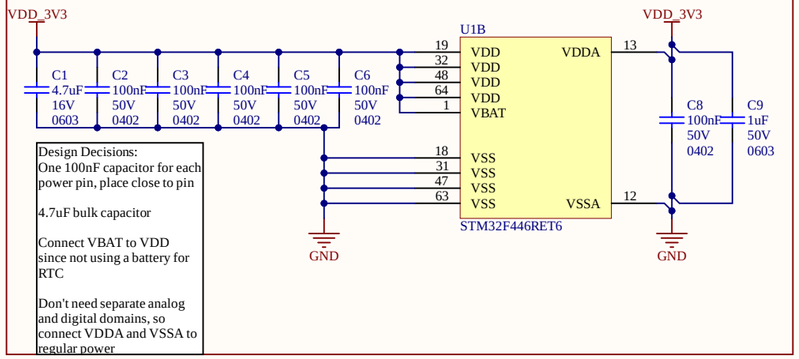
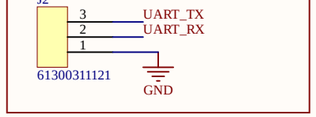
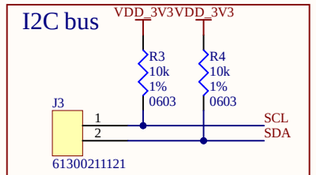
STM32 Power



