Official Journal of
ARRL
The national association
for AMATEUR RADIO

QST

devoted entirely to
AMATEUR RADIO

July 2002

QST reviews

- **Wattmeter roundup**
- **ICOM IC-V8000**
  2-meter mobile transceiver

K4VX linear-loaded dipole

N4GG wire array

A portable HF vertical

July Antenna Issue

$4.99 U.S. $6.99 Can.

"The PCR1000 has something to intrigue and satisfy everyone. This is a fun product." – QST, 7/98

IC-PCR1000 The original black box

The IC-PCR1000 turns your PC into a Wide Band Receiver! Compatible with most PC's and laptops*, the 'PCR1000 connects externally- in minutes! Choose from three different onscreen interfaces tailored to suit your needs, whether beginner or pro.

- 100 kHz – 1.3 GHz†
- AM, FM, WFM, USB, LSB, CW
- Unlimited Memory Channels
- Real Time Band Scope
- IF Shift
- Noise Blanker
- Digital AFC
- Voice Scan Control ("VSC" when activated, stops only on modulated signals)
- Attenuator
- Tunable Bandpass Filters
- AGC Function
- S Meter Squelch
- CTCSS Tone Squelch
- Large Selection of Tuning Steps and Scans
- External Speaker Level Control
- Optional DSP

computer not included
**Windows 3.1/95 only*

FREE DSP MODULE
LIMITED TIME OFFER.
FOR IC-R75 ONLY.
SEE DEALER FOR DETAILS.

IC-R75 Pull out the weak signals

The IC-R75 covers a wide frequency range allowing you to listen in to a world of information. With innovative features like twin passband tuning, synchronous AM detection, DSP capabilites, remote PC control and more - shortwave listening is easier than ever. All this comes in a compact, lightweight package that can be conveniently used in your ham shack, den or car.

- 30 kHz - 60.0 MHz
- AM, FM, S-AM, USB, LSB, CW, RTTY
- 101 Alphanumeric Memory Channels
- Twin Passband Tuning (PBT)
- Commercial Grade
- Synchronous AM Detection (S-AM)
- Optional DSP with Auto Notch Filter
- Triple Conversion
- Up to Two Optional Filters
- Front Mounted Speaker
- Large Display
- Well Spaced Keys and Dials
- PC Remote Control with ICOM Software for Windows® (RSR75)

"A versatile HF/6-meter receiver that offers a good measure of performance in a compact package. All mode capability for the ham and utility listeners and synchronous AM for the SWLs should make the IC-R75 a popular choice for a wide variety of radio enthusiasts." – QST, 1/00

TUNE IN THE WORLD WITH ICOM

IC-R8500 The experts choice

ICOM technology brings you super wide band, all mode coverage from HF to 2GHz, including shortwave and VHF/UHF, while maintaining a constant receive sensitivity. The IC-8500 is not simply a scanner - it's a professional quality communications receiver with versatile features from high speed scanning to computer control.

- 100 kHz - 2.0 GHz†
- AM, FM, WFM, USB, LSB, CW
- 1000 Aphanumeric Memories
- Commercial Grade
- IF Shift
- Noise Blanker
- Audio Peak Filter (APF)
- Selectable AGC Time Constant
- Digital Direct Synthesis (DDS)
- RS-232C Port for PC Remote Control with ICOM Software for Windows®

"If you want a receiver that is both a superior world band radio and a solid scanner, the new ICOM IC-R8500 is the best choice."
– Passport to World Band Radio, 1998

FREE PROGRAMMING SOFTWARE & CABLE
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IC-R2

Excellent audio, tiny package

The 'R2's compact size, only 2 1/4" wide by 3 3/8" high by 1" thick, allows you to have a "world of listening" in the palm of your hand. Large internal speaker delivers loud, clear audio - so you can hear everything.

- 500 kHz – 1.3 GHz†
- AM, FM, WFM
- 400 memory channels
- CTCSS Decode
- Easy Band Switching
- Priority Watch
- MIL SPEC 810C/D/E
- Weather Resistant
- Includes 2 AA Ni-Cds & Charger.

