www.Kama-Labs.com

(Assembly instructions and latest firmware you can find on my website)

QUEEN NUMITRON

Assembled my own hands ☺

Thanks for purchase!!!

Features:

* 4x **IV-13** Russian numitron tubes (made in 1984)
* 1x **IV-9** numitron separator (show on/off of alarm)
* 32bit STM32F100C8 processor
* 13 parameters
* 12/24h time mode
* 1 Alarm
* Fade at night (increase lifetime of tubes in twice!)
* Fade leading zero
* Noiseless work
* Smooth PCB routing
* Full remote control
* USB connection to PC (for update firmware)
* Double Multicolour led glow (independent random color leds and **RGB** leds under each tube)
* Adjustable brightness of **RGB** and AUTO leds
* **RGB** led (6 colors of backlight or autochange color mode)
* 9 modes of switch digits
* **IV-13** tubes works in static mode
* Thermometer
* Correction of temperature
* Temperature format: Celsius or Fahrenheit
* Accurate to **+/- 1 minute/year**

* Setup of clock accuracy
* Date in format DD.MM.YY or MM.DD.YY
* Backup battery. Data is not lost when power off
* 3 buttons
* Power source - DC **12V** barrel plug 5.5mm/2.1mm ("+" inside, "-" outside)
* Consuming current - 1000mA
Dimensions of the clock - 55mm(L) x 60mm(H) x 115mm(W).
Dimensions of the clock in case - 85mm(L) x 70mm(H) x 145mm(W).

№	Parameter	Value
1	12/24 time format	0 - 12h time format 1 - 24h time format
2	Hi.Hour tube fading	0 - disable fading 1 - enable
3	Show time mode	0 - hard mode 1 - constructor 2 - smooth 3 - slot machine №1 4 - slot machine №2 5 - wave 6 - random fade 7 - shift 8 - all effects one by one
4	Backlight mode	0 - all leds off 1..5 - brightness 6 – AUTO brightness 7 – AUTO brightness + fade at night 8 - fade at night
5	Show current temperature	0 - disable 1 - every 2 minutes 2 - every 5 minutes
6	Night fading	0 - Off 1 - On
7	Show current date	0 - off 1 - every 2 minutes 2 - every 5 minutes

8	Correction of temperature coefficient	0 .. 9 Current temp. - temp.coeff. = real temperature

Temp.coeff	Current temp.
0	0
1	-1
.	.
.	..
10	-10
11	+1
.	.
.	.
19	+10

9	Clock accuracy correction	0 .. 9 Bigger value - slowly clock
10	Date format	0 - DD.MM.YY 1 - MM.DD.YY
11	Temperature format	0 - Celsius 1 - Fahrenheit
12	Brightness of bottom LEDs	0 .. 6
13	Brightness of tubes	0 .. 3 4 – automatic brightness

How to use remote control?

Button	Action
OK	Enter/exit in parameters mode
◀ ▶	Next effect of switch time
▲ ▼	Change value
0	HH:MM or MM:SS time format
1	Time setup
2	Alarm setup
3	Date setup
4	Show temperature
5	Show date

6	On/off alarm
7	
8	Fade LEDs and tubes
9	Brightness of bottom LEDs
*	Change brightness of top LEDs
#	Change color of top LEDs
▲	Change brightness of tubes

- Use ◄ ► for change position in setup modes

- For change value you can use ▲ ▼ or use any number buttons

Button function:

Short click = ~0.5 sec. Long click = ~1 sec

First button - Time: Short click - on/off alarm (indicates by IV-1 separators tubes) Long click - time setup

Second button - Alarm: Short click - parameters mode
Long click - alarm setup

Third button - Color: Short click - change color of backlight or disable leds Long click - date setup

Button function in settings:
First button: +1 Second button: -1 Third button - Time: Next

If you will press and hold one button and then will press second:
1 + 2 = show current temperature
1 + 3 = show current date
2 + 3 = test mode for checking tubes

How to set time or alarm?