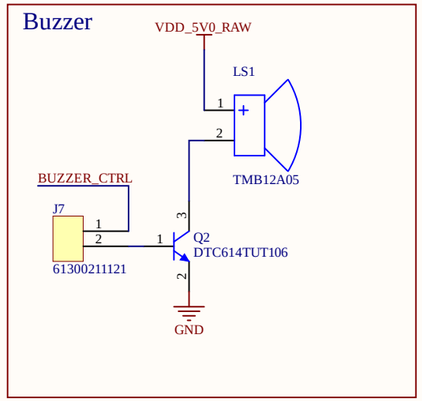
Debug UART

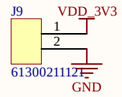


I2C bus

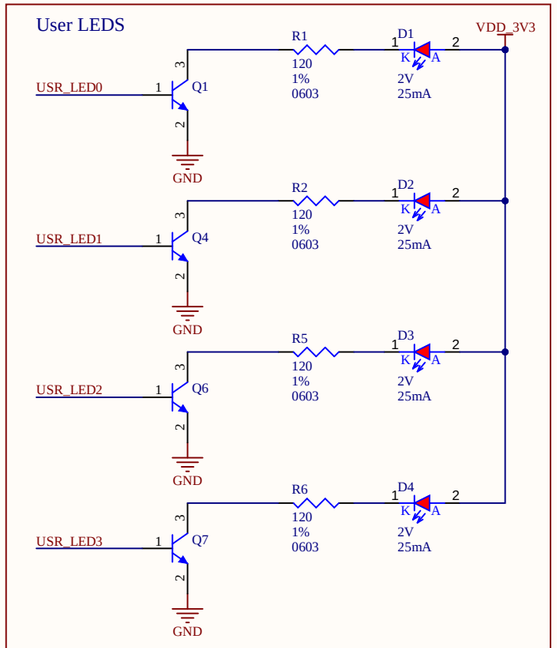


Buzzer

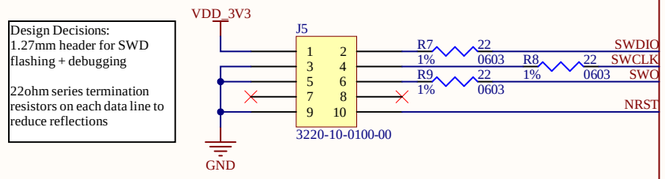




User LEDs



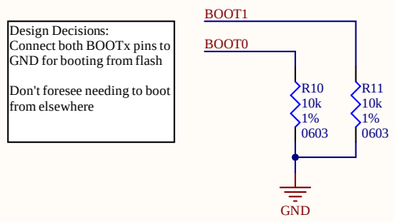
SWD Connector



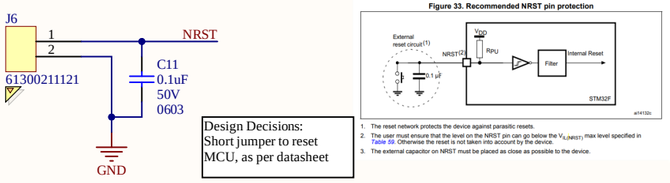
Boot Mode

Table 2. Boot modes

Boot mode selection pins		Boot mode	Aliasing
BOOT1	BOOT0		
x	0	Main Flash memory	Main Flash memory is selected as the boot area
0	1	System memory	System memory is selected as the boot area
1	1	Embedded SRAM	Embedded SRAM is selected as the boot area



Reset



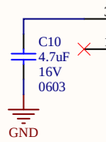
STM32

PYRO SNS on ADC channels

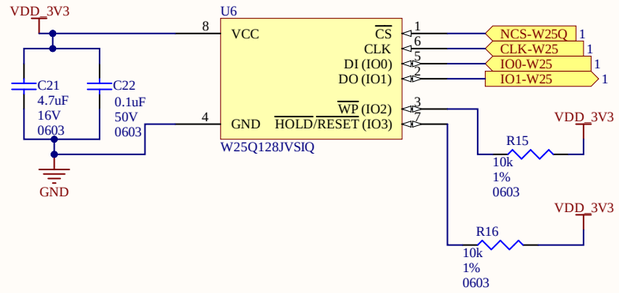
Make a project in STM32CubeIDE and use the GUI to determine pinout of device

Don't need extremely precise timing so using internal oscillator is OK

Design Decisions:
Value from datasheet



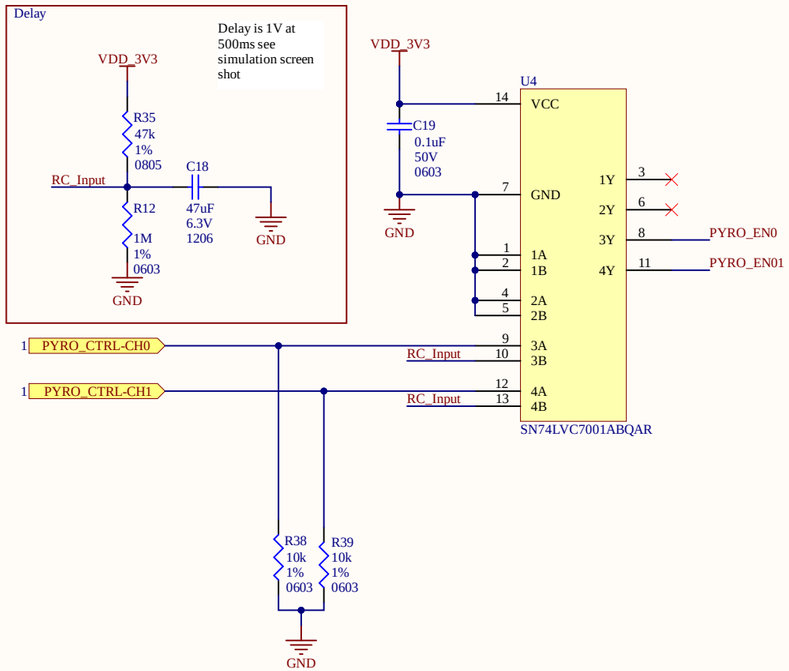
Flash Memory

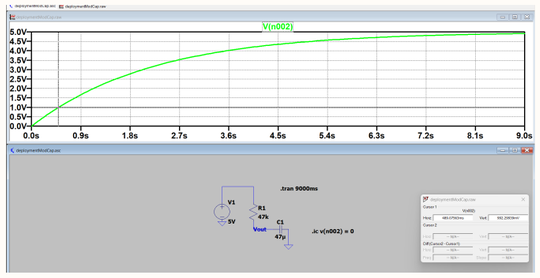


SHEET NAME: STM.SchDoc	PROJECT: air_module_1.1.0.PrjPcb
ENGINEER: Mary Dertinger	DATE: 2/15/2026

