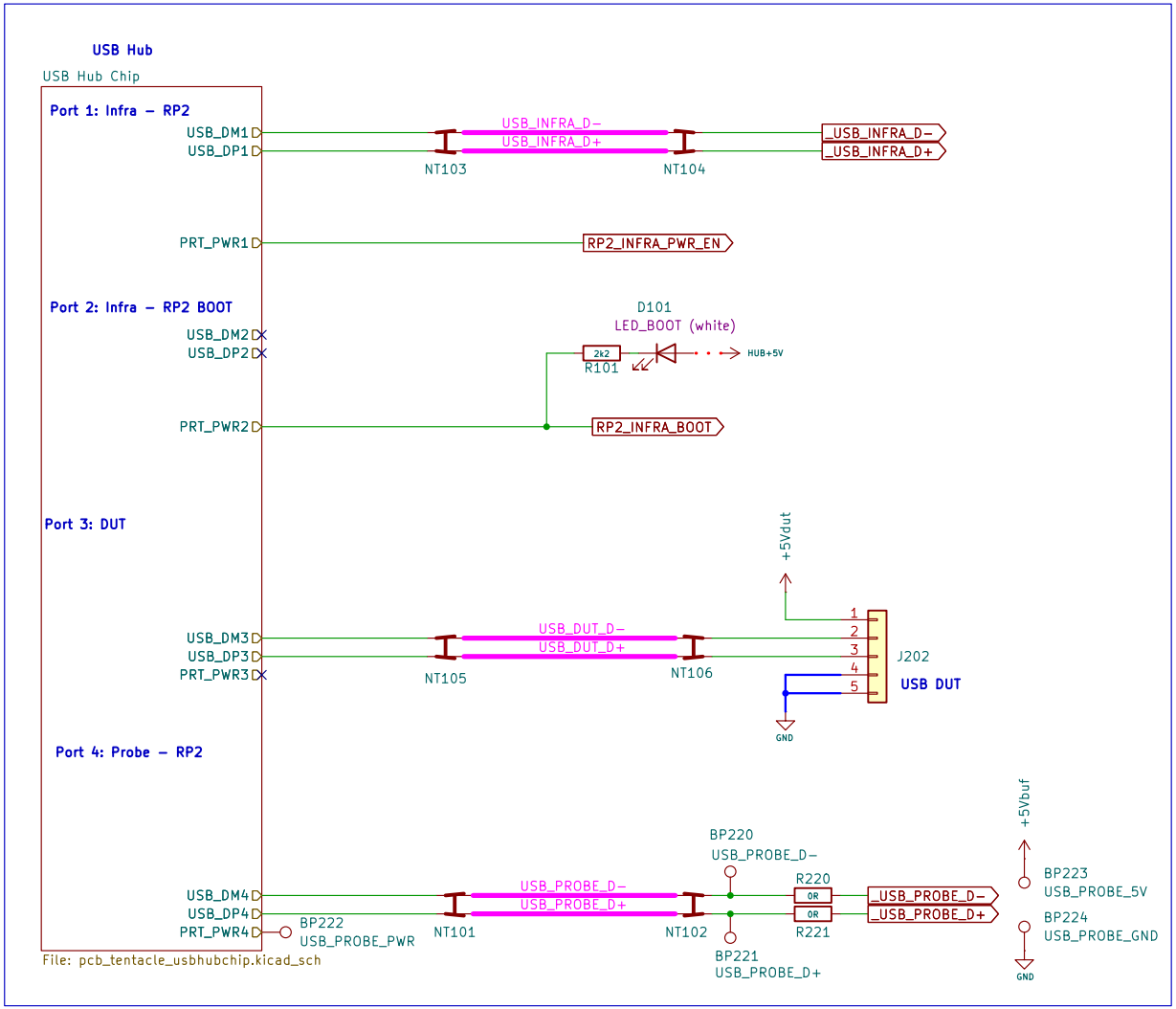

Regulator 3V3

File: pcb_tentacle_regulator3V3.kicad_sch

RP2 CPU

12MHz

File: pcb_tentacle_cpu.kicad_sch

RP2 PROBE

12MHz

File: pcb_tentacle_probe.kicad_sch

Relay Breakout

File: pcb_tentacle_relay_breakout.kicad_sch

Prototype Area

File: pcb_tentacle_prototype_area.kicad_sch

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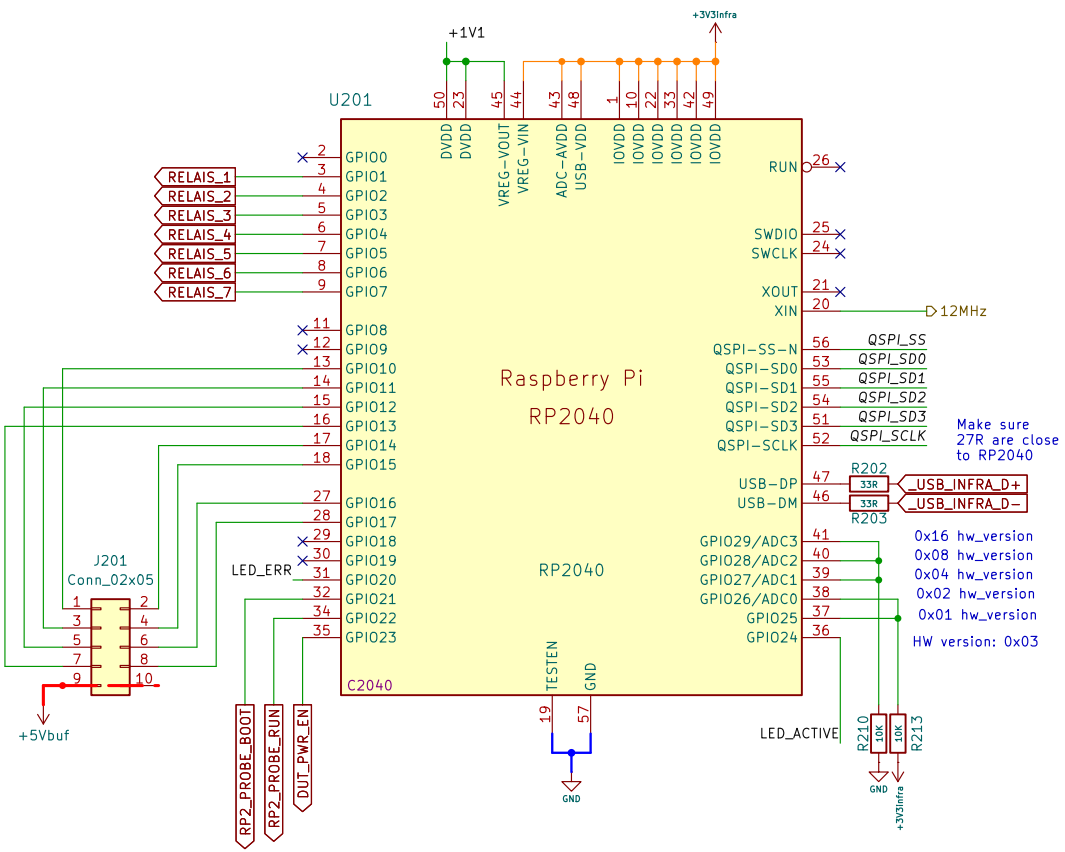
Sheet: /
File: pcb_tentacle.kicad_sch

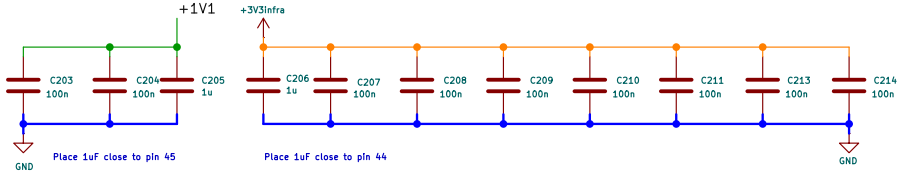
