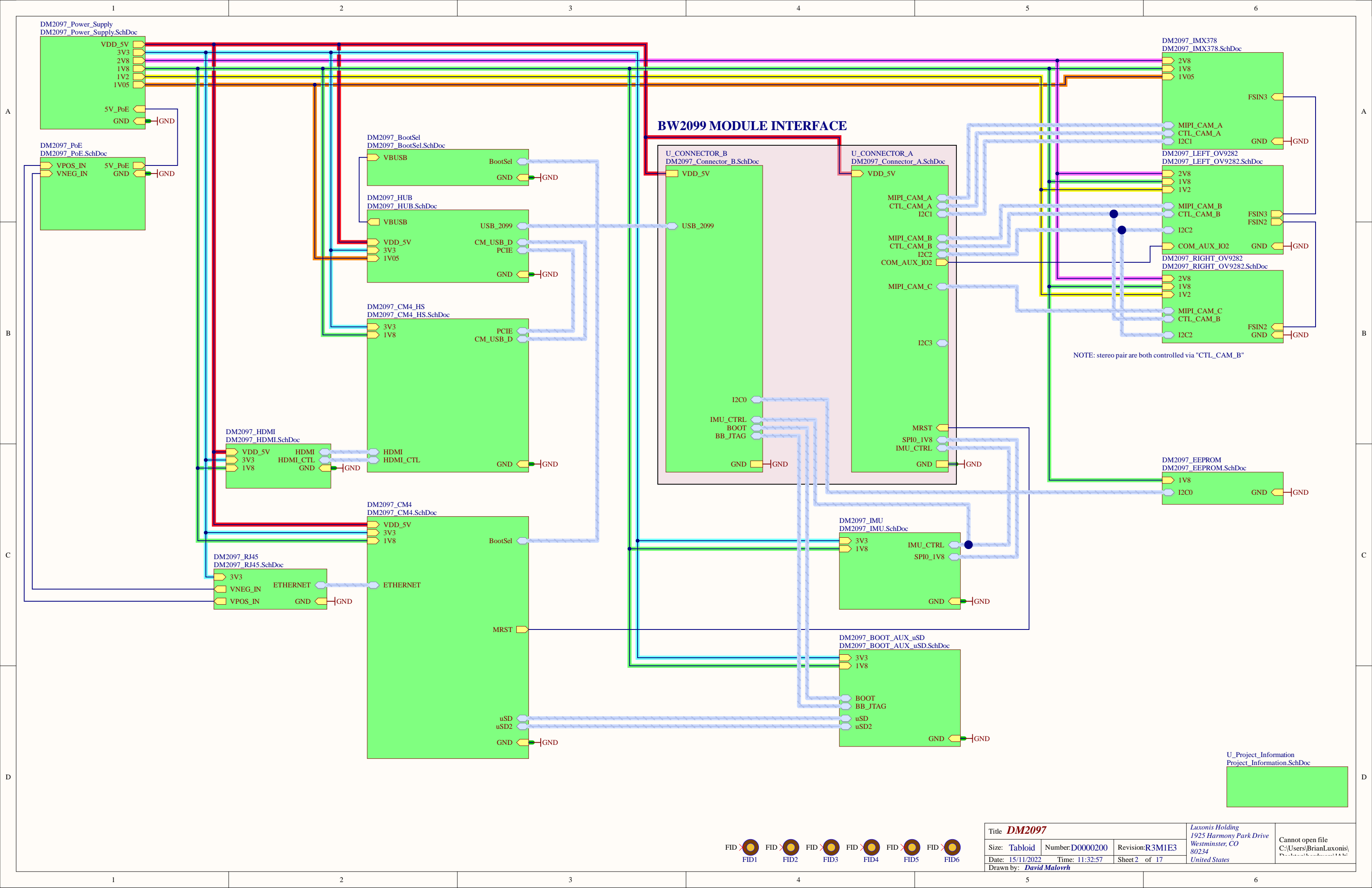


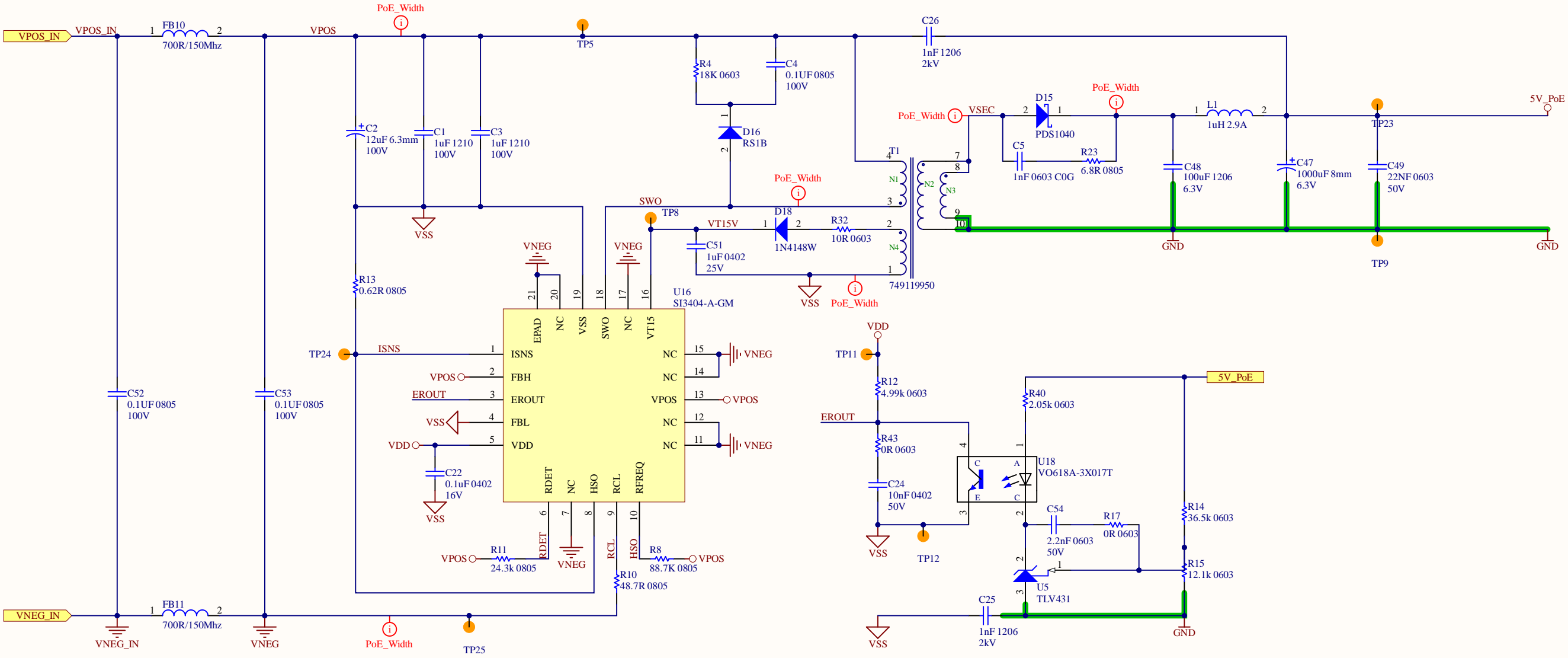
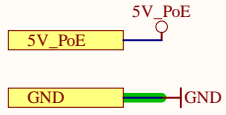
Project: DM2097

Current Revision: R3M1E3

DM2097Revision History:

12/11/2020	R0M0E0	Initial release	
04/05/2021	R0M0E0 -> R1M1E1	1) Add PoE support so that device can be used remotely and in an eclosure 2) Design board to be easily enclosed 3) Add USB3 support for faster transfer rate between SoMs 4) Add IMU 5) Update all leveraged errors from previous designs	1) Imported PoE circuitry from LUX-D-PoE designs 2) Made sure that only necessary connectors are populated and used on this design 3) Added PCIe to USB3 hub 4) Implemented IMU design used on other base boards 5) Updated IMX378 footprint to 1.6mm PCB compatible, updated sync circuitry
04/05/2021	DM1097_R1M1E1 -> DM2097_R0M0E0	1) Correct the USB connection to the SoM (swapped RX and TX) add AC caps for SSTX from USB hub to SoM 2) Incorporate new Arducam FPC/connector design for CCMs 3) Add another uSD socket for mass storage 4) Add EEPROM for board info memory	1) Swapped RX and TX and added AC caps for SSTX from USB hub to SoM 2) New Arducam FPC/connector design for CCMs 3) Added another uSD socket 4) Added EEPROM
10/07/2021	DM2097_R0M0E0 -> DM2097_R1M1E1	1) Round corners with bigger diameter on the PCB because of the possible interference between enclosure and PCBA 2) Connect PMIC EN to 3V3 RPi for proper power-up sequence on CM4 3) Move EEPROM to I2C0 and change address to 0x51	1) Cut corners on the PCB because of the collision with the enclosure 2) Connect PMIC EN to 3V3 RPi over 10K resistor 3) Moved EEPROM to I2C0 and changed address to 0x51
02/14/2022	DM2097_R1M1E1 -> DM2097_R2M1E2	1) Connect PMIC EN back to 5V rail so that rails on baseboard are initiated before MX is pulled out of reset	1) Connected PMIC EN back to 5V rail
06/24/2022	DM2097_R2M1E2 -> DM2097_R3M1E3	1) USB HUB IC has stopped working at temperatures lower than specified in the datasheet. 2) New USB HUB IC needed a 24MHz crystall instead of 25MHz	1) Replaced USB HUB IC to UPD720201K8-701-BAC-A 2) Replaced crystall with FA-12824.0000MF10Z-W3

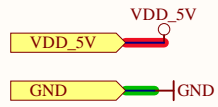




A VNEG is a thermal plane as well as ESD and EMI. Use thermal vias to at least 1 inch square plane on backside.

