# PDNode-600Pro
## Rev 1.0.0

# Baseboard
## Variant: Pro

07.02.2026

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**VERSION:**

DRAFT - Very early stage of schematic, ignore details.

**PRELIMINARY - Close to final schematic.**

CHECKED - There shouldn't be any mistakes. Contact the engineer if you find any.

RELEASED - A board with this schematic has been sent to production.

## PCB TOP VIEW

## PCB BOTTOM VIEW

## NOTES

Not fitted components are marked as X

| | | | | |
|---|---|---|---|---|
| Comments: | Company: DvidMakesThings | | Variant: Pro | Git Hash: |
| | Board Name: Baseboard | | Project Name: PDNode-600 Pro | |
| Sheet Title: | File Name: PDNode_Baseboard.kicad_sch | Designer: David Sipos | Date: 2026-02-05 | Revision: 1.0.0 |
| Sheet Path: / | | Reviewer: | Size: A3 | Sheet: 1 of 15 |

Block Diagram — File: Project Architecture.kicad_sch

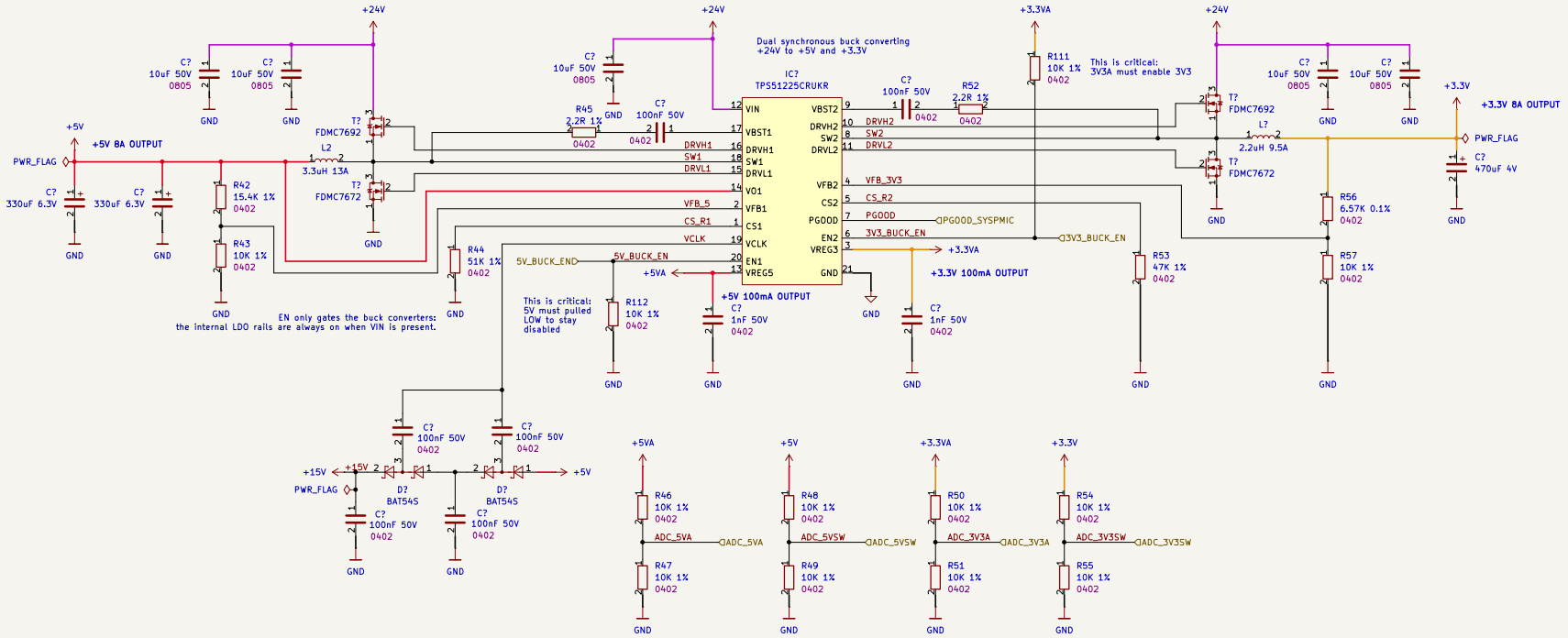
Revision History — File: Revision History.kicad_sch

# Block Diagram

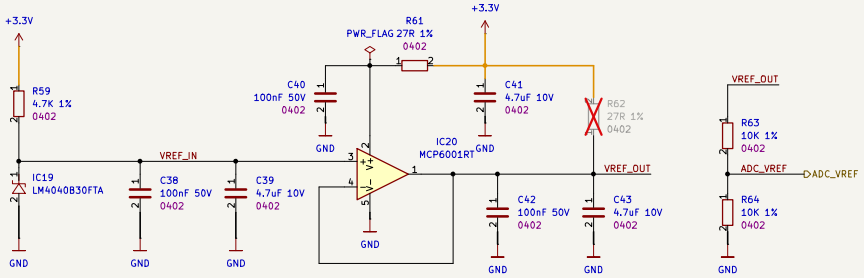
| | | | | |
|---|---|---|---|---|
| Comments: | Company: DvidMakesThings | | Variant: Pro | Git Hash: |
| | Board Name: Baseboard | | Project Name: PDNode-600 Pro | |
| Sheet Title: Project Architecture | File Name: Project Architecture.kicad_sch | Designer: David Sipos | Date: 2026-02-05 | Revision: 1.0.0 |
| Sheet Path: /Block Diagram/ | | Reviewer: | Size: A3 | Sheet: 2 of 15 |

