www.Kama-Labs.com

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

NUMITRON v4

Made my own hands ☺

Thanks for purchase!!!

Features:

* 6 **IV-9** Russian numitron tubes (made in 1982)
* 2 KM separators (show am/pm and on/off of alarm)
* 32bit STM32F100C8 processor
* 15 parameters
* 12/24 hours mode
* 1 Alarm
* Turn off at night (increase lifetime of tubes in twice!)
* Turn off leading zero
* Smooth PCB routing
* Countdown timer 99days:23hour:59mins:59sec
* Full remote control
* Anti-cathode poisoning system
* 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)
* 10 modes of switch digits
* 2 modes of separator tubes
* **IV-9** tubes works in static mode
* 6 Russian chips KR514ID2 in sockets
* Thermometer

* Correction of temperature
* 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 button - Time, Alarm, Color.
* Power source - DC 5V(not 4.6V) barrel plug 5.5mm/2.1mm ("+" inside, "-" outside)
* Clock can powered from USB-port (if your USB-port can provide more than 500mA ONLY)
* Consuming current - 900mA
* Noiseless work
* Dimensions of the clock - 115mm x 50mm x 50mm
* Dimensions of the clock in plastic case - 145mm x 81mm x 65mm

№	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 - soft mode №1 2 - soft mode №2 3 - random mode №1 4 - random mode №2 5 - slot machine 6 - wave 7 - fade one by one 8 - shift 9 - run 10 - all effects one by one
4	Backlight mode	0 - all leds off 1..5 - brightness 6 - AUTO brightness 7 - AUTO brightness + turn off at night 8 - turn off at night
5	Show current temperature	0 - disable 1 - every 2 minutes 2 - every 5 minutes
6	Work of separators	0 - disable

<table>
<tr><td></td><td></td><td>1 - work together
2 - work alternately</td></tr>
<tr><td>7</td><td>Show current date</td><td>0 - off
1 - every 2 minutes
2 - every 5 minutes</td></tr>
<tr><td>8</td><td>Correction of temperature coefficient</td><td>0 .. 9
Current temp. - temp.coeff. = real temperature

<table><tr><th>Temp.coeff</th><th>Current temp.</th></tr><tr><td>0
1
.
.
10
11
.
.
19</td><td>0
-1
.
..
-10
+1
.
.
+10</td></tr></table></td></tr>
<tr><td>9</td><td>Clock accuracy correction</td><td>0 .. 9
Bigger value - slowly clock</td></tr>
<tr><td>10</td><td>Date format</td><td>0 - DD.MM.YY
1 - MM.DD.YY</td></tr>
<tr><td>11</td><td>Temperature format</td><td>0 - Celsius
1 - Fahrenheit</td></tr>
<tr><td>12</td><td>Brightness of BOTTOM LEDs</td><td>0 .. 6</td></tr>
<tr><td>13</td><td>Firmware type</td><td>0 - for IN-14, IN-4, IN-16, IN-8 and IN-18 nixie clocks
1 - for IV-9 Numitron clock</td></tr>
<tr><td>14</td><td>Anti-cathode poisoning
For NIXIE clocks only</td><td>0 - Off
1 - Every 1 minute
2 - Every 5 minutes
3 - Every 10 minutes</td></tr>
<tr><td>15</td><td>Night fading</td><td>0 - Off
1 - On</td></tr>
</table>

Button function:

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

First button - Time: Short click - on/off alarm (indicates by KM 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

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 nixie tubes
3 + 1 = show countdown timer

How to set time?

1) Press and hold 1 button ~1 sec
2) Hours tubes start to blink
3) Press 1 button for increment value and 2 button for decrement value
4) Press 3 button for go to next value
6) Seconds will reset to "00" if you will press 1 or 2 button
7) Press 3 button for exit from setting time mode

How to set alarm?

Similarly. However, use 2 button for enter into setting mode (press and hold ~1 sec).

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 increment value and 2 button for decrement value

4) Press 3 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 and 2 button for decrement 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 set countdown timer?

Press 3 + 1 for show countdown timer. Here buttons have next function:

1 - Short click – on/off timer
Long click – exit
2 - Short click – DD:HH:MM or HH:MM:SS time format
Long click – timer setup
3 - Short click – reset to previous timer value

In timer mode first separator show DD:HH:MM / HH:MM:SS time format, second separator show on/off alarm.

