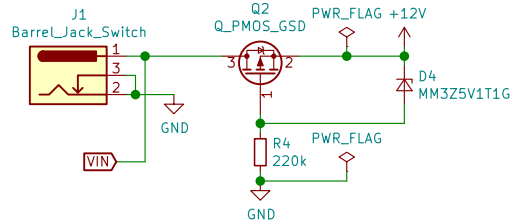
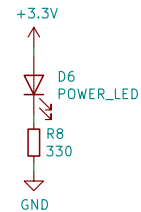


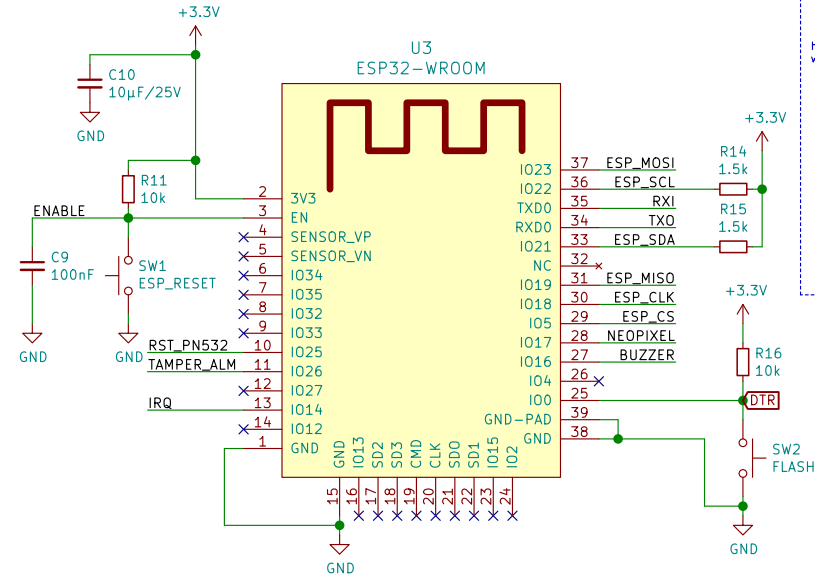
Input Protection



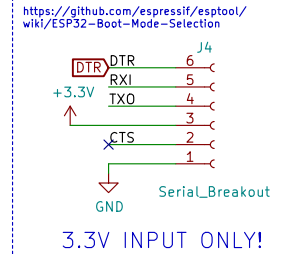
Power Status



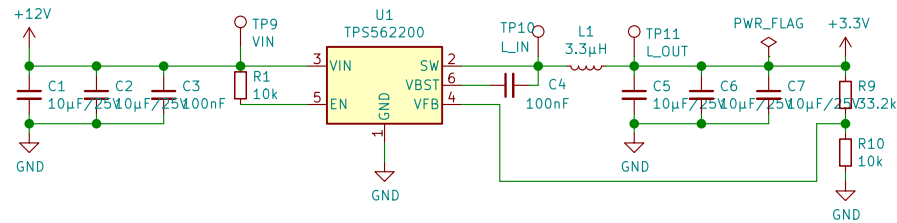
ESP32



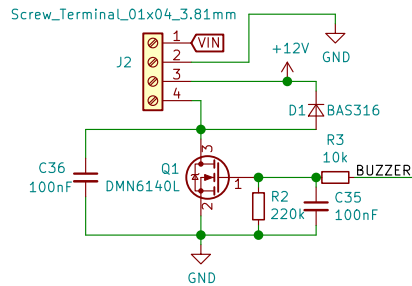
ESP32 UART



Step down module 12V-3.3V 2A

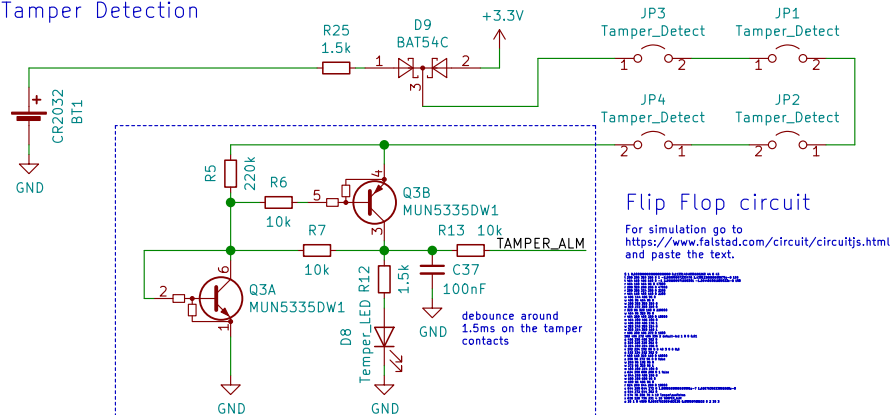


Buzzer Switch



GPIO16 should be fine during boot.
Espressif states the pin as oe=0
during boot (no output).
See https://www.espressif.com/sites/default/files/1a-esp32_pin_list_en-v0.1.pdf

