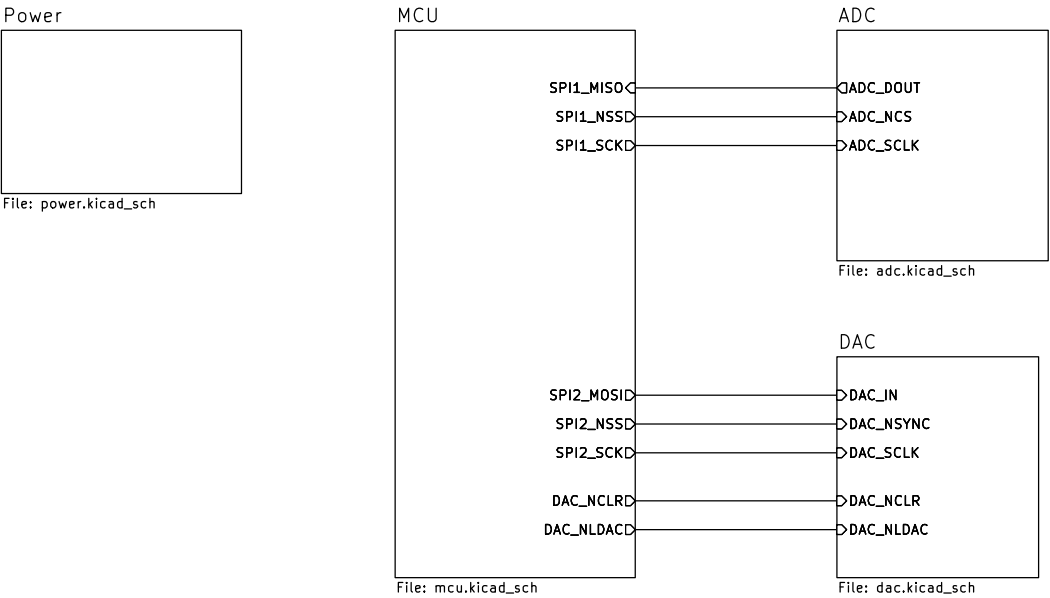


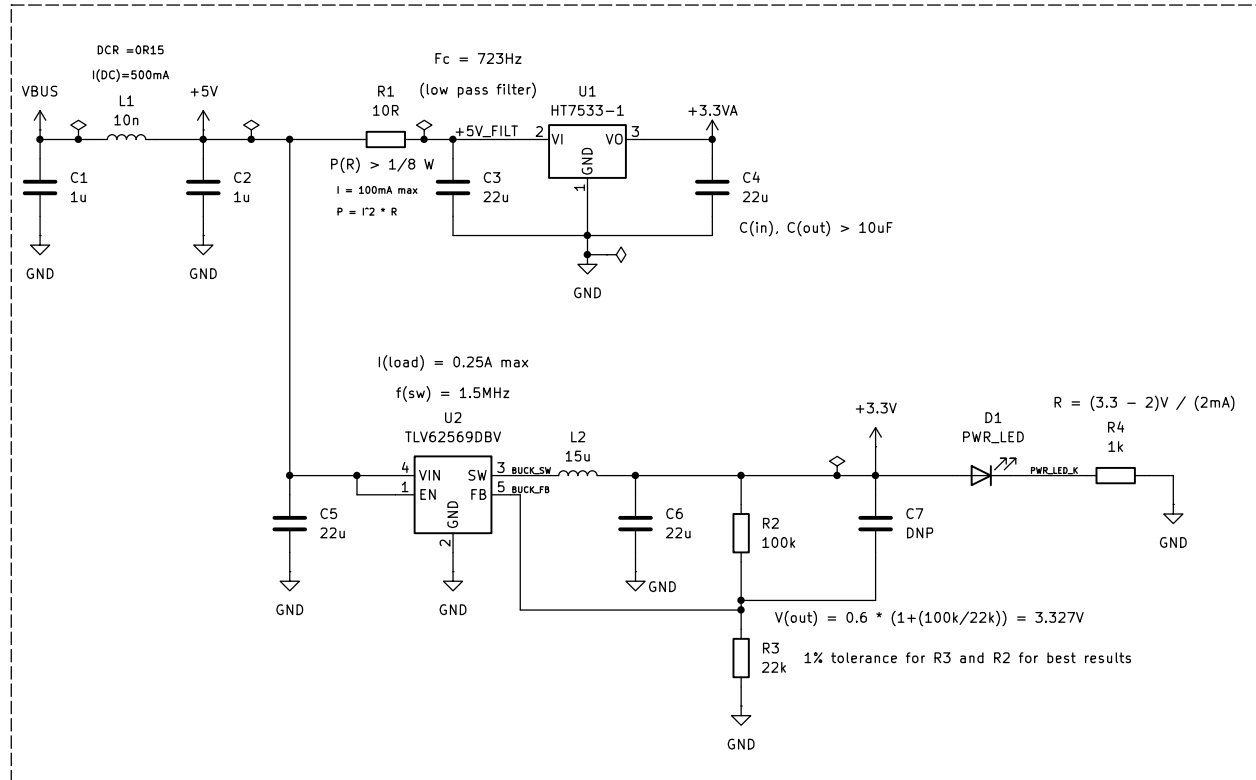
# Mixed-Signal Demo PCB



Mounting Holes (M3)

