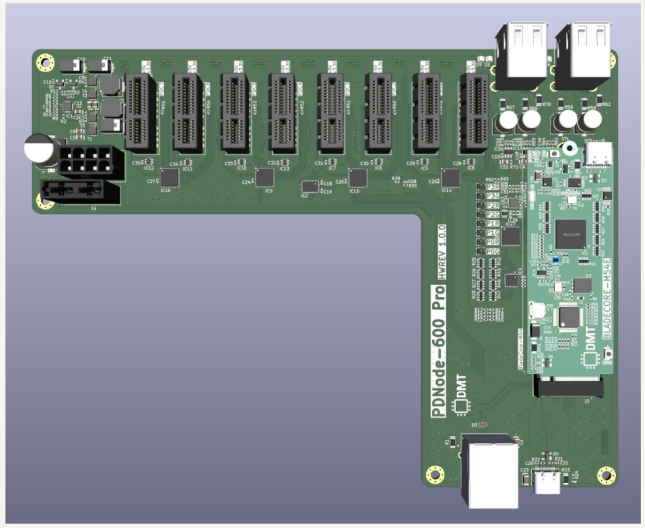
Baseboard Schematic Documentation

Project: PDNode-600 Name: Baseboard Var: Pro Rev 1.0.0 2026-02-15

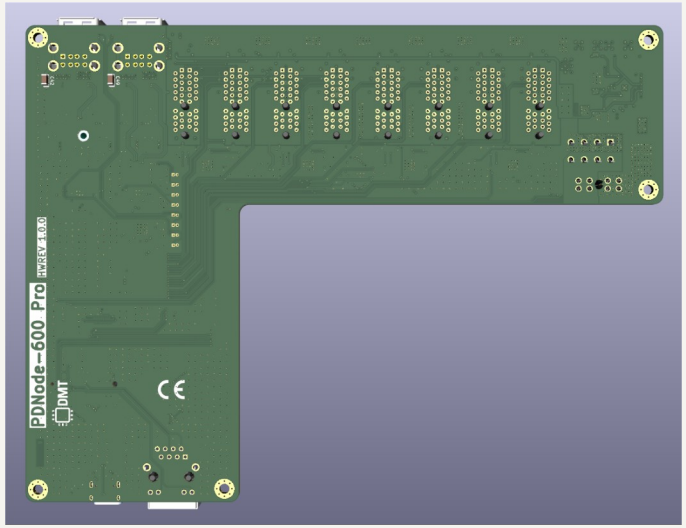
CONTENT

PCB PREVIEW

TOP VIEW



BOTTOM VIEW



COMMENT GUIDELINES

General comments are black, 50 mil size
Design notes and guidelines are blue, 50 mil size
Layout instructions are red, 50 mil size

NOTES

Not fitted components are marked as X

DMT Date: 2025-01-12	Board Name: PDNode-600		Project Name: Baseboard	
	File Name: PDNode_Baseboard.kicad_sch		Revision: 1.0.0	Variant: Pro
Sheet Title: Root	Company: DvidMakesThings	Designer: David Sipos Reviewer:	Size: A3	Sheet: 1 of 15

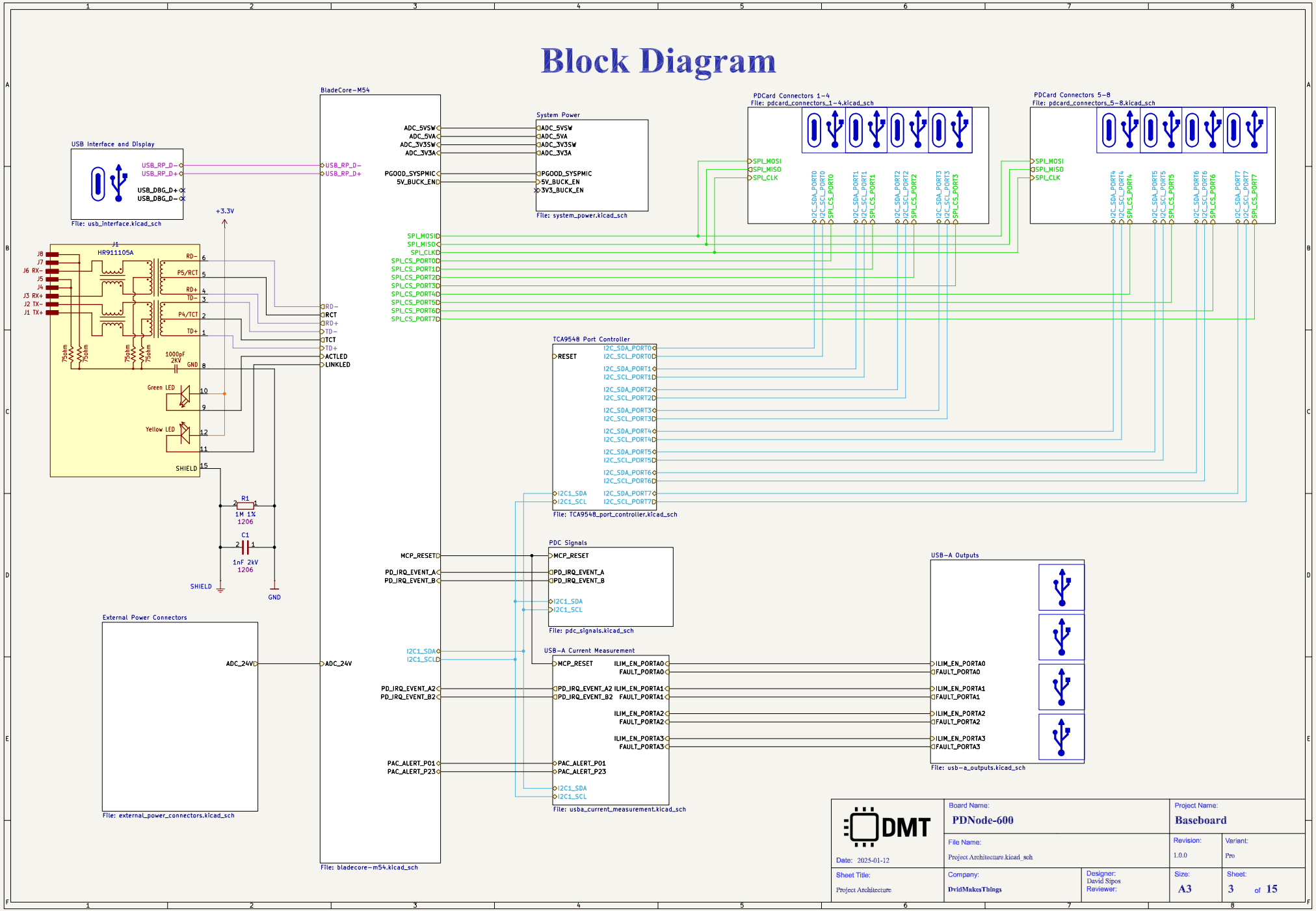
Block Diagram
File: Block Diagram.kicad_sch