Title: Octoprobe tentacle

Size: A4	Date: 2026-02-18	**Rev: 0.7.1**
KiCad E.D.A. 9.0.7		Id: 1/14

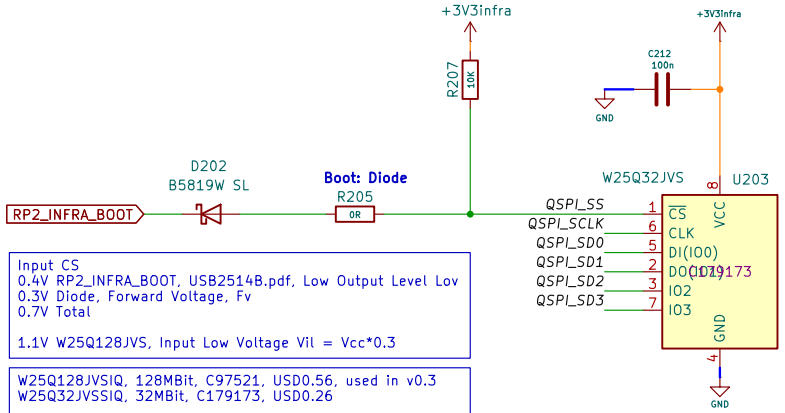
RP2040 Infra

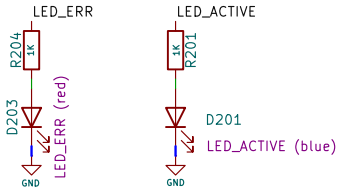


Bypass Capacitors

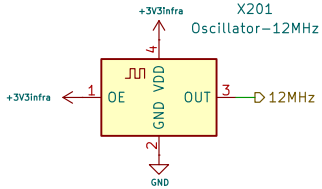


Flash Memory





Oscillator



JLC alternatives

jlc	USD/Stock	Package	Comments
C2831468	0.37/1k	SMD2520-4P	1nd
C2901596	0.37/1k	SMD2520-4P	2nd
C437139	0.29/188	SMD2520-4P	2nd
C387449	0.49/3k	SMD2520-4P	2nd
C409301	0.55/2k	SMD2520-4P	2nd

