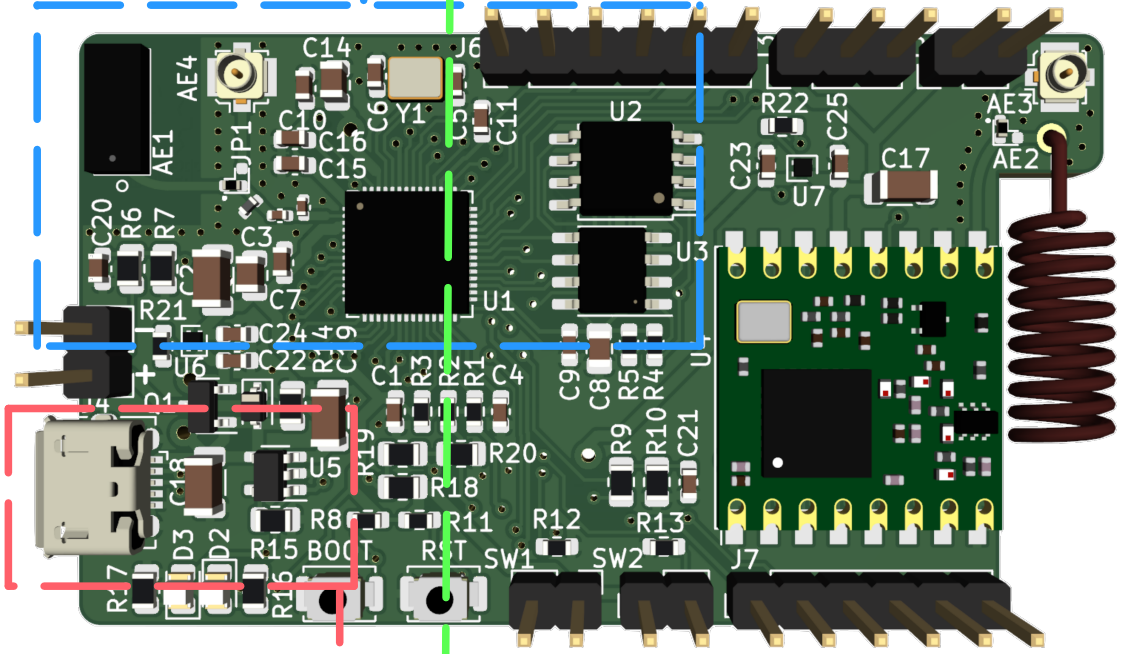
MCU

MCU

File: MCU.kicad_sch

Iot-PostBox

sensor



INTERFACE

INTERFACES

File: INTERFACE.kicad_sch

POWER

POWER

File: POWER.kicad_sch

IoT-PostBox board based on ESP32-S2
github.com/paclema/iot-postbox

Pablo Clemente Maseda
@paclema

LOGO2

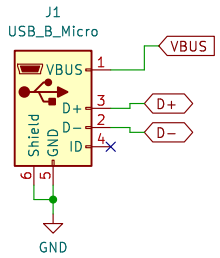
LOGO1

Sheet: /
File: iot-postbox_v1.kicad_sch

Title: IoT-PostBox

Size: A4	Date: 31.07.2025	**Rev: v1.2**
KiCad E.D.A. 9.0.3		Id: 1/4

USB CONNECTOR



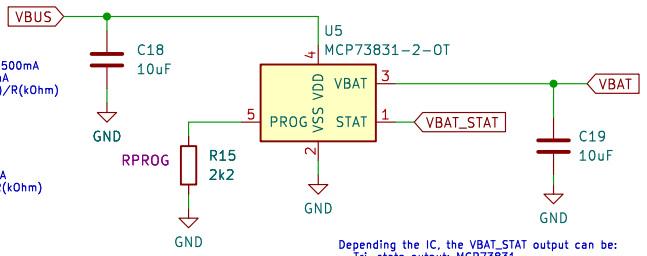
LIPO CHARGER

Protecctions:
- Battery and input reverse polarity

WARNING:
- No temp protection
- No Overcurrent protection

For MCP73831/2 max 500mA
and TP4054 max 800mA
Icharge(ma) = 1000(V)/R(kOhm)
10k = 100mA
5k = 200mA
2k2 = 455mA
2k = 500mA
1k = 1000mA

