** Short click - change effect

Long click – led color and brightness setup

## How to set time? Easily!

- 1) Press and hold **First Button** ~1 sec
- 2) Hours tubes start to blink
- 3) Press **Second Button** for increment value
- 4) Press **First Button** for change digit
- 5) Seconds will reset to "00" if you will press **Second Button**
- 6) Press **First Button** for exit from setting time mode

## How to set current date? Simply!

- 1) Press **First Button** shortly
- 2) You will see date in DD.MM.YY format
- 3) Press and hold **First Button** for enter into date setup mode
- 4) Similarly like you set time, set date.

If you will press **First Button** shortly and then press **Second Button**, you can change date show parameters. Date can be shown every 5 minutes or 10, or be turned off.

## How to set alarm? Lightly!



Similarly like date setup. Moreover, you can turn on/off alarm here.

## How to change parameters? Readily!

1) Press and hold **Second Button**

2) You will see number of parameter and value of parameter in second tubes:

**1 2 1.0 2 4**

3) Press **Third Button** for change value

4) Press **Second Button** for go to next parameter

No	Parameter	Value
1	12/24 time format	0 - 12h time format 1 - 24h time format
2	Date format	0 - DD.MM.YY 1 - MM.DD.YY
3	Hi.Hour tube fading	0 - enable fading 1 - disable fading
4	Effect of change digit influence to 1 digit or to all digits	0 - 1 digit 1 - all digits
5	Temperature units	0 - °C 1 - °F
6	Correction of temperature coefficient	Current temp. - temp.coeff. = real temperature

## How to setup led backlight? Airily!

1) Press and hold **Third Button**

2) You will see **CLR** text on tubes

3) Press **First Button** to change brightness of bottom leds

4) Press **Second Button** to change brightness of top **RGB** leds

5) Press **Second Button** to set next color of **RGB** leds

## How to change effect of time show?

Just press **Third Button** and choose effect what you like.

Long click  
~1 sec.      Short click