For set countdown timer push 2 button for 1 sec. You will enter in timer setup mode and you will see:

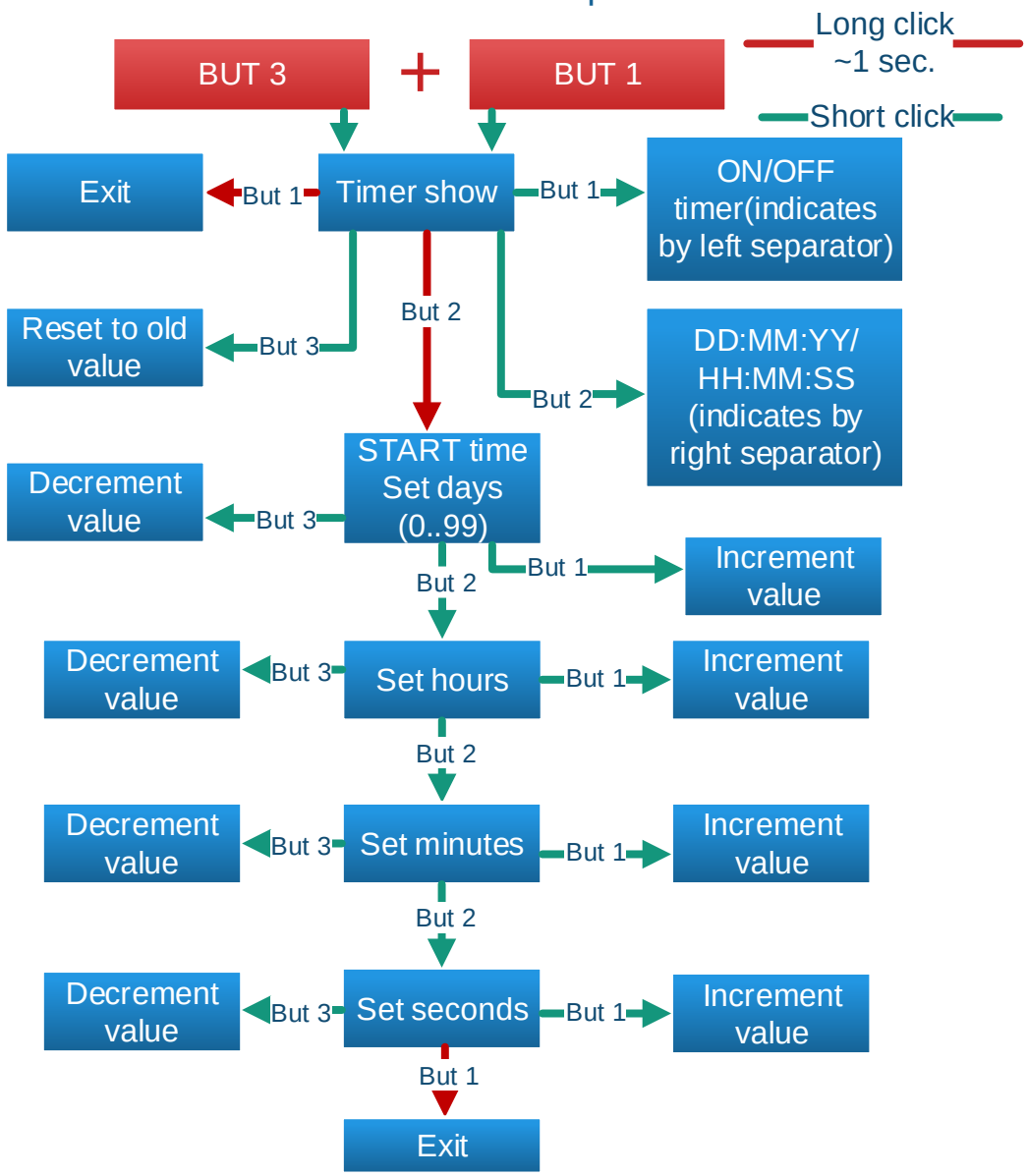
Days : Hours : Months

00 : 00 : 00

Use 1 button for increase value and 3 button for decrease value. Push 2 button for change position. For set seconds you will see next format: _ _:SS:_ _

