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ASSEMBLY MANUAL FOR

KATUSHA v2

CLOCK

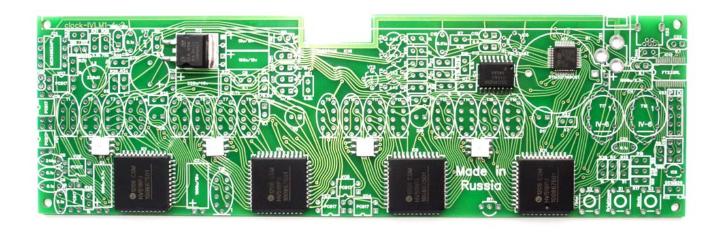
Be very careful with static electricity. If clock not work after build its mean that they been

damaged by static electricity in process of assemble.

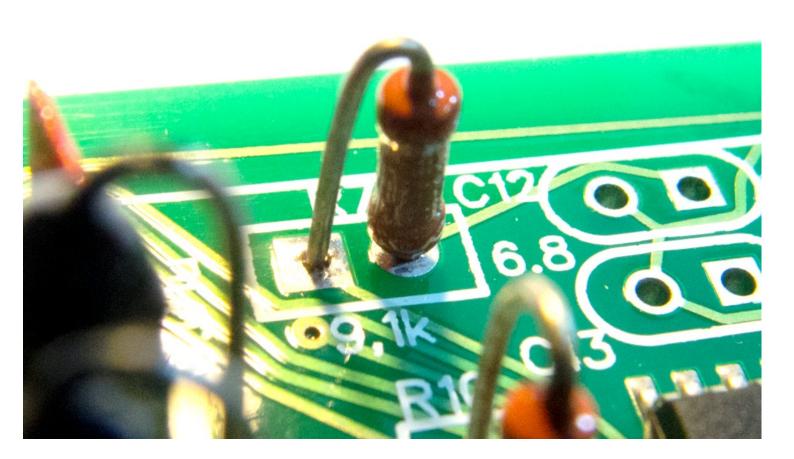
Check resistance between +3.3 and GND pins of XS2.

The resistance should be not lower 1kOhm.

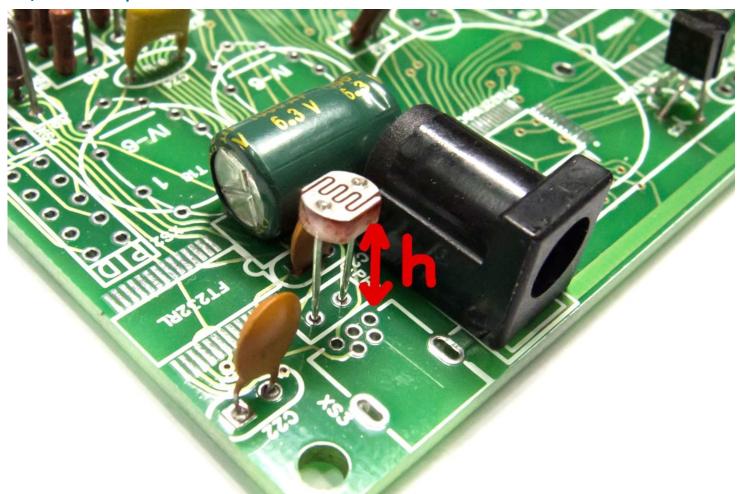
1) You have a PCB with ICs:



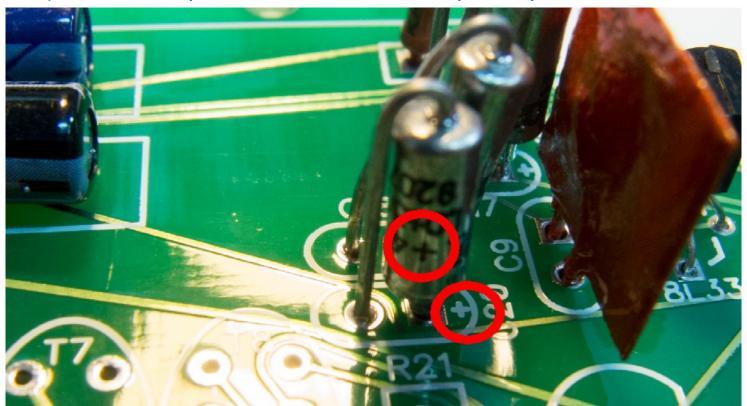
2) Place all resistors vertical.

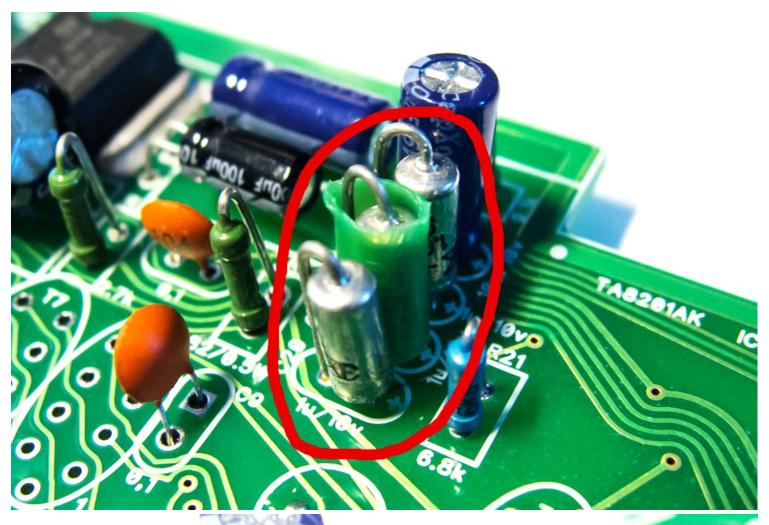


3) Place photoresistor. I recommend to make h = ~20mm.

