

TACNPR project

Tatu OH2EAT, Lasse OH3HZB & Tommi OH1GJV & SCOMS team
Special thanks to: Mikko OH2FLO & Vili OH5GE

SUBSHEETS (revision C):

cpu

MCU, SRAM,
SERIAL

File: cpu-sheet.kicad_sch

radio

Si4463 &
RF switching

File: radio-sheet.kicad_sch

RF-PA

RF LNA
& PA

File: RF-PA-sheet.kicad_sch

tacbucks

DC/DC
converters

File: tacbuck-sheet.kicad_sch

linear-regs

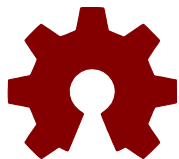
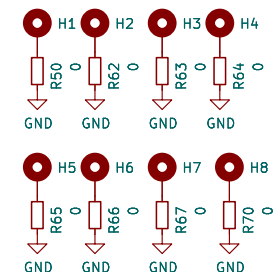
3V3 lin.reg.
& terminals

File: linreg-sheet.kicad_sch

ethernet

W5500
Ethernet

File: ethernet-sheet.kicad_sch



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TACNPR project

OH1GJV, OH2EAT, OH2FLO, OH3HZB, OH5GE



Sheet: /
File: TACNPR.kicad_sch

Title: TACNPR

Size: A4 Date: 2021-03-22
KiCad E.D.A. kicad 7.0.6-7.0.6-ubuntu22.04.1

Rev: C
Id: 1/7

MCU: STM32L432KC (256 kB Flash)

SRAM (23LC1024, 1Mbit)

CONN LEDs

GPIO ESD protection

USB ESD PROTECTION & CH340G SERIAL

GPIO header

TACNPR / CPU sheet
(CPU, SRAM, GPIO, ETHERNET, USB SERIAL)

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[illegible]