1 _ :00: _ 1

Press and hold Button 3 and then press Button1



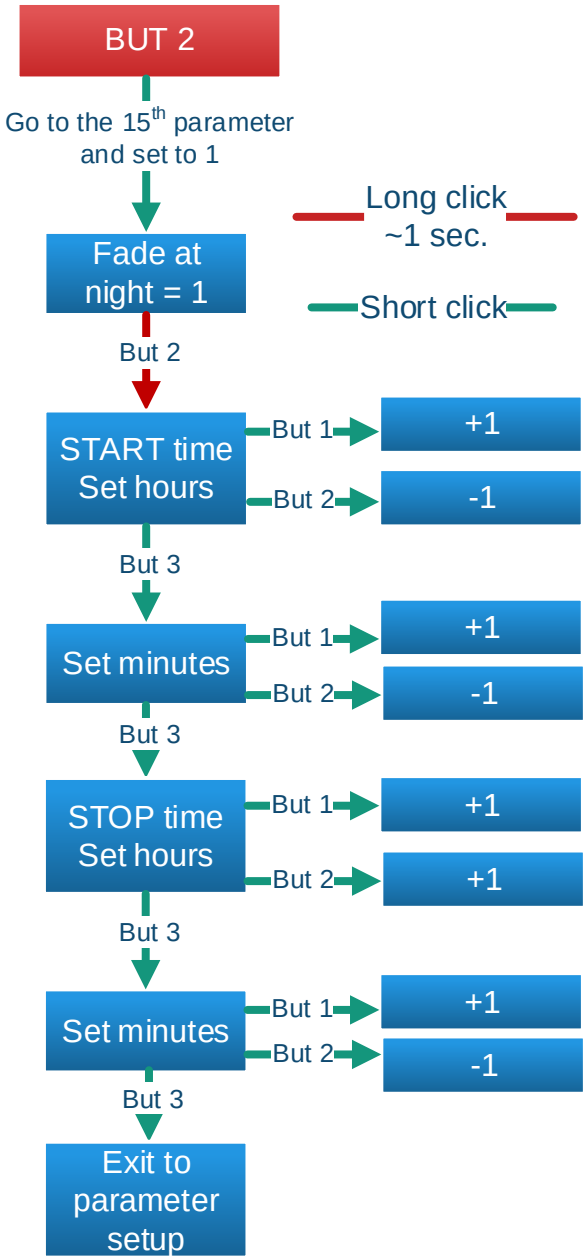
Remote control in timer mode

Button	Action
OK	On/off timer
▶	DD:HH:MM / HH:MM:SS
◀	Reset to previous timer value
1	Timer setup
7	Exit

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



How to set night fading?

Set 15th parameter to 1 and press 2 button for ~1sec and you will enter into setup. You will hear b-i-i-i-p and will see:

00 : __ : __

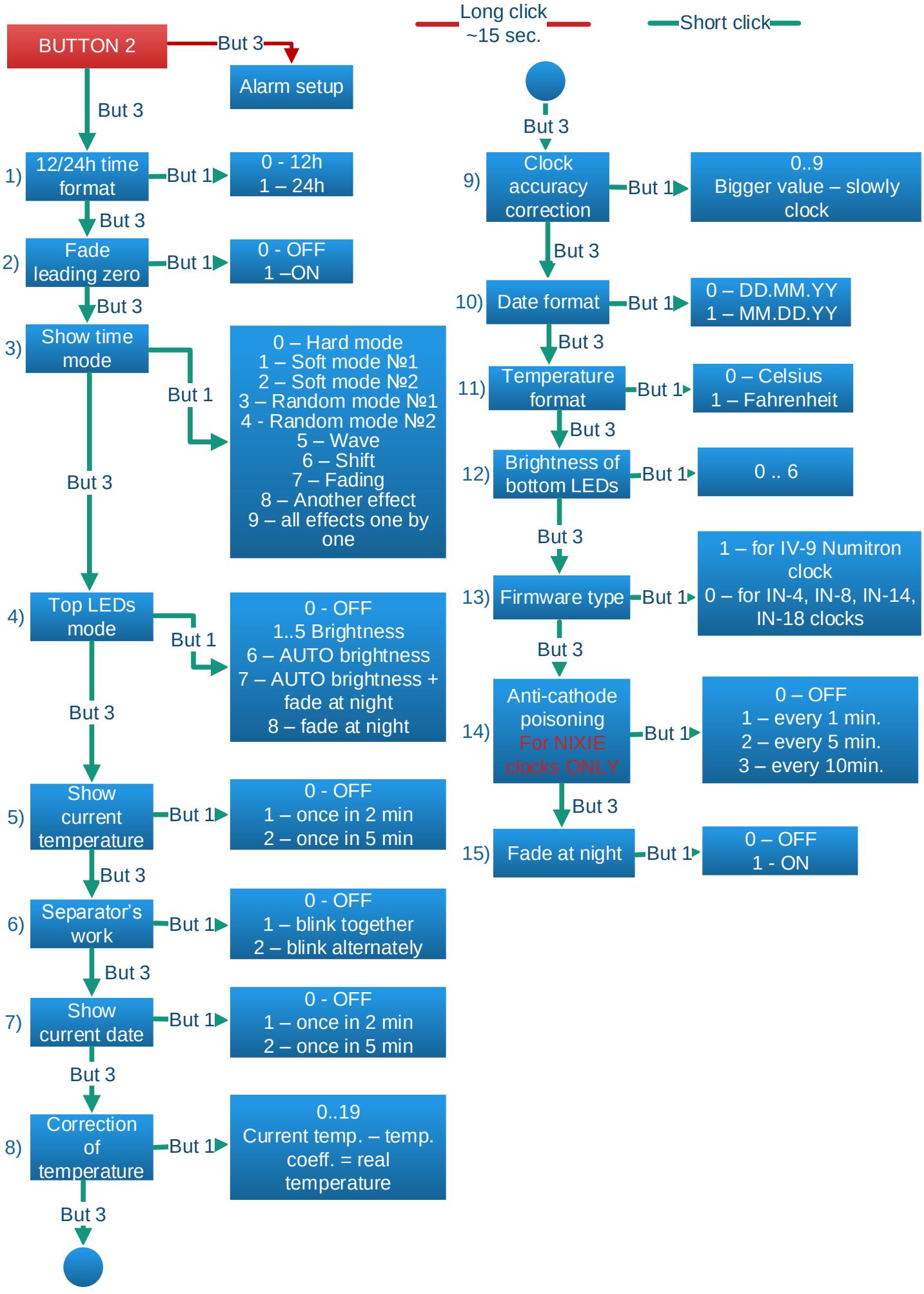
Now, you need set time of START fading. Use 1 and 2 button for increase/decrease value and 3 button for change digit. After that, you need to set time of STOP fading similarly.

