

HALPI2 is licensed under CERN-OHL-S v2.
To view a copy of this license, visit
https://ohwr.org/cern_ohl_s_v2.pdf

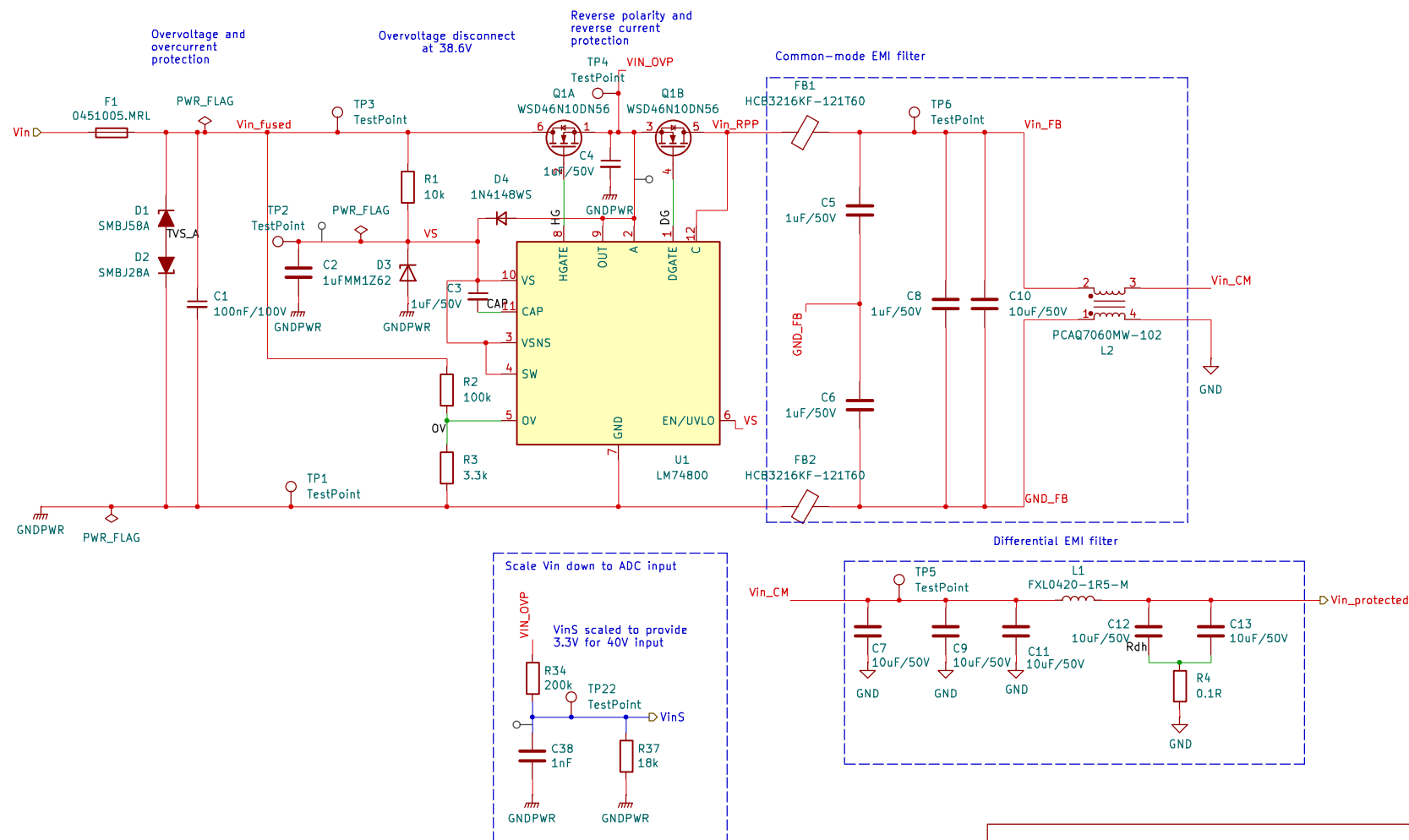
Hat Labs Oy

Sheet: /Power/
File: Power.kicad_sch

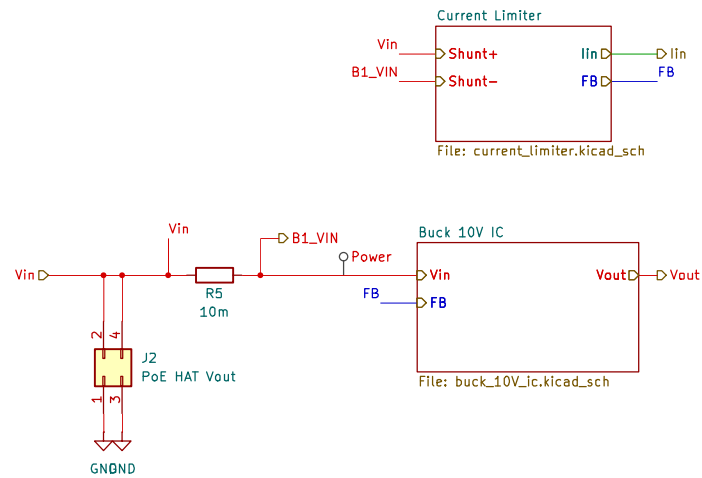
Title: HALPI2

Size: A4 Date: 2025-12-20
KiCad E.D.A. 9.0.6

Rev: v0.6.1
Id: 2/38



Rev: v0.6.1
Id: 3/38



HALPI2 is licensed under CERN-OHL-S v2.
To view a copy of this license, visit
https://ohwr.org/cern_ohl_s_v2.pdf

Hat Labs Oy

Sheet: /Power/Buck converter 10V/
File: buck_10V.kicad_sch

Title: HALPI2

Size: A4

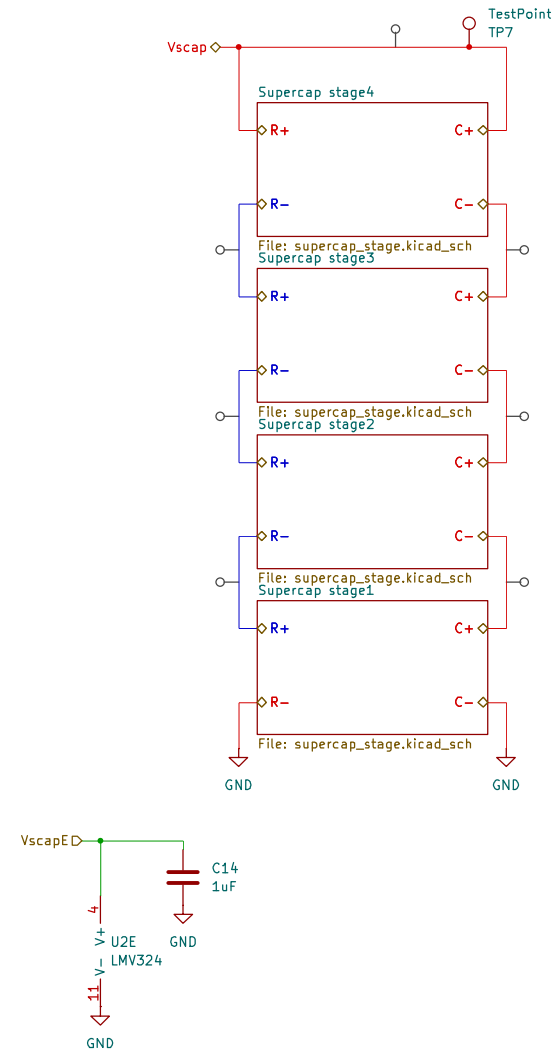
Date: 2025-12-20

Rev: v0.6.1

KiCad E.D.A. 9.0.6

Id: 4/38

Supercapacitor balancing circuit modeled after
<https://www.eevblog.com/forum/renewable-energy/supercapacitor-balancer/>



HALPI2 is licensed under CERN-OHL-S v2.
 To view a copy of this license, visit
https://ohwr.org/cern_ohl_s_v2.pdf

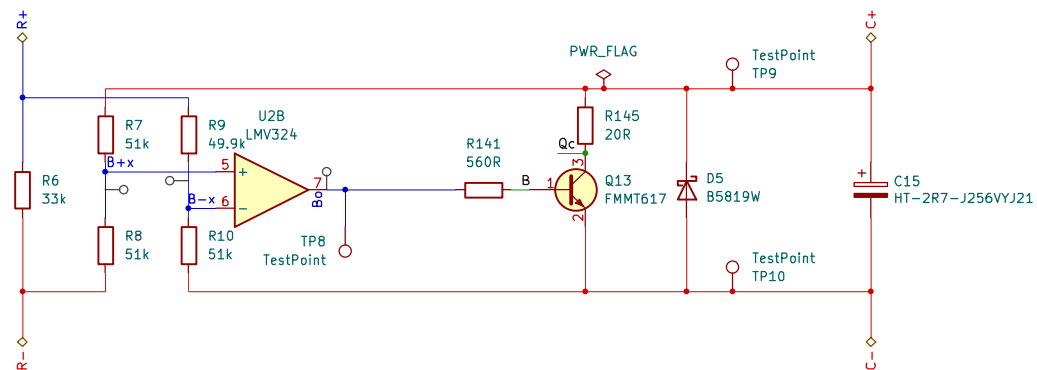
Hat Labs Oy

Sheet: /Power/Supercaps/
 File: supercap.kicad_sch

Title: HALPI2

Size: A4 Date: 2025-12-20
 KiCad E.D.A. 9.0.6

Rev: v0.6.1
 Id: 5/38



HALPI2 is licensed under CERN-OHL-S v2.
To view a copy of this license, visit
https://ohwr.org/cern_ohl_s_v2.pdf

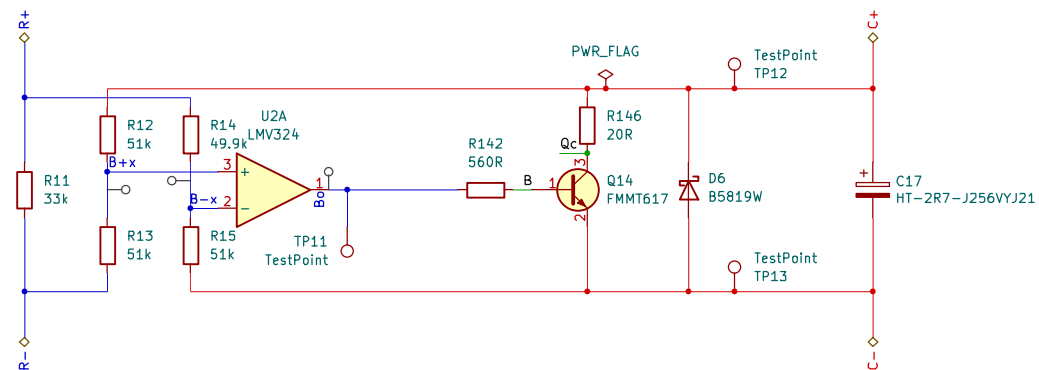
Hat Labs Oy

Sheet: /Power/Supercaps/Supercap stage1/
File: supercap_stage.kicad_sch

Title: HALPI2

Size: A4 Date: 2025-12-20
KiCad E.D.A. 9.0.6

Rev: v0.6.1
Id: 6/38



HALPI2 is licensed under CERN-OHL-S v2.
To view a copy of this license, visit
https://ohwr.org/cern_ohl_s_v2.pdf

