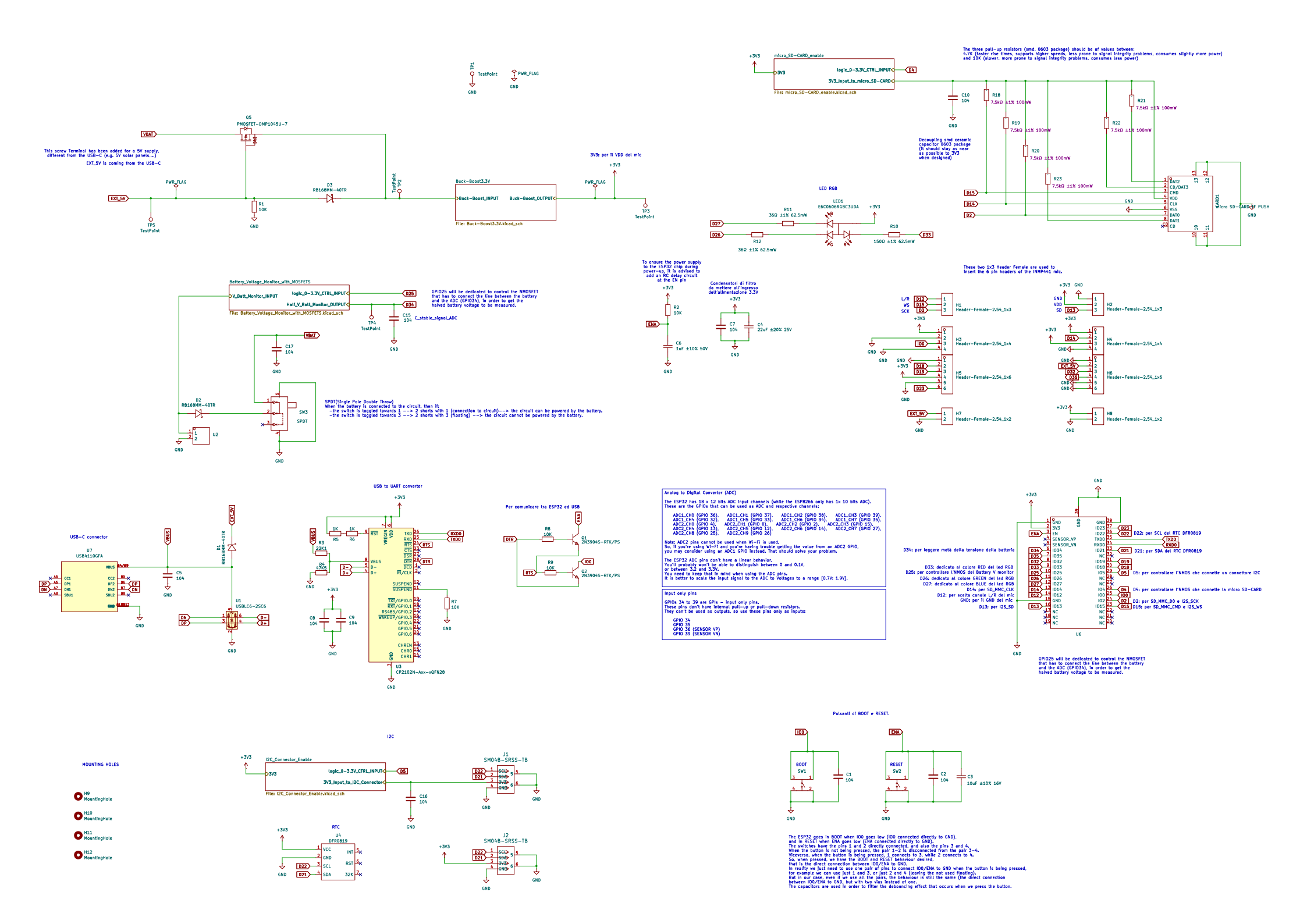
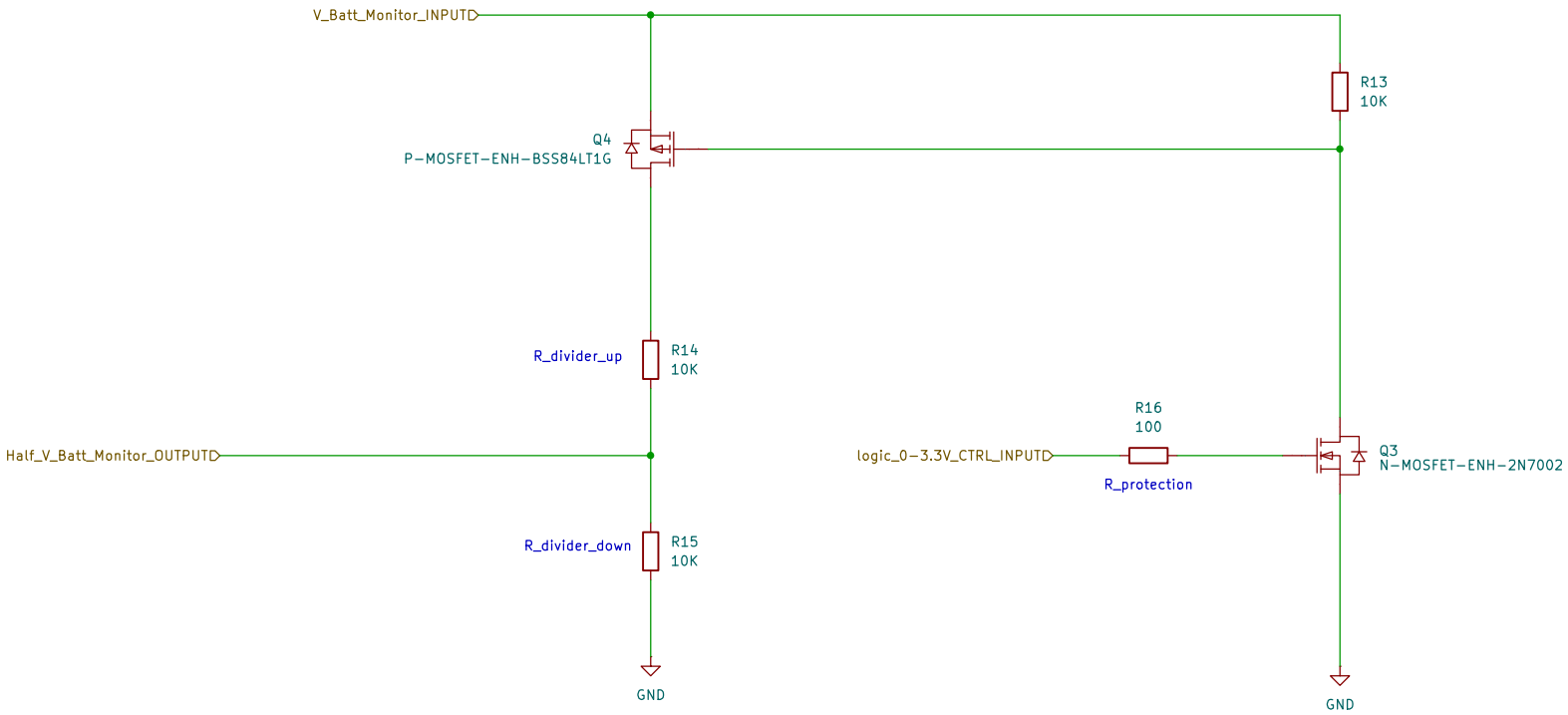
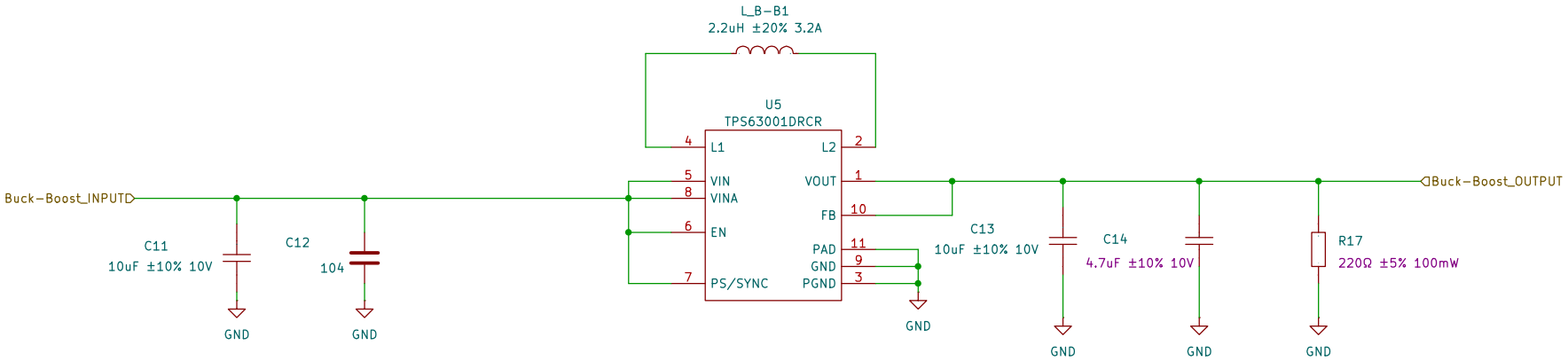
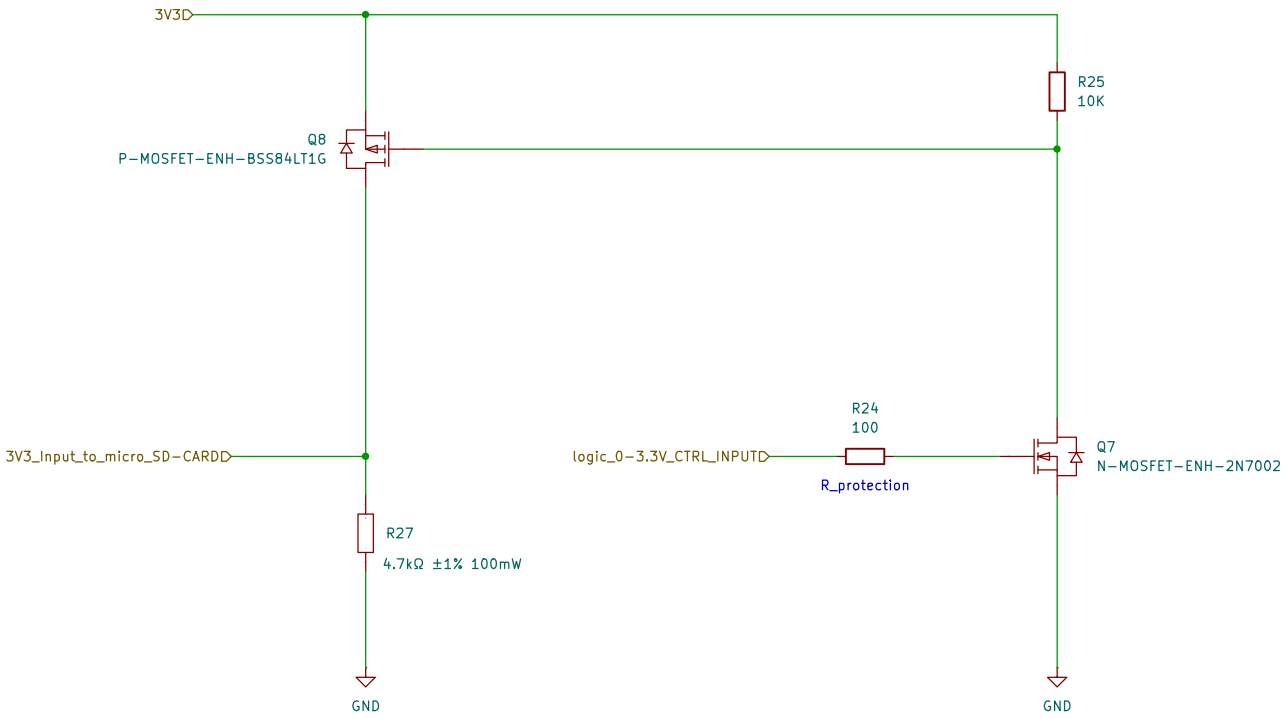
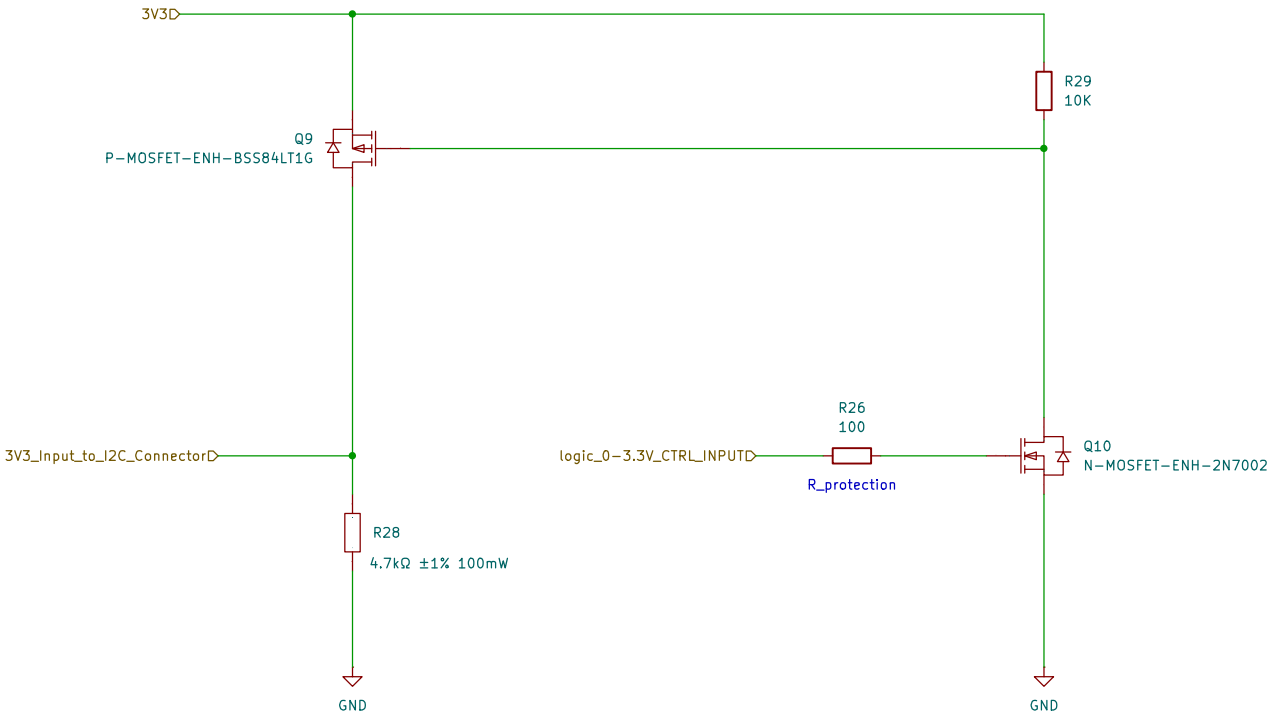

This screw Terminal has been added for a 5V supply, different from the USB-C (e.g. 5V solar panels....)
EXT_5V is coming from the USB-C
Q5
PMOSFET-DMP1045U-7
D3
RB168MM-40TR
Buck-Boost3.3V
Buck-Boost_INPUT
Buck-Boost_OUTPUT
File: Buck-Boost3.3V.kicad_sch
3V3: per il VDD del mic
micro_SD-CARD_enable
logic_0-3.3V_CTRL_INPUT