Revision History
File: Revision History.kicad_sch

[2] Block Diagram

DMT Date: 2025-01-12	Board Name: PDNode-600		Project Name: Baseboard	
	File Name: Block Diagram.kicad_sch		Revision: 1.0.0	Variant: Pro
Sheet Title: Block Diagram	Company: DvidMakesThings	Designer: David Sipos Reviewer:	Size: A3	Sheet: 2 of 15

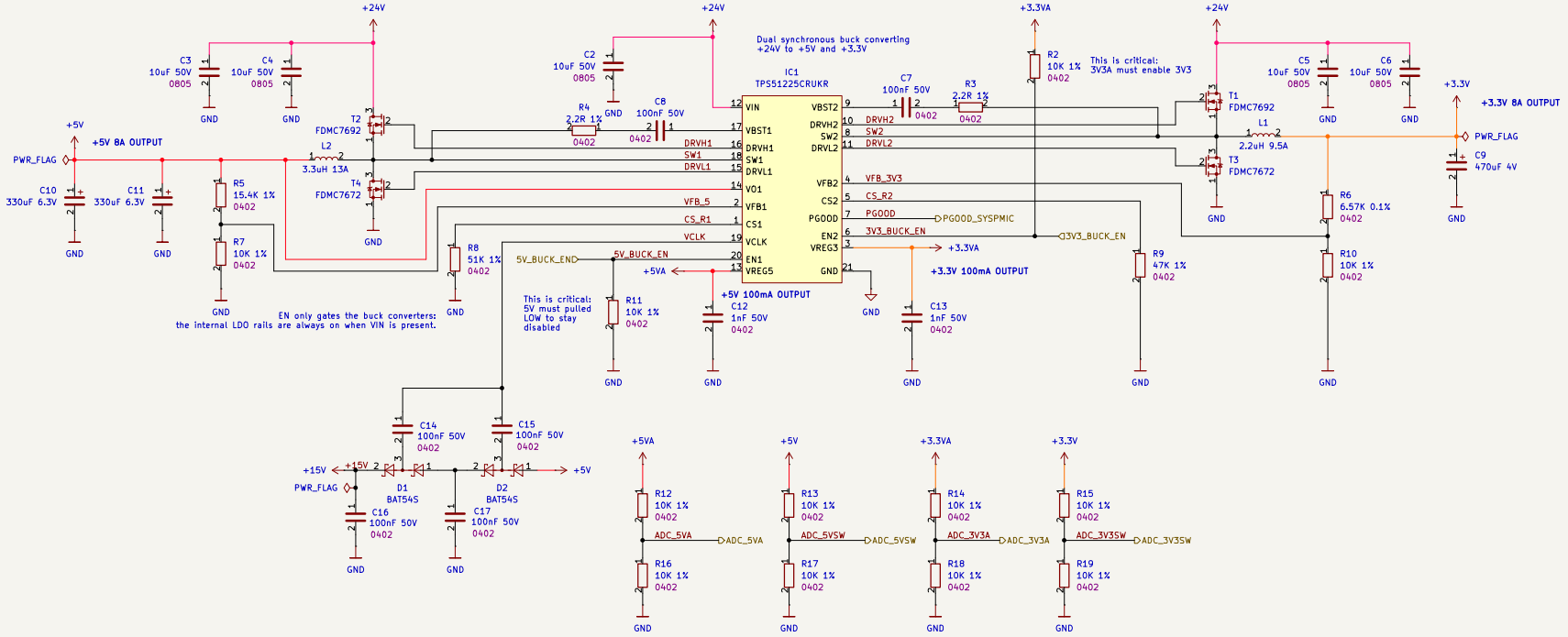
Block Diagram



DMT	Board Name: PDNode-600		Project Name: Baseboard
Date: 2025-01-12	File Name: Project Architecture.kicad_sch		Revision: 1.0.0 / Variant: Pro
Sheet Title: Project Architecture	Company: DvidMakesThings	Designer: David Sipos / Reviewer:	Size: A3 / Sheet: 3 of 15

System Power

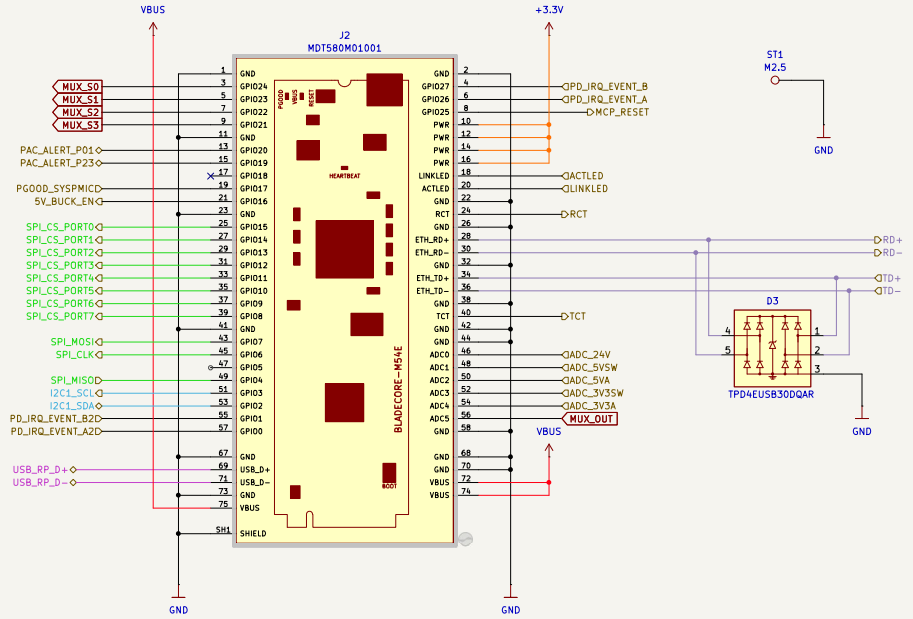
+24V TO +3.3V AND +5V CONVERTER



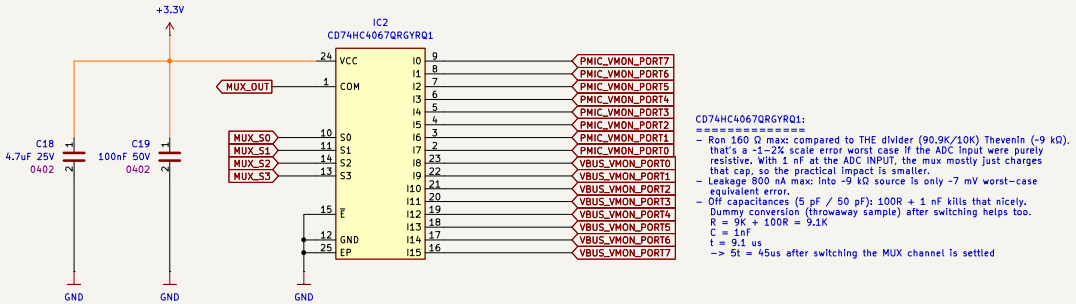
DMT	Board Name: PDNode-600		Project Name: Baseboard	
Date: 2025-01-12	File Name: system_power.kicad_sch		Revision: 1.0.0	Variant: Pro
Sheet Title: System Power	Company: DvidMakesThings	Designer: David Sipos Reviewer:	Size: A3	Sheet: 4 of 15