Hat Labs Oy

Sheet: /Power/Supercaps/Supercap stage2/
File: supercap_stage.kicad_sch

Title: HALPI2

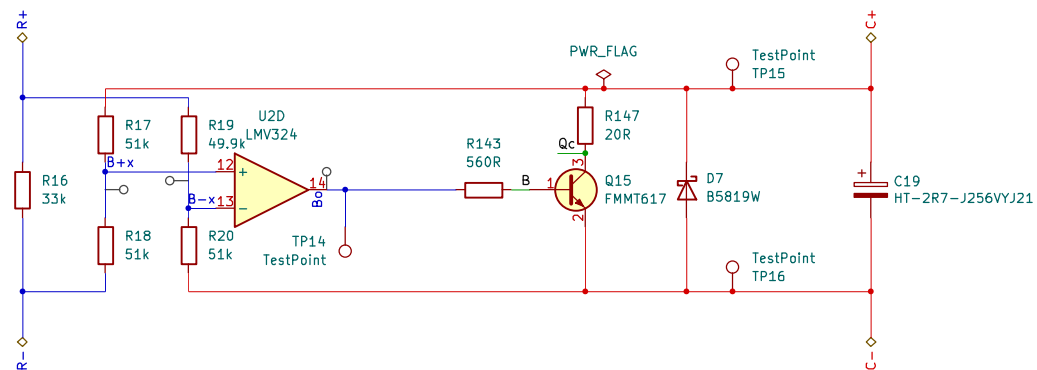
Size: A4

Date: 2025-12-20

Rev: v0.6.1

KiCad E.D.A. 9.0.6

Id: 7/38



HALPI2 is licensed under CERN-OHL-S v2.
To view a copy of this license, visit
https://ohwr.org/cern_ohl_s_v2.pdf

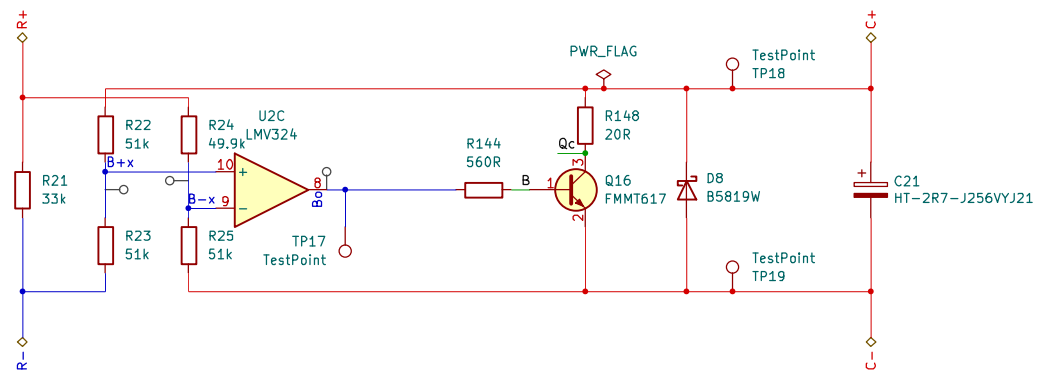
Hat Labs Oy

Sheet: /Power/Supercaps/Supercap stage3/
File: supercap_stage.kicad_sch

Title: HALPI2

Size: A4 Date: 2025-12-20
KiCad E.D.A. 9.0.6

Rev: v0.6.1
Id: 8/38



HALPI2 is licensed under CERN-OHL-S v2.
To view a copy of this license, visit
https://ohwr.org/cern_ohl_s_v2.pdf

Hat Labs Oy

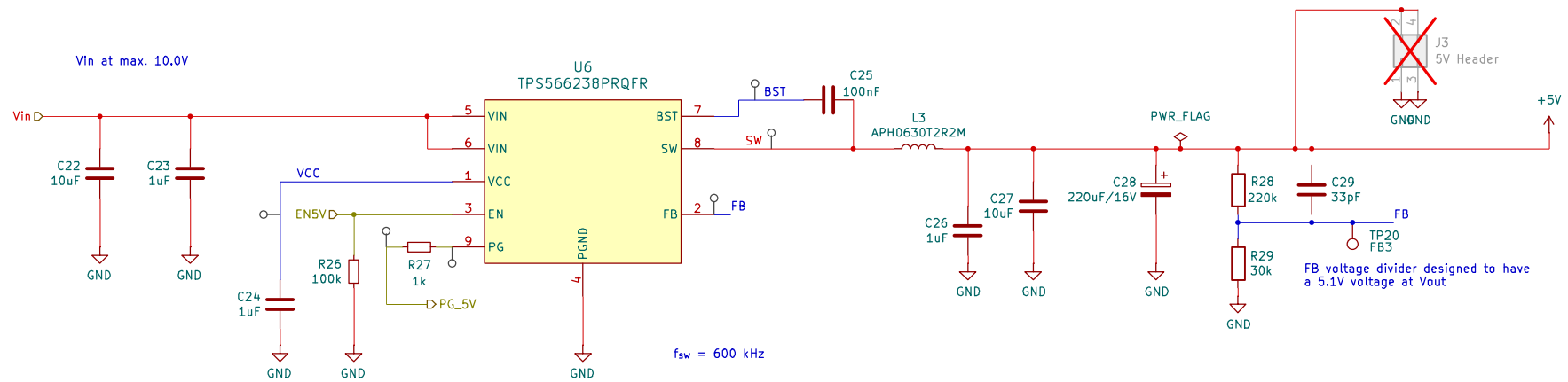
Sheet: /Power/Supercaps/Supercap stage4/
File: supercap_stage.kicad_sch

Title: HALPI2

Size: A4 Date: 2025-12-20
KiCad E.D.A. 9.0.6

Rev: v0.6.1
Id: 9/38

Buck converter dropping the supercap voltage
down to 5V for the CM4/5 module input and
USBs



HALPI2 is licensed under CERN-OHL-S v2.
To view a copy of this license, visit
https://ohwr.org/cern_ohl_s_v2.pdf

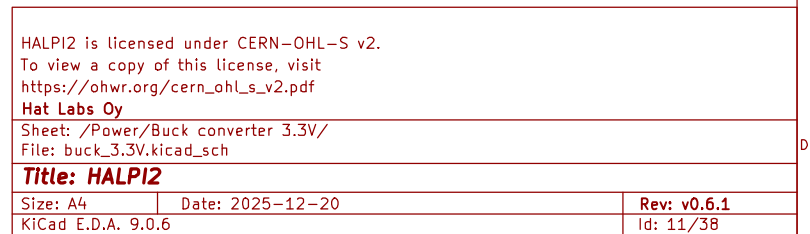
Hat Labs Oy

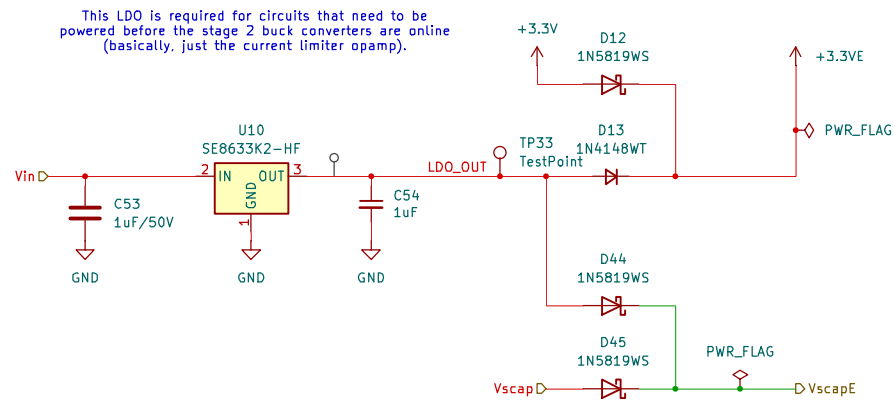
Sheet: /Power/Buck converter 5V/
File: buck_5V.kicad_sch

Title: HALPI2

Size: A4 Date: 2025-12-20
KiCad E.D.A. 9.0.6

Rev: v0.6.1
Id: 10/38





VscapE is used to ensure the supercap balancing circuit op-amps are powered immediately.

During undervoltage, TTL op-amps may be at a high state, causing all balancing NPNs to conduct before voltage is increased.

HALPI2 is licensed under CERN-OHL-S v2.
To view a copy of this license, visit
https://ohwr.org/cern_ohl_s_v2.pdf

Hat Labs Oy

Sheet: /Power/Early 3.3V/
File: early_3v3.kicad_sch

Title: HALPI2

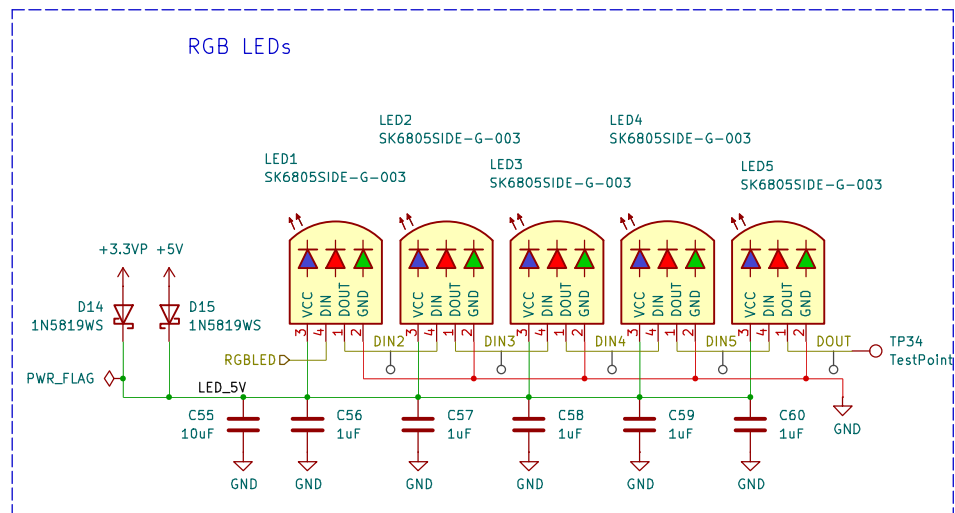
Size: A4

Date: 2025-12-20

Rev: v0.6.1

KiCad E.D.A. 9.0.6

Id: 13/38



HALPI2 is licensed under CERN-OHL-S v2.
To view a copy of this license, visit
https://ohwr.org/cern_ohl_s_v2.pdf