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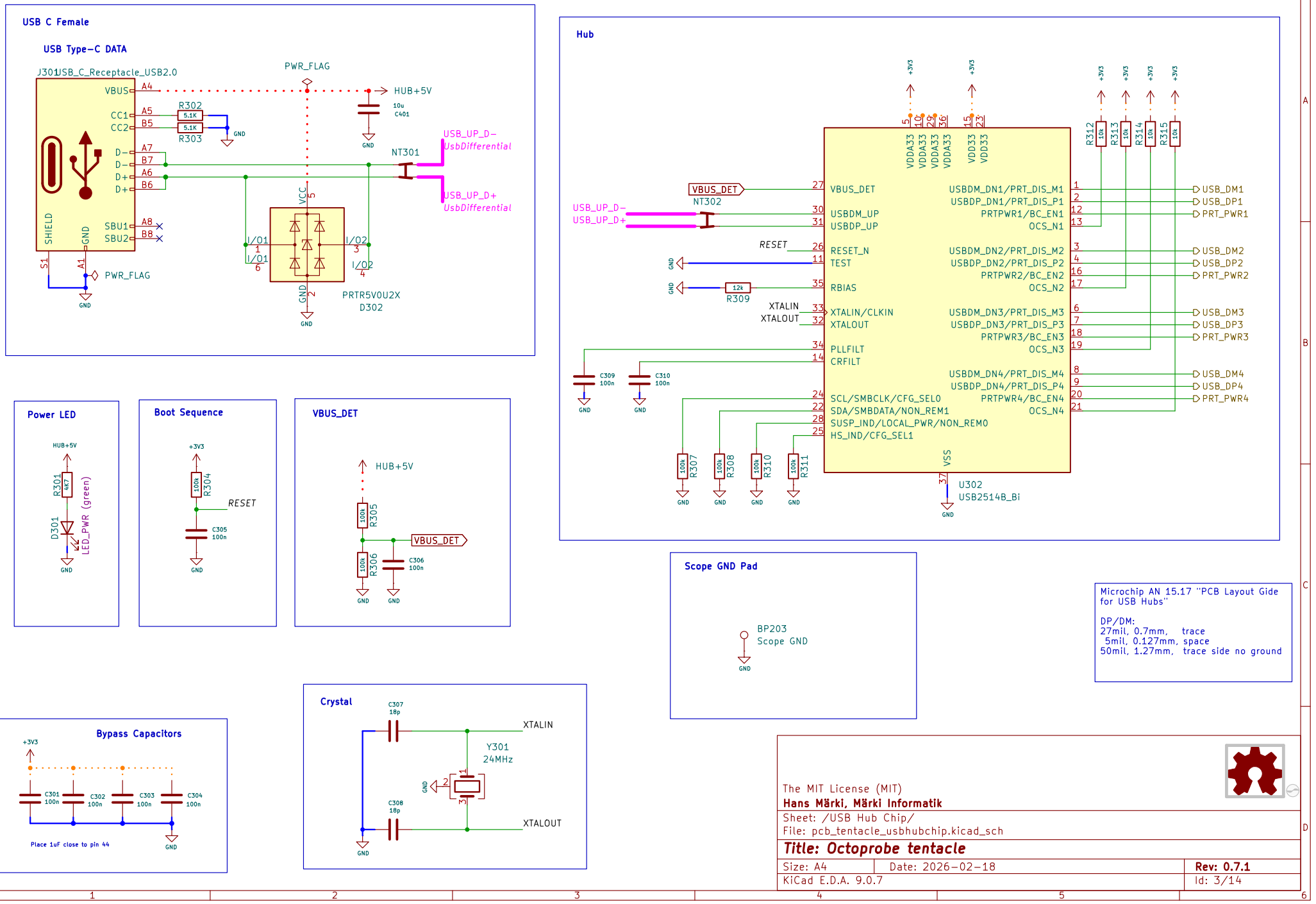
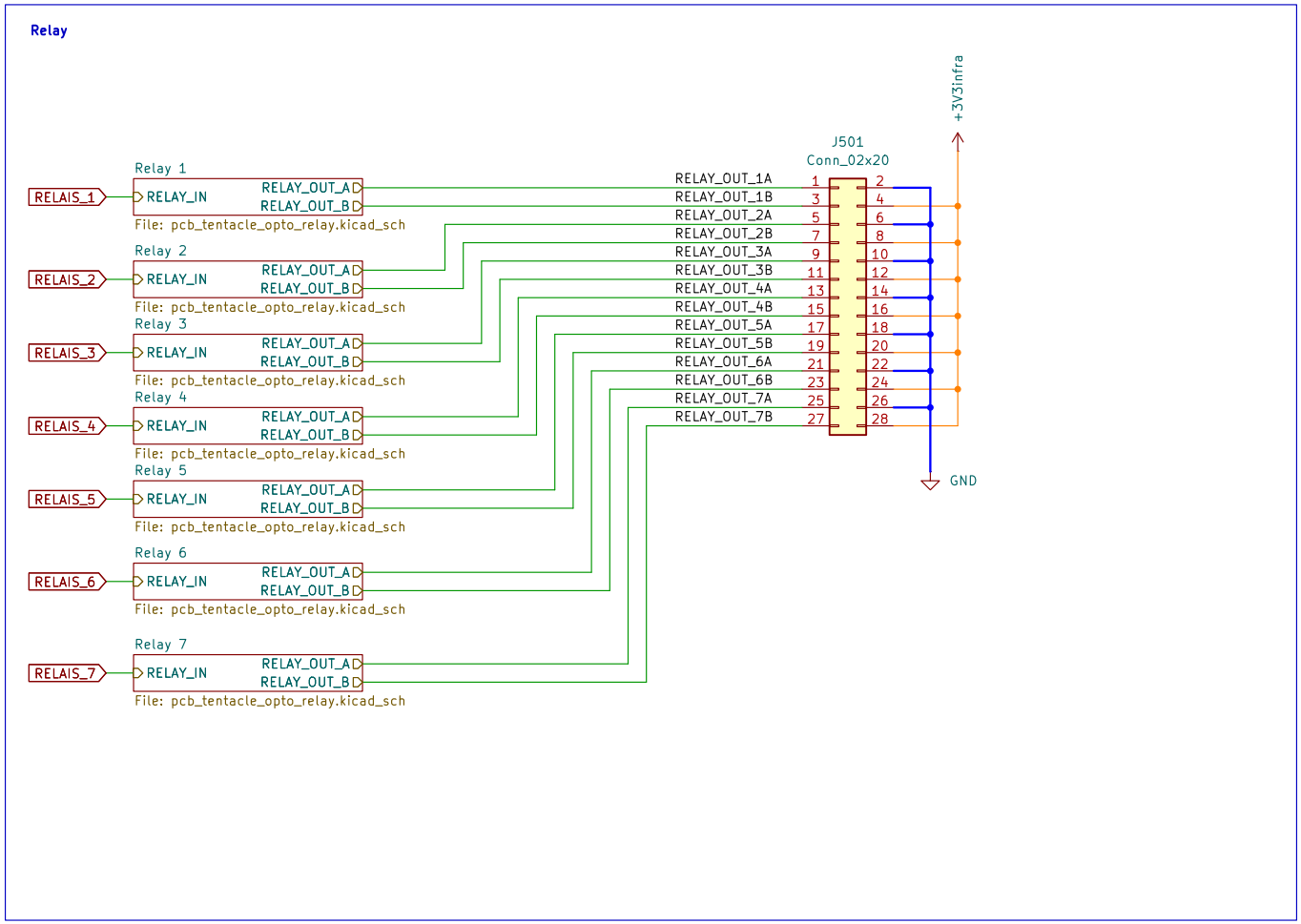
Sheet: /RP2 CPU/
File: pcb_tentacle_cpu.kicad_sch

