Millclock

version 1.3

USER MANUAL

NIXIE SIX by Millclock

The Nixie Six ZIN-18 time and date indicating device (hereinafter referred to as the “clock”) is designed to accurately indicate the time and date. The indication is carried out by gas-discharge lamps of various designs. The clock has RGB LEDs that are used as the underlights of the lamps. It carries a built-in battery to count the time when the power is off and a Wi-Fi module to communicate with a time server or an application.

Main parameters of the clock:

1. Supply voltage, V	9...14
2. Maximum current, A	1
3. Average current, A, not more than	0.4
4. Accuracy, %, not more than	0.05
5. Backup battery	CR1220

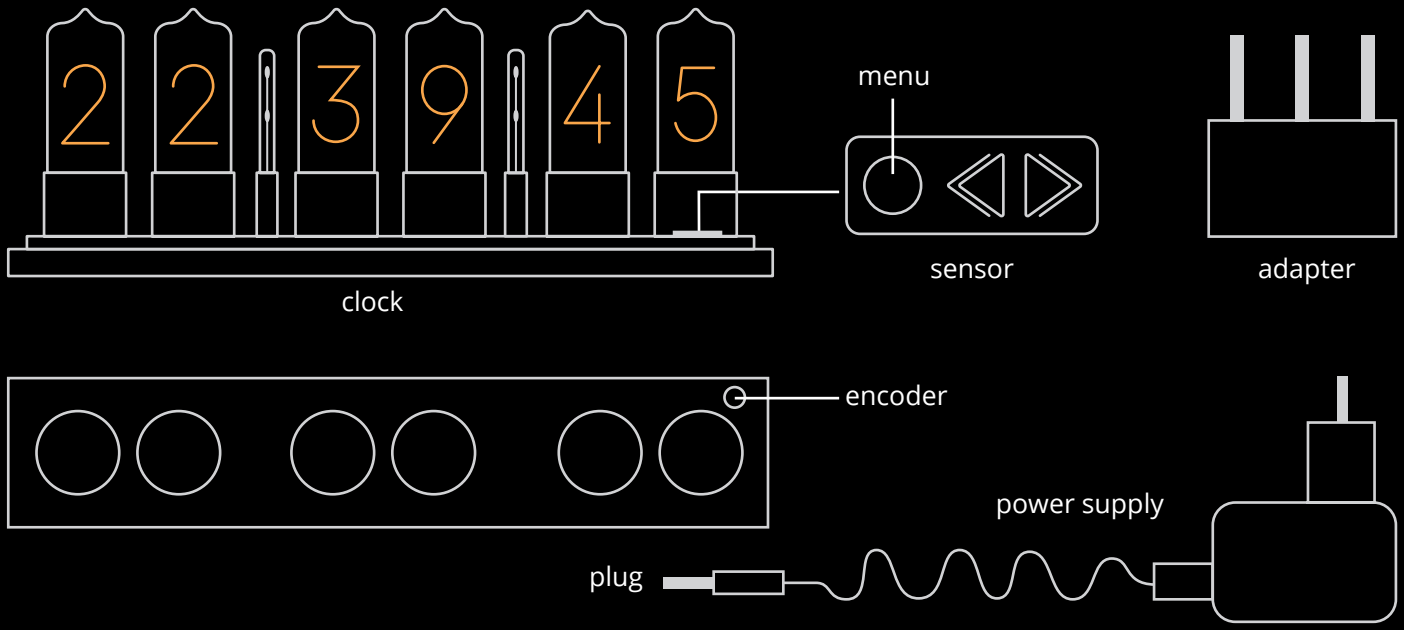
Attention!

This clock is under High Voltage of at least 150V (depending on the type of lamps that are used in the clock). You are not recommended to turn on the clock if it is not assembled. If you touch the Printed Circuit Board of the started clock you can feel a painful and unpleasant electric shock.

The clock carries vacuum tubes that are sensitive to hits, drops, and other impacts. Please note, that when broken the thin glass of the tubes is sharp enough to cause injuries. That is why such use of the

clock is not allowed.

To keep running when the power is off, the clock uses a CR1220 backup battery. Please bear in mind that if the battery is missing or invalid, the clock does not count time.



