



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 243

Harold Kramer, WJ1B
Publisher

Larry Wolfgang, WR1B
Editor

Lori Weinberg, KB1EIB
Assistant Editor

L. B. Cebik, W4RNL
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

Devon Neal, KB1NSR
Technical Illustrator

Joe Shea
Production Assistant

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: ARRL Member \$24,
nonmember \$36;

US by First Class Mail:
ARRL member \$37, nonmember \$49;

Elsewhere by Surface Mail (4-8 week delivery):
ARRL member \$31, nonmember \$43;

Canada by Airmail: ARRL member \$40,
nonmember \$52;

Elsewhere by Airmail: ARRL member \$59,
nonmember \$71.

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 ©2007 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

Jack Smith, K8ZOA, presents the Z100 tuning aid; a modern version of a station accessory that will help you quickly zero beat a CW signal or tune RTTY signals. A PIC microcontroller provides selectable center frequencies and tuning steps for the LED display.



In This Issue

Features

3 The Z100 CW Tuning Aid
By Jack R. Smith, K8ZOA

11 A Low-Cost, Flexible USB Interface
By Professor Dr Thomas C. Baier, DG8SAQ

16 A 2256 MHz PLL Local Oscillator
By Jim Kocsis, WA9PYH

26 More Octave for Transmission Lines
By Maynard Wright, W6PAP

32 A Squelch Amplifier
By J. R. Laughlin, KE5KSC

Columns

40 Antenna Options
By L.B. Cebik, W4RNL

48 Upcoming Conferences

45 Letters to the Editor

48 In the Next Issue of QEX

Index of Advertisers

American Radio Relay League:.....	39, Cover III
Atomic Time:.....	13
Down East Microwave Inc:.....	48
Kenwood Communications:	Cover IV
National RF, Inc:	44
Nemal Electronics International, Inc:.....	39
RealNerds.....	44
RF Parts	45, 47
Teri Software:.....	39
Tokyo Hy-Power Labs, Inc:	Cover II
Tucson Amateur Packet Radio:	15