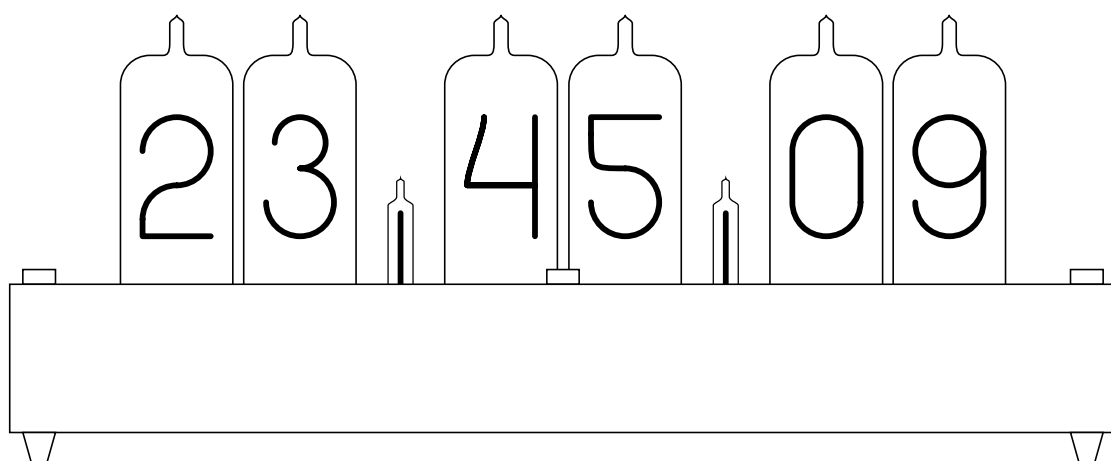




MIGHTY-8

Nixie clock user manual

Version 1.2

Proudly made in Georgia

CAUTION! This clock uses high voltage, 180VDC, which can be (and will be) lethal, if not handled properly. There are no user serviceable parts inside, do not open the clock cabinet!

TECHNICAL SPECIFICATIONS

Clock type: Static driven segments, 6-digit nixie tube clock with alarm, adjustable RGB backlighting, LCD screen and GPIO/Serial port (Optional)

Features: 12/24-hour mode selection, calendar, alarm with weekend adjustment, customizable tube backlight with alarm sync, automatic/manual tube brightness, mp3 files as a alarm tone (optional), GPIO port for GPS receiver or other peripheral connection.

Timekeeping: GPS Sync, precision TCXO RTC (DS3231), supercap clock backup (24-72 hours)

Tube types:

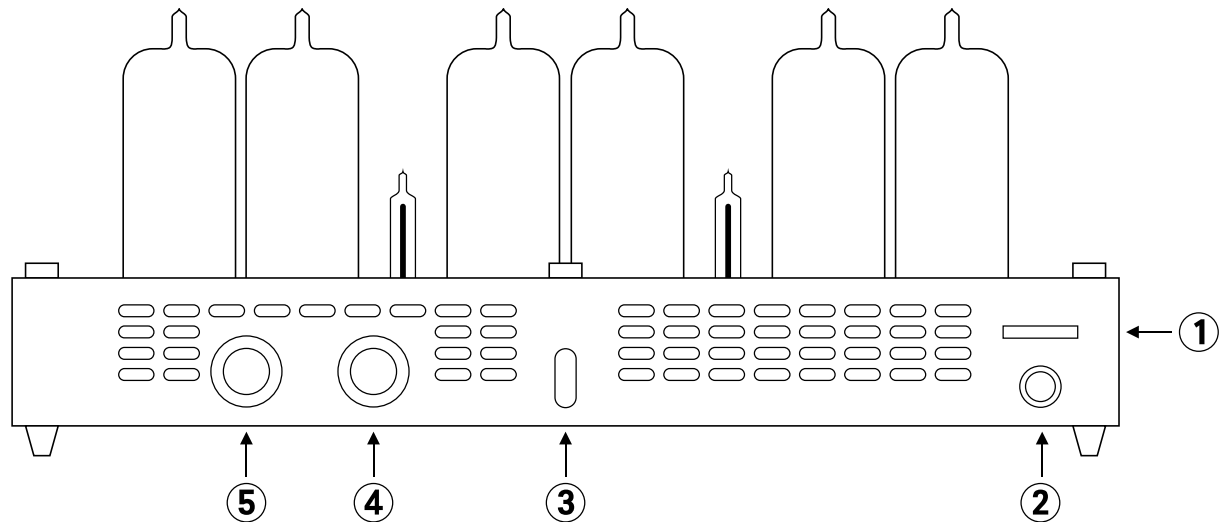
- IN-14
- IN-8-2
- IN-16
- Z574M or any of the substitute tubes from these: B570M, F9080B, F9080BA, TAF1093A, TAF1317A, TAU7030, Z5700M, Z570M, Z5730M, Z573M, Z5740M, ZM1080(T), ZM1082, ZM1134, ZM1135, ZM1136A, ZM1136L, ZM1136R, ZM1138A, ZM1138L, ZM1138R