For TP4065 max 600mA
Icharge(ma) = 1100/R(kOhm)
2k2 = 500mA
2k = 600mA

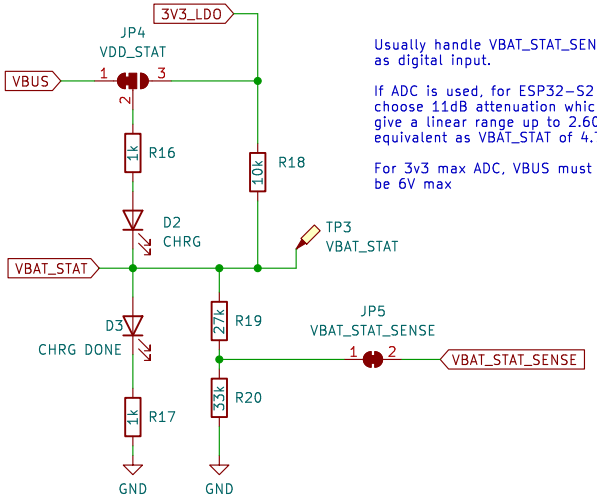


Depending the IC, the VBAT_STAT output can be:
- Tri-state output: MCP73831
- Open-drain output: MCP73832, TP4054 or TP4065

Only for Open-drain, R18 make sense because
VDD_STAT can be configurable only in that case

CHARGER STATUS

MCP73831. Assuming VBUS 6V:
VBAT_STAT = VBUS -> VBAT_STAT_SENSE= 3.3V --> Not Charging
VBAT_STAT = GND -> VBAT_STAT_SENSE= 0V --> Charging
VBAT_STAT = HI-Z -> VBAT_STAT_SENSE= 2.48V

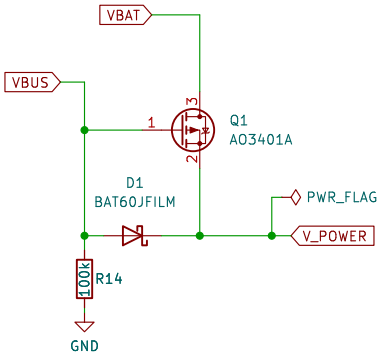


Usually handle VBAT_STAT_SENSE as digital input.

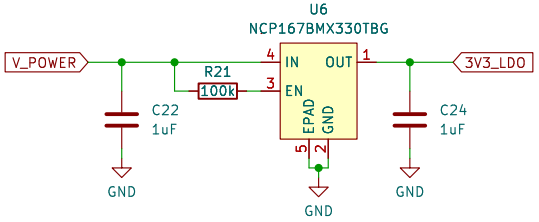
If ADC is used, for ESP32-S2 choose 11dB attenuation which give a linear range up to 2.600mV equivalent as VBAT_STAT of 4.727V.