Microcontroller

BladeCore–M54 Connector



PDC ANALOG SIGNAL MUX

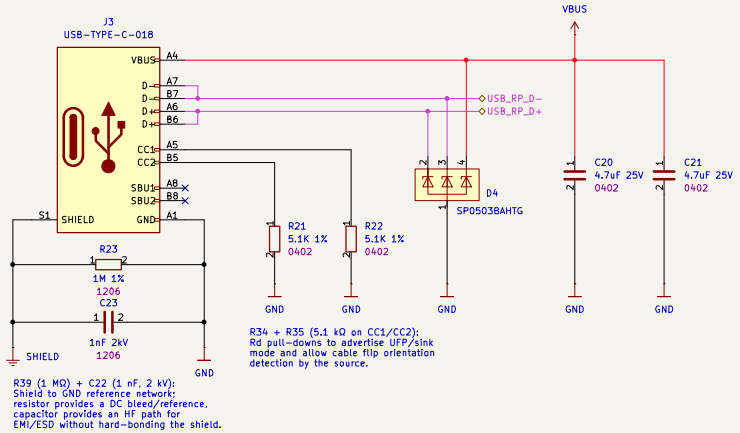


CD74HC4067QRGYRQ1:
==========
- Ron 160 Ω max: compared to THE divider (90.9K/10K) Thevenin (~9 kΩ). that's a ~1–2% scale error worst case if the ADC input were purely resistive. With 1 nF at the ADC INPUT, the mux mostly just charges that cap, so the practical impact is smaller.
- Leakage 800 nA max: into ~9 kΩ source is only ~7 mV worst-case equivalent error.
- Off capacitances (5 pF / 50 pF): 100R + 1 nF kills that nicely. Dummy conversion (throwaway sample) after switching helps too.
  R = 9K + 100R = 9.1K
  C = 1nF
  t = 9.1 us
  -> 5t = 45us after switching the MUX channel is settled

DMT	Board Name: PDNode-600		Project Name: Baseboard	
Date: 2025-01-12	File Name: bladecore-m54.kicad_sch		Revision: 1.0.0	Variant: Pro
Sheet Title: BladeCore-M54	Company: DvidMakesThings	Designer: David Sipos Reviewer:	Size: A3	Sheet: 5 of 15

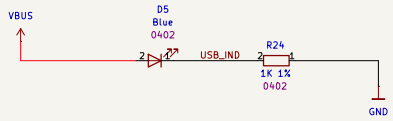
USB Interface and Display

USB-C CONNECTOR



DISPLAY CONNECTOR

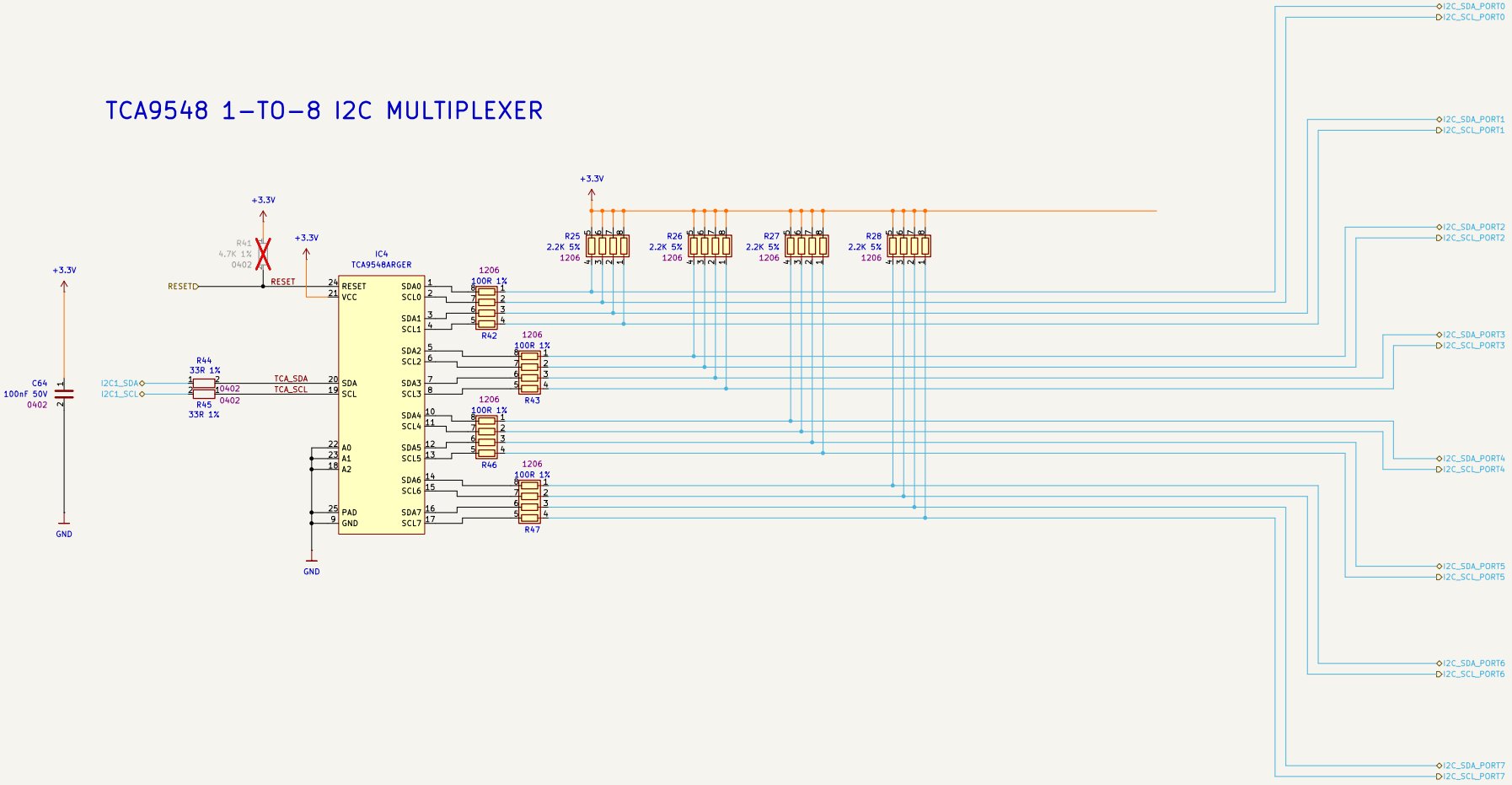
USB INDICATOR LED



DMT	Board Name: PDNode-600		Project Name: Baseboard	
Date: 2025-01-12	File Name: usb_interface.kicad_sch		Revision: 1.0.0	Variant: Pro
Sheet Title: USB Interface and Display	Company: DvidMakesThings	Designer: David Sipos Reviewer:	Size: A3	Sheet: 6 of 15

