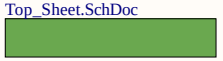
BLACK BOX AND FLIGHT COMPUTER

CENTRAL COMPUTE

RE: Tymur Tkachenko

Top Level
Top_Sheet.SchDoc



Project: ***Flight_Computer_Board.PrjPcb***		
Sheet Title: ***Cover.SchDoc***		
Size: A4	Schematic Designer: Tymur Tkachenko PCB Layout Designer: Tymur Tkachenko Responsible Engineer: Tymur Tkachenko	*Yellow Jacket Space Program* *Georgia Tech* *Atlanta, GA*
Date: 7/22/2026 Revision: 4.0 Sheet: 1 of: 4		

Flight Computer Board (FCB)

Informational Notes | Layout Notes | Software Notes | Assembly Notes

CONNECTORS Input_Connectors.SchDoc — VBUS, SPI1, CSA, CSB, CSC, VBUS-GND

POWER Power.SchDoc — VBUS, P5V0, P3V3, IV-P5V0, IV-P3V3, VBUS-GND, GND

Current Loop Current_Loop.SchDoc — VBUS, PT1, PT2, PT1-SIG, PT2-SIG, GND

ADCs ADCs.SchDoc — P5V0, P3V3, IV-P5V0, IV-P3V3, SPI5, ADC0-CS#, ADC0-DRDY#, PT1, PT2, PT1-SIG, PT2-SIG, GND

SENSORS Sensors.SchDoc — P3V3, SPI0, MAG-CS#, BAR-CS#, SPI5, IMU-CS#, IMU-DR, IMU-RST#, GND

FLIGHT COMPUTER

Q1 — RPI_5

P5V0, P3V3, C1 10µF, C2 10µF, GND

R44 10k 0402, R45 10k 0402 — SCL, SDA

CS-uCA, CS-uCB, IMU-DR, IMU-RST#, ADC0-DRDY#, ADC0-CS#

GPIO_4/GPCLK0, GPIO_3/SCL, GPIO_2/SDA, GPIO_11/SCLK, GPIO_9/MISO, GPIO_10/MOSI, GPIO_0/ID_SD, GPIO_1/ID_SC, GPIO_12/PWM0, GPIO_13/PWM1, GPIO_14/TXD, GPIO_15/RXD, GPIO_18/PCM_CLK, GPIO_8/CE0, GPIO_7/CE1, GPIO_20/PCM_DIN, GPIO_21/PCM_DOUT, GPIO_19/PCM_FS

SCLK0-R_R2 47 SCLK0, MISO0, MOSI0-R_R3 47 MOSI0

IMU-CS#, MISO5

MOSI5-R_R4 47 MOSI5, SCLK5-R_R5 47 SCLK5, CS-uCC

BAR-CS#, MAG-CS#

MOSI-uC-R_R6 100 MOSI-uC, SCLK-uC-R_R7 100 SCLK-uC, MISO-uC-R_R8 100 MISO-uC

SPI: SCLK0, MISO0, MOSI0 → SPI0

SPI: SCLK5, MISO5, MOSI5 → SPI5

SPI: SCLK-uC, MISO-uC, MOSI-uC → SPI1

GPS GPS.SchDoc — P5V0, P3V3, SCL, SDA, GND

FANS & CAMERAS

J3, J4 — P5V0, GND

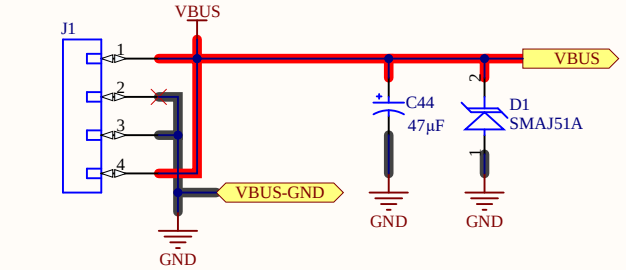
Raspberry Pi 5 and 4B use identical pinouts, and either one may be used with the flight computer board

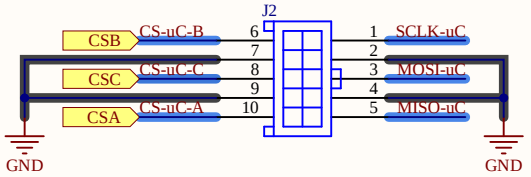
SPI5 must be configured in Raspberry Pi device tree

