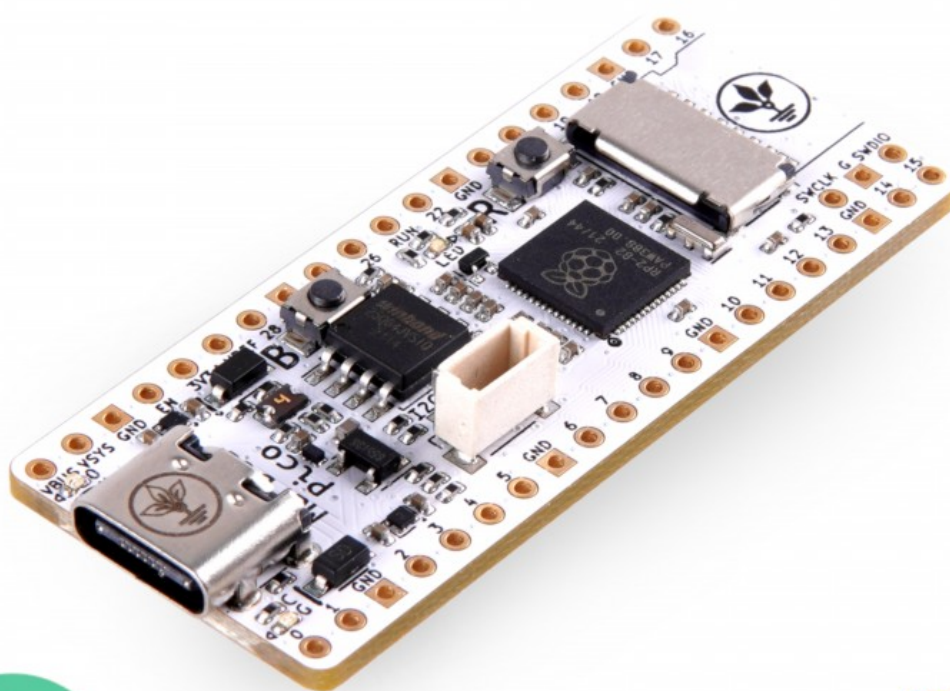


# Groundstudio Marble Pico development board



**FABRICAT  
ÎN ROMÂNIA**

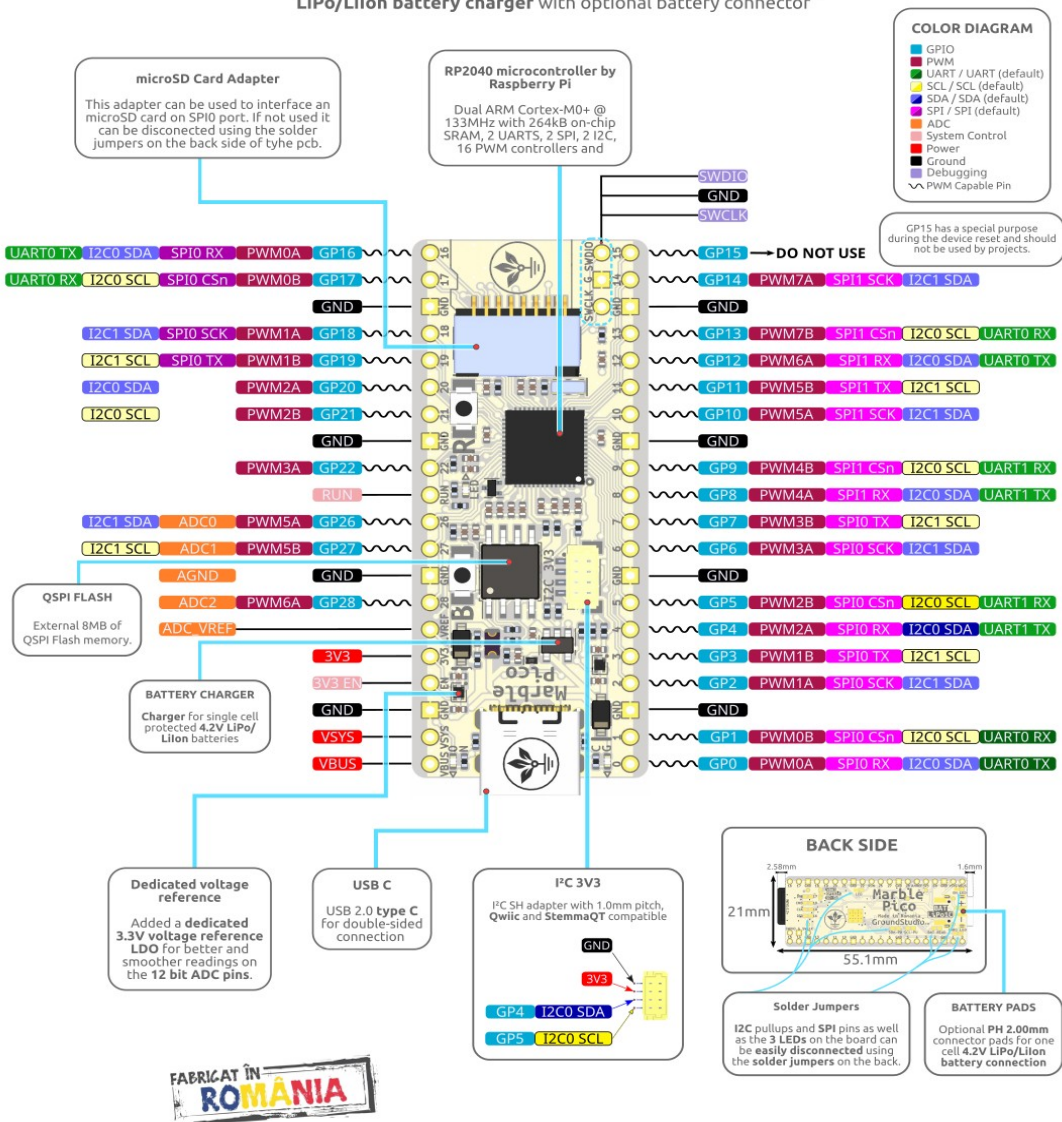
## Table of Contents

Board Pinout.....	3
Board Circuit Schematic.....	4
Open Source.....	5
License.....	5
Overview.....	5
Pins general function.....	6
Technical specifications.....	6
Legal disclaimer notice.....	8
Developer info.....	8
Datasheet Revision History.....	8

# Board Pinout

## GroundStudio Marble Pico

RP2040 based development board with 25 GPIO, 16 controllable PWM channels, three 12-bit ADC with dedicated ADC voltage reference, 8MB external SPI Flash memory, I<sup>2</sup>C 3V3 adapter, microSD card adapter, 1 cell LiPo/LiIon battery charger with optional battery connector



Board: "GroundStudio Marble Pico" RLJDMV\_GS REV0.0.3

Credits: "Raspberry Pi Pico" by Raspberry Pi

Copyright: ARDUSHOP SRL 2023

License: CC BY-SA 4.0 Attribution-ShareAlike 4.0 International Pinout REV: 1

Figure 1: GroundStudio Marble Pico pinout [Revision 1]