1) Press and hold 1 button ~1 sec for set time and 2 button for set alarm
2) Hours tubes start to blink

3) Press 1 button for increment value

4) Press 2 button for decrement value

5) Press 3 button to go for next value

How to change parameters?

1) Press 2 button for enter into parameters mode

2) You will see number of parameter (1) and value of parameter (0):   1_ : _ 0

3) Press 1 button for change value

4) Press 2 button for go to next parameter

How to set current date?

1) Press and hold 3 button for 1 sec
2) You will see date in DD.MM.YY format
3) Press 1 button for increment value of days in month
4) Press 3 button again for set the month and year

How to change color of backlight?

Press 3 button to change color or to set autochange color.

How to make HARD RESET if something wrong?

When your clock starts, you hear short melody. If you will press 1 button for 1-2 second in this moment, clock will reset all your setting.

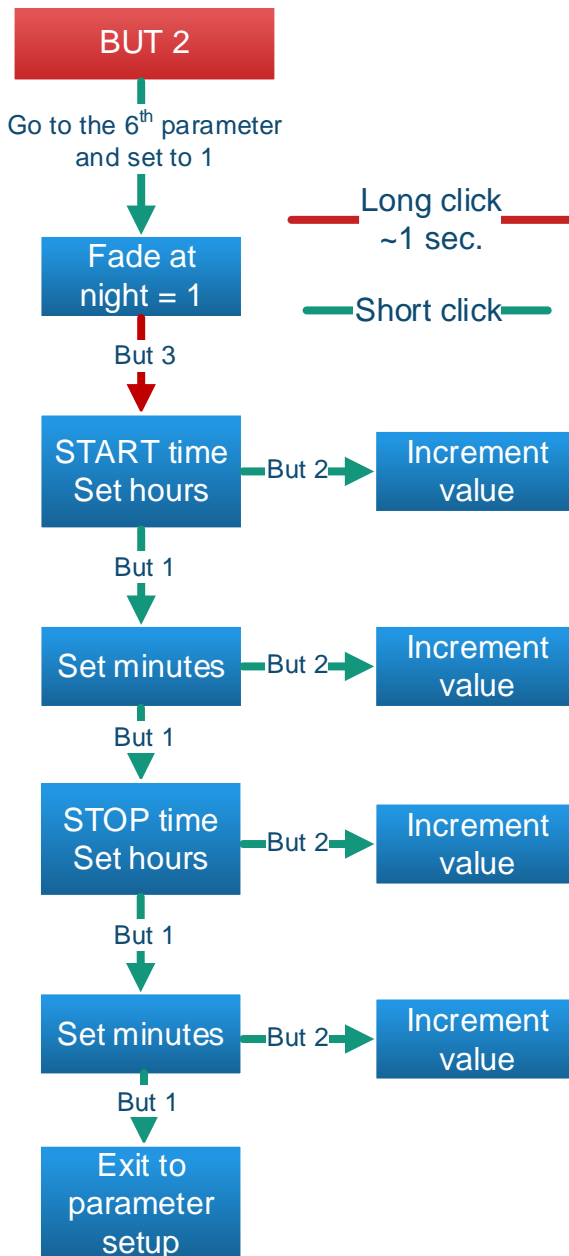You will hear p-i-i-i-i-i-p p-i-p p-i-p. That's mean HARD RESET is done.

