SPECIAL EMERGENCY COMMUNICATIONS ISSUE

QST

DEVOTED ENTIRELY TO AMATEUR RADIO

September 2010 WWW.ARRL.ORG

SEPTEMBER 2010 QST Vol 94 No 9

QST reviews:

READY • RESILIENT • RESPONSIVE
AMATEUR RADIO
1935 2010
EMERGENCY SERVICE®
Seventy Five Years

Inside:

ARES®

75 Years of Serving the Public...and Counting!

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Official Journal of ARRL the national association for AMATEUR RADIO™

September is...

National Preparedness Month

"Preparing Makes Sense!"

Get a Kit, Make a Plan, Be Informed

IC-92AD 2M/70CM

An important part of any ham's emcomm kit, the '92AD offers 5 full watts of output power and comes D-STAR ready. Connect the optional GPS speaker mic to transmit position data — perfect for SAR or other in-the-field responders. Both the handset and optional HM-175GPS speaker mic are submersible* and built military rugged.

D'PRS™

A public service announcement
brought to you by Icom America Inc.

To learn more about how you and your family can prepare for emergencies or get involved visit: **www.ready.gov** or **www.citizencorps.gov**

*IP-X7: tested to work after being under 1 meter of water for 30 minutes.

ICOM®

Ameritron *1200 Watts* Solid State Amplifier

1200 Watts PEP SSB/CW Output, 1.5-30 MHz. No Tune, Instant-On, Instant Bandswitching, Super Reliable, Whisper Quiet, Remote Controllable, QSK, Fully Protected, Fully Metered ...

ALS-1300

New!

$2899

Suggested Retail

Just select the band and transmit!

Ameritron's new solid state no-tune, instant-on, instant bandswitching ALS-1300 desktop linear amplifier gives you 1200 Watts PEP SSB/CW with less than 100 Watts drive. Covers 1.5 to 22 MHz (10/12 Meters with optional MOD-10MK). You'll bust through weak band conditions, heavy QRM and QRN because the ALS-1300 is less than 1 dB down from a full legal limit 1500 Watt amplifier.

Super Reliable!

Eight conservatively rated MRF-150 FETs mounted on two *huge* heat sinks spreads heat evenly. *Four* whisper quiet temperature controlled fans keep the FETs at a safe temperature. You get *unparalleled* Ameritron reliability and trouble-free service. Competing amplifiers using a single expensive device concentrate heat at a single hotspot that greatly reduces reliability.

50-Volt operation gives you highly linear operation with a superbly clean signal.

Put out-of-the-way and Remote Control

The ALS-1300 amplifier and its matching power supply can be placed out-of-the-way and controlled remotely. *Remote Control Head*, **ALS-500RC, $49.95**, lets you monitor data and manually switch bands. *Radio Interface*, **ARI-500, $119.95**, reads band data from your transceiver and automatically bandswitches the ALS-1300 as you change bands on your transceiver.

Features Galore!

An Operate/Standby switch lets you run "barefoot" and *instantly* switch to full power when you need it.

Fast 5 millisecond T/R relays (10 million operation lifetime specs) give you full QSK operation. The T/R relay sub-board is easily replaced if the relays ever fail.

Ameritron's *exclusive* front-panel ALC control prevents overdriving your transceiver.

The ALS-1300 can be keyed by any transceiver that can sink 15 mA at 12 VDC without requiring a special interface.

Super-clean modular construction makes service quick and easy.

Fully Protected!

The ALS-1300 is fully protected to prevent amplifier damage if you: switch to a band different from your transceiver, use the wrong antenna or have overly high SWR, if the heat sink temperature exceeds a safe level, if the dual 600 Watt modules are significantly RF unbalanced. Whenever the amplifier faults, it is automatically bypassed.

If output forward or reflected power exceeds a safe level, output power is automatically reduced to prevent amplifier damage by controlling ALC to the transmitter.

Fully Metered!

Two accurate Cross-Needle meters use *LEDs* with adjustable brightness for backlighting -- no more burned-out meter lamps.

The left meter continuously monitors DC current of both 600 watt amplifier modules.

The right meter is a multi-meter. Read antenna SWR, forward, reflected output power simultaneously (has adjustable PEP meter hold time) . . . amplifier balance . . . ALC between amplifier and transceiver . . . DC drain voltage of each power amplifier.

LEDs show which band is selected (manually bandswitched or automatically with optional ARI-500 Radio Interface) . . . ALC activity . . . when the amplifier is keyed . . . high SWR . . . power amplifier fault.

The desktop size amplifier is a compact 10½Wx6¾Hx19D in. Weighs just 23 lbs.

Hash-Free Switching Power Supply!

The *hash-free* fully regulated 50 VDC, 50 Amp switching power supply is wired for 220 VAC but can be rewired for 110 VAC. Includes six foot cable to ALS-1300. Draws 12 Amps at 220 VAC, 25 Amps at 110 VAC. Has inrush current protection, current-limited outputs, exceptional filtering and RFI suppression. Works on 50-400 Hz, 200-260/ 100-135 VAC making it ideal for remote DX-peditions. 10Wx6½Hx9½D inches. 12 pounds.

Options

MOD-10MK $39.95, low-pass filter assembly gives you 12 and 10 Meter operation. Requires FCC ham license.

QSK-5, $359.95, pin-diode T/R switch gives lightning fast silent QSK operation.

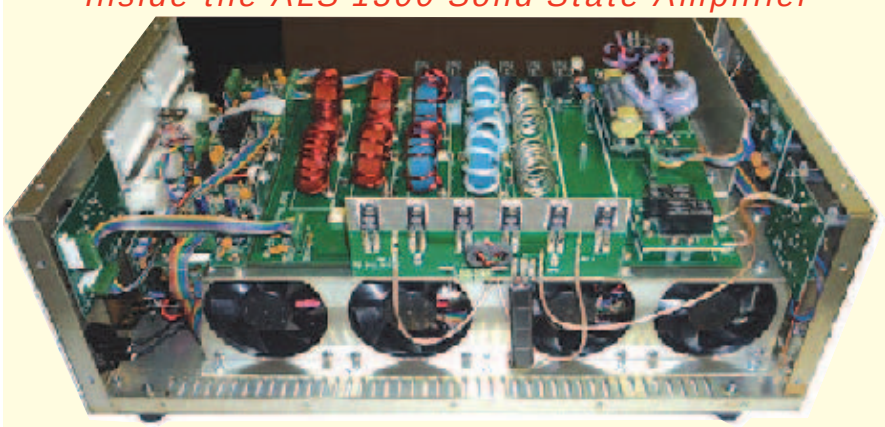
Here's what they say . . .

I have had my amp now for a few days and WOW! I picked the amp up at the factory and Mike was very helpful in showing me the ins & outs of the amp. Mine is S/N 8 and these amps are in high demand. It will truly talk 1200 watts all night long and never get warm. Thanks to Ameritron for the way they treat their customers and taking time that I was satisfied. N5SBZ

I've been using SN3 for about six weeks now. No processors or digital read-outs, but very easy to use and it puts out 1200 watts on most bands with no problem. I have been operating QSK as the internal relays are plenty fast enough. AD5X

I have had this fine amp now for a week and have made a number of QSO's (20). It can make the difference, and has in a number of occasions, getting thru the QRN and making a contact. Some of my QSO's have lasted up to 1 hour and there has not been a single problem...runs cool and gives me excellent results. KB4KKX

Inside the ALS-1300 Solid State Amplifier



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hy-gain ROTATORS

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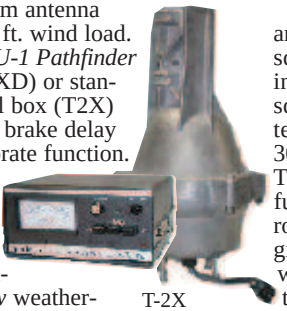
HAM-IV

HAM-IV
$649.95

The most popular rotator in the world! For medium communications arrays up to 15 square feet wind load area. *New* 5-second brake delay! *New* Test/Calibrate function. *New* low temperature grease permits normal operation down to -30 degrees F. *New* alloy ring gear gives extra strength up to 100,000 PSI for maximum reliability. *New* indicator potentiometer. *New* ferrite beads reduce RF susceptibility. *New* Cinch plug plus 8-pin plug at control box. Dual 98 ball bearing race for load bearing strength and electric locking steel wedge brake prevents wind induced antenna movement. North or South center of rotation scale on meter, low voltage control, max mast size of $2^{1}/_{16}$ inches.

HAM IV and HAM V Rotator Specifications	
Wind Load capacity (inside tower)	15 square feet
Wind Load (w/mast adapter)	**7.5 square feet**
Turning Power	800 in.-lbs.
Brake Power	**5000 in.-lbs.**
Brake Construction	Electric Wedge
Bearing Assembly	**dual race/96 ball bearings**
Mounting Hardware	Clamp plate/steel U-bolts
Control Cable Conductors	**8**
Shipping Weight	26 lbs.
Effective Moment (in tower)	**2800 ft.-lbs.**

TAILTWISTER SERIES II



For large medium antenna arrays up to 20 sq. ft. wind load. Available with *DCU-1 Pathfinder* digital control (T2XD) or standard analog control box (T2X) with *new* 5-second brake delay and *new* Test/Calibrate function. Low temperature grease, alloy ring gear, indicator potentiometer, ferrite beads on potentiometer wires, *new* weatherproof AMP connectors plus 8-pin plug at control box, triple bearing race with 138 ball bearings for large load bearing strength, electric locking steel wedge brake, North or South center of rotation scale on meter, low voltage control, $2^{1}/_{16}$ inch max. mast.

T-2X
$799.95

T-2XD
$1229.95
with DCU-1

TAILTWISTER Rotator Specifications	
Wind load capacity (inside tower)	20 square feet
Wind Load (w/ mast adapter)	**10 square feet**
Turning Power	1000 in.-lbs.
Brake Power	**9000** in.-lbs.
Brake Construction	Electric Wedge
Bearing Assembly	**Triple race/138 ball brngs**
Mounting Hardware	Clamp plate/steel U-bolts
Control Cable Conductors	**8**
Shipping Weight	31 lbs.
Effective Moment (in tower)	**3400 ft.-lbs.**

CD-45II

For antenna arrays up to 8.5 sq. feet mounted inside tower or 5 sq. ft. with mast adapter. Low temperature grease good to -30 F degrees. *New* Test/Calibrate function. Bell rotator design gives total weather protection, dual 58 ball bearing race gives proven support. Die-cast ring gear, stamped steel gear drive, heavy duty, trouble free gear train, North center scale, lighted directional indicator, 8-pin plug/socket on control unit, snap-action control switches, low voltage control, safe operation, takes maximum mast size to $2^{1}/_{16}$ inches. MSLD light duty lower mast support included.

CD-45II
$449.95

CD-45II Rotator Specifications	
Wind load capacity (inside tower)	8.5 square feet
Wind Load (w/ mast adapter)	**5.0 square feet**
Turning Power	600 in.-lbs.
Brake Power	**800 in.-lbs.**
Brake Construction	Disc Brake
Bearing Assembly	**Dual race/48 ball brings**
Mounting Hardware	Clamp plate/steel U-bolts
Control Cable Conductors	**8**
Shipping Weight	22 lbs.
Effective Moment (in tower)	**1200 ft.-lbs.**

HAM-V

HAM-V
$1099.95
with DCU-1

For medium antenna arrays up to 15 square feet wind load area. Similar to the HAM IV, but includes *DCU-1 Pathfinder* digital control unit with gas plasma display. Provides automatic operation of brake and rotor, compatible with many logging/contest programs, 6 presets for beam headings, 1 degree accuracy, auto 8-second brake delay, 360 degree choice for center location, *more!*

AR-40

AR-40
$349.95

For compact antenna arrays and large FM/TV up to 3.0 square feet wind load area. Dual 12 ball bearing race. Automatic position sensor never needs resetting. Fully automatic control -- just dial and touch for any desired location. Solid state, low voltage control, safe and silent operation. $2^{1}/_{16}$ inch maximum mast size. MSLD light duty lower mast support included.

AR-40 Rotator Specifications	
Wind load capacity (inside tower)	3.0 square feet
Wind Load (w/ mast adapter)	**1.5 square feet**
Turning Power	350 in.-lbs.
Brake Power	**450 in.-lbs.**
Brake Construction	Disc Brake
Bearing Assembly	**Dual race/12 ball bearings**
Mounting Hardware	Clamp plate/steel bolts
Control Cable Conductors	**5**
Shipping Weight	14 lbs.
Effective Moment (in tower)	**300 ft.-lbs.**

HDR-300A

HDR-300A
$1499.95

King-sized antenna arrays up to 25 sq.ft. wind load area. Control cable connector, *new* hardened stainless steel output shaft, *new* North or South centered calibration, *new* ferrite beads on potentiometer wires reduce RF susceptibility, *new* longer output shaft keyway adds reliability. Heavy-duty self-centering steel clamp and hardware. Display accurate to 1°. Machined steel output.

HDR-300A Rotator Specifications	
Wind load capacity (inside tower)	25 square feet
Wind Load (w/ mast adapter)	**not applicable**
Turning Power	5000 in.-lbs.
Brake Power	**7500 in.-lbs.**
Brake Construction	solenoid operated locking
Bearing Assembly	**bronze sleeve w/rollers**
Mounting Hardware	stainless steel bolts
Control Cable Conductors	**7**
Shipping Weight	61 lbs.
Effective Moment (in tower)	**5000 ft.-lbs.**

ROTATOR OPTIONS

MSHD, $109.95. Heavy duty mast support for T2X, HAM-IV and HAM-V.
MSLD, $49.95. Light duty mast support for CD-45II and AR-40.
TSP-1, $34.95. Lower spacer plate for HAM-IV and HAM-V.

Digital Automatic Controller

DCU-1
$749.95

Automatically controls T2X, HAM-IV, V rotators. 6 presets for favorite headings, 1° accuracy, 8-sec. brake delay, choice for center of rotation, crisp *plasma* display. Computer controlled with many logging/contest programs.

AR-35 Rotator/Controller

AR-35
$89.95

For UHF, VHF, 6-Meter, TV/FM antennas. Includes automatic controller, rotator, mounting clamps, mounting hardware. 110 VAC. One Year Warranty.

RBD-5
$29.95

NEW! Automatic Rotator Brake Delay

Provides automatic 5-second brake delay -- insures your rotator is fully stopped before brake is engaged. Prevents accidentally engaging brake while rotator is moving. Use with HAM II, III, IV, V, T2Xs. Easy-to-install. Includes pre-assembled PCB, hardware.

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MINI COOPER SHOWN WITH CP-5M UNIVERSAL LIP MOUNT ON THE DOOR EDGE.

All the mounts attach to van doors, truck side doors, SUV doors, etc... and require no holes. Includes 16' 6" deluxe cable assy w/18" mini RG-1888A/U type coax for weather seal entry.

Choose a mount depending on the antenna size and vehicle mounting location space.

For Small Antennas & Limited Space

MODEL / ANT CONN / COAX CONN

Maldol **EM-5M** SO-239 / PL-259
Footprint: 1.1"x .75"
Max Antenna: 40"

For Medium Size Antennas

MODEL / ANT CONN / COAX CONN

COMET **CP-5M** SO-239 / PL-259
COMET **CP-5NMO** NMO / PL-259
Footprint: 3.4" x 1.25"
Max Antenna: 60"

For Tall or Multi-band HF Antennas

MODEL / ANT CONN / COAX CONN

COMET **HD-5M** SO-239 / PL-259
COMET **HD- 5 3/8-24** 3/8-24 / PL-259
Footprint: 3.75" x 1.1 "
Max antenna: 80"

COMET **BNC-24** **DUAL-BAND 2M/70CM HT ANTENNA** RX range: 100-1200MHz
• Wavelength: 2M 1/4 wave • 440MHz 1/2 wave • Length: 17" • Conn: BNC Super flexible featherweight whip

COMET **SMA-24** **DUAL-BAND 2M/70CM HT ANTENNA** RX range: 100-1200MHz
• Wavelength: 2M 1/4 wave • 440MHz 1/2 wave • Length: 17" • Conn: SMA Super flexible featherweight whip

COMET **SMA-503** **DUAL-BAND 2M/70CM HT ANTENNA** RX range: 100-1200MHz
• Length: 8.75" • Conn: SMA

Maldol **MH-209** *(BNC Conn)* **MH-209SMA** *(SMA Conn)* **2M/70CM DUAL-BAND HT ANTENNAS**
3" length, soft rubber cover. Good performance in a small package!

COMET **NEW! CSB750A** **DUAL-BAND 2M/440MHZ W/FOLD-OVER**
Wavelength: 2M 1/2 wave, 70cm 5/8 wave x 2 • VSWR: 1.5:1 or less • Length: 42" • Conn: PL-259 • Max Pwr: 150W

COMET **NEW! CSB770A** **DUAL-BAND 2M/440MHZ W/FOLD-OVER**
Wavelength: 2M 5/8 wave center load, 70cm 5/8 wave x 2 center load • VSWR: 1.5:1 or less • Length: 51" • Conn: PL-259 • Max Pwr: 150W

COMET **NEW! CSB790A** **DUAL-BAND 2M/440MHZ W/FOLD-OVER**
Wavelength: 2M 7/8 wave center load, 70cm 5/8 wave x 3 center load • VSWR: 1.5:1 or less • Length: 62" • Conn: PL-259 • Max Pwr: 150W

Maldol **AX-50** **DUAL-BAND 2M/440MHz**
Wavelength: 2M 1/4 wave • 70cm 9/8 wave • Length: 21" • Conn: PL-259 • Max Power: 60W

Maldol **AX-75** **DUAL-BAND 2M/440MHz W/FOLD-OVER**
Wavelength: 2M 1/2 wave center load • 70cm 5/8 wave x 2 • Length: 30" • Conn: PL-259 • Max Power: 60W

Maldol **AX-95** **DUAL-BAND 2M/440MHz W/FOLD-OVER**
Wavelength: 2M 1/2 wave • 70cm 5/8 wave x 2 • Length: 38" • Conn: PL-259 • Max Power: 60W

COMET **B-10 / B-10NMO** **DUAL-BAND 2M/440MHz**
Wavelength: 146MHz 1/4 wave • 446MHz 1/2 wave • Length: 12"
• Conn: B-10 PL-259, B-10NMO - NMO style • Max Pwr: 50W

COMET **SBB-2 / SBB-2NMO** **DUAL-BAND 2M/440MHz**
Wavelength: 146MHz 1/4 wave • 446MHz 5/8 wave center load • VSWR: 1.5:1 or less • Length: 18"
• Conn: SBB-2 PL-259 • SBB-2NMO NMO style • Max Pwr: 60W

Maldol **EX-107RB / EX-107RBNMO** **DUAL-BAND 2M/440MHz**
Wavelength: 146MHz 1/2 wave • 446MHz 5/8 wave x 2 • VSWR: 1.5:1 or less • Length:29"
• Conn: EX-107RB PL-259 • Ex-107RBNMO NMO style • Max Pwr: 100W

COMET **SBB-5 / SBB-5NMO** **DUAL-BAND 2M/440MHz W/FOLD-OVER**
Wavelength: 146MHz 1/2 wave • 446MHz 5/8 wave x 2 • Length: 39"
• Conn: SBB-5 PL-259, SBB-5NMO - NMO style • Max Pwr: 120W

COMET **SBB-7 / SBB-7NMO** **DUAL-BAND 2M/440MHz W/FOLD-OVER**
Wavelength: 146MHz 6/8 wave • 446MHz 5/8 wave x 3 • Length: 58"
• Conn: SBB-7 PL-259, SBB-7NMO - NMO style • Max Pwr: 70W

COMET and Maldol Mobile

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Our Cover
For the past 75 years, Amateur Radio and emergency communicators have forged a unique partnership. In this issue, we celebrate those radio amateurs who apply their skills to provide support to law enforcement, emergency management agencies and their local communities. **Inset photo**: Caleb McCormick, KE5EOP, and Larry Brown, K5LMB, members of Oxford-Lafayette County (Mississippi) Amateur Radio Emergency Service W5LAF assist the Lafayette County Fire Department with emergency communications. Photo by Mike Corey, W5MPC. **In the background photo**, non-ham crew members aboard an MH-60S Seahawk helicopter activate a release button, dumping 420 gallons of water on a raging forest fire. US Navy photo by Mass Communication Specialist 3rd Class (USN) Dustin Kelling.

Departments

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- 5 ppm Frequency Stability (-4° F to +140° F)
- 1000 Memory Channels for serious users
- Yaesu Unique Power Saving Circuit Design Minimizes Vehicle Battery Drain

• Separation Kit for Remote Mounting (optional separation kit YSK-7800 requires)

50 W 2 m/70 cm* DUAL BAND FM TRANSCEIVER
*70 cm 45 W
FT-7900R
Size: 5.5" (W) x 1.6" (H) x 6.6" (D) / Weight: 2.2 lb

2 m/70 cm DUAL BAND

The King of Mobile

- Massive Heatsink guarantees 75 Watts of Solid RF Power with No Cooling Fan Needed
- Loud 3 Watts of Audio Output for noisy environments
- Large 6 Digit Backlit LCD for excellent visibility
- 200 Memory Channels for serious users

2 m MONO BAND

HEAVY-DUTY 75 W 2 m FM TRANSCEIVER
FT-2900R
Size: 6.3" (W) x 2.0" (H) x 7.3" (D) / Weight: 4.0 lb

Best Selling, Reliable Mobile

- 55 Watts of Solid RF Power within a compact footprint
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- Large 6 Digit Backlit LCD for excellent visibility
- 200 Memory Channels for serious users

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Size: 5.5" (W) x 1.6" (H) x 5.8" (D) / Weight: 2.2 lb

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The Totally New - Advanced Dual Band Mobile Radio
5.2" x 1.6" Large dot matrix (264 x 64 dots) LCD display
GPS / APRS® / Bluetooth® Features

NEW

144/(220)* /430 MHz 50 W
FM Dual Band Transceiver

FTM-350R

*220 MHz 1W (USA Version only)

NEW Large (5.2" x 1.6"/130 x 40 mm) dot matrix (264 x 64 dots) LCD display for comfortable viewing for night and day. Choose your favorite LCD display from 8 vibrant color options

NEW The Display Control Head is designed for easy separation from the main RF power unit built by tough aluminum die-cast;10ft control cable included (Optional 20ft control cable available)

NEW Multi-purpose Global Positioning System display (with optional FGPS-1 GPS Receiver and Antenna. Optional FGPS-2 External GPS Receiver and Antenna is also available)

NEW Compatible with the worldwide standard data-communications system, APRS®, and SmartBeaconing™ capabilities

NEW Huge memory channel management capability! 500 Independent Memory channels + 9 Programmable Band Limit Memory Scan channels + 1 Rewritable Preferred channel for each L and R Band

NEW 3 Speaker System (including Built-in Dual Speakers on the rear of the Control Head for FM Broadcast in Stereo!)

Exclusive Dual Band AF Monitor for listening to FM/AM broadcast and monitoring ham bands as well

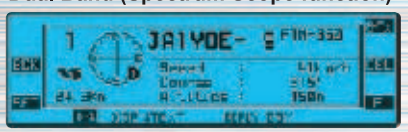
Exclusive Built-in Barometric Pressure Sensor

Screen Example

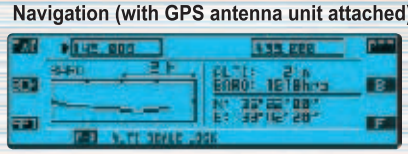
Dual Band (Spectrum Scope function)

Navigation (with GPS antenna unit attached)

Mono Band (Spectrum Scope function)



APRS®



Barometer

Timer

YAESU
Choice of the World's top DX'ers℠

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* SmartBeaconing™ from HamHUD Nichetronix

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http://www.vertexstandard.com

Specifications subject to change without notice. Some accessories and/or options may be standard in certain areas. Frequency coverage may differ in some countries. Check with your local Yaesu Dealer for specific details.

Introducing the Yaesu FT-950 transceiver for DX enthusiasts
Superb receiver performance
Direct lineage from the legendary FT DX 9000 and FT-2000

HF/50 MHz 100 W Transceiver

FT-950

- Triple-conversion super-heterodyne receiver architecture, using 69.450 MHz 1st IF
- Eight narrow, band-pass filters in the RF stage eliminate out of band interference and protect the powerful 1st IF
- 1st IF 3 kHz Roofing filter included
- High-speed Direct Digital Synthesizer (DDS) and high-spec Digital PLL for outstanding Local Oscillator performance
- Original YAESU IF DSP advanced design, provides comfortable and effective reception. IF SHIFT / IF WIDTH / CONTOUR / NOTCH / DNR
- DSP enhancement of Transmit SSB/AM signal quality with Parametric Microphone Equalizer and Speech Processor
- Built-in high stability TCXO (±0.5 ppm after 1 minute@77 ° F)
- Built-in automatic antenna tuner ATU, with 100 memories
- Powerful CW operating capabilities for CW enthusiasts
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- Large Multi-color VFD (Vacuum Fluorescent Display)
- Optional Data Management Unit (DMU-2000) permits display of various operating conditions, transceiver status and station logging.
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Compact size : 9" X 3.3" x 8.5" and Light weight : 7.9 lb

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HF/50/144/430 MHz
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FT-857D DSP 60 m Band

HF/50/144/430 MHz
100 W All Mode Transceiver (144 MHz 50 W/430 MHz 20 W)

Real Performance,
Really Portable

FT-817ND

HF/50/144/430 MHz
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60 m Band

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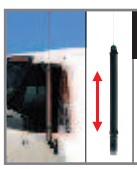

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Disaster Drills: The Last Word?

"On July 14 the FCC released a Report and Order amending the Amateur Radio Service rules to permit amateurs, with some limitations, to transmit messages on behalf of their employers during emergency and disaster preparedness drills."

No less than five times over the past 17 months, this page has been devoted to one aspect or another of the issues of pecuniary interest and disaster preparedness. Back in 1993 the FCC adopted a much-needed revision of Part 97 of its rules to give amateurs greater flexibility in providing communications in which someone — but not the amateurs themselves — might have a pecuniary or business interest. The new rules were applied without much controversy until early last year, when it became apparent that some employers were planning to use Amateur Radio in ways that violated both the spirit and the letter of Part 97. In the course of explaining why they could not do so, FCC staff noted that while amateurs have an important role to play in emergency and disaster response, including those amateurs who are employed professionally in this field, there was no exception in the rules that would permit amateurs to participate in emergency and disaster preparedness drills on behalf of an employer.

Unjustified criticism was hurled at Commission staff — unjustified because in explaining the rules they were simply doing their job, and doing it correctly. Still, consideration of the issue over the summer and fall of 2009 led many to conclude that it was illogical for disaster response entities to be encouraged to include Amateur Radio in their planning — which is clearly good public policy — while at the same time their licensed personnel could not participate in training exercises.

As a partial response, on October 20, 2009 the FCC issued a Public Notice establishing a waiver process for government agencies wishing to sponsor disaster drills or exercises involving employees communicating on behalf of their employers. Dozens of such waivers have been granted.

In further response, on March 24 of this year the FCC released a Notice of Proposed Rule Making (NPRM) in WP Docket No. 10-72 to add an exception to Part 97 that would obviate the need for such waivers. The NPRM also solicited comment on whether the public interest would be served by making provision for employee operation during drills sponsored by non-government entities.

Thanks to work by the ARRL Board of Directors and staff beginning last July, when the NPRM was released the Board already had a clear policy on these issues. Not only that, but the Board's policy had been explained to Commission staff in a series of visits that ARRL General Counsel Chris Imlay, W3KD and I made in February to Commissioners' and Bureau offices. The Board's policy, adopted at its January 2010 meeting, instructed us to seek an exception for employee participation "…in emergency preparedness and disaster drills that include Amateur operations for the purpose of emergency response, disaster relief or the testing and maintenance of equipment used for the purpose." The policy did not distinguish between government- and non-government-sponsored drills. The Board considered, but did not adopt, an amendment that would have limited such participation to the same periods that now apply to RACES training drills and tests: one hour per week and for a period not to exceed 72 hours no more than twice in any calendar year. In response to the NPRM General Counsel Imlay filed comments and reply comments reflecting the Board's policy.

More than 200 other comments were filed by amateurs and other interested parties. In record time — barely five weeks after the deadline for reply comments — the FCC completed work on the docket and released the Report and Order. A new provision has been added — with an effective date that has yet to be determined — that provides the following exception to the "no pecuniary interest" rule: "A station licensee or control station operator may participate on behalf of an employer in an emergency preparedness or disaster readiness test or drill, limited to the duration and scope of such test or drill, and operational testing immediately prior to such test or drill. Tests or drills that are not government-sponsored are limited to a total time of one hour per week; except that no more than twice in any calendar year, they may be conducted for a period not to exceed 72 hours."

With this change, amateurs may participate in such tests and drills without having to worry that they may be violating the rules by communicating "on behalf of" their employers. The time limits on non-government-sponsored tests and drills should make it clear to non-government entities that they cannot ask their employees to use Amateur Radio for routine business purposes under the guise of "emergency preparedness." There is some possibility for abuse, for example by government entities that may try to declare a "permanent drill" so they can use Amateur Radio instead of public safety land mobile radio systems, but should that occur it can be addressed through normal enforcement channels. As the Report and Order emphasizes, "…the amendment does not permit communications unrelated to the drill or exercise being conducted."

The Report and Order leaves no doubt that the FCC recognizes the value of Amateur Radio: "Our decision reflects the practical reality that a large number of agencies and organizations at the state and local levels coordinate with their local volunteer amateur radio operators to conduct emergency drills and exercises in concert with other modes of communication, such as land mobile radio. This integrative activity is essential to allow for a practiced response on the part of the first responder community in the event of an emergency."

Will this be the last word on the subject? Probably not. Part 97 is a work in progress, as befits a dynamic radio service. But the new rule appears to satisfy current needs. Congratulations to the FCC for its rapid and reasoned rulemaking.

David Sumner, K1ZZ
ARRL Chief Executive Officer

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Self-supporting -- no guys required . . . Remarkable DX performance -- low angle radiation, omnidirectional . . . Handles 1500 Watts . . . Low SWR . . . Automatic band switching . . . Aircraft quality aluminum tubing . . . Stainless steel hardware . . . Recessed SO-239 connector . . . Two year limited Warranty . . .

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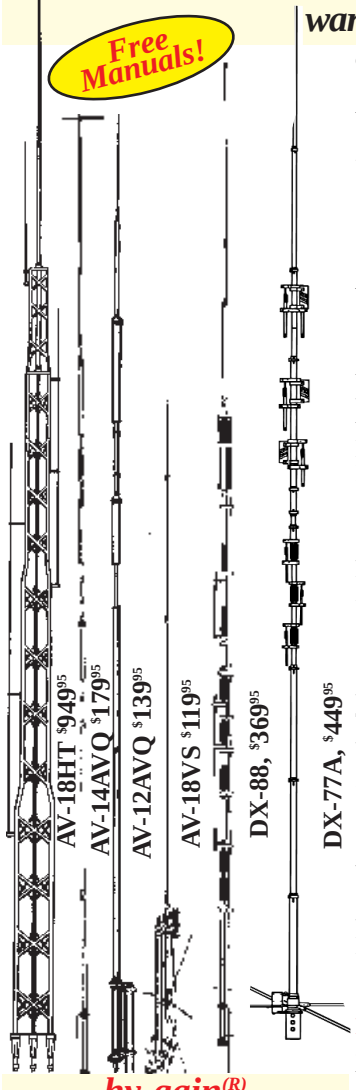

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They offer remarkable DX performance with their extremely low angle of radiation and omnidirectional pattern.

All handle 1500 Watts PEP SSB, have low SWR, automatic bandswitching (except AV-18VS) and include a 12-inch heavy duty mast support bracket (except AV-18HT).

Heavy duty, slotted, tapered swaged, aircraft quality aluminum tubing with full circumference compression clamps is used for radiators.

Includes all stainless steel hardware. Recessed SO-239 prevents moisture damage.

Hy-gain verticals go up easily with just hand tools and their cost is surprisingly low.

Two year limited warranty.

AV-18HT, $949.95. (10,12,15,20,40,80 M, 160, 17 Meters optional). 53 ft., 114 lbs.

Standing 53 feet tall, the famous *Hy-Gain HyTower* is the world's best performing vertical! The AV-18HT features automatic band selection achieved through a unique stub-decoupling system which effectively isolates various sections of the antenna so that an electrical 1/4 wavelength (or odd multiple of a 1/4 wavelength) exists on all bands. Approximately 250 kHz bandwidth at 2:1 VSWR on 80 Meters. The addition of a base loading coil (**LC-160Q, $109.95**), provides exceptional 160 Meter performance. **MK-17, $89.95**. Add-on 17 Meter kit. 24 foot tower is all rugged, hot-dip galvanized steel and all hardware is iridited for corrosion resistance. Special tilt-over hinged base for easy raising & lowering.

AV-14AVQ, $179.95. (10,15,20,40 Meters). 18 ft., 9 lbs. **The** Hy-Gain AV-14AVQ uses the same trap design as the famous Hy-Gain Thunderbird beams. Three separate air dielectric Hy-Q traps with oversize coils give superb stability and 1/4 wave resonance on all bands. Roof mount with Hy-Gain AV-14RMQ kit, $89.95.

AV-12AVQ, $139.95. (10, 15, 20 Meters). 13 ft., 9 lbs. **AV-12AVQ** also uses Thunderbird beam design air dielectric traps for extremely Hy-Q performance. This is the way to go for inexpensive tri-band performance in limited space. Roof mount with AV-14RMQ kit, $89.95.

AV-18VS, $119.95 (10,12,15,17,20,30,40,80 Meters). 18 ft., 4 lbs. **High** quality construction and low cost make the AV-18VS an exceptional value. Easily tuned to any band by adjusting feed point at the base loading coil. Roof mount with Hy-Gain AV-14RMQ kit, $89.95.

DX-88, $369.95. (10, 12, 15,17,20,30,40,80 Meters, 160 Meters optional). 25 ft., 18 lbs.

All bands are *easily* tuned with the DX-88's *exclusive* adjustable capacitors. 80 and 40 Meters can even be tuned from the ground without having to lower the antenna. Super heavy-duty construction. DX-88 OPTIONS: 160 Meter add-on kit, KIT-160-88, $199.95. Ground Radial System, GRK-88, $99.95. Roof Radial System, RRK-88, $99.95.

DX-77A, $449.95. (10, 12, 15, 17, 20, 30, 40 Meters). 29 ft., 25 lbs.

***No** ground radials required!* Off-center-fed Windom has 55% greater bandwidth than competitive verticals. Heavy-duty tiltable base. Each band independently tunable.

Model #	Price	Bands	Max Power	Height	Weight	Wind Surv.	Rec. Mast
AV-18HT	$949.95	10,15,20,40,80	1500 W PEP	53 feet	114 pounds	75 MPH	------
AV-14AVQ	**$179.95**	**10,15,20,40**	**1500 W PEP**	**18 feet**	**9 pounds**	**80 MPH**	**1.5-1.625"**
AV-12AVQ	$139.95	10/15/20 M	1500 W PEP	13 feet	9 pounds	80 MPH	1.5-1.625"
AV-18VS	**$119.95**	**10 - 80 M**	**1500 W PEP**	**18 feet**	**4 pounds**	**80 MPH**	**1.5-1.625"**
DX-88	$369.95	10 - 80 M	1500 W PEP	25 feet	18 pounds	75 mph no guy	1.5-1.625"
DX-77A	**$449.95**	**10 - 40 M**	**1500 W PEP**	**29 feet**	**25 pounds**	**60 mph no guy**	**1.5-1.625"**

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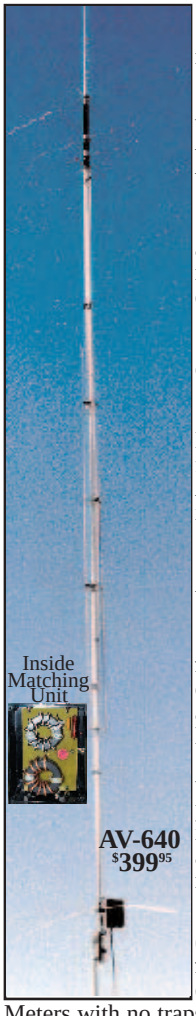
Hy-Gain's new PATRIOT HF verticals are the best built, best performing and best priced multiband verticals available today. For exciting DX make full use of your sunspot cycle with the PATRIOT's *low 17 degree angle* signal.



No ground or radials needed

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Automatic bandswitching

Single coax cable feed. Each band is individually tunable. Extra wide VSWR bandwidth. End fed with broadband matching unit.

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Handles 1500 Watts key down continuous for two minutes.

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High wind survival of 80 mph. Broadband matching unit made from all *Teflon*(R) insulated wire. Aircraft quality aluminum tubing, stainless steel hardware.

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AV-640, $399.95. (6,10,12, 15,17,20,30,40 Meters). 25.5 ft., 17.5 lbs. The AV-640 uses quarter wave stubs on 6, 10, 12 and 17 meters and efficient end loading coil and capacity hats on 15, 20, 30 and 40 meters -- no traps. Resonators are placed in parallel not in series. End loading of the lower HF bands allows efficient operation with a manageable antenna height.

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The radio... FT DX 9000

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FT DX 9000MP
Two Pairs of Meters, plus LCD Window; Data Management Unit and Flash Memory Slot Built In. Main/Sub Receiver VRF, plus Full Dual Receive Capability, External 50 V/24 A Switching Regulator Power Supply and Speaker with Audio Filters

Display color (Umber or Light Blue) may be selected at the time of purchase. Modification from 400 to 200 W not possible.

HF/50 MHz Transceiver
FT DX 9000D 200 W Version
Large TFT, Data Management Unit and Flash Memory Slot Built In, Main/Sub Receiver VRF, plus Full Dual Receive Capability, Three μ-Tuning Modules for 160 - 20 M, 50 V/12 A Internal Switching Regulator Power Supply

HF/50 MHz Transceiver
FT DX 9000 Contest
Custom-Configurable Version
Two Pairs of Meters, plus LCD Window, VRF Input Preselector Filter, Three Key Jacks, and Dual Headphone Jacks, 50 V/12 A Internal Switching Regulator Power Supply

Display color (Umber or Light Blue) may be selected at the time of purchase. Modification from 200- to 400-Watt version not available.

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Optional Data Management Unit (DMU-2000)

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This Just In

Joel P. Kleinman, N1BKE
jkleinman@arrl.org

In Brief

- The ARRL Board of Directors met in Windsor, Connecticut July 16-17. A full report will appear in the October issue.
- In a *Report and Order*, the FCC amended Part 97.113 of its rules to allow amateurs, with certain restrictions, to participate in government sponsored disaster preparedness drills on behalf of an employer. See Happenings, this issue, for details.
- The 2010 World Radiosport Team Championship was held July 10-11 near Moscow. See Amateur Radio World, this issue, for more information.
- During the first half of 2010, the FCC has issued more than 18,000 new Amateur Radio licenses, an increase of more than 8 percent over the same period last year.
- The Office of Management and Budget has named the Federal Communications Commission the "most improved" agency across the entire federal government.
- Llewellyn "Pat" Rose, W5OZI, of Junction, Texas, is the recipient of the Fred Fish Memorial Award #2. See Happenings, this issue, for details.
- ARRL West Gulf Division Vice Director John Thomason, WB5SYT, of Edmond, Oklahoma, has resigned from the ARRL Board.
- On July 6, Andrea Salt, KE7OPV, of Gilbert, Arizona, was a contestant on the popular TV game show *Jeopardy!* Andrea, who is 13, appeared during the show's Kids Week.
- ARRL now has its own Facebook page. See **www.facebook.com/pages/ARRL-the-National-Association-for-Amateur-Radio/20069212407?ref=ts**.
- Billed as Europe's biggest Amateur Radio exhibition, HAM RADIO 2010 was held in Friedrichshafen, Germany, June 25-27.
- Early on June 30, WX4NHC, the VoIP Hurricane Net and the Hurricane Watch Net activated as Hurricane Alex approached northeastern Mexico.
- Two ARRL Teachers Institutes on Wireless Technology were held in June.
- The winner of the *QST* Cover Plaque Award for July is Jim Talens, N3JT, for his article "A Simple and Effective Approach to Station Grounding."

Media Hits

Allen Pitts, W1AGP
Media & Public Relations Manager

- A personal family favorite, *History Detectives* on PBS, had a nice media hit. While the focus of their story was on a piece of an Echo satellite, the many peripheral parts showing Amateur Radio were well done — a friendly, intelligent and an interesting hobby. Chuck Roedel, WA2MXR, did very well!

And then came Field Day!

- We tried three PR experiments this year in Field Day promotions. The first experiment was the webinar hosted by Director Bill Edgar on media promotions for Field Day with the Public Relations Committee. This received many compliments from members. The second experiment was the use of Twitter, the Internet communications program, in promotion of Field Day. In this, I was disappointed. Despite the hype and assurances that this will be a way to reach a new audience and over 300 "followers" for ARRL_FD who "re-tweeted" (relayed the messages on) to their own followers, I did not see outreach results justifying the time invested in this area. The Twitter messages found in searches were only from hams tweeting among themselves. The third experiment was mailing an individual letter to every ARRL PIO in the country prior to Field Day, praising their volunteer efforts and encouraging their activity. Whatever it was, *something* made for a new record in media coverage of Field Day!
- David Lane of Linuxjournal.com wrote what he described as "A shameless Field Day promotion" while reviewing logging software. Jonathan Pitts (no relation other than he is also a good friend of Amateur Radio) also promoted hams in the *Baltimore Sun* by writing, "…just six months ago, the earthquake in Haiti was another reminder that amateur radio still gives a strong signal. Ham operators sent early news reports from the shattered island, just as they've done for decades in the aftermath of every hurricane, earthquake and snowstorm that has crippled or jammed the means of communication we usually assume will work."

They were the beginnings of an avalanche of media hits for this year's Field Day.

- In addition to normal news outlets, many business publications were also targeted this year. This paid off well. Among the major business hits were TMCnet.com, CNN IndustryWatch, Atlanta Business Chronicle, Austin Business Journal, Baltimore Business Journal, Boston Business Journal, Business Journal of Greater Milwaukee, Business Journal of Phoenix, Charlotte Business Journal, Cincinnati Business Courier, Dallas Business Journal, Denver Business Journal, East Bay Business Times, Houston Business Journal, IT Industry Today, Sacramento Business Journal, San Antonio Business Journal, San Francisco Business Times, San Jose Business Journal, South Florida Business Journal, St Louis Business Journal, Tampa Bay Business Journal, Technology Today and the Washington Business Journal.
- There were also more hits on National Public Radio such as NPR Indianapolis and NPR in Michigan.
- Print, television and radio hits were so numerous that extra pages had to be added to the Media Hits section of **www.arrl.org/media-hits** just to post the links to most of them. Nationwide, the PIOs were having a "field day" of their own in their promotional work. Everywhere from the *Washington Post* to the *Ventura County Star* — and all points in between — were getting hits this year.
- Not only were there more media hits than ever, but just as important, the quality of the articles and stories was substantially improved. There were very few of the simple "community calendar" listings this year as they were replaced by whole articles about Amateur Radio. We also had many more television and broadcast radio hits than before and a wonderful lack of the tiresome "old time, dying radio" comments. While not quite as many as last year, we had 25 state or governor's level Field Day proclamations plus a host of city and county proclamations.

It was a great day!

State or Governor Field Day Proclamations Came in from These States

LA, AR, NC, MI, WI, TX, NH, VA, PA, NM, DE, MO, IN, WY, MS, MA, IA, CT, MN, IL, SC, AZ, NE, OH, AK.

STEVE FORD, WB8IMY

ARRL Board Meets in Connecticut: **With ARRL President Kay Craigie, N3KN, in the chair, the ARRL Board held its 2010 Second Meeting July 16-17 in Windsor, Connecticut. A detailed report will appear in the October issue.**

HAROLD KRAMER, WJ1B

Your typical 24A FD operation: **The Potomac Valley Radio Association Field Day site in Ellicott City, Maryland, with (from the left) visitor Sam Fao, KC3TO; PVRC member Frank Donovan, W3LTL, and PVRC FD co-chair Rol Anders, K3RA. Quite the collection of cables!**

PVRA antenna system: **The PVRA FD effort sported a 50 foot military surplus AB-577 tower owned by Maurice Cahill, KB3EJJ. The antennas include Yagis for 50, 144, 222, 432 and 1296 MHz and a multi-band vertical. The dual rotator set-up, designed and built by KB3EJJ, allows the 50 MHz Yagi to be rotated independently of the other antennas. —** ***tnx Dave Prestel, W8AJR***

JOE MOELL, KØOV

At the Hospital Disaster Support Communications System (HDSCS) Field Day site in Huntington Beach, California: **FCC District Director Nader Haghighat (at right) explains the workings of the Los Angeles FCC Office to April Moell, WA6OPS; Tom Gaccione, WB2LRH, and Congressman Dana Rohrabacher. A member of the House Committee on Science and Technology, Representative Rohrabacher has a keen interest in communications and disaster planning.** ***— Joe Moell, KØOV***

Inside HQ

Web Site Launch Highlights Busy First Half of 2010

We had a busy first half of the year. Our new Web site, **www.arrl.org**, was launched in April. (Have you completed your member profile yet?)

Along with the new Web site, here's an update of our activities and programs.

- Installed a D-Star Repeater system for our Club station W1HQ/W1INF.
- Added an EchoLink conference server that allows EchoLink users to connect and listen to W1AW's CW and digital transmissions.
- Changed the W1AW digital transmission schedule so that three digital modes, Baudot, BPSK31 and MFSK16, now run on a revolving schedule.
- Received about 340,000 DXCC credits during the first half of the year, about the same number as last year.
- 290 million QSOs are now entered in Logbook of the World. We also updated the instructions for signing up for LoTW: **www.arrl.org/logbook-of-the-world**
- Received more than 1800 more logs for the ARRL DX contests in 2010 than in 2009. Better band conditions contributed to this increased activity.
- Supported a Petition for Reconsideration of an FCC Waiver permitting a manufacturer to market devices that operate on the 70 cm band.
- There are now almost 4000 ARRL registered ARRL License Instructors. Not registered? Sign up here: **www.arrl.org/License-instructor-registration**
- Four Teachers Institutes on Wireless Technology have been held so far in 2010. Three more are planned. **www.arrl.org/teachers-institute-on-wireless-technology**
- International Space Station crew members participated in one or more Amateur Radio on the International Space Station (ARISS) educational activities per week.
- Mike Corey, W5MPC, became our new Emergency Preparedness and Response Manager. Mike has been building relationships with many served agencies such as National Public Telecommunications Council (NPSTC), National VOAD, the National Weather Service and FEMA's Net Guard project.
- 40 applicants took the final assessment for the new Emergency Communications Management course. **www.arrl.org/online-course-catalog**
- Reached an all time high of more than 33,000 ARRL Accredited Volunteer Examiners. Thanks to all of you who volunteer your time for this important job.
- Demand for Amateur Radio exam sessions remained strong. There were about 3,500 ARRL/VEC sponsored exam sessions through May 2010 compared to 3,400 in 2009.
- Published the following new books: *Storm Spotting and Amateur Radio, Remote Operating for Amateur Radio* and *ARRL's PIC Programming for Beginners; The ARRL RFI Book—3rd Edition; The ARRL Ham Radio License Manual* and *ARRL's Tech Q&A* — both with the new Technician question pool; *Understanding Basic Electronics — 2nd Edition; The DXCC Yearbook — 2009 Edition* and *The ARRL Field Day Handbook*.
- The weekly ARRL Audio News returned: **www.arrl.org/arrl-audio-news**
- ARRL EXPO 2010 at the Dayton Hamfest was a success for us, particularly the ARRL "Project Building" booth. We plan to offer more kit projects to our members in the future.
- Connected with more than 10,000 other folks interested in Amateur Radio on the ARRL Facebook page. For details, visit **www.arrl.org/news/arrl-now-on-facebook**

That wraps up the highlights from a busy first half of 2010 here inside HQ.

73,

Harold Kramer, WJ1B
ARRL Chief Operating Officer
wj1b@arrl.org

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Officers

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President
KAY C. CRAIGIE,* N3KN
570 Brush Mountain Rd
Blacksburg, VA 24060
540-552-3903; n3kn@arrl.org

First Vice President
RICK RODERICK, K5UR*
PO Box 1463, Little Rock, AR 72203
501-988-2527; k5ur@arrl.org

Vice President
BRUCE FRAHM, KØBJ
1553 County Rd T, Colby, KS 67701
785-462-7388; k0bj@arrl.org

International Affairs Vice President
JAY BELLOWS, KØQB
1925 Bidwell St,
West St Paul, MN 55118
651-238-4444; k0qb@arrl.org

Chief Executive Officer
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Business Staff

Business Manager
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*Executive Committee Member

Atlantic Division

Bill Edgar, N3LLR
22 Jackson Ave, Bradford, PA 16701
(814-362-1250); **n3llr@arrl.org**

Vice Director: **Tom Abernethy, W3TOM**
PO Box 73, Accokeek, MD 20607
(301-292-6263); **w3tom@arrl.org**

Central Division

George R. Isely, W9GIG*
736 Fellows St, St Charles, IL 60174
(630-584-3510); **w9gig@arrl.org**

Vice Director: **Kermit Carlson, W9XA**
1150 McKee St, Batavia, IL 60510
(630-879-0983); **w9xa@arrl.org**

Dakota Division

Gregory P. Widin, KØGW
13457 Sixth St N, Stillwater, MN 55082
(651-436-8811); **k0gw@arrl.org**

Vice Director: **Kent R. Olson, KAØLDG**
7702 Forest River Rd, Fargo, ND 58104-8004
(701-298-0956); **ka0ldg@arrl.org**

Delta Division

Mickey D. Cox, K5MC
754 Cheniere Drew Rd, West Monroe, LA 71291
(318-397-1980); **k5mc@arrl.org**

Vice Director: **David A. Norris, K5UZ**
640 Josephine Dr, Batesville, AR 72501
(870-793-6431); **k5uz@arrl.org**

Great Lakes Division

Jim Weaver, K8JE
5065 Bethany Rd, Mason, OH 45040-8130
(513-459-1661); **k8je@arrl.org**

Vice Director: **Gary L. Johnston, KI4LA**
3056 Hergott Dr, Edgewood, KY 41017
(859-391-6399); **ki4la@arrl.org**

Hudson Division

Frank Fallon, N2FF
30 E Williston Ave, East Williston, NY 11596
(516-746-7652); **n2ff@arrl.org**

Vice Director: **Joyce Birmingham, KA2ANF**
235 Van Emburgh Ave, Ridgewood, NJ
07450-2918 (201-445-5924); **ka2anf@arrl.org**

Midwest Division

Cliff Ahrens, KØCA
65 Pioneer Trail, Hannibal, MO 63401
(573-221-8618); **k0ca@arrl.org**

Vice Director: **Rod Blocksome, KØDAS**
690 Eastview Dr, Robins, IA 52328-9768
(319-393-8022); **k0das@arrl.org**

How to Find an ARRL HQ Staff Member

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New England Division

Tom Frenaye, K1KI*
PO Box J, West Suffield, CT 06093
(860-668-5444); **k1ki@arrl.org**

Vice Director: **Mike Raisbeck, K1TWF**
85 High St, Chelmsford, MA 01824
(978-250-1235); **k1twf@arrl.org**

Northwestern Division

Jim Fenstermaker, K9JF
1545 NW 57th St, Unit 410, Seattle, WA
98107-5645 (360-256-1716); **k9jf@arrl.org**

Vice Director: **Grant Hopper, KB7WSD**
PO Box 3318, Everett, WA 98213
(425-238-1433); **kb7wsd@arrl.org**

Pacific Division

Bob Vallio, W6RGG*
18655 Sheffield Rd, Castro Valley, CA 94546
(510-537-6704); **w6rgg@arrl.org**

Vice Director: **Jim Tiemstra, K6JAT**
13450 Skyline Blvd, Oakland, CA 94619;
(510-569-6963); **k6jat@arrl.org**

Roanoke Division

Dennis Bodson, W4PWF
233 N Columbus St, Arlington, VA 22203
(703-243-3743); **w4pwf@arrl.org**

Vice Director: **Dr James Boehner, N2ZZ**
525 Barnwell Ave NW, Aiken, SC 29801-3939
(803-641-9140); **n2zz@arrl.org**

Rocky Mountain Division

Brian Mileshosky, N5ZGT*
PO Box 20186, Albuquerque, NM 87154-0186
(505-463-9468); **n5zgt@arrl.org**

Vice Director: **Dwayne Allen, WY7FD**
82 Wenger Dr, Devils Tower, WY 82714
(307-756-9439); **wy7fd@arrl.org**

Southeastern Division

Greg Sarratt, W4OZK
230 Latigo Loop, Huntsville, AL 35806;
(256-337-3636); **gsarratt@arrl.org**

Vice Director: **Jeff Beals, WA4AW**
PO Box 1584 Loxahatchee, FL 33470
(561-252-6707); **wa4aw@arrl.org**

Southwestern Division

Richard J. Norton, N6AA
21290 West Hillside Dr, Topanga, CA 90290
(310-455-1138); **n6aa@arrl.org**

Vice Director: **Marty Woll, N6VI**
21301 Candice Pl, Chatsworth, CA 91311-1404
(818-773-9655); **n6vi@arrl.org**

West Gulf Division

Dr David Woolweaver, K5RAV*
2210 S 77 Sunshine Strip, Harlingen, TX 78550
(956-425-3128); **k5rav@arrl.org**

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Delaware: Frank T. Filipkowski, Jr, AD3M, 1130 N Hilton Rd, Oak Lane Manor, Wilmington, DE 19803-5216 (302-656-0409); **ad3m@arrl.org**

Eastern Pennsylvania: Eric Olena, WB3FPL, 284 Blimline Rd, Mohnton, PA 19540 (610-775-0526); **wb3fpl@arrl.org**

Maryland-DC: James E. Cross III, WI3N, 16013 Dorset Rd, Laurel, MD 20707-5314 (301-725-6829); **wi3n@arrl.org**

Northern New York: Thomas Dick, KF2GC, 11 Jenkins St, Saranac Lake, NY 12983 (518-891-0508); **kf2gc@arrl.org**

Southern New Jersey: George Strayline, W2GSS, 10 E Pacific Ave, Villas, NJ 08251-2630 (609-741-8322); **w2gss@arrl.org**

Western New York: Scott Bauer, W2LC, 1964 Connors Rd, Baldwinsville, NY 13027 (315-638-7551); **w2lc@arrl.org**

Western Pennsylvania: John Rodgers, N3MSE, 803 S Main St, Butler, PA 16001 (724-287-0424); **n3mse@arrl.org**

Central Division (IL, IN, WI)

Illinois: Tom Ciciora, KA9QPN, 1887 Irene Rd, Sandwich, IL 60548 (815-498-4929); **ka9qpn@arrl.org**

Indiana: John Poindexter, W3ML, 204 S Main St, Knox, IN 46534-1620 (574-772-2772); **w3ml@arrl.org**

Wisconsin: Donald Michalski, W9IXG, 4214 Mohawk Dr, Madison, WI 53711 (608-274-1886); **w9ixg@arrl.org**

Dakota Division (MN, ND, SD)

Minnesota: Richard H. "Skip" Jackson, KSØJ, 1835-63rd St E, Inver Grove Heights, MN 55077 (651-260-4330); **ks0j@arrl.org**

North Dakota: Lynn A. Nelson, WØND, 6940 4th St SW, Minot, ND 58701 (701-839-8200); **w0nd@arrl.org**

South Dakota: Scott Rausch, WAØVKC, 15362 Canyon Trl, Piedmont, SD 57769-7286 (605-787-7566); **wa0vkc@arrl.org**

Delta Division (AR, LA, MS, TN)

Arkansas: J. M. Rowe, N5XFW, 128 Carnation Pl, Hot Springs, AR 71913-9012 (501-767-9492); **n5xfw@arrl.org**

Louisiana: Gary L. Stratton Sr, K5GLS, 8424 Kaw Court, Shreveport, LA 71107 (318-309-0023); **k5gls@arrl.org**

Mississippi: Malcolm Keown, W5XX, 64 Lake Circle Dr, Vicksburg, MS 39180 (601-636-0827); **w5xx@arrl.org**

Tennessee: Glen Clayton, W4BDB, 238 Old Parksville Rd NE, Cleveland, TN 37323; (423-472-7751); **w4bdb@arrl.org**

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Michigan: Dale Williams, WA8EFK, 291 Outer Dr, Dundee, MI 48131 (734-529-3232); **wa8efk@arrl.org**

Ohio: Frank J. Piper, KI8GW, 496 Hillview St, Pickerington, OH 43147-1197 (614-589-4641); **ki8gw@arrl.org**

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NYC-Long Island: Mike Lisenco, N2YBB, 1635 E 46th St, Brooklyn, NY 11234-3604 (718-258-7830); **n2ybb@arrl.org**

Northern New Jersey: Richard Krohn, N2SMV, 23 Sweetmans Ln, Manalapan, NJ 07726; **n2smv@arrl.org**

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Iowa: Tom Brehmer, NØLOH, 1114 East Tenth St, Muscatine, IA 52761 (563-263-3097); **n0loh@arrl.org**

Kansas: Ronald D. Cowan, KBØDTI, PO Box 36, LaCygne, KS 66040 (913-757-3758); **kb0dti@arrl.org**

Missouri: Dale C. Bagley, KØKY, PO Box 13, Macon, MO 63552-1822 (660-385-3629); **k0ky@arrl.org**

Nebraska: Art Zygielbaum, KØAIZ, 6601 Pinecrest Dr, Lincoln, NE 68516-3573 (402-421-0839); **k0aiz@arrl.org**

New England Division (CT, EMA, ME, NH, RI, VT, WMA)

Connecticut: Betsey Doane, K1EIC, 92 Mohegan Rd, Shelton, CT 06484-2448 (203-929-7759); **k1eic@arrl.org**

Eastern Massachusetts: Michael P. Neilsen, W1MPN, 5 Otsego Dr, Hudson, MA 01749-3127 (978-389-0558); **w1mpn@arrl.org**

Maine: William Woodhead, N1KAT, 68 Madison St, Auburn, ME 04210 (207-782-4862); **n1kat@arrl.org**

New Hampshire: Alan K. Shuman, K1AKS, PO Box 681, New Boston, NH 03070-3520 (603-487-3333) **k1aks@arrl.org**

Rhode Island: Bob Beaudet, W1YRC, 30 Rocky Crest Rd, Cumberland, RI 02864 (401-333-2129); **w1yrc@arrl.org**

Vermont: Paul N. Gayet, AA1SU, 11 Cherry St, Essex Junction, VT 05452 (802-878-2215); **aa1su@arrl.org**

Western Massachusetts: Ed Emco, W1KT, 37 Bullard Ave, Worcester, MA 01605 (508-853-3333); **w1kt@arrl.org**

Northwestern Division (AK, EWA, ID, MT, OR, WWA)

Alaska: Jim Larsen, AL7FS, 3445 Spinnaker Dr, Anchorage, AK 99516-3424 (907-345-3190); **al7fs@arrl.org**

Eastern Washington: Mark Tharp, KB7HDX, PO Box 2222, Yakima, WA 98907-2222 (509-965-3379); **kb7hdx@arrl.org**

Idaho: Edward Stuckey, AI7H, 2300 W Polo Green Ave, Post Falls, ID 83854-9680 (208-457-0354); **ai7h@arrl.org**

Montana: Doug Dunn, K7YD, 216 Fiddle Creek Rd, Livingston, MT 59047-4116 (406-686-9100); **k7yd@arrl.org**

Oregon: Bonnie Altus, AB7ZQ, 7770 Harmony Rd, Sheridan, OR 97378 (971-237-0711); **ab7zq@arrl.org**

Western Washington: Jim Pace, K7CEX, PO Box 1602, Centralia, WA 98531 (360-508-8437); **k7cex@arrl.org**

Pacific Division (EB, NV, PAC, SV, SF, SJV, SCV)

East Bay: James Latham, AF6AQ, 1798 Warsaw Ave, Livermore, CA 94550-6140; (925-447-6136); **af6aq@arrl.org**

Nevada: Joe Giraudo, N7JEH, 720 Holyoke Dr, Spring Creek, NV 89815-5306 (775-738-7110); **n7jeh@arrl.org**

Pacific: Bob Schneider, AH6J, PO Box 131, Keaau, HI 96749-0131 (808-966-8146); **ah6j@arrl.org**

Sacramento Valley: Ronald D. Murdock, W6KJ, 998 Bogue Rd, Yuba City, CA 95991-9221 (530-674-8533); **w6kj@arrl.org**

San Francisco: Bill Hillendahl, KH6GJV, PO Box 4151, Santa Rosa, CA 95402-4151 (707-544-4944); **kh6gjv@arrl.org**

San Joaquin Valley: Dan Pruitt, AE6SX, 4834 N Diana St, Fresno, CA 93726 (559-779-2974); **ae6sx@arrl.org**

Santa Clara Valley: Bill Dale, N2RHV, 142 N Milpitas Blvd #264, Milpitas, CA 95035 (408-263-5325); **n2rhv@arrl.org**

Roanoke Division (NC, SC, VA, WV)

North Carolina: Bill Morine, N2COP, 101 Windlass Dr, Wilmington, NC 28409-2030 (910-452-1770); **n2cop@arrl.org**

South Carolina: Marc Tarplee, N4UFP, 4406 Deer Run, Rock Hill, SC 29732-9258 (803-327-4978); **n4ufp@arrl.org**

Virginia: Carl Clements, W4CAC, 4500 Wake Forest Rd, Portsmouth, VA 23703 (757-484-0569); **w4cac@arrl.org**

West Virginia: L. Ann Rinehart, KA8ZGY, 1256 Ridge Dr, South Charleston, WV 25309 (304-768-9534); **ka8zgy@arrl.org**

Rocky Mountain Division (CO, NM, UT, WY)

Colorado: Jeff Ryan, KØRM, 9975 Wadsworth Pky K2-275, Westminster, CO 80021 (303-432-2886); **k0rm@arrl.org**

New Mexico: Donald D. Wood, W5FHA, 9100 Wimbledon Dr NE, Albuquerque, NM 87111 (505-828-0988); **w5fha@arrl.org**

Utah: Mel Parkes, NM7P, 2166 E 2100 North, Layton, UT 84040 (801-547-1753); **nm7p@arrl.org**

Wyoming: Garth Crowe, N7XKT, 1206 Avalon Ct, Gillette, WY 82716-5202 (307-686-9165); **n7xkt@arrl.org**

Southeastern Division (AL, GA, NFL, PR, SFL, VI, WCF)

Alabama: Jay Isbell, KA4KUN, 2290 Quail Dr, Bessemer, AL 35022 (205-424-9993); **ka4kun@arrl.org**

Georgia: Gene Clark, W4AYK, 1604 Lynwood Lane, Albany, GA 31707 (229-888-1090); **w4ayk@arrl.org**

Northern Florida: Paul L. Eakin, KJ4G, PO Box 625, Panacea, FL 32346 (850-591-0442); **kj4g@arrl.org**

Puerto Rico: Roberto Jimenez, KP4AC, PO Box 360536, San Juan, PR 00936-0536 (787-756-7276); **kp4ac@arrl.org**

Southern Florida: Sharon T. "Sherri" Brower, W4STB, 736 34th Ter, Vero Beach, FL 32968-1226 (772-562-3240); **w4stb@arrl.org**

Virgin Islands: John Ellis, NP2B, PO Box 24492, Christiansted, St Croix, VI 00824 (340-773-9643); **np2b@arrl.org**

West Central Florida: Dee Turner, N4GD, 10132 64th St N, Pinellas Park, FL 33782 (727-548-7474); **n4gd@arrl.org**

Southwestern Division (AZ, LAX, ORG, SDG, SB)

Arizona: Thomas J. Fagan, K7DF, 10650 E Bridgeport St, Tucson, AZ 85747-5925 (520-574-1129); **k7df@arrl.org**

Los Angeles: David Greenhut, N6HD, 21781 Ventura Blvd, #243, Woodland Hills, CA 91364 (818-992-5507); **n6hd@arrl.org**

Orange: Carl Gardenias, WU6D, 20902 Gardenias St, Perris, CA 92570 (951-443-4958); **wu6d@arrl.org**

San Diego: Stephen M. Early, AD6VI, 4724 Maple Ave, La Mesa, CA 91941 (619-461-2818); **ad6vi@arrl.org**

Santa Barbara: Robert Griffin, K6YR, 1436 Johnson Ave, San Luis Obispo, CA 93401-3734 (805-543-3346); **k6yr@arrl.org**

West Gulf Division (NTX, OK, STX, WTX)

North Texas: Jay Urish, W5GM, 1711 Buckeye Dr, Flower Mound, TX 75028-1259 (972-691-0125); **w5gm@arrl.org**

Oklahoma: Dean Feken, KL7MA, 111 Noble Ave, Perry, OK 73077-2610 (580-336-8495); **kl7ma@arrl.org**

South Texas: Lee H. Cooper, W5LHC, 2507 Autrey Dr, Leander, TX 78641 (512-260-7757); **w5lhc@arrl.org**

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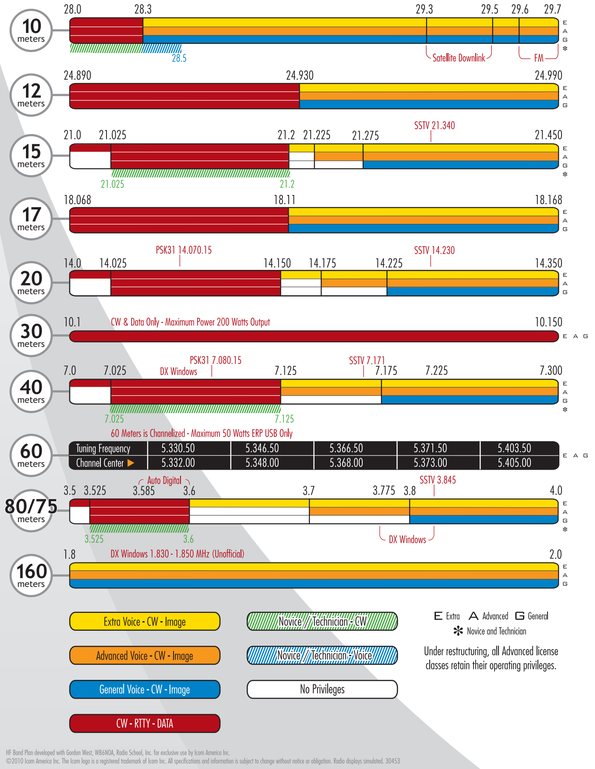

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Steaming

Members of the Intercity Amateur Radio Club (W8WE) took part in the annual steam show put on by the Richland County (Ohio) Steam Threshers in September 2009. Among other attractions at the show, held at the Black Fork Retreat Center north of Mansfield, was steam powered ham radio.

Members of the club were there to provide communications for the event and prevent traffic jams on the long single lane road that leads back to the main event area. Paul Ward, N8IIU, hooked up his 1897, 10 HP Peerless Model Q steam tractor to a 12 V generator mounted on an old buzz saw table to provide power to the IARC emergency trailer.

Rob Ruth, KD8AZQ, was in the trailer making contacts on 40 and 20 meters. Other members present but not pictured were Richard Hensel, N8WLC; Dan Baker, AB8SI; Joy Baker, KC8RHD; Dave Weigold, N8DPW, and Steve Barr, KD8GRM. — *Richard Hensel, N8WLC; photos by Steve Barr, KD8GRM*

KD8AZQ made "steam power" contacts on 40 and 20 meters.

The club emergency trailer, with the vintage tractor at the rear.

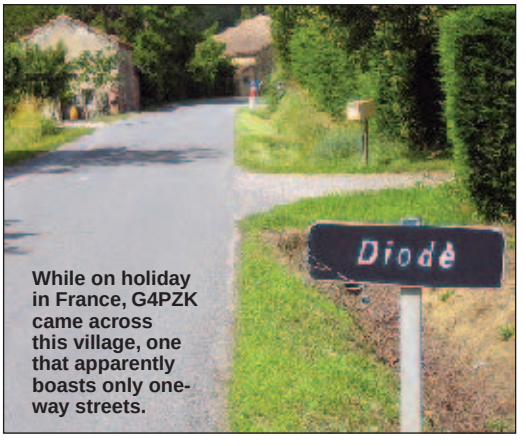
Paul Ward, N8IIU, at the throttle with Rob Ruth, KD8AZQ, looking on.

Our 12 V generator setup. The steam engine drive belt is in the rear.

WHITEY DOHERTY, K1VV

No moving parts: **A group of us put together this "Touch" keyer paddle recently. We used the Doug DeMaw, W1FB, method of making the project box by soldering copper clad circuit boards together. This way you can custom make a box to fit the project. Even the fixed paddles are from circuit board. It weighs about 2½ pounds with some steel plate inside the box, and it does not move around on the table. With Old Sam watching it inspires one to send better CW. —** ***Whitey Doherty, K1VV***

CLIFF BRYANT, G4PZK



While on holiday in France, G4PZK came across this village, one that apparently boasts only one-way streets.

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CORRESPONDENCE

TRAIN TO BE READY

♦ The article by Assistant Editor Steve Sant Andrea, AG1YK, article touches only on the tip of the iceberg ["When *Not* to Operate," Apr 2010, page 74]. A not often enough thought of summary says "Amateurs train until they *think* can do it right, professionals train until they cannot do it wrong." Many in our community find that offensive because our name is "amateur," yet others say "amateur in name only." That's a big difference. Which is correct? Answer: It depends.

It depends on if you are in Amateur Radio as a hobby or if you think of yourself as a communicator. A communicator can have fun in the hobby, but few hobby people are even remotely adequate communicators. While both use radios, there is little else in common. From what I have seen, the majority of ARES®/RACES/MARS groups are woefully short in training. They feel that being able to check into a net and possibly operate a Packet station means they are trained. AG1YK's example of a 25 word message requiring 15 minutes to pass is accurate, and that is horrifying!

Does this mean that to be a communicator that you must spend hours every day or days every week at training? No, it does not. It does mean that *you* as an individual *must* decide for yourself if you wish to become a communicator, and if you say yes, plan what you can do and how much time you have available to accomplish it. Checking in to a net with your name and call does not prepare you for an emergency net. Similarly, being able to take check-ins for a weekly net does not prepare you to be a real NCS. Many will complain that they don't have the time. Fine, you have just defined when you will be ready as a communicator.

You *must* participate regularly — at least for the first few years — in public service nets, training nets, data nets and anything else you can. It is only by learning to apply the training materials that are available (some available at no cost) that you begin to become a communicator. Just please do not say "I'll be ready when I'm needed" unless you have trained, *really* trained.

PAT LAMBERT, WØIPL, ARRL Life Member
Longmont, Colorado

SIMPLICITY GAINED

♦ The review written by ARRL Contributing Editor Richard K. Palm, K1CE ["Product Review," Jun 2010, pages 46-48], struck a chord with me. I'm part of an emergency response communications team in my retirement community. After I got my ticket, I went looking to buy a 2 meter band radio. A note: I am not a "ham" or a "radio amateur" or "enthusiast"; the only time I would get on the air would be in an emergency. So after reading a review on your Web site, I bought a radio that the marketing types would call a "feature rich radio," but it suffers from technology bloat and very poor usability. The number of third-party products available for the maker attests to this; I find that most of the 2 meter radios for sale today suffer from this disease.

Palm wrote in his review that "The amount of functionality built in to modern VHF transceivers can get in the way of easy use of the basic radio functions. If I were an emergency coordinator on a disaster scene, I would want a radio that can be operated out of the box by anybody within seconds, not after reading the fine print of a manual. There may be a niche for a 2 meter FM handheld with only the most basic of functions: frequency selection via keypad or knob, CTCSS, and 10 memory channels on a larger, rugged chassis with big knobs and key buttons and a BNC connector antenna."

