Groundstudio Carbon S2 development board

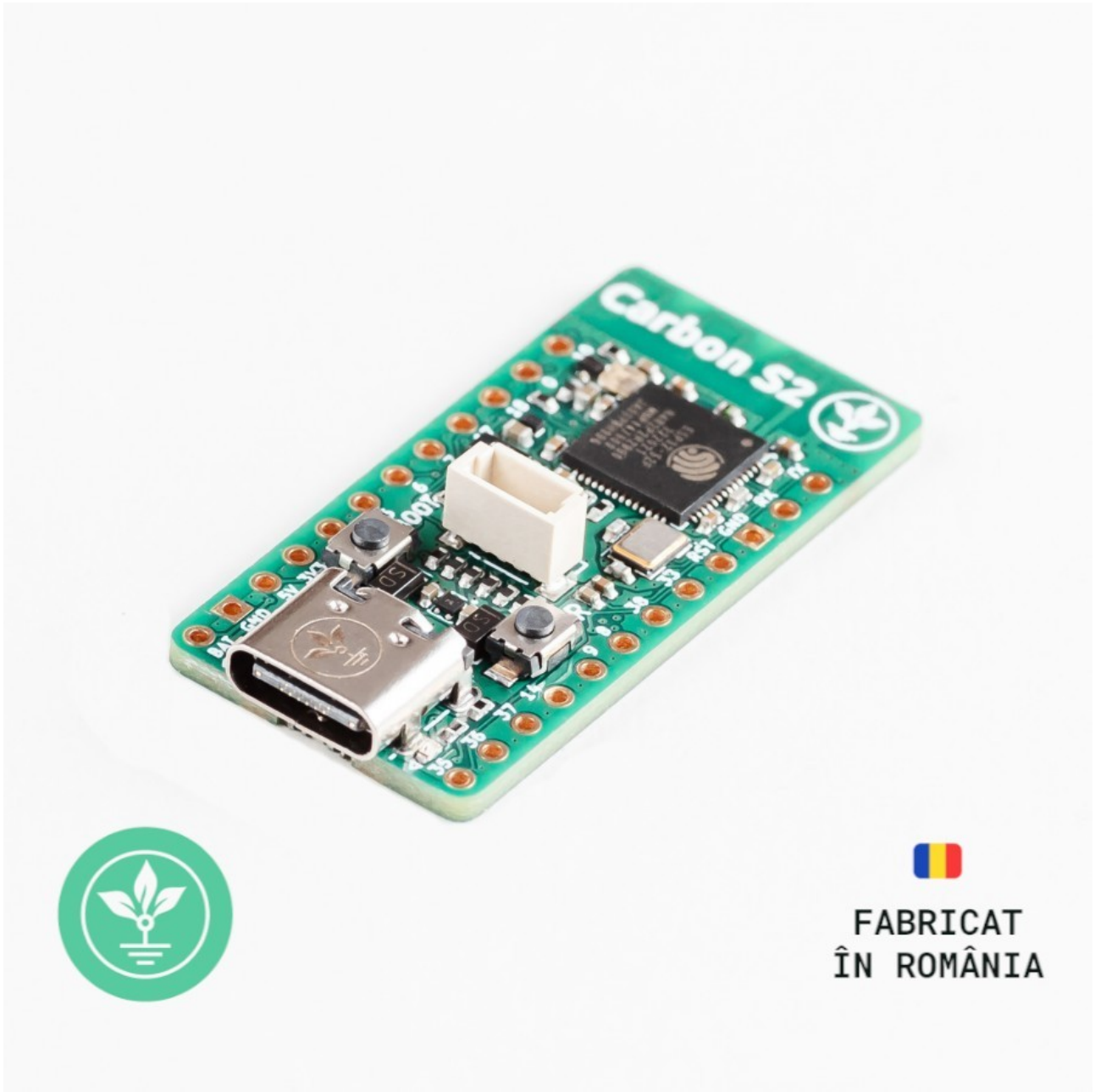

Table of Contents