Hat Labs Oy

Sheet: /Controller/RGB LEDs/
File: rgb_leds.kicad_sch

Title: HALPI2

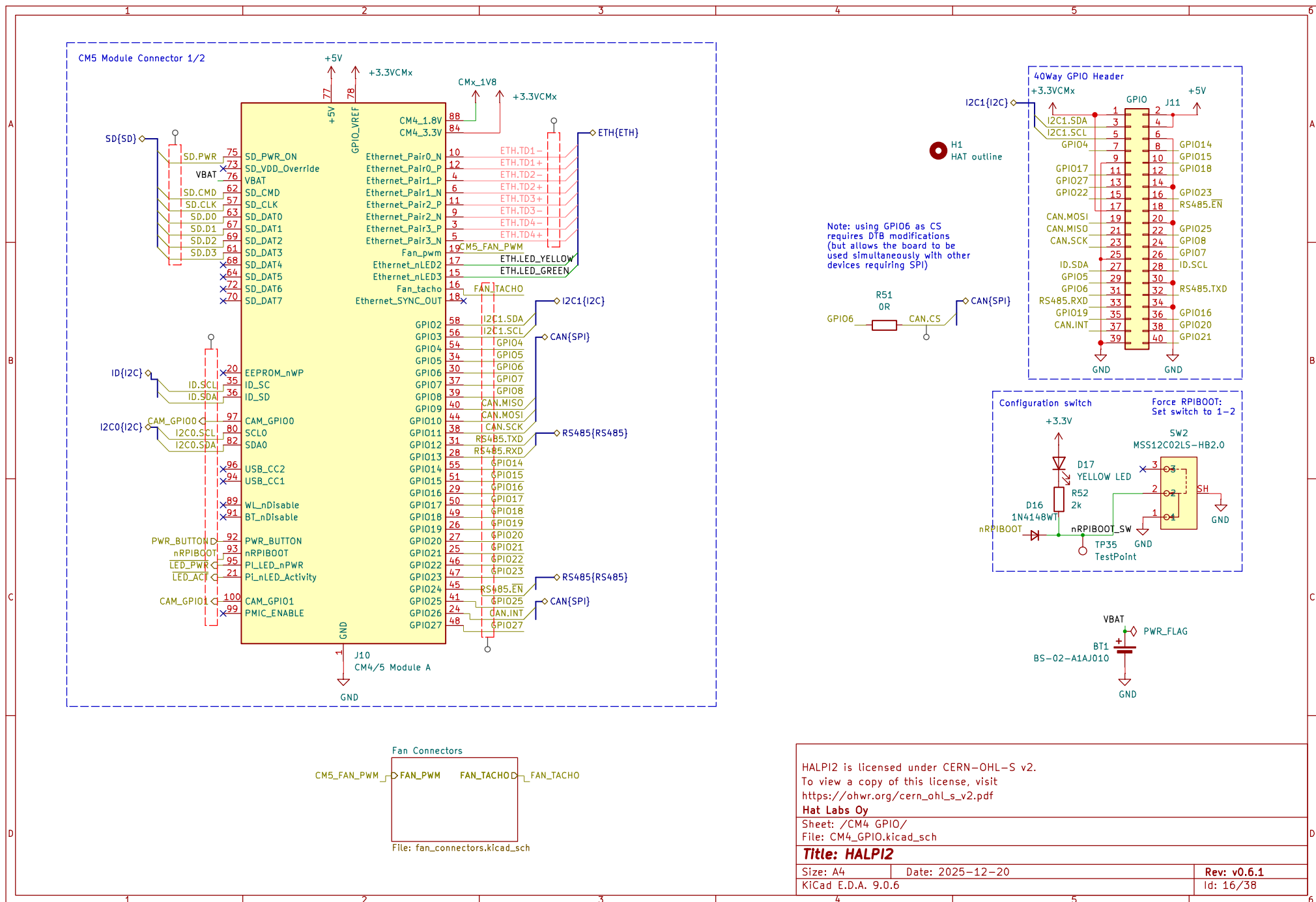
Size: A4

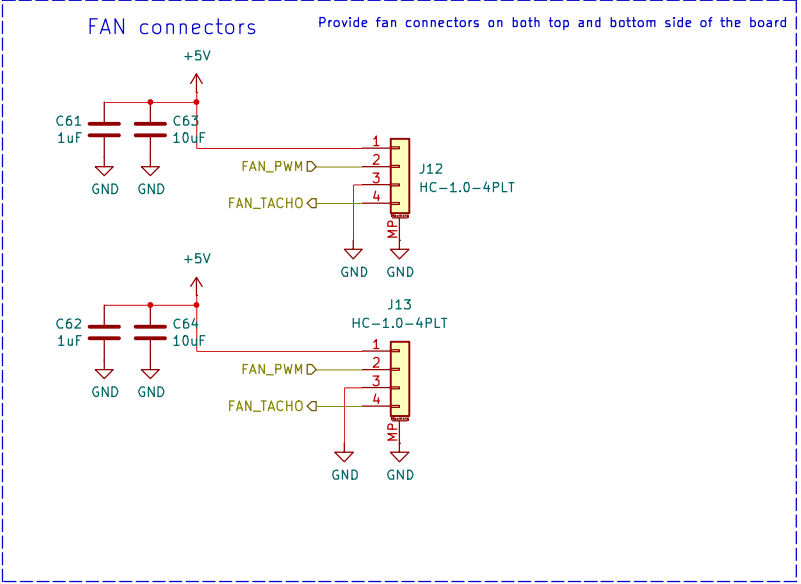
Date: 2025-12-20

Rev: v0.6.1

KiCad E.D.A. 9.0.6

Id: 14/38





HALPI2 is licensed under CERN-OHL-S v2.
To view a copy of this license, visit
https://ohwr.org/cern_ohl_s_v2.pdf