How to set night fading?

```
┌─────────────────┐
│      BUT 2      │
└─────────────────┘
         │
Go to the 6ᵗʰ parameter
   and set to 1
         ▼
┌─────────────────┐
│   Fade at       │
│   night = 1     │
└─────────────────┘
       But 3
         ▼
┌─────────────────┐      ┌─────────────────┐
│  START time     │─But 2→│   Increment     │
│  Set hours      │       │     value       │
└─────────────────┘      └─────────────────┘
       But 1
         ▼
┌─────────────────┐      ┌─────────────────┐
│  Set minutes    │─But 2→│   Increment     │
│                 │       │     value       │
└─────────────────┘      └─────────────────┘
       But 1
         ▼
┌─────────────────┐      ┌─────────────────┐
│  STOP time      │─But 2→│   Increment     │
│  Set hours      │       │     value       │
└─────────────────┘      └─────────────────┘
       But 1
         ▼
┌─────────────────┐      ┌─────────────────┐
│  Set minutes    │─But 2→│   Increment     │
│                 │       │     value       │
└─────────────────┘      └─────────────────┘
       But 1
         ▼
┌─────────────────┐
│   Exit to       │
│   parameter     │
│   setup         │
└─────────────────┘
```

Long click ~1 sec. ▬▬▬

Short click ━━

Set 6ᵗʰ parameter to 1 and press 3 button for ~1sec and you will enter into setup. You will hear b-i-i-i-p and will see:

$$00 : \_\_ : \_\_$$
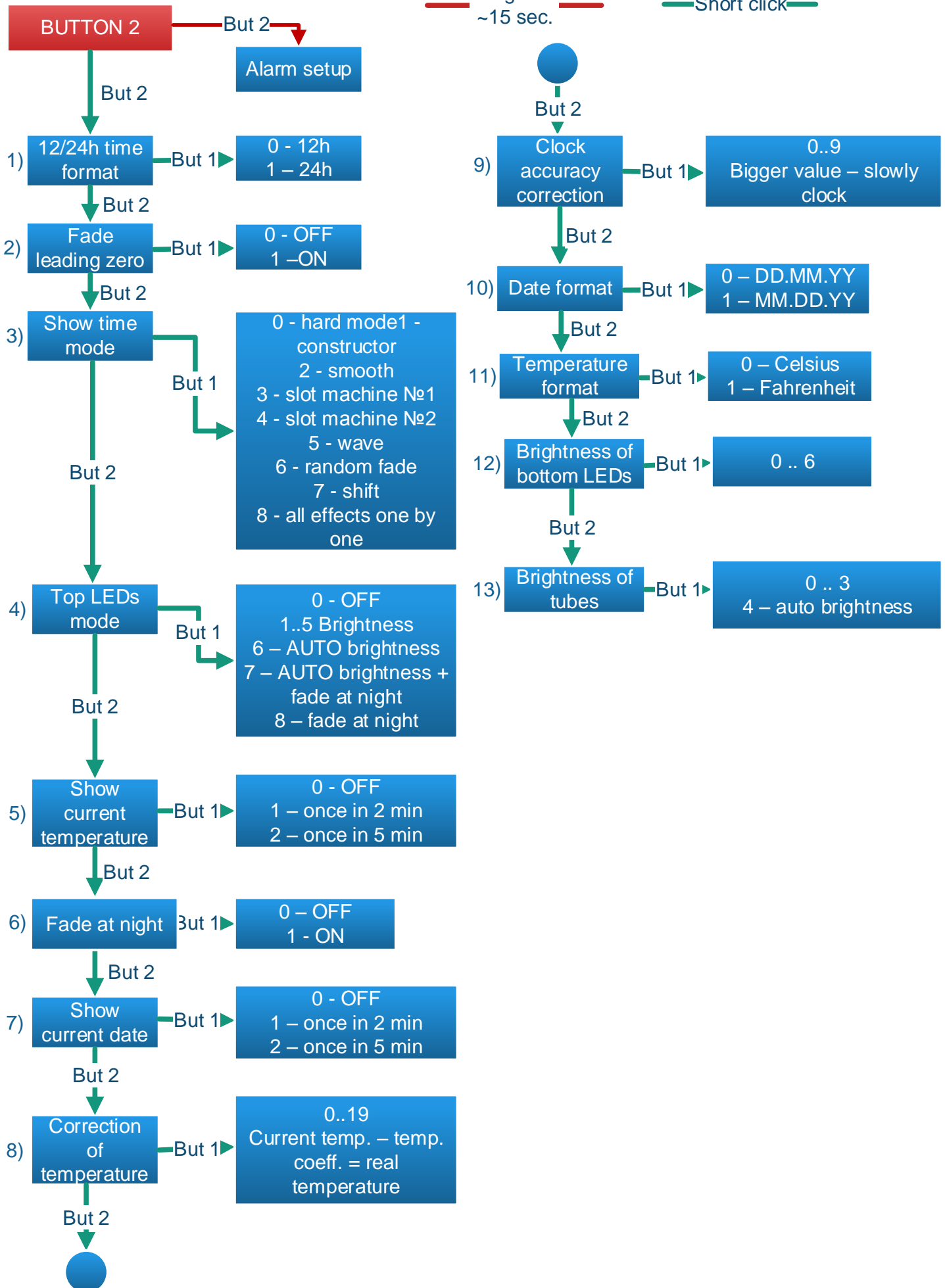
Now, you need set time of START fading. Use 2 button for increase value and 1 button for change digit. After that, you need to set time of STOP fading similarly.