# System Power

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




## 3.0V ADC VOLTAGE REFERENCE

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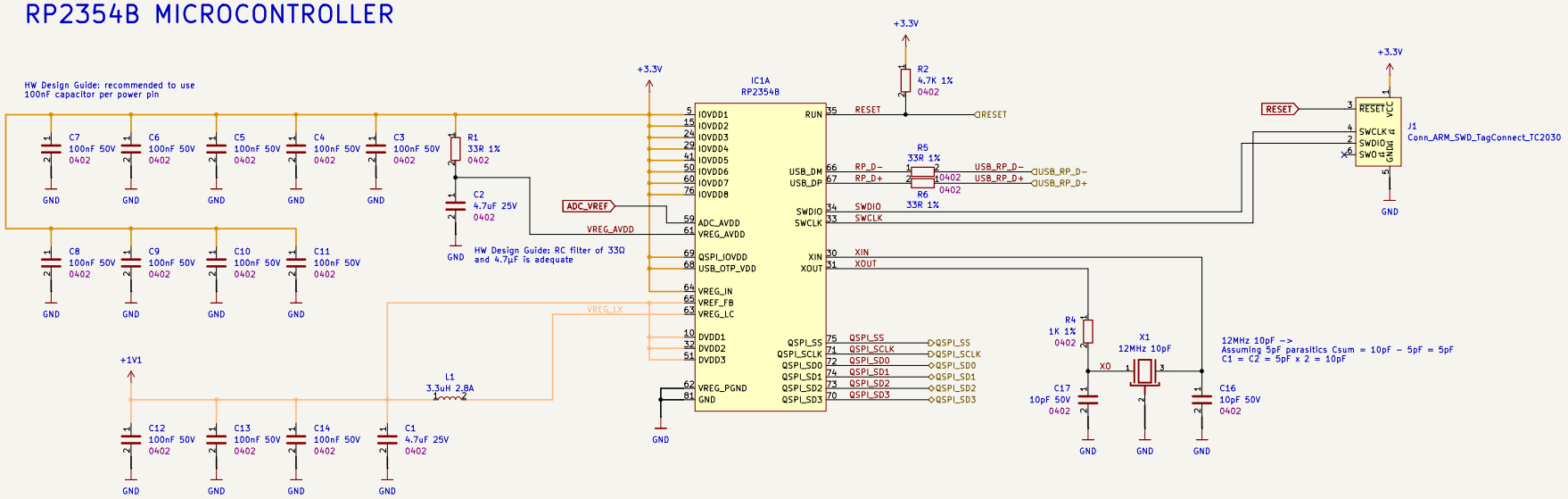
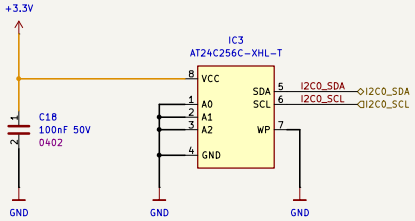
|---|---|---|---|---|
| Comments: | Company: DvidMakesThings | | Variant: Pro | Git Hash: |
| | Board Name: Baseboard | | Project Name: PDNode-600 Pro | |
| Sheet Title: System Power | File Name: system_power.kicad_sch | Designer: David Sipos | Date: 2026-02-05 | Revision: 1.0.0 |
| Sheet Path: /Block Diagram/System Power/ | | Reviewer: | Size: A3 | Sheet: 3 of 15 |

# Microcontroller Peripherals

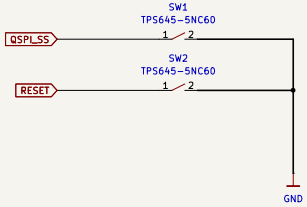
## RP2354B MICROCONTROLLER



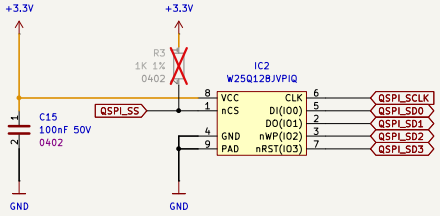

## EXTERNAL EEPROM




## PUSHBUTTONS




## EXTERNAL FLASH

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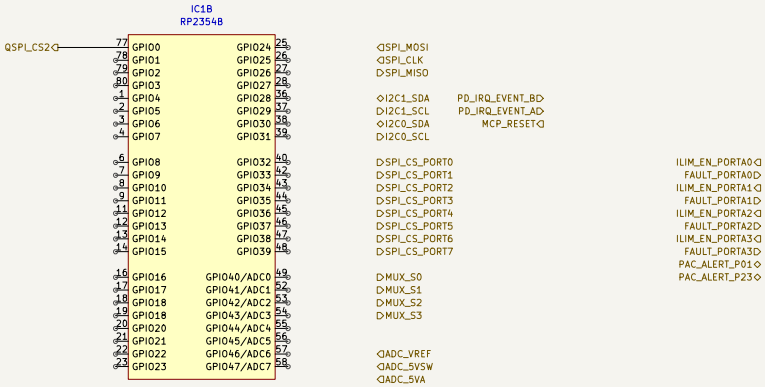
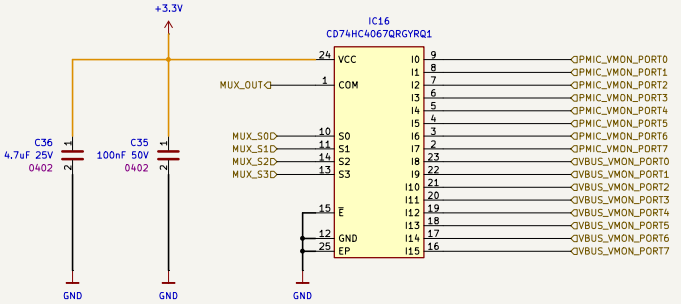
|---|---|---|---|---|
| Comments: | Company: DvidMakesThings | | Variant: Pro | Git Hash: |
| | Board Name: Baseboard | | Project Name: PDNode-600 Pro | |
| Sheet Title: Microcontroller Peripherals | File Name: microcontroller_peripherals.kicad_sch | Designer: David Sipos | Date: 2026-02-05 | Revision: 1.0.0 |
| Sheet Path: /Block Diagram/Microcontroller Peripherals/ | | Reviewer: | Size: A3 | Sheet: 4 of 15 |

