

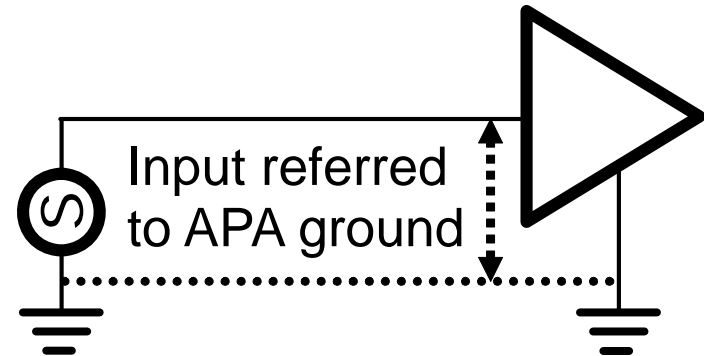
Audio Power Amplifier (APA) Differential Input Connection

Stephen Crump
Audio Applications Engineering
Audio and Imaging Products
23 November 2009

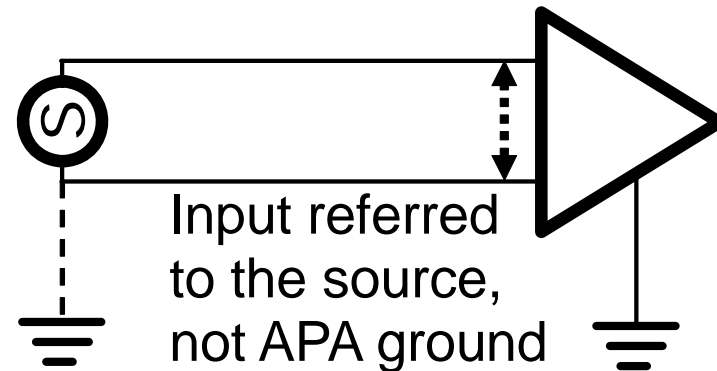
APA Input Configurations

- There are two common input configurations.

- Single-ended – single input line referred to ground. Traditional configuration.



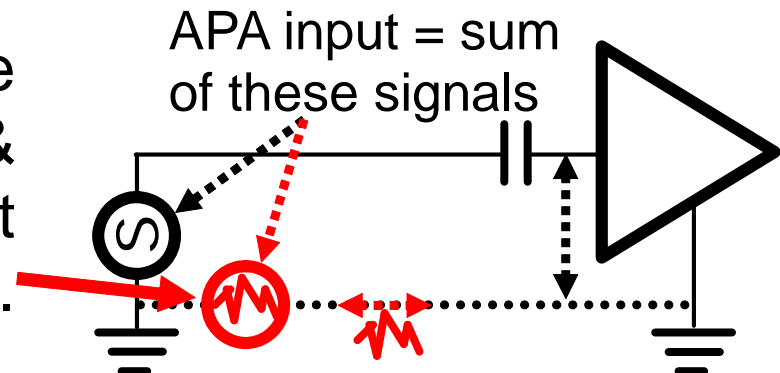
- Differential – a pair of input lines. A superior configuration.
- May be connected to a differential source OR a single-ended source.



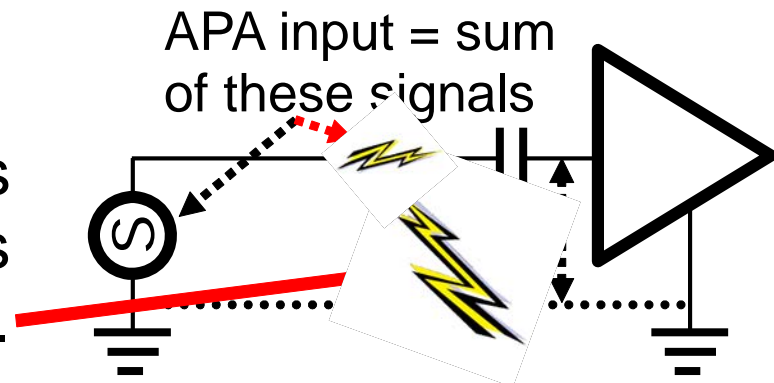
Single-Ended Inputs: Disadvantages

- Input DC blocking cap are practically always required in single-supply systems.
- No rejection of input noise or interference.

Noisy power currents in the ground between source & APA produce voltages that add to the APA input signal.



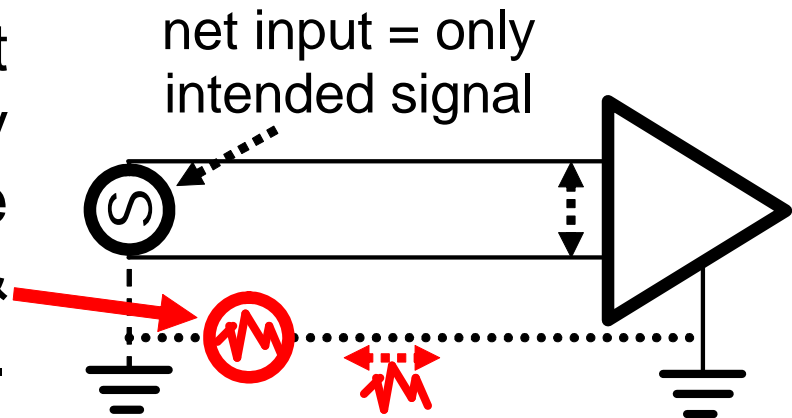
Radiation from other circuits near APA induces voltages that add to the input signal.