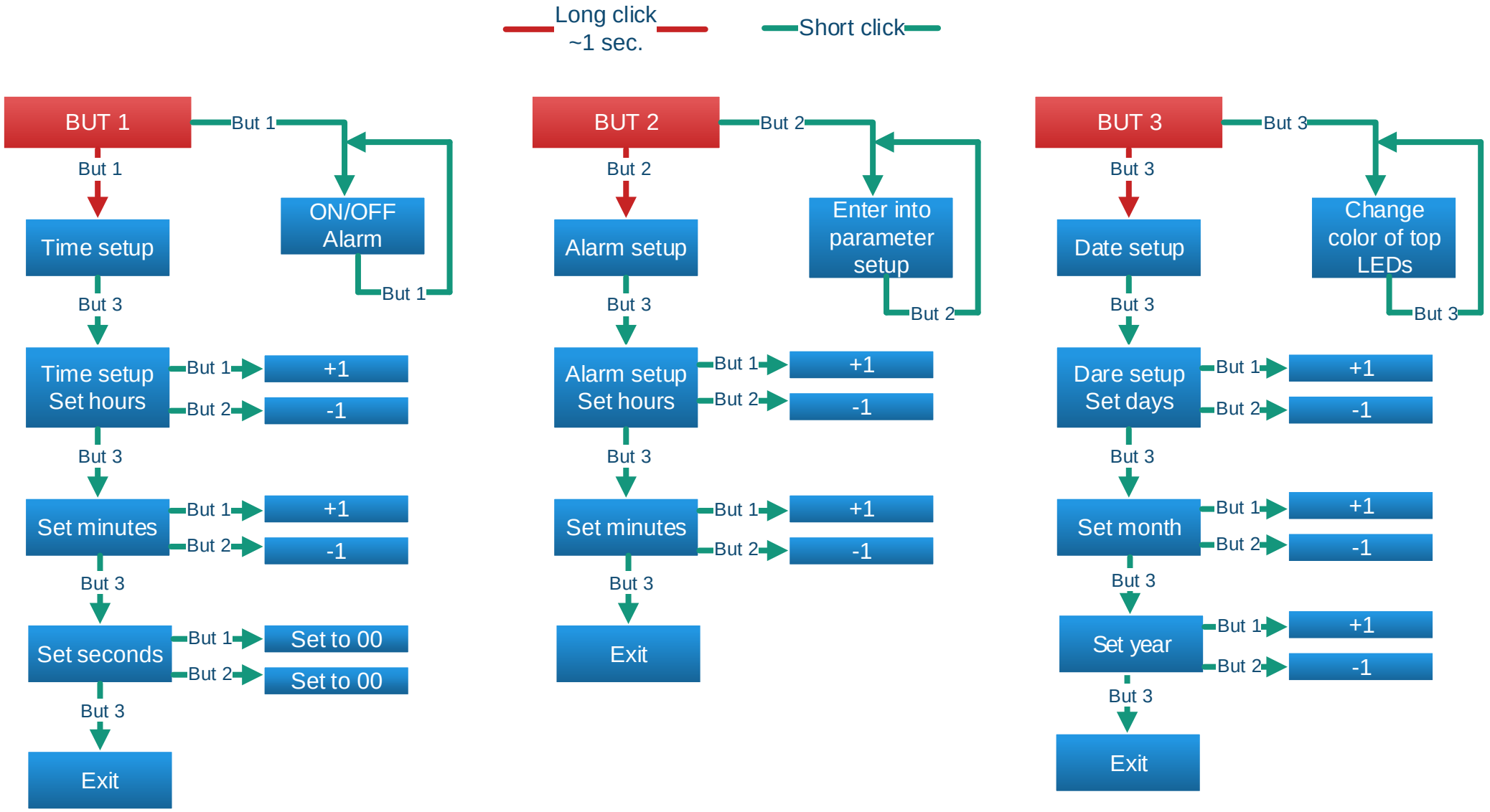
Example: you go to sleep at 11:10PM and get up 6:30AM. So, you need to set START time as 23:10 and STOP time as 6:30.

