

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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Officers

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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 Street, 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.

Kazimierz "Kai" Siwiak, KE4PT

Perspectives

In this Issue

Our intent in *QEX* is to cover a wide range of technologies in each issue. Herein, the technologies span using arbitrary cross-section conductors for antenna elements, FDMA modulation techniques, polar modulation, satellite tracking positioners, a digital voice tutorial, CW filters, and a low cost RF measurement apparatus.

David M. Drumheller, K3WQ, explains how to model antennas made from angle stock, wires cages, tape measures and other unconventional conductors; Rick Peterson, WA6NUT, shows how FDMA technology can be used for new sound card modes; Brian Machesney, K1LI, and Tony Brock-Fisher, K1KP, use polar modulation to implement a linear amplifier; Bob Harbour, KE7FEF, takes us through several iterations of antenna positioners for tracking satellites; Andrew Milluzzi, KK4LWR, introduces digital voice modulations with this simple tutorial; James L. Tonne, W4ENE, explains how to make better sounding add-on audio filters for the CW operator; and Bruce Pontius, NØADL and Kai Siwiak, KE4PT, describe an inexpensive apparatus for very low level RF and digital signal measurements.

Please continue to support *QEX*, and help it remain a strong technical publication. Help determine the content of future *QEX* issues by putting your favorite topic or innovative measurement on paper. Share it on these pages with fellow readers. Just follow the details on the www.arrl.org/qex-author-guide web page, and contact us at qex@arrl.org or via US Mail to *QEX*, ARRL HQ, 225 Main St, Newington, CT 06111. We value your feedback, comments and opinions about these pages.

73,

Kazimierz "Kai" Siwiak, KE4PT

Editor

Dr. Ulrich Rohde, N1UL, Recognized for Pioneering Work on SDR

Dr. Ulrich L. Rohde, N1UL, of Synergy Microwave Corp. was invited to give the *6th Sir J C Bose Memorial Lecture* at IEEE Hyderabad Section on Dec 2, 2016 in Hyderabad, India. This was a joint session of the IEEE MTT, AP and EMC Societies. Dr. Rohde delivered the talk entitled, "Next Generation Networks: Software Defined Radio – Emerging Trends." While working at RCA in 1982, Dr. Rohde's department developed the first SDR with the COSMAC (Complementary Symmetry Monolithic Array Computer) chip working under a DoD contract. The RCA CDP1802, a 40-pin LSI integrated circuit chip, is an 8-bit CMOS microprocessor introduced by RCA in early 1976 and was the company's first single-chip microprocessor. Dr. Rohde was one of the first to present publically on this topic when he gave a talk entitled, "Digital HF Radio: A Sampling of Techniques" at the Third International Conference on HF Communication Systems and Techniques, London, England, February 26-28, 1985.

The lecture is named in honor of Sir Jagadish Chandra Bose, a Bengali scientist and expert in math, physics, biology, and archaeology who lived in British India. He pioneered the investigation of radio and microwave optics, made significant contributions to plant science, and laid the foundations of experimental science doing most of his work in during the late 1800's and early 1900's. Sir J.C. Bose did much of his original scientific work in the area of microwaves. He was the first to use a semiconductor junction to detect radio waves. The IEEE named him one of the fathers of radio science. [Source: Microwave Journal, www.microwavejournal.com.]