Project: Flight_Computer_Board.PrjPcb
Sheet Title: Top_Sheet.SchDoc

Size: A4	Schematic Designer: Tymur Tkachenko PCB Layout Designer: Tymur Tkachenko Responsible Engineer: Tymur Tkachenko	Yellow Jacket Space Program Georgia Tech Atlanta, GA
Date: 7/22/2026 Revision: 4.0 Sheet: 2 of: 11		

INPUT





Project: *Flight_Computer_Board.PrjPcb*		
Sheet Title: *Input_Connectors.SchDoc*		
Size: A4	Schematic Designer: Tymur Tkachenko PCB Layout Designer: Tymur Tkachenko Responsible Engineer: Tymur Tkachenko	*Yellow Jacket Space Program* *Georgia Tech* *Atlanta, GA*
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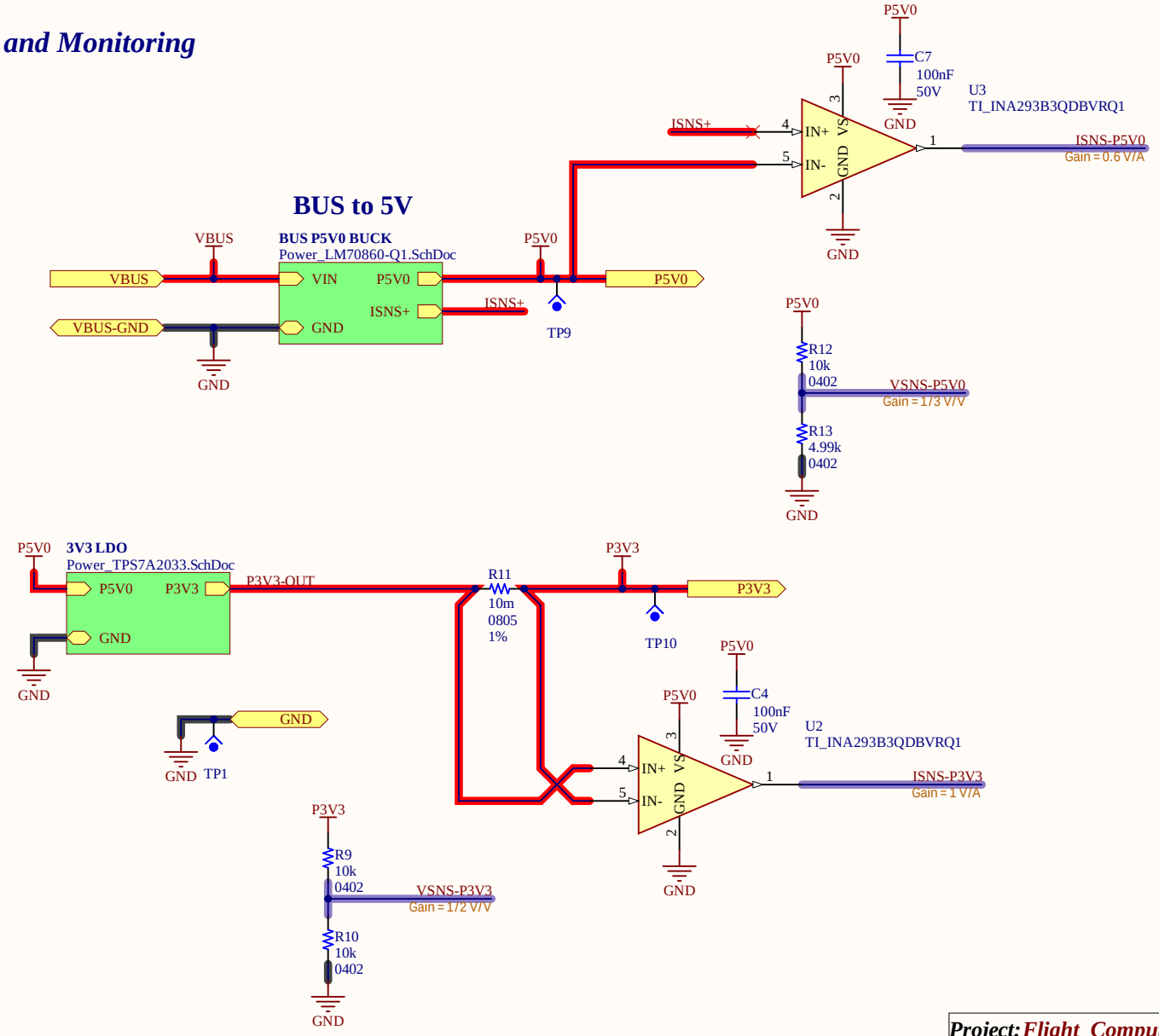
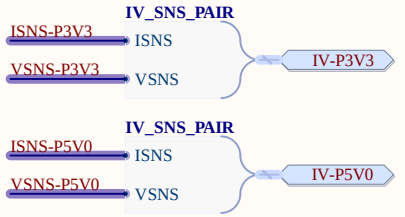
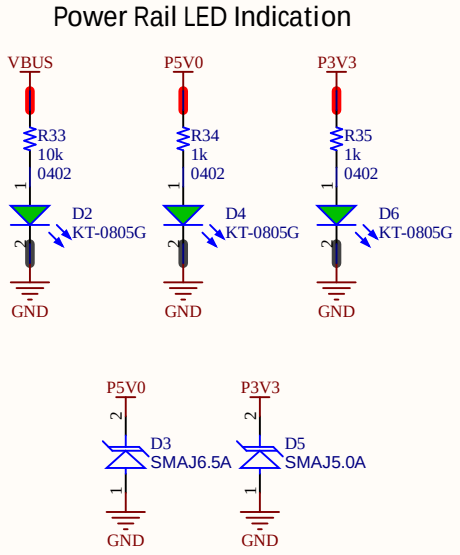
Power