"With live video reception of broadcast and amateur television, and short range RF based video systems, Icom has opened up a new frontier for the progressive wide spectrum scanner enthusiast."
– QST, 2/01

IC-R3

See & Hear all the action

Wide tuning range allows you to see and hear the excitement behind the scenes. Large easy to read color display for frequency settings and video reception.

- 500 kHz – 2.45 GHz†
- AM, FM, WFM, AM-TV, FM-TV
- 450 Alphanumeric Memories
- CTCSS with Tone Scan
- 4 Level Attenuator
- Telescoping Antenna with BNC Connector
- 2" Color TFT Display with Video/Audio Output
- Lithium Ion Power

FREE PROGRAMMING SOFTWARE & CABLE
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FOR IC-R2 & IC-R10 ONLY.
SEE DEALER FOR DETAILS.

IC-R10

Advanced performance

With the 'R10 you can tune in the world where ever you go. With a Real-time bandscope and Voice Scan Control to make it easy to find all the action.

- 500 kHz – 1.3 GHz†
- AM, FM, WFM, USB, LSB, CW
- 1000 Alphanumeric Memories
- Attenuator
- Alphanumeric Backlit Display
- VSC (Voice Scan Control)
- 7 Different Scan Modes
- Beginner Mode
- Band Scope
- Includes AA Ni-Cds & Charger

The world is waiting

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ICOM®

New IC-2720H 2M/70CM Mobile Transceiver

REMOTE HEAD. Mounts nearly anywhere! Bracket and separation cable included.

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SPEAKER. Large 3.5" speaker for crisp, clear audio.

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PALM CONTROL. HM-133 Remote Control Mic, with ICOM's exclusive hot keys for your most used settings.

FLOW-THRU VENTILATION. Directs heated air away from sensitive electronics.

2 MIC CONNECTORS. Attach Mic to Main Unit or Control Head!

DATA JACK. For Packet operation.

SEPARATION CABLE. 11' of cable, standard.

Two Bands. Endless Possibilities.

Fresh off the drawing board! With ICOM's new IC-2720H you can have V/V, U/U simultaneous receive capability, plus V/U full duplex operation! Each band has independent controls for tuning, volume, and squelch. Change from the main band to sub-band with the touch of a button. The combination of the '2720H's one piece die-cast aluminum chassis and 50W VHF (35W UHF) of transmit power gives you a rugged, powerful package to get your signal out, even in the most demanding environments. With features like a Remote Mount Head with 11' of Separation Cable and Mounting Hardware, Remote Control Mic, and ICOM's exclusive DMS Scan System, this is one dual band mobile that has endless possibilities. Check with your authorized ICOM dealer for more details.

IC-2720H. True dual band fun.

2M/70CM • 50W VHF/35W UHF • VV/UU/VU • CTCSS/DTCS Encode/Decode w Tone Scan • Wide Band RX including Weather & Air Bands • 212 Memory Channels • Remote Control Mic • DMS • DTMF Encode • 10dB Attenuator • Cross Band Repeat* • Independent Controls • Rugged Construction

IC-2720H Features

- **SELECTABLE OUTPUT POWER.** Output power is selectable in three steps, 50W (35W UHF), 20W, & 5W.
- **REMOTE MOUNT HEAD.** The '2720H comes standard with a remote mount head, 11' of separation cable, and mounting hardware, giving you limitless installation options. Put the control head where it's easiest to operate! Plus, you can connect the mic to the remote mount head or the main unit.
- **CTCSS AND DTCS OPERATION WITH TONE SCAN.** Get onto the repeater fast! 104x2 DTCS and 50 CTCSS codes help gain you quick repeater access. With pocket beep and tone scan.
- **212 MEMORY CHANNELS.** A total of 212 memory channels, including 2 call channels and 10 scan edges.
- **HM-133V REMOTE CONTROL MICROPHONE.** Control everything from the palm of your hand! ICOM's exclusive hot keys let you program the most used features for quick access. Bigger backlit keys allow you to operate in low light conditions.
- **DYNAMIC MEMORY SCAN (DMS).** ICOM's exclusive DMS system gives you flexibility to customize and manage your memory banks like no other dual bander.
- **DTMF ENCODE.** 12 DTMF memory channels with up to 24 digit DTMF codes can be used to control other equipment.
- **RUGGED CONSTRUCTION.** The one piece, die-cast aluminum chassis ensures reliable operation against shock and vibrations. A large cooling fan on the back keeps the internal components cool and allows you to operate in even the harshest environments.