This begs the question: Why don't they make a very simple 2 meter radio for people like me who use their radios only for emergency use? I think Palm is definitely going in the right direction.

JULES E. THOMPSON JR, KI6PBA
Santa Rosa, California

MAY WE NEVER FORGET

♦ I want to thank Aram L. Ehramjian, K2US, for his reminder once again of the sacrifice and contributions of our World War II veterans ["Correspondence," Aug 2010, page 24]. My dad was also at the Battle of Midway, a Radioman onboard the heavy cruiser USS *New Orleans* (CA-32). His entry into the war began while standing on the deck of his ship in the "chow line" on December 7, 1941 on what would have otherwise been a peaceful morning in a little known place called Pearl Harbor. I was born in the 1950's "baby boom," and while my dad was never a ham, he taught me Morse code at a young age and was a never-ending source of encouragement for me in both Amateur Radio and life in general. Thanks to his tutelage, I never had any problems passing the code tests and was first licensed in 1971 at the age of 14, the start of a lifelong career in communications and electronics, along with a lifelong enjoyment of ham radio. The WWII veterans changed the world in battle and they changed this nation when they came back home victorious. Many of the best and brightest contributions to the state of the art of our fine avocation came from these folks. My dad passed away in 2004, but I feel him close by as I work in technology and especially when I place my hand on the key. Thank you Aram, for your service to your country, your sacrifice and reminding us once again of the legacy and depth of honor we owe to those who fought and won, starting on that "date that will live in infamy" so long ago and continuing today. May we never forget.

RON PARKS, WB5DYG
Gilbert, Arizona

KIDS CODE THE DARNDEST THINGS

♦ As I was getting ready for ARRL Field Day this year, I kept hearing the faint sound of my call sign, KF5EQB KF5EQB. I walked into the shack and looked at my gear — nothing was on. Then I heard my call again, slightly slurred and drawn out — coming from under the desk. When I bent down to investigate, springing out and laughing and giggling at me came my 4 year old, Austin. Now on a regular basis he pops right out of the blue with KF5EQB KF5EQB.

Since this episode, we have discovered the value of hidden kill switches for your gear, unplugging mics and other precautionary measures. Never assume that just because the power supply is turned off and unplugged and the coax is unscrewed from the radio that a motivated 4 year old can't figure it out!

JESSE BEAR, KF5EQB
Austin, Arkansas

GIVING BACK

♦ In Harold Kramer's, WJ1B, column regarding volunteering ["Inside HQ," Aug 2010, page 13], I have to relate to you my own experience. I have been an ARRL member for more than 50 years, licensed in 1960. As a Life Member and doing what I could for Amateur Radio, I took the exam for and received my Amateur Extra ticket in January of 2009 at the age of 80. One month later, I applied and received my Volunteer Examiner credentials. I feel I need to "give back" and volunteering to administer the exams is a way to do this.

MAURICE DAVIDSON, K8SJD
ARRL Life Member
West Bloomfield, Michigan

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Dave Leavenworth, WV6JPL, and Pete Tiffany, KT4BW

The emergency communications aspects of Amateur Radio have always been important to most operators. Our ability to get the message through when other methods fail is what the public has come to expect from us. With this in mind, our local radio club, the Cumberland Plateau Amateur Radio Club (CPARC), recently undertook a project to convert the club VHF emergency repeater from commercial power, with battery backup, to solar power.

If we were to have a long power outage, so long that the station backup batteries were close to discharge, a means of recharging these batteries would be needed to keep the repeater on the air. New batteries or a gasoline powered generator could be brought in. A better choice, as suggested by Repeater Trustee Paul Dorschel, W4EYJ, would be solar power, not just for times of commercial power outages, but as a replacement for ac mains power. This article describes the development of our club's solar powered VHF repeater located in Crossville, Tennessee.

CPARC Repeater Configuration

The CPARC 2 meter repeater is a Motorola Mitrek model T83 that uses a CAT 300 DX controller. Good coverage of the Cumberland County area is obtained by running at about 40 W into a Diamond vertical antenna mounted at a height of 50 feet.

Some might argue that the repeater modified as planned will not really be solar powered, but will be battery powered, with the battery charging and recharging accomplished by use of a photovoltaic (PV) panel. The authors leave it to the reader to decide if the electrons that activate the repeater come from the battery or the PV panel.

Funding

Solar equipment is not cheap. Although the cost per watt continues to decrease, PV panels remain an expensive item. In addition, batteries of 100-200 or more ampere hours (Ah) were needed along with sophisticated charge controllers. After an initial successful fund raising event, CPARC turned to our regional power company, Volunteer Energy Cooperative (VEC). The VEC, through their Customer SHARE Program, awarded a grant to CPARC that, when combined with club funds, gave us enough to proceed with this project. Without their assistance, this project could not have taken place. Thank you VEC!

The awarding of the grant is shown in Figure 1.

KT4BW

Figure 1 — Receiving Volunteer Energy Cooperative grant from VEC. Left to right are Dick Chabot, KB3YR, CPARC president; VEC representative Jim Purcell, and coauthor KT4BW, solar project manager for CPARC.

The Plan

The use of solar power to run repeaters or other radio equipment is not new.[1-5] Most solar emergency power systems have the following elements in common: the PV panel(s), the charge controller, the battery(s) and a disconnect mechanism. A block diagram is shown in Figure 2. The capacity needed from the panel and battery plus the balance of these capacities was determined by power demand, peak loads expected, environment, cost and reliability.

As a starting point, we made

[1]Notes appear on page 33.

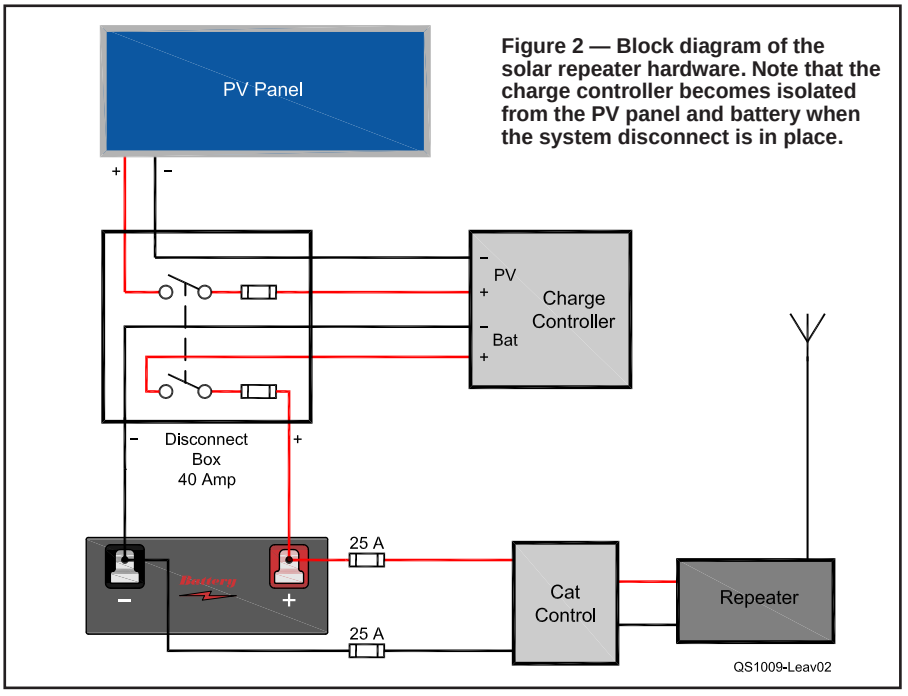


Figure 2 — Block diagram of the solar repeater hardware. Note that the charge controller becomes isolated from the PV panel and battery when the system disconnect is in place.

some base assumptions. We chose 12 hours of key down transmissions from the repeater in each week, 500 mA of current needed to keep the repeater on the air during periods not in use, a maximum of five consecutive sunless days in our Tennessee weather and an average of 21 Ah per day while transmitting at 60 W. These data were entered onto a system sizing worksheet found in the *Solar Living Sourcebook*, 30th Edition.[6] A modified worksheet helped us to determine the necessary size and capacity of the panel and battery for our project and helped ensure that they would match each other when installed in the field.

Element Details

PV Panel

PV panels are available in a variety of sizes, styles, configurations and prices from a number of manufacturers. After a extensive search, we chose a Kyocera panel rated at 130 W. At $484, it seemed a good value. On sunny days, this panel should produce 7.4 A at 17.6 V.

Charge Controller.

Co-author WV6JPL lives off the grid in rural Cumberland County. He uses only solar and other non commercial sources of power. Using his experience and guidance, we initially chose a Xantrex model 35C charge controller for this project. This advanced controller can monitor the PV panel, the battery and the repeater demand to choose how best to distribute the power coming into the system. In addition, it features an optional data gathering accessory that monitors current, voltage and energy use on an instantaneous and cumulative basis. Unfortunately, the pulse width modulation (PWM) based Xantrex C35 turned out to generate so much RFI that it was unusable, even after repeated attempts at filtering.[7]

After a literature search, technical discussions with vendors and problem solving discussions within the club, we found that a newer, potentially better, charge controller technology was available. This was in the form of charge controllers using *Maximum Power Point Tracking* (MPPT) technology. A controller of this type, an MPPT500 manufactured by BZ Products was available to us for evaluation.

This controller worked properly and exhibited none of the RFI problems of the Xantrex unit.[8,9] Power from the PV panel comes to the controller at about 17 V. MPPT uses all the 17 V and so obtains a 20 to 30% increase in available charging current compared to PWM technology. The BZ controller we evaluated also had a battery temperature probe as a standard feature to help it adjust to differing ambient conditions, a useful tool during seasonal temperature swings. Data gathered using the BZ controller is limited compared to the Xantrex, as only instantaneous current and voltage readings are available. With no internal recording options, data must be collected by an external device as described later.

Battery

Batteries are expensive, heavy and potentially dangerous. These factors must be considered as part of the planning and implementation. Flooded cell, gelled electrolyte and glass mat batteries were studied. Lead/acid battery life is tied closely to number of charge/discharge cycles and to the depth of discharge. After consideration of each, AGM technology (Absorbed Glass Mat) was chosen. For good AGM battery life (greater than 750 charge-discharge cycles), maximum discharge should not exceed 50% of total battery capacity.[10,11] Based on the use parameters previously stated, this would mean that our repeater would require an AGM battery of 200 Ah, based on the standard 20 hour discharge rate. A 198 Ah Deka AGM battery as shown in Figure 3 was purchased for this project.

Equipment Installation

The solar panel, charge controller and AGM battery were installed at the CPARC repeater site. A solar panel mounting bracket was also purchased and attached to the antenna tower at the 30 foot level using a fabricated interface. For system and operator safety, a disconnect box with 40 A fuses was installed between the panel and the battery. As can be seen in Figure 2, it is wired so that if open, it will isolate the charge controller, the battery and the PV panel. Copper wire of #8 AWG was used for all current carrying runs. Figures 4 and 5 show site construction.

Elevation and azimuth positioning are important parameters for any solar panel as they help determine the capture efficiency of the panel. Depending upon geographic location, month of the year and time of the day, the optimum position for a PV panel will change.[12] We concluded that for small systems such as ours, mechanical sun tracking devices do not pay for themselves in overall increased efficiency of capture. We are located at a latitude of about 36° and have aimed our panel due south with a tilt using the popular algorithm of latitude plus 15° for a tilt of 51°. This tilt optimizes the panel position for the winter months.

When the PV panel, charge controller and battery were connected, the charge controller immediately sensed power from the solar panel. It continued to register battery

KT4BW

Figure 3 — Selected battery for our system, a Deka 12 V, 198 Ah unit. This battery weighs 130 pounds. Insulated battery box designed and constructed by Joe Koester, W4NSA.

N7TRK

Figure 4 — Panel bracket installation by Al Perkins, KA1KIX, on left, assisted by KT4BW.

KT4BW

Figure 5 — Construction at repeater site. Left to right: Dick, KB3YR, club president; Bill Melton, N4TRK, fabrication; coauthor WV6JPL, solar and Al Perkins, KA1KIX, tower work.

KT4BW

Figure 6 — 130 W PV panel on line in Tennessee.

charging until the float stage was reached at which point the charge current dropped to 0 A and the full charge voltage was registered at the charge controller. The system worked! Figure 6 shows our repeater site after installation. This was on October 23, 2009. The repeater has been on solar power exclusively since that date.

Data Collection

We needed actual usage data to evaluate our system and to help answer a number of questions, such as:

- How deep a discharge is there to the system battery during an average usage sunny day?
- How deep is the discharge during a cloudy day? a cloudy week?
- How deep a discharge after an hour weekly net (heavy usage) session?
- What is the voltage drop overnight due to repeater current drain?
- How fast is the recovery of the battery after daybreak?
- How much battery charging during a cloudy day? (There will be some.)
- Can we expect to limit maximum battery discharge to 50% (above 12.3 V)?

Enter the Data Logger by Velleman Instruments. This instrument, a four channel device, can collect system data on a continuous basis. It was configured to collect battery voltage data using the software included with the instrument. The data are stored and displayed on a PC using the *Windows* operating system. Both numerical and graphic data have been obtained. Figure 7 shows a trace of battery voltage taken over a period of 23 hours, sampling every 5 seconds. Note some of the interesting information obtained. One can "see" sunset, sunrise and a number of repeater usages during the early evening. At 7 PM, our local ARES® net was on for about 30 minutes. There are also regular hourly voltage spikes seen on the graph. These are audio repeater controller time announcements. Note there may have been some stray clouds during sunrise.

Conclusions

It has been an interesting technical journey to date and it will not be over nor will all questions be answered for some time. We are on the air, however, and the system appears to be running well. Long term battery life remains a concern and needs additional study. The goal of a reliable VHF communication medium during an extended power outage appears obtainable.

Not previously mentioned is the freedom we now have for repeater location because we are not dependent on commercial mains connectivity. We can thus choose a location based solely on desired coverage area.

See the QST-In-Depth Web site and visit **www.cparc.net** for further project information.

Future Plans

An important addition planned for our system is a low voltage cutoff for the battery. It would be wise to protect the battery in the event of the excessive drain that might occur during the worst of all conditions (simultaneous cloudy or rainy weather exceeding five straight days with very hot temperatures and heavy repeater usage). The cutoff would be set to activate when a preset voltage was reached.

The Data Tracker will be used to help define battery voltage profiles during a variety of operating and weather conditions.

It would also be advantageous to have a 24/7 reading and recording trace (wireless?) of battery voltage and other parameters. This could be done if sufficient funds became available, but there are no plans at this time.

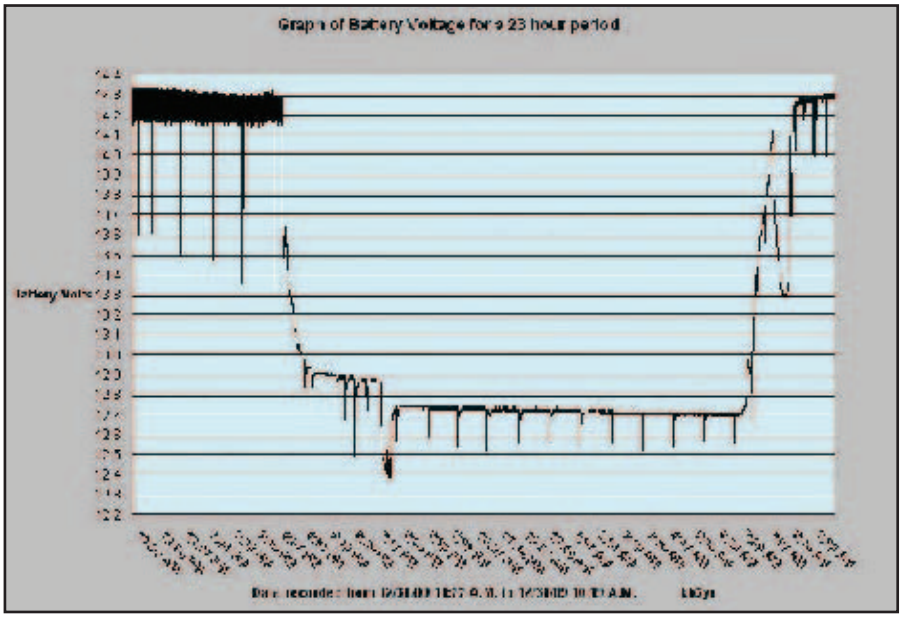


Figure 7 — Plot of battery voltage from Data Tracker taken over 23 hour period from December 30 to December 31, 2009. Graphic display developed by KB3YR.

Acknowledgments

This has been a club project that has involved most of our 30 CPARC members. The authors thank all who participated in fund raising, construction, publicity, purchasing and technical discussions and those who gave encouragement during this adventure.

Notes

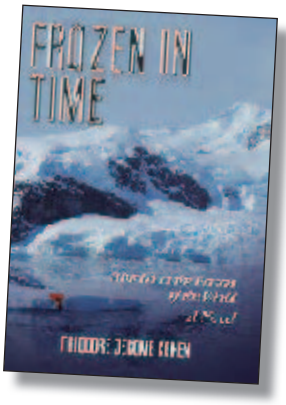
[1]D. Casler, KEØOG, "Solar Power for Your Ham Station," *QST*, Apr 1996, pp 33-37.
[2]**www.qsl.net/va3pla**, solar powered repeater.
[3]**www.polkcounty.org/ham/repeater.htm**, solar powered repeater.
[4]P. McChesney, "Solar Electric Power for Instruments at Remote Sites," **geopubs.wr.usgs.gov/open-file/of00-128/of00-128.pdf,** 2000.
[5]M. Morris, WA6ILQ, "Some Thoughts on Off-The-Grid (Solar, Micro-Hydro or Wind Powered) Repeater Systems," **www.repeater-builder.com/tech-info/some-thoughts-on-solar-power.html**.
[6]J. Schaeffer, Editor, *Solar Living Sourcebook*, 30th Edition, Real Goods, Aug 2007, pp 171-176, 579-580.
[7]**www.ecodirect.com/what-is-a-pwm-charge-controller-s/144.htm**
[8]**www.arrl.org/qst-in-depth**
[9]**www.windsun.com/General/PV-EMI.htm; www.windsun.com/ChargeControls/MPPT.htm**
[10]See Note 8.
[11]**www.windsun.com/Batteries/Battery_FAQ.htm**
[12]**www.oksolar.com/technical**

David Leavenworth, WV6JPL, was first licensed in the early '60s. For a variety of reasons, he was not active for the next 40 years, instead obtaining his degree in electronics and working in the field of optical coatings. Upon retirement and relocation to Tennessee in 2001, Dave picked up the urge again and passed his Amateur Extra class exam in 2008. Dave lives in rural Cumberland County and is off the grid. He uses a combination of solar, wind and diesel (backup) for 100% of his residential power needs. Dave is a member of CPARC, ARRL and ARES, and is a VE. Dave can be reached at **leavenworth@frontiernet.net**.

Peter Tiffany, KT4BW, was first licensed in 1992 after retiring to Tennessee in 1990 with his wife, Linda. Prior to this, Pete had spent 31 years in Michigan working in chemical research and development. He is currently a member of CPARC, ARRL, ARES and SATERN, and is a VE. Radio interests include chasing DX, the digital modes and emergency communications. Shortly after Katrina hit, Pete was part of the ARRL response, operating for the Red Cross in Gulfport, Mississippi. In addition to Amateur Radio, Pete plays euphonium in the local community band and rides his Harley every chance he gets. Pete can be reached at **kt4bw@arrl.net**. QST

New Products

FROZEN IN TIME — A NOVEL BY TED COHEN, N4XX



◊Nearly 50 years ago, Theodore J. (Ted) Cohen, N4XX, spent four months on a small peninsula jutting out of the North Antarctic Peninsula. There, he and another scientist from the University of Wisconsin-Madison conducted geological and geophysical studies throughout the 1961-1962 Austral summer. From time to time in those intervening years, Cohen thought about the many experiences they encountered as they moved among their various work sites on the Peninsula, the nearby offshore islands, and the Chilean bases in the South Shetland Islands...harrowing experiences that almost cost them their lives on several occasions.

The novel *Frozen in Time* chronicles how Cohen (the character Ted Stone in the novel) joined UW-M's Geophysical and Polar Research Center to assist a fellow scientist with collecting rock and fossil samples. Stone also will be conducting his own geophysical studies. Together, they travel to Punta Arenas, Chile, where they join the 16th Chilean Expedition to the Antarctic, which takes them Base Bernardo O'Higgins on the Antarctic Peninsula.

On that expedition are two Chilean Navy non-commissioned officers who robbed the Banco Central de Chile in Talcahuano following The Great Chilean Earthquake of 1960. The valuables they took from safe deposit boxes in the bank now are hidden in a crate that is on its way to Antarctica as well. Once the Expedition has been completed, that crate is to be shipped to the home of a friend of Chilean Army First Sergeant Leonardo Rodríguez, one of the two Navy non-coms assigned to Base O'Higgins for the duration of the Expedition.

When Sergeant Rodríguez fails to return from a seal hunt in the waters around the base, the two Chilean Navy non-commissioned officers become Lieutenant-Commander Cristian Barbudo's prime theft and murder suspects. Fearing he will die, Barbudo reveals the identity of his two suspects to Stone, thereby placing Stone's life in jeopardy. But who can Stone trust with this information, if it comes to that, to see justice done?

This story is a work of fiction based on real events that took place between 1958 and 1965. It is a tale of greed, betrayal, and murder — one in which the reader is given a window into the frozen world at the bottom of the Earth that few people ever will read about, much less experience. *Frozen in Time* is available from the ARRL Bookstore, ARRL order number 0098. Telephone 860-594-0355 or toll free in the US 888-277-5289, **www.arrl.org/shop**, **pubsales@arrl.org**.

ARGENT DATA SYSTEMS SIMPLEX REPEATER

◊The ADS-SR1 from Argent Data Systems is a multifunction voice recorder device that connects to virtually any handheld, base or mobile radio. The ADS-SR1 records incoming transmissions and retransmits them on the same frequency. It's intended for disaster response, home or campground use and any place where radio range needs to be extended without the cost and complexity of a traditional repeater. The ADS-SR1 can be operated in silent mode (repeating transmissions only when requested) to repeat a missed transmission or to check for missed calls. The ADS-SR1 can also be used for voice mail or for a beacon. The unit features 218 seconds total recording time and up to 10 voice announcements with independent timers. The unit features optional Morse code or voice identification and DTMF remote control for all functions. It requires two AA batteries or an external 4-28 V dc supply. Price: $89. For more information or to order, visit **www.argentdata.com**.

A Portable Antenna Mast and Support for Your RV

This antenna support can help you get on the air quickly from your recreational vehicle.

Paul Voorhees, W7PV

One of the big frustrations with setting up antennas in a campground or in the field for contesting is getting the thing up in the air without getting a hernia or needing the help of two other adults and three children who would rather be doing something else.

Since there is something enticing to me about operating in the field, either contesting or just hanging out in a state park, I really wanted something simple and cheap that I could attach to my RV to get my 2 element 20 meter beam up high enough to use it. Most of the commercial products I found were expensive and even more objectionably required guys and supports that were potential hazards to other park users.

A Solution Appears

While eyeballing my RV trying to figure out where to attach some mast supports without drilling a lot of potentially leaky holes, or otherwise attaching something functional but ugly, I noted that the 4 inch square bumper (that most RVs have for storing their plastic sewer hose) would be an almost perfect fit for a piece of 4 × 4 inch fence post. I could then attach my antenna support to the 4 × 4. I had previously purchased several 4 foot sections of surplus fiberglass mast on an Internet auction site. I have seen similar items at several hamfests for just a few dollars per section.

Next I headed for my local hardware store to figure out how to attach the mast sections to the 4 × 4. I took a section of mast along to try to make sure this was a one trip adventure. I did get a weird look after responding to the usual question from the person in the orange apron, "Are you finding everything okay?" My response "I'll know when I see it."

I came away with some ¾ inch diameter galvanized pipe pieces: a mounting flange, a 2 inch nipple, a 12 inch nipple and two double female pipe connectors. The pipe connectors were chosen as they had just the outer diameter I needed for a good fit to the inner diameter of the mast. This all came to about $13. Obviously, if you could find a pipe with the right outer diameter (and a flange to go with it), you could avoid purchasing more pieces. As you can see from Figure 1, the flange is screwed onto the end of a 24 inch 4 × 4, and the pipes and two connectors are attached as shown.

Figure 1 — The flange is screwed onto the end of a 24 inch 4 × 4, as shown.

I recommend drilling some small holes through the connected fiberglass sections to allow a piece of stiff wire, about 4 inches

Figure 2 — View of the mating ends of the fiberglass mast sections. The marking is needed because each joint's locking wire position will be slightly different.

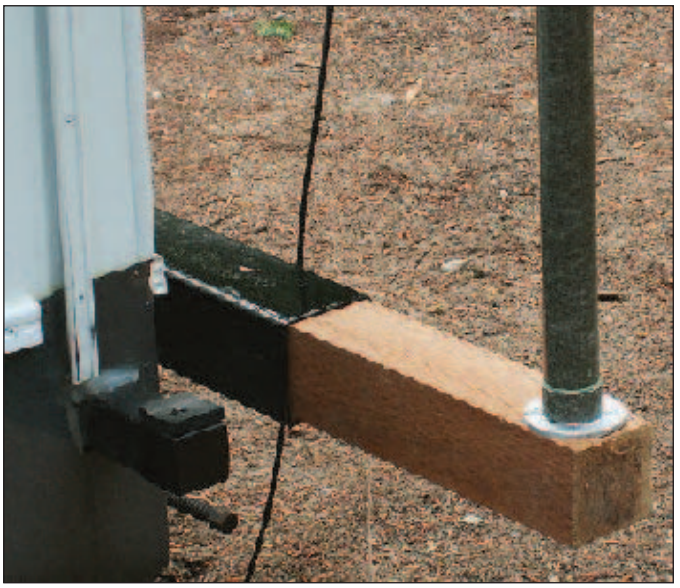


Figure 3 — The 4 × 4 is positioned in the 4 inch square bumper, used for storing the sewer hose. Shims are used to secure it as described in the text.

long, to be fed through and bent over to keep the mast sections together (see Figure 2) while mounting and turning. It's also advisable to dab a couple drops of paint on each connecting pair as shown, using different colors or marks, to make sure the small holes match up for future installations. After disassembly, I just duct taped the wire to the mast sections so it's always there.

To snug the 4 × 4 in the bumper, I added a couple of shims tacked and glued to the bottom. Also, to get the mast properly vertical with the RV level, I similarly shimmed the base of the flange with some scrap sheet metal. The installed mount is shown in Figure 3.

Getting It Up

To get the antenna in the air, I first assemble the beam on a picnic table, attach the coax, and then put the four mast sections together and lock them using the short pieces of wire mentioned earlier. I use a two element Superantenna, but a Spider Beam or other lightweight array could be used. Then the antenna is tilted up off the table and attached to the tapered end of the mast. At this point I can lift the whole thing by grasping the bottom two mast sections. Holding it vertically, I then lift it over the mount on the bumper. With the mast, it only weighs about 16 pounds. The antenna is then about 19 feet off the ground, but if you want to use another mast section to get to about 23 feet, it is likely that a ladder would be needed, or someone standing on the bumper to help steady it while it was lifted into place.

So, for about $25, I have a self supporting mast and base that is light weight, can be erected by one person in just minutes and requires no guys. It easily supports my two element beam, and could probably handle something even larger, or be the center support for a wire antenna. And, to the relief of my wife, once removed it leaves no trace of having ever been there.

If you don't have an RV, you could probably use the same basic approach and screw or bolt the flange to a piece of 2 × 6 inch lumber, and park a car wheel on top of it.

To try out my new creation I headed over to Lake Wenatchee State Park in eastern Washington. I found a campsite with enough area free of trees so I could rotate my beam. I received some signal reports from distant stations at well over S9 on 20 meters with 100 W. It just doesn't get any better!

Photos by the author.

ARRL member and Amateur Extra class operator Paul Voorhees, W7PV, was first licensed in 1963. He has held calls K7YHQ, W7CHF, WØPAB and W7KXM. After 2 years in the military, he spent 31 years as a financial manager with the US government, living in the Seattle/Bremerton area, St Louis, northern Virginia and Albuquerque. Paul retired in 2003 to his current location.

He enjoys travel, grandkids, volunteer work in health care, camping with his travel trailer, and of course, hamming whenever and wherever possible. He has operated from Korea, Johnston Atoll, the Virgin Islands, Western Europe and South Africa. He is currently exploring satellite radio, PSK31 and remote HF operating.

You can reach Paul at 10090 Misery Point Rd NW, Seabeck, WA 98380 or at **ropavo@wavecable.com**. QST

New Products

BHI DSP NOISE CANCELING BASE STATION SPEAKER

♢The Desk Top Noise Away from bhi Ltd includes a 4 inch bass driver and 1 inch tweeter, a DSP noise canceling filter and audio amplifier rated to produce up to 2.5 W RMS output. Intended for base station use, the unit offers up to eight DSP filter levels. The speaker connects to your radio's external speaker or headphone jack (50-500 mW required). Set up and control is via pushbuttons on the front of the speaker grille. The Desk Top Noise Away requires 12-18 V dc at 300 mA. Noise reduction is specified at 9-35 dB and tone reduction at 4-65 dB. Price $230. For more information, or to order, visit the US distributor, W4RT Electronics, at **www.w4rt.com** or GAP Antenna Products, **www.gapantenna.com**.

One Ham's DC Power Connector Preference

Mal explains why he has converted to Anderson Powerpoles for dc connectivity.

Mal Eiselman, NC4L

I love Anderson Powerpoles. You will too after reading this article. Why? Before I answer that, a short disclaimer: I am in no way related to nor do I have any financial interests in the Anderson Company.

As amateurs, we need reliable and low resistance connections for our 12 V equipment. Although there have been many connector types used for this function over the years, my strong preference is now for Anderson Powerpoles. I previously used Molex type connectors for this purpose and will describe here the reasons I decided to move to Powerpoles.

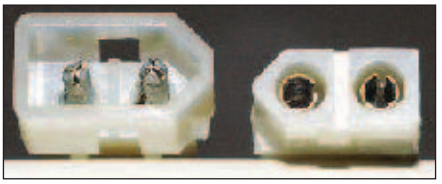


Figure 1 — Molex type connectors. On the right, female pins in a male housing; on the left, male pins in a female housing. The female pins in male housing should be used for supply side connections since they are less likely to short.

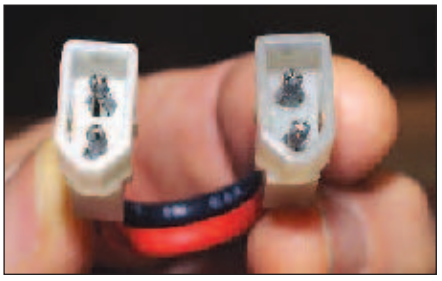


Figure 2 — Molex gender changer — typically used to connect two usual supplies as when charging a battery with a power supply.

Powerpoles are Genderless

If you want to run your 12 V rig from a storage battery, in the Molex system you will have to choose a male or female connector housing for the battery supply cable and the opposite for the radio cable. Note that Molex male housings and male pins are different items — thus there can be four variations of housing and pin gender.

Usually and by convention you will need male connector housings (on the right in Figure 1) for the battery cable plug and female housings on the radio power cord connector. The reasoning there is that pins can short out if stray metal objects contact the exposed pins of the female housing.

In addition you may also want to power the radio from a power supply. Same conventional wisdom here — male housing on the power supply cable (with female pins) and female housing (with male pins) again on the radio cable. So far so good.

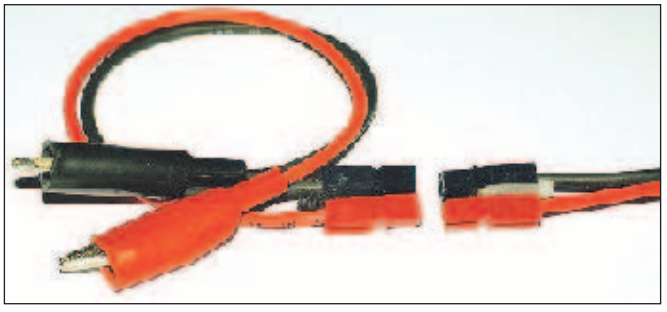


Figure 3 — A pair of disconnected Powerpole connectors. Note that the two connectors are identical, but can be connected together — this is what we mean by genderless connections.

But what happens if you want to use that power supply to charge your battery? A male housing cannot connect to another male connector in the Molex system so you have to construct a two wire cable with female housings and male pins on each end called a gender converter. (See Figure 2.)

You will also probably find a need to have one for male to male and another for female to female housings. Extra gender converting cables are inconvenient, time consuming, costly and add resistance to the circuit. And if you are anything like me, you can never find the converter when you need it. Now comes an unexpected emergency and time is wasted trying to find where you hid the gender adapter. All of this is avoided with genderless connections as everything fits everything else if Powerpoles are used as shown in Figures 3 and 4.

Figure 4 — The connectors from Figure 3 interconnected.

In addition you or your friend might not set up the Molex pins correctly. The proper way is to place the male pins in the female housing and vice versa. Some people place them differently, however. The way shown in Figure 1 is correct. If you look at the RadioShack Web site, and look for Molex connectors they show them wired with female pins in the female housing. None of this can happen with the Powerpole connectors.

That configuration makes a quick connection less likely as the wide metal flange of the female pin can get caught on the plastic male housing. But the real relevance is that when you bring your radio to ARRL Field Day you might find your Molex scheme won't connect to someone else's, not only because of housing incompatibility but due to pin incompatibility as well.

Powerpoles Handle Heavy Current Without Getting Hot

It's always important to use wires sized to radio manufacturers' specifications. As a test, I have run 30 A through #12 AWG wires and 30 A Powerpole pins for extended times with the Powerpoles becoming only minimally warm. Standard Molex pin connectors are rated for 7 A and Tamiya connecting pins at 10 A, and they both get hot if operated at their rated current.

By the way, and let me emphasize this: Tamiya pins and not Molex pins are used in the six slot plugs on 12 V power connectors on some Amateur Radio transceivers. Be aware that female Molex pins are of slightly wider diameter than Tamiya pins, so using those on the plug end of power cords to

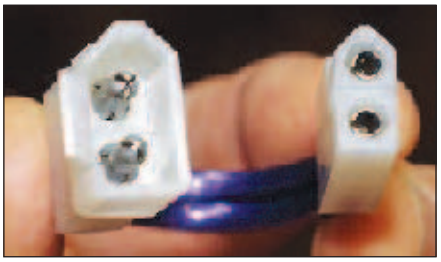


Figure 5 — Comparison of 20 A (on left) and 7 A Molex connectors. While appearing similar, they cannot be connected.

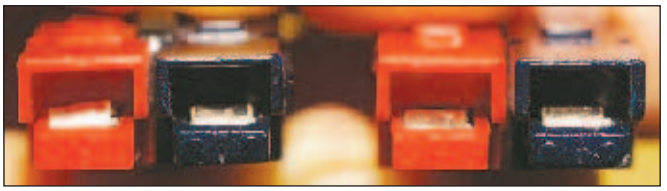


Figure 6 — Standard orientation of Powerpole connectors.

power a ham radio will cause intermittent loss of power as the fit is not tight. If you have replaced the factory Tamiya with Molex pins, reach around to the power connector while the radio is on and wiggle the plug. If you see a flickering of the display replace the pins with the correct Tamiya pins to avoid problems. Those are available at any hobby store and are inexpensive. The Molex pin connectors are routinely sold at hamfests as replacements or to make spare plugs. The substitution is not satisfactory in most cases.

Bright Colors Make Polarity Identification Easy

I love the colors of Powerpole connectors. The colors make it easy to identify the polarity of the wire from the connector housing, assuming it was set up properly when the connector was first made. It's easy — red always goes to red and black to black. (See Figure 3.) The physical size of the Powerpole connector is the same as the standard 7 A Molex connector but carries at least four times the current. They are also significantly smaller than the 20 A Molex and still they handle about twice the current of those larger types. In addition, if you use large and smaller Molex connectors they will not match up with one another. That means that you not only need gender changers for both sizes but size adapters as well. That makes for a waste of time and funds in purchasing extra connectors and in making up the extra cables (see Figure 5).

All of that is not necessary in the Anderson system. I hope you are starting to see why I love Anderson Powerpoles.

Orientation

If you orient the connectors properly in relation to the wire with red (positive) on the left and black (negative) on the right looking into the ends of the connector with the metal contacts at the bottom — they cannot be connected improperly. That is the orientation that I have seen on several Internet sites and seems to be the conventional standard (see Figure 6).

Comparison of Contact Material

The materials and construction are much better for the Powerpole pins. Molex pins are thin gauge tin plated steel while the Powerpole connectors are twice as thick and are silver plated solid copper (see Figures 7 and 8).

If you look up the resistivity of metals you will find that silver and copper have much less resistance than tin or steel. The lower resistivity plus the extra thickness of the Powerpole pins is why they are able to carry higher current. They easily handle 30 A, and in fact even more depending on the wire gauge as heavier wire draws the heat away and acts like a heat sink. Some of the people at Anderson feel that the 30 A Anderson connectors can handle 40 A or more. I have done exactly that and it will work but the connector does become unpleasantly hot.

Figure 7 — End view of pin wire attachment mechanism of Powerpole (left) and Molex (right) connector pins. Note the additional thickness of the Powerpole connectors.

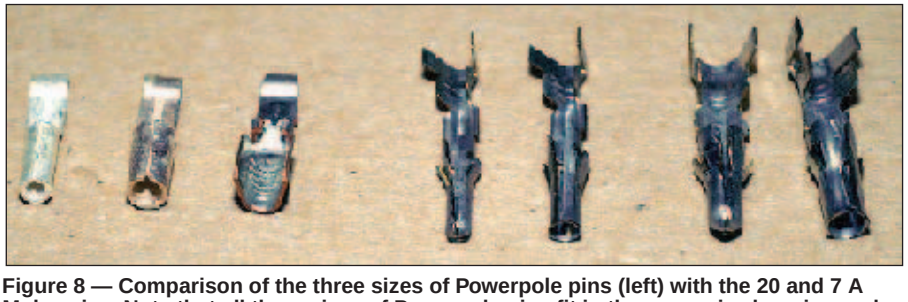


Figure 8 — Comparison of the three sizes of Powerpole pins (left) with the 20 and 7 A Molex pins. Note that all three sizes of Powerpole pins fit in the same size housing and that they can be interconnected.

Three Size Pins all Fit the Same Plastic Housings

Powerpole connectors that fit the regular size plastic housings used in 12 V amateur service come in three ratings. They are different only in the crimp or back part of the pin with the smallest rating at 15 A, the mid size at 30 A and the largest at 45 A ratings. Therefore they will mate perfectly with any of the other pin sizes. Externally you cannot see a difference when a Powerpole connector is hooked up. Figure 8 shows the relative sizes.

And in Closing

The cost of a Molex connector with two pins and housing is $1.99 at RadioShack for either the 7 A or 20 A versions. Anderson Powerpoles are usually around a dollar for two of the 15, 30 or 45 A pins with one red and one black interlocking plug housings.

Note that if you are part of an EmComm group that has adopted a connector standard, it makes sense to use whatever connector series the group has adopted for any gear that might be deployed in an emergency. If your group doesn't have a standard, by all means help them decide to adopt one. Many groups have standardized on Powerpoles and I suggest you consider them for your group.

I have written this article because it was my prior incorrect opinion and assumption that these pretty little red and black connectors offered no advantages. I now know differently and wanted to share this with you.

Photos by the author.

ARRL member Mal Eiselman, NC4L, has been licensed since 1961 and has been a member of the ARRL for the past 30 years. He currently holds an Amateur Extra class license. He is a trained cardiologist who practiced in Hollywood, Florida for 30 years before retiring in 2003. His Amateur Radio interests include keeping in contact with old friends as well as making new friends on the air on a daily basis. His second interest is making electronic things work better. You can reach the author at 3650 N 55th Ave, Hollywood, FL 33021 or at **NC4LMal@aol.com**. *Visit his Web site at* **www.w8kvk.com.nc4l**.

Attic Antenna Experiments

Outside antennas are recommended, but attic antennas can work, too.

Max E. Norman, W2IQE

My move to a retirement community with restrictive covenants 7 years ago presented me with problems in continuing a long Amateur Radio career. Some research into indoor antennas in *The ARRL Antenna Book* provided encouragement about their use and since this house has easy attic access, I thought I'd give an attic antenna a try.[1] I decided to go with a 40 through 10 meter trap dipole.

The First Indoor Antenna

The traps were constructed based on details from a *QST* article using PVC tubing and coax.[2,3] A grid dip meter was used to check the resonance of each trap. The length of the antenna when finished was 39 feet. It was mounted in the attic at about 15 feet above ground at the center with the ends at roughly 13 feet. The antenna performed well although running low power (QRP) with an indoor antenna requires patience. In addition to many stateside contacts, the antenna performed well into Central and South America. The only downside of the trap antenna was its limited VSWR frequency range on each band.

Solving the SWR Problem

Recently MFJ introduced the MFJ-927 Remote Automatic Antenna Tuner.[4] This tuner looked like the perfect candidate for feeding a remotely tuned multiband attic antenna. A big advantage of this autotuner is that no cabling, other than the coax feed line, is required since the coax is used to supply 12 V power to the unit.

Using the house construction drawing, I determined that a center fed 40 meter dipole could be installed though the open truss bays from the center of the house to the front corner and to the opposite rear corner. While the trap antenna could work well with the tuner, a center fed 40 meter size dipole would provide additional gain on higher frequencies and be more efficient. As you can see from the layout drawing (Figure 1), the roof truss vertical supports required the use of several intermediate insulators (made from Plexiglas) as well as a few others to insure better clearance. The antenna is about 20 feet above ground at the center and approximately 11 feet at the ends.

The tuner is mounted on one of the vertical truss supports near the center of the antenna with 7 feet of open wire line from the tuner to the antenna. Since the output of the tuner is unbalanced, a 1:1 balun was installed at the tuner output to provide a balanced output to the feed line.

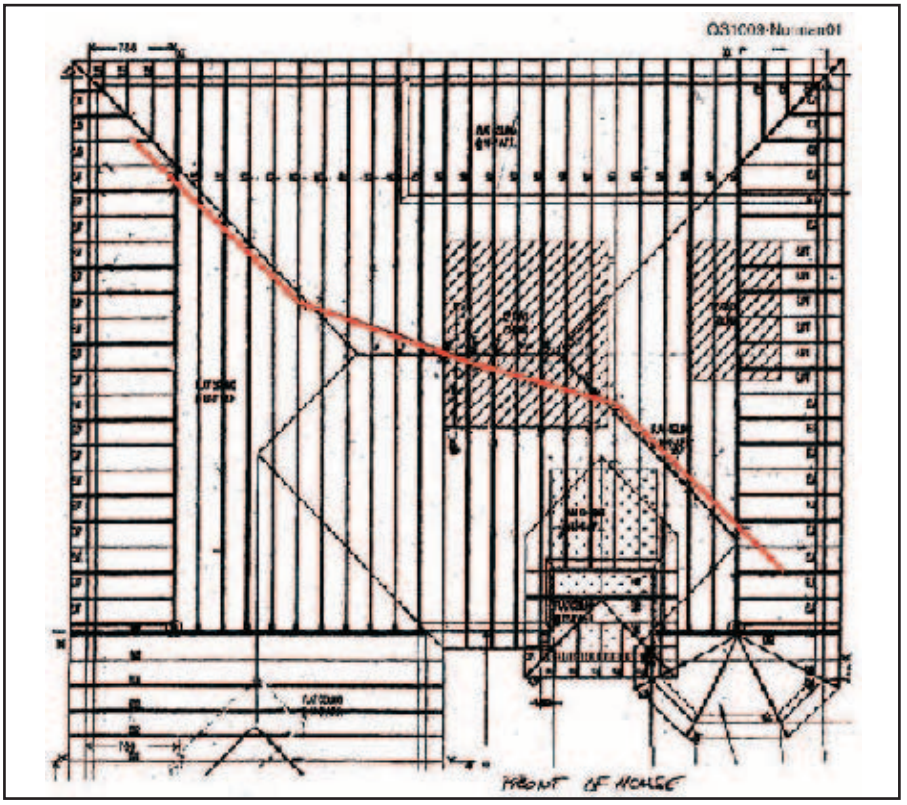


Figure 1 — Attic construction drawings provide a road map to obstructions as well as antenna support possibilities.

The Results are In

The auto tuner tunes the antenna to a 1:1 VSWR across all amateur bands from 40 meters though 10 meters. Running 10 W to the antenna on 40 meters, a contact (QSO) was made with CM3GW in Cuba despite the extremely noisy conditions in Florida at night. That same evening, another 40 meter QSO was made with DK3FW near Hanover, Germany.

The antenna performs very well on 40 meters. Unfortunately, propagation on 20 meters and higher bands has been very poor preventing a realistic antenna evaluation. Hopefully, this will change in the near future as propagation improves.

The bottom line is that if you're faced with not being able to erect an outside antenna, consider experimenting with an attic antenna. You might be pleasantly surprised.[5]

Notes

[1]R. D. Straw, Editor, *The ARRL Antenna Book*, 21st Edition. Available from your ARRL dealer or the ARRL Bookstore, ARRL order no. 9876. Telephone 860-594-0355, or toll-free in the US 888-277-5289; **www.arrl.org/shop**; **pubsales@arrl.org**.

[2]R. Sommer, W4UU, "Optimizing Coaxial-Cable Antenna Traps," *QST*, Dec 1984, pp 37-42.

[3]R. Johns, W3JIP, "Coaxial Cable Antenna Traps," *QST*, May 1981, pp 15-17.

[4]**www.mfjenterprises.com**

[5]Note that an inside antenna often results in transmitted RF in proximity to people and animals. Be sure to perform a careful RF Safety assessment as required by the FCC. While low power HF operation generally does not require a detailed assessment, in cases such as this it should be performed to verify compliance.

ARRL Life Member Max Norman, W2IQE, was first licensed as WØUJE in 1948 and now holds an Amateur Extra class license. Max received a BSEE degree from Iowa State College and has attended graduate school at St Louis and Columbia Universities. Max is now retired.

You can reach Max at 4624 Turnberry Ln, Lake Wales, FL 33859 or at **w2iqe@aol.com**.

Yaesu FT-2900R 2 Meter FM Transceiver

Reviewed by Howard Robins, W1HSR
ARRL Contributing Editor

The FT-2900R is very similar to the FT-2800M and replaces it in the Yaesu Amateur Radio product lineup.[1] At first glance the most significant difference is increased high power from 65 to 75 W. On the front panel, the positions of the POWER and WIRES buttons have been swapped, the stenciling on some of the other buttons has changed and the front panel lines are a bit smoother. When I compared the manuals for both radios, however, I discovered that the FT-2900R manual had 30 more pages. So, there is a bit more to the new rig that is not so obvious and some neat features have been added.

Physical Description

As with other Yaesu mobile transceivers, the FT-2900R is built on a massive cast aluminum heat sink and does not use a cooling fan. There is nothing dainty about this radio, and I would bet that it could be driven over and never skip a beat. Normally, I would be cautious not to drop a delicate instrument for fear of damaging it. If I dropped the FT-2900R on my ceramic tile floor, I think the floor would be the loser. I have been using an FT-2800M to send APRS weather beacons every 10 minutes for more than two years and it keeps on going. These are very rugged radios.

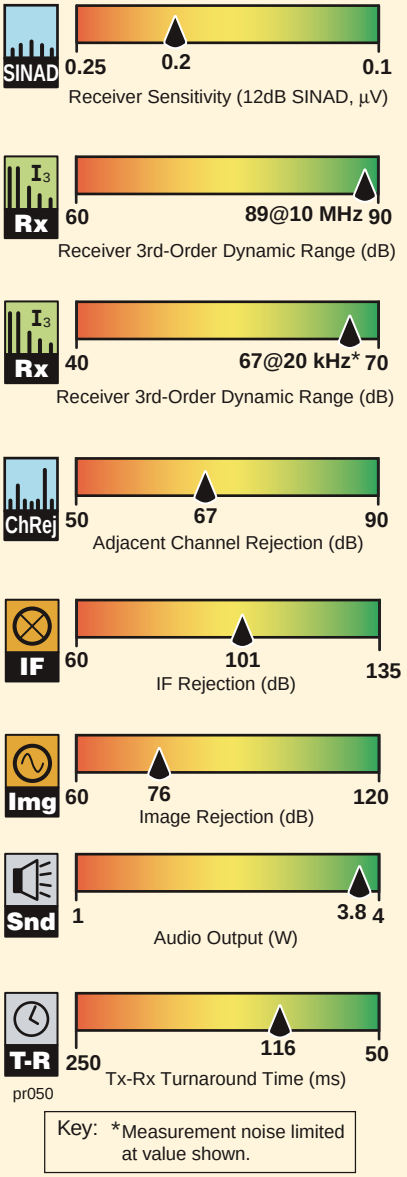
The front panel has a large six digit liquid crystal display (LCD) with controllable backlighting. There are three knobs — VOLUME and SQUELCH on the left and the MAIN TUNING dial on the right. Six push buttons — POWER, WIRES/LOCK, SET/MHz, DW/REVERSE, A/N/LOW and MW/D/MR are below the display. It's obvious what several of these controls are used for. I will explain the less obvious ones in this review by example. I have used radios with more cryptic labeling.

The rear panel SO-239 RF connector is recessed and partly shrouded by an extended part of the cast aluminum body. The external speaker jack is recessed in the lower left corner next to the power pigtail. Note that there is no data port on this radio. You would need to use the external speaker and mic jacks to interface with your TNC or other data device and adjust the squelch and volume levels accordingly.

There is a bottom-firing internal speaker that sounds crisp and loud enough to me. Lab testing showed plenty of audio output — nearly 4 W. The mic is the MH-48 with keypad that comes packed with most new Yaesu VHF radios. This mic permits users to safely control many of the FT-2900R's features and functions and uses an RJ-45 connector.

[1]J. Carcia, NJ1Q, "Yaesu FT-2800M 2-Meter FM Transceiver," Product Review, *QST*, Jun 2003, pp 63-65. Past *QST* reviews are available to ARRL members at **www.arrl.org/product-review**.

Key Measurements Summary



Bottom Line

Sturdy and powerful, the FT-2900R has all of the features we've come to expect in a 2 meter transceiver and adds some useful new ones.

Mark J. Wilson, K1RO ♦ Product Review Editor ♦ k1ro@arrl.org

Programming

Yaesu offers an optional USB cable and *Windows* software for programming channels and settings on this radio (part number ADMS-2900). I did not use this software, but if you plan to load up the radio's 200 memory channels or change them frequently, you might consider it.

I found that after about five minutes of self training, manual programming is fairly simple. It took about 10 minutes to program 10 channels with repeater parameters — receive frequency (split is automatic), tone frequency, tone type and channel name.

Step one is to repeatedly press the MW/D/MR button until VFO is displayed on the LCD. Then turn the frequency knob or use the microphone keypad to enter the receive frequency.

Next, pressing the SET/MHz button for a second brings up an alphabetically ordered and numbered menu of settings (menu mode). Use the large knob to scroll through the menu items until TN FRQ (tone frequency) is displayed. Press the SET/MHz button to select this item, turn the large knob to scroll to the appropriate subaudible tone and press the SET/MHz button again to set the selection. The tone frequency is now set.

To set the tone type, while still in the menu mode turn the large knob to SQL.TYP. Press SET/MHz, select TONE from among TONE/TSQL/DCS/RV TN/OFF and press SET/MHz again. This last action displays a T on the LCD, indicating that TONE is on. Pressing and holding SET/MHz again exits the menu mode.

At this point, all the repeater parameters are set in the VFO buffer. Press and hold the MW/D/MR button to get into the memory storage mode. The next available channel number blinks on the LCD. Press and hold the MW/D/MR button again to write the contents of the VFO buffer into the memory channel. You could select a different channel to write to by turning the large knob.

Next, enter a name for the memory channel. Repeatedly press the MW/D/MR button until MR is displayed on the LCD, indicating that the radio is in memory read mode. While in this mode, press the SET/MHz button, and scroll to NM SET, press the SET/MHz button again to enter a channel name one letter at a time. Turn the large knob to scroll through the character set. Press the SET/MHz button to set each character. Press and hold SET/MHz again to exit the menu mode. Although this procedure may sound tedious, it's easier to do than describe — and easier yet with the optional software.

This example should give you a good sense of what's required to set up the many features in this radio. Menu mode operation is fundamentally consistent, and the method to turn on and customize features is the same. However, some buttons on the FT-2900R are used differently depending upon feature, so the owner's manual may become your best friend.

Table 1

Yaesu FT-2900R, serial number 9I041737

Manufacturer's Specifications	Measured in ARRL Lab
Frequency coverage: Receive, 136-174 MHz; transmit, 144-148 MHz.	Receive and transmit, as specified.
Modes: FM, NFM.	As specified.
Power requirements: Receive: <700 mA, <300 mA (standby); transmit, 15, 9, 5, 4 A (high, low 3, low 2, low 1) at 13.8 V dc ±15%.	Receive, 760 mA (max volume, max lights, no signal); standby, 160 mA (no lights). Transmit, 14, 8.9, 5.5, 4.3 A (high, low 3, low 2, low 1).
Receiver	**Receiver Dynamic Testing**
FM sensitivity: 12 dB SINAD, <0.4 µV.	For 12 dB SINAD, 0.2 µV; 0.2 µV at 138 MHz, 0.21 µV at 162 MHz.
FM two-tone, third-order IMD dynamic range: Not specified.	20 kHz offset: 67 dB*; 10 MHz offset: 89 dB.
FM two-tone, second-order IMD dynamic range: Not specified.	146 MHz, 92 dB.
Adjacent-channel rejection: Not specified.	20 kHz offset: 67 dB.
Spurious response: Not specified.	IF rejection, 101 dB; image rejection, 76 dB.
Squelch sensitivity: Not specified.	At threshold, 0.07 µV; 0.27 µV max.
S meter sensitivity: Not specified.	4.2 µV at full scale.
Audio output: 3 W at 10% THD into 4 Ω.	3.8 W at 10% THD into 4 Ω; THD at 1 V RMS, 1.5 %.
Transmitter	**Transmitter Dynamic Testing**
Power output: 75, 30, 10, 5 W (high, low 3, low 2, low 1) at 13.8 V dc ±15%.	71.4, 27.4, 7.7, 3.8 W (high, low 3, low 2, low 1); 69.7 W at 11.4 V dc.
Spurious signal and harmonic suppression: >60 dB.	>70 dB, meets FCC requirements.
Transmit-receive turnaround time (PTT release to 50% of full audio output): Not specified.	Squelch on, S9 signal, 116 ms.
Receive-transmit turnaround time ("tx delay"): Not specified.	132 ms.
Size (height, width, depth): 1.6 × 5.5 × 5.7 inches; weight, 2.6 pounds.	
Price: FT-2900R, $160; ADMS-2900 programming software/cable, $50.	

*Measurement was noise limited.

New Features

The FT-2900R includes several new features shared with the latest generation of Yaesu VHF/UHF FM transceivers. A few are proprietary to Yaesu, which may make them useful only if your friends have compatible radios.

Enhanced Paging and Code Squelch (EPCS)

EPCS uses a dedicated microprocessor and paging memory to provide paging and selective calling features. Two CTCSS (continuous tone coded squelch system) tone pairs are used — one pair for sending and another for receiving. A tone pair is sent to the receiving station when paging. If the tone pair matches those stored in the receiving radio, its squelch will open. You could use the same tones in several radios for closed group calling or unique tone pairs to page individual radios. This coded squelch system could be used to keep your radio quiet until calls directed only to you are received. While the radio is squelched, you cannot hear activity on frequency. So, before initiating a page, listen to make sure the frequency is not in use. This feature can be used to make a bell ringing sound when your tone pair is decoded. The number of rings is settable.

EPCS settings can be saved to individual memory channels, so once programmed, it is pretty simple to use this feature when you want to. For public service activities you could have different transmit tone pairs on different channels (with all other settings the same) to page different groups or individuals participating in your activity.

Memory Bank Operation

This feature lets you group channels that are not necessarily sequential. For example, I have my programmed channels 5, 11 and 13 assigned to bank 1. There are eight banks available, and the same channels can be as-

signed to as many banks as you need. With 200 channels this feature could come in handy, especially if you are on the road and want to group your channels by areas that you travel. You can use this feature to manually select channels within the bank or to scan just the selected bank channels. Banks can be selectively linked for scanning. This is a pretty flexible radio.

Automatic Range Transponder System (ARTS)

The ARTS feature uses DCS (digital coded squelch) signaling to alert parties with this capability that they are within simplex communication range of each other. When activated, a DCS code is transmitted for 1 second every 25 seconds (or optionally, every 15 seconds), or when the PTT is pushed. Other radios with this feature activated and within range can sound an audible beep (if enabled) and display IN RNG on the LCD.

If out of range, OUT RNG will be displayed and polling signals will continue until the ARTS feature is deactivated. Three beeps will sound if you go out of range for more than one minute and OUT RNG will be displayed. After the radios are back in range, normal beeps return and IN RNG is again displayed. You can even set this radio up to send your call sign in CW every 10 minutes to assure compliance with identification requirements. While the ARTS feature is active, other functions are locked to prevent inadvertent changes and loss of contact.

Weather Band/Weather Alert

The weather alert scan monitors for NOAA's 1050 Hz tone alert — this can be optioned on or off. After turning this feature on, the weather broadcast channels are checked for activity every five seconds. I can set the FT-2900R to scan a memory bank to monitor those frequencies, while also having the weather broadcast bank scanned every five seconds. All scanning can be observed on the LCD, including the excursions to the weather memory bank. I observed that even though there may be activity on a weather channel — indicated by a full scale S-meter reading — without the alert tone, scanning does not stop.

The FT-2900R also includes password protection, busy channel lock-out, a CW training feature and WiRES (Wide-Coverage Internet Repeater Enhancement System) capability. These features were described in the May 2010 review of the FT-1900R.[2]

The Owner's Manual

I own radios from most of the manufacturers and have reviewed a few others, so I have read through many different manuals. The FT-2900R has some typical and not so typical capabilities, and I found its manual to be very well written and illustrated. It does a great job of explaining how the features could be used, and how to activate and deactivate and set options for them.

The FT-2900R is a fine heavy duty 2 meter radio with lots of power and some very nice features. I particularly like the memory bank, password protection and weather alert features and would use them routinely. Some of the features, EPCS and ARTS for example, would be useful in specialized applications.

Manufacturer: Vertex Standard, 10900 Walker St, Cypress, CA 90630; tel 714-827-7600; **www.yaesu.com**.

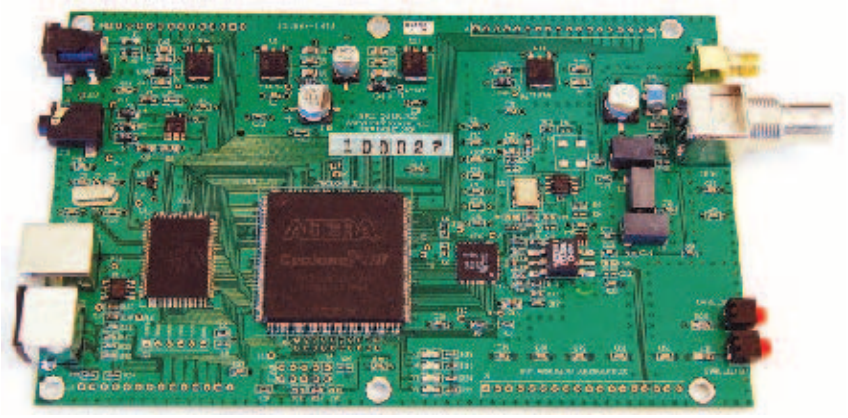
[2]S. Ford, WB8IMY, "Yaesu FT-1900R 2 Meter FM Transceiver," Product Review, *QST*, May 2010, pp 47-49.

SRL QS1R Software Defined Receiver

Reviewed by Martin S. Ewing, AA6E
ARRL Laboratory

Small software defined radio (SDR) receivers are developing into an Amateur Radio industry category. The QS1R "Quicksilver" radio (Revision D); from Phillip Covington, N8VB, of Software Radio Laboratory, is one of the latest and most powerful. *QST* has previously reviewed the Microtelecom Perseus, the RFSpace SDR-IQ, and the more specialized Telepost LP-PAN Panadapter.[1-3] If you combine most of these SDR radios with a personal computer and the right software, you have a complete general coverage communications receiver with "panoramic" spectrum display.

The QS1R supports a wide range of applications, from amateur and SWL listening, to interference diagnosis and laboratory measurements. It features wide instantaneous bandwidth and a very flexible signal processing scheme built around a large field programmable gate array (FPGA).



Hardware

When you purchase the QS1R, you receive a small black box, a USB cable, an optional 5 V wall mount supply, a short list of instructions and that's it for your hefty investment. The picture improves if you look at the product Web site (**qs1r.wikispaces.com**) and Internet support group (**groups.yahoo.com/group/qs1r/**). Download the software (*QS1RServer* and *SDRMAX-II*, discussed below), load up your PC and you're in business. The instructions are a bit minimal, but if you have middling computer or SDR experience, there should be no trouble. If you are SDR challenged, you will get a lot of patient help through the Internet support group. Still, more complete new user documentation would be welcome.

Inside the box, the QS1R is a single PC

Bottom Line

The Quicksilver QS1R software defined receiver offers a number of interesting advanced possibilities in addition to use as a flexible general coverage receiver.

[1]S. Ford, WB8IMY, "Microtelecom Perseus Software Defined Receiver," Product Review, *QST*, Dec 2008, pp 40-44. *QST* Product Reviews are available to ARRL members at **www.arrl.org/product-review**.
[2]S. Ford, WB8IMY, "RFSpace SDR-IQ Software Defined Receiver," Product Review, *QST*, Feb 2010, pp 49-51.
[3]J. Hallas, W1ZR, "TelePost LP-PAN Software Defined IQ Panadapter," Product Review, *QST*, Feb 2009, pp 45-47.

Table 2

Software Radio Laboratory QS1R, Rev D, serial number 100027

Manufacturer's Specifications	*Measured in the ARRL Lab*
Frequency coverage: 10 kHz-62.5 MHz	As specified.
Power requirement: 5-6 V dc, 1A.	At 6 V dc, 900 mA (minimum volume); 910 mA (maximum volume).*
Modes of operation: SSB, DSB, CW, AM, SAM, FM, WFM.	As specified.
Receiver	***Receiver Dynamic Testing***
Sensitivity: 0.63 µV SSB at 10 dB (S+N)/N.	Noise floor (MDS), 500 Hz filter: 0.137 MHz –114 dBm 0.505 MHz –117 dBm 1.0 MHz –117 dBm 3.5 MHz –118 dBm 14 MHz –118 dBm 50 MHz –118 dBm
Noise figure: Not specified.	14 MHz, 29 dB
AM sensitivity: Not specified.	10 dB (S+N)/N, 1 kHz tone, 30% modulation, 6 kHz bandwidth: 1.0 MHz 8.13 µV 3.8 MHz 7.08 µV 50 MHz 8.80 µV
FM sensitivity: Not specified.	For 12 dB SINAD: 29 MHz 2.51 µV 52 MHz 3.09 µV
Spectral display sensitivity Not specified.	–123 dBm.
Blocking gain compression: Not specified.	Gain compression, 500 Hz bandwidth:** *20 kHz offset* *5/2 kHz offset* 3.5 MHz 122 dB 122/122 dB 14 MHz 122 dB 122/122 dB 50 MHz 122 dB 122/122 dB
Reciprocal mixing (500 Hz BW): Not specified.	20/5/2 kHz offset: better than 122 dBc.†
FM two-tone, third-order IMD dynamic range: Not specified.	20 kHz offset: 29 MHz, 56 dB; 52 MHz, 57 dB.
Spurious free dynamic range: 112 dB.	100 dB.
S-meter sensitivity: Not specified.	S9 signal at 14.2 MHz: 50.1 µV.
Squelch sensitivity: Not specified.	29 and 52 MHz, 0.6 µV.
IF/audio response: Not specified.	Range at –6 dB points (bandwidth):‡ CW (500 Hz filter): 302-800 Hz (498 Hz). Equivalent Rectangular BW: 481 Hz. USB (2.4 kHz filter): 73-2384, 2311 Hz. LSB (2.4 kHz filter): 73-2383, 2310 Hz. AM: (6 kHz): 72-2809 (one sideband; 5474 Hz for both sidebands).

Size (height, width, depth): 2.0 × 4.1 × 6.4 inches; weight, 14.1 ounces.

Price: QS1R receiver, $999.99; power supply, $19.99.

*Depends on amount of processing in use; 1.5 A when used with *Skimmer Server* software.
**Blocking level exceeds the threshold of ADC clipping.
†No reciprocal mixing occurred up to ADC clipping (+4 dBm).
‡Adjustable with DSP.

board as shown in the lead photo. The external connections include a BNC antenna jack, an SMA jack for optional external clock, a USB jack, audio output and a 5 V power jack. An 8-pin DIN jack provides I/O connections for planned additional devices, to include a front end amplifier/pre-selector and a transmitter module.

The QS1R board has only three major ICs — a 16-bit 130 megasample per second (MSPS) analog to digital converter (ADC), a Cyclone III FPGA and a microcontroller. The controller and FPGA are initialized at power up by the *QS1RServer* program running on your PC.

At the board level, the QS1R has several interesting features you can use to go beyond basic ham applications. With a minor board modification, you can clock the ADC, which normally runs at 125 MHz, from an external source at any frequency between 1 and 130 MHz. This lets you sync the receiver to an external frequency standard if you need high accuracy or stability. Even with the standard internal clock, a software adjustment allows you to precisely zero beat WWV or other frequency standard.

Frequency Aliasing

When an SDR samples the input at 125 MHz, you would want a low pass filter at the radio's input to reject any signal above about 62.5 MHz, the Nyquist frequency.[4] Without the filter, any signal above 62.5 MHz will be aliased into the 0-62.5 MHz "baseband." The ADC operates like a mixer with a local oscillator (LO) at 125 MHz and harmonics of 125 MHz.

The QS1R's input low pass filter is relatively flat up to 62 MHz and falls off by 20 dB at about 75 MHz. The good news is that you can receive signals up to 62.5 MHz with full sensitivity. The bad news is that signals (and noise) at a frequency, f, between 62.5 MHz and 125 MHz, may be visible at an apparent frequency 125 – f MHz. For example, the FM broadcast band limits 88 and 108 MHz alias to 37 and 17 MHz, respectively. At the ARRL Lab, we verified that many strong local FM stations were clearly received in the 17 to 37 MHz range when we connected to a GAP Titan vertical antenna. They were attenuated but might cause you problems above 18 MHz.

Frequency aliasing can be used to your advantage, but you may have to provide your own bandpass filter. You can make a small board modification that bypasses the input filter and lets you receive up to 300 MHz or higher in segments of 62.5 MHz. The *SDRMAX-II* software supports this "undersampling" mode and provides the right frequency scale readings.

This receiver provides the demodulated audio on a stereo phone jack, suitable for headphone listening or passing to your PC's soundcard input. Getting your audio this way (instead of over the USB connection to your PC) gives you flexibility and minimal time delay, but it complicates the picture if you want to use the receiver remotely over a LAN. You would have to find a way to transmit the audio separately from the data channel.

The QS1R always samples the entire band from 10 kHz to 62 MHz, and you can display a chunk of spectrum as small as 40 kHz or as wide as 20 MHz. After filtering in the FPGA, a digital output stream of up to 4 MSPS is output from the receiver to your PC.

Software

Two separate programs run on your PC to support the receiver. *QS1RServer* talks with the receiver hardware, and loads the receiver's microcontroller and FPGA

[4]The Nyquist frequency (half the sampling rate) is the highest signal frequency that can be accepted without aliasing. See **en.wikipedia.org/wiki/Nyquist_frequency**.

The QS1R, Contesters and Skimmer Server

Pete Smith, N4ZR

I suppose there may still be some active Amateur Radio operators who haven't heard of *CW Skimmer*, the amazing, somewhat controversial software written by Alex Shovkoplyas,VE3NEA (**www.dxatlas.com**). It decodes all the CW signals across a wide slice of a band, decides which ones are CQing and which are answering CQs, and can, if asked, offer "spots" via Telnet and the Internet. DXers use it to find DX on a band, and to figure out where to call in big pile-ups by tracking the successful callers. Contesters use it like traditional "packet clusters" to find people to work and to catch band openings.

The QS1R, with its open software architecture, offered Alex a tempting challenge. Instead of listening to one band at a time, could the radio be reprogrammed to listen to many bands simultaneously? Well, it could, and he did. The result was *Skimmer Server*, software that offers *Skimmer*-style decoding on up to seven bands at once, and up to 192 kHz per band. As a result, the QS1R/*Skimmer Server* combination has captured the attention of contesters and DXers worldwide.

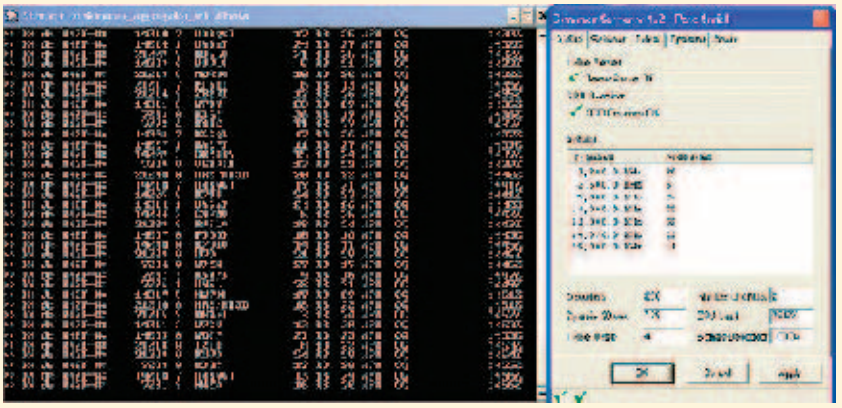


Figure A — The Skimmer Server provides a wealth of information about received stations. Information about software and computer parameters is displayed on the right.

Reverse Beacon Network

I use my *Skimmer Server*/QS1R combination both as a stand-alone Telnet server, open to anyone who wishes to log on, and also to contribute to the Reverse Beacon Network (RBN), a worldwide network of *Skimmer* and *Skimmer Server* receiving stations (**reversebeacon.net**). The RBN collects Telnet spots from each connected receiver and passes them to the server, where they are displayed on a constantly changing world map and also archived for future analysis. The amount of information collected is quite spectacular — for example, in the 24 hours of the Russian DX Contest, the RBN collected over 545,000 spots from 34 "reverse beacons" on four continents.

So what? To begin with, you can find out what stations or countries have been spotted by the network, when and on what frequencies — like a constantly revised real-time DX bulletin. Thanks to Rick Walker, K4TD, spots from the RBN are also available at **telnet.reversebeacon.net**, port 7000. You can filter the spot stream you receive, just as with a DX Cluster node — only there are many more spots.

In addition, a group led by Felipe Ceglia, PY1NB, is hard at work developing other new ways to use the RBN"s prodigious spot database. The first of these is an online *Spot Analysis Tool*, written by Nick Sinanis, F5VIH/SV3SJ. Tell it a date, the call signs of several stations to compare and a reverse beacon's call sign, and it will quickly display comparative graphs of the stations' signal strength (relative to local noise) on every band. Although fading and interference can invalidate any single comparison, the graphs clearly portray comparative performance — you can use the data for bragging rights, or to plan improvements for "the next time."