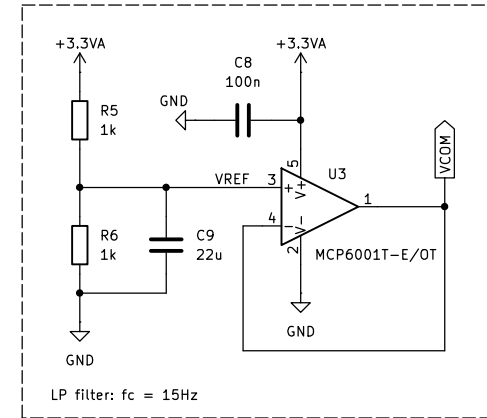
- H1 MountingHole
- H2 MountingHole
- H3 MountingHole
- H4 MountingHole

# Input Filtering & Analog and Digital Supplies

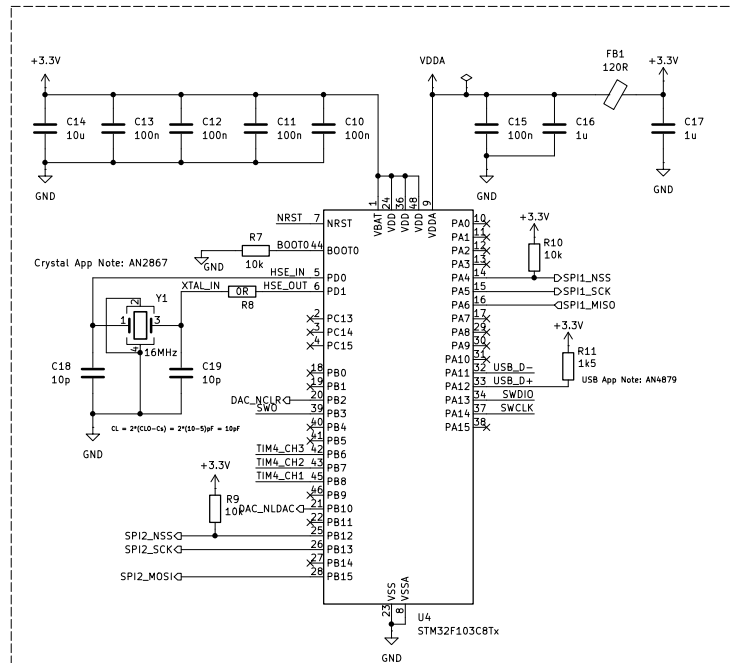


VBUS from USB from MCU page

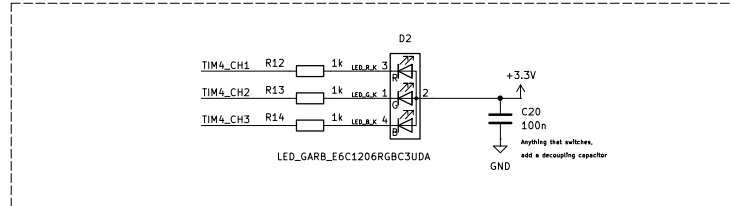
## Bias Generator



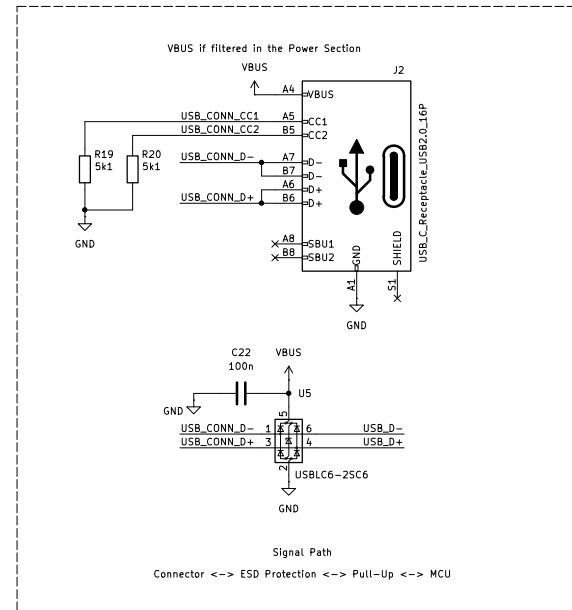
## MCU



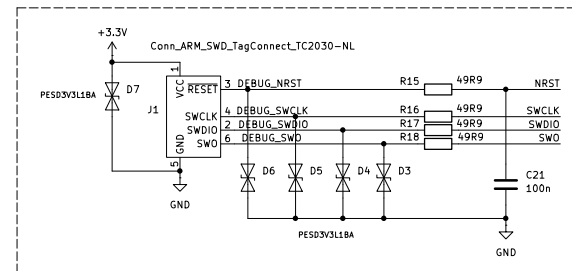
## RGB-LED



## USB-C



## SWD HEADER



[illegible]

**Circuit Diagram: Single-ended to 'balanced' conversion**

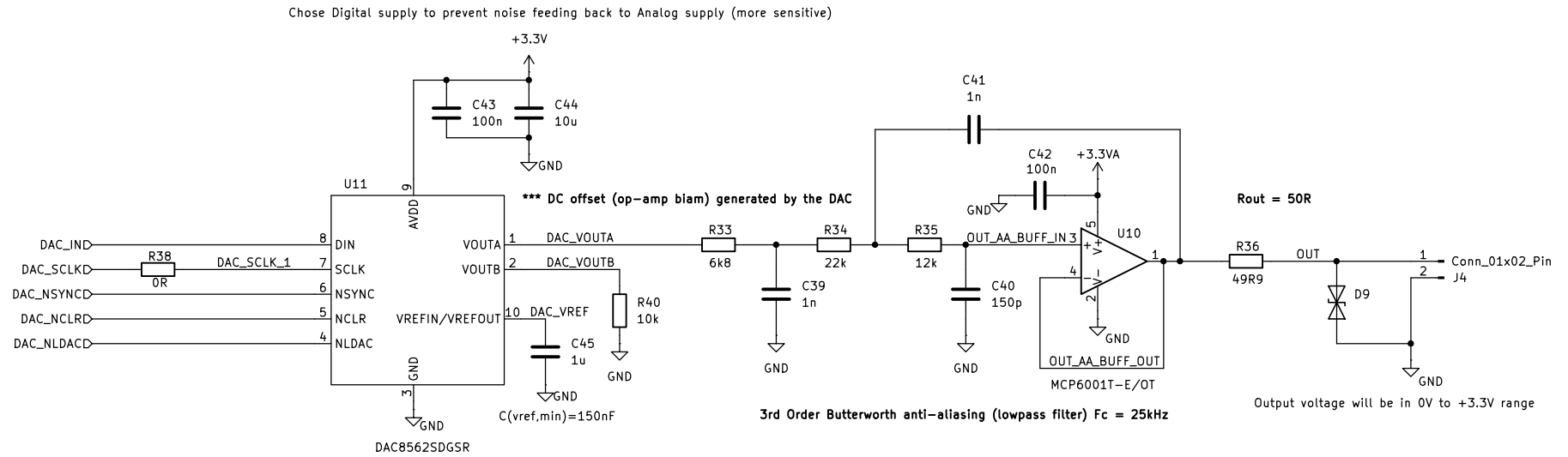
**Components and Values:**

- Resistors:** R25 (1k), R26 (2M2), R27 (2M2), R28 (6k8), R29 (22k), R30 (12k), R31 (1k), R32 (1k)
- Capacitors:** C31 (100n), C32 (100n), C33 (150p), C34 (1n), C35 (150p), C36 (1n), C37 (100n), C38 (150p)
- Diode:** D8
- Op-Amps:** U8 (MCP6001T-E/OT), U9 (MCP6001T-E/OT)

**Key Features and Notes:**

- HP filter = 1.4HZ (R26, C32, R27)**
- 3rd Order Butterworth anti-aliasing (lowpass filter)  $F_c = 25\text{kHz}$**
- Input voltage must be within +1.65V and -1.65V**
- MCP6001:** Rail-to-Rail Input/Output, Supply Voltage: 1.8V to 6.0V, high-impedance CMOS inputs with low bias currents
- Johnson noise is only for resistors in the signal path, so R26 and R27 can be large**
- Minimum voltage drop across R27 because  $I^+ = -I^- = 0\text{A}$  (ideal)**
- R31 and C38 forms an RC LP Filter**
- Single-ended to 'balanced' conversion**
- Both ADC inputs must be at the same VCOMs**

## DAC and Anti-aliasing Filter



- 10k at VOUTB ensure it is not floating and minimises noise
- Using 3.3V supply instead of +3.3VA to prevent noise feeding to AC parts
- Generating DC offset via DAC (firmware) so no need AC coupling