

Letters to the Editor

Energy Conversion in Capacitors (Jul/Aug 2003)

Dear Mr. Smith,

I just discovered your *QEX* article on energy conversion in capacitors. You may be interested in a related article of mine published in the July 2005 English journal, *Physics Education*. Navigate to www.iop.org/journals/physed and search the database by my last name. The referenced article is “Two Theorems on Dissipative Energy Losses in Capacitor Systems.” There is an abstract of the article on the Web site, along with information about subscribing to *Physics Education*, as well as information about purchasing individual articles. — *With best wishes, Ronald Newburgh; rgnew@verizon.net*

Antenna Options (Jan/Feb 2007)

Hello Mr. Cebik,

Your Antenna Options column is my favorite *QEX* reading. I look forward to it every two months. Also, I find your Web site (www.cebik.com) a fantastic resource. — *73, John Green, W5AR; W5AR@hscaren.org*

Empirical Outlook (Jan/Feb 2007)

Doug,

I enjoyed your editorial about remote bases. I agree with you almost totally.

I have operated remote bases in one form or another since the early 1980s and have found that most hams are distressingly averse to them. As a matter of fact I must confess that I myself thought remote bases were supposed to be private systems. Milt Jensen, N5IA, pioneer of the now-defunct Zia Network linking New Mexico and Arizona wide-area repeaters, attended a repeater-enthusiast meeting in Silver City, New Mexico prior to his construction of that network. He promoted the idea of all of us combining our resources to put up a frequency-agile remote base instead of just another simple repeater.

Most of us thought it a dumb idea. My biggest objection to the concept was that I had always thought of a remote base as a private link, whether RF or landline, controlling a remote system. Milt's idea of a shared remote system allowing an entire club (or the ham public, for that matter) sounded very new and weird to me.

Within a couple of years, Milt's ideas took root with me and I have been fruitlessly promoting remote bases ever since. As you may well be aware, hams are *not* always enthusiasts of new things, whether hardware, software or even conceptual. I care not for the current “dumbing-down” debate about the state of ham radio: In my experience, most

hams resist new technology or change of any kind. One of my closest friends still maintains his ham ticket, but he has not owned a radio since the mid-1960s because he was outraged at the multitudes of hams changing over to SSB from AM.

I have tried to *give* him semi-modern radios and antennas so I could stay in touch with him over the air. It's been too long — he has lost interest in radio entirely, and all he remembers is his bitterness about the SSB/AM change of so many years gone by. He surely must be one of the few left who are old enough to remember those days. But hams of all eras seem to get riled up about almost anything, especially change. I've heard old timers recall the spark versus CW change, the 1970s, when CB radio brought many (now mostly welcome) newcomers to the ham bands, and so on. Nowadays I know many highly technical hams who think the computerization of ham radio is terrible. They just don't get it: *Everything* now operates with a computer of some sort, whether it's your car or your HT.

Anyway, I have had an open-to-the-ham-public remote base on the air for almost 20 years. I have even published the control codes (except for the super secret shut-down and turn-on codes reserved for the *ultimate* control operator, me) in magazines and on the Internet, and how many users have ever gotten on and tried it? I think I can almost count them on one hand, especially the ones who actually got interested and tried it more than once.

One is the high school kid to whom I loaned a spare 220 MHz hand-held radio when he first got his license. He really stirred up the bands. This was just before the revolution of cell phones, and he would wander around school demonstrating his radio to anyone who would take a few minutes to listen. He'd call their families on the autopatch and let them talk on the radio to their folks and friends. Most of the time he would dial up the 10-m SSB remote (he was a Technician class licensee with Morse code credit in those days), call CQ and amaze his friends by talking across the country or the oceans with his

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hand-held radio, and then handing the radio to his friends so they could say, "Hi." A better ambassador for ham radio I've never met.

He had an uncle who was a ham, who came to town one hamfest weekend and convinced him and his mother that he should be on "HF, where the real hams are!"

His uncle attended the hamfest with him and convinced him to buy a used Kenwood TS-140, instead of his own 220 MHz hand-held radio, like I'd been coaching him to do. The kid hung a 10-m dipole from his apartment roof to a nearby tree. He was able to work *no one* because his RF got into all the phones in the building, including his Mom's, and thus a very active young ham went silent. I should have *given* him that loaner radio. It would have been the best investment in ham radio I'd ever made.