TCA9548 Port Controller

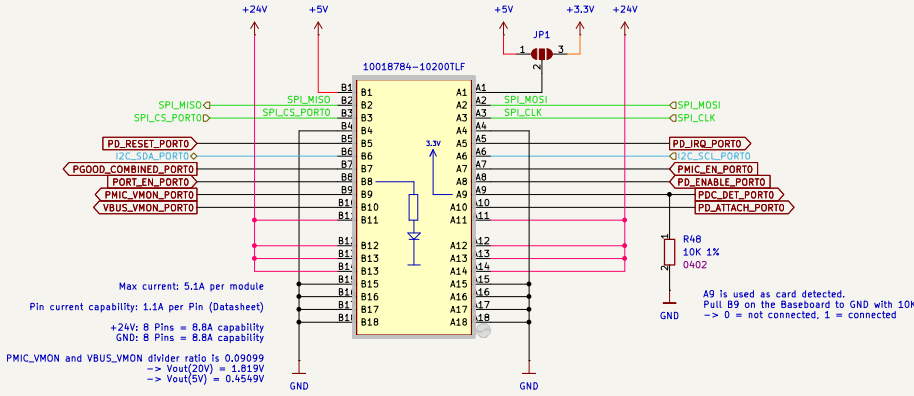
TCA9548 1-TO-8 I2C MULTIPLEXER



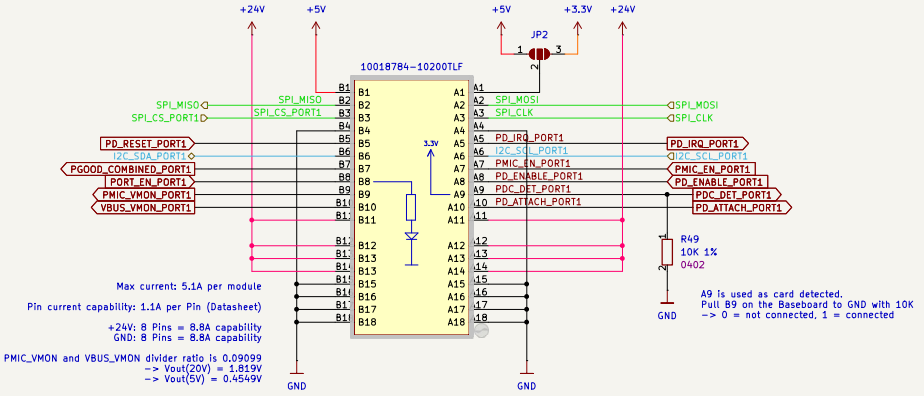
DMT Date: 2025-01-12	Board Name: PDNode-600		Project Name: Baseboard	
	File Name: TCA9548_port_controller.kicad_sch		Revision: 1.0.0	Variant: Pro
Sheet Title: TCA9548 Port Controller	Company: DvidMakesThings	Designer: David Sipos Reviewer:	Size: A3	Sheet: 7 of 15