This device has not been approved by the FCC. This device may not be sold or leased, or offered for sale or lease, until approval of the FCC has been obtained.
*For more information about acceptable cross band repeat operation, please call our literature request hotline at 425-450-6088 and ask for our cross band repeat brochure.

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MH-C777PLUS
Universal Charger & Analyzer

Pop'Comm / April 2002
" The Maha did well with charging single cells, multiple cells, and big battery packs from several different pieces of equipment I own."
-By Gordon West WB6NOA

- Charge/Analyze nearly any battery pack for ham radio, cellular, and more.
- Supports Lithium Ion, Lithium Polymer, NiMH, and NiCD battery chemistries.
- Supports a wide range of voltage for 1.2V to 14.4V (1 to 12 cells) for NiMH & NiCD, and 3.6V to 14.4V (1 to 4 cells) for Lithium Ion.
- Charge 1 to 12 AA, AAA, C, and D cells (optional battery holder needed).
- Intelligent microprocessor driven Negative Delta V detection, Zero Delta V, and Delta Temperature.
- Digitally displays voltage, time, and capacity throughout the charge and discharge process.
- Includes a light weight travel AC adapter (80V to 240V AC) and car kit.

MH-C204F SMART CHARGER
FOR 2 / 4 AA / AAA NiMH & NiCD

- Microprocessor driven intelligent rapid charger.
- Charge most batteries in about 1 - 3 hours.
- Charge two or four AA / AAA NiMH or NiCD rechargeable batteries.
- Conditioning feature to rejuvenate your batteries.

EDITORS' CHOICE PC Photo

Editors' Choice Award
For Best Charger And Battery
-By PC Photo Magazine

Digital Camera

By Oct. 99 Digital Camera Magazine as "The Mother of All Chargers"

NiMH Rechargeable Battery
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- Memory free operation.
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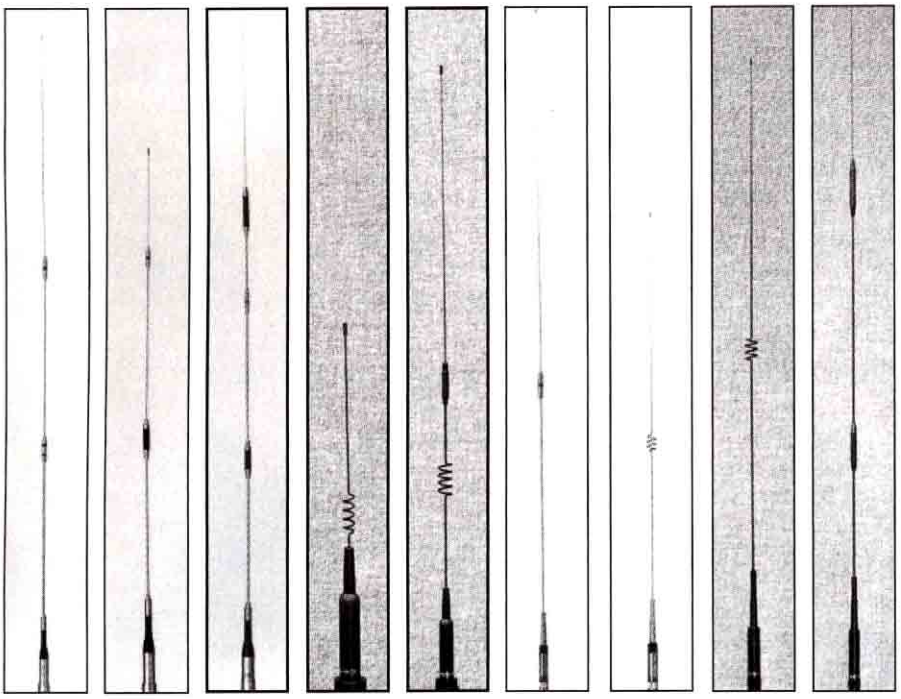

