HIGH FREQUENCY
ELECTRONICS

Vol. 11 No. 8, August 2012

Publisher
Scott Spencer
scott@highfrequencyelectronics.com
Tel: 603-472-8261

Associate Publisher/Managing Editor
Tim Burkhard
tim@highfrequencyelectronics.com
Tel: 707-544-9977

Senior Technical Editor
Tom Perkins
tom@highfrequencyelectronics.com
Tel: 603-472-8261

Vice President, Sales
Gary Rhodes
grhodes@highfrequencyelectronics.com
Tel: 631-274-9530

Business Office
Summit Technical Media, LLC
One Hardy Road, Ste. 203
PO Box 10621
Bedford, NH 03110

Also Published Online at
www.highfrequencyelectronics.com

Subscription Services
Sue Ackerman
Tel: 651-292-0629
circulation@highfrequencyelectronics.com

Send subscription inquiries and address changes to the above contact person. You can send them by mail to the Business Office address above.

BPA WORLDWIDE

Our Environmental Commitment

High Frequency Electronics is printed on paper produced using sustainable forestry practices, certified by the Program for the Endorsement of Forest Certification (PEFC™), www.pefc.org

PEFC PEFC/29-31-130

SUMMIT Technical Media LLC

Summer Gives Time to Pause and Reflect

Tom Perkins
Senior Technical Editor

While attending the IEEE International Microwave Symposium in June, and observing folks using all sorts of mobile transmit/receive devices, a thought occurred that was revelatory if somewhat nerd-like. These people were nonchalantly communicating using a subset of microwave technology that, in itself, was at best only imagined just a few decades ago. Of course one could include consideration of cartoon detective Dick Tracy's Two-Way Wrist Radio (early 1946). I'm not sure those small radios pretended to use microwave frequencies, and use of simplex (no repeaters) was probably all that was contemplated, but the idea did predate invention of the transistor at Bell Labs in 1947. This wrist-radio cartoon fantasy was alleged to have been inspired by Alfred J. Gross, inventor of a walkie-talkie in 1937. Mr. Gross is thought to have been born too early, as his patents expired prior to the widespread use of two-way portable devices. He also developed pagers—remember those? Incidentally, in 1964 Dick Tracy's radio was replaced with a two-way wrist TV. One wonders if it was a digital, high-definition flat-screen display?

Useless Frequencies—Not!

What attendees at the conference and millions worldwide now do routinely with relatively inexpensive and very reliable consumer equipment was cutting-edge subject matter in talks and exhibits only a few years ago. In fact, just the thought of thousands of users performing all kinds of routine enabling tasks simultaneously in a small area sharing the electromagnetic spectrum is mind-boggling. A mere live point-to-point microwave transmission outside the confines of a radar range or laboratory would have drawn considerable attention only two decades ago. Now it occurs all around us, 24/7. Less than 100 years ago wavelengths shorter than 200 meters (1500 KHz) were generally considered useless. The higher frequencies (short wavelengths) were left to "radio amateurs" to explore. Weigh that fact in contrast to the now-widespread use of millimeter-wave technology and the emerging use of Terahertz Technology. Now we're working with frequencies up to at least 10,000 GHz (30 μm).

What Comes Around Goes Around

Many advances have enabled widespread wireless technology. Interestingly, the term "wireless" has made a comeback from the early "spark gap" transmitter days. Unquestionably, solid-state technology, accompanied by numerous breakthroughs in RFICs, synthesizers, digital circuitry, advanced communications techniques, materials science, satellites, antennas, long-life rechargeable batteries, computers, sophisticated design software, standards and regulations, to name a few, have enabled

our present wireless infrastructure. Take a moment to count the number of devices and gadgets you own that commonly utilize frequencies above 300 MHz. You might be very surprised. Equipment might include Wi-Fi (WLAN), mobile GPS tracking devices, cell phones, smart phones, cordless phones, electronic tablets, laptop computers, radar detector, intrusion alarm, garage door opener, satellite TV receiver, over-the-air TV, tag reader devices, toll reader, automotive collision avoidance sensors, pet protection, Bluetooth, wireless microphones, wireless headphones, marine radar, and microwave ovens. If only Chester Gould, the original Dick Tracy cartoonist, were here to predict what's next.

Coming Soon

An upcoming issue of *High Frequency Electronics* will feature an article by Analog Devices Inc. that emphasizes a higher level of RF component integration. The piece will examine the kinds of signal chains and applications that have tended to use discrete high-performance RFICs. Recent advancements in component integration will help identify those areas where significant opportunities exist to make circuits smaller, while still maintaining a high level of performance. The advantages of direct conversion (zero Intermediate Frequency) architecture are among the features to be examined.

In future issues we also look forward to publishing several articles from AWR Corp., A National Instruments Company™. These will cover simulation of everything from the effects of wire bonds to systems and links. As always, *HFE* welcomes the opportunity to review articles that *you* may wish to submit.

Old Crows Flocking Together

If your expertise is or may become Electronic Warfare, plan to attend the 49th Association of Old Crows Annual International Symposium and Convention to be held September 23 - 26 in Phoenix, Ariz. This year's theme is *Arming the Spectrum Warrior.* Special registration rates are being offered to *Young Crows.* The form states:

"To help bring young EMS warriors into the Crow family, we are offering discounted registration fees for first-time AOC convention attendees who are 35 years of age or younger by September 24, 2012. You must provide your date of birth at the time of registration and past attendance will be verified by AOC staff."

A nice gesture to get needed young talent—that may be you—involved!