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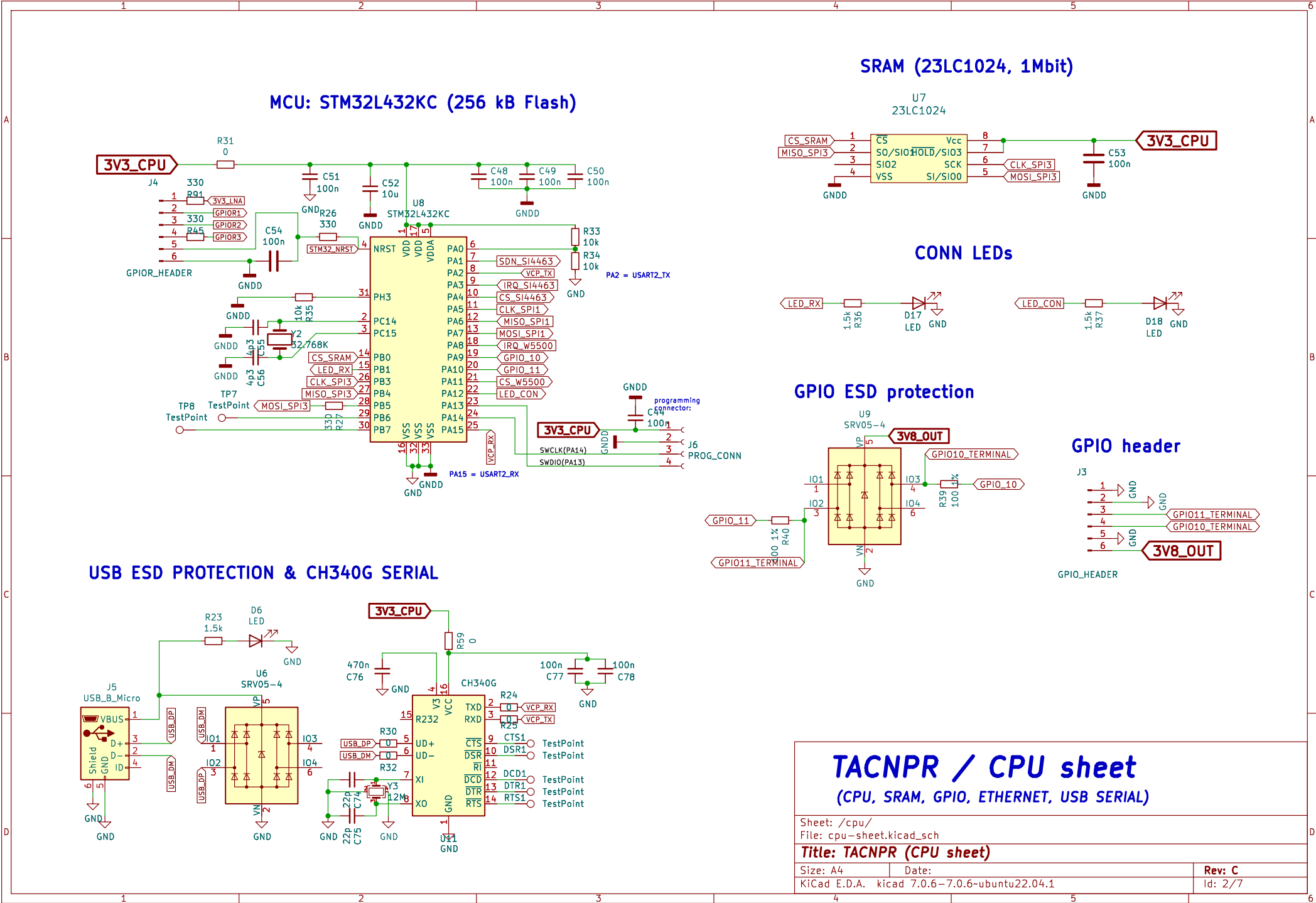
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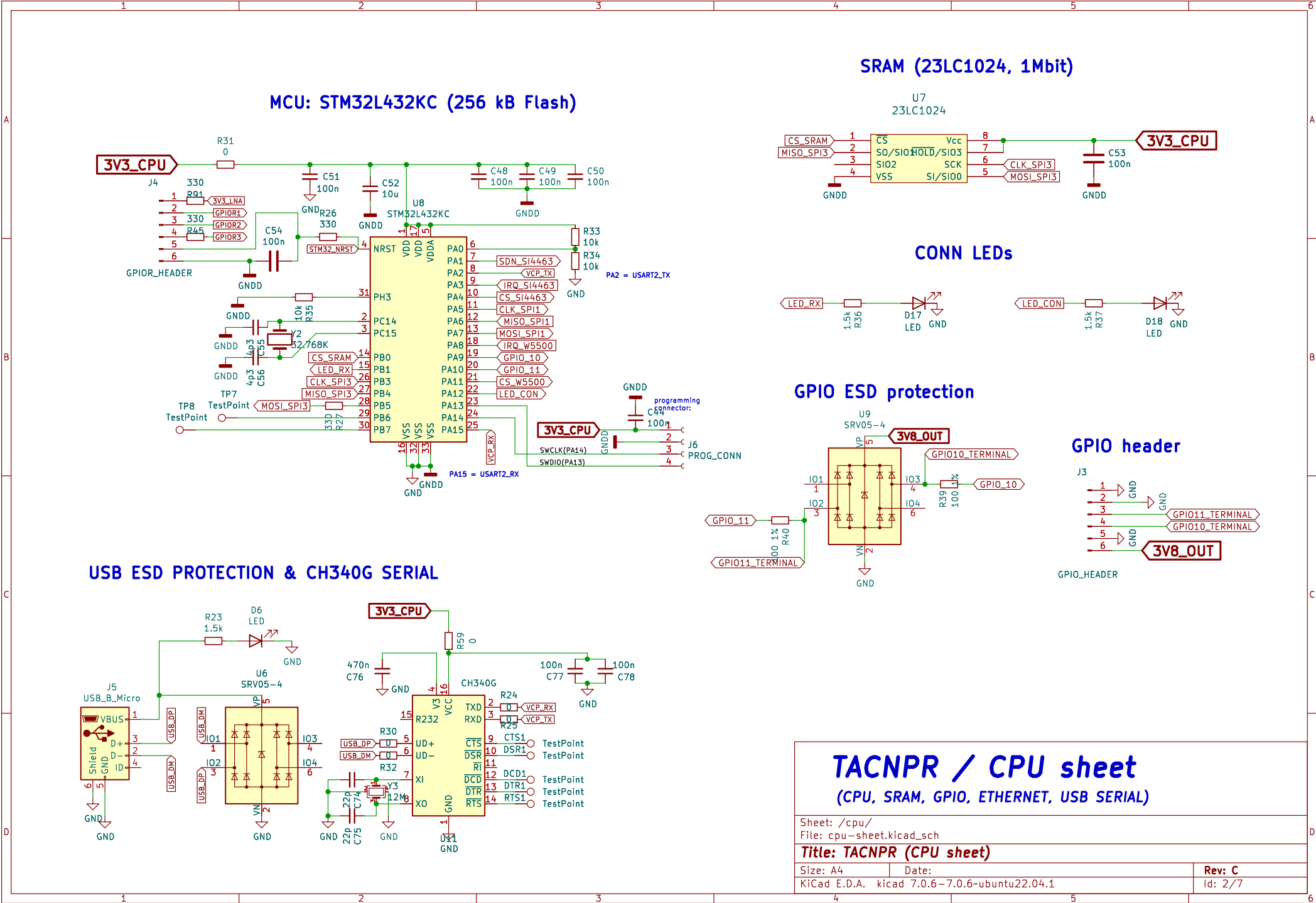
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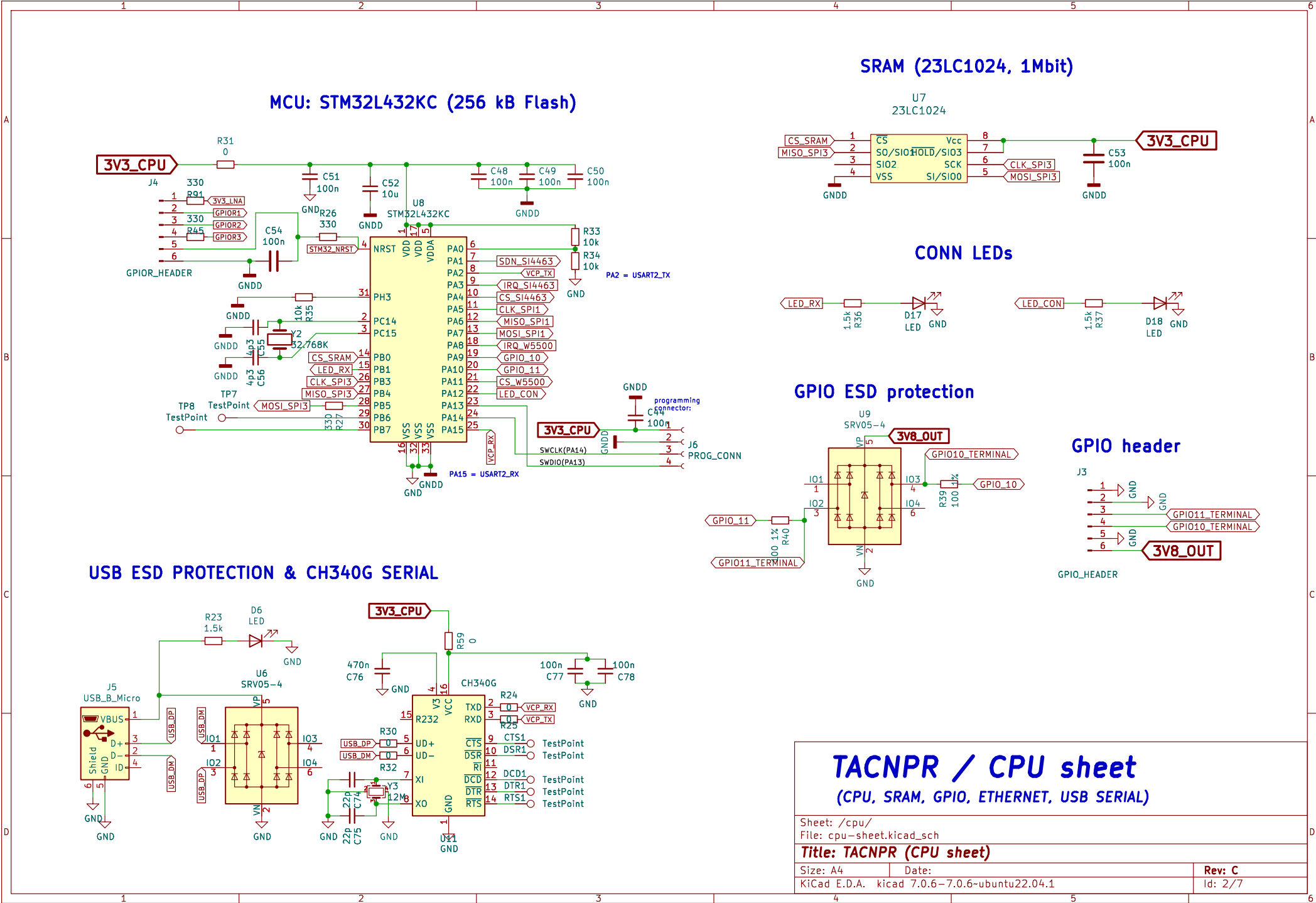