Title: Octoprobe tentacle

Size: A4	Date: 2026-02-18	**Rev: 0.7.1**
KiCad E.D.A. 9.0.7		Id: 2/14

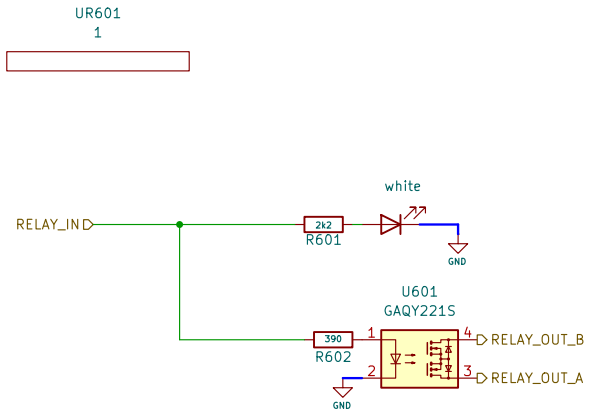

USB C Female
USB Type-C DATA
J301 USB_C_Receptacle_USB2.0
VBUS
CC1
CC2
D-
D-
D+
D+
SHIELD
GND
SBU1
SBU2
A4
A5
B5
A7
B7
A6
B6
A8
B8
S1
A1
R302 5.1K
R303 5.1K
PWR_FLAG
HUB+5V
10u C401
NT301
USB_UP_D-
UsbDifferential
USB_UP_D+
UsbDifferential
VCC
I/O1
I/O2
PRTR5V0U2X
D302
Hub
VBUS_DET
NT302
USB_UP_D-
USB_UP_D+
RESET
R309 12k
XTALIN
XTALOUT
C309 100n
C310 100n
VDDA33
VDD33
VBUS_DET
USBDM_UP
USBDP_UP
RESET_N
TEST
RBIAS
XTALIN/CLKIN
XTALOUT
PLLFILT
CRFILT
SCL/SMBCLK/CFG_SEL0
SDA/SMBDATA/NON_REM1
SUSP_IND/LOCAL_PWR/NON_REM0
HS_IND/CFG_SEL1
VSS
USBDM_DN1/PRT_DIS_M1
USBDP_DN1/PRT_DIS_P1
PRTPWR1/BC_EN1
OCS_N1
USBDM_DN2/PRT_DIS_M2
USBDP_DN2/PRT_DIS_P2
PRTPWR2/BC_EN2
OCS_N2
USBDM_DN3/PRT_DIS_M3
USBDP_DN3/PRT_DIS_P3
PRTPWR3/BC_EN3
OCS_N3
USBDM_DN4/PRT_DIS_M4
USBDP_DN4/PRT_DIS_P4
PRTPWR4/BC_EN4
OCS_N4
R307 100k
R308 100k
R310 100k
R311 100k
R312 10k
R313 10k
R314 10k
R315 10k
USB_DM1
USB_DP1
PRT_PWR1
USB_DM2
USB_DP2
PRT_PWR2
USB_DM3
USB_DP3
PRT_PWR3
USB_DM4
USB_DP4
PRT_PWR4
U302
USB2514B_Bi
Power LED
HUB+5V
R301 4K7
D301
LED_PWR (green)
Boot Sequence
+3V3
R304 100k
RESET
C305 100n
VBUS_DET
HUB+5V
R305 100k
R306 100k
C306 100n
Scope GND Pad
BP203
Scope GND
Microchip AN 15.17 "PCB Layout Gide for USB Hubs"
DP/DM:
27mil, 0.7mm, trace
5mil, 0.127mm, space
50mil, 1.27mm, trace side no ground
Bypass Capacitors
+3V3
C301 100n
C302 100n
C303 100n
C304 100n
Place 1uF close to pin 44
Crystal
C307 18p
C308 18p
Y301 24MHz
XTALIN
XTALOUT
The MIT License (MIT)
Hans Märki, Märki Informatik
Sheet: /USB Hub Chip/
File: pcb_tentacle_usbhubchip.kicad_sch
Title: Octoprobe tentacle
Size: A4
Date: 2026-02-18
Rev: 0.7.1
KiCad E.D.A. 9.0.7
Id: 3/14