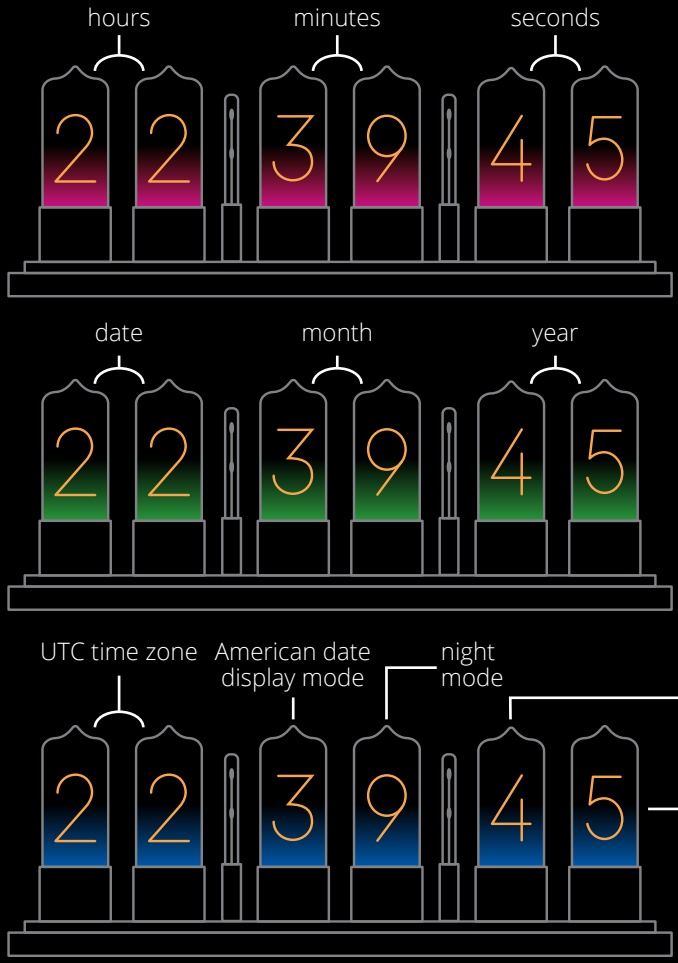
Getting started

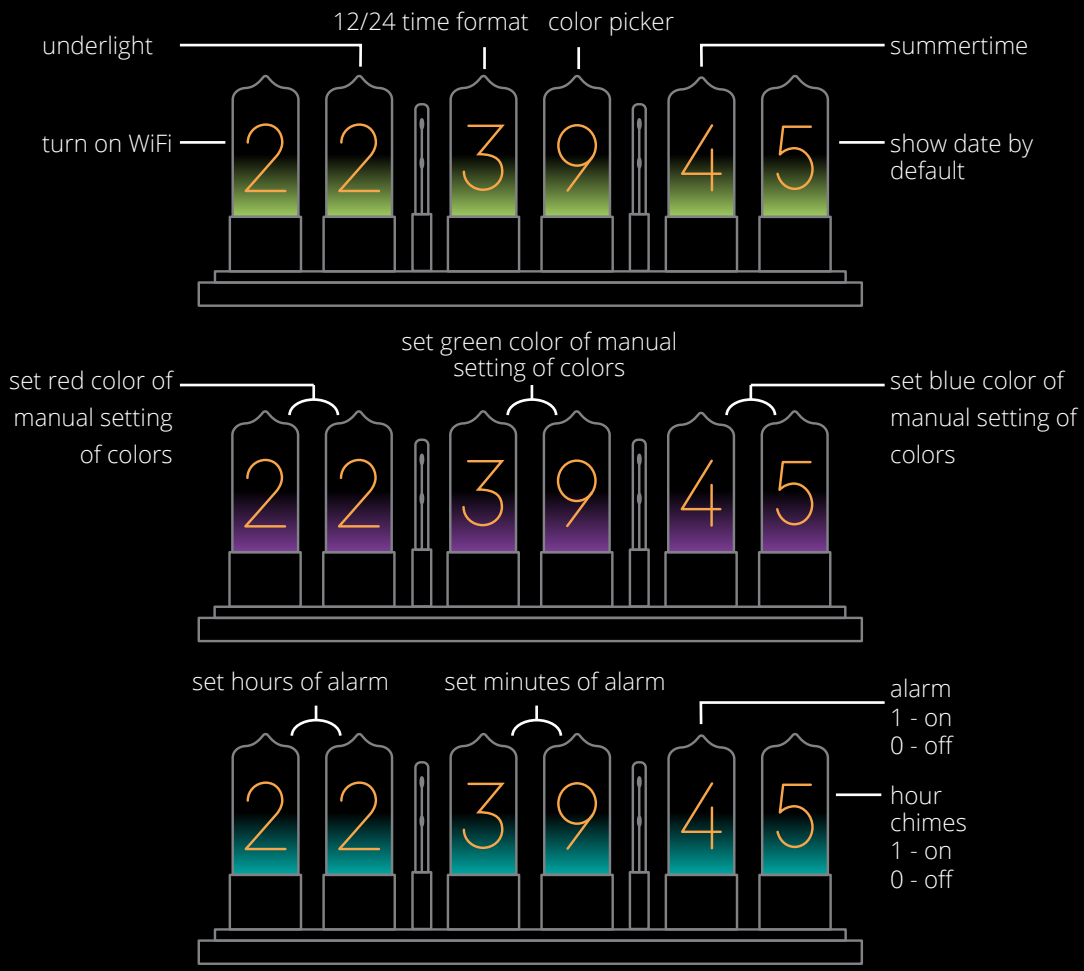
To enter the setting mode, press the “menu” press button on the control panel of the clock or the hash “#” key on the remote control [if your clock supports it]. You will immediately go to the 1st sheet of the Main settings menu that is designed to set the time of the clock. The parameter (lamps) that you are setting will be highlighted: it can change the color, while the other lamps will preserve their color, or it will light up brighter than the other lamps, or it will light up while the other lamps won’t.