Using the Software

Back to *Skimmer Server*. In Figure A, the left hand "pane" is the aggregator, displaying the spots that my station heard and reported (on a simple vertical) in the few minutes before the screen shot was taken. The right-hand "pane" is the *Skimmer Server* control panel, which I usually keep on the STATUS tab, to tell me how it's doing in real time. In order to reduce load on the host computer, the *Skimmer Server* normally operates almost invisibly, as a simple icon in the *Windows* System Tray, but you can pop this window up to keep track of what it is doing and to change settings if you wish.

You'll note that the control panel tells me that both the Telnet server and the link to the QS1R are working normally, and also how many decoders are currently operating on each band. It reports how much computer power is being used (this was on a relatively quiet Monday morning at 96 kHz bandwidth on seven bands), and other parameters of interest. By the way, the computer on which I'm running *Skimmer Server* is a relatively basic dual-core Pentium, much slower than the cheapest computers currently on the market from major manufacturers. A quad-core Godzilla is not required.

Why are contesters so interested? Well, *Skimmer Server* spots have some unique advantages over spots from traditional DX clusters. If you connect to a *Skimmer Server* relatively close to you, you will be able to hear everything it can. It spots everything, not just rare stations, which makes it ideal for contesting, though it can occasionally get confused about which stations are CQing (*running* in contest parlance). The frequency calibration is consistent, so that all stations are heard at roughly the same pitch as you jump up or down the bandmap, and copy accuracy is at least as good as the DX cluster average. And finally, connecting to a *Skimmer Server* off-site is an ideal solution for multioperator stations, avoiding the complex engineering required if a *CW Skimmer* were used in that RF-loaded environment.

The *Skimmer Server* software is part of the *CW Skimmer* package, available for download from Afreet Software (**www.dxatlas.com**). The package can be tried free for 30 days and costs $75 to register for continued use thereafter.

Figure 1 — The *SDRMAX-II* software with *QS1RServer* behind.

configuration. It also detects the desired audio channel. The *SDRMAX-II* program is the one you work with directly with through its complex graphical interface. The two programs talk to each other using TCP/IP protocols. You normally run both of them in the same PC, but you can place them in separate computers on a LAN — and across the Internet, if your connection is fast enough. (I measured a typical data rate of 333 kbit/s between the programs.)

While currently the *Windows*-only *SDRMAX-II* is the recommended software, you do have (free) alternatives. They include a "cross-platform" *SDRMAX-III* that works with *Linux*, MacOS X, or *Windows*, and independent software such as *Winrad* (**www.winrad.org**) and *WinradHD* (**www.hdsdr.de**). Naturally, each program has its strong points. I am a *Linux* fan, and I appreciate that I can run *SDRMAX-III* on my Ubuntu system, even if I have to compile it from source. However, I found that *SDRMAX-II* for *Windows* was more mature and easier to use. I think it looks better too, but that's a matter of taste. A major update called *SDRMAX-IV* is in development.

Because SDR is CPU intensive, I wanted to explore how it worked on a small computer. I was able to run *SDRMAX-II* on my Celeron M (1.5 GHz) laptop, using 40 to 60% of its CPU power. Operation was fairly smooth even on this small machine, especially after I reduced the spectrum update rate. SRL specifies the minimum configuration as a 1.6 GHz Atom 330 CPU with 512 MB RAM (2.5 GHz Dual Core recommended).

All the QS1R code from SRL is open source, so if you have the desire and expertise, you can make modifications or even roll your own software. That's important, even for non-programmers, because developers are likely to provide new capabilities over time.

Skimmer Server (see the sidebar) is an elegant product developed on the QS1R platform. It takes complete control of the QS1R, bypassing the SRL software. Because this program uses much more of the FPGA's capability, up to 7 receivers with 192 kHz bandwidth running in parallel, it needs a beefy power supply. Even if you aren't going to use *Skimmer Server*, I recommend using a supply with at least 2 A capacity — it leaves your options open for future applications.

Learner's Permit

Any advanced radio takes some time to learn, and the QS1R is no exception. The hardware connections are simple, but the *SDRMAX-II* software definitely has a learning curve to climb. The operating screen is complex, and it is not immediately clear how to do even the basic functions such as tuning. There is no built-in help system, except that tooltips are displayed if your cursor hovers over a particular control. The support Web site offers an online help manual that helps, but it is incomplete. The site's FAQ list fills in some of the gaps, but you're going to face a certain amount of trial and error and e-mail consultation! A training video would go a long way toward getting new users up to speed.

Joy of the Open Road

I enjoyed learning to drive this radio, but the real fun begins when you take it out on the highway. Hooked to my antenna farm (dipoles for 80 and 40 meters plus a three element SteppIR Yagi), its receive performance on the amateur bands was comparable to my Ten-Tec Orion, except for reduced sensitivity on the higher bands. My home location is relatively quiet — no high power transmitters in the area — and the bands were not crowded.

For me, the major plus of the SDR is the spectrum display and the waterfall. You can monitor a band segment, a whole band, or even multiple bands (up to 20 MHz of spectrum) to monitor propagation using HF broadcast or amateur stations. The waterfall shows a time history. You can find some very interesting modulation modes, swept frequency radios and ionosondes. You can even do radioscience — watch interference patterns (selective fading) drifting across the sidebands of a distant HF broadcast signal, telling you how ionospheric clouds are moving!

There are many other ways you can use the QS1R. You can find a signal with an unknown frequency, such as parasitic oscillations, very quickly. You can diagnose obscure interference issues. Many interference sources have broad spectra that can be a little hard to understand with a narrowband receiver. I discovered that a problem I had been seeing on 10 meters was actually spread out over several MHz, putting me on the track to find some arc-like source. The QS1R would serve as a fine panadapter attached to another receiver's first IF, but it would be overkill for this relatively narrowband application.

You can connect the audio output to your computer's audio input jack and use any audio analysis program you like. For example, DRM or other digital voice decoders, PSK31, RTTY and other digital data modes should be simple to decode. With its synchronous AM detection, the QS1R makes an excellent AM broadcast receiver.

Conclusions

There are a few rough edges with this product, which I've touched on above. The documentation is incomplete, although the e-mail and Web based help ecosystem is very useful. The receiver sensitivity is relatively low, limiting performance in the higher bands, and the input low-pass filter is not sufficient to prevent aliasing of signals above 62.5 MHz. If all you want is a good general-coverage receiver, there are less expensive products on the market with better specifications.

The compelling features of the QS1R SDR have to do with its ability to quickly survey the entire spectrum from 10 kHz to 62 MHz and to provide a very flexible display with point and click signal tuning and setting of bandpass filters. As a panoramic display of one or more entire amateur bands, it can add a lot of capability to your station. It is also a useful piece of test equipment for your bench. On top of that, the QS1R has a lot of untapped horsepower for special applications, as the *Skimmer Server* product shows.

Manufacturer: Software Radio Laboratory, 8776 Shillington Dr, Powell, OH 43065-9001; tel 614-339-4324; **www.srl-llc.com**. QST

TECHNICAL CORRESPONDENCE

WHICH FINGER FOR DOTS? (TECHNICAL CORRESONDENCE, THE DOCTOR IS IN, MAY 2010)

◊When I selected the correspondence about which finger for sending dots for the May 2010 Technical Correspondence column, I was not aware that The Doctor was addressing another question about the same topic for that issue! It seems there is more interest in this question than I had realized.

I heard from several readers with other suggestions, and they reminded me of two items that I believe ran in the Hints & Kinks column a number of years ago, and were also included in *The ARRL Handbook* for at least a few years. I wired a DPDT switch in the line from a paddle, so if can easily be switched from right or left side of the paddle for dots. This is handy since I often use that paddle and an AEA Morse Machine MM-3 keyer when I am demonstrating ham radio to Scout groups. The Scouts love to send their name or a short message in CW, and a flip of that switch quickly changes the dot side for the Scouts. Another Hint was to install a matching stereo phone jack and plug on opposite ends of a jumper cable, with the tip and ring wires reversed between the two connectors. Simply plug your paddle cable into this jumper and then plug the jumper into your keyer or rig to reverse the contacts.

One reader pointed out an even easier way to change the paddle sense. Most modern rigs have built-in keyers, and nearly all of them have a menu option to reverse the paddle input. Even many stand-alone keyers include this menu option, so there is no switch or jumper wire required to try all four combinations of hands and finger/thumb for dots.

So, try both thumb and forefinger for dots, and even with both hands, and see what feels best. Most importantly, have fun! — *73, Larry Wolfgang, WR1B, ARRL HQ*; **lwolfgang@arrl.org**

KEEPING CURRENT WITH ANTENNA PERFORMANCE (FEB 2009), TECHNICAL CORRESPONDENCE (JULY 2010)

◊I appreciate the input from Steve Noskowicz, K9DCI, on current measurements and it includes some excellent follow-up information. The sole goal of my simple circuit was to obtain relative readings that represent the current in the line to "tune for maximum smoke."

By the way, the picture of the toroid in the box for a 50 Ω system in Paul (N1II) Danzer's article has proven to be an excellent tool for tuning PSK-31 transmit bubbles. Hook it to a 10 MHz scope and adjust the computer audio output for a perfect pattern. — *73, Allen Wolff, KC7O, 57 W Grand View Ave, Sierra Madre, CA 91024*; **kc7o@arrl.net**

RETURN LOSS DEFINITION

◊As an ARRL Technical Advisor, I am asked to review ARRL publications, to serve as a source of information, to write articles for ARRL publications and to assist ARRL members.

For many years I have been actively attempting to eliminate the incorrect manner of specifying return loss and insertion loss as negative values when associated with a passive load such as an antenna or filter. These two parameters are the most common parameters used when specifying the performance of filters, and therefore it is important that they be correctly stated.

My efforts in eliminating from ARRL publications references to negative return loss have been partially successful, but a continual effort is required to completely eliminate this error. For example, in the 2010 *ARRL Handbook*, this error of a negative return loss specification appears in Table 11.2 on page 11.10, and in the caption of Figure 6.29 on page 6.22. This continued appearance of the error of specifying return loss as a negative value has prompted me to write this letter.

Perhaps what has been lacking until recently was an explicit statement from a recognized authority that is available to anyone with a computer, and having access to the Internet. Thanks to the initiative of Dr Trevor S. Bird, the Editor-in-Chief of *IEEE Transactions on Antennas and Propagation*, this problem no longer exists. Anyone interested in how to correctly specify return loss can obtain his paper, "Definition and Misuse of Return Loss" by typing "return loss definitions" in a Google search box, and then scanning down until you see the PDF file by Dr T.S. Bird. Click on this entry and see his five page file appear on your computer screen. This same article appeared in Volume 51, Number 2, pages 166-167, April 2009, of the *IEEE Transactions on Antennas and Propagation*.

On the first page of the article, Dr Bird states: "...return loss is defined (by Equation 1) which is a *positive* value." (My emphasis.) He further explains that return loss is now the most common term used to describe reflection and mismatch associated with antennas and filters. This term is frequently confused with reflection coefficient, which has been expressed in dB. The logarithm is taken of the magnitude of the reflection coefficient and incorrectly referred to as return loss. The difference between the two is a minus sign. Dr Bird continues by describing his experiences in trying to stop this error. The similarity between his experiences and mine are striking, to say the least!

$$RL = 10\log_{10}\left(\frac{P_{in}}{P_{ref}}\right) \text{ dB} \qquad \text{[Eq 1]}$$

In the abstract portion of Dr Bird's paper he writes: "Perhaps over thirty percent of all antenna papers submitted to the *Transactions* in the past twelve months have used return loss incorrectly. The reason for this is uncertain."

I have an explanation of the "uncertain reason" for return loss being so widely considered as negative. Perhaps this explanation will help inform readers and prevent this error from any further appearance in Amateur Radio, commercial and professional publications.

Network analyzers are now widely used to plot S parameters versus frequency. S parameters are voltage ratios, and are measured and specified with all ports of a transmission system (filter, antenna, attenuator, and so on) terminated in a specified system impedance, usually 50 Ω or 75 Ω. Each S parameter is a ratio of a voltage potential out of a specified port to that of the voltage applied to a specified port. The ratio is identified by two subscript numbers, the first for the numerator, and the second representing the denominator of the ratio.

The input port of a transmission system (frequently a two-port system) is labeled with a subscript "1," and its output port is labeled with a subscript "2." The S_{11} parameter is equal to the voltage reflected out of port 1 divided by the voltage applied to port 1. The S_{11} parameter is therefore called the "input voltage reflection coefficient." When naming this S parameter it is called "S-sub-one-one" and not "S-sub-eleven."

For passive systems such as an inductor-capacitor filter, the input voltage reflection

Larry D. Wolfgang, WR1B ♦ Senior Assistant Technical Editor ♦ tc@arrl.org

coefficient (S_{11}) is always less than unity because the reflected voltage out of port one is always less than the incident (input) voltage to port one. This less-than-unity voltage ratio is usually plotted in decibels (dB), and therefore the S_{11} value in dB will be negative because the log of a number less than unity is negative.

For example, for a terminated passive filter having a measured reflected voltage from port 1 of 1 V and with an input voltage of 10 V, the S_{11} value equals 1/10 = 0.1. When indicated in dB the S_{11} value is 20 × log (0.1) = 20 × (–1) = –20 dB. This is the input voltage reflection coefficient in dB. If the reflected voltage is smaller (0.10 V) with the same 10 V input, then the S_{11} value would be more negative, as –40 dB.

S-parameters are usually measured and plotted in dB with a network analyzer. The most commonly plotted S-parameters are S_{11}, the input voltage reflection coefficient, and S_{21}, the forward voltage transmission coefficient, where the output port is labeled "2." Similar to S_{11}, the S_{21} parameter, when plotted in dB, is also negative because the ratio of the S_{21} voltages is less than unity.

When these two parameters are plotted on a semi-log graph, the scalar responses have the same shapes and levels as return loss and insertion loss. To the lay reader these plots appear to be identical with the S_{11} and S_{21} plots. When describing these plots, the terms of "return loss" and "insertion loss" are preferred because they are more descriptive and less intimidating to the lay reader than "input voltage reflection coefficient" and "forward voltage transmission coefficient." But now comes the error! Because of not understanding that the negative signs must be omitted before the terms of return loss and insertion loss can be correctly used, the inexperienced engineer or technician incorrectly includes the negative signs.

When specifying return loss and insertion loss obtained from the S_{11} and S_{21} data, the negative signs associated with the corresponding S parameter must be removed. Thus, both return loss and insertion loss data become *positive*. In addition to Dr Bird, this fact was also emphasized by Dr H. Paul Shuch, N6TX, in his text on the bottom of page 5-5 and the top of page 5-6, in *The ARRL UHF/Microwave Experimenter's Manual*. I quote: "Since the reflection coefficient magnitude is always less than unity, Eq 12 will always yield a negative number. But by simply changing its sign we have an expression for return loss."

[*The ARRL UHF/Microwave Experimenter's Manual* is now out of print. Here are Equations 12 and 13 from Chapter 5 of that book. — *Ed.*]

$$\rho(dB) = 10\log\left(\rho^2\right) \quad \text{[Eq 12]}$$

$$Return\ Loss(dB) = -10\log\left(\rho^2\right) \quad \text{[Eq 13]}$$

If we examine the data sheets of filter manufacturers, we will discover that many incorrectly specify their passive filters as having both negative return loss and negative insertion loss. The specification of "negative insertion loss" for a passive filter is especially amusing, for it implies the filter has a gain, and for a passive device, that is quite an accomplishment! The same is true for a "negative return loss," because it implies that the reflected voltage is greater than the input voltage, and again, for a passive device, that is quite an accomplishment.

From a recent conversation I had with a marketing manager of one of the well-known filter manufacturers I learned one reason why such a practice of incorrectly specifying return loss and insertion loss continues. It seems that this marketing manager believes that if these filter specifications were corrected their customers would become confused because of the different terminology, and orders for filters might be delayed until the discrepancy is explained. The explanation that incorrect terminology had been published for many years would prove to be embarrassing, and he told me it would be better to "Let sleeping dogs lie." There are some more technically competent companies, however, such as Agilent Technologies, Mini-Circuits and Miteq, that have correctly specified return loss and insertion loss from the beginning, and no corrections to their filter specifications are necessary. For example, see the advertisements of Mini-Circuits in several of the electronics magazines such as *High Frequency Electronics*, where Mini-Circuits correctly specifies the insertion loss and return loss of their Flex Test Cables as positive.

How can we eliminate this common error of specifying return loss and insertion loss as negative? This can be done by first understanding that these two parameters are always positive when associated with a passive load, and then becoming acquainted with the least confusing manner of depicting

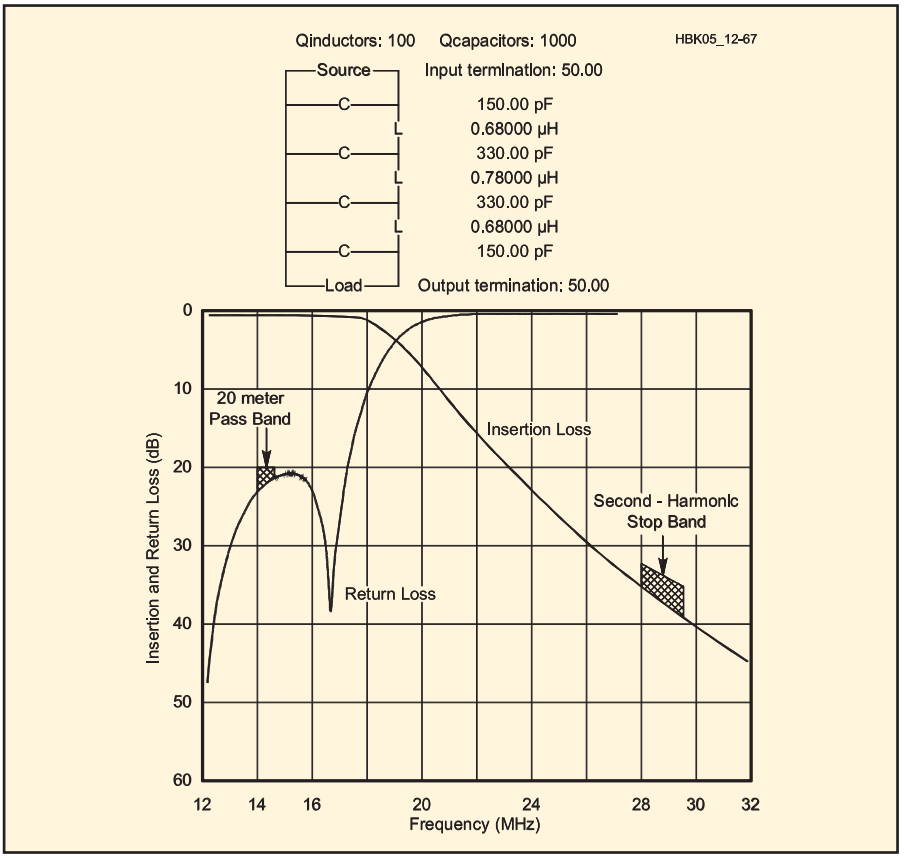


Figure 1 — This graph is reproduced from Figure 12.67 in the 2007 *ARRL Handbook*. The plot is from the *ELSIE* computer program, by Jim Tonne, W4ENE. (For more information about *ELSIE*, see http://tonnesoftware.com. The student edition of the program is included on the bonus CD accompanying the 2010 *ARRL Handbook*, and is also available as a free download from Jim's Web site.) The plot shows the computer-calculated return loss and insertion loss of the 7th order Chebyshev standard-value-capacitor filter described in the *Handbook*. The 20 meter passband return loss is about 21 dB, and the insertion loss over the second harmonic frequency band ranges from 35 to 39 dB.

these parameters on a graph showing them versus frequency. These two parameters are usually plotted together on the same graph, and because they have distinctly different plots it is easy to tell them apart.

Whenever a graph is encountered with plots recognized to be return loss or insertion loss, but the designations on the Y-axis are something else, such as "Negative Response," or "Negative S_{11} or S_{21}," or "Negative Transmission," or "Negative Return," the editor should remove the negative signs and the confusing designations and replace them with "Insertion Loss" and "Return Loss" as appropriate. Since a passive filter is being discussed, the reader is interested in learning the insertion loss or return loss in the least confusing manner. The designations of "Negative Transmission" and "Negative Return" do not meet this requirement.

Good examples of graphs correctly depicting plots of return loss and insertion loss may be seen in the pages of the following *ARRL Handbooks*:

1) 2007, Figures 12.67 (reproduced here as Figure 1) and 12.68 on page 12.38, and Figure 12.74 on page 12.40;

2) 2008 and 2009, Figure 12.77 on page 12.35; and

3) 2010, Figure 11.98 on page 11.48 (reproduced here as Figure 2).

I originally prepared Figures 12.67 and 12.68, and they appeared in my February 1999 *QST* article, "Second-Harmonic-Optimized Low-Pass Filters." For these plots, the parameters of Insertion Loss and Return Loss were specified as positive values. In the current version of Jim Tonne's *ELSIE* computer program, however, these same parameters are specified as "Negative Transmission (dB)" and Negative Return (dB)." The word "Gain" following "Return" is not included but is implied, so that "Negative Return Gain" equals "Return Loss." This manner of specifying Return Loss on a plot is awkward, and not recommended.

With references to the authoritative articles of Dr Bird and Dr Shuch, provided in this letter, I hope that any further references to "negative return loss" and "negative insertion loss" will no longer appear in Amateur Radio publications or other technical literature. If any readers of the *ARRL Handbook*, *QST*, *QEX* or other ARRL publications discover such errors, I encourage those readers to bring them to the attention of the responsible editors, to help prevent these errors from being repeated. I believe it is important that our common electronics literature not be polluted with incorrect terminology. Your cooperation and assistance will be appreciated. — *73, Ed Wetherhold, W3NQN, ARRL Technical Advisor, 1426 Catlyn Pl, Annapolis, MD 21401*; **faye.ed@comcast.net**

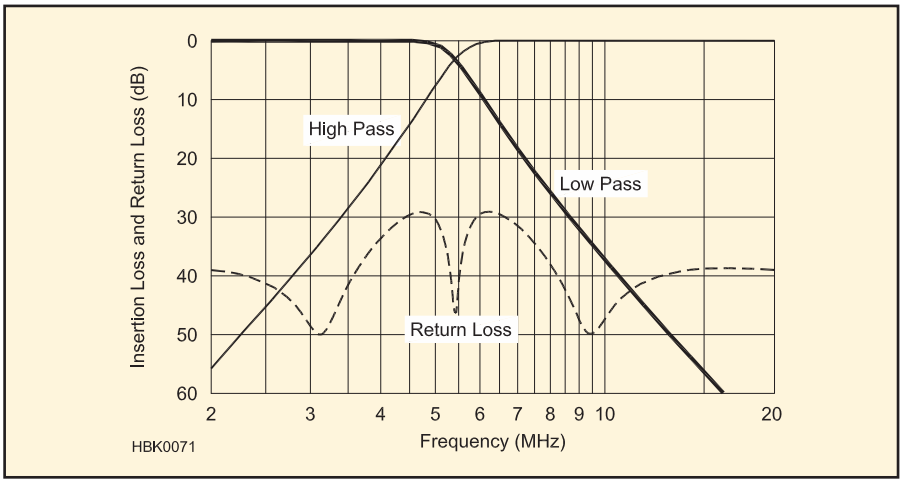


Figure 2 — This graph is reproduced from Figure 11.98 in the 2010 *ARRL Handbook*. It shows the insertion loss response for the low-pass and high-pass portions of an 80 meter diplexer filter. Also shown is the return loss of the filter.

New Products

NN4ZZ TILTPLATE FOR TILTOVER TOWERS

◊ The TiltPlate from NN4ZZ is an accessory for tiltover towers designed to allow Yagi antenna booms to swivel out of the way so the tower and antenna can be lowered all the way to ground level. The TiltPlate comes in two models, one for antennas up to 15 square feet and one for larger antennas up to 25 square feet. Hardware is stainless steel. Prices start at $750. To order or for more information visit **nn4zz.com/tiltplate.htm**.

Feedback

◊ In the "Hands-On Radio: Experiment #89 — Overvoltage Protection" [Jun 2010, pp 55-56], the reference to *The 2010 ARRL Handbook* in the third column on page 55 should be to section 7.16.8 on page 7.57.

◊ Art, VE2AHH, found that D1, the voltage protective device specified in "Compact Voltage Protector and Fuse Assembly for 100 W Transceivers" [Apr 2010, pp 30-32], was on backorder at Mouser. Art found that a 625-1.5KE15A-E3 is a substitute that is in stock and the same as that specified except that it is a lead free part. With that change, all parts are available from Mouser.

W1ZR

THE DOCTOR IS IN

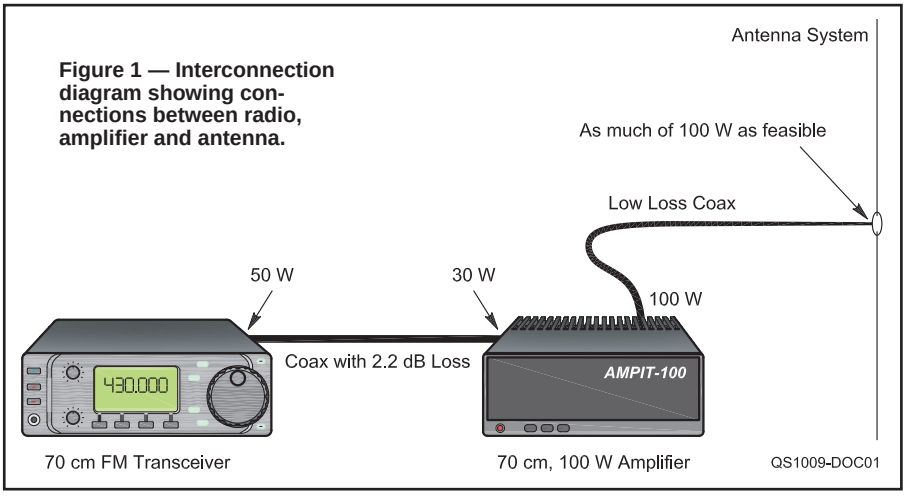


Figure 1 — Interconnection diagram showing connections between radio, amplifier and antenna.

Q Tom, K4YAZ, asks: I find that I need to use more power to consistently reach my local D-Star repeaters in the Tampa Bay Area. I live in a condo and my VHF/UHF antenna is on a second floor porch. Moving it higher or into the clear is out of the question, due to my condo association. I am using a dual band transceiver with 50 W output on high power. This is not enough to consistently reach the local repeaters.

Since I am mainly using the 70 cm band, I have purchased an amplifier that has an output of 100 W with 30 W drive on 70 cm. The amplifier also has a useful receive preamp. To obtain the full 100 W output from the linear, one must input 30 W. My 50 W radio would be over the input rating of my linear, and the approximately 15 W output from the radio on medium power will not drive the linear to the full 100 W output. Is there an easy solution to this issue, or do I have to get a different amplifier?

A If you are right on the edge of the coverage area, the 3 dB increase in power may make the difference. Also consider any other losses, such as in the coax run to your antenna — at 70 cm, coax loss can be a big factor, and if the length is more than a few feet, better coax may reduce loss by almost as much as the amplifier gain — get every decibel you can.

Your amplifier drive problem turns out to have an incredibly simple solution. If you have 2.2 dB loss between the radio and the amplifier, your 50 W radio output will be just 30 W at the amplifier. This only makes sense because of the preamp in the amplifier; otherwise, the loss would also reduce receiver sensitivity. With a preamp that has a reasonable gain, the noise figure and thus signal to noise ratio is determined largely by the noise figure of the preamp. On HF making a reasonably accurate attenuator using power resistors can be easy. [See the article by Phil Salas, AD5X, in the August 2010 issue. — *Ed.*] At UHF, component, lead and wiring inductance can make it a very difficult job — but all is not lost!

Now for the really simple part. You need coax cable between the radio and amplifier anyway (see Figure 1). If you use coax with a loss of 2.2 dB, you're done. On 440 MHz, it takes just 16 feet of Belden 8259 RG-58 coax to get the loss — hopefully emphasizing my earlier point! If you select a different cable, make sure you have the cable attenuation specs available. The extra coax can be neatly coiled out of the way — or better yet, move the amplifier closer to the antenna to reduce the coax length and attenuation between the amplifier and antenna. Note that this all assumes that the amplifier input is a good match to 50 Ω; if not, the coax loss will be higher. If you have a wattmeter, it will be a good idea to confirm all the power levels when you're done — and life being what it is — plan to do a little trimming.

Q Jerry, K2QJB, asks: I just bought a surplus military transmitter that works very well but uses cathode keying for CW. This GRC-109 has two tubes, a 6AC7 Pierce oscillator and a 2E26 as the final amplifier stage. I have an old electronic keyer that was designed for grid blocked keying. What is the difference between grid block and cathode keying and can I use my keyer with this transmitter? The radio does have a built in straight key but I prefer an electronic keyer.

A Grid block and cathode keying were the most popular CW keying methods in the vacuum tube days, with the popularity edge going to cathode keying — in terms of number of radios. The two are quite different and only if your keyer has relay contacts at the output might it be able to handle either from the same circuit.

Cathode keying involved opening the connection between one or more RF stage cathodes and ground. Use caution, because the typical keying line has around +300 V on it with the key up. [How we survived so many years with this condition may be one of life's mysteries. — *Ed.*]. The current, with your 2E26 output stage, could be in the 100 to 150 mA range. You can easily measure both with a VOM across the key contacts, set for voltage and then for current. Note that the transmitter will key while measuring current, so make sure it is tuned and properly loaded before you do this.

Grid block keying applies a negative cutoff bias to one or more RF stages to keep them turned off while the key is up. The typical voltage is –100 V or so, with a much smaller keying current of a few tens of a mA or less.

Some keyers of the period had two output connectors, one for positive and one for negative voltages, or sometimes a switch to select the keying polarity. Most project keyers in magazine or handbook articles had output options so you could make it for either. Be careful, though — most recent keyers are designed to key the positive voltages of modern solid state keyers. They may not be able to handle the voltage or current of an older cathode keyed tube radio even if both key positive voltages. If you have a keyer designed for positive voltages, check its specs against what you measure at the GRC-109 key contacts — both in terms of voltage and current.

If your keyer is not compatible with the radio, the simple answer is to get a small 12 V dc relay with contacts that will handle the required current and voltage of the GRC-109 and wire it for the appropriate polarity that can be keyed by your keyer.

Q Bob, NF5Y, asks: Would you explain the benefit of a ⅝ wavelength vertical monopole antenna compared to one of a height of ¾ wavelength? The ⅝ wave verti-

Joel R. Hallas, W1ZR ♦ *QST* Technical Editor ♦ jhallas@arrl.org

cal requires a device of some sort to match its base to 50 Ω coax while the ¾ wave vertical can be fed directly. I do not have a tower and am trying to find something that will work well on 10 meters. I notice that some of the 10 meter beacons use ⅝ wave verticals.

A ⅝ wave vertical monopole is the longest simple monopole that will have its peak radiation at the low angles suitable for long distance communication. A ¼ wave monopole over real ground will do as almost as well, and can also be fed directly, but the ⅝ has about 2 dB gain at the lower angles (14°) as shown in Figure 2. As noted in the figure, the ¾ wave vertical has its peak radiation at relatively high angles (47°), so while slightly easier to feed than the ¼ wave, it is not as useful for terrestrial communication — taller isn't always better. Another advantage of the ⅝ wave antenna is that it is somewhat less dependent on the ground system at the feed point — important in some areas. While matching is needed, the required matching device is pretty simple; for 10 meters just a series inductance of about 1.2 µH should do it. Using the inductance chart on page 2.50 in *The ARRL Handbook*, we can get an idea of a starting point of a coil of 12 to 13 turns of #12 AWG wire at 8 turns per inch with an inside diameter of ¾ inch.[1] Much less expensive than a general purpose antenna tuner — a few inches of scrap PVC pipe and some leftover house wire. The modeled configuration is shown in Figure 3 with an SWR of less than 2:1 from 28 to 29 MHz. Your ground and other conditions may be somewhat different than those in my *EZNEC* model, so plan to spend a bit of time adjusting the coil, but when set, it will be an effective antenna at low cost.[2]

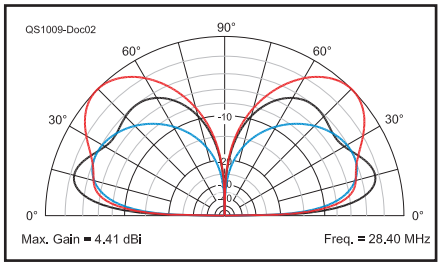


Figure 2 — Comparison of modeled elevation patterns of ¼ wave (blue), ⅝ wave (black) and ¾ wave (red) monopoles. In each case, the antennas were fed against a ground system of four elevated ¼ wave radials 1 foot above and isolated from typical ground. See Figure 3 for construction details.

Q Ken, KØHL, asks: One day while on the air another operator called me and told me I was splattering all over the band. I was so embarrassed I went off the air.

I am now returning to ham radio after being off for 20 years. I want to drive my microphone as hard as possible without causing distortion. I just purchased an amplifier and the last thing I want to do is splatter all over the band.

A There are a number of ways, although using a scope may not be the best or easiest way. You can look at the envelope of your signal using an RF probe, and watch for any signs of compression, but the best way is to use a spectrum analyzer and look for spurious outputs directly.

Keep in mind a couple of things:

- There is little to be gained by hitting an amplifier too hard. The same distortion that generates the spurious signals also makes your signal sound muddy and hard to understand. Thus the goal, in my opinion, should be to have the cleanest and easiest signal to understand — not the loudest.
- Before you jump to any conclusions about your signal, ask the reporting station how strong your signal is and what kind of receiver he has. If your signal is strong — the spurious signals could be generated in his receiver rather than your transmitter — both sound about the same. This is particularly likely if his receiver is not one that is well rated in near-in dynamic range — see the *QST* "Product Review" columns.[3] It's best to have a report from someone who can receive you well over S9, but not so strong that they are generating the spurs in their receiver. Ask the station to turn off the receive preamp, or put in 10 dB of attenuation. If your spurious signals go down more than the 10 dB, they are generated in the receiver.
- All transceivers that I've seen have indicators that tell you when you are driving hard enough. Unfortunately, unless you hold a steady whistle, your meters can't follow quickly enough to indicate the expected power output — go by the other indicators, such as the ALC bar or light. Adjust the amplifier the same way — using the indicators and the manufacturer's instructions.
- One test is to put a steady whistle into the mic. If the radio and amplifier are properly set neither will exceed ratings, nor show signs of overload.

While lab grade spectrum analyzers are expensive, many transceivers have spectrum scopes. If you have local friends with scopes, they can look at your signal on a dead band (so there aren't too many signals on the scope) and easily confirm your settings. Again, to make sure you are not overloading the receiver ask them to insert 10 dB of attenuation — both your signal and any spurs should go down by 10 dB if their receiver isn't overloading. If it is, your signal should go down by 10 dB, or perhaps less, while the spurs should go down by 30 dB.

[1] *The ARRL Handbook for Radio Communications*, 2010 Edition. Available from your ARRL dealer or the ARRL Bookstore, ARRL order no. 1448 (Hardcover 1462). Telephone 860-594-0355, or toll-free in the US 888-277-5289; **www.arrl.org/shop**; **pubsales@arrl.org**.

[2] Several versions of *EZNEC* antenna modeling software are available from developer Roy Lewallen, W7EL, at **www.eznec.com**.

[3] All *QST* product reviews since 1980 are available to ARRL members at **www.arrl.org/product-review**.

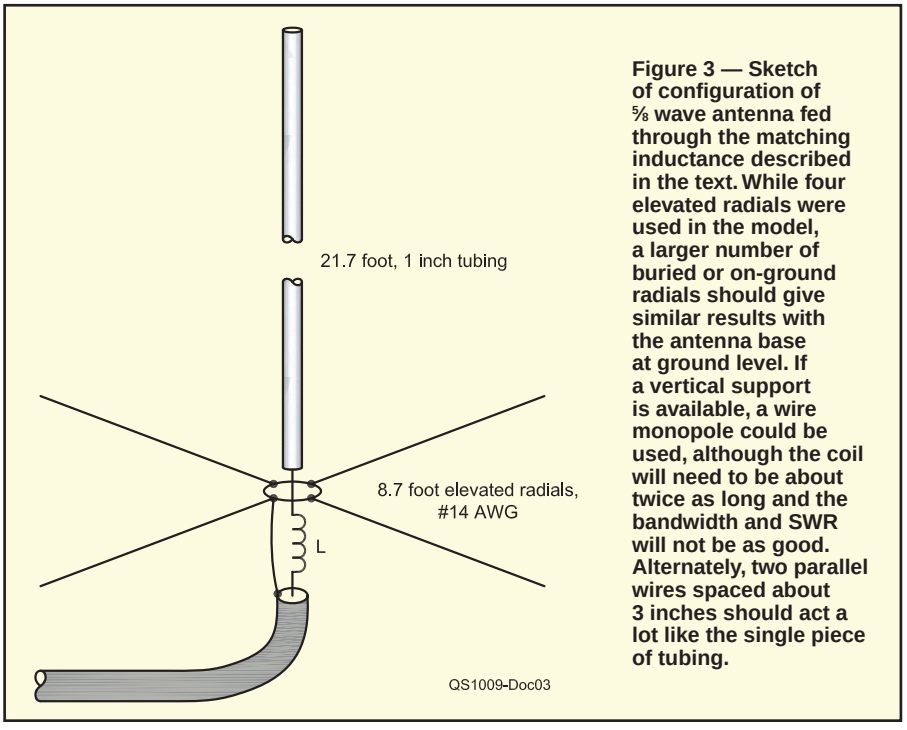


Figure 3 — Sketch of configuration of ⅝ wave antenna fed through the matching inductance described in the text. While four elevated radials were used in the model, a larger number of buried or on-ground radials should give similar results with the antenna base at ground level. If a vertical support is available, a wire monopole could be used, although the coil will need to be about twice as long and the bandwidth and SWR will not be as good. Alternately, two parallel wires spaced about 3 inches should act a lot like the single piece of tubing.

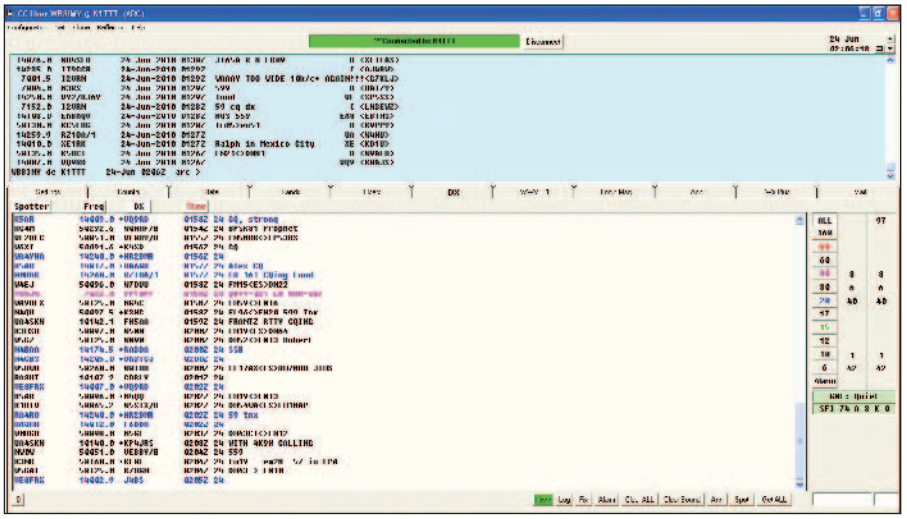
Do you have a question or a problem? Ask the Doctor! Send your questions (no telephone calls, please) to "The Doctor," ARRL, 225 Main St, Newington, CT 06111; doctor@arrl.org.

SHORT TAKES

CC User DX Cluster Client

When someone gushes about a piece of Amateur Radio software and ends the excited tale by saying, "And it's *free*, too!" I am instantly skeptical. Throughout my life to date, the ancient axiom "You get what you pay for" has usually proven to be accurate. If something is said to be free, I lower my expectations quite a bit.

But axioms aren't blessed with universal veracity, otherwise they'd become scientific truths like Maxwell's equations. In the case of VE7CC's *CC User* software, the axiom is entirely wrong!



The *CC User* main page.

What is a DX Cluster Client?

A DX Cluster is a network devoted to monitoring on-the-air activity throughout the world. Hundreds of hams are connected at any given time, posting *spots* with information about signals they've discovered on bands from 160 meters through microwave. DX Clusters are an outgrowth of the original DX PacketClusters that performed the same tasks using radio data networks on 2 meters and 70 cm. Some of these PacketClusters still exist, but most Cluster networking has since shifted to the Internet.

DX Clusters are popular among contest enthusiasts, DX hunters or anyone else who is interested in keeping their fingers on the pulse of Amateur Radio activity. But many of us, myself included, are often too busy to sit before the computer and sample the action. That's where the Cluster client comes into play.

Cluster clients are software applications that do much of the monitoring for you. They connect to the Cluster of your choice, get the most recent spots, periodically download propagation information and so on. Best of all (at least for me), these clients can filter the torrent of information. For example, if you don't have the ability to get on 160 meters, you may not be interested in seeing spots for 160 meter activity. Not a problem. The Cluster client can be configured to ignore 160 meter spots. Or, if you are looking for a particular station (such as a DXpedition operation) or a station from a particular DXCC entity, the Cluster client can "watch" for these and alert you if they are spotted.

VE7CC's *CC User*

A number of Amateur Radio logging and contest applications have Cluster clients built in, but *CC User* by Lee Sawkins, VE7CC, is a stand-alone program for *Windows*. It is rich with features, yet surprisingly easy to use. *CC User* can "talk" to a packet TNC if you prefer to connect via radio, or it can make Internet Telnet connections to your favorite online DX Cluster.

For this review I used a Telnet connection, which was simple to set up. *CC User* includes a list of Telnet Clusters, or you can enter another of your choice. There is a User Info screen that allows you to enter your call sign, Cluster password (if needed), your location, etc.

CC User's filtering features are impressive. Since I tend to operate CW and digital, I set my filter to ignore spots in the phone portions of the bands. I also configured it to only show spots from hams who were in my area of the country (seeing spots from stations on the other side of the continent wasn't as useful since I may not be able to hear what they are hearing).

If a particular spot catches my eye, I can click my mouse cursor on the call sign and look up the station on QRZ. Holding the CONTROL key while clicking my mouse opens a window showing the sunrise and sunset times for that station.

CC User keeps an eye on space weather, too. One day I glanced at the screen to find a glowing red box announcing Minor Radio Blackouts. No wonder I wasn't hearing much on HF that afternoon!

If you are interested in working stations who participate in ARRL's Logbook of The World, *CC User* will request this information and flag these stations in the list. It reminds you to refresh the LoTW database with the appearance of a red highlighted button.

The alarm function is excellent. I turn up my computer speakers for a welcome blast of audio whenever a desired station appears. I can even tell *CC User* to shoot an e-mail message to my cell phone. Use this function with care, though. You don't want to find yourself interrupting a business meeting to declare that you have to rush home because 6 meters is open.

Great Software; Great Price

Lee has done an outstanding job with *CC User*. The layout is clean and direct. He has even built in an auto updater that "phones home" via the Internet and alerts you to download the latest version (Lee is constantly making improvements). The fact that all this functionality comes free of charge is just icing on the cake. You can download the latest version of *CC User* at **www.ve7cc.net**. Scroll about ¾ of the way down the page to find the download link. QST

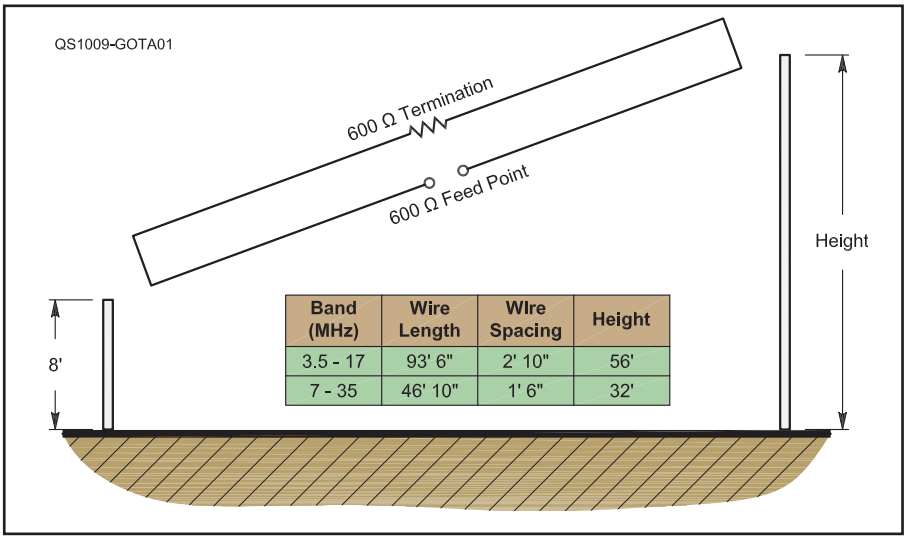
Steve Ford, WB8IMY ♦ *QST* Editor ♦ sford@arrl.org

W1ZR

GETTING ON THE AIR

A Close Look at the Terminated Folded Dipole Antenna

It is an age old saying that every antenna is a compromise. With every antenna design, it is important to know what is being given up as well as what is being gained. There is perhaps no antenna that is the subject of more controversy that the *terminated folded dipole*. This antenna is also known as a *terminated, tilted folded dipole* or T2FD. Its major characteristics are similar whether horizontal, vertical or tilted. What is promised is wide SWR bandwidth. What is given up is signal intensity or gain. This article will attempt to put all the cards on the table so an intelligent choice can be made.



Band (MHz)	Wire Length	Wire Spacing	Height
3.5 - 17	93' 6"	2' 10"	56'
7 - 35	46' 10"	1' 6"	32'

Figure 1 — Details of a tilted terminated folded dipole configuration as proposed by Countryman in a 1949 *QST* article.

So What's a T2FD and Where Did it Come From?

The T2FD was first introduced to the amateur community in 1949 in a *QST* article by then Cmdr G. L. Countryman, USN, W1RBK, W3HH.[1] He attributed the initial development to the US Navy, but did not provide a reference. Interestingly, in those days of open wire feed rather than coax, he was more interested in providing an antenna with omnidirectional characteristics over a wide frequency range than with a particular SWR, although he got both — the omnidirectionality over a 5:1 frequency range. He used two sizes to cover the HF spectrum as shown in Figure 1.

His sizes were optimized for omnidirectionality, not always a priority for an amateur. He fed his antenna with 600 Ω open wire line to a link coupled transmitter output circuit. In today's world, the common configuration is to use a 12:1 transformer at the feed point and feed the antenna with 50 Ω coax. It has also been observed that while omnidirectionality suffers on the higher frequencies, a reasonable match can be found over the entire HF spectrum using the longer version.

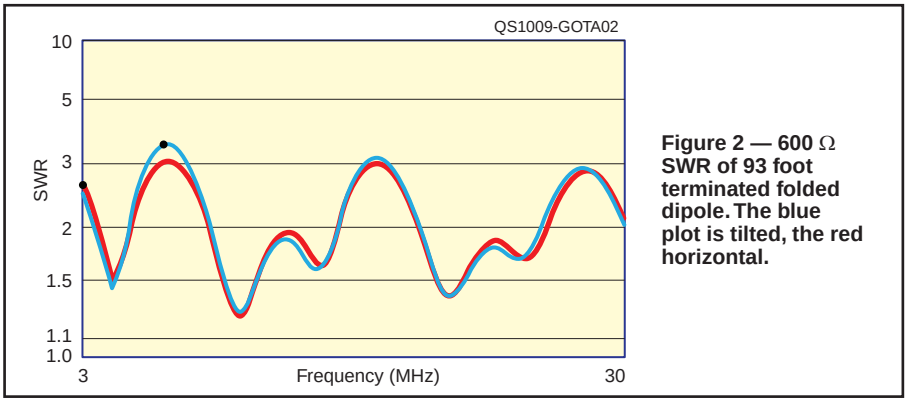


Figure 2 — 600 Ω SWR of 93 foot terminated folded dipole. The blue plot is tilted, the red horizontal.

How Does it Play?

Countryman reported similar results for his tilted version to those from a similarly tilted 40 meter dipole during comparison tests. He also provided an indication that it worked on 80 meters, although he did not do any comparisons on that band. A much later *EZNEC* assessment of the horizontal configuration by ARRL Technical Advisor Jack Belrose, VE2CV, was validated by some comparison testing to a half wave dipole on a number of frequencies.[2] I chose to make a comparison to a nonresonant dipole of the same length as the TFD, since I thought it would be a fairer comparison. The results described below track fairly closely to those of Belrose, taking into consideration the differences in our approach. Belrose used a commercial version of the TFD, still available from B&W.[3]

[1]G. Countryman, W1RBK, W3HH, "An Experimental All-Band Nondirectional Transmitting Antenna," *QST*, Jun 1949, pp 54-55.

[2]J. Belrose, VE2CV, "Technical Correspondence — Terminated Folded Dipole," *QST*, May 1994, pp 88-89.

[3]P. Pagel, N1FB, "Product Review — The B&W Model 370-15 Antenna [now BWD-90 — *Ed.*]," *QST*, Mar 1981, pp 50-51.

Joel R. Hallas, W1ZR ♦ *QST* Technical Editor ♦ jhallas@arrl.org

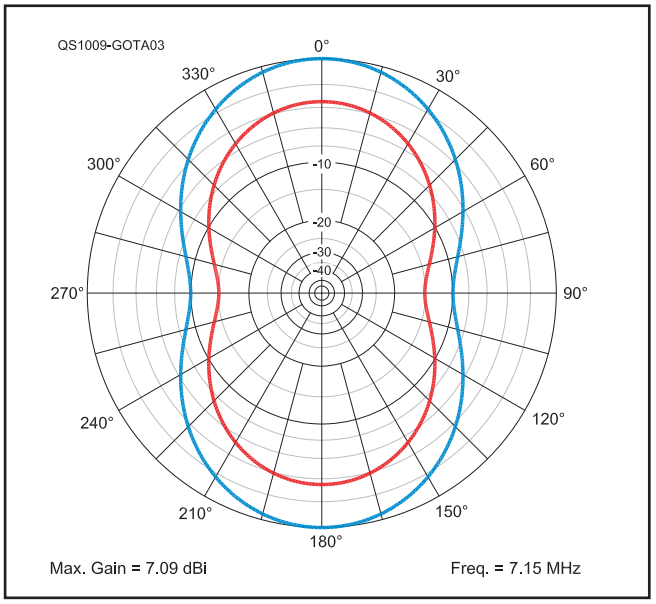


Figure 3 — Comparison of TFD (red) and CFD (blue) azimuth patterns on 40 meters at same height above typical ground. Both antennas have their peak response at 34° elevation.

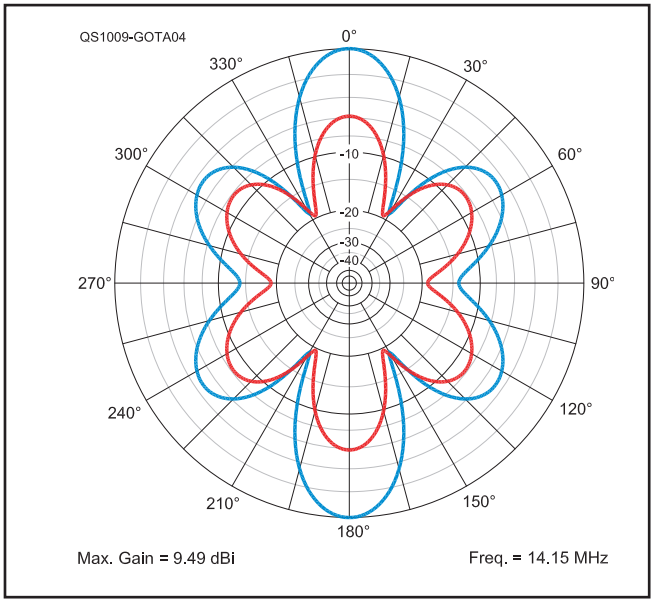


Figure 4 — Comparison of TFD (red) and CFD (blue) azimuth patterns on 20 meters at same height above typical ground. Both antennas have their peak response at 17° elevation.

My *EZNEC* modeled SWR over the HF range is shown in Figure 2. Indeed, we find a very nice wideband SWR response. Skeptics are quick to point out that putting a 600 Ω resistor at a 600 Ω feed point should indeed provide a good match over a wide frequency range — we call that a dummy load. Dummy loads do provide a good match, but don't usually serve as a very effective antenna.

A more careful assessment of the performance using *EZNEC* provides the results shown in Table 1. In this case, we have modeled a 93 foot version and compared the peak response to the peak response of a 93 foot center fed dipole in the same location. In use, the 93 foot dipole would be fed by open wire or window line and a tuner — a fairly popular multiband antenna. We have done this for both tilted and horizontal implementations.

Not surprisingly, there is a penalty associated with this type of antenna and that is in radiating efficiency. Any power that is dissipated in the resistor is not radiated and thus there is less available than would be the case of an antenna made entirely of conducting material. The penalty for either the horizontal or tilted case is greatest at the low frequency end of the range — around 8 to 9 dB. This improves quickly to 3 to 6 dB, an S-unit or less, on the higher bands.

Countryman, perhaps thinking of the terminated rhombic, suggested that the resistive load needs to have a power rating of 50% of the applied power. This is not a terminated rhombic — in that antenna the termination absorbs just what would be the backward going wavefront. In the TFD, at the low end of the range, *EZNEC* predicts that the resistor absorbs slightly more than 90% of the applied power, closely agreeing with Table 1. Thus a 100 W station running RTTY would need a termination rated at 90 W. SSB and CW stations can likely use a termination with 25 W dissipation, if they don't tune for long — but what's to tune here?

Table 1

Comparison of Maximum Field Intensity of 93 foot TFD and Center Fed Dipole (dBi) Over Typical Ground

	Tilted		*Horizontal*	
Frequency (MHz)	*TFD*	*CFD*	*TFD*	*CFD*
3.7	–6.1	2.5	–2.7	6.2
7.15	0.3	4.3	3.6	7.1
14.15	1.6	5.8	3.8	9.5
21.2	2.2	7.6	4.3	9.7
28.3	3.8	6.1	7.3	10.4

As seen in Table 1, the horizontal version has an advantage over the tilted one of a few dB, largely due to the fact that the tilted one is more omnidirectional on the lower bands. Whether this is important to you depends on your application. The horizontal version has a pattern similar to a center fed dipole (see Figure 3) — bidirectional until it gets above a full wavelength, then a more complex pattern with deep nulls on the higher frequencies — the price for the extra gain toward the peaks.

Is the Trade Off Worth It?

This antenna may be a good choice in some applications. At the lower portion of the HF spectrum, received signal-to-noise ratio (SNR) is often limited by external noise, so a loss in the antenna system won't reduce received SNR. On the transmit side, a government funded station may be able to just throw a switch to add 10 dB of power and more than make up for the antenna loss at many frequencies (if the termination can handle the power). Being able to change frequencies without worrying about antenna operation is a great convenience, especially for untrained or stressed operators.

This would also be a perfect antenna for a radio system making use of automatic link establishment (ALE). In an ALE system, radios at both ends of the link send test signals on prearranged frequencies across the spectrum in a synchronized sequence. The received signal to noise ratio is noted and the radios switch to the frequency that works best at that moment. This is repeated throughout the day so that the optimum path is always in use. Such a system must switch frequencies instantaneously without an opportunity to retune antennas. Note that any loss in gain on a frequency will automatically be included in the determination of which frequency to use.

In the typical amateur station the rationale may be less dramatic. For the operator who uses 80 or 75 meters occasionally, can only have a single antenna and doesn't want to invest in an antenna tuner, this may be a reasonable compromise. At my station, I have instead chosen the 100 foot dipole, center fed with window line and a tuner. Perhaps I worry more about that last S-unit than some, but I could easily understand going the other way. QST

NØAX

HANDS-ON RADIO

Experiment 92 — The 468 Factor

This month, I'm going to revisit a topic originally touched upon in Experiment #82 — Antenna Height.[1] We've all seen this number over and over again — the "magic number" that gives us the length of a half wavelength dipole in feet from the dipole's resonant frequency: L = 468/f. In free space the wavelength in feet is 492/f, but a practical half wavelength antenna is shorter so the constant is smaller. After publishing the column showing what happens as an antenna gets raised and lowered, my interest was piqued. [This column is based on **eham.net** article #23802, "Where Does 468 Come From?"]

The number 468 is on the license exams and in the literature. It's been there ever since I started reading about ham radio in the mid 1960s. It's a pillar of amateur antenna theory. Every ham is expected to memorize it. And it's wrong.

It would be more accurate to say that it's rarely correct. There are certain instances where it's close, but using it often leads to wasted wire. The usual instructions to a new ham are, "Calculate how much wire you need using 468/f and then add a couple of feet." What that really means is the value 468 is too small and we compensate for the error by adding a couple of feet. If 468 isn't right, why do we use it? Answering that question required me to take a meandering trip along the paths of history.

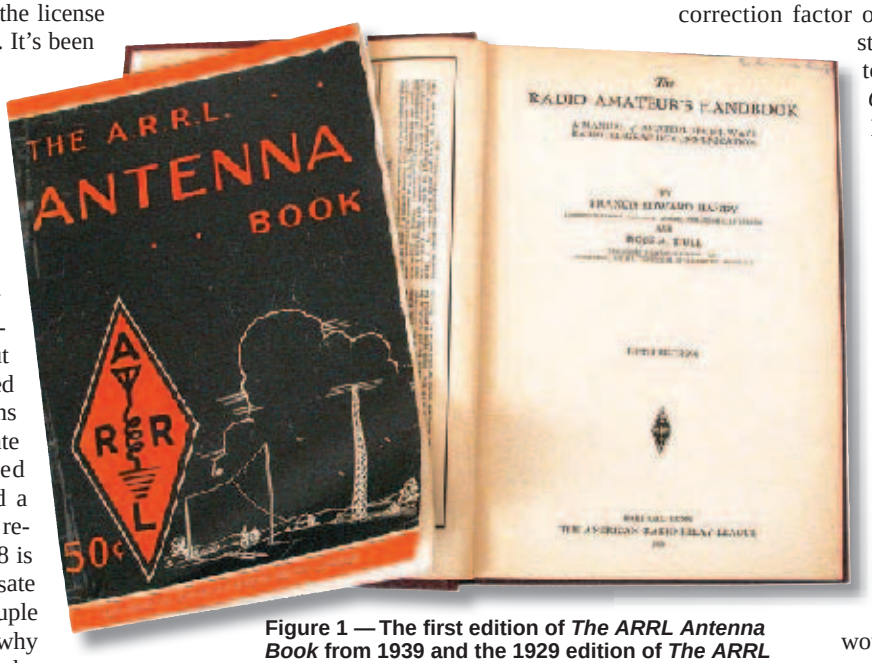


Figure 1 — The first edition of *The ARRL Antenna Book* from 1939 and the 1929 edition of *The ARRL Handbook*, in which the source of 468 was found.

The Search for 468

Recently, I had the opportunity to spend a few days at ARRL Headquarters to plan upcoming writing and editing projects. The ARRL has a great technical library with every edition of ARRL publications and technical publications going back decades. (If you ever get close to Connecticut, it's well worth dropping in on the ARRL for a tour.) I had some time one afternoon and decided to find out when and how the number 468 first appeared in the literature of Amateur Radio.

My first stop was *The ARRL Antenna Book*'s initial edition in 1939. Sure enough, on page 13 in the chapter on "Antenna Properties," the familiar formula 468/f appears. The *Antenna Book* states that the *end effect* caused by the attachment of insulators at the ends of the antenna results in the approximately 5% reduction in length from the free space 492/f to 468/f. The text goes on to state that the percentage "varies slightly with different installations," but doesn't say how, nor is a citation provided to identify how the value of 468 was obtained.

Since it is unlikely that the value of 468 appeared in the *Antenna Book* without any "prior art," I next turned to *The ARRL Handbook*'s first edition in 1926. That turned out to be a dry hole — no formula for antenna length and nothing in 1927 or 1928 either. Then, in the 1929 edition's "Antennas" chapter on page 128, I hit pay dirt. The text defines natural wavelength as the highest wavelength (the lowest frequency) at which the Hertz antenna (a half wavelength dipole) will resonate. It is stated that "The natural wavelength of the wire…will be its length in meters multiplied by 2.1." Hmmm…2.1 is 5% longer than would be the free space value of 2. (Remember, the text is discussing wavelength, not frequency.) Farther down the page I saw, "Speaking in terms of feet, the natural wavelength of the antenna will be its length in feet divided by 1.56." That equation translates to L = (300 × 1.56)/f and 300 × 1.56 is 468. Here were the headwaters of the mighty River 468!

Still, no background for the correction was given. Where does the use of a correction factor originate? Back to the stacks. Did I really want to go through all of the *QST* magazines until I found my answer? Well, not really, but inspiration struck in the form of the online *QST* archives.[2] I logged into the ARRL Web site, brought up the *QST* archive search page and…hit another roadblock. I couldn't very well search for "468" because it was unlikely to be a keyword. "Dipole" would return hundreds of hits. Then I realized that in the early days, a half wavelength dipole would have been referred to as a "Hertz" antenna or "Hertzian" antenna. I entered the former and scrolled down to the very earliest entries.

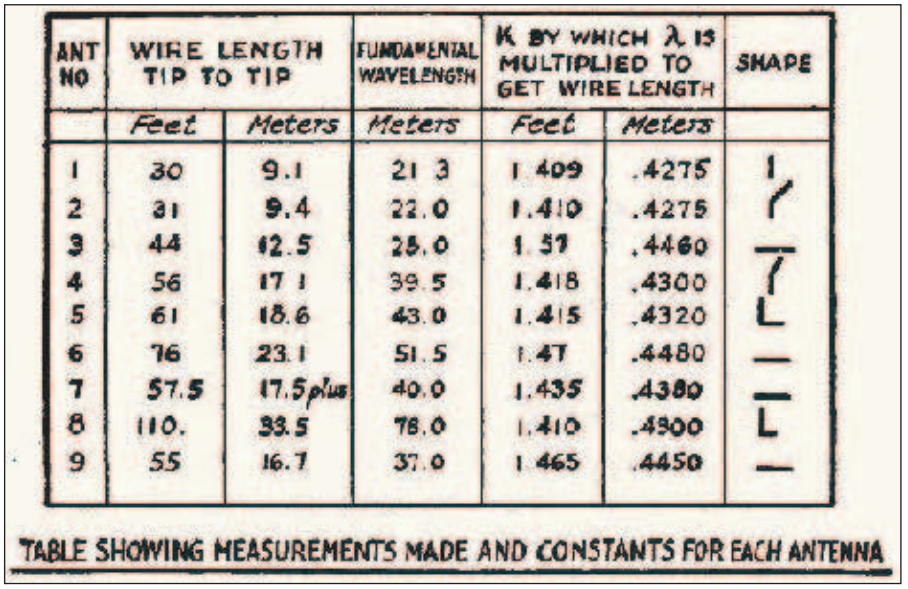
The oldest article on Hertz antennas was in the July 1925 issue by 9BXQ and titled "The Hertz Antenna at 20 and 40 Meters" but it didn't discuss a formula for length. The next oldest article, October 1926's "The Length of the Hertz Antenna" by G. William Lang, turned out to be what I was looking for.

In the article, Lang (who was apparently

[1]All previous Hands-On Radio experiments are available to ARRL members as downloadable PDF files at **www.arrl.org/hands-on-radio**.

[2]Archives of ARRL publications are available online to ARRL members at **www.arrl.org/arrl-periodicals-archive-search**.

H. Ward Silver, NØAX ♦ 712 Jefferson St, St Charles, MO 63301 ♦ n0ax@arrl.org



ANT NO	WIRE LENGTH TIP TO TIP		FUNDAMENTAL WAVELENGTH	K BY WHICH λ IS MULTIPLIED TO GET WIRE LENGTH		SHAPE
	Feet	Meters	Meters	Feet	Meters	
1	30	9.1	21 3	1 409	.4275	
2	31	9.4	22.0	1.410	.4275	
3	44	12.5	28.0	1.57	.4460	
4	56	17 1	39.5	1.418	.4300	
5	61	18.6	43.0	1.415	.4320	
6	76	23.1	51.5	1.47	.4480	
7	57.5	17.5 plus	40.0	1.435	.4380	
8	110.	33.5	78.0	1.410	.4300	
9	55	16.7	37.0	1.465	.4450	

TABLE SHOWING MEASUREMENTS MADE AND CONSTANTS FOR EACH ANTENNA

Figure 2 — Table from page 16, Oct 1926 *QST*, reproduced as a figure to show the old style lettering.

not a ham, but worked in the Department of Radio Operations for Radio Station WBZ in Boston) set up some Hertz antennas at amateur station 1KA and also measured antennas at station 1CK and 1KF. He used an oscillator and a wavemeter to determine the frequency at which the antenna resonated then measured the entire antenna — tip-to-tip, including the counterpoise.

A table of correction values was derived, with the free space wavelength in meters multiplied by an average value of 1.46 to get the antenna's resonant wavelength in feet. This corresponds to an equation of L = 438/f. This is the first suggestion that the actual resonant length of a practical amateur antenna can be predicted by applying a correction factor to a free space wavelength.

The table is reproduced in Figure 2, neatly lettered in the style of the day. Take a look at the right hand column, though. It shows the *shape* of the antenna. Antenna enthusiasts will recognize an early inverted L along with a vertical and a "bent vertical." In those days, it was not at all clear (at least to amateurs) what effect antenna shape had on resonant wavelength or on radiating capability. Thus, it was important to note everything when making measurements. These antennas also included a *counterpoise* — another wire laid out on or near the ground.

The experiments of 1925 and 1926 took place on or near 40 meters. In those days, CW operation on what we now call the "low bands" of 80 and 40 meters was the norm. At these wavelengths, a half wavelength dipole was of a reasonable length. It could be made of ordinary copper wire, probably #8 to #14 AWG, and installed in the back yard at heights of 20 to 40 feet. For these antennas, ⅛ to ¼ wavelength above ground, a value of 468 is about right, resulting in the equation printed in the *ARRL Handbook* in 1929.

Discovering this article was a little spooky, since one of my first "serious" ham radio publications was a report on some antenna testing I performed with Steve Morris, K7LXC.[3] Here I was, discovering that my answer was to be found in the report of another set of antenna tests nearly 85 years before!

Why Doesn't 468 Mean 468?

In truth, many variables affect the resonant frequency of a half wavelength dipole. The two primary factors are the length to diameter ratio of the antenna conductor and, most strongly, the antenna's height above ground. These can combine to change the actual correction factor quite a bit! (Insulation can also affect an antenna's electrical length.) In Experiment #82, I modeled a typical 20 meter dipole made of #12 AWG uninsulated wire at heights from ⅛ to 2 wavelengths over realistic ground and calculated the correction factor when its length was adjusted to resonance at each height. (The resonant frequency is the frequency at which the feed-point impedance is purely resistive, i.e. X=0) It varied from 466 to 481 over that range as you can see in Table 1.[4] Clearly, using 468/f would lead to an antenna being too short most of the time.

Table 1

Variation in Length × Feet with Height of a 20 Meter Dipole

Height in Wavelengths at 14.175 MHz (feet)	*Length × Feet*
⅛ (8.8)	467.8
¼ (17.4)	466.4
½ (34.7)	483.4
¾ (52.0)	473.4
1 (69.4)	480.5
1½ (104.1)	479.1
2 (138.8)	479.1

If 468 is too small and rarely correct, what should you do? Realistically, you should expect to trim your dipole to get the resonant frequency you want. Instead of being frustrated that the calculations aren't exact, learn to adjust the antenna's length efficiently by using an instrument such as an antenna analyzer. Start with an estimated value based on a more realistic formula such as 490/f that results in a small amount of extra wire for attaching insulators. During tuning, twist the wire connections together or use clamps, then raise the antenna into position and measure. When it's right, only then solder and weatherproof the connections. Recognize that every antenna's circumstances are slightly different — height, ground conductivity, thickness of wire, nearby conductors and so forth.

Magic Numbers

Another lesson to learn from this exploration is to realize that "magic numbers" in formulas have often been determined through experimentation under specific circumstances. As such, they likely depend on a variety of factors that you may not be able to replicate. They will only approximate what you actually encounter. If the assumptions behind the value are given — you can use that information by comparing it to your situation. If the assumptions are not known — you should allow for variations or try to find a more accurate model representative of your own circumstances.

I hope you've enjoyed reading about this journey as much as I enjoyed taking it, opening the covers of books nearly 80 years old and mapping the stream of knowledge back to its sources — finding there the footprints of wireless pioneers that set ham radio on the course we travel today.

For Further Reading

This would be a great opportunity for you to use the *QST* archives and find that October 1926 article. When you're through, enjoy a trip through ham history in the pages of that old *QST*. The only thing you'll be missing online will be the wonderful smell of an ancient magazine! QST

[3]W. Silver, NØAX, and S. Morris, K7LXC, "HF Tribander Performance — Test Methods and Results, Second Edition," Champion Radio Products, **www.championradio.com**, 2000.

[4]See also J. Hallas, W1ZR, "The Real World Meets Your Real Antenna," *QST*, Apr 2010, p 47.

AG1YK

HINTS & KINKS

JIM MATIS, K2TL

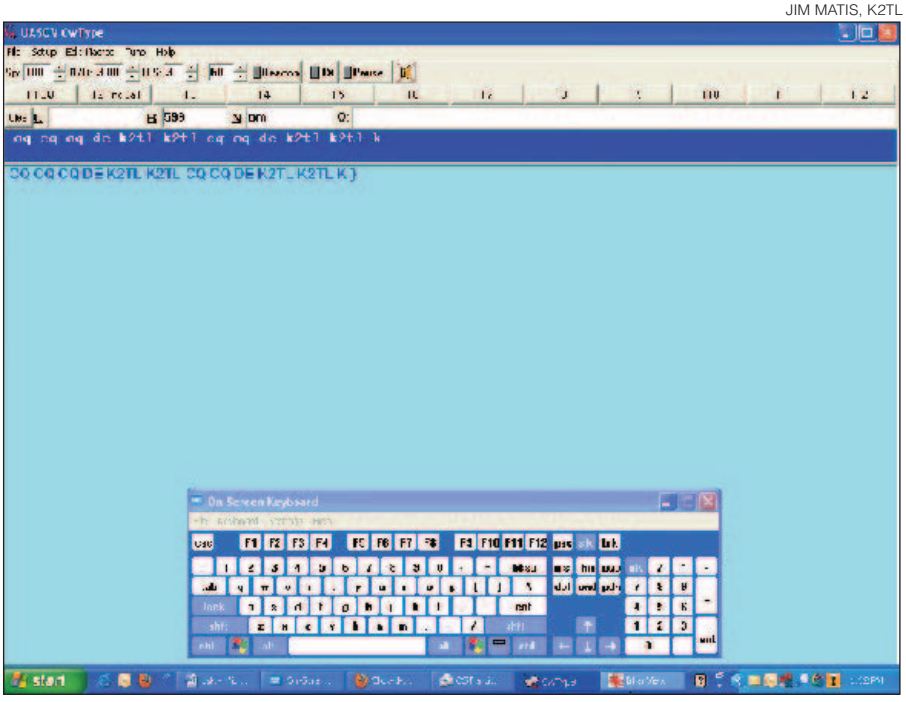


Figure 1 — A screen capture showing *OSK* with *CW Type*, a free CW keyboard program from UA9OV (www.dxsoft.com).

HELP FOR THE MOBILITY IMPAIRED AMATEUR

◊I came across a simple and free keyboard alternative for amateurs who have limited dexterity, severely restricted hand motor skills or otherwise cannot use a keyboard.

My search for a modified keyboard arose from the needs of a dear friend, a long time CW man who can no longer manage a key or paddle and has great difficulty with a keyboard. Not only does this restrict his Amateur Radio activities but also any other computing that requires a keyboard. Simple things that we all take for granted like e-mail or surfing the net can be impossible for someone with limited motor abilities — particularly hand dexterity.