Power and Monitoring







Project: ***Flight_Computer_Board.PrjPcb***		
Sheet Title: ***Power.SchDoc***		
Size: A4	Schematic Designer: Tymur Tkachenko PCB Layout Designer: Tymur Tkachenko Responsible Engineer: Tymur Tkachenko	*Yellow Jacket Space Program* *Georgia Tech* *Atlanta, GA*
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Power

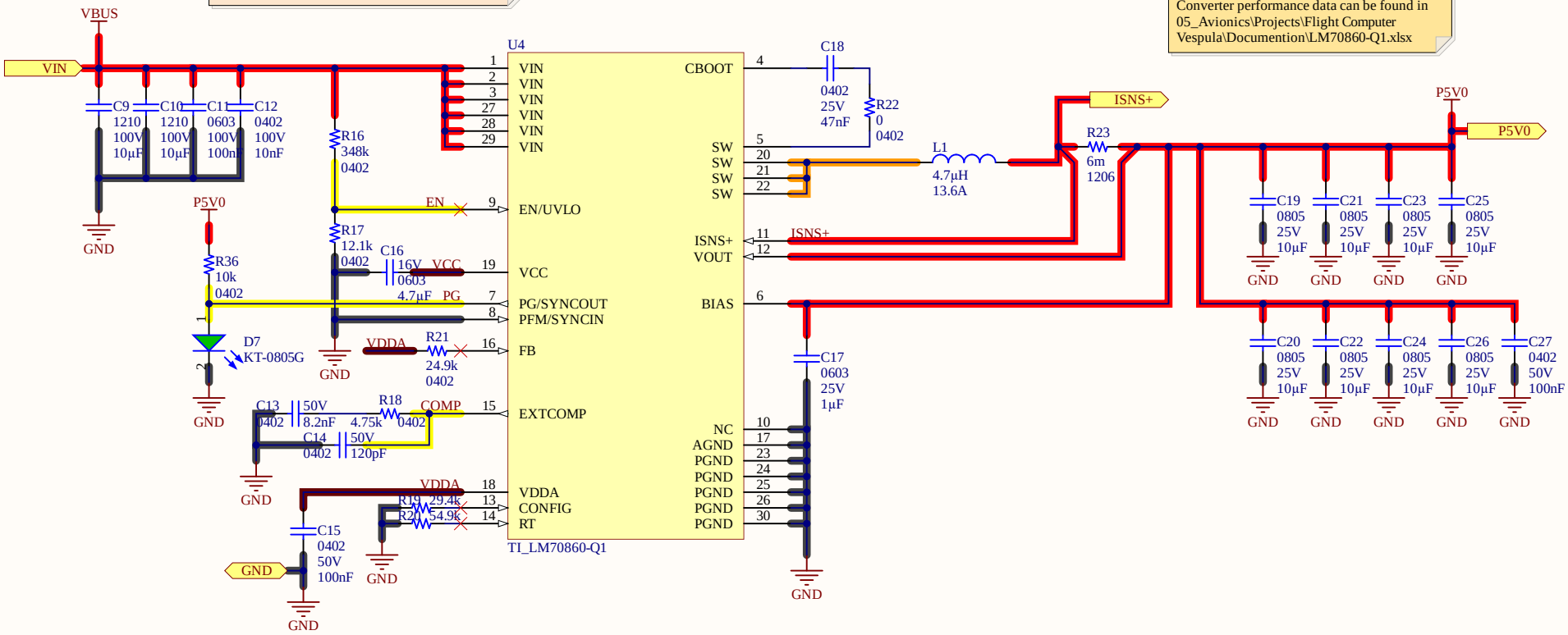
Bus to 5V0 Buck Converter

+5V Buck Regulator

+48V (30V-54V MAX) -> +5V / 6A

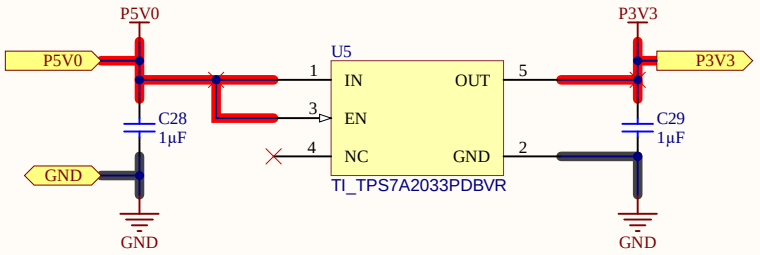
Design calculations can be found in 05_Avionics\Projects\Flight Computer Vespula\Documention\Power Calculations.xlsx

Converter performance data can be found in 05_Avionics\Projects\Flight Computer Vespula\Documention\LM70860-Q1.xlsx



Project: ***Flight_Computer_Board.PrjPcb***		
Sheet Title: ***Power_LM70860-Q1.SchDoc***		
Size: A4	Schematic Designer: Tymur Tkachenko PCB Layout Designer: Tymur Tkachenko Responsible Engineer: Tymur Tkachenko	*Yellow Jacket Space Program* *Georgia Tech* *Atlanta, GA*
Date: 7/22/2026 Revision: 4.0 Sheet: 5 of: 11		