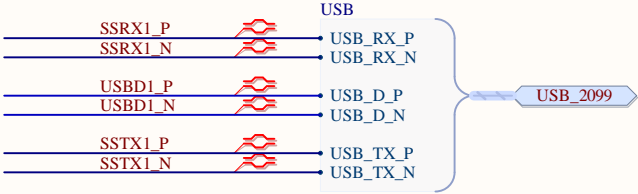
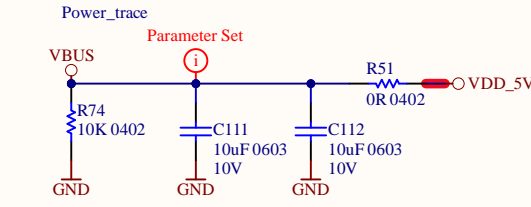
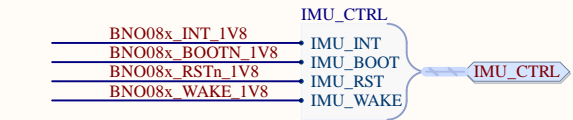
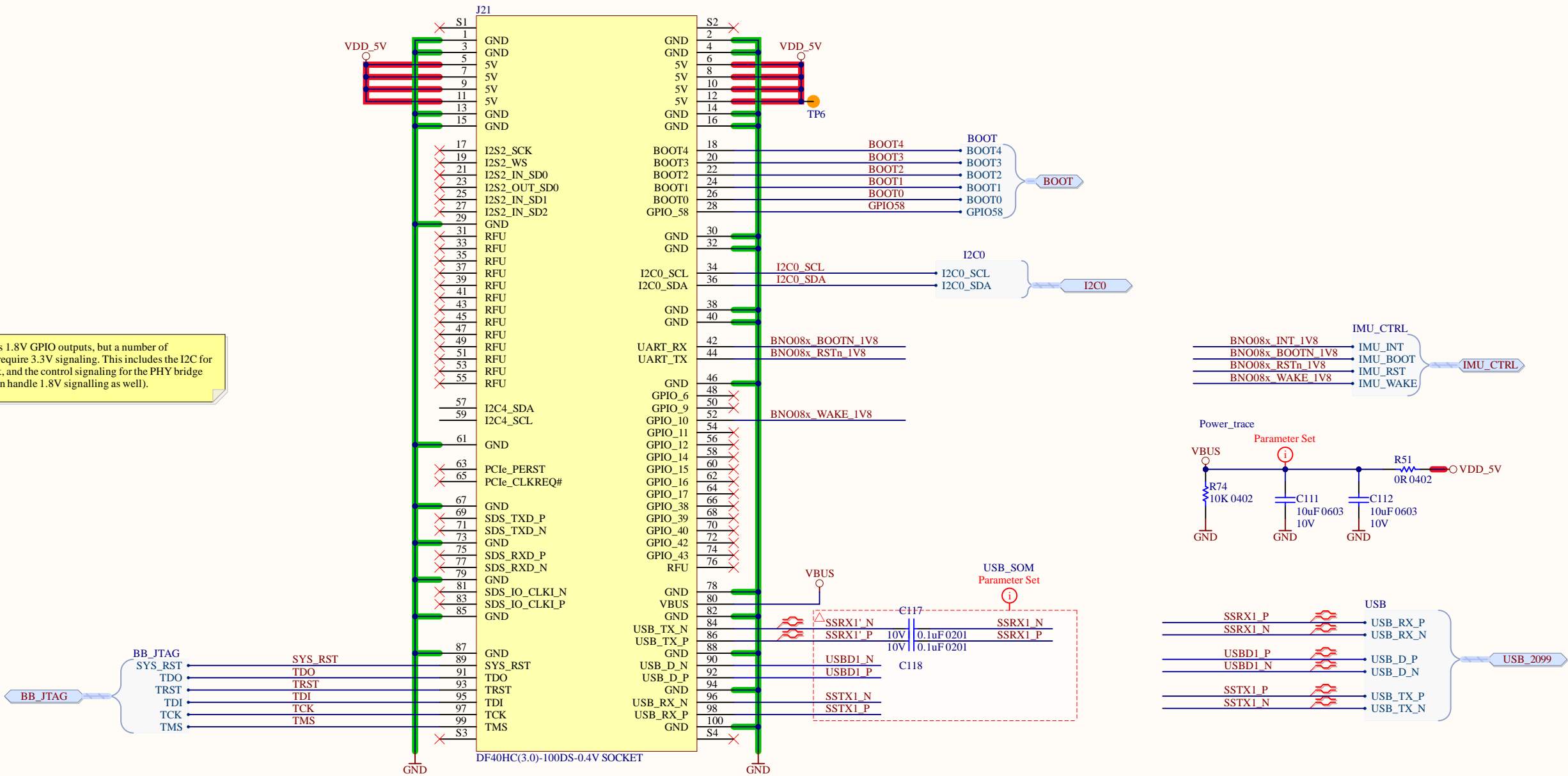
A Schematic based on the reference design for the SI3404 PoE.

Title	DM2097		Luxonis Holding 1925 Harmony Park Drive Westminster, CO 80234 United States	
Size:	Tabloid	Number:D0000200	Revision:R3M1E3	Cannot open file C:\Users\BrianLuxonis\
Date:	15/11/2022	Time: 11:32:57	Sheet 3 of 12	
Drawn by:	David Malovrh			

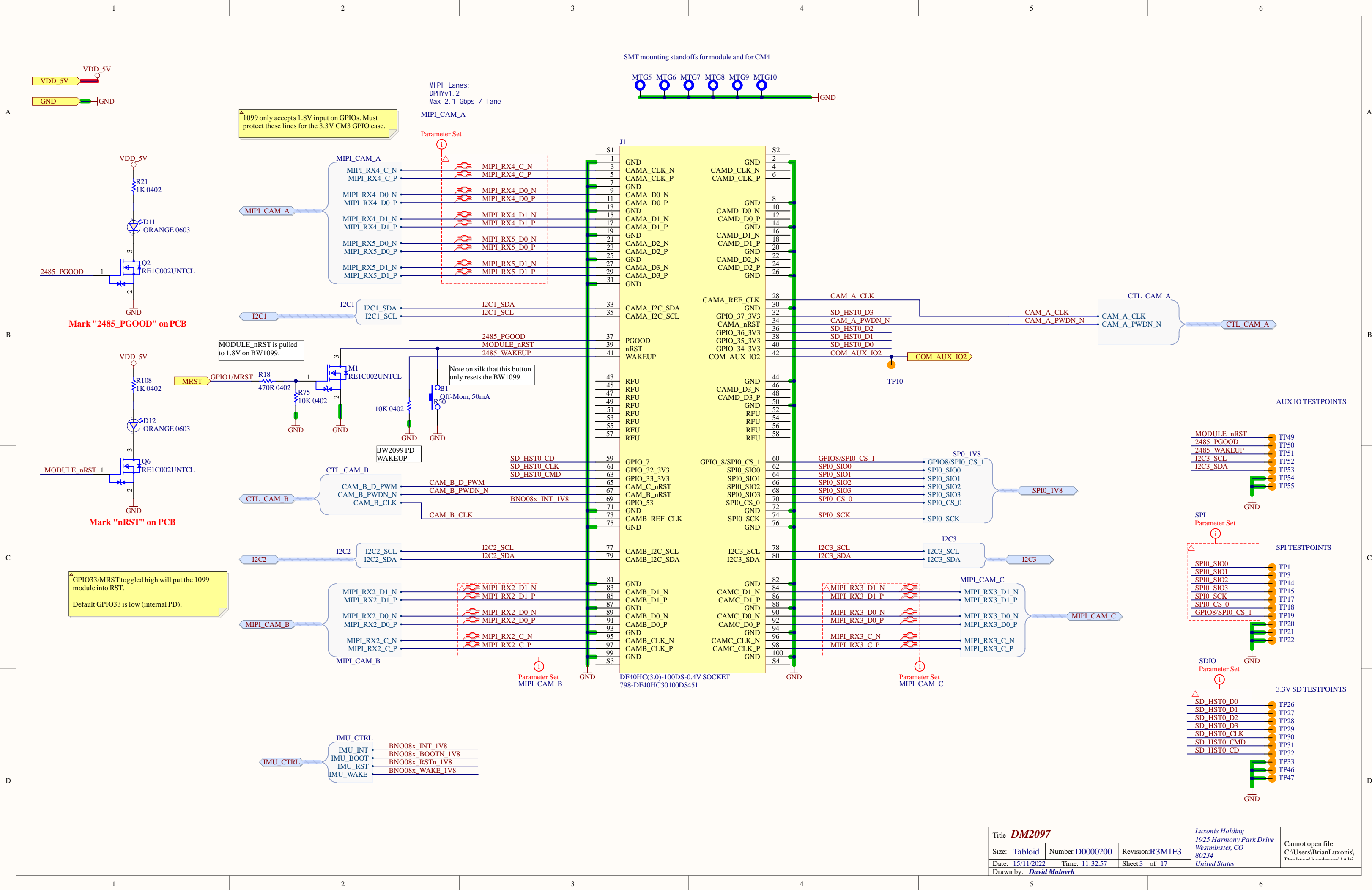


BW2099 CONNECTOR B

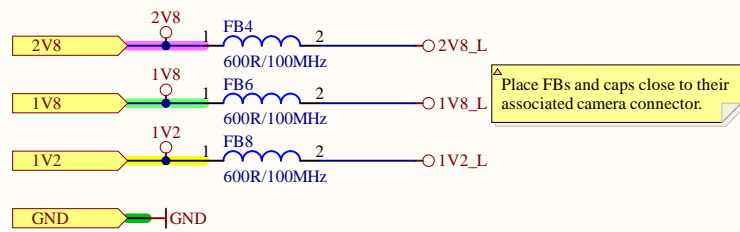
The Myriad X (MX) has 1.8V GPIO outputs, but a number of PCIe-related functions require 3.3V signaling. This includes the I2C for the PCIe reference clock, and the control signaling for the PHY bridge (though RTL8111HS can handle 1.8V signalling as well).