To set the clock, use the press buttons on the control panel: “plus” (adding a value), “minus” (subtracting a value), “menu” (switching parameters and sheets); everything goes in accordance with the Table of settings below.

To exit the menu, keep pressing the “menu” press button on the control panel to the end of the table, or, if none of the buttons was pressed, then in 30-45 seconds (depending on the software version), the device will go into standby mode by default.

Setup sheet #	Color of underlights	1st pair oflamps (left)		2nd pair of lamps (center)		3rd pair of lamps (right)	
1	Crimson	Setting hours		Setting minutes		Setting seconds	
2	Dark green	Setting date		Setting month		Setting year	
3	Navy	UTC time zone		American date display mode	Night mode	Smooth switch of filaments	Colons
4	Light green	Turn on WiFi	Under-lights	12/24 time format	Color picker	Turn on summer time	Show date by default
5	Purple	Set red color of manual setting of colors		Set green color of manual setting of colors		Set blue color of manual setting of colors	
6	Azure	Set hours of alarm		Set minutes of alarm		0 – Alarm off 1 – Alarm on	Hour chimes 1 – on 0 – off


hours
minutes
seconds
2 2 3 9 4 5
date
month
year
2 2 3 9 4 5
UTC time zone
American date display mode
night mode
smooth switch of filaments
colons
2 2 3 9 4 5


underlight
12/24 time format
color picker
summertime
turn on WiFi
show date by default
2 2 3 9 4 5
set red color of manual setting of colors
set green color of manual setting of colors
set blue color of manual setting of colors
2 2 3 9 4 5
set hours of alarm
set minutes of alarm
alarm 1 - on 0 - off
hour chimes 1 - on 0 - off
2 2 3 9 4 5

Time zone as related to UTC: The zone of time is relative to UTC. From 1 to 14 – an increase of hours as related to zero value, from 15 to 26 – a decrease of hours as related to zero value. The table below contains the values of this parameter for the following countries of the world:

Value	Correction	Capitals, countries, territories
	Main time zones	
00	0	Dublin, Edinburgh, Lisbon, London, Casablanca, Monrovia
01	+1	Amsterdam, Berlin, Bern, Brussels, Vienna, Copenhagen, Madrid, Paris, Rome, Stockholm, Belgrade, Bratislava, Budapest, Warsaw, Ljubljana, Prague, Sarajevo, Skopje, Zagreb
02	+2	Athens, Bucharest, Vilnius, Kyiv, Chisinau, Riga, Sofia, Tallinn, Tiraspol, Helsinki), Egypt, Israel, Lebanon, Libya, Turkey, South Africa
03	+3	Minsk, Moscow, East African Time (Kenya, Ethiopia, Eritrea, Tanzania, Somalia, Uganda, Sudan, Madagascar), Iraq, Yemen, Kuwait, Saudi Arabia, Qatar
04	+4	Countries of the Caucasus, United Arab Emirates, Oman
05	+5	Western Kazakhstan, Pakistan, Tajikistan, Turkmenistan, Uzbekistan
06	+6	Central and eastern parts of Kazakhstan, Kyrgyzstan, Bangladesh, Bhutan time (Bhutan)
07	+7	Kemerovo, Novosibirsk, Southeast Asia (Bangkok, Jakarta, Hanoi