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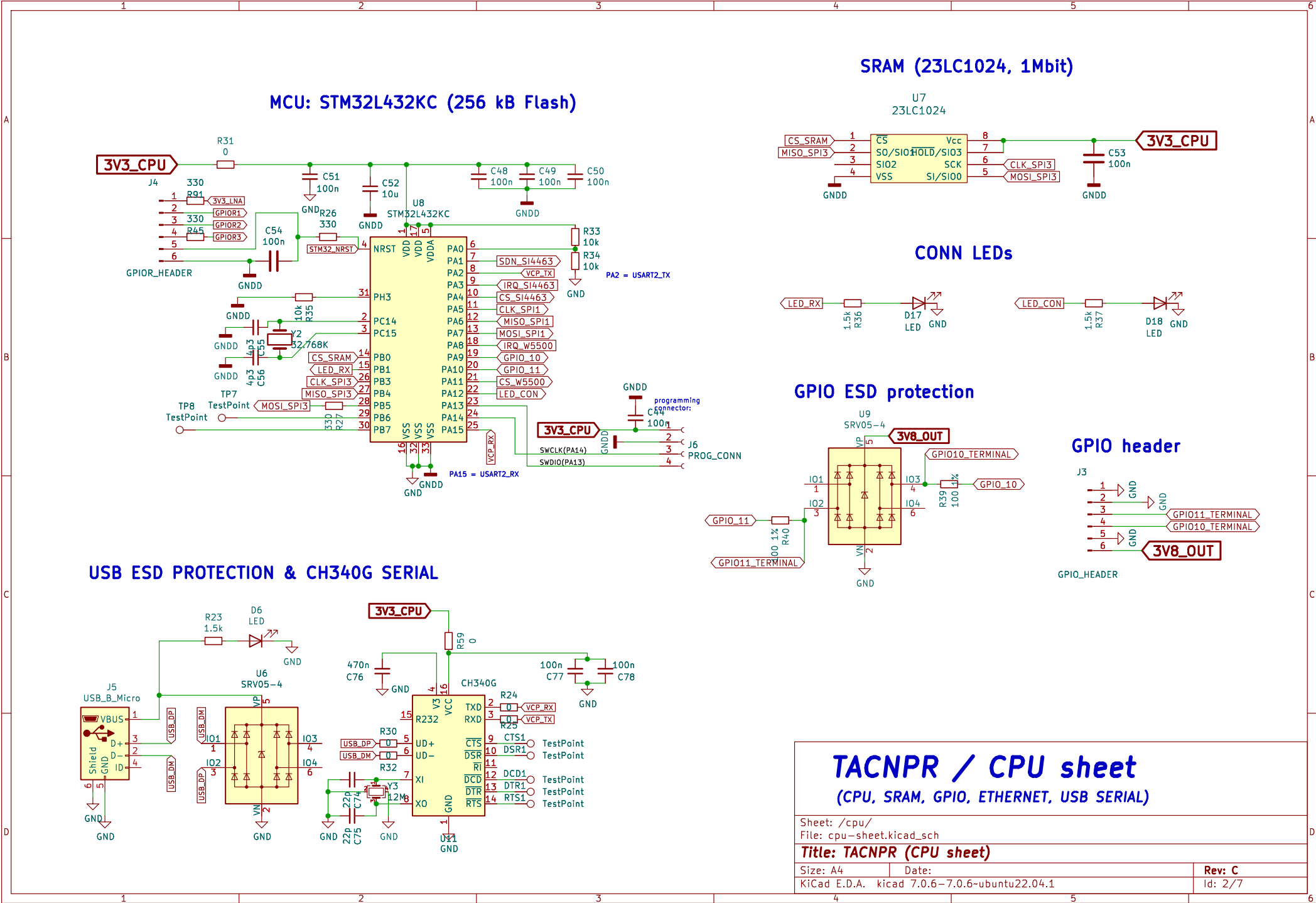
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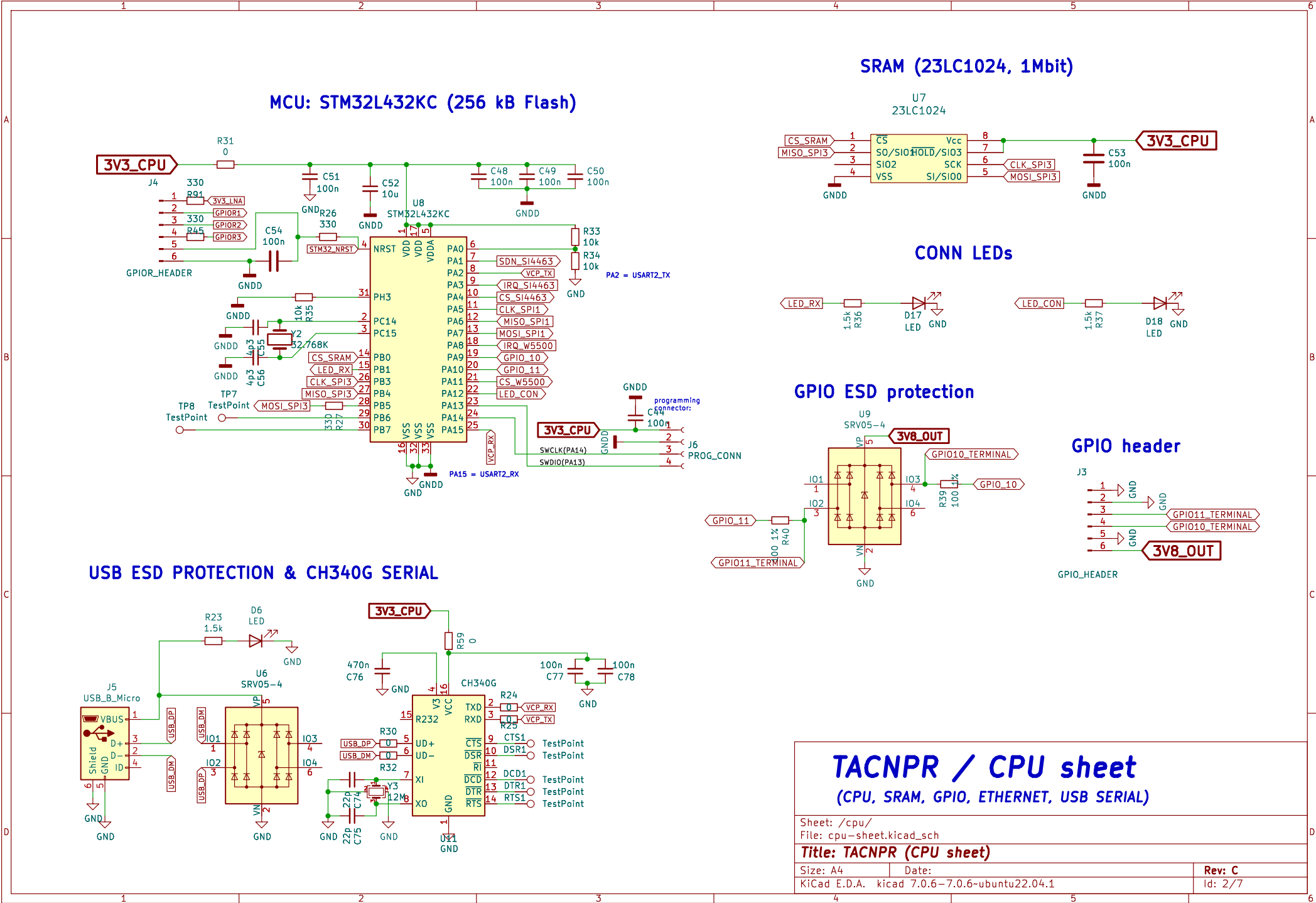
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MCU: STM32L432KC (256 kB Flash)