Tamper Detection

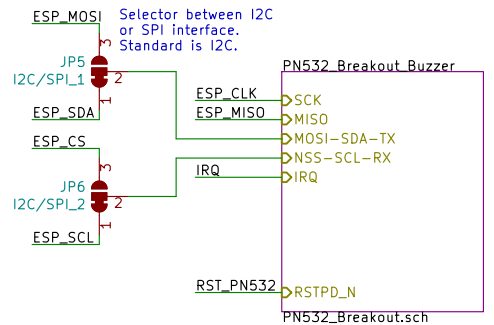


Flip Flop circuit

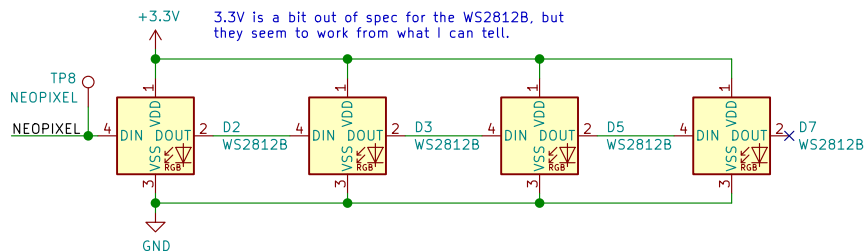
For simulation go to
<https://www.falstad.com/circuit/circuitjs.html>
and paste the text.



PN532 Module



NEOPIXEL



Sheet: /
File: Buzzer_2.0.sch

Title:

Size: A4
KiCad E.D.A. kicad (5.1.0-0)

Date:

Rev:
Id: 1/2

The antenna impedance should be close to 50 Ohm.
 JLCPCB JLC7628 controlled impedance stackup:
 -Dielectric constant 4.6
 -Substrate height 0.2mm (from the top layer to the first inner layer)
 -Trace thickness 1 oz/inch² or 0.035mm
 -Trace width 0.356mm
 Z = 48.9 Ohm

Inductance of the rect. coil:

- 54x42mm
- 4 turns
- Wire diameter 0.356mm x 0.035mm -> ca. 0.126mm
- Relative permeability 1
- L = 3.6μH

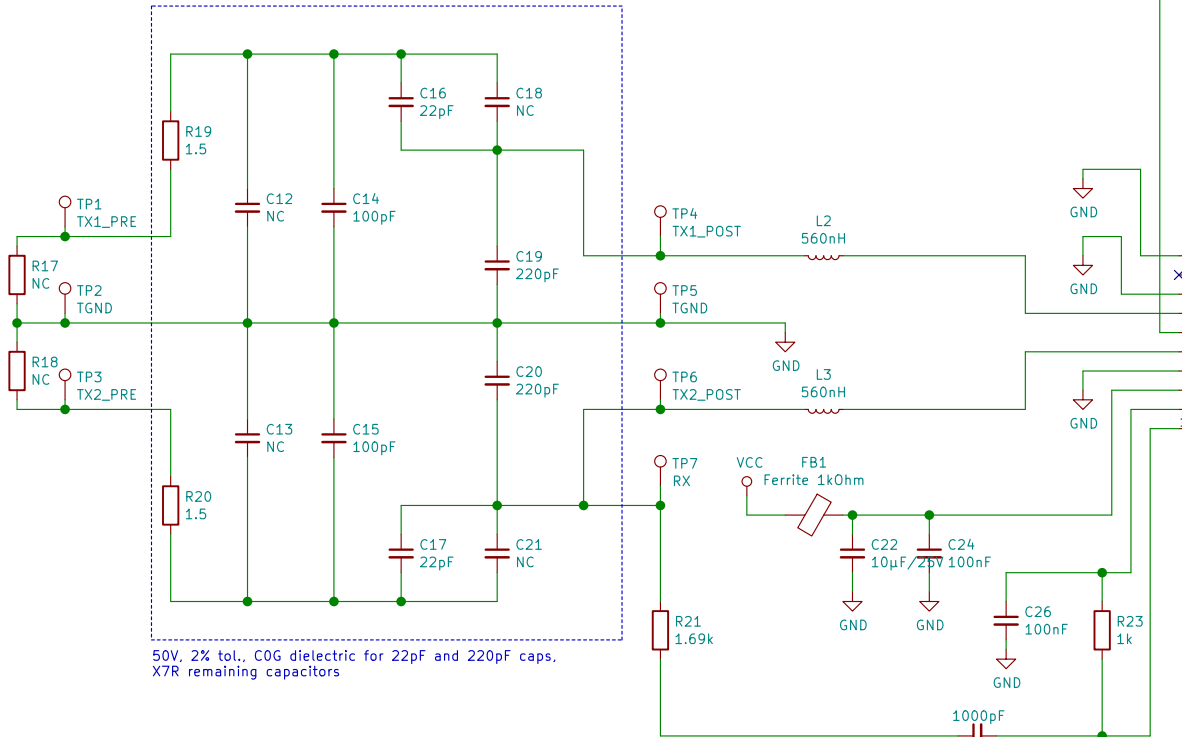
Resistance (w/o adjustment resistors)