Example: you go to sleep at 11:10PM and get up 6:30AM. So, you need to set START time as 23:10 and STOP time as 6:30.
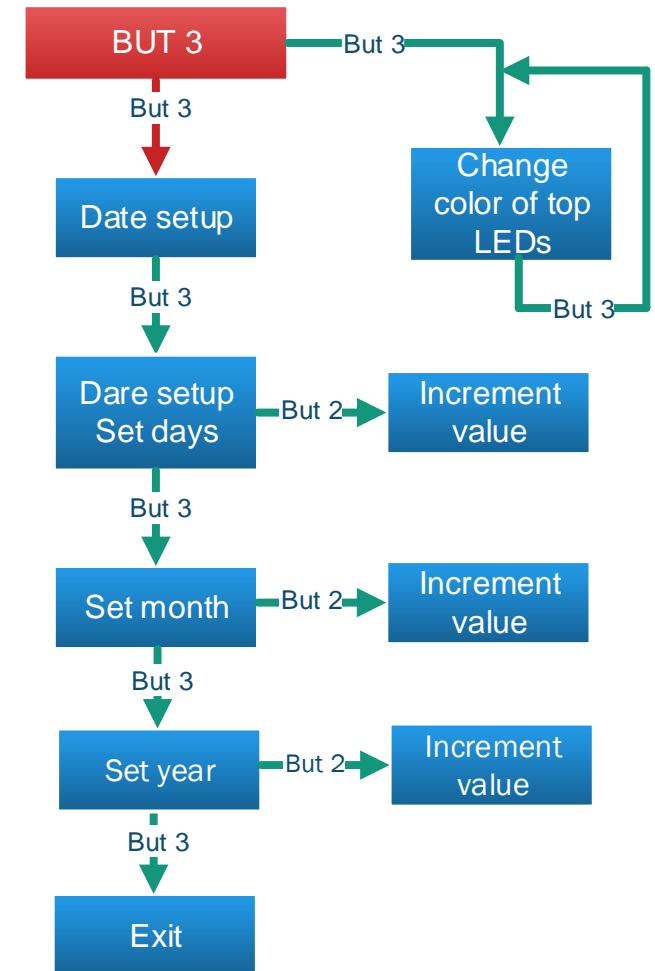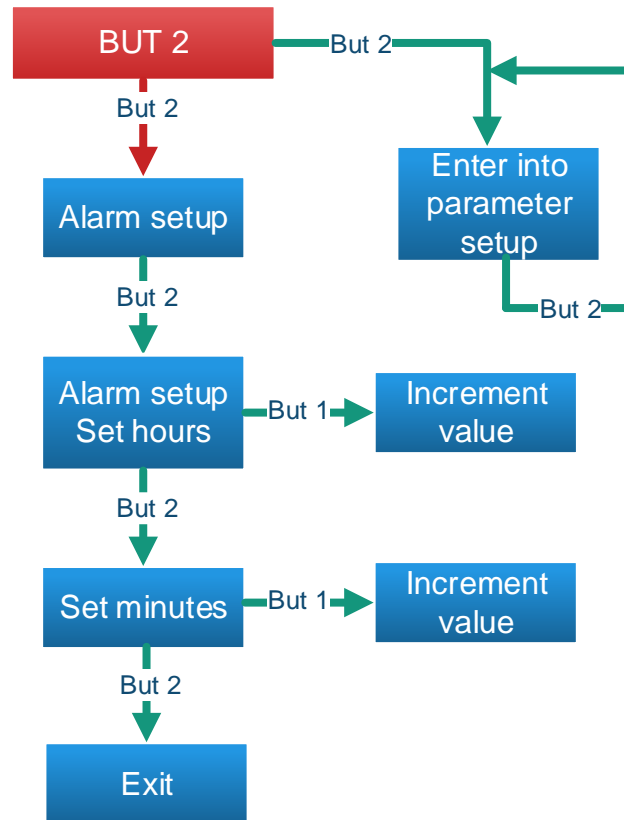
BUTTON 2 ──But 2──▶ Alarm setup