3V3_input_to_micro_SD-CARD
File: micro_SD-CARD_enable.kicad_sch
The three pull-up resistors (smd, 0603 package) should be of values between:
4.7K (faster rise times, supports higher speeds, less prone to signal integrity problems, consumes slightly more power)
and 10K (slower, more prone to signal integrity problems, consumes less power)
Decoupling smd ceramic capacitor 0603 package
(It should stay as near as possible to 3V3 when designed)
LED RGB
LED1
E6C0606RGBC3UDA
Battery_Voltage_Monitor_with_MOSFETS
V_Batt_Monitor_INPUT
Half_V_Batt_Monitor_OUTPUT
File: Battery_Voltage_Monitor_with_MOSFETS.kicad_sch
GPIO25 will be dedicated to control the NMOSFET that has to connect the line between the battery and the ADC (GPIO34). In order to get the halved battery voltage to be measured.
C_stable_signal_ADC
SPDT(Single Pole Double Throw)
When the battery is connected to the circuit, then if:
-the switch is toggled towards 1 --> 2 shorts with 1 (connection to circuit)--> the circuit can be powered by the battery.
-the switch is toggled towards 3 --> 2 shorts with 3 (floating) --> the circuit cannot be powered by the battery.
To ensure the power supply to the ESP32 chip during power-up, it is advised to add an RC delay circuit at the EN pin
Condensatori di filtro da mettere all'ingresso dell'alimentazione 3.3V
These two 1x3 Header Female are used to insert the 6 pin headers of the INMP441 mic.
USB-C connector
USB to UART converter
Per comunicare tra ESP32 ed USB
Analog to Digital Converter (ADC)
The ESP32 has 18 x 12 bits ADC input channels (while the ESP8266 only has 1x 10 bits ADC).
