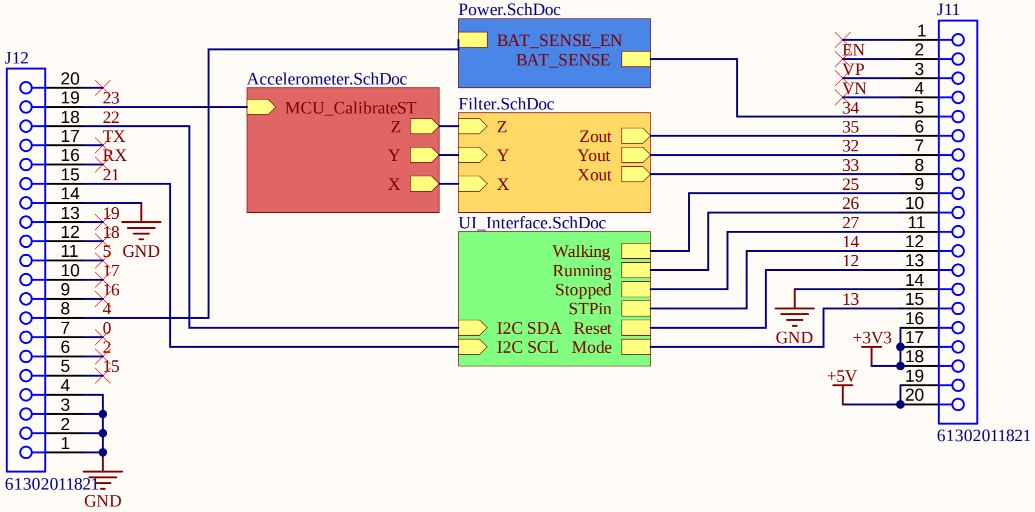
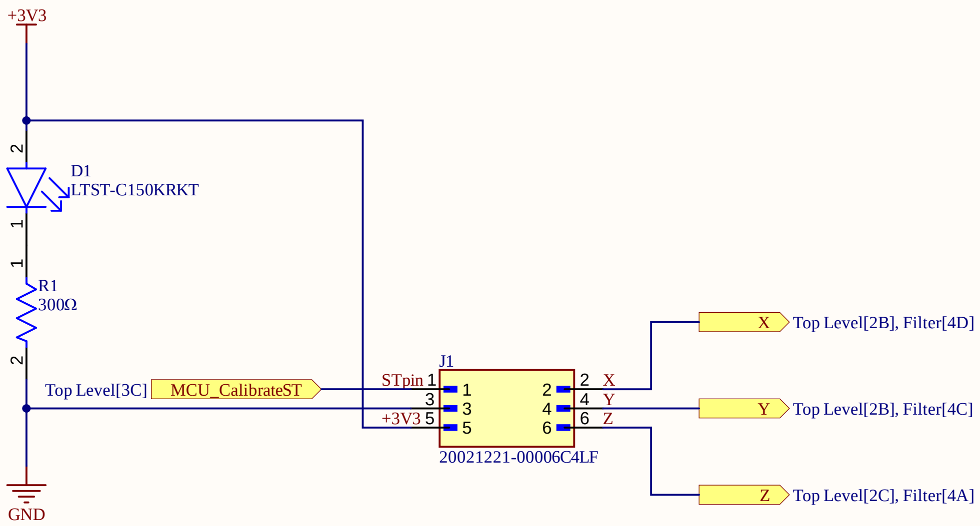
