

Barry J. Shelley, N1VXY Publisher

Steve Ford, WB8IMY Editor

Becky R. Schoenfeld, W1BXY Managing Editor

Jen Glifort, KC1KNL Senior Editor

Caroline Kenney Meghan Reilly Leanna Zwiebel Assistant Editors

Bart Jahnke, W9JJ Radiosport & Field Services Manager

Rick Lindquist, WW1ME Happenings

Bob Allison, WB1GCM Product Review Lab Testing

Mark J. Wilson, K1RO Al Brogdon, W1AB Bernie McClenny, W3UR H. Ward Silver, NØAX Paul Wade, W1GHZ Jon Jones, NØJK Rick Palm, K1CE Joel R. Hallas, W1ZR Barry Shackleford, W6YE Kai Siwiak, KE4PT Bruce Draper, AA5B Contributing Editors

Michelle Bloom, WB1ENT Production Supervisor

Jodi Morin, KA1JPA Assistant Production Supervisor

Maty Weinberg, KB1EIB Production Coordinator

David Pingree, N1NAS Senior Technical Illustrator

Janet Rocco, W1JLR Advertising Sales Manager

Bob Inderbitzen, NQ1R Product Development Manager

Yvette Vinci, KC1AIM Marketing and Sales Manager

Steve Ewald, WV1X Field Organization Supervisor

Eric Casey, KC2ERC Convention and Event Coordinator

Contents

September 2020 + Volume 104 + Number 9

Second Century Moving On



Build Your Own Optical Encoder Riccardo Gionetti, IØFDH

33 Big

Bigger Buttons are Better Derek Rutz, K7NZ

36

4()

56

59

Easy to Use Antenna Mast for Portable Operators Zach Thompson, KM4BLG

Product Review Mark Wilson, K1RO SDRplay RSPdx Software-Defined Receiver; FUNKAMATEUR/SDR-Kits FA-VA5 Vector Antenna Analyzer; Cushcraft AR-2 "Ringo" 2-Meter Antenna; EAntenna DUOSAT Dual-Band Satellite Antenna



Trans World Radio Caribbean Powerhouse Andy Corbin, W4KDN

Augment Your ARES[®] Mission with FirstNet[®] Randy Richmond, W7HMT

- 62 Amateur Radio Disability Access Steve Appleyard, G3PND
 - 2020 Simulated Emergency Test Steve Ewald, WV1X

2020 ARRL International DX Phone Contest Results Chris Tate, N6WM

The 2020 Collegiate QSO Party

87 4

A Look Back — November 1970

Columns

Classic Radio93
Contest Corral71
Correspondence24
The Doctor is In52
Eclectic Technology 39
Happenings65
Hints & Hacks54
How's DX?
Member Spotlight 13
Public Service
The World Above 50 MHz 80
Up Front
100, 50, and 25 Years Ago96

Digital and Mobile Editions

ARRL members can access the digital edition via a link at www.arrl.org/qst, download our iOS app from the iTunes Store, and download our Android app from the Google Play Store.

Departments

ARRL Section Managers 16
ARRL VEC Honor Roll
Certificate of Code
Proficiency Recipients77
Convention and Hamfest Calendar
Feedback
Field Organization Reports
Guide to ARRL Member Benefits
Ham Ads 124
Index of Advertisers126, 127
Officers, Division Directors, and Staff15
QST Cover Plaque Award76
Silent Keys
Special Event Stations
Strays
This Month in QEX75
W1AW Qualifying Runs77
W1AW Schedule
W1AW's QSL File28

Write for QST

www.arrl.org/qst-author-guide email: qst@arrl.org



Our Cover

Experienced hiker Zach Thompson, KM4BLG, understands the struggle of minimizing the weight of his equipment while operating portable. With a lightweight design in mind, he built an antenna mast out of his trekking poles. Read more about it in his article, "Easy to Use Antenna Mast for Portable Operators," on page 36 of this issue.



QST (ISSN:0033-4812) is published American Radio Relay League, Inc, 225 Main St., Newington, CT 06111-1400, USA. Periodicals postage paid at Hartford, CT, USA and at additional mailing offices.

POSTMASTER: Send address changes to: QST, 225 Main St., Newington, CT 06111-1400, USA. Canada Post: Publications Mail Agreement #90-0901437. Canada returns to be sent to IMEX Global Solutions, 1501 Morse Ave., Elk Grove Village, IL 60007.

US & Possessions: Membership in the ARRL, including a 1-year subscription to QST, is available to individuals at \$49. Licensed radio amateurs age 21 and under and the eldest licensee in the household may qualify for the rate of \$25. Life Membership, including a subscription to QST is available at \$1,225.* Membership includes \$21 per year for subscription to QST. Membership and QST cannot be separated. Libraries and institutions, \$49 per year. Single copies \$6.95.

International

To compensate for additional postage for mailing outside the US, the following rates apply:

Canada: Membership in the ARRL, including a 1-year subscription to *QST*, \$62, payable in US funds. Life Membership, including a subscription to *QST* is available at \$1,550.* Libraries and institutions, \$62 per year.

All Other Countries: Membership in the ARRL, including a 1-year subscription to QST, \$76, payable in US funds. Life Membership, including a subscription to QST, is available at \$1,900.* Libraries and institutions, \$76 per year.

Membership without QST is available to the immediate family of a member living at the same address, and to anyone who is legally blind, for \$10 per year. Foreign remittances should be by interna-

tional postal or express money order or bank draft negotiable in the US and for an equivalent amount in US funds.

Membership in the ARRL, including a 1-year subscription to Digital QST only, is available to Canadian and International members at \$49

Copyright © 2020 by the American Radio Relay League Inc. Title registered at the US Patent Office. International copyright secured. All rights reserved. Quedan reservados todos los derechos. Printed in the USA

(GST[®], DXCC[®], VUCC[®], DX Century Club[®], ARES[®], Amateur Radio Emergency Service[®], Logbook of The World[®], LoTW[®], and ARRL, the national association for Amateur Radio[®] are registered trademarks of the American Radio Relay League, Inc.

The ARRL and QST in no way warrant the products described or reviewed herein.

QST is available to blind and physically handicapped individuals from the Library of Congress, National Library Service for the Blind and Physically Handicapped. Call 1-800-424-8567 or go to www.loc.gov/nls/.

Indexed by Applied Science and Technology Index, Library of Congress Catalog Card No: 21-9421.

*Payment arrangements available. Please write for details.

In order to ensure prompt delivery, we ask that you periodically check the address infor-mation on your mailing label. If you find any inaccuracies, please contact the Circulation Department at circulation@arrl.org or 860-594-0200 immediately. Thank you for your assistance.

Reprints and permissions: permission@arrl.org

Details of our Online Privacy Policy can be found at www.arrl.org/online-privacy-policy.

Telephone: 860-594-0200 Fax: 860-594-0259