PDCard Connectors 1-4

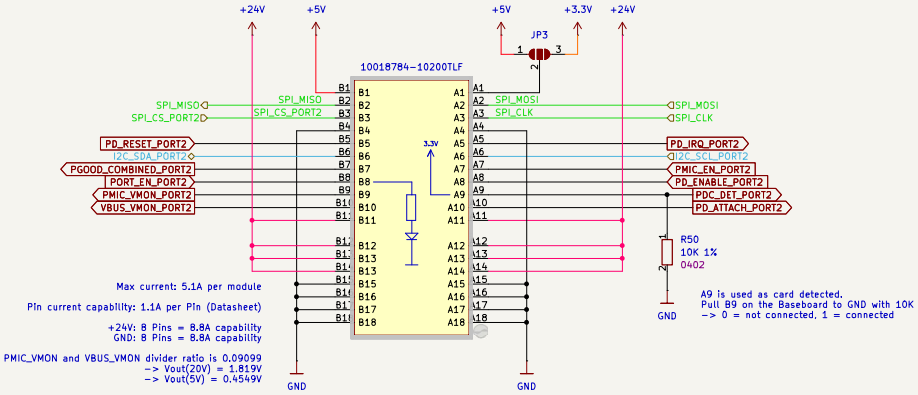
PORT0 PDC CONNECTOR



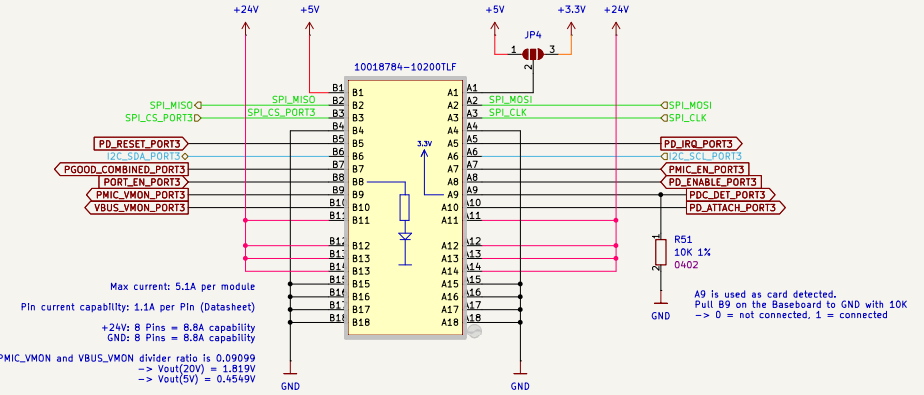
PORT1 PDC CONNECTOR



PORT2 PDC CONNECTOR



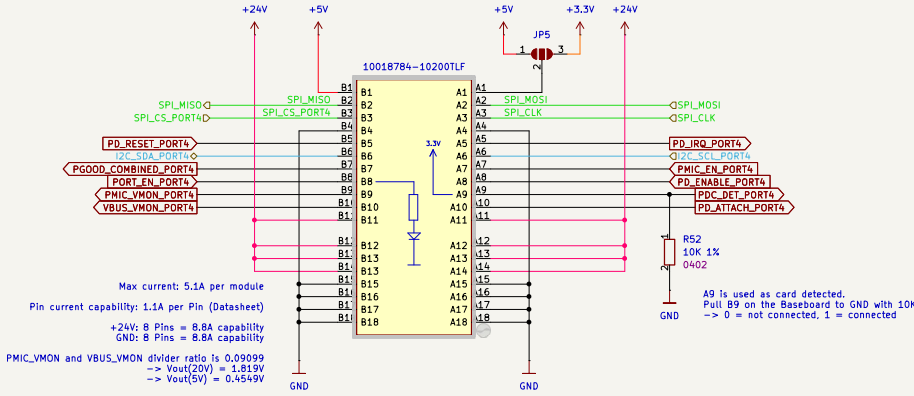
PORT3 PDC CONNECTOR



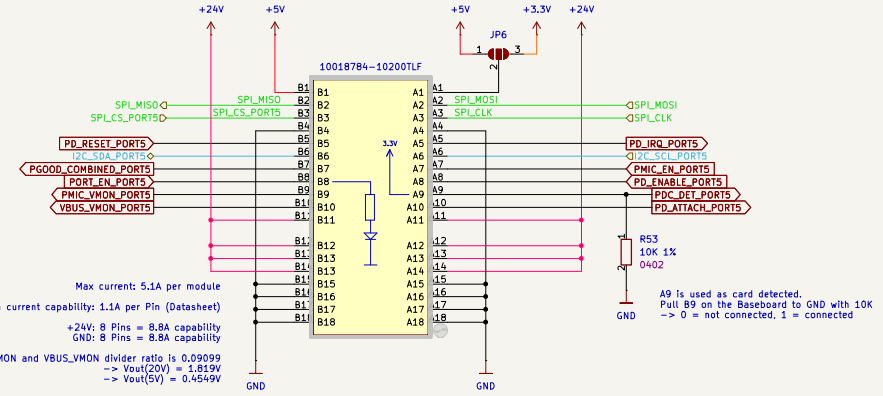
DMT Date: 2025-01-12	Board Name: PDNode-600		Project Name: Baseboard
	File Name: pdcard_connectors_1-4.kicad_sch		Revision: 1.0.0 / Variant: Pro
Sheet Title: PDCard Connectors 1-4	Company: DvidMakesThings	Designer: David Sipos Reviewer:	Size: A3 / Sheet: 8 of 15