Sheet: /Relay Breakout/
File: pcb_tentacle_relay_breakout.kicad_sch

Title: Octoprobe tentacle

Size: A4	Date: 2026-02-18	**Rev: 0.7.1**
KiCad E.D.A. 9.0.7		Id: 5/14



Calculation of the input resistor

Vdiff = 3.3V – Vf = 3.3V– 1.2V = 2.1V
I_Fon = 5mA
R = 2.1V / 5mA = 420 Ohm

390 Ohm

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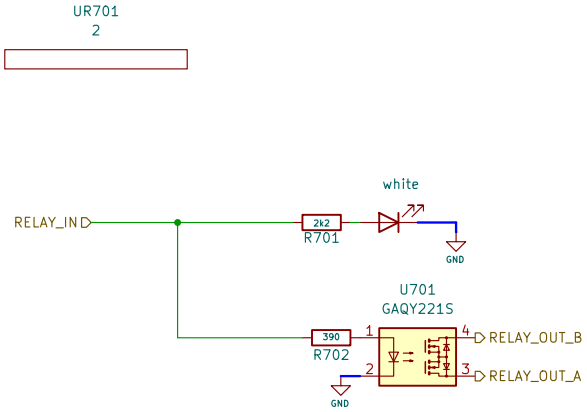
Sheet: /Relay Breakout/Relay 1/
File: pcb_tentacle_opto_relay.kicad_sch

Title: Octoprobe tentacle

Size: A4	Date: 2026-02-18	**Rev: 0.7.1**
KiCad E.D.A. 9.0.7		Id: 6/14



Calculation of the input resistor

Vdiff = 3.3V – Vf = 3.3V– 1.2V = 2.1V
I_Fon = 5mA
R = 2.1V / 5mA = 420 Ohm

390 Ohm

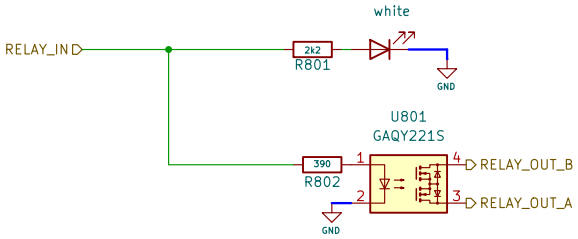
Hans Märki, Märki Informatik

Sheet: /Relay Breakout/Relay 2/
File: pcb_tentacle_opto_relay.kicad_sch

Title: Octoprobe tentacle

Size: A4	Date: 2026-02-18	**Rev: 0.7.1**
KiCad E.D.A. 9.0.7		Id: 7/14

UR801
3



Calculation of the input resistor

Vdiff = 3.3V – Vf = 3.3V– 1.2V = 2.1V
I_Fon = 5mA
R = 2.1V / 5mA = 420 Ohm

390 Ohm

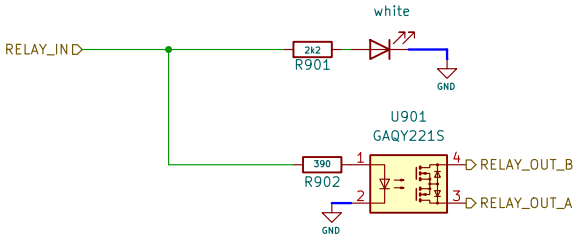
Hans Märki, Märki Informatik

Sheet: /Relay Breakout/Relay 3/
File: pcb_tentacle_opto_relay.kicad_sch

Title: Octoprobe tentacle

Size: A4	Date: 2026-02-18	**Rev: 0.7.1**
KiCad E.D.A. 9.0.7		Id: 8/14

UR901
4



Calculation of the input resistor

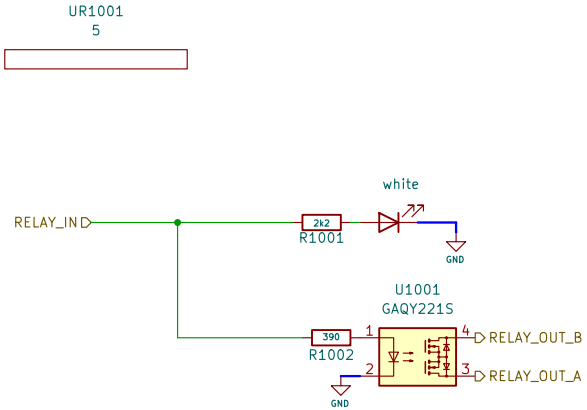
Vdiff = 3.3V – Vf = 3.3V– 1.2V = 2.1V
I_Fon = 5mA
R = 2.1V / 5mA = 420 Ohm