Title <b>DM2097</b>			Luxonis Holding 1925 Harmony Park Drive Westminster, CO 80234 United States	
Size: <b>Tabloid</b>	Number: <b>D0000200</b>	Revision: <b>R3M1E3</b>	Cannot open file C:\Users\BrianLuxonis\Documents\DM2097.dwg	
Date: 15/11/2022	Time: 11:32:57	Sheet 3 of 17		
Drawn by: <b>David Malovrh</b>				

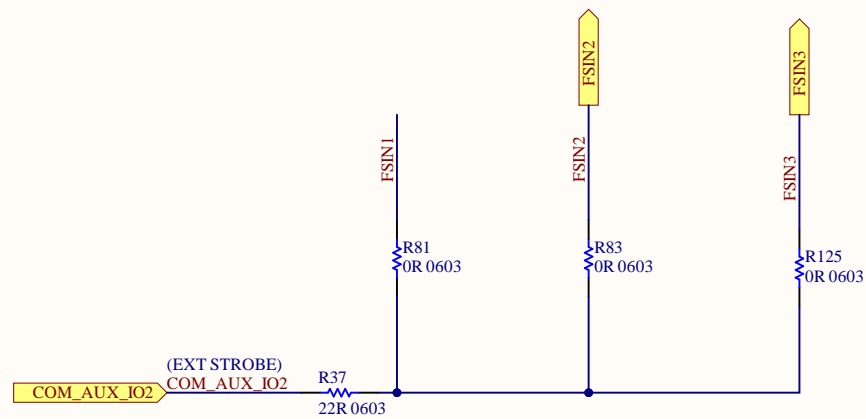
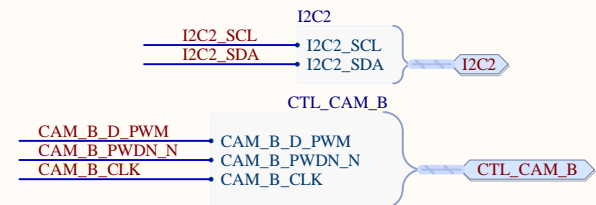
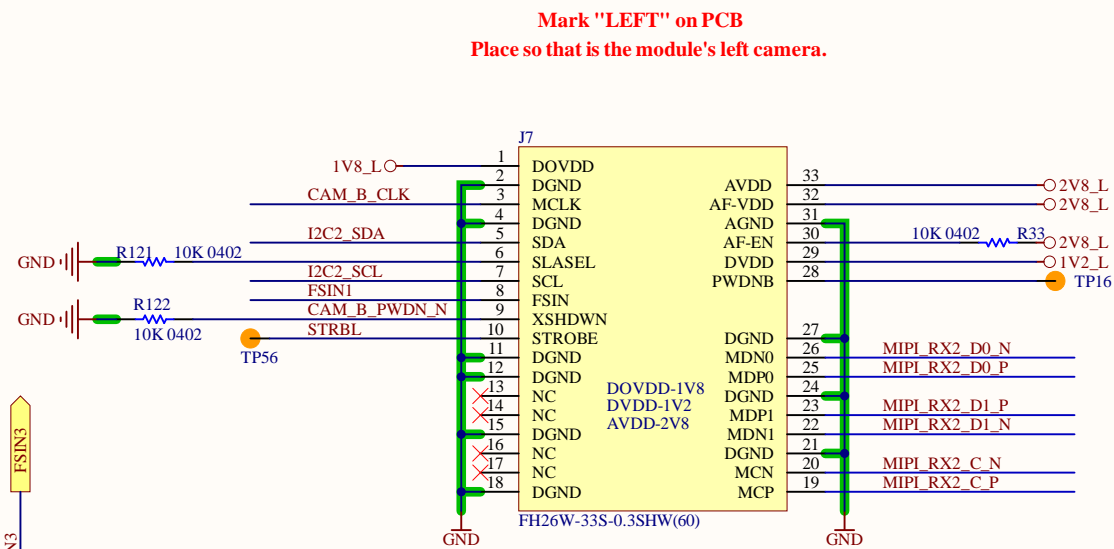
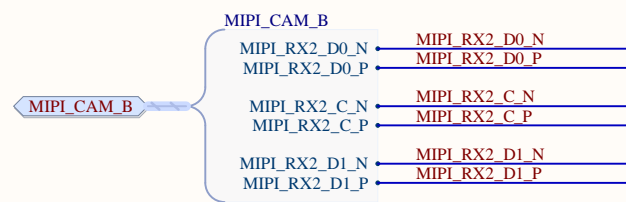




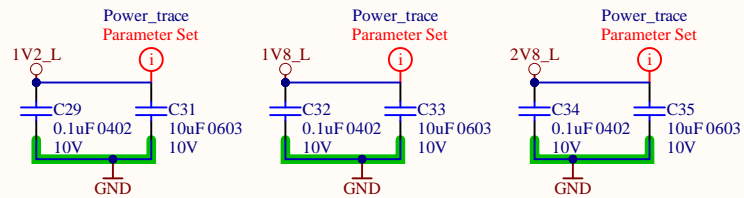


MODULE & SENSOR INFORMATION			
MODULE	TG161B-201 OR ANOV132-0JG		12C Clock Rate
SENSOR	0V09282-G4AA	12C Address (8 bit s)	400 kHz Max
	B&W 1 Mega pixel CMOS		0xC0(W) 0xC1(R)
	1/4 1 inch		
MAX RESOLUTION	1280x800	Sensor Clock Input	6 - 64 MHz (24 MHz typ.)

Supply Information			
Supply Name		Voltage	Max Current
Module	Sensor		
DOVDD	VDD-I/O	1.8V	2.5mA
DVDD	VDD-D	1.2V	52mA
AVDD	VDD-A	2.8V	24mA



## Camera timing Sync Option

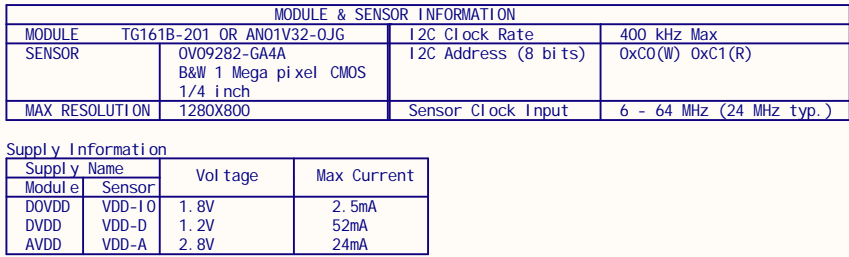


### CAMERA CONNECTOR RESET CONNECTION TABLE

CAMERA CONNECTOR			
	CAM_B	CAM_C	CAM_D
	CAM_PWDN	CAM_PWDN	CAM_PWDN
	CAM_PWM	CAM_AUX_I01	CAM_AUX_I01

Title <b>DM2097</b>			Luxonis Holding 1925 Harmony Park Drive Westminster, CO 80234 United States	Cannot open file C:\Users\BrianLuxonis\ Project\DM2097\Tabloid
Size: <b>Tabloid</b>	Number: <b>D0000200</b>	Revision: <b>R3M1E3</b>		
Date: <b>15/11/2022</b>	Time: <b>11:32:57</b>	Sheet <b>5</b> of <b>17</b>		
Drawn by: <b>David Malorh</b>				

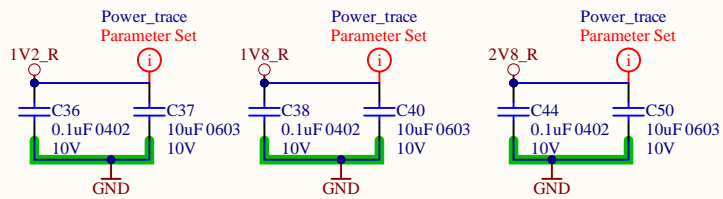
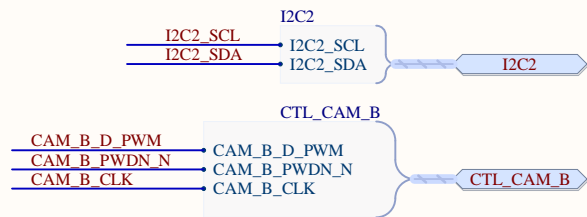
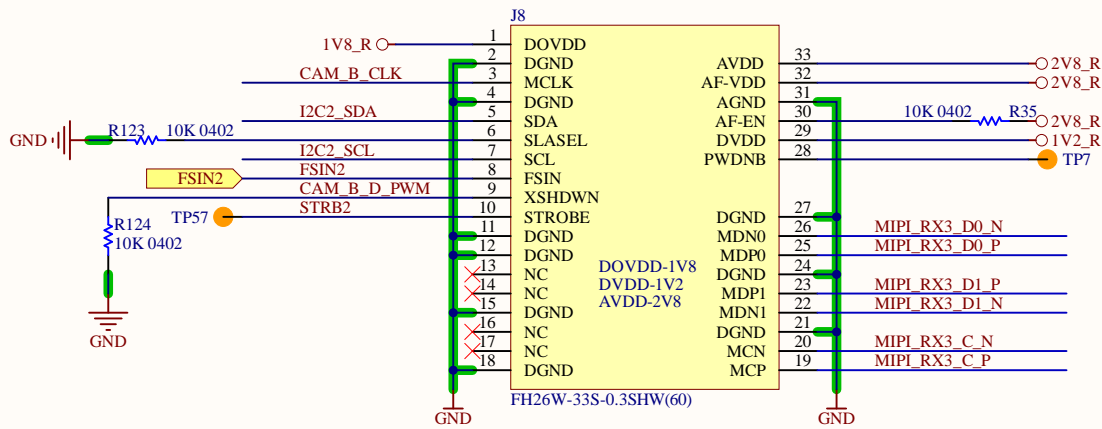