Board Pinout

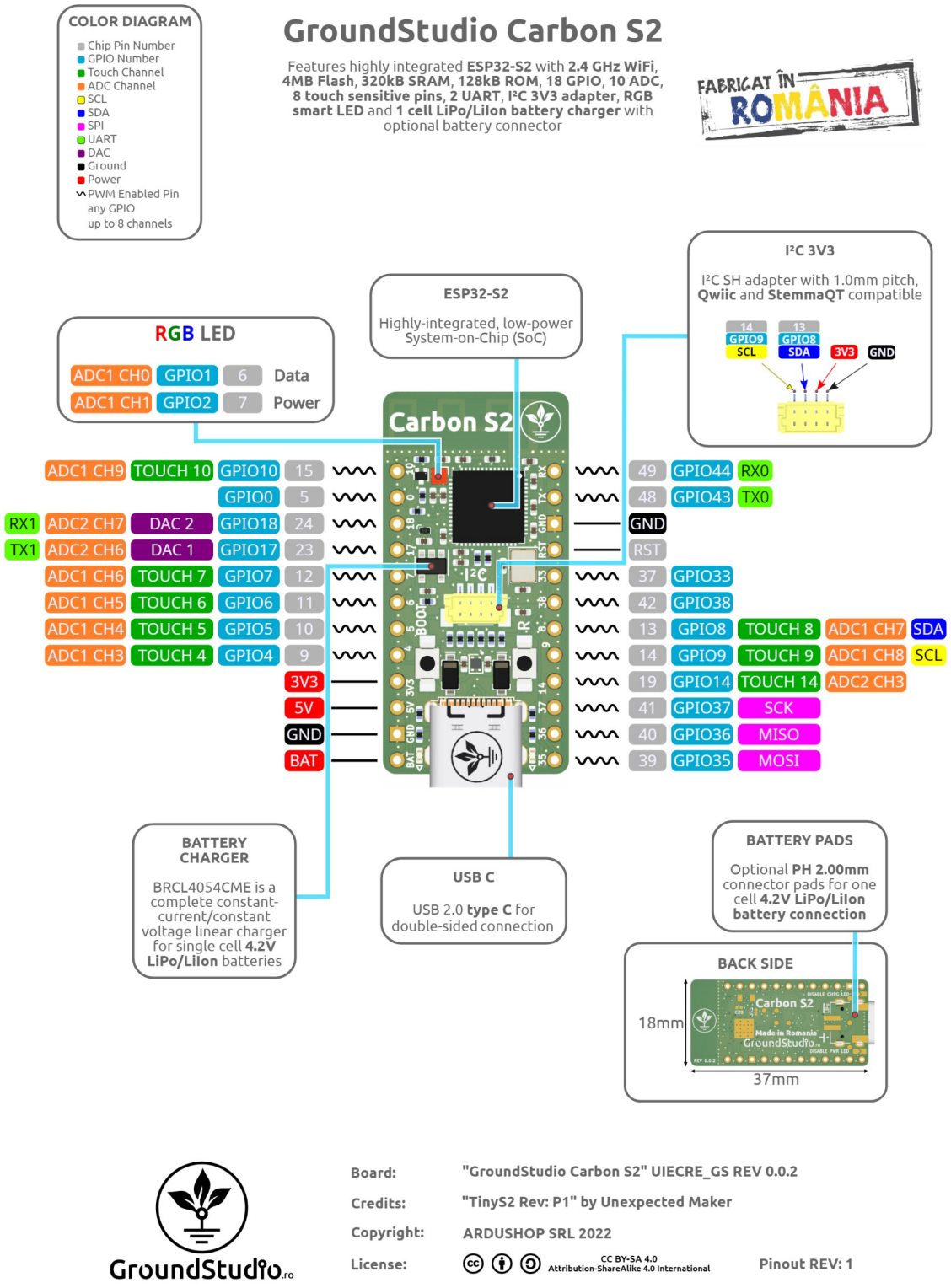

Figure 1: GroundStudio Carbon S2 pinout [Revision 1]