# Microcontroller

## RP2354B GPIO ASSIGNMENT

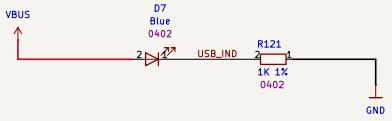



## PDC ANALOG SIGNAL MUX




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

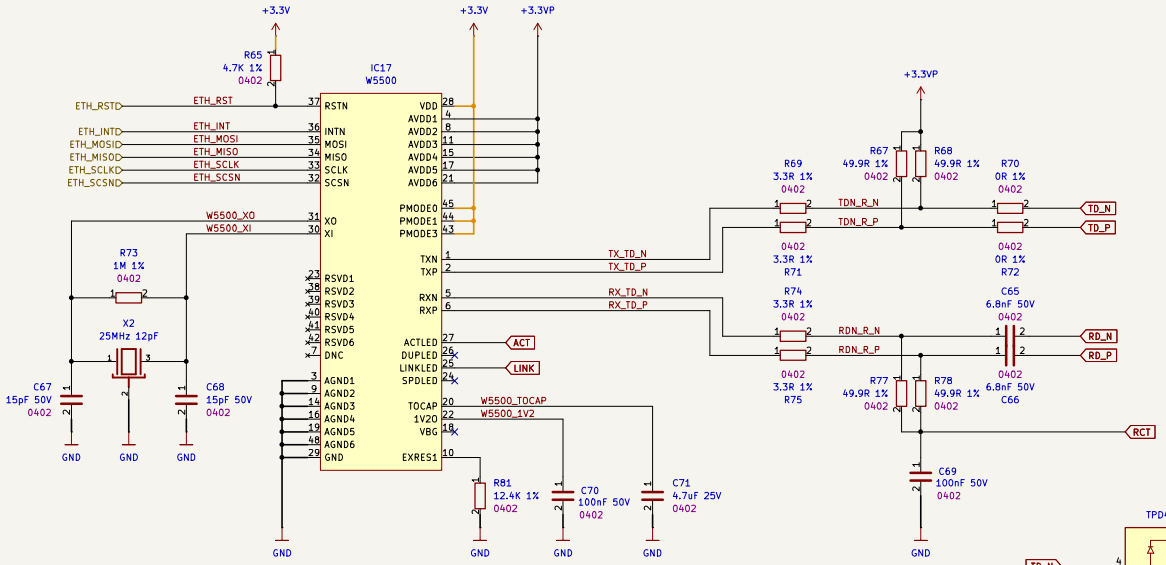
## HEARTBEAT LED



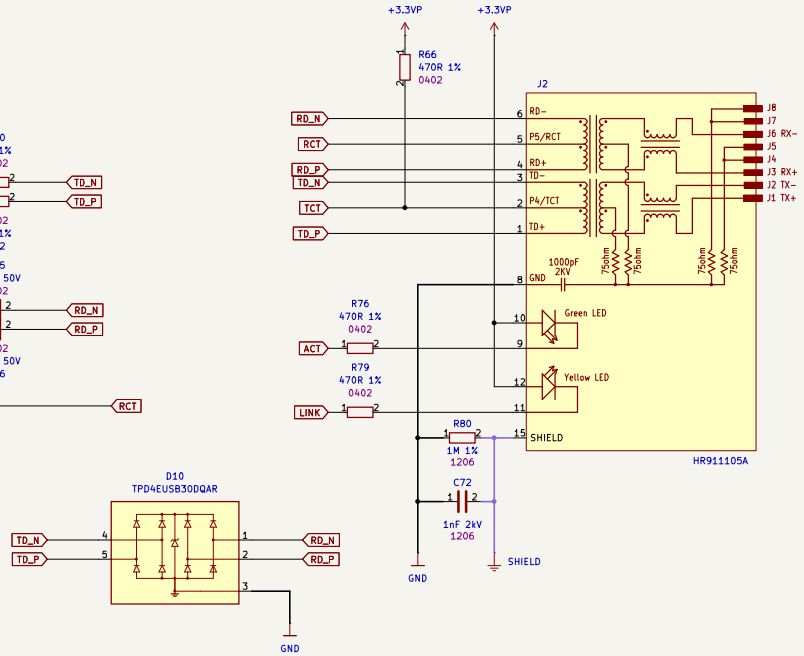

| | | | | |
|---|---|---|---|---|
| Comments: | Company: DvidMakesThings | | Variant: Pro | Git Hash: |
| | Board Name: Baseboard | | Project Name: PDNode-600 Pro | |
| Sheet Title: Microcontroller | File Name: microcontroller.kicad_sch | Designer: David Sipos | Date: 2026-02-05 | Revision: 1.0.0 |
| Sheet Path: /Block Diagram/Microcontroller/ | | Reviewer: | Size: A3 | Sheet: 5 of 15 |

# Ethernet Interface

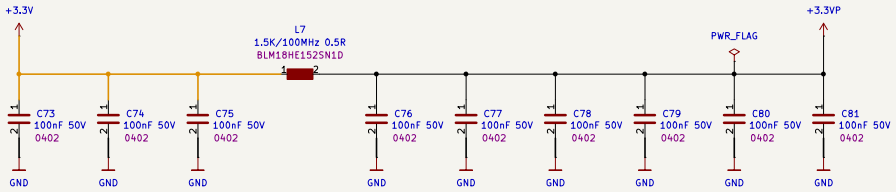
## W5500 ETHERNET CONTROLLER WITH PHY




## MAGJACK




## DECOUPLING

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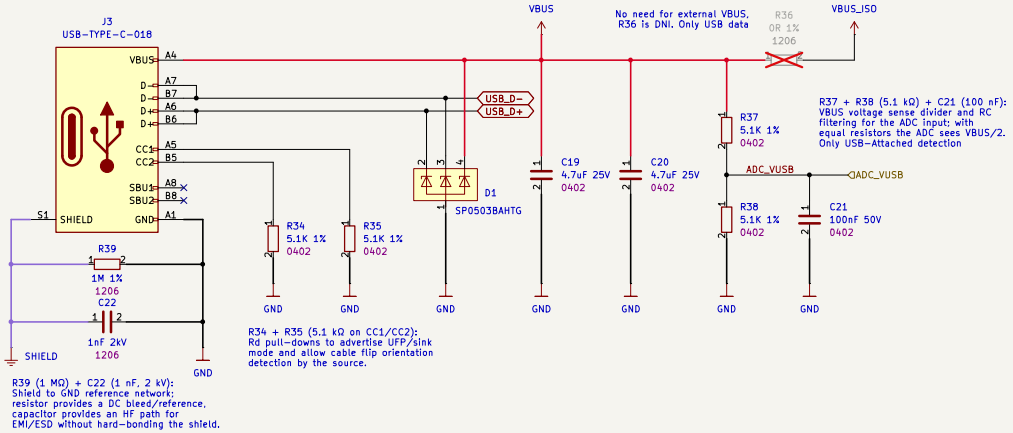
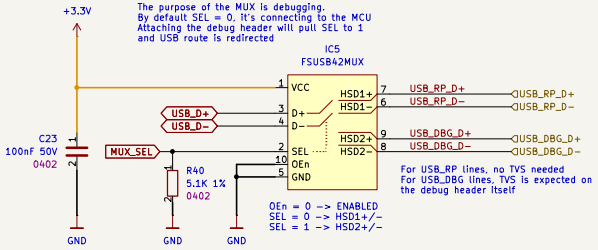
|---|---|---|---|---|
| Comments: | Company: DvidMakesThings | | Variant: Pro | Git Hash: |
| | Board Name: Baseboard | | Project Name: PDNode-600 Pro | |
| Sheet Title: Ethernet Interface | File Name: ethernet_interface.kicad_sch | Designer: David Sipos | Date: 2026-02-05 | Revision: 1.0.0 |
| Sheet Path: /Block Diagram/Ethernet Interface/ | | Reviewer: | Size: A3 | Sheet: 6 of 15 |

