

Digital Repeater Controller V2

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- NOTES:
- * This is an analog board that interfaces with two radios. A separate digital board based on the RP2040 is also required. A ribbon cable connects the two boards.
 - * The goal of this design is to do as little as possible in hardware.
 - * Many things that usually happen in hardware (or FPGA) will happen in software:
 - Audio routing between the two radios will happen in software.
 - Audio pre-emphasis/de-emphasis (if needed) will happen using DSP using digital filters.
 - CTCSS decoding (if needed) will happen in DSP.
 - CTCSS encoding (if needed) will happen in DSP.
 - DTMF decoding will happen in DSP.
 - CWID and other tone prompts will happen in DSP/software.
 - Voice IDs will happen in DSP/software.

Audio In 0



File: audio_in_0.kicad_sch

Audio In 1



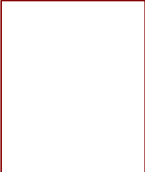
File: audio_in_1.kicad_sch

ADC



File: adc.kicad_sch

DAC



File: dac.kicad_sch

Audio Out 0



File: audio_out_0.kicad_sch

Audio Out 1



File: audio_out_1.kicad_sch

Controls



File: controls.kicad_sch

Power



File: power.kicad_sch

Connectors

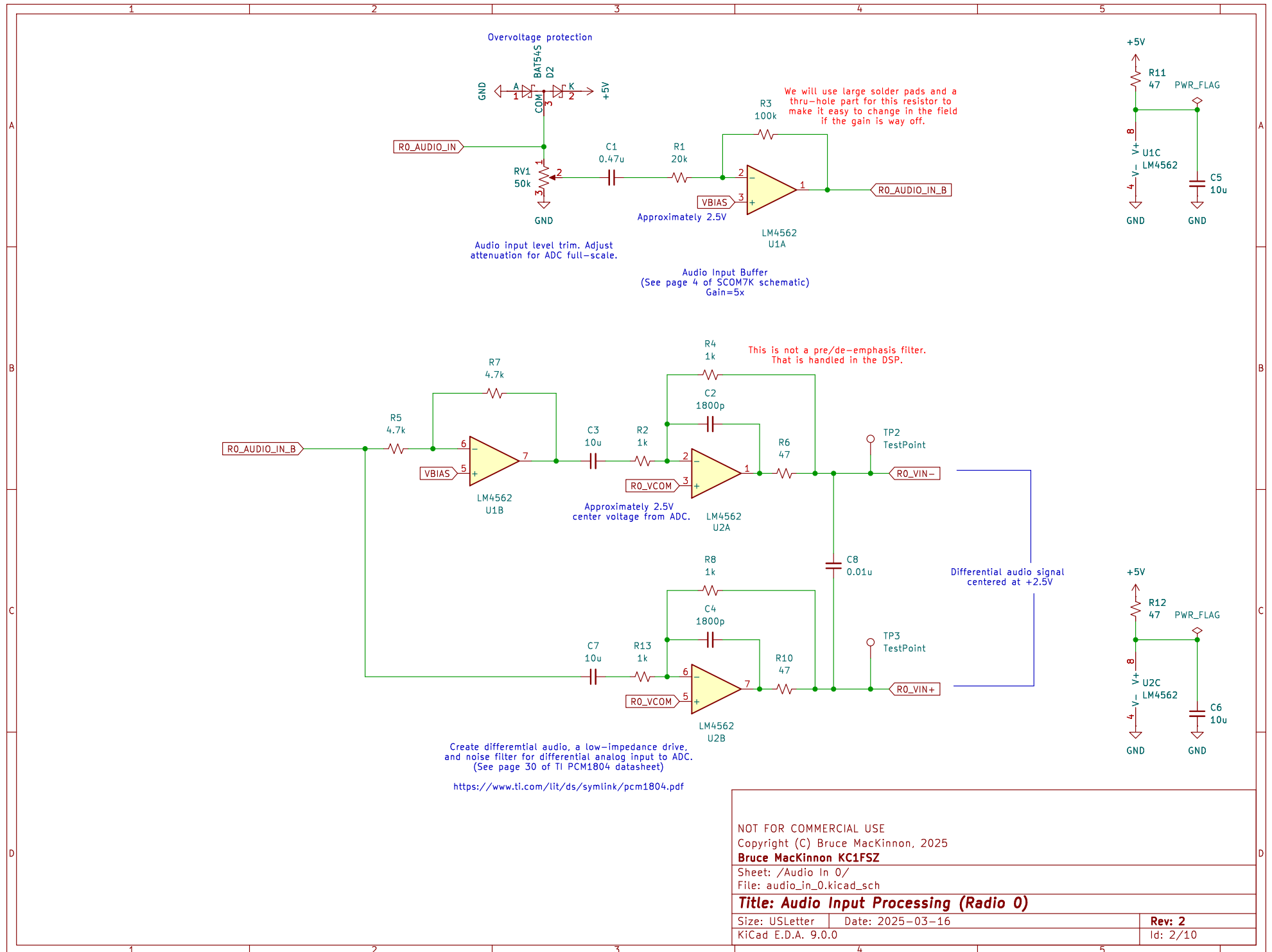


- H1 MountingHole
- H2 MountingHole
- H3 MountingHole
- H4 MountingHole

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Sheet: /
File: if-2.kicad_sch

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File: audio_in_0.kicad_sch

Title: Audio Input Processing (Radio 0)

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1	2	3	4	5	
A					A
B					B
C					C
D					D
1	2	3	4	5	

(Will Be Copy of R0 Audio Input)

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The TI PCM1804 is a 24-bit stereo analog to digital converter designed for audio applications. It contains an integrated low-pass anti-aliasing filter on the front-end with a cut-off around 20 kHz. Sample rate (f_s) will be 48,000 samples/second. Narrower filtering will be achieved in DSP.

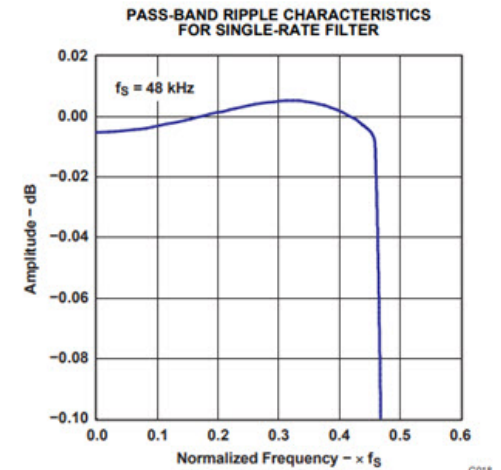
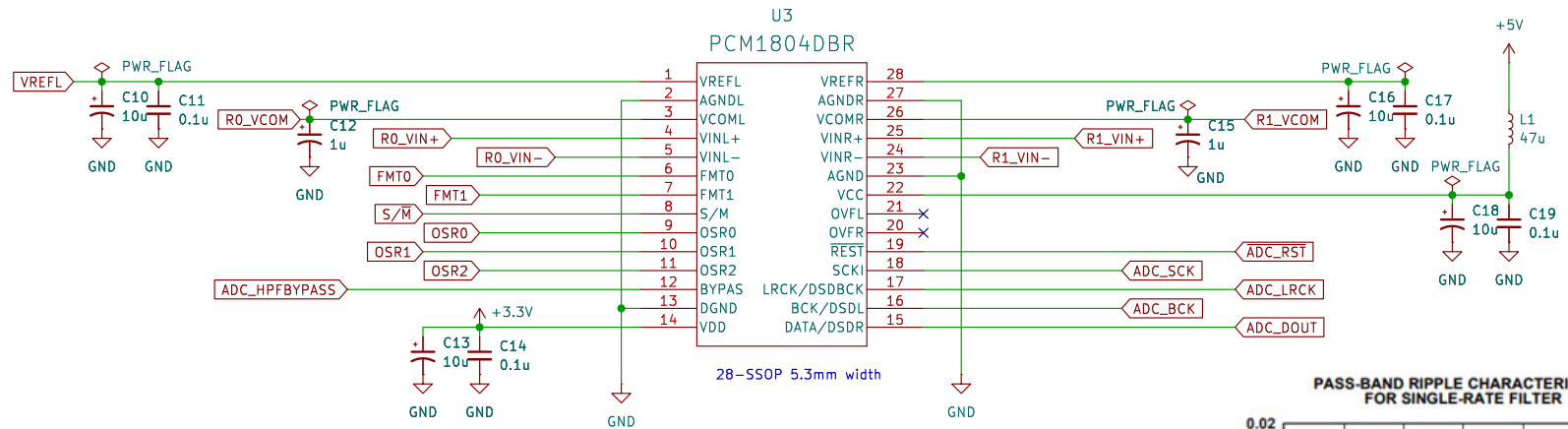