The main schematic shows the STM32L432KC microcontroller at the center. It is powered by a 3V3_CPU supply through R31 and C51. The reset pin NRST is pulled up to 3V3_CPU by R26 and has a 100nF capacitor C54. The microcontroller's pins are connected to various peripherals:

- SRAM (23LC1024, 1Mbit):** U7 is connected via CS_SRAM (pin 1), MISO_SPI3 (pin 2), VSS (pin 4), SCK (pin 6), and SI/SIO0 (pin 5).
- CONN LEDs:** LED_RX (D17) and LED_CON (D18) are connected to PA2 and PA15 respectively.
- GPIO ESD protection:** U9 (SRV05-4) protects the GPIO10_TERMINAL and GPIO11_TERMINAL pins.
- GPIO header:** J3 provides connections for GPIO10_TERMINAL, GPIO11_TERMINAL, and 3V8_OUT.
- USB ESD PROTECTION & CH340G SERIAL:** J5 (USB_B_Micro) connects to the CH340G (U6) which interfaces with the MCU's TXD, RXD, and RTS pins.
- Other components:** Various capacitors (C48, C49, C50, C52, C53, C54, C55, C56, C76, C77, C78) and resistors (R33, R34, R35, R36, R37, R39, R40, R41, R42, R43, R44, R45, R46, R47, R48, R49, R50, R51, R52, R53, R54, R55, R56, R57, R58, R59, R60, R61, R62, R63, R64, R65, R66, R67, R68, R69, R70, R71, R72, R73, R74, R75, R76, R77, R78, R79, R80, R81, R82, R83, R84, R85, R86, R87, R88, R89, R90, R91, R92, R93, R94, R95, R96, R97, R98, R99, R100) are used for timing and signal conditioning.