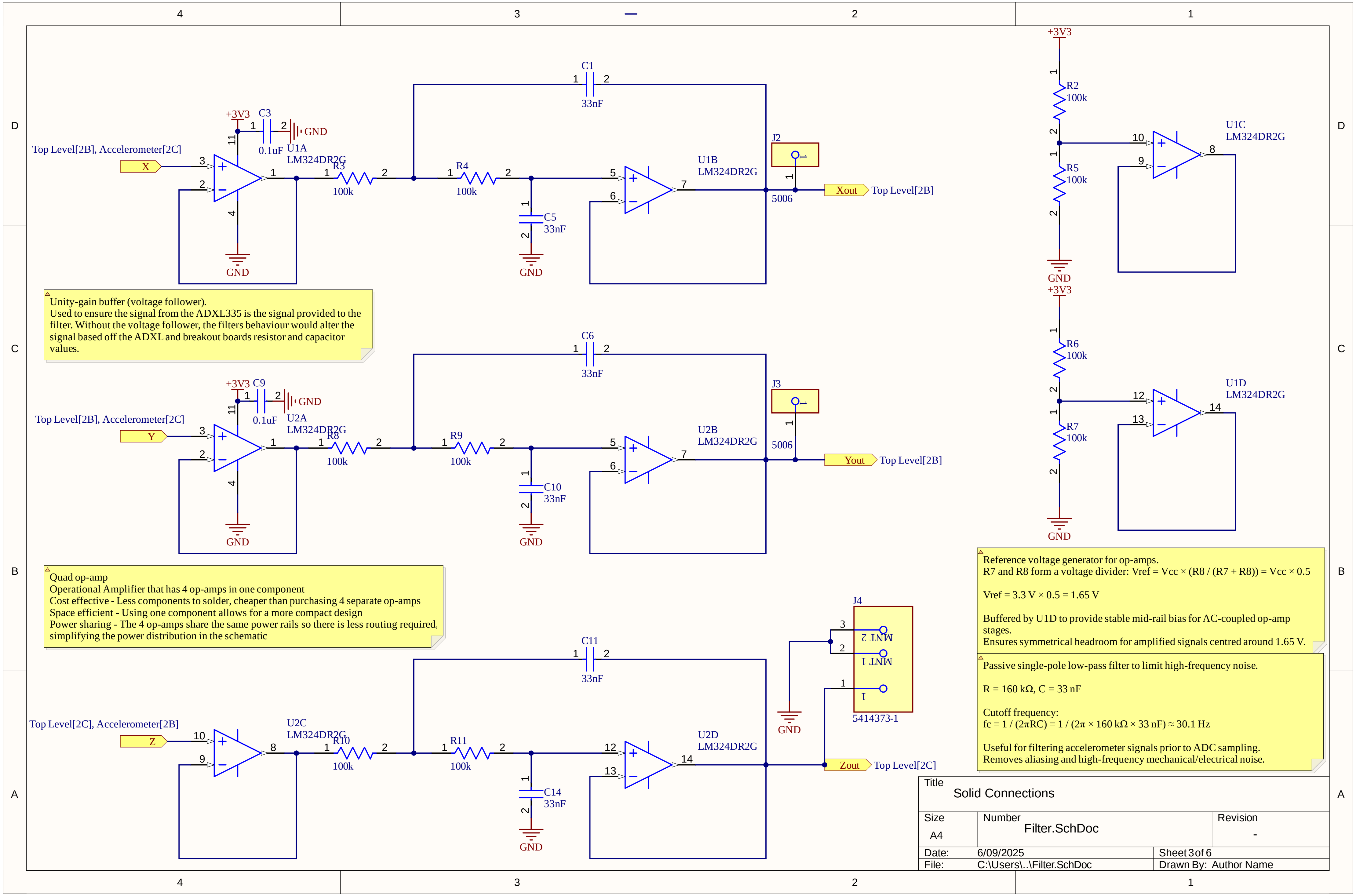


