Jegatron Electronics

BBB, Bestest Button Brick - Design Description

Overview

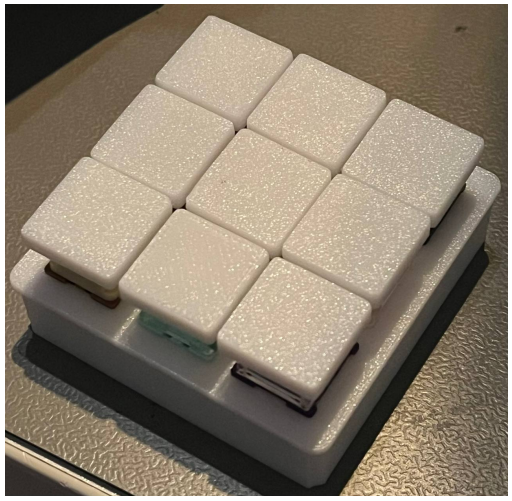

Figure 1: First iteration of BBB

The BBB is a multipurpose user programmable input device and also serves as an exercise product to hone my skills and try out different circuit solutions. Not all features and component make sense from a real product perspective, but serves as a learning experience.

It all started with the desire to have a more professional feel to my hobby and learning projects. So instead of using the classical tactile buttons forced down into a breadboard entangled in jumper wires, I bought some random mechanical keyboard switches and 3d-printed an enclosure for them. Then came the time to make the circuit board to empower this.

Feature creep. That is the spirit of this project. Because of personal projects I need the BBB need to be Zigbee enabled and preferably also wifi capable. Since I had already used the ESP32-C6 for such purposes I decided to use this.

Features

- Nine user programmable buttons
- ESP32-C6 - Zigbee, Wifi, BLE etc
- LiPo charger with Power Path
- USB-C sink IC
- LED lights

Contents

Hardware design

The hardware architecture can be seen in figure 2. The design can definitely be made more simple and cheap, but that is not the purpose of this project. However, several of the parts can be skipped if not desired.

Desired features

- Zigbee
- Wifi
- Battery powered long life
- USB-C powered / charged
- LED lights

Optional Subsystems

The following parts can be not-mounted or replaced with something else:

- USB-C Sink controller: Can be replaced by resistors.
- Fuel Gauge: Can be removed and the battery power can be bridged directly to the charger
- LiPo Charger + LiPo battery: Can be removed. System power directly bridged from VBUS.
- Boost regulator + LED Matrix: Can be skipped
- Miniature speaker: Can be skipped
- Flash: Can be avoided if using ESP32-C6FH4 or ESP32-C6FH8 instead

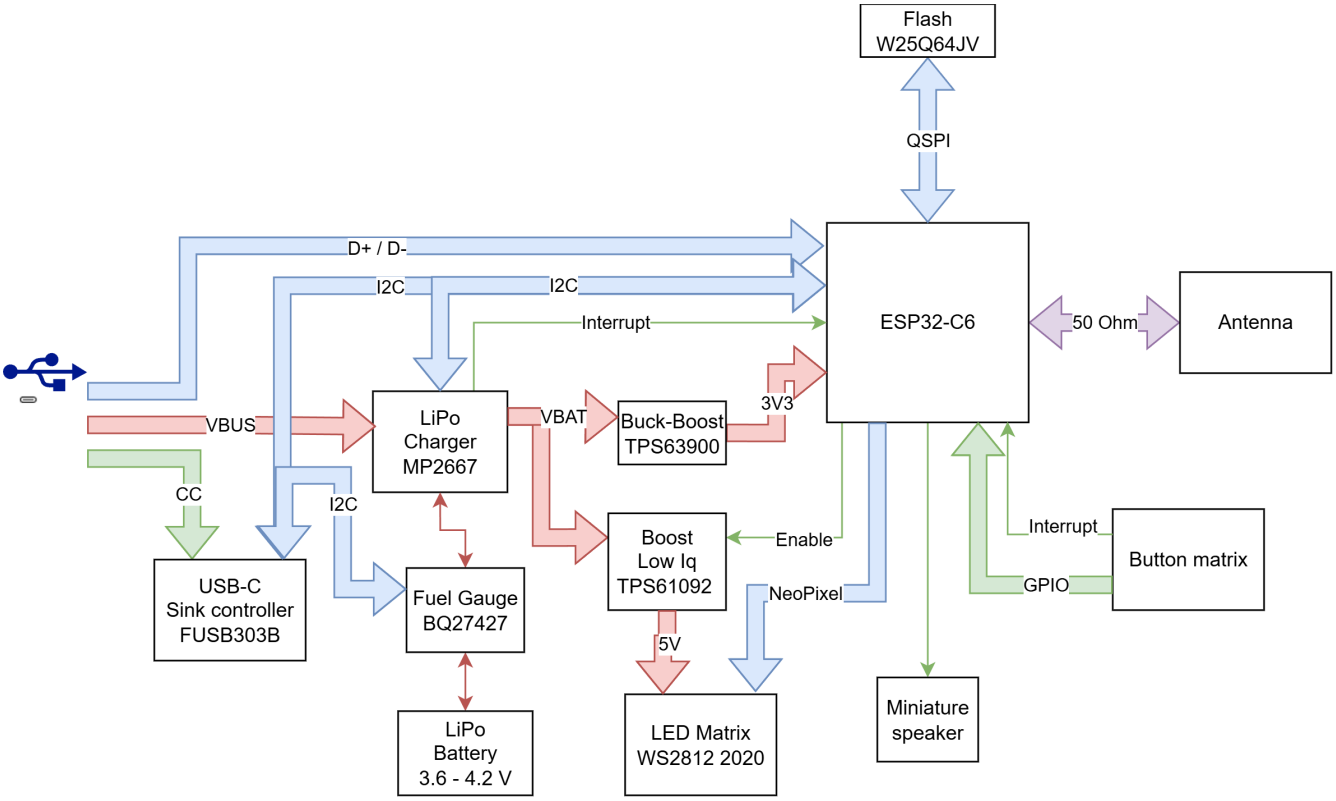

Figure 2: The hardware architecture of the BBB

Charger Circuit – MP2667

USB-C Sink Controller – FUSB303B

Fuel Gauge – BQ27427

3V3 Buck-Boost Regulator – TPS63900

5V Boost Regulator – TPS61092

LED – WS2812

MCU – ESP32-C6