# USB Interface

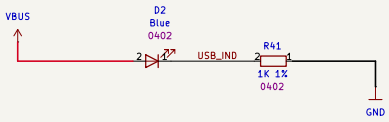
## USB-C CONNECTOR




## USB DATA-PATH SELECTOR

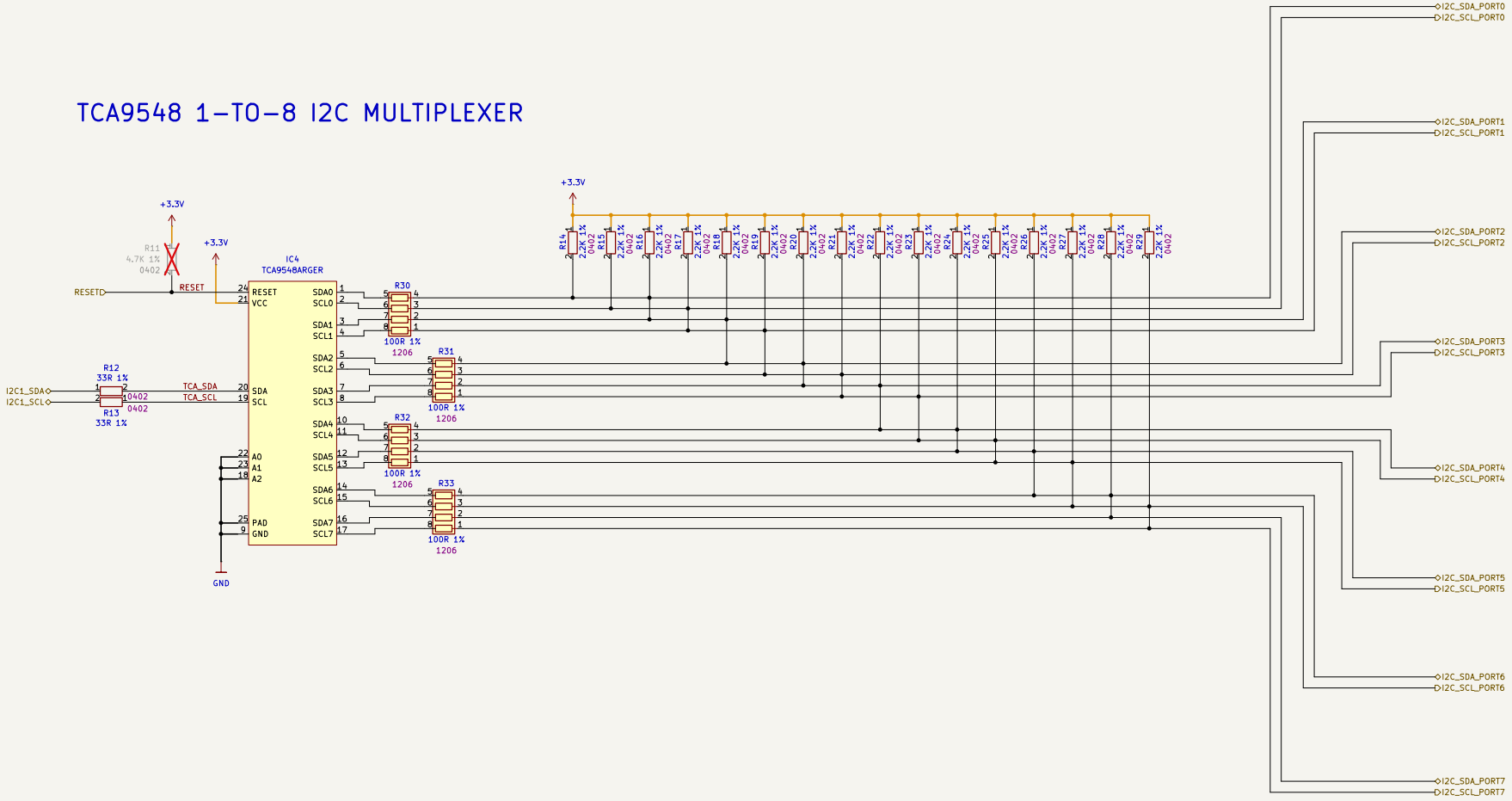



## USB INDICATOR LED




| | | | | |
|---|---|---|---|---|
| Comments: | Company: DvidMakesThings | | Variant: Pro | Git Hash: |
| | Board Name: Baseboard | | Project Name: PDNode-600 Pro | |
| Sheet Title: USB Interface | File Name: usb_interface.kicad_sch | Designer: David Sipos | Date: 2026-02-05 | Revision: 1.0.0 |
| Sheet Path: /Block Diagram/USB Interface/ | | Reviewer: | Size: A3 | Sheet: 7 of 15 |

# TCA9548 Port Controller

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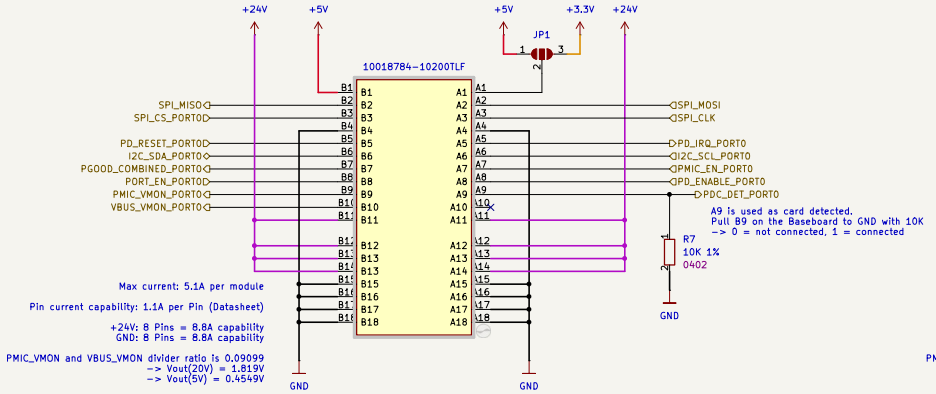
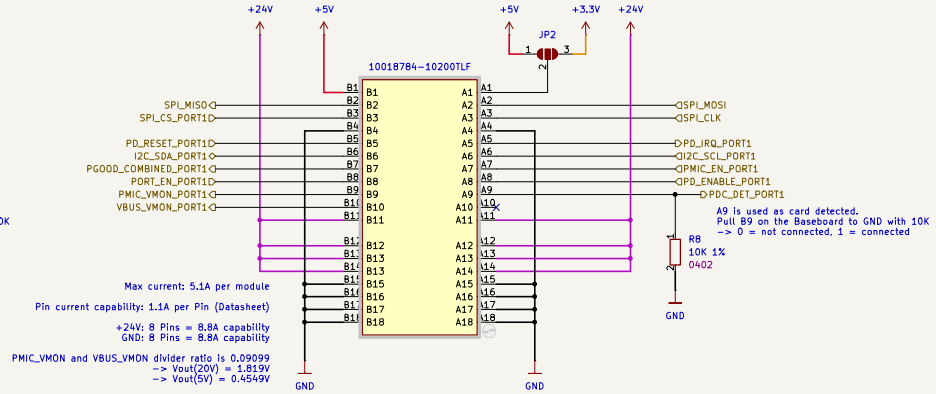
|---|---|---|---|---|
| Comments: | Company: DvidMakesThings | | Variant: Pro | Git Hash: |
| | Board Name: Baseboard | | Project Name: PDNode-600 Pro | |
| Sheet Title: TCA9548 Port Controller | File Name: TCA9548_port_controller.kicad_sch | Designer: David Sipos | Date: 2026-02-05 | Revision: 1.0.0 |
| Sheet Path: /Block Diagram/TCA9548 Port Controller/ | | Reviewer: | Size: A3 | Sheet: 8 of 15 |