Title	**Solid Connections**		
Size	Number Top Level.SchDoc		Revision 1
A4			
Date: 6/09/2025		Sheet 1 of 6	Author Name
File: C:\Users\..\Top Level.SchDoc		Drawn By:	



6-pin connector for external 3-axis analog accelerometer module (e.g., ADXL335).Pinout:
1 - +3.3 V
2 - Z-axis output
3 - ST (self-test or config pin)
4 - Y-axis output
5 - GND
6 - X-axis outputSignal lines (X, Y, Z) routed to analog filter & buffer stage (see Filter.SchDoc).STpin can be left floating or connected depending on sensor needs.

Title: Solid Connections		
Size: A4	Number: Accelerometer.SchDoc	Revision: -
Date: 6/09/2025		Sheet 2 of 6
File: C:\Users\..\Accelerometer.SchDoc		Drawn By: Author Name



Unity-gain buffer (voltage follower).
Used to ensure the signal from the ADXL335 is the signal provided to the filter. Without the voltage follower, the filters behaviour would alter the signal based off the ADXL and breakout boards resistor and capacitor values.

Quad op-amp
Operational Amplifier that has 4 op-amps in one component
Cost effective - Less components to solder, cheaper than purchasing 4 separate op-amps
Space efficient - Using one component allows for a more compact design
Power sharing - The 4 op-amps share the same power rails so there is less routing required, simplifying the power distribution in the schematic

Reference voltage generator for op-amps.
R7 and R8 form a voltage divider: Vref = Vcc × (R8 / (R7 + R8)) = Vcc × 0.5

Vref = 3.3 V × 0.5 = 1.65 V

Buffered by U1D to provide stable mid-rail bias for AC-coupled op-amp stages.
Ensures symmetrical headroom for amplified signals centred around 1.65 V.

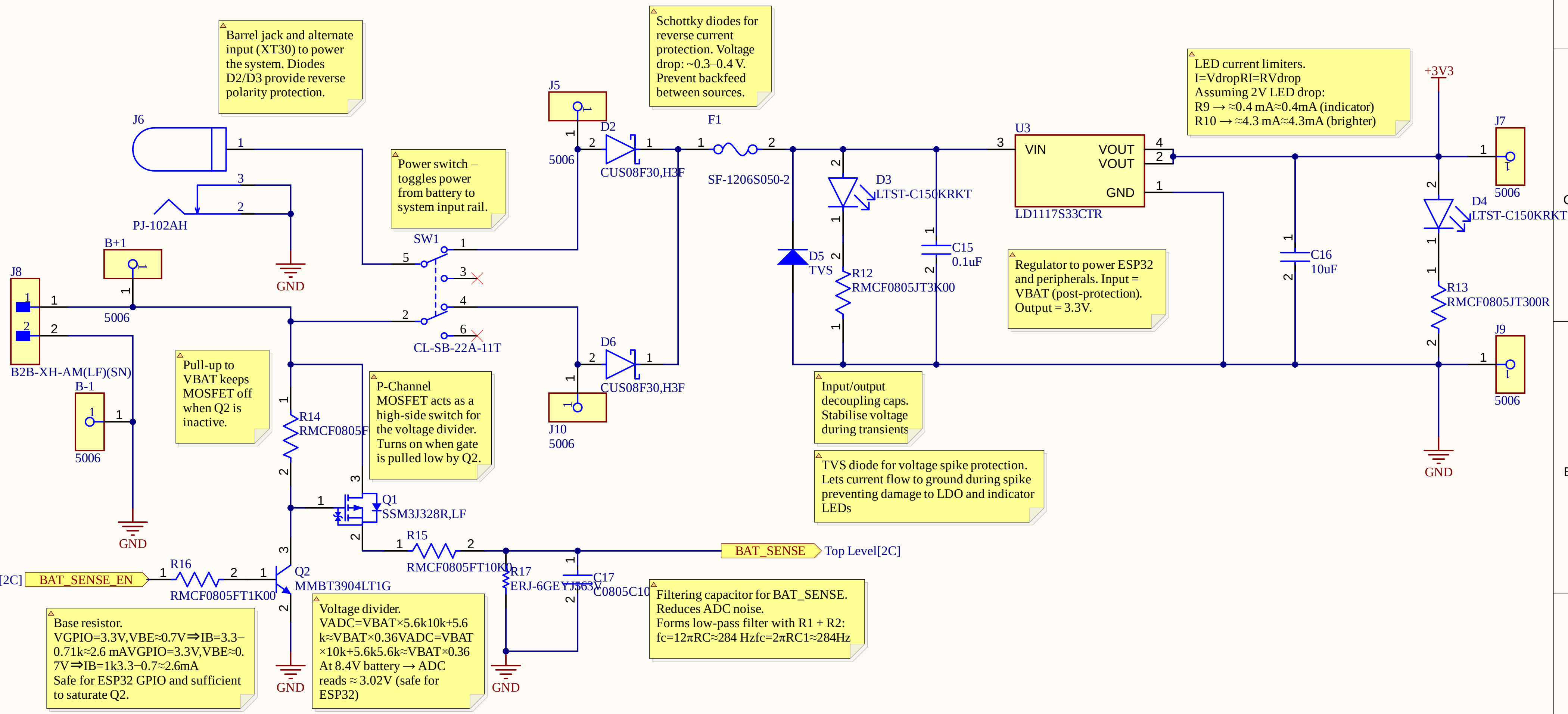
Passive single-pole low-pass filter to limit high-frequency noise.