MIPI\_CAM\_C

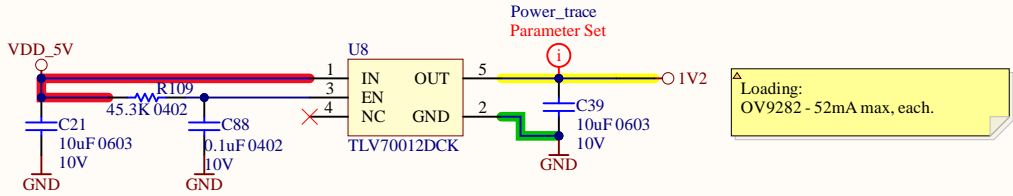
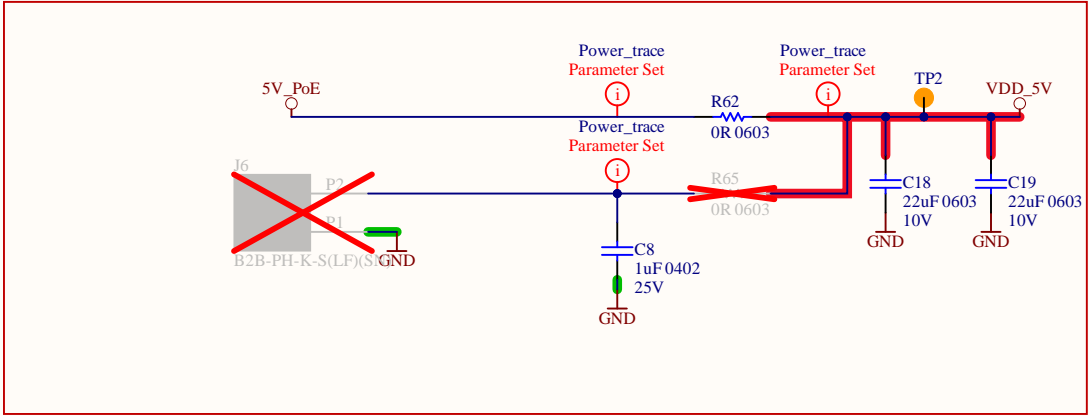
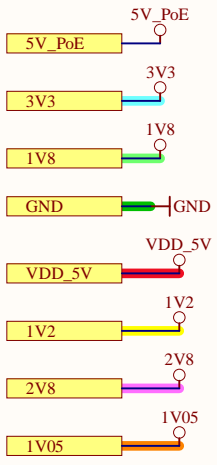
- MIPI\_RX3\_C\_P
- MIPI\_RX3\_C\_N
- MIPI\_RX3\_D0\_P
- MIPI\_RX3\_D0\_N
- MIPI\_RX3\_D1\_P
- MIPI\_RX3\_D1\_N

MIPI Lanes:  
DPHYv1.2  
Max 2.1 Gbps / lane

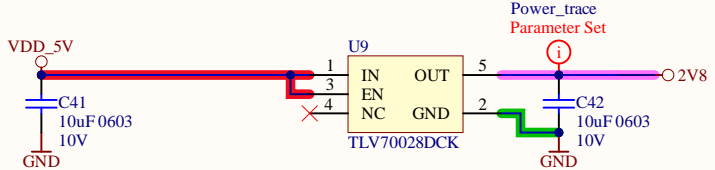




POWER INPUT



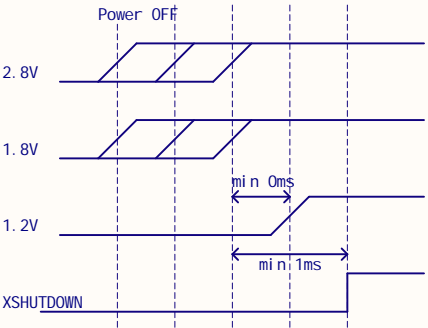
⚠ Loading:  
OV9282 - 52mA max, each.



⚠ Loading:  
OV9282 - 24mA max, each  
IMX378 - 55mA max  
CM\_VDAC - 25mA, if active for A/V output

Placed RC timing circuit for EN pins in order to obtain the appropriate power supply sequencing if necessary

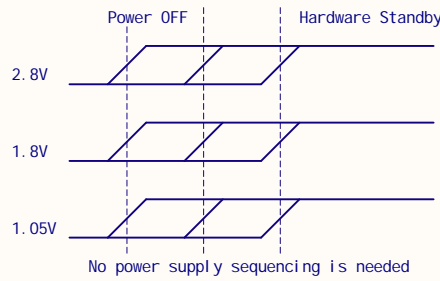
OV9282 POWER REQUIREMENTS



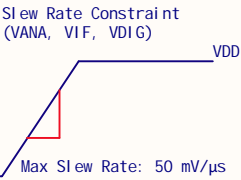
Supply Information		
Supply Name	Sensor	Vol tage
DOVDD	VDD-I/O	1.8V
DVDD	VDD-D	1.2V
AVDD	VDD-A	2.8V

1. AVDD rising can occur before or after DOVDD rising as long as they are rising before XSHUTDOWN rising
2. XSHUTDOWN is pulled up after AVDD and DOVDD are stable
3. DVDD rises after DOVDD, but before XSHUTDOWN is pulled high

IMX378 POWER REQUIREMENTS



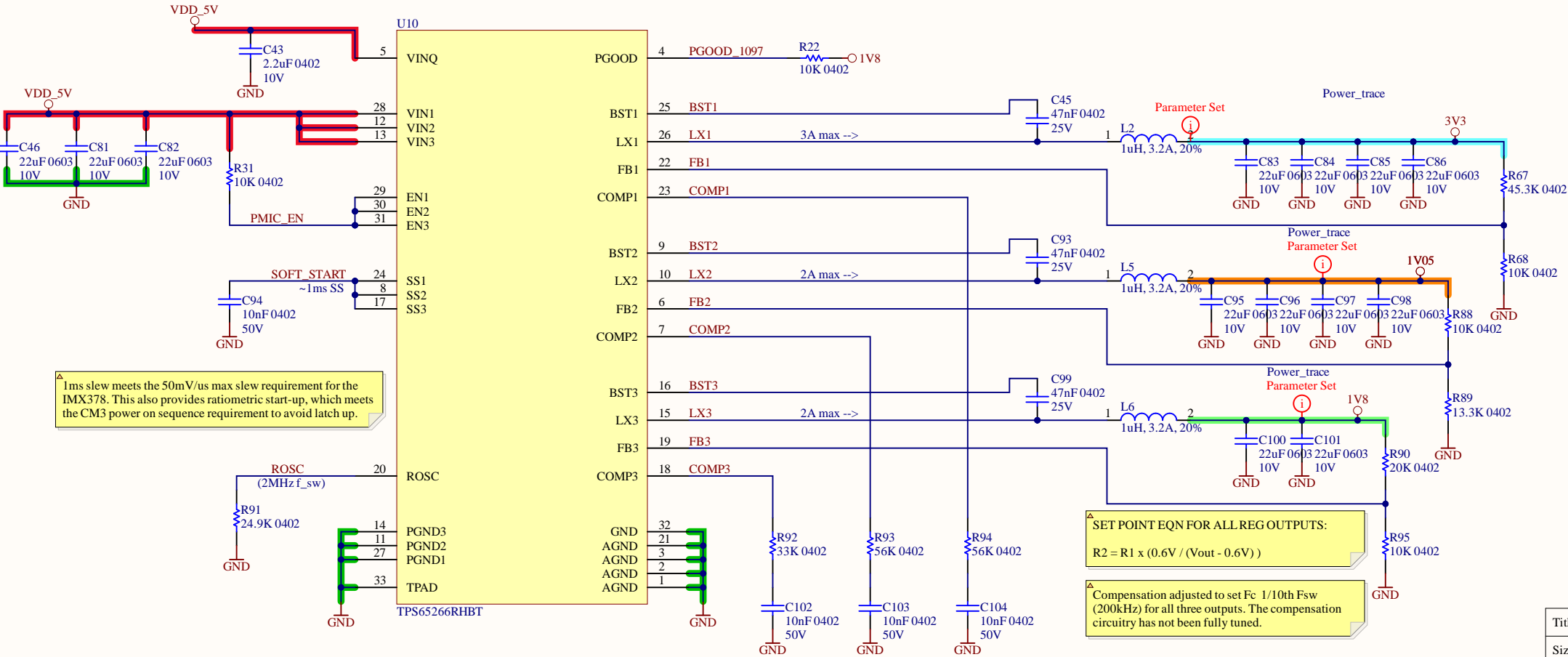
Supply Information		
Supply Name	Sensor	Vol tage
AVDD	VANA	2.8V ± 0.1
DOVDD	VIF	1.8V ± 0.1
DVDD	VDI G	1.05V ± 0.1



⚠ POWER SEQUENCING REQUIREMENTS:

The BW2099 module handles it's own power sequencing on-board. (TBC)

The camera modules have their own power sequencing requirements. The OV9282 have requirements for sequencing, and the IMX378 has a max slew rate requirement. See above.



⚠ 1ms slew meets the 50mV/us max slew requirement for the IMX378. This also provides ratiometric start-up, which meets the CM3 power on sequence requirement to avoid latch up.

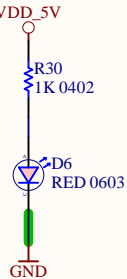
⚠ SET POINT EQN FOR ALL REG OUTPUTS:  
 $R2 = R1 \times (0.6V / (V_{out} - 0.6V))$

⚠ Compensation adjusted to set Fc 1/10th Fsw (200kHz) for all three outputs. The compensation circuitry has not been fully tuned.

