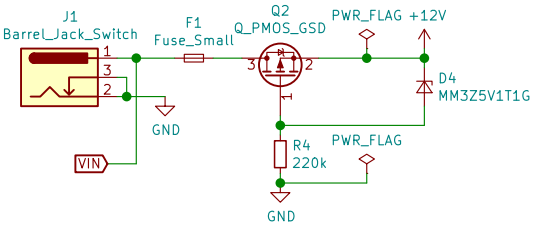
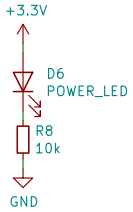
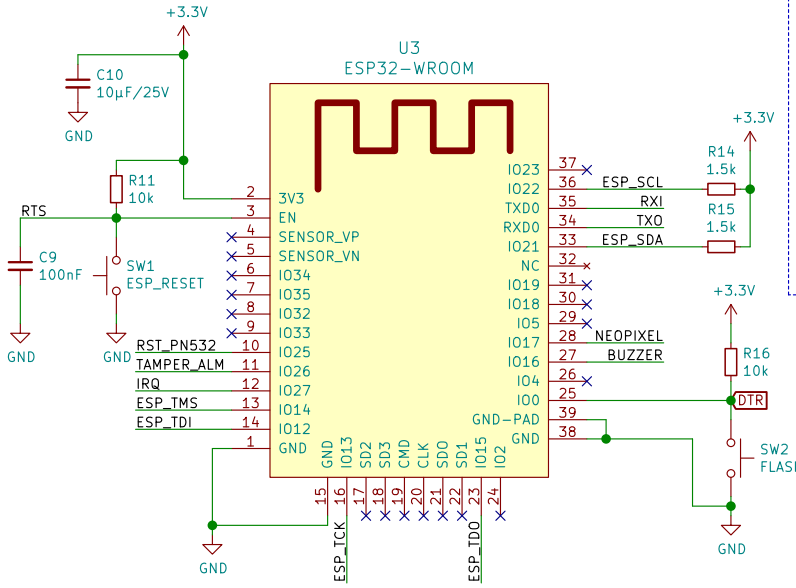
## Input Protection




## Power Status

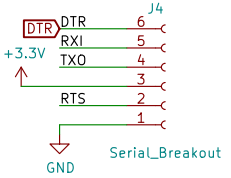



## ESP32

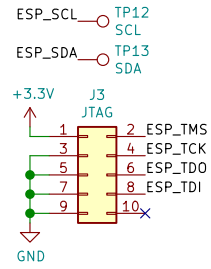



## ESP32 UART

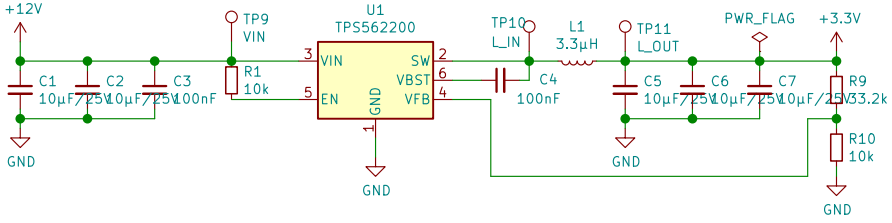
https://github.com/espressif/esptool/wiki/ESP32-Boot-Mode-Selection



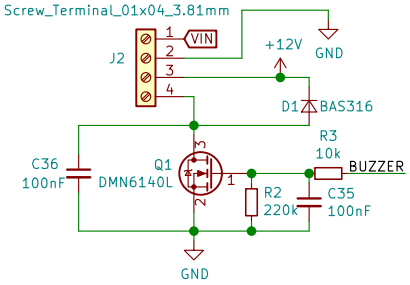

3.3V INPUT ONLY!




## Step down module 12V-3.3V 2A

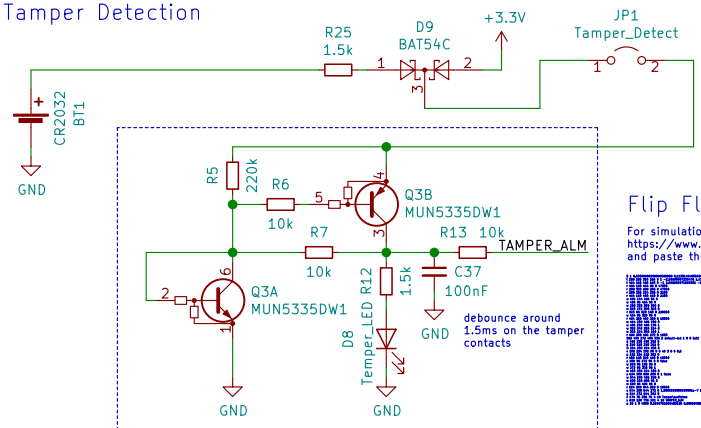



## Buzzer Switch




GPIO16 should be fine during boot.
Espressive 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



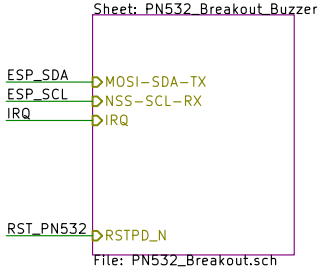

## Flip Flop circuit

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

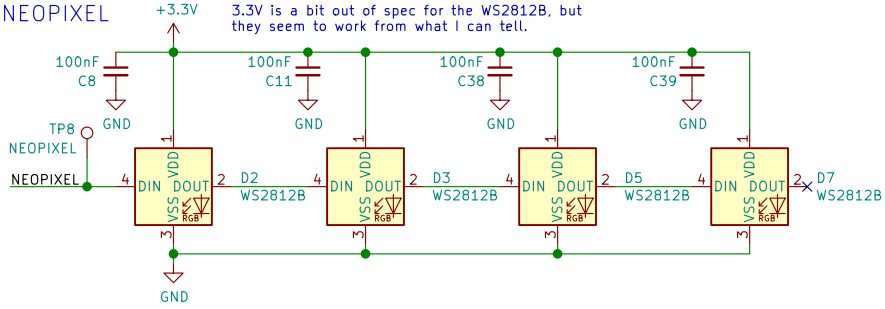


## PN532 Module

Based upon Adafruits PN532 Breakout Board v1.6
Attribution-ShareAlike 3.0 Unported
Changes:
- removed power LED indicator
- transmission mode jumpers replaced by solder jumpers
- removed 3.3v regulator




## NEOPIXEL




H1 M3
H2 M3
H3 M3
H4 M3

Sheet: /
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**Title:**

| Size: A4 | Date: | **Rev:** |
|---|---|---|
| KiCad E.D.A. kicad (5.1.4-0-10_14) | | 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/inch^2 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

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

## Antenna Matching Circuit

50V, 2% tol., C0G dielectric for 22pF and 220pF caps,
X7R remaining capacitors

Standard config is I2C

Sheet: /PN532_Breakout_Buzzer/
File: PN532_Breakout.sch

**Title:**

| Size: A4 | Date: | Rev: |
|---|---|---|
| KiCad E.D.A. kicad (5.1.4-0-10_14) | | Id: 2/2 |