Power
3V3 Low Dropout Regulator



Project: ***Flight_Computer_Board.PrjPcb***		
Sheet Title: ***Power_TPS7A2033.SchDoc***		
Size: A4	Schematic Designer: Tymur Tkachenko PCB Layout Designer: Tymur Tkachenko Responsible Engineer: Tymur Tkachenko	*Yellow Jacket Space Program* *Georgia Tech* *Atlanta, GA*
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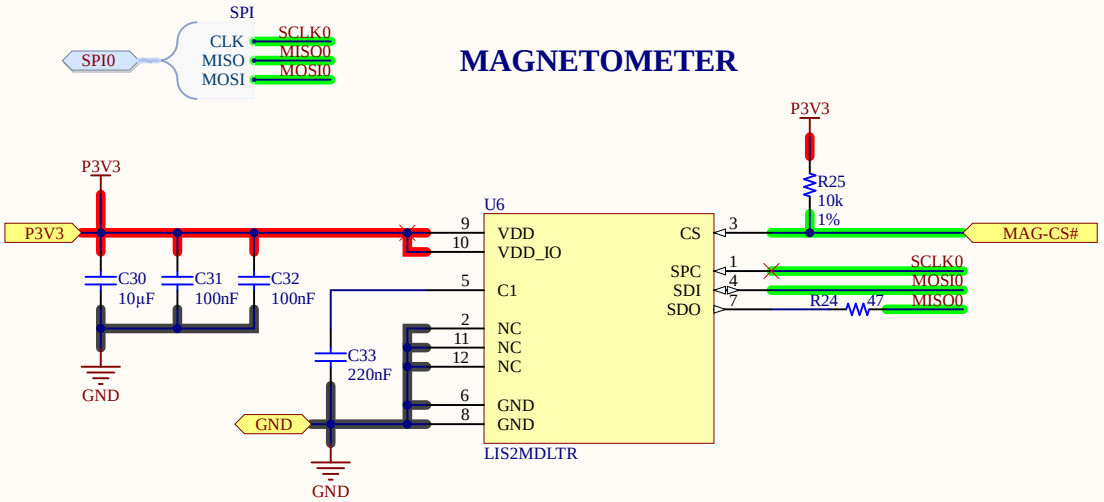
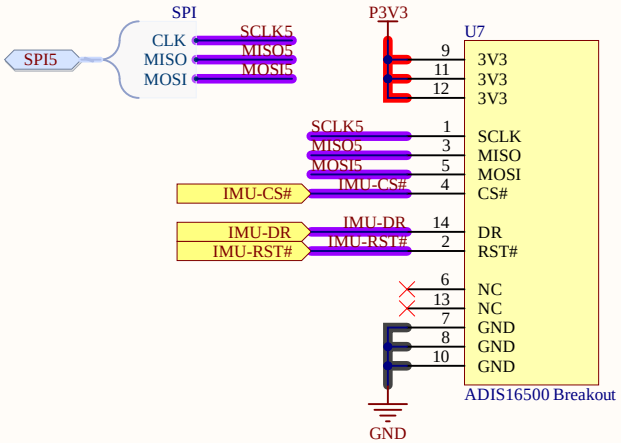
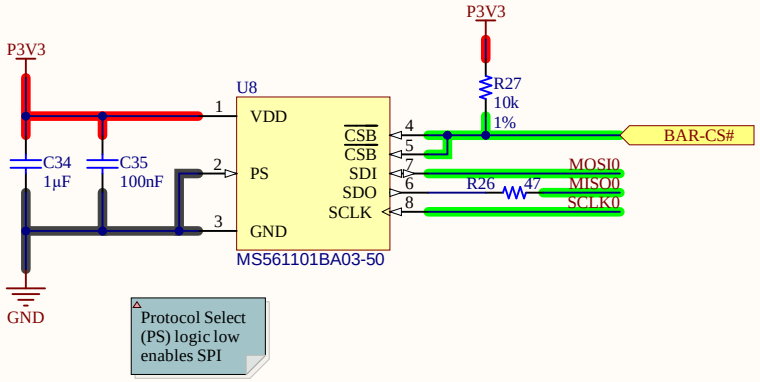
MAGNETOMETER



INERTIAL MEASUREMENT UNIT



BAROMETER AND THERMOMETER



Project: *Flight_Computer_Board.PrjPcb*		
Sheet Title: *Sensors.SchDoc*		
Size: A4	Schematic Designer: Tymur Tkachenko PCB Layout Designer: Tymur Tkachenko Responsible Engineer: Tymur Tkachenko	*Yellow Jacket Space Program* *Georgia Tech* *Atlanta, GA*
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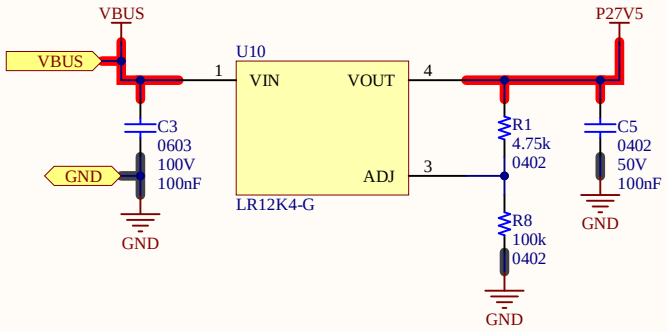
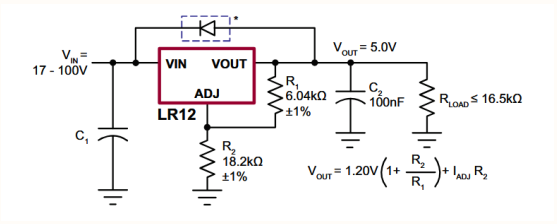
+27.5V LDO