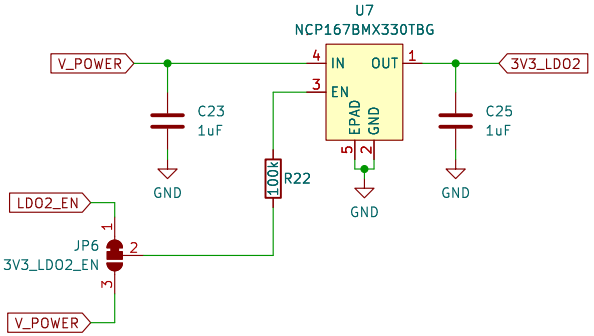
For 3v3 max ADC, VBUS must be 6V max

LOAD SHARING

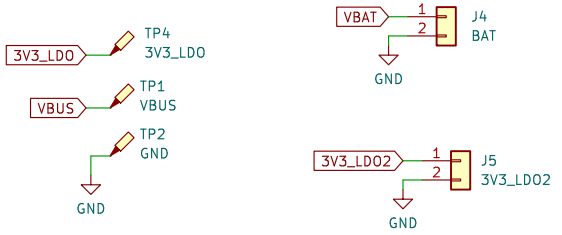


POWER AND FILTERING





POWER CONNECTORS



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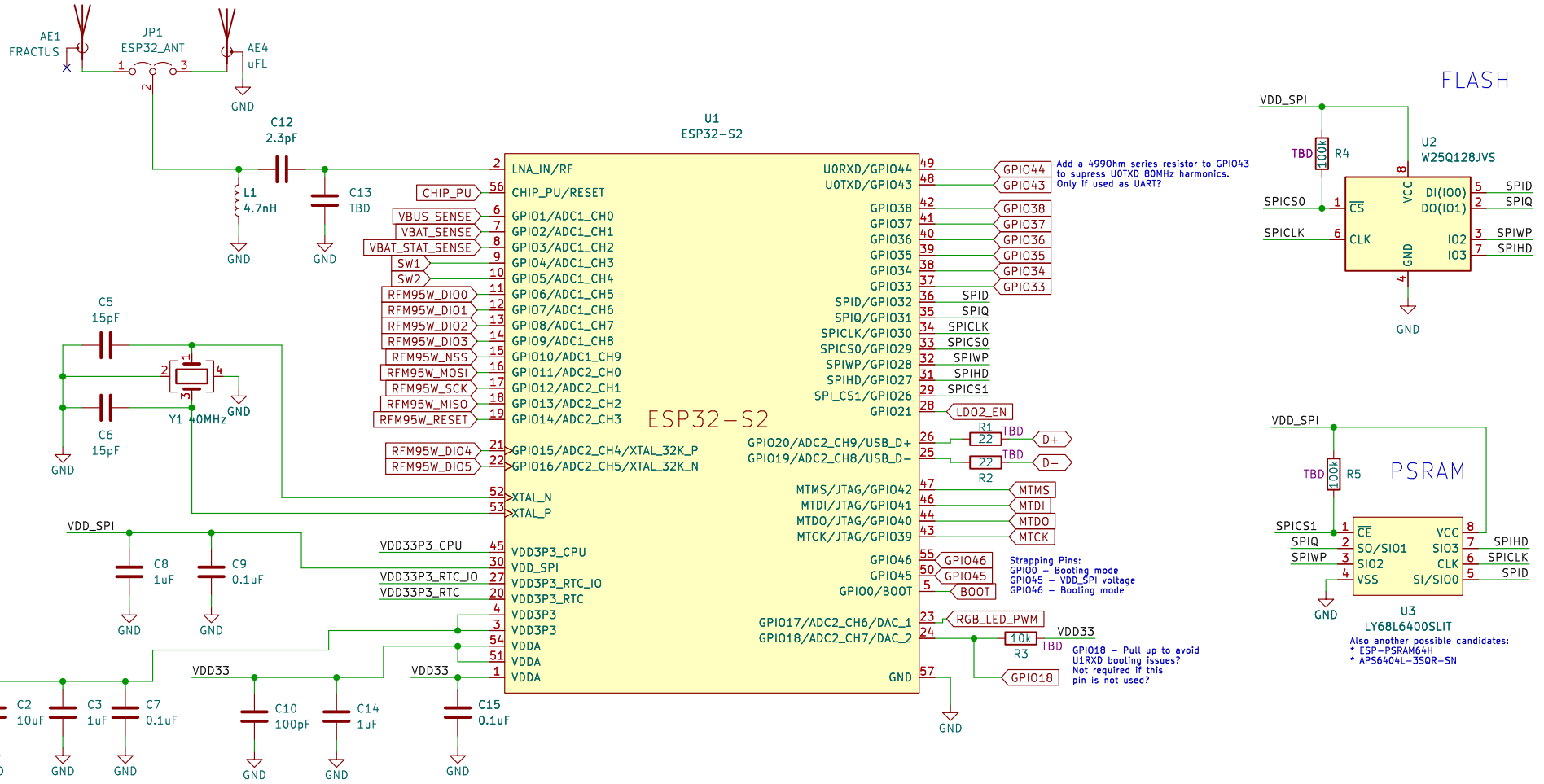
KiCad E.D.A. 9.0.3		Id: 3/4



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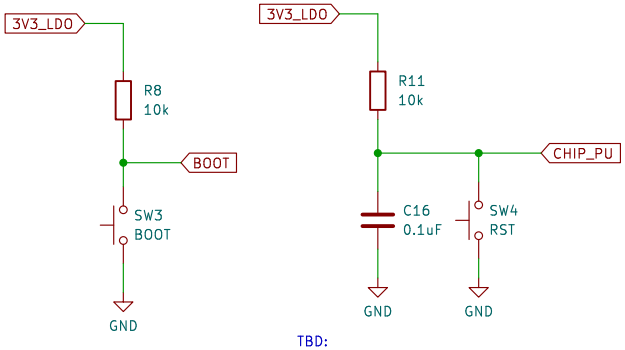
Sheet: /MCU/
File: MCU.kicad_sch

