

QEX (ISSN: 0886-8093) is published bimonthly in January, March, May, July, September, and November by the American Radio Relay League, 225 Main Street, Newington, CT 06111-1494. Periodicals postage paid at Hartford, CT and at additional mailing offices.

POSTMASTER: Send address changes to: QEX, 225 Main St, Newington, CT 06111-1494 Issue No 303

Publisher
American Radio Relay League

Kazimierz "Kai" Siwiak, KE4PT
Editor

Lori Weinberg, KB1EIB
Assistant Editor

Zack Lau, W1VT
Ray Mack, W5IFS
Contributing Editors

Production Department

Steve Ford, WB8IMY
Publications Manager

Michelle Bloom, WB1ENT
Production Supervisor

Sue Fagan, KB1OKW
Graphic Design Supervisor

David Pingree, N1NAS
Senior Technical Illustrator

Brian Washing
Technical Illustrator

Advertising Information Contact:

Janet L. Rocco, W1JLR
Business Services
860-594-0203 – Direct
800-243-7768 – ARRL
860-594-4285 – Fax

Circulation Department

Cathy Stepina, QEX Circulation

Offices

225 Main St, Newington, CT 06111-1494 USA
Telephone: 860-594-0200
Fax: 860-594-0259 (24 hour direct line)
e-mail: qex@arrl.org

Subscription rate for 6 issues:

In the US: \$29;

US by First Class Mail: \$40;

International and Canada by Airmail: \$35

Members are asked to include their membership control number or a label from their QST when applying.

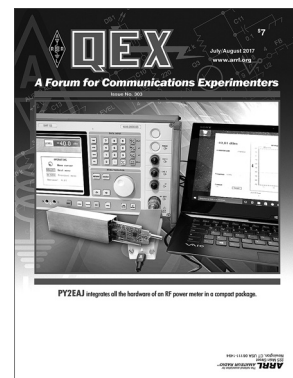
In order to ensure prompt delivery, we ask that you periodically check the address information on your mailing label. If you find any inaccuracies, please contact the Circulation Department immediately. Thank you for your assistance.



Copyright © 2017 by the American Radio Relay League Inc. For permission to quote or reprint material from QEX or any ARRL publication, send a written request including the issue date (or book title), article, page numbers and a description of where you intend to use the reprinted material. Send the request to the office of the Publications Manager (permission@arrl.org).

About the Cover

Euclides Lourenço Chuma, PY2EAJ, designed a low cost precision power meter integrated in a single compact piece of equipment that is connected directly to a computer via a USB connection. Measurements are possible from -70 dBm to +10 dBm at frequencies ranging up to 2.5 GHz, with a precision of 0.1 dBm.



In This Issue

Features

- 2 Perspectives**
Kazimierz "Kai" Siwiak, KE4PT
- 3 A High Performance 1 MHz to 2.5 GHz USB Power Meter**
Euclides Lourenço Chuma, PY2EAJ
- 8 Antenna Comparisons Using Simultaneous WSPR Measurements**
Charles Preston, K7TAA
- 15 Automatic Tracking Filter for DDS Generator**
Riccardo Gionetti, IØFDH
- 21 High-Frequency Near Vertical Incidence Skywave Propagation**
Marcus C. Walden
- 35 Experiments with a Broadband, High-Dynamic Range, Low Noise HF Receiver Preamplifier**
Scott Roleson, KC7CJ
- 42 Letters to the Editor**
- 43 Upcoming Conferences**

Index of Advertisers

ARRL.....	44, Cover III
DX Engineering:	23
Kenwood Communications:	Cover II
Nemal Electronics International, Inc:	7
SteppIR.....	Cover IV
Tucson Amateur Packet Radio:	14