# PDCard Connectors 1-4

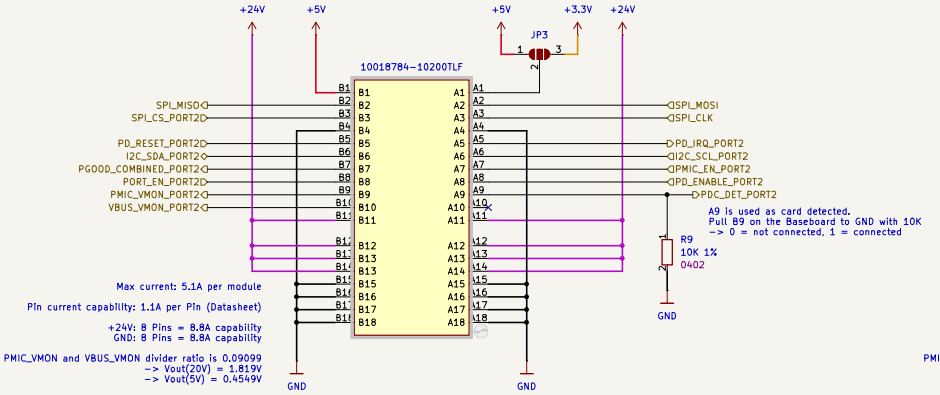
## PORT0 PDC CONNECTOR



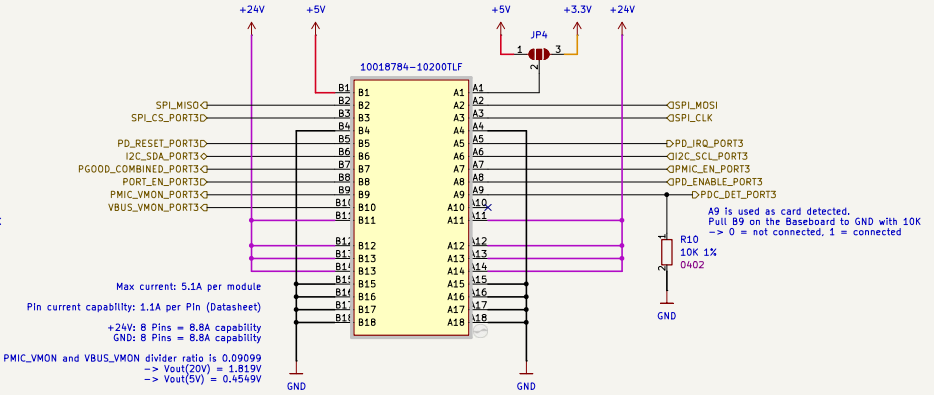

## PORT1 PDC CONNECTOR




## PORT2 PDC CONNECTOR



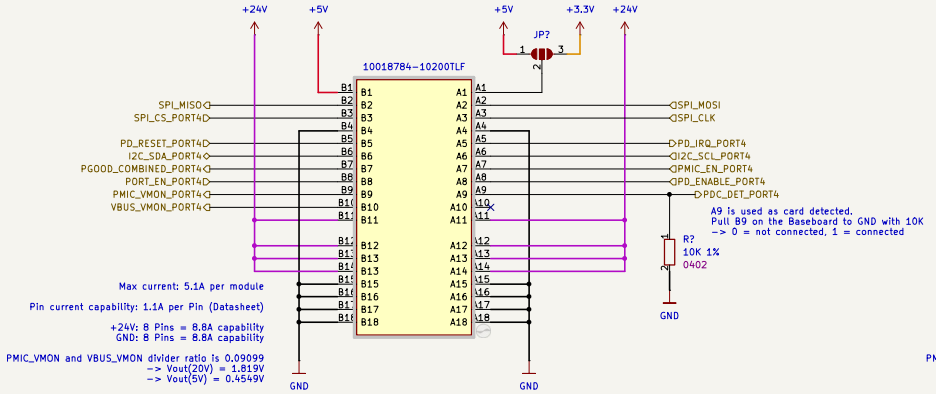

## PORT3 PDC CONNECTOR



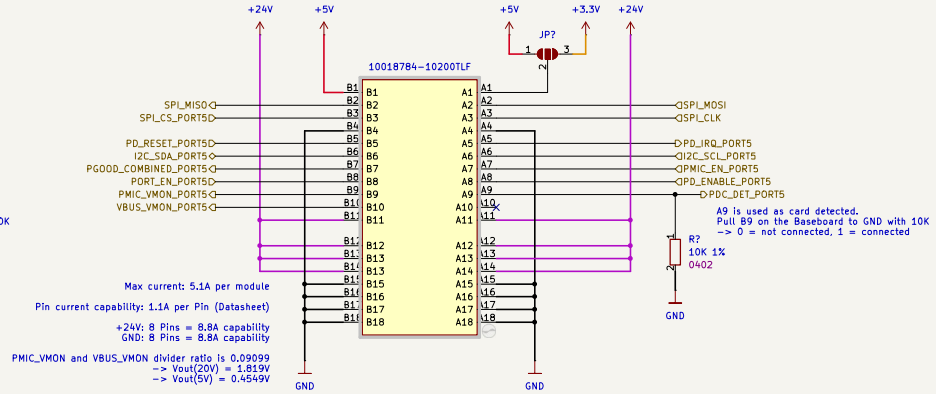

| | | | | |
|---|---|---|---|---|
| Comments: | Company: DvidMakesThings | | Variant: Pro | Git Hash: |
| | Board Name: Baseboard | | Project Name: PDNode-600 Pro | |
| Sheet Title: PDCard Connectors 1-4 | File Name: pdcard_connectors_1-4.kicad_sch | Designer: David Sipos | Date: 2026-02-05 | Revision: 1.0.0 |
| Sheet Path: /Block Diagram/PDCard Connectors 1-4/ | | Reviewer: | Size: A3 | Sheet: 9 of 15 |