SRAM (23LC1024, 1Mbit)

U7
23LC1024

CS_SRAM 1 CS Vcc 8
MISO_SPI3 2 SO/SI0HOLD/SI03 7
3 3 SCK 6 CLK_SPI3
4 VSS SI/SIO0 5 MOSI_SPI3

C53 100n

3V3_CPU

GND

CONN LEDs

LED_RX 1.5k R36 D17 LED GND

LED_CON 1.5k R37 D18 LED GND

GPIO ESD protection

U9 SRV05-4

VP 5 3V8_OUT

I01 1 I03 4 GPIO10_TERMINAL

I02 2 I04 6 GPIO10_TERMINAL

R39 100 1% R40 100 1%

VN 2 GND

GPIO header

J3

1 GND

2 GND

3 GPIO11_TERMINAL

4 GPIO10_TERMINAL

5 GND

6 3V8_OUT

GPIO_HEADER

USB ESD PROTECTION & CH340G SERIAL

J5 USB_B_Micro

VBUS 1

D+ 2

D- 3

ID 4

Shield 5

GND 6

GND

U6 SRV05-4

VP 5

I01 1

I02 2

I03 4

I04 6

VN 2

GND

CH340G

VCC 16

TXD 2

RXD 3

CTS1 9 TestPoint

DSR1 10 TestPoint

DCD1 12 TestPoint

DTR1 13 TestPoint

RTS1 14 TestPoint

XO 1

GND

UD+ 5

UD- 6

XI 7

XT 8

Y3 12M

C75 22p

C76 470n

C77 100n

C78 100n

3V3_CPU

R59 0

R23 1.5k

D6 LED

GND

TACNPR / CPU sheet
(CPU, SRAM, GPIO, ETHERNET, USB SERIAL)

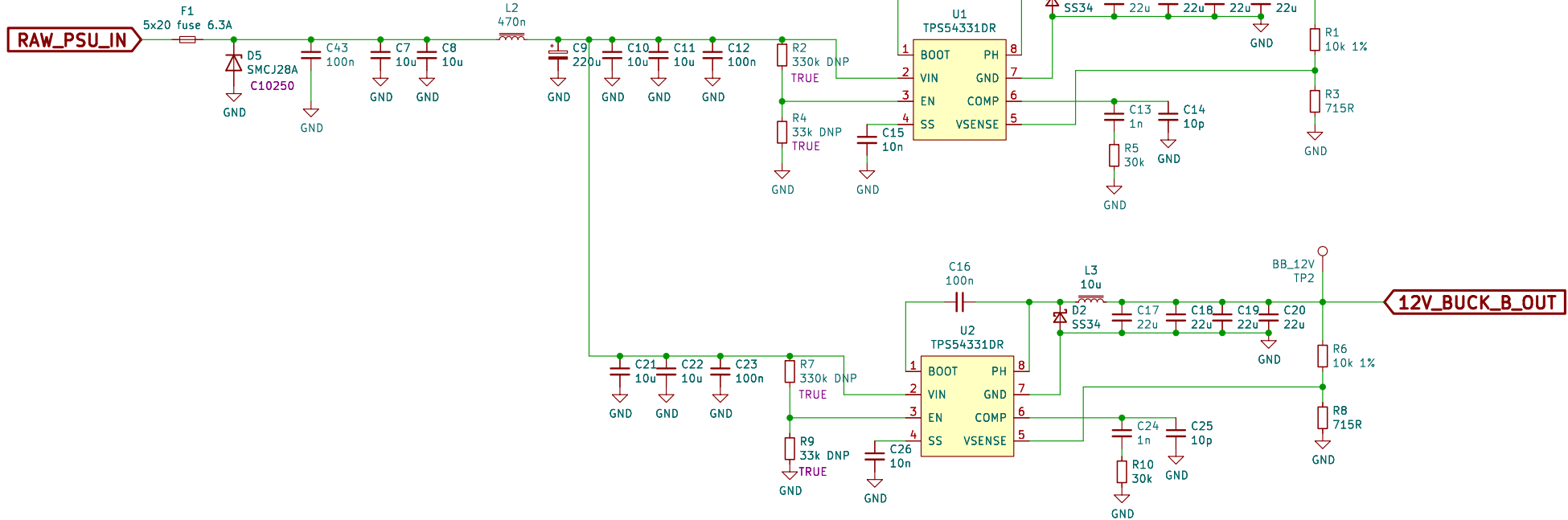
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Title: TACNPR (CPU sheet)

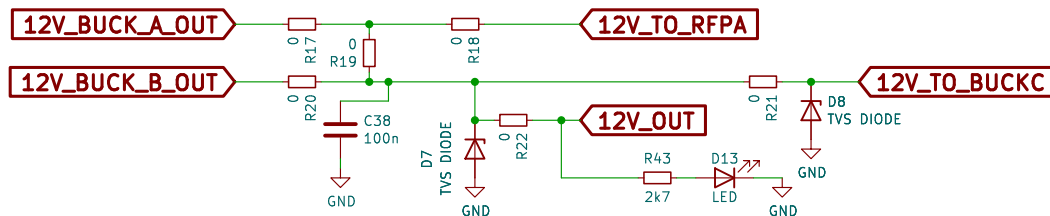
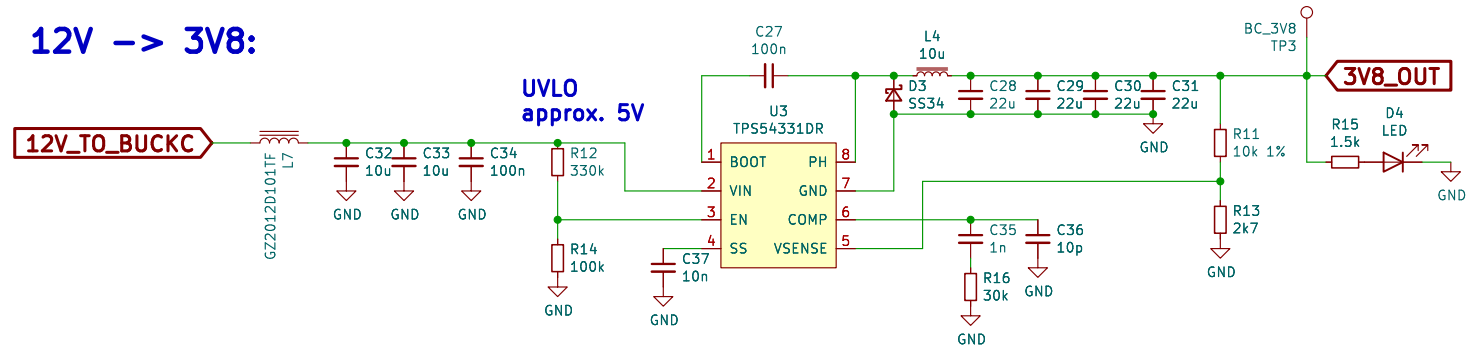
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| Size: A4 | Date: | Rev: C |
| KiCad E.D.A. | kicad 7.0.6-ubuntu22.04.1 | Id: 2/7 |