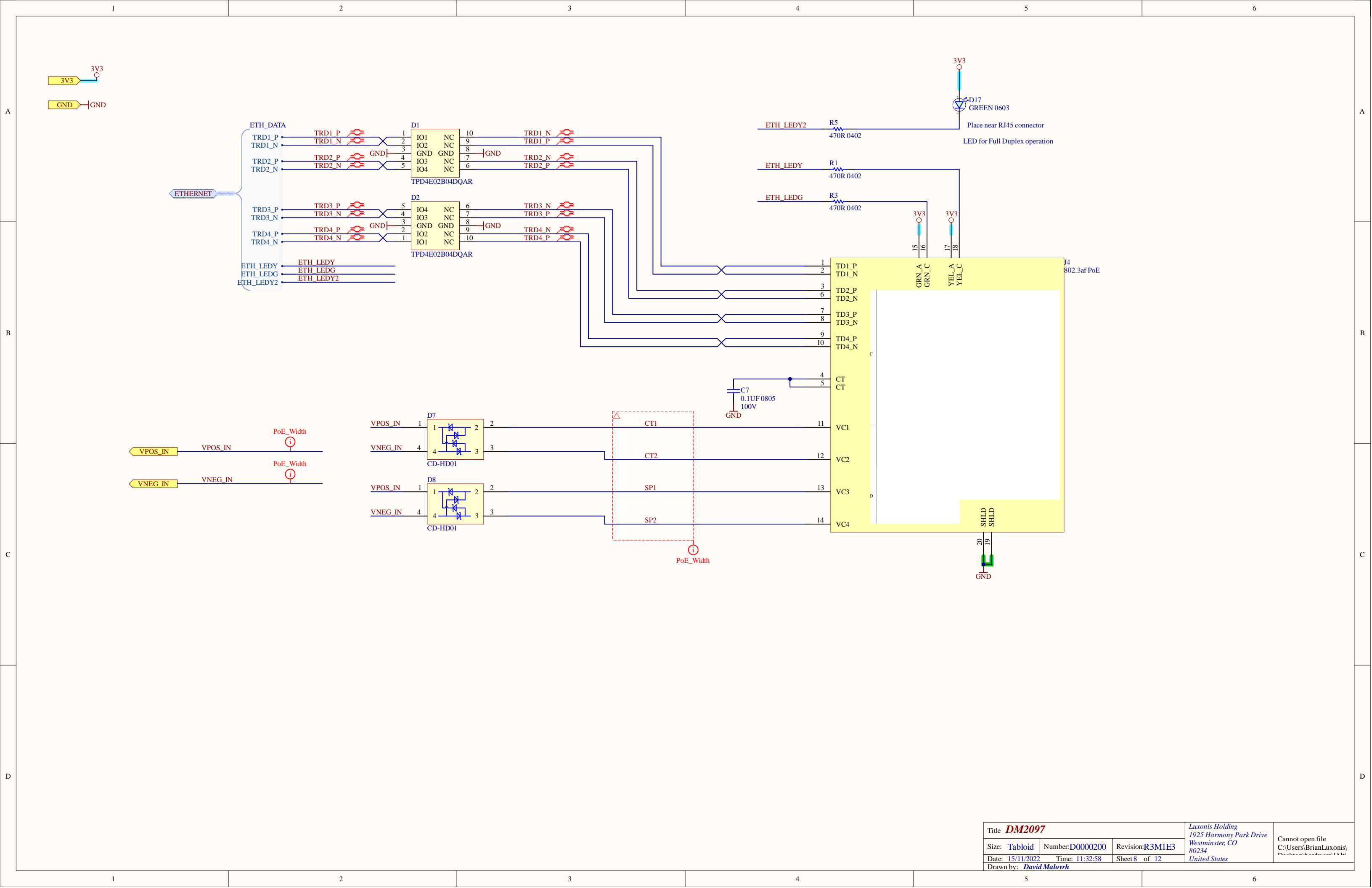
⚠ Effective capacitance targets for each rail, taking into account DC bias and other effects:  
3.3V C\_eff = 24uF  
1.8V C\_eff = 26uF  
1.05V C\_eff = 70uF

Voltage ripple and allowed voltage tolerance on all rails is +/-5%  
  
Load step design assumptions, based on worst case rail loading:  
3.3V - 2.5A step  
1.8V - 1A step  
1.05 - 0.5A step

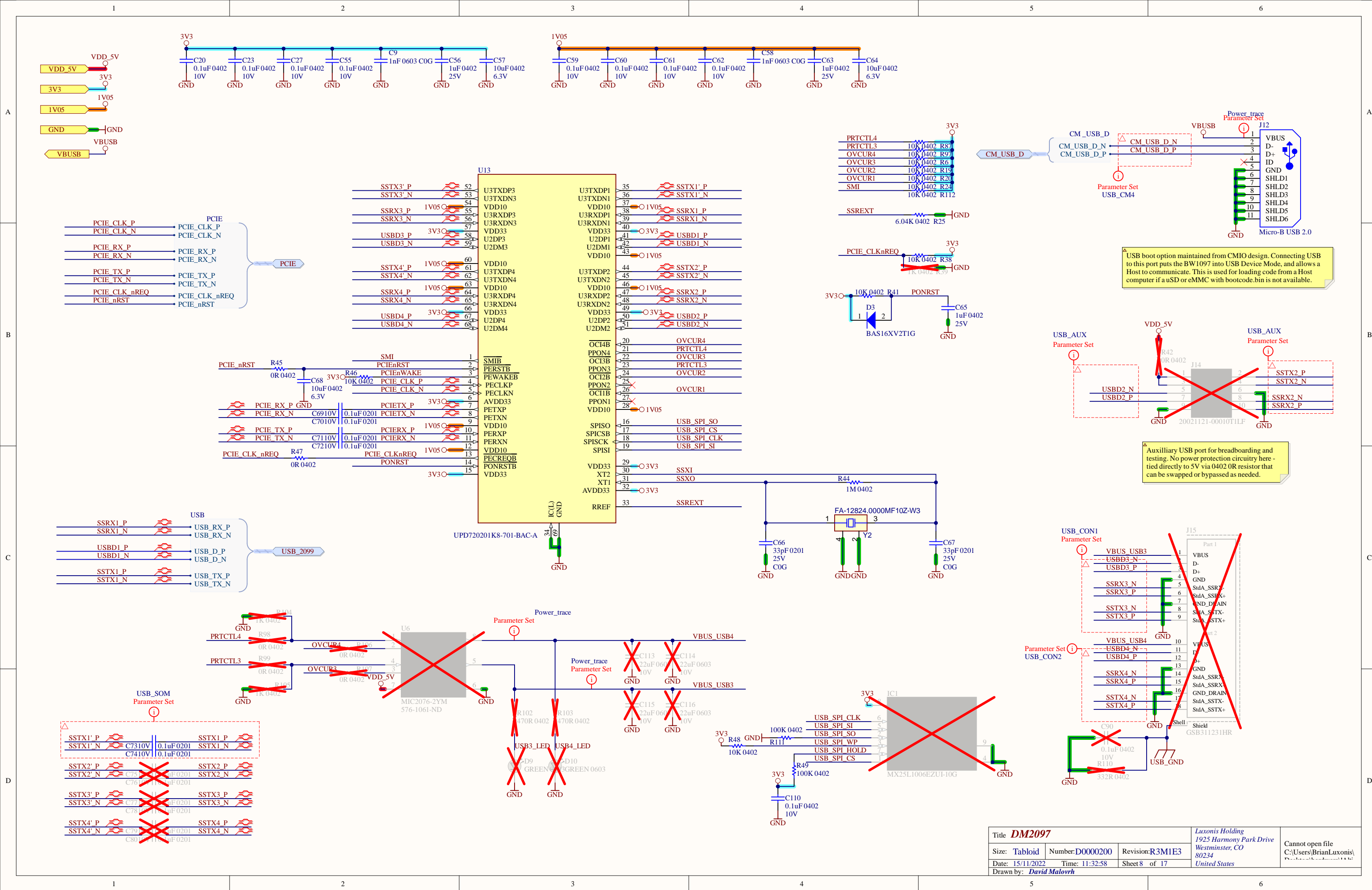
Mark "PWR" on PCB

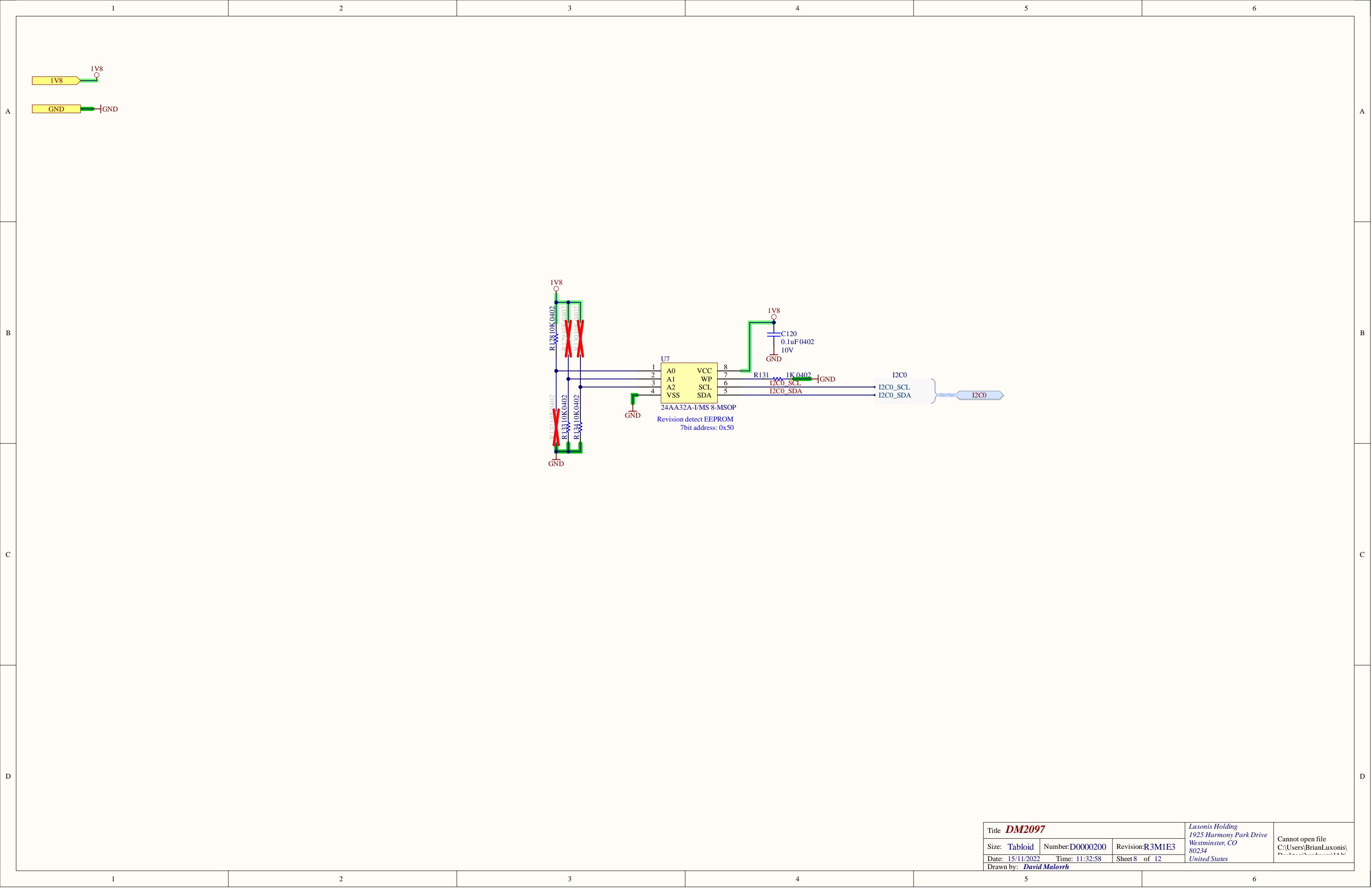


Title <b>DM2097</b>			Luxonis Holding 1925 Harmony Park Drive Westminster, CO 80234		Cannot open file C:\Users\BrianLuxonis\Documents\DM2097.dwg
Size: <b>Tabloid</b>	Number: <b>D0000200</b>	Revision: <b>R3M1E3</b>			
Date: <b>15/11/2022</b>	Time: <b>11:32:57</b>	Sheet <b>7</b> of <b>17</b>	<b>United States</b>		
Drawn by: <b>David Malovrh</b>					