# PDCard Connectors 5-8

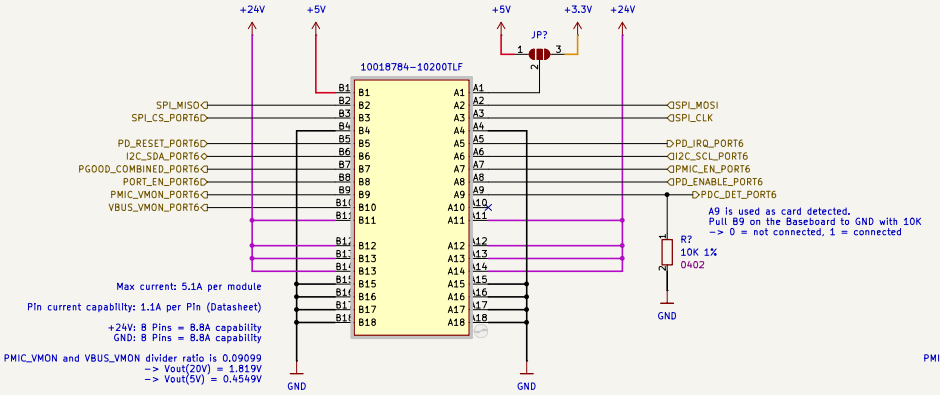
## PORT0 PDC CONNECTOR



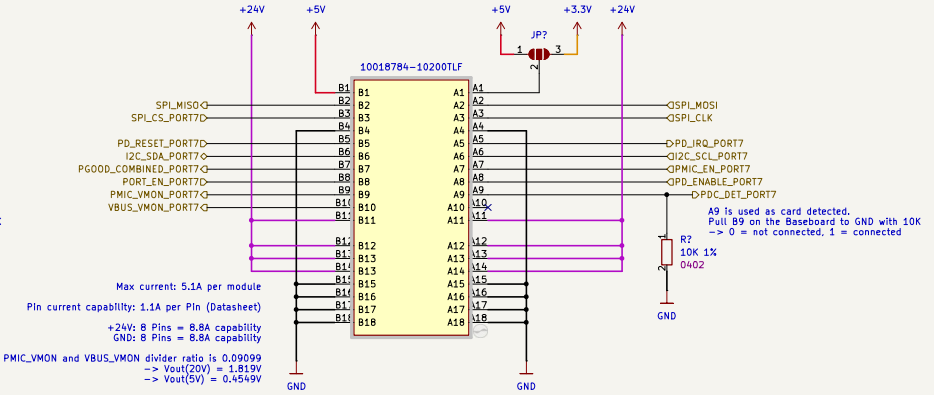

## PORT1 PDC CONNECTOR




## PORT2 PDC CONNECTOR




## PORT3 PDC CONNECTOR

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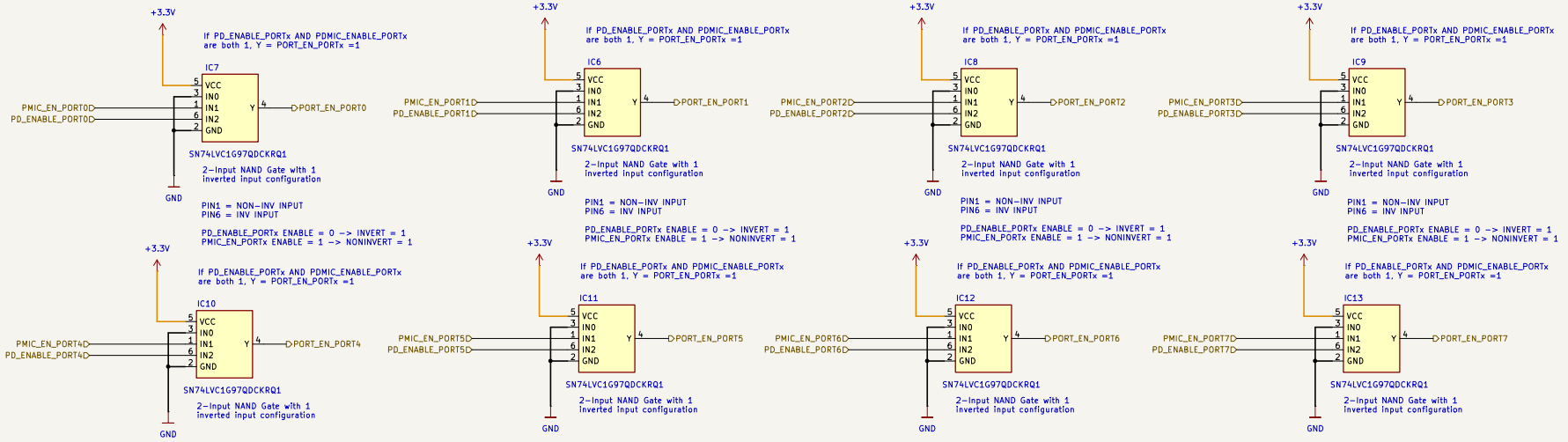
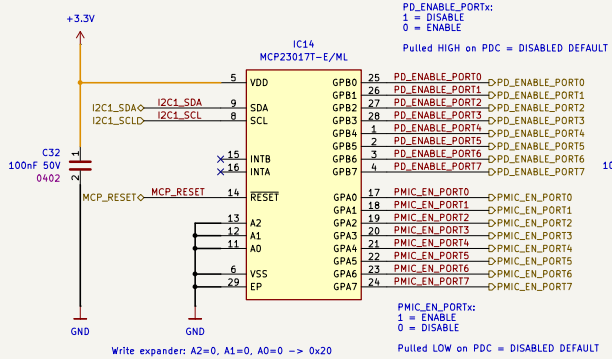
|---|---|---|---|---|
| Comments: | Company: DvidMakesThings | | Variant: Pro | Git Hash: |
| | Board Name: Baseboard | | Project Name: PDNode-600 Pro | |
| Sheet Title: PDCard Connectors 5-8 | File Name: pdcard_connectors_5-8.kicad_sch | Designer: David Sipos | Date: 2026-02-05 | Revision: 1.0.0 |
| Sheet Path: /Block Diagram/PDCard Connectors 5-8/ | | Reviewer: | Size: A3 | Sheet: 10 of 15 |