Figure 18.

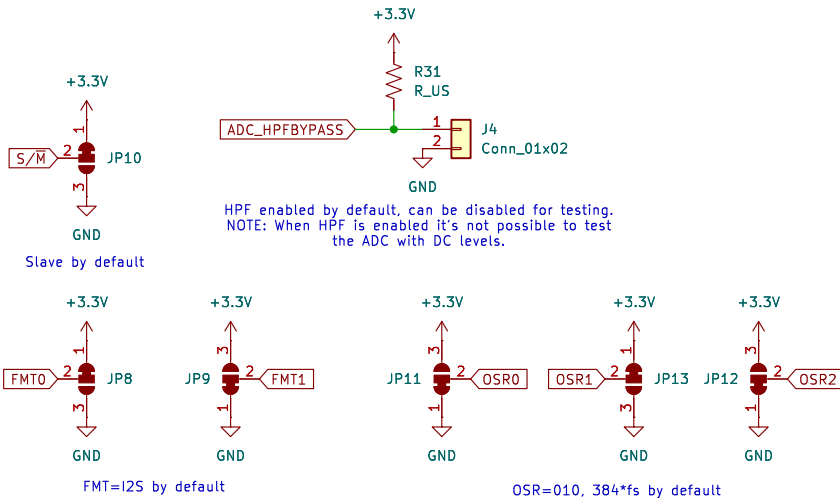
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Sheet: /ADC/
File: adc.kicad_sch

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OSR=010, 384*fs by default

The TI PCM5100 is a 24-bit stereo digital to analog converter designed for audio applications. It contains an integrated low-pass reconstruction filter on the back-end with a cut-off around 20 kHz. Sample rate (f_s) will be 48,000 samples/second. Narrower filtering will be achieved in DSP.