Hat Labs Oy

Sheet: /CM4 GPIO/Fan Connectors/
File: fan_connectors.kicad_sch

Title: HALPI2

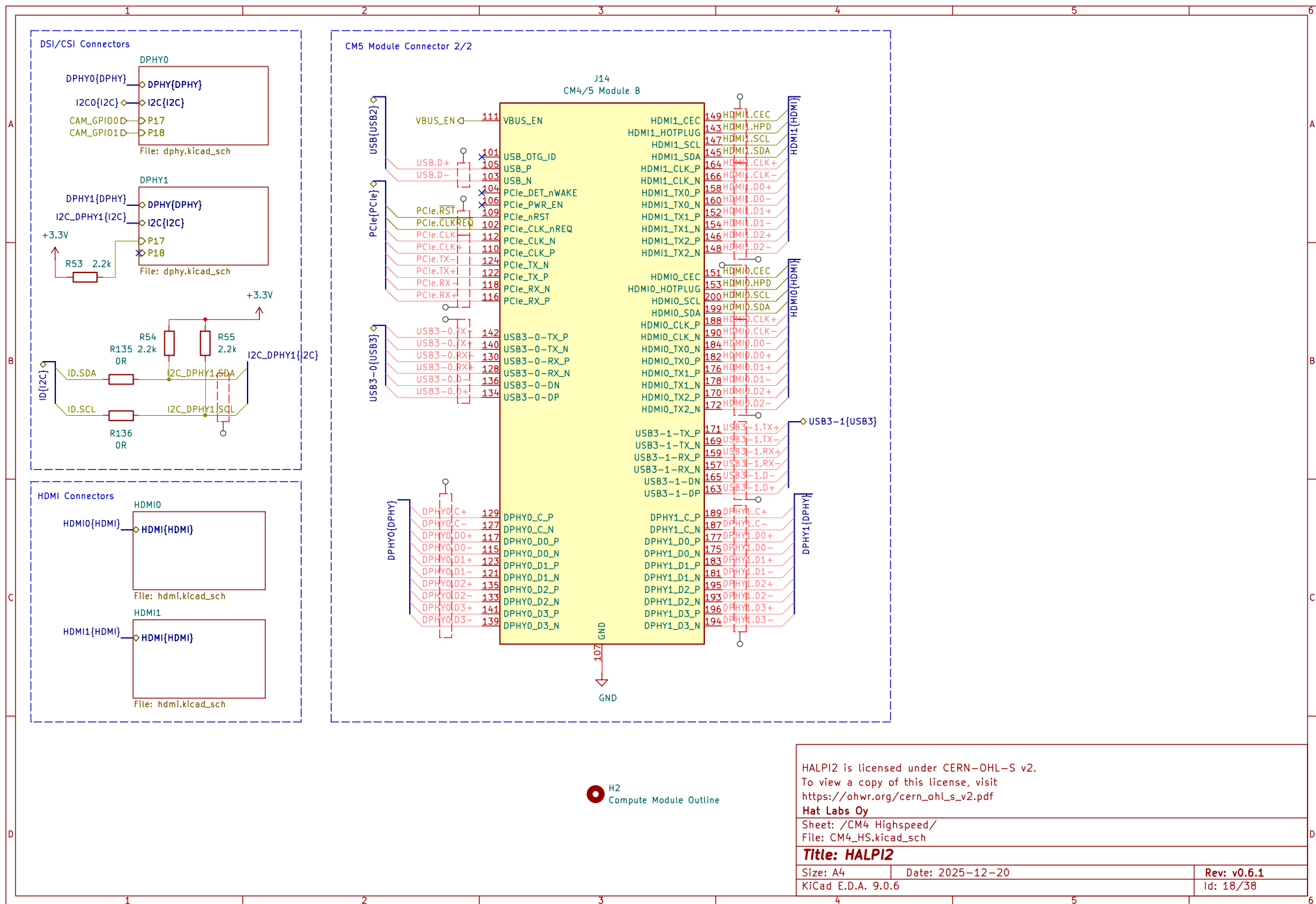
Size: A4

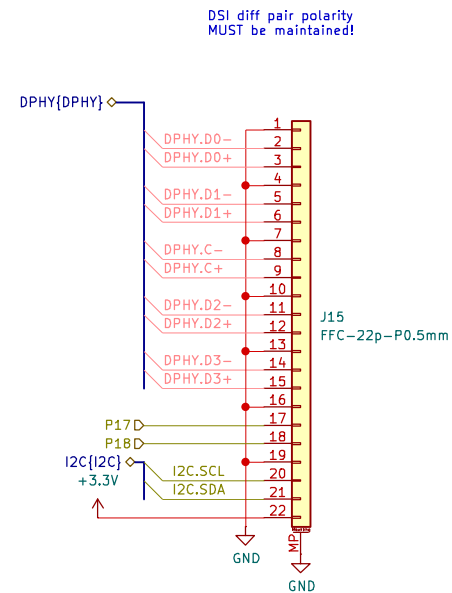
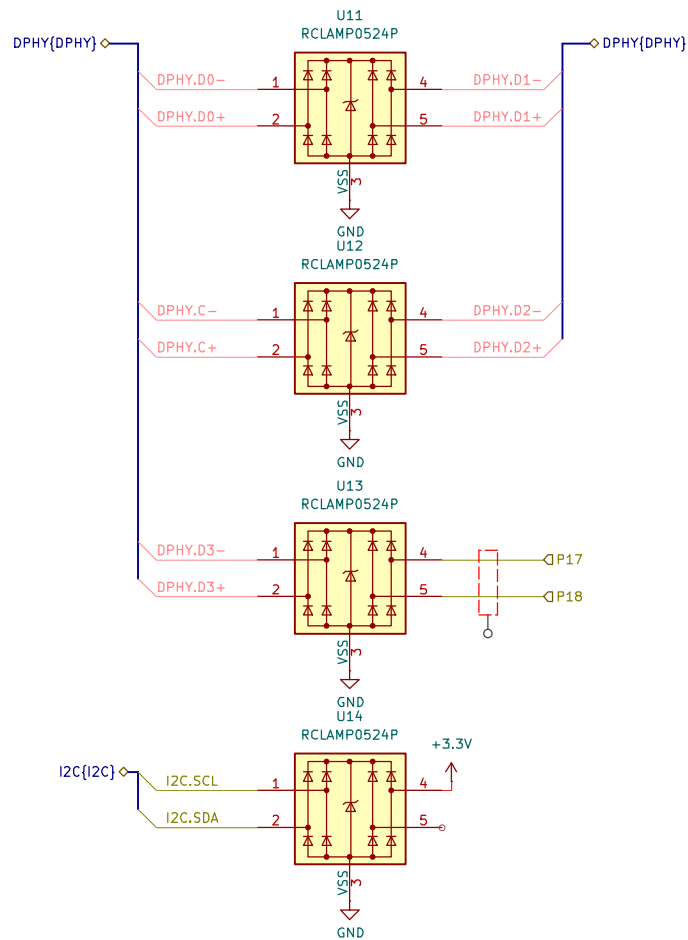
Date: 2025-12-20

Rev: v0.6.1

KiCad E.D.A. 9.0.6

Id: 17/38





HALPI2 is licensed under CERN-OHL-S v2.
To view a copy of this license, visit
https://ohwr.org/cern_ohl_s_v2.pdf

Hat Labs Oy

Sheet: /CM4 Highspeed/DPHY0/

File: dphy.kicad_sch

Title: HALPI2

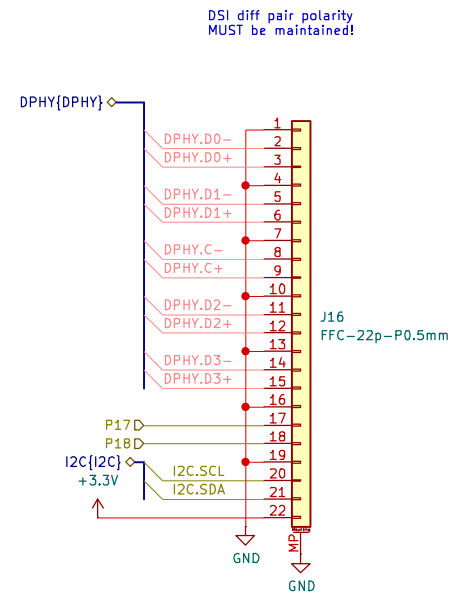
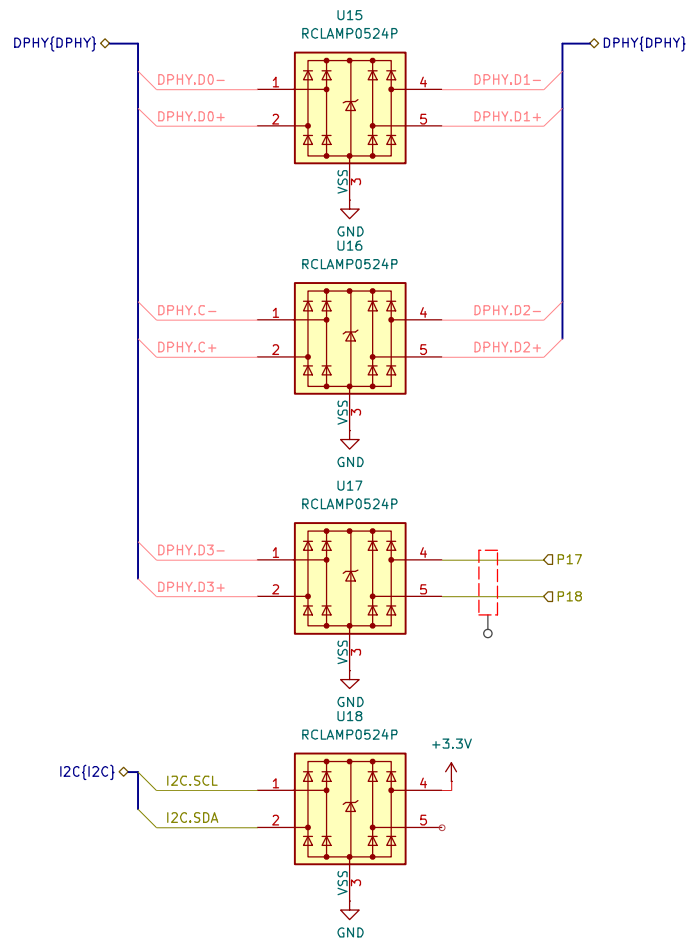
Size: A4

Date: 2025-12-20

Rev: v0.6.1

KiCad E.D.A. 9.0.6

Id: 19/38



HALPI2 is licensed under CERN-OHL-S v2.
To view a copy of this license, visit
https://ohwr.org/cern_ohl_s_v2.pdf

Hat Labs Oy

Sheet: /CM4 Highspeed/DPHY1/

File: dphy.kicad_sch

Title: HALPI2

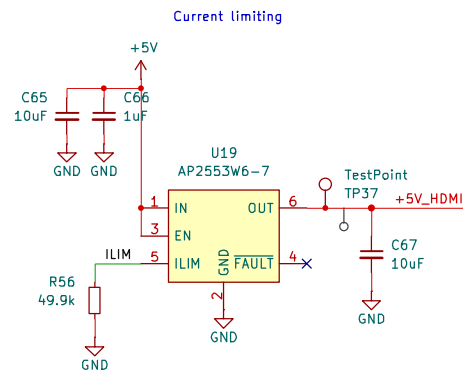
Size: A4

Date: 2025-12-20

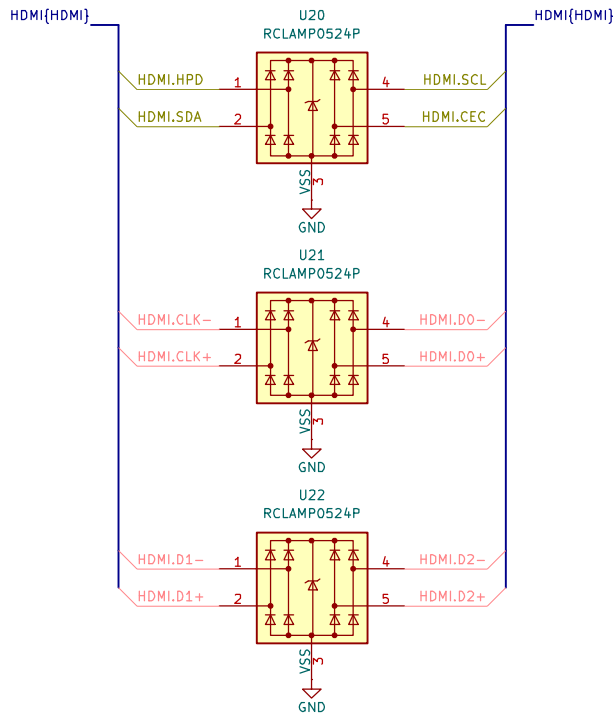
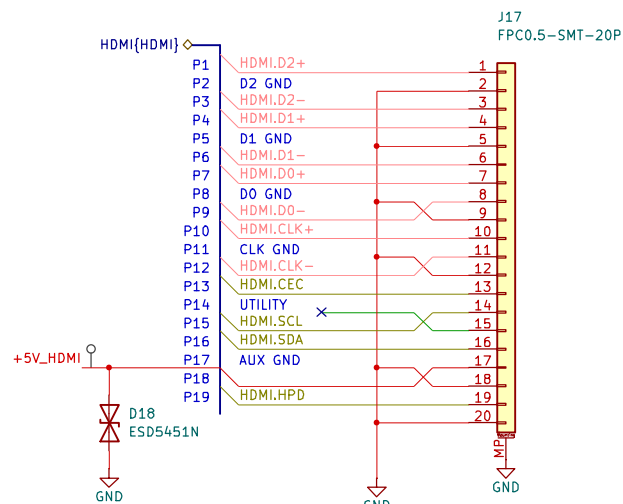
Rev: v0.6.1

KiCad E.D.A. 9.0.6

Id: 20/38



HDMI diff pair polarity
MUST be maintained.