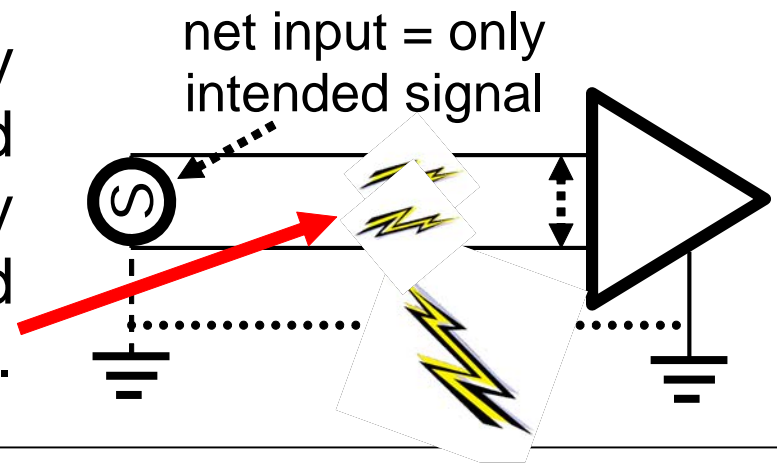
Differential Inputs: Advantages

- Input blocking caps may not be required.
- High rejection of input noise and interference.

With ground reference at source, voltages induced by noisy ground currents are the same at both inputs & are rejected by APA CMRR.

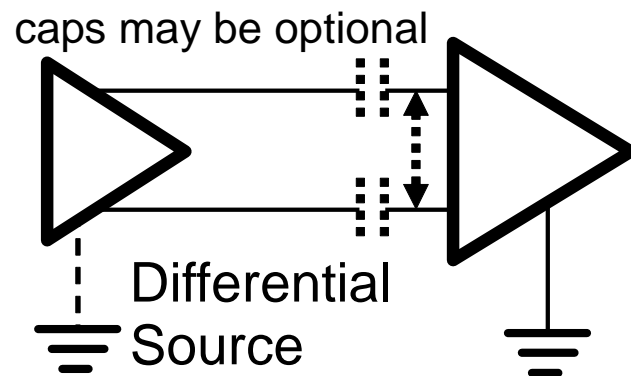


If input leads are closely spaced, voltages induced by radiation are essentially the same at both inputs and are rejected by APA CMRR.

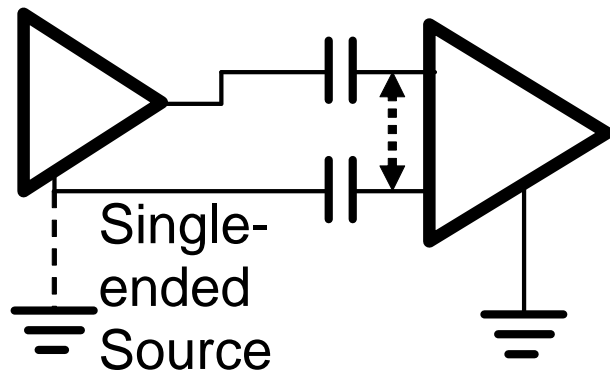


Differential Inputs Cont'd.

- Differential inputs may be connected to either differential or single-ended sources.



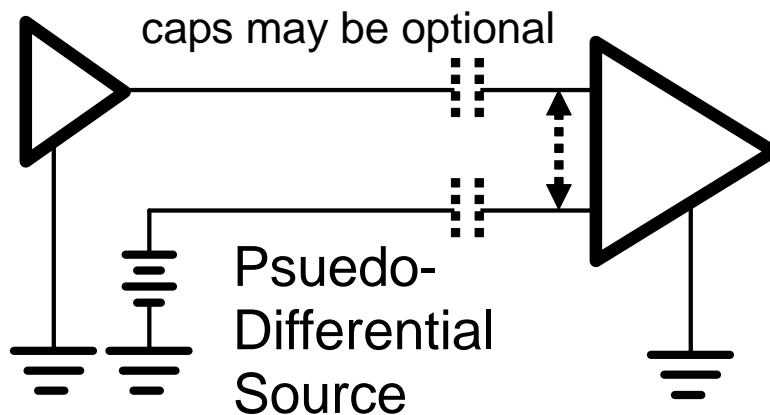
- If the audio source DC is within the APA common-mode range, DC blocking caps are optional.
- However, be sure source DC offset is not a problem!
- Input caps may still be used if high-pass filtering is needed.



- Input DC blocking caps are required with a single-supply single-ended source.

Differential Inputs Cont'd.

- Psuedo-differential sources use a single output with a midrail bias.



- Treat these like differential sources for wiring to the differential inputs of APAs.

Differential Input Connections

- Keep the 2 input leads close together.
- With single-ended sources connect the APA input ground lead at source ground, NOT at APA ground.
- This lets the CMRR of the APA reject any common-mode radiation or any ground noise between the APA and the source.