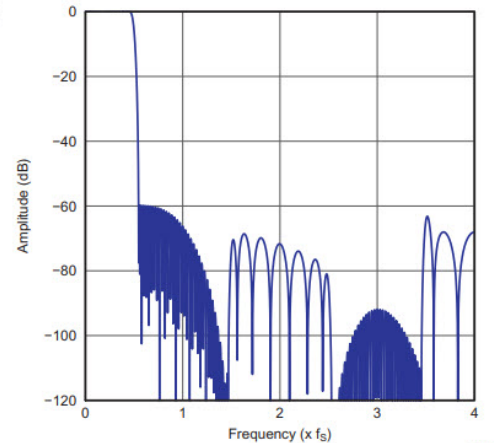
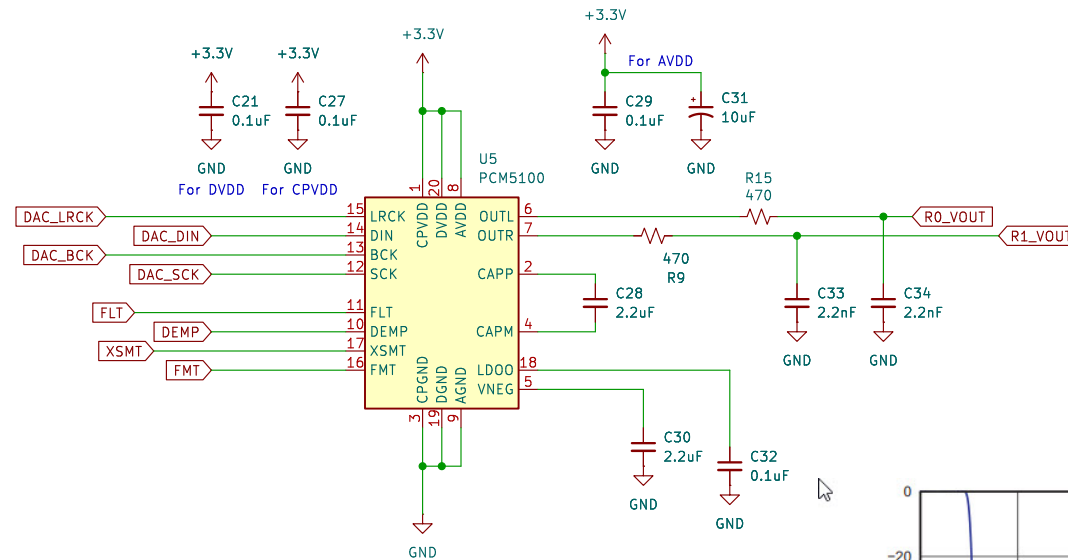
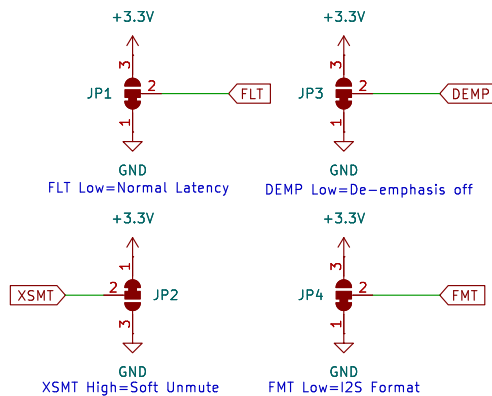