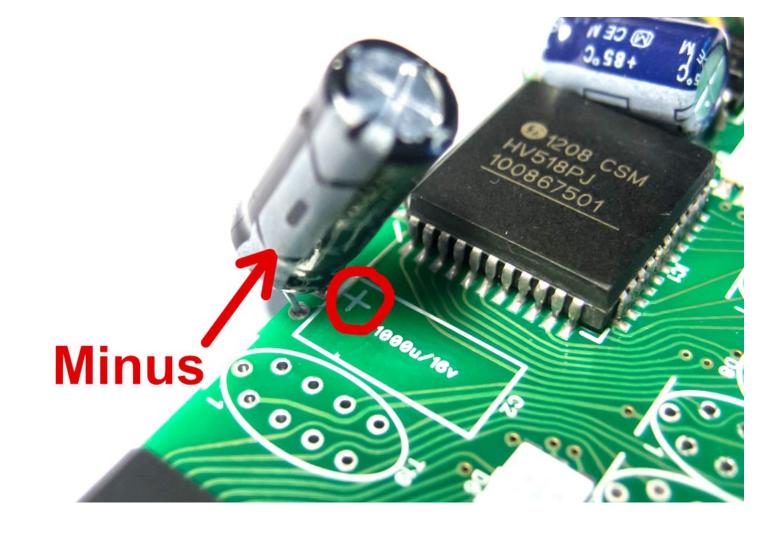


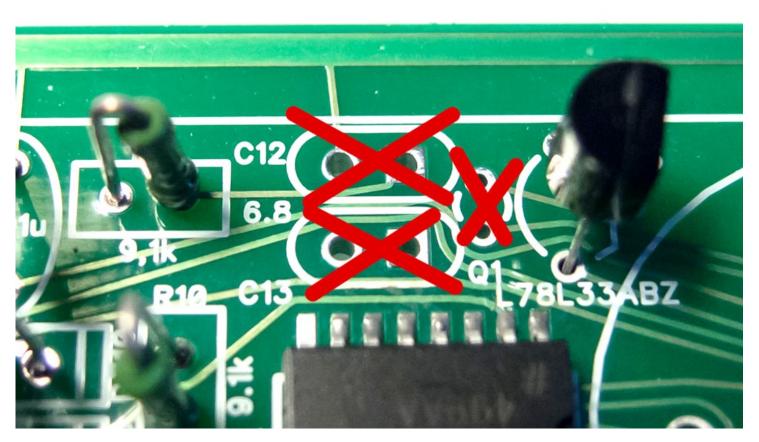
4) Place all capacitors. Be careful with polarity!





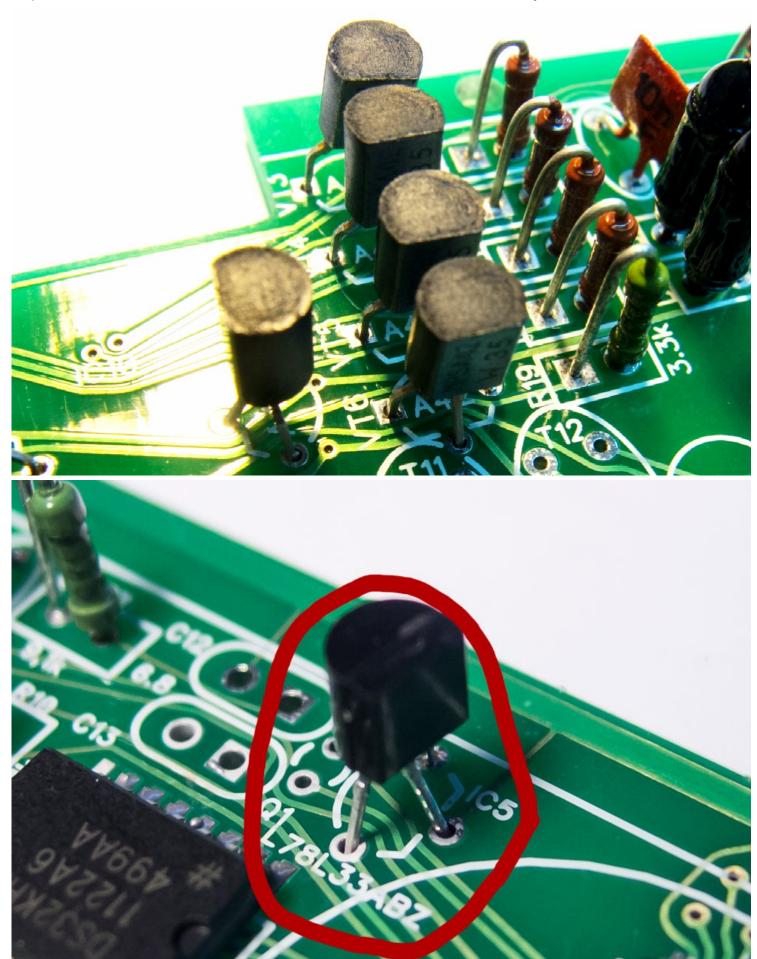


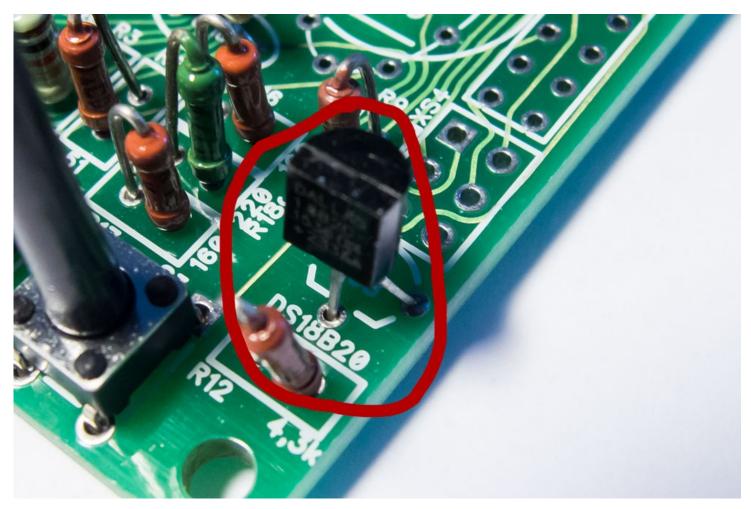




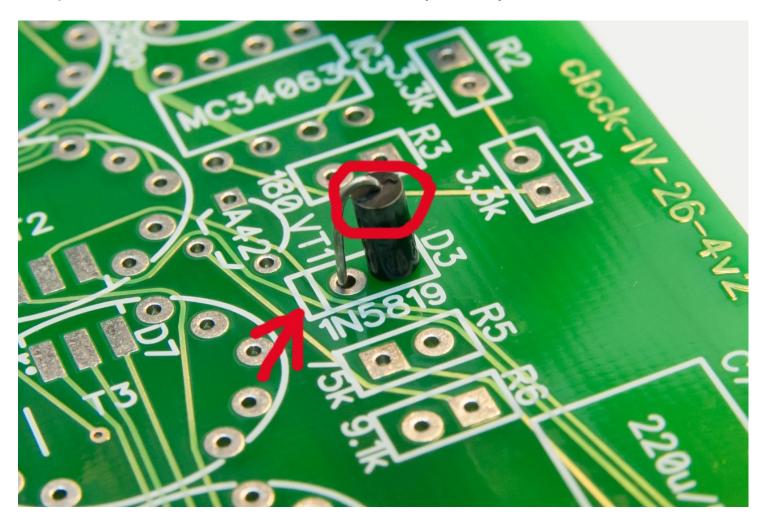
C 12,C13 and Q1 should be empty!

