The American Radio Relay League

The American Radio Relay League, Inc., is a noncommercial association of radio amateurs, organized for the promotion of interest in Amateur Radio communication and experimentation, for the establishment of networks to provide communications in the event of disasters or other emergencies, for the advancement of the radio art and of the public welfare, for the representation of the radio amateur in legislative matters, and for the maintenance of fraternalism and a high standard of conduct.

ARRL is an incorporated association without capital stock chartered under the laws of the state of Connecticut, and is an exempt organization under Section 501(c)(3) of the Internal Revenue Code of 1986. Its affairs are governed by a Board of Directors, whose voting members are elected every three years by the general membership. The officers are elected or appointed by the Directors. The League is noncommercial, and no one who could gain financially from the shaping of its affairs is eligible for membership on its Board.

"Of, by, and for the radio amateur," ARRL numbers within its ranks the vast majority of active amateurs in the nation and has a proud history of achievement as the standard-bearer in amateur affairs.

A *bona fide* interest in Amateur Radio is the only essential qualification of membership; an Amateur Radio license is not a prerequisite, although full voting membership is granted only to licensed amateurs in the US.

Membership inquiries and general correspondence should be addressed to the administrative headquarters:

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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**.

Any opinions expressed in *QEX* are those of the authors, not necessarily those of the Editor or the League. While we strive to ensure all material is technically correct, authors are expected to defend their own assertions. Products mentioned are included for your information only; no endorsement is implied. Readers are cautioned to verify the availability of products before sending money to vendors.

Ron Diehl, NQ8W

Perspectives

Happy New Year! I always enjoy the clean slate that comes with turning the calendar page. It's a natural time to reset, make new goals, and plan the next round of experiments. The good news for us is that amateur radio never runs out of new directions to explore — from antennas and DSP to propagation studies and, increasingly, artificial intelligence.

AI is finding its way into nearly every corner of our lives, and amateur radio is no exception. In this issue, we look at a practical and very "shack-friendly" application: an AI-based voice synthesizer system that can augment our operating procedures. By combining modern text-to-speech engines with familiar station control software, this project shows how AI can become another tool on the bench, helping with everything from routine messages to more accessible operating for those who need it.

At the opposite end of the spectrum — literally — we also visit the extreme top of our operating privileges. You'll find an article describing the construction of a 241 – 250 GHz transverter that opens the door to experimentation on the 1 mm band. Working at these frequencies demands careful RF design, creative mechanical solutions, and a willingness to push beyond the comfort zone of "conventional" microwave work.

Pushing even further, another article in this issue explores how to achieve higher data rates in the so-called THz gap. Earlier demonstrations using black-body radiator techniques proved that communication is possible there, but often at very low symbol rates. Our author demonstrates how careful system design and modulation choices can move those experiments from proof-of-concept into more practical territory.

None of this innovative work would be possible without the foundations laid over radio's 129-year history. That is why we also revisit some core concepts and instructional themes that underlie everything we do, from basic circuit analysis and electromagnetics to measurement technique and good documentation. Mastering these fundamentals is what allows today's experimenters to build AI-driven station tools, millimeter-wave transverters, and THz data links with confidence.

As you sketch out your goals for the coming year, I hope this issue nudges you to pair solid fundamentals with a willingness to experiment at the edges — whether that edge is in software, spectrum, or both. Here's to a year of learning, building, and sharing what you discover.

Writing for *QEX*

QEX is a forum for the free exchange of ideas among communications experimenters. *QEX* is published bimonthly.

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