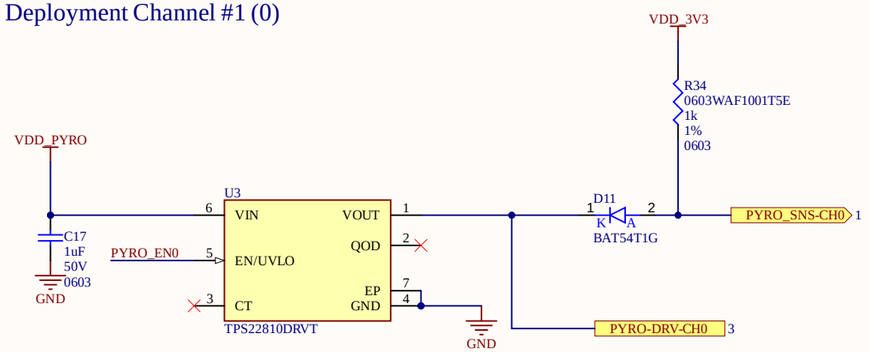
RIT LAUNCH INITIATIVE

Deglitching

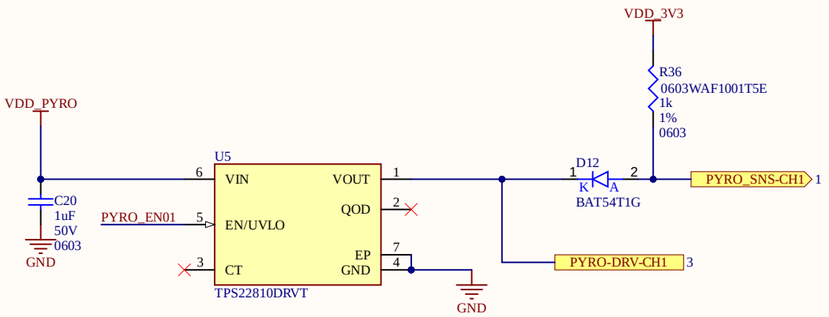




Deployment Channel #1 (0)



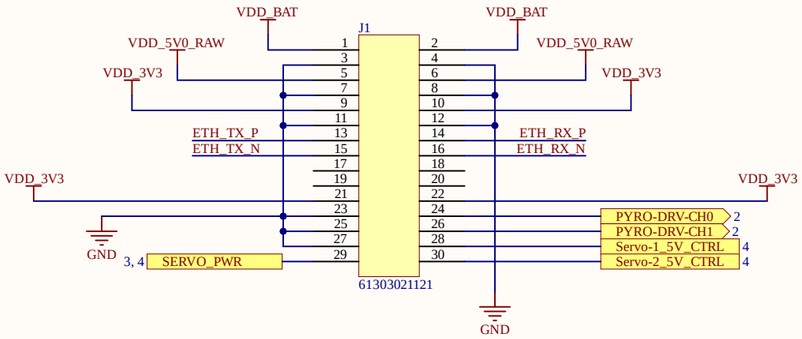
Deployment Channel #2 (1)



SHEET NAME: Deployment.SchDoc	PROJECT: air_module_1.1.0.PrjPcb
ENGINEER: Mary Dertinger	DATE: 2/15/2026

RIT LAUNCH INITIATIVE

Backplane Connector



Description	PIN		Description
Battery Voltage	1	2	Battery Voltage
GND	3	4	GND
5v	5	6	5v
GND	7	8	GND
3v3	9	10	3v3
GND	11	12	GND
TX+	13	14	RX+
TX-	15	16	RX-
ADDR 0 (LSB)	17	18	ADDR 1
ADDR 2	19	20	ADDR 3 (MSB)
LED 0	21	22	LED 1
GPIO 0 PYRO 0 RTN	23	24	GPIO 1 PYRO 0 DRV
GPIO 2 PYRO 1 RTN	25	26	GPIO 3 PYRO 1 DRV
GPIO 4 PYRO 2 RTN	27	28	GPIO 5 PYRO 2 DRV
GPIO 6 PYRO 3 RTN	29	30	GPIO 7 PYRO 3 DRV