R = 160 kΩ, C = 33 nF

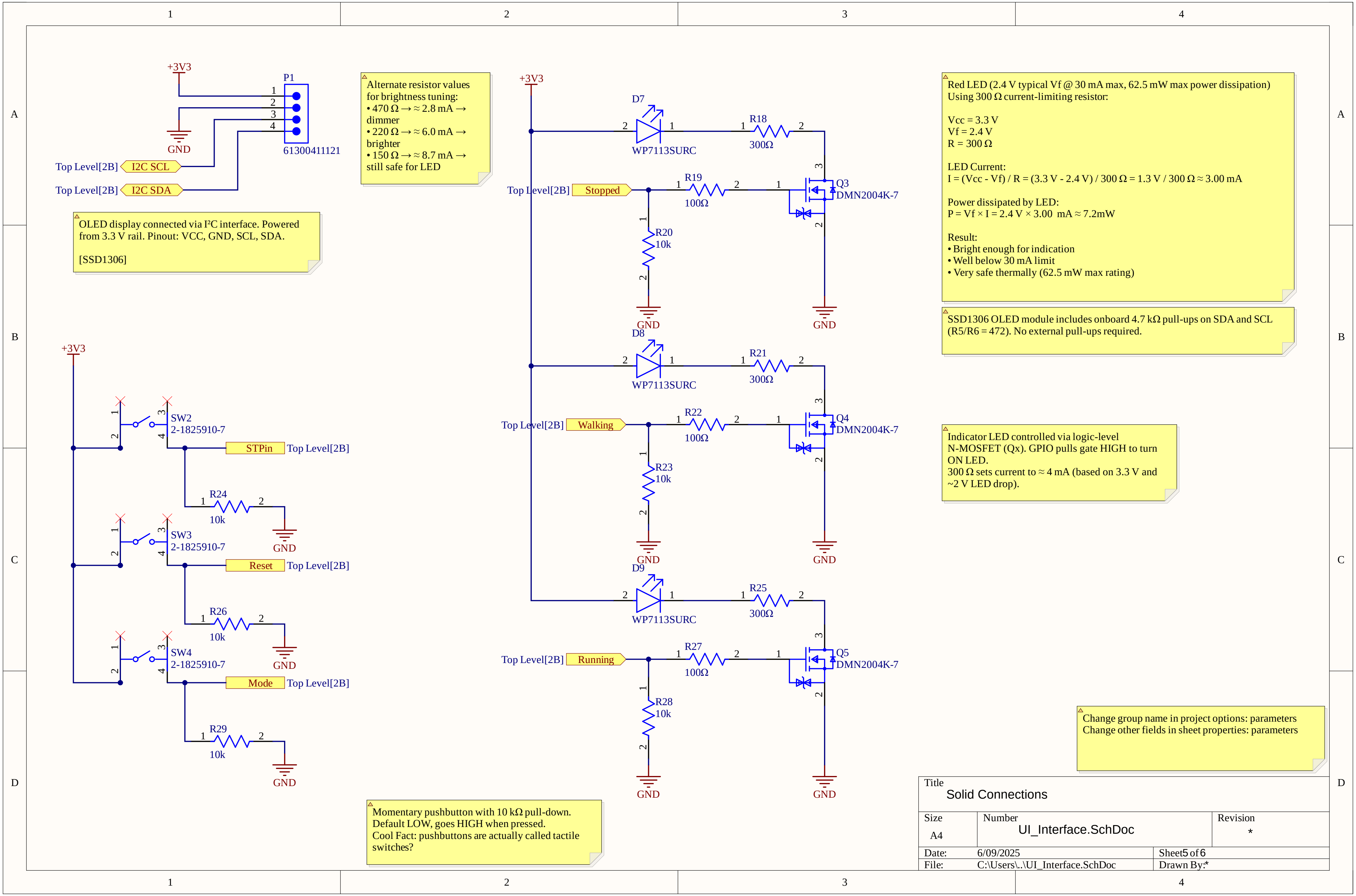
Cutoff frequency:
fc = 1 / (2πRC) = 1 / (2π × 160 kΩ × 33 nF) ≈ 30.1 Hz

