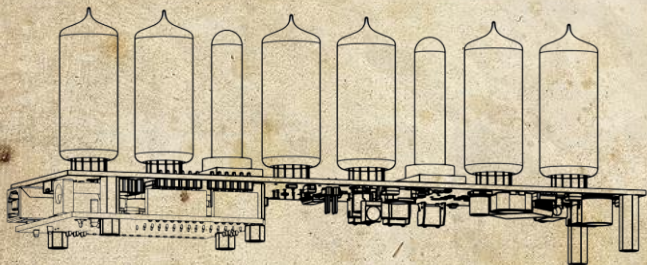


GRA & AFCH



Divergence Meter

**NCS3XX NIXIE CLOCK SHIELD FOR
ARDUINO**

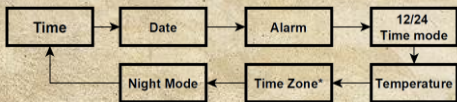
OPERATING INSTRUCTION

2036

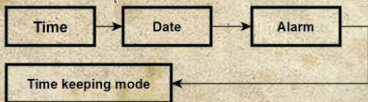
Release 1.98

GENERAL GUIDE

1. Press "Mode" to change from mode to mode. Each mode is explained in detail on the following pages.



TIMEKEEPING MODE



To set the time

1. Hold down "Mode" while in the Timekeeping Mode until the hours digits start to flash. The hours flash because they are selected.
2. Press "Mode" to change the selection in the following sequence:
 - Once you reach the Timekeeping display, you have to hold down "Mode" again to display flashing hours.
 - While the digits are selected (flashing), hold down "Mode" to return to Timekeeping Mode without saving.
3. While any digits are selected, press "Up" to increase the number, or "Down" to decrease the number. Holding down "Up" or "Down" changes the current selection at high speed.
4. After you set the time, press "Mode" to select the Timekeeping Mode.
 - If you do not operate any button for a few minutes while selection is flashing, the flashing stops and the clock goes back to the Timekeeping Mode automatically.

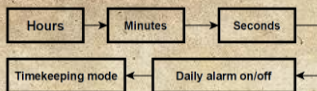
DATE MODE



To set the date

1. Hold down "Mode" while in the Date Mode until the all digits start to flash.
2. Press "Mode" to change selection in following sequence:
3. While the digits are selected (flashing), hold down "Mode" to return to Timekeeping Mode without saving.
4. Press "UP" or "Down" button to switch between dd/mm (31/12/99) format and mm/dd (12/31/99) format.
 - While any digits are selected, press "Up" to increase the number, or "Down" to decrease the number. Holding down "Up" or "Down" changes the current selection at high speed.
5. After you set the date, press "Mode" to select the Date Mode.
 - If you do not operate any button for a few minutes while a selection is flashing, the flashing stops and clock goes back to the Date Mode automatically.
 - The clock does not make validation for correct date. So clock not to return to Date Mode if date is incorrect.

ALARM MODE



When the Daily Alarm Function is switched on, the alarm sounds at the preset time each day. Press any button to stop the alarm after it starts to sound.

To set the alarm time

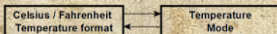
1. Hold down "Mode" while in Alarm Mode until the hour digits start to flash. The hour digits flash because they are *selected*.
 2. Press "Mode" to change selection in the following *sequence*.
 3. Press "Up" or "Down" buttons to increase or decrease selected digits. Holding down buttons changes the selections at high speed.
 4. Daily alarm on/off mode is representing by upper separate dots, press "Up" or "Down" to enable or disable daily alarm.
- Entering in Alarm Mode always switch daily alarm on.
 - If you do not operate any buttons a few minutes while a selection is flashing, the flashing stops and the clock goes to the Timekeeping Mode.

12/24 Hours Mode

To change 12/24 mode

1. Enter in 12/24 mode settings, by holding down "Mode" button until 12 or 24 digits start to flash.
 2. Press "Up" or "Down" buttons to switch between 12 and 24 modes.
 3. After you set time format press "Mode" button to return to Timekeeping mode.
- If you do not operate any buttons a few minutes while a selection is flashing, the flashing stops and the clock goes to the Timekeeping Mode

Temperature Mode



To change the temperature format from Celsius to Fahrenheit and vice versa.

1. Select Temperature Mode, pressing the mode button several times...
2. Enter in temperature mode settings, by holding down "Mode" button until digits start to flash.
3. Press "Up" or "Down" buttons to switch between Celsius and Fahrenheit formats.
4. Press "Mode" button to save settings and return to Temperature mode.

Time zone*

To change Time zone from -12 to +14

1. Select Time zone mode, pressing the mode button several times (default value is +02).
2. Press "Up" to increase the number, or "Down" to decrease the number.
3. For negative values, the top (or right) dots is turned off.
4. Press "Mode" button to save settings and return to Time zone mode.

* Time Zone Mode available only with Arduino Mega, and it is used together with an **external** GPS receiver GA-6.

Night Mode



Night mode allows you to set the daily tubes and LED backlight shutdown time (hour) and the daily tubes and RGB backlight activation time (hour). The indication that **Night Mode** is selected is the display of the pair of digits "01" on the 5th and 6th tubes*. Tubes 1 and 2 display the time for turning **OFF** the clock, while tubes 3 and 4 indicate the time for turning **ON** the clock. The activation and deactivation times are set using the 24-hour time format. To wake up the clock that has entered night mode, simply press any button. To prevent the clock from entering night mode, you should set the same time for turning off and turning on. For example, "00:00:01" will deactivate the night mode, while "23:08:01" will set the deactivation time to 23:00 (11:00 PM) and the activation time to 08:00 AM.

** Since tubes 5 and 6 are not involved in setting the night mode and serve only as a reminder to the user that the 1st group of two tubes (tubes 1 and 2) is responsible for the time to turn off the clock, and the 2nd group (tubes 3 and 4) is responsible for the time to turn on the clock, users of clocks with 4 tubes can ignore the status of tubes 5 and 6.*

Accessories

Any additional accessories must be connected only when the clock is turned off.

GPS Receiver (GA-6): It doesn't require any setup except specifying the time zone (Menu #6). It is supported only by Arduino Mega-based clocks. During the initial startup, the GPS receiver may take up to an hour to determine the precise time. Subsequently, time synchronization occurs every 30 minutes. For reliable GPS reception, the receiver should be placed in a location with a clear view of the sky. Also, make sure that the connector is fully inserted.

Remote Controller (RM-X153): It doesn't require any setup. For clocks in an opaque case, an external IR receiver is required. Direct line of sight with the IR receiver (built-in or external) is required for proper operation. The remote control uses only three buttons: UP, DOWN, MODE, and their functions are identical to the buttons on the clock. The remote control periodically requires replacing the CR2025 battery.

Temperature Sensor (DS18B20): It doesn't require any setup. Like any other accessory, it must be connected before turning on the clock.

RGB LED Backlight

To disable LED backlight

- Hold down "Down" until the LED backlight turns off.

To enable LED backlight

- Hold down "Up" until the LED backlight turns on.

To fix color of LEDs

- Press "Down" button.

To resume automatic LEDs color changing

- Press "Up" button.

POWER ON SELF TEST

Immediately after a clock is powered on Self-Test is starting in the following sequence:

1. Red LEDs on.
2. Green LEDs on.
3. Blue LEDs on.
4. Tubes test which display all digits from 0 to 9 on all tubes simultaneously.
5. Firmware version.
6. Sound test.

web-site: www.gra-afch.com