** Perspectives **

### Another Mode for the Basic SDR System

The basic Software Defined Radio (SDR) System has been identified in *Wikipedia* and in this column as comprising some form of RF front end (a stable transceiver), followed by conversion between the analog and digital realms (such as by an audio sound card), along with a general purpose personal computer (PC). We emphasize that the *software defined* part of this basic radio system is the Amateur Radio communications software that operates on the PC, producing a wide range of communications protocols, or “waveforms” that are not native to the transceiver used as the RF front end. While modern SDR platform architectures do provide a transceiver function that continues to migrate the boundary between the analog and digital realms ever closer to the antenna — those SDR platforms still require, and benefit from, the PC-based waveforms and modes.

New modes or digital protocols continue to proliferate — now with the addition of FT4 (in beta testing as of this writing) to the WSJT-X suite. Your basic SDR System (or SDR platform plus PC) benefits once again, without the need of any additional piece of hardware. All of the magic happens in the software running on the PC. Our Amateur Radio communications capabilities have again grown without the need to change the basic hardware.

According to WSJT-X developers Joe Taylor, K1JT; Steve Franke, K9AN; and Bill Somerville, G4WJS; "FT4 is an experimental digital mode designed specifically for radio contesting... FT4 can work with signals 10 dB weaker than needed for RTTY, while using much less bandwidth." Watch these pages for additional modulation waveforms, and for further SDR System evolution.

### In This Issue

We feature a range of topics in this issue of *QEX*.

- **John Westmoreland**, AJ6BC, describes THEMIS, a GPS-disciplined oscillator.
- **Andy Przedpelski**, KØABP, takes a different look at the phase locked loop.
- **Tuck Choy**, MØTCC, considers pi networks with and without inductor loss in this first of a two-part series.
- **Joseph Pingree**, WB2TVB, shows how to design and print 3D components.
- **Scott Roleson**, KC7CJ, constructs a receiver step attenuator.

### Writing for QEX

Keep the full-length *QEX* articles flowing in, or share a Technical Note of several hundred words in length plus a figure or two. Let us know that your submission is intended as a Note. *QEX* is edited by Kazimierz “Kai” Siwiak, KE4PT, (*ksiwiak@arrl.org*) and is published bimonthly. *QEX* is a forum for the free exchange of ideas among communications experimenters. The content is driven by you, the reader and prospective author. The subscription rate (6 issues per year) in the United States is $29. First Class delivery in the US is available at an annual rate of $40. For international subscribers, including those in Canada and Mexico, *QEX* can be delivered by airmail for $35 annually. Subscribe today at [www.arrl.org/qex](http://www.arrl.org/qex).

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### Very best regards,

Kazimierz “Kai” Siwiak, KE4PT

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**Dr. Ulrich Rohde, N1UL, Wins 2019 IEEE CAS Industrial Pioneer Award**

The Industrial Pioneer Award honors the individual(s) with exceptional and pioneering contributions in translating academic and industrial research results into improved industrial applications and/or commercial products. The award is given by IEEE Circuits and Systems Society and president Yong Lian extended his congratulations and looks forward to honoring Dr. Rohde at their flagship conference, ISCAS 2019.

The purpose of the annual IEEE Circuits & Systems Society Awards is to illuminate the accomplishments of CAS Society members and celebrate their dedication and contributions both within the field and to the CAS Society. Award recipients are nominated by their CAS peers in order to honor the service and contributions that further strengthen the CAS Society.