08	+8	Ulaanbaatar, Kuala Lumpur, Hong Kong, China, Singapore, Taiwan, Western Australian Time
09	+9	Republic of Korea, Japan
10	+10	Eastern Australian Time (Brisbane, Canberra, Melbourne, Sydney), Tasmania, Western Pacific Time (Guam, Port Moresby)
11	+11	Central Pacific Time (Yuzhno-Sakhalinsk, Solomon Islands, New Caledonia)
12	+12	Marshall Islands, Fiji, New Zealand
13	+13	Samoa, Tonga
14	+14	Line Islands (Kiribati)
15	-1	Azores, Cape Verde
16	-2	Mid Atlantic time
17	-3	South American Eastern Time (Brasilia, Buenos Aires, Georgetown), Greenland
18	-4	Atlantic Time (Canada), La Paz, Santiago)
19	-5	East American Time (US & Canada), Pacific South American Time (Bogota, Lima, Quito)
20	-6	Central Time (US & Canada), Central American Time, Mexico (Guadalajara, Mexico City, Monterrey)

21	-7	Mountain Time (USA and Canada), Mexico (Chihuahua, La Paz, Mazatlan)
22	-8	North American Pacific Time (US & Canada)
23	-9	Alaska
24	-10	Hawaii
25	-11	American Samoa
26	-12	Dateline
Additional time zones *		
01	+3:30	Tehran time
02	+4:30	Afghanistan
03	+5:30	India, Sri Lanka
04	+5:45	Nepal
05	+6:30	Myanmar
06	+8:30	DPRK
07	+8:45	5 cities in Australia
08	+9:30	Australian Central Time (Adelaide, Darwin)

09	+10:30	part of Australia
10	+11:30	Norfolk Island (Australia
11	+12:45	Chatham Archipelago (New Zealand)
12	+13:45	Daylight Saving Time in the Chatham Archipelago (New Zealand)
13	-4:30	Caracas
14	-3:30	Newfoundland

** you can set these values in the corresponding section of the Advanced settings menu*

UTC time is not divided into winter or summer time. It is always constant. To make the clock switch to summer time by default, you need to turn on the corresponding function in the menu.

Setting ***summer time:*** 0: disabled; 1: European time (transfer on the last Saturdays of October and-March); 2: American time (transfer on the 2nd Sunday of March and on the 1st Sunday of November).

For more information about summer time or daylight saving time, please see these pages:
https://en.wikipedia.org/wiki/Daylight_saving_time
https://en.wikipedia.org/wiki/Daylight_saving_time_by_country

https://en.wikipedia.org/wiki/Summer_Time_in_Europe
https://en.wikipedia.org/wiki/Daylight_saving_time_in_the_Americas
https://en.wikipedia.org/wiki/Daylight_saving_time_in_Oceania
https://en.wikipedia.org/wiki/Daylight_saving_time_in_the_United_States

Smooth switch of filaments – the gradual transition of digits of hours, minutes, and seconds. The new value smoothly replaces the previous one.

Colons – a few modes of neon separating dots in time display mode:

0 – colons blink at a frequency of 0.5 Hz (1 time per 2 seconds);
1 - colons blink at a frequency of 1 Hz (1 time per 1 second);
2 - 3 - various visual effects of colons;
4 – colons are disabled;
5 – colons are always on.

Settings page #5 is meant for manual presetting of colors of underlights in operation mode 0 (you can select it by the menu item “color picker”).
The menu item “***color picker***” enables the mode of changing the underlights colors depending on the program. The clock can have up to 9 modes of underlights. Mode 0 switches on the manual setting of

colors. In other modes, the colors change according to the program.

Underlights - turns on or off the underlights in operation mode. But, in the settings mode (when you are setting the modes) and in the alarm mode, the underlights are always on.

Default date display - is a function that automatically switches on the date display mode in certain intervals. The date is displayed in the following format DD: MM: YY (Day-Month-Year).

American date display standard. When this option is turned on in position “1”, the date is displayed in the MM.DD.YY format, otherwise - in the DD.MM.YY format.