Circuit Diagram / 电路图

C1	C2	C1	C2
1	1	11	12
2	2	12	11
3	3	13	13
4	4	14	15
5	5	15	14
6	6	16	16
7	7	17	18
8	8	18	17
9	8	19	19
10	10	Shell	20

HALPI2 is licensed under CERN-OHL-S v2.
To view a copy of this license, visit
https://ohwr.org/cern_ohl_s_v2.pdf

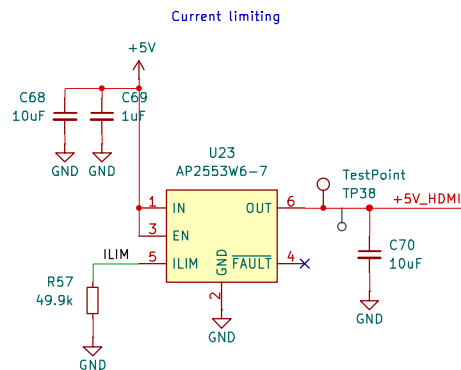
Hat Labs Oy

Sheet: /CM4 Highspeed/HDMI0/
File: hdmi.kicad_sch

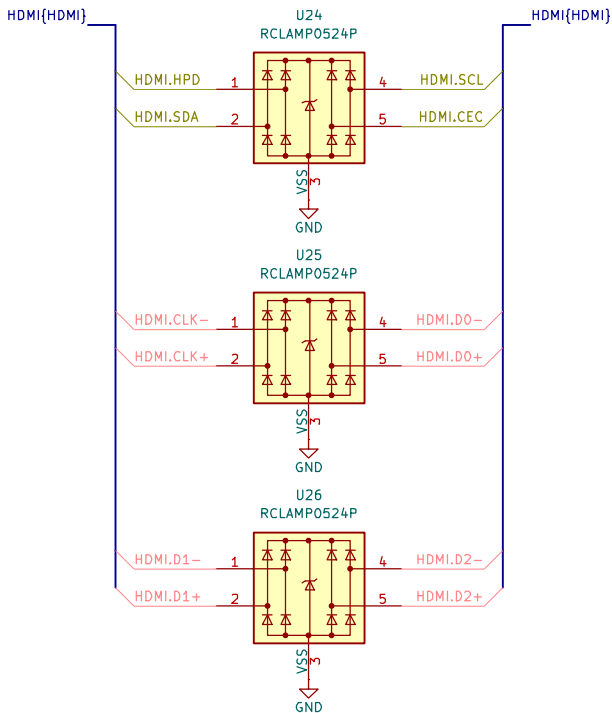
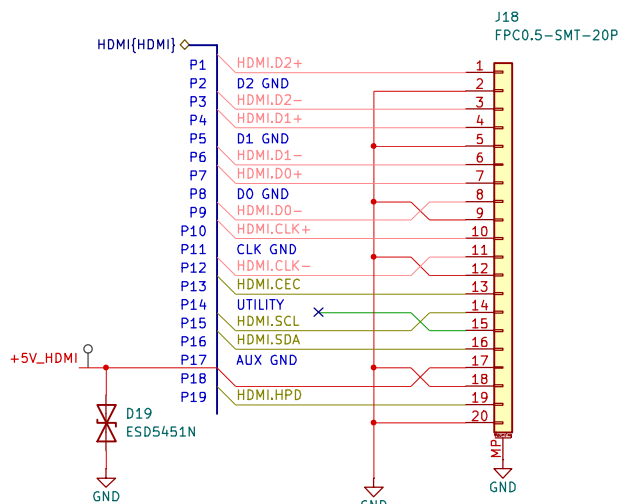
Title: HALPI2

Size: A4 Date: 2025-12-20
KiCad E.D.A. 9.0.6

Rev: v0.6.1
Id: 21/38



HDMI diff pair polarity
MUST be maintained.



Circuit Diagram / 电路图

C1	C2	C1	C2
1	1	11	12
2	2	12	11
3	3	13	13
4	4	14	15
5	5	15	14
6	6	16	16
7	7	17	18
8	8	18	17
9	9	19	19
10	10	Shell	20

HALPI2 is licensed under CERN-OHL-S v2.
To view a copy of this license, visit
https://ohwr.org/cern_ohl_s_v2.pdf

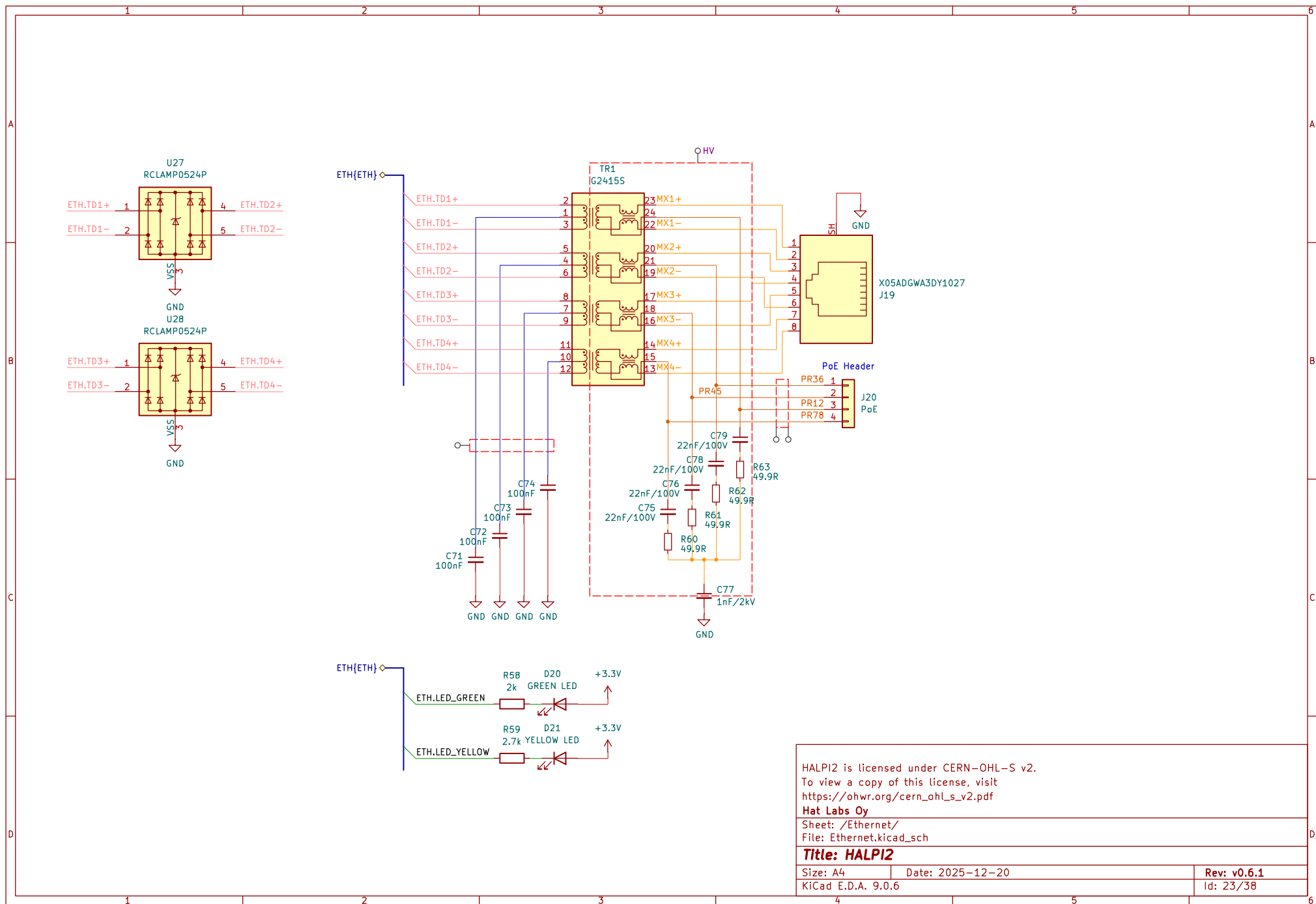
Hat Labs Oy

Sheet: /CM4 Highspeed/HDMI1/
File: hdmi.kicad_sch

Title: HALPI2

Size: A4 Date: 2025-12-20
KiCad E.D.A. 9.0.6

Rev: v0.6.1
Id: 22/38



HALPI2 is licensed under CERN-OHL-S v2.
To view a copy of this license, visit
https://ohwr.org/cern_ohl_s_v2.pdf

Hat Labs Oy

Sheet: /Ethernet/

File: Ethernet.kicad_sch

Title: HALPI2

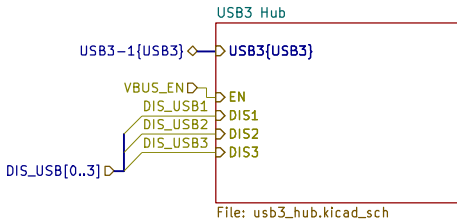
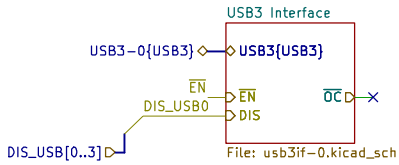
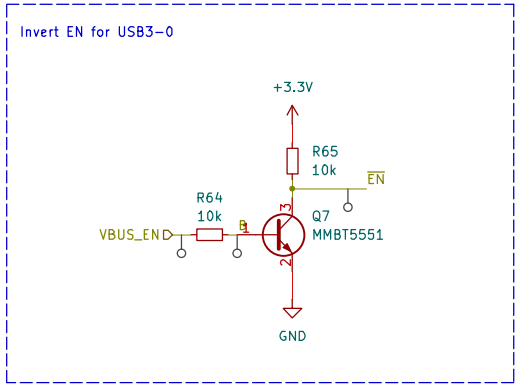
Size: A4

Date: 2025-12-20

Rev: v0.6.1

KiCad E.D.A. 9.0.6

Id: 23/38



HALPI2 is licensed under CERN-OHL-S v2.
To view a copy of this license, visit
https://ohwr.org/cern_ohl_s_v2.pdf

Hat Labs Oy

Sheet: /USB3/

File: USB3.kicad_sch

Title: HALPI2

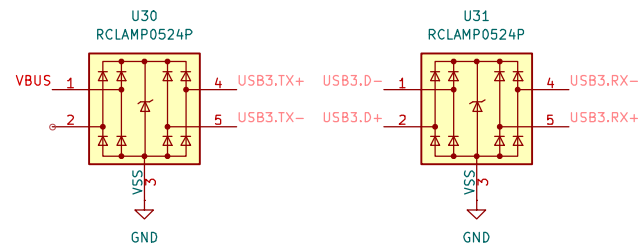
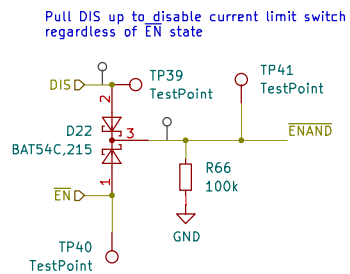
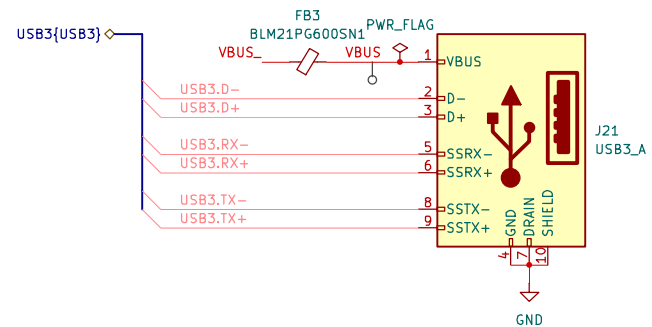
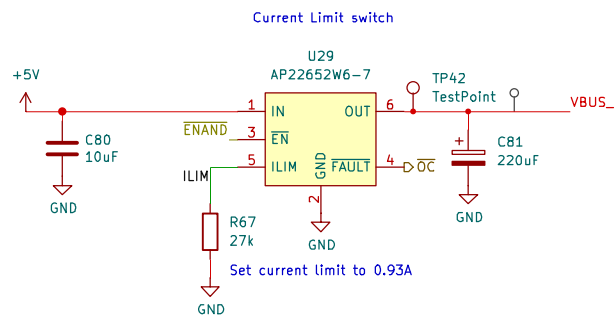
Size: A4