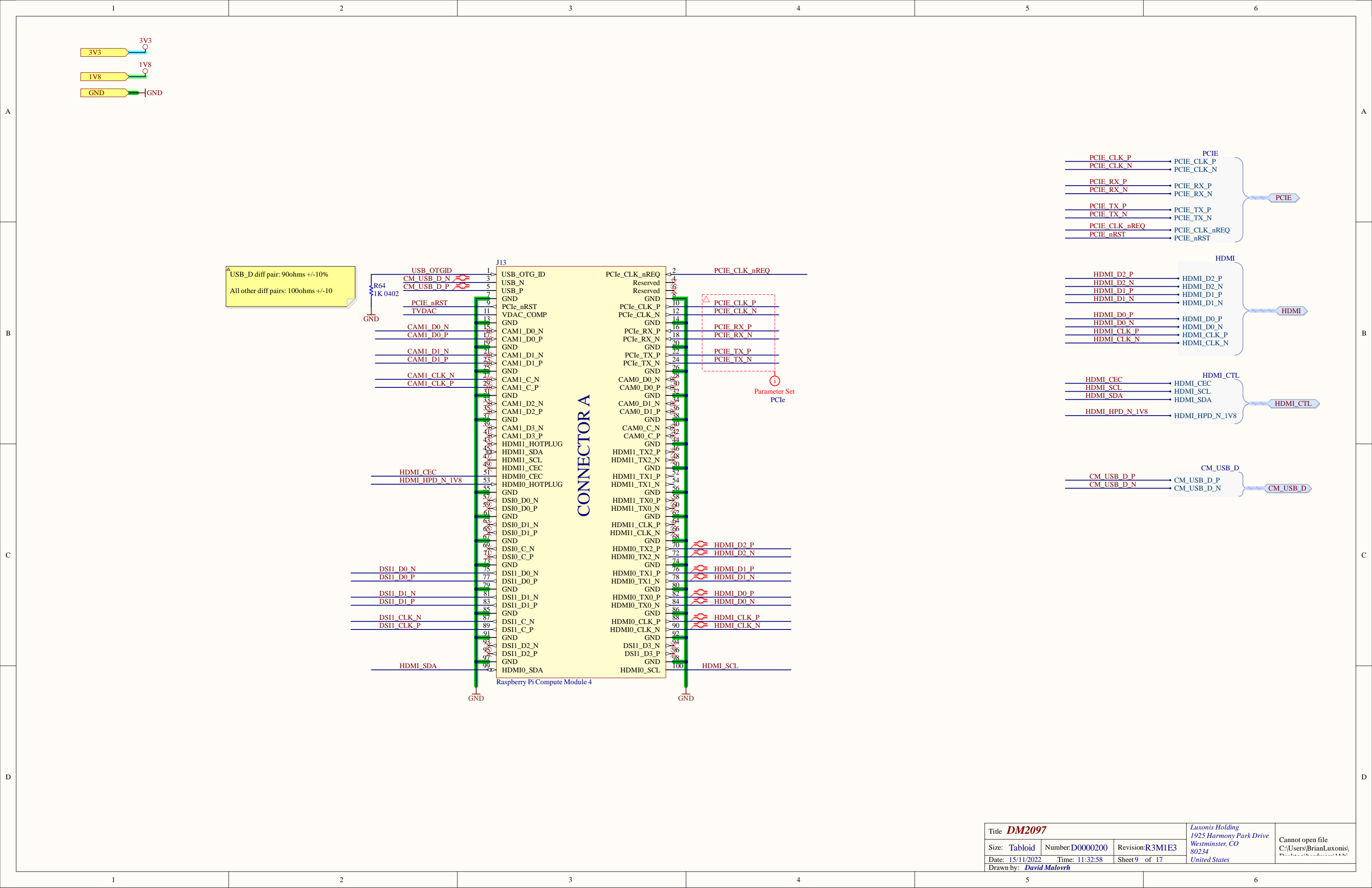


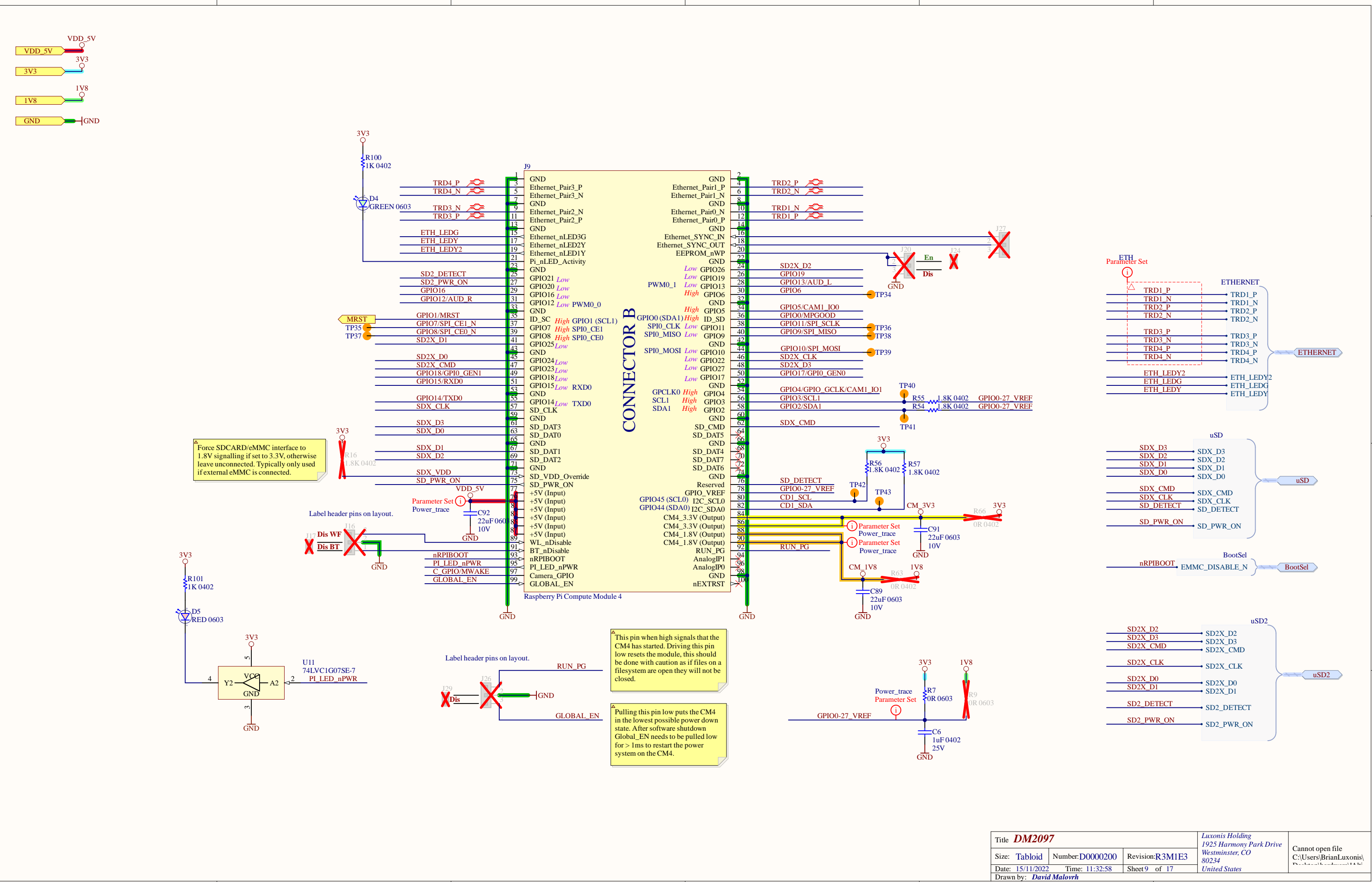
Title <b>DM2097</b>			Luxonis Holding 1925 Harmony Park Drive Westminster, CO 80234 United States	
Size: <b>Tabloid</b>	Number: <b>D0000200</b>	Revision: <b>R3M1E3</b>	Cannot open file C:\Users\BrianLuxonis\... .....	
Date: 15/11/2022	Time: 11:32:58	Sheet 8 of 12		
Drawn by: <b>David Malovrh</b>				