Night mode. When this mode is turned on, the lamps and underlights fade out from 23 hours (11:00 PM) till 6:00 hours, 6 am. (To set different values, please see the Advanced settings section).

Brief step-by-step Set up guide

1. Apply power to the clock and wait for the time to show. When first turned on, the clock shows 00:00:00 time.

2. Short press the “menu” press button (far left) 1 time. Then, the underlights of the lamps will turn crimson, and the underlights of the 1st pair of lamps will light up brighter. Use the “minus” (center) and “plus” (far right) press buttons to set the current time - hours.

3. Short press the “menu” button again. Then, the underlights of the 2nd pair of lamps (center) will light up brighter than the others. Use the “plus” and “minus” press buttons to set the minutes of the current time.

4. Short press the “menu” button. The underlights of the 3rd pair of lamps (far right) will light up brighter. Use the “plus” and “minus” press buttons to set the seconds to zero.

5. Use the table of Settings (see above) to perform the operations described in sections 2-4 for all the menu items. When you finish setting up the last item, you have completely set up the clock.

Press buttons

In operation mode, the purpose of the buttons is the following: ***Left*** - the press button for entering the settings mode. ***Center*** – the press button for calling the current date.
Right - the press button to turn on /off the underlights. Note: if the program mode of the backlight is set to 0 (manual setting of color) and the color levels are also set to 0 (menu item #5), then the clock will not react to pressing this button – and the underlights will not turn on. You can see this effect, for example, when you first turn on the clock.

To learn the purpose of the buttons in the setting mode, please see above and in the table below.

Mode	**Left press button**	**Center press button**	**Right press button**
Operation	Enter Main settings (short press) Enter Advanced settings (long press)	Turn on date display	Turn on/off underlights
Setting	Switching of the parameters of the Main settings menu or of the Advanced settings menu	Minus (subtracting)	Plus (increasing)

Extended options

Alarm clock

Item #6 of the menu sets the time of the alarm clock off and on. The alarm starts with ringing and lighting (bright white glow and blinking of underlights LEDs). It lasts for about 90 seconds. You can stop the alarm by pressing the underlights button (if the clock has press buttons or a sensor), or by turning the knob clockwise (if the clock uses an encoder). The clock has a Snoozy mode when the alarm activates again in five minutes after the signal was turned off. This mode is activated if the alarm has started, and you press the center button (if the clock has buttons or a sensor) or if you turn the knob counterclockwise (if the clock has an encoder). The alarm starts again in 24 hours (if it was not turned off in menu #6).

You can also set Hour chimes, then the clock will signal every new hour. Hour chimes are active from 5 am to 11 pm.

Advanced settings (only for versions 1.1 and higher)

Pressing and holding the “menu” press button for more than 5 seconds opens the Advanced settings menu designed to customize most of the parameters of the clock. This menu makes the clock very flexible and allows you to tweak it to meet all your preferences.

The principle of information display in the Advanced settings menu:

- the 1st two lamps show the number of page settings
- depending on the parameter that you are setting, either the 2nd pair of lamps or the 3rd pair of lamps light up
- flipping through parameters is carried out by the “menu” press button, while the setting of values is carried out by the other press buttons.

Below in the table, you can see a brief description of the parameters (default values are given in square brackets).

Line	2nd pair of lamps	3rd pair of lamps
00	Date display timeout, sec **[20]**	Duration of alarm ringing, sec +30 **[60]**
01	Duration of date display, sec **[08]**	Turn on cathode “antipoisoning” **[01]**
02	Time to start hour chimes **[05]**	Time to stop hour chimes **[23]**
03	Time to start cathode “antipoisoning” **[02]**	Turn on sound confirmation (of key press **[01]**
04	Choose a tune of hour chimes **[00]**	Choose a ringtone of alarm **[00]**
05	Choose visual effect of transfer from time to date **[00]**	Set additional time zones **[00]**
06	Turn off testing LED (1-LED_OFF; 0-LED_ ON)	Update WiFi information (see Using WiFi section)
07	Set the brightness levels of lamps **[00]**	Not applicable for this clock version **[00]**
08	Not applicable for this clock version **[00]**	Not applicable for this clock version **[00]**
09	Not applicable for this clock version **[00]**	Set all values to default **[00]**

Detailed description of parameters of the Advanced settings menu

Date display timeout - the time in seconds when the actual time is displayed before switching to the date display mode. This function works when the default date display option is enabled in the Main settings menu.