Date: 2025-12-20

Rev: v0.6.1

KiCad E.D.A. 9.0.6

Id: 24/38



HALPI2 is licensed under CERN-OHL-S v2.
To view a copy of this license, visit
https://ohwr.org/cern_ohl_s_v2.pdf

Hat Labs Oy

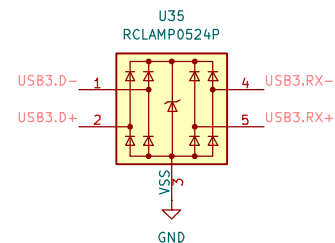
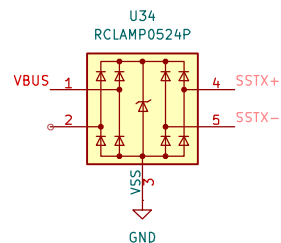
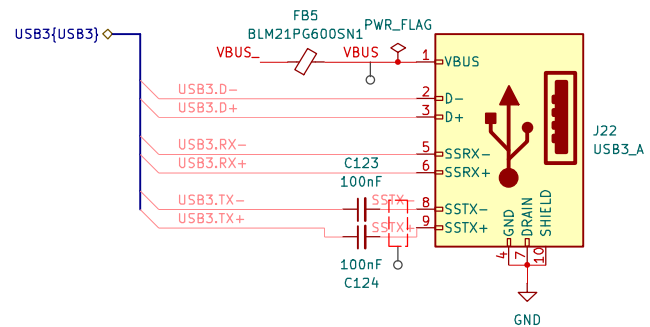
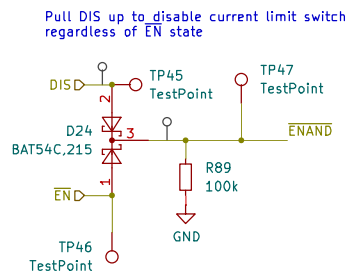
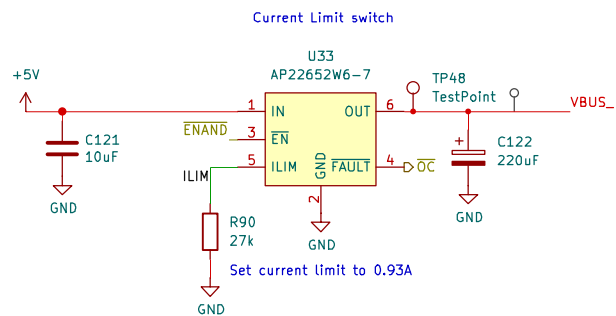
Sheet: /USB3/USB3 Interface/
File: usb3if-0.kicad_sch

Title: HALPI2

Size: A4
KiCad E.D.A. 9.0.6

Date: 2025-12-20

Rev: v0.6.1
Id: 25/38



HALPI2 is licensed under CERN-OHL-S v2.
To view a copy of this license, visit
https://ohwr.org/cern_ohl_s_v2.pdf

Hat Labs Oy

Sheet: /USB3/USB3 Hub/USB3 Interface1/

File: usb3if.kicad_sch

Title: HALPI2

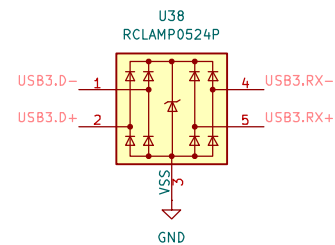
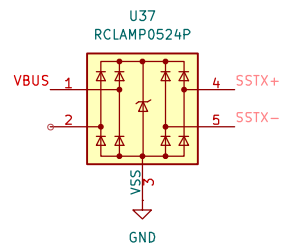
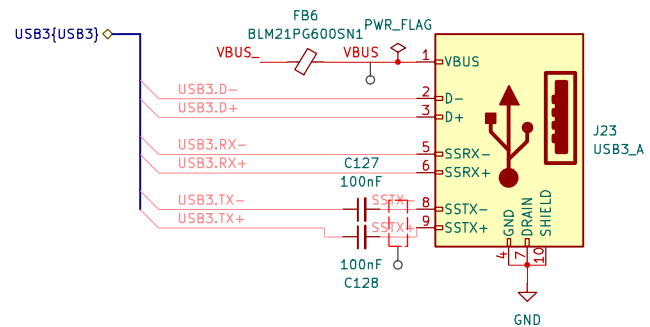
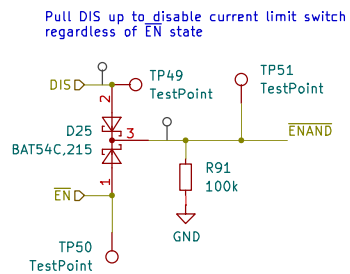
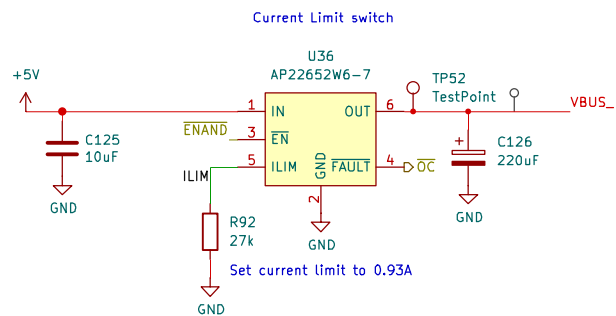
Size: A4

Date: 2025-12-20

Rev: v0.6.1

KiCad E.D.A. 9.0.6

Id: 27/38



HALPI2 is licensed under CERN-OHL-S v2.
To view a copy of this license, visit
https://ohwr.org/cern_ohl_s_v2.pdf

Hat Labs Oy

Sheet: /USB3/USB3 Hub/USB3 Interface2/

File: usb3if.kicad_sch

Title: HALPI2

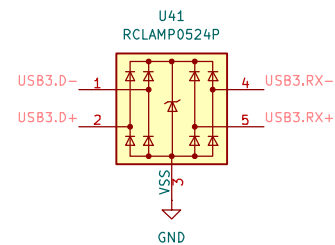
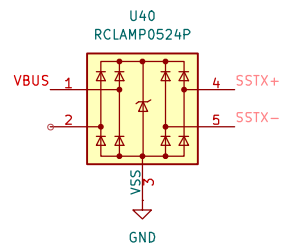
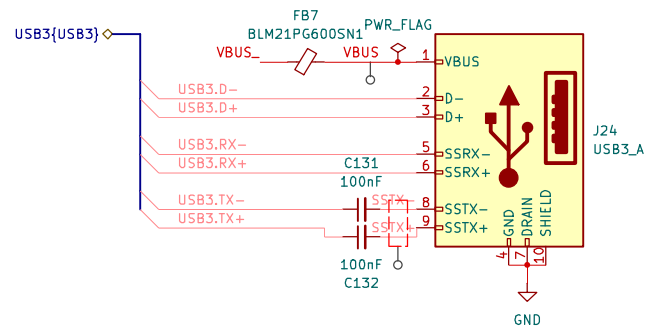
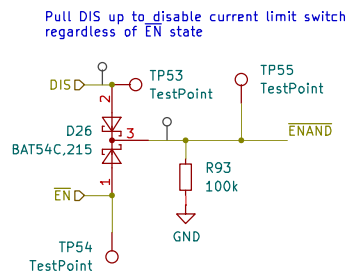
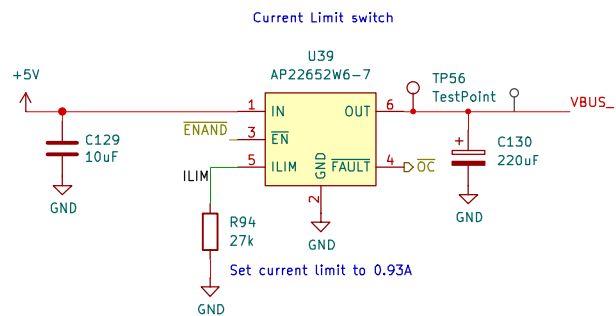
Size: A4

Date: 2025-12-20

Rev: v0.6.1

KiCad E.D.A. 9.0.6

Id: 28/38



HALPI2 is licensed under CERN-OHL-S v2.
To view a copy of this license, visit
https://ohwr.org/cern_ohl_s_v2.pdf

Hat Labs Oy

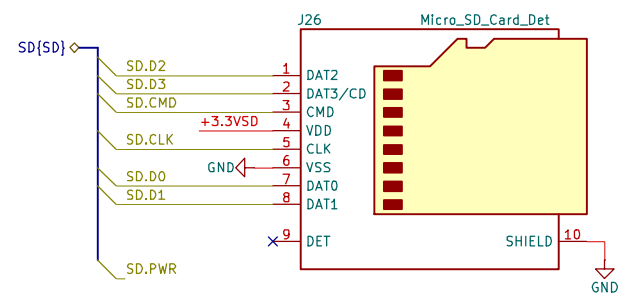
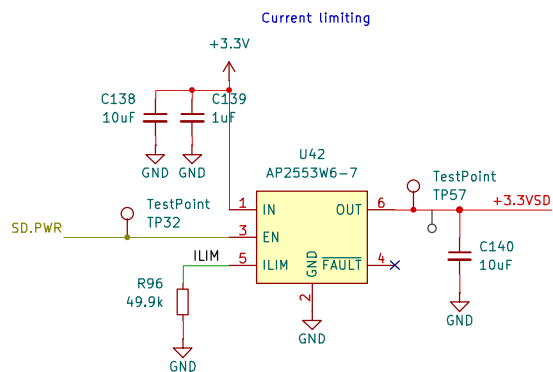
Sheet: /USB3/USB3 Hub/USB3 Interface3/
File: usb3if.kicad_sch

Title: HALPI2

Size: A4
KiCad E.D.A. 9.0.6

Date: 2025-12-20

Rev: v0.6.1
Id: 29/38



HALPI2 is licensed under CERN-OHL-S v2.
To view a copy of this license, visit
https://ohwr.org/cern_ohl_s_v2.pdf