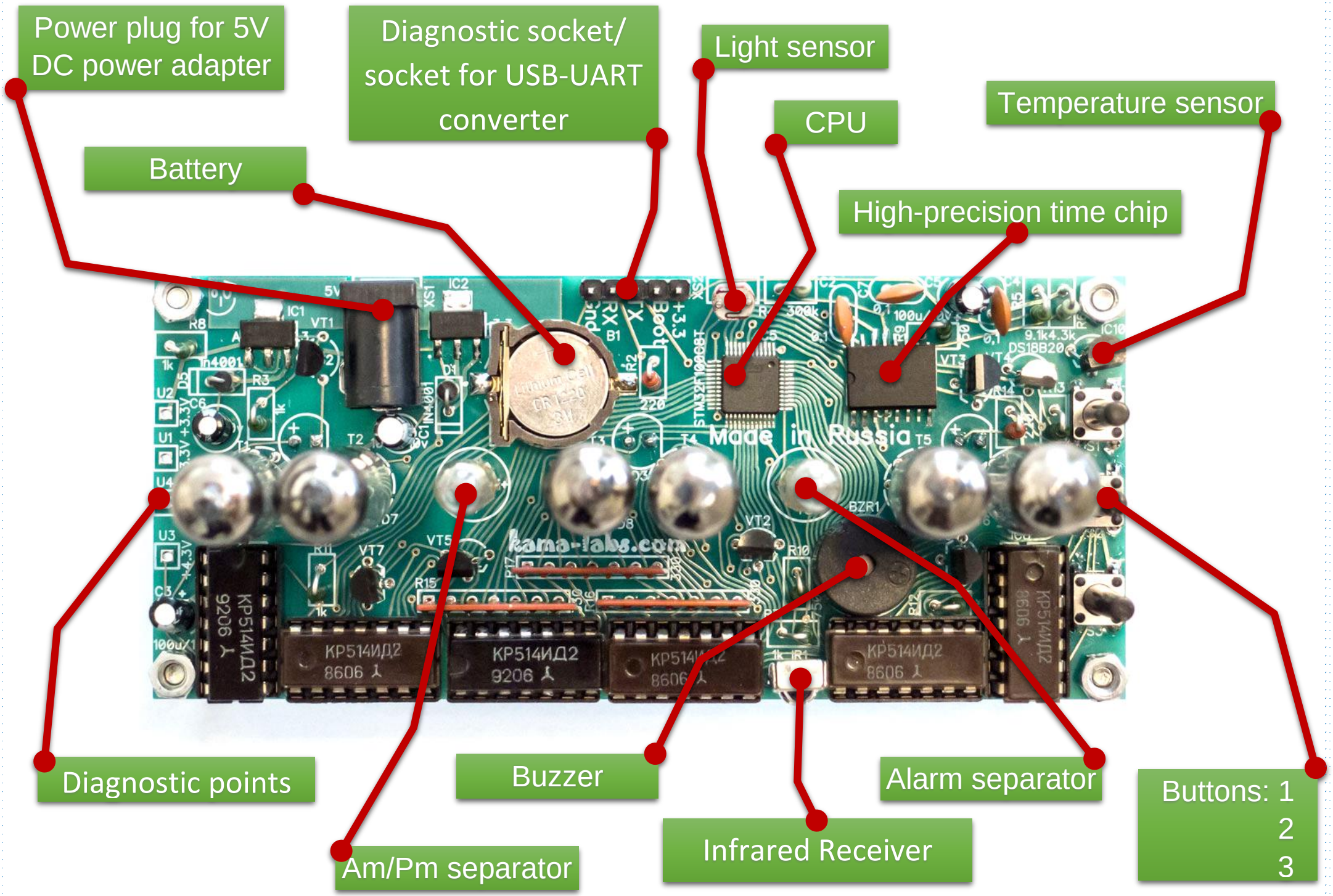
How to use remote control?

