ESP32_PLC_V3

This microcontroller is based on the ESP32 WROOM DEVKIT V1. It is designed for DIN-rail mounting, and various expansion modules can be connected to the headers on both sides.

The controller features:

8 – Opto-isolated digital inputs with LED indication.

8 – NMOS transistor outputs (2A each) with LED indication.

2 – Analog inputs with 10kΩ variable resistors connected to ground.

1" OLED display (128x64, SSD1306).

A number of GPIO pins routed directly to the side headers.

Rx0, Tx0, SDA, and SCL lines are also routed to the side headers via a logic level converter (supporting both 3.3V and 5V operation).

The GPIO pins routed to the side headers are as follows:

D2, D16 – Direct connection (no resistors).

D4, D5, D13, D14 – Direct connection with 4.7kΩ pull-up resistors to +3.3V.

D18, D19, D23, D25 – Direct connection with 100kΩ pull-down resistors to ground (G).

DESCRIPTION OF GPIO PINS USED:

GPIO0

GPIO1 – D1, Tx0, PWM; routed to the side header—direct (left side) or via logic level converter (right side).

GPIO2 – D2, LED, PWM; routed directly to both side headers. GPIO3 – D3, Rx0, PWM, HIGH at boot; routed to the side connector—either directly (left) or via a logic level converter (right).

GPIO4 – D4, PWM, input via optocoupler, 4.7k resistor to +3.3V, right connector.

GPIO5 – D5, PWM, input via optocoupler, 4.7k resistor to +3.3V, right connector.

GPIO12 – D12, boot fails if pulled high, onboard button.

GPIO13 – D13, PWM, input via optocoupler, 4.7k resistor to +3.3V, right connector.

GPIO14 – D14, PWM, input via optocoupler, 4.7k resistor to +3.3V, right connector.

GPIO15 – D15, PWM, input via optocoupler, 4.7k resistor to +3.3V.

GPIO16 – D16, Rx2, PWM, routed directly to both side connectors.

GPIO17 – D17, Tx2, PWM, input via optocoupler, 4.7k resistor to +3.3V. GPIO18 – D18, PWM, transistor output, right connector, 100k to ground (G).

GPIO19 – D19, PWM, transistor output, right connector, 100k to ground (G).

GPIO21 – D21, SDA, PWM

GPIO22 – D22, SCL, PWM

GPIO23 – D23, PWM, transistor output, right connector, 100k to ground (G).

GPIO25 – D25, PWM, transistor output, right connector, 100k to ground (G).

GPIO26 – D26, PWM, transistor output, right connector, 100k to ground (G).

GPIO27 – D27, PWM, transistor output, right connector, 100k to ground (G).

GPIO32 – D32, PWM, transistor output, left and right connectors, 100k to ground (G).

GPIO33 – D33, PWM, transistor output, left and right connectors, 100k to ground (G).

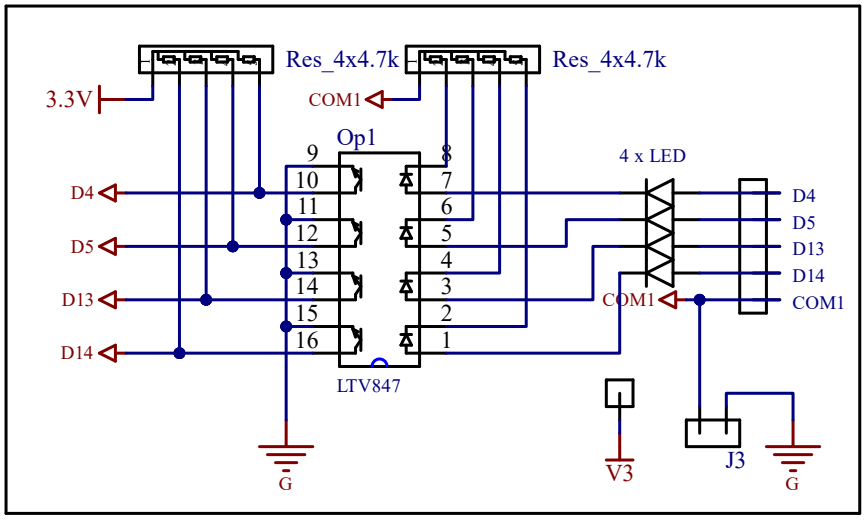
GPIO34 – D34, Optocoupler input, 4.7k resistor to +3.3V, left connector