SG2000HD | SG7500A SG7500NMO | SG7900A | NR72BNMO | NR73BNMO | NR2C | NR770HA NR770HB | NR770HNMO NR770HBNMO | CR627B CR627BNMO

HV7A Mobile Antenna System

For New HF/VHF transceivers (Such as: IC706 series and FT100) NEW!

Optional Loading Coils

HVC7	40m
HVC14	20m
HVC18	17m
HVC21	15m

Recommended Antenna Mounts: K400C or K600M

MX62M Duplexer

Specifications:
HF/6m & 2m/70cm bands
1.6-56 MHz LPF
76–470 MHz HPF
(76–120 receive only)

Watts:	600 P.E.P.
Loss:	0.2 dB LPF
	0.3 dB HPF
Isol.:	50 dB

The NEW HV7A has 5 band capability: 70cm, 2m, 6m, and 2 HF bands through use of loading coils. Foldover feature allows for easy access into low overhead buildings. Ideal for users of IC706 series and FT100 radios.

Bands Supplied:	10m/6m/2m/70cm
Opt. Loading Coils:	40m/20m/17m/15m
Power, P.E.P.:	HF 120w/VHF 200w
Mount Connection:	UHF
Length:	54"
SWR:	1.5:1 nominal

MX62M

Use with HF/VHF mobile transceivers such as IC706 series, FT100, or combine 2m/70cm and HF rigs.

SPECIAL FEATURES:

- Factory pre-tuned/no adjustment
- Highest Performance antennas
- NMO and UHF (PO) base styles
- 24 Kt gold plated connector pin
- No grounding required unless noted
- Fold-over feature on most models

FOLD-OVER

Patented One-Touch Fold-over Feature
(Not available on NR72BNMO, NR73BNMO, & NR770SA.)

MODEL	BAND (MHz)	WATTS	CONN.	HT. IN.	ELEMENT PHASING
NR72BNMO*[6]	2m/70cm	100	NMO	13.8	1/4λ, 1/2λ
NR73BNMO	2m/70cm	100	NMO	33.5	1/2λ, 1-5/8λ
NR770HA[7]	2m/70cm	200	UHF	40.2	1/2λ, 2-5/8λ
NR770HNMO[8]	2m/70cm	200	NMO	38.2	1/2λ, 2-5/8λ
NR770RA	2m/70cm	200	UHF	38.6	1/2λ, 2-5/8λ
SG7000A*[6]	2m/70cm	100	UHF	18.5	1/4λ, 6/8λ
SG7500A	2m/70cm	150	UHF	40.6	1/2λ, 2-5/8λ
SG7500NMO	2m/70cm	150	NMO	41.0	1/2λ, 2-5/8λ
SG7900A*	2m/70cm	150	UHF	62.2	7/8λ, 3-5/8λ

* Not recommended for Magnet Mount
6 Grounding required.
7 NR770HB same specifications but in black finish.
8 NR770HBNMO same specifications but in black finish.
9 52-54MHz only

