

# The Readers Respond:

*Another Mailbag Of 'Tool & Tip' Reactions.*

Since the last time we summed up reactions to this column (June 9), several more installments have gone by. That, along with the earlier columns not reviewed due to publishing lags, provides quite a mailbag, and a good point to sample a variety of reader feedback.

**Analog's Shrinking World (April 1):** This topic must have been pretty much on target, as certainly no one wrote in to object to the basic theme. Rather than that, virtually all responses received on this column agreed that the shrinking world phenomenon of surface-mount isn't necessarily helping analog performance. In many respects, it is creating near-term problems for designers.

But, there is one positive aspect of IC performance within the smaller packages which was originally mentioned, and also showed up in reader feedback. This is simply the overall reduction of parasitics. Certainly for cases where power dissipation isn't a performance limitation, smaller packages do help, with less parasitic effects and correspondingly better high-frequency performance. But from the designer's perspective, this can really be a two-edged sword. Why? The ultimate performance can indeed be better, but the route to getting there may be more difficult than ever. Breadboarding is much more difficult, if not outright impractical, so lots of time and money can be spent finalizing a design. In the long term, more complete models will help with simulating designs before prototyping, at least for those system portions where models do exist. Unfortunately, for LSI analog and mixed-signal IC components, the model world right now is a relatively barren landscape.

What can help leapfrog the design impasse is more work by the IC vendors in characterizing their complex analog parts within the complete system environment, and then providing the customer with evaluation boards that reflect this aggregate effort. The board then becomes a practical means of demonstrating viability of a part for

an intended function. The customer is then able to adapt the pc-board design of the evaluation board for their own system, with the knowledge that some minimum performance levels will be realized. And without the major time/expense efforts involved in multiple iterations of a sophisticated high-frequency layout. A case in point of just this context was the evaluation board for the AD8116 16x16 crosspoint switch, which underwent multiple passes before the desired isolation performance was realized.

**The Well-Stocked Toolbox (May 1):** This one drew a number of responses with the same general theme—that people like to be provided with links to useful design-related websites and other info sources. This is an understandable thing, so as long as they appear useful, we'll try to keep them coming.

**Readers Respond (June 9):** In this first piece reviewing early columns and reader reactions, some issues were raised that brought even further useful responses.

Related to e-mail, I invited reader responses on solutions for combating SPAM, and got an interesting and useful response from reader Michael Guthrie. **TIP:** He describes his version of a SPAM filter trick as follows:

*Dear Walter:*

*My solution to the SPAM problem is right in your column. I keep multiple mail boxes. Since Juno is free, I use it whenever a message is likely to generate SPAM. Hence, my mail comes in presorted! One box for direct contact in business, another to register on web sites and for USENET, etc. Since you can have as many Juno boxes as you want, just use different boxes for different purposes. It also allows you at times to figure out where the SPAMmer got the address.*

So, perhaps an answer may sometimes be lying just under your nose, eh? Thanks to Michael for sharing his useful anti-SPAM tip with us.

Personally, I prefer a single mail program that can scan multiple mailboxes, and then sort downloaded mail into folders (including the trashbin). But, I also realize that our tech-world complexities can often be very non-accommodating, forcing us to use proprietary software for those services that insist on it. But, alas, if only we had some recourse for an e-mail address that has already found its way to various SPAM lists (short of outright abandonment, that is).

**TIP:** Here's some miscellaneous book news. First, with regard to the June 9 column's book list, there are several interesting developments. Sergio Franco's book, *Designing with Operational Amplifiers and Analog Integrated Circuits*, from McGraw-Hill, should be out in a second edition by the time this column appears.

A couple of readers asked about my own (as then reported) OOP book, *IC Op Amp Cookbook*, 3d Ed. I'm now happy to say it is available again.

Another reader wrote to say that Jim Roberge's *Operational Amplifiers: Theory and Practice* (Wiley, 1975 ISBN 0-471-72585-4), should also have been on the "top ten" list. This is a point with which I basically don't argue. However, all such lists must get whittled down. But, I'd still rate the (OOP) Roberge

book a close #11, and I do hope to see it in a new edition someday. In the interim, readers may be able to find it via the OOP sources in the June column.

Dan Sheingold, editor of *Analog Dialogue*, wrote about a new (and free) offering by various ADI engineers. A collection of 23 different chapters that originally appeared in *Analog Dialogue*, the 53-page (plus index) book, *Ask The Applications Engineer* can be requested from the ADI literature center at (800) 262-5643.

**Low Noise Power For Analog Circuits (June 23 Analog Special Issue):** This one drew a couple of responses from some old co-workers, more to say hello than anything of major interest in the column itself. But, I'm always glad to hear from old friends, especially if a current topic is of interest in your work. So, don't be bashful!

Another reader wrote to say that



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the bootstrapped supply configuration used in the regulator of that column may be of help to him in a higher voltage version. Due to space constraints in the June 23 article, higher voltage modifications didn't get addressed, but they are nevertheless feasible. In that circuit, the ultimate limit is the maximum rail voltage of the op amp used, or typically 36 V for such types as the AD797 (used in earlier versions of the basic design). And, you also need to satisfy the startup voltage criteria, as was generally outlined in the article. If anyone needs details on setting up regulators appreciably higher than 18 V, drop me a note. This has been done, and with sufficient interest, it could be a future topic.