GPIO35 – D35, Optocoupler input, 4.7k resistor to +3.3V, left connector

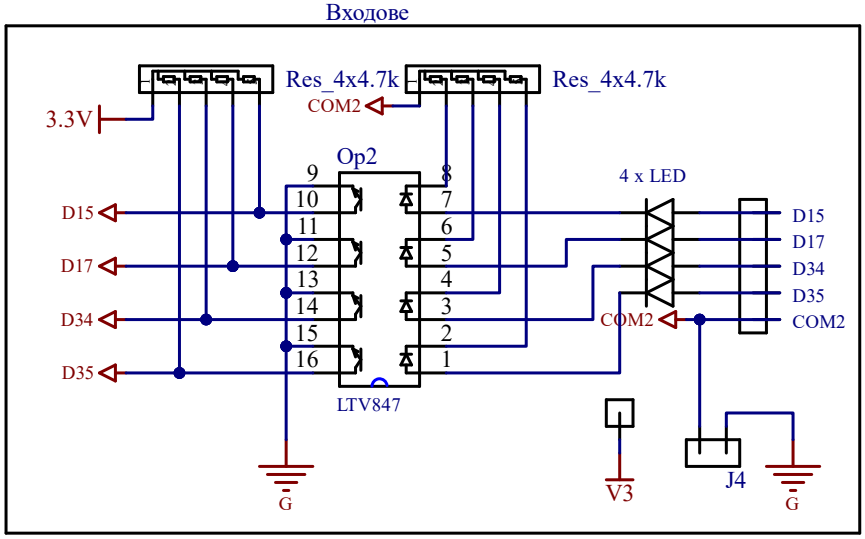
GPIO36 – D36, Vp, 10k trimmer

GPIO39 – D39, Vn, 10k trimmer

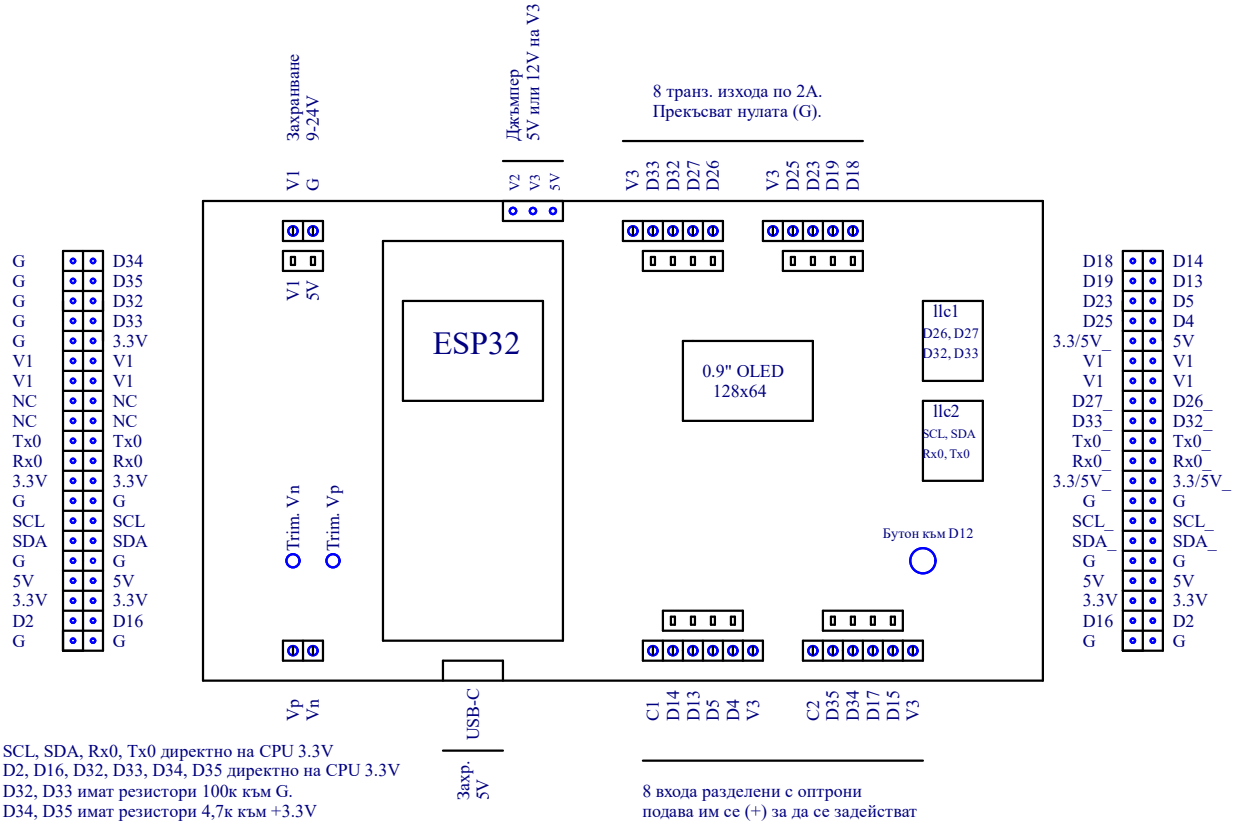
Input description: Triggered by +9-28V. They can be galvanically isolated by removing jumpers J3 and J4, which connect COM1 and COM2 to the controller's ground (for convenience during testing).


