ClimateGuard

1 Key features

Functional:

- Ability to control RGBW and addressable LED strips
- 5 channels of common anode LED tape control
- The maximum current for one channel - 6 A
- Support for IR remotes
- Compatible with WLED firmware
- Removable screw terminals for connection
- Built-in programmer
- USB-c connector
- ESP32-WROOM microcontroller
- The presence of a current shunt
- Button connector
- Reverse polarity protection
- LED strip parasitic inductance protection

- Support NRF24L01 radio module and 433MHz modules
- Built-in Wi-Fi and Bluetooth

Electrical:

- Power supply: 5 V, 12…24 V

Technical:

- Module size:
  90 mm x 53 mm x 12 mm
- Module weight: 50 gr
- Operating temperature range:
  -30 $°C$ to +60 $°C$

2 Description

CG_led is a universal board for controlling various types of LED strips. The maximum current per channel is 6 A. The total maximum through output is 30 A. The main controller is ESP32 with built-in Wi-Fi and Bluetooth.

No external programmer is required for the board due to the built-in programmer based on the CH340 chip.

Built-in infrared receiver allows you to control the board from the remote.

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3 Device specification

3.1 Technical

Parameter	Value			Unit
	Min	Operating	Max	
Power supply	5	-	24	V
Board consumption (V = 5V)	-	-	0.5	A
Temperature range	-30	+20	+60	°C
Humidity range	0	60	98	%

Table 1 (technical characteristics)

3.2 Dimensions

Module size: 90 *mm* x 53 *mm* x 12 *mm*

Module weight: 50 *gr*

4 Start and operation

The WLED firmware is installed on the module during manufacturing.

To connect to the controller, you need to: turn on the module, scan available Wi-Fi networks, select the "WLED-AP" network (by default, the network is not password protected). After connecting, you will be automatically redirected to the landing page (if redirection does not occur, you must go to the address "4.3.2.1"). From the landing page, you can navigate to the settings and to the control panel.

4.1 Firmware

The firmware of the controller is carried out via the USB-C connector.

The controller successfully works with all IDEs (Arduino, PlatformIO, ESP Tools, ESP-IDF).

4.2 LEDs connection

By default, the WLED firmware is configured to work with address tapes (WS281x series). To run an LED tape, you need to connect it in accordance with the pinout to the 5-pin connector (see paragraph 9 "Pinout"). Please note that the connection should only be made to a connector that has a GPIO22 output. Next, you need to turn on the controller and connect to the WLED-AP network. After connecting, you need to go to the control panel, select the "LED preferences" item in the settings and set the parameters:

- LED Voltage – voltage specified by the manufacturer;
- LED Outputs/1 – used series of addressable LEDs;
- Color Order – the sequence of reading indicators for color channels, is set arbitrarily.

After setting the parameters, click on the "Save" button. Setup is complete.

Important: *When using an internal power supply (via USB-C), the maximum carrying current will be 2A.*

4.3 Connecting RGB LEDs

To start the RGB LED, you need to connect it according to the pinout (see paragraph 9 "Pinout"). Please note that the connection must be made only to a 6-pin connector that has outputs for channels R, G, B (GPIO 17, GPIO 16, GPIO 2, respectively). Next, you need to turn on the controller and connect to the WLED-AP network. After connecting, you need to go to the control panel. In the settings, select the "LED preferences" item and set the parameters:

- LED Voltage – voltage specified by the manufacturer;
- LED Outputs/1 – used series of addressable RGB LEDs;
- GPIOs – 17, 16, 2 correspondingly;
- Color Order – the sequence of reading indicators for color channels, is set arbitrarily.
- After setting the parameters, click on the "Save" button. Setup is complete.

Important: *When using an internal power supply (via USB-C), the maximum carrying current will be 2A.*

5 RGB Control

By default, the channel control keys RED, GREEN, BLUE, WCOLD, WWARM are closed, there is no voltage on the channels. To open the key, you must apply a high level to the esp32 output pins, which number corresponds to the selected tape channel (see paragraph 9 "Pinout" or marking on the board). To close the channel, you have to set a low level at the output of the microcontroller.

If necessary, a PWM signal can be applied to the control outputs.

6 Current shunt control

The current shunt is designed to measure the consumption of LEDs on a 5V line.

