

# EEs And The Audio Hobby:

*Finding Audio Craft Fulfillment.*

Readers who may know me from past writings in sources other than *Electronic Design* also may be aware that audio electronics, in particular the do-it-yourself (DIY) kind, is one of my special interests. You can read that "special" as either a passion or paranoia (I'm not sure which it is myself.) Nevertheless, there is something uniquely rewarding and relaxing about bringing a bunch of electronic parts together in a designated pattern, and then having enjoyable musical sound pour forth from it.

Therefore, this month may be a good time to explore audio. With the space available this can't be anything of major depth, but it can be a start. We'll talk about some current information sources, and hopefully stimulate you to discuss your own audio interests.

I never cease to be amazed at what a large percentage of electronics engineers dabble in audio. This is perhaps natural to a great extent, since almost everyone likes music. And, since home audio systems are so common, it is only logical that design engineers would seek to improve commercial equipment, or to design their own, from the ground up. I can tell some interesting stories about typical electronics engineers and their love for audio, as years ago when I made frequent calls on engineers at various sites, it seemed about half the folks I met wanted to talk audio as well as the new IC chip-of-the-day (the business reason for the visit). And, often popular DIY audio magazines such as *The Audio Amateur* could be seen on their bookshelves, along with vendors' catalogs. More recently, the national seminars with which I've been involved have drawn plenty of audio-oriented EEs to lunchtime chats.

These experiences tell us something about the hobby interest of EEs! This audio-interest drive is in fact a powerful force, and one seeking an outlet. In some cases, the drive for better audio and music making leads to the entrepreneurial urge, and ultimately a new audio-specific career.

But, while everyone won't quit their day job to start a new audio business,

many more may just be looking for sharing audio ideas and experiences with others, to build upon and craft some portion of a system for their own listening pleasure. Obviously, you don't need to be an engineer to simply go out and purchase off-the-shelf system electronics or speakers, so what we'll address here is electronic DIY examples, where source info is more critical.

Traditionally, the greatest source of this type of information has been craft publications, which are geared toward construction or modification articles for electronics, or especially speakers, for ground-up construction projects. While there may be a tendency among some naive design engineers to poo-poo this type of publication as amateurish or less than fulfilling, that's really misplaced thinking. **TIP:** Direct, hands-on experience *always* counts both as relevant and highly valuable. And this fact is especially true with some of the more sophisticated DIY audio projects available to a builder today, such as high-power amplifiers, or an over-sampling audio digital-to-analog converter (DAC).

If you think about it, this latter example introduces myriad potential glitches for a DIY'er. Why? Well, today's audio circuitry, especially when the digital front ends are considered, demands a very broad range of engineering specialties. To construct a credible design requires sophisticated pc board layout and construction skills, once given the proper tools. It is a rare individual who has all these required resources at his/her disposal, plus the time to carry through a high-speed, mixed-signal design from concept through execution.

In other words, DIY audio today can be a far cry from the simple 20-20 kHz signal spectrum we dealt with in the old days. Back then, everything originated from a relatively-narrow-band phonograph cartridge, and preamps could be constructed via a variety of methods, by virtually anyone who could read a schematic and solder. Nowadays, the

audio DIY experimenter has a much more difficult task, particularly if the goal is a roll-your-own electronic widget. While speakers are somewhat easier to build, they too can still require some fancy woodworking tools, as well as refined cabinet-making skills.

All of this leaves specialized information sources as critical items towards accomplishing modern audio electronic projects. Complete electronic kits from such companies as Heath seem to have left us permanently now, indicative of another trend not altogether good. Thus, if you are interested in audio projects, you need to know where to look for projects, as well as be willing to do some searching.

One such general set of sources are the related publications of Audio Amateur Corporation<sup>1</sup>, all of which are focused on audio craft projects of one sort or another. Three of these are *Speaker Builder*, *Audio Electronics*,

and *Glass Audio*. As their names suggest, they are concerned with modifying and/or building speakers, low- and high-level audio electronic projects, and vacuum-tube audio projects. These publications are probably the single most useful US source of audio craft discussions.

