

Tom Gallagher, NY2RF Publisher

Steve Ford, WB8IMY Editor

Becky R. Schoenfeld, W1BXY Managing Editor

> Jen Glifort **Caroline Kenney** Assistant Editors

Bart Jahnke, W9JJ Contest Branch 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 Asst. Production Supervisor

Maty Weinberg, KB1EIB Production Coordinator

Sue Fagan, KB10KW Graphic Design Supervisor

David Pingree, N1NAS Senior Technical Illustrator

Debra Jahnke, K1DAJ **Business Services Manager QST** Advertising

Bob Inderbitzen, NQ1R Marketing Manager

Yvette Vinci, KC1AIM Circulation Manager

Diane Szlachetka, KB1OKV Advertising Graphics Designer

Steve Ewald, WV1X Field Organization Supervisor

Gail lannone Convention Program Manager

Allison McLellan Digital Media Support Specialist

In This Issue

July 2017

Volume 101 Number 7

Technical

An Arduino-Controlled Digital VFO for Vintage Tube Transmitters 30

Mike Aiello, N2HTT

Use a microprocessor to add a direct digital synthesizer VFO to any tube radio.

The Raspberry Pi Alternative for WSJT-X 34

Thomas Kocourek, N4FWD

Turn an inexpensive microcomputer into a digital communication machine.

Troubleshooting 101: RF Mayhem 38

Steve Ford, WB8IMY

Part of an occasional series on common troubleshooting techniques. In this installment, we're grappling with interference to a home theater audio system, although the same techniques can help suppress other interference issues.

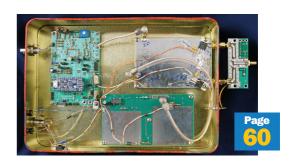
Product Review 41

Mark Wilson, K1RO

Rigol Technologies DSA705 Spectrum Analyzer; RigExpert AA-30 0.1 to 30 MHz Antenna Analyzer; Elenco XK-150 Digital/Analog Trainer; TKEY-1 CW Touch Key Paddle Kit; Wolf River Coils Silver Bullet 1000 and Silver Bullet Mini Antennas; Rainbow Kits TT-16 DTMF Decoder and RELAY-5 Kits.







News and Features

Second Century 9

Tom Gallagher, NY2RF

Mythbusting: ARRL Not "A Big Radio Club"

Route 66 Adventures on the Bridge 64

Jack Lunsford, KD7RCJ

How these radio amateurs tackled the challenge of using a bridge as an antenna.

Why I Operate Remote Radio 66 Gene Hinkle, K5PA

Remote operation has many uses to fit your interests.

Satellite Roving in the Northwest Territories 68

Gabriel Zeifman, NJ7H/VE6NJH

A young ham braves rough, snowy terrain to activate rare grids.

2016 Simulated Emergency Test Results 71

Steve Ewald, WV1X

Reports from around the country show a variety of approaches to this annual training exercise.

Happenings 74

Rick Lindquist, WW1ME

ARRL's first AM Rally was a hit; the Harvard Wireless Club sponsors its first symposium; FCC news: more.

Our Cover

The IARU HF World Championship is one of the largest summertime contests. Our cover image was taken during a previous Championship at the station of Jeremi Sus, SP7JQQ, which was functioning as the 80-meter station in the Polski Zwiazek Krotkofalowcow (Polish Amateur Radio Union) SNØHQ network during the competition. The operators were Pawel Piotrowski, SP7AH (left), and Dariusz Karcz, SQ7FPD (right). The SNØHQ group has been active in the Championship since 2000, attracting more than 50 operators and supporters from throughout Poland. [Henryk Kotowski, SMØJHF, photo]

Radiosport

Contest Corral 82

Bruce Draper, AA5B

ARRL's New 222 MHz and Up Distance Contest Debuts August 5 – 6, 2017 83

ARRL 10 Meter Contest 2016 Results 84

Scott Tuthill, K7ZO

Participants enjoyed highlights during a challenging, low-sunspot year.

2017 January VHF Contest Results 88

James Duffey, KK6MC With MSK144, the digital modes come into their own for VHF contesting.

The August 2017 ARRL Rookie Roundup — RTTY 92





Columns

Amateur Radio World	79
At the Foundation	103
Classic Radio	100
Correspondence	24
The Doctor is In	56
Eclectic Technology	40
Exam Info	102
Hands-On Radio	58
Hints & Kinks	62
How's DX?	93
Member Spotlight	13
Microwavelengths	60
Public Service	80
Up Front	20
The World Above 50 MHz	95
100/50/25 Years Ago	106

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 Member Services14
ARRL Section Managers 16
ARRL VEC Honor Roll 33
Convention and Hamfest Calendar 104
Field Organization Reports106
Ham Ads154
Index of Advertisers 156, 157
New Books 65, 103
Officers, Division Directors, and Staff \dots 15
QuickStats140
Silent Keys107
Special Event Stations98
Strays81, 92, 94, 99
Strays 81, 92, 94, 99 This Month in <i>QEX</i> 37

Interested in Writing for QST? www.arrl.org/qst-author-guide e-mail: qst@arrl.orq July 2017 Volume 101 Number 7

QST (ISSN:0033-4812) is published monthly as its official journal by the American Radio Relay League, Inc, 225 Main St., Newington, CT 06111-1494, USA. Periodicals postage paid at Hartford, CT, USA and at additional mailing offices.

POSTMASTER: Send address changes to: QST, 225 Main St., Newington, CT 06111-1494, 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

Internationa

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*, 862, 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 international 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 © 2017 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

QST®, 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

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

Telephone: **860-594-020** Fax: **860-594-0259**