Power supply: USB Type-C, or 5V DC supply. Max. power consumption $\leq 5W$

LCD Screen and setup menu: 2x16 digits alphanumeric LCD display with backlight, two (four optional) button control, English language. Optional languages: French, Italian.

Dimensions: 187 x 77 x 25-55mm. (Actual dimensions depending on the cabinet style)

CONTROLS AND CONNECTIONS (Rear view)



1. MicroSD card slot (available in MP3 version only)
2. Line out for audio output (available in Enhanced MP3 version only) or GPS serial port connection. (See DIY kit manual for jack pinout, if you want to make your own GPS receiver module)
3. DC power connector. Either USB Type C or barrel connector
4. Left button – Enter setup/Next setup item
5. Right button – Display calendar/Mute alarm/Change setup item value

(Depending on the cabinet models, buttons will be placed either on rear panel or underneath the clock base, next to LCD screen)

OPERATION

Startup: This clock requires no special care and is “ready to run” directly – just connect the power supply. Power supply compatibility is tested on startup (all zeros are shown on the clock for 2 seconds) – if there is not enough voltage or power, LCD screen will display the message “**Check the power supply!**” and clock operation will be halted. If power supply is ok, clock will continue booting.

Normal mode: In this mode, clock displays the time, according to the user settings (12- or 24-hour mode). Pressing the bottom (or right) button will enter the setup menu, pressing the top (or left) button will display the calendar – year/month/date and if alarm is enabled, alarm time will be also displayed (with dot separators blinking). Pressing top (left) button when alarm is ringing, will mute the alarm.

Setup menu: This clock has intuitive and user-friendly setup menu, which is used in the following way – pressing the bottom (right) button will change the menu item, and pressing the top (left) button will change the selected value. Setup is done via built-in LCD screen, which is located at the bottom of the clock and the menu has the following items:

Item name	Available choices	Remarks (if any)
SET REGION/MODE	12 HOUR/F 24 HOUR/C	This is used to set the hour display mode for the clock
SET YEAR	2024-2099	
SET MONTH	January-December	
SET DATE	1-31	Warning: setting illegal date, like February 31th, will cause improper operation of alarm and calendar.
SET DAY OF WEEK	Monday-Sunday	This is important for proper alarm operation.
SET HOURS	0-23 or 0-12 with AM/PM	Time setting format depends on region setting.
SET MINUTES	0-59	
SET ALARM	OFF (Default), ON ALL WEEK, ON WORKDAYS ONLY	If you set this menu item to OFF, the related alarm related settings won't appear in setup sequence.
ALARM HOURS	0-23 or 0-12 with AM/PM	
ALARM MINUTES	0-59	
ALARM DURATION	1-3 Minutes	
ALARM SOUND	1-32 (Selected sound will play)	There are two hardware versions of this clock, one with mp3 and one without. Version without the mp3 will just play annoying beep as alarm, regardless of number selection in this menu item. Version with mp3 will play the files from the included MicroSD card according to their number.
ALARM COLOR SYNC	OFF (Default), ALL TOGETHER, RANDOM FLASH	It is possible to sync tube backlight colors to the alarm. "All together" changes all colors at once and "random flash" just does random flashes.
TUBE BRIGHTNESS	1-8, AUTO	There are 8 tube brightness levels and "Auto" mode too. These settings apply to backlight brightness as well. When "Auto" is enabled, tubes and backlight will gradually dim at evening and come back to full power in the morning.
SUPER SAVER	ON/OFF	Enabling this option will completely turn off the tubes and backlight from 00:00 to 06:00. Alarm operation won't be affected.
REFRESH MODE	DIGIT SEQUENCER / COUNTER / OFF	As some people believe, there is a need to refresh tube displayed data, to reduce cathode poisoning. While we do believe this is just complete b/s, we've implemented two cool