Title: IoT-PostBox

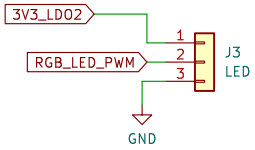
Size: A4	Date: 31.07.2025	**Rev: v1.2**
KiCad E.D.A. 9.0.3		Id: 2/4

PUSH BUTTONS

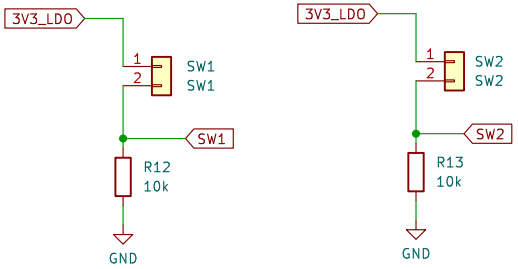


TBD:
C16 0.1uF or 1uf?

RGB LED STRIP

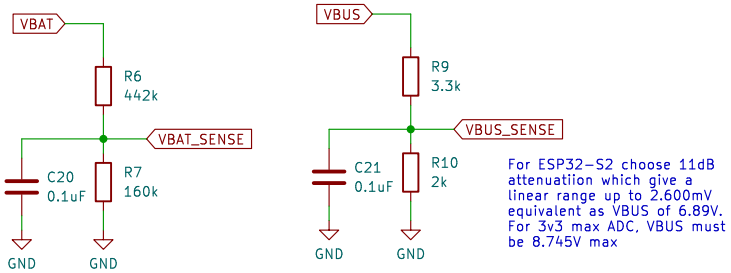


SWITCH SENSORS



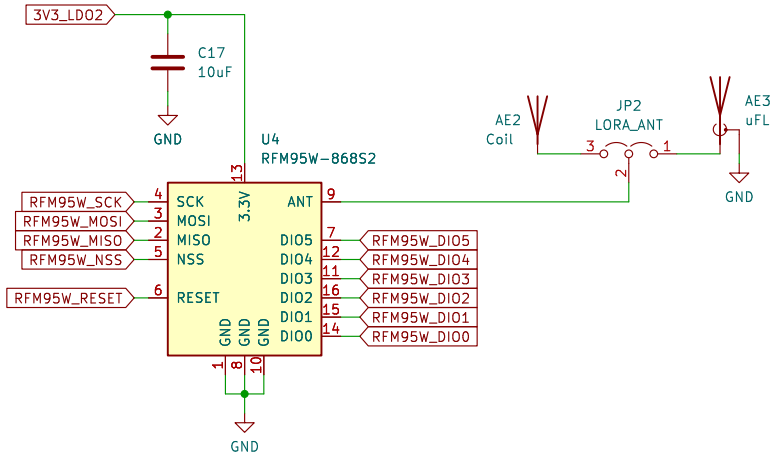
ADC SENSE

Assuming LiPo VBAT 4.2V max
the ADC output is 1.116mV
For ESP32-S2 choose 6dB
attenuatiion which give a
linear range up to 1.300mV

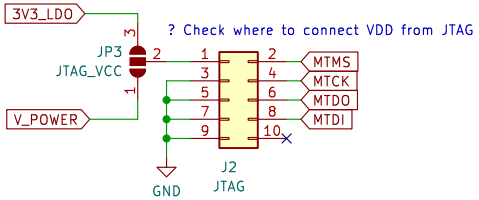


For ESP32-S2 choose 11dB
attenuatiion which give a
linear range up to 2.600mV
equivalent as VBUS of 6.89V.
For 3v3 max ADC, VBUS must
be 8.745V max

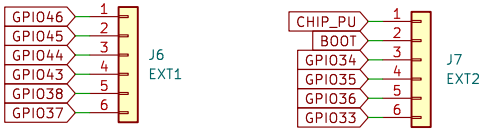
LORA



JTAG



EXTENSION PORTS



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KiCad E.D.A. 9.0.3		Id: 4/4