[illegible][illegible]

IN -> 12V:



12V -> 3V8:



TACNPR / DC/DC converters

based on TACBUCK-A design by Tommi OH1GJV

Sheet: /tacbucks/

File: tacbuck-sheet.kicad_sch

Title: TACNPR (TACBUCKs)

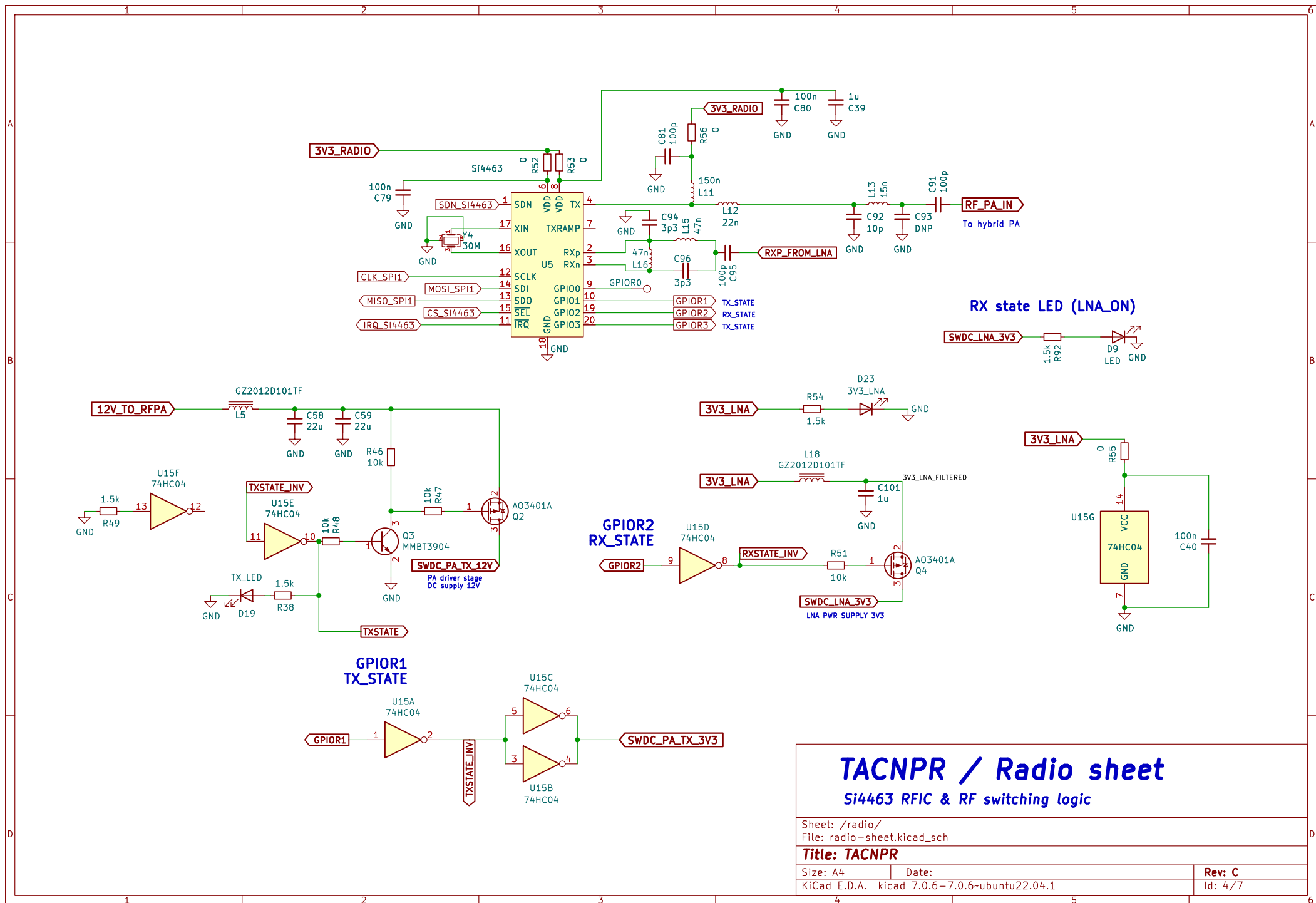
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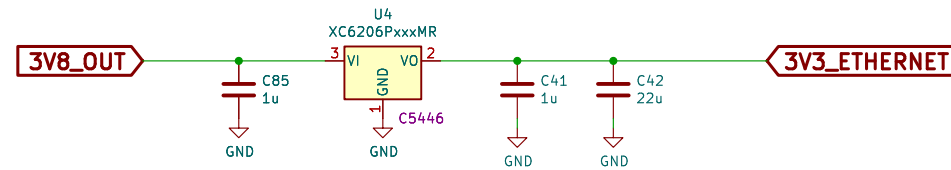
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Rev: C