Figure 16. Normal x8 Interpolation Filter Frequency Response

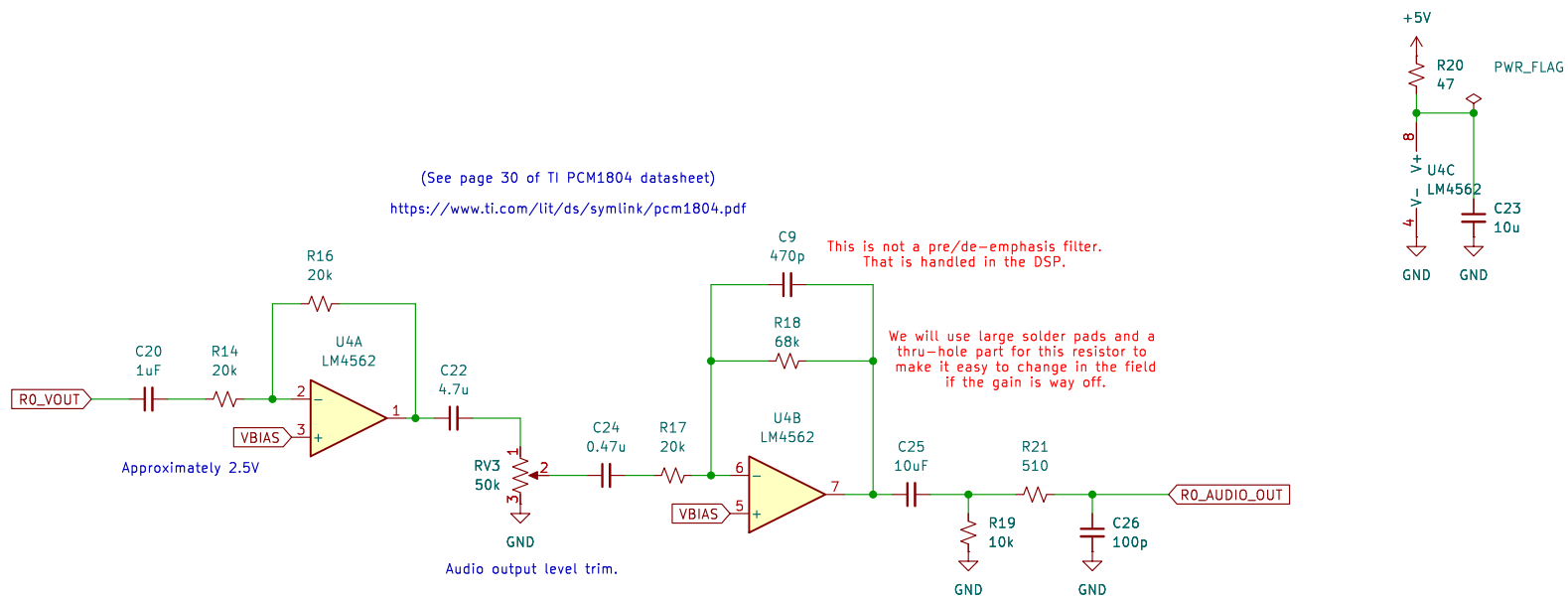


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 File: audio_out_0.kicad_sch

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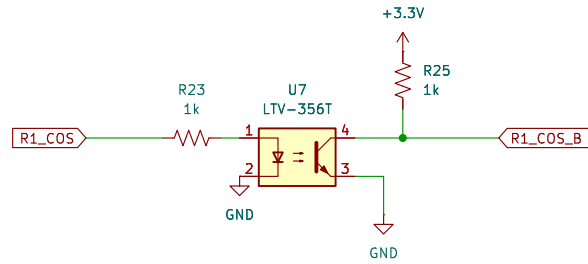
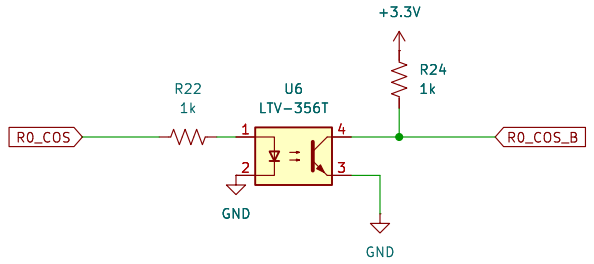
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(Will Be Copy of R1 Audio Output)

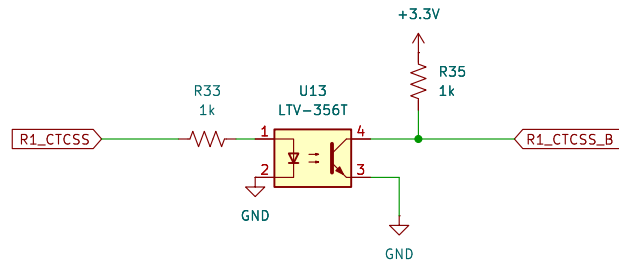
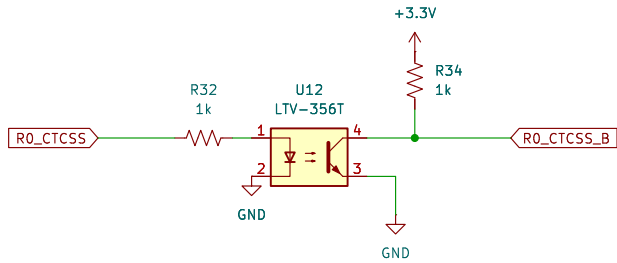
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Sheet: /Audio Out 1/
File: audio_out_1.kicad_sch