The consumed current is calculated according to the formula 1 mV = 5 mA (see paragraph 9 "Pinout").

7 Power supply indicator

The power supply indicator (red LED) is designed to notify the user about the board's power status. A stable glow of the LED indicates the correct power supply of the module, in other cases there are power issues.

8 Alternative uses

CG_led is a universal controller that can act as a powerful PID or other controller for various low-voltage loads, direct current. Paired with a mechanical or solid-state relay, CG_led can be used to regulate high power AC and DC.

9 Pinout
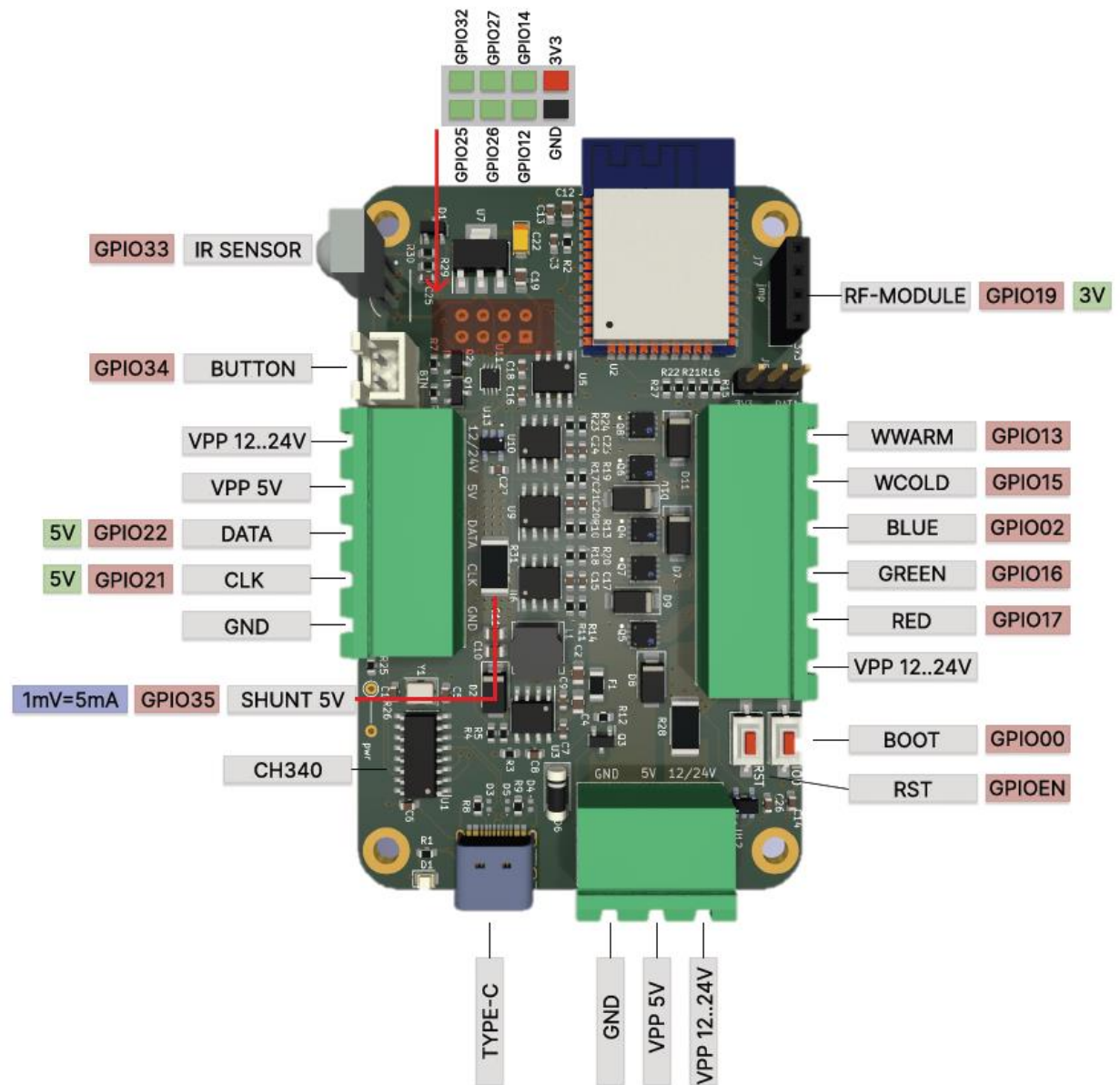
10 Drawings
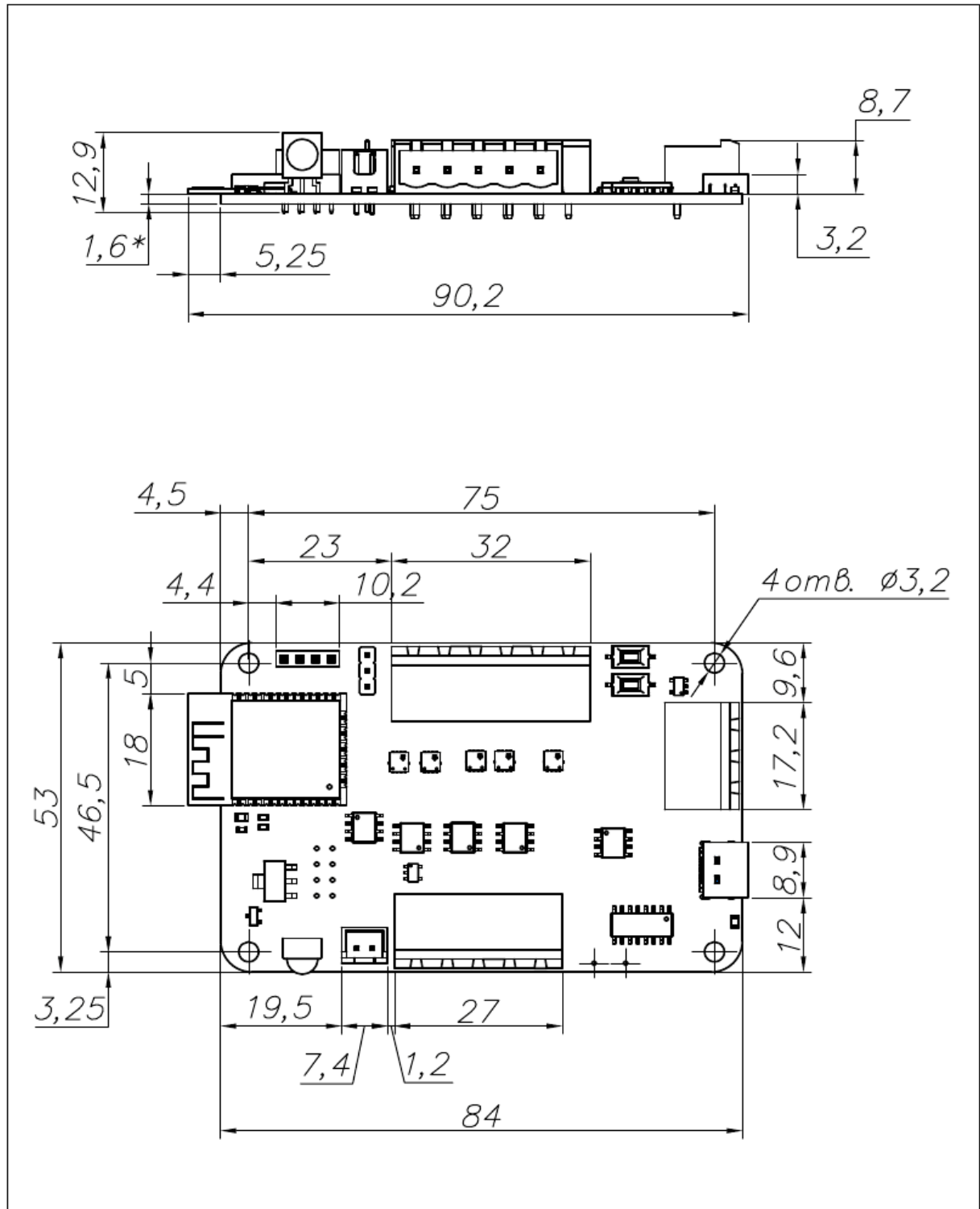
11 Reference

Contact information and information about module operation are presented in the table.

Description	Link
Manufacturer website	https://climateguard.ru/
Telegram community	https://t.me/climateguard_community
Additional data and modules	https://github.com/climateguard/CG_led
Module library	https://github.com/Aircoookie/WLED

Table 2 (reference materials)