# Board Circuit Schematic

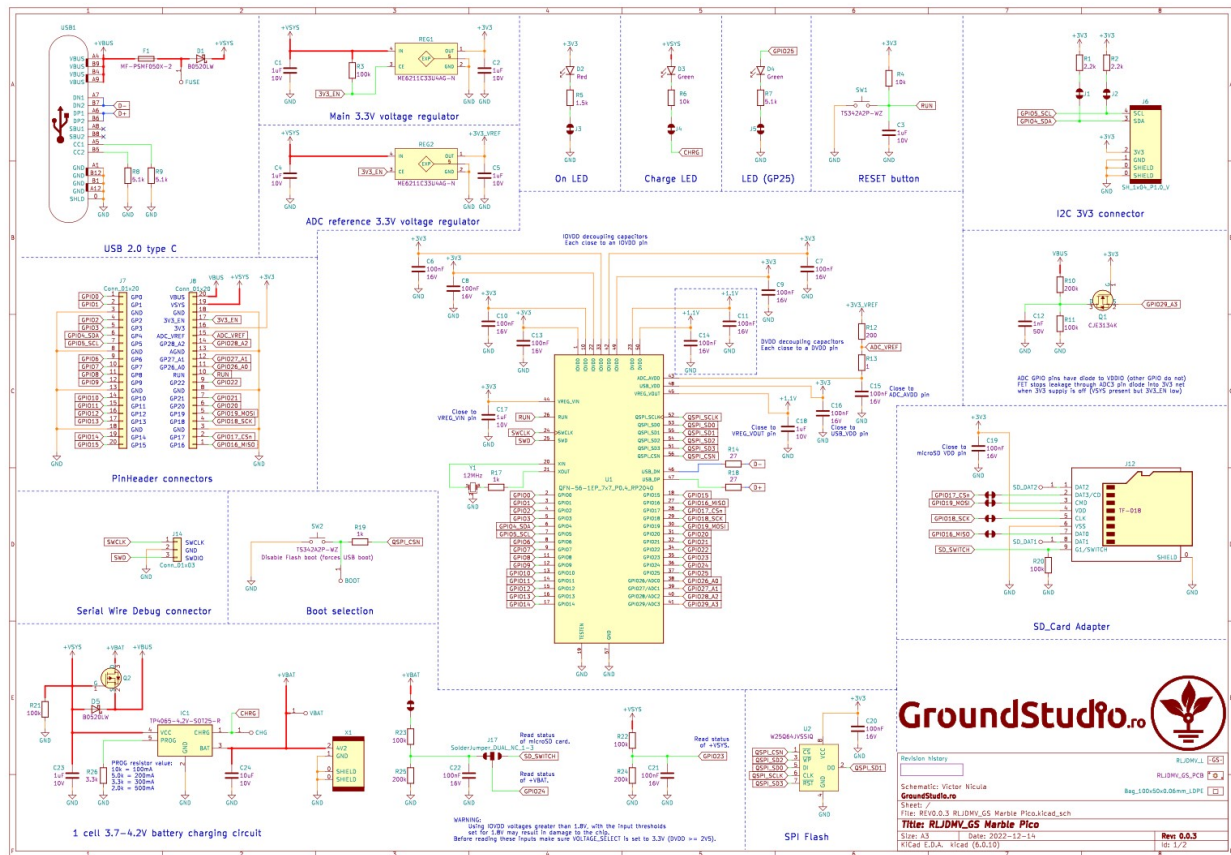


Figure 2: GroundStudio Marble Pico schematic circuit [Revision 0.0.3]

## Open Source

This is an Open Source project, you can find all the technical documents online:

[https://github.com/GroundStudio/GroundStudio\\_Marble\\_Pico](https://github.com/GroundStudio/GroundStudio_Marble_Pico)

## License

All documentation for GroundStudio Marble Pico is released under the [Attribution-ShareAlike 4.0 International \(CC BY-SA 4.0\)](#) license. You are welcome to use this for commercial purposes.

Please consider contributing back to this project or others to help the open-source hardware community continue to thrive and grow!