Mounting Holes

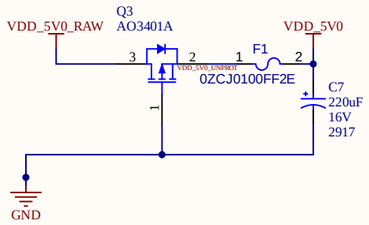
Power Rail Protection

Reverse polarity protection per TI SLVA139

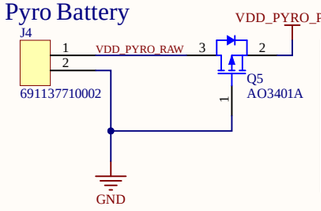
Absolute worst case Rdson = 85mOhm

PTC Fuse: 750mA hold, 1.5A trip. <1s at 1.1A

Not using VBAT or 3V3



Pyro Battery

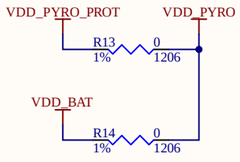


Reverse polarity protection per TI SLVA139

Absolute worst case Rdson = 85mOhm

PYRO_BAT only draws when the charge fires, voltage drop negligible

Pyro Source

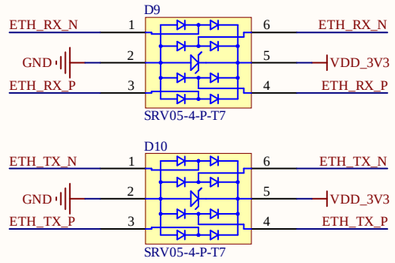


0ohm resistor network for choosing power source for ematches.

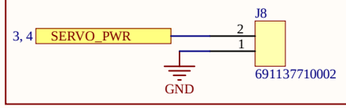
Nominally, only one of these resistors is populated

R13 selects the dedicated pyro battery as the source and R14 selects the main Backplane battery as the source