Duration of alarm ringing, sec

Setting the duration for the alarm will sound. Indicator readings 00 correspond to 30 seconds, indicator readings 99 correspond to 129 seconds.

Duration of date display, sec

The time when the date is being displayed automatically (by setting the corresponding item in the Main setting menu) or manually (by pressing the center press button on the control panel).

Turn on cathode "antipoisoning"

One of the technical disadvantages of gas-discharge indicators is that the filaments are stacked one on the other, overlapping each other. Therefore, in the case of a rare switch on of individual indicator cathodes and often switch on of the rest indicator cathodes, metal particles sprayed by the active cathodes sediment on rarely used cathodes that contributes to their "poisoning". At first, this leads

to dim areas uneven glow of rarely used cathodes (caused by uneven dim areas on them), and with further “poisoning”, some of these filaments stop glowing at all. All gas-discharge indicators with rare and often switch on of filaments are subject to this effect. For example, hours and tens of hours are switched on extremely rarely.

One of the methods to fight the cathode “poisoning” in lamps is to enable various effects of flipping through all the digits in the lamp (similar to the slot machine effect). Quick switching on all the cathodes in a row can significantly reduce the “poisoning” rate of the cathodes and increase the life service of the lamps.

Therefore, it is strongly recommended to not disable this function and to not reduce the life of the lamps.

Time to start hour chimes

Time in hours from 00 to 22 when hour chimes are activated. This function has to be activated in the Main settings menu.

Time to stop hour chimes

Time in hours from 02 to 24 when hour chimes are deactivated. This function has to be activated in the Main settings menu.

Please pay attention when setting these two parameters. Otherwise, there may be situations when hour chimes either will not be activated at all or they will be activated permanently.

Time to start cathode "antipoisoning"

You can activate the function of protection against cathode poisoning any time that is convenient to you. The time range is from 00 to 23 hours. This function operates for one or two hours. It is strongly recommended to not completely disable it.

Turn on sound confirmation (of key press)

Activation of the function of audio signaling upon pressing on the controls.

Choose a tune of hour chimes

Selecting one of several chimes for hourly chimes. This function should be switched on in the Main settings menu.

Choose a ringtone of alarm

Selecting one of several alarm sound effects.

Choose visual effect of transfer from time to date

Selecting one of three light effects how to go from time to date display.

Setting of additional time zones

Additional settings that help to determine the exact time in a given location. This function can only operate with special software and a connected GPS module. For more information, please see the description of the Main settings menu.

Turn off testing LED

This option allows you to disable the signal LED (if applicable for your model). In this case, the value “1” corresponds to the disabled state. Depending on the configuration, this LED can indicate the response of pressing the keys on the remote control, monitoring of the GPS connection, and the status of the WiFi connection (for more details, please see the corresponding sections of the Manual).

Setting the brightness levels of the lamps

By changing this item, you can set the brightness of the lamps within certain limits. The clock does not store this value to avoid incorrect operation. It will be reset to default values when the power is restarted.

Set all values to default

When this function is set to 01, the next press on the “menu” button will reset all settings to default.

Using WiFi

If your clock’s hardware supports WiFi, then you can set the exact time of the clock by receiving accurate time signals from specialized sites. The list of sites (4) is set by default. Also, you can correct this list in the Millclock Commander program (for Windows).

As well, you can configure your clock via WiFi using the app Millclock for Android from your smartphone or tablet that support WiFi.

To use WiFi functions, you have to enable WiFi in the corresponding section of the Main settings menu (please, see the Main settings section). Then, you need to configure the Internet point of access and the time for updating the Internet information about the exact time.

To do this, please complete the following steps.

1. Wait for the testing LED on the clock’s PCB to fade out. If it blinks for a long time, press the “RIGHT” button (turn on and off the underlights) and hold it for at least 4 seconds. In 15 seconds, the LED will fade out.

2. Run a special application on your Android device to set the parameters of the clock. You can download it on the Manufacturer's website, or on the Google Play Market. Establish a WiFi connection with the device. By default, the name of the device is "Millclock_V6", the password is "ML123456". You can change this parameter in this software (items "My point" and "My password").

3. In the pop-up window, touch the "Connect" button. If communication is successful, the testing LED on the PCB of the clock will light up with constant light. If the LED is off, you need to repeat the actions described in steps 1 and 2. After the connection is established, the current time and date will be displayed in the corresponding field of the application. They must exactly coincide with the time on the clock.