# PDC Signals

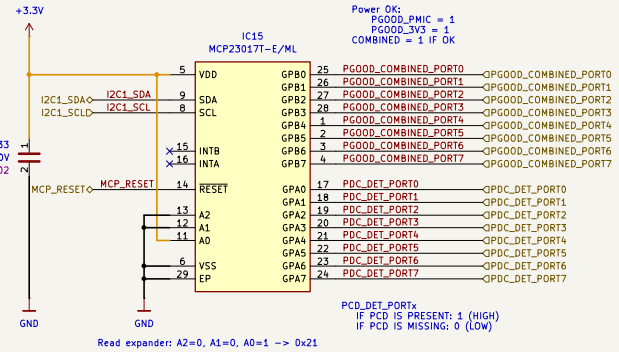
## PDC ENABLE LEDS



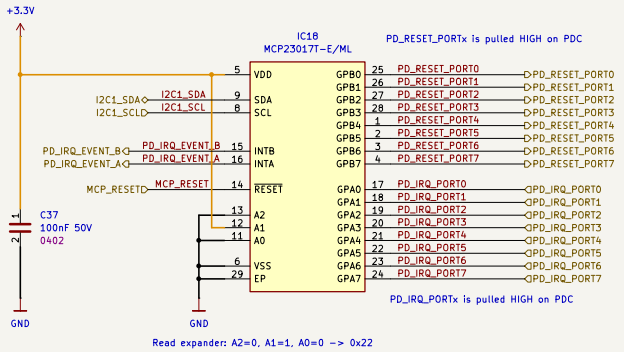

## PDC CONTROL SIGNALS (TO WRITE)



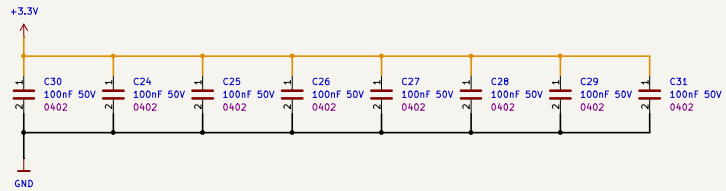

## PDC STATUS SIGNALS (TO READ)




## PDC RESET AND INTERRUPT




## DECOUPLING

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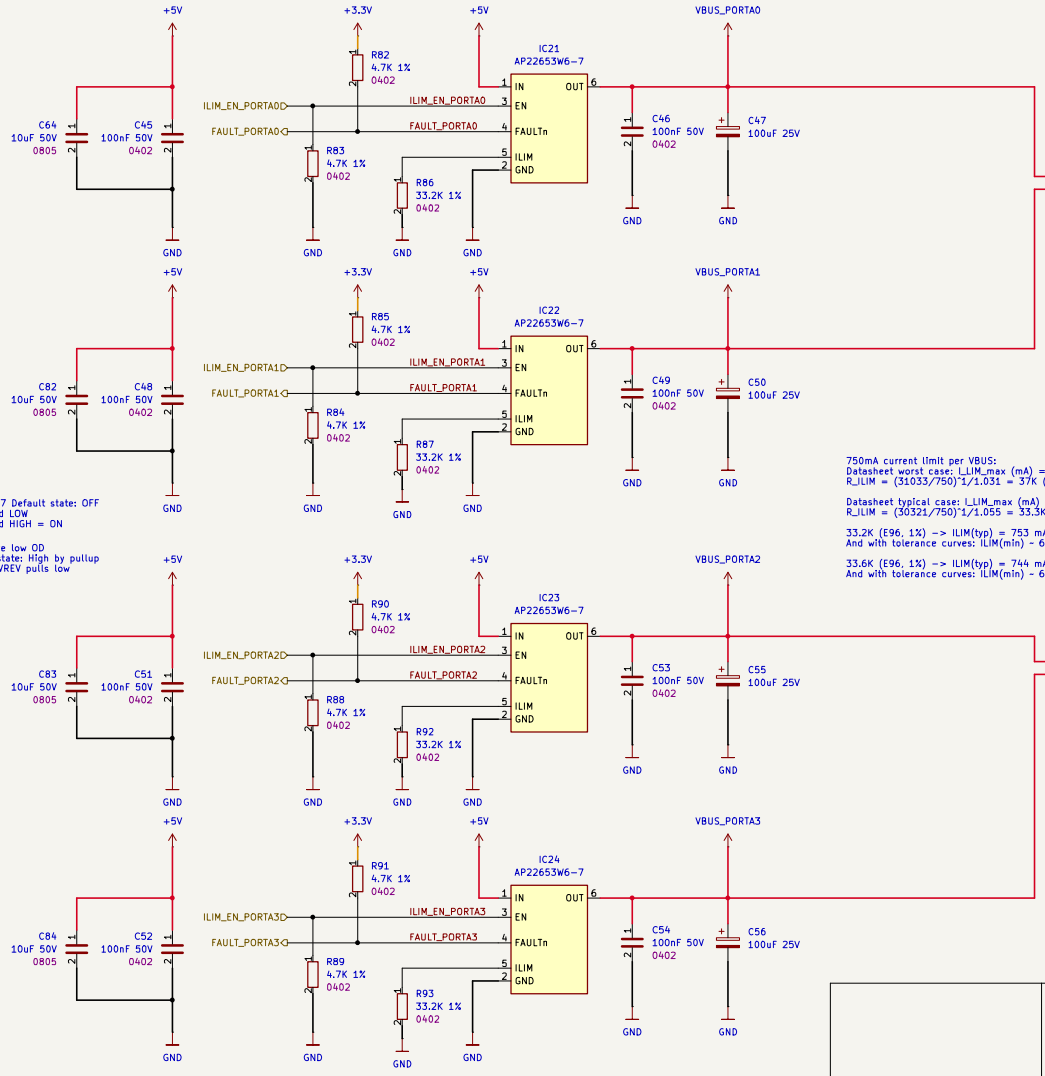
|---|---|---|---|---|
| Comments: | Company: DvidMakesThings | | Variant: Pro | Git Hash: |
| | Board Name: Baseboard | | Project Name: PDNode-600 Pro | |
| Sheet Title: PDC Signals | File Name: pdc_signals.kicad_sch | Designer: David Sipos | Date: 2026-02-05 | Revision: 1.0.0 |
| Sheet Path: /Block Diagram/PDC Signals/ | | Reviewer: | Size: A3 | Sheet: 11 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

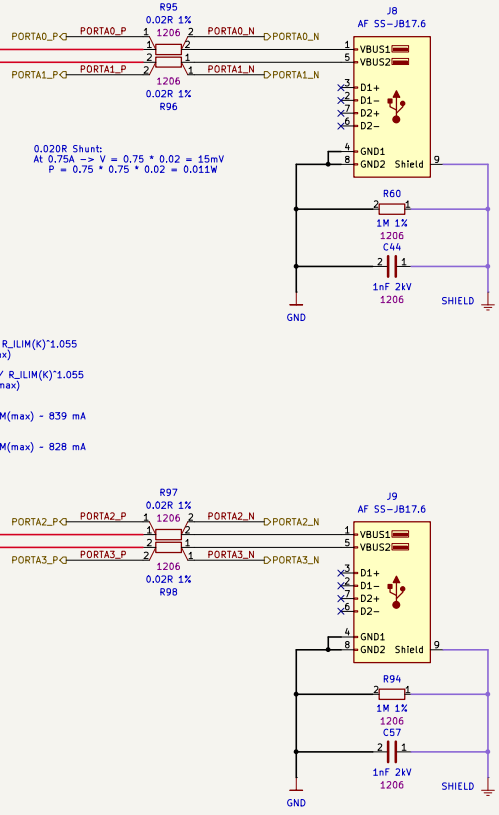
750mA current limit per VBUS:
Datasheet worst case: I_LIM_max (mA) = 30321 / R_ILIM(K)^1.055
R_ILIM = (31033/750)^1/1.031 = 37K (750mA max)

