

AD1981B Headphone Jack Connections and Jack Presence Sensing

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OVERVIEW

This application note describes the best method to connect audio jacks to the [AD1981B](#), in particular for headphone output and reliable jack presence detection. This application applies to most IAG AC '97 codecs but has been written specifically for the [AD1981B](#).

CONNECTING HEADPHONE JACKS TO THE AD1981B

The [AD1981B](#) is capable of driving a 32 Ω stereo headphone with a minimum of external circuitry. In addition, there are two jack sense signal lines designed to report the presence of a jack (plugged in or not).

The HP_OUT_R and HP_OUT_L pins are capable of directly driving 32 Ω headphones. Designs should use larger dc-blocking capacitors on any headphone-capable jack. Capacitors up to 220 μF can be used, but 100 μF capacitors give acceptable performance and output level for most applications. Figure 1 and Figure 2 show these capacitors (C1 and C4). All coupling capacitors should be high quality and maintain capacitance and coupling characteristics over the full audio range of better than 20 Hz to 20 kHz.

Component L1, Component L2, Component C2, and Component C6 reduce EMI radiation. These components are

suggested for all applications. If EMI is not a concern in a user's application, these components can be removed.

Component R1 and Component R3 resistors prevent unconnected jacks from building any substantial dc offset. Such an offset builds over time if nothing is plugged into the jack. This offset causes a loud pop noise when an amplified speaker or headphone first plugs into the jack. These resistors are recommended for all applications.

The codec signal used to detect the present state of a headphone jack is JS1. Using software or the internal codec hardware, the presence of (or lack of) a device plugged into the headphone jack can be used to control the mute state of other audio signals or to trigger some other event via a software interrupt. The JS1 (or JS0) signal can use a standard or an isolated jack switch for presence detection. Using an isolated jack switch provides the best JS1 performance because the standard style jacks (sometimes called loopbacks) can produce false jack-state changes if the audio becomes quiescent for a significant duration. Figure 1 and Figure 2 show the recommended isolated jacks for both normally open (NO) (see Figure 1) and normally closed (NC) (see Figure 2) jack types. The JS signals have a built-in 25 μA pull-up to reduce component count when using NC style switches. Two external resistors are required (R4 and R5) when using NO style switches.

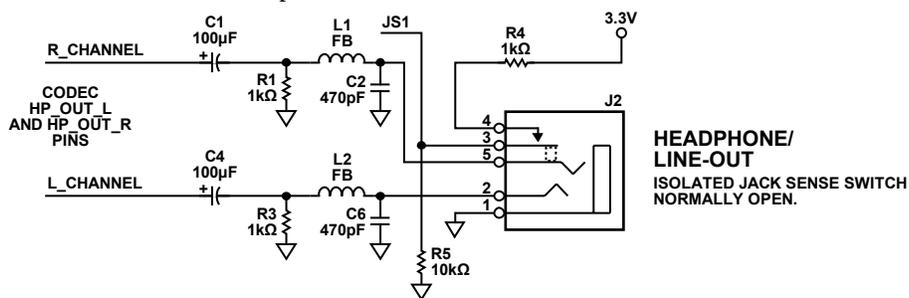


Figure 1. Normally Open (NO) Isolated Switches

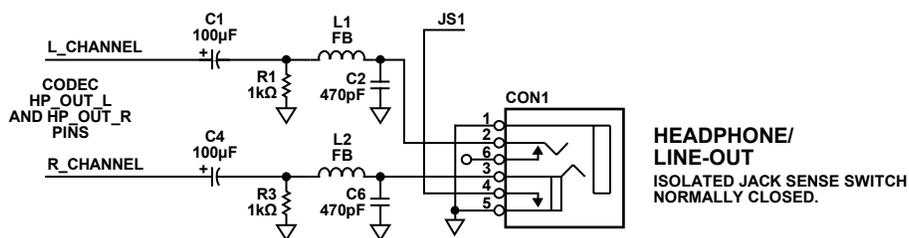


Figure 2. Normally Closed (NC) Isolated Switches

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