*Audio* magazine<sup>2</sup> is now in the midst of a 50th anniversary year, and it certainly has had a great track record of

DIY projects in the past. While it has never been heavily oriented to DIY reader projects, many of those that have run have been notable. Among these are Marshall Leach's two low-TIM-amplifier project series.<sup>3-5</sup> But, what also is worthy of note is that he continues to support the amplifiers he created 20 odd years ago, with an up-to-date, quality web site. His web page features the latest version of these amplifiers, construction details, schematics, pictorials, parts lists and sources, and so on. Highly impressive, and highly recommended to those interested in power amplifiers.

For those with Net access, a most-fascinating website that is loaded with useful DIY audio information is maintained by Craig Stark.<sup>6</sup> Not only does Stark provide detailed project information for DACs, speakers and other items, he also includes a comprehensive



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list of links to various other audio (and non-audio) sites. **Tip:** This one is a "must visit," if you are at all interested in DIY audio. With one single stop, Stark's site can guide you to a high percentage of other useful audio sites.

Two U.K.-based publications are worth investigating as well. Although neither is a craft magazine per se, each occasionally runs audio project articles. *Electronics World & Wireless World*<sup>7</sup> is circuit-design oriented, but has featured some classic audio projects over the years, and is well worth searching out. This also applies to their general design-oriented articles, if not just for the audio-related ones. *Hi-Fi News & Record Review*<sup>8</sup> is definitely more audio (and music) oriented, but often runs construction projects. Neither of these publications is inexpensive in the U.S., so you might check your library first to see how you like their style.

There are also information sources that operate in a different manner altogether, such as an interactive mode, as opposed to disseminating traditional printed or on-line matter. The interaction facilitates exchange of questions, ideas, etc., in dialogue form. As one example, audio-oriented bulletin boards are the most obvious interactive info sources. The best I know of in this category is Guy Hickey's The Audiophile Network, or more simply, TAN.<sup>9</sup> TAN has been available since 1984, and is a great way to get in touch with others with common audio interests. There is an annual subscription fee, plus long distant access charges (from outside the LA area). **TIP:** But, the access costs do change for the better, if you access TAN via the Internet, as this step eliminates the toll call (this option just started in June). TAN has a number of audio oriented forums, an e-mail service, as well as other features.

There also are USENET groups on audio topics, under the general prefix of "rec.audio." While these forums have what appears to be the basic advantage of being freely available, they sometimes aptly illustrate the old adage of "you get what you pay for." What's meant by this? Quite simply, the Internet's fundamental premise of an equal voice for everyone seems to be a magnet for rude groups of undisciplined audio zealots in some of these forums. As a consequence, the noise-to-signal ratios run very high, especially in the un-

moderated opinion-based forums, where personal attacks often seem to be the default method of advancing a view. With all the technical power and sophistication of the Internet and its world-wide reach, with some of these USENET groups we appear to have regressed rather woefully in terms of simple civility in communications! So, while these groups can hardly be recommended as balanced and reliable audio information sources, they may be worthy of consideration for a study in diverse audio personality types.

I'm sure that many readers out there can identify with these topics, and may have some additional sources to share with our readers. Let's hear from you, on what you find useful as enabling resources, or just examples of worthwhile audio projects.

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### References:

1. Audio Amateur Corporation, Box 576, Peterborough, NH, 03458-0576; (603) 924-9464, or see: <http://www.audioexpress.com/>
2. *Audio*, 1633 Broadway, New York, New York, 10019.
3. W. Marshall Leach, "Build A Low TIM Amplifier," *Audio*, Feb. 1976. **TIP:** for current updates, see: <http://www.ee.gatech.edu/users/207/lowtim/index.html>
4. W. Marshall Leach, "Low TIM Amplifier, Part 2," *Audio*, Feb. 1977.
5. W. Marshall Leach, "Build A Double-Barreled Amplifier, Parts 1 & 2," *Audio*, April & May, 1980.
6. Craig Stark's audio DIY website: <http://roughy.psy.cmu.edu/~cst6h/audio/DIYaudio.html>
7. *Electronics World & Wireless World*, Reed Business Publishing, Stuart House, Perrymount Road, Haywards Heath, West Sussex, RH16 3DH, U.K.
8. *Hi-Fi News & Record Review*, Link House, Dingwall Avenue, Croyden, CR9 2TA, U.K.
9. The Audiophile Network, available by modem at (818) 988-0452 (8 bits, no parity, 1 stop bit, 1200-28,800 bits/s), or, also Telnet TANet.com:23. Voice: (818) 782-1676, or see also: <http://www.TANet.com>