Button	Action
OK	Enter/exit in parameters mode
◄ ►	Next effect of switch time
▲ ▼	Change value
1	Time setup
2	Alarm setup
3	Date setup
4	Show temperature
5	Show date
6	On/off alarm
7	Countdown timer setup
8	Turn off LEDs and tubes
9	Brightness of bottom LEDs
*	Change brightness of top LEDs
#	Change color of top LEDs

- Use ◄ ► for change position in setup modes
- For change value you can use ▲ ▼ or use any number buttons


Long click
~15 sec.
Short click
BUTTON 2
But 3
Alarm setup
But 3
1)
12/24h time format
But 1
0 - 12h
1 – 24h
But 3
2)
Fade leading zero
But 1
0 - OFF
1 –ON
But 3
3)
Show time mode
But 1
0 – Hard mode
1 – Soft mode №1
2 – Soft mode №2
3 – Random mode №1
4 - Random mode №2
5 – Wave
6 – Shift
7 – Fading
8 – Another effect
9 – all effects one by one
But 3
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 3
5)
Show current temperature
But 1
0 - OFF
1 – once in 2 min
2 – once in 5 min
But 3
6)
Separator's work
But 1
0 - OFF
1 – blink together
2 – blink alternately
But 3
7)
Show current date
But 1
0 - OFF
1 – once in 2 min
2 – once in 5 min
But 3
8)
Correction of temperature
But 1
0..19
Current temp. – temp. coeff. = real temperature
But 3
But 3
9)
Clock accuracy correction
But 1
0..9
Bigger value – slowly clock
But 3
10)
Date format
But 1
0 – DD.MM.YY
1 – MM.DD.YY
But 3
11)
Temperature format
But 1
0 – Celsius
1 – Fahrenheit
But 3
12)
Brightness of bottom LEDs
But 1
0 .. 6
But 3
13)
Firmware type
But 1
1 – for IV-9 Numitron clock
0 – for IN-4, IN-8, IN-14, IN-18 clocks
But 3
14)
Anti-cathode poisoning
For NIXIE clocks ONLY
But 1
0 – OFF
1 – every 1 min.
2 – every 5 min.
3 – every 10min.
But 3
15)
Fade at night
But 1
0 – OFF
1 - ON


Long click
~1 sec.
Short click
BUT 1
But 1
ON/OFF Alarm
But 1
But 1
Time setup
But 3
Time setup Set hours
But 1
+1
But 2
-1
But 3
Set minutes
But 1
+1
But 2
-1
But 3
Set seconds
But 1
Set to 00
But 2
Set to 00
But 3
Exit
BUT 2
But 2
Enter into parameter setup
But 2
But 2
Alarm setup
But 3
Alarm setup Set hours
But 1
+1
But 2
-1
But 3
Set minutes
But 1
+1
But 2
-1
But 3
Exit
BUT 3
But 3
Change color of top LEDs
But 3
But 3
Date setup
But 3
Dare setup Set days
But 1
+1
But 2
-1
But 3
Set month
But 1
+1
But 2
-1
But 3
Set year
But 1
+1
But 2
-1
But 3
Exit


Power plug for 5V DC power adapter
Diagnostic socket/ socket for USB-UART converter
Light sensor
CPU
Temperature sensor
Battery
High-precision time chip
Diagnostic points
Buzzer
Alarm separator
Buttons: 1 2 3
Am/Pm separator
Infrared Receiver
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