4. Configure the device: enter the point of access and your password. You can fill in other settings at your discretion.

5. Close the Android program. Disconnect from the "Millclock_V6" point of access. In this case, the testing LED will start blinking, which indicates that the device is trying to configure the connection and read the information about the exact time from the exact time site. As the device stops reading, the LED will stop blinking. In case the reading was not successful, or the device failed to connect to the point of access, or it had other problems, it will make a long beep.

Fine-tuning

Calculation of the duration of request for information from the site of the exact time. You should set this parameter in the Advanced settings menu of both the device itself and the software. The request time is set from 15 minutes (1 point) to 1485 minutes (approximately 24 hours). It is not recommended to set a too short time, as the exact time site may recognize such requests as spam and respond to them rarely or do not respond to them at all. One time per 1 hour – 2 hours is the best option.

The software of the device is organized in such a way that requests for information about time are performed in a specific order; the use of multiple sites of exact time increases the probability of response and receiving of the data.

This Manual does not contain Help for the software as it is supplied together with software distributions in the electronic form. It is strongly recommended to use the most recent version of the software that is available on the official website of the Manufacturer.

Warranty of Manufacturer

The Manufacturer guarantees the uninterrupted operation of the electronic part of the device within 1 year from the production date. The average service life of the electronic part of the clock (with the exception of gas-discharge lamps) is 5 years.

Gas-discharge indicators and batteries are not covered by this warranty.

The team is responsible for the quality of the products.

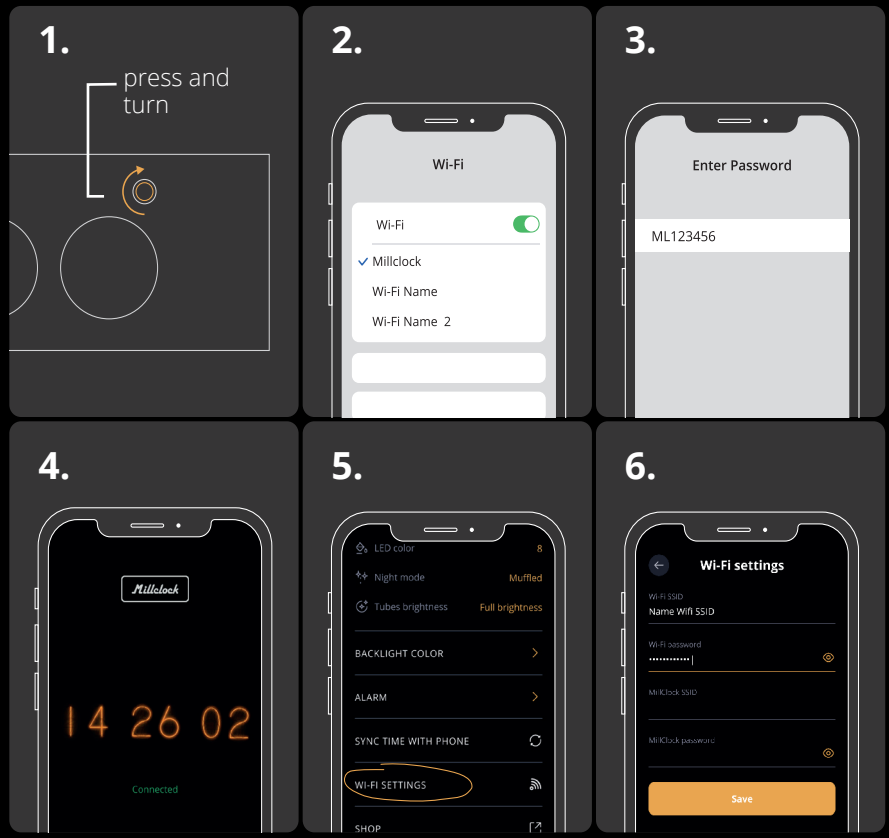
CEO:

Head engineer:

Product assembler:

How to set your clock

1. Turn on the Wifi reciever in the clock: Press and turn the encoder button to the right- ON.
2. Select anyone from the list of Wi-Fi with the name Millclock.
3. Connect using password ML123456.
4. Go to the application and see the mark “Connected”.
5. Press Wi-Fi Settings.
6. Enter the login and password from the home network Wifi SSID log and Wifi SSID Pass.



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