Fortunately, *Windows* has a built-in solution. It is called *On-Screen Keyboard* (*OSK*) (see Figure 1). *OSK* only requires the user to move a mouse or joystick a little. *OSK* will work with any application that requires input from a keyboard. It also works with all of the common e-mail clients, word processors and any Internet Web page.

OSK can be configured for "Hover to Select" mode. Rather than having to click on a key to produce a letter, this mode selects the letter simply by hovering the pointer over the key. It doesn't matter if you have a slight tremor, as long as the mouse pointer doesn't cross the boundaries of the key. You can set up the selection time delay to give yourself plenty of time to change your mind on the character or to move on to another character. *OSK* can also be set to "Click to Select" using the mouse or joystick button. Font color and size are also selectable.

So, how does this work for Amateur Radio? I have tested *OSK* with *DigiPan*, *MixW*, *CW Type* and *HRD DM780*. It works perfectly. In addition, macros can easily be used with *OSK* as all of these programs assign an F key to the macros. *OSK* can select up to 12 F keys.

To access *Windows OSK* click on START, then RUN and then enter osk into the OPEN box. Click on OK to open the *OSK* program. To create a shortcut on the desktop:

1. Right-click the desktop.

2. Point to NEW and a list will open. Click SHORTCUT.

3. Type osk then click NEXT.

4. Type a name for the shortcut and then click FINISH.

Some functions of any application require a mouse click and do not offer a keyboard alternative, so *Windows OSK* may not be a perfect solution for those who cannot maneuver a mouse and click. In this case, on-screen keyboard programs have a greater functionality. One such *free* program is *Click-N-Type* (**www.lakefolks.org/cnt**). This program makes it easier to get text into those uncooperative places, like browser address fields, e-mail address and subject fields, and other dialog box input fields. — *73, Jim Matis, K2TL, 11 Moss Haven Way, Howell, NJ 07731-2293,* **k2tl@arrl.net**

SQUIRREL CONTROL

◊In response to "Coax Critter Damage," I had hired someone to climb a giant fir tree to attach my antenna support, a nautical pulley through which ran Dacron covered nylon cord.[1] Imagine my chagrin the next day to discover a squirrel had been gnawing on the rope — fortunately the end. I tidied it up with some cloth-type electrical tape, which the squirrel subsequently made off with. He thought it was a treat. I figure the glue was made from rendered horse flesh. So much for bargain tape.

Time to get serious. I ground some red pepper into a powder and made a paste that I smeared on the accessible part of the rope. Those squirrels have sensitive snouts. My rope hasn't been chewed since.

I needed to send the squirrel a message so I bought a cloth snake from a hobby store, which I affixed to the tree. One morning soon after, I was awakened by a critter tearing down the trail from the tree as fast as its little paws could move. Silhouettes of predators like cats, hawks and snakes are imprinted on their brains and they don't pause for close examination before making tracks. I figured I'd gotten even for the scare he gave me.

Then one day as I was typing on my computer, the house power failed. When I went out with the neighbors to find the cause, we discovered a squirrel had shorted itself across a pole transformer. I had been editing the final draft of a paper that was due in a couple hours and I hadn't bothered to make any backup copies. When the lights went out, I was about to utter a few choice words when I noticed that, oddly, my computer was still on. Then I remembered I was running it through an uninterruptible power supply (UPS), which

[1]T. Kuykendall, NK4I, "Coax Critter Damage," *QST*, Feb 2009, pp 78-79.

Steve Sant Andrea, AG1YK ♦ Assistant Editor ♦ h&k@arrl.org

I'd installed some time ago and forgotten about. If you have a squirrel that likes wires, depending on how promiscuous its tastes, you might want to invest in a UPS. — *73, Earl Gosnell, N7NZ, PO Box 3492, Eugene, OR 97403-0492,* **arrl@bibles.n7nz.org**

TARHEEL ANTENNA PROTECTOR

◊During the first winter using my Tarheel screwdriver antenna (**www.tarheelantennas.com**) I had wondered how it would hold up against the ice and snow. As I found out, a lot of ice and snow can collect on the mounting bracket and antenna base. I had to find something to shield the area around the mount without interfering with the tuning of the antenna.

I found a plastic fence post at a local hardware store that was 4 × 4 inches square and 3 feet long for less than $10. I cut a length of the plastic post to 11⅞ inches to fit the MT-1 mount. In the center of one side of plastic post I cut two vertical lines about 1 inch apart (see Figure 2). This 1 inch gap is used to pry open the post with your hands. Once the cut is made, paint the post an appropriate color and then slip the post around the antenna mount protecting the lower portion of the antenna and shunt coil (see Figure 3). — *73, Steve Benell, WA9JNM, 1160 Shoreline Cir, Cicero, IN 46034-9426,* **kjbenell@comcast.net**

STEVE BENELL, WA9JNM

Figure 2 — The fence post modified for mounting on the Tarheel antenna mount. The picture shows hurried cuts that are not straight, but they do the job until I can make better ones.

STEVE BENELL, WA9JNM

Figure 3 — The finished cover, painted and mounted on the Tarheel.

BUTTON BATTERY TABS

◊It is often difficult to solder leads to button batteries. I devised this alternative attachment method for when you lack the proper tabbed battery. You'll need a length of hookup wire, superglue or hot melt glue and heat shrink tubing.

Strip about ¾ inch of insulation off one end of the two wires. Form the stripped portion into a zigzag/curlicue. Lay the thoroughly cleaned battery on your work surface. Press and hold the shaped portion against the battery (with a piece of plastic) and apply the glue to hold the shaped portion to the battery. Make sure the glue doesn't get between the wire and the battery terminal. When set, verify the continuity of the connection, then repeat on the opposite battery face.

Place heat sink tubing over the assembly and apply heat. As the tubing shrinks, it will conform to both the battery and the formed portion of the wire leads. This will provide an electrical connection and mechanical retention of the leads at the battery. Non-formed leads would simply lack retention. Solder the exposed leads as usual.

This hint suffices for low current memory batteries. I've used this approach many times at repeater sites with no detrimental issues on NiCad battery sizes up to and including D cells. — *73, Wayne Troutman, KC7FKW, PO Box 568, Payson, AZ 85547,* **usaf1@joimail.com**

PERF BOARD DRILL GUIDE

◊ After etching a printed circuit board, drilling the holes accurately can be a formidable challenge. I've found that if you lay out your project using a 0.1 inch grid pattern, your hole locations will line up perfectly for using "perf" board as a drill guide. After etching the printed circuit board, I tape the perfboard on the printed circuit board and mark the hole locations with a pencil. I then use a drill press to drill the holes. Perfboard can be purchased at RadioShack, part number 276-1396. — *73, Dave Palmgren, N8DP, 6132 Co 420 - 21st Rd, Gladstone, MI 49837,* **n8dp@arrl.net**

MOLESKIN PAINT FINISH PROTECTOR

◊In response to Bill's, N4CRO, hint about auto finish discoloration, I found myself cringing at the thought of my car's finish being ruined by a mag-mount or the rubber pad that is supposed to protect it.[2] The mag-mount padding I use has not marred the surface of the car in any way shape or form, despite fall and winter weather, spring rain and summer sun.

What do I use? I use plain old fashioned moleskin. It can be found in the foot care aisle of your local discount store or pharmacy and it's cheap, to boot. To make it stick better, when you remove the paper backing, heat up the sticky side with a hairdryer before placing it on your mag-mount. Carefully trim with a sharp knife or file and enjoy. — *73, Georges P. Godfrin, KJ4BNE, 112 Grant Dr, Laurens, SC 29360-3712,* **georgesrn@yahoo.com**

COAX CABLE END SEALING

◊I prefer to retain the "ole-way" of doing things, so none of these newfangled dipole center connectors for me. I found a very neat way to weatherproof and seal the end of the coax at the feed point. For that matter, it can also seal your connectors. Two coats sealed the end very nicely and it is flexible too.

This product is called "Liquid Tape Electrical Insulation." I purchased a small can from a local hardware store. To quote the manufacturer, Plasti Dip International, "Performix Liquid Tape is a rubber insulation coating that exhibits excellent acid, alkaline and abrasion protection, and seals out moisture and salt permanently. The 4 oz brush-in-cap container colors come in Black and Red." Give it a try — it's a simple cure for all those "water in the coax" problems. — *73, Charlie Rankin, WA2HMM, 165 Hickory Ln, Smithtown, NY 11787,* **crankin@dialup4less.com**

EASY LADDER-LINE STANDOFF

◊A trip to the local hardware store turned up a nice ladder-line standoff. The 1.5 inch plastic pipe hanger matches my ladder-line without modifying either. Each hanger comes with a pair of slots for a zip tie. — *73, Dave VonDielingen, AD8B, 17701 E Willow Rd, Garber, OK 73738-1027,* **ad8b@arrl.net**

[2]B. Stewart, N4CRO, "Auto Clearcoat Discoloration," *QST*, Aug 2009, p 62.

"Hints and Kinks" items have not been tested by *QST* or the ARRL unless otherwise stated. Although we can't guarantee that a given hint will work for your situation, we make every effort to screen out harmful information. Send technical questions directly to the hint's author.

QST invites you to share your hints with fellow hams. Send them to "Attn: Hints and Kinks" at ARRL Headquarters, 225 Main St, Newington, CT 06111, or via e-mail to **h&k@arrl.org**. Please include your name, call sign, complete mailing address, daytime telephone number and e-mail address on all correspondence. Whether praising or criticizing an item, please send the author(s) a copy of your comments. QST

The Flight of *PBH-8*

A routine checkout flight for an Amateur Radio equipped balloon becomes a 33 hour epic journey.

John Ceccherelli, N2XE

Di di di dah. The simple Morse character V, transmitted by a half-watt Rock-Mite transceiver provoked wild cheering from a group gathered 1000 miles away.[1] On March 21, 2009 a group of graduate students from Cornell University launched a high altitude balloon for a routine system checkout. What was intended to be a 200 mile flight ended up 1160 miles away in Newfoundland.

Project Blue Horizon

Project Blue Horizon is the final class for the group and the capstone project on their quest for a Master's degree in Systems Engineering from Cornell University. Steve Betza, WZ2V, a sponsor and advisor to Cornell, conceived the project. Steve envisioned a grand experiment combining real-world pressure and intense engineering, while cultivating management skills required to perform a complicated project. As an avid ham, he also wanted Amateur Radio to be an integral part of the project. In the past 3 years, Project Blue Horizon has licensed 28 new hams and set an altitude world record for an Amateur Radio balloon of over 125,000 feet above sea level.

Each year, the students are handed a list of requirements and mission objectives. They are required to propose a solution to the customer (Cornell professors and industry advisors). The proposal is of the same depth, breadth and quality as would be expected for any real project. The students typically spend 40-80 hours a week for a month or so just on the proposal phase. If it is accepted by the customer they expend even greater effort designing and building the balloon. This current group has over 2 man-years invested on the project — a remarkable workload considering they all have full-time jobs.

The Maiden Flight of the 2009 Flying Season

On March 21, 2009 the group launched their first flight of the year on a routine mission to evaluate the performance of all onboard systems and verify their simulation data for flight dynamics and altitude control. *PBH-8* (Project Blue Horizon, flight 8) contained a UHF/VHF link and redundant HF link (Small Wonder Labs Rock-Mite in an Altoids tin) on 30 meters for command and control. Also flying was a VHF/UHF repeater, APRS transmitter, an additional GPS receiver, strobe light for night flying and a ballast tank for altitude control. A microprocessor manages all onboard systems, power and battery life.

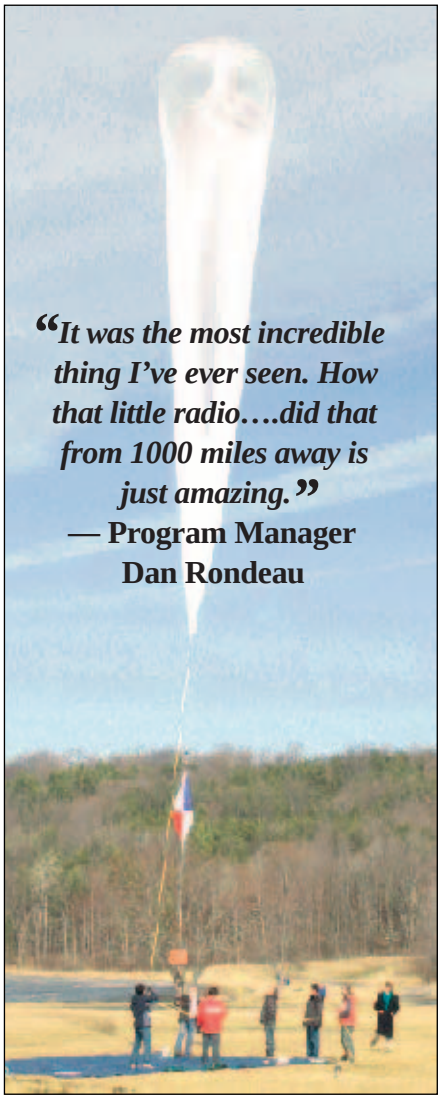


Figure 1 — Preparing *PBH-8* for launch.

Lift off occurred at 10 AM local time in Owego, New York (see Figures 1 and 2) and the balloon stabilized at 79,000 feet an hour later — just as predicted. Several ballast drops were performed throughout the day. Given how well the balloon was performing, the team decided to extend the mission through the night. One last ballast drop was performed via HF to stabilize the balloon before line of sight communication was lost. High altitude winds shifted, taking the balloon on a projected path into the Atlantic so the team, not wanting to lose the payload, commanded an abort, which was not successful. Chris Davin, KC2UFH, the Flight Dynamics Officer (FIDO), determined the vehicle was stable and on course for Newfoundland so the team opted to continue. Both the FAA and Canadian air authorities were notified and were tracking the balloon on **www.APRS.fi**.

Things Start to Get Interesting

The balloon descends throughout the night and stabilizes at 32,000 feet. For the next 18 hours it travels at 32,000 feet and 70 mi/h. Since the balloon is performing well and there is a high likelihood that the payload would not be recovered, the team decides to further extend the flight and shoot for Greenland. To keep it aloft, they need to drop ballast to survive the coming night. Far out of UHF/VHF range, the commands will have to be performed over the HF link.

With the balloon two hundred miles off the coast and approaching Newfoundland, Matt Howells, NS3FD, the Mission Flight Director, starts sending HF commands to drop ballast (see Figure 3). The odds of success are not high. A sizeable crowd assembles at Mission Control as team members, advisors and significant others gather to watch the mission unfold. Chatter subsides to silence as Matt hammers out the Morse commands. If successful, it will be obvious as the balloon first sends a series of "Vs" before any data.

[1]**www.smallwonderlabs.com**

Tension Mounts…

I have witnessed eight of these flights for Project Blue Horizon and I am continually surprised by the pressure. Each of the 10 team members has spent countless hours away from home and loved ones developing and refining their respective subsystems. The desire to succeed is enormously intense. Perhaps no one feels it more than Dan Rondeau, KC2UFJ, the project Program Manager. The success or failure of *PBH-8* rests on his shoulders and the decisions he has made for the past 6 months. Dan is the name and face of *PBH-8*. He has ultimate responsibility for the mission outcome.

Figure 2 — Dan Rondeau, KC2UFJ (far right) says goodbye to *PBH-8*. From the left: Matt Howells, NS3FD; Steve Orzechowski, KC2UFK; Angela Bratt, KC2UFL, and John Ceccherelli, N2XE.

Dan's fiancée, Marci, is at mission control. Marci is studying to be a dental hygienist and will graduate in May. Neither she nor Dan has much time to spend together lately. Marci sits quietly in the back of mission control away from the trench.

The similarity of mission control to NASA's Houston center is not an accident. In the trench are four operating positions with an assortment of radio equipment. Each position has a 60 inch LCD display above with pertinent information. The FIDO has the left-most station. The flight director owns the center two positions and typically has telemetry and mapping data on his displays. To the right is the data/communications position (DATACOM).

Marci's eyes are locked on Dan. This is the first time she's seen him in action as an engineer. She is as absorbed by it as the rest of us. The payload is moving at 70 mi/h and the situation demands Dan's attention. Issues are raised, discussed, debated and decided in a matter of seconds with no time to second-guess.

Dan nervously paces mission control as Matt attempts contact with the balloon. NS3FD sends command after command trying slight variations in frequency (the Morse decoder onboard is somewhat finicky). Finally a faint V V V from the balloon bleeps out of the HF receiver at mission control. The crowd explodes with cheers and applause in what is probably the most emotional DX low power contact of all time. Matt successfully communicates several more ballast drops and puts the vehicle on course for the North Atlantic.

Bitter Sweet

Minutes later, Canadian air traffic control (ATC) calls Matt requesting he abort the flight because the apparent flight path will be near a congested flight lane. Disappointed, Matt communicates with the balloon and attempts to execute the abort.

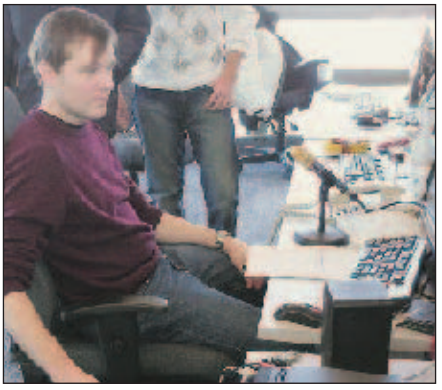


Figure 3 — Flight Director Matt Howells, NS3FD, reviewing flight procedures.

Steve Orzechowski, KC2UFK, is the chief engineer for the project. Aside from being directly responsible for the power management, cabling and abort systems, he has the overall responsibility for every other subsystem in the balloon. Now several subsystems must work exactly as designed or Steve gets to explain to Canadian ATC why the flight paths of dozens of aircraft are being diverted. Anyone who has been an engineer for any length of time knows what he is going through. Although this is just a class project, the stakes are now far greater and it is impossible not to feel the tension. The abort command is successful and with not much of Newfoundland left underneath, the balloon comes to rest in a tree.

The team arranged for Calvin Janes, VO1CAL, to recover the payload but when his team arrived on the scene, there was nothing but snow machine tracks and footprints. Regretful about terminating our flight, one of the air traffic controllers who ordered us down recovered the payload. Shortly afterward, a call from him solved the mystery.

PBH-8 traveled 1162 miles and spent 33 hours in the air, coming in second place for time aloft by an Amateur Radio balloon. The 30 meter Rock-Mite that flew on *PBH-8* also flew on *PBH-9*. This was a stock Rock-Mite except the crystals were for 10.147 MHz. That rig performed flawlessly for an accumulated flight time of over 83 hours and traveled 3127 miles at temperatures ranging from −20 to −40 Celsius. PBH-9 was last heard from 500 miles east of the Azores at 20,000 feet above sea level. The team would like to salute Dave Benson, K1SWL, for designing such a remarkable radio.

Steve Betza has often wondered how, in this age of instant worldwide communication, one excites newcomers about the hobby. Similarly he wonders how many new hams licensed in the project continue with Amateur Radio as an avocation. At the post-flight party, Program Manager Dan Rondeau said, "It was the most incredible thing I've ever seen. How that little radio (the Rock-Mite) did that from 1000 miles away is just amazing." Flight Director Matt Howells commented, "I am a ham for life. I see now that Amateur Radio is much more than a hobby, it is a means of reaching the most challenging of goals."

Apparently Betza's experiment is a success.

Photos courtesy of John Ceccherelli, N2XE.

John Ceccherelli, N2XE, an ARRL member, is a senior staff engineer for the Processor Development group at Lockheed Martin in Owego, New York. When not hiking and camping with his low power radio, John can be found bicycling hard or collecting tree ring samples. His previous QST *articles include "Vibroplex — The Company and its Classic Key," Jan 2003 and "The Dipole Dilemma," Mar 2004. He can be contacted at* **n2xe@arrl.net**.

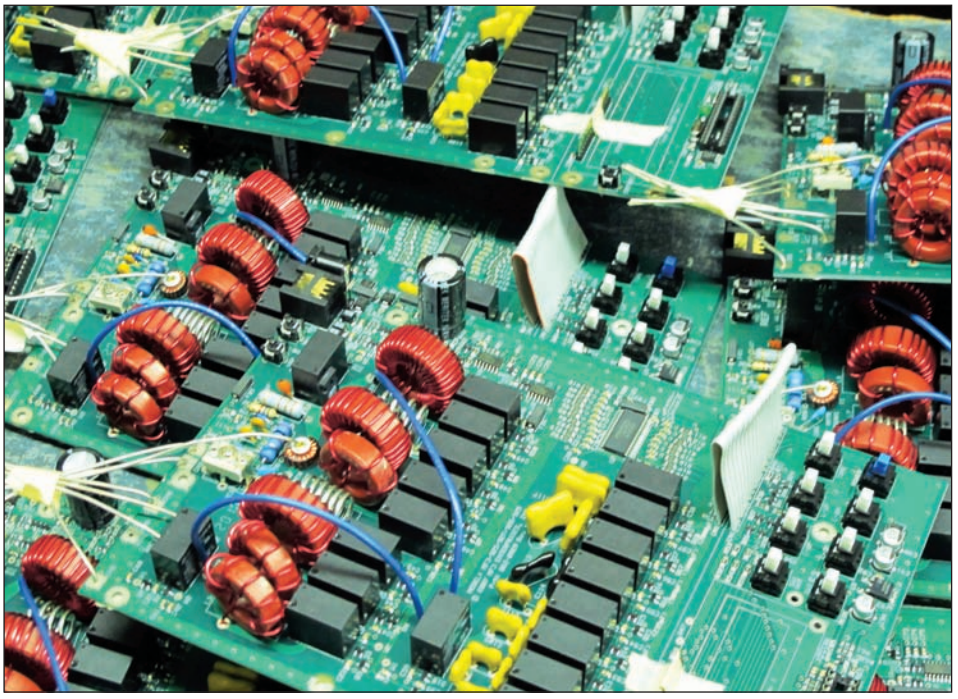
Ham Radio Manufacturing: An Inside Look

On a recent tour of the MFJ factory in Starkville, Mississippi, the author found it humming with activity most of us never get to see: skilled workers assembling a wide range of ham radio products.

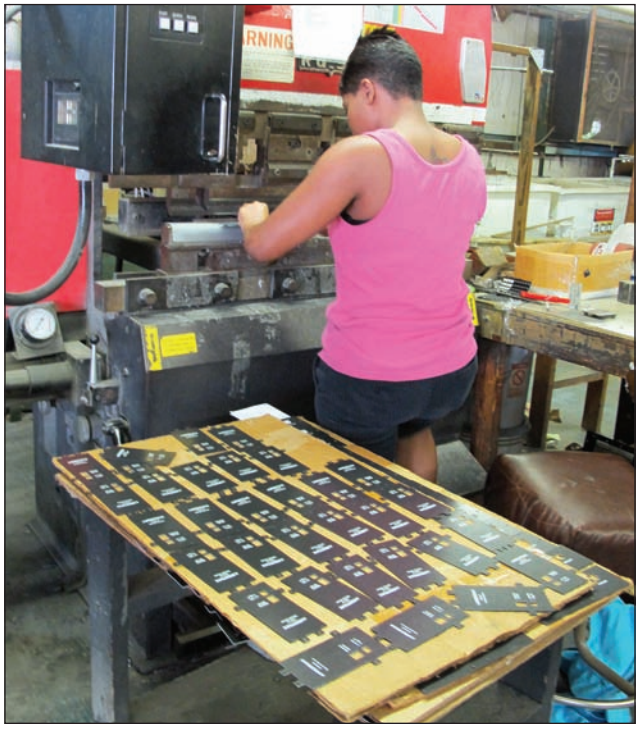
Harold Kramer, WJ1B

I had the pleasure of visiting MFJ in Starkville, Mississippi in June, and I was impressed with the scope of the operation and the friendliness of everyone I met. My goal here is to provide a glimpse into a modern Amateur Radio manufacturing facility, something few of us have the chance to see.

My thanks to MFJ owner Martin F. Jue, K5FLU, who gave me a great tour and helped fill in some of the information for the photo captions.



PC boards after wave soldering. Their permanent home will be inside a tuner. The switch boards have not yet been separated from the main PC board.



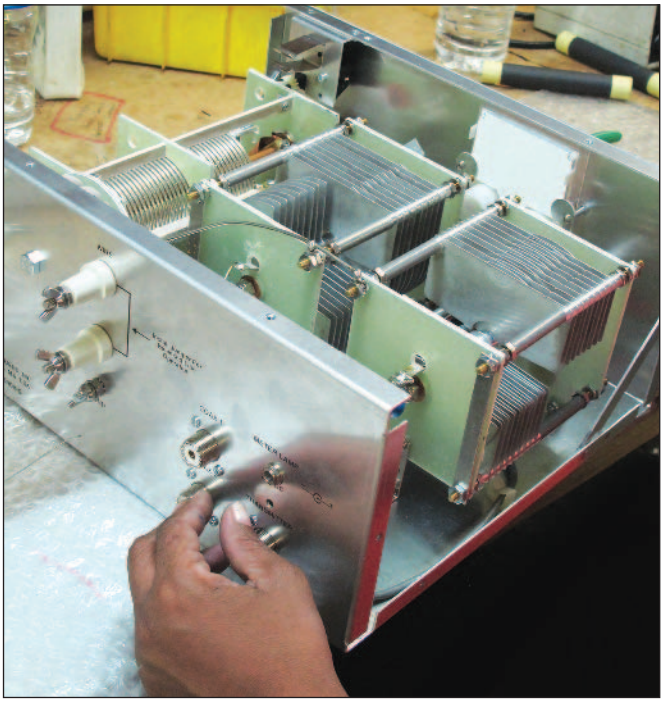
Celletta Tate is using a computer controlled bending machine to form a wattmeter cabinet.

Here we have Randy Sharp dimpling two concentric aluminum tubes to form a double wall structure for a vertical antenna.

With a variety of parts within reach, Shonda Warren assembles an air variable capacitor for an antenna tuner.

These thick-wall rectangular tank coils will end up in a full legal limit amplifier. Their considerable surface area and mass helps dissipate the extreme heat generated when the amplifier is running full power for an extended period. The taps are silver soldered and the entire inductor assembly will be glass beaded and silver plated for added efficiency.

Wiring a high-Q air-wound inductor to a rotary switch for use in an antenna tuner.



Putting the final touches on a legal-limit antenna tuner.

Up close, matching networks for a vertical antenna.

Photos by the author.

Harold Kramer, WJ1B, is ARRL Chief Operating Officer. You can reach him at **hkramer@arrl.org**.

JOTA 2010 is October 16-17

As the Boy Scouts of America celebrates its centennial, the 53rd Jamboree on the Air will be an opportunity to introduce young people to Amateur Radio.

Debra Johnson, K1DMJ

With the BSA centennial celebration as a backdrop, the 53rd annual Jamboree on the Air will provide an opportunity for Scouts to get on the air and get a taste of the fun and magic of radio that has captivated many a young person over the past 100 years.

JOTA is an international scouting event organized by the World Scouting Bureau. While JOTA officially starts at 12 midnight local time Friday night/Saturday morning and goes until midnight Sunday local time, there will be plenty of stations on the air Friday evening. The official Scouting frequencies will be the center of operations.[1] Each JOTA event provides an opportunity for a local club or Scout troop to get something started that can result in the beginning of a tradition of fun-filled activities.

JOTA 2009

We received reports from a number of groups participating in JOTA for the first time in 2009. Here are a few of those stories.

●The National Scouting Museum in Irving, Texas hosted JOTA for the first time in 2009. The Irving Amateur Radio Club and other hams from the Dallas/Fort Worth area with the Circle Ten and Longhorn Scout Council along with support from BSA headquarters International Department hosted 400 Scouts and guests. Ham radio activities included five operating positions: HF phone, HF PSK31, IRLP 1 and IRLP 2 and a VHF station. There were also several demonstrations of amateur satellite communication throughout the day.[2] — *Tom Schuessler, N5HYP*

●This was the first time that the Gaston County (NC) Amateur Radio Society and Gaston County ARES had teamed up with the Two Rivers District of the Piedmont Council of the Boy Scouts of America to provide a JOTA experience for local scouts. We combined our JOTA with a "Webeloree" that was going on at a nearby park. We had over 70 Cub and Boy Scouts take part in the event. For most of the scouts, this was their first time to ever hear, much less transmit over, an Amateur Radio station. We had scouts lining up to get on the radio, with many gathering around the HF rig to hear some DX stations and to see us demonstrate PSK31 and CW. In all, we talked to scouts and hams in five states and two countries! We combined the JOTA station with the communicator pin for the Webelos and helped them to fulfill the requirements for that award. Those scouts who were not directly in front of the radio were learning about radio theory, signal propagation and trying out Morse code on a code key oscillator. — *Bill Stevenson, AJ4JZ*

●Mount Vernon, Iowa's Boy Scout Troop 40 participated in their first ever JOTA during their Fall Camporee at Camp Waubeek, north of Cedar Rapids. As the Scouts had just concluded a Radio Merit Badge class, they were very enthusiastic about the opportunity to try their hand at ham radio.

As set-up concluded about 3 PM, the boys gathered around the picnic table that had become the improvised ham station and eagerly awaited their turn at the mike. One by one, they experienced QSOs with hams and scouts in New York, Massachusetts, Michigan, Idaho, Tennessee and other locations. A few even got their first taste of contesting, making contacts in the Iowa QSO Party. In all, nine Boy Scouts and four Cub Scouts experienced the magic of ham radio! Many boys inquired about the telegraph key at the table, and asked about learning Morse code.

Early Sunday morning when 20 meters opened up, the boys got to hear some DX, from England, Germany and Russia. Even teardown didn't diminish the excitement. As the gear was packed away for next year, nearly every boy expressed an interest in getting a license, and asked about bringing a license class to Mount Vernon.

You can be sure they are looking forward to Troop 40's second annual JOTA operation!" — *Dave Cripe, NMØS*

Debra Johnson, K1DMJ, is Manager of the ARRL Education Services Department. She can be reached at **djohnson@arrl.org**.

"*Whether it's your 1st, 2nd or your 20th — we hope you're looking forward to JOTA 2010 too!*"

A Cub Scout tries his hand at an HF contact at the Boy Scout Museum in Irving, Texas.

BOY SCOUTS OF AMERICA

Scouts learn about HF digital communications at the PSK31 station in Irving, Texas.

[1] A listing of those frequencies, information about third party traffic restrictions and other details can be found on the ARRL Web site at **www.arrl.org/jamboree-on-the-air-jota**, or on the World Scouting site at **www.scout.org/en/information_events/events/jota**.

[2] For a photo slide show and audio of the 2009 National Scouting Museum JOTA activities, visit **www.scouting.org/sitecore/content/Home/International/ProgramEnrichment/JOTA_JOTI.aspx**.

2009-2010 School Club Roundup Results

School power! Looking back to the Fall 2009 and Spring 2010 successful events and looking forward to the next one in October.

Lew Malchick, N2RQ, and Sean Kutzko, KX9X
n2rq@arrl.net kx9x@arrl.org

From the corners of the science lab to the cafeteria, with antennas from beams on the roof to dipoles strung between flagpoles, the twice-a-year School Club Roundup brings Amateur Radio into elementary, high school and college classrooms across North America. Armed with a rig and logging program, this week-long contesting curriculum takes center stage. The 2009-2010 school year presented numerous challenges for those who took part in the October 2009 and February 2010 sessions. Even so, entries increased from 30 and 33 in 2008/2009 to 43 and 47 in October 2009/February 2010. Several school operations were curtailed because of weather related closures.

JEFF SHARROCK, AF4CM

Members of the Wagoner Windtalkers, the Amateur Radio club at Wagoner High School in Wagoner, Oklahoma show off their certificates for their participation in the School Club Roundup

Instead of focusing only on scores, the SCR is more about getting younger people on the air. It's important to get the mike in the hands of the students so they can experience the thrill of a QSO and the unity of being part of a team. Many thanks to the numerous club trustees and Elmers who help activate clubs during the event. If you participated, make sure each of your operators gets a certificate. Participation certificates are available for everyone.

The Numbers

In the Elementary School category, all other locales bowed before Pennsylvania. The Cowanesque Valley School ARC of Knoxville, KB3BRT, took top honors in October 2009; for the Spring 2010 event, the North Clarion School ARC of Tionesta, W3NCS, emerged victorious. We'll have to find out what they eat in the Keystone State to get such performance!

The Middle/Intermediate/Junior High School category saw entries from nine schools in the Fall and 12 in the Spring. The William Byrd Middle School ARC of Vinton, Virginia, K4WBM, climbed to the top of the pack in October 2009. Representing the Pacific Northwest, Chief Joseph Middle School Ham Radio Club, K7BZN, of Bozeman, Montana rose above all other contenders in February 2010.

In the High School category, 13 logs were received for the Fall, compared to 10 for the February 2010 running. WB4HS was the leader among high schools in both October and February. The Roanoke County Public School District in Virginia should be proud of their schools in Vinton. The William Byrd High School ARC, WB4HS, won both the Fall '09 and Spring '10 events, and three of the possible eight winners for the 2009-2010 year came from Vinton. Well done!

There was a significant increase of College Club entries, from 13 in 2008-2009 to 27 in 2009-2010. Top marks were scored by the Amateur Radio Club at UC Santa Barbara, W6RFU, in the fall and the Amateur Radio Society at Arizona State University in Scottsdale, W7ASU, in the Spring session. Much of this increase is due to the efforts of Brent (KB1LQD) and Bryce (KB1LQC) Salmi of Rochester Institute of Technology (K2GXT) who reached out to college clubs with their Web site, **www.collegearc.com**. The Samli brothers have done a great job with their Web site; keep it up, guys!

Scores Don't Tell the Entire Story

How is the health of the SCR? Numbers that are not part of the score give us some ideas. The total number of operators reported increased from 255 in October 2008 to 452 in February 2010. The total number of QSOs was up to 6139 in February 2010. Although 24 hours are allowed, the average entry is between 12 and 14 hours. Due to poor conditions — both propagation and weather — a number of very small entries were reported with scores under 100 points. This indicates interest in reporting the effort even when the results are not great. All signs indicate slow but steady growth of the SCR.

Administrative Changes

From the beginning of the School Club Roundup we have been based at Brooklyn Technical High School in New York City, with student members of the BTHS-ARC helping with processing of entries. However, virtually all of the members of the Council for the Advancement of Amateur Radio in the New York City Schools (CAARNYCS) have retired or moved away. At the request of Marty (KA2NRR) and Lew (N2RQ), the Long Island Mobile Amateur Radio Club (LIMARC) will be helping to sponsor the SCR. Many thanks to LIMARC for their assistance! We expect this new relationship will improve administration of the SCR.

Be sure to visit the School Club Roundup on the ARRL Web site at **www.arrl.org/school-club-roundup-scr**. Upload your school's story and photos from your effort in the SCR Soapbox page, get the full results and scores, download entry forms or logging software and get the latest news on the event!

The next SCR sessions are scheduled for October 18-22, 2010 and February 14-18, 2011. Will your club be active? We hope so! QST

FCC Allows Limited Participation, on Behalf of an Employer, in Disaster Drills

In a *Report and Order* (*R&O*) released July 14, the FCC amended Part 97.113 to allow amateurs to participate without an FCC waiver in government-sponsored disaster preparedness drills on behalf of their employers participating in the exercise. The FCC also has amended the rules to allow employees to participate in non-government drills and exercises up to one hour per week and up to two 72 hour periods during the year.

"Experience has shown that amateur operations can and have played an essential role in protecting the safety of life and property during emergency situations and disaster situations," the FCC noted in the *R&O*. "Moreover, the current Amateur Radio Service rules, which permit participation in such drills and tests by volunteers (*ie*, non-employees of participating entities), reflect the critical role Amateur Radio serves in such situations. However, as evidenced by recent waiver requests, state and local government public safety agencies, hospitals and other entities concerned with the health and safety of citizens appear to be limited in their ability to conduct disaster and emergency preparedness drills, because of the employee status of Amateur Radio licensees involved in the training exercises. We therefore amend our rules to permit amateur radio operators to participate in government-sponsored emergency and disaster preparedness drills and tests, regardless of whether the operators are employees of the entities participating in the drill or test. We find that extending authority to operate amateur stations during such drills will enhance emergency preparedness and response and thus serve the public interest."

In order to allow participation in non-governmental disaster drills — such as those sponsored by ARES® or private hospitals — the FCC will now allow amateurs employed by an agency participating in such a drill to participate up to one hour per week. In addition, they may also participate in up to two exercises in any calendar year, each for a time period not to exceed 72 hours. "This time limitation, which is consistent with the timeframes contained in the waiver requests filed with the Commission, should serve to further ensure the use of Amateur Radio for bona fide emergency testing," the *R&O* stated. "We emphasize that the purpose for any drills we authorize herein must be related to emergency and disaster preparedness. By limiting the purpose in this manner, we further ensure that such drills will be appropriately limited."

In amending the Amateur Radio rules, the FCC reiterated that it does not intend to disturb the core principle of the Amateur Radio Service "as a voluntary, non-commercial communication service carried out by duly authorized persons interested in radio technique with a personal aim and without pecuniary interest. Rather, we believe that the public interest will be served by establishing a narrow exception to the prohibition on transmitting amateur communications in which the station control operator has a pecuniary interest or employment relationship, and that such an exception is consistent with the intent of the Amateur Radio Service rules."

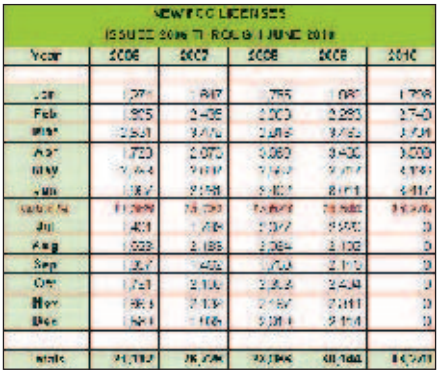
The effective date of the *R&O* is to be determined and will be at some time after its publication in the *Federal Register*.

FIRST HALF OF 2010 SHOWS SURGE IN NEW AMATEUR RADIO LICENSES

With more than 18,000 new Amateur Radio licenses issued in the first half of this year — 18,270 to be exact — 2010 is shaping up to be a banner year for Amateur Radio. So far, the number of new licenses issued by the FCC in 2010 is outpacing the January-June 2009 totals by almost 8.5 percent; at this time last year, the FCC had issued 16,844 new licenses. Broken down by license class at the end of June 2010, there were 16,299 Novices, 342,064 Technicians, 154,284 Generals, 60,059 Advanced and 121,640 Amateur Extra licensees for a total of 694,346, according to the ARRL VEC.

In 2009, a total of 30,144 new licenses were granted, an increase of almost 7.5 percent from 2008. In 2005, 16,368 new hams joined Amateur Radio's ranks — just five years later, that number had increased by almost 14,000, a whopping 84 percent!

"The ARRL VEC has been busy meeting the needs of the Amateur Radio community by helping people to become radio amateurs or upgrade their existing licenses," said ARRL VEC Manager Maria Somma, AB1FM. "So far in 2010, ARRL VEs have administered 20,929 exam elements at 3600 ARRL VEC-sponsored exam sessions. The number of amateurs who want to be Volunteer Examiners and who want to teach Amateur Radio classes is also going up — we've seen a spike in the number of applications from General and Extra class radio amateurs who want to give back to their community by serving as ARRL examiners and instructors."


NEW FCC LICENSES

Year	2006	2007	2008	2009	2010
Jan					
Feb					
Mar					
Apr					
May					
Jun					
Jul					
Aug					
Sep					
Oct					
Nov					
Dec					
totals					

As of June 30, 2010, the number of new licenses issued by the FCC outpaced the January-June 2009 totals by almost 8.5 percent. By June 30, 2009, the FCC had issued 16,844 new licenses.

S. Khrystyne Keane, K1SFA ♦ ARRL News Editor ♦ k1sfa@arrl.org

FCC News

♦**White House Budget Office Names FCC "Most Improved" Federal Agency**: The Federal Communications Commission is the "most improved" agency across the entire federal government in terms of employee satisfaction, according to the 2010 OPM Viewpoint Employee Satisfaction Survey released July 12 by the White House's Office of Management and Budget (OMB).

"I am delighted that the FCC has been recognized as the 'most improved' federal agency," said FCC Chairman Julius Genachowski. "The survey results reflect the hard work being done throughout the agency to make the FCC a model of excellence in government. The FCC's reform agenda, which builds on the impressive strides made by Commissioner Copps as acting chairman, includes creating new opportunities for employees to provide feedback; improving employee communication through technology and new media; and focusing on leadership development and opportunities for employees. I applaud the work of the FCC management and staff and look forward to more great things to come."

This annual online survey is designed to gauge job satisfaction and motivation within federal agencies. It was distributed in March and reached more than half a million federal government employees.

ARRL WEST GULF DIVISION VICE DIRECTOR JOHN THOMASON, WB5SYT, RESIGNS POSITION

On July 11, ARRL West Gulf Division Vice Director John Thomason, WB5SYT, of Edmond, Oklahoma, submitted his resignation to ARRL President Kay Craigie, N3KN. Thomason told President Craigie that by resigning, he will be able to "devote my energy to serve my family, employer and health." Craigie accepted the resignation with regret and then informed West Gulf Director Dr David Woolweaver, K5RAV.

Thomason was appointed in January 2009 as Vice Director after Dr Woolweaver moved up to the Director position upon the retirement of Division Director Coy Day, N5OK. The Director and Vice Director positions in the West Gulf Division — as well as the Pacific, Rocky Mountain, Southeastern and Southwestern Divisions — are up for election this November.

CAN I HAVE AMATEUR RADIO FOR $1000, ALEX?: YOUNG AMATEUR MAKES HER MARK ON *JEOPARDY!*

For hams who are fans of the television quiz show *Jeopardy!* — where contestants have to answer in the form of a question — the July 6 show was a real treat: Andrea Salt, KE7OPV, of Gilbert, Arizona, was a contestant. But what makes Andrea's time on *Jeopardy!* even more special is that she is only 13.

The first week in July, *Jeopardy!* hosted their annual Kids' Week. To be eligible to participate in Kids' Week, all contestants must be between the ages of 10 and 13 and pass an online test consisting of 30 questions. The questions cover a variety of categories and the kids must answer each question within 20 seconds. And yes, spelling *does* count!

Andrea — an ARRL member — told the ARRL she became interested in Amateur Radio in the summer of 2006. "We went to the Charlotte, North Carolina science center. My dad and I challenged each other to get our licenses. I got my Technician license in August 2007 when I was 10. Now I enjoy teaching people about Amateur Radio at the Arizona Science Center." Dad is Thomas Salt, AD7PM.

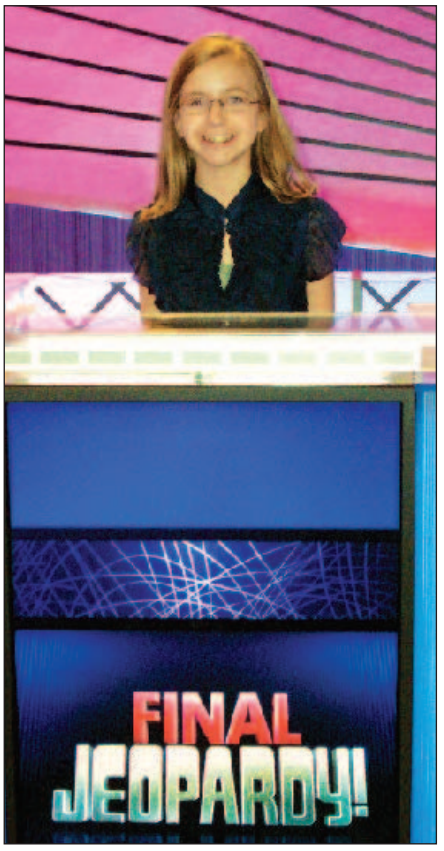
Andrea told KNXV, the Phoenix ABC-affiliate television station, that appearing on *Jeopardy!* was "a dream come true. I've grown up watching *Jeopardy*." The day she found out she made it onto the show, her mom took the phone call from the *Jeopardy!* producers while she was doing her math homework. But her parents held the news back a little: "They made me finish my homework and practicing my flute before they even told me," Andrea said, adding that she celebrated with a lot of jumping up and down and screaming.

This was her second attempt to get on *Jeopardy!* and she said the test was not easy. "There was some stuff I knew, but I didn't get it written down in time, and some stuff I just didn't know," Andrea said. Her father says he knew if Andrea went after it, she would achieve her goal: "She just has a wealth of knowledge," he said. This future veterinarian said that her favorite *Jeopardy!* category is "Rhyme Time."

When it came down to show time, Andrea said she wasn't even nervous. "All I did was focus!" But when asked what her favorite part about appearing on *Jeopardy!* was — the tough questions, being in front of the audience, maybe even achieving her goal — she replied that she "really liked having sodas and cupcakes for breakfast."

After the first set of commercials on *Jeopardy!*, host Alex Trebek interviews each contestant. In her interview, Andrea mentioned that she is an Amateur Radio operator. Unfortunately, Andrea did not win her round, but her future is definitely a bright one. A well-rounded young lady, Andrea enjoys playing the flute, reading and teaching others about ham radio.

COURTESY OF THE SALT FAMILY



Thirteen year old Andrea Salt, KE7OPV, of Gilbert, Arizona, was a contestant on the television quiz show *Jeopardy!* in July during Kids' Week.

FRED FISH MEMORIAL AWARD #2 GOES TO TEXAS HAM

Llewellyn "Pat" Rose, W5OZI, of Junction, Texas, is the recipient of the Fred Fish Memorial Award (FFMA) #2. Thanks to a recent Grid DXpedition by Russ Dwarshius, KB8U, of Ann Arbor, Michigan, Rose earned FFMA #2; FFMA #1 was awarded posthumously to Fred Fish, W5FF (SK), himself. The ARRL Awards Branch received and approved Rose's QSL for his last-needed grid — CM79 in California — on July 8, 2010.

The Fred Fish Memorial Award was created in honor of Fish, a legendary VHF+ operator who became the first amateur to work and confirm all 488 Maidenhead grid squares within the 48 contiguous United States on 6 meters. Rose is the first amateur to duplicate Fish's feat. The FFMA will be awarded to any amateur who can duplicate Fish's accomplishment.

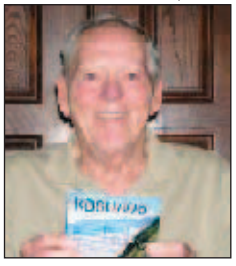
Grid square CM79 is one of the more dif-

ficult grid squares to activate. According to Bill VanAlstyne, W5WVO, the logistics of how to activate CM79 have been discussed [on the FFMA Yahoo! group] for a couple of years now. "Russ [Dwarshius, KB8U] is basically following the only realistic approach to activating this grid from land — 'realistic' meaning (a) it's physically possible to do it that way, and (b) the radio capabilities provided by the approach should result in strong enough a signal over wide enough a range of azimuths for the effort to be worthwhile," he explained. "For example, running 5 W to a whip antenna from the western slope of the mountain (or from the beach) would be a lot easier, but it would not meet the (b) part of the realistic test. Very few QSOs (if any) would result." VanAlstyne runs the FFMA Yahoo! Group.

VanAlstyne said that there is a primitive campground accessible by car, just north of the CM79 grid corner: "From this campground, a trail runs roughly south-by-southeast up the ridgeline of Chamisal Mountain. Near the peak of the ridgeline, about a 90 minute hike from the campground, the trail comes within about 70 feet of the grid corner (though it never actually crosses into CM79). The exact grid corner is located down the hill southwest from the trail. The location is carefully located by GPS and the batteries and transceiver are placed there. An extender cable for the rig's detachable front panel is then run up the hill to the ridgeline where the operating position and antenna are set up. It is necessary for the antenna to be at the ridgeline in order to get any RF out to the east."

Dwarshius set up his operation in accordance with the VUCC/FFMA rules as a "grid corner" operation. Working him only once counted for four grid squares: CM79, CN70, CM89 and CN80. VanAlstyne explained that this approach satisfies the VUCC/FFMA requirement that some part of the operating setup be located in each of the four grid squares, to within the error limits of the GPS, which must not exceed 20 feet. "Modern GPS receivers can get you to within 5 feet, so meeting the accuracy requirement is not difficult," he said. "You can activate four grids by doing this sort of approach around a grid intersection point, or two grids by doing it along a grid boundary."

COURTESY OF PAT ROSE, W5OZI



Pat Rose, W5OZI, holds up the last-needed QSL card to receive the Fred Fish Memorial Award #2.

Fred Fish, W5FF, was the first amateur to ever work all 488 grid squares in the 48 contiguous United States on 6 meters.

To qualify for the FFMA, hams must submit confirmation of 2-way contact with all 488 grid squares on 50 MHz; any mode may be used. There are no endorsements and no recognized tiers of progression. The rules for the award will strictly follow the rules of the ARRL VUCC program. Of particular importance is VUCC Rule 6 that states that all QSOs submitted for credit must be made within the same 200 km circle. For example, this prohibits a station in Oklahoma from submitting grids worked while on vacation in North Carolina. While the award is open to all amateurs worldwide, American and Canadian applicants must be a member of the ARRL to participate, as per VUCC rule 1(a).

In Brief

- **ARRL Represented at Europe's Largest Amateur Radio Convention**: Billed as Europe's biggest Amateur Radio exhibition, HAM RADIO 2010 was held in Friedrichshafen, Germany, June 25-27, 2010. The event is held annually in the Lake Constance region. This was the 35th international Amateur Radio exhibition and the 61st Lake Constance Convention of Radio Amateurs, sponsored by the Deutscher Amateur Radio Club (DARC), which established the event. As part of the Lake Constance Convention, visitors experienced a variety of programs including lectures, international and national meetings and large stage presentations. At the center of activities was the anniversary of the DARC. Germany's IARU Member-Society is celebrating 60 years with its 45,000 members.

"The event adds a unique dimension to the Amateur Radio Service's principal of international goodwill," said ARRL Marketing Manager Bob Inderbitzen, NQ1R. "Among the most popular convention halls at Friedrichshafen is the one devoted to exhibits organized by the national Amateur Radio societies. The experience is much like a cultural fair. It's fun to wander from booth to booth — or country to country! — and meeting with society representatives, enjoying their displays of maps and awards and exchanging eyeball QSLs." Inderbitzen, ARRL Chief Executive Officer David Sumner, K1ZZ, ARRL Regulatory Information Manager Dan Henderson, N1ND, and International Affairs Vice President Jay Bellows, KØQB, attended Friedrichshafen, representing the ARRL.

The ARRL has attended HAM RADIO for the past few years to greet our non-US members and network with other national radio societies. ARRL also supports DXCC card checking at its booth — a very popular activity among the international community who travels to this large show. The ARRL, as International Secretariat for the International Amateur Radio Union (IARU), also hosted a meeting area for IARU officials and friends at the convention. Last year's HAM RADIO had 17,400 visitors and nearly 200 exhibitors from 30 nations. Pictures from this year's event have been posted to ARRL's Facebook page.

- **Former ARRL Staffer Mike Kaczynski, W1OD (SK)**: Michael B. Kaczynski, W1OD, of Bristol Connecticut, died unexpectedly on July 6, 2010 at Bristol Hospital. He was 51. An ARRL Life Member, Kaczynski worked at ARRL Headquarters from 1979-1987 starting off at the DXCC Desk, then becoming a Communications Assistant, Technical Information Specialist, Lab Technician and eventually an Assistant Technical Editor and Contest Manager; at the time of his death, he was employed at ESPN. While at the ARRL, he authored almost 50 articles in *QST*, including contest results articles and product reviews. He was also President of the Newington Amateur Radio League from 1991-1992 and a member of the ARRL's A-1 Operator Club. In lieu of flowers, memorial donations may be made to the Kaczynski Scholarship Fund, c/o St Stanislaus Church, 510 West St, Bristol, CT 06010 or to Special Olympics, 2666 State St, Suite 1, Hamden, CT 06517-2232.

- **Anthony "Tony" Dorbuck, K1FM (SK)**: Tony Dorbuck, K1FM, of New Britain, Connecticut, passed away May 27. He was 75. Dorbuck was an ARRL Assistant Technical Editor in the League's former Technical Department from 1971-1978. While at the ARRL, he penned almost 30 articles in *QST*, including Product Reviews, as well as contributing to *The ARRL Handbook*.

Northern Florida Hams Assist Hospitals in Emergency Exercise

Stan Zawrotny, K4SBZ
k4sbz@arrl.net

What if the hospital lost its telephone service and the Emergency Room (ER) couldn't call another medical department? What if during a crisis situation, one local hospital needed assistance from another and the phones were out? In a hospital emergency exercise in Tallahassee, Florida, on Thursday, March 25, those were just two of the many possible scenarios where Amateur Radio operators might come to the rescue.

Operation Secure Assure

Operation Secure Assure was an exercise to test hospital response 12 hours post landfall of a Category II hurricane affecting a regional area with massive damage and a large number of medically critical injuries. Tallahassee Memorial Hospital (TMH), Capital Regional Medical Center (CMRC) and Select Specialty Hospital participated in the exercise. The mission was to test communication between hospitals and Leon County Emergency Operation Center (EOC), storm surge and external triage for the Emergency Department as well as lockdown and monitoring of the facility. The Hospital Incident Command was tested as was utilization of the new Hospital Command Center.

Ten hams from the Capital District Northern Florida Section ARES volunteered to provide emergency communications to TMH and CMRC during this annual joint exercise. Six hams were positioned at TMH with Paul Eakin, KJ4G, acting as TMH command and David Miner, W4SKG; Sal Martocci, K4YFW; Stan Zawrotny, K4SBZ; David Davis, WA4WES, and Art Yarborough, KG4YZE, at the ER, triage and exercise EOC. Norm Scholer, KJ4JPK, served as the CMRC command, with Alan Torledsky, W1ABT, and Dan Moniz, KI4HGO, positioned at the ER and EOC there. Donna Jean Barker, WQ4M, remained mobile as the ARES Incident Commander (IC) serving the two hospitals.

Immediate Shift to Backup Frequencies Demonstrates Preparedness

Upon arrival, the primary and backup 2 meter VHF command frequencies were found to be unusable within the hospitals. A shift was made to the backup 440 MHz UHF frequency, which was solid copy throughout both hospitals and with the mobile IC.

The Capital District ARES has Statements of Understanding with TMH and CMRC that they will provide emergency communications for the hospitals in a crisis situation. Permanent radio equipment installations have been made at both hospitals including Kenwood VHF and UHF stations with antennas installed on the roofs. Antenna connections are available in or near the ERs and boardrooms of the hospitals. We do not have HF capabilities in our hospitals. The messages handled have all been either between units within the hospital or between the hospitals and community resources such as the American Red Cross or EMS. These messages are easily handled by voice on VHF and UHF frequencies, either via repeaters or simplex.

Constant Communications Maintained

Simulated emergency messages were relayed between the two hospitals conveying status reports and requests for resources when one hospital became overloaded with casualties. Messages were also relayed to the Capital Area Chapter of the American Red Cross. Within the hospitals, constant communications was maintained between triage, the ER and the EOC. At triage, the hospitals had a group of volunteers bandaged as simulated critical injuries.

A D-STAR (*D-RATS*) link between the two hospitals was tested, but, due to the brief nature of the messages, was not actually used for the exercise.

Just Communicators

Paul Eakin, KJ4G, NFL Section Manager, was acting as TMH command. Paul explains that he would deliver a message to the Liaison Officer by simply laying it next to her hand, tapping it and standing aside without a word, waiting for a response. Paul advises that, "We were there as communicators and it was important for us not to get in the way of the exercise." He would not leave until she answered the message. When she provided an answer, he would take the message back and transmit it to the original sender. This would complete the message cycle.

Two and a half hours into the 4 hour drill, the large radar screen on the wall in the EOC began to show the large dark green and red

STAN ZAWROTNY, K4SBZ

Dave Miner, W4SKG, handling traffic at the Tallahassee Memorial Hospital EOC.

STAN ZAWROTNY, K4SBZ

Paul Eakin, KJ4G, delivering a message to Freda Lyon, Tallahassee Memorial Hospital Liaison Officer.

Steve Ewald, WV1X ♦ Public Service Specialist ♦ sewald@arrl.org

blotches for which Florida is well-known. Severe weather was rapidly approaching from the west and the hospitals knew that such weather would soon mean extra work for them. After just a few moments of conference, the Incident Commander announced that the exercise was terminated in response to "real world needs." Even though the exercise was shortened, everyone, hospital and ARES officials both, concurred that Operation Secure Assure was a complete success and that the role of Amateur Radio in the exercise was significant.

EVOLUTION OF A CLASSIC "GO-KIT"

Mike Urich, KA5CVH
ARRL PIO, Southeastern Harris Co ARES
ka5cvh@arrl.net

Our ARES group is unique compared to most structures in the United States. Harris County (Texas) is a single county district in the South Texas Section with its own District Emergency Coordinator (DEC). This is largely because of the significant population base, the high exposure from tropical weather related events and potential terrorism threat to the large petrochemical manufacturing complexes. The county is presently broken up into four geographic zones or "units" and each has its own Emergency Coordinator (EC), Assistant Emergency Coordinators (AECs) and Public Information Coordinator (PIC).

The Emergency Operations Center (EOC) at Harris County Homeland Security and Office of Emergency Management (HCHS & OEM) is the communications hub for all of Harris County. HCHS & OEM is headquartered in the Transtar building on the northwestern side of Houston. In addition to being the county EOC, Transtar has its own Amateur Radio Station (N5TRS) and presently has four operating positions. The positions are not identical, but together they comprise a variety of HF with PACTOR, V/UHF, packet, *Airmail* and D-STAR.

In addition, most incorporated cities inside of Harris County have their own EOC. Many of them are permanently equipped with Amateur Radio stations as well. As the Incident Command Structure (ICS) has developed, it is only necessary for the incorporated cities to be able to contact Transtar, which can be done on the V/UHF bands with FM using repeaters and simplex. While many of the city EOCs have HF capabilities, this is not our primary mode of communications. The State Operations Center (SOC) is in Austin, Texas. Since that is beyond the reach of V/UHF from Harris County, the primary mode to contact SOC is HF, which is Transtar's responsibility. Of course the other cities can assist when necessary.

A few years ago, I voluntarily took on the task of trying to put together a Web site that would have all the necessary elements for Harris County ARES to provide support to our served agencies. One page was for go-kits. As many would do, I used a search engine on the Web to find go-kits and subsequently read a lot of Web sites, forms, check-off lists, etc, and quickly came to the conclusion that there is no one perfect go-kit. I did find a lot of similarities. For some applications, the suggested go-kits would be overkill. As an example, my preassigned duty for an ARES event is the EOC at the City of La Porte. Outside of a small cooler for sodas and snacks, my personal netbook and some change for the vending machines down the hall, I do not need a classic go-kit.

Be Self Sufficient

The following is just one part of the Harris County ARES field operations manual located at **harriscountyares.org** in the "Field Operations Manual" section.

What should you have in a go-kit? There really is no one right answer to this question. The goal is to be self sufficient no matter what the situation. What we will try to do here is give you some examples of what you may want to include in your kit.

Emergency Operations Center

If you are deployed to an EOC, hospital or other fixed site that has permanently installed radios, you only need to be concerned with providing the following. Many ARES members who are badged at the various permanent EOCs already know the capabilities and limitations of those facilities and can adjust their kits accordingly.

For a short-term assignment (24 hours or less):

- All appropriate IDs including ARES/RACES and drivers license.
- Field operations manual.
- Small cooler with drinks and snacks of your choosing.
- Medications including OTC pain relief of your choosing.
- Money, especially small bills and change.

For a medium term assignment (24-72 hours). In addition to all of the above you will need to consider bringing the following, most of which may be left in your vehicle until needed:

- Two or three changes of clothes.
- Personal toiletries and towels.
- Additional drinks, snacks and food.
- Sleeping bag or pillow.
- Cot or air mattress

General Deployment

If you are deployed to a shelter, hospital or other facility that does not have installed Amateur Radios, you will need:

For a short term assignment (24 hours or less):

- All appropriate IDs including ARES/RACES and driver's license
- Field operations manual
- Small cooler with drinks and snacks of your choosing
- Medications including OTC pain relief of your choosing
- Radio or handheld transceiver with external power amplifier
- Power supply or battery of adequate capacity
- Portable antenna with stand and coax
- SWR meter
- Small multimeter
- Earphone or headphones (speaker microphone or headset)
- Extra batteries if needed
- Various RF cable adapters
- Various 12 V dc adapters as for cigarette lighter and Powerpoles
- Watch
- Portable alarm clock with AM/FM radio
- Money, small bills and change especially
- NOAA weather radio, preferably with Specific Area Message Encoding (SAME) capability
- Camera

For a medium term assignment (24-72 hours). In addition to all of the above you will need to consider bringing the following, most of which may be left in your vehicle until needed:

- Two or three changes of clothes.
- Baby wipes or similar product
- Personal toiletries and towels.
- Additional drinks, snacks and food.
- Sleeping bag or pillow.
- Cot or air mattress

Outdoors or "In the Open"

If your deployment is going to have you outside ("in the open"), you will need to consider adding the following to your deployment kit. Weather will also dictate what you do and do not need.

Personal items for a short-term assignment (24 hours or less):

- Cap, jacket or rain poncho as weather dictates.
- Pocket knife or multitool
- Mini first aid kit
- Sunglasses
- Sun screen or block
- Insect repellent
- Umbrella, canopy or tent
- Small trash bag
- Small table and chair
- Hand cleaner or paper towels
- Small flashlight
- Lip balm
- Tissues

For a medium term assignment (24-72 hours). In addition to all of the above you will need to consider bringing the following, most of which may be left in your vehicle until needed:

- Two or three changes of clothes
- Baby wipes or similar product
- Personal toiletries and towels
- Additional drinks, snacks and food

- Sleeping bag or pillow.
- Cot or air mattress

More hostile environments/situations may require you to consider adding:

- More substantial shoes and/or hiking boots
- Wide-brimmed hat
- Pocketed vest
- Compass
- Whistle
- Matches/lighter (even if you don't smoke)
- Earplugs
- Eye protection
- Leather / work gloves
- Camp shovel
- Toilet paper
- Safety pins
- Water purifier

Extras

Additional carry along items to bring provided you have the space and feel the need.

Administration/Office Items

- Pens
- Pencils
- Paper clips
- Rubber bands
- Clear tape
- Post it notes
- Ruler
- Envelopes various sizes of Manila
- Stapler and staples
- Calculator
- Clipboard
- Highlighters and markers
- Local maps

Tools are very important to have along with you. A small toolbox with the following is easy to carry along:

- Screw drivers, flat and Phillips
- Adjustable wrench
- Adjustable pliers
- Adjustable locking pliers (vise grips)
- Soldering iron
- Solder
- Sand paper
- Assortment of Allen wrenches
- Electrical tape
- Duct tape
- Hammer
- Tape measure
- Assortment of small screws, nuts, bolts and washers

In addition an assortment of spare parts such as:

- Fuses
- Wire
- Jacks
- Plugs
- Other connectors

Other Miscellaneous Items

- Food that does not require cooking unless you bring the stove and fuel
- Handheld propane torch
- Additional antennas
- Slingshot and fishing line
- Rope
- 50 Ω coax
- Binoculars
- Generator
- Extension cords
- Power strips
- Bags and baggies
- Hammock
- Jumper cables
- Camp stove with fuel
- Eating utensils
- Large trash bag

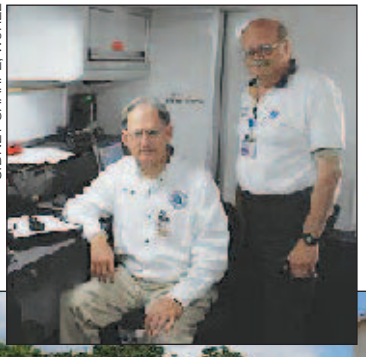
This list could go on forever to include everything possible. It is intended to serve as a guide to help you determine what you need to be equipped for your assignment.

EAGLE TORNADO RESPONSE

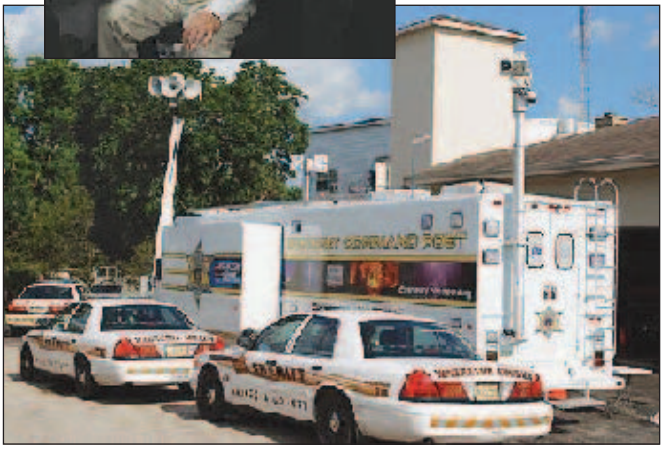
Waukesha County ARES/RACES was activated on Friday morning, June 25, to assist Waukesha County Emergency Management and the Eagle Police Department in their relief activities for the Eagle tornado that occurred Monday, June 21. This activation immediately followed a 3 day activation on behalf of the American Red Cross relief activities to the same tornado. Our 3 day response to this callout included 13 operators, 170.8 duty hours and 29.6 travel hours amounting to 1294 travel miles. ARES/RACES operators who responded came from Waukesha, Dane, Milwaukee, Ozaukee, Racine and Washington Counties. — *Thanks to Larry Noldan, NZ9I, ARES Emergency Coordinator, Waukesha County, Wisconsin*

Waukesha County EC Larry Noldan, NZ9I, and Waukesha County Emergency Manager Bill Stolte, N9VBJ, confer in the Waukesha County mobile command post at the Village of Eagle.

SIDNEY SHARPE, W9REL



SIDNEY SHARPE, W9REL



This is the Waukesha County mobile command post vehicle surrounded by Waukesha County sheriff cars at the Village of Eagle fire station.

NTS RESOURCES ON THE ARRL WEB PAGE

The National Traffic System (NTS) Resources Web page is a part of the "Public Service" portion of the ARRL Web site. The specific link to the NTS Resources is **www.arrl.org/nts**.

On this Web page, you'll also find a variety of links to resources such as the "NTS Methods and Practices Guidelines" — NTS MPG (**www.arrl.org/appendix-b-nts-methods-and-practices-guidelines**). This is the working reference manual on traffic net and message handling procedures in the National Traffic System. It also serves as an appendix to the *Public Service Communications Manual* (**www.arrl.org/public-service-communications-manual**). According to the NTS MPG's editor, Al Nollmeyer, W3YVQ, "the methods presented are a reasonably accurate snapshot of current practices. They are indeed practices, and not strict rules, but the beginner, Section, Region, Area and Transcontinental Corps net operators and management alike will find it beneficial to have a uniform protocol reference to be used by operators."

"The National Traffic System — An Introduction" is a *PowerPoint* presentation that provides an introduction to the National Traffic System (NTS), including an introduction to National Traffic System Digital (NTSD). Thanks to Greg Szpunar, N2GS (Official Relay Station and NTS Digital Relay Station) and to Dave Struebel, WB2FTX (Section Traffic Manager of Northern New Jersey and NTS Eastern Area Digital Coordinator) for writing and creating this program. To see and download the program, click on its link on the NTS Resources Web page.

"An Instructors Guide to Training Traffic Handlers" by Mark W. Rappaport, W2EAG, is also available on the NTS Resources Web page. This guide is written for the volunteers who are willing to train Amateur Radio operators about traffic handling. These volunteer instructors know that the end result of training is to bring new traffic handlers to the nets.

ARES®: 75 and Counting

When Mother Nature wreaks havoc, hams are there to assist — as we have since the early days of Amateur Radio. A key player, the Amateur Radio Emergency Service® turns 75 this month.

Mike Corey, W5MPC, and Allen Pitts, W1AGP

The Beginnings

"At least one amateur station in every community should be equipped with auxiliary station equipment for use in an emergency…."

With those words, writing in the September 1935 issue of *QST*, ARRL Communications Manager F. E. Handy, W1BDI, announced the ARRL Emergency Corps (AEC). Its goal was "An Amateur Radio Emergency Station in Every Community!" To enlist, the amateur had to have (1) transmitting and receiving equipment suitable for emergency operation and (2) the capability to operate from auxiliary power. Registration was made through a postcard to the ARRL, and approved stations received a membership card.

Now, 75 years later, the requirements are much the same. Amateurs participating in ARES indicate what equipment they have for emergency use and the bands and modes they can operate. They register their station with their local Emergency Coordinator or online. But the similarity does not end there.

Amateur Radio was involved with emergency communications from the very beginning — the first documented team effort was in the 1913 midwestern floods with hams at the University of Michigan and Ohio State University providing emergency communications. Soon after the formation of the ARRL in 1914, *QST* ran regular accounts of amateurs taking action in emergencies. Hams were not only involved in aiding storm victims, but also recovering stolen cars and helping the railroads (critical lines of communication at the time).

The first landmark test of Amateur Radio in emergencies is the 1927 flooding of New England. With whole communities cut off, it was the hams who provided rescue communications for large areas. But while the hams' efforts won the praise of the Federal Radio Commission (forerunner of the FCC), they also showed the need for a formal organization and protocols. The November 1928 and January 1930 issues of *QST* laid out priorities and message handling procedures.

Why the AEC Came to Be

The impetus for the Corps was twofold. In August 1935, *QST* reported activities in Colorado, Nebraska and neighboring states in which Amateur Radio operators helped fill the gap when normal lines of communications went down. Newspapers carried stories of Amateur Radio operators providing assistance during a flood in Western New York. Field Day also played a part in getting the AREC started, with its emphasis on emergency preparation along with stimulating the development and trial of successful portable stations.

"A.R.R.L's Emergency Corps — Join Now" was the headline in the September 1935 *QST* that gave birth to the program that became ARES. Ed Handy, W1BDI, asked for volunteers from "…those amateurs who have available at their stations transmitting and receiving equipment suitable for use in an emergency." As reported in November 1935 *QST*, 39 hams and four clubs made up the initial core of the A.R.R.L. Emergency Corps. This was fortuitous, as within five months they would be sorely needed.

"Amateur Radio Rises to the Greatest Emergency Need of All Time" trumpeted the May 1936 issue of *QST*. The birth of the AEC just a few months earlier was timed perfectly, as in March 1936 flooding in 14 Northeast states left a half-million people homeless, and Amateur Radio rose to the occasion. It appears that only 18 stations were involved, but for the time it was a heroic effort and was well-noted by the media, as there was not yet much of an "All Else" to fail.

A year after the founding of the AEC, September 1936 *QST* reported that 297 stations had registered either as emergency powered stations or as support members, those who did not have the ability to operate under auxiliary power. All registered stations were listed. The AEC continued to grow until the outbreak of World War II. Following the war, it was re-formed under the name Amateur Radio Emergency Corps. In the 1970s it underwent another name change, to the Amateur Radio Emergency Service, emphasizing our service to others.