PDCard Connectors 5-8

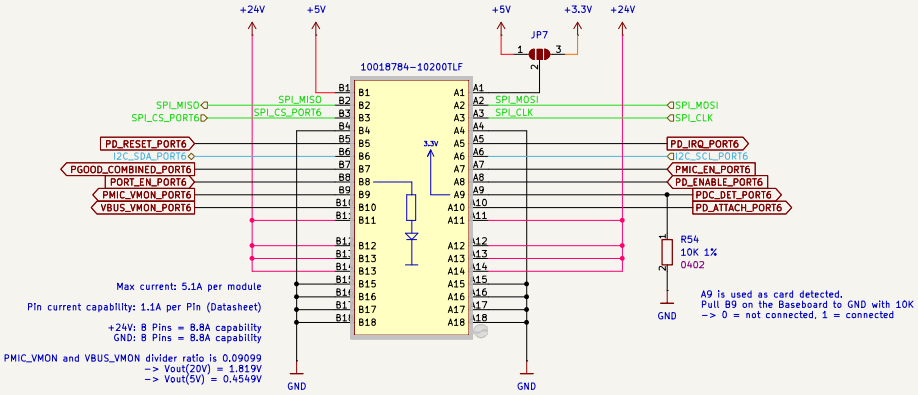
PORT4 PDC CONNECTOR



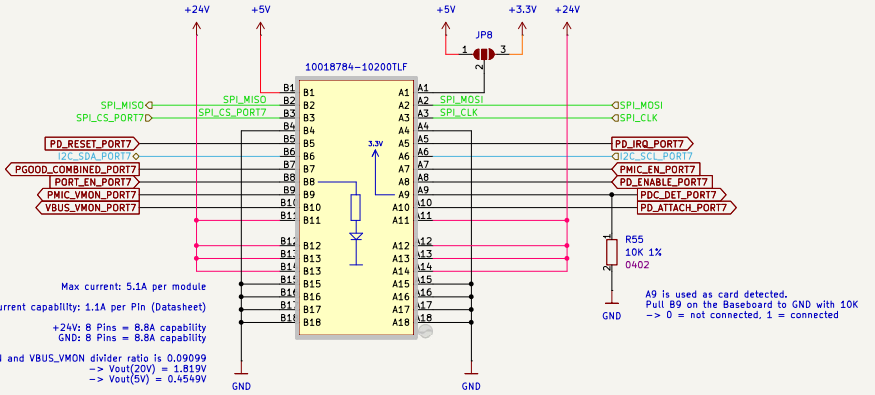
PORT5 PDC CONNECTOR



PORT6 PDC CONNECTOR



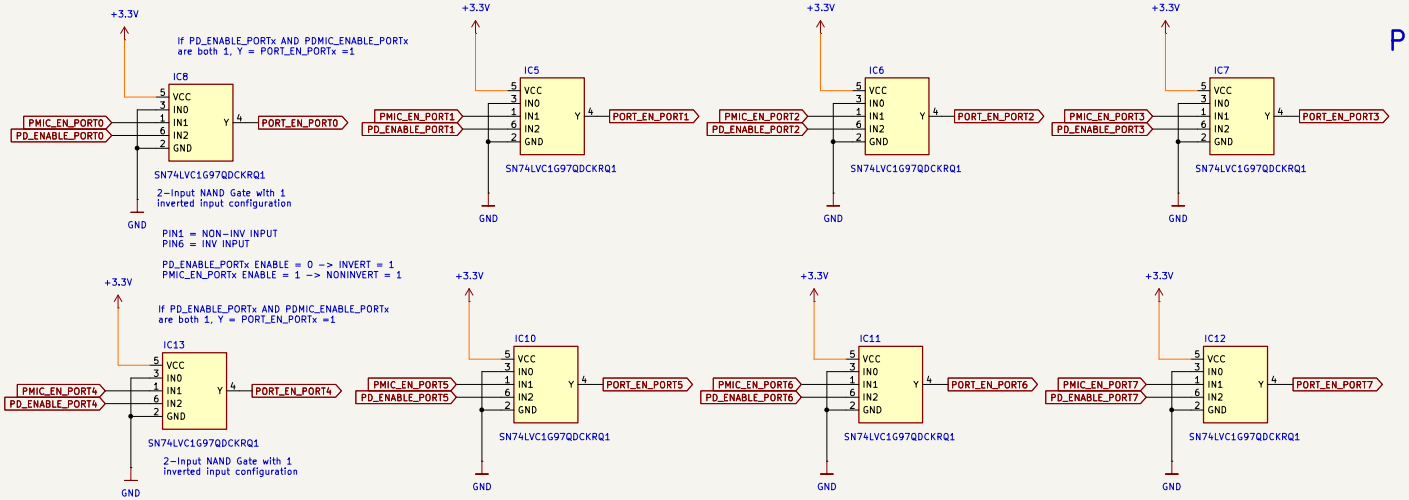
PORT7 PDC CONNECTOR



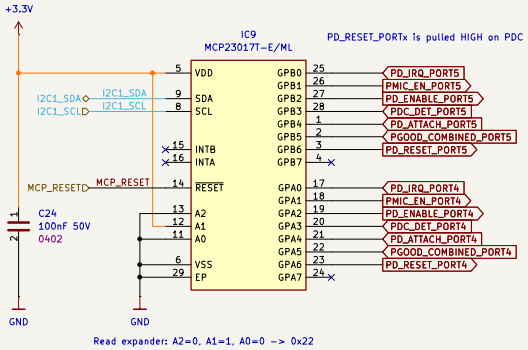
DMT Date: 2025-01-12	Board Name: PDNode-600		Project Name: Baseboard
	File Name: pdcard_connectors_5-8.kicad_sch		Revision: 1.0.0 / Variant: Pro
Sheet Title: PDCard Connectors 5-8	Company: DvidMakesThings	Designer: David Sipos Reviewer:	Size: A3 / Sheet: 9 of 15

PDC Signals

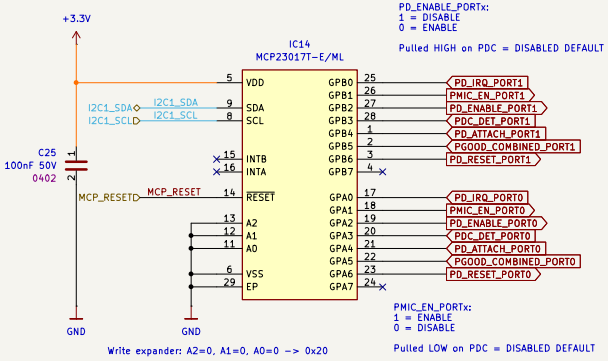
PDC ENABLE LEDS



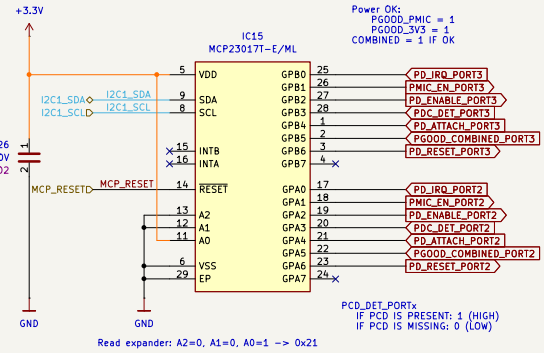
PDC RESET AND SINK-DETECT



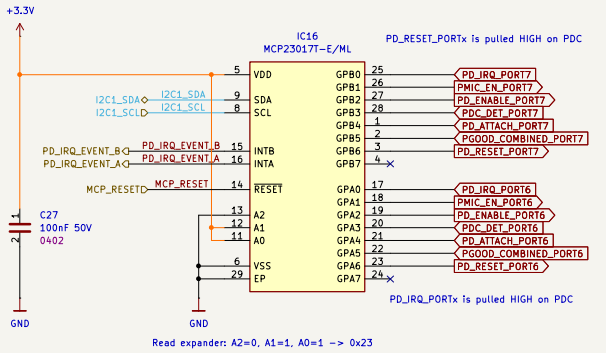
PDC CONTROL SIGNALS (TO WRITE)



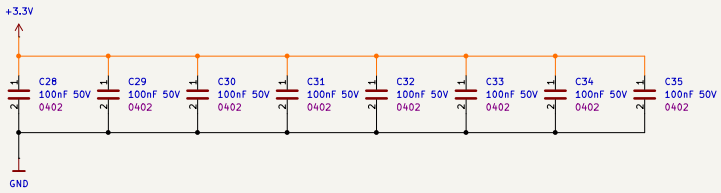
PDC STATUS SIGNALS (TO READ)