		looking visual options for that, since people demanded them.
TUBE BACKLIGHT	OFF / FIXED COLOR / COLOR EFFEX	Tube backlight can be customized in a several ways – you can either turn it off, adjust color individually or set some “effex” – gradient colors or fading. If you select “effex” at this point, “individual color” and “backlight color tube xx” won’t appear – clock will directly go into “effex” selection mode.
INDIVIDUAL COLOR	OFF/ON	If you enable this option, on the next step, you will be able to customize backlight colors for each tube (including dot separators). If not, single color setting will be applied to all tube backlights.
BACKLIGHT COLOR TUBE XX	15 Backlight colors total	In this mode, pressing the bottom button will select tube numbers from left to right, and the top button will change the color for the selected tube. If individual color is set to OFF, there will be only one setting, which will adjust backlight color for all tubes.
BACKLIGHT EFFEX	15 Backlight effex available	Here you can select from various preset backlight color options, some of which are gradient, some are discrete and so on – have to see them all by yourself.
CLOCK FINE TUNE	15-45	This is a factory calibration setting and should not be adjusted by the user. Leave it on a default value of 30.
BEEP ON KEYPRESS	ON/OFF	Clock beeps on keypress for better feedback, but if you find this annoying, you can turn it off in this setting.
ALARM VOLUME (Available only in models with the MP3 function)	1-10	There are 10 volume levels for alarm sound playback. This menu item won’t appear, if your clock has no MP3 as alarm feature, or if you have disabled your alarm.
STATUS	Here you can see status of some internals – the tube supply voltage – it should be around 170-180 volts and GPS status – more on that on the right.	Please note, GPS receiver is queried on clock startup, so you should connect it BEFORE powering the clock on, or it won’t be detected. The status message for GPS will be one from the following: GPS: Not found – when module is not connected.

		GPS: Not locked – when module found, but there is no signal lock due to bad module placement. GPS: Locked:XX – Signal is locked and time data received. XX represent current minutes from the GPS.
FIRMWARE	F/W: 3.1 EN S/N: XXX (Depends on your clock actual build)	Displays current version of the firmware and serial number of your clock.
SETUP COMPLETE! EXIT OR RESTART?	Pressing the top button exits setup, bottom button restarts the setup	

PLEASE NOTE: During the setup or startup sequence, some digits of nixie tubes may come on randomly. Also, during the normal use of the clock, LCD screen might show question marks or other symbols. All this is completely normal and does not affect proper clock operation.

GPS Operation

Please note, GPS is used for time syncing only, since there are too many time zones, adding time zone control to clock might confuse some users, so GPS works as follows – you just set date/day/month/hours/minutes via the menu, according to your time zone, and GPS will take care of time keeping afterwards.

Please connect GPS receiver only to the clock when it is powered off. Connecting GPS module to the clock which is already running, with high probability will physically damage both clock and GPS receiver.

Types of GPS receivers supported:

Any of GPS receivers which are compatible with NMEA standard, operate at 9600bps and have output signals with TTL levels will work normally. (The module included by default is NEO-6)

If you have purchased clock without GPS module and want to add one by yourself, you should use 3 pin connector, located at the top center of the PCB (See appendix for detailed info). There are 3 pins, marked as VDD, IO, GND. By default, there is a jumper, connecting IO and GND pins. Do not remove it if you do not plan to connect the GPS module. If you want to connect the GPS module, remove that jumper and connect positive power supply pin of GPS module to VDD, TX pin to IO and GND to GND.

Complete information regarding pinout and connections is available in DIY kit manual.