The current elements of leadership — Emergency Coordinator, District Emergency Coordinator and Section Emergency Coordinator — have existed in some form

> *"At least one amateur station in every community should be equipped with auxiliary station equipment for use in an emergency. For real preparedness such equipment should be designed to operate from power supplies other than regular a.c. or d.c. lines. Although it is true that much of the most valuable emergency work is done using equipment operating directly from a.c. or d.c. mains, it must be remembered that the "stricken area" itself is usually without current from the power company. This means a wait until lines are repaired. "Waits" are inexcusable in emergencies. Communication should be established at the earliest possible moment. To guard against delays the "emergency set-up" must operate from auxiliary power, and the operator must at all times know where he can secure the auxiliary power (if he does not have emergency power himself, arrangements can usually be made with local hardware dealers, radio stores, etc., for the loan of batteries when the need arises)."*
> — from Operating News, September 1935 QST

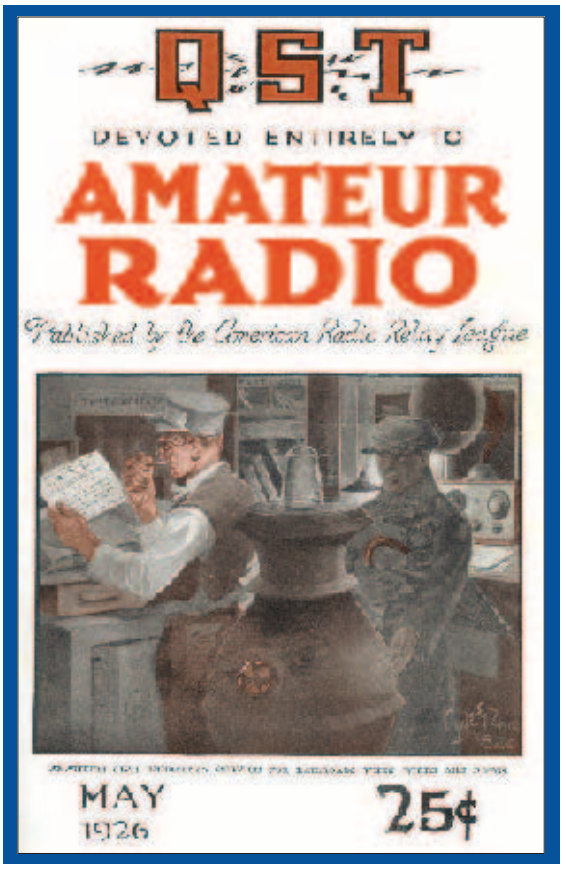
ARES Registration

To register your station in the Amateur Radio Emergency Service, contact your local Emergency Coordinator or Section Emergency Coordinator. You can also register online at **www.arrl.org/ares**.

Major Deployments Since 1995

While selecting any list is hard, these are candidates for the biggest ARES deployments in the past 15 years:

Hurricane Ike — 2008
Hurricanes Katrina, Wilma and Rita — 2005
Wildfires in Texas, Oklahoma and New Mexico — 2005
Hurricanes Charley, Frances, Ivan and Jeanne — 2004
Earthquake in Central California — 2003
Northeast Blackout — 2003
Shuttle Columbia Recovery Effort — 2003
World Trade Center, Pentagon and Western Pennsylvania Terrorist Attacks — 2001
Tropical Storm Allison — 2001
Fires in Los Alamos, New Mexico — 2000
Hurricane Floyd — 1999
"500 Year Flood" in North Dakota and Minnesota — 1997
Oklahoma City Bombing — 1995



Back in May 1926, *QST* highlighted the productive partnership between Amateur Radio and the railroads.

since the very beginning. For a period there was a National Emergency Coordinator. National coordination of ARES is now handled at ARRL HQ by the Field Services Supervisor and the Emergency Preparedness and Response Manager.

Keys to Longevity

What has led to the longevity of ARES when other groups have come and gone? There are several factors, but the top three are (1) that ARES always sought to serve others, and never itself, (2) the versatility of the program and (3) common trainings. These can best be seen in contrasts.

Right from the beginning in 1935, ARES was designed to serve other agencies or response organizations. Two months after the formation of the AEC, *QST* advised members to seek out local Red Cross officials, railroads, police, military units and representatives of the press associations to make their availability known. Cooperation with served agencies was critical for the success of the Corps just as much as it is today with ARES. This cooperation starts with the local groups that will work closely together during an emergency. The cooperation between partners continues today at the local level and nationally with Memoranda of Understanding (MOU) between the ARRL and served agencies.

The second key to the longevity of ARES is its versatility. It has changed as the world and communication needs have changed. The atomic bomb and the Cold War changed everything in America, much as terrorism and 9/11 have changed our world today. The ARRL and federal government officials saw the need for a specific, civil defense service. Out of their discussions, the Radio Amateur Civil Emergency Service (RACES) was born in 1952 to serve the government's needs. RACES, the cousin of ARES, was a child of the Cold War era. Its mission was providing government officials (and only them) with special licenses using special frequencies. But times change and, while there are still groups serving and using RACES in their name, there are no longer any RACES licenses.

The Military Auxiliary Radio Service (MARS) also had a singular focus for many years. Recently MARS underwent a major overhaul, including its purposes, to meet changing world conditions. Time will tell how that works out, but so far it seems well planned.

The National Traffic Service (NTS), for all of its past services, now battles for recognition against the options that modern phone systems and the Internet provide for long distance communication. Discussions are now being held about the future of NTS.

Meanwhile, ARES never limited itself to what, who or how, other than to provide emergency radio communications for others. This gave it great flexibility at the local and section level.

ARRL EmComm Courses Help Standardize Protocols

The relationship between ARES and the ARRL Emergency Communications training courses started in 2002 with a grant from United Technologies Corporation. The grant covered the cost of the Level 1 training course for 250 Connecticut amateurs. Connecticut Section Manager Betsey Doane, K1EIC, encouraged all Connecticut ARES members to take and complete the course within a year to meet the grant specifications.

It made an incredible difference in the state's ARES operations. Members started using the same terms in the same way; there was true interoperability in both equipment and also in leadership roles. A feeling of pride and


This Certifies that_____

is a member of the

AMERICAN RADIO RELAY LEAGUE

EMERGENCY CORPS

FOR PUBLIC SERVICE

QRR

This operator is prepared to furnish communication to his community in the event of failure of regular communication facilities due to storms, floods and similar disasters.

_____ Comms. Mgr. A.R.R.L.

Stations accepted into the ARRL Emergency Corps received this official certificate from the HQ Communications Department.

In the aftermath of Hurricane Katrina in 2005, hundreds of Amateur Radio volunteers took time away from work and family to assist residents of New Orleans and other devastated Gulf Coast communities.

esprit de corps developed. From this success, three levels were made available nationwide and became a model for other organizational trainings. The ARECC remains the benchmark for emergency communications training. There are now two levels, one for Managers and one for Members, incorporating procedural changes that have evolved over the years.

The Future

Looking into the tea leaves to see the future of ARES is difficult in post 9/11 America. Just as volunteer fire departments are now hard-pressed to get volunteers due to the ever increasing training requirements placed on their members, ARES faces similar problems. The "I will be there when you need me" radio amateur is an EC's worry. Yes, recent history has shown that they *will* indeed be there, motivated but untrained. In a major disaster, when it is "all hands on deck," we need them. But what can they successfully do? The need for training of *all* ARES members, while recognizing the other time demands that modern life places on volunteers, is a balancing act the ARES program continually works to master.

Credentialing is another major issue the tea leaves don't clarify. In the absence of guidelines from above, many local entities are developing their own requirements and identification schemes. In drills and small events, uncredentialed volunteers can be turned away. But in a major event, the local people involved will probably be called "victims" and help will have to come in quickly from surrounding areas. We saw some of this during Katrina; those who demanded "only *our* card-carrying people will be allowed in" soon found themselves overwhelmed as state and national agencies responded, bringing hams with them. A large part of any reasonable planning needs to include the rapid assimilation and integration of amateur operators coming in from other areas, states and even countries (as in Haiti in January 2010).

Quick to Adopt Technology

One Amateur Radio revolution began quietly around 1988 with the creation of the computer sound card. Sound cards jump-started the digital revolution for hams. Before this, TNCs may have allowed a menu of packet type signals, but the sound card opened a whole new world. Ever increasing numbers of hams took the technology of computers and radios and blended them into what have become today's most popular digital modes. This also has led to an interesting problem — a surplus of opportunities. Which mode(s) should be "standard"?

In addition, the US is still blessed with the legacy of a wonderful interlocking system of VHF and UHF Amateur Radio repeaters. There's nothing wrong with these thousands of analog systems that daily provide extended voice communications. But as our emergency communications toolbox grows, how do we merge the new digital systems into the mix? This is not an ARES-specific problem, but it is a discussion that will have a direct effect on its future.

Spreading the Word

Whatever the future may hold, *publicity* of ARES activities will continue to remain a critical need. Because ARES serves others, we need to let these others know we are there and our capabilities. Major milestones in this area were the 2003 video *Amateur Radio Today* narrated by Walter Cronkite, KB2GSD, the PR-101 Course for PIOs and the 2007 Emergency Radio campaign.

With the "hardening" of other communications and quicker response times, the time window when ARES is of the greatest use appears to be within the first 48 hours of an event. Unfortunately, this is also when few hams think about grabbing a camera and informing media and others about their actions. By the time such contacts are made, other communications are being restored and the media talk about how well the cell phone systems came back.

News is what's happening *now*. After-action reports are great in planning, but worthless in promoting ARES to the media. Without this promotion, we face increasing antenna restrictions and challenges to our bands. On the bright side, we have a *great* story to tell. We can boast thousands of skilled volunteers, aiding their communities with thousands of dollars worth of communications equipment, who in the worst of times can save lives and property in ways that only they can do. And for training exercises, such as Field Day, we can have fun while preparing for the worst. What's not to like about that?

To the SECs, ASECs, DECs, ADECs, ECs, AECs, ARES members and others, irrespective of the alphabet soup you may have on your ARRL badge, Happy Anniversary! "Ya dun gud" — and we're still going strong.

Mike Corey, W5MPC, is ARRL Emergency Preparedness and Response Manager. He can be reached at **mcorey@arrl.org**. *Allen Pitts, W1AGP, is ARRL Media and Public Relations Manager. He can be reached at* **apitts@arrl.org**.

Emergency Communications Training

The ARRL offers two emergency communications courses: Intro to Emergency Communications and EmComm for Managers. Information can be found at **www.arrl.org/emergency-communications-training**.

Discovering D-STAR

Trying something new occasionally takes a leap of faith.

Larry Moxon, K1KRC

For me, it all began with an idea.

I wanted to become more active on 2 meters and 70 centimeters, not just to talk to friends, but for public service applications as well. If my objectives had ended there, an ordinary FM transceiver would have been more than adequate.

But I wanted to go beyond ordinary FM. In addition to my voice, I wanted the ability to swap digital information with my fellow hams. I wanted to exchange everything from short text messages to small files. I realized that I could accomplish some of this by tapping into the APRS (Automatic Packet/Position Reporting System) network with a standard analog FM transceiver and a packet TNC (Terminal Node Controller), but I wanted to push the envelope further. My ideal configuration was a digital communications system where the hardware was fully integrated — *everything*, from voices to text, would be digital within a single device. No external boxes or rat's nests of wires.

ROSS MOXON, KB1TNP

Larry Moxon, K1KRC, enjoys a mobile D-STAR conversation with Fran, W1FJM.

D-STAR Discovered

I described my idea to a fellow ham and he suggested that I investigate D-STAR. I had heard about D-STAR, but I had always assumed that it was just ICOM's attempt at marketing another old-style analog FM radio with built-in packet and GPS positioning at a significant increase in price.

I was also concerned about what seemed to be a closed, proprietary system. Unlike analog FM where you can select from radios made by a number of different manufacturers, D-STAR looked like it was strictly an ICOM product.

As it turned out, I was wrong on several counts. First of all, D-STAR is an open digital protocol developed by the Japan Amateur Radio League (JARL) — it is *not* an ICOM product. Any manufacturer can make a D-STAR compatible transceiver. It just so happens that ICOM is the first to do so on a large scale.

Secondly, D-STAR transceivers are not at all like analog FM rigs, at least in a functional sense. A D-STAR transceiver *can* operate as an analog FM rig for those times when you need to communicate with analog FM users (or through standard FM repeaters), but its true strength lies in its digital capability. You can use a D-STAR transceiver for voice communication in which your speech is converted to digital information and reconstructed — minus any noise — at the receiving end. You can also send a stream of digital data (containing your location, call sign, etc) *at the same time*. This isn't high-speed data, but it is perfectly adequate for the kind of brief information it usually carries. This is known as the D-STAR *DV* mode.

D-STAR also has a *DD* mode that is intended for dedicated data transfers rather than the digitized voice/data combo we find with DV. The ICOM ID-1 transceiver can exchange data on the 23 cm band at rates as high as 128 kbps in the DD mode. True, this is not broadband Internet, but it is fine for exchanging sizeable files. To put it in perspective, the DD mode on 23 cm is more than twice as fast as the fastest dial-up Internet connection.

Since the entire communication is digital, D-STAR offers some extraordinary capabilities. You can configure a D-STAR transceiver to respond only to calls from certain individuals, or you can direct calls to specific individuals or groups. This is perfect for public service. And the D-STAR repeaters themselves can be linked via the Internet for long distance coverage. You can use this function to set up a call to a buddy on the other side of the continent. Once the call routing is programmed, you simply press the button and talk.

On the Air with D-STAR

One day push finally came to shove. There was nothing left to do but make the investment and give D-STAR a try.

I entered the D-STAR universe by ordering an ICOM IC-2820H transceiver with the plug-in digital/GPS board. When it finally showed up, I eagerly opened the package and read through the manual. After wiring the power connections in my car, I was off and running.

Any new technology has a learning curve and that was certainly the case here. In my haste I had failed to correctly configure the DV mode; I couldn't make contacts! I went back to the manual, but I still was uncertain. This is where having a D-STAR mentor is invaluable. I had two: Bill, N1CNV and Fran, W1FJM. They had me up and running in no time.

The results were amazing. Voices were consistently, digitally clear. A glance at the radio would tell me who was calling, or where they were located. Connections — even to distant locations — were made smoothly and automatically. Good old analog FM couldn't compare to that experience and I've never looked back!

No matter how much research you do, you'll never be completely sure until you make the leap of faith and try a new technology yourself. Breaking with old habits and assumptions is never easy, but the rewards can make the effort worthwhile.

ARRL member Larry Moxon, K1KRC, spent most of his career as a System Integrator for marine instrumentation data collection and logging, primarily dealing with government contracts. Now retired, he is presently working on several video and print projects to assist new D-STAR users. You can contact Larry at 338 Indigo St, Mystic, CT 06355-1326; **k1krc@arrl.net**.

2010 Simulated Emergency Test

Get ready… The annual ARRL SET is October 2-3.

Steve Ewald, WV1X
sewald@arrl.org

The 2010 ARRL Simulated Emergency Test (SET) is just around the corner, and ARRL Field Organization leaders are planning an event that will actively involve members of the Amateur Radio Emergency Service® (ARES®), the Radio Amateur Civil Emergency Service (RACES), the ARRL National Traffic System (NTS) and many other related groups that prepare for and respond to emergencies. Public service and emergency response agencies and organizations in your community, ARRL Section Leaders and/or local and state officials will also be invited to participate. You, too, are invited to be a part of this annual tune-up for emergency response.

Make the Best of the Opportunity

To help make the best of this training opportunity, contact your local ARRL emergency coordinator or net manager to find out the details. Although October 2-3 is the focal point weekend, ARRL Sections, ARES teams and nets may conduct their exercises anytime — and especially during the months of September through December. If you don't know whom to contact, please touch base with your ARRL Section Manager and/or Section Emergency Coordinator or Section Traffic Manager for assistance. See page 16 of *QST* for Section Manager contact information or consult the ARRL Web site for the referrals to your Section Leadership officials. The URL to start with is **www.arrl.org/sections/**. From there, you'll find links to ARRL section home pages with appropriate contact information. Listen in on nets, too, or attend your local club meeting. The net leaders and club leaders will often have announcements and be able to provide general information on the local plans or arrangements for the SET.

Be Prepared to Respond

The SET is a training opportunity to try out something new under simulated emergency conditions. You can try or practice skills in a variety of areas. Test a communication mode that you may have not been too involved with yet and have an interest in. This experience could prove worthy so that you would be ready to operate if a real activation were to take place. You can also spruce up your traffic handling and net operation skills or use this time to help a newcomer in these facets of Amateur Radio.

WB4NWS

From the left: Tom Olley, KG4VUB (Assistant SEC Digital), Darragh McCluer, WA6IKS (EC), and Jim Millsap, WB4NWS (AEC), operate from the Cherokee County (Georgia) Emergency Operations Center during the 2009 Simulated Emergency Test.

ARRL Field Organization officials in your area and Section are planning the simulated emergency scenarios that will be used during the SET event. These scenarios are designed to involve public service or public safety agencies and organizations. They, too, will learn first hand through this SET how Amateur Radio can assist in emergencies.

Of course, some agencies have longstanding working relationships with ARRL, ARES and other associated Amateur Radio groups. The Simulated Emergency Test is one of the best opportunities to exercise the relationships. For more information on whom the ARRL maintains a National Memoranda of Understanding with, check this page: **www.arrl.org/served-agencies-and-partners**.

National Preparedness Month

National Preparedness Month is an annual nationwide effort held each September to encourage Americans to take simple steps to prepare for emergencies in their homes, businesses and schools. Once again this year, ARRL is a coalition member. National Preparedness Month 2010 is sponsored by the US Department of Homeland Security. The goal of the month is to increase public awareness about the importance of preparing for emergencies and to encourage individuals to take action. Throughout September and the months surrounding it, Homeland Security will work together with a wide variety of organizations, including local, state and federal government agencies and the private sector, to highlight the importance of family and business emergency preparedness as well as to promote individual involvement through events and activities across the nation. More information can be found at **www.ready.gov.**

You are encouraged to consider this year's ARRL Simulated Emergency Test and all preparations as well as post exercise evaluations as a demonstration of your readiness and Amateur Radio's readiness. Be an active participant in SET, and join others nationwide in National Preparedness Month.

Additional background on the annual SET is presented in the article, *2009 Simulated Emergency Test Results*. See July 2010 *QST*, pp 69-71. Also, guidelines and specific SET reporting forms for the ARRL Section and Field Leaders will be posted on the ARRL Web site at **www.arrl.org/public-service-field-services-forms**. QST

New Products

SIGNAL FORGE PORTABLE SIGNAL GENERATOR

◊The SF1010 portable signal generator from Signal Forge is designed for use with National Instruments *LabView* and other automated test environments. The SF1010 has a frequency range of 1 Hz to 1 GHz (up to 2.6 GHz with add-on modules). Waveform modulation functions supported are AM, ASK, BPSK, Chirp, FSK, OOK and Sweep. The SF1010 may be operated using included *EZ Wave* software for *Windows*. Price: $985. For more information, visit **www.signalforge.com**.

AOR AR2300 COMMUNICATIONS RECEIVER

◊The AR2300 from AOR is a "black box" professional grade receiver operated with included *Windows* software through a USB interface. The tuning range is 40 kHz to 3.15 GHz and supported modes include AM, wide and narrow FM, USB, LSB and CW. Up to 2000 memory channels can store frequency, mode, selected antenna, an alphanumeric label and more. Up to three frequencies can be received simultaneously.

Additional standard features include an adjustable analog 45 MHz IF output with 15 MHz bandwidth, an SD memory card port for storing recorded audio, analog composite video output connector, CTCSS and DCS squelch operation, two selectable antenna input ports, and an internal speaker along with a headset and external speaker port. An optional external IP control unit enables the AR2300 to be fully controlled from a remote location and to send received signals to the control point via the Internet.

Other optional equipment includes an adapter for reception of APCO-P25 digital transmissions; an I/Q output port that allows the user to capture up to 1 MHz of bandwidth onto a computer hard drive or external storage device; and a GPS board to provide an accurate time base and for time stamping digital I/Q data. Price: $3795. For more information, visit **www.aorusa.com**.

MFJ BALUNS

◊The MFJ-2911 is a 1:1 current-choke style balun that mounts on the boom of an HF or 6 meter Yagi to transition from unbalanced coaxial feed line to a balanced driven element. It is designed to prevent unwanted pattern distortion from feed point imbalance, radiation from outer surface of coax shield, element detuning, RFI to consumer electronics and noise transfer to the radio's receiver. MFJ uses a toroid style transmission line choke rated for maximum legal power on SSB/CW. The MFJ-2911 is mounted in a molded case with SO-239 connector. The MFJ-2912 is similar but mounts on the exterior wall of your shack to keep RF out of your operating position and away from internal house wiring. The MFJ-2975 is designed for use with dipole antennas and transforms 75 Ω loads down to 50 Ω. Price: $39.95 each. To order, or for your nearest dealer, call 800-647-1800 or see **www.mfjenterprises.com**.

ARRL/TAPR DIGITAL COMMUNICATIONS CONFERENCE DVD SET FROM ARVN

◊ The 2009 ARRL/TAPR Digital Communications Conference (DCC) was a three-day event that showcased the latest developments in Amature Radio digital communications. Amateur Radio Video News (ARVN) has produced a set of six DVDs that include 17 conference presentations. Producer Gary Pearce, KN4AQ, arranged the DVD content around topics including equipment design and construction, FPGA programming, software defined radio, AMSAT/ARISSat, digital operation from edge-of-space balloons, packet and D-STAR networking, advanced APRS and digital ATV. Each of the six DVDs in the set runs about 45 minutes. The DVDs are professionally produced with quality video, audio and navigation menus. Intended

for individual viewing or club meeting programs, the DCC video collection showcases the latest in Amateur Radio digital communications technology. The DVDs are produced in NTSC standard definition format but may be played on computers worldwide. Detailed information on contents of each DVD and a sample video are available on the ARVN Web site. Price: $15 per DVD or $75 for all six. For more information or to order, visit **www.ARVidNews.com**.

DEPICTION 1.2 MAPPING SOFTWARE

Depiction 1.2 is Web-enabled desktop mapping, simulation and collaboration software that is designed to allow users to imagine, depict and share scenarios. Agencies and individuals have used *Depiction* software to coordinate responses during Hurricanes Gustav and Ike in the Gulf Coast, wildfires in California, winter storms in the Northeast, and other events across the country. Example: What if the river rose by five feet? By ten? The software's simulation tools allow users to move elements around the map, simulating flooding of buildings, barriers blocking planned routes or blackouts that shuts down critical facilities. Price: $199. For more information or to download, visit **www.depiction.com**.

LINE-LOK ROPE CLEATS

◊Line-Lok rope cleats from Clamcleats Ltd glow in the dark and are designed to help prevent people from tripping over guy lines in temporary antenna setups or emergency situations. These cleats hold ropes from 1 to 8 mm diameter. They are said to work over a wide temperature range and make it easy to set and hold correct tension. For more information, visit **www.clamcleat.com**.

This Month in Contesting

Sean Kutzko, KX9X
ARRL Contest Branch Manager, kx9x@arrl.org

ADVENTURES IN FLEA-POWERED CONTESTING

There's a common phrase uttered in the world of Amateur Radio: "Life's too short for QRP." I would have to say that in my 27 years of being a contester, I have rarely heard words so untrue.

"Need that cash to feed that Jones." — Bob Weir

By the time I had earned my General (22 years ago…egads!) I was already convinced that Bigger was Better. I had saved enough money from my part-time job to acquire a used tribander and 40 feet of tower, bolted it to my house, and started working lots of DX and contests with 100 watts during the climb of Solar Cycle 22. I couldn't wait until I moved to a new house where I could put up bigger antennas, get an amp, and start kicking some serious tail and run with the Big Dogs. This pursuit, however, cost a lot of time and money, and I discovered I was never satisfied with what I had.

Paradigm Shift

On a whim, I'd bought an old Heathkit HW-8 at a swapfest for $40. It seemed "cute." Four bands, 3 watts, CW only. I looked at it as a novelty. I hooked it to my antenna and thought I'd see what I could hear. I heard plenty, especially on 15 meters. That first afternoon, I'd worked several stations in the US, South Africa, Moldova and Japan. I was intrigued, but I still didn't believe that in the world of Charles Atlas, I could do a contest with a 98 pound weakling of a radio. "Nobody will hear me," I lamented. My HW-8 sat on the shelf, with only the occasional trip to the operating desk over the years.

I worked my first SSB Sweepstakes contest in 1993. While looking through the results, I was stunned to see fellow Society of Midwest Contester Scott, KA9FOX, had piloted W9UP to a first-place finish in the QRP category in SS Phone with a whopping 1049 QSOs! I said, "well heck, if he can do it, so can I."

1994 SS Phone came, and I entered QRP with 5 measly watts from my Icom IC-745 and my triband Yagi at 40 feet. 455 QSOs later, I earned 10th in the country, first place in Illinois and second in the Central Division (Scott still doubled my score that year, the dirty rotten so-and-so). I've been interested in "doing more with less" ever since.

There are *Advantages* to QRP?

With so much hardware and technology available to contesters today, why on Earth would anybody consider not using it? Perhaps the biggest is the rise of houses that have the dreaded Covenants and Restrictions attached to them, prohibiting large antennas of any sort. Operating low power (possibly with stealth antennas) keeps you "under the radar" as far as your neighbors are concerned. Lower power means less RFI that could potentially interfere with your neighbor's telephone or computer speakers, blowing your cover. QRP transceivers generally cost less than their QRO counterparts and offer just as many bells and whistles.

"Yet, my eyes are drawn toward the mountain in the east..." — Neil Peart

If you're unable to put up any sort of antenna at home, QRP gear is generally quite portable, which allows for easy operating away from home. Living in a New England apartment, I have really come to appreciate the fun and simplicity of throwing some gear in a pack and operating a contest from a nearby mountaintop. There are no man-made noise sources (so the bands are nice and quiet), the scenery is usually incredible and the increase in height will make even a battery-powered rig with a wire antenna sound nice and loud. If you're into VHF+ operating, QRP from a high location will produce amazing results; try the Single Operator, Portable category in this month's ARRL September VHF QSO Party from your favorite hilltop and see what you can work with only a few watts!

Will Anybody Hear Me?

Let's say you have an average station: 100 watts and a dipole up 40 feet. One S-unit represents about 6 dB increase in output power. Dropping your power from 100 watts to 10 watts is about 10 dB. Drop it to 5 and that's about a 13 dB reduction from 100 watts. That's only 2 S-units lower than your 100 watt station. So, if your 10-watts-and-a-dipole station is getting you reports of 57-58, you'll be getting reports of 55-56 with a QRP signal. That's still plenty workable, even in a contest. If you're fortunate enough to have a gain antenna, such as a Yagi or quad, then you'll be even louder. The worst enemy of operating QRP is the attitude that you won't succeed. Why psyche yourself out before you even start?

QRP Clubs and Contests

Like any other aspect of Amateur Radio, there are numerous clubs devoted to QRP operation. QRP-ARCI is one of the largest, with over 16,000 members globally. Regional QRP clubs abound, such as the Flying Pigs, the American QRP Club, Michigan QRP Club, New England QRP Club, the Adventure Radio Society, Northern California QRP Club and numerous other clubs across North America and around the world. There is a wealth of information to be had by joining a club and learning from the experience of others. Use your favorite search engine online and type in "QRP Clubs" to find one near you.

While most major contests have a QRP category, there are many events that are geared specifically for the QRPer. Many QRP clubs sponsor a sprint contest, such as the Flying Pigs' monthly Run For The Bacon, the Adventure Radio Society's monthly Spartan Sprint and numerous others. One of my favorites is the Adventure Radio Society's Flight of the Bumblebees, held the last Sunday in July. Extra multipliers are earned by working the "bumblebees," or stations operating from the field. This 4 hour event requires Bumblebees to walk, bike or boat (human power) to reach their operating location.

73? No, 72!

There are plenty of avenues for trying QRP contesting, and plenty of reasons, too. Working 3000 stations in a weekend with big antennas and a huge signal will always be exciting to me, but consider getting a view from the other side. An amazing amount of fun can be found in the sheer simplicity of QRP contesting.

SEPTEMBER 2010 W1AW QUALIFYING RUNS

W1AW Qualifying Runs are 10 PM EDT Friday, September 3 (0200Z September 4) (10-40 WPM) and 7 PM (2300Z) Wednesday, September 15. The West Coast Qualifying Run will be transmitted by station K6KPH on 3581.5, 7047.5, 14047.5, 18097.5 and 21067.5 kHz at 2 PM PDT (2100Z) Saturday, September 18. Unless indicated otherwise, speeds are from 10-35 WPM.

CONTEST CORRAL

in association with the *National Contest Journal*

SEPTEMBER 2010

Start and Finish	HF	VHF+	Contest Title	Phone	CW	Digital	Exchange	Sponsor's Web Site
Sep 3, 0230Z - Sep 3, 0300Z	1.8-14		NS Weekly Sprint		✘		Serial, name, and S/P/C	www.ncccsprint.com/rules.html
Sep 4, 0000Z - Sep 5, 2400Z	3.5-28		All Asia Contest	✘			RS and age ("00" for YL)	www.jarl.or.jp/English
Sep 4, 0000Z - Sep 4, 2400Z	3.5-28		Russian Radio RTTY WW			✘	RST and oblast or WAZ zone	www.radio.ru/cq/contest/rule-results/index2.shtml
Sep 4, 0000Z - Sep 5, 2400Z		**2.3G+**	**ARRL EME Contest**	✘	✘	✘	**Both call signs, sig rpt, acknowledgment**	**www.arrl.org/contests**
Sep 4, 1100Z - Sep 4, 1700Z	28		DARC 10-Meter Digital "Corona"			✘	RST and serial	www.darc.de/referate/ukw-funksport
Sep 4, 1200Z - Sep 5, 0400Z	1.8-28	50+	Colorado QSO Party	✘	✘	✘	Call sign, name, and county or S/P/C	www.ppraa.org/coqp
Sep 4, 1300Z - Sep 5, 1300Z	1.8-28		IARU Region I Field Day	✘			RS and serial	See IARU Society Web pages
Sep 4, 1600Z - Sep 4, 1900Z	7		Straight Key Party		✘		RST, serial, category, name, age	www.agcw.org
Sep 5, 1800Z - Sep 6, 0300Z	1.8-28	50+	Tennessee QSO Party	✘	✘	✘	RS(T) and county or S/P/C	www.tnqp.org
Sep 6, 0200Z - Sep 6, 0400Z	3.5-28		ARS Spartan Sprint		✘		RST, S/P/C, and power	www.arsqrp.blogspot.com
Sep 6, 2300Z - Sep 7, 0300Z	1.8-28	50	Labor Day Sprint		✘		RST, S/P/C, MI QRP nr or power	miqrp.org
Sep 8, 1100Z - Sep 9, 0400Z	3.5-14		CWops Mini-CWT Test		✘		Name and member number or S/P/C	www.cwops.org/onair.html
Sep 10, 8 PM - Sep 11, 2 AM	3.5		070 Club KA3X Memorial Sprint			✘	Call sign, RST and S/P/C	www.podxs070.com
Sep 10, 0000Z - Sep 10, 2359Z	1.8-28	50	Straight Key Weekend Sprint		✘		RST, QTH, name, member number	www.skccgroup.com/sprint/wes
Sep 11, 0000Z - Sep 12, 2400Z	3.5-28		WAE DX Contest	✘			RS and serial	waedc.de
Sep 11, 0800Z - Sep 11, 2000Z	3.5-28	144	Arkansas QSO Party	✘	✘	✘	RS(T), county or S/P or "DX"	www.arkanhams.org
Sep 11, 1600Z - Sep 11, 2400Z	3.5-28	50,144	Ohio State Parks On the Air	✘	✘	✘	"Ohio" or S/P/DX and Park ID	parks.portcars.org
Sep 11, 1800Z - Sep 13, 0300Z		**50+**	**ARRL September VHF QSO Party**	✘	✘	✘	**4-char grid square**	**www.arrl.org/contests**
Sep 11, 1900Z - Sep 12, 0400Z		50+	QRP ARCI VHF Contest	✘	✘	✘	4-char grid square	www.qrparci.org
Sep 12, 0000Z - Sep 12, 0400Z	**3.5-14**		**North American Sprint**		✘		**Call signs, serial, name, and state**	**www.ncjweb.com**
Sep 12, 1300Z - Sep 13, 0700Z	1.8-28	50,144	Classic Exchange		✘		Name, RS, S/P/C, type of equipment	www.classicexchange.org
Sep 18, 6 AM - Sep 19, 12 Mid		**10G+**	**ARRL 10 GHz and Up Contest**	✘	✘	✘	**6-char grid locator**	**www.arrl.org/contests**
Sep 18, 0000Z - Sep 18, 2359Z	3.5-28		Connecticut QSO Party	✘	✘	✘	RS(T) and CT county or S/P/C	www.ctqp.org
Sep 18, 1200Z - Sep 19, 1200Z	3.5-28		Scandinavian Activity Contest		✘		RST and serial	www.sk3bg.se/contest/sacnsc.htm
Sep 18, 1200Z - Sep 19, 1200Z	1.8-28		CIS DX Contest		✘	✘	RST and CIS area code or serial	www.cisdx.srars.org/cisdxc.pdf
Sep 18, 1300Z - Sep 19, 2100Z	3.5-28	50+	South Carolina QSO Party	✘	✘	✘	RS(T) and county or S/P/C	w4cae.org
Sep 18, 1600Z - Sep 18, 1800Z	1.8-28		Feld-Hell Monthly Sprint			✘	RST, S/P/C, Feld-Hell member nr or age	www.feldhellclub.org
Sep 18, 1600Z - Sep 19, 2400Z	1.8-28	50	Washington State Salmon Run	✘	✘	✘	RS(T) and county or S/P/C	www.wwdxc.org
Sep 18, 1800Z - Sep 19, 1800Z	1.8-28	50+	QCWA Fall QSO Party	✘	✘	✘	Call sign, year lic'd, name, chptr or S/P/C	www.qcwa.org/qso-party.htm
Sep 19, 0000Z - Sep 19, 0400Z	**3.5-14**		**North American Sprint**	✘			**Call signs, serial, name, and state**	**www.ncjweb.com**
Sep 19, 1300Z - Sep 20, 0700Z	1.8-28	50,144	Classic Exchange	✘			Name, RS, S/P/C, type of equipment	www.classicexchange.org
Sep 20, 7 PM - Sep 20, 11 PM		144	Fall VHF Sprint	✘	✘	✘	4-digit grid square	www.svhfs.org
Sep 25, 0000Z - Sep 26, 2400Z	3.5-28		CQ WW RTTY Contest			✘	RST, CQ zone and State/VE area (US/VE)	www.cqwwrtty.com
Sep 25, 1400Z - See Web site	1.8-28	50,144	Texas QSO Party	✘	✘	✘	RS(T), county or S/P/C	www.txqp.net
Sep 28, 7 PM - Sep 28, 11 PM		222	Fall VHF Sprint	✘	✘	✘	4-digit grid square	www.svhfs.org
Sep 28, 0000Z - Sep 28, 0400Z	3.5-28		Fall QRP Homebrewer Sprint		✘		RST, S/P/C, and power	www.njqrp.org

All dates refer to UTC and may be different from calendar date in North America. Times given as AM or PM are local times and dates.
Refer to the contest Web sites for full rules, scoring information, operating periods or time limits and log submission information.
No contest activity occurs on 60, 30, 17, 12 meters. Serial = Sequential number of the contact. S/P/C = State, Province, DXCC Entity.
Publication deadline for Contest Corral listings is the first day of the second month prior to publication.

Check for updates and a downloadable PDF version online at www.arrl.org/contests

Sean's Picks

- **State QSO Parties This Month:** Arkansas, Connecticut (first ever!), Colorado, South Carolina, Tennessee, Texas, Washington State (Salmon Run).
- **All Asia Contest, Phone (Sep 4-5):** Beams point to the Pacific for this 48 hour event. Exchange is signal report and age. If you're a YL, you can send 00!
- **ARRL September VHF QSO Party (Sep 11-13):** September generally brings great tropo conditions to the VHF+ bands; take advantage of the excellent conditions and work hundreds of miles on 6 meters and up! Exchange is your Maidenhead grid Square. See last month's *QST* for more info.
- **Worked All Europe DX Contest, SSB (Sep 10-11):** One of the biggest contests on the continent. Be prepared for sending QTC, a list of other stations you've worked. Read the rules for info on QTC in WAE.
- **North American Sprint, Phone (Sep 18):** Four hours of frenetic contesting activity, thanks to a rule that you must QSY after making 2 QSOs on the same frequency. Exchange is a serial number, your name and state. The CW Sprint is September 12!
- **CQ WW RTTY Contest (Sep 25-26):** One of the biggest RTTY contests on the planet. Everybody works everybody in this digital gala!

In the September/October "Contesting 101"

"How to start and grow a contest club from the ground up." The column will feature TCG charter members KØEJ and WO4O, who were instrumental in forming the Tennessee Contest Group. Contesting 101 can be found in the *National Contest Journal*, published six times per year. For subscription information, visit **www.arrl.org/ncj**.

2010 ARRL DX Phone — Was That a *Sunspot*?

Contests make conditions! — *PAØM*

Ward Silver, NØAX
n0ax@arrl.net

One might say that the weekend of March 6-7 was a "busy" one on the HF bands as the ARRL International DX Phone contest pushed PTT switches and pulled final amplifier current. "Busy," though, doesn't hardly come close to the experience of trying to wedge a signal in edgewise, particularly on 20 or 40 meters! Activity was intense — and the trend of big increases in participation started last year just kept on rolling!

Log submissions hit an all-time record of 3188 — up by 24% over 2009 — with 1697 from W-VE contesters and 1491 from DX stations. Not only were there more logs submitted, but they were fatter than last year's:
QSOs in DX logs: 695,243 — up by 34%
QSOs in W/VE logs: 545,754 — up by 32%

Using the DX to W-VE total, that is a rate of more than 14,000 QSOs per hour!

Another measure of participation is the maximum number of calls worked on one band by the big stations. At first blush, the 3246 QSOs on 20 meters by F6KHM (F8DBF, op) is down from last year's 3805, but look at the 3188 QSOs on 15 meters by ZX5J (PP5JR, op). The second-highest band is *much* closer than last year's 2786 as more operators were spread across both 20 and 15 meters. From here at home, the 2836 DX calls logged by the K3LR operators on 20 meters was 16% higher than last year. On every band, W-VE operators had more entities to chase — the maximum logged was 145 countries on 20 meters at K3LR. You can see the increase in activity in Figure 1. The red line showing the total number of W-VE Single Operator logs is headed through the roof and shows no sign of slowing down. More hams, making more QSOs, in more places, on more bands, means more fun!

NØAX

Finding the "sweet spot" along Seattle's Elliott Bay was a good way for your author to conclude a 27 year run of Pacific Northwest contesting.

All this is occurring, even with an SSN still vanishingly small…as leads to the topic of our title. The Propagation Indices tells the solar tale and actually the answer is, "No! That wasn't a sunspot!" But solar flux was the highest since 2005 and even in that year, the ionosphere was quite a bit more disturbed. So conditions were quite good and everyone benefited. From Figure 2 we can also see the importance of the 15 meter band to DX contest participation this year and probably in the future.

Why is 15 meters so important and not 10 or 20 meters? For contesting, 10 meters is a peak-of-the-cycle band that is certainly fun to work, but will only have the really strong openings in the few years straddling the solar maximum. Twenty meters, while a rock-solid band with world-wide openings — however brief — even during the solar minimum, gets so crowded that the smaller stations have a hard time getting through. The band may

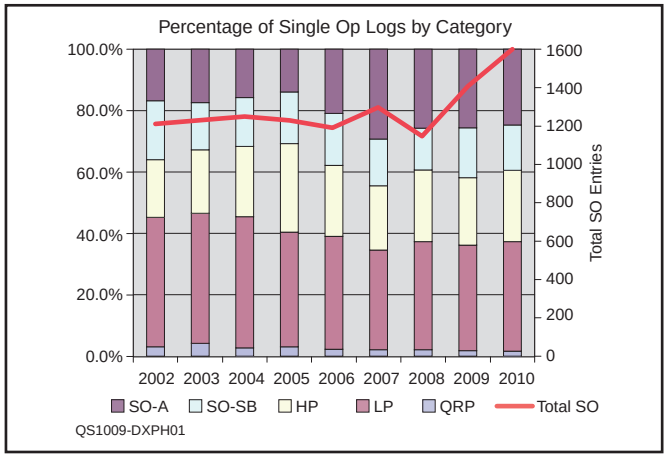


Figure 1 — Distribution of W-VE Single-Operator entries by contest category.

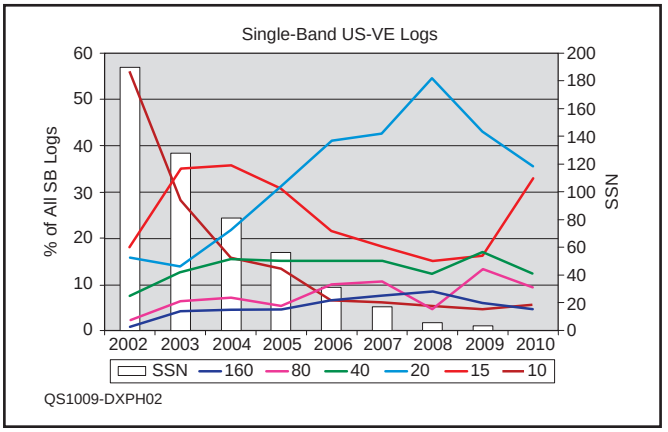


Figure 2 — Distribution of W-VE Single-Band entries by band with Smoothed Sunspot Number (SSN) for comparison. The SSN for 2010 was a hefty zero!

New Records for 2009

W-VE Records

Category	Call District	Call	New Record	Old Record	Year Set
SOAB-LP	1	N1UR	1.717M	1.596M	1992
SOAB-QRP	Canada	VA3DF	294k	168k	2003
SOSB-20	4	N4PN	447k	380k	1999
SOSB-40	6	W6YI	207,648	207,603	2004
SOSB-160	2	W2MF	25,578	22,692	2009
SOSB-160	Canada	VE2DWA	4,416	1,596	1984

DX

Category	Continent	Call	New Record	Old Record	Year Set
SOSB-40 (OH2BH, op)	EU	CR2X	469k	257k	2004
SOSB-40	NA	ZF2AH	431k	366k	2005
SOSB-40	AS	JAØJHA	198k	99k	1992
SOSB-80 (NH6V, op)	OC	KH6LC	211k	141k	1990
MS	AF	D4C	8.37M	6M	1992
MM (@KH6YY)	OC	KH7X	7.88M	6.3M	2006

Active Winning Streaks

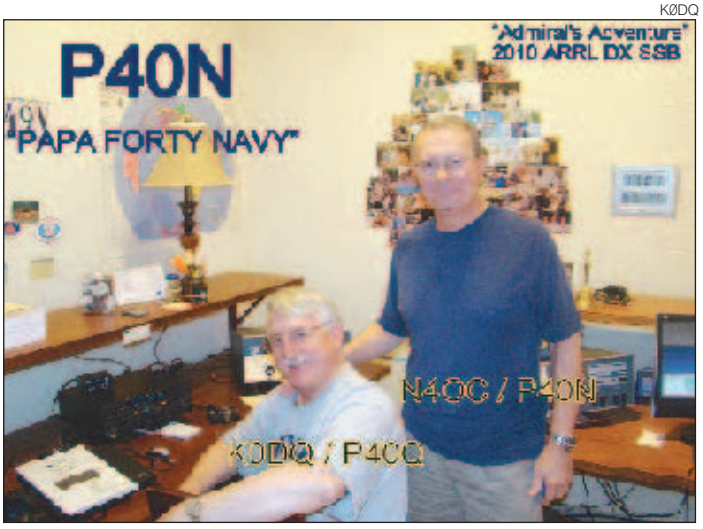
W-VE

Call (@QTH)	Number	Category
K1ZM (@VY2ZM)	8	SOAB-HP

DX

Call (@QTH)	Number	Category
KK9A (@P4)	6	SOAB-LP
LU1HF	5	SOSB-10
PP5JR (@ZX5J)	4	SOSB-15

KØDQ



I'll bet you don't call out of turn when one of these guys is running the pileup! Retired admirals Scott, KØDQ, and Ed, N4OC, navigated Papa Forty Navy (P4ØN) to the top of the MS ranks.

be "propagationally open, but behaviorally closed." Thus part-time and casual participants tend to spend less time on the air or may just find something else to do that weekend.

When 15 meters is open, as it was more this year, smaller stations gain 250 kHz of potential spectrum, lessening "band pressure" on everyone. A smaller station is more likely to be effective for DX communications on 15 meters because a tribander is 33% higher electrically than on 20 meters, lowering the angle of radiation. Signal strengths on frequencies just below the MUF tend to be stronger, as well. All three of these — more space, lower angle, better propagation — make 15 meters a "money band" for HF DX contesting.

Caveats

Every year, I remind folks to play by the rules and an easy one to overlook, particularly for a new contest participant, is the use of "spots" from the worldwide spotting networks. Most logging software is "Internet-enabled" these days and logs on auto-magically. Remember to send in your log as "Single-Operator, Assisted" if you receive *any* information from the spotting network about the operation of another contest competitor. This includes announcements, schedules, and text messages or chat room conversations, for example.

While you're thinking about the rules, if you are operating a station by remote control (that is, a "remote station"), you must identify based on the location from which you transmit, you must be fully licensed to transmit from that location and have full permission from the station owner. In addition, all receiving and transmitting antennas must be located at a single site.

Write-up Notes and Features

I'm going to try something a little different this year. I assume that everyone can read the tables of winners and Top Ten stations, so I will write about the neat stories those tables tell instead of repeating them in text. (There is considerably more detail in the online version of this article at **www.arrl.org/contests**.) I am also introducing a new "figure of merit" for logs — an accuracy index.

Look to the online extended version of these results for the following features: Once again this year, volunteers have delved the depths of data to create a Regional Analysis write-up for every Division and Continent, plus the Caribbean. Plus, look for these ongoing features:

- A set of Top Ten call signs since 2002 is available as a downloadable PDF file.
- Changes in QSOs and multipliers as a percentage of the 2002 totals
- DX entries are tracked by category from year to year
- Accuracy figures and charts
- Soapbox is presented from all electronic logs.

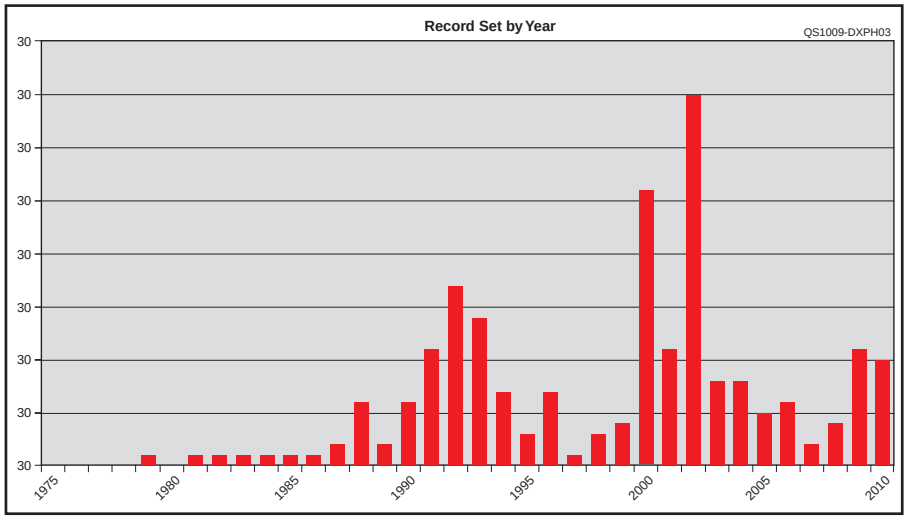


Figure 3 — Records Set By Year

Records

Great contest, especially 40 metre band, just fantastic conditions here. — VK3IO

What is a competition without records and record-keepers? A competition without a history, that's what! Records are one of the threads that stitch together the scroll, year by year, from the earliest contest in 1929 right down to 2010. New records are something we should all be proud of and strive for ourselves. Figure 3 shows the call district and continental record count by year including all the new ones from 2010. The mother lode year of 2002 remains the biggest year for records. The oldest surviving record remains the MM Methuselah established by KØRF (CO) in 1979.

While this section covers the district- and continent-level achievements, surely there are many more new records set in your section and in your club — your club *does* keep records of its members, *doesn't it*??

All-band Records

With Ol' Sol still not quite awake (Can somebody please fetch our parent star a cup of coffee…Bueller?) the all-band records are pretty much untouchable. Except that nobody told either N1UR or VA3DF! The New Records Table shows the results as N1UR set a new 1st district SOAB-LP record with 1.717M points, eclipsing the old record of 1.596M points, set in 1992. VA3DF also has the new SOAB-QRP record for Canada with 294k points. The old record was 168k points, set in 2003. In case I wasn't clear — that is Hard To Do — Well Done!

Africa has a new Multi-Single record, too, smashed to bits after the team at D4C hoisted the 1992 standard from 6M points to 8.37M. Northwest Africa has seen a run of big scores over the years and we can expect a big shoot-out between EA8, CT3, and D4 as the sunspots return. Improving on their 2006 performance, the KH7X team at KH6YY raised the altitude of Oceania's Multi-Multi record from 6.3M to a lofty 7.88M total atop Oahu's Pupukea Ridge overlooking the famous surfing Banzai Pipeline.

40 Meter Gold

At any time of the solar cycle an experienced operator can target the right band for conditions and make a run at a record. Forty meters was "gold" this year as stations took advantage of the absence of broadcasters from the 7.100-7.200 MHz allocation. Records were set by N4PN in the 4th district and W6YI in the 6th. W6YI barely made it — his 207,648 points just barely squeezed by the old 207,603 points — that's only 45 points or 15 QSOs!

On the DX side of the ledger, *three* stations broke the 2004 European 40 meter record of 257k: CR2X (OH2BH, op) with 469,944 points; CT1ILT with a score of 345,420; and EA7LL pouring it on with 279,129 points. Showing why they're called the *Grand* Caymans, the North American 40 meter record was bumped from 366k to 431k by ZF2AH, taking ZF2CF's 2005 perch. JAØJHA overwhelmed the 1992 Asian 40 meter record of 99k with a big 198k score. I'd say the long efforts of persuading the ITU to give hams some breathing room on 40 meters has paid off pretty effectively — another Well Done!

Single-Band Records

Forty meters wasn't the only band on which increased activity paid off. On 80 meters from Oceania, the new record-holder is KH6LC (NH6V, op) with 211k points, besting a 20 year old record of 141k points. In fact, I don't see another Oceania station in the Top Ten on 80 meters in any of the years since 2002 in which I've been tracking the contest! The 1990 record was the oldest to fall in 2010.

Down on Top Band, the increased awareness of this band, better equipment and antennas, fewer frequency and power restrictions for DX hams — all helped W2MF eclipse his record-setting 2nd district effort from last year on 160 meters, raising the bar from 22,692 to 25,578 points. VE2DWA picked off the 1984 1596 point Canadian 160 meter record with a new mark of 4416 points.

The Crowd Groans

VY2ZM (K1ZM, op) just missed a new Canadian SO-HP record with 5.436M points — the old record was 5.647M points. P4ØA (KK9A, op) came close to the old South American record of 5.91M points with 5.51M points of his own. KH7Y's 431,640 points on 15 meters came within a whisker of the 433k Oceania record. Likewise, AO8A (EA8AH, op) put 288,720 points on the board on 20 meters, but couldn't quite capture the 298k African record. As our JA friends say, *"Mo ichi do!"* (One more time!)

Thank you to my father PP5JR (operator of ZX5J) to give this opportunity. I'm 11 years old, my first contest alone. PU5FJR.

I shared my father's station with my brother PU5FJR, great experience I'm 13 years old. — PU5BIA

Propagation Indices

	Flux		Planetary Ap		Estimated K	
Year	Sat	Sun	Sat	Sun	Sat	Sun
2002	191	183	5	10	1.6	2.5
2003	138	147	14.5	11	2.8	2.6
2004	105	106	5	6	1.8	1.8
2005	81	84	10	36	2.5	4.3
2006	75	74	2	1	0.9	0.5
2007	73	73	2	3	0.5	0.8
2008	69	69	19	8	3.3	2.0
2009	69	69	1	8	0.3	2.6
2010	78	77	3	4	0.8	1.0

Category Abbreviations

Contest results are easier to read if you know the abbreviations for the different categories. You'll find the complete description for all of these in the contest rules:

- SO: Single Operator
- HP/LP/QRP: High Power, Low Power, QRP
- AB: All Band
- SB: Single Band
- A or U: Assisted or Unlimited (see note below)
- MO: Multioperator
- MS: Multioperator, Single-Transmitter
- M2: Multioperator, Two-Transmitter
- MM: Multioperator, Multiple Transmitters

These abbreviations are usually combined, such as SOAB-LP for a Single Operator, Low Power entry. (Sometimes the "AB" is omitted and you can assume that SO-LP is the same.) A band number will be added to a Single Operator, Single Band entry, such as SO-10 or SOSB-15.

A or U indicates that the operator made use of information from the call sign spotting networks — it doesn't refer to "assistance," meaning physical help with operating, for example.

Accuracy Leaders

W-VE

Single-Op (Non-assisted)

Call	QSOs	Error %	Index	Category
VY2ZM	4084	0.5	13.561	SO-HP
VX3AT (VE3AT, op)	3762	0.4	13.535	SO-HP
VY2TT	3591	1	13.455	SO-HP
W9RE	2710	0.3	13.403	SO-HP
K3CR (LZ4AX, op)	2890	0.7	13.391	SO-HP

Single-Op (Assisted)

Call	QSOs	Error %	Index	Category
W2RE	3404	0.9	13.442	SOA
K3WW	2517	0.9	13.311	SOA
AA3B	2024	0.9	13.216	SOA
W1GD	1566	0.6	13.135	SOA
W4MYA	1352	0.6	13.071	SOA

Multiop

Call	QSOs	Error %	Index	Category
K3LR	6968	0.7	13.773	MM
W3LPL	6521	0.8	13.734	MM
KC1XX	6475	0.9	13.721	MM
WE3C	5423	0.8	13.654	M2
K1TTT	4381	0.7	13.572	MM

DX

Single-Op (Non-assisted)

Call	QSOs	Error %	Index	Category
8P5A (W2SC, op)	8005	0.3	13.873	SO-HP
6Y9V (WE9V, op)	7520	0.3	13.846	SO-HP
KH7XS	6732	0.3	13.798	SO-HP
PJ2T (WB9Z, op)	6622	0.7	13.751	SO-HP
KP2M (N2TK, op)	5819	0.2	13.745	SO-HP

Single-Op (Assisted)

Call	QSOs	Error %	Index	Category
J7N (K3TEJ, op)	4684	0.8	13.591	SOA
LT1F (LU1FAM, op)	3847	0.4	13.545	SOA
OE3K	3613	0.7	13.488	SOA
IR4M	3463	0.6	13.479	SOA
OM3GI	3685	1	13.466	SOA

Multiop

Call	QSOs	Error %	Index	Category
KH7X	8496	0.6	13.869	MM
TI5N	8261	0.6	13.857	M2
D4C	8868	1.1	13.838	M2
V48M	7722	0.8	13.808	MM
P4ØN	7461	0.8	13.793	MS

DX

Single Operator High Power

8P5A (W2SC, op)	7,951,068
6Y9V (WE9V, op)	6,819,318
PJ2T (WB9Z, op)	6,554,676
KH7XS	6,244,950
KP2M (N2TK, op)	4,897,830
TO5A	3,886,035
CT1JLZ (OK1RF, op)	3,121,476
LX7I (LX2A, op)	2,608,290
PZ5RA	2,459,646
4O3A (YU1YV, op)	2,069,256

Single Operator Low Power

P4ØA (KK9A, op)	5,510,736
HI3TEJ	3,488,265
V26M (N3AD, op)	3,032,010
VP9/W6PH (W6PH, op)	2,860,164
J88DR (G3TBK, op)	2,653,224
J7Y (K1LI, op)	2,315,328
8P6EX	1,571,994
GIØKOW	767,961
HK6P	653,913
KH7T	652,344

Single Operator QRP

OK2BYW	65,286
F5BEG	51,600
CT2IOV	36,675
JR4DAH	25,872
OK1DVM	18,468
IV3AOL	16,650
IK1BBC	13,029
JE1LDU	9,999
JA2MWV	4,968
PU5ATX	4,536

Single Operator 160 Meters

M8M (G3LNP, op)	34,848
S56P	25,992
I4FYF	13,860
LU2DVI	1,248
SP5CJY	288
LY2OU	144
OK1DF	48

Single Operator 80 Meters

KH6LC (NH6V, op)	211,731
C6AWL (RA3CO, op)	199,125
GM3PPG (G4BYB, op)	193,662
CT2ITR	132,516
YV5MSG	113,190
E77DX	109,152
HK1NK	99,693
YV6BXN	85,542
UX2X (UT2XQ, op)	62,568
G8DYT	45,030

Single Operator 40 Meters

CR2X (OH2BH, op)	469,944
ZF2AH	431,100
CT1ILT	345,420
EA7LL	279,129
YT8A (YU1EA, op)	257,040
JAØJHA	198,000
HQ9R (WQ7R, op)	180,747
TMØT	166,041
RW2F (UA2FB, op)	163,611
YTØW	152,847

Single Operator 20 Meters

F6KHM (F8DBF, op)	621,696
TM5C	583,632
S5ØK	442,680
SN2B (SP2WKB, op)	426,006
OH8L (OH8LQ, op)	400,680
OZ7X (OZ5KF, op)	377,346
E7ØT	345,216
HQ2T (K2BB, op)	334,341
LN9Z (LA5KO, op)	331,962
TG9ANF	323,826

Single Operator 15 Meters

ZX5J (PP5JR, op)	588,504
LP2F (LU1FDU, op)	558,699
CR2A (OH8NC, op)	435,174
KH7Y	431,640
PY2BK	398,574
HC1HC	379,908
EF8R	359,640
AY5F	325,008
PY1KN	266,448
PY3FOX	264,261

Single Operator 10 Meters

LU1HF	255,696
LR2F	202,608
LU1UM	103,509
LU6FOV	93,330
PY2ZXU	83,556
PU5OGE	81,075
CE2WZ	74,925
PY2MTS	63,624
PU2LEP	46,242
CX4DX	39,663

Single Operator Assisted

J7N (K3TEJ, op)	4,058,577
OM3GI	2,781,300
LT1F (LU1FAM, op)	2,728,818
OE3K	2,532,360
IR4M	2,397,720
ZX2B (PY2MNL, op)	1,928,004
OK4U (OK1DIG, op)	1,875,750
S57DX	1,548,021
NP2KW	1,200,114
DK4YJ	1,195,404

Multioperator Single Transmitter

P4ØN	7,373,388
PJ4G	6,494,220
VP5H	5,931,945
HI3K	4,851,120
4A2S	4,698,120
TO2T	3,455,334
CW5W	3,170,976
C6ANM	3,083,841
YN2EA	2,465,280
G5W	2,026,692

Multioperator Two Transmitters

D4C	8,372,304
TI5N	7,792,560
LP1H	5,586,975
KL7RA	4,810,680
CE4CT	4,360,125
ZY7C	3,647,520
DF7ZS	2,008,818
RL3A	1,400,976
PR5D	750,060
OZ1ADL	566,406

Multioperator Multi Transmitter

KH7X	7,884,783
V48M	6,668,550
ZW5B	5,258,400
TI8M	4,388,202
DR1A	3,875,430
9A1A	3,546,630
HG1S	2,397,750
JA3YBK	2,394,948
JA1YPA	1,311,057
RX3APM	730,125

W/VE

Single Operator, High Power

VY2ZM	5,436,120
VX3AT (VE3AT, op)	4,534,959
VY2TT	4,147,332
K3CR (LZ4AX, op)	3,344,841
W9RE	3,149,784
AA1K	3,038,208
W3BGN	2,852,922
K8PO	2,716,848
K1TO	2,686,602
NC1I (K9PW, op)	2,621,949

Single Operator, Low Power

N1UR	1,717,380
N5AW	883,479
VE3BDN	775,248
VE3AD	677,424
N4XL	594,282
KT4ZB	588,612
K6AM	448,596
NA4K	439,230
KD9MS	394,605
WA2JQK	387,504

Single Operator, QRP

VA3DF	294,120
N1TM	217,005
NØKE	188,853
N5DO	186,000
NDØC	137,448
W6QU (W8QZA, op)	123,708
WF4U	88,920
KT8K	55,590
N5FPW	54,108
K3TW	51,975

Single Operator, 160 Meters

W2MF	25,578
K5RX	13,728
W3GH	11,475
VE2DWA	4,416
W2VO	4,257
KØKT	3,108
NA4W (K4WI, op)	1,725
VE3EDY	1,134
VE3CUI	624
KK4SI	495

Single Operator, 80 Meters

AA1BU	150,552
KU2M	114,075
N4QV	46,224
NØNI	39,690
VE9ZX	36,465
W4QNW	35,145
KM1R	26,724
WD5COV	20,274
W2RR (WA2AOG, op)	18,270
WA4TII	17,655

Single Operator, 40 Meters

W6YI	207,648
KI6LZ	116,100
WDØBGZ	66,861
K4KZZ	58,500
W1AJT	42,180
W8FR	30,150
K1EY	27,966
NØUU	25,704
VA3XH	24,759
N8QAZ	21,336

Single Operator, 20 Meters

VE6WQ	809,088
KU1CW	552,123
N4PN	447,552
VE3DZ	406,929
VX3XN	369,198
VE3NE	285,120
KK1KW	205,200
WR2G	190,404
N8II	184,497
VO1KVT	148,473

Single Operator, 15 Meters

W4SVO	245,670
N3HBX	235,710
W5KFT (NA5TR, op)	185,625
KV4T	157,872
N1SV	151,923
W6AFA	125,610
N7RQ	105,702
AC5O	85,449
N4TZ	81,528
W6SR	76,734

Single Operator, 10 Meters

W5PR	16,380
K4WI	4,224
W3EP	3,942
KC4TVZ	1,980
KE5SNJ	1,518
KD4W	1,512
WA2AOG	672
KI6YYT	156
N1AIA	126
K7ULS	99

Single Operator, Assisted

W2RE	4,174,938
K3WW	3,156,300
AA3B	2,445,795
N2MM	1,916,214
N8TR	1,898,334
W1GD	1,821,687
W4MYA	1,674,216
N4ZC	1,664,388
W2IRT	1,567,500
VE3MMQ	1,533,927

Multioperator, Single Transmitter

K1LZ	5,240,760
K9RS	3,922,695
N1MM	3,216,663
W5RU	2,251,158
NK7U	2,236,761
W1ZA	2,215,020
N1FD	2,086,272
NN2W	1,925,478
W3MF	1,668,975
N2RM	1,638,270

Multioperator, Two Transmitter

WE3C	8,679,984
W4RM	4,652,967
KØTV	3,659,001
N1LN	3,321,402
K7ZSD	2,179,377
NØIJ	2,065,833
K1KP	1,917,825
W7RN	1,681,560
K2AX	1,556,640
VE3MIS	1,505,142

Multioperator, Multi Transmitter

K3LR	12,240,396
W3LPL	10,761,933
KC1XX	10,688,937
KM1W	7,031,871
K1TTT	6,574,713
WØAIH	3,515,184
NE3F	2,751,552
W6WB	2,303,160
K4VV	2,055,504
N8RA	1,529,376

Success Over Time

One of the stories rarely covered in a yearly write-up is the history of the contest, particularly of operators and stations that do well year after year. If you search through the table of Top Ten stations since 2002 available with the online article, you'll see some calls that should be mighty familiar. (Another fun place to explore is the K5TR Contest database at **www.kkn.net/~k5tr/scoredb/** — more than 400,000 published scores have been entered by volunteers!)

The active Winning Streaks table shows the active winning streaks for both W-VE and DX stations. From the W-VE scores, K1ZM has run a pretty amazing string of eight consecutive SOAB-HP wins from Prince Edward Island. It's going to be hard to get any closer to Europe than Jeff, he's a good operator, and the station is second to none. Literally! You can learn more about VY2ZM at **www.k1zm.com**, including a video taken from the 170 foot level of one of the towers. There are four other two-win active streaks by single operators: N1UR (SOAB-LP), W5PR (SOSB-10), W2MF (SOSB-160), and W2RE (SOA). In the Multioperator categories, WE3C's team has won M2 three times in a row and K1LZ is coming on strong with two MS wins in a row.

Outside the borders of W-VE, KK9A is pushing K1ZM hard with a six-pack string in SOAB-LP from his Aruba (P4) station. The top scores on 10 and 15 meters have been pretty much locked up recently by a pair of South American operators; LU1HF has a full tally of five consecutive SOSB-10 titles and PP5JR has piloted the ZX5J station to four in a row on 15 meters. Winning any category just once is hard enough, but all of these operators have been able to stay the course and do it time after time — Well Done for a third time!

The Top Ten Finishes table looks beyond the winning streaks to see how many times an operator made the Top Ten. The table shows whose calls have visited the Top Ten at least five times since 2002, with at least one being in the tough SOAB-HP or SOAB-LP category. (Not to say the Single Band or Assisted categories aren't competitive — I promise to look at those categories next year!)

AA1K and N5AW share the limelight at nine Top Tens — in other words, for every year that I've authored the results, these two call signs appeared somewhere in a Top Ten box. All of AA1K's scores have been in the SOAB-HP category, competing against some pretty stiff challengers! Right behind is W9RE with eight Top Ten's, also in the SOAB-HP category and from the so-called "Black Hole" section of Indiana, too.

Over on the DX side of the equation, KK9A's winning streak of six is supple-

W/VE Regional Leaders

Table lists list call sign, score, and power (A = QRP, B = Low Power, C = High Power).

Northeast Region (New England, Hudson and Atlantic Divisions; Maritime and Quebec Sections)

N1TM	217,005	A
K3TW	51,975	A
W2JEK	2,028	A
N1UR	1,717,380	B
WA2JQK	387,504	B
W1JQ	370,866	B
W2JU	349,596	B
K1VSJ	289,044	B
VY2ZM	5,436,120	C
VY2TT	4,147,332	C
K3CR (LZ4AX, op)	3,344,841	C
AA1K	3,038,208	C
W3BGN	2,852,922	C

Southeast Region (Delta, Roanoke and Southeastern Divisions)

N5FPW	54,108	A
K4XD	23,310	A
W4IM	17,808	A
N4ESS	5,130	A
N4XL	594,282	B
KT4ZB	588,612	B
NA4K	439,230	B
N4IG	333,684	B
WB4JFS	303,606	B
K1TO	2,686,602	C
KT4Q	1,095,540	C
W5WMU	1,036,431	C
K5RQ	943,572	C
KZ2I	871,995	C

Central Region (Central and Great Lakes Divisions; Ontario Section)

VA3DF	294,120	A
KT8K	55,590	A
N9TTX	45,552	A
AI9I	14,790	A
WD9FTZ	11,016	A
VE3BDN	775,248	B
VE3AD	677,424	B
KD9MS	394,605	B
K8LY	233,874	B
K9MY	221,034	B
VX3AT (VE3AT, op)	4,534,959	C
W9RE	3,149,784	C
WO9Z	805,794	C
W8TWA	614,781	C
N8BJQ	569,646	C

Midwest Region (Dakota, Midwest, Rocky Mountain and West Gulf Divisions; Manitoba and Saskatchewan Sections)

NØKE	188,853	A
N5DO	186,000	A
NDØC	137,448	A
WF4U	88,920	A
KA5PVB	26,718	A
N5AW	883,479	B
VE5ZX	374,631	B
NØHR	304,950	B
VE5SF	270,000	B
W5GFI	225,639	B
VE4EAR	739,152	C
NN7ZZ (N5LZ, op)	694,320	C
KØVXU	511,980	C
AD5XD	425,847	C
KØOU	399,147	C

West Coast Region (Pacific, Northwestern and Southwestern Divisions; Alberta, British Columbia and NWT Sections)

W6QU (W8QZA, op)	123,708	A
KFØX	1,275	A
KB1PWF	741	A
K6MI	510	A
K6AM	448,596	B
K7JE	324,768	B
N6RV	267,300	B
W7RV	218,286	B
WN6K	172,770	B
K6NA	1,213,800	C
N7TT	899,388	C
K5RR	806,508	C
K7RL	763,113	C
VE6BBP	609,525	C

mented by two more big scores that give him eight Top Ten appearances, along with "Voice Of the Virgin Islands," N2TK, and world traveler NH7A who scores well from both Guadeloupe (TO) and KH6 in the SOAB-HP category.

It would be truly interesting to do an "all time" sweep of the Top Ten scorers and the category winners. If some enterprising database delver would like to tackle this project, I'm sure the ARRL DX participants would be thrilled by such a compilation!

Neat Stuff This Year

Browsing the results, you can tell something was up — namely, solar flux. In SOAB-HP — Indiana (W9RE) and West Central Florida (K1TO) invaded SOAB-HP Top Ten. The paths taken were slightly different, but W9RE wore out 40 meters with 800 QSOs and 95 entities, the top DX entity total by a single operator. From farther south, K1TO was able to muscle up on 15 meters, logging a Top Ten-leading contact total of 738 spread over 83 entities. Last year, the entire SOAB-HP Top Ten was roughly north and east of West Virginia!

Along with the new calls in the SOAB-HP, the Top Ten for SOAB-LP was all over the map, too: Northeast, Midwest, Midwest, Central, Southeast, Southeast, West Coast, Southeast, Central, Northeast. Last year, the West Coast was nowhere to be seen! As conditions open wider, I'm sure we'll see the 10th district and other Dakota, Northwestern and Rocky Mountain Division call signs in that list.

In the "Persistence Pays Department," after five straight Top Ten finishes in SOAB-QRP, VA3DF finally grabbed the brass ring this year — congratulations! On 10 meters, since 2002 either W5PR or K4WI has been first or second: can you smell a *rivalry*? Will next year be the West Gulf's year on 160 meters? K5RX has been steadily moving up year by year and placed second in 2010. Let's see if Texas can triumph on Top Band!

In the massively competitive MM category, teams at K3LR swept both modes this year from Western Pennsylvania. (Give plate tectonics another century or two and K3LR will be portable-8!) In the M2 group, a pair of West Coast stations (K7ZSD and NK7U) appear for the first time since 2004.

Affiliated Club Competition

Unlimited Category	Score	Entries
Yankee Clipper Contest Club	234,062,475	203
Frankford Radio Club	197,699,928	140
Potomac Valley Radio Club	159,675,111	163
Contest Club Ontario	55,574,469	79
Northern California Contest Club	52,535,436	128
Florida Contest Group	49,639,950	93
Society of Midwest Contesters	46,504,080	112
*Minnesota Wireless Assn	44,967,489	91
Southern California Contest Club	21,271,257	52
Tennessee Contest Group	17,925,594	61
Arizona Outlaws Contest Club	13,299,261	70
Medium Category		
North Coast Contesters	58,532,361	31
Hudson Valley Contesters & DXers	27,636,801	39
Carolina DX Assn	22,155,432	46
Central Texas DX and Contest Club	21,177,222	18
Willamette Valley DX Club	17,177,835	42
Maritime Contest Club	16,199,220	18
Alabama Contest Group	16,786,749	41
Mad River Radio Club	15,329,817	27
Rochester (NY) DX Assn	15,143,019	16
South East Contest Club	13,960,356	38
Louisiana Contest Club	12,256,338	9
Order of Boiled Owls of New York	8,114,070	17
Western Washington DX Club	7,800,837	25
North Texas Contest Club	7,737,999	15
Grand Mesa Contesters of Colorado	7,590,135	30
Contest Group Du Quebec	5,021,055	14
CTRI Contest Group	4,953,390	18
Utah DX Assn	4,197,258	21
Western New York DX Assn	3,989,697	12
Texas DX Society	3,295,278	7
Mother Lode DX/Contest Club	3,301,542	15
Central Arizona DX Assn	3,067,443	7
Spokane DX Association	2,122,962	17
Saskatchewan Contest Club	1,859,364	9
Bergen ARA	1,493,955	15
*Sterling Park ARC	1,442,100	11
BC DX Club	1,371,510	6
Kentucky Contest Group	1,123,467	6
Allegheny Valley Radio Association	1,116,471	7
Eastern Iowa DX Assn	796,782	5
Magnolia DX Assn	706,551	6
Portage County Amateur Radio Service	549,594	11
Oklahoma DX Assn	307,551	5
Local Category		
Southwest Ohio DX Assn	4,397,364	8
Central Virginia Contest Club	2,168,688	10
Southern California DX Club	1,971,396	6
Kansas City DX Club	1,906,203	6
Delaware ARA (Ohio)	1,382,190	4
Metro DX Club	1,228,992	8
Lincoln ARC	956,811	3
Southeastern DX Club	515,937	5
Northern Arizona DX Assn	513,951	3
Meriden ARC	496,806	7
West Park Radiops	351,138	10
Falmouth ARA	293,787	4
Skyview Radio Society	274,173	5
Salt City DX Assn	265,848	3
Loudoun ARG	137,970	3
Delaware-Lehigh ARC	131,034	5
Great South Bay ARC	125,559	4
Hays-Caldwell ARC	120,000	6
Wireless Association of South Hills	113,403	3
Fort Wayne Radio Club	93,129	3
Low Country Contest Club	51,144	3
Saginaw Valley ARA	47,850	4
South Texas DX and Contest Club	45,903	4
Bristol (TN) ARC	36,399	3
Heartland DX Association	17,241	3

Close Calls

In the world of instant replay, short of car wrecks and bang-bang plays at the plate, nothing is more popular than a photo finish. The log checkers sure were "busy" as 78% of W-VE to DX QSOs were submitted for inspection — a most excellent scrutinizing! When you have thousands of scores, surely there were a few races decided by a nose? But of course!