Title: Audio Output Processing (Radio 0)

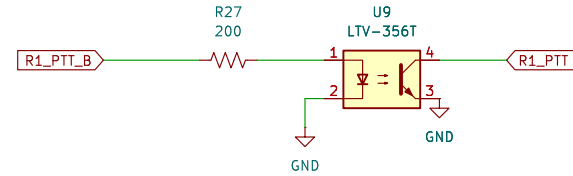
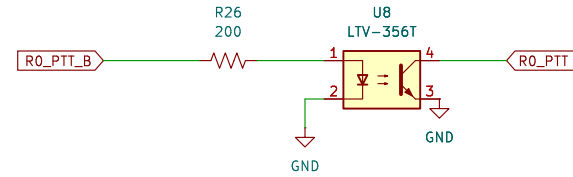
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Converts radio COS signals to 3.3V logic.
 TODO: Validate max current on LTV-353T input.



Converts radio CTCSS signals to 3.3V logic.
 TODO: Validate max current on LTV-353T input.



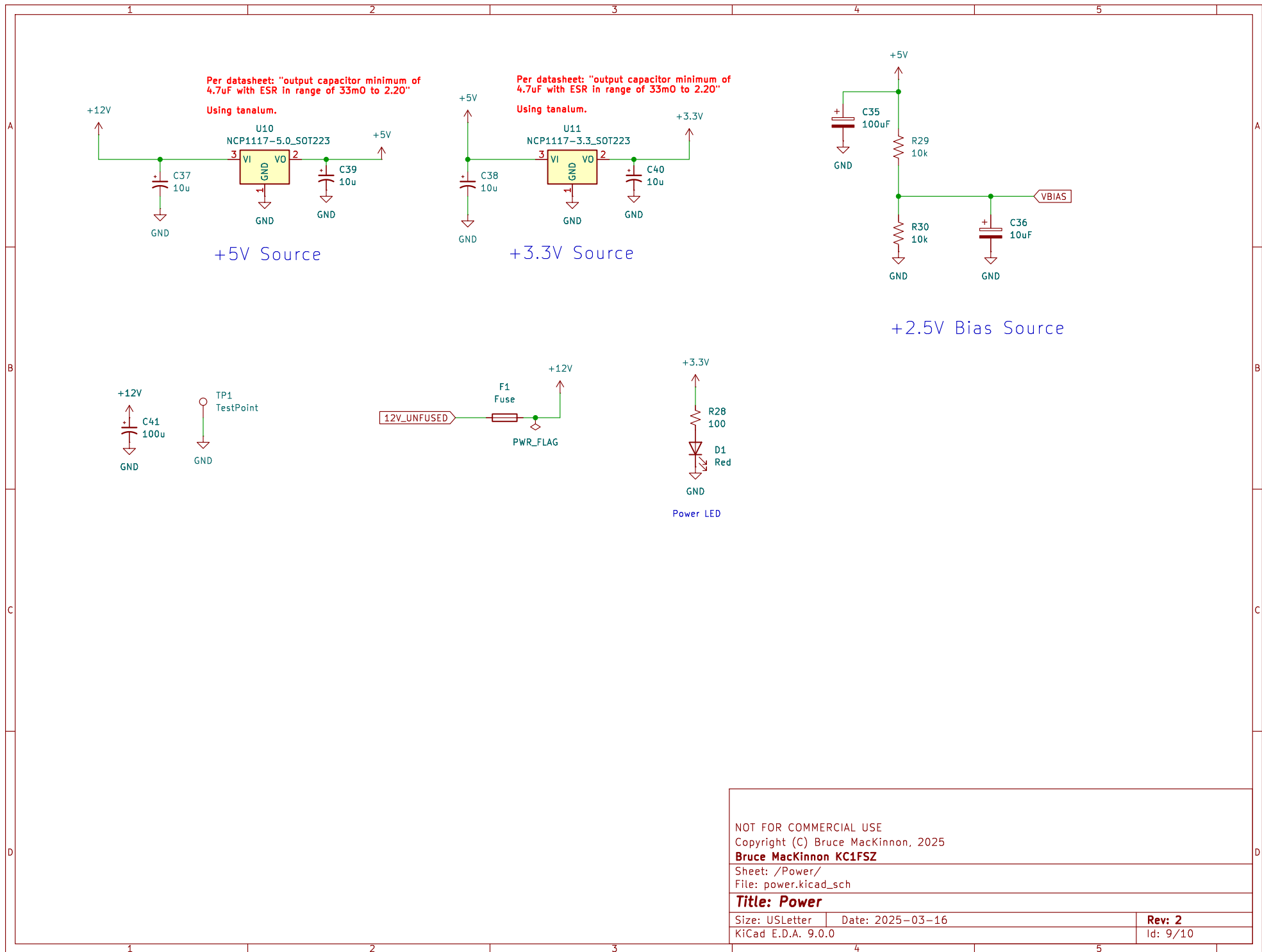
Converts 3.3V logic to pull PTT to ground.