PDC INTERRUPT AND USB-A SIGNALS



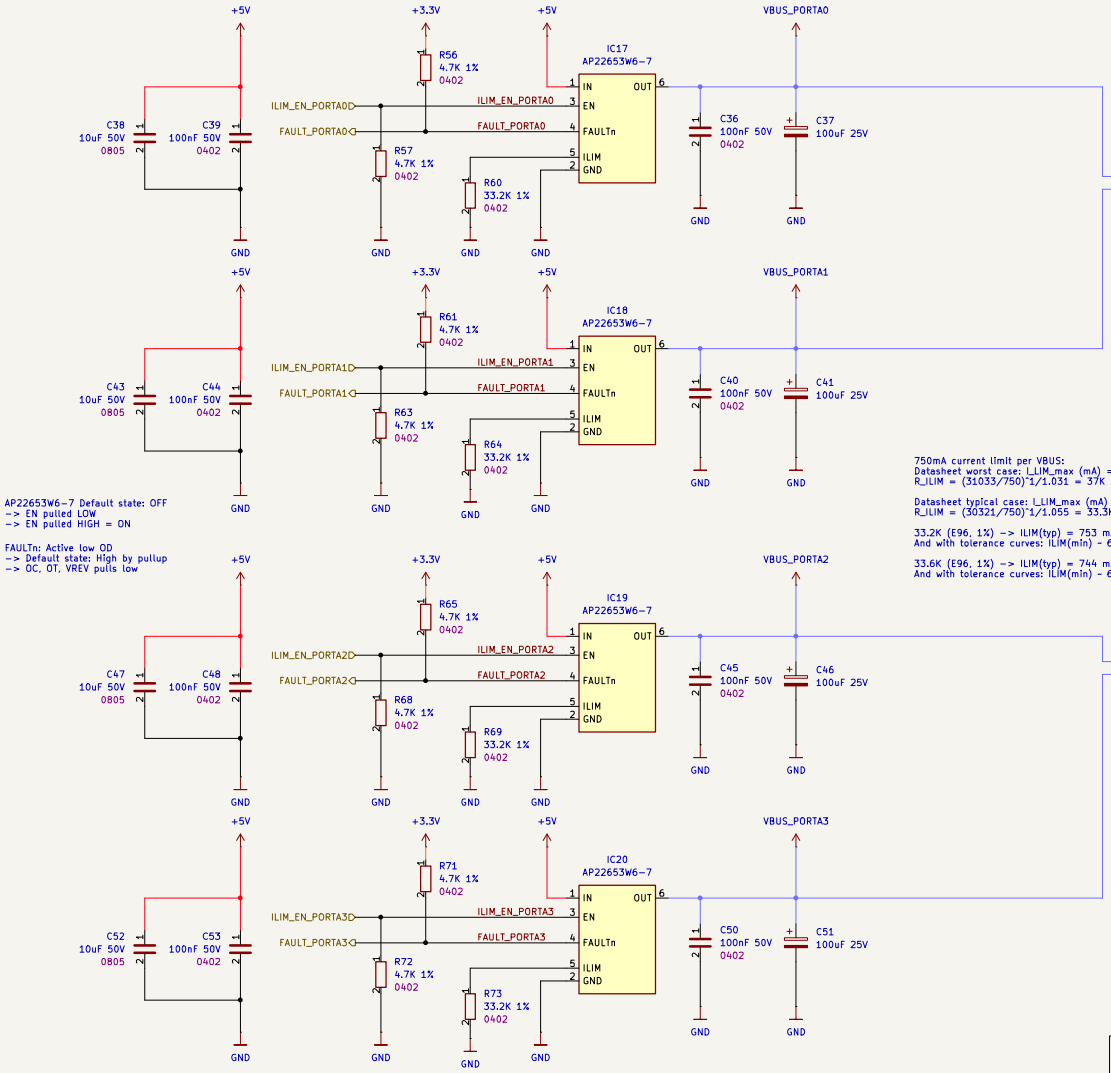
DECOUPLING



DMT	Board Name: PDNode-600		Project Name: Baseboard
Date: 2025-01-12	File Name: pdc_signals.kicad_sch		Revision: 1.0.0 / Variant: Pro
Sheet Title: PDC Signals	Company: DvidMakesThings	Designer: David Sipos / Reviewer:	Size: A3 / Sheet: 10 of 15

USB-A Outputs

USB CURRENT LIMIT SWITCH



AP22653W6-7 Default state: OFF
-> EN pulled LOW
-> EN pulled HIGH = ON

FAULTn: Active low OD
-> Default state: High by pullup
-> OC, OT, VREV pulls low

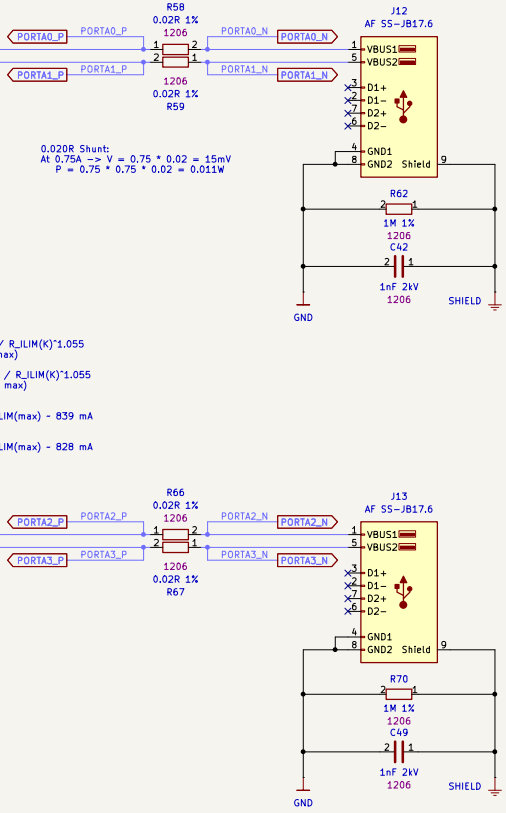
750mA current limit per VBUS:
Datasheet worst case: I_LIM_max (mA) = 30321 / R_ILIM(K)^1.055
R_ILIM = (31033/750)^1/1.031 = 37K (750mA max)

Datasheet typical case: I_LIM_max (mA) = 30321 / R_ILIM(K)^1.055
R_ILIM = (30321/750)^1/1.055 = 33.3K (750mA max)

33.2K (E96, 1%) -> ILIM(typ) = 753 mA
And with tolerance curves: ILIM(min) - 671 mA, ILIM(max) - 839 mA

33.6K (E96, 1%) -> ILIM(typ) = 744 mA
And with tolerance curves: ILIM(min) - 662 mA, ILIM(max) - 828 mA

USB-A STACKED OUTPUTS

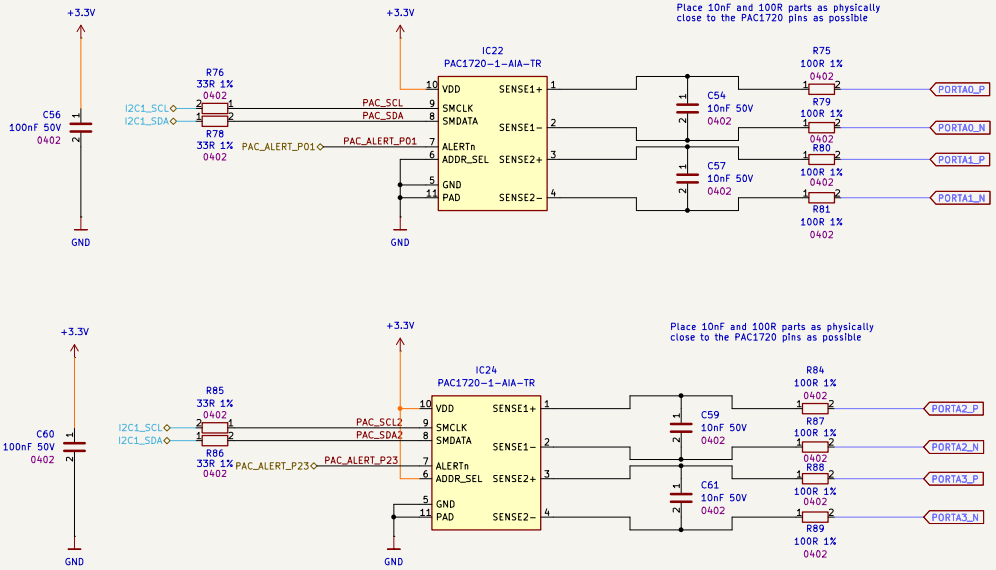


0.020R Shunt:
At 0.75A -> V = 0.75 * 0.02 = 15mV
P = 0.75 * 0.75 * 0.02 = 0.011W

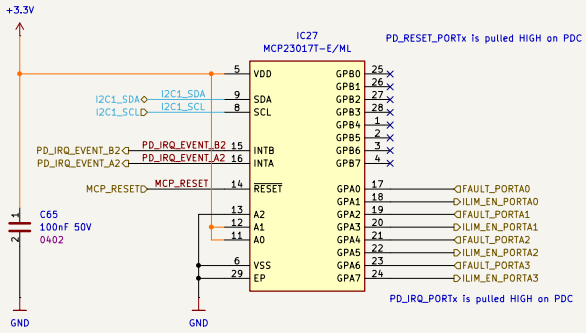
DMT	Board Name: PDNode-600		Project Name: Baseboard
Date: 2025-01-12	File Name: usb-a_outputs.kicad_sch		Revision: 1.0.0 / Variant: Pro
Sheet Title: USB-A Outputs	Company: DvidMakesThings	Designer: David Sipos / Reviewer:	Size: A3 / Sheet: 11 of 15