In the W-VE Top Ten, the Multioperator teams try to "pull a vacuum," working everything that transmits. In this kind of an environment, the margin of victory can be paper-thin. For example, second and third places in MM were decided by 0.68% (73,000 points out of 10.7M) with W3LPL prevailing over KC1XX. The trio of W5RU (4th, LA), NK7U (5th, OR), and W1ZA (6th, VA) may have been spread from sea to shining sea, but they swept across the wire separated by only 36,000 points out of 2.2M.

Single Operator categories saw races just as hotly contested. SOA entrants W4MYA (6th) and N4ZC (7th) were only 0.59% apart — the tightest race of any Top Ten. The SOAB-HP scores of K8PO (8th, ME) and K1TO (9th, WCF) were only 1.13% apart. N4XL (5th) and KT4ZB (6th) were only 0.96% apart, too. Who says log checking doesn't matter? Send in your log, no matter how small!

Accuracy

With all the extra scrutiny applied to

Top Ten Finishes Since 2002

With at least one SOAB-HP or SOAB-LP

W-VE

Call (@QTH)	*Number*	*Category*
AA1K	9	SOAB-HP
N5AW	9	Various
W9RE	8	SOAB-HP
N1UR	7	SOAB-LP
N4TZ	7	Various
W3BGN	7	Various
VE3AT	7	SOAB-HP
K6LA (@VY2)	6	Various
K2PS	5	Various
K3ZO	5	SOAB-HP
K8IA	5	Various
KU1CW	5	Various
LZ4AX (@K3CR)	5	SOAB-HP
N1PGA	5	SOAB-LP
N1SV	5	Various
NN3W	5	Various
VE3EJ	5	SOAB-HP
VO1MP	5	Various

DX

Call (@QTH)	*Number*	*Category*
KK9A (Various)	8	Various
N2TK (@KP2)	8	SOAB-HP
NH7A (@FG,KH6)	8	SOAB-HP
G3FBK (@J8)	7	SOAB-LP
HI3TEJ	7	Various
W6PH (@VP9)	7	SOAB-LP
W2SC (@8P)	6	SOAB-HP
8P6EX	6	SOAB-LP
OK1RI	6	Various
W5AJ (Various)	6	Various
KH6ND	5	Various
LU1HF	5	SOSB-10
OH2BH (Various)	5	Various

Sponsored Plaque Winners

Thanks to the generous sponsorship of numerous clubs and individuals, we are pleased to announce the winners of a sponsored ARRL DX SSB plaque. The ARRL wishes to thank the plaque sponsors for their continued commitment to the ARRL Plaque Program. Without their support and dedication, the Plaque Program would not be possible.

Category	Plaque Sponsor	Winner
World Single Operator Phone High Power	North Jersey DX Association	8P5A (W2SC, op)
World Single Operator Phone QRP	QRP-ARCI	OK2BYW
World Single Operator Assisted Phone	Southern California DX Club	J7N (K3TEJ, op)
World 1.8 MHz Phone	Fred Race, W8FR, In Memory of ZL2BT	M8M (G3LNP, op)
World 7 MHz Phone	Jim Rafferty, N6RJ Memorial - Cayman ARS	CR2X (OH2BH, op)
World 14 MHz Phone	Don Wallace, W6AM, Memorial Award	F6KHM (F8DBF, op)
World 21 MHz Phone	Long Island DX Association	ZX5J (PP5JR, op)
World 28 MHz Phone	North Shenandoah DX Association, NS4DX	LU1HF
World Multioperator Two Transmitters Phone	W6NL and K6BL	D4C
World Multioperator Unlimited Phone	Stanley Cohen, W8QDQ	KH7X
W/VE Single Operator High Power Phone	Frankford Radio Club	VY2ZM
W/VE Single Operator Low Power Phone	Dauberville DX Association	N1UR
W/VE Single Operator QRP Phone	Jeffrey Briggs, K1ZM	VA3DF
W/VE Single Operator Assisted Phone	Pete Carter, K3VW Memorial	W2RE
W/VE 3.5 MHz Phone	Jeffrey Briggs, VY2ZM	AA1BU
W/VE 28 MHz Phone	Ralph Fontaine, AF7DX	W5PR
W/VE 1.8 MHz Phone	Butch Greve, W9EWC Memorial	W2MF
Asia Multioperator Single Transmitter Phone	Yankee Clipper Contest Club	RTØC
Europe Multioperator Unlimited Phone	Operators at K1TTT	DR1A
North America Multioperator Single Transmitter Phone	Nick Lash, K9KLR	VP5H
Oceania Single Operator High Power Phone	W7EW / W7AT	KH7XS
South America Multioperator Two Transmitter Phone	Operators at K1TTT	LP1H
Japan Single Operator Low Power Phone	Western Washington DX Club	JH4UYB
Great Lakes Division Single Operator Unlimited Phone	Northern Ohio DX Association	N8TR
New England Division Single Operator Low Power Phone	CTRI Contest Group	N1TM

Unsponsored plaques may be purchased by the plaque winner. If you wish to purchase an unsponsored plaque or order a duplicate plaque, contact ARRL Contest Branch Manager Sean Kutzko, KX9X, at 860-594-0232 or by e-mail at **kx9x@arrl.org**. The cost for plaques is $75 (includes shipping).

contest logs, it's high time that we recognize the exceptional logging accuracy of top operators and teams. You'll see that error rate is included in the Top Ten tables this year. Error rate is calculated in percent as the number of "bad" QSOs — those with a busted call (B), a miscopied exchange (X), or that can't be found in the other station's log (N) — divided by the total number of "good" QSOs after duplicates have been removed from that log.

Error Rate (%) = 100% × (B+X+N) / QSOs

This calculation is pretty much the same across the contest world. The penalties a particular sponsor assesses for each bad QSO vary, ranging from simply not counting the QSO to assessing extra penalty points. (Note that having a QSO designated as "bad" in one's log is *not* an accusation of cheating any more than being assigned an error for bobbling a ground ball or having to back up five yards for illegal procedure.)

Error rate, though, isn't enough. There are a lot of "golden logs" out there but most contain less than 100 QSOs — a multi-thousand QSO log with a very low error rate is a tougher achievement. To recognize those exceptional performances, I devised a formula for computing an accuracy index that accounts for log size and adds a bonus for low error rate:

Accuracy Index = log(QSOs) + Accuracy Factor (1 – Error Rate in %/100)

where QSOs is the same as for Error Rate, Accuracy Factor is a weighting constant equal to 1 or higher that emphasizes accuracy more as its value increases. I took the log of QSOs because it keeps the numbers within a reasonable range and I wanted a 1-QSO log with a 100% error rate to have an index of 0.

I'm sure there could be (and will be) lots of discussion about what value of Accuracy Factor is appropriate and whether the formula actually measures what it is purported to measure. The intent is to stimulate discussion and create a formula that could be used for any contest, regardless of scoring methods. The Accuracy Leaders table contains the top five Accuracy Indexes achieved by SOA, SO (AB and SB) and MO stations. (This subject is discussed in more detail in the online article.)

DXing

Hey, it's a DX contest! Who cares if G or CT counts just the same as ZA or ND? The rarer it is, the more fun it is to work and the bigger the cheer when that QSO scrolls across the screens at a multiop station! Here are the top DX count band bonanzas for multiop and single-op:

160: K3LR (MM) 67, W2MF (SOSB-16) 58
80: K3LR (MM) 104, AA1BU (SOSB-80) 82
40: K3LR (MM) 126, W2RE (SOA) & W9RE (SOAB-HP) 95
20: K3LR (MM) 145, VE6WQ (SOSB-20) 128, and 64 stations made DXCC
15: K3LR (MM) & KC1XX (MM) 120, N4ZC (SOA) & W5KFT (SOSB-15, NA5TR, op) 99, and 10 stations made DXCC
10: W5PR (SOSB-10) 30, W3LPL (MM) 28

Which station will be the first to log 5BDXCC in the new cycle? Out of 15 stations listed, 10 are category leaders!

Oddities

One can't stare at this many numbers for this long and not find some really interesting material! The best is K1GU's 30,000-point DX Phone "hat trick." Ned not only had a "golden log" (no errors), but grabbed 100 DX multipliers in 100 QSOs exactly! If that isn't sufficiently unique for you, his score tied with adjacent SOA entry, K2RS!

There were 52 tied scores, with the largest being W9WI and N1BCL in SOAB-HP, each with 235,620 points. The smallest winning score was 12 points by NH6PE on SO-10 for the Oceania title!

My very first contest, not the last for sure! — CM5FZ

Concluding Remarks

This was my last contest from the Seattle area after 27 years of West Coast contesting. I'm relearning the Midwest propagation after returning to Missouri, with its own set of challenges — namely, having to fight through *both* coasts to work anybody! Thanks to all my old friends in WWA for the good times and contest fun.

Keep it ever so — see you in the pileups on March 5 and 6 of next year!

A Web Full of Information

You'll find a lot more reading and photos in the online version of this article at **www.arrl.org/contests**. There are many graphs and charts to help put the contest in perspective — how did you do?

W3UR

HOW'S DX?

Tips for Beginners (and Experts!)

The June "How's DX?" column included an article on "Trade Secrets for Beginning DXers."[1] John Dwiggins, N4QVM, has been a ham since 1987. He has never owned an amplifier nor tower and runs wire antennas with a Kenwood TS-480 transceiver. He has worked 265 countries, 250 of which are confirmed, and has earned 5BDXCC. John sent in the following DXing tips:

1 Listen, listen, listen. Don't take a cluster spot as positive ID of the station. Listen for the station to ID to be sure who it is. Listen to the operator; get a feel for how he works the pileup.

2 For a quick boost to your country count, play in a major DX contest. This is the quickest and easiest way to work a large number of DX stations in a short period. Take a few minutes to look up the instructions for the contest, especially what the exchange is.

3 Don't let anyone tell you that you will not be able to work a DXpedition with your limited station. I have worked some of the most wanted DXpeditions with a barefoot 100 or 200 W rig and wire antennas. Attitude has a lot to do with it. If you think you will fail, you probably will.

4 Learn how to operate split. Most rare and semi-rare stations operate split. If the station is operating split he will never hear you if you call him on his transmit frequency.

5 When the DX station comes back with a partial call of K4G and your call is N4Q don't send your call again — he is not calling you. Wait until the DX works the station he heard and then indicates he is ready for other callers. Usually the operator will indicate he is ready for more callers by saying QRZ, up, or in CW sometimes just two dits.

6 Get into a rhythm. I do a three count in my mind as a timing guide. It sounds silly, but it keeps my call/listen times in a pattern. If the other operator is slow coming back to calls, sometimes I will stretch it to a five count. On CW try to match your send speed to the DX send speed, unless you have reason to think he can copy at a faster rate.

7 Unless you are the station that the DX has just sent a report to, you should not be transmitting. First, you may cause interference and the DX will have to ask for a repeat. Second, especially in CW, if you are transmitting after the DX has sent his report you run the risk of someone tuning to your frequency because they think you are sending a report back to the DX station. There is only a very short time to tune around and find the station that is sending a report back to the DX. Some CW exchanges go so fast there isn't time to hang around long enough to be sure the station you have found is actually sending a report back to the DX. Everyone who hears you transmitting will be transmitting on top of you as soon as the DX asks for the next call. You don't really want that to happen do you?

8 Stop transmitting and listen to see if the DX has picked out a call. On CW I only send my call once, unless the operator has asked people to send their call twice or more. On CW simplex I have heard stations that would send their call eight, 10 or more times. I have actually sent my call, the DX picked me out and sent my report and I sent his report back, all the while with some station sending his call repeatedly.

COURTESY JOHN DWIGGINS, N4QVM

John Dwiggins, N4QVM, of Cooleemee, North Carolina runs a barefoot TS-480 with wire antennas and has worked 265 countries.

9 Simple antennas work. For one major DXpedition I worked them on all modes and all bands from 80 meters up. At the time I did not have a 160 meter antenna, but they were operating on that band also. So, in 1 day I measured out a ¼ wavelength of wire, threw a line over a tree and pulled the wire up. The end result was a slightly tilted inverted L. I fed the antenna with TV twin lead, tied one side into the inverted L and the other side I tied into the radial system for a ground mounted multi-band vertical. It wasn't pretty but I worked them on 160 meters.

10 Wire antennas work very well. Using only wire antennas and 200 W or less I have achieved DXCC on SSB, CW and mixed. I need two more confirmations on RTTY to get DXCC there. I also have DXCC on 10, 15, 20 and 40, and on 80 meters I have the credits for it. When I apply for 80 meter DXCC I will also apply for 5BDXCC; the credits are there, I just have to do the paper work. So simple wire antennas do work — you don't have to spend a fortune on towers, beams and amplifiers.

11 If you know other DXers, bounce ideas off of them. The DXers I have known were very happy to share tips.

12 Subscribe to a DX newsletter. The information is invaluable.

13 Get a cluster program running on a computer. This is the best way to know what DX is on now. Don't limit the spots you receive to a certain area. If you see DX spotted by a South American or European station check it out and see if you hear them. It'll be a lot easier to work them before all of North America starts calling.

14 Early morning, before dawn in the winter, is a good time for East Coast stations to work the Pacific area on 30 meters and down. Most people won't get up that early to work DX so the bands are less crowded. The downside is you have to compete with Japanese stations and there

[1]B. McClenny, W3UR, "How's DX?," *QST*, Jun 2010, pp 89-90.

Bernie McClenny, W3UR ♦ 3025 Hobbs Rd, Glenwood, MD 21738-9728 ♦ w3ur@arrl.org

are a lot of them. If you are lucky the station you are trying to work will take time to call for North America. If not, you just have to fight it out with the JAs and sometimes you will get the contact.

15 If you haven't worked and confirmed the entity it doesn't matter that you work them every time you hear them. If you are applying for awards it doesn't matter how many times you work a country, only how many times you have it confirmed.

16 Read books and articles about DX-ing. Study it, take it seriously and make an effort if you want to get to the top of the heap. The operators who you will be competing against in the pileups do. Most of all have fun. It's a great hobby and the more effort you devote to it the more fun you will have.

DXERS IN FRIEDRICHSHAFEN — HAM RADIO 2010

For many years your editor has wanted to go to Friedrichshafen, Germany to see what the Europeans call Ham Radio. I have been to Dayton, Visalia, the Pacific Northwest DX Convention, Miami, Ham Com and, my favorite off all, W9DXCC. I decided that this was the year to do one overseas and Ham Radio 2010 was more than I anticipated. Over the past few years my good friend Jan Harders, DJ8NK, had been asking me "why not come to Friedrichshafen?" With less than 6 weeks before Europe's biggest hamfest Jan once again asked and I said yes! Jan was gracious enough to make a few key reservations for me with well-known hotels in Zurich and Friedrichshafen and for the DX and Contest dinners, which took place over the weekend.

I flew into Zurich airport then took a 1 hour train ride to Romanshorn, on the southern side of Lake Constance. It was a beautiful journey on the very clean, fast and efficient Swiss rail system. Once in Romanshorn I took a ferry and in less than 30 minutes I was in Friedrichshafen. It was a perfect day and the lake was calm both to and from. I stayed at the family run Buchhorner Hof along with my good friend Roger Brown, G3LQP. Getting back and forth from the hotel to Ham Radio was very easy with a free bus ride, with the depot less than a 2 minute walk from our hotel.

Everything at Ham Radio is located indoors, except for the food and drinks. While some food was located indoors, most was right outside the convention center with ample seating — many tables with huge umbrellas.

Indoors there are three huge rooms. One room contained commercial vendors, IARU societies and clubs. This was where I spent the majority of my time. The others contained a flea market of equipment from all over Europe. They seem to have plenty of space for growth and apparently have been growing in attendance yearly.

Like Dayton the event runs from Friday to Sunday. Likewise, the biggest days are Friday and Saturday. Many of the attendees I met were very interested in my opinions and comparisons of Dayton and Ham Radio.

One of the things I enjoyed most was the IARU, Club and Association booths. Many European countries, and a few from the Middle East, send representatives of their IARU societies. All have tables and chairs along with drinks, snacks and interesting advertisements (papers) from their organization. They were all very welcoming and glad to visit and talk with those from other countries. In addition, many of the societies were collecting QSL cards for their incoming QSL bureau.

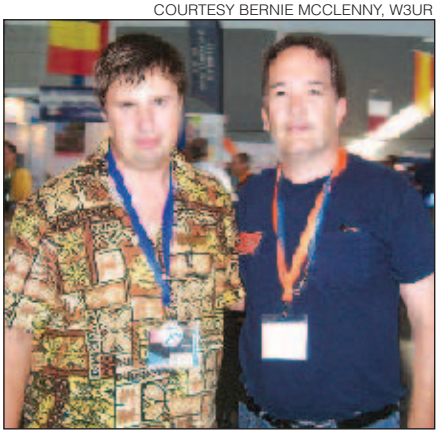
I spent a majority of my time visiting the societies, clubs and associations. There I was able to talk with many DXers and contesters from all throughout Europe and several from Asia. I was able to talk about upcoming operations that are yet to be announced to the public.

Like Dayton there are DX and Contest dinners. The Rhein Ruhr DX Association holds a DX dinner on Friday night in a nearby restaurant. There were about 60 people at this event. On Saturday night members of the Bavarian Contest Club (BCC) hold a Contest dinner at a local hall that was attended by about 300 people.

I really enjoyed Friedrichshafen and would highly recommend it for anyone who has never made the trip. I really liked meeting other attendees, many of whom I had previous contacts and e-mail exchanges with over the years.

I would like to publicly thank Jan, DJ8NK, for his encouragement and support during this trip. I could never have done it without him. Also a big thanks to the members of the European DX Foundation (EUDXF) and Jan, PA1TT, for a wonderful time and hospitality at the booth. QST

COURTESY BERNIE MCCLENNY, W3UR



Alex, UT5UY, tells your editor that members of the Ukrainian DXpeditioners Team will attempt to go to Kanton Island (T31X) in early September of this year.

COURTESY BERNIE MCCLENNY, W3UR

German DXpeditioners Bruno, DH1BL; Manfred (Willi), DJ7RJ, and Hartwig, DL7BC, were on hand in Friedrichshafen talking about their next DXpeditions.

COURTESY BERNIE MCCLENNY, W3UR

Robbie Ferguson, GM3YTS (left), presented George Wallner, AA7JV (center) and Tomi Pekarik, HA7RY, with the GM DX Group DXpedition of the year award for the fantastic operation of TX3A from the Chesterfields.


W3ZZ

THE WORLD ABOVE 50 MHz

A June to Remember on VHF

In September 2006 I wrote a column entitled "A June for the Ages." I should have saved that title. June 2010 surpassed it in almost every respect and probably represented the finest propagation for the most US stations of any month in the annals of VHF. This month we will discuss multiple 2 meter E_s openings, some of which approached true European proportions, and review some of the 6 meter details. Next month we will delve more deeply into some spectacular 6 meter propagation for which there is just no room this month. On both bands there were stunning achievements well worth noting for posterity.

Let's look first at 2 meters. The information I present is garnered from over 120 e-mails from my correspondents and postings from *DX Sherlock* (**www.vhfdx.net**), **dxworld.com** and *DX Summit* (**www.dxsummit.fi**). TV, broadcast and FM reports were mostly from Bob Cooper, ZL4AAA. I try to mention all my correspondents but my apologies in advance to those who may be overlooked as I try to stuff five pages of information into little more than two pages of printed space.

222 MHz E_s — Missing

Let's start with what didn't happen. Although 6 meter contacts were made at distances close enough to appear to support an MUF above 222 MHz, not a single 222 MHz E_s QSO was reported to your conductor. Specifically, operators in wide areas — W5UWB, NØLL, N9HF, K5VH, K5QE, W7XU, W4DEX and K2LNS@WA2FGK — all tried with no results. Although several e-mails (eg, from K7JA) indicated that *DX Sherlock* reported an MUF exceeding 300 MHz at one point on June 3 and Jeff, K1MOD, reported Mexican TV channel 13 into IL on June 18, looking closely at the reports I received and doing some math on the G7RAU MUF calculator at **g7rau.demon.co.uk/default.aspx?menu=1001** indicates that the MUF never reached 222 MHz most of the time. For instance, Peter, N4LI (EM55cb) worked NØLL (EM09os) at 952 km on 2 meters June 3, a short distance but only a 204 MHz MUF. Perhaps Bob, ZL4AAA, said it best, "I strongly suspect 222 was available but not on a path which had stations at both ends." In any case should any readers know of 222 MHz contacts during any of the June 2010 E_s openings, please send me the details at **w3zz@arrl.org**. This information is too important not to document.

This Month

*September 5	Good EME conditions
September 11-13	ARRL September VHF QSO Party
September 18-19	10 GHz and Up Contest
September 25	Mid Atlantic States VHF Conference

*Moon data from W5LUU

June 2-3

The opening, mapped in Figure 1, displays Qs earlier than 2300Z in blue and after 2300Z in red. I am indebted to reports from Maarten, N1DZ (FN41); Ellis, WA1RKS (FN32); Kent, WA3IEM (FN20); Peter, N4LI (EM55); Todd, N4QWZ (EM66); Les, N1LF/4 (EM63); Ken, AC4TO (EM70); David, WB4JGG (EM75); John, W5UWB (EL17); Al, K7ICW/5 (DM62); John, AA5JG (EM04); Brandon, N8PUM (EN66); Ray, W9VHF (EN71); Jay, KØGU (DN70); Jon, NØJK (EM17); Larry, NØLL (EM09), and Chad, NØYK (DM98).

As with many intense 2 meter E_s openings a few contacts often are made much earlier in the day than the peak. In this instance, at 1540Z June 2 from EM25 to EL87 on *DX Sherlock* and then nothing more until an E_s cloud appeared over the central Rockies about 1800. This extended the opening almost to the Pacific Coast. By 2115Z north/south paths had opened between FL and EN5x-EN8x, then quickly from FL to the Northeast crossed by east/west paths from the mid-Atlantic to the Midwest/Southwest. By 0000Z June 3 the opening had matured to include all of the East Coast up to VE2, 3 and another cloud supported some long distance contacts between CO and FL. At its peak the opening supported contacts west to

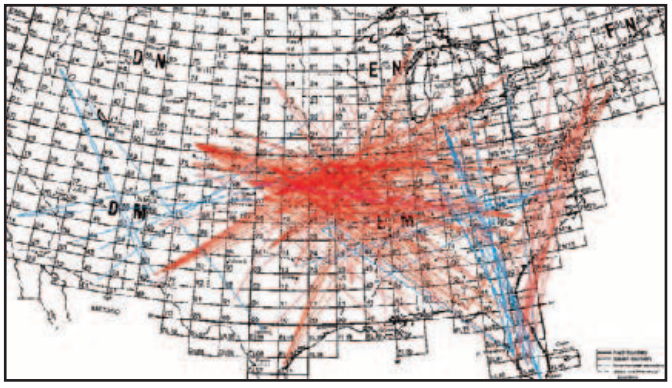


Figure 1 — 2 meter E_s opening of June 2-3. Legend: Blue = early <2300Z. Red = late >2300Z.

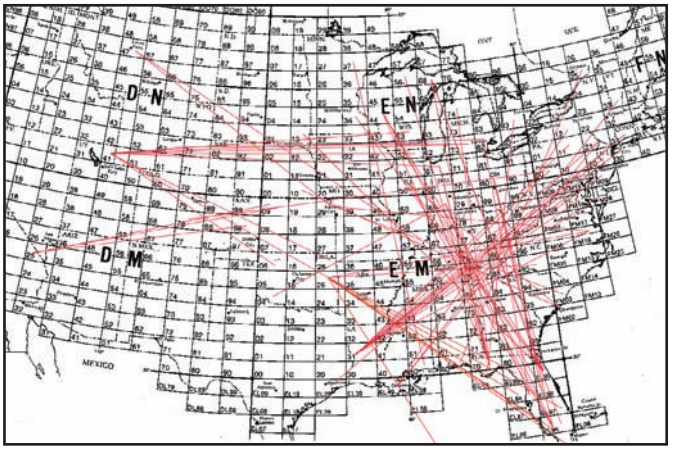


Figure 2 — 2 meter E_s opening of June 13.

Gene Zimmerman, W3ZZ ♦ 33 Brighton Dr, Gaithersburg, MD 20877 ♦ w3zz@arrl.org; (301-948-2594)

CO (DM79, DN70) and western KS (DM98), southwest to EL09 west TX, south to FL and north into southern VE2. As the opening came to a close ~0140Z it expanded to DM62 (NM). The longest contact (2435 km ODX) may have been KØGU (DN70mq) to W3HH (EL89vk). Quite a few worked new states and dozens of new grids. By working EM54 and 80, NØLL now is lacking only two grids in the EM field. Several different clouds were involved and overall the band was open for almost 8 hours.

VHF Contest — June 13

Due to the high incidence of E_s on 6 meters, a short E_s opening from 0000-0236Z was a welcome addition to 2 meter activity. Upwards of a dozen grids were possible for well-situated stations in the Southwest. My thanks to Jeff, K1TEO (FN31); Dave, K1WHS (FN43); Mitch, W1SJ (WB1GQR FN33); Phil, K3TUF (W3CCX FN21); Ethan, K8GU/3 (FM19); David, KE4YYD (EL79); Dave, N9HF (EL99); AC4TO; Marshall, K5QE (EM31); Roger, K6LMN (DM03); Matt, K7BG (DN47); Mike, K7ULS (DN41); Jeff, N8CC (EN72); Keith, N8KOL (EN80); N8PUM; Al, N9ISN (EN44); Bill, KØAWU (EN37); NØJK; NØLL; NØYK, and Paul, WØUC (EN44).

Look at Figure 2. Two small clouds appeared to the west, one over DM88/89 and another over EN02 supporting propagation E/SE from DN41 and SE from DN47 as well as a narrow opening from DM25 to DM98, EM09. A larger cloud formed over EM75 that provided propagation in all directions in a starburst pattern typical of larger 2 meter E_s openings. The peak appeared to be 0100-0130Z. The main opening moved eastward only to western New England, and K1WHS (FN43) for instance heard only one Gulf Coast station with no contact.

June 18-19

These 2 days encompassing two distinct time periods, early June 18 and later June 18/early June 19, produced some of the most widespread 2 meter E_s in decades. The map in Figure 3 shows the 18th in magenta and the 18-19 in red. The first round extended from 0000-0530Z June 18. Several clouds appeared — one between New England, the Dakotas and NE; another between CO and northwest TX into FL, and a third from FL to the boot of TX and Mexico. The propagation reflectors noted a few contacts from FM16 to WØ and crosswise from the Gulf Coast to IL. The main event was the second round beginning as early as 1400Z and continuing until almost 0300Z June 19, a total of 13 hours. Many major centers of refraction were noted, particularly around EM56 and EN50 creating interlocking starbursts.

The second event produced a number of noteworthy contacts and some impressive contact, state and grid totals. How good was it? Let's ask some long-time denizens of 2 meters: "One of the wildest days since the late 70s for me." — W5UWB. "Never seen anything like it in over 40 years." — WB4JGG. "That is an E event that will write history. Think I have only seen one, maybe two, in over 40 years on VHF that can compare." — W4DEX. "Best two meter E_s that I've experienced in 30 years." — WBØULX.

David, WB4JGG (EM75ne) owns the champion ODX for this month. At 0101Z June 19 he worked Tim, VE6SH, IARU President (DO21xc) at 2927 km, a clear double hop E_s contact and one of a handful ever recorded in North America. Other notable ODX were KØGU (DN70mq) – N4QV (EL96vc) (2798 km) and NØKE (DM69em) – N3LL (EL86tx) (2719 km), which are likely to have been double hop. Some representative performance data includes Dave, K1RZ (FM19) 17 grids — five new; Jerry, KN4SM (FM16) 20 Q/12 grids; WB4JGG 31 Q/11 states; Dave, N9HF (EL99) four new states NE, IA, CO, WY, and Gary, KBØHH (EM06) 27 Q/18 grids.

Many thanks to all who contributed to documenting this exciting event: K1WHS; Emil, W3EP/1 (FN31); WA1RKS; Herb, K2LNS (@WA2FGK FN21); Jay, NY2NY (FN31); K1RZ/3; Chris, WA3HMK (FN10); K4LY; KN4SM; Dex, W4DEX (EM95); Vance, W4VC (EM81); WB4JGG; George, W1LVL/4 (EL99); N9HF/4; John, AA5JG (EM04); W5UWB; K7ICW; Peter, N5UWY (EM15); W5UWB; K7XC; Lance, W7GJ (DN27); N8PUM; K1MOD/9; KØAWU; KØGU; KBØHH; Charlie, NØAKC (EN44); Dan, NØHF (DM79); NØJK; NØKE; John, WØJRP (EM27); John, WØUN (EM00), and Arliss, W7XU/Ø (EN13).

Two Meter Field Alignment Irregularities (FAI)

FAI is a rare back- or side-scattering type of E_s where the scatter direction corresponds to the direction of the Earth's magnetic field lines passing through the scattering volume. FAI is usually seen only immediately after the end of an intense E_s episode and is characterized by a raspy auroral-quality signal generated by spectral spreading and an azimuth heading some 40° at variance with the true heading. I have encountered it only once on 2 meters — following an intense E_s opening in 1987 where I worked TX and AL on FAI peaking west of north of the

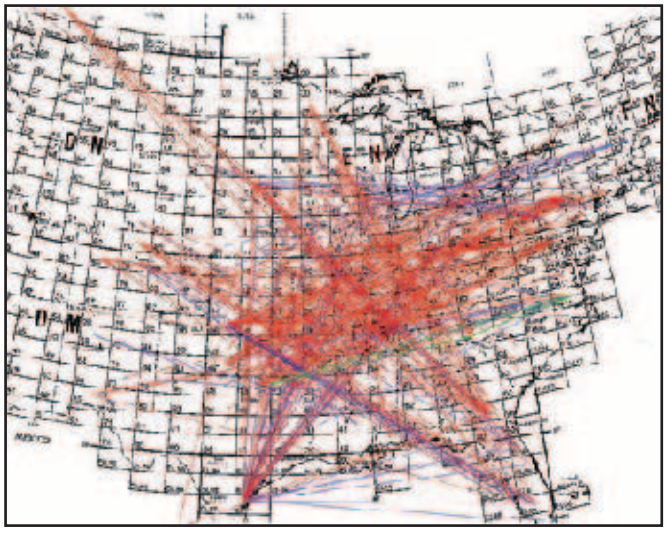


Figure 3 — 2 meter E_s openings of June 18 (magenta) and June 18/19 (red). FAI opening is in green.

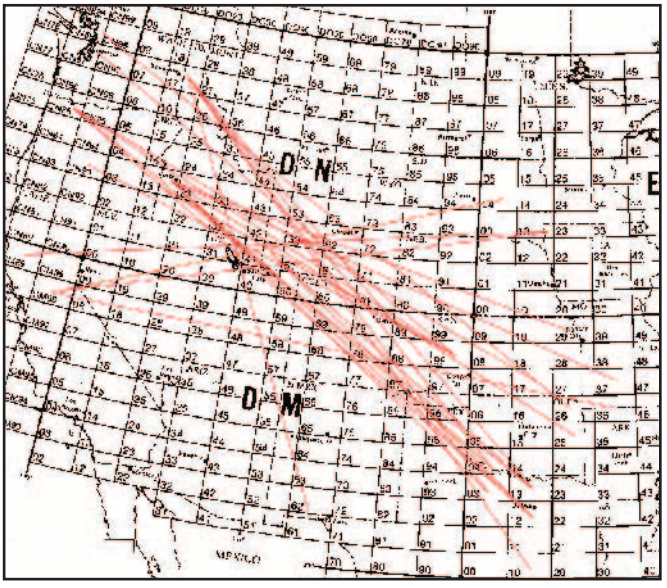


Figure 4 — 2 meter E_s opening of June 20.

usual southwesterly direction. On June 19 at 0150Z after the end of the opening Doug, K4LY (EM85) recognized the characteristic rasp on W5LUA's signal in EM13 and later between 0157-0219Z worked KR5V (EM13) and Jerry, KN4SM (FM16) all to the northwest. At 0157Z Al, W5LUA, worked Jerry at 2182 km, which may be a new North American FAI record for 2 meters. The FAI paths shown in green in Figure 3 are the only ones reported during this event.

June 20

After the major openings the previous 2 days, June 20 was more subdued. Still it bought the Pacific Northwest into TX and interior CA into the Dakotas, again in a starburst-like pattern. Thanks to Al, W5LUA (EM13); Norm, KC6ZWT (CM98); Dave, N7DB (CN85), and NØYK. It was a relatively short opening from 0156-0303Z and the center of refraction appeared to be around DN51 from Figure 4.

Other 2 Meter E_S

Two other short openings occurred in June. On June 29 Jay, KØGU, worked 14 Qs in six Pacific Northwest grids in 1½ hours. Tim, K7XC (DM09) had a short opening to DN41 (UT) on the 25th.

We haven't moved to Europe where this kind of thing happens all the time, but we can only hope it repeats next year!

ON THE BANDS

6 meters. Six meters was just as impressive as 2 meters but a recounting of the best parts will have to wait until next month. This was a month of unusually long contacts, many displaying the characteristics of chordal or ductal propagation with signals traveling long distances without appearing to touch the ground during the intermediate hops. Next month we will chronicle some important domestic expeditions and the events of June 18-20 that saw the best conditions to Europe from the western United States perhaps in the history of E_S propagation and cover 6 meter domestic grid expeditions. This month we will discuss the other days, which by themselves would have provided an outstanding month of 6 meter activity. I start with a quote from Neil, GØJHC (tnx W2RS): "It has been the best sporadic E season I have ever known on 6 meters over the last 25 years. Never heard the band quite like it." Between May 13 and June 24 Neil worked DXCC on 6 meters!

DX filled every nook and cranny of the US. To Europe noteworthy openings were recorded to all areas. June 1: Steve, NN4X (EL98) east and central Europe. June 2: Terry, K4RX (EM70) to Scandinavia; DK1MAX (JN58sp) to XE2WWW (EL06vc) (9202 km), and Chip, K7JA (DM03xs) to CT1HZE (IM57nh) (9202 km). June 7: Phil, NØKE (DM69em) to Scandinavia and eastern Europe; Bob, K6QXY (DM88ql) his first terrestrial Q to SM with SM5EDX (JO89fp) (9427 km); KE7V (CN88ic) to UT7QF (KN77mv) (9134 km) and LZ2CC (KN23jg) (9352 km). June 9: Ken, AC4TO (EM70) 25 Q/11 DXCC to central and eastern Europe and Pat, W6RMJ (DM14cp) to EA3AR (JN12db) (9553 km). June 10: CT1HZE (IM57nh) to Tim, K7XC (DM09nm) (8902 km) and K6QXY (9221 km); and Rich, K1HTV (FM18) strong to the Mediterranean. June 11: Herb, K2LNS@WA2FGK (FN21) and W3ZZ (FM19) to Scandinavia. June 12: Europe to the Midwest, NM, AZ southwest and Pacific Northwest; Lou, WØFK (EM48) worked 9A and HA for new ones. June 14: an outstanding opening to eastern Europe and TA to FL and the Southeast; Russ, K4QI (FM06) reports excellent conditions and NN4X works 64 Qs in 25 DXCC. June 22: big opening from JA to western Europe with multiple 9000 km Qs including EI5FK (IO51rt) to JL8GFB (9098 km) and JHØINP (PM96cw) (9627 km). June 24: outstanding to Europe from the interior US; Tom, K4PI (EM73) 72 Qs from the Baltics to the Mediterranean; Bill, K2EK (EL88) 50 Qs in 15 DXCC; Bill, WØWOI (EN22) to CN, W5, CU, EA8; John, WØJRP (EM27) to the Mediterranean; John, W5UWB (EL17) briefly to EI, G. June 25: Mick, W1JJ (FN41fe) called by A92IO (LL56fe) (10,427 km); W5UWB 10 Qs to western Europe.

Japan and the Far East were also busy. June 3: Wilhem, DU7/PAØHIP worked KS7DX (11,970 km) and K6QXY (10,585 km). June 9: K3ZO (FM18mt) worked JE1BMJ (10,917 km) via SSSP and AK3E, W3ZZ and K3TKJ heard Han. June 18: Mike, K4PI worked 30 JAs. June 21: AC4TO worked JA6GCE (PM52) (12,125 km), the farthest southwest Ken has ever worked in JA. June 22: The first E_S JA/VE1 contact VE1PZ (FN85pr) to JL8GFB (QN03rh) (9856 km). June 23: several New England/JA contacts by Emil, W3EP (FN31vg) — JE1BMJ (10,827 km), N1BUG and W1JJ while K4QI worked 3 JAs. June 24: Lefty, K1TOL (FN44vg) worked JL8GFB (9807 km).

To South America and the Caribbean we have several openings from west of the Mississippi. June 2: K6QXY to FG, HI; Jon, NØJK (EM17) to VP9, HI, PZ. June 6: KI7JA and K7RWT both CN85 to FG (tnx N7DB). Hawaii was into the Pacific Northwest June 8 (tnx N7DB and K6QXY). Bob also worked KH6 June 17 as did NØJK and propagation reached the East Coast that day.

Finally Emil, W3EP, writes that TN5SN (JI75) worked many Europeans on June 27. JI75 is south of the geographic equator and more significantly, clearly south of the geomagnetic equator. Emil reminds us that popular wisdom says that E_S cannot cross the geomagnetic equator yet here TN5SN does just that. He is too close to the equatorial bulge for TEP and besides, June is the worst month for TEP. The exact mechanism is unclear but it is a very interesting question that will require more study.

4 meters. Under an FCC experimental license Brian Justin, WA1ZMS, began operating a remote base beacon, WE9XFT, on May 3 on 70.005 MHz to test 70 MHz propagation between the US and Europe. The beacon is located in (FM07fm) at 1280 meters elevation and runs 2.5 kW ERP directional toward Europe. WE9XFT has been heard by EA8/DL3GCS June 10 and June 14 and by CT1HZE June 26 (tnx WA1ZMS and W3EP). Brian indicates several heard reports from widely scattered areas such as NH, FL and TX. W3EP and ZL4AAA report that CT1HZE worked K1SIX crossband 70/50 MHz at 2126Z June 24.

Tropospheric ducting. After years of trying, Bernardo, XE2HWB (DL44uc) finally worked Paul, KH6HME (BK29go) (4676 km) at 1920Z June 24 via the transpacific duct. He thanks Paul and KH7Y for making the contact possible.

HERE AND THERE

First FFMA Award Worked. I am delighted to report that on June 17 Pat Rose, W5OZI (EM00) worked and has now confirmed KB8U/6 in CM79 for his last of the 488 grid locators in the contiguous United States (CONUS), thus becoming only the second person, after the legendary Fred Fish, W5FF (SK), ever to have worked and confirmed them all on 6 meters. Pat will now be able to apply for the Fred Fish Memorial Award (see **www.arrl.org/ffma)** honoring this lifetime achievement. We will hear more from Pat in an upcoming column. Hearty congratulations! It couldn't have happened to a finer person or a greater supporter of 6 meters.

2010 ARRL International EME Competition. The first full 48 hour period covers 2.3 GHz and up from 0000Z to 2359Z September 4-5. There are All Mode (CW, SSB, digital) and CW only categories. Liaison to coordinate band-by-band activity is explicitly permitted for the 2.3 GHz and higher bands. Full rules may be found at **www.arrl.org/eme-contest**.

ARRL September VHF QSO Party. After the outstanding conditions in the June contest, can we expect some superior tropoducting in September? Join in and find out. The contest runs between 1800Z September 11 and 0259Z September 13. More details may be found in August 2010 *QST*, or at **www.arrl.org/september-vhf-qso-party**.

ARRL 10 GHz and Up Contest. The second weekend of this contest begins at 0600 local time September 18 and ends at midnight local time September 19. See further information in the August "World Above 50 MHz" column and **www.arrl.org/10-ghz-up**.

Fall Sprints. The first two Sprints, 144 and 222 MHz, sponsored by the Southeastern VHF Society, will be held on September 20 and 28, respectively, from 7 to 11 PM local time. Rules are the same as last year. See **www.svhfs.org/sprints.html** for complete details.

Mid Atlantic States VHF Conference. The Mt Airy VHF Radio Club (Pack Rats) hosts their annual convention at the Quality Inn, Montgomeryville, Pennsylvania September 25. This meeting includes an extensive beginners' session, indoor equipment display and outdoor tailgating. See **www.packratvhf.com** for further information.

TI5KD 2 Meter Beacon. We now have a marker for extended 2 meter propagation into Central America. TI5KD has installed a 2 meter beacon built by W1XE running 30 W to a vertical dipole on 144.273. The beacon is collocated with the TI2NA/b 6 meter beacon on the Irazu volcano at 3500 meters ASL (tnx K2PLF, N3LL).

48 Teams, 34 Countries, 1 Contest: WRTC 2010

After almost four years of planning, the 2010 World Radiosport Team Championships — held just outside of Moscow, Russia — have come and gone. WRTC, held every few years, takes place during the IARU HF World Championships; for 2010, this was July 10-11. WRTC is an invitation-only Amateur Radio contest where the world's elite contesters compete against one another from operating stations that are in one geographic area of the world; each station is equipped with similar antennas and operating restrictions. Each WRTC event is organized by a standing committee of internationally recognized contesters and a host organization in the locality where the competition will be held. WRTC is the closest thing to a world championship in the sport of Amateur Radio contesting.

WRTC began in 1990 under the auspices of the Goodwill Games, the brainchild of Ted Turner of CNN fame. The first Games were organized in Seattle, Washington and focused on areas of cultural exchange, arts and other varied subjects — one of these being Amateur Radio and WRTC. Radio amateurs from around the world gathered in an Olympic-style event, joining in competition and camaraderie. In 1996, WRTC moved to San Francisco, then Slovenia in 2000, Finland in 2002 and Brazil in 2006.

Each of the 48 competing teams used a distinctive Russian call sign for the event disclosed to the teams just 15 minutes before the start of the contest. The teams were not allowed to disclose which calls were theirs, to promote fairness. For the first time since WRTC began, a North American team was not atop the podium: The gold medal went to the R32F Team of Vladimir Aksenov, RW1AC, and Alexey Mikhailov, RA1AIP, of Russia with 4,098,162 points. The silver medal went to the R33A Team of Tonno Vahk, ES5TV, and Toivo Hallikivi, ES2RR, from Estonia, with 4,084,889 points, while the R33M Team of Dan Craig, N6MJ, and Chris Hurlbut, KL9A, of the United States took the bronze with 3,942,904 points. The R33A Team had the best SSB score, while the R33L Team of Yuri Onipko, VE3DZ, and Yury Romanov, VE3XB, of Canada, claimed the highest CW score. To be eligible for this award, the highest scoring SSB team had to submit at least 35 percent of their contacts in CW, and vice versa for the CW winning team. The R33A team also boasted the highest number of multipliers — 389 — in the contest. Multipliers included IARU HQ stations and DXCC entities per band (80-10 meters). Fourth place went to the R39D Team of Tine Brajnik, S5ØA, and Robert Bajuk, S57AW, of Slovenia.

The R32F Team of Vladimir Aksenov, RW1AC, and Alexey Mikhailov, RA1AIP, of Russia won the WRTC 2010 gold medal.

The R33A Team of Tonno Vahk, ES5TV, and Toivo Hallikivi, ES2RR, from Estonia, took second place. This team also had the highest SSB score and the highest number of multipliers.

The R33M Team of Dan Craig, N6MJ, and Chris Hurlbut, KL9A, of the United States took the bronze medal.

The next highest-placing American team — in 5th place — was R34P: Randy Thompson, K5ZD, and Tom Georgens, W2SC. "The contest started at 4 PM and the rates far exceeded our expectations," Thompson said. "We had 160+ QSOs in the first hour. Somewhere around the third hour, the skies darkened and we could hear thunder. We never saw lightning, but I was sure a thunderstorm was coming. The wind picked up for awhile and the tent was making so much noise we couldn't hear the radios. No rain, but the downdraft from the storm cooled the temperatures. Other teams did get the full brunt of the storm and were not as lucky. The rest of the contest was a blur. The rates were far ahead of any expectations. We fell into a pattern where W2SC did most of the running and I spent time chasing QSOs and mults on the second station. It was like doing SO2R without having to pay attention to the CQ radio. When the contest ended, we looked at each other with total satisfaction. Everything worked great. We felt very loud. We agreed there was nothing that we could have done better. And we thought that anyone who beat us did an even better job!"

Team R34P placed 5th before the judges began checking the logs. "We arrived back to the hotel and saw that we were fifth on the scoreboard," Thompson said. "We didn't expect to move and when the results were announced, we were happy to have maintained our 5th place standing. Only two multipliers would have moved us to 4th! Only two [more] QSOs per hour might have moved us to 3rd. Yes, it was that close!"

Eleven teams came from North America, 21 teams came from Europe, six from Asia, one from Africa, one from Oceania and two from South America. Another four teams — including the WRTC 2006

S. Khrystyne Keane, K1SFA ♦ ARRL News Editor ♦ k1sfa@arrl.org

WRTC runs during the 24 hour IARU HF Championships. The contest began at 1200 UTC (4 PM Moscow Summer Time) on Saturday, July 10. The WRTC 2010 Organizing Committee supplied each team with a 20/15/10 meter tri-band antenna on a 12 meter tower, as well as a 40 and 80 meter inverted V dipoles.

WRTC 2010 volunteers install antennas to be used by one of the 48 teams.

NODIR TURSOON-ZADEH, EY8MM

The R33U Team of Kazunori Watanabe, JK3GAD, and Junichi Tanaka, JH4RHF, in their operating tent.

There were four judges at WRTC 2010 (from left to right): Don Field, G3XTT; David Sumner, K1ZZ, and Nodir Tursoon-Zadeh, EY8MM. Not pictured: Mike Klokov, UA9PM.

Chief Judge Mike Klokov, UA9PM, and software guru Dima Gulyaev, UA4WLI, scrutinize a log.

Champions (John Sluymer, VE3EJ, and James Roberts, VE7ZO) and a host team — brought the total to 48 teams. Each Team Leader nominated a referee, who, along with volunteers from the radiosport community, was placed on a referee nomination list. From that list, referees were selected and assigned to teams. During the competition, team referees had to have been from a different country than that of their nominating team and could not referee the team that nominated them.

Criteria selection for Team Leaders was via a formula that took into account operators' results from various Amateur Radio contests, weighting them according to contest (some contests count more than others) and the categories (single operator, multi-operator/two transmitter, and such) entered in the contests. Team Leaders must have had permanent residence in the country they represented in WRTC, along with a valid passport for that country. Each Team Leader could choose a partner; the partner did not need to be from the same call area as the Team Leader, but must have had permanent residence of the same country as their Team Leader from the date of the first submitted contest result. Team Leaders from Africa, Asia or Pacific entities may choose their partner from another country, but the partner must be from the same selection area.

The 11 North American teams were (Team Leaders precede partners) as follows:

- Area 1 (W1, W2, W3 and the Virginia, North Carolina, South Carolina, Florida and Georgia portions of W4): Randy Thompson, K5ZD, and Tom Georgens, W2SC; Jeff Briggs, K1ZM, and Krassy Petkov, K1LZ; Andy Blank, N2NT, and Tim Duffy, K3LR.
- Area 2 (the Kentucky, Tennessee and Alabama portions of W4, W8 and W9): Terry Zivney, N4TZ, and Marvin Bloomquist, N5AW; Scott Robbins, W4PA, and Ken Widelitz, K6LA.
- Area 3 (W5, WØ): Steve London, N2IC, and Bob Wilson, N6TV; Kevin Stockton, N5DX, and Stan Stockton, K5GO.
- Area 4 (W6, W7, KL7): Daniel Craig, N6MJ, and Chris Hurlbut, KL9A; Bob Wolbert, K6XX, and Richard Tavan, N6XI.
- Area 5 (VE1, VE2, VE3, VE4, VE9, VY2 and VO2): Yuri Onipko, VE3DZ, and Yury Romanov, VE3XB.
- Area 6 (VE5, VE6, VE7 and VE8): Lee Sawkins, VE7CC, and Dale Green, VE7SV.

The 2010 WRTC was held outside, "Field Day-style," in fields in a flat area about 35 km south of Moscow. Competitors were located in clusters of 4-8 teams each in a total area encompassing about 40×30 km. Height differences between teams were no greater than 40 meters, and each team was separated by at least 500 meters.

Each team had antennas and power monitors supplied, along with a tent, generator (and gasoline), tables, chairs and water. To avoid having team members spend time refilling the generator, organizers supplied volunteers dedicated at each location to help keep it up and running during the contest period.

The location of the 2014 WRTC has yet be announced; according to WRTC officials groups in two countries — the United States and Bulgaria — have submitted letters of interest to host the 2014 event.

All photos courtesy of the WRTC 2010 Organizing Committee except as noted. QST

SPECIAL EVENTS

Contact these stations and help commemorate history. Many provide a special QSL card or certificate!

Aug 18-Aug 21, 1600Z-2000Z daily, KDØIXB, Slayton, MN. Murray County Amateur Radio Club. Murray County's 100th Fair. 14.260. Certificate. Desirae Weinrebe, KDØDWB, 201 NE 2nd St, Avoca, MN 56114. **www.murraycountyradioclub.com**

Aug 29, 1500Z-2300Z, W9Y, Elmhurst, IL. York Radio Club. 21.350 14.250 7.250. Family Aviation Celebration. QSL. Robert Bejna, KB9FUR, 917 Babbitt Ave, Addison, IL 60101. *IRLP and Echolink contacts welcome on the W9YRC repeater (442.875 +5).* **yorkradioclub.com**

Sep 4-Sep 5, 1400Z-0200Z, WA8RRA, Belding, MI. Riverside Radio Amateurs of Ionia County. Annual Belding Homecoming. 14.250 7.250. Certificate. David Sailer, AB8LE, 313 Hanover St, Belding, MI 48809. **www.saranack.k12.mi.us/rra**

Sep 4-Sep 5, 1700Z-0100Z, WA5CC, McCrory, AR. Cross County Amateur Radio Club. Annual Three County Fair Celebrating Farming Activities. 14.240 7.230. Certificate. Preston E. Koelling, 269 Lexington Dr, Forrest City, AR 72335. **www.qsl.net/crosscarc**

Sep 4-Sep 6, 1900Z-1400Z, W5C, Prairie Grove, AR. Joe Dunn. 14.220 7.235. 57th Annual Prairie Grove Clothesline Fair. QSL. Joe Dunn, KD5TLH, 12358 W Ervan Beek Rd, Farmington, AR 72730.

Sep 4-Sep 6, 1900Z-1900Z, K7RDG, Sierra Vista, AZ. Cochise Amateur Radio Association. Contact the Ghost Town of Paradise, AZ, 31st Anniversary. 21.315 18.115 14.315 7.230. Certificate & QSL. Cochise ARA, PO Box 1855, Sierra Vista, AZ 85636. **www.k7rdg.org**

Sep 9-Sep 13, 1200Z-2359Z, N3U/Flt 93, Altoona, PA. Blair Amateur Radio Society. Memorial Dedication United Flight 93. SSB 18.130 14.240 7.195 3.820 CW 18.090 14.030 7.030 3.530. QSL. Blair Amateur Radio Society, 112 E Wopsononock Ave, Altoona, PA 16601. *No LoTW or e-QSL. If you need a bureau QSL, e-mail QSO information to **w3btx@arrl.net** — do not send card via the bureau*. **www.qrz.com/db/n3u**

Sep 10, 1300Z-2300Z, KC2RA, Battery Park, NY. Kings County Repeater Association. 9/11 Memorial Event. 14.295 USB 14.070 PSK31 7.250 LSB D-Star: REF020B or WG2MSK/B EchoLink node 64300. QSL. Kings County Repeater Association, PO Box 288, Brooklyn, NY 11228. *This year's annual event takes place as close as possible to Ground Zero. All D-Star and EchoLink users are welcome to participate, but must use RF on your end for QSL card. See Web site for 20 m voice/data times.* **www.kc2ra.org**

Sep 10-Sep 12, 1300Z-2200Z, N5I, Galveston, TX. 2nd Anniversary of Hurricane Ike. 28.485 21.305 18.600 14.285. QSL. Leslie Bartosh, 17 Campeche Dr, Galveston, TX 77554. **ad5wb2@yahoo.com**

Sep 10-Sep 12, 1400Z-2300Z, K7S, North Bend, WA. Northwest Automatic Position Reporting System. NWAPRS 12th Annual Summer Gathering at Valley Camp. 10/15/20 m Voice 446.525s IRLP 7808 APRS 144.39/12kb 440.8 144.35/96kb EchoLink 98045. QSL. Thom Proehl, K7FZO, PO Box 1212, North Bend, WA 98045-1212. **www.nwaprs.info**

Sep 11, 1300Z-2300Z, W5GWD, Hernando, MS. Chickasaw Amateur Radio Association 35th Anniversary. 28.480 21.380 14.280 3.862. QSL. Chickasaw Amateur Radio Association, PO Box 2, Hernando, MS 38632. **www.qsl.net/w5gwd**

Sep 11, 1600Z-2359Z, NI6IW, San Diego, CA. USS *Midway* (CV41) Museum Radio Operations Room. First Nuclear Powered Aircraft Carrier USS *Enterprise* (CVAN-65) Launched 1960; Birthday United States Air Force 1947. SSB 14.320 7.250 D-STAR 012C 2 m/70 cm SOCAL rptrs. QSL. USS *Midway* Museum Radio Room, 910 N Harbor Dr, San Diego, CA 92101. **kk6fz@arrl.net**

Sep 11-Sep 19, 0001Z-2359Z, W6A through W6T, San Bernardino, CA. Citrus Belt Amateur Radio Club. 11th Annual Route 66 On The Air. 21.366 14.266 7.266 3.866. Certificate. Citrus Belt Amateur Radio Club, PO Box 3788, San Bernardino, CA 92413. **www.w6jbt.org**

Sep 11-Sep 12, 0100Z-0100Z, W8V, Morgantown, WV. Monongalia Wireless Association. Mason-Dixon Line celebration. 21.280 14.325 7.225 3.825. Certificate. Mason-Dixon c/o KC8AYW, 373 Dunkard Ave, Morgantown, WV 26505. **www.w8mwa.org**

Sep 12, 1400Z-2100Z, W2GSB, Babylon Village, NY. Great South Bay Amateur Radio Club. Babylon Village Country Fair. 14.225 7.175 3.850 14.070 PSK. QSL. W2GSB BVF, PO Box 1356, West Babylon, NY 11704. **www.gsbarc.org**

Sep 16, 1700Z-2000Z, W6ID, Orange, CA. California Public-Safety Radio Association Amateur Radio Club. 146.895 136.5 14.320 7.230. Certificate. California Public-Safety Radio Association 75th Anniversary Celebration, PO Box 1181, Riverside, CA 92502. **www.cpra.org**

Sep 16-Sep 19, 1200Z-2359Z, K4MIA, Loxahatchee, FL. PBSE Radio Society. National POW/MIA Recognition Day. 14.265 7.185 3.885 PSK 14.070. QSL. Michael Bald, 6758 Hall Blvd, Loxahatchee, FL 33470. **www.qrz.com/db/k4mia**

Sep 18, 1400Z-1800Z, VC3M, Milton, ON Canada. Mississauga Amateur Radio Club. 7.210. Halton County Radial Railway Museum VC3M Special Call Sign Celebrating MARC's 25th Anniversary. Certificate. Michael Brickell, VE3TKI, 2801 Bucklepost Cres, Mississauga, ON L5N 1X6, Canada. *Please send US$2 for postage — can't use US postage in Canada. Halton County Radial Railway Museum Web site **www.hcry.org**.* **www.marc.on.ca**

Sep 18-Sep 19, 1400Z-1400Z, N9ZF, Oconto, WI. Marinett and Menominee Amateur Radio Club. 2nd Annual EAA Warbird Fly-In. 21.220 14.240 7.175 3.875 PSK EchoLink. QSL. Marc Denis, 8515 Porcupine Lake Rd, Lena, WI 54139. **n9zf@arrl.net** *or* **w8pif.com**

Sep 18-Sep 19, 1300Z-0300Z, KØT, Boone, IA. Boone Amateur Radio Klub. Day Out with Thomas the Tank Engine. 14.260 7.250. QSL. Clay Conard, PO Box 286, Stratford, IA 50249. *Event is weekends of Sep 18-19 and 26-27.* **www.qsl.net/kb0tlm**

Sep 24-Sep 26, 1400Z-2200Z, W4H, Crossville, TN. Cumberland Plateau Amateur Radio Club. Cumberland Homestead Apple Festival. 21.260 14.235 7.180 3.980 RTTY. QSL. Jim Walker, PO Box 652, Crossville, TN 38557. *From the historic Cumberland Homestead Museum and Tower*. **www.cparc.net**

Sep 24-Oct 4, 2359Z-2359Z, N1ME, Bangor, ME. Pine State Amateur Radio Club. 35th Anniversary Special Event. 28.405 14.255 7.188 3.937. QSL. Jeff Collins, W1JFF, 294 Maple St, Bangor, ME 04401. **www.n1me.org**

Sep 25, 0000Z-2359Z, K8S, Belleville, MI. Clinton Valley Scout Radio Club & Motor City Radio Club. Boy Scouts of America Great Lakes Council Centennial Rendez-Vous.14.290 7.190 14.060 7.030. QSL. Frank Maynard, NF8M, 44683 Mansfield Dr, Novi, MI 48375.

Sep 25, 1300Z-2100Z, KA1KD, Bethel, CT, Bethel Educational Amateur Radio Society/ Bethel Office of Emergency Management. P. T. Barnum 200th Birthday. 21.365 14.265 7.265. Certificate. J. Ritterbusch, 8B Kayview Ave, Bethel, CT 06801.

Sep 25, 1400Z-2100Z, WØR, Red Wing, MN. Hiawatha Valley Radio Club. Goodhue County Red Cross Birthday. 147.300 21.300 14.250 7.200. QSL. Bill Eichenlaub, 1966 Launa Ave, Red Wing, MN 55066.

Sep 25, 1700Z-2359Z, KØMOB, Moberly, MO. Tri County Amateur Radio Club. 14.255 7.190. Founding of Moberly 144th Year Celebration. Certificate. Tri County Amateur Radio Club, PO Box 341, Moberly, MO 65270. To receive certificate by e-mail, include address with QSL.

Sep 26-Sep 27, 1300Z-0300Z, KØT, Boone, IA. Boone Amateur Radio Klub. Day Out with Thomas the Tank Engine. 14.260 7.250. QSL. Clay Conard, PO Box 286, Stratford, IA 50249. *Event is weekends of Sep 18-19 and 26-27.* **www.qsl.net/kb0tlm**

Certificates and QSL cards: To obtain a certificate from any of the special-event stations offering them, send your QSO information along with a 9 ×12 inch self-addressed, stamped envelope to the address listed in the announcement. To receive a special event QSL card (when offered), be sure to include a self-addressed, stamped business envelope along with your QSL card and QSO information. *Note: Some clubs may ask for a nominal fee to cover the cost of the certificate or QSL. Request will be made on air during the event or on the club's Web site.

Special Events Announcements: For items to be listed in this column, use the ARRL Special Events Listing Form, at **www.arrl.org/special-events**. A plain text version of the form is also available at that site. You can also request a copy by e-mail or send a self-addressed, stamped envelope (SASE) (Special Requests, ARRL, 225 Main St, Newington, CT 06111; write "Special Events Form" in the lower left-hand corner.) Off-line completed forms can be mailed, faxed (Attn: Special Events) or e-mailed.

Submissions must be received by ARRL HQ no later than the 1st of the second month preceding the publication date; a special event listing for **Nov** *QST* would have to be received by **Sep 1**. In addition to being listed in *QST*, your event will be listed on the *ARRLWeb* Special Events page. Note: All received events are acknowledged. If you do not receive an acknowledgment within a few days, please contact us.

Special Events listed in this issue include current events received through July 10. You can view all received Special Events at **www.arrl.org/special-events**. QSTz

Maty Weinberg, KB1EIB ♦ Special Events ♦ events@arrl.org

WB8IMY

ECLECTIC TECHNOLOGY

HF Packet is Not Dead — Network 105

Rumors concerning the death of 300 baud HF packet radio are somewhat exaggerated. As Tony Bombardiere, K2MO, explains below, if you're looking for a reason to blow the dust off your old packet TNC, or try the "packet" functions in your sound card software, this may be it …

Packet radio was one of the major developments to come along in Amateur Radio in the 1980s. It is a time-sharing digital mode that allows several simultaneous connections to take place on the same frequency. Hams can use packet to communicate keyboard-to-keyboard or by sending messages via packet radio e-mail. Packet radio networks are comprised of a number of relay stations known as *nodes*.

A map of active Network 105 nodes.

HF Packet via "Network 105"

Network 105 is a North American-based packet network. Its primary frequency is 14.105 MHz LSB, hence the name. Bernard Amero, VE1AMA (SK) started the network in 1986 and it has been in continuous operation since. It is a network where packet radio operators meet to chat and send messages to one another on a daily basis. In addition to handling everyday Amateur Radio traffic, it is also used to facilitate emergency communications. The network nodes are capable of cross-porting connections between HF and VHF, and some have TCP/IP ports that provide Internet telnet access to other nodes around the world — the packet equivalent of EchoLink or IRLP.

Exploring Network 105

Network 105 uses 300 baud packet, a mode supported by many of the terminal node controllers (TNCs) that were popular in the heyday of packet radio. Today there are a number of software applications that use your computer sound card to accomplish the same thing. The short list includes *AGWPE* (**www.sv2agw.com/ham/agwpe.htm**), *MixW* (**http://mixw.net**) and *MultiPSK* (**http://f6cte.free.fr/index_anglais.htm**).

If you tune your transceiver to 14.105 MHz LSB, you'll likely hear the occasional buzzing transmissions of network stations. Before you can try Network 105, however, it helps to understand how the network operates.

Packet stations can have several different addresses under the same call sign, for example W2ABC, W2ABC-1, W2ABC-2, W2ABC-3. The number that follows the call sign is called the Secondary Station Identifier (SSID). Network defaults are:

-1 : Personal Mailbox
-2 : HF/VHF Gateway
-7 : Node

For the purposes of this article, we'll concentrate on packet nodes since they provide the gateway to the packet network. To connect to a node, the packet operator must send the *connect* command followed by the node call sign and SSID. For example, to connect to Network 105 node WØTX-7, the user would type: CONNECT W0TX-7 and hit the ENTER key. (This technique may vary depending on the software you are using.) The node will acknowledge the connection and send a short command menu:

*** CONNECTED to COA105:W0TX-7}

TYPE 'HELP' OR ? FOLLOWED BY COMMAND FOR MORE INFORMATION

BYE	BBS	CONNECT	CQ
HELP	INFO	LINKS	MHEARD
NODES	PORTS	ROUTES	STATS
USERS	SYSOP		

At this stage, the user can explore the node by typing the commands shown in the menu. For example, typing the command *PORTS* will list the ports on the node:

COA105:W0TX-7} Ports:
Port 1: 14.105
Port 2: 145.05

The port list shows that WØTX-7 uses Port 1 for HF and Port 2 for VHF. The command *MHEARD* (MESSAGES HEARD) will show a list of stations heard on both ports. The node will respond with a message heard list ending with the port number:

N0ABC-1/2
K9ABC-7/1
K7ABC-1/1
W2XYZ-1/2

The user can now connect to one of those stations on either the HF port or VHF port using the *connect* command followed by the call sign and the SSID. For example: CONNECT 2 N0ABC-1. This tells the node to route your connection to NØABC-1 via the nodes VHF port. The node will respond with the following messages:

COA105:W0TX-7} Attempting downlink to N0ABC-1 on port 2

COA105:W0TX-7} Connected to N0ABC-1
[KAM-XL-1.0-HM$]
51096 BYTES AVAILABLE IN 13 BLOCKS
THERE ARE 12 MESSAGES NUMBERED 1 THROUGH 13
Welcome! N0ABC-1 PBBS in Anytown, USA. Please leave a message.

ENTER COMMAND: B,J,K,L,R,S, or Help >

At this point, WØTX-7 is cross-porting between HF and VHF. That is, it is routing information from NØABC-1 on the VHF port and sending it out on the HF port. In this example, we have connected to the NØABC-1 mailbox and are presented with another menu. Type HELP to list the specific functions of each command. Most of the commands can be abbreviated so it's not necessary to type the full command. C can be used instead of typing the word CONNECT, for example. Once you get the hang of it, you can exchange e-mail or even make keyboard-to-keyboard "live" connections to distant stations. If you can connect to a node, and the node can connect to the station, you're good to go! — *Tony Bombardiere, K2MO*

Steve Ford, WB8IMY ♦ *QST* Editor ♦ sford@arrl.org

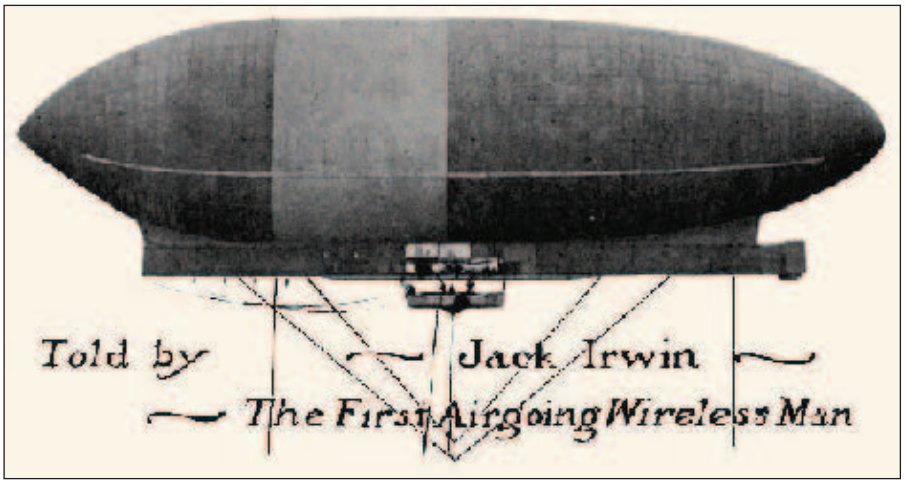
K2TQN

VINTAGE RADIO

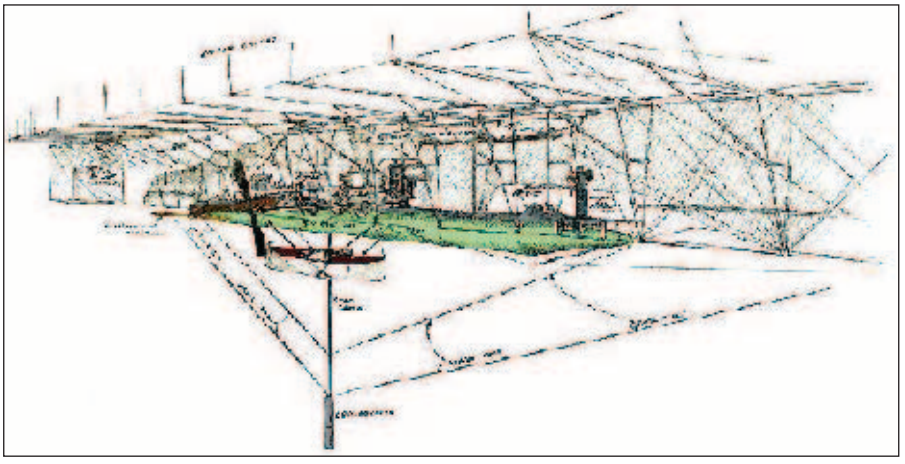
The First Air-going Wireless Man

Jack Irwin, edited by John Dilks, K2TQN

K2TQN COLLECTION



K2TQN COLLECTION



Details of Airship *America*'s construction. For a larger view, visit www.k2tqn.com.

In the spring of 1910 I received what, at that period in the history of radio, was the strangest assignment a wireless operator ever had. I had returned to New York after a trip to England as radio operator on the old American Liner St. Louis. The Marconi Wireless Telegraph Company of America was then a small organization and I was one of the four sea-going operators in its employ (there were only fifteen operators in the company's entire service). To be in charge of one of the four ship stations the company controlled was considered, in those days, a good job. I was contented with my lot and satisfied with what life offered, a fine ship, good fellows for shipmates, and a pleasant run.

It was then customary, in that small family-like organization, for ship operators to report after each voyage direct to the Chief Engineer of the company, Mr. Frederick M. Sammis. He occupied a similar position to Poo Bah that extraordinary and versatile character in Gilbert and Sullivan's "Mikado." He acted in almost every capacity. Without any other thought in mind, except, perhaps, the usual operator's genius for smelling a salary advance, I entered Mr. Sammis' office and made the customary report. It was then I received the jolt he had prepared for me. He nonchalantly inquired whether I was prepared for a transfer to another ship, just as though it was an everyday duty with him. In a few words he tendered me the job of operator on the airship America, then being constructed at Atlantic City. Whether I jumped at this offer or not I cannot remember now, but I found myself in the course of a day or two in Atlantic City, duly signed on as a member of the crew of a dirigible and committed to make the first attempt to cross the Atlantic by air line.

So started Jack Irwin's recounting of his famous voyage in a 1924 *Radio Broadcast* magazine. He continued:

My contract with Mr. Walter Wellman, who commanded the expedition, called for my services not only as a wireless man, but as a general aide. And the months intervening between June, when I joined the crew, and October 15th, when we sailed, found me handling many jobs and assimilating a knowledge of aeronautics. There was also born in me a love for the flying game that has persisted to this day.

Who was Walter Wellman?