Hat Labs Oy

Sheet: /SDCard/

File: SDCard.kicad_sch

Title: HALPI2

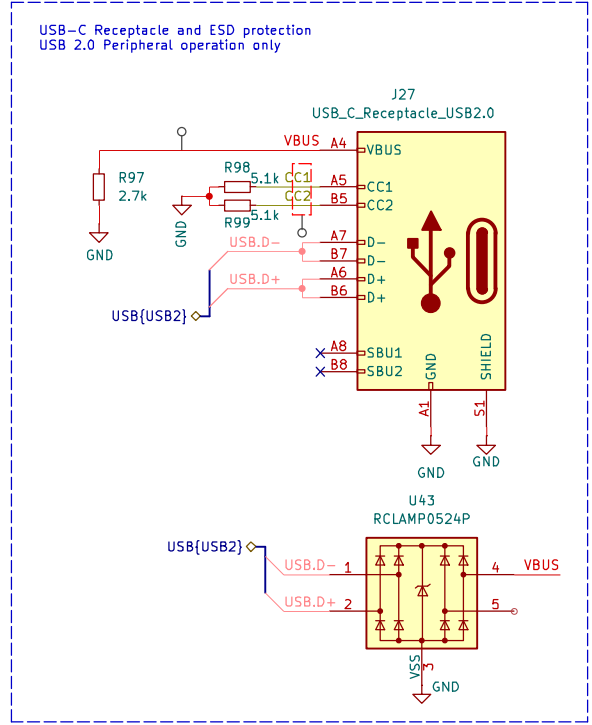
Size: A4

Date: 2025-12-20

Rev: v0.6.1

KiCad E.D.A. 9.0.6

Id: 31/38



HALPI2 is licensed under CERN-OHL-S v2.
To view a copy of this license, visit
https://ohwr.org/cern_ohl_s_v2.pdf

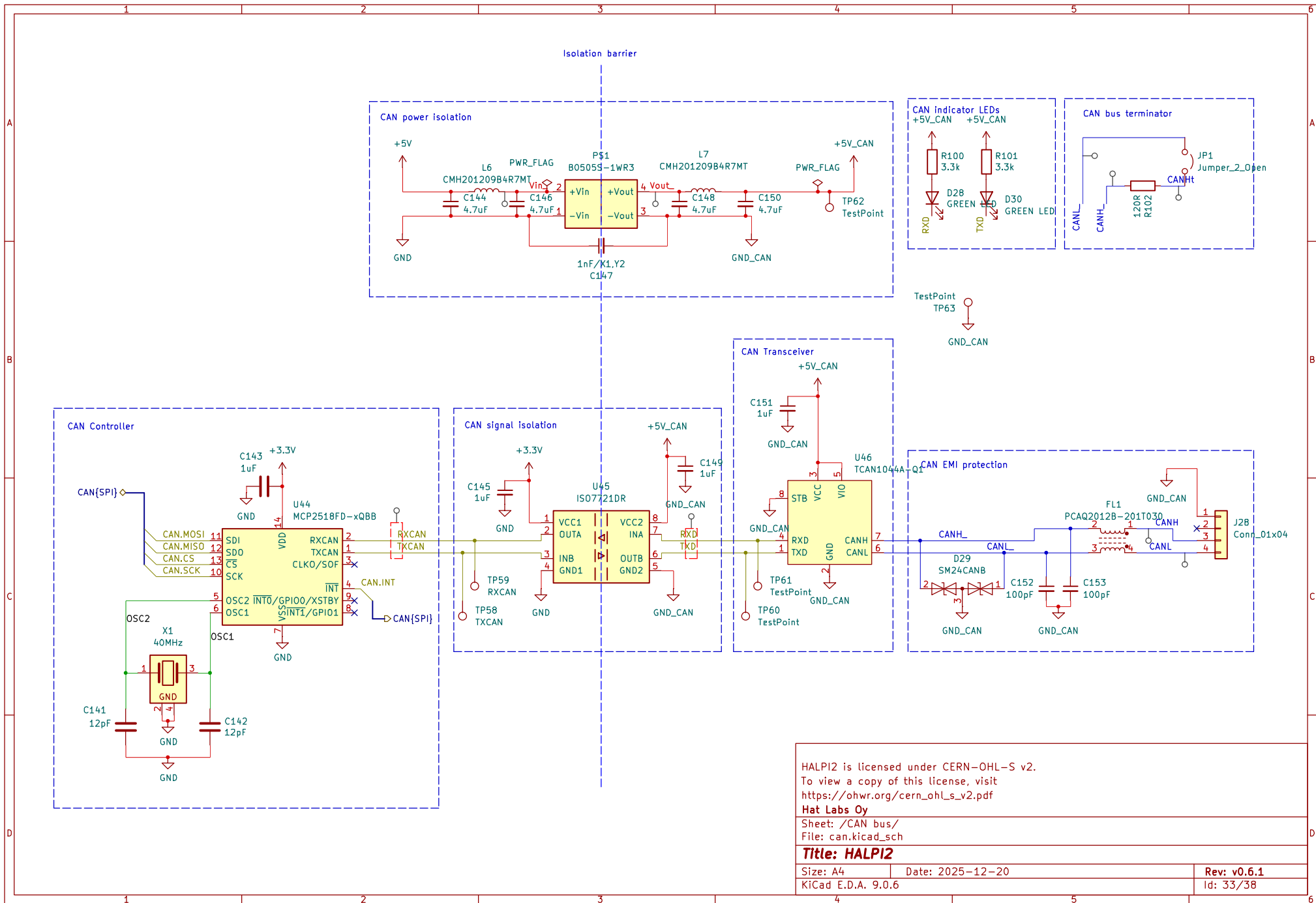
Hat Labs Oy

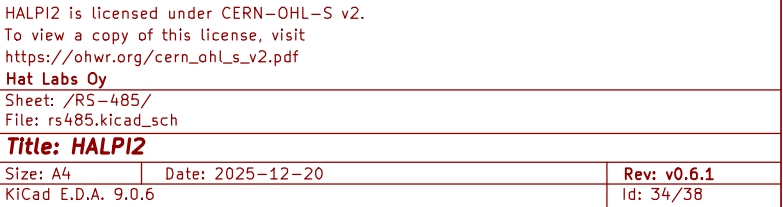
Sheet: /USB 2.0 Peripheral Interface/
File: USB2.kicad_sch

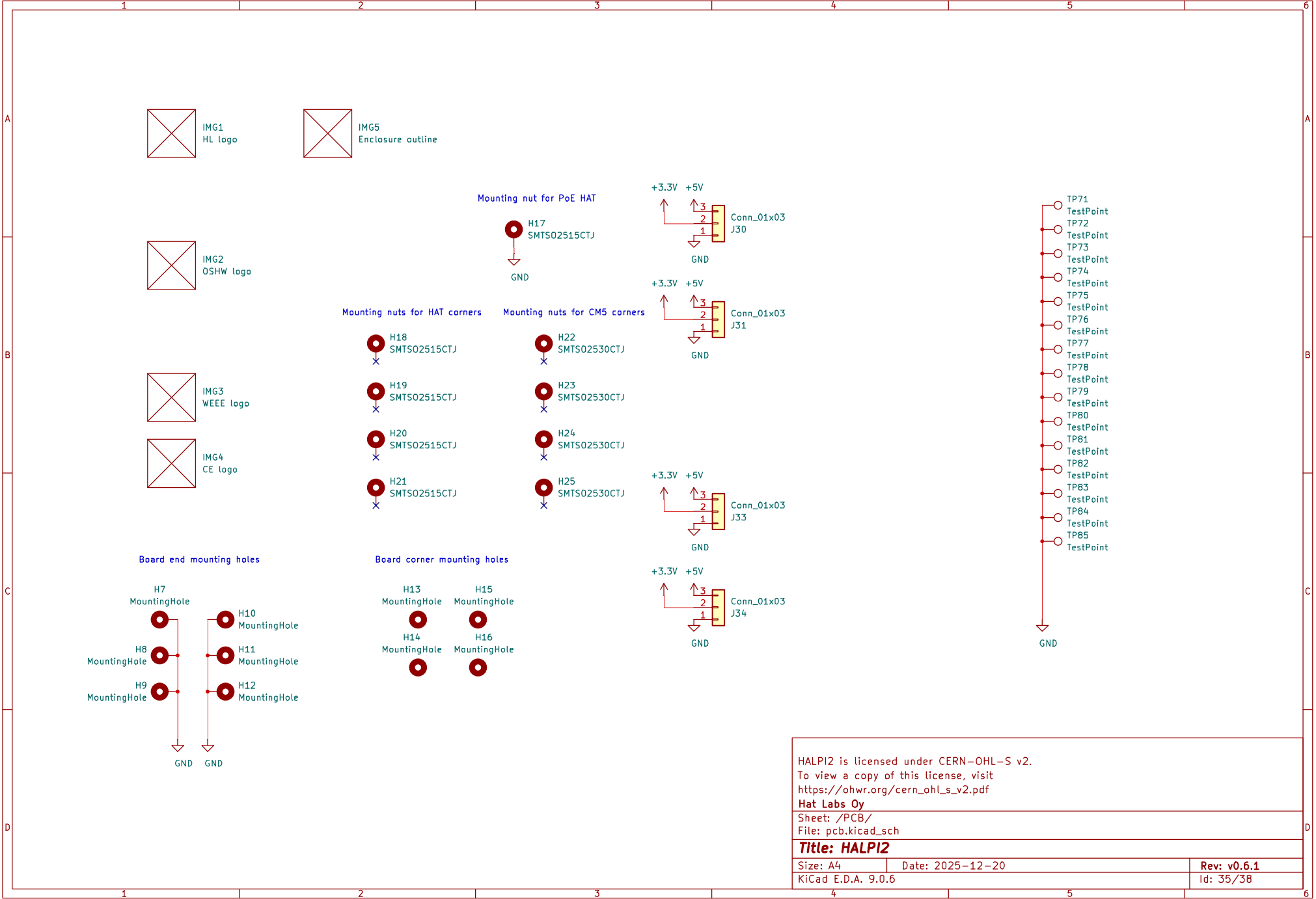
Title: HALPI2

Size: A4 Date: 2025-12-20
KiCad E.D.A. 9.0.6

Rev: v0.6.1
Id: 32/38







HALPI2 is licensed under CERN-OHL-S v2.
To view a copy of this license, visit
https://ohwr.org/cern_ohl_s_v2.pdf