Another was an older guy, also a new ham, who used to get on the remote regularly to work 10-m SSB. He was a great guy and quite elderly and loved to work contest weekends through the remote (he was a Technician with no HF gear of his own), and I never had the heart to tell him his contest contacts through the remote base were not considered legitimate contest contacts.

Perhaps it would help to popularize remote bases if you (or someone) could convince ARRL to change the contest rules that disallow remote base/repeater contacts. At least they might be able to get discounted points for working through a remote, or maybe we should give them bonus points for using new technology.

In spite of the unpopularity of remotes, I find quite a few hams who are sort of closet remote-base operators. There are many more Internet-controlled remotes than most people are aware of. Their operators never discuss them on the air and certainly do not publish access codes or addresses for them.

I like Internet remotes when I am far from home; but so far, they leave a lot to be desired. The delays and intermittencies resulting from VOIP (voice over Internet protocol) are very frustrating, especially if you are trying to check into a net or round-table QSO involving quick-trigger-PTT operators — which includes most of us!

You might also put out a call for existing remote base "sysops" like myself, who are willing to list their publicly accessible systems. I'd *love* to be able to find UHF-to-HF remotes along my travel routes so I could stay in touch with the gang back home, or actually find someone to talk to (say, on 20 meters) when I'm within range of a system somewhere. Most of us who travel can key up literally dozens of repeaters at most points along our trips but we rarely find anyone with the time or inclination to answer our calls for information or a chat.

We have all these repeaters all over the

USA, seemingly more than we have active hams to use them. What's the first thing most new hams talk about wanting to do? Put up another repeater? Wouldn't it be nice if some percentage of those could be convinced to set up remote-base access so their systems could actually be used to make contact with someone, no matter the time of day or night (such as on 80 through 10 meters)?

There are still far too many hams who:

- 1) are against anything new;
- 2) hate hearing touch tones or control codes in their speakers;
- 3) are fearful to try someone else's system, even if it is public, worrying they'll mess up;
- 4) hate the idea of a Technician licensee getting on 20 m (actual complaints I've heard), even though it's legal so long as a control operator is standing by; and
- 5) are exceedingly vocal about anyone doing something different than what they themselves are doing.

I think (as I think you do) that remotes are our hope for the future, especially for students, apartment dwellers, nursing home residents, and those thousands stuck in restrictive homeowner's-covenant situations. Perhaps ARRL and other organizations might be convinced to do more to promote the idea.

— *Jim Devenport, W5AOX; jim.devenport@transcore.com*

A Low-Budget Vector Network Analyzer for AF to UHF (Mar/Apr 2007)

Dear OM Baier,

I very much enjoyed your article about vector network analyzers, especially the elegant use of aliasing to obtain a wide frequency range.

You described two ways to generate the offset reference for the second DDS. One is to use a PLL to synthesize a 29.97 MHz reference. But you also mentioned that a DDS could be used for this instead. That made me think of a way to make this design even more flexible.

Suppose we used two more DDS sections, driven by a common clock. The two DDS outputs in turn would be the two clock inputs for the two DDS units you have in your design. Obviously, as you mentioned, we could then set one to 30 MHz and the other to 29.97 MHz, which would result in the same operation as you described. But it also would allow other settings.

For example, set one to 25 MHz and the other to 24.97 MHz. The spacing is the same but the aliases move. In particular, the crossovers shown in Figure 5 move. Similarly, the nulls in the spectral envelope shown in Figure 3 move. This should eliminate the two limitations you mentioned that prevent continuous frequency coverage in the original design (not enough power at integer multiples of the clock, and alias interference at odd half-multiples of

the clock). Both of those could then be avoided by shifting the clock source DDS settings, whenever a particular measurement requires a frequency close to a crossover or null.

— *73, Paul Koning, NIID; pkoning@equallogic.com*

In Search of New Receiver Performance Paradigms, Part 3 (Mar/Apr 2007)

Hi Doug,

Thank you for coming up with the cool combiner. I plan to build one for my test setup. I always check dynamic range at the MDS because my system runs out of steam above that level. My pair of HP8640Bs seem to have interaction at higher levels. My combiner barely has 30 dB of isolation.

Looking at your schematic on p 33, I see Z1 and Z2 could be mounted on their sides to accept Z3 and Z4 stacked, lying on their flat sides. This would allow for almost zero lead length. Now I need to study things to see if I can wind them without making any solder connections between cores.

I find the MDS with the generator going through the combiner to eliminate error in the combiner attenuation. The second input port is connected but the level is set very low. I measure phase noise dynamic range with a clean crystal oscillator and step attenuator. I tune the radio across the oscillator so it can be a fixed frequency.