MODEL	BAND (MHz)	WATTS	CONN.	HT. IN.	ELEMENT PHASING
NR2C	2m	150	UHF	55.5	1/2λ+1/4λ
SG2000HD*	2m	250	UHF	62.6	1/2λ+3/8λ
SG6000NMO*[6,9]	6m	150	NMO	39	1/4λ
CR224A*[6]	2m/1-1/4m	150	UHF	68.5	7/8λ, 2-5/8λ
CR320A*[6]	2m/1-1/4m 70cm	200 100/200	UHF	37.4	1/4λ, 1/2λ 2-5/8λ
CR627B*[6,9]	6m/2m/	120	UHF	60	1/4λ, 1/2+1/4λ/
CR627BNMO*[6,9]	70cm	120	NMO	60	2-5/8λ

1/4λ rated in dBi.

www.rfparts.com/diamond

Diamond Antenna Division of RF Parts Co. Tel: (760) 744-1943 • E-mail: rfp@rfparts.com

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Technical

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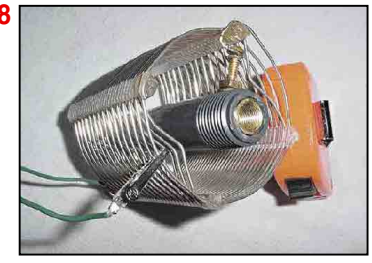

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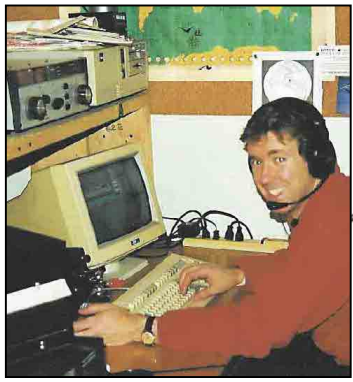
News and Features

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

QST Workbench



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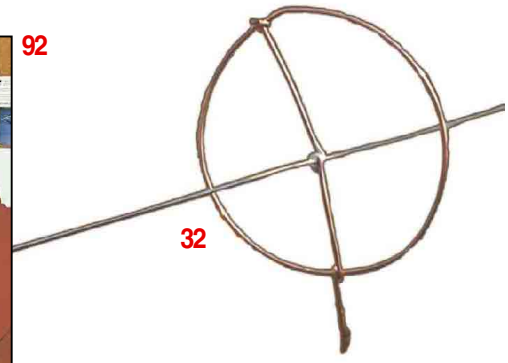

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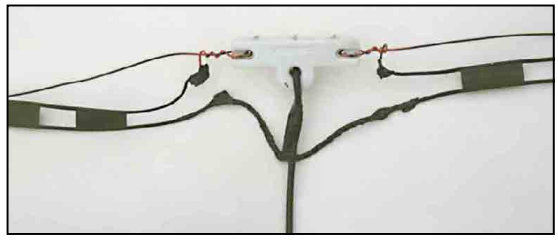

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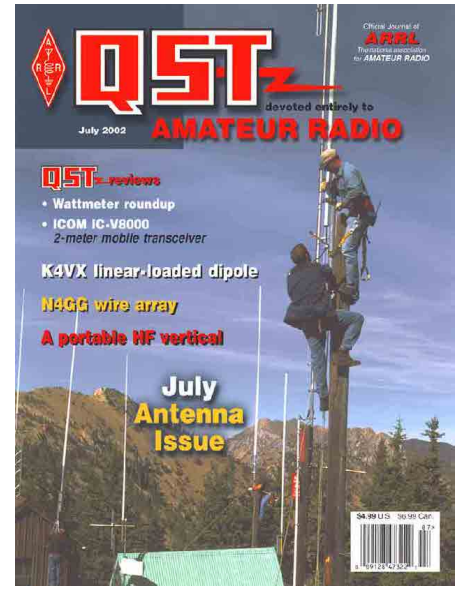
Operating

Departments



Our Cover:
This view of Montana's Big Sky made antenna maintenance duty for Neil Ramhorst, KL7JGS, and Alan Harper, KD7GUZ, a bit easier to bear. This month's antenna issue features four articles that describe innovative designs that work well in limited space. Photo courtesy Ian Shive, Water and Sky Photography (**www.waterandsky.com**).