390 Ohm

Sheet: /Relay Breakout/Relay 4/
File: pcb_tentacle_opto_relay.kicad_sch

Title: Octoprobe tentacle

Size: A4	Date: 2026-02-18	**Rev: 0.7.1**
KiCad E.D.A. 9.0.7		Id: 9/14



Calculation of the input resistor

Vdiff = 3.3V – Vf = 3.3V– 1.2V = 2.1V
I_Fon = 5mA
R = 2.1V / 5mA = 420 Ohm

390 Ohm

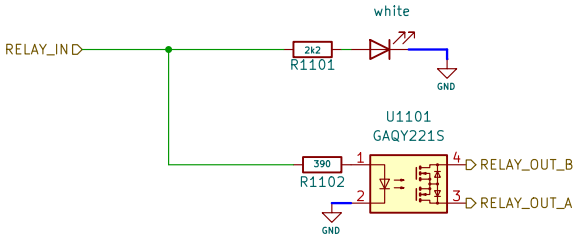
Hans Märki, Märki Informatik

Sheet: /Relay Breakout/Relay 5/
File: pcb_tentacle_opto_relay.kicad_sch

Title: Octoprobe tentacle

Size: A4	Date: 2026-02-18	**Rev: 0.7.1**
KiCad E.D.A. 9.0.7		Id: 10/14

UR1101
6



Calculation of the input resistor

Vdiff = 3.3V – Vf = 3.3V– 1.2V = 2.1V
I_Fon = 5mA
R = 2.1V / 5mA = 420 Ohm

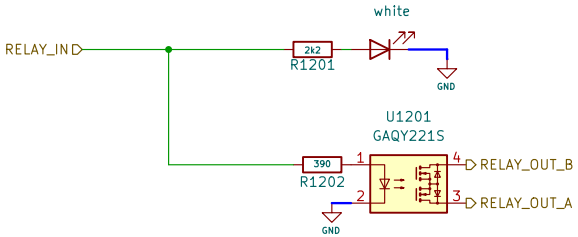
390 Ohm

Sheet: /Relay Breakout/Relay 6/