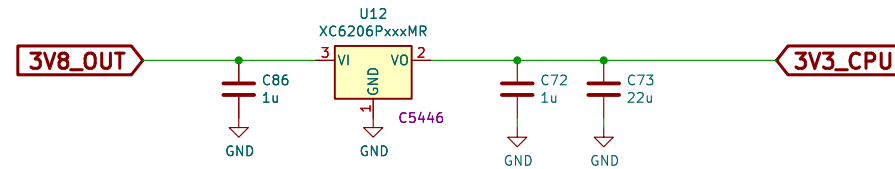
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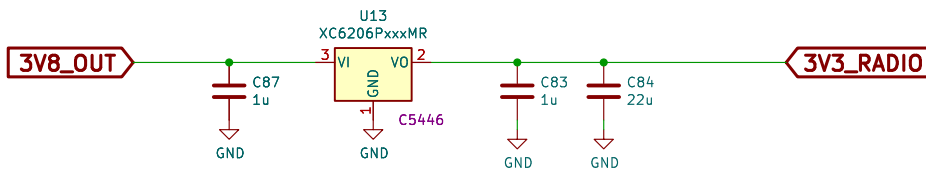
3V3 for Ethernet transceiver



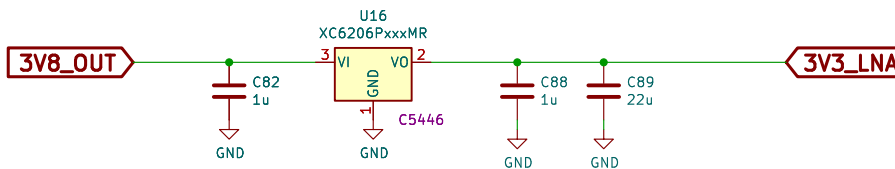
3V3 for STM32 CPU



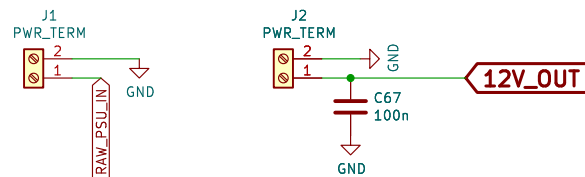
3V3 for Si4463 radio chip



3V3 for LNA



Screw terminals



TACNPR / regulators & terminals

3V8 -> 3V3 LDO linear regulators & screw terminals

Sheet: /linear-regs/

File: linreg-sheet.kicad_sch

Title: TACNPR (linear regulators)

Size: A4

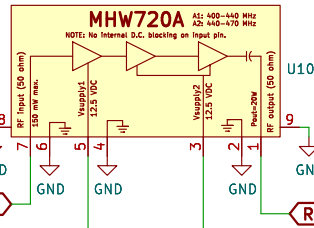
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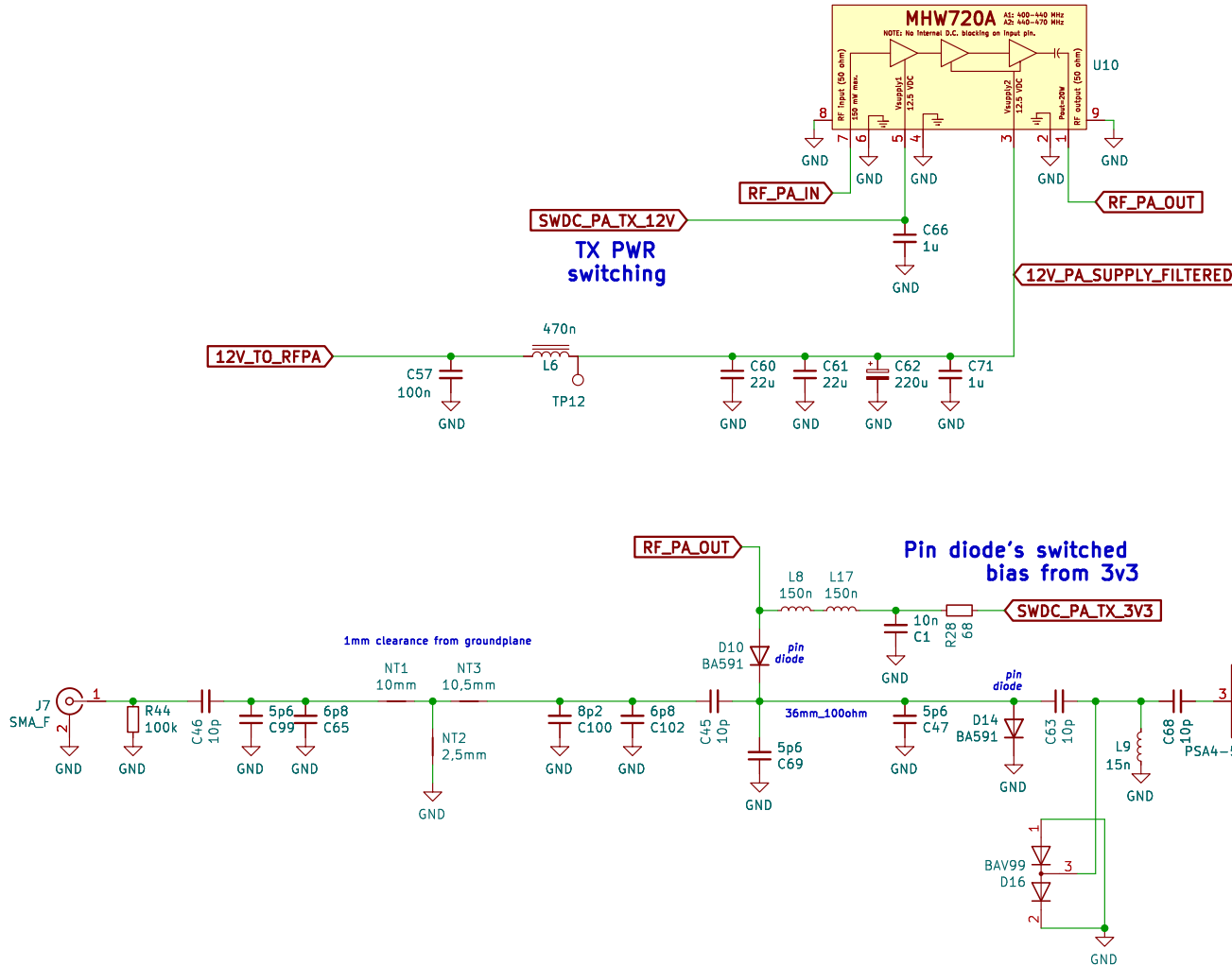
Id: 5/7