Long click ~15 sec. ── ── Short click ──

↓ But 2

1) **12/24h time format** ──But 1▶ 0 - 12h / 1 – 24h

↓ But 2

2) **Fade leading zero** ──But 1▶ 0 - OFF / 1 –ON

↓ But 2

3) **Show time mode** ──But 1──▶
0 - hard mode 1 - constructor
2 - smooth
3 - slot machine №1
4 - slot machine №2
5 - wave
6 - random fade
7 - shift
8 - all effects one by one

↓ But 2

4) **Top LEDs mode** ──But 1──▶
0 - OFF
1..5 Brightness
6 – AUTO brightness
7 – AUTO brightness + fade at night
8 – fade at night

↓ But 2

5) **Show current temperature** ──But 1▶
0 - OFF
1 – once in 2 min
2 – once in 5 min

↓ But 2

6) **Fade at night** ─But 1▶ 0 – OFF / 1 - ON

↓ But 2

7) **Show current date** ──But 1▶
0 - OFF
1 – once in 2 min
2 – once in 5 min

↓ But 2

8) **Correction of temperature** ──But 1▶
0..19
Current temp. – temp. coeff. = real temperature

↓ But 2

●

○ ↓ But 2

9) **Clock accuracy correction** ──But 1▶
0..9
Bigger value – slowly clock

↓ But 2

10) **Date format** ──But 1▶ 0 – DD.MM.YY / 1 – MM.DD.YY

↓ But 2

11) **Temperature format** ──But 1▶ 0 – Celsius / 1 – Fahrenheit

↓ But 2

