Integrated Mixed-Signal Solutions

STAC9766 and STAC9750 Motherboard Implementation for AC'97 Codecs with Integrated Headphone Amplifiers

SigmaTel Application Note

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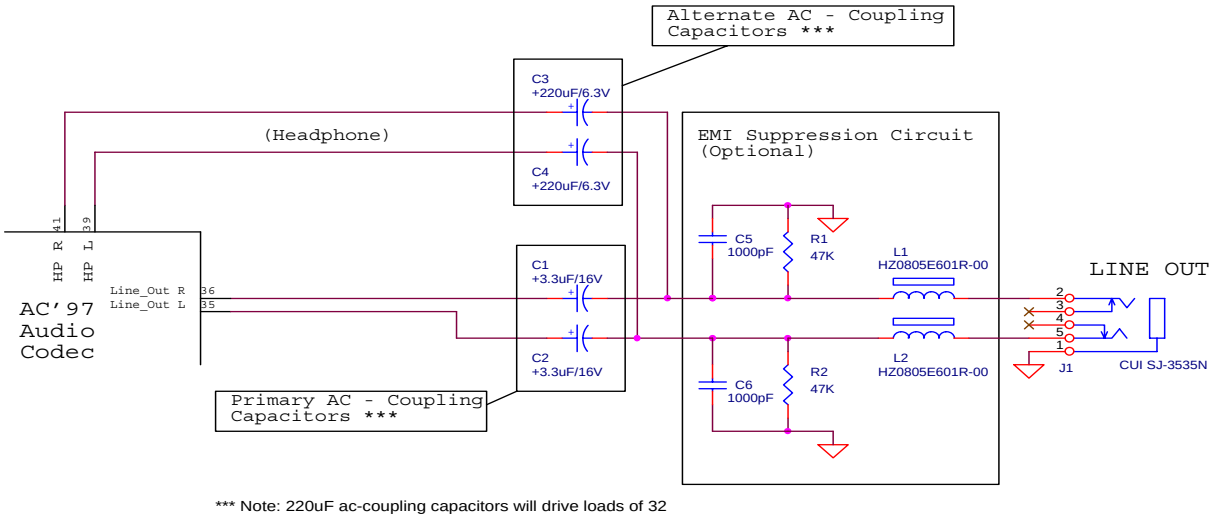
The AC'97 audio codec specification provides for a standard LINE_OUT 1Vrms analog output, as well as an optional output on pins 39 and 41, that may be either a headphone amplifier output, or a True Line Output. Earlier codecs did not support the headphone amplifier driver capability, and the main LINE_OUT output was usually routed to the output connector through a simple AC-coupling circuit. Several codecs have been released to the market that support an internal headphone drive amplifier, including the STAC9766 and the STAC9750 audio codecs.

To best take advantage of the new codecs with headphone support as well as the older designs with very high quality output amplifiers driving the LINE_OUT pins, the configuration in the figure below is suggested. Both outputs are routed to the primary output connector through the ac-coupling capacitors, but only one set of ac-coupling capacitors is installed. For traditional codecs that do not support the internal headphone amplifier, the standard LINE_OUT outputs should be connected with the primary set of ac-coupling capacitors. For Modern codecs that provide an internal headphone driver the secondary output should be connected to the output connector as indicated in the AC'97 specification through the alternate set of ac-coupling capacitors. For proper adherence to the WHQL testing requirements for frequency response, headphone amplifier ac-coupling capacitors should be 220uF for 32-ohm headphone drive, while the typical LINE_OUT output can be connected with 3.3uF capacitors to drive 2k ohm and larger loads. The optional EMI suppression circuit is recommended, but not required.

	Standard LINE_OUT Configuration	**Internal Headphone Amplifier Configuration**
Primary ac-coupling Capacitors	C1 and C2 Installed	Do not Install
Alternate ac-coupling Capacitors	Do Not Install	C3 and C4 Installed

Capacitor Installation Table



*** Note: 220uF ac-coupling capacitors will drive loads of 32 ohms and greater and still meet the bandwidth requirements of PC2001. 3.3uF ac-coupling capacitors will drive loads of 10K ohms and greater and still meet the bandwidth requirements of PC2001.

The STAC9766/67datasheet, product brief and additional information is available at www.sigmatel.com.