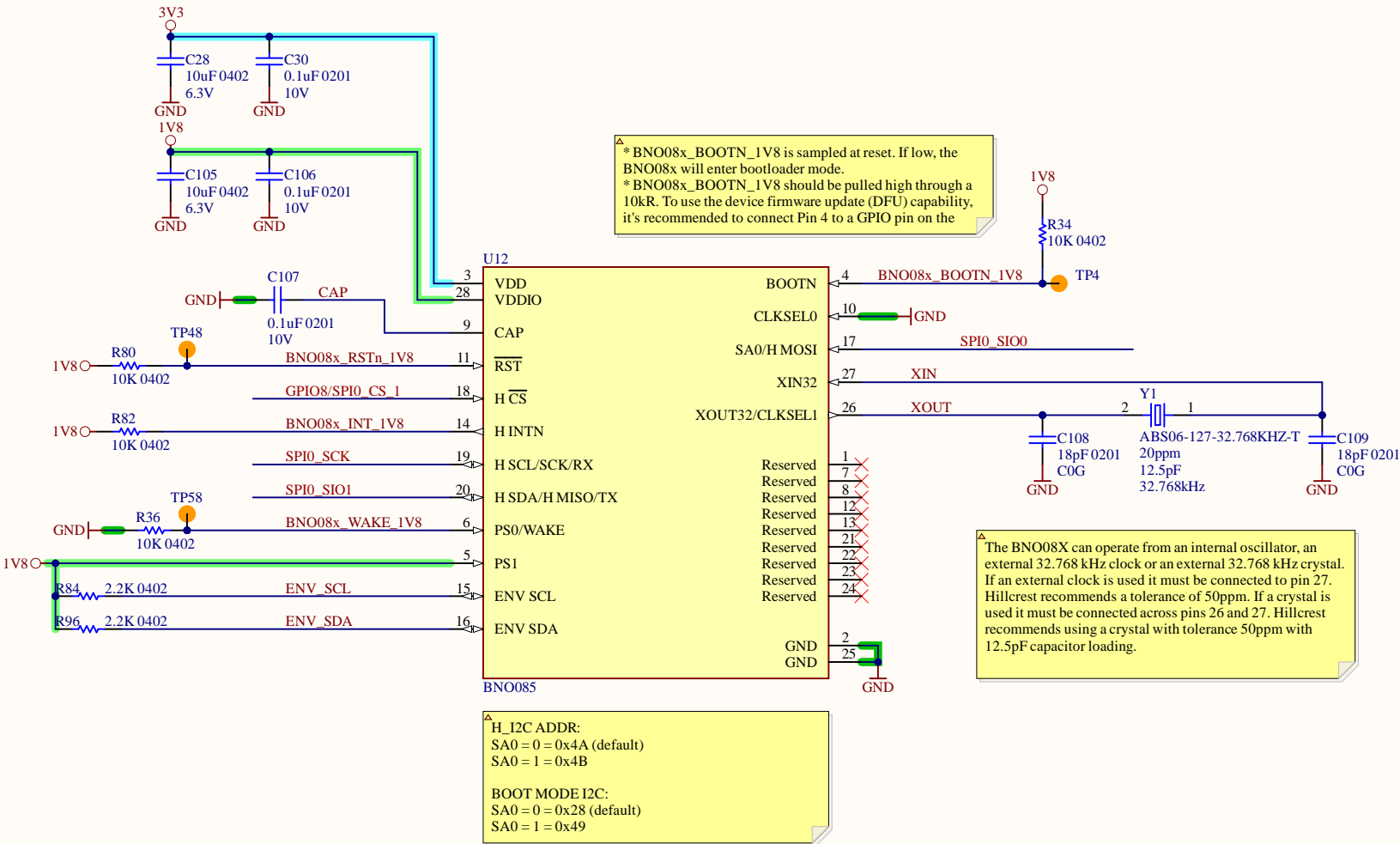
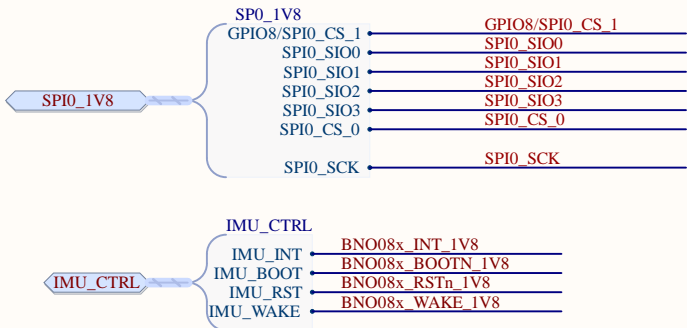
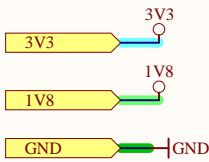
Title <b>DM2097</b>			Luxonis Holding 1925 Harmony Park Drive Westminster, CO 80234 United States	Cannot open file C:\Users\BrianLuxonis\Documents\DM2097
Size: <b>Tabloid</b>	Number: <b>D0000200</b>	Revision: <b>R3M1E3</b>		
Date: 15/11/2022	Time: 11:32:58	Sheet 8 of 12		
Drawn by: <b>David Malovrh</b>				





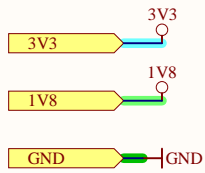
Title <b>DM2097</b>			Luxonis Holding 1925 Harmony Park Drive Westminster, CO 80234 United States	
Size: <b>Tabloid</b>	Number: <b>D0000200</b>	Revision: <b>R3M1E3</b>	Cannot open file C:\Users\BrianLuxonis\	
Date: 15/11/2022	Time: 11:32:58	Sheet 9 of 17		
Drawn by: <b>David Malovrh</b>				



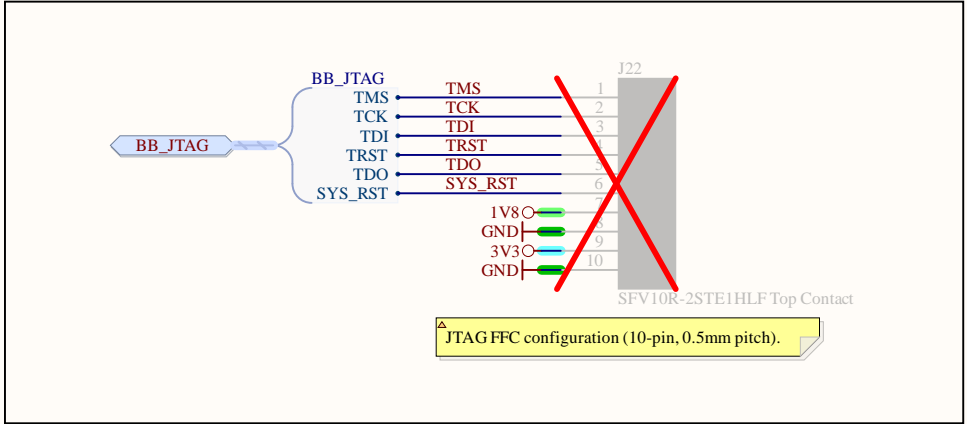


Title <b>DM2097</b>			Luxonis Holding 1925 Harmony Park Drive Westminster, CO 80234 United States	
Size: Tabloid	Number: D0000200	Revision: R3M1E3	Cannot open file C:\Users\BrianLuxonis\Documents\DM2097.dwg	
Date: 15/11/2022	Time: 11:32:58	Sheet 10 of 12		
Drawn by: David Malovrh				

