

## AES3 and S/PDIF Recommended Transformers

Transformers are used in professional digital audio interfaces to provide common-mode noise and interference rejection, high-frequency rejection, impedance-matching, isolation from ground loops, DC blocking, and short-circuit protection. Due to the specialized needs of this application, several manufacturers have designed transformers specifically for AES3 and S/PDIF circuits.

The transformer used in the professional interface should be capable of operation from 3.6 to 24.6 MHz, which is the audio data rate of 28 kHz to 192 kHz after biphase-mark encoding. Transformers used for digital audio should also have low inter-winding capacitance. Inter-winding capacitance couples the primary and secondary windings, degrading the isolation between the windings with increasing frequency. This energy appears in the form of common mode noise on the receive side ground and has the potential to degrade analog performance.

The companies listed in [Table 1](#) are a few manufacturers of digital audio transformers. Please contact these manufacturers directly for more detailed information<sup>1</sup>.

[“References” on page 2](#) provides a list of transformer design and analysis papers.

<sup>1</sup>-Cirrus Logic is unable to guarantee the performance of components manufactured by others.

Manufacturer	Manufacturer Address
Minicircuits	<a href="http://www.minicircuits.com">http://www.minicircuits.com</a>
Pulse Engineering	<a href="http://www.pulseeng.com">http://www.pulseeng.com</a>
Schott Corporation	<a href="http://www.schottcorp.com">http://www.schottcorp.com</a>
Scientific Conversion Inc	<a href="http://www.scientificconversion.com">http://www.scientificconversion.com</a>
VITEC	<a href="http://www.VitecCorp.com">http://www.VitecCorp.com</a>

Table 1. Digital Audio Transformer Manufacturers

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## References

“Understanding Common Mode Noise,” Pulse Engineering, G019, April 1999, <http://www.pulseeng.com>

“Introduction to Transformer Magnetics,” Pulse Engineering, G022, July 1999, <http://www.pulseeng.com>

“The Effect of Transformers on Transmission of Digital Audio Signals,” Scientific Conversion, Inc., Jon D. Paul, 1998, AES Paper: Preprint #4840, <http://www.scientificconversion.com>

“Characterizing Digital Audio Transformers with Induced Jitter Histograms,” Scientific Conversion, Inc., Jon D. Paul, December 2001, AES Paper: Preprint #5448, <http://www.scientificconversion.com>

“The Effects and Reduction of Common-Mode Noise and Electromagnetic Interference in High Resolution Digital Audio Transmission Systems,” Scientific Conversion, Inc., Jon D. Paul, October 2003, AES Paper: Preprint #5879, <http://www.scientificconversion.com>

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## Contacting Cirrus Logic Support

For all product questions and inquiries contact a Cirrus Logic Sales Representative.

To find the one nearest to you go to [www.cirrus.com](http://www.cirrus.com)

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