US & Possessions: Membership in the ARRL, including a one year subscription to *QST*, is available to individuals at $39. Age 65 and over, with proof of age, $34. Licensed radio amateurs age 21 and under and the eldest licensee in the household may qualify for the rate of $20. Life Membership, including a subscription to *QST* is available at $975.* Age 65 and over, $850.* Membership and *QST* cannot be separated. Fifty percent of dues is allocated to *QST*, the balance for membership. Subscription rate for libraries and institutions is $39 per year. Single copies $5.

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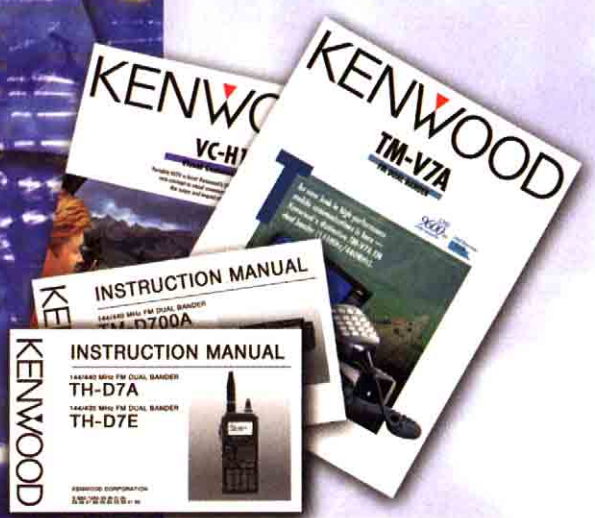

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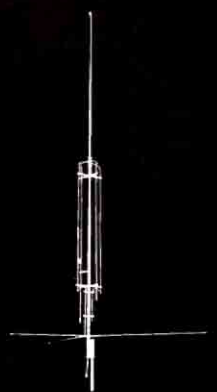
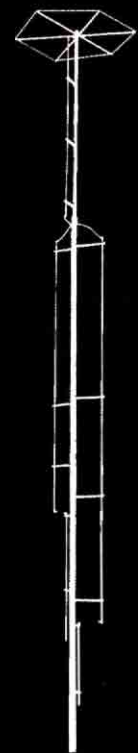
GAP: THE PERFECT ANTENNA

We at GAP realize there isn't a perfect antenna. No singular antenna will scream DX on 80 and be the best for local nets on 10. If anyone tells you there is, beware! The perfect antenna does not exist, but the right one for you may. If you want something to bust the pile on the low bands, then consider the Voyager. Just starting out in ham radio and need a great general coverage antenna, the Challenger is easy to assemble and for little effort will yield superior performance, especially on DX. Maybe you knowingly or unknowingly moved into one of those "restricted areas" where the Eagle's limited visibility, but unlimited ability is desired.



Eagle DX

Challenger DX



Voyager DX

This chart helps you select the right GAP antenna. When comparing GAPs, bandwidth is not a concern. With few exceptions, a GAP yields continuous coverage under 2:1 for the **ENTIRE BAND**.

All antennas utilize a GAP elevated asymmetric feed. A major benefit is the virtual elimination of the earth loss, so more RF radiates into the air instead of the ground. This feed is why a GAP requires **NO RADIALS**. Just as elevating a GAP offers no significant improvement to its performance, adding radials won't either, making set up a breeze.

A GAP antenna has no traps, coils or transformers. This is important. The greatest sources of failure in multiband antennas are these devices. Perhaps you heard someone discuss a trap that had melted, arced or became full of water. Improvements to these inherent problems are the focus of the antenna manufacturer, while the basic design of the antenna remains unchanged. **GAP improved the trap by eliminating it!** Removing these devices means they don't have to be tuned and, more importantly, won't be detuned by the first ice or rain. The absence of these devices improves antenna reliability, stability and increases bandwidth.

Another major advantage to a GAP antenna is its NO tune feature. Screws are simply inserted into predrilled holes with a supplied nutdriver.

The secret is out and people in the know say:

CQ–"The GAP consistently outperformed base-fed antennas...and