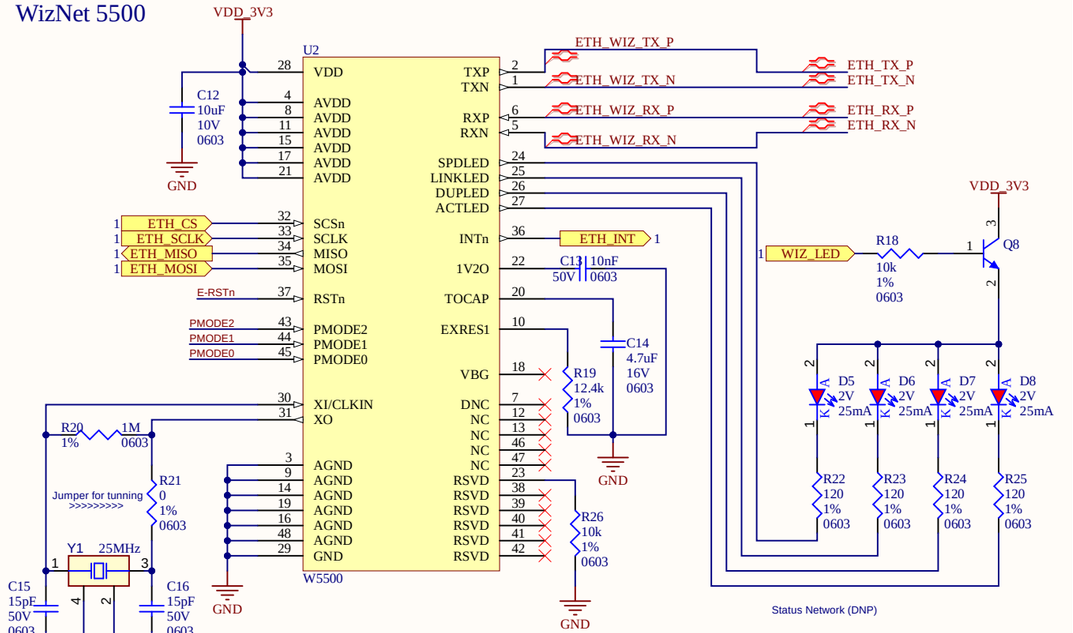
Ethernet ESD Protection



Servo Power Screw Terminal

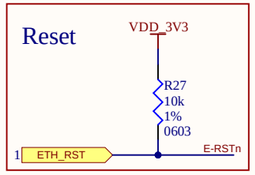


WizNet 5500



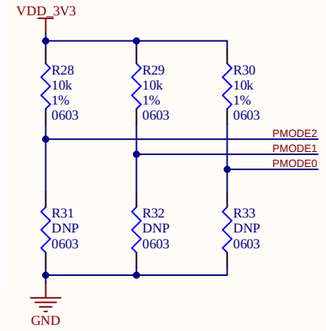
C1 = C2 = 2Cload - 2Cstray = 2(12pF) - 2(5pF) = 14pF
Closest common value chosen
Cload from datasheet, Cstray estimation rule of thumb

Reset



PMODE Select

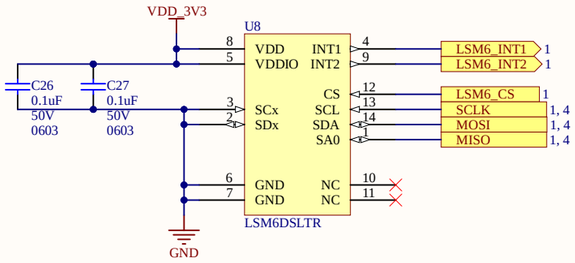
PMODE [2:0]			Description
2	1	0	
0	0	0	10BT Half-duplex, Auto-negotiation disabled
0	0	1	10BT Full-duplex, Auto-negotiation disabled
0	1	0	100BT Half-duplex, Auto-negotiation disabled
0	1	1	100BT Full-duplex, Auto-negotiation disabled
1	0	0	100BT Half-duplex, Auto-negotiation enabled
1	0	1	Not used
1	1	0	Not used
1	1	1	All capable, Auto-negotiation enabled

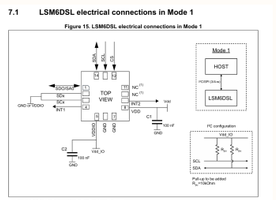


SHEET NAME: Connectors.SchDoc	PROJECT: air_module_1.1.0.PrjPcb
ENGINEER: Mary Dertinger	DATE: 2/15/2026

RIT LAUNCH INITIATIVE

IMU LSM6DSLTR





The device core is supplied through the Vdd line. Power supply decoupling capacitors (C1, C2 = 100 nF ceramic) should be placed as near as possible to the supply pin of the device (common design practice).

The functionality of the device and the measured acceleration/angular rate data is selectable and accessible through the SPI/I²C interface.

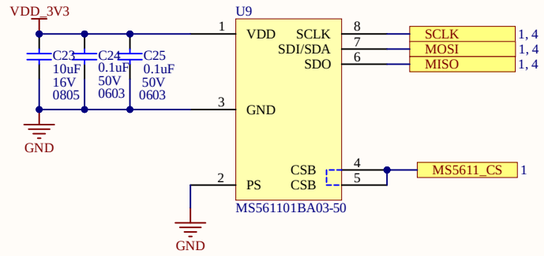
The functions, the threshold and the timing of the two interrupt pins for each sensor can be completely programmed by the user through the SPI/I²C interface.