Hat Labs Oy

Sheet: /PCB/

File: pcb.kicad_sch

Title: HALPI2

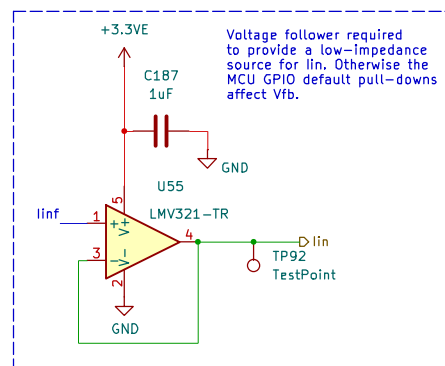
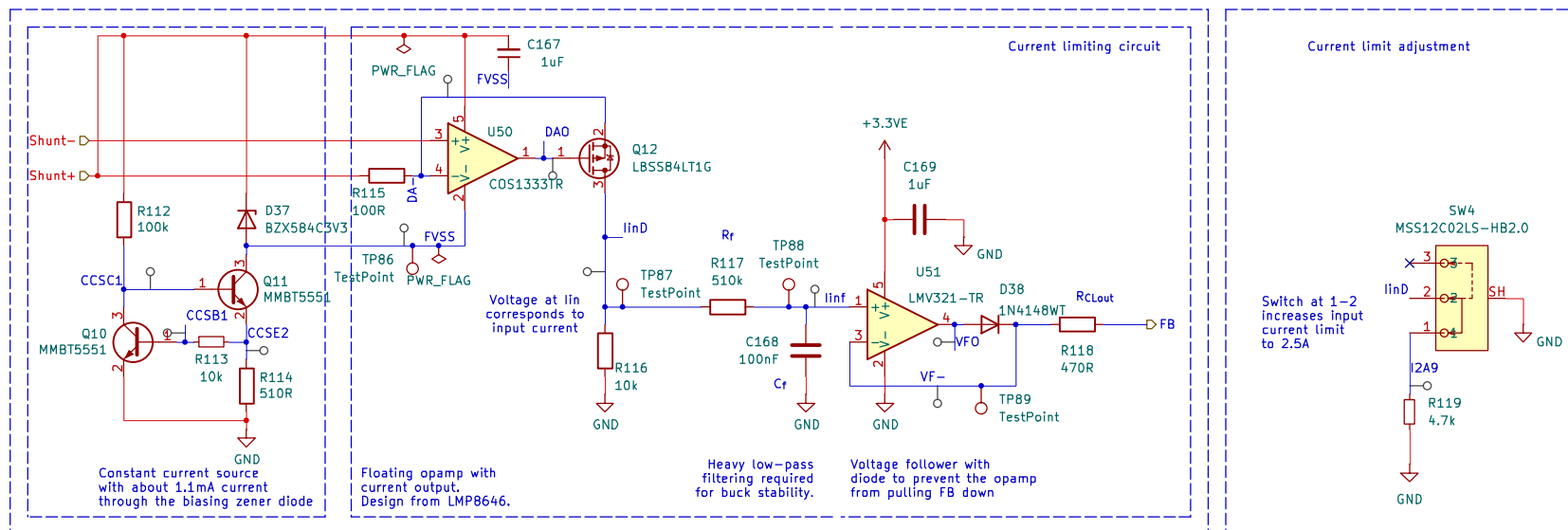
Size: A4

Date: 2025-12-20

Rev: v0.6.1

KiCad E.D.A. 9.0.6

Id: 35/38



HALPI2 is licensed under CERN-OHL-S v2.
 To view a copy of this license, visit
https://ohwr.org/cern_ohl_s_v2.pdf

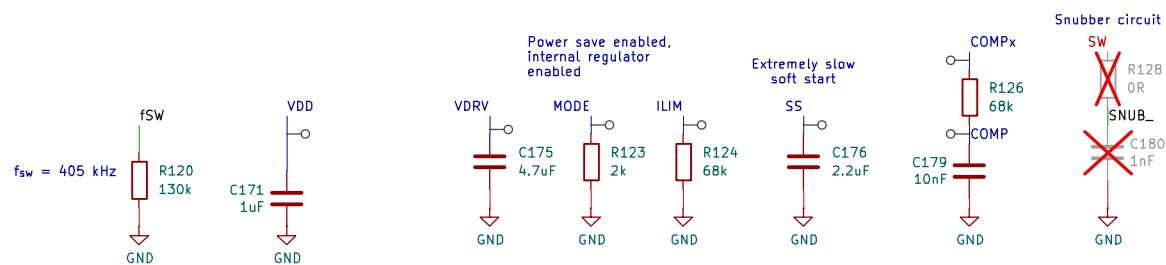
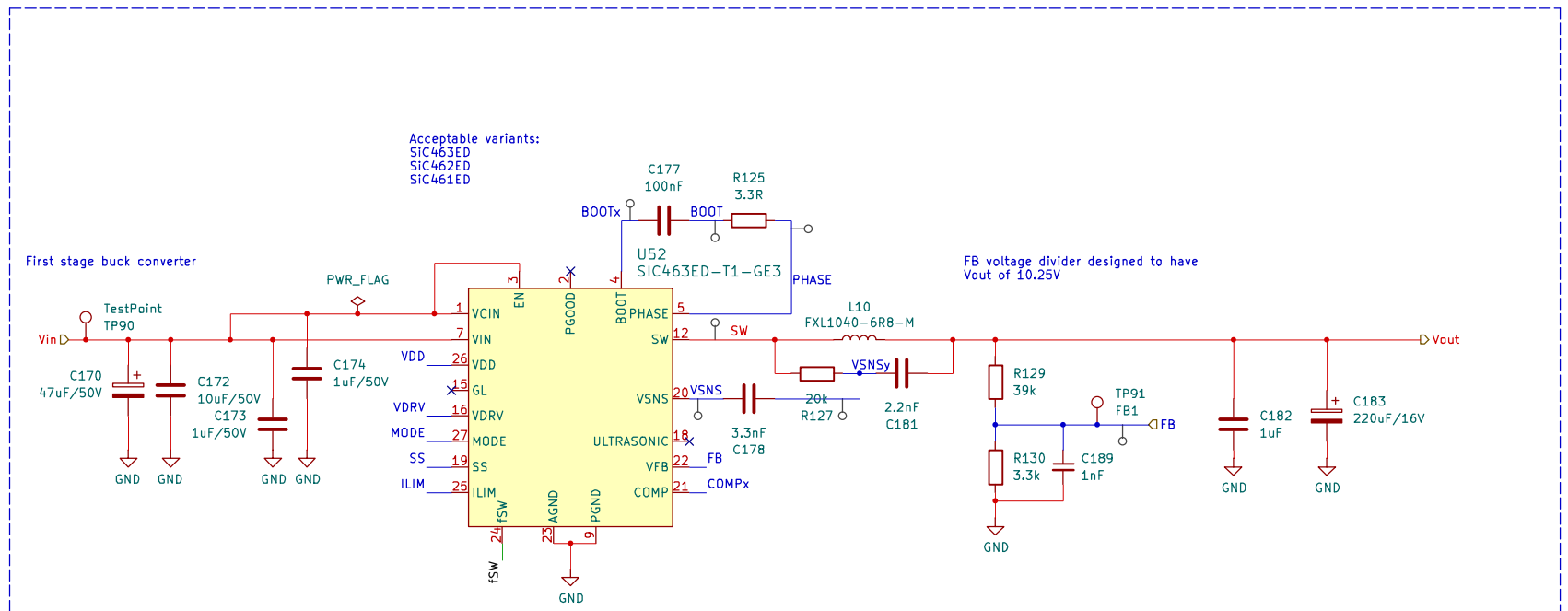
Hat Labs Oy

Sheet: /Power/Buck converter 10V/Current Limiter/
 File: current_limiter.kicad_sch

Title: HALPI2

Size: A4 Date: 2025-12-20
 KiCad E.D.A. 9.0.6

Rev: v0.6.1
 Id: 36/38



NOTE: If the converter is configured with a different SIC46x variant, ILIM must be adjusted as well (even for the same output current value).

HALPI2 is licensed under CERN-OHL-S v2.

To view a copy of this license, visit

https://ohwr.org/cern_ohl_s_v2.pdf

Hat Labs Oy

Sheet: /Power/Buck converter 10V/Buck 10V IC/

File: buck_10V_ic.kicad_sch

Title: HALPI2

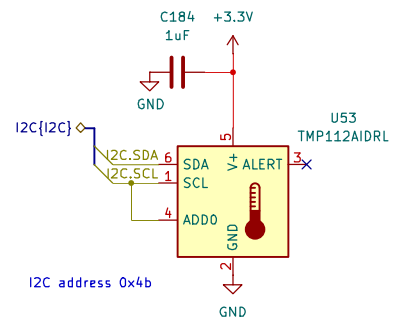
Size: A4

Date: 2025-12-20

Rev: v0.6.1

KiCad E.D.A. 9.0.6

Id: 38/38



HALPI2 is licensed under CERN-OHL-S v2.
To view a copy of this license, visit
https://ohwr.org/cern_ohl_s_v2.pdf

Hat Labs Oy

Sheet: /Controller/Temperature Sensor/
File: temp_sensor.kicad_sch

Title: HALPI2

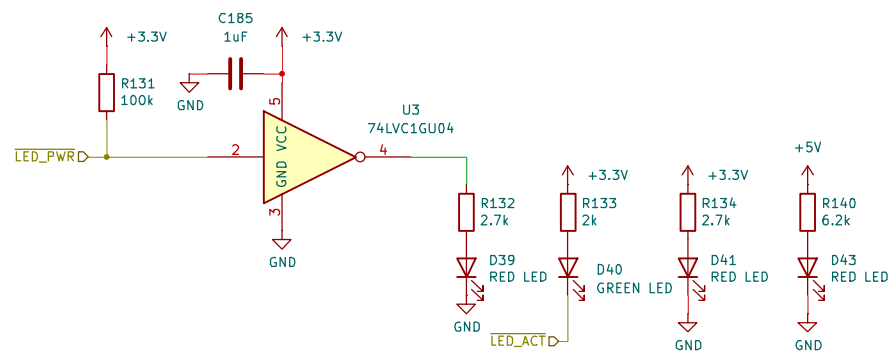
Size: A4

Date: 2025-12-20

Rev: v0.6.1

KiCad E.D.A. 9.0.6

Id: 39/38



HALPI2 is licensed under CERN-OHL-S v2.
To view a copy of this license, visit
https://ohwr.org/cern_ohl_s_v2.pdf

Hat Labs Oy

Sheet: /Controller/MCU LEDs/
File: mcu_leds.kicad_sch

Title: HALPI2

Size: A4

Date: 2025-12-20

Rev: v0.6.1

KiCad E.D.A. 9.0.6

Id: 39/38