Useful for filtering accelerometer signals prior to ADC sampling.
Removes aliasing and high-frequency mechanical/electrical noise.

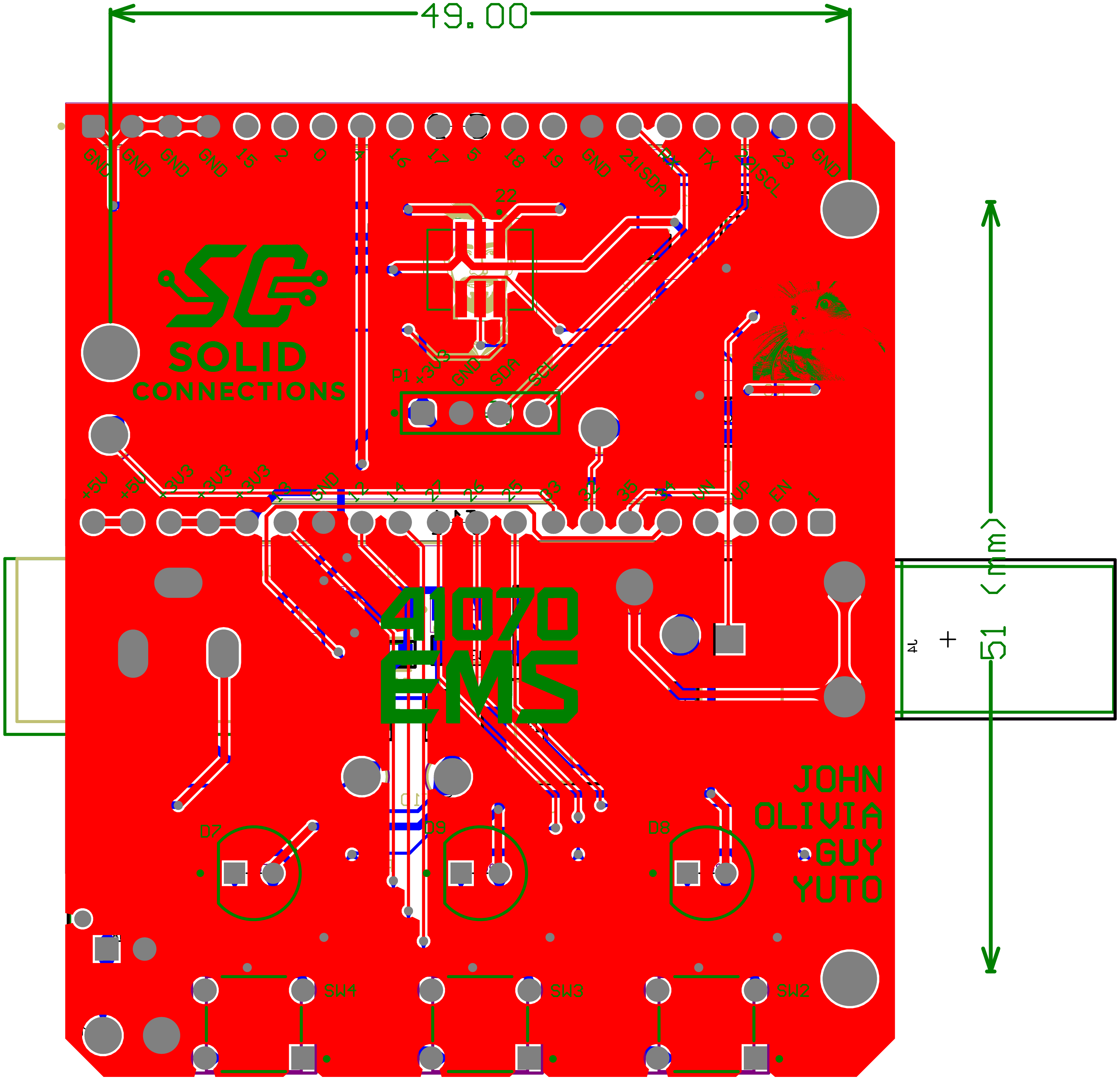
Title: Solid Connections		
Size: A4	Number: Filter.SchDoc	Revision: -
Date: 6/09/2025		Sheet 3 of 6
File: C:\Users\..\Filter.SchDoc		Drawn By: Author Name