Res_4x4.7k
Res_4x4.7k
3.3V
COM1
Op1
9
8
10
7
11
6
12
5
13
4
14
3
15
2
16
1
4 x LED
D4
D5
D13
D14
COM1
LTV847
G
V3
J3
G

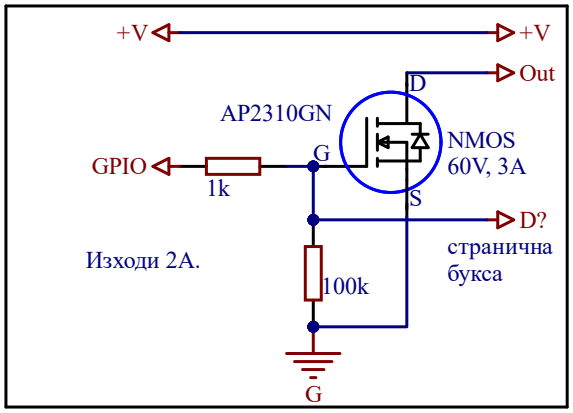
Входове


Res_4x4.7k
Res_4x4.7k
3.3V
COM2
Op2
9
8
10
7
11
6
12
5
13
4
14
3
15
2
16
1
4 x LED
D15
D17
D34
D35
COM2
LTV847
G
V3
J4
G

Microcontroller pinout diagram.



Description of transistor outputs: They switch the neutral (ground) line. This means the device being controlled can be powered by a positive voltage (+) from a source with a different voltage level—up to +60V—provided that the power supplies share a common ground.



Supply voltage V1:

In the standard version, the supply voltage V1 can range from 9 to 28 V.Захранване V1 може да се подава през захранващата букса, през лява или дясна странична букса или през USB – C порта на основната платката.

A version with 5V-compatible inputs (using lower-resistance input resistors) can also be produced.

In the standard version, 5V is insufficient to trigger the input optocouplers, although all other components operate on the 5V supplied via the USB connector.

Voltage V2 is equal to V1 but is taken from the output side of fuse F (2A).

V2 powers a 5V DC-DC converter.

The 3.3V supply for the CPU is provided by the onboard voltage regulator integrated into the ESP32 module.

V3 is selectable via a jumper and can be set to either 5V or V2 (9–28V).

All operational tests of the module were conducted using a 12V power supply.

The module features an integrated 128x64 white OLED display with I2C control.