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Where Do You Find Answers to Your Design Questions?

Gary Breed
Editorial Director



Recently, I've gotten an unusual number of phone calls and e-mails with questions from readers of the magazine or searching the archives of our Web site. These inquiries come somewhat regularly, but the extra activity makes me wonder if it's part of a larger trend. Are there more new engineers that need information, or is it something else?

There is definitely a certain number of "new engineer" questions among those I receive. Sometimes, I'm truly surprised—such as a question I got a while back from an engineer running a small project for military communications. He worked for a large company with a sizable government/military group, but was asking questions that I was certain could be answered by any number of engineers elsewhere in the company.

A recent question came from an experienced engineer with a small company. This company was successfully making a microwave product line, but the question from one of their main designers was quite fundamental. Perhaps he was looking for a "second opinion" on the subject, but it sure seemed like he was serious.

It also occurred to me that I was definitely NOT the first one people call with technical questions! Many of the engineers who found me must have reached a dead end in their attempts to find the information they needed.

Hmmm...maybe there is something else going on. I can think of two things:

First is searching on the Internet. If I'm getting fairly basic questions, maybe it is because we have regular tutorial articles and openly-accessible archives. We're easy to find online, and some of the questions are just a follow-up to something they found via Google. This could be true, especially if they are also contacting other authors. Perhaps newer engineers are beginning their searches on the Internet instead of in reference books. It's easy, fast, and if you're lucky you'll find someone who just gives you the answer instead of figuring it out yourself. Pardon my slight sarcasm; I know it's just human nature to look for the fastest way to get the solution to the problem at hand.

The second possibility is a bit more interesting: I wonder if today's engineers have become isolated from the rest of their fellow high frequency

specialists. There are more pre-packaged solutions than ever for many wireless systems. This allows a company to incorporate wireless capability into product using fewer engineers with that specialty.

Also, with outsourced manufacturing and other cost management methods, a small- to medium-size company can leverage the expertise of a very small staff, sometimes with only one veteran designer. It's possible that some of the questions I'm getting are from the junior members of the team who are simply trying not to bother an overburdened chief designer.

Finding Answers

Since the total number of questions that reach me is really quite modest, I assume that most engineers are pretty good at finding the information they need. But, a review is never harmful, and

maybe the newer engineers will find a few suggestions useful.

I've said this before in this column—when I'm faced with a technical question, I start with books. Often, that means old books, if the question is fairly basic. It seems that every design area has one or more books that are extremely well-proven as "classic" references. More recent books will fill in new developments, and occasionally, have become "modern classics" because of their particularly lucid treatment of a topic.

If you do not already have a list of personal favorites, develop one! Ask your more experienced colleagues, review the references at the end of articles and papers you find particularly useful, then learn how to find used books online and at used bookstores. I have found some interesting 1920s and 1930s-era books on radio in antique shops.

My First Edition of Terman's *Radio Engineers' Handbook* cost one dollar at a ham radio swap meet.

Books are my clear first choice and experienced colleagues are number two. Smart people seek out smart friends! Also high on the list are manufacturers' application notes and support staff (more smart friends), since many questions are about specific devices and the techniques for using them.

Finally, you can search the Internet for technical papers, personal Web pages and other resources that can effectively fill in the gaps or provide the newest information.

Ultimately, you are going to do *all* of these things if you want to be successful. Experience is more than a collection of facts—it's knowing where to find answers, too!