USB-A Current Measurement

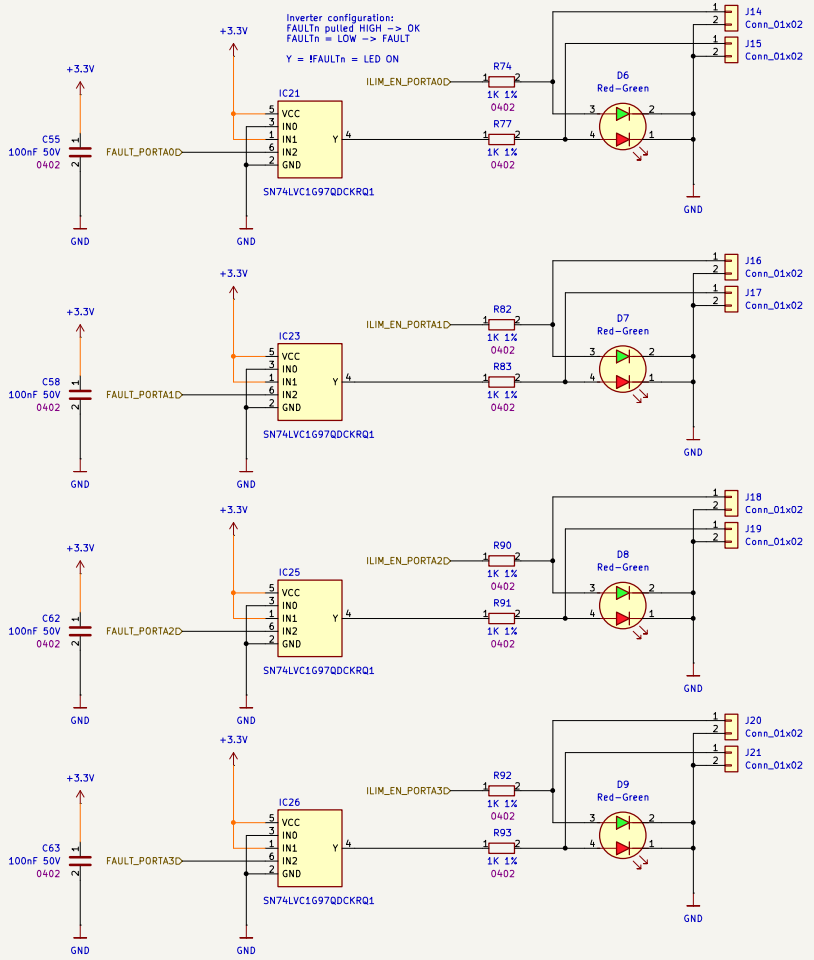
USB CURRENT MEASUREMENT



USB-A SIGNALS



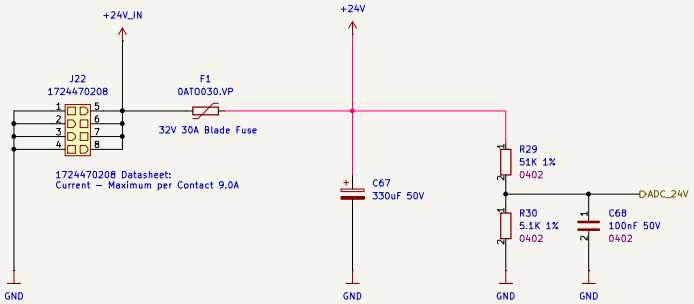
USB-A CURRENT LIMIT SIGNALS



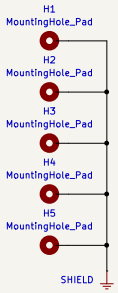
DMT	Board Name: PDNode-600		Project Name: Baseboard	
Date: 2025-01-12	File Name: usba_current_measurement.kicad_sch		Revision: 1.0.0	Variant: Pro
Sheet Title: USB-A Current Measurement	Company: DvidMakesThings	Designer: David Sipos Reviewer:	Size: A3	Sheet: 12 of 15

External Power Connectors

8 PIN EPS +24V POWER CONNECTOR



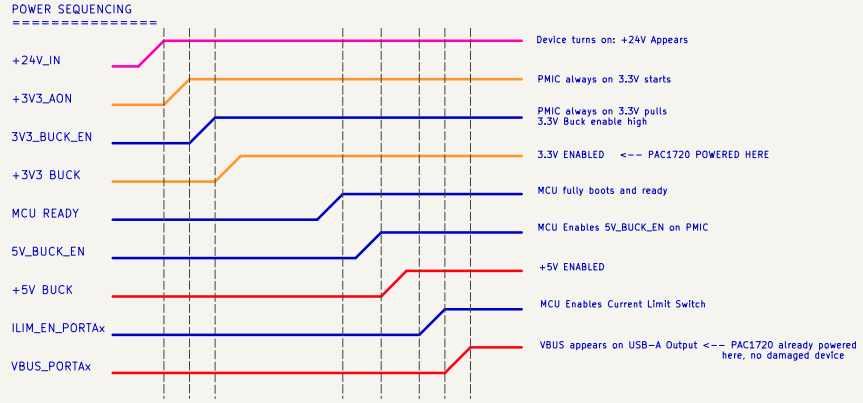
MOUNTING HOLES



DMT	Board Name: PDNode-600		Project Name: Baseboard	
Date: 2025-01-12	File Name: external_power_connectors.kicad_sch		Revision: 1.0.0	Variant: Pro
Sheet Title: External Power Connectors	Company: DvidMakesThings	Designer: David Sipos Reviewer:	Size: A3	Sheet: 13 of 15

[14] Power - Sequencing

Biggest landmine with PAC1720:
don't let the SENSE pins see VBUS when VDD is unpowered.
If USB 5V can exist while 3.3V is off, mitigation is needed
That's the one thing that can turn "happy board" into "dead board."



DMT	Board Name: PDNode-600		Project Name: Baseboard	
Date: 2025-01-12	File Name: Power - Sequencing.kicad_sch		Revision: 1.0.0	Variant: Pro
Sheet Title: Power - Sequencing	Company: DvidMakesThings	Designer: David Sipos Reviewer:	Size: A3	Sheet: 14 of 15

Revision History

DATE	REVISION	RESPONSIBLE	CHANGE
15.02.2026	1.0.0	DMT	INITIAL CREATION

DMT

Date: 2025-01-12

Board Name: PDNode-600

Project Name: Baseboard

File Name: Revision History.kicad_sch

Revision: 1.0.0

Variant: Pro

Sheet Title: Revision History

Company: DvidMakesThings

Designer: David Sipos

Reviewer:

Size: A3

Sheet: 15 of 15