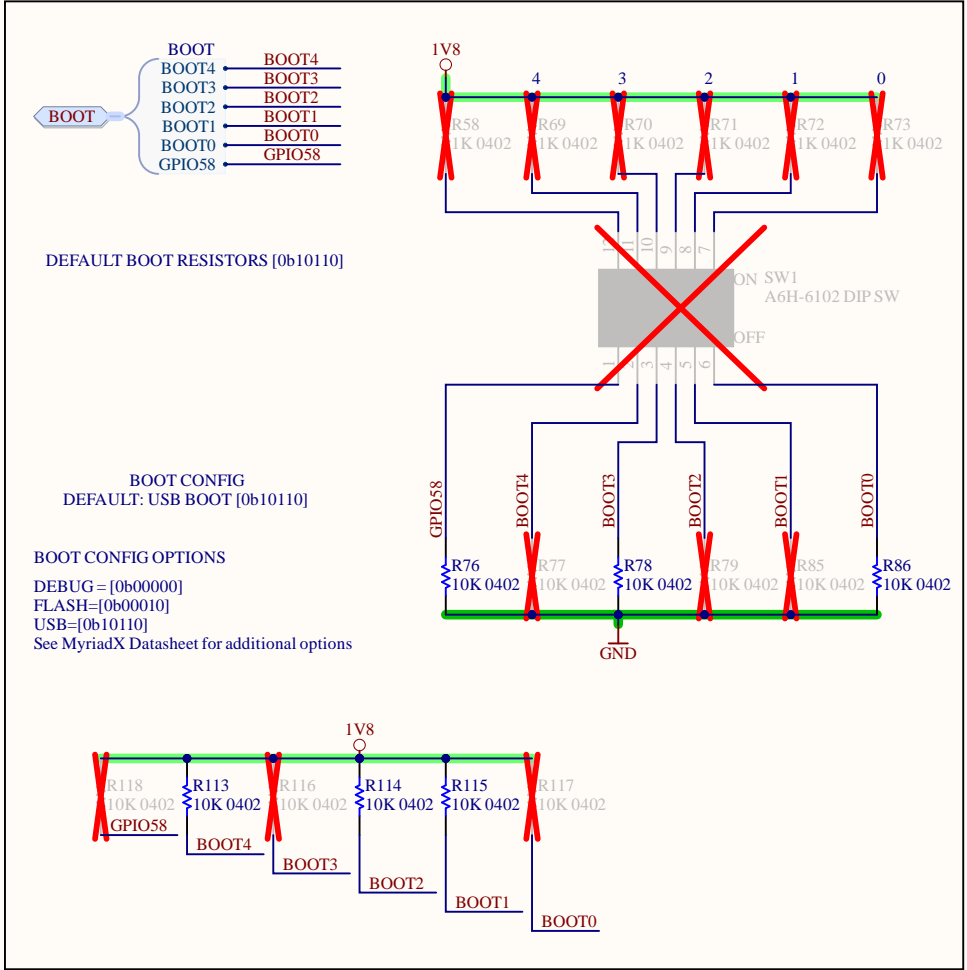




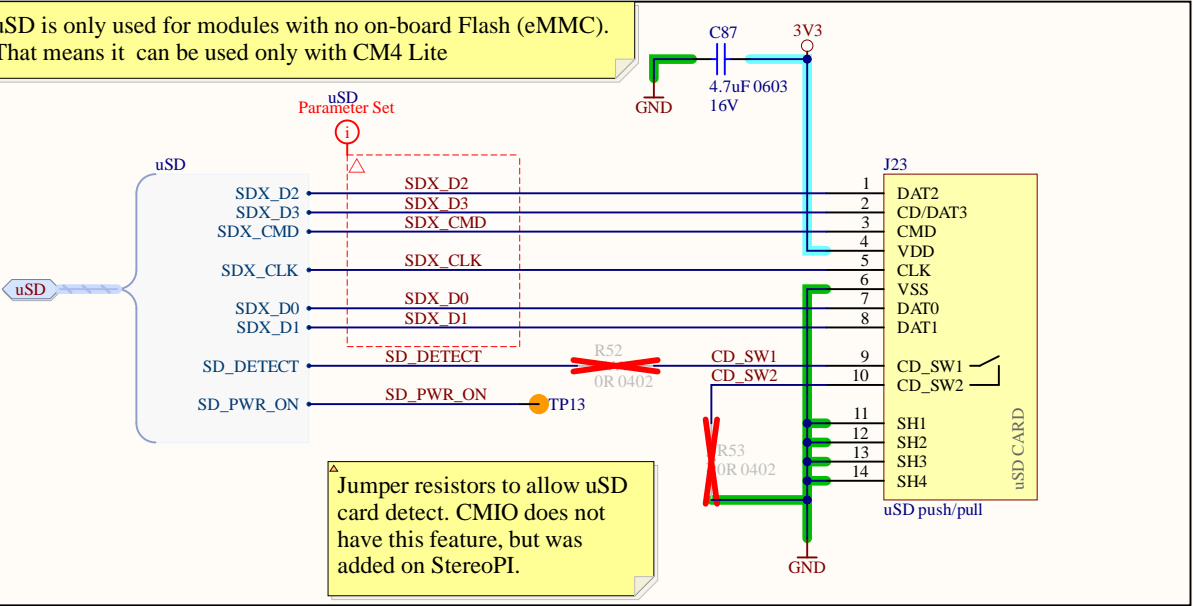
JTAG CONNECTOR



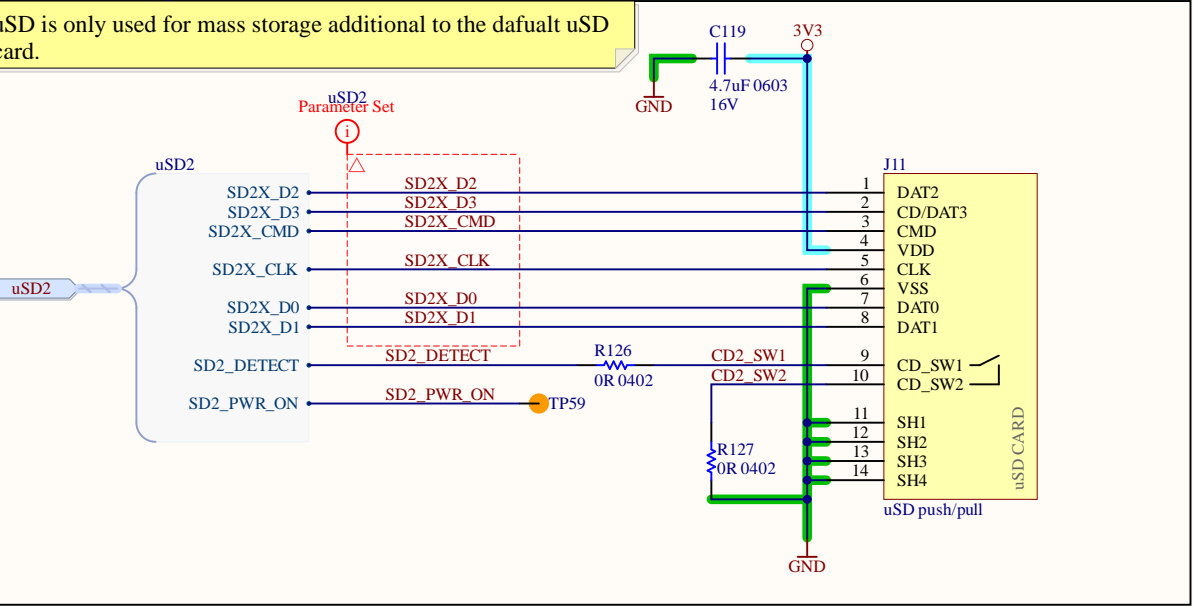
BOOT MODES



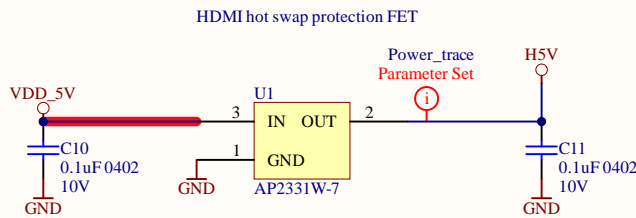
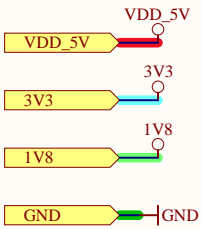
uSD-bootable



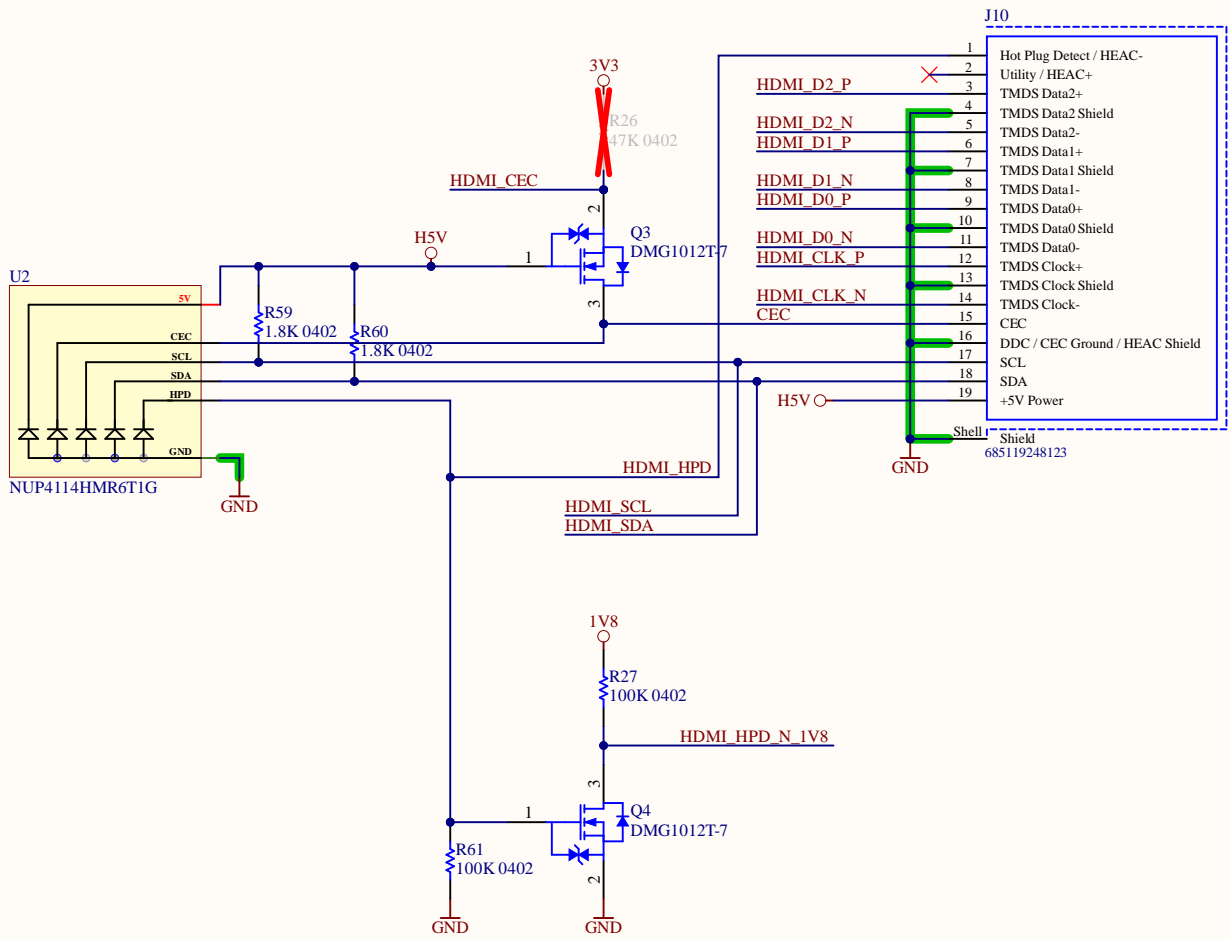
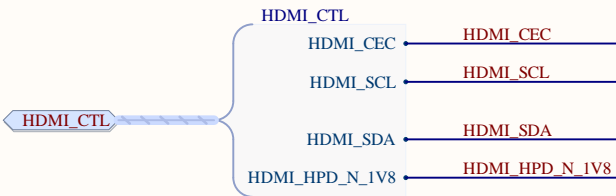
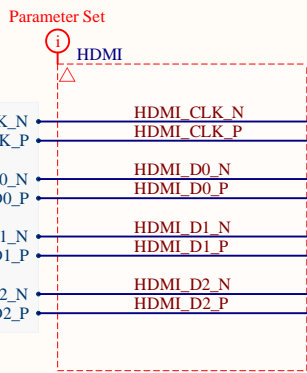
uSD-mass storage



Title <b>DM2097</b>			Luxonis Holding 1925 Harmony Park Drive Westminster, CO 80234 United States	
Size: Tabloid	Number: D0000200	Revision: R3M1E3	Cannot open file C:\Users\BrianLuxonis\Documents\DM2097.dwg	
Date: 15/11/2022	Time: 11:32:58	Sheet 10 of 17		
Drawn by: David Malovrh				



Basic onboard ESD protection is provided for the I2C EDID signals and the CEC signals, internal pullup and down resistors are also provided. On the [tpi4] the HDMI signals don't have any extra ESD protection, depending on the application extra ESD protection maybe required.



Title <b>DM2097</b>			Luxonis Holding 1925 Harmony Park Drive Westminster, CO 80234 United States	
Size: <b>Tabloid</b>	Number: <b>D0000200</b>	Revision: <b>R3M1E3</b>	Cannot open file C:\Users\BrianLuxonis\Documents\DM2097.dwg	
Date: 15/11/2022	Time: 11:32:58	Sheet 12 of 17		
Drawn by: <b>David Malovrh</b>				

