

DESIGN NOTES

Help Finding Answers to Design Questions

I received several responses to last month's editorial, and have collected some of them to include here. I hope these suggestions help find your answers. —ed.

Use a Consultant

There are a few reasons for the lack of internal resources to help neophyte engineers. The microwave industry is a cyclic one, with perhaps a 5-9 year repetition period. Unfortunately, instead of continually hiring new engineers through the lean times, major companies often just stop hiring. So a company can easily find itself in a position where many of its experienced engineers retire or move up into management, leaving no one to mentor the new hires. Also, as you stated, if manufacturing is done off site (maybe half way around the world), it is a little difficult for a young engineer to be confident in his design releases to manufacturing.

The obvious solution to this dilemma is to hire an RF/microwave consultant. Ten to forty hours of consulting help at the start of a project can open one's eyes to many different approaches to solving a problem, and give a heads-up to the potential pitfalls. A few more hours of consulting time at critical points, like at a preliminary/critical/final design review can save a lot of personal and company financial grief!

One way to find consultants in the New England area is through the Boston Section of the IEEE Consultants Network:

<http://www.boston-consult.com/index.php>

I would recommend that virtually any microwave or wireless manager search out and keep on file the names of a few good consultants in his area.

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Mentoring Connection and More

I enjoyed reading your editorial. Keep them coming. I recently signed up for the Mentoring Connection (www.mentoringconnection.com) and have had one Japanese and one Chinese student respond.

A few additional resources that come to mind are listed below.

San Rotter
<http://www.bit7.com/>

Helping EEs to Navigate A Changing World: <http://www.eehomepage.com/refs.php>

Technical books online: http://www.pmilllett.com/technical_books_online.htm

Edmund A. Laport's *Radio Antenna Engineering* is now available in electronic form: <http://snulbug.mtview.ca.us/books/RadioAntennaEngineering/>

IEEE Xplore: <http://ieeexplore.ieee.org/Xplore/guesthome.jsp>

Google Scholar: <http://scholar.google.com/>

Additional Resources

Other readers suggested the following resources for searching out answers to engineering questions:

I can't emphasize manufacturers' Application Notes enough—nearly all have them on their web sites, but a few companies are concerned about providing too much information to their competitors and limit the amount of technical information on their web sites. If you don't find information online, a phone call or e-mail will almost always get you help in a hurry.

www.microwaves101.com—I often use their Microwave Encyclopedia (www.microwaves101.com/encyclopedia/index.cfm) and Microwave Calculators (www.microwaves101.com/content/calculators.cfm)

www.rfcafe.com—lots of material!

Government agencies and some of the National Laboratories have great info. Look for sections called "resources" or "library" and other similar terms since not all the sites are organized the same way:

National Institute of Science and Technology: www.nist.gov

Sandia National Laboratories: www.sandia.gov

Lawrence Livermore National Laboratories: www.llnl.gov

Lawrence Berkeley National Laboratory: www.lbl.gov

Fermi National Accelerator Laboratory (Fermilab): www.fnal.gov

Los Alamos National Laboratory: www.lanl.gov