+48V (80V MAX) -> +27.5V / 50mA





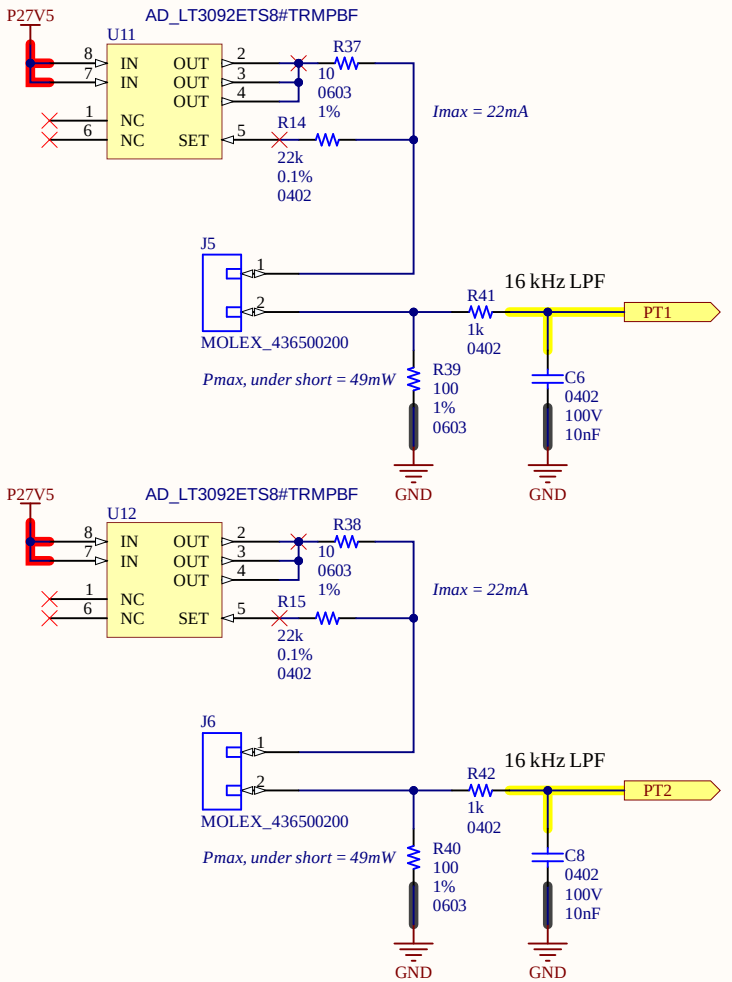
$$1.2 \cdot \left(1 + \frac{R_2}{R_1}\right) + I_a R_2 = 27.4631578947$$