MHW720A



RF strip widths
on the keepout area:

50 ohm: 2 mm (millimeters)
100 ohm: 0,5 mm



TACNPR / RF PA & TRX switch

Motorola MHW720A 20W RF PA, design & simulations: Tatu OH2EAT

Sheet: /RF-PA/

File: RF-PA-sheet.kicad_sch

Title: TACNPR (RF PA & LNA)

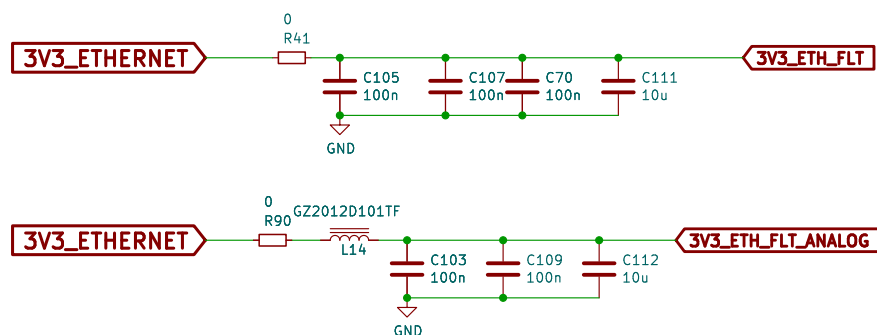
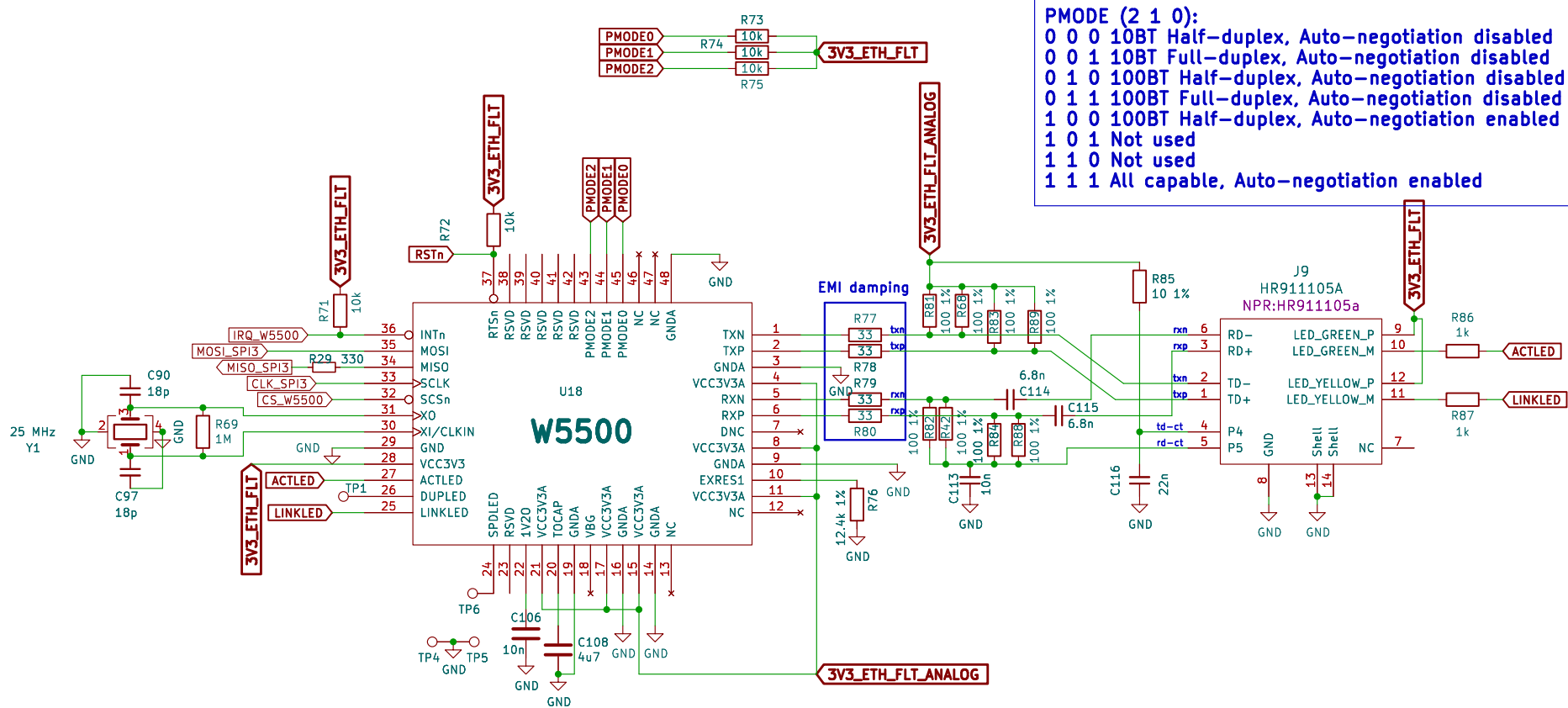
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W5500 reference schematic:
<https://docs.wiznet.io/Product/iEthernet/W5500/ref-schematic>
 W5500 Ref.Schematic – RJ45 with Transformer

See also the HR911105A datasheet.
 On page 1 (REV A/2): "Connect CHS GND to PCB ground".
 The connector is equipped with an internal 1nF 2kV CAP (P8).

| | | | |
|--|-------|------------------------|--|
| Reviewed by OH2EAT 2023 Drawn by OH3HZB 2022–2023 | | TACNPR Ethernet | |
| Scoms | | | |
| Sheet: /ethernet/ File: ethernet-sheet.kicad_sch | | | |
| Title: TACNPR (Ethernet) | | | |
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