

DISPLAY MODULE

USER GUIDE

www.tiktoki.ge

TECHNICAL SPECIFICATIONS:

Display capabilities: 8 characters, 16 segment display, built-in ASCII decoder and RAW data support. Optional digital clock with thermometer, calendar and alarm.

Available colors: red, blue, high brightness green, white*, orange*, yellow-green*.

Operating voltage & power source: Red, Yellow-green, orange modules: 2.5-5.5V, Blue, High brightness green, white: 3.3-5.5V. USB Type C socket, HX 2.54mm connector (optional)

Communication interface: Serial (RS-232/TTL auto-switch), 9600bps, 3 wire SPI (Up to 10MHz)

Optional features: Alarm clock with high precision TCXO and customizable interface.

Power consumption: $\leq 0.3A$ at 5V and maximal brightness.

Physical dimensions: 185x30x10mm (W-H-D), weight: <100gr.

ASCII Decoder: CR (DEC 13) DEC 32-127. Option with clock also supports BELL (DEC 07) control character.

Clock features: 6-digit, 12/24 hour mode digital clock with alarm, thermometer and calendar, adjustable display separator type and automatic/manual brightness. SuperCap backup (24-72 hours)

Thermometer specifications: (available only in module with clock option): Measurement range: -25+125C. Precision $\pm 1C$.

* These colors are only available on volume order (at least 100 modules of same color to be ordered).

Feature introduction

I tried to make this manual as short as possible and avoid useless yada-yada, so it won't take you too long to read this manual, but it is still necessary, to get used with this module.

This module can be operated in conjunction with any serial interface supplier – PC, Raspberry, Arduino or anything else, which can either output serial data in ASCII format, or just send raw bytes over the serial port. If you require higher transfer speeds, there is SPI interface available, command data for which are same as for TM1638 decoder IC, which is widely supported via libraries by Arduino and other DIY solutions like Orange PI or Raspberry PI.

Module supports wide operating voltage, 2.5V-5.5V, so no logic shifters or any other measures are needed when operating with either 3.3V or 5V logic (in case of 2.5V operation, you need to reduce the input resistor from 22K to 10K).

The settings for the serial port are as follows:

Speed: 9600bps

Data: 8 bit

Parity: none

Stop bits: 1 bit

Flow control: None

Self-test/demo mode

If you keep the “test” button pressed while powering the module on, it will enter into self-test mode, when it will sequentially light up all segments, display some text and change brightness levels. To exit the demo loop, just cycle the power of the module.

ASCII decode mode

This is the default mode, which is available after the power-up. In this mode, you can either sent 8 digits of text to be displayed at once, or you can send 1-7 letters, with CR (Enter, ASCII 13) at the end, to display them immediately.

RAW decode mode

In this mode, the input data are directly sent to segments – this means, you have the full control over the segments being lit up. To activate this mode, send ASCII 126 and ASCII 13 (CR), followed by 16 bytes of the data to be displayed (from left to right). Repeat this each time you need to send the raw data to display module.

Brightness adjustment

To adjust the brightness, send LF (ASCII 10) followed by ASCII 48-56 (Codes for digits 0-8) and CR (ASCII 13). Display brightness will be adjusted instantly, screen contents not affected. Brightness adjustment is stored in EEPROM and read and applied on each power on.

ASCII BELL

In case you need to make built-in speaker beep, just send ASCII BELL (07) code + CR (ASCII 13). This works only for modules which have the clock function.

Clock Mode

If your module has clock function, on power up, there's a one second delay, during which module awaits mode selection data (ASCII 0 followed by ASCII 13) on serial port. If no data is received, then it processes to clock mode. You can switch from clock mode and back any time.

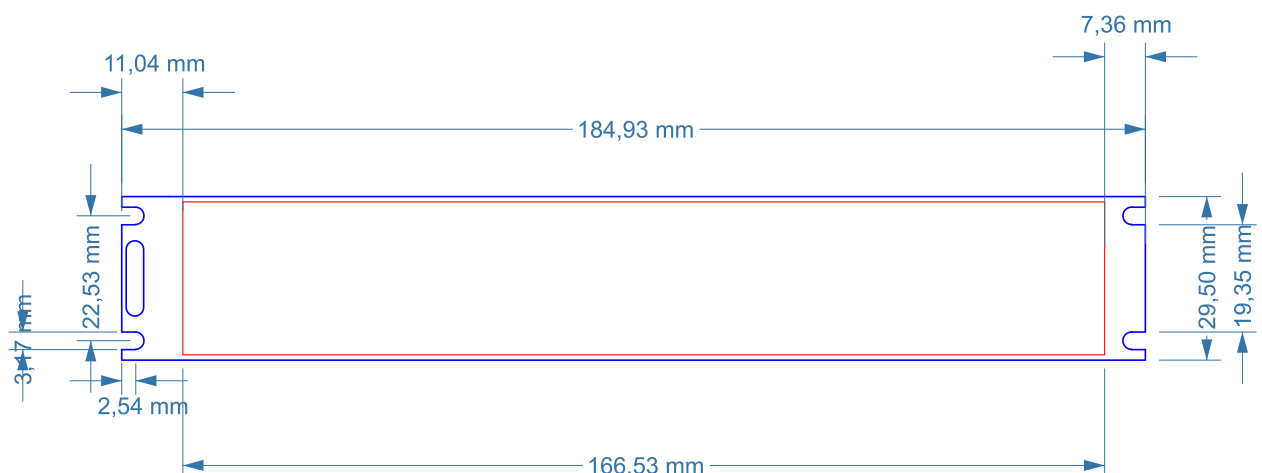
ASCII 0 + ASCII 13 = Serial input mode

ASCII 1 + ASCII 13 = Clock display mode.