File: pcb_tentacle_opto_relay.kicad_sch

Title: Octoprobe tentacle

Size: A4	Date: 2026-02-18	**Rev: 0.7.1**
KiCad E.D.A. 9.0.7		Id: 11/14

UR1201
7



Calculation of the input resistor

Vdiff = 3.3V – Vf = 3.3V– 1.2V = 2.1V
I_Fon = 5mA
R = 2.1V / 5mA = 420 Ohm

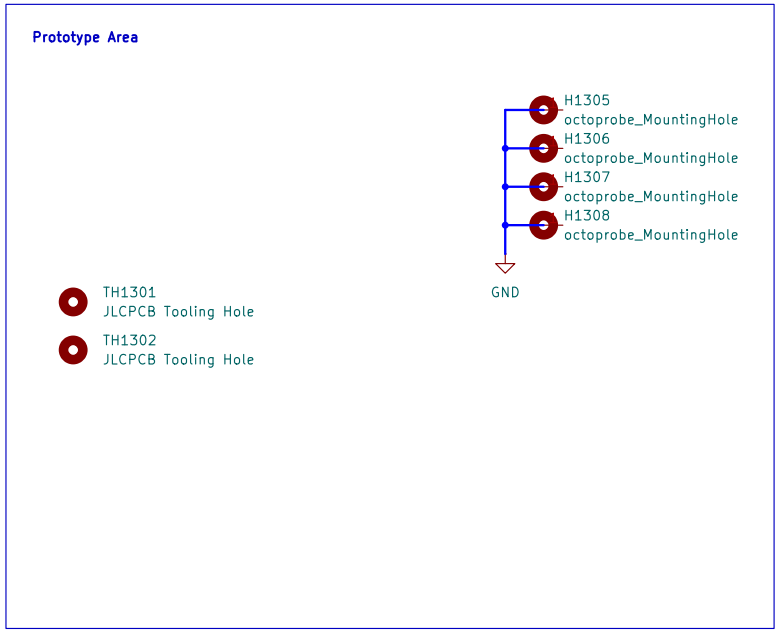
390 Ohm

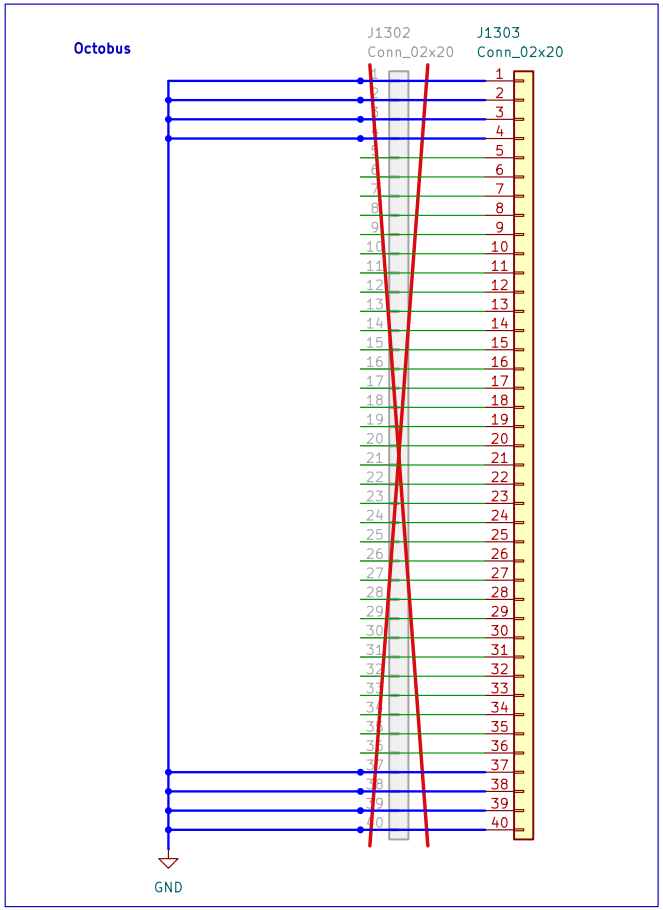
Hans Märki, Märki Informatik

Sheet: /Relay Breakout/Relay 7/
File: pcb_tentacle_opto_relay.kicad_sch

Title: Octoprobe tentacle

Size: A4	Date: 2026-02-18	**Rev: 0.7.1**
KiCad E.D.A. 9.0.7		Id: 12/14





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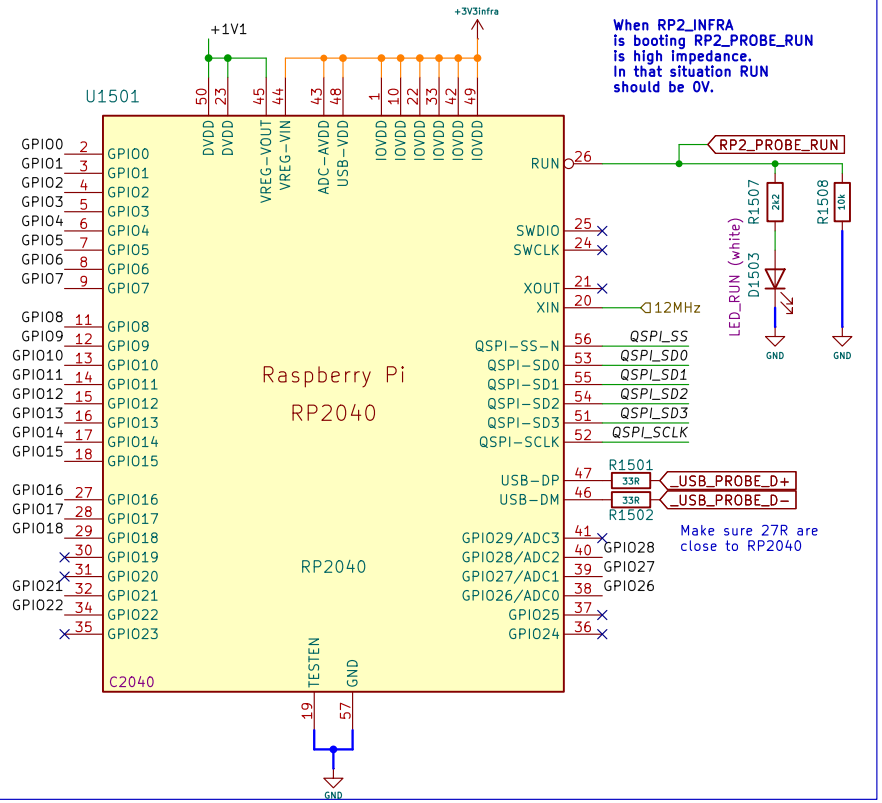
Sheet: /Prototype Area/
File: pcb_tentacle_prototype_area.kicad_sch

