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ARRL
225 Main St.
Newington, CT 06111 USA
Telephone: 860-594-0200
FAX: 860-594-0259 (24-hour direct line)

**Officers**

***President:*** Rick Roderick, K5UR
P.O. Box 1463, Little Rock, AR 72203

**The purpose of *QEX*** is to:

1) provide a medium for the exchange of ideas and information among Amateur Radio experimenters,

2) document advanced technical work in the Amateur Radio field, and

3) support efforts to advance the state of the Amateur Radio art.

All correspondence concerning *QEX* should be addressed to the American Radio Relay League, 225 Main St., Newington, CT 06111 USA. Envelopes containing manuscripts and letters for publication in *QEX* should be marked Editor, *QEX*.

Both theoretical and practical technical articles are welcomed. Manuscripts should be submitted in word-processor format, if possible. We can redraw any figures as long as their content is clear. Photos should be glossy, color or black-and-white prints of at least the size they are to appear in *QEX* or high-resolution digital images (300 dots per inch or higher at the printed size). Further information for authors can be found on the Web at **www.arrl.org/qex/** or by e-mail to **qex@arrl.org**.

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**Kazimierz "Kai" Siwiak, KE4PT**

# Perspectives

## Digital Waveform Development

We repeat here the definition of the basic SDR system that we've touted in this column before. The basic SDR comprises some form of RF front end (a stable transceiver), followed by conversion between the analog and digital realms (a soundcard), along with a general purpose personal computer (PC). The SD or *software defined* part of the system is the amateur radio communications software that operates on the PC, producing a wide range of different communications protocols, or "waveforms" that usually are not native to the transceiver used as the RF front end.

To be sure, innovations in modern "proper" SDR receiver and transmitter platform architectures continue to migrate the boundary between the analog and digital realm closer to the antenna — but even those platforms benefit from the development of new PC-based waveforms or modes.

Hams continue to exploit the SD or *software defined* part of the SDR by adding new amateur radio communications software to the library of digital waveforms. Waveforms are usually tailored to address specific characteristics and needs, such as challenging propagation paths, or the general desire go make rapid fire minimalistic contacts with good link margin. SD waveforms and protocols breathe new life into older transceivers and enabled the enormous progress in digital waveform design.

Continue to watch these pages for the development of additional modulation waveforms, and for further SDR evolution.

## In This Issue:

- Steven Davidson, K3FZT, designs and builds a Radio Message Server Winlink Gateway.
- Peter DeNeef, AE7PD, estimates diffracted fields inside a building near a window.
- Richard L. Quick, W4RQ, builds a horizontally-polarized triangular VHF loop.
- Eric Nichols, KL7AJ, in his Essay Series, explains filters.
- Brian R. Callahan, AD2BA, and Zhemin "Hisen" Zhang, KD2TAI, combine artificial intelligence and machine learning in a bot that transcribes heard audio into text.
- Lynn Hansen, KU7Q, reveals a unique method of constructing custom front panels.
- Steve Geers, KA8BUW, uses a microcontroller to build a CW audio filter.

## Writing for *QEX*

Please continue to send in full-length *QEX* articles, or share a **Technical Note** of several hundred words in length plus a figure or two. *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. All members can access digital editions of all four ARRL magazines: *QST*, *OTA, QEX*, and *NCJ* as a member benefit. The *QEX printed edition* is available at an annual subscription rate (6 issues per year) for members and non-members, see **www.arrl.org/qex**.

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Very kindest regards,
Kazimierz "Kai" Siwiak, KE4PT
*QEX* Editor