These are the GPIOs that can be used as ADC and respective channels:
ADC1_CH0 (GPIO 36), ADC1_CH1 (GPIO 37), ADC1_CH2 (GPIO 38), ADC1_CH3 (GPIO 39),
ADC1_CH4 (GPIO 32), ADC1_CH5 (GPIO 33), ADC1_CH6 (GPIO 34), ADC1_CH7 (GPIO 35),
ADC2_CH0 (GPIO 4), ADC2_CH1 (GPIO 0), ADC2_CH2 (GPIO 2), ADC2_CH3 (GPIO 15),
ADC2_CH4 (GPIO 13), ADC2_CH5 (GPIO 12), ADC2_CH6 (GPIO 14), ADC2_CH7 (GPIO 27),
ADC2_CH8 (GPIO 25), ADC2_CH9 (GPIO 26)
Note: ADC2 pins cannot be used when Wi-Fi is used.
So, if you're using Wi-FI and you're having trouble getting the value from an ADC2 GPIO,
you may consider using an ADC1 GPIO instead. That should solve your problem.
The ESP32 ADC pins don't have a linear behavior.
You'll probably won't be able to distinguish between 0 and 0.1V,
or between 3.2 and 3.3V.
You need to keep that in mind when using the ADC pins.
It is better to scale the input signal to the ADC to Voltages to a range [0.7V; 1.9V].
Input only pins
GPIOs 34 to 39 are GPIs – input only pins.
These pins don't have internal pull-up or pull-down resistors.
They can't be used as outputs, so use these pins only as inputs:
GPIO 34
GPIO 35
GPIO 36 (SENSOR VP)
GPIO 39 (SENSOR VN)
D34: per leggere metà della tensione della batteria
D33: dedicato al colore RED del led RGB
D25: per controllare l'NMOS del Battery V monitor
D26: dedicato al colore GREEN del led RGB
D27: dedicato al colore BLUE del led RGB
D14: per SD_MMC_CLK
D12: per scelta canale L/R del mic
GNDs: per il GND del mic
D13: per I2S_SD
D5: per controllare l'NMOS che connette un connettore I2C
D4: per controllare l'NMOS che connette la micro SD-CARD
D2: per SD_MMC_CMD e I2S_SCK
D15: per SD_MMC_CMD e I2S_WS
GPIO25 will be dedicated to control the NMOSFET that has to connect the line between the battery and the ADC (GPIO34). In order to get the halved battery voltage to be measured.
MOUNTING HOLES
I2C
RTC
Pulsanti di BOOT e RESET.
The ESP32 goes in BOOT when IO0 goes low (IO0 connected directly to GND).
and in RESET when ENA goes low (ENA connected directly to GND).
The switches have the pins 1 and 2 directly connected, and also the pins 3 and 4.
When the button is not being pressed, the pair 1-2 is disconnected from the pair 3-4.
Viceversa, when the button is being pressed, 1 connects to 3, while 2 connects to 4.
So, when pressed, we have the BOOT and RESET behaviour desired.
that is the direct connection between IO0/ENA to GND.
In reality we just need to use one pair of pins to connect IO0/ENA to GND when the button is being pressed,
for example we can use just 1 and 3, or just 2 and 4 (leaving the not used floating).
But in our case, even if we use all the pairs, the behaviour is still the same (the direct connection
between IO0/ENA to GND, but with two vias instead of one.
The capacitors are used in order to filter the debouncing effect that occurs when we press the button.


V_Batt_Monitor_INPUT
R13
10K
Q4
P-MOSFET-ENH-BSS84LT1G
R_divider_up
R14
10K
R16
100
logic_0-3.3V_CTRL_INPUT
Q3
N-MOSFET-ENH-2N7002
Half_V_Batt_Monitor_OUTPUT
R_protection
R_divider_down
R15
10K
GND
GND

This Buck-Boost (TPS63001DRCR) is an efficient converter (up to 96%),
and can convert either the 5V coming from the USB,
or eventually the 3-3.6V coming from the batteries,
to fixed 3.3V necessary for the esp32.




3V3D
R25
10K
Q8
P-MOSFET-ENH-BSS84LT1G
R24
100
3V3_Input_to_micro_SD-CARD
logic_0-3.3V_CTRL_INPUT
Q7
N-MOSFET-ENH-2N7002
R_protection
R27
4.7kΩ ±1% 100mW
GND
GND


3V3
R29
10K
Q9
P-MOSFET-ENH-BSS84LT1G
3V3_Input_to_I2C_Connector
R26
100
logic_0-3.3V_CTRL_INPUT
R_protection
Q10
N-MOSFET-ENH-2N7002
R28
4.7kΩ ±1% 100mW
GND
GND