12) **Brightness of bottom LEDs** ──But 1▶ 0 .. 6

↓ But 2

13) **Brightness of tubes** ──But 1▶
0 .. 3
4 – auto brightness

Long click ~1 sec. ——— Short click ———

BUT 1 —But 1—

But 1 ↓

Time setup

But 1 ↓

Time setup Set hours —But 2→ Increment value

But 1 ↓

Set minutes —But 2→ Increment value

But 1 ↓

Set seconds —But 2→ Seconds to 00

But 1 ↓

Exit

ON/OFF Alarm —But 1

BUT 2 —But 2—

But 2 ↓

Alarm setup

But 2 ↓

Alarm setup Set hours —But 1→ Increment value

But 2 ↓

Set minutes —But 1→ Increment value

But 2 ↓

Exit

Enter into parameter setup —But 2

BUT 3 —But 3—

But 3 ↓

Date setup

But 3 ↓

Dare setup Set days —But 2→ Increment value

But 3 ↓

Set month —But 2→ Increment value

But 3 ↓

Set year —But 2→ Increment value

But 3 ↓

Exit

Change color of top LEDs —But 3

Power plug for 12V DC power supply

Light sensor

Diagnostic socket/ socket for USB-UART converter

High-precision time chip

Buttons:
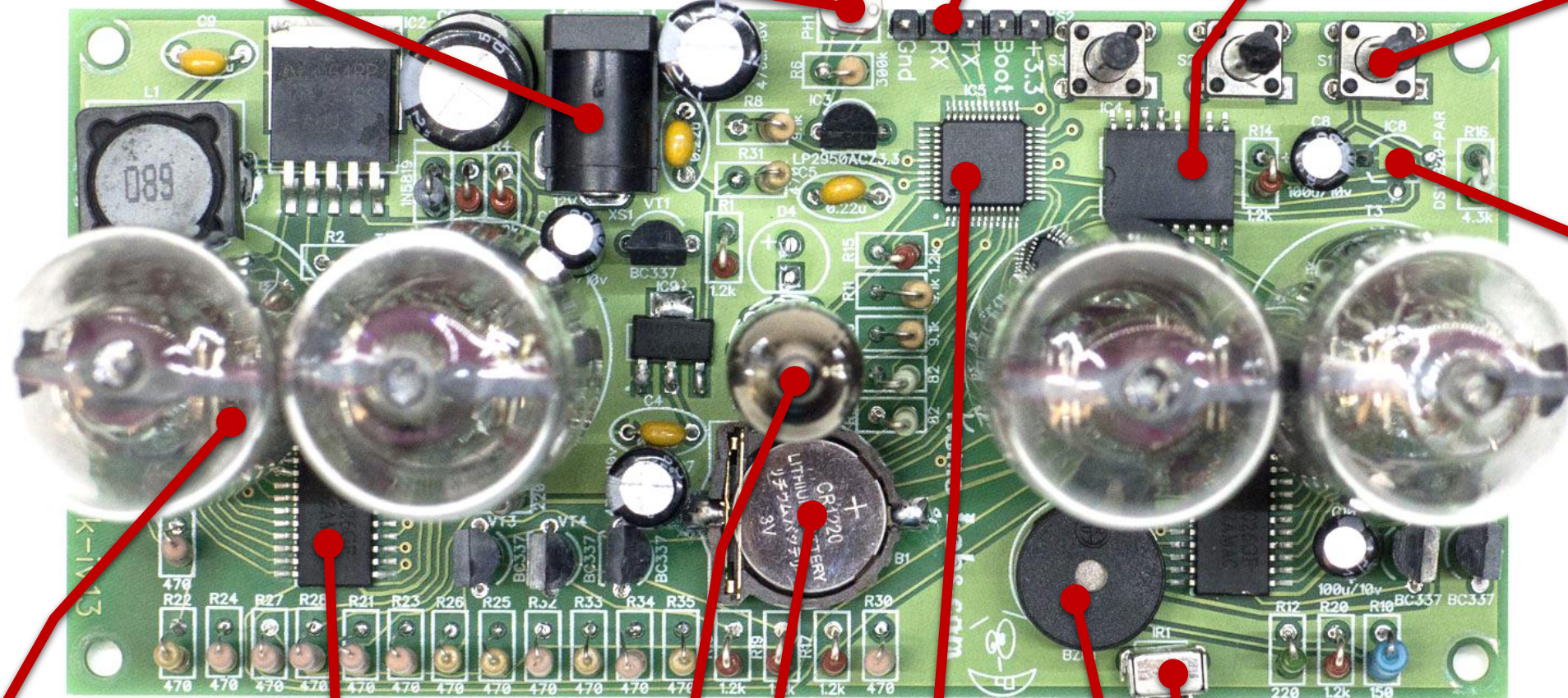1   2   3

AM/PM indicator

VFD driver

IV-9 separator on/off alarm

Battery

MCU

Buzzer

Temperature sensor

Infrared Receiver