Please be aware, that there might be a slight delay (0.1-0.5 sec) when switching from clock mode to serial input mode. Clock continues to operate while module is in serial input mode and timekeeping is going as usual, but alarms and brightness control will be disabled in this mode.

Outline and dimensions

Module dimensions can be seen on the following picture. If you need a digital file with exact outlines, including button and socket locations, please scroll down to the end of this document, to find the download links for the outline in the vector format (SVG/DXF). Please note: actual dimensions might vary within 0.1-0.3mm, due to batch differences.



Clock setup

Modules with built-in clock function have setup menu, which can be accessed by pressing the left (when viewed from the front of the module) button. The word **SETUP** will be displayed. The left button selects the menu item, and the right button adjusts it's value. There are the following options ins the setup:

REGION: 12/24. This setting adjusts the region – 12 means 12-hour mode and temperature display in Fahrenheit, 24 means 24-hour mode and temperature display in Celsius. **Please note: Since this clock has no AM/PM indicator, time and alarm setting are always done in 24-hour mode, to avoid confusion with alarm ringing time.**

YEAR2022-2099: Used to set the current year. Year can be set up to 2099.

MONTH: 01-12. Set the current month

DATE: 1-31. Sets the current date

DAY: MON-SUN. Sets the current day

HOURS: 0-23. Sets the current hour

MINUT: 0-59. Sets the current minutes (seconds are set to zero automatically)

ALARM: ON/OFF. Turns alarm on or off.

AL-HR: 0-23. Sets the alarm hours

AL-MN: 0-59. Sets the alarm minutes

AL-WK: ON/OFF. Enables/disables alarm on the weekends

BRIG: AUT/MAN. Display brightness, automatic (based on time) or manual

BRIG: 01-08. Adjust brightness, there are total 8 levels available.

DIVIDER: -, o, /, * , + . You can select the animated seconds divider shape here, or turn it off.

DISP: TIM/T+C/T+T/TCT. Selects the display mode:

TIM: Only time is displayed

T+C: Time and calendar (once per minute) will be displayed

T+T: Time and temperature (once per minute) will be displayed

TCT: Time, calendar and temperature (once per minute) will be displayed.

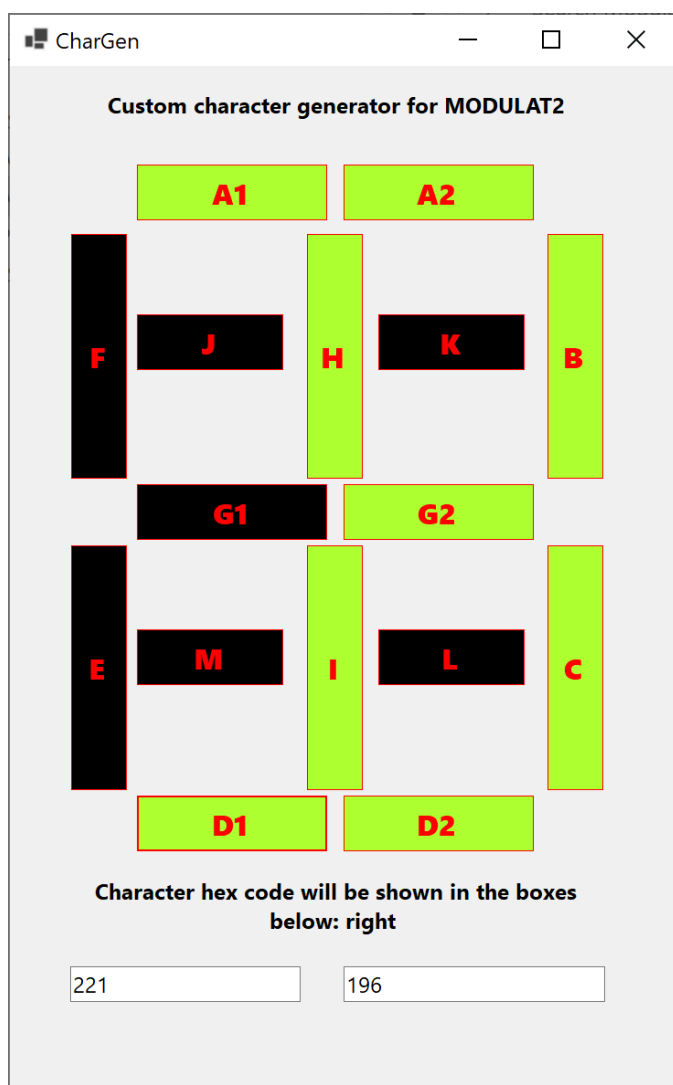
EXIT: Y/N. Pressing the right button in this sub-menu will exit setup and return to normal clock operation, pressing the left button will re-launch the setup.

Clock operation

Clock operation does not need any special attendance – it is made to function autonomically. During the normal operation, pressing the left button will go to setup menu (please read above). Pressing the right button will display calendar, temperature and if enabled – alarm hours and minutes.

Custom character generator

In the RAW mode, you can send bytes to arbitrarily light up various segments of the display. To aid you with that, I've developed a special PC software, which is called CharGen for Modulat2. The operation is fairly simple – you just click on the segments you wish to light up, and then copy & paste codes from the textboxes below. This software is "portable" and does not require installation. If you got message at startup, saying some DLL or modules missing, please reinstall the .NET framework 4.5 for your OS.



Downloads

This PDF file, the software above and module outlines can be downloaded in a single zip file from the following address: www.tiktoki.ge/projects/modulat2.zip