$$R_2 = 100 \cdot 10^3 = 100000$$

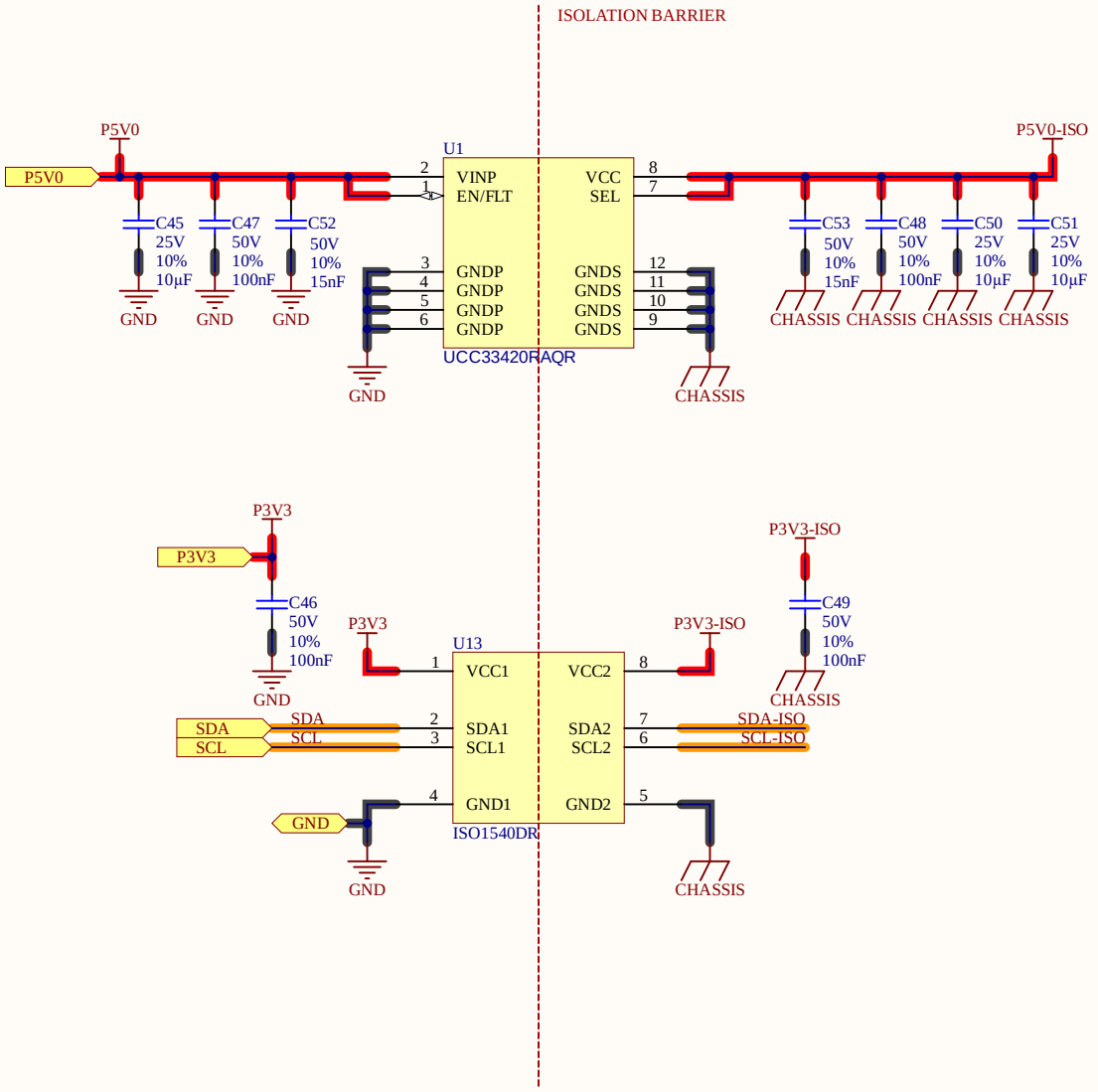
$$R_1 = 4.75 \cdot 10^3 = 4750$$

$$I_a = 10 \cdot 10^{-6} = 0.00001$$

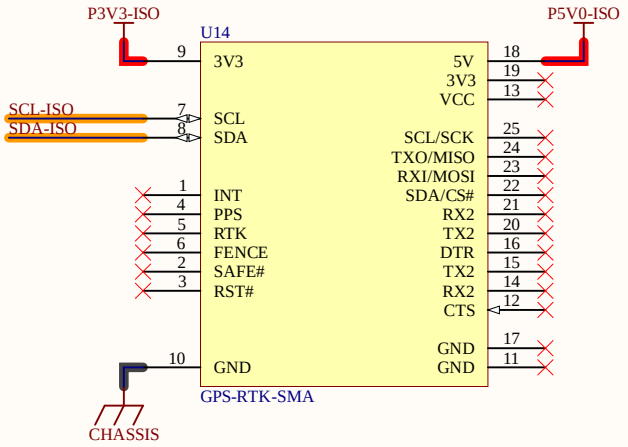
PT INTERFACE



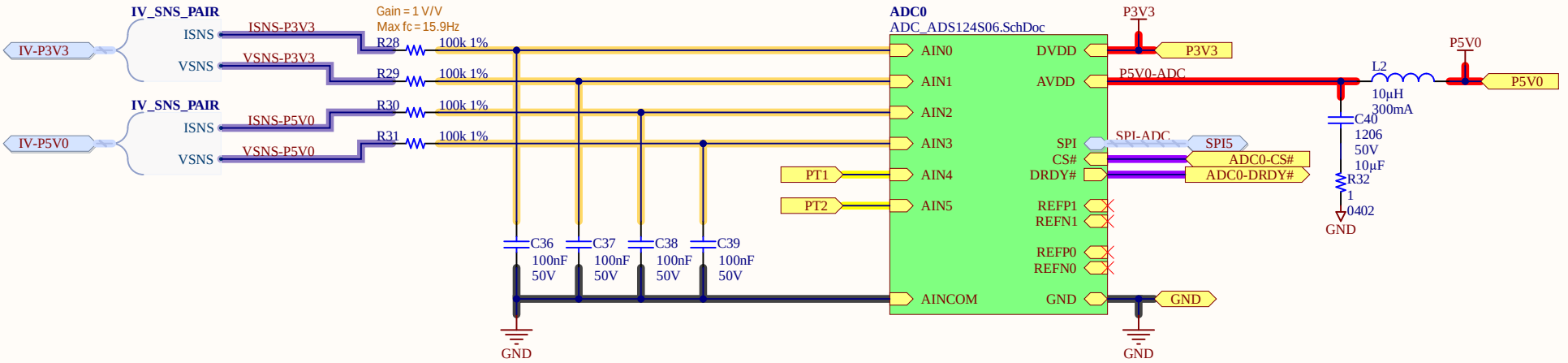
Project: *Flight_Computer_Board.PrjPcb*		
Sheet Title: *Current_Loop.SchDoc*		
Size: A4	Schematic Designer: Tymur Tkachenko PCB Layout Designer: Tymur Tkachenko Responsible Engineer: Tymur Tkachenko	*Yellow Jacket Space Program* *Georgia Tech* *Atlanta, GA*
Date: 7/22/2026 Revision: 4.0 Sheet: 8 of: 11		