Title: Solid Connections		
Size: A4	Number: Power.SchDoc	Revision: -
Date: 6/09/2025		Sheet 4 of 6
File: C:\Users\..\Power.SchDoc		Drawn By: Author Name



+3V3
P1
1
2
3
4
GND
61300411121
Top Level[2B]
I2C SCL
Top Level[2B]
I2C SDA
Alternate resistor values for brightness tuning:
• 470 Ω → ≈ 2.8 mA → dimmer
• 220 Ω → ≈ 6.0 mA → brighter
• 150 Ω → ≈ 8.7 mA → still safe for LED
OLED display connected via I²C interface. Powered from 3.3 V rail. Pinout: VCC, GND, SCL, SDA.
[SSD1306]
+3V3
D7
WP7113SURC
R18
300Ω
Top Level[2B]
Stopped
R19
100Ω
Q3
DMN2004K-7
R20
10k
GND
GND
D8
WP7113SURC
R21
300Ω
Top Level[2B]
Walking
R22
100Ω
Q4
DMN2004K-7
R23
10k
GND
GND
D9
WP7113SURC
R25
300Ω
Top Level[2B]
Running
R27
100Ω
Q5
DMN2004K-7
R28
10k
GND
GND
Red LED (2.4 V typical Vf @ 30 mA max, 62.5 mW max power dissipation)
Using 300 Ω current-limiting resistor:
Vcc = 3.3 V
Vf = 2.4 V
R = 300 Ω
LED Current:
I = (Vcc - Vf) / R = (3.3 V - 2.4 V) / 300 Ω = 1.3 V / 300 Ω ≈ 3.00 mA
Power dissipated by LED:
P = Vf × I = 2.4 V × 3.00 mA ≈ 7.2mW
Result:
• Bright enough for indication
• Well below 30 mA limit
• Very safe thermally (62.5 mW max rating)
SSD1306 OLED module includes onboard 4.7 kΩ pull-ups on SDA and SCL (R5/R6 = 472). No external pull-ups required.
Indicator LED controlled via logic-level N-MOSFET (Qx). GPIO pulls gate HIGH to turn ON LED.
300 Ω sets current to ≈ 4 mA (based on 3.3 V and ~2 V LED drop).
+3V3
SW2
2-1825910-7
STPin
Top Level[2B]
R24
10k
GND
SW3
2-1825910-7
Reset
Top Level[2B]
R26
10k
GND
SW4
2-1825910-7
Mode
Top Level[2B]
R29
10k
GND
Momentary pushbutton with 10 kΩ pull-down.
Default LOW, goes HIGH when pressed.
Cool Fact: pushbuttons are actually called tactile switches?
Change group name in project options: parameters
Change other fields in sheet properties: parameters
Title
Solid Connections
Size
A4
Number
UI_Interface.SchDoc
Revision
*
Date: 6/09/2025
Sheet5 of 6
File: C:\Users\..\UI_Interface.SchDoc
Drawn By:*


49.00
51 (mm)
GND GND GND GND 15 2 0 4 16 17 5 18 19 GND 21/SDA RX TX 22/SCL 23 GND
22
SOLID
CONNECTIONS
P1 +3V3 GND SDA SCL
+5V +5V +3V3 +3V3 +3V3 13 GND 12 14 27 26 25 33 32 35 34 VN VP EN 1
4070
EMS
JOHN
OLIVIA
GUY
YUTO
D7
D9
D8
SW4
SW3
SW2

Board Stack Report