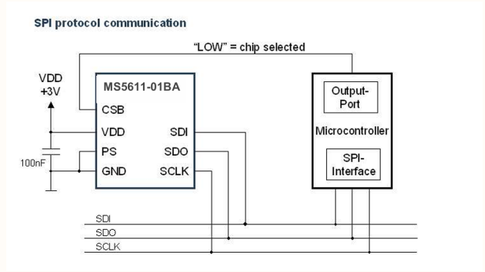
Table 2. Pin description

Pin#	Name	Mode 1 function	Mode 2 function
1	SDO/SA0	SPI 4-wire interface serial data output (SDO) I²C least significant bit of the device address (SA0)	SPI 4-wire interface serial data output (SDO) I²C least significant bit of the device address (SA0)
2	SDx	Connect to VDDIO or GND	I²C serial data master (MSDA)
3	SCx	Connect to VDDIO or GND	I²C serial clock master (MSCL)
4	INT1	Programmable interrupt 1	
5	VDDIO[1]	Power supply for I/O pins	
6	GND	0 V supply	
7	GND	0 V supply	
8	VDD[1]	Power supply	
9	INT2	Programmable interrupt 2 (INT2) / Data enable (DEN)	Programmable interrupt 2 (INT2)/ Data enable (DEN)/ I²C master external synchronization signal (MDRDY)
10	NC[2]	Leave unconnected	
11	NC[2]	Leave unconnected	
12	CS	I²C/SPI mode selection (1: SPI idle mode / I²C communication enabled; 0: SPI communication mode / I²C disabled)	I²C/SPI mode selection (1: SPI idle mode / I²C communication enabled; 0: SPI communication mode / I²C disabled)
13	SCL	I²C serial clock (SCL) SPI serial port clock (SPC)	I²C serial clock (SCL) SPI serial port clock (SPC)
14	SDA	I²C serial data (SDA) SPI serial data input (SDI) 3-wire interface serial data output (SDO)	I²C serial data (SDA) SPI serial data input (SDI) 3-wire interface serial data output (SDO)

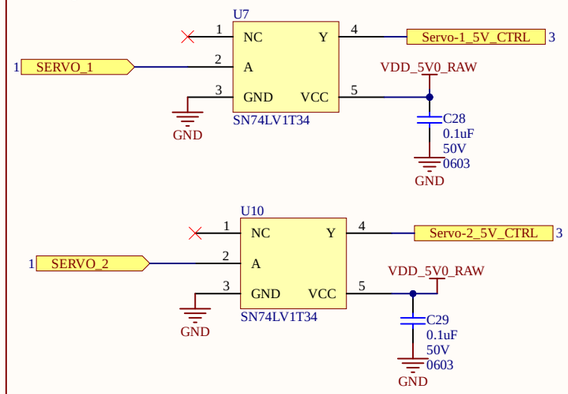
1. Recommended 100 nF filter capacitor.
2. Leave pin electrically unconnected and soldered to PCB.

Altimeter MS5611

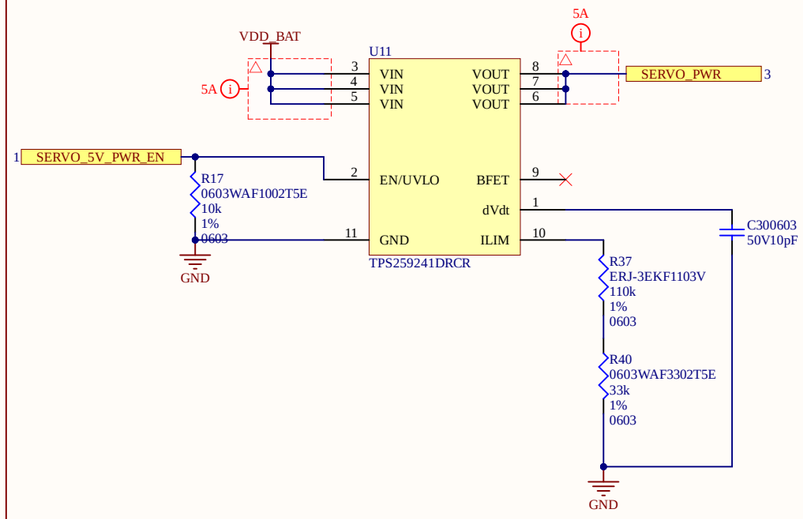




5V Logic for Servos



Servo Efuse - Fuses at 4.5A



8.3.6 ILIM

The device continuously monitors the load current and keeps it limited to the value programmed by R_{ILIM}. After start-up event and during normal operation, current limit is set to I_{OL} (over-load current limit) as shown in Equation 3:

$$I_{OL} = \left(0.7 + 3 \times 10^{-5} \times R_{ILIM}\right) \quad (3)$$

SHEET NAME: Sensors_and_Servo.SchDoc	PROJECT: air_module_1.1.0.PrjPcb
ENGINEER: Mary Dertinger	DATE: 2/15/2026

RIT LAUNCH INITIATIVE