**EEs And the Audio Hobby (July 7):** This one, with a theme of DIY audio projects and related source information, drew more in terms of both quantity and quality of mail than any other column thus far. Naturally, I find this just delightful, since audio is my hobby as well as yours. So, my special thanks to all who wrote in. Why? For providing a mandate to feature more audio-related topics in future columns!

To take some sample reader reactions, Rich Compeau wrote in and described a power amp project he and Bob Krebs recently tackled.

*Hi Walter:*

*Several of us at work enjoyed your article "EEs And The Audio Hobby" in the July 7 issue of Electronic Design. It hit pretty close to home!*

*The latest power amp is an all-FET, two-stage, single-ended Class A amp biased for a load of 3  $\Omega$ . It utilizes servo bias, servo-offset reduction, a regulated high-voltage front-end supply, and an unregulated high-current supply. There is no active current limiting circuit (the Hexfets will probably protect the fuses). It has low NFB (<10 dB) and no capacitors outside of the power supply and servo loop compensation networks. The Zobel is implemented as an L-R. The efficiency is only about 10% (great for Northern climates), but the sound is pretty incredible!*

*In designing and building this amp there were many challenges—cutting and drilling aluminum; thermal calculations and heat sinking; prototyping and pc-board design and layout; reliability calculations; procurement of expensive and hard-to-find compo-*

*nents; procurement of used test instrumentation, which sometimes worked; high-current power-supply design and protection; modular construction concepts; creation of SPICE models; disconnection of the smoke detector over my bench, and, treatment of minor burns....*

In bringing a major DIY project to fruition, Rich has described experiences going far beyond basic design and calculation tasks, which also well illustrates the diversity of skills required to build a sophisticated audio project from start to finish. Thanks for sharing this story with us, Rich. I hope your interesting amplifier is ultimately published as a DIY project.

Barry Bolling, a former student of Marshall Leach's at Georgia Tech, wrote in to describe building the low TIM amplifier referenced in the footnotes of the July 7 column. Excerpted from his "Background" notes from the cited web page, Marshall Leach has this to say about this amplifier:

*The Leach Amp v4.2, is the latest update of the "Low TIM Amplifier" which I originally published in Audio Magazine. The Georgia Tech students who built it never referred to it as the "Low TIM Amplifier." They always called it "The Leach Amp." Over the years, I have seen countless versions of the amplifier built by students and others. All of the bugs have been worked out, and the amplifier should perform flawlessly if it is built with patience and care. This is an advanced construction project. I do not recommend that someone tackle it who has not had experience with electronic construction and assembly.*

The Leach amplifier, with its maturity and all of the well documented technical details should be a good DIY project for audio-minded EEs.

Ian Haynes, a U.K. reader and audio enthusiast, wrote that I missed another U.K. publication covering DIY audio, namely *Hi-Fi World*. While I have seen them on occasion, this hasn't been occurring regularly or recently. What I have seen dates to three years ago, and featured then was an interesting class-A power-amp project with bipolar output devices. For those who wish to investigate this one, you can reach them at: Hi-Fi World, Audio Publishing Ltd., 64 Castellain Rd., Maida Vale, London W9 1EX,

+44(0)171-289-3533; fax: +44(0)171-289-5620.

In the July 7 column, I also talked about the new Telnet Internet access feature of The Audiophile Network (TAN), a popular and useful audio forum. However, I didn't offer details of use. As it turns out, this is simplicity itself if you are running Windows 95.

**TIP:** To get started, all you need to do is create a shortcut to the Windows 95 Telnet utility, which by default is:  
C:\WINDOWS\TELNET.EXE

You do this by logging into your C:\WINDOWS directory with Explorer, locate the TELNET.EXE file, and drag it to the desktop. Presto, you now have a Telnet shortcut! Then, click on this Telnet icon to bring up the program and start your Winsock. Once connected, under the Connect menu, select Remote System, which brings up a dialog box. Enter "TANet.com" for Host, "telnet" for Port, and "vt100" for Termttype, then Connect, and you should then soon see the TAN login prompt. After entering your particulars and logging in, you'll want to check the recent on-line messages for other user preferences in Telnet packages.

However, the above is just a quick start for anyone with Windows 95 running. You'll ultimately want a more sophisticated Telnet program. Fortunately, the TAN website offers more in the way of setup detail, and you'll want to visit <http://www.TANet.com>.

Do so, and follow the instructions to acquire and setup up the advanced Telnet utility, "Netterm." You will then be able to start up your Telnet and log onto TAN from your browser.

Finally, one other category of mail received on the July 7 column were publisher inputs on audio books. As a given, I'm always interested in new books, and welcome any new information on the same. A couple of book reviews are in the works, and audio topics are also planned.

That's it for this mailbag installment. Many thanks to those who took the time to write in. I encourage you all to keep those card and letters coming.

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