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

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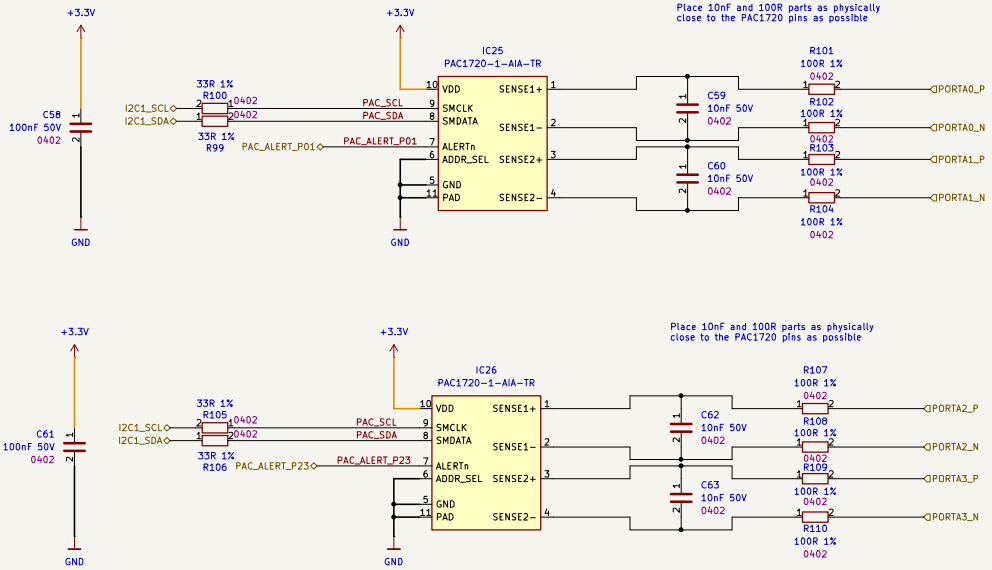
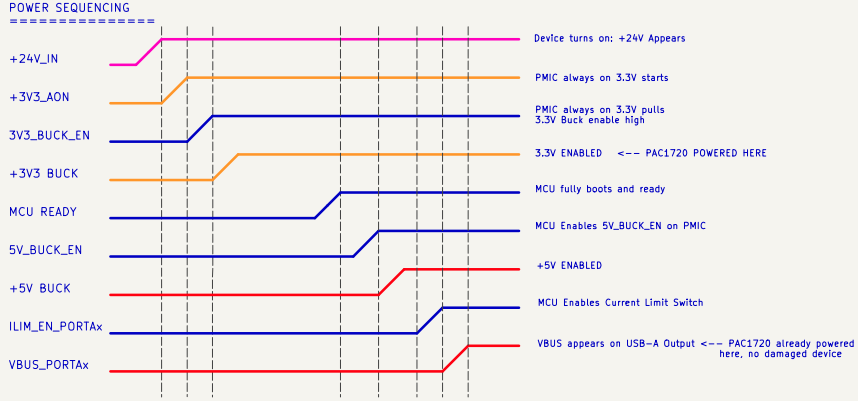
|---|---|---|---|---|
| Comments: | Company: DvidMakesThings | | Variant: Pro | Git Hash: |
| | Board Name: Baseboard | | Project Name: PDNode-600 Pro | |
| Sheet Title: USB-A Outputs | File Name: usb-a_outputs.kicad_sch | Designer: David Sipos | Date: 2026-02-05 | Revision: 1.0.0 |
| Sheet Path: /Block Diagram/USB-A Outputs/ | | Reviewer: | Size: A3 | Sheet: 12 of 15 |

# USB-A Current Measurement

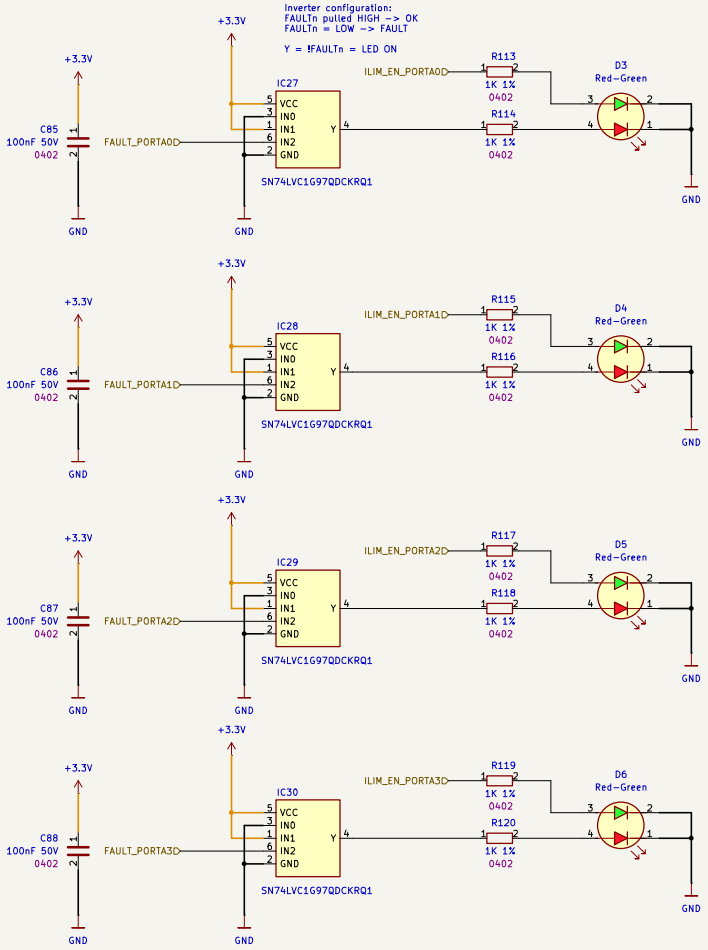
## USB CURRENT MEASUREMENT




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."




## USB-A CURRENT LIMIT SIGNALS

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|---|---|---|---|---|
| Comments: | Company: DvidMakesThings | | Variant: Pro | Git Hash: |
| | Board Name: Baseboard | | Project Name: PDNode-600 Pro | |
| Sheet Title: USB-A Current Measurement | File Name: usba_current_measurement.kicad_sch | Designer: David Sipos | Date: 2026-02-05 | Revision: 1.0.0 |
| Sheet Path: /Block Diagram/USB-A Current Measurement/ | | Reviewer: | Size: A3 | Sheet: 13 of 15 |

# External Power Connectors

| | | | | |
|---|---|---|---|---|
| Comments: | Company: DvidMakesThings | | Variant: Pro | Git Hash: |
| | Board Name: Baseboard | | Project Name: PDNode-600 Pro | |
| Sheet Title: External Power Connectors | File Name: external_power_connectors.kicad_sch | Designer: David Sipos | Date: 2026-02-05 | Revision: 1.0.0 |
| Sheet Path: /Block Diagram/External Power Connectors/ | | Reviewer: | Size: A3 | Sheet: 14 of 15 |

# Revision History

| DATE | REVISION | RESPONSIBLE | CHANGE |
|---|---|---|---|
| 16.01.2026 | 1.0.0 | DMT | INITIAL CREATION |
| 03.02.2026 | 1.0.1 | DMT | 24V to 5V and 3.3V PMIC removed for cost reduction |
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|---|---|---|---|---|---|
| Comments: | Company: DvidMakesThings | | | Variant: Pro | Git Hash: |
| | Board Name: Baseboard | | | Project Name: PDNode-600 Pro | |
| Sheet Title: Revision History | File Name: Revision History.kicad_sch | | Designer: David Sipos | Date: 2026-02-05 | Revision: 1.0.0 |
| Sheet Path: /Revision History/ | | | Reviewer: | Size: A3 | Sheet: 15 of 15 |