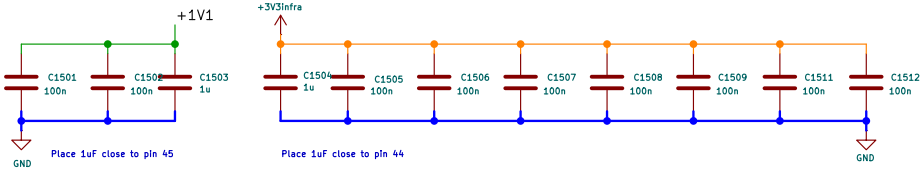
Title: Octoprobe tentacle

Size: A4	Date: 2026-02-18	**Rev: 0.7.1**
KiCad E.D.A. 9.0.7		Id: 13/14

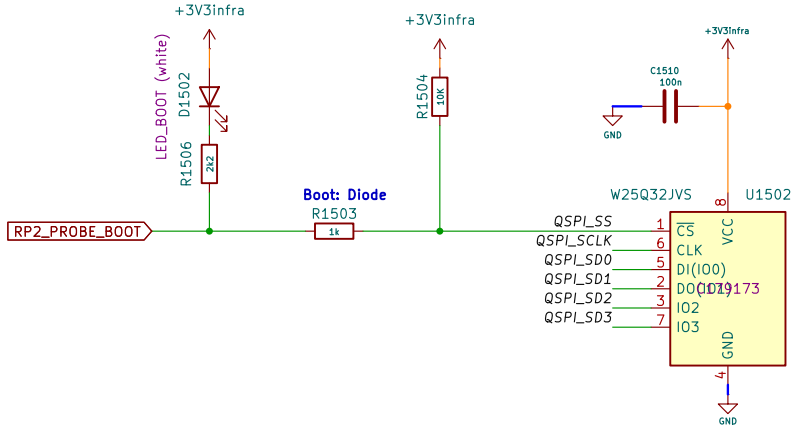
RP2040

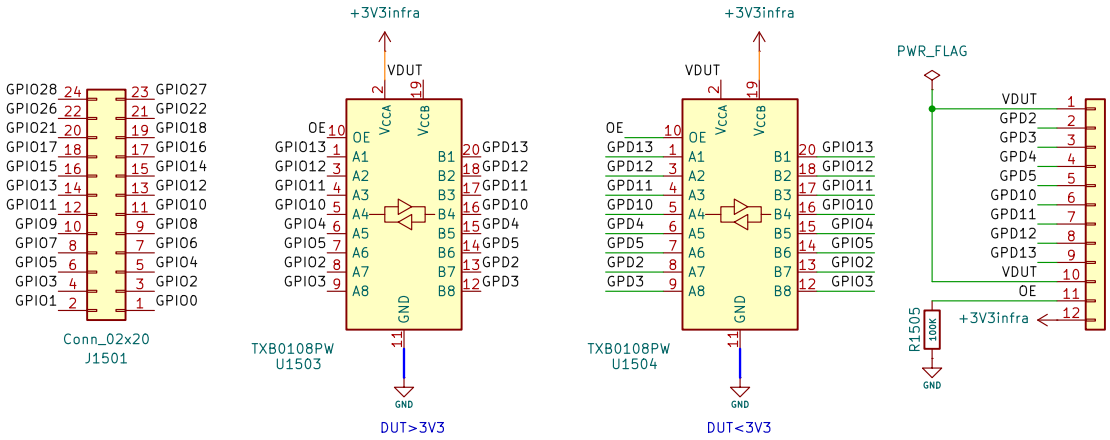


Bypass Capacitors



Flash Memory





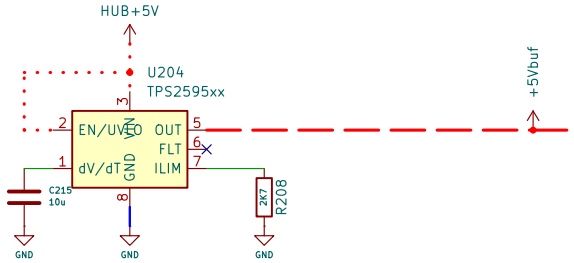
Hans Märki, Märki Informatik

Sheet: /RP2 PROBE/
File: pcb_tentacle_probe.kicad_sch

Title: Octoprobe tentacle

Size: A4	Date: 2026-02-18	**Rev: 0.7.1**
KiCad E.D.A. 9.0.7		Id: 15/14

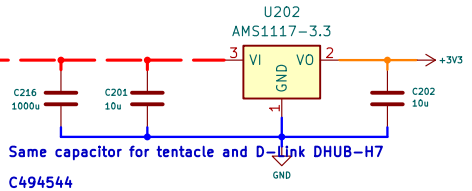
Current Limiter 5V



Datasheet "Active Current Limiting":
Goal: 800mA
Rilm = 2000/(0.8A−0.04) = R2K630, choosen: R2K7

Datasheet "Slew Rate and Inrush Current Control":
Goal: 5V/1000ms
C = 42000/V*ms = 6'363'636pF = 6uF, choosen: 10uF

Regulator 3V3

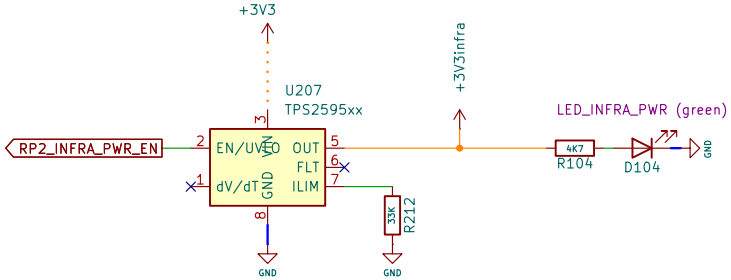


Same capacitor for tentacle and D-Link DHUB-H7

C494544

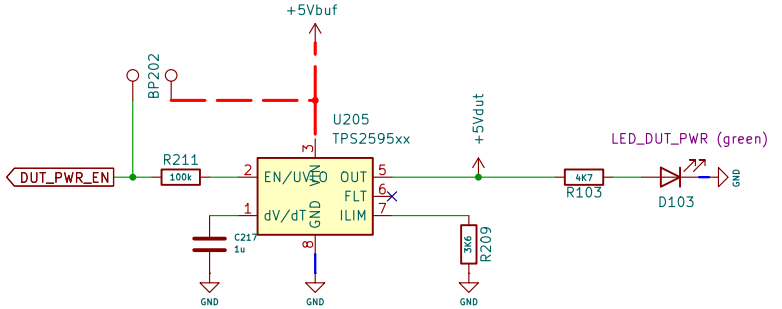
2.5mm distance between wires
6.3mm diameter
11mm height

POWER RP Infra



Datasheet "Active Current Limiting":
Goal: 100mA
Rilm = 2000/(0.1A−0.04) = R33K333, choosen: R33K

Current Limiter 3V3 DUT



Datasheet "Active Current Limiting":
Goal: 600mA
Rilm = 2000/(0.8A−0.04) = R3K571, choosen: R3K6

Datasheet "Slew Rate and Inrush Current Control":
Goal: 3V3/100ms
C = 42000/V*ms = 1'272'272pF, choosen: 1uF

Sheet: /Regulator 3V3/		
File: pcb_tentacle_regulator3V3.kicad_sch		
Title:		
Size: A4	Date:	**Rev:**
KiCad E.D.A. 9.0.7		Id: 16/14