Keep up the good work!

— *73, Frank Carcia, WA1GFZ; carcia@sbcglobal.net*

Hi Frank,

Yes, I think you can wind the hybrids without making any solder connections between them — I wish I'd thought of that!

By the way, there's a boo-boo in Part 3, Mar/Apr 2007, on page 30, in the third column, second paragraph: The peak displacement is almost two inches during 5 G shake testing at 5 Hz, not 50 Hz.

— *73, Doug Smith, KF6DX, QEX Editor, kf6dx@arrl.org*

In Search of New Receiver Performance Paradigms, Part 2 (Jan/Feb 2007)

Doug,

On page 24, in the left column, in the bottom paragraph, starting with the second sentence, the text says: "Not all manufacturers specify the acceptable range of input voltages, but $\pm 15\%$ is a reasonable range for testing. For 13.8 V dc equipment, that is 11.7 to 15.8 V dc; for 120 V ac gear, it's 102 to 138 V ac. In many areas of the world, the ac mains rarely remain within a few percent of its nominal value. AC-powered equipment needs to be checked at both 50 and 60 Hz. Most linear supplies lose significant capacity at 50 Hz and suffer from increased ripple."

When I worked doing CE mark testing, I

was taught by a guy who worked for TÜV in Boulder, CO to apply a $\pm 10\%$ rule. For a rating of 230 V ac at 50 Hz this would be 207 V ac to 253 V ac. For testing for North America the nominal voltage was taken as 115 V ac at 60 Hz, for which the range would be from 103.5 V ac to 126.5 V ac.

On page 30, Note 2: "...see IEC1000-4..." You must have looked at an old copy:

You have to add 60,000. The correct references are IEC 61000-4 and EN 61000-4. As an example, the old IEC 617 on graphic symbols is now IEC 60617.

— 73, Larry Joy, WN8P; lawrence_joy@yahoo.com

Hi Larry,

Thanks for that information. I've been

to TÜV Boulder for CE testing and I think I've worked with the gentleman you mention. What we're finding out is that in some countries of the world, the mains voltage is rarely within 8% of nominal and often fluctuates quite wildly. Europe might hold within 10% but hams really want to know at what voltage things quit working.

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Out of the Box

Raymond Mack, W5IFS
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SKYWORKS SOLUTIONS, INC

This is the first in a series of Out of the Box profiles of companies that supply products for the RF marketplace. Our focus will be on companies that are friendly to purchases in small quantities, either direct or through distribution. The first company is Skyworks Solutions, Inc of Woburn, Massachusetts. Skyworks was formed by a merger of Alpha Industries and the cell phone business of Conexant Systems in 2002. Skyworks has acquired additional product lines from other corporations, including the technical ceramics business.

Skyworks has a broad product line that focuses primarily on the microwave bands used by cellular telephones and wireless data. These lines have significant overlap with amateur bands, however. These include the following product lines:

- Amplifiers
- Attenuators
- Diodes
- Chip capacitors
- Cellular infrastructure receivers and transmitters
- Power dividers/combiners
- Receivers
- Switches
- Synthesizers/PLLs
- Technical ceramics
- Transmitters

Several product categories are likely to be of interest to the amateur community. The dual fractional-N synthesizer line covers the frequency range of 100 MHz to 6100 MHz. Each of these products contain a synthesizer for the main RF as well as an IF synthesizer. The technical ceramic product lines include ceramic transmission lines and dielectric resonators for VCO and filter applications.

Some Skyworks products can be purchased in sample quantities directly from Skyworks, while others are available through distributors such as Avnet.

Skyworks Solutions, Inc, 20 Sylvan Road, Woburn, MA 01801; Phone (781) 376-3000; Fax (781) 376-3100; Web site: www.skyworksinc.com

Novel Direct Conversion Receiver from Skyworks

Skyworks has introduced the SKY73013 direct conversion receiver IC for the 5.7 GHz NII computer data band. The SKY73013 offers superior quadrature accuracy performance, noise figure and linearity specifications. The internal "no-pull" architecture offsets the local oscillator from the carrier frequency by a factor of 3 to 2. This novel arrangement greatly reduces LO pulling and

DC offset issues, which are classic problems with direct conversion receivers.

The SKY73013 operates from 4.9 to 5.925 GHz, with a local oscillator range of 3.2 to 3.9 GHz. It has a 6-dB noise figure, and an input 1-dB compression point of -15 dBm. The SKY73013 is available in sample quantities directly from Skyworks.

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