- 8*(42+54)mm 0.356mm*0.035mm -> 1.08 Ohm

Q-factor should be around 35±10%
 Given the current stats it is closer to 75
 Might need to replace the 1.5 Ohm
 dampening resistors with 3.7 Ohm

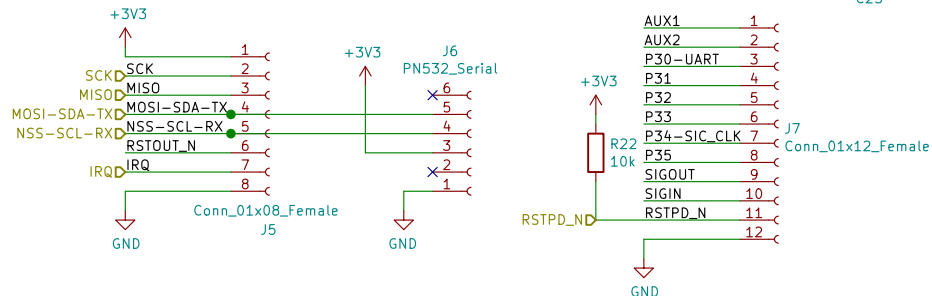
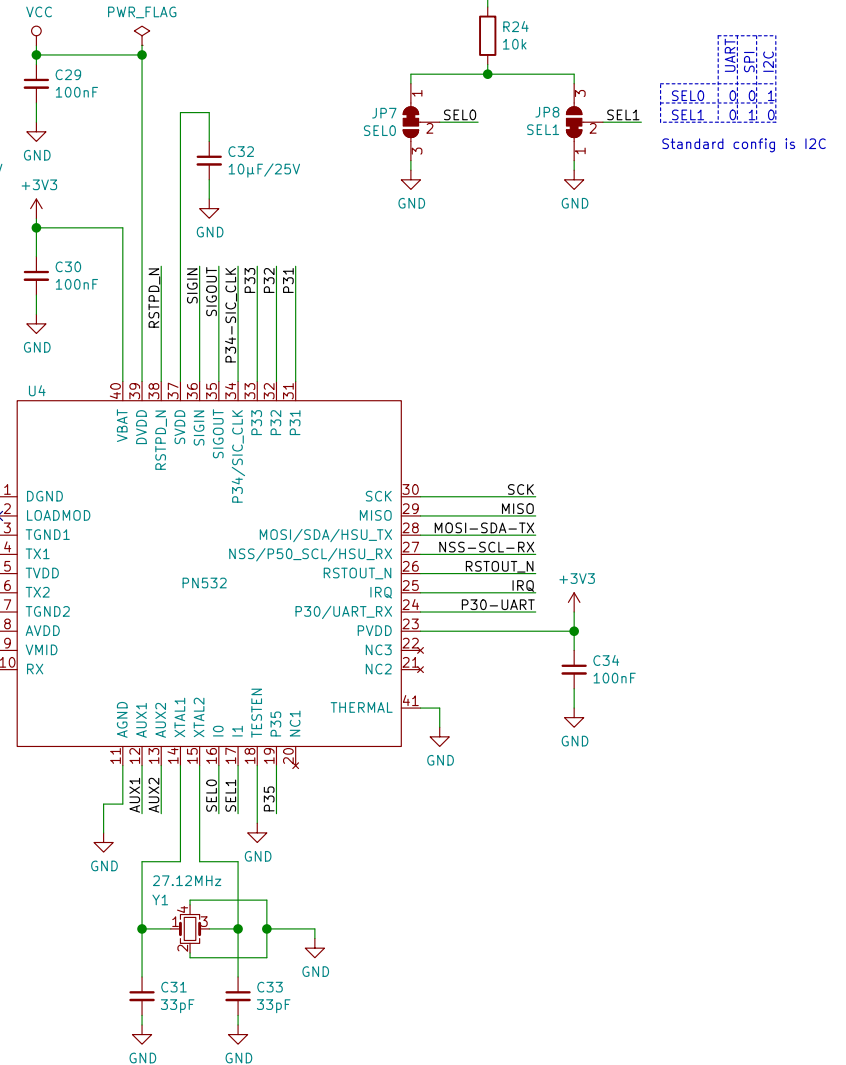
Based on antenna design
 guide AN1445 by NXP

Antenna Matching Circuit



Value of the ferrite beads is not specified,
 but should be between 0.1-1kOhm.
 Due to the large capacitance of 10μF it is
 a good idea to double check for ringing
 with a splice simulation or at least probe
 with an oscilloscope.
 Also the bead needs to be placed BEFORE
 the caps!

VCC - device power provided
 through LDO of PN532



Sheet: /PN532_Breakout_Buzzer/
 File: PN532_Breakout.sch

Title:

Size: A4

Date:

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Rev:

Id: 2/2