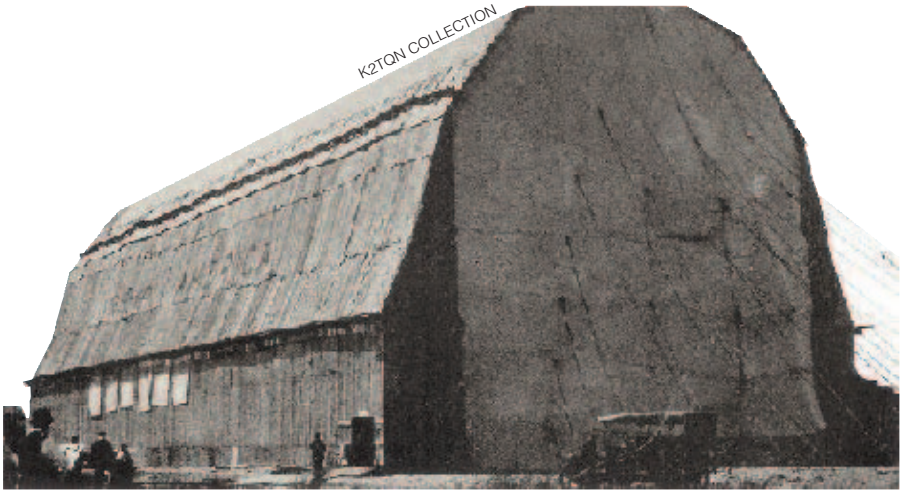
Wellman was a newspaper man from Chicago who also made the news. He did this by finding something exciting to do that no one else had done, for instance, discover the North Pole. To get funding he promised great stories to be written about his adventures. Newspapers and magazines jumped on board and soon he was trying to cross the great ice expanses to find the North Pole. He was not successful the first time on foot, but pioneered on thinking he could float above the unforgiving ice in a balloon. Eventually he purchased a motor-powered non-rigid airship from a company in France. He was not successful this time either. As he was planning another attempt by air he found out that Robert E. Peary (accompanied by Donald MacMillan, later

John Dilks, K2TQN ♦ 125 Wharf Rd, Egg Harbor Township, NJ 08234-8501 ♦ k2tqn@arrl.org

of *Bowdoin* Schooner fame, and Matthew Henson, America's greatest African-American Arctic explorer) had discovered the North Pole on April 6, 1909.

Then the idea struck him: Why not take the airship, have it rebuilt and be the first to cross the Atlantic Ocean by air. Knowing he was not alone in this idea, he rushed the rebuilding in France and had it transported to America onboard the liner *Oceanic* then sent to Atlantic City, New Jersey where it would be put back together.

Atlantic City was chosen because there was an Aero club there that would fund the building of a giant hangar for Airship *America*'s construction and the prevailing winds would assist the airship with its journey eastward to Europe. Another factor I'm sure is that Atlantic City hosted a huge gathering of air pioneers that summer, who of course brought their airplanes with them. Everybody who was anybody in the airplane business was there that summer. An "Air Carnival" as it was called was held on the beaches and flying boats landed in the inlet. Since this was the first event of this kind several records were recorded: Walter Brookins set an altitude record of 6175 feet and Glenn Curtiss flew 50 miles and returned in 1 hour and 14 minutes. Atlantic City was air crazy and the airship project fit right in. (Bader Field in Atlantic City became known as the first "air-port" in 1919, a name given it because of its close proximity to the ocean and because it could also service seaplanes.)



This is the hangar built by the Aero Club where the Airship America was constructed. It was located in the northern part of Atlantic City next to the inlet, which provided tugboat access. A tugboat would later tow it out to the ocean for the first part of the journey.

K2TQN COLLECTION

***America*'s lifeboat being prepared for the Atlantic crossing. Jack Irwin's "shack" was located amidships in the lifeboat; from there he would operate a spark transmitter directly under a huge bag of hydrogen gas.**

The Airship *America*

Quoting again from Irwin:

> The *America* was what is known as a non-rigid type of dirigible, cigar shaped. She was 228 feet long and 52 feet in diameter at the central or thickest part. This great gas reservoir was made of cotton, silk and rubber and beautifully tailored, all seams being wide lapped, sewn and gummed, and extra strips cemented over to cover the stitches and prevent leakage of hydrogen. The huge envelope contained when fully inflated, 345,000 cubic feet of hydrogen gas. This lifted a load of 28,000 pounds.
>
> Under the balloon or gas envelope was built a huge steel frame, enclosed with varnished linen, and attached to the balloon by eighty steel cables fastened to the balloon about ten feet below its equator and extending its full length. This frame was fashioned of the best steel tubing and wires, strung as a bridge, the whole being 156 feet long, 8 feet wide at the top, V-shaped, and at the bottom of the V there was a staunch steel cylinder two feet in diameter, divided into ten compartments, with a capacity of 1,500 gallons of gasoline. Along the top of this cylinder ran a thin boardwalk 2 feet wide, forming the floor or deck of the car. Celluloid windows were placed at intervals in the linen sides of the car enclosures; and about the engine rooms, amidships, steel screenings replaced the linen. Non-inflammable paint was employed to minimize fire risks. In this car were the crew's quarters, engine rooms, dynamo, and control or navigating bridge.
>
> Slung under the central portion of the car was the lifeboat. This lifeboat was then the last word in boat-building. It was built of hewn, laminated mahogany - 27 feet long, 6 feet wide, with a depth of 3½ feet amidships. Each end was decked over and made into a water-tight compartment by simply battening down a circular hatch in each deck. Amidships was a spacious cockpit in the center of which was a self-baling device and in the forward end a cubby-hole for the wireless apparatus.

This lifeboat is where Jack Irwin would be the first airborne wireless operator to use a "spark wireless" transmitter with a huge bag of hydrogen gas hanging above. I can't imagine having guts enough to push that key for the first time. The antenna was the steel framework that was all around the gas bag. The ground was the trailing equilibrator, designed to help stabilize the airship and carry additional gasoline and fresh water.

To be continued next month — *K2TQN*

Correction

In the July "Vintage Radio" column the name of Dr John Mauchly was misspelled. I apologize for the error.[1]

[1]J. Dilks, K2TQN, "Vintage Radio," *QST*, Jul 2010, pp 95-96.

AT THE FOUNDATION

The ARRL Foundation Awards Most Scholarships Ever in 2010

After a review of hundreds of scholarship applications from radio amateurs seeking to pursue advanced education, the 2010 awards have been made to 70 qualified students representing more than $100,000 in scholarships, including four students who are studying with support from the William R. Goldfarb Memorial Scholarship. The 2010 award of the William R. Goldfarb Memorial Scholarship was made to Kyle Ebersold, KB1MNN. The 2010 awards will help young hams studying electronics, engineering, communications, computer technology and related subjects. These young radio amateurs excel in academics, contributions in community service and Amateur Radio activities. We offer heartiest congratulations and wish each of them the best of luck!

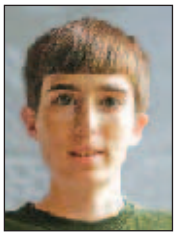
The application period for the 2011 scholarship awards opens October 1, 2010 and closes promptly on February 1, 2011. For the first time this fall all applications must be filed electronically using the form provided on the ARRL Web site. All the information about ARRL Foundation Scholarships, including application instructions and forms, can be found on the Web at **www.arrl.org/scholarship-program**.

Candidates should review the descriptions of all the scholarships and apply only those for which they qualify. Note that a recent transcript is required of all candidates. The William R. Goldfarb Memorial Scholarship is open only to high school seniors who must include a FAFSA or SAR based on the most recent family financial information, along with a full high school transcript.

A special note for Amateur Radio clubs: You can help young hams in your area by including the scholarship information above in your next club newsletter, and share it with members, especially students and their parents, at your next club meeting.

Jessica Amundsen, KC9OJK
Six Meter Club of Chicago Scholarship

Kathryn Ankenbauer, KD8AHA
Dayton Amateur Radio Association Scholarship



Nicholas Bauer, KC9GZY
Northern California DX Foundation Scholarship

Stephanie Bauer, KC2VVZ
Norman E. Strohmeier, W2VRS Memorial Scholarship

Michael Bifalco, KJ4IFM
IRARC Memorial/ Joseph P. Rubino, W4MMD Scholarship

Daniel Bradke, W2AU
Henry Broughton, K2AE, Memorial Scholarship

Alex Brech, KCØYLD
Richard W. Bendickson, N7ZL Memorial Scholarship

Elijah Brown, AD7ZJ
Central Arizona DX Association Scholarship

Chelsey Bruce, KC8YSS
Dayton Amateur Radio Association Scholarship

Angela Capolupo, KB1NZV
FEMARA Scholarship

Kyle Clever, KC2RQO
Dr. James L. Lawson Memorial Scholarship

Richard Elrod, KB3LLM
Thomas W. Porter, W8KYZ Scholarship Honoring Michael Dougherty, W8LSE

Tom Fielitz, KC8YAK
Zachary Taylor Stephens Memorial Scholarship

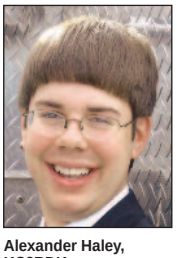
William Fisher, W4WJF
L. Phil and Alice J. Wicker Scholarship

Elizabeth Garbee, KCØOTR
Dayton Amateur Radio Association Scholarship

Allison Gropper, KI4WZZ
Gary Wagner, K3OMI, Scholarship

Robert Guiliani, K1RJG
Yankee Clipper Contest Club Youth Scholarship

Nathaniel Hachten, KB3RZO
You've Got a Friend In Pennsylvania Scholarship



Alexander Haley, KC2RDK
Henry Broughton, K2AE, Memorial Scholarship

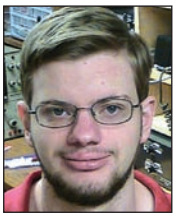
David Hall, KCØWNP
Earl I Anderson Scholarship

John Hays, KC9LVZ
Peoria Area Amateur Radio Club Scholarship

Mary M. Hobart, K1MMH ♦ Secretary, ARRL Foundation Inc ♦ mhobart@arrl.org

Daniel Hechavarria, KB1TME
Carole J. Streeter, KB9JBR, Scholarship

Logan Holden, KE5ZGN
Fred R. McDaniel Memorial Scholarship



Robert Hoops, W3EGL
You've Got a Friend In Pennsylvania Scholarship

Jordan Hoover, KC9PXM
Francis Walton Memorial Scholarship

Timothy Jones, KE5ZNS
Mississippi Scholarship

Anna Keller, KC9GDD
Edmond A. Metzger Scholarship

Kelly Kinkade, KD8LXM
Earl I. Anderson Scholarship

Stephanie Klimzak, KDØBFH
ARRL Scholarship Honoring Barry Goldwater

Carl Koehler, N3YFG
Challenge Met Scholarship

Lydia Kouletsis, KB1MUM
FEMARA Scholarship

Alexander Lemke, AF6JF
William Bennett, W7PHO, Memorial Scholarship

Lloyd Lindberg, KC9FZY
Chicago FM Club Scholarship

Joseph Lipa, N8OY
Northern California DX Foundation Scholarship

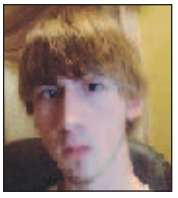
Donald Lovell, KJ4RKI
Gwinnett Amateur Radio Society Scholarship

Morgan Massey, KI4OIG
Charles Clarke Cordle Memorial Scholarship

Mark McCurry, KC2UDS
Henry Broughton, K2AE, Memorial Scholarship

Lindsey Meyer, KG6ELV
Scholarship of the Morris Radio Club of New Jersey

Justin Miller, KE7GTS
YASME Foundation Scholarship



Stephen Mooney, K5STM
Magnolia DX Association Scholarship

Sean Morgan, K4ZF
Challenge Met Scholarship & Eugene "Gene" Sallee Memorial Scholarship

Tyler Nicholas, K5TDN
Tom and Judith Comstock Scholarship

Joe O'Kane, KB1NJD
FEMARA Scholarship

Sabra Perry, KD7JPR
Mary Lou Brown Scholarship

Lauren Rice, KC2LR
K2TEO Martin J. Green Sr. Memorial Scholarship

Rebecca Rich, KBØVVT
PHD Scholarship

Jeremy Schotter, KC9GIC
Earl I. Anderson Scholarship

Zachary Schrempp, KM7I
Ted, W4VHF and Itice, K4LVV Goldthorpe Scholarship

James Schwoebel, KJ4PLS
Dayton Amateur Radio Association Scholarship

Stephen Simpson, KC8IOY
Charles N. Fisher Memorial Scholarship

Lile Squires, KE7YIA
YASME Foundation Scholarship

Sarah Stanley, KE5WEJ
Bill, W2ONV, and Ann Salerno Memorial Scholarship

Greta Steinbruner, KI6NTL
L.B. Cebik, K4RNL, and Jean Cebik, N4TZP, Memorial Scholarship

Sheldon Torlina, KDØJTT
Paul and Helen L. Grauer Scholarship

Samuel Turner, KB1PHP
FEMARA Scholarship

Jacob Wagner, KD8CDC
Bill, W2ONV, and Ann Salerno Memorial Scholarship

Eric Wilson, AD7JL
YASME Foundation Scholarship

Samantha Young, KC9ENB
Don Riebhoff Memorial Scholarship

Simeng Zhu, KJ4KTI
IRARC Memorial/ Joseph P. Rubino, W4MMD Scholarship

Not pictured: **Reid Crowe, NØRC** Irving W. Cook, WAØCGS Scholarship; **David Strachan-Olson, KI6UXJ,** ARRL Foundation General Scholarship; **Catherine Qualls, KC9RHO,** ARRL Foundation General Scholarship; **Robert Preston, KCØYDZ,** Ray, NØRP and Katie, WØKTE, Pautz Scholarship; **Lindsay Westerfield, KD5UVL,** Louisiana Memorial Scholarship

OP-ED

ARES: Maintaining Relevance in a Changing World

Herbert Cole, AI6AT

ARES® has a long history of serving the public good in times of disaster. Unfortunately, the days of Amateur Radio operators offering assistance to government agencies on an impromptu basis are quickly disappearing. September 11, 2001 changed how volunteers are viewed during emergencies. Previous agreements with ARES have been reevaluated as professional emergency managers move to adopt National Incident Management System (NIMS) type structures, press for background checks and accept only trained volunteers.

Because of the drastic changes occurring in the professional emergency management arena, many ARES groups now find themselves marginalized. Government sponsored Amateur Radio emergency communication groups are becoming prevalent throughout the country. These are not RACES programs, but local groups created by various governmental units to provide EmComm support specific to their needs. The sponsoring agencies set background qualifications, training requirements and often require interviews to determine if the volunteer possesses a "professional" attitude.

Some agencies do not recognize ARES and instead opt for exclusive use of their own Amateur Radio resources. The fires in southern California illustrate this as professionally trained volunteer groups provided communications that previously might have been served by ARES.

To counter this trend, ARES leaders need to begin behaving like professional emergency managers. ARES leadership must take a proactive role in developing not only Amateur Radio resources but also solid relationships with served agencies. ARES must bring tangible value to the table since having a radio is no longer enough.

Below are some suggestions that will raise the level of your ARES organization's standing for emergency managers while helping your members better understand how they fit into the emergency management landscape.

Training

Training is the foundation upon which an ARES organization can build a highly functional EmComm group that many served agencies would be happy to affiliate with. The Incident Command System (ICS) as outlined in NIMS is the management structure used throughout the US during disaster incidents. Volunteer organizations and resources become a part of the ICS. For this reason, it is extremely important that ARES volunteers understand their place in the ICS structure. Minimum ICS training should include:

IS-100.a "Introduction to Incident Command System, ICS-100"

IS-200.a "ICS for Single Resources and Initial Action Incidents, ICS-200"

IS-700.a "NIMS An Introduction"

IS-800.B "National Response Framework, An Introduction"

IS-802 "Emergency Support Functions Communications"

Taking these classes does not guarantee that an ARES group will be activated by a served agency. They will, however, provide the necessary foundation for inclusion in an agency's ICS should it seek qualified volunteers. These classes are all provided free of charge online at **training.fema.gov/IS/NIMS.asp**.

In addition to ICS coursework, ARES members should complete the ARRL course "Introduction to Emergency Communications — Level 1/Basic." It provides a concise understanding of what it means to be a volunteer EmComm operator. Course information can be found at **www.arrl.org/online-course-catalog**.

Finally, participate in Field Day and invite your local served agencies to participate in the annual ARRL Simulated Emergency Test. SET can be coordinated not only with local government agencies but with Community Emergency Response Teams (CERT) and other volunteer organizations that could need EmComm support. Public service events are also a good training opportunity and they serve to get your group out into the community where people can see the benefits of Amateur Radio.

Memorandum of Understanding

The most important thing an ARES organization can do to ensure their relevance is to seek out a written cooperative agreement called a Memorandum of Understanding (MOU) with served agencies. While not a guarantee of participation, the written MOU adds a level of recognition to the ARES organization and details what the agency expects and what your ARES group can provide. Training, background checks and other requirements for volunteer service can also be specified in the agreement. All MOUs must be reviewed by ARRL Headquarters prior to signing. See examples of current ARRL MOUs at **www.arrl.org/served-agencies-and-partners**. For more information on how you can initiate an MOU, contact your Section Manager or Section Emergency Coordinator.

Conclusion

As the world of emergency and disaster response changes, ARES must also change and adapt to new realities. With diminished agency budgets during these tough economic times, ARES groups have a unique opportunity to show what they can do — at no cost — for the served agency. Just imagine being the emergency manager and someone offers you a highly trained, highly motivated team of EmComm specialists — for *free*.

The keys to your ARES group's success are in your hands. Training and MOUs will help unlock the numerous opportunities that await you in this new and exciting era of emergency communications.

Herbert Cole, AI6AT, an ARRL member, serves as the Section Emergency Coordinator for the ARRL East Bay Section and is a Lead Instructor and Incident Commander for the San Ramon Valley Fire Protection District CERT program. He has a BA in Economics from California State University and an Emergency Management Certificate from Western Washington University. He presented "Integrating ARES into CERT During Disaster Operations" at the 2009 National Conference on Community Preparedness in Washington, DC. First licensed in 2005, Herbert came to Amateur Radio primarily for Emergency Communications but has since upgraded to Amateur Extra class and is interested in all aspects of Amateur Radio. He can be found hanging around 7.114 MHz or he can be reached at 2252 Granite Ct, Alamo, CA 94507, **ai6at@arrl.net**.

CONVENTION AND HAMFEST CALENDAR

Abbreviations
Spr = Sponsor
TI = Talk-in frequency
Adm = Admission

Alabama (Attalla) — Sep 18 D F H R T V
8 AM-2 PM. *Spr:* Gadsden ARC. Etowah County Fairgrounds, Griffin St SE. *TI:* 147.16 (100 Hz). *Adm:* Free. Tables: Free. David Waits, K4VMV, 2169 Cove Cir E, Gadsden, AL 35903; 256-492-9562; **k4vmv1@charter.net**; **garc.org**.

Arkansas (Little Rock) — Sep 18 D F H R T V
8 AM-3 PM. *Spr:* Central Arkansas Radio Emergency Net (CAREN). Catholic High School, 6300 Father Tribou St. *TI:* 146.94. *Adm:* $5. Tables: $15. Mark Barnhard, KD5AIV, 12563 Southridge Dr, Little Rock, AR 72212; 501-221-3909; **mbarnhard@aristotle.net**; **www.carenclub.com**.

SOUTHWESTERN DIVISION CONVENTION

September 17-19, San Diego, California
D F H Q R S V

The Southwestern Division Convention, sponsored by SANDARC, will be held at the Four Points Sheraton Hotel, 8110 Aero Dr. Doors are open Friday 3 PM to Sunday noon. Features include vendors from all aspects of Ham Radio; technical forums and other seminars; host of exhibitors and manufacturers; hospitality rooms; guest speakers talking about the latest on antenna issues; large free outdoor flea market (Saturday morning); QSL card checking; T-Hunt; display of Communications Vans; Special Event Amateur Radio Station (W1AW/6 to be "on the air"); VE sessions; banquet with special guest speaker Chris Imlay, W3KD, ARRL General Counsel (Saturday, 6:30 PM); Wouff Hong ceremony; DX Breakfast (Sunday, 8 AM). Talk-in on 145.32 (107.2 Hz), 146.52. Admission is $18 in advance (until Aug 22), $20 at the door. Contact Paul Rios, KC6QLS, 1237 Victor Ave #4, El Cajon, CA 92021; 619-593-9445; **kc6qls@cox.net**; **www.sandarc.net**.

Colorado (Longmont) — Sep 26 D F H R V
8 AM-noon. *Spr:* Boulder ARC. Boulder County Fairgrounds Exhibit Building, 9595 Nelson Rd. 57th Annual Event, BARC Junior Tables. *TI:* 146.7. *Adm:* $5, under 13 free with paying adult. Tables: advance $10, door $15. Michael Derr, W3DIF, 13815 Meadowbrook Dr, Broomfield, CO 80020; 303-404-2161 (phone and fax); **mderr44995@aol.com**; **www.qsl.net/w0dk**.

Connecticut (Newtown) — Sep 12 D F H R S T
8:30 AM-12:30 PM. *Spr:* Candlewood ARA. Edmond Town Hall, 45 Main St. Western CT Hamfest, batteries. *TI:* 147.3 (100 Hz). *Adm:* $6. Tables: $15. Joe de Groot, AB1DO, 30 Sunnyview Dr, Redding, CT 06896; 203-938-4880; fax 203-938-4886; **ab1do@arrl.net**; **www.danbury.org/cara/hamfest.html**.

CONNECTICUT STATE CONVENTION

October 10, Wallingford
D F H R S T V

The Connecticut State Convention (19th Annual Event), sponsored by the Nutmeg Hamfest Alliance, will be held at the MountainRidge Resort, 350A High Hill Rd. Doors are open for indoor vendor setup and tailgating at 6 AM; public 8 AM-1 PM. Features include the largest flea market in Southern New England; indoor exhibitors; unlimited tailgating space; major vendors (**vendors@nutmeghamfest.com**); new and used equipment; forums; demonstrations; emcomm equipment and vehicles on display; Annual Meeting; VE sessions (Don Mitchell, KE1AY, **dmitchell1273@sbcglobal.net** or **vetest@nutmeghamfest.com**); plenty of free parking; excellent food at good prices. Talk-in on 147.36 (no PL). Admission is $7 (under 12 free). Tables are $30 each (8-ft and chair; includes 1 admission); outside spaces are $20 each (bring your own tables and tents, no electricity outside; includes 1 admission). Contact John Bee, N1GNV, 30 Tremont St, Meriden, CT 06450; 203-440-4468; **info@nutmeghamfest.com**; **www.nutmeghamfest.com**.

Coming ARRL Conventions

August 15
Kansas State, Salina*

August 21
West Virginia State, Weston*

August 21-22
Southeastern Division, Huntsville, AL*

August 22
Western Pennsylvania Section, New Kensington*

August 27-29
New England Division, Boxborough, MA*

September 10-11
W9DXCC, Elk Grove Village, IL*

October 15-17
Pacific Division, San Ramon, CA

October 16
Ohio Section and ARES Conference, Columbus, OH

October 22-23
Amateur Radio Lighthouse Society, Biloxi, MS

November 6-7
Georgia State, Lawrenceville

*See August *QST* for details.

FLORIDA STATE CONVENTION

October 9-10, Melbourne
D F H Q R S T V

The Florida State Convention (45th Annual Melbourne Hamfest), sponsored by the Platinum Coast ARS, will be held at the Melbourne City Auditorium, 625 E Hibiscus Blvd. Doors are open for setup on Friday 6-9 PM and Saturday 7-9 AM; public Saturday 9 AM-5 PM; Sunday 9 AM-2 PM. Features include great outdoor tailgate area ($10 per parking space), plenty of indoor commercial booths and swap tables, consignment table, VE sessions, excellent forums and meetings, ARES Badging, ARRL awards checking. Talk in on 146.85. Admission is $6 in advance (before Sep 30), $7 (after Sep 30). Tables are $20. Contact Kathy Quinn, KI4RQY, c/o PCARS Melbourne Hamfest, Box 1004, Melbourne, FL 32902-1004; 321-327-2647, 321-626-1349 (cell), or 321-956-2482; **hamfest2010@pcars.org**; **www.pcars.org**.

Florida (Odessa) — Sep 25 F H R T
8 AM-1 PM. *Spr:* Suncoast ARC. Gunn Hwy Flea Market, 2317 Gunn Hwy. Pasco County Hamfest. *TI:* 146.64. *Adm:* $5. Tables: $1. Ron Wright, N9EE, 2265 Evenglow Ave, Spring Hill, FL 34609; 352-683-4476; **mccrpt@att.net**; **www.sarcfl.com**.

Florida (Orlando) — Sep 11 F H R T
Set up 7 AM; public 8 AM-2 PM. *Spr:* AR Unit of Bahia Shrine. Bahia Shrine Center, 2300 Pembrook Ave. *TI:* 147.39 (103.5 Hz). *Adm:* $4. Tables: $6. Warren Hill, W4WHH, 177 Hanging Moss Dr, Oviedo, FL 32765; 407-365-6682; **w4whh@arrl.net**; **www.bahiashrine.org/~radio/Tailgate.htm**.

Florida (Titusville) — Sep 25 F H R T V
5:30 AM-2 PM. *Spr:* North Brevard ARC. Sand Point Park, 10a Max Brewer Memorial Pkwy. Titusville Tailgate. *TI:* 147.33 (107.2 Hz). *Adm:* Free. Tables: $10. Bob Jones, N6USP, 4743 Cambridge Dr, Mims, FL 32754; 321-264-2622; fax 321-383-1864; **n6usp@bellsouth.net**; **northbrevardarc.org/tailgateparty2.htm**.

Georgia (Blythe) — Oct 9 D H R T V
9 AM-3 PM. *Spr:* ARC of Augusta. Blythe Area Community Center, 3129 Hwy 88. *TI:* 145.49. *Adm:* $6. Tables: $10. Doug Pugh, KE4JSJ, 1806 Birch Dr, N Augusta, SC 29860; 803-279-6725; **doug9945@yahoo.com**; **www.w4dv.org**.

Georgia (Dallas) — Sep 18 D F H R T V
8 AM-dark. *Spr:* Paulding ARC. Earl Duncan Park (Paulding Meadows), 724 Paulding Meadows Dr. 20th Annual Hamfest. *TI:* 146.895 (77 Hz). *Adm:* Free. Tables: Free. Marvin Wilken, KT4W, 320 Collins Dr, Douglasville, GA 30134; 770-489-0620; **icomw2a@yahoo.com**; **www.pauldingarc.com**.

Georgia (LaGrange) — Oct 9 D F H R S T V
9 AM-1 PM. *Spr:* LaGrange ARC. Oakside Baptist Church Gym, 1921 Hamilton Rd. *TI:* 146.7 (141.3 Hz). *Adm:* Donation. Tables: $20. Gary Pike, KA4KBX, Box 926-CLH, Roanoke, AL 36274-0926; **lagrangehamfest@yahoo.com**; **www.lagrangeradioclub.org**.

Illinois (Belvidere) — Sep 25 D F H R S T V
6 AM-3 PM. *Spr:* Chicago FM Club. Boone County Fairgrounds, 8791 IL Rte 76. Radio Expo 2010. *TI:* 146.76 (107.2 Hz), 147.255 (114.8 Hz), 444.725 (107.2 Hz). *Adm:* advance $8, door $10. Tables: $20. Mike Brost, WA9FTS, 5127 N Monterey Dr, Norridge, IL 60706; 708-457-0966; fax 708-457-1629; **mikeb2006@comcast.net**; **www.chicagofmclub.org**.

D = DEALERS / VENDORS
F = FLEA MARKET
H = HANDICAP ACCESS
Q = FIELD CHECKING OF QSL CARDS
R = REFRESHMENTS
S = SEMINARS / PRESENTATIONS
T = TAILGATING
V = VE SESSIONS

Gail Iannone ♦ Convention and Hamfest Program Manager ♦ giannone@arrl.org

AMSAT SYMPOSIUM and GENERAL MEETING

October 8-10, Elk Grove Village, Illinois

D H Q R S

The AMSAT Symposium and Annual General Meeting, sponsored by AMSAT, will be held at the Elk Grove Village Holiday Inn, 1000 Busse Rd. Doors are open 8 AM-9 PM daily. Features include Space Symposium with Amateur Satellite presentations; operating techniques, news, and plans from the Amateur Satellite world; Board of Directors Meeting open to AMSAT members; meet Board members and officers; annual general membership meeting; banquet with keynote speaker. Admission is $60 in advance, $70 at the door. Tables are $10. Contact Kermit Carlson, W9XA, 1150 McKee St, Batavia, IL 60510; 630-879-0983; **w9xa@amsat.org**; **www.amsat.org/amsat-new/symposium/2010/index.php**.

Illinois (Peoria) — Sep 18-19
D F H Q R S T V

Saturday 8 AM-5 PM, Sunday 8 AM-2 PM. *Spr:* Peoria Area ARC. Exposition Gardens, 1601 W Northmoor Rd. 52nd Peoria Superfest. *TI:* 147.075 (103.5 Hz); 145.105 (D-Star). *Adm:* advance $6, door $8. Tables: $25. John Coker, N9FAM, 133 Vonachen Ct, E Peoria, IL 61611; 309-369-7428; **n9fam@arrl.net**; **www.peoriasuperfest.com**.

Indiana (Bedford) — Oct 3 D F H R T V

Set up Saturday noon-9 PM; public Sunday 6 AM-2 PM. *Spr:* Hoosier Hills Ham Club. Lawrence County 4-H Fairgrounds, US Hwy 50 W. 49th Annual Hamfest, free chili and hot dog supper (Saturday eve). *TI:* 146.73 (107.2 Hz). *Adm:* $8 (under 12 free). Tables: $10 per table or bring your own. Mike Wright, KF9NP, 8242 Tunnelton Rd, Bedford, IN 47421; 812-849-4230; **vice.pres39@yahoo.com**; **www.hoosierhillshamfest.org**.

Indiana (Crown Point) — Oct 9 D F H R V

Set up 6 AM; public 8 AM-1 PM. *Spr:* Lake County ARC. Lake County Fairgrounds, 889 S Court St. All indoors. *TI:* 147.0 (131.8 Hz), 146.52. *Adm:* $5. Tables: Free (electricity available). Rich Gilles, KA9SVS, 156 S Ridge St, Crown Point, IN 46307; 219-662-0594; **paris156@yahoo.com**; **www.lakenetnwi.net/member/lcarc**.

Indiana (Greenfield) — Sep 25 F H R T

8 AM-1 PM. *Spr:* Hancock ARC. Hancock County 4-H Fairgrounds, Apple St. *TI:* 145.33. *Adm:* Free. Jon Reeves, WB9CNE, 1725 Sugar Creek Tr, Greenfield, IN 46140; 317-326-2440; **wb9cne@arrl.net**; **www.w9atg.org**.

Iowa (Mondamin) — Sep 19 D F H R

8 AM. *Spr:* Boyer Valley ARC. Mondamin Community Center, 200 Maple St. 12th Annual Flea Market. *TI:* 145.13. *Adm:* $2. Tables: $4. Leo Schwertley, KCØKJR, 1752 260th St, Modale, IA 51556; 712-645-2077; **laschwer@loganet.net**; **BVARC.net**.

IOWA STATE CONVENTION

October 2-3, West Liberty

D F H Q R S T V

The Iowa State Convention (26th Annual Southeast Iowa Hamfest), co-sponsored by the Muscatine and Washington Area ARCs, will be held at the Muscatine County Fairgrounds, 101 N Clay St. Doors are open Saturday eve 6-8 PM for Wiener Roast only; Sunday 7 AM-1 PM for convention. Features include commercial vendors; outside flea market space free with gate ticket; new radios, antennas and test equipment; computer dealers with new equipment and software; DXCC, VUCC, and WAS card checking; special guest from ARRL HQ Norm Fusaro, W3IZ, MVP Assistant Manager; VE sessions (9:30-11:30 AM; Jerry Schroder, KCØWWV, 563-607-0793); overnight parking. Talk-in on 146.91, 146.85 (192.8 Hz). Admission is $5 (under 15 free). Tables are $8. Contact Tom Brehmer, NØLOH, 1114 E Tenth St, Muscatine, IA 52761; 563-263-3097; **n0loh@arrl.org**; **www.kc0aqs.org/hamfest.html**.

Kansas (Wichita) — Oct 2 D F H Q R V

8 AM-1 PM. *Spr:* Valley Center ARC. Sweetbriar Bingo Hall, 2349 N Amidon. 9th Annual Hamfest. *TI:* 146.94. *Adm:* $2. Tables: $5. Jim Cochran, KØRH, 3600 W 77th St N, Valley Center, KS 67147; 316-755-2283; **k0rh@cox.net**; **vcarc.org**.

Kentucky (Richmond) — Sep 18 D F H R T V

8 AM-3 PM. *Spr:* Central Kentucky ARS. Madison County Fairgrounds, 3237 Old KY Rte 52. *TI:* 145.37 (192.8 Hz). *Adm:* $6. Tables: $5. Mike Rogers, KE4ISW, 144 Allen Douglas Dr, Richmond, KY 40475; 859-624-9156; **ke4isw@arrl.net**; **www.qsl.net/ckars/hamfest**.

Kentucky (Shepherdsville) — Sep 11
D F R S T V

Set up Friday 6-9 PM, Saturday 6-7:45 AM; public 8 AM-2 PM. *Spr:* Greater Louisville Hamfest Assn. Paroquet Springs Conference Centre, 395 Paroquet Springs Dr. *TI:* 146.7 (79.7 Hz). *Adm:* advance $6, door $7. Tables: $10. Bob Myers, c/o Greater Louisville Hamfest Assn, Box 34444, Louisville, KY 40232-4444; 502-935-6710; **GLHA50@LouisvilleHamfest.com**; **LouisvilleHamfest.com**.

Louisiana (Harahan) — Sep 25
D F H Q R S V

8 AM-2 PM. *Sprs:* Jefferson ARC, Delta DX Assn., and New Orleans ARC. Harahan Recreation Dept Gymnasium, 6601 10th St. *TI:* 146.86 (114.8 Hz). *Adm:* $5. Tables: $10. Keith Barnes, W5KB, Box 73665, Metairie, LA 70033; 504-289-1504; fax 504-737-0858; **nohamfest@w5gad.org**; **noarc.info/HAMFEST.aspx**.

Louisiana (Pineville) — Oct 9 D H R S T V

7 AM-2 PM. *Spr:* ARC of Central Louisiana. Kees Park, 2450 Hwy 28 E. *TI:* 147.33 (173.8 Hz). *Adm:* Free. Tables: $10. Charles Standlee, AC5PW, 2747 Hwy 28 E, Apt 902, Pineville, LA 71360; 318-448-8088 or 318-880-1537; **ac5pw@arrl.net**; **www.clarc.us**.

Maryland (West Friendship) — Oct 3
D F H Q R T V

6 AM-4 PM. *Spr:* Columbia ARA. Howard County Fairgrounds, 2210 Fairgrounds Rd. *TI:* 147.135 (156.7 Hz). *Adm:* $6. Tables: $20. Dave Prestel, W8AJR, 10160 Tanfield Ct, Ellicott City, MD 21042; 443-812-4403; fax 410-981-5146; **dave.prestel@gmail.com**; **www.carafest.org**.

Massachusetts (Cambridge) — Sep 19. Nick Altenbernd, KA1MQX, 617-253-3776 (9 AM-5 PM); **w1gsl@mit.edu**; **www.swapfest.us**.

Michigan (Adrian) — Sep 19 D F H R T

8 AM-1:30 PM. *Spr:* Adrian ARC. Lenawee County Fairgrounds, 602 N Dean St. 38th Annual Hamfest. *TI:* 145.37 (85.4 Hz). *Adm:* $5. Tables: $10. Mark Hinkleman, NU8Z, 108 E Kilbuck St, Tecumseh, MI 49286; 517-423-5906; **nu8z@comcast.net**; **www.w8tqe.com**.

Michigan (Wyoming) — Sep 11 D F H R T V

8 AM-noon. *Spr:* Grand Rapids ARA. Home School Bldg, 5625 Burlingame Ave SW. *TI:* 145.26 (94.8 Hz). *Adm:* $6. Tables: $10. Mike Bowen, N8ILU, Box 3282, Grand Rapids, MI 49501; 616-531-2338; **mikeN8ILU@yahoo.com**; **www.grahamfest.org**.

Minnesota (Rush City) — Sep 11 F R T

9 AM-noon. *Spr:* East Central Minnesota ARC. Rush City High School, 51001 Fairfield Ave. 18th Annual Rush City Radio Rendezvous, guest speaker. *TI:* 145.33 (146.2 Hz). *Adm:* Free. Tables: Free. John O'Brien, KØDEH, 425 West 2nd St, Rush City, MN 55069; 320-358-4676 (phone and fax); **k0deh@ecenet.com**; **ecmarc.us**.

Missouri (St Joseph) — Sep 18 D F H R V

9 AM-3 PM. *Sprs:* Missouri Valley and NW Missouri ARES ARCs. American Legion Post #359, 4826 Frederick Ave. *TI:* 146.85, 444.925 (both 100 Hz). *Adm:* $3 or 2 for $5. Tables: $15. Tom Kinard, WAØRTU, 16626 Hwy 169, Savannah, MO 64485; 816-217-9193; **wa0rtu@yahoo.com**; **www.w0nh.com/index_files/hamfest.htm**.

New Jersey (Mullica Hill) — Sep 19
D F H Q R T V

8 AM-2 PM (gates open at 6 AM). *Spr:* Gloucester County ARC. 4-H Fairgrounds, 240 Bridgeton Pike (Rte 77). 32nd Annual Hamfest. *TI:* 147.18 (131.8 Hz). *Adm:* $6. Tables: $10. Cory Sickles, WA3UVV, 1200 Cedar Ave, Glassboro, NJ 08028; 856-582-9146; **wa3uvv@arrl.net**; **www.w2mmd.com**.

New Jersey (Tinton Falls) — Sep 11
F H R T V

8 AM-noon. *Spr:* Jersey Coast Chapter of the NADXA. Luigi's Restaurant, 5119 Asbury Ave. *TI:* 146.52. *Adm:* $5. Tables: $10. Mike DiPersio, KC2Q, Box 357, Bradley Beach, NJ 07720; 908-415-6162; **kc2q@arrl.net**; **nadxa.org**.

New Jersey (Wall Township) — Oct 2
F H R T V

6 AM-1 PM. *Spr:* Ocean-Monmouth ARC. Infoage Learning Center, Project Diana Site, 2300 Marconi Rd. *TI:* 145.11 (127.3 Hz). *Adm:* $5. Tables: $10. Jeff Harshman, N2LXM, 5 The Arborway, Ocean, NJ 07712; 732-996-0637; **n2lxm@juno.com**; **omarc.org**.

New York (Ballston Spa) — Sep 11
D F H R T V

7 AM-3 PM. *Spr:* Saratoga County RACES. Saratoga County Fairgrounds, Prospect St. *TI:* 147.0, 147.24. *Adm:* $5. Tables: $5. Al Margadonna, KA1IEG, 924 Chestnut Hill Rd, Cambridge, NY 12816; 518-677-3316; **ka1ieg@hotmail.com**; **k2dll.net**.

New York (Horseheads) — Sep 25
D F H R S T V

8 AM-2 PM. *Spr:* ARA of the Southern Tier. Chemung County Fairgrounds, Grand Central Ave. 35th Annual Elmira Hamfest. *TI:* 147.36. *Adm:* advance $5, door $6. Tables: $17. Charlie Santi, 6 Hickory Grove Rd, Horseheads, NY 14845; 607-481-0908; fax 607-739-9817; **2010Septemberfest@arast.org**; **www.arast.org**.

New York (Pompey/Syracuse) — Sep 18
D F H R S T V

8 AM-2 PM. *Spr:* Radio Amateurs of Greater Syracuse. Pompey Hills Fire Department, Henneberry Rd. 55th Annual Hamfest, National Weather Service Demo. *TI:* 147.3. *Adm:* $5. Tables: 8-ft $8 reserved ($5 if you bring your own). Viv Douglas, WA2PUU, c/o RAGS, Box 88, Liverpool, NY 13088; 315-698-4558; **ragsonline@hotmail.com**; **ragsinreview.com**.

New York (Queens)--Oct 3 D F H Q R T V

Set up 7:30 AM; public 9 AM-2 PM. *Spr:* Hall of Science ARC. NY Hall of Science Parking Lot (Flushing Meadow Corona Park), 47-01 111th St. Tune-up clinic, "Drop and Shop" available, free admission to Museum from 10-11 AM or $6 after with hamfest ticket). *TI:* 444.2 (136.5 Hz), 145.27 (136.5 Hz). *Adm:* buyers $5, sellers $10. Stephen Greenbaum, WB2KDG, 85-10 34th Ave, Apt 323, Jackson Heights, NY 11372; 718-898-5599; **wb2kdg@arrl.net**; **www.hosarc.org**.

EMCOMM EAST CONVENTION

September 18, Rochester, New York

S V

The EmComm East Convention, sponsored by the Monroe County ARES, will be held at St John Fisher College, 3690 East Ave. Doors are open 8 AM-5 PM. Features include an Amateur Radio emergency communications conference where Amateur Radio operators involved in EmComm can attend training sessions on technical topics, learn from served agencies, obtain VE testing for license upgrades, and interact with other EmComm operators from all over the area. Talk-in on 146.61, 444.45 (both 110.9 Hz). Registration is $30 (includes catered lunch; pre-registration is strongly encouraged to give count to caterer). Contact Jeff Wigal, WY7Q, Box 10011, Rochester, NY 14610; 585-210-0426; **info@emcommeast.org**; **www.emcommeast.org**.

North Carolina (Maysville) — Oct 10

F H R T

8 AM-3 PM. *Spr:* Maysville Hamfest Assn. Rotary Park Community Center, 2 blocks N of the intersection of Hwys 17 and 58. *Tl:* 146.685 (88.5 Hz). *Adm:* Free. Byron Highland, K4BMH, 3753 Thorne Dr, Farmville, NC 27828; 252-347-1498; **bhighland@nc.rr.com**.

North Carolina (Pfafftown) — Oct 9

F R

8 AM-noon. *Spr:* Forsyth ARC. West Central Community Center, 6130 Yadkinville Rd. *Tl:* 146.64, 145.47 (both 100 Hz). *Adm:* $5. Tables: Bring your own (free inside space available; first-come, first-served). Ray D'Eau, c/o Forsyth ARC (W4NC), Box 11361, Winston-Salem, NC 27116-1361; 336-245-5740; **hamfest@w4nc.org**; **www.w4nc.com**.

North Dakota (Grand Forks) — Oct 2

D F H R S T V

8:30 AM-noon. *Spr:* Forx ARC. Zion United Methodist Church, 1001 24th Ave S. *Tl:* 146.94. *Adm:* $5. Tables: Free. Karen Noss, NØTKP, 1113 4th Ave N, Grand Forks, ND 58203; 701-775-7781 (phone and fax); **klnoss@gra.midco.net**; **www.wa0jxt.org**.

Ohio (Berea) — Sep 26

D F H Q R S T V

8 AM-2 PM. *Spr:* Hamfest Assn of Cleveland. Cuyahoga County Fairgrounds, 164 Eastland Rd. Cleveland Hamfest and Computer Show. *Tl:* 146.73 (110.9 Hz). *Adm:* $6. Tables: $20. William Beckman, N8LXY, c/o Hamfest Assn of Cleveland, Box 81252, Cleveland, OH 44181-0252; 800-CLE-FEST; **www.hac.org**.

Ohio (Cincinnati) — Sep 19

D F H R S T V

8 AM-3 PM. *Spr:* Greater Cincinnati ARA. Diamond Oaks Career Development Center, 6375 Harrison Ave. Hidden transmitter hunt. *Tl:* 146.88, 145.37. *Adm:* $6. Tables: $8 (per flea market space), $20 (commercial). Stan Cohen, W8QDQ, 2301 Royal Oak Ct, Cincinnati, OH 45237-2939; 513-531-1011 or 513-236-0980; fax 513-531-3834; **stanco49@zoomtown.com**; **www.gcara.org**.

Ohio (Findlay) — Sep 12

D F H Q R S

8 AM-1 PM. *Spr:* Findlay Radio Club. Hancock County Fairgrounds, 1017 E Sandusky St. 68th Annual Hamfest. *Tl:* 147.15. *Adm:* $6. Tables: $20. Eric Wilkinson, K8ERW, Box 587, Findlay, OH 45839; 567-429-9077; **hamfest@findlayradioclub.org**; **www.findlayradioclub.org**.

ARRL/TAPR DIGITAL COMMUNICATIONS CONFERENCE

September 24-26, Portland, Oregon

H S

The 2010 ARRL/TAPR Digital Communications Conference will be held near Portland, Oregon at the Heathman Lodge, 7801 NE Greenwood Dr, Vancouver, WA 98662; tel 1-888-475-3100. Technical and introductory sessions Friday and Saturday followed by a Friday evening Social and Saturday evening Banquet. The Sunday seminar focuses on a topic and provides an in-depth four-hour presentation by an expert in the field. Register in advance by calling the Tucson Amateur Packet Radio (TAPR) at 972-671-8277, or online at **www.tapr.org/dcc**.

Pennsylvania (Elizabeth) — Oct 3

D F H R T

8 AM-1:30 PM. *Spr:* Monessen ARC. Blaine Hill VFD, 409 Oxford Ave. *Tl:* 147.225, 443.35. *Adm:* $5. Tables: $10. John Graham, N3OVO, 1228 Mississippi Ave, Pittsburgh, PA 15216; 412-287-8291; **n3ovo1@gmail.com**; **w3csl.com/**.

MID-ATLANTIC STATES VHF CONFERENCE

September 25, Montgomeryville, Pennsylvania

D H R S T

The Mid-Atlantic States VHF Conference, sponsored by the Mt Airy VHF Club (PACKRATS), will be held at the Quality Inn Conference Center, 969 Bethlehem Pike. Doors are open 8 AM-9 PM. Features include Friday eve hospitality suite (7 PM); conference topics including VHF, UHF and microwave construction, operating, digital modes, EME, antennas, roving and more; free special VHF beginners session (1-4 PM); continental breakfast (8 AM); lunch; buffet banquet Saturday eve; limited indoor seller tables until 4 PM; outdoor tailgate selling area; VHF equipment testing area. Admission is $70 until Aug 27; $80 from Aug 28-Sep 16; $90 after Sep 16. Contact Rick Rosen, K1DS, 206 Kimberton Dr, Blue Bell, PA 19422; 610-270-8884; **rick1ds@hotmail.com**; **www.packratvhf.com**.

Pennsylvania (Stroudsburg) — Sep 11

D F H R S T V

8 AM-2 PM. *Sprs:* Eastern Pennsylvania ARA and Pocono ARK. Stroudsburg Jr High School, 1198 Chipperfield Dr. 10th Annual Pocono Area Hamfest, Special Event Station 14.325. *Tl:* 147.045 (131.8 Hz). *Adm:* $5. Tables: $6 and $10. Jerry Truax, N3SEI, Box 756, Bartonsville, PA 18321; 570-620-9080; fax 570-620-1089; **cameras@ptd.net**; **www.qsl.net/n3is/hamfest/index.html**.

Pennsylvania (Talmage) — Oct 2

D F H R T

7 AM-1 PM. *Spr:* Red Rose Repeater Assn. West Earl Community Park, Newport Rd (Rte 772). *Tl:* 147.015 (118.8 Hz). *Adm:* $2. Tables: $7 (includes 1 admission). Edward Albright, KB3OWF, 237 N Fulton St, Strasburg, PA 17579; 717-203-3943; **kb3owf@hotmail.com**; **w3rrr.org**.

Rhode Island (Forestdale) — Sep 18

F H R T

8 AM-3 PM. *Spr:* Rhode Island Amateur FM Repeater Service. VFW Post 6342, Main St. Auction (11 AM-2 PM). *Tl:* 146.76. *Adm:* Free. Tables: $5. Rick Fairweather, K1KYI, 106 Chaplin St, Pawtucket, RI 02861; 401-864-9611; **k1kyi@arrl.net**; **qsl.net/riafmrs**.

South Carolina (Rock Hill) — Oct 2

D H R T V

8 AM-1 PM. *Spr:* York County ARS. Faith Assembly of Rock Hill, 2800 Faith Blvd. *Tl:* 147.03. *Adm:* $5. Tables: $20. Sheila Parrish, KG4CDF, 2358 J P Dirt Rd, Edgemoor, SC 29712; 803-328-5983; **coy@navacore.net**; **www.ycars.org**.

South Dakota (Pierre) — Sep 18

D F H R S V

10 AM-3 PM. *Spr:* Pierre ARC. Pierre Senior Center, 401 W Pleasant. *Tl:* 145.35 (146.2 HZ). *Adm:* Free. Tables: $5. Dave Mehlhoff, WØNWT, 2101 Waldron St, Ft Pierre, SD 57532; 605-223-2553; **eaglewings150@yahoo.com**; **www.sdhams.com**.

Tennessee (Oak Ridge) — Oct 9

D H R T V

8 AM-3 PM. *Spr:* Oak Ridge ARC. Order of Eagles Bldg, 1650 Oak Ridge Tpk. *Tl:* 146.88, 146.97. *Adm:* $5. Tables: $10. Tom Muncy, AG4SF, 142 Manhattan Ave, Oak Ridge, TN 37830; 865-599-9223; **ag4sf@arrl.net**; **www.discoveret.org/orarc/**.

SEDCO W4DXCC CONVENTION

September 24-25, Pigeon Forge, Tennessee

D H Q R S

The SEDCO W4DXCC Convention (W4 DX and Contest Convention), sponsored by the SouthEastern DX and Contesting Organization, will be held at the MainStay Suites and Conference Center, 410 Pine Mountain Rd. Registration begins at 11 AM on Saturday and programs start at noon; manufacturers display and demonstration starting on Friday evening. Features include a fellowship of DXers and contesters; QSL card checking; great speakers including special guest from ARRL HQ Dan Henderson, N1ND, Regulatory Information Manager; dinner. Admission is $25. Contact Rosie Lamb, KA4S, 3134 Allen Dr, Maryville, TN 37803; 865-681-2279 or 865-898-2279 (cell); **RosieLamb@charter.net**; **sedco.homestead.com**.

Tennessee (Sevierville) — Sep 24-25

D F H R S T V

Friday 2-7 PM, Saturday 9 AM-2 PM (flea market opens at sunrise on Saturday). *Spr:* Ten-Tec, Inc. Ten-Tec Factory, 1185 Dolly Parton Pkwy. Factory tours. *Adm:* Free. Stan Brock, WDØBGS, 865-453-7172; fax 865-428-4483; **sales@tentec.com**; **www.tentec.com**.

Texas (Paris) — Oct 8-9

D F H R T V

Friday 5 PM, Saturday 8 AM. *Sprs:* Paris Texas Radio Group and Red River Valley ARC. Red River Valley Fairgrounds, 570 E Center St. 6th Annual Hamfest. *Tl:* 146.76 (203.6 Hz). *Adm:* $2. Tables: $15. Richard Lenoir, KI5DX, 2150 Plum St, Paris, TX 75460; 903-783-0968; **ki5dx@yahoo.com**; **www.paristexasradio.com**.

Utah (Logan) — Oct 9

D F H R V

8 AM-5 PM. *Spr:* Bridgerland ARC. Cache County Fairgrounds Pavilion, 450 S 500 W. *Tl:* 146.72 (103.5- Hz), 147.26 (103.5+ Hz). *Adm:* Free. Tables: advance $8, door $10. Bill Neville, WA7KMF, 544 W 500 S, Logan, UT 84321; 435-770-1087; **bneville@sisna.com**; **www.barconline.org**.

VIRGINA SECTION CONVENTION

September 11, Virginia Beach

D F H Q R S T V

The Virginia Section Convention, sponsored by Tidewater Radio Conventions, will be held at the Virginia Beach Convention Center, 1000 19th St. Doors are open 9 AM-5 PM. Features include hamfest and electronics flea market, multiple vendors, tailgating, forums and programs, youth lounge, VE sessions, DX dinner (6:30 PM; special guest speaker Bob Allphin, K4UEE). Talk-in on 146.97. Admission is $9 in advance, $10 at the door. Tables are $25 each. Contact Steve Batton, W4XQ, 2808 County Pl, Virginia Beach, VA 23456; 757-635-8646; fax 757-673-7426; **steve@vbhamfest.com**; **vbhamfest.com**.

MICROHAMS DIGITAL CONFERENCE

September 18, Redmond, Washington

D H R S

The MicroHAMS Digital Conference,

sponsored by the MicroHAMS Radio Club, will be held at the Microsoft Corporate Campus, 15120 NE 40th St. Doors are open 8:30 AM-5:30 PM. Features include a wide variety of digital communications and Amateur Radio topics and presentations; wireless 802.11 Internet Connectivity; special guest speakers including ARRL Rep Ward Silver, NØAX. Talk-in on 146.58. Registration is $25 in advance, $30 at the door (lunch and snacks are included with this price). Contact Phil Moscinski, N2EU, 5610 322nd Ave SE, Fall City, WA 98024; 206-255-6779; **pmoscinski@gmail.com**; **www.microhams.com**.

WASHINGTON STATE CONVENTION

September 25, Spokane Valley

D H R S V

The Washington State Convention, co-sponsored by the Kamiak Butte Amateur Repeater Assn, NW Tri-State ARO, Palouse Hills ARC, Inland Empire VHF Radio Amateurs, Spokane DX Assn, University High School ARC, Lilac City ARC, and the Panoramaland ARC will be held at University High School, 12420 E 32nd Ave. Doors are open for setup Friday 7-9 PM, Saturday 8 AM; public Saturday 9 AM-5 PM. Features include commercial and non-commercial vendors, seminars and displays, Open-Cry Auction (3 PM), VE sessions (11 AM; Mary, AA7RT, 509-991-2192; **aa7rt@arrl.net**), radio test gear table, post hamfest dinner (5 PM), free off-street parking for cars and RVs, refreshments. Talk-in on 147.24, 146.52. Admission is $5, 18 and under free. Swap tables are $5 before Sep 3, $7.50 after Sep 3; commercial tables are $12 before Sep 3, $15 after Sep 3. Contact Bob Meenach, AC7GP, 4814 W Houston Ave, Spokane, WA 99208; 509-327-3188; **ac7gp@hotmail.com**; **www.kbara.org**.

To All Event Sponsors

Before making a final decision on a date for your event, you are encouraged to check the Hamfest and Convention Database (**www.arrl.org/hamfests-and-conventions-calendar**) for events that may already be scheduled in your area on that date. You are also encouraged to register your event with HQ as far in advance as your planning permits. See **www.arrl.org/hamfest-convention-application** for an online registration form. Dates may be recorded up to two years in advance.

Events that are sanctioned by the ARRL receive special benefits, including an announcement in these listings and online, donated ARRL gift certificates and handouts.

For hamfests: Once the form has been submitted, your ARRL director will decide whether to approve the date and provide ARRL sanction. *For conventions:* Approval must come from your director and the ARRL executive committee.

The deadline for receipt of items for this column is the **1st of the second month preceding publication date**. For example, your information must arrive at HQ by **September 1** to be listed in the **November** issue. Information in this column is accurate as of our deadline; contact the sponsor or check the sponsor's Web site for possible late changes, for driving directions and for other event details. Please note that postal regulations prohibit mention in *QST* of prizes or any kind of games of chance such as raffles or bingo.

Promoting your event is guaranteed to increase attendance. As an approved event sponsor, you are entitled to special discounted rates on *QST* display advertising and *ARRLWeb* banner advertising. Call the ARRL Advertising Desk at 860-594-0207, or e-mail **ads@arrl.org**.

Wisconsin (Cedarburg) — Sep 11 D F R T

Set up 6 AM; public 8 AM. *Spr:* Ozaukee RC. Fireman's Park, 796 Washington Ave. *TI:* 146.97 (127.3 Hz). *Adm:* $5. Tom Ruhlmann, W9IPR, 465 Beechwood Dr, Cedarburg, WI 53012; 262-377-6945 (home) or 262-844-6331 (cell); **teruhlmann@sbcglobal.net**; **ozaukeeradioclub.org**. QST

ARRL VEC Volunteer Examiner Honor Roll

The ARRL VEC Honor Roll recognizes the top 25 Volunteer Examiners according to the total number of exam sessions they have participated in since their accreditations. Since each session requires an average time commitment of 2-4 hours or more, the thousands of hours these VEs have invested in extraordinary! Whether you are one of our VE Teams that test once a week, once a month or once a year, we want to express our warmest appreciation to all volunteers for their generous contribution to the ARRL VEC program.

If you are an ARRL VE, you can see your session stats online at **www.arrl.org/arrlvec/veparti.php**.

If you're not a VE, become one! See **www.arrl.org/arrlvec/become-a-ve.html**.

Examiner Call	*Sessions*	*Accreditation Date*
Sammy Neal, N5AF	503	20-Nov-1984
Harry Nordman, ABØSX	415	9-Jan-2002
Royal Metzger, K6VIP	368	29-Apr-1985
Karen Schultz, KAØCDN	352	6-Sep-1984
Glenn Schultz, WØIJR	342	28-Sep-1984
Kevin Naumann, NØWDG	342	17-Nov-2002
Franz Laugermann, K3FL	337	1-Dec-1991
David Bartholomew, ABØTO	323	22-Mar-2002
John Moore, III, KK5NU	318	21-May-1995
John Mackey, Jr, KSØF	316	1-Oct-1990
Paul Maytan, AC2T	314	6-Sep-1984
Victor Madera, KP4PQ	300	1-Mar-1992
John Hauner, KØIH	288	11-Jan-1985

Examiner Call	*Sessions*	*Accreditation Date*
Gerald Grant, WB5R	286	4-Jan-1985
David Fanelli, KB5PGY	282	1-Oct-1991
Daniel Calabrese, AA2HX	279	1-Nov-1991
Gary Mangels, AD6CD	278	30-Jul-1997
Frankie Mangels, AD6DC	274	14-Oct-1997
Michael Faucheaux, N5KBW	272	15-Jul-1996
William Martin, AIØD	270	1-Nov-1984
Leslie Dale, NI5S	266	6-Sep-1984
Scott Swanson, K6PYP	266	1-Dec-1992
Robert Hamilton, NØRN	264	19-May-1987
Loren Hole, KK7M	261	6-Sep-1984
Roy Johnson, N1IKM	261	24-Jul-1995

Strays

WRITE FOR *QST*? SURE!

◊Have you ever wanted to see your name in print? Ever have someone at the club come up and ask you how you did that or tell you what a great talk you gave? Ever had an article published in your club newsletter or read a *QST* article and thought "Hey, I did something like that but my way was easier/cheaper"?

If you have experience in a particular area of ham radio and can explain your ideas in a straightforward way, we're interested in seeing your work. We are in need of practical articles that provide *QST* readers with useful information. If you like building, maintaining or repairing equipment or are involved in DXing, digital operating or other types of on-air activity, you can help your fellow hams — and earn $65 a page — by putting your experience into words.

Articles should be between 900 and 3000 words, and should include high-resolution photos or clear drawings. Send your article to **qst@arrl.org** or to *QST*, 225 Main St, Newington, CT 06111. Before you get started, you may want to have a look at our authors guidelines at **www.arrl.org/qst-author-guide**. If you prefer, we can mail you a printed copy if you send a self-addressed, stamped envelope to *QST* Authors Guide, ARRL, 225 Main St, Newington, CT 06111.

75, 50 AND 25 YEARS AGO

September 1935

- The cover photo shows the technique of displaying a waveform on a cathode-ray tube.
- The editorial discusses the value of cooperation among hams, with the aim of reducing the "bedlam" of mutual interference that sometimes occurs on our ham bands.
- George Grammer, W1DF, gives us tips on "Plate Modulation of Pentodes."
- Charles Fisher, W3FX describes "An All-Purpose S.S. Superhet with Turret-Type Automatic Coil Changing."
- Ev Battey, W1UE, presents the "Results, A.R.R.L.'s 1935 DX-Contest," describing it as "the greatest contest ever held in the history of amateur radio." W3SI posted the world's highest score, making 234 contacts with 50 countries in *all* continents!
- Ronold King describes "A New Type Ultra-High-Frequency Transmitter."
- "A.R.R.L.'s Field Day" reports that this third annual event was "the best yet."
- Alpha Learned, W1FUB, presents "A Flexible E.C.-Controlled Transmitter" that operates on 3.5, 7, and 14 Mc.
- The 1936 Super Skyrider receiver is prominently featured in Hallicrafters' own ad, as well as the many dealers who are carrying it in stock…including The Radio Shack in Boston.
- An item in "Strays" reports that an SWL neighbor of Herb Brier, W9EGQ, asked him about the location of a station he heard hams repeatedly calling…"LOCQ."

September 1960

- The cover photo shows the setups of W1BU and W6HB, who made contact via "1296 Moonbounce."
- The editorial, "New Frontiers," discusses the spectacular new achievement of working coast to coast on 1296 Mc.
- The lead article, "Coast to Coast via the Moon on 1296 Mc.," gives further details of the fine work of the hams who forged a new bit of ham history.
- Melvin Shadbolt, WØKYQ, takes a look at what's going on in "Amateur Color Television."
- Lew McCoy, W1ICP, presents "A Simple Wavemeter for Use in Coaxial Lines."
- Hubert Woods, W9IK, discusses "An Improved Audio-Driven A.G.C. Circuit."
- In "Deluxing the ARC-5 Transmitter," George Shuart, W4AMN, tells how he modified a BC-696 to provide 200 watts output on 3.5 and 7 Mc., V.F.O. or crystal control, and built-in S.W.R. metering — at low cost.
- Ed Tilton, W1HDQ, tells us how to convert another piece of military surplus gear, in "Communication on 1215 Mc. with the APX-6."
- Alvin Kanda, KØMHU, presents Part 1 of "The 'Ultimatic' — Transistorized," a solid-state version of the original Ultimatic keyer.
- Clyde Lee, W4PHJ, tells us about his stable and selective two-band receiver for the C.W. DX man, "The PHJ-1."

September 1985

- The cover photo montage — showing Fort Knox, Churchill Downs, the steamboat *Belle of Louisville*, and President Abraham Lincoln's childhood home — says, "See you at the National Convention in Louisville, Oct. 4-6."
- The editorial discusses the current state of "Repeater Coordination."
- In "When the Heat Is On," Ed Mitchell, WA6AOD, reports on hams helping with communication during the recent California forest fires.
- Doug DeMaw, W1FB, explains "The Principles and Building of SSB Gear."
- Bob Ewing, WA4GWG, discusses "Remote Control of Digital Communications."
- Jim Dietrich, WAØRDX, presents "Loops and Dipoles: A Comparative Analysis."
- Robert White, KBØCY, gives us a good tutorial, "A Close Look at Frequency Modulation."
- "Clarence D. Tuska — 1896-1985" looks at the Amateur Radio accomplishments of the man who was co-founder and first Secretary of the ARRL, and the first Editor of *QST*.
- "Contesting for Noncontesters," by Bob Halprin, K1XA, explains how you can join the contest fray for fun, rather than as a serious competitor.
- The Public Service column this month describes the destruction caused by recent tornadoes that wreaked havoc in Ohio and western Pennsylvania, and how ham radio once again helped out during the aftermath.

Al Brogdon, W1AB ♦ Contributing Editor

Field Organization Reports

JUNE 2010

Public Service Honor Roll

This listing recognizes radio amateurs whose public service performance during the month indicated 70 or more points in six categories. Details on the program are at this Web page: **www.arrl.org/public-service-honor-roll**.

689	193	134	101	N8DD
KE7BIT	WA2BSS	W4LHQ	N2VC	
				87
575	190	131	100	K6RAU
KF7BRW	W7QM	KK1X	KI6RUW	W8IM
			WB4FDT	
560	185	130	AA3SB	86
KØIBS	N5NVP	K6JT	N1JX	W9WXN
		KB1NMO	N3SW	
511	180	WB2FTX	W3TWV	84
W4CAC	NA9L	N2JBA	N8NMA	KB5SDU
	WM2C	W8UL	W8CPG	
505			W7JSW	83
WB7WOW	177	129	K4SCL	KD7OED
	WD8USA	W2SFD	N9MN	
478			NR2F	82
W7LUX	175	125	NU8K	WD8DHC
	K7BC	NN7H	WØCLS	W4AVD
380	KA8ZGY	AG9C	WAØVKC	KJ8O
W4DNA		K4BEH	WB8SIQ	
	170	N2GJ	WG8Z	80
320	KD1LE	KA8IAF	WD8Q	AL7N
KT2D			K8VFZ	KC5CW
	165	120	KI4YV	KJ4HGH
310	AC6C	KB2BAA		KCØZDA
K2HJ	WB2KNS	N2GS	99	WA3EZN
		N3RB	K2GW	W8DJG
293	164	N2YJZ		KD8LZB
WB9FHP	W2DWR	KA4FZI	98	K8KV
		W1GMF	W1PLW	
281	162	KW1U		79
NC4VA	KK5NU	N1LKJ	97	WDØGUF
		NØMEA	N2DW	KB1KRS
277	160	N8IO	KØBXF	
K4DND	KK3F	WB8HHZ		78
	KGØGG	K3RC	96	KK7TN
270			NØZIZ	K8DD
KB2RTZ	155	116		
	KE5HYW	K4BG	94	76
265	WØLAW		K6HTN	KB1NAL
W5KAV	WD8BCS	112	KS3Z	WC5M
N7CM		KK7DEB	K5MC	
	151			75
261	N8OLY	111	93	KT5SR
KI4KWR		W7ELI	KF5CRX	W5XX
	150		AD4BL	W1PLK
260	K4GK	110		
N7EIE		WB6UZX	92	73
WB9YBI	145	KC5OZT	W5ESE	W5GKH
	WD9FLJ	N4ABM	KJ7NO	
255	WA4UJC	W7GB	NA7G	72
K7EAJ		N5OUJ		KI4DHS
K2HAT	144	K1HEJ	91	
	KF7GC	N7XG	N7IE	71
250	K7OAH	N7YSS		KBØDTI
K9LGU	KØLQB	K5KV	90	N2VQA
		KE4CB	KE5YTA	
239	142	KK5GY	K4MSG	70
WB8RCR	KB4CAU	N1IQI	W9MBT	K5GLS
		WB4GHU	N3ZOC	KJ4MNW
235	140	N8OD	KB3LNM	KØDEU
K8RDN	NX9K	WB8WKQ	K3IN	NØDLK
	N9VC	W4TTO	W4WNE	NØDUW
225	K7BFL		WB4BIK	NØDUX
W4OTN	WE2G	108	WA2CUW	NUØF
	WB6OTS	KB5PGY	KCØM	KAØFUI
210			AAØOM	KBØJKO
W5DY	139	106	W4AGA	NØMHJ
W2EAG	K9EOH	KC4PZA	K1JPG	N3NTV
			W3GQJ	KØPTK
200	135	105	NIØI	KØOR
WB9JSR	W3YVQ	KA3NZR	KB8GT	KØRXC
	N9AUG			NØUKO
194	K4IWW	104	88	KD7ZUP
N4HUB		W3CB	KC5MMH	KC8UR
			KB9KEG	

The following stations qualified for PSHR in previous months, but were not properly recognized in this column: (April) WB9FHP 210, K7EAJ 195, N7CM 185, WB9YBI 170, NA9L 160, K9EOH 153, KK7DEB 141, W7ELI 132, N7XG 110, N7YSS 110, W7RRC 110, W9MBT 90, W9WXN 83. (May) AAØM 95, KØBXF 94, KBØDTI 82.

Section Traffic Manager Reports

The following Section Traffic Managers reported: AK, AL, AZ, CO, CT, EB, EMA, EPA, EWA, GA, IL, IN, KS, LA, LAX, MDC, ME, MI, MN, MS, NC, NFL, NLI, NNJ, NNY, NTX, OH, OK, ORG, SFL, SJV, STX, TN, UT, VA, WCF, WMA, WI, WV, WY.

Section Emergency Coordinator Reports

The following ARRL Section Emergency Coordinators reported: AZ, CT, EWA, GA, IA, IN, KS, MDC, ME, MI, MT, NC, NLI, SD, SFL, STX, SV, TN, WTX, WV.

Brass Pounders League

The BPL is open to all amateurs in the US, Canada and US possessions who report to their SMs a total of 500 or more points or a sum of 100 or more origination and delivery points for any calendar month. Messages must be handled on amateur radio frequencies within 48 hours of receipt in standard ARRL radiogram format. Call signs of qualifiers and their monthly BPL total points follow.

N1IQI 2029, WB5NKD 1662, KA8EKG 1396, W8UL 1148, KW1U 911, KK3F 806, WB8WKQ 763, WB5NKC 755, N1LKJ 739, N8IXF 648, W1GMF 644, WB9JSR 624, K7IFG 561, KZ8Q 535.

Stations earning BPL by Originations plus Deliveries: NM1K 120, K8LJG 106.