Board Circuit Schematic

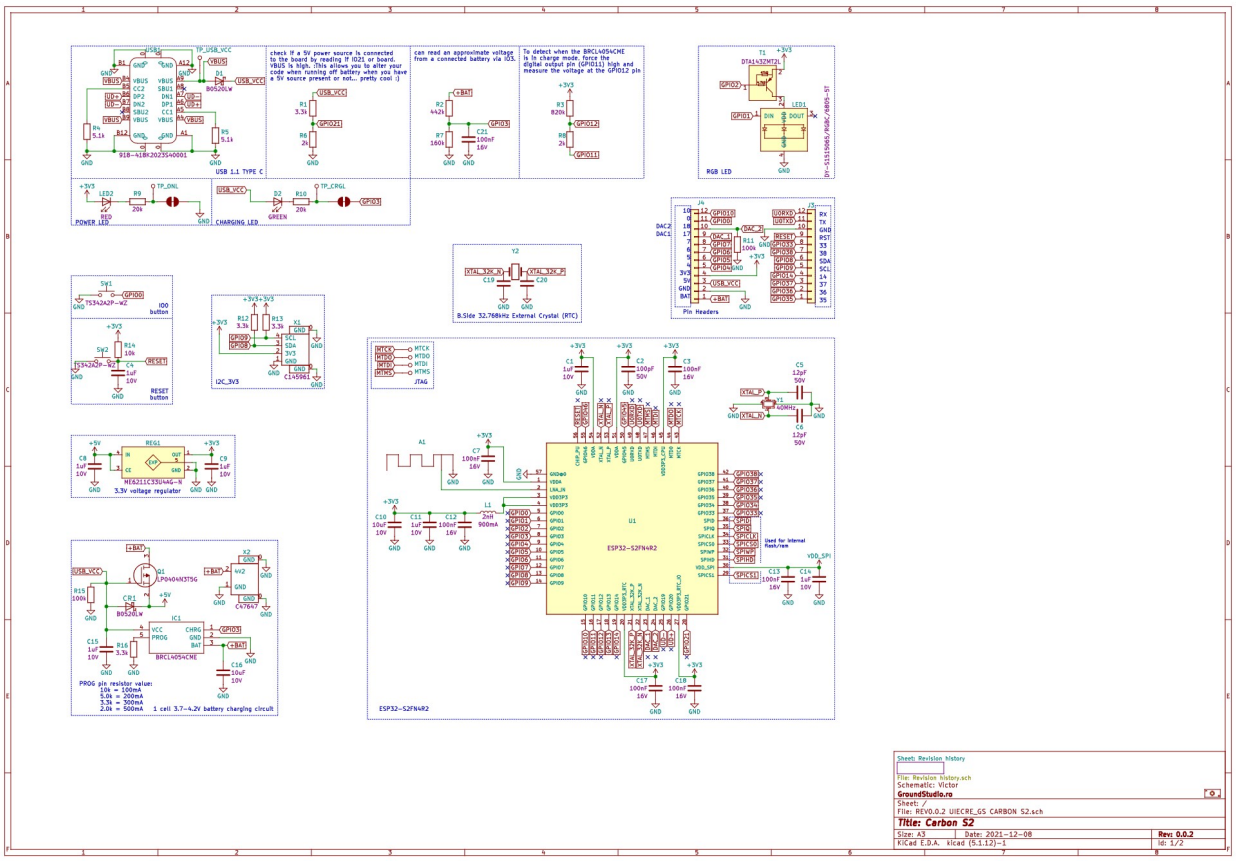

Figure 2: GroundStudio Carbon S2 schematic circuit [Revision 0.0.2]

Open Source

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

https://github.com/GroundStudio/GroundStudio_Carbon_S2

License

Overview

The GroundStudio Carbon S2 development board is based on the ESP32-S2FN4R2 chip, which is a low voltage integrated solution for Wi-Fi System-on-Chip 2.4GHz operating at 240MHz.

ESP32-S2 includes Wi-Fi subsystems that integrate Wi-Fi MAC, Wi-Fi radio and bandwidth, RF switch, power amplifier, and a sound reduction amplifier, etc. The chip integrates a 320KB SRAM memory and 128KB ROM.

It is used for very low power applications with several reduced power modes. Equipped with a fine-grained clock, dynamic voltage, frequency scale and adjustable power amplifier contributing to an optimal compromise between the communication domain, data network and power consumption

The device provides a rich set of peripheral interfaces including SPI, I2S, UART, I2C, LED_PWM, LCD interface, camera interface, ADC, DAC, touch sensor, temperature sensor, as well as 43 GPIOs. It also includes an On-The-Go (OTG) interface with maximum speed to enable USB communication.

The board includes an I²C 3V3 connector compatible with "STEMMA QT" or "Qwiic".

ESP32-S2 contains several Hardware dedicated to the security feature. Cryptographic accelerators are integrated for AES, SHA and RSA algorithms. Additional hardware security features are provided by RNG, HMAC and digital signature modules such as flash encryption and secure boot signature verification. These features allow the device to meet strict security requirements.

NOTE:

The development board does not have under-voltage protection, it only has a charging circuit for a single Lithium-Ion (LiIon) or Lithium-Polymer (LiPo) cell of 3.7-4.2V.

If a battery without a protection circuit is connected, it will be destroyed after the first use!

If the board is powered by a battery without an additional protection circuit for under-voltage, the voltage level will drop below its minimum voltage, which will lead to its irreparable destruction.

Technical specifications

Microcontroller: **ESP32-S2FN4R2**

- **128KB ROM** for booting and basic functions

- **320KB SRAM** for data instructions

- **16 KB SRAM** in **RTC**

USB-Serial converter: ESP32-S2 integrated internally

Voltage regulator 3.3V: ME6211C33U4AG-N

Battery charging circuit: a single 3.7-4.2V Lithium-Ion (LiIon) or Lithium-Polymer (LiPo) cell. **The battery must include a discharge protection circuit.**

GPIO pins: **18**

USB 2.0 **type C** adapter

ROM memory: **128 KB**

SRAM memory: **320 KB**

Interfaces: ADC, DAC, SD/SDIO/MMC Host Controller, SPI, SDIO/SPI Slave Controller, EMAC, PWM motor, PWM LED, UART, I2C, I2S, GPIO

Maximum processor frequency: 240 MHz

Dimensions approx. pcb: **37mm x 18mm**

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)

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