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 Sheet: /Controls/
 File: controls.kicad_sch

Title: COS/CTCSS/PTT Controls

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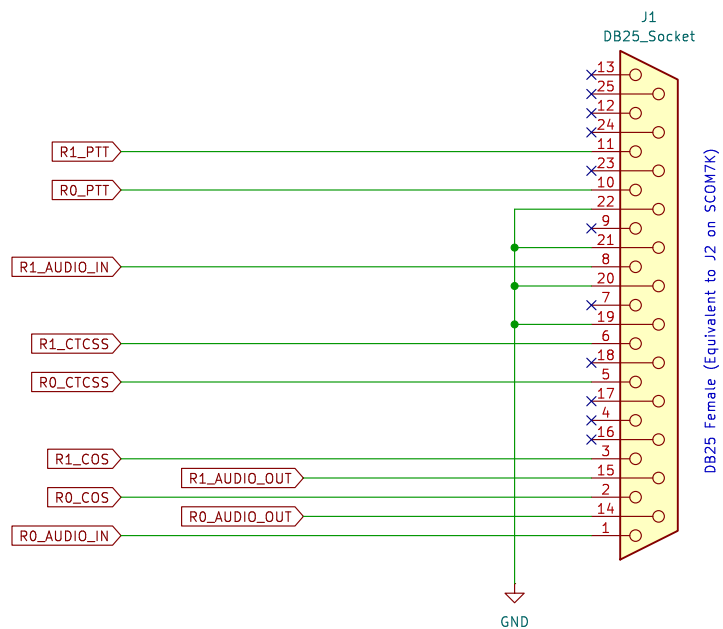


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File: power.kicad_sch

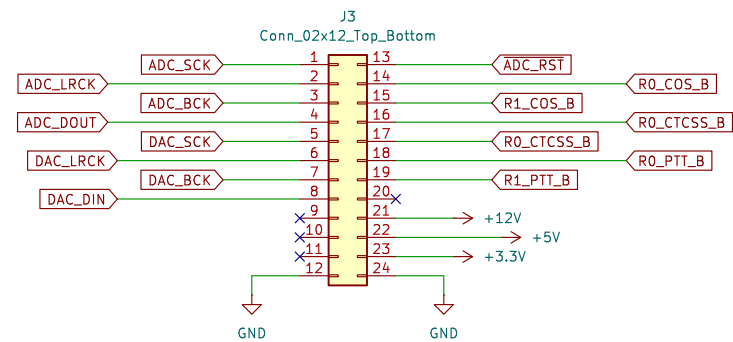
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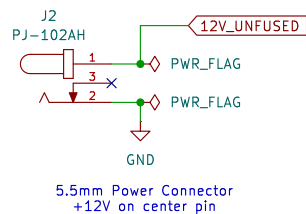
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DB25 To Radios



Ribbon Cable to Digital Board



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