GPS



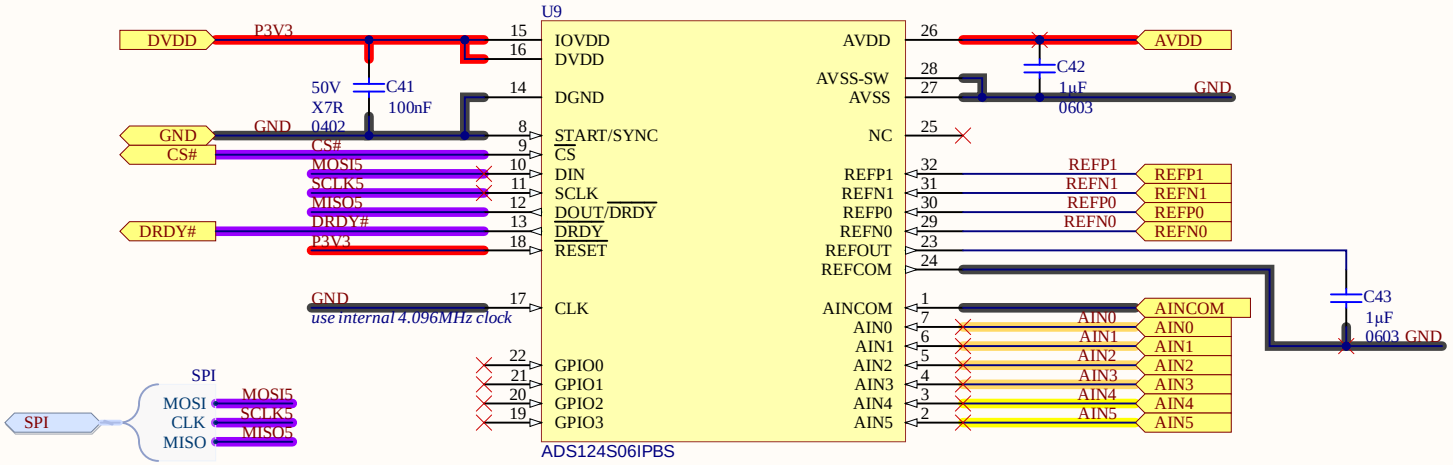
Project: ***Flight_Computer_Board.PrjPcb***		
Sheet Title: ***GPS.SchDoc***		
Size: A4	Schematic Designer: Tymur Tkachenko PCB Layout Designer: Tymur Tkachenko Responsible Engineer: Tymur Tkachenko	*Yellow Jacket Space Program* *Georgia Tech* *Atlanta, GA*
Date: 7/22/2026 Revision: 4.0 Sheet: 9 of: 11		



Project: ***Flight_Computer_Board.PrjPcb***		
Sheet Title: ***ADCs.SchDoc***		
Size: A4	Schematic Designer: Tymur Tkachenko PCB Layout Designer: Tymur Tkachenko Responsible Engineer: Tymur Tkachenko	*Yellow Jacket Space Program* *Georgia Tech* *Atlanta, GA*
Date: 7/22/2026 Revision: 4.0 Sheet: 10 of: 11		

ANALOG TO DIGITAL CONVERTER

can use ADS114S06 as substitute, only difference is # of data bits



Project: *Flight_Computer_Board.PrjPcb*			
Sheet Title: *ADC_ADS124S06.SchDoc*			
Size: A4	Schematic Designer: Tymur Tkachenko PCB Layout Designer: Tymur Tkachenko Responsible Engineer: Tymur Tkachenko	*Yellow Jacket Space Program* *Georgia Tech* *Atlanta, GA*	
Date: 7/22/2026 Revision: 4.0 Sheet: 11 of: 11			