## Overview

The GroundStudio Marble Pico is a development board based on the RP2040 chip made by the Raspberry Pi Foundation. It has the same pinout as the Raspberry Pi Pico, but is equipped with a series of improvements:

- USB type C adapter (upgrade from micro USB).
- I2C 3V3 connector connected to I2C0 port (default) compatible stemmaQT or Qwiic for easier inter-connectivity with a diverse range of sensors and modules.
- separate 3.3V stabilizer feeding the ADC\_VREF reference voltage for a more accurate, noise-free ADC conversion.
- adapter for micro-SD type memory cards connected to the SPI0 port (default) allows, for example, the quick saving of data received from a sensor. To use the SPI0 port for another purpose, the adapter can be disconnected using the solder jumpers on the back of the pcb.
- external QSPI flash chip of 8MB (compared to 2MB).
- connector (available as an accessory) for connecting a 4.2V LiPo or Lithium single-cell protected battery using the exposed pads on the back of the pcb. Be careful, however, because the battery control circuit does not provide discharge protection, but only for charging the battery using the USB type C input.

The GroundStudio Marble Pico development board is compatible with sensors and other modules that work at 3.3V voltage logic level.

For use with 5V logic level devices, it is necessary to use a separate logic level converter module.

There is a built-in LED controlled by the GP25 pin. When the pin is HIGH or LOW, the LED is on and off, respectively. The board also has two other LEDs to indicate the charging

status "CG" and the power supply "ON". They can be disconnected using the solder jumpers on the back of the pcb.

## Pins general function

- VBUS - Input voltage to the board from the USB connector. If the board is not powered by the USB connector, this pin can also be used to power the board from an external stabilized 5V DC source.
- VSYS - If the board is powered from USB, this pin can be used as a power source for other modules or sensors that require a voltage of 4.8-5V and do not have a maximum instantaneous consumption greater than 200mA. Otherwise, the board can be powered through it with a voltage between 3.4V and 6.5V.
- 3V3 A 3.3V source generated by the on-board stabilizer. The maximum instantaneous current consumption is 200 mA.
- GND Pins connected to ground.
- ADC\_VREF The reference voltage for ADC conversion.
- RUN Typically used to read or modify the reset state of the microcontroller.
- GPIO pins 25 pins for input and output. There are 26 GPIO pins in total, but GP15 has a special function during the reset of the board and for this reason we do not recommend its use.
- PWM channels There are 16 channels and each pin can use a certain channel for the PWM function (see [Pinout](#)).

## Technical specifications

- Microcontroller dual-core Cortex M0+ Raspberry RP2040\*
- Voltage regulator 2x ME6211C33U4AG-N (ADC reference and power supply)
- USB supply voltage [VBUS] 5V
- Supply voltage [VSY] 3.4V ~ 6.5V
- GPIO pins 25
- Analog input pins 3
- USB connector USB 2.0 type C
- I2C connector I2C\_3V3 (STEMMA QT or QWIIC compatible)
- Maximum DC current on I/O pin 4mA (max 12mA)
- Maximum DC current on all I/O pins 50mA

## GroundStudio® Marble Pico Datasheet

- External QSPI FLASH memory 8MB
- SRAM memory 264 kB
- 16kB ROM memory
- Pcb dimensions: 51mm x 21mm

## Legal disclaimer notice

This development board is considered a subassembly in accordance with FCC CFR Title 47 §15.101(e):

[https://www.ecfr.gov/current/title-47/chapter-I/subchapter-A/part-15/subpart-B/section-15.101#p-15.101\(e\)](https://www.ecfr.gov/current/title-47/chapter-I/subchapter-A/part-15/subpart-B/section-15.101#p-15.101(e))

The device does not have a standalone functionality and does not include an enclosure or power supply.

The device is mainly intended for development and prototyping but it can be integrated into a product. In this case it is the responsibility of the developer/manufacturer to obtain all the necessary certifications.

GroundStudio is a registered trademark of ARDUSHOP SRL:

<https://www.tmdn.org/tmview/#/tmview/detail/EM500000018364087>

## Developer info

ARDUSHOP SRL

Addr: Str. Aleea Unirii, Nr. 8, Ap. 7, Loc. Selimbar, Jud. Sibiu, ROMANIA, 557260

e-mail: office@ardushop.ro

## Datasheet Revision History

[Revision 1] - Initial version release