SILENT KEYS

It is with deep regret that we record the passing of these amateurs:

K1FM **Dorbuck**, Anthony A. "Tony" Jr, New Britain, CT
KB1LGH **Babin**, Robert A., Shrewsbury, MA
W1LJO **Dumais**, Paul E., Newton, MA
AA1LV **Lamarche**, Germain L., Apple Valley, CA
W1MNG **Balboni**, Henry H., Groveland, MA
K1NDD **Murray**, Michael E., Taunton, MA
W1NYN **Clubb**, James M. Jr, Bonita Springs, FL
♦W1OD **Kaczynski**, Michael B., Bristol, CT
W1PMR **Szafranski**, Theodore, Rogers, CT
WJ1X **Berg**, John F., Hartland, VT
W2EXY **Marshall**, Richard H., Ransomville, NY
♦WA2FDL **Pashalidis**, James Jr, Zephyrhills, FL
W2KVG **Schneider**, Norman, Long Beach, NY
K2LFL **Sheffield**, Louis, Ilion, NY
KB2LML **Haggett**, Alvah B., Plattsburgh, NY
N2LMP **Sussman**, Stanley J., Chester, NY
♦W2LOP **Cooke**, George H., Morris Plains, NJ
W2LWQ **Hanrahan**, Leo R., Elverson, PA
♦WB2PJU **Benua**, David, Marblehead, MA
W2PKM **Black**, Raymond H., Sun City Center, FL
KO2Q **Roney**, Frank E. Jr, Horseheads, NY
W2WSE **Benton**, David, Sea Girt, NJ
KA3BKO **Watson**, James S., Glen Burnie, MD
W3EFH **Shaw**, Gustavus W., Havertown, PA
♦WB3ITS **Drexler**, Opal E., New Wilmington, PA
NO3N **DeLlanos**, Eugenio "Gene," Trevose, PA
KF3R **Devlin**, Edward J., Okeechobee, FL
W3RZ **Zimmer**, Robert E., West Mifflin, PA
NT3W **Wright**, Kenneth W., Las Cruces, NM
♦W3WU **Daly**, George W., Middletown, DE
WN4BOT **Spoelker**, Robert M., Louisville, KY
KJ4DSZ **Hilbert**, Robert M., Sunrise, FL
AJ4EB **Coulter**, William, Lexington, KY
KE4FVJ **Kelly**, Roy E., Inverness, FL
K4HCG **Wisdom**, James W., Raleigh, NC
K4HEB **Mayer**, George E., Spring Hill, FL
WA4HIV **Fiveash**, Jack B., Donalsonville, GA
♦WA4IGS **Forsee**, Robert E., Benton, KY
W4MNS **Minter**, Charles E., Roanoke, VA
W4OFI **Evans**, Harry, Coconut Creek, FL
KF4ONG **Swilley**, Linda Mae, Melrose, FL
W4PES **Judd**, Eugene, Goldsboro, NC
KJ4RM **Solomon**, Michael W., Waynesboro, VA
KF4TYD **Sutton**, Donald, Lawtey, FL
K4WHT **Patty**, Joseph S., Gadsden, AL
W4ZEF **Lindell**, Arthur A., Vero Beach, FL
W4ZWK **Brown**, Rhoderick E. Sr, Hendersonville, NC
KB4ZYW **Wiles**, James E. Sr, Madisonville, KY
N5BJH **Webb**, David W. Jr, Brandon, MS
WA5DGO **Locke**, Alan B., Oxford, MS
W5ELO **Haak**, Charles H. "Chuck" Jr, Santa Fe, TX
KD5EZM **Gilley**, Palmer G., Camden, TN
KC5IZO **West**, Raymond T., Edgewood, NM
W5LWC **Gunn**, Harold J., Kosciusko, MS
AA5OV **Elliott**, Gordon E., Duluth, GA
WA5PJT **Smith**, Robert H., Abbeville, LA
W5RGF **Feran**, Russell G., New Orleans, LA
AC5Z **Fisher**, Albert L., Nacogdoches, TX
AD6BO **Thompson**, Joseph E. Jr, Vallejo, CA
N6BWW **Bowen**, Francis P. "Frank," Fresno, CA
WB6DXZ **Craddock**, Alan H., Oakland, CA
W6EUF **Gingerich**, Wayne E., Long Beach, CA
AH6GI **Hamasaki**, Cory K., Honolulu, HI
WA6KQB **Gabriel**, George H. "Gabe," El Sobrante, CA
W6OBU **Roth**, Bruce A., Eugene, OR
K6QJY **Ziegler**, Gordon L., Lafayette, CA
KI6RP **Young**, Fletcher A. "Fletch," Lafayette, CA
KE6RWD **Sherwood**, Earl D., Riverside, CA
KE6VOB **McBain**, Harry J., North Highlands, CA
N6VT **Conly**, Ralph A., Sunnyvale, CA
W7AHE **Hoopes**, M. Burton, West Valley City, UT
W7BQZ **Miller**, Wesley R., Portland, OR
KF7CHV **Konka**, Karl S., Astoria, OR
AC7FG **Jones**, Greydon, Edgewood, WA
KC7GQE **Thompson**, Charles D. "Chuck," Seattle, WA
K7INM **Skinner**, Kenneth R., West Richland, WA
W7JWA **Goodwin**, Claude J., Silverton, OR
K7XYF **Gibbons**, George R., Herriman, UT
KD8DMM **Clark**, Bobbie J., Ohio City, OH
KA8EDS **Leverenz**, Kenneth H., East China, MI
K8GOU **VanSickle**, Donald R., Gowen, MI
W8IIK **Litty**, Richard C., Cary, NC
W8SJK **Bachschmidt**, Warren J. Sr, Marlette, MI
K8TUY **Bender**, Jack E., Dayton, OH
W8TWJ **Blumenthal**, Gerald, Novi, MI
♦K8UFX **Abeare**, Ronald J., Bay City, MI
KC8VFI **Jepson**, Michael J., Coldwater, MI
K8VWA **Thornberg**, Harry, Hamersville, OH
N8YYY **Artl**, Gerard "Gary," Cleveland, OH
KB9EDM **Medinger**, Gerald W. "Jerry," Cedar Grove, WI
N9JSJ **Coolidge**, Elisabeth "Bette," Lewistown, MT
WQ9L **Gibbs**, Wayne L., Carmi, IL
KE9LL **Rayome**, Joseph G., Ishpeming, MI
KC9PC **Spehr**, Otto P., Bloomington, IN
W9TX **Koester**, William H., Benton, KY
K9VJI **Latta**, Ted R., Greenup, IL
W9ZC **Pratt**, Robert E. "Bob," Neenah, WI
WBØAKY **Daugherty**, Jerry L., Portageville, MO
WØAPG **Wilson**, Guy, Bel Aire, KS
♦WBØBWL **Ruen**, Reuben C., Columbia Heights, MN
KØMHK **Placzek**, James F., Saint Paul, MN
KCØODM **Lounsberry**, Annabelle Mary, Duluth, MN
WØQWS **Ferguson**, John W. Sr, Independence, MO
KGØV **West**, Charles A. "Chuck," Durango, CO
KAØWQQ **Zeller**, Charles F., Independence, MO
VE3BFI **Telling**, Marion, Tecumseh, ON, Canada
LA2QR **Johannessen**, Roar, Drammen, Norway
9V1UV **Selvadurai**, K. C., Singapore, Singapore

♦ Life Member, ARRL

Note: Silent Key reports must confirm the death by one of the following means: a letter or note from a family member, a copy of a newspaper obituary notice, a copy of the death certificate, or a letter from the family lawyer or the executor. Please be sure to include the amateur's name, address and call sign. Allow several months for the listing to appear in this column.

Many hams remember a Silent Key with a memorial contribution to the ARRL Foundation or to ARRL. If you wish to make a contribution in a friend or relative's memory, you can designate it for an existing youth scholarship, the Jesse A. Bieberman Meritorious Membership Fund, the Victor C. Clark Youth Incentive Program Fund, or the General Fund. Contributions to the Foundation are tax-deductible to the extent permitted under current tax law. Our address is: The ARRL Foundation Inc, 225 Main St, Newington, CT 06111. QST

Gail Iannone ♦ Silent Keys Administrator ♦ sk@arrl.org

Strays

REMEMBERING N9VBU

♢Kenneth R. Cary, K9UCX, has contributed $10,000 on behalf of John Gerber, N9VBU. Cary has been welcomed into the ARRL Legacy Circle, which honors ARRL members who have included ARRL in their estate plans. More information can be found on the ARRL Web site at **www.arrl.org/arrl-legacy-circle**.

JOHN SHY

Taken by a friend at my QTH in Rio Verde, Arizona. — *Steve Robinson, WU9B*

HAMSPEAK

The following are brief descriptions of Amateur Radio related terms found in this month's issue of *QST*. More information on most can be found in *The ARRL Handbook*, or other specialized ARRL publications.[1] See also **www.arrl.org/ham-radio-glossary**.

Attic Antenna Experiments

Autotuner — Device that is connected between radio equipment and antenna system to transform the antenna system impedance to the value that the radio is designed to operate with, usually 50 Ω. In an auto tuner, rather than a manual one, the mismatched is sensed automatically resulting in adjustments being made without operator intervention.

Grid dip meter — Test instrument designed to measure the resonant frequency of a inductance/capacitance tuned circuit. It does this by observing the feedback current of an oscillator that will be reduced if coupled into a resonant circuit. In the vacuum tube implementation, the indication was a reduction in measured grid current.

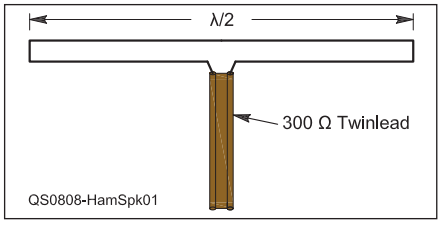
Restrictive covenants — Rules about limitations on property use written into some real estate deeds.

Trap — Parallel resonant circuit used to electrically isolate sections of an antenna to provide resonant operation on more than one frequency range.

A Close Look at the Terminated Folded Dipole Antenna

EZNEC — Antenna modeling software that provides a user friendly interface to the powerful *Numerical Electromagnetic Code* (NEC) calculating engine. Several versions of *EZNEC* antenna modeling software are available from developer Roy Lewallen, W7EL, at **www.eznec.com**.

Folded dipole — Multiple wire antenna in which the transmission line is connected to the center of one wire and the other wires are interconnected at the ends. The input impedance of the antenna goes up with the square of the number of wires. Since a single wire dipole in free space has a Z of 72 Ω, a two-wire folded dipole in free space (see Figure) would have an impedance of 72 × 2^2 = 288 Ω, a close match to 300 Ω TV type twinlead.



[1]*The ARRL Handbook for Radio Communications,* 2010 Edition. Available from your ARRL dealer or the ARRL Bookstore, ARRL order no. 1448 (Hardcover 1462). Telephone 860-594-0355, or toll-free in the US 888-277-5289; **www.arrl.org/shop/**; **pubsales@arrl.org**.

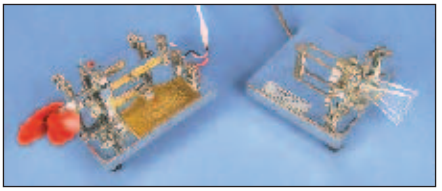
Link coupled transmitter output circuit — Transformer in which the primary is a tuned resonant circuit connected to the plate(s) of a vacuum tube transmitter's amplifier. The transformer secondary is a few turns coupled to the primary to match to the low impedance of an antenna system. In some cases the position of the link is adjustable to allow varying the coupling

Omnidirectionality — Property of an antenna, microphone or light source such that it radiates equally in all directions. In contrast, a directional source, such as a flashlight, focuses its energy in a particular direction.

The Doctor is IN

Attenuation — A reduction in the strength of a signal generally due to losses that result in conversion of the signal energy to heat. An attenuation of "3 dB" results in half the output power of the input with the other half dissipated as heat.

Electronic keyer — Circuitry that generates sequences of Morse code dots and dashes initiated by switch contact closures. Typically ensures that spacing and character element duration are correct for the selected speed. The switches are usually made in the form of easy to operate levers in what is called a paddle or paddles (see photo).



Vertical monopole — Single vertical antenna element, typically a quarter or more wavelengths long. Often used as a transmit and receive antenna, singly or in combination with other similar antennas.

One Ham's DC Power Connector Preference

Anderson Powerpole — Trade name for a kind of electrical plug-in connector designed for low power loss and ease of interconnection. By their design they are "genderless"; that is, any connector can plug into any other. The 30 A size are very popular for Amateur Radio dc circuits. For more information, see **www.andersonpower.com**.

ARRL Field Day — Annual operating event, the fourth full weekend each June, in which US stations set up in portable, simulated emergency configurations and contact as many other such stations as possible. See **www.arrl.org/field-day** for details.

Female connector — Electrical connector variety that serves as a receptacle for a compatible type "male" plug.

Gender converting cable — Usually temporary cable with a male connector on each end or female connector on each end intended to serve as an interconnect patch between two incompatible connectors of the same gender.

Genderless — Descriptor of connector series in which any connectors can be interconnected with any other. Examples are the Anderson Powerpoles for dc circuits and the General Radio GR coax connectors for RF.

Male connector — Electrical connector variety that has a plug that fits into a compatible type "female" receptacle.

Molex connector — Nylon supported two or more pin connector often used for power connections.

Tamiya — Japanese manufacturer of molded plastic parts including a line of power connectors similar to, but not compatible with the more frequently encountered Molex type.

A Portable Antenna Mast and Support for Your RV

Galvanized pipe — Iron or steel pipe coated with a zinc compound to improve corrosion resistance.

Hernia — Condition in which an internal body part protrudes through the muscle or other material that normally contains it.

Nipple — Short section of pipe, generally threaded at each end with male threads. Can be used to interconnect two pieces of pipe with female threads.

A Solar Powered Repeater for EmComm

Absorptive glass mat (AGM) battery — One technology of valve regulated sealed lead-acid (VRSLA) batteries. In AGM batteries, the electrolyte is kept in contact with the electrodes by being within a mat structure that is fixed between the electrodes.

Charge controller — Circuitry that manages the charging of a storage battery under charge from a variable source to keep the battery from being overcharged or discharging back toward the source. An automotive voltage regulator — between alternator and battery — is a kind of charge controller, as is specialized circuitry that goes between a solar power source or wind turbine and a battery.

Float voltage — Voltage at which a fully charged rechargeable battery is just receiving enough charge current to make up for losses. The battery charger can be at this level indefinitely and will maintain a fully charged condition.

Flooded cell battery — Rechargeable lead-acid battery in which the electrolyte is in liquid form.

Full quieting — In an FM radio system, the condition in which the incoming signal is strong enough that background noise is eliminated and the signal is thus at excellent signal to noise ratio.

Gelled electrolyte (gel cell) lead-acid batteries — Battery technology in which the acid based electrolyte is maintained in a jellied form with the gel located between adjacent battery plates.

Living off the grid — Description of condition in which one obtains any and all needed electrical power from local sources rather than from the commercial power grid.

Photovoltaic (PV) panels — Semiconductor based device that produces electrical power if illuminated, typically by sunlight. See **www1.eere.energy.gov/solar/photovoltaics.html** for more information.

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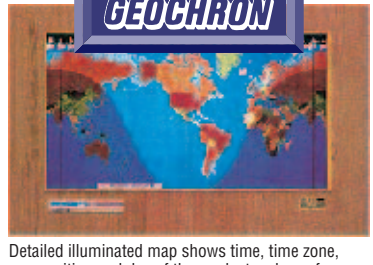

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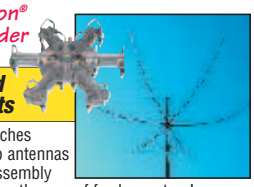

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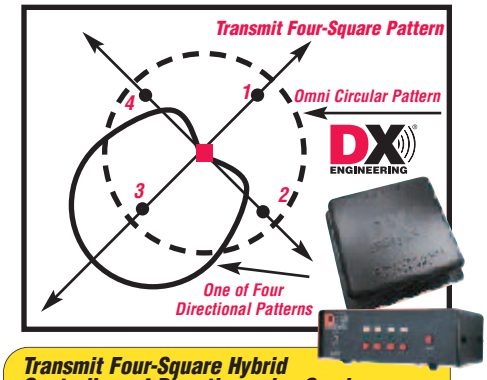

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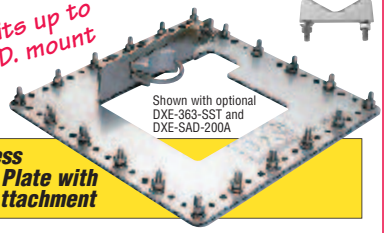

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Z-11ProII

Meet the Z-11ProII, everything you always wanted in a small, portable tuner. Designed from the ground up for battery operation. Only 5" x 7.7" x 1.5", and weighing only 1.5 pounds, it handles 0.1 to 125 watts, making it ideal for both QRP and standard 100 watt transceivers from 160 - 6 meters. The Z-11ProII uses LDG's state-of-the-art processor-controlled Switched-L tuning network. It will match dipoles, verticals, inverted-Vs or virtually any coax-fed antenna. With an optional LDG balun, it will also match longwires or antennas fed with ladder-line. Includes Icom interface cable, DC power cable and coax jumper.
Suggested Price $179.99

radio not included

Z-817

The ultimate autotuner for QRP radios including the Yaesu FT-817(D). Tuning is simple; one button push on the tuner is all that is needed - the Z-817 takes care of the rest. It will switch to PKT mode, transmit a carrier, tune the tuner, then restore the radio to the previous mode! 2000 memories cover 160 through 6 meters. The Z-817 will also function as a general purpose antenna tuner with other QRP radios. Just transmit a carrier and press the tune button on the tuner. Powered by four AA internal Alkaline batteries (not included), so there are no additional cables required. A coax jumper cable is also induced for fast hook up.
Suggested Price $129.99.

radio not included

AT-897Plus for the Yaesu FT-897

If you own a Yaesu FT-897 and want a broad range automatic antenna tuner, look no further! The AT-897Plus Autotuner mounts on the side of your FT-897 just like the original equipment and takes power directly from the CAT port of the FT-897 and provides a second CAT port on the back of the tuner so hooking up another CAT device couldn't be easier. ***Suggested Price$199.99***

- ***RF Sensing***
- ***Tunes Automatically***
- ***No Interface Cables Needed***

AT-100ProII

This desktop tuner covers all frequencies from 1.8 – 54 MHz (including 6 meters), and will automatically match your antenna in no time. It features a two-position antenna switch with LEDs, allowing you to switch instantly between two antennas. The AT-100ProII requires just 1 watt for operation, but will handle up to 125 watts. Includes Icom interface cable, DC power cable and coax jumper. ***Suggested Price $229.99***

Z-100Plus

Small and simple to use, the Z-100Plus sports 2000 memories that store both frequency and tuning parameters. It will run on any voltage source from 7 to 18 volts; six AA batteries will run it for a year of normal use. Current draw while tuning is less than 100ma. The Z-100Plus now includes an internal frequency counter so the operating frequency is stored with tuning parameters to make memory tunes a blazingly fast 0.1 seconds; full tunes take an average of only 6 seconds. Includes Icom interface cable, DC power cable and coax jumper.
Suggested Price $159.99

LDG Electronics, Inc. 1445 Parran Road, St. Leonard, MD 20685 ***Phone 410-586-2177 • Fax 410-586-8475***

AT-1000Pro

The AT-1000Pro has an Automode that automatically starts a tuning cycle when the SWR exceeds a limit you set. Operates at any power level between 5 and 1,000 watts peak. RF Relay protection software prevents tuning at greater than 125 watts. Tunes from 1.8 to 54.0 MHz (inc. 6 meters), with tuning time usually under 4 seconds, transmitting near a frequency with stored tuning parameters, under 0.2 seconds. 2000 memories. 2 Antenna connections. Includes Icom interface cable, DC power cable and coax jumper. ***Suggested Price $599***

NEW! AT-600Pro

The LDG AT-600Pro will handle up to 600 watts SSB and CW, 300 on RTTY (1.8 – 30 MHz), and 250 watts on 54 MHz. It will match virtually any kind of coax-fed antenna and will typically match a 10:1 SWR down to 1.5:1 in just a few seconds. You can also use the AT-600Pro with longwires, random wires and antennas fed with ladder line just by adding a balun. It has two antenna ports with a front-panel indicator, and separate memory banks for each antenna. Easy to read LED bar-graph meters showing RF power, SWR and tuner status, tactile feedback control buttons and an LED bypass indicator. Operates from 11 – 16 volts DC at 750 mA. Includes Icom interface cable, DC power cable and coax jumper. ***Suggested Price $359.99***

- ***RF Sensing***
- ***Tunes Automatically***
- ***No Interface Cables Needed***

AT-200Pro

The AT-200Pro features LDG's new "3-D memory system" allowing up to eight antenna settings to be stored for each frequency. Handles up to 250 watts SSB or CW on 1.8 – 30 MHz, and 100 watts on 54 MHz (including 6 meters). Rugged and easy-to-read LED bar graphs show power and SWR, and a function key on the front panel allows you to access data such as mode and status. Includes Icom interface cable, DC power cable and coax jumper. ***Suggested Price $249***

IT-100

Matched in size to the IC-7000 and IC-706, the new IT-100 sports a front panel push-button for either manual or automatic tunes, and status LEDs so you'll know what's going on inside. You can control the IT-100 and its 2000 memories from either its own button or the Tune button on your IC-7000 or other Icom rigs. It's the perfect complement to your Icom radio that is AH3 or AH-4 compatible.
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KT-100

LDG's first dedicated autotuner for Kenwood Amateur transceivers. Easy to use - just right for an AT-300 compatible Kenwood transceiver (except TS-480HX). The KT-100 actually allows you to use the Tune button on the radio. The LEDs on the front panel indicate tuning status, and will show a match in seconds, or even less of you've tuned on or near that frequency before. Has 2,000 memories for instant recall of the tuning parameters for your favorite bands and frequencies. If you have an AT-300 compatible Kenwood radio, you can simply plug the KT-100 into your transceiver with the provided cable; the interface powers the tuner, and the Tune button on the radio begins a tuning cycle. The supplied interface cable makes the KT-100 a dedicated tuner for most modern Kenwood transceivers.
Suggested Price $199.99

YT-100

An autotuner for several popular Yaesu Radios. An included cable interfaces with your FT-857, FT-897 and FT-100 (and all D models) making it an integrated tuner, powered by the interface. Just press the tune button on the tuner, and everything else happens automatically: mode and power are set, a tune cycle runs, and the radio is returned to its original settings. It's the perfect complement to your Yaesu radio.
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FT Meter 2.5" face with calibrated scales for signal strength, discriminator reading on receive, and power output, SWR, modulation, ALC action and supply voltage on transmit, all selectable from the radio's menu. ***Still Only $49***

FTL Meter For Yaesu FT-857(D) and FT-897(D). 4.5" face with calibrated scales for signal strength, discriminator reading on receive, and power output, SWR, modulation, ALC action and supply voltage on transmit, all selectable from the radio's menu. ***Suggested Price $79.99***

NEW! M-7600 For IC-7600. It will display S-meter on receive, or power out, SWR, ALC level or supply voltages, all selectable from the radio's menu. What's more, the M-7700 and the virtual meter on your radio can work together.
Suggested Price $79.99

M-7700 For IC-7700. It will display S-meter on receive, or power out, SWR, ALC level or supply voltages, all selectable from the radio's menu. What's more, the M-7700 and the virtual meter on your radio can work together.
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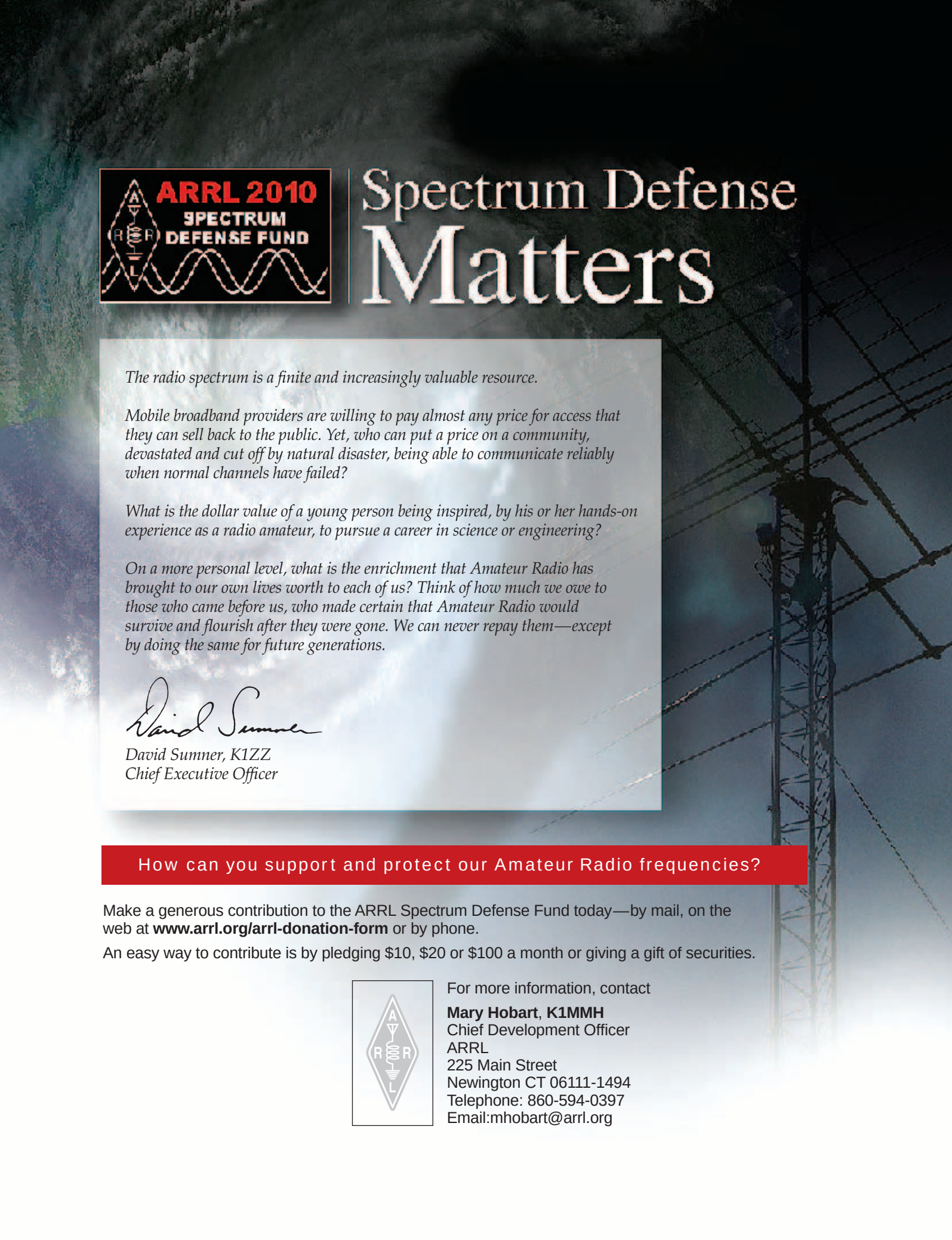

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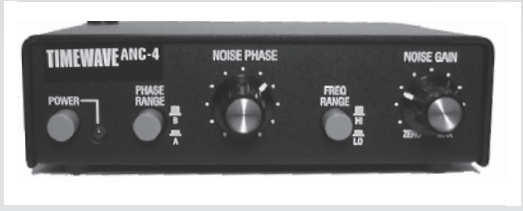

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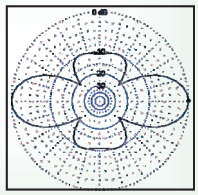

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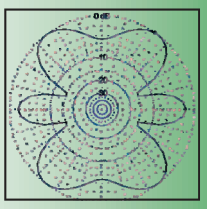

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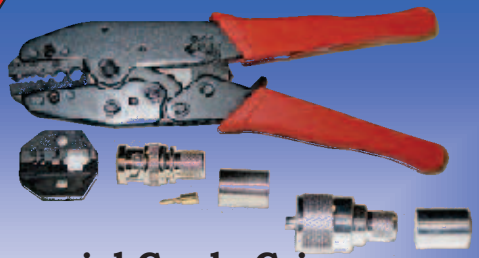

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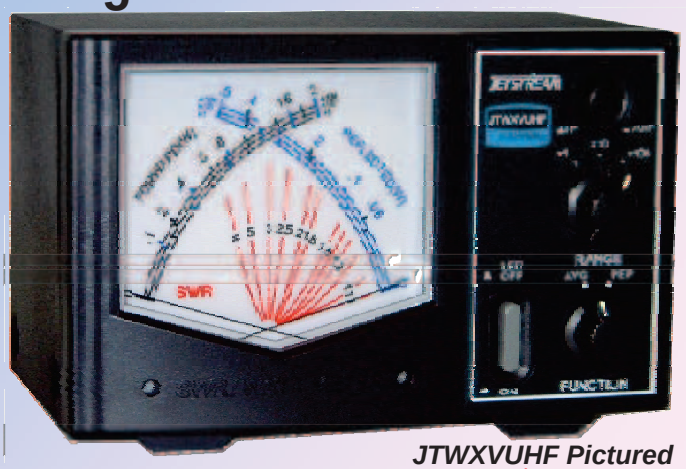

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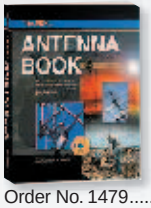

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Continued on page 132

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Carrollton, TX - On June 26, 2010, Dale Finley, KBNFT, joined hams across the country in participating in Field Day. Finley made his a bit extra special, though, by depicting all his contacts using Depiction mapping software.

Using contact zip codes from QRZ.com, Finley was able to quickly produce an

"There are so many ways that hams can use Depiction."
Dale Finley, KBNFT

interactive map of his contacts across the country.

"There are so many ways that hams can use Depiction," Finley said. "From mapping license and club locations, to using the APRS add-ons, to disaster simulations and much more, Depiction provides very powerful capabilities."

Finley has used Depiction for many other projects, as well--with his local ARES group, the Boy Scouts, VOAD

groups, the city of Denton, Texas, Red Cross and more. He had created depictions to support bike rides, Eagle Scout projects, emergency drills, amateur radio presentations, and other projects and events.

Learn more at www.depiction.com/qst

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ARRL Publications—continued from page 130

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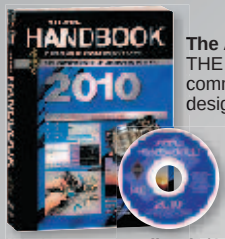

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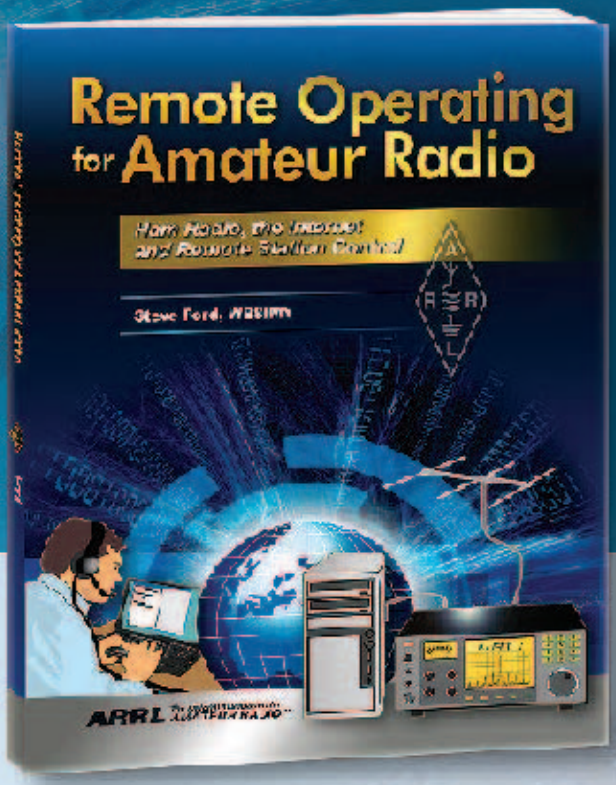

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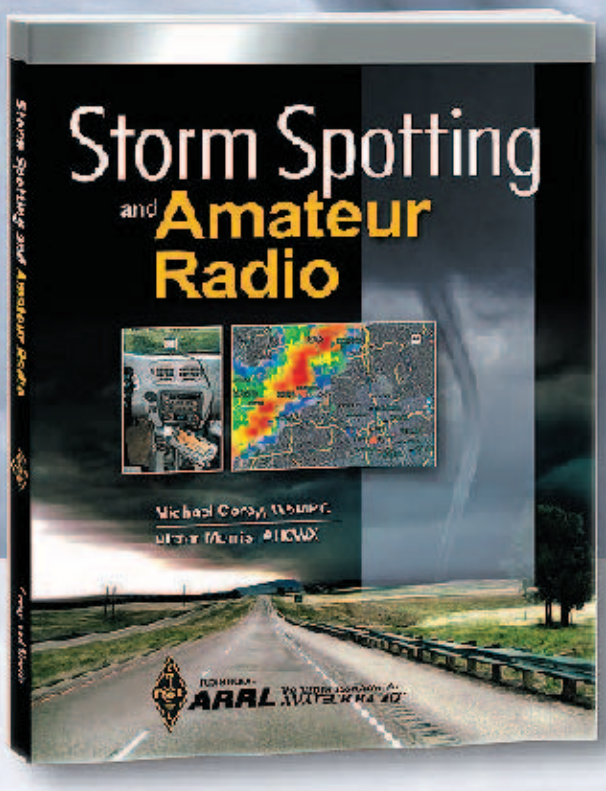
By Michael Corey, W5MPC and Victor Morris, AH6WX



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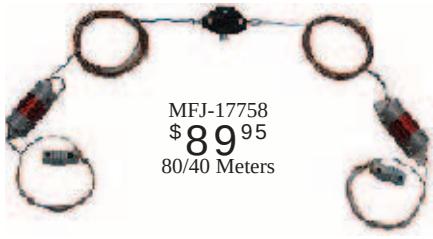

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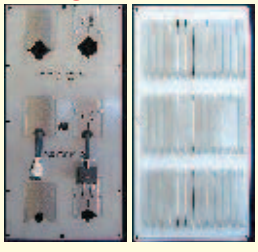

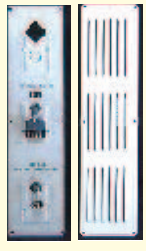

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CoaxCalculator™ lets you calculate coax line length in feet given electrical degrees and vice versa for any frequency and any velocity factor -- *an MFJ-269 exclusive!*

Use any Characteristic Impedance

You can measure SWR and loss of coax with *any* characteristic impedance (1.8 to 170 MHz) from 10 to over 600 Ohms, including 50, 51, 52, 53, 73, 75, 93, 95, 300, 450 Ohms -- *an MFJ-269 exclusive!*

Inductance/Capacitance Meter

Measures inductance in uH and capacitance in pF at RF frequencies, 1.8-170 MHz.

Frequency Counter/Signal Source

You can also use it as a handy frequency counter up to 170 MHz and as a signal source for testing and alignment.

Digital and Analog displays

415 to 470 MHz Range features

Just plug in your UHF antenna coax, set frequency and read SWR, return loss and reflection coefficient simultaneously. You can read coax cable loss in dB and match efficiency.

You can adjust UHF dipoles, verticals, yagis, quads and others and determine their SWR, resonant frequency and bandwidth.

You can test and tune stubs and coax lines. You can manually determine velocity factor and impedances of transmission lines.

You can adjust/test RF matching networks and RF amplifiers without applying power.

Has easy-to-read LCD *logarithmic* SWR bargraph and SWR meter for quick tuning.

Much Better Accuracy

New 12-bit A/D converter gives much better accuracy and resolution than common 8-bit A/D converters -- *an MFJ-269 exclusive!*

Super Easy-to-Use

Select a band and mode. Set frequency. Your measurements are instantly displayed! Smooth reduction drive tuning makes setting frequency easy.

Take it anywhere

Take it anywhere - to remote sites, up towers, in cramp places. Fully portable -- battery operated, compact 4Wx2Dx6¾ in., weighs 2 lbs. *Free* "N" to SO-239 adapter.

Has battery saver, low battery warning and built-in charging circuit for rechargeables.

Use 10 AA Ni-MH or Ni-Cad or alkaline batteries (not incl.) or 110VAC with MFJ-1312D, $15.95.

MFJ SWR Analyzer Accessories

MFJ-39C, $24.95.

Tote your MFJ-269 anywhere with this *genuine* MFJ custom carrying case. Has back pocket with security cover for carrying dip coils, adaptors and accessories. Made of special foam-filled fabric, the MFJ-39C cushions blows, deflects scrapes, and protects knobs, meters and displays from harm. Wear it around your waist, over your shoulder, or clip it onto the tower while you work -- the fully-adjustable webbed-fabric carrying strap has snap hooks on both ends. Has clear protective window for frequency display and cutouts for knobs and connectors.

MFJ-66, $24.95.

Plug these MFJ dip meter coupling coils into your MFJ *SWR Analyzer™* and turn it into a sensitive and accurate *band switched* dip meter. Set of two coils cover 1.8-170 MHz depending on your MFJ-269 *SWR Analyzer™*.

MFJ-99C, $40.90.

SWR** Analyzer Power Pack.* 10 Pack MFJ *SuperCell™* Ni-MH batteries, and power supply for SWR analyzers. ***Save $5!

MFJ-98, $60.85.

MFJ-269** Accessory Pack.* MFJ-39C *custom* Carrying Pouch, MFJ-66 dip coils, power supply for MFJ-269. ***Save $5!

MFJ-98B, $88.90.

MFJ-269** Deluxe Accessory Pack.* Complete accessory pack! MFJ-39C Pouch, 10 Ni-MH batteries, dip coils, power supply. ***Save $7!

MFJ-269*PRO™* Analyzer

Like MFJ-269, but has extended coverage in UHF range ***(430 to 520 MHz)*** and ruggedized cabinet that protects LCD display, knobs, meters and connectors from damage.

MFJ-269*PRO* $419.95

MFJ-259B HF/VHF Antenna *SWRAnalyzer™*

MFJ-259B $289.95

The world's most popular antenna analyzer gives you a complete picture of your antenna performance 1.8 to 170 MHz.

It's Super easy-to-use -- makes tuning your antennas quick, painless and easy.

Read antenna SWR, complex impedance, return loss, reflection coefficient. Determine velocity factor, coax cable loss in dB, length of coax and distance to short or open in feet. Read inductance in uH and capacitance in pF at RF frequencies.

Large easy-to-read two line LCD screen and side-by-side meters clearly display your information. Built-in frequency counter, Ni-Cad charger circuit, battery saver, low battery warning and smooth reduction drive tuning.

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MFJ *IntelliTuner*™ Automatic Tuners

More hams use MFJ tuners than all other tuners in the world!

World's most advanced Automatic Antenna Tuners feature world renowned MFJ AdaptiveSearch™ and AutomaticRecall™ algorithms -- world's fastest ultra-wide range tuning. Nine World Class models! Choose your features: Digital/Analog/Audio SWR-Wattmeter, Antenna Switch, Balun, Radio Interface, Digital frequency readout, Remoteable, Coax/Balanced Lines/Wire Tuning, Field Upgradeable . . .

MFJ-993B 300 Watt *IntelliTuner*™

The World's Best Selling Automatic Antenna Tuner!

The MFJ-993B *IntelliTuner*™ lets you tune any antenna -- balanced or unbalanced -- *automatically* and *ultra fast*.

It's a comprehensive automatic *antenna tuning center* complete with SWR/Wattmeter, antenna switch for two antennas and 4:1 current balun for balanced lines.

MFJ's exclusive *IntelliTuner*™, *Adaptive Search*™ and *Instant Recall*™ algorithms give you *ultra fast* automatic tuning with over 20,000 *VirtualAntenna*™ Memories.

Select 300 Watt SSB/CW power level and match 6-1600 Ohm antennas ***Or . . .*** select **150 Watt** SSB/CW power level and match *extra wide-range* 6-3200 Ohms!

You get a highly efficient L-network, 1.8-30 MHz coverage, Cross-Needle *and* digital meters, audio SWR meter, *backlit* LCD, remote control port, radio interface, heavy-duty 16 amp/1000V relays.

MFJ-993B $259.95

The MFJ-993B automatically tunes for minimum SWR and remembers your frequency and tuner settings. The next time you operate on that frequency and antenna, these tuner settings are instantly restored and *you're ready to operate in milliseconds!* 10W x2¾ Hx9D". Use 12-15 VDC/1 amp or 110 VAC with **MFJ-1316, $21.95**. Radio interface cables, remote control available. See ***www.mfjenterprises.com***

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AL-811/ALS-600/ALS-500

For 600 Watt amps like Ameritron AL-811/ALS-600/ALS-500M. Matches 12-800 Ohms. 10,000 *Virtual Antenna*™ memories. Cross-Needle SWR/Wattmeter. 10Wx2¾Hx9D inches.

MFJ-994B $359.95

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Roam the entire HF spectrum 1.8-30 MHz *hands-free* with full *1500 Watt* legal limit on SSB/CW and near-perfect SWR! Lighted LCD/Cross-Needle Meter.

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300 Watt...*Extra* Wide Range

SWR/Wattmeter, 10000 VA Memories

Extra *wide matching range at less cost.* Exclusive dual power level: 300 Watts/6-1600 Ohms; 150W/6-3200 Ohms. Cross-Needle SWR/Wattmeter.

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200 Watt ...Compact

Digital Meter, Ant Switch, Wide Range

World's fastest compact auto tuner uses MFJ *Adaptive Search*™ and *InstantRecall*™ algorithms. 132,072 tuning solutions instantly match virtually any antenna with near perfect SWR.

MFJ-929 $219.95

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Small, Ant Switch, 20K VA Memories

High-speed, wide matching range and compactness at low cost! Leave in-line and forget it -- your antenna is *always* automatically tuned! 2-position antenna switch.

MFJ-928 $199.95

200 Watt *MightyMite*™

Matches IC-706, FT-857D, TS-50S

No *extra space needed!* Just set your IC-706/7000, FT-857D, TS-50S on top of this matching low-profile automatic tuner -- it's all you need for a completely automated station using *any* antenna! Just tune and talk!

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Covers all bands, 160-10 Meters with antenna tuner. 102 ft. long. Can use as inverted vee or sloper. Use on 160 Meters as Marconi.1500 Watts. Super-strong fiberglass center/feedpoint insulators. *Glazed ceramic* end insulators. All hand-soldered connections. Add coax, some rope and you're *on the air!*

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200W...Weather-sealed

for Remote/Outdoor/Marine

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Fully *weather-sealed for remote Outdoor/Marine use*! Tough, durable, built-to-last the elements for years.

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Coax/Wire Ant, No pwr cable needed

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Weather protected fully automatic *remote* auto tuner for wire ***and*** *coax* antennas -- an MFJ exclusive. Powers through coax -- No separate power cable needed.

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The ARRL DXCC Handbook

The Thrill of Worldwide Operating!

by Jim Kearman, KR1S
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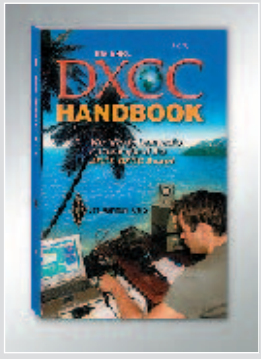

Many radio amateurs enjoy the lure of DXing—seeing how far away we can communicate with other Amateur Radio operators. It's a way of determining how well our stations—and we, the operators— perform. DXing is a full-time goal for some hams and a just-for-fun challenge for others. We hope this book will inspire you to try DXing, and that you'll use it as a guide to beginning your own DX journey.

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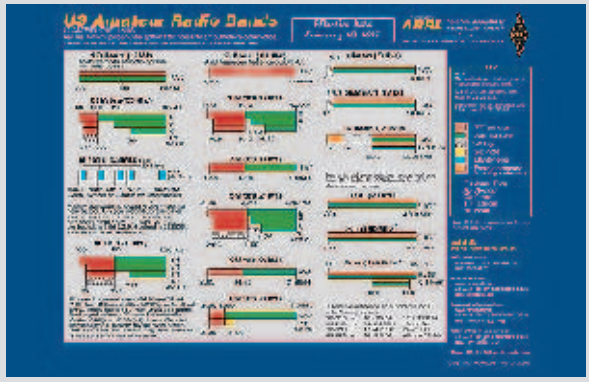

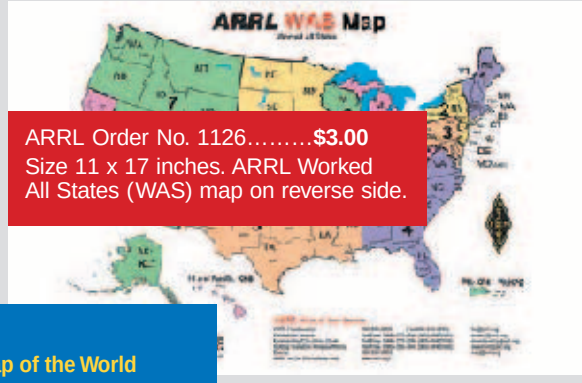

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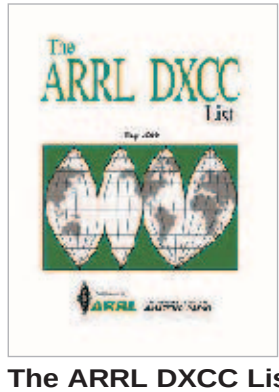

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Ham Radio's *Most Popular* 300 Watt Antenna Tuner

More hams use MFJ-949s than any other antenna tuner in the world!

Why? Because the world's leading tuner has earned a world-wide reputation for being able to match just about anything.

Full 1.8-30 MHz Operation

Tune your antenna for minimum SWR! Works 1.8-30 MHz on dipoles, verticals, inverted vees, random wires, beams, mobile whips, shortwave receiving antennas . . . Use coax, random wire, balanced lines. Has heavy duty 4:1 balun for balanced lines.

Custom inductor switch

Custom designed inductor switch, 1000 volt tuning capacitors, *Teflon*(R) insulating washers and proper L/C ratio gives you *arc-free* no worries operation

MFJ-949E $179.95

up to 300 Watts PEP transceiver input power.

The MFJ-949E inductor switch was *custom* designed to withstand the extremely high RF voltages and currents that are developed in your tuner.

8-Position Antenna switch

Antenna switch lets you select two coax fed antennas, random wire/balanced line or dummy load through your MFJ-949E or direct to your transceiver.

Lighted Cross-Needle Meter

Full *size* 3-inch lighted Cross-Needle Meter. Lets you easily read SWR, *peak* or average forward and reflected power simultaneously. Has 300 Watt or 30 Watt ranges.

QRM-Free PreTune™

MFJ's *QRM-Free PreTune™* lets you pre-tune your MFJ-949E *off-the-air* into its built-in dummy load! Makes tuning your actual antenna faster and easier.

Plus Much More!

Full *size* built-in non-inductive 50 Ohm dummy load, scratch-proof Lexan multi-colored front panel, $10^{5}/_{8}$x$3^{1}/_{2}$x7 inches. Superior cabinet construction and more!

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MFJ-989D ***Legal Limit*** Tuner

MFJ-989D $389.95

New, improved MFJ-989D *legal limit* antenna tuner gives you better efficiency, lower losses and a new *true* peak reading meter. Easily handles *full* 1500 Watts SSB/CW, 1.8-30 MHz, including MARS/WARC bands. Six position antenna switch, dummy load. *New* 500 pF air variable capacitors. *New* improved *AirCore™* Roller Inductor. *New* high voltage current balun. *New* crank knob. $12^{7}/_{8}$Wx6Hx$11^{5}/_{8}$D".

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Two knob tuning (differential capacitor and *AirCore™* roller inductor) makes tuning foolproof and easier than ever. Gives minimum SWR at only one setting. Handles 3 KW PEP SSB amplifier input power (1.5 KW output). Gear-driven turns counter, lighted peak/average Cross-Needle SWR/Wattmeter, antenna switch, balun. 1.8 to 30 MHz. $10^{3}/_{4}$Wx$4^{1}/_{2}$Hx15 in.

MFJ-962D ***compact*** kW Tuner

MFJ-962D $299.95

A few more dollars steps you up to a KW tuner for an amp later. Handles 1.5 KW PEP SSB amplifier input power (800W output). Ideal for Ameritron's AL-811H! *AirCore™* roller inductor, gear-driven turns counter, pk/avg lighted Cross-Needle SWR/Wattmeter, antenna switch, balun, Lexan front, 1.8-30MHz. $10^{3}/_{4}$x$4^{1}/_{2}$x$10^{7}/_{8}$ in.

MFJ-969 300W ***Roller Inductor*** Tuner

MFJ-969 $219.95

Superb *AirCore™* Roller Inductor tuning. Covers *6 Meters* thru 160 Meters! 300 Watts PEP SSB. *Active* true peak reading lighted Cross-Needle SWR Wattmeter, *QRM-Free PreTune™*, antenna switch, dummy load, 4:1 balun, Lexan front panel. $10^{1}/_{2}$Wx$3^{1}/_{2}$Hx$9^{1}/_{2}$D inches.

MFJ-941E ***super value*** Tuner

MFJ-941E $139.95

The *most for your money!* Handles 300 Watts PEP, covers 1.8-30 MHz, *lighted* Cross-Needle SWR/Wattmeter, 8 position antenna switch, 4:1 balun, 1000 volt capacitors, Lexan front panel. Sleek $10^{1}/_{2}$Wx$2^{1}/_{2}$Hx7D in.

MFJ-945E HF/6M ***mobile*** Tuner

MFJ-945E $129.95

Extends your mobile antenna bandwidth so you don't have to stop, go outside and adjust your antenna. Tiny 8x2x6 in. *Lighted* Cross-Needle SWR/Wattmeter. Lamp and bypass switches. Covers 1.8-30 MHz *and* 6 Meters. 300 Watts PEP. **MFJ-20, $6.95,** mobile mount.

MFJ-971 ***portable/QRP*** Tuner

MFJ-971 $119.95

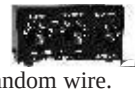
Tunes coax, balanced lines, random wire 1.8-30 MHz. Cross-Needle Meter. SWR, 30/300 or 6 Watt QRP ranges. Matches popular MFJ transceivers. Tiny $6x6^{1}/_{2}$x$2^{1}/_{2}$ in.

MFJ-901B ***smallest*** Versa Tuner

MFJ-901B $99.95

MFJ's smallest (5x2x6 in.) and most affordable wide range 200 Watt PEP Versa tuner. Covers 1.8 to 30 MHz. Great for matching solid state rigs to linear amps.

MFJ-902 ***Tiny Travel*** Tuner



MFJ-902 $99.95

Tiny $4^{1}/_{2}$x$2^{1}/_{4}$x3 inches, full 150 Watts, 80-10 Meters, has tuner bypass switch, for coax/random wire.

MFJ-904H, $149.95. Same but adds Cross-needle SWR/Wattmeter and 4:1 balun for balanced lines. $7^{1}/_{4}$x$2^{1}/_{4}$x$2^{3}/_{4}$ inches.

MFJ-16010 ***random wire*** Tuner

MFJ-16010 $69.95

Operate all bands anywhere with MFJ's reversible L-network. Turns random wire into powerful transmitting antenna. 1.8-30 MHz. 200 Watts PEP. Tiny 2x3x4 in.

MFJ-906/903 ***6 Meter*** Tuners

MFJ-906 $99.95

MFJ-906 has lighted Cross-Needle SWR/Wattmeter, bypass switch. Handles 100 W FM, 200W SSB. **MFJ-903, $69.95**, Like MFJ-906, less SWR/Wattmeter, bypass switch.

MFJ-921/924 ***VHF/UHF*** Tuners

MFJ-921/924 $89.95

MFJ-921 covers 2 Meters/220 MHz. **MFJ-924** covers 440 MHz. SWR/Wattmeter. 8x$2^{1}/_{2}$x3 in.

MFJ-931 ***artificial*** RF Ground

MFJ-931 $109.95

Eliminates RF hot spots, RF feedback, TVI/RFI, weak signals caused by poor RF grounding. Creates artificial RF ground or electrically places far away RF ground directly at rig. **MFJ-934, $209.95**, Artificial ground/300 Watt Tuner/Cross-Needle SWR/Wattmeter.

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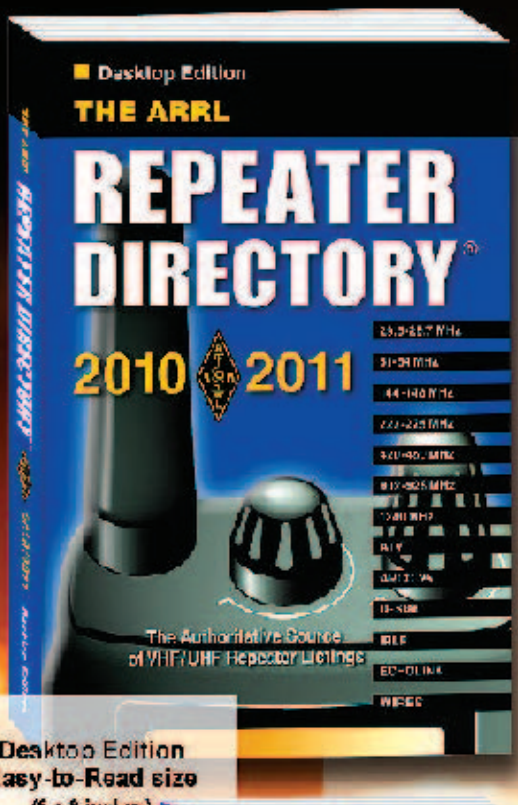

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Easy-to-Read size
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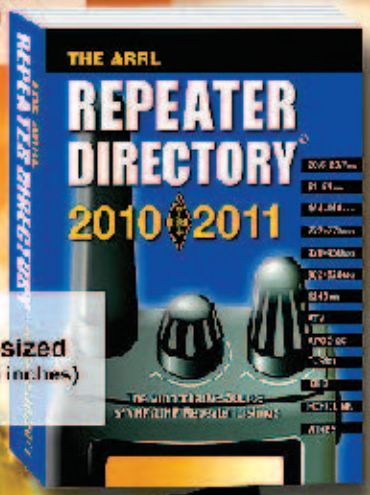

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QS6/2010

MFJ high-accuracy *Digital* SWR/Wattmeter

MFJ-826B
$179.95

New!

MFJ's high-accuracy digital SWR/Wattmeter gives you three 10-bit frequency compensated power ranges!

An optimum power range is automatically selected. Each range has full 10-bit resolution. A low range (25 Watt full scale), a mid-range (250 Watt full scale) and a high-range (1500 Watts full scale) covers the entire amateur power spectrum with high accuracy.

A built-in frequency counter selects the appropriate frequency compensated data set to insure highest accuracy for each band. It also displays your transmitted frequency and provides digital frequency readout for older rigs and QRP rigs such as MFJ-9420/9040/9340.

True peak or average forward and reflected power, SWR and frequency are *simultaneously* displayed.

Bargraphs makes tuning antenna tuners, amplifiers and transmitters easy. You can select bargraphs to display forward and reflected power *or* forward power and SWR *or* SWR only.

MFJ's PeakHold™ freezes high-est forward power displayed (bar segment also) for 1, 2 or 3 seconds.

MFJ's *TrueActive*™ peak reading circuit gives you *true* peak or average power.

When SWR is greater than 1.5 to 3 (selectable) an alarm LED lights and buzzer sounds.

Has large high-contrast *backlit* LCD display.

Use 12 VDC or 110 VAC with optional MFJ-1312D, $15.95. 6½Wx2⅝Hx6D inches.

MFJ *giant* SWR/Wattmeter

World's *largest HF SWR/Wattmeter has giant 6½ inch meter!*

This one you can SEE! Extra-long scales gives you highly accurate SWR and power measurements. Huge numbers makes reading easy across your shack.

Like your analog watch, one glance at the meter needle gives you fast and accurate readings without actually reading the scale.

MFJ's exclusive *TrueActive*™ peak reading circuit captures *true* peak or average forward and reflected power readings.

Has 20/200/2000 Watt ranges for accurate QRP or QRO operation.

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$149.95

Exclusive MFJ Wattmeter *Power Saver*™ circuit turns on meter only when RF power is being measured.

Covers 1.8-30 MHz. Use 9 volt battery or 12 VDC or 110 VAC with MFJ-1312D, $15.95. 7Wx5½Hx5D in. SO-239 connectors.

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Giant 144/220/440 MHz SWR/Wattmeter

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Lighted 3" Cross-Needle Meter, SWR/Watts, 1.8-200 MHz, Fwd/Ref pwr, 30/300W. Compact.

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Lighted Cross-Needle Meter, SWR/Watts, 144/220/440 MHz, 30/300 Watts Fwd, 60/6 W Ref.

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Lighted Cross-Needle,SWR/Watts, 1.8-60/144/440 MHz, 30/300W Fwd, 6/60W Ref. Hook up HF&VHF/UHF rigs.

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Lighted 3" C/N Meter, SWR/Watts, 1.8-30 MHz, 300/3000W Fwd, 60/600W Ref. True Peak.

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$39.95

VHF SWR Wattmeter, 2M/220 MHz, built-in field strength meter, Fwd/Ref, Pwr in 2 30/300W ranges.

MFJ-4416B *Super* Battery Booster

Boost battery voltage as low as 9 Volts back up to 13.8 VDC! Keeps your transceiver at full power output, compensates for run down battery, wiring voltage drop, car off . . .

MFJ-4416B
$149.95

Boost battery voltage as low as 9 Volts back up to 13.8 VDC! Keeps your transceiver at full power output, provides full performance/efficiency, prevents output signal distortion and transceiver shutdown. Compensates for run-down battery, wiring voltage drop or when car is off. Provides up to 25 Amps peak with 90% efficiency. Selectable 9/10/11 Volts minimum input voltage prevents battery damage from over-discharging. RF sense turns MFJ-4416B off during receive to save power and increase efficiency. Adjustable 12 to 13.8 VDC output pass-through voltage improves efficiency and lets transceiver run cooler. Has output over-voltage crowbar protection. *Anderson PowerPoles*® and high-current 5-way binding posts for DC input, regulated output. 7¾Wx4Hx2⅛D inches.

100 Watts SSB from cigarette lighter socket!

MFJ-4403
$119.95

4-Farad capacitors supply 25 Amps needed for 100 Watts SSB peaks and replenished by 10 Amps average from cigarette lighter socket. Protects against reverse/over voltage, voltage transients, short circuits. Provides super noise/ripple filtering.

MFJ AC Line RFI Filter

Eliminate obnoxious power line and computer hash and noise by 6 S-units!

MFJ-1164B
$79.95

Filters and reduces AC power line RFI, hash, noise, transients, surges generated by computers, motors, RF transmitters, static/lightning by 30 db and up to 60-80 dB with a good earth ground. Super fast, *nano-second* overvoltage protection. Four 3-wire 15A, 120VAC outlets.

Transceiver Surge Protector

MFJ-1163, $69.95. Protects your expensive transceiver from damaging power surges. Capacitive decoupling and *ultra-fast* MOVs protection. 4 AC outlets.

MFJ all-in-one *Transmit Audio Console*

MFJ-655B
$219.95

MFJ all-in-one *Transmit Audio Console* gives you an *8-Band Equalizer* for full quality ragchewing audio *or* powerful, pileup penetrating speech . . . Adjustable *Noise Gate* gives you transparent, back-ground noise reduction . . . Clean low-distortion *Compressor* gives you more powerful, richer, fuller sounding speech and higher average power SSB . . . Smooth *Limiter* keeps audio peaks from over-driving your transmitter, prevents SSB distortion and splatter. *Universal Mic-Interface* lets you use any microphone with any transceiver. Has low-noise preamp, mic voltages, PTT jack, impedance matching, level controls, RF/audio isolation, VU meter, headphone monitor, auxiliary input.

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MFJ *Pocket size* Morse Code Reader™

Hold near your receiver -- it instantly displays CW in English! Automatic Speed Tracking . . . Instant Replay . . . 32 Character LCD . . . High-Performance Modem . . . Computer Interface . . . Battery Saver . . . More!

Is your CW rusty?

Relax and place this tiny pocket size MFJ Morse Code Reader near your receiver's speaker . . .

Then watch CW turn into solid text messages as they scroll across an easy-to-read LCD display.

No cables to hook-up, no computer, no interface, nothing else needed!

Use it as a backup in case you mis-copy a few characters - - it makes working high speed CW a breeze - - even if you're rusty.

Practice by copying along with the MFJ-461. It'll help you learn the code and increase your speed as you instantly see if you're right or wrong.

Eavesdrop on interesting Morse code QSOs from hams all over the world. It's a universal language that's understood the world over.

MFJ *AutoTrak*™ automatically locks on, tracks and displays CW speed up to 99 Words-Per-Minute.

Simply place your MFJ-461 close to your receiver speaker until the lock LED flashes in time with the CW. Digs out weak signals. Phase-Lock-Loop even tracks slightly drifting signals.

MFJ-461 $89.95

Of course, nothing can clean up and copy a sloppy fist, especially weak signals with lots of QRM/QRN.

The MFJ-461's serial port lets you display CW text full screen on a bright computer monitor -- just use your computer serial port and terminal program.

When it's too noisy for its microphone pickup, you can connect the MFJ-461 to your receiver with a cable. A battery saving feature puts the MFJ-461 to sleep during periods of inactivity. It wakes up and decodes when it hears CW.

Uses 9 Volt battery. Fits in your shirt pocket with room to spare - smaller than a pack of cigarettes. Tiny 2¼x3¼x1 inches. 5½ ounces.

Super easy-to-use! Just turn it on -- it starts copying instantly!

MFJ-26B, $9.95. Soft leather protective pouch. Clear plastic overlay for display, push button opening, strong, pocket/belt clip secures MFJ-461.

MFJ-5161, $16.95. MFJ-461 to computer serial port cable (DB-9).

MFJ-5162, $7.95. Receiver cable connects MFJ-461 to your radio's external speaker 3.5 mm jack.

MFJ-5163, $10.95. Cable lets you use external speaker when MFJ-461 is plugged into radio speaker jack. 3.5 mm.

MFJ Morse Code *Reader and Keyer* Combination

Plug MFJ's CW Reader with Keyer into your transceiver's phone jack and key jack.

Now you're ready to compete with the world's best hi-speed CW operators -- and *they won't even know you're still learning the code!* Sends and reads 5-99 WPM.

Automatic speed tracking. Large 2-line LCD shows send/receive messages. Use paddle or computer keyboard.

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MFJ-551, $39.95. RFI suppressed keyboard, a must to avoid RFI problems.

MFJ-464 $199.95 *(Keyboard, paddle not included.)*

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MFJ-564B Black
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MFJ *Deluxe Iambic Paddles*™ feature a full range of adjustments in tension and contact spacing. Self-adjusting nylon and steel needle bearings, contact points that almost never need cleaning, precision machined frame and non-skid feet on heavy chrome base. Works with all MFJ and other electronic keyers.

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MFJ-561, $24.95. 1¾Wx1¾D x¾H inches. *Formed* phosphorous bronze spring paddle, stainless steel base. 4 ft. cord, 3.5 mm plug.

MFJ Code Oscillator

MFJ-557 $39.95

MFJ-557 Deluxe Code Practice Oscillator has a Morse key and oscillator unit mounted together on a heavy steel base -- stays put on your table! Portable. 9-Volt battery or 110 VAC with MFJ-1312D, $15.95. Earphone jack, tone and volume controls, speaker. Adjustable key. Sturdy. 8½x2¼x3¾ inches.

MFJ-550, $14.95. Telegraph Key Only with adjustable contacts. Handsome black.

MFJ Deluxe CW Keyer

Deluxe MFJ Keyer has all controls on front panel for easy access -- speed, weight, tone, volume knobs, and tune, semi/auto, on/off push-buttons. You get all keyer modes, dot-dash memories, self completing dots/dashes, jam- proof spacing, sidetone, built-in speaker, type A /B keying. RF proof. Solid state keying. 7x2x6 inches.

MFJ-407D $79.95

MFJ-401D, $69.95. Econo Keyer II has front-panel volume/speed controls (8-50 wpm), tune switch. Internal adjust weight, tone. Solid state keying. Tiny 4x2x3½ inches.

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MFJ-422D $189.95

Best of all CW worlds -- a *deluxe MFJ Curtis*™ *keyer* that fits right on *Bencher paddle*! Adjustable weight and tone, front panel volume and speed controls (8-50 WPM), built-in dot-dash memories, speaker, sidetone, semi-automatic/tune or automatic modes. Use 9V battery or 110 VAC with MFJ-1312D, $15.95. 4⅛x2⅝x5¼ in.

MFJ-422DX, $99.95.

MFJ *Curtis*™ Keyer only, fits on your Bencher paddle or MFJ-564 (chrome) or MFJ-564B (black) paddles above.

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Research shows that nearly *half* the speech intelligibility is contained in 1000 to 4000 Hz range, but contains a miniscule 4% of total speech energy.

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Second, drastically reduce speech energy below 500 Hz where only 4% of speech intelligibility lies.

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Even if you *don't* have high frequency hearing loss, you'll dramatically improve your ability to understand speech. You'll get an edge in contesting and DXing and enjoy ragchewing more.

Here's what *QST* for April, 2001 said . . . *"I expected a subtle effect at best, but I was astonished . . . The result was remarkably clean, understandable speech without hissing, ringing or other strange effects . . . made a dramatic improvement . . ."*

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Transformer-coupled -- No RFI, hum or feedback . . . 75 seconds total, 5-messages . . . Records received audio . . .

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Store frequently used phrases like "CQ Contest this is AA5MT", "You're 59" . . . "Qth is Mississippi" . . . Contest by pressing a few buttons and save your voice.

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Has jack for remote or computer control (using CT, NA or other program). Lets you select, play and cancel messages.

Your mic's audio characteristics do not change when your MFJ-434B is installed.

All audio lines are RF filtered to eliminate RFI, audio feedback and distortion. An audio isolation transformer totally eliminates hum and distortion caused by ground loops.

New! **It's** easy to use -- just plug in your 8 pin round or modular mic plug, set the internal jumpers for your transceiver and plug in the appropriate (included) cable for your rig.

Built-in speaker-amplifier. Speaker/phone jack. Use 9 Volt battery, 9-15 VDC or 110 VAC with optional MFJ-1312D, $15.95. 6½Wx2½Hx6½D in.

MFJ-73, $34.95. MFJ-434B Remote Control with cable.

60 dB Null *wipes out* noise and interference

MFJ-1026
$199.95

Wipe out noise and interference *before* it gets into your receiver with a 60 dB null!

Eliminate all types of noise -- severe power line noise from arcing transformers and insulators, fluorescent lamps, light dimmers, touch controlled lamps, computers, TV birdies, lightning crashes from distant thunderstorms, electric drills, motors, industrial processes . . .

It's *more effective* than a noise blanker! Interference much stronger than your desired signal can be completely removed without affecting your signal.

It works on *all modes* -- SSB, AM, CW, FM -- and frequences from BCB to lower VHF.

You can null out strong QRM on top of weak rare DX and then work him! You can null out a strong local ham or AM broadcast station to prevent your receiver from overloading.

Use the MFJ-1026 as an *adjustable phasing network*. You can combine two antennas to give you various directional patterns. Null out a strong interfering signal or peak a weak signal at a push of a button.

Easy-to-use! Plugs between transmitting antenna and transceiver. To null, adjust amplitude and phase controls for minimum S-meter reading or lowest noise. To peak, push reverse button. Use built-in active antenna or an external one. MFJ's exclusive *Constant Amplitude Phase Control*™ makes nulling easy.

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Only MFJ gives you *tunable* and *programmable* "brick wall" DSP filters.

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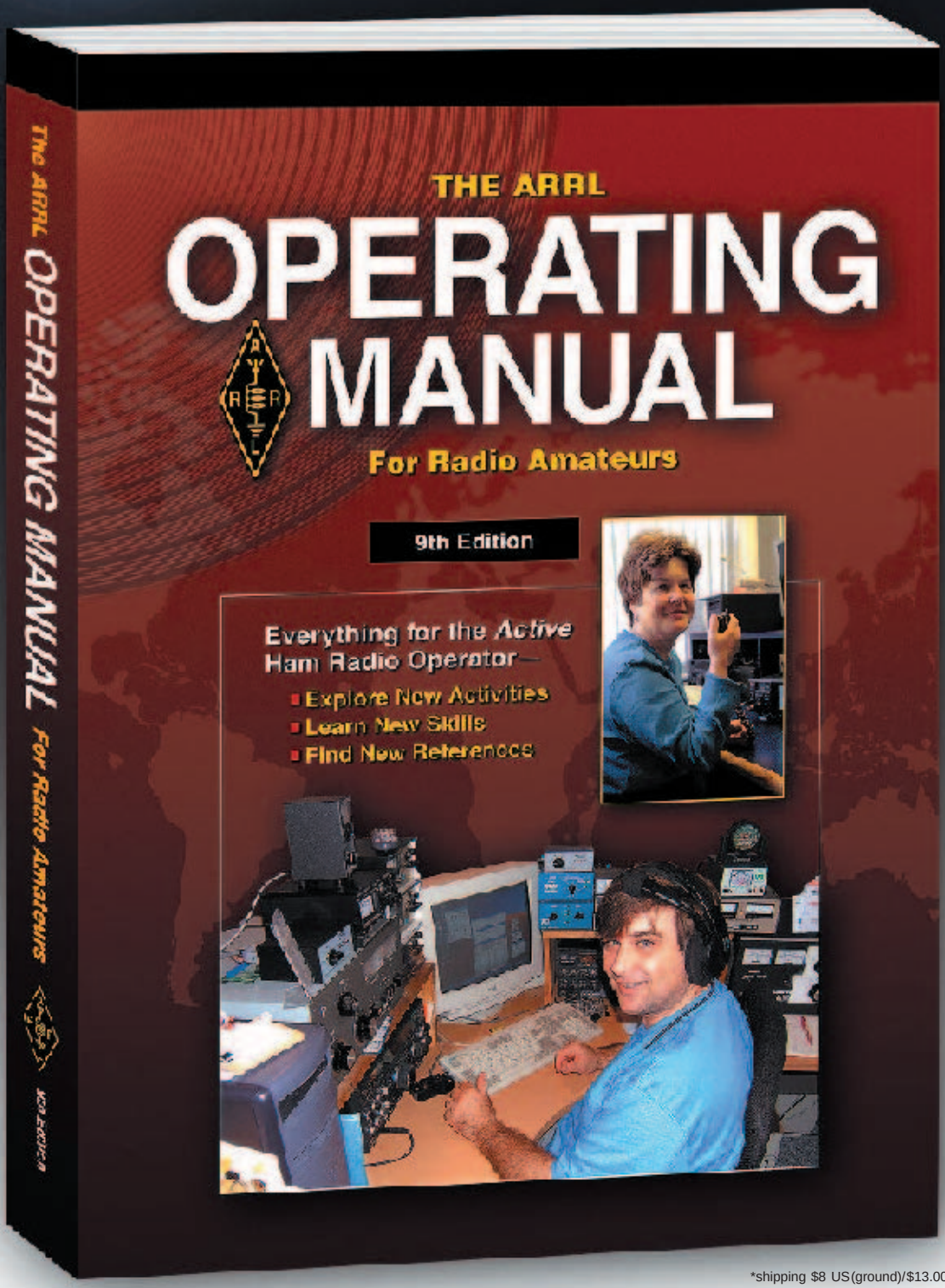

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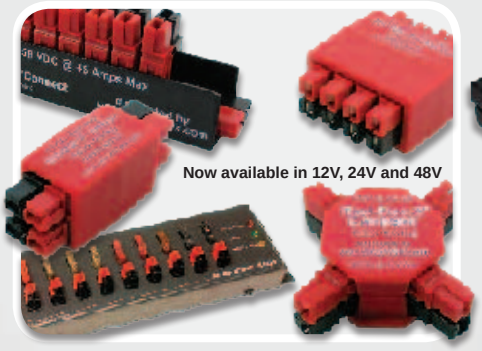

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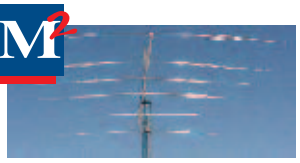

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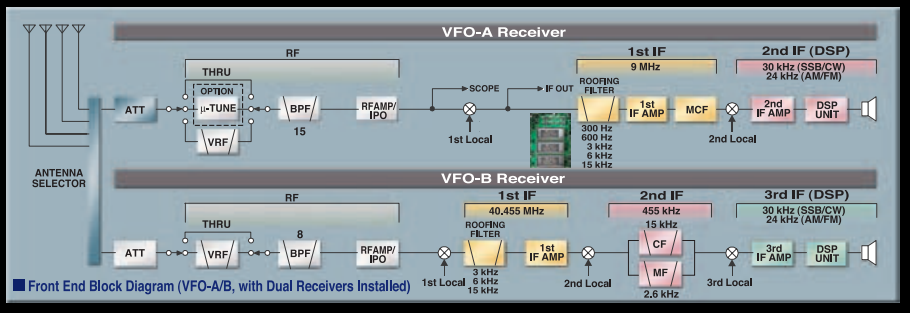
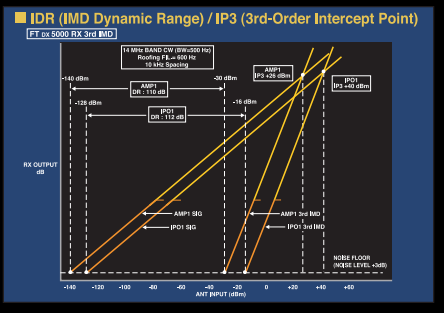


Front End Block Diagram (VFO-A/B, with Dual Receivers Installed)



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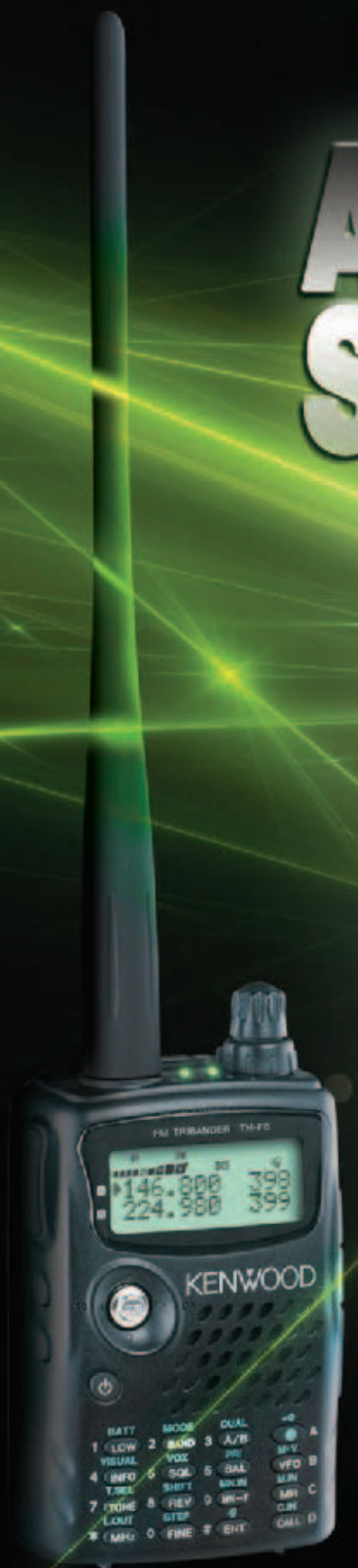

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