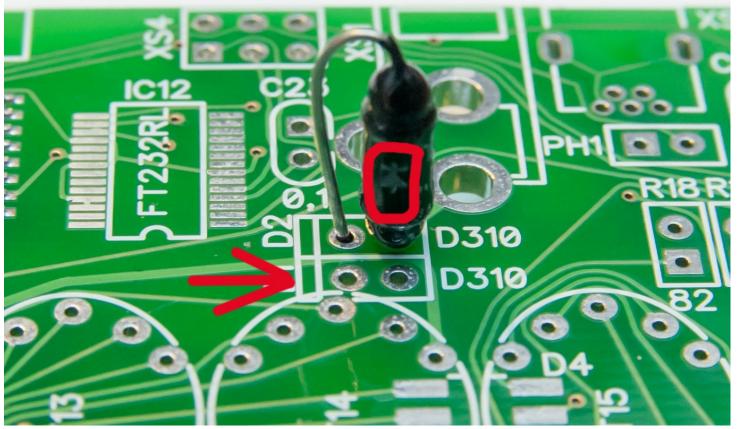
5) Place all transistors, 3.3v stabilizer and temperature sensor:

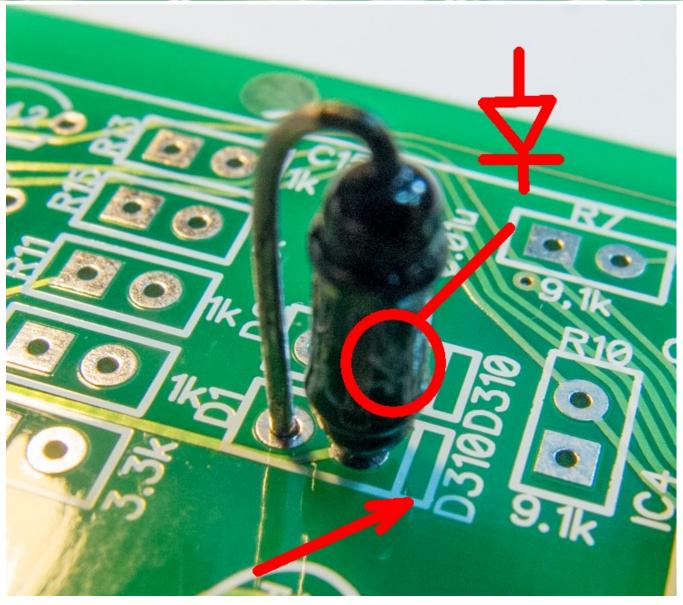




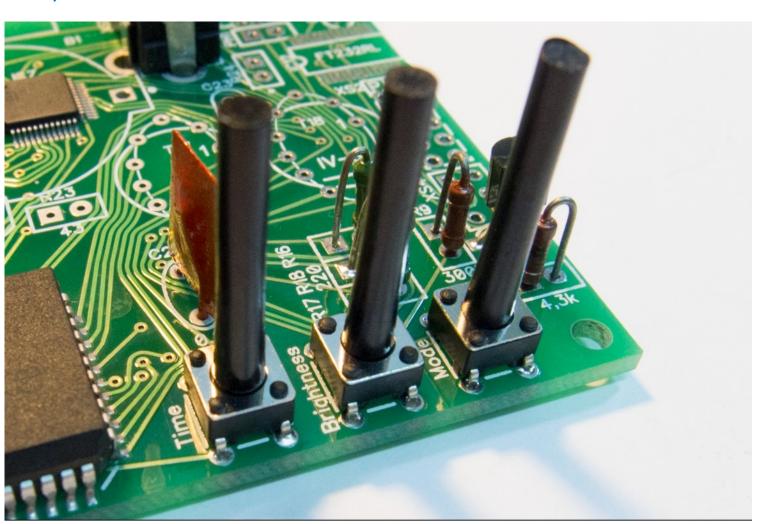
6) Place diodes and be careful with polarity:



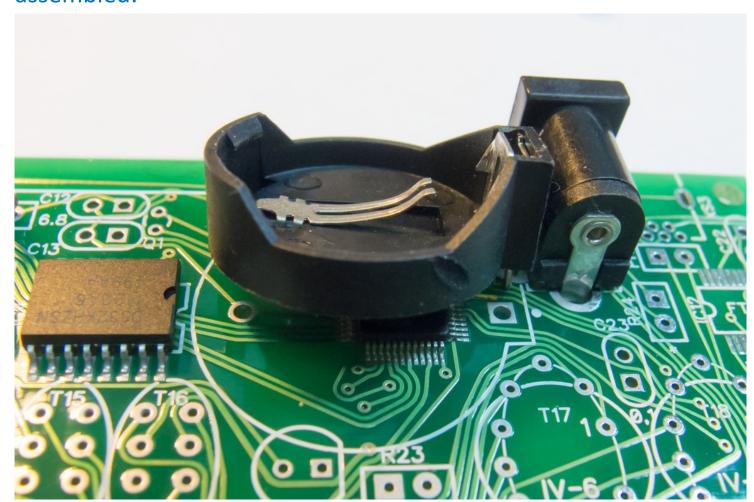




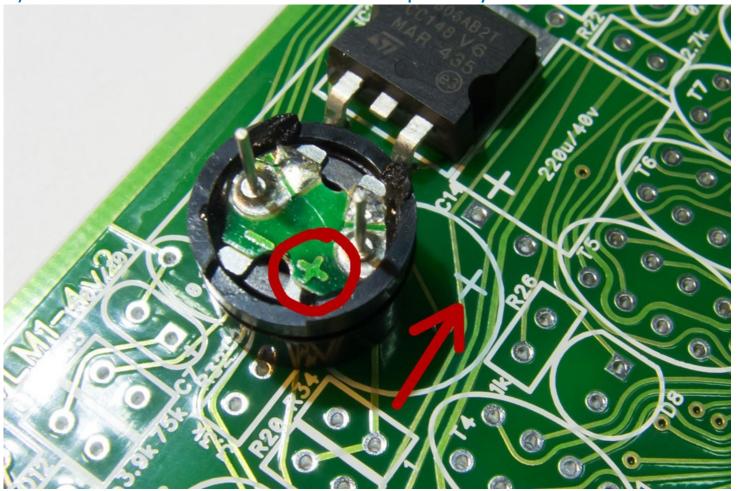
7) Place 3 buttons:

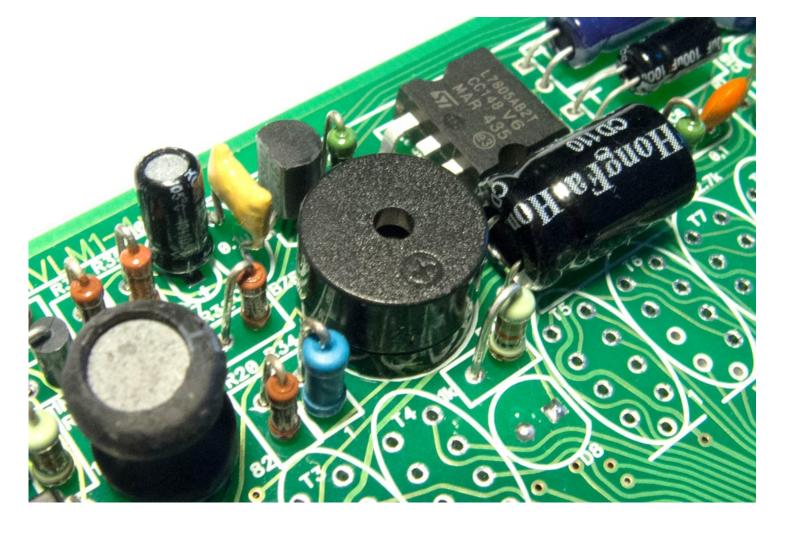


8) Place battery holder and insert battery when clock will be fully assembled:

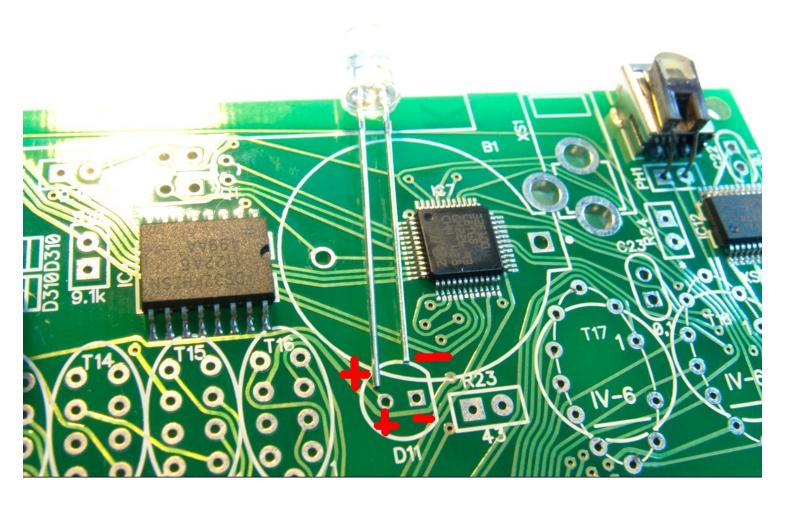


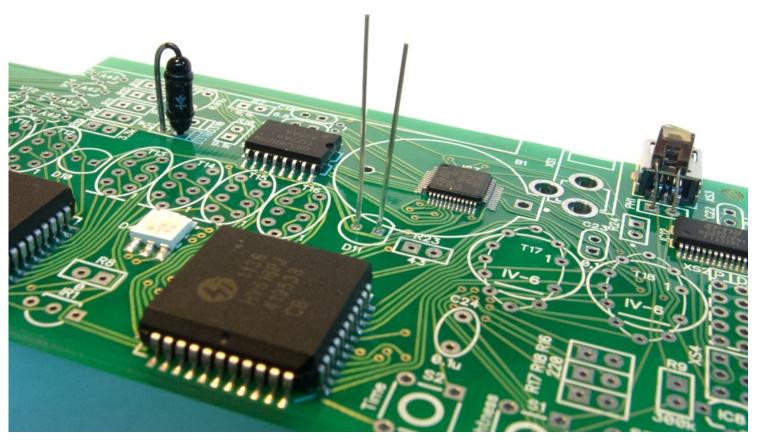
9) Place buzzer and be careful with polarity:



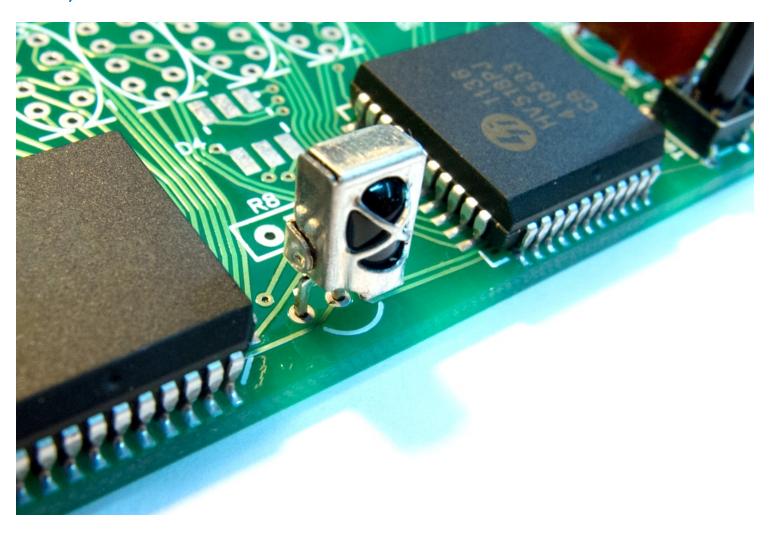


10) Prepare and install LEDs. LEDs should be UNDER PCB:

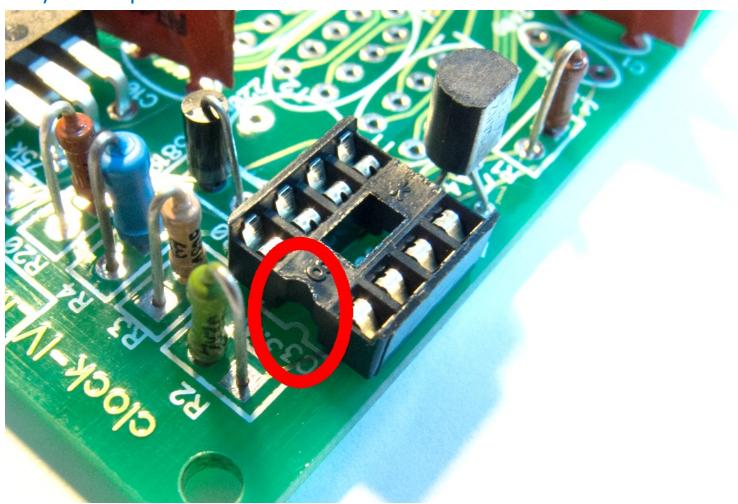




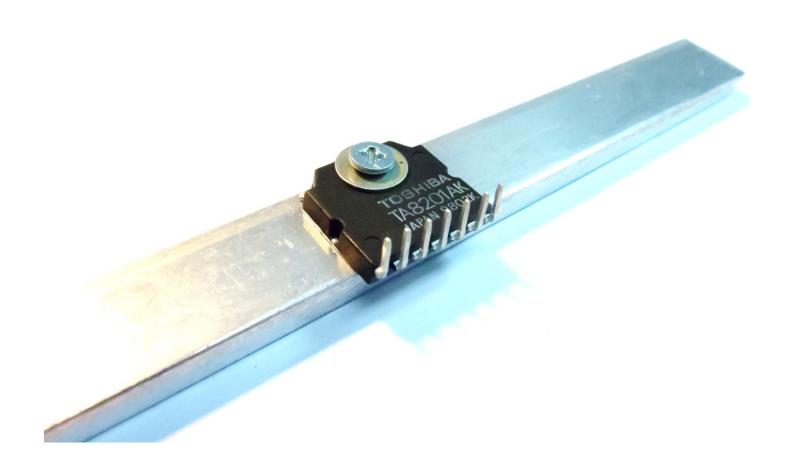
11) Place infrared receiver for remote control:



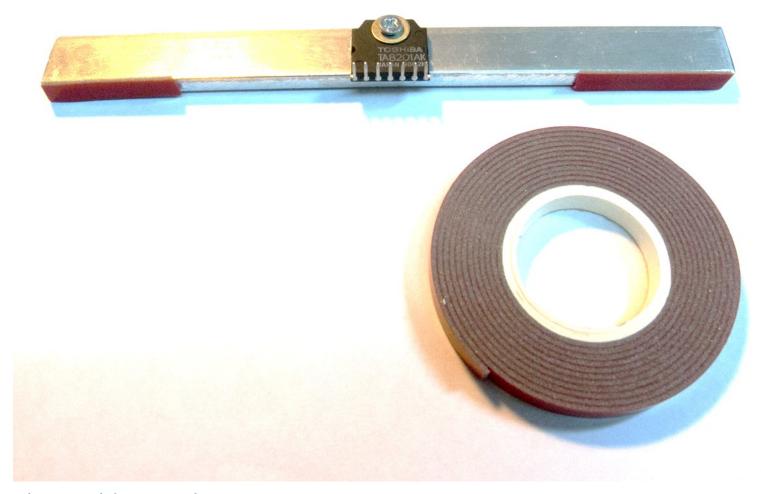
12) Place 8pin socket:



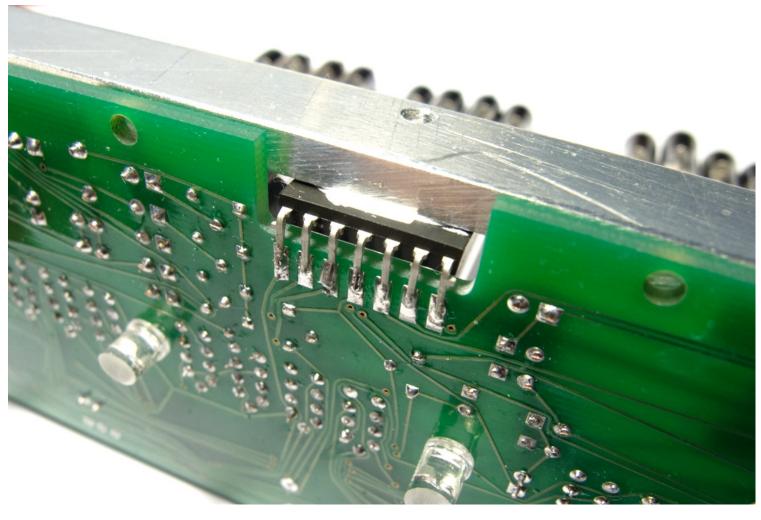
13) Prepare and place TA chip. You can use some heatsink between radiator and TA chip:



Use double-sided adhesive tape for fix radiator to PCB.

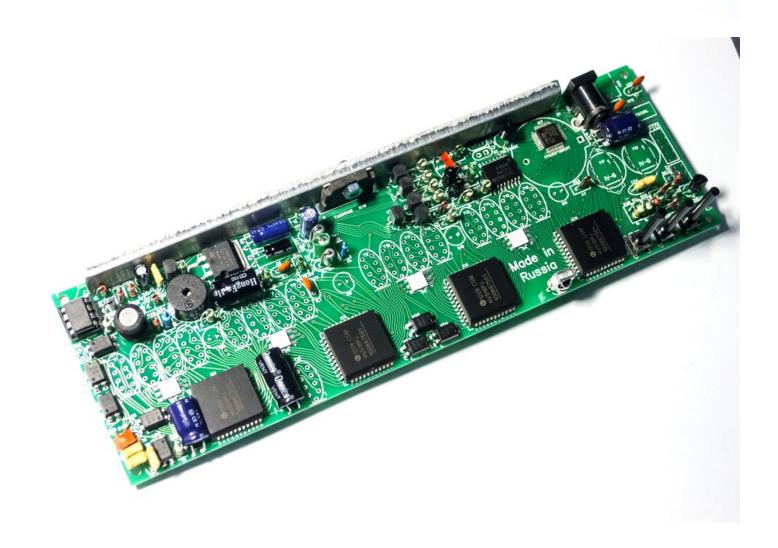


Then solder TA chip to pins on PCB:

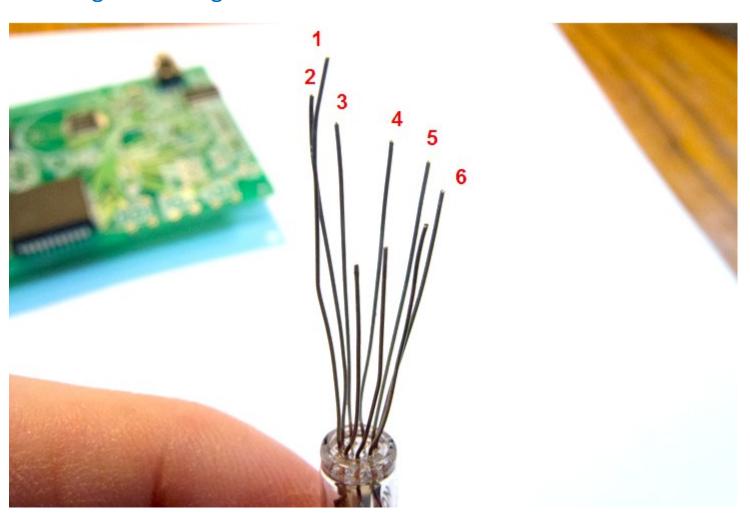


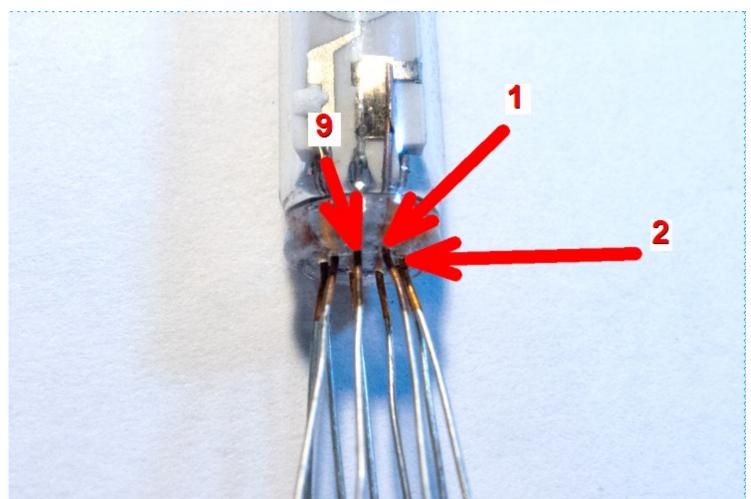
14) Completely assembled board should look like this.

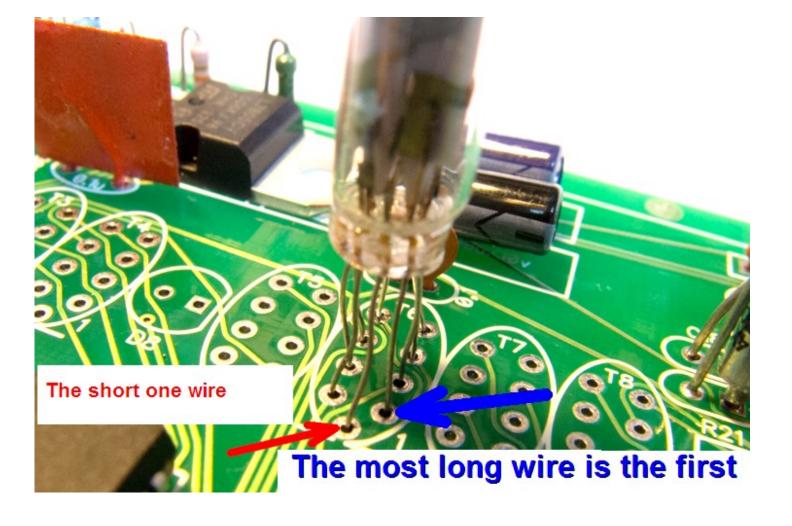




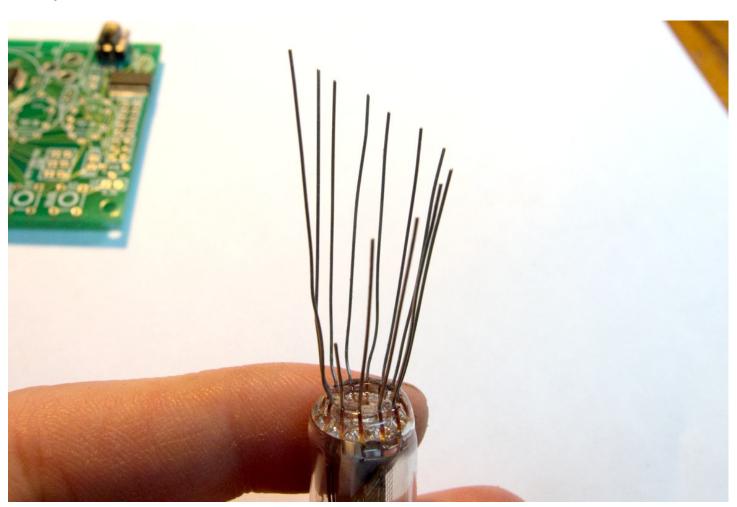
15) Prepare the IVLM tubes. The numeration start from most long wire and go in clockwise.



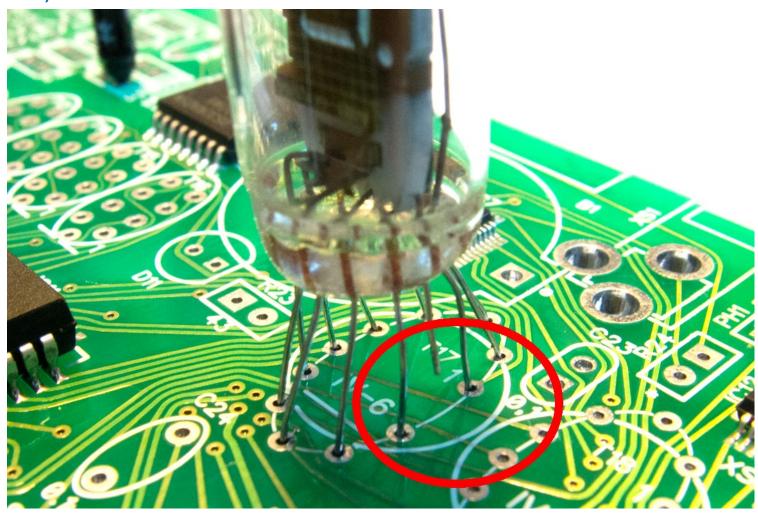




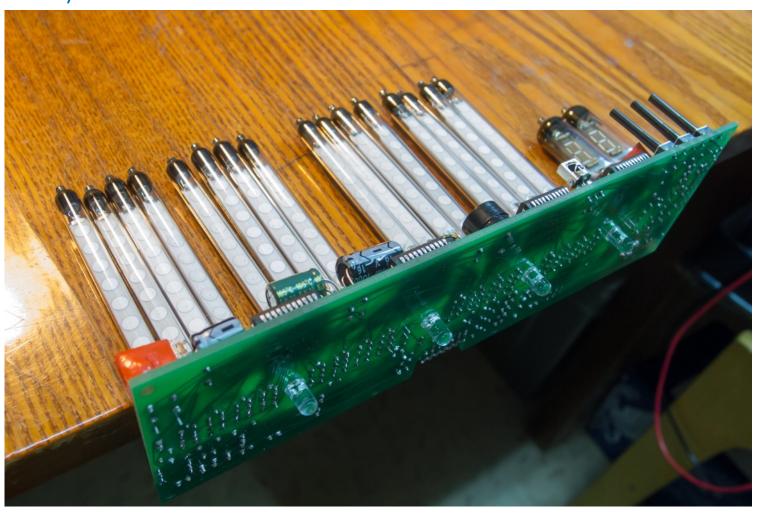
16) Prepare IV-6 tubes, similarly. The first pin – the longest pin.



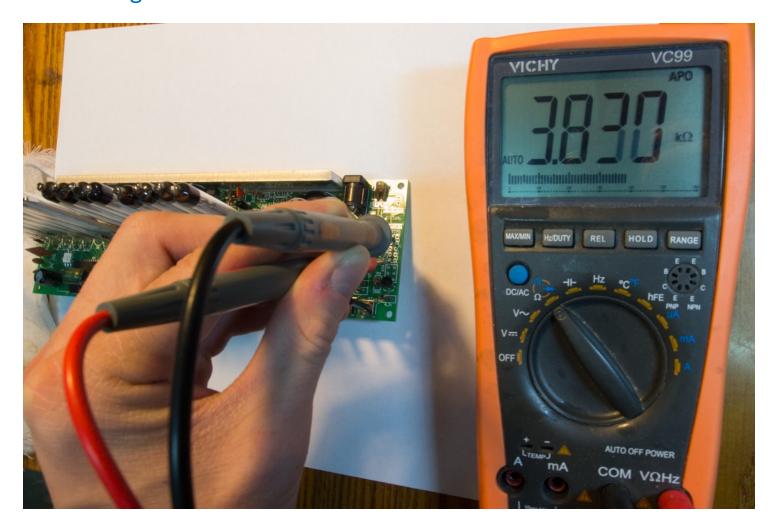
17) Insert tube into holes in PCB:



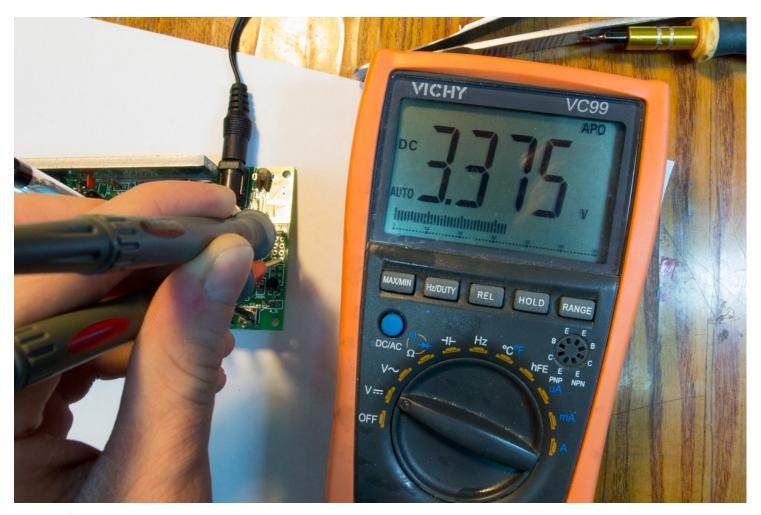
18) Put clock on the flat surface and solder the tubes.



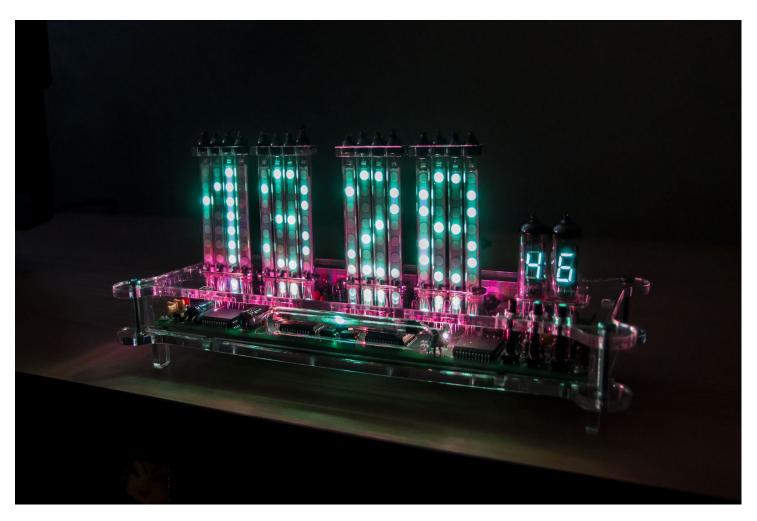
19) Then check the resistance between GND and +3.3V pins of XS2 again. It is should be not lower 1 kOhm.



20) Then plug 12V DC adapter. The microcontroller starts work and you will hear short melody. LEDs start work too and should change colors. If it not happens, check the +3.3V and resistance on XS2 between GND and +3.3 pins.



21) After all clock should work.



CONGRATULASIONS!

SPECIFICATION

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

Correct values below:

Label	Value	Photo
B1	CR2032 3V	CR2032
BZR1	Buzzer	
C1,C6, C8-C10, C16, C22-C24	0.1uF	10D FH 100

C2	1000uF/16v	1000 JE 1000 16 V 16
C3, C19	10uF/10v or 10uF/16v or 10uF/25v	CapXon Cap? 10 uF 10 uF 25 V

C4,C11	1000uF/6.3v	CON SUNCON SUN UF 1000 UF 1000 V 6.3 V 6.0
C5	240p	Hn24
C7,C21	100uF/10v	100 uF 100 u 10 V 10 V

C14	220uF/35v	220 µF 22 35 V
C15	10nF	
C12, C13	6.8 pF	NOT USED!
C17 C18,C20	1uF/20v	7.28

D1,D2	D310	35.5
D3	1N5819	
D4-D7	RGB led	
D8-D11	Auto led	

IC1, IC6 IC9,IC11	HV518	1136 HV518PJ 419533 CB
IC2	LM7805CT	
IC3	MC34063AP1	34063API NCCRTNS (N) 139D

IC4	DS32kHz	
IC5	Stabilizer 3.3V	17 BL 33
IC7	STM32F100C6 T	SETABLE PROCESSION OF THE PROPERTY OF THE PROP
IC8	DS18B20	

IC10	TA8201AK	TOSHIBA TA8201AK JAPAN 9724K
IC12	FT232RL	NOT USED!
IR1	Infrared receiver	RB
L1	220uH	
Q1		NOT USED!

	T	
PH1	Photoresistor	
R1	82	
R3,R8,R11 R13-R15,R2 4 R26-R30	1k	
R4-R7,R10	9.1k	

R9	300k	
R12	4.3k	
R16, R17	160 or 150	MCC
R18	220	

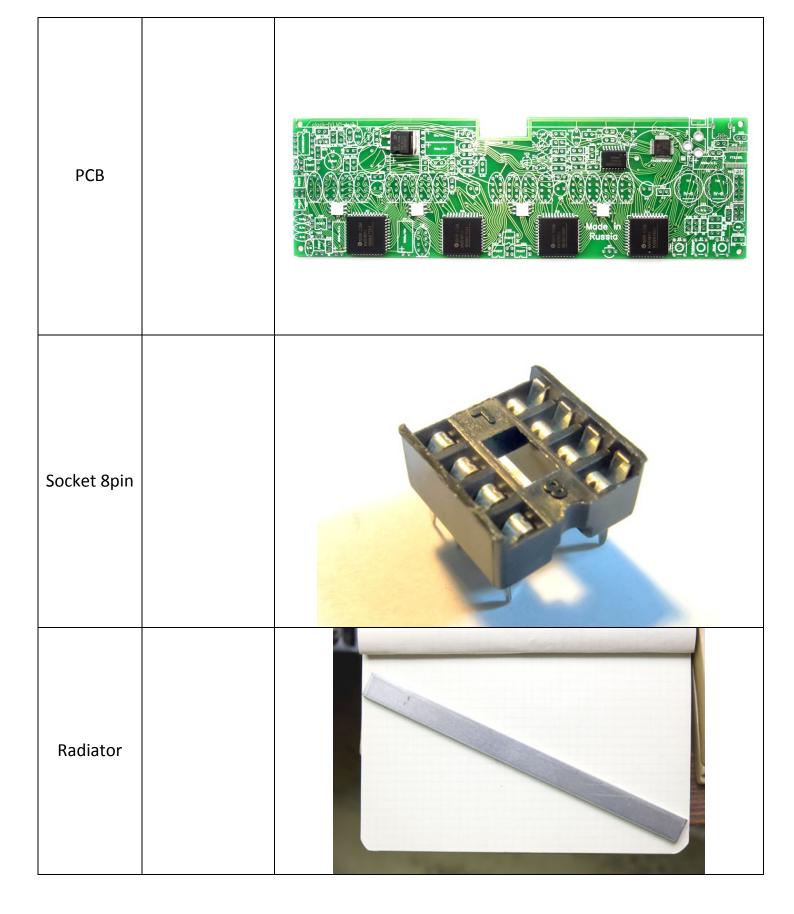
R19,R32	3.3k	
R20,R25	82	
R21	6.8k	
R22	2.7k	

R23	36	35RK
R31	3.9k	
R33	180	

R34	1	
R35	75k	75KK
S1-S3	Buttons	

T1-T16, T19	IVLM1-1/7 Tube	
T17, T18	IV-6 Tube	
VO1-VO8	PC817	CC736 EL 817 EVERLIANT

VT2-VT7	MPSA42	A 4 2 B 331
XS1	Power plug	
XS3	USB-port	NOT USED!
CR2032 Holder		



Plastic case	
Screws	
Remote control	1 2 3 4 5 6 7 8 9 9 0 # KEYES

www.Kama-Labs.com **Katusha**

Assembled my own hands Thanks for purchase!!!

Features:

* 17x Soviet IVLM1-1/7 VFD tubes (made in 1983)

* 2x IV-6 VFD tubes (made in 1992)

* Full remote control

* 4mm plastic case

* Life time of tubes 10-15 years

* 32bit STM32F100C8 processor

* 12/24h time mode

* Unique high effective smooth routing of PCB

* Fade leading zero

* 1 Socket for control external devices (for ex. radio, bells, light and etc.)

* 1 Alarm

* IVLM & IV-6 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

* OFF at night by timer

* 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 600mA

 * Noiseless work
 - * Dimensions of the clock 197mm(7.75in) x 60mm(2.36in) x 95mm(3.74in)
- * Dimensions of the clock in plastic case 207mm(8.15in) x 69mm(2.72in) x 105mm(4.13in)

Button function:

(from left side of clock First, Second and Third buttons)

Short click = \sim 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:

12 1.0 24

- 3) Press Third Button for change value
- 4) Press Second Button for go to next parameter

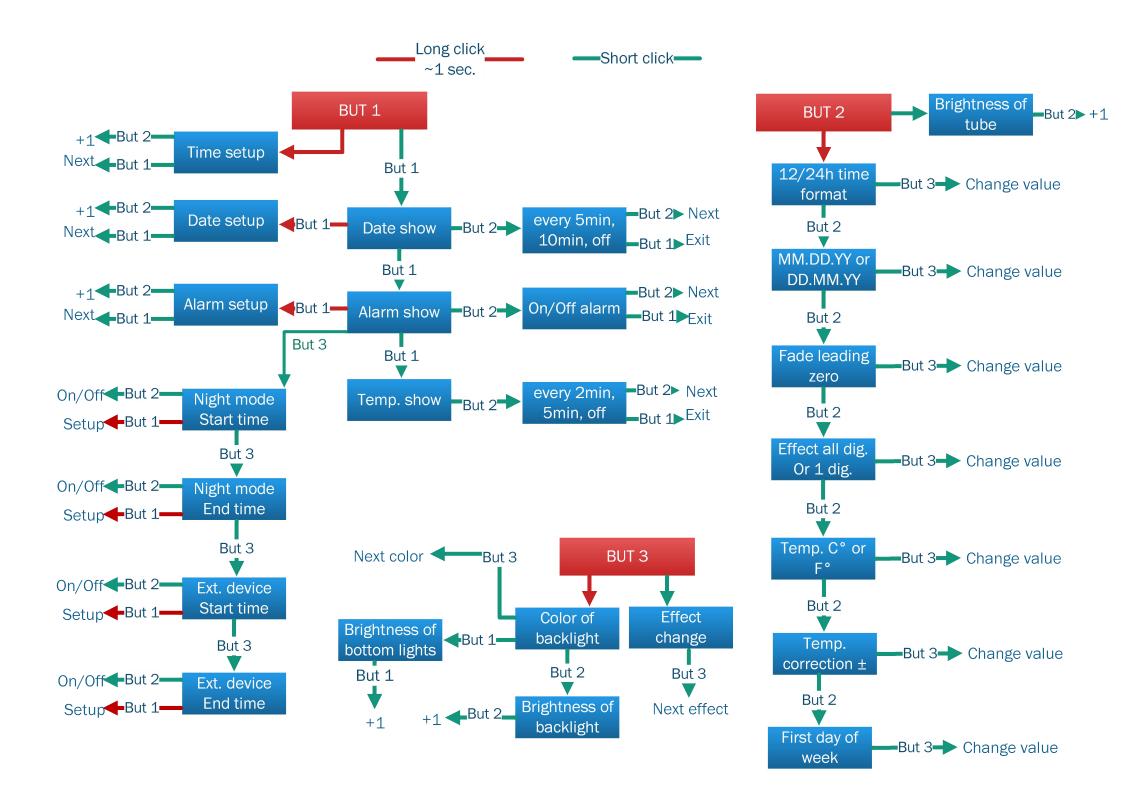
Nº	Parameter	Value
1	12/24 time format	0 - 12h time format
		1 - 24h time format
2	Date format	0 - DD.MM.YY
		1 - MM.DD.YY
3	Hi.Hour tube fading	0 - enable fading
		1 - disable fading
4	Effect of change digit	0 - 1 digit
	influence to 1 digit or to all	1 - all digits
	digits	
5	Temperature units	0 -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

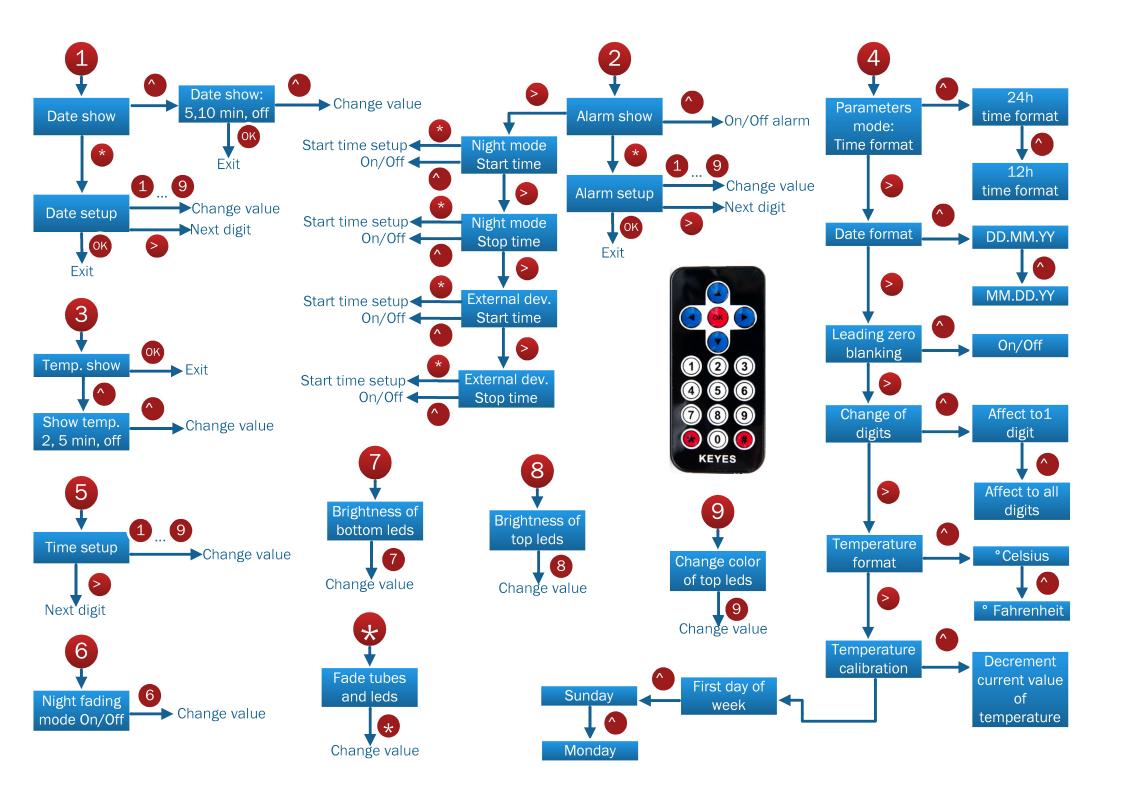
How to setup led backlight? Airily!

- 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.





Socket for external device

Aluminum radiator

High-precision real time chip

Light sensor

Power plug for 12V DC power adapter

Battery holder



Buzzer

4x Auto leds

4x RGB LEDs

Day of week

Infrared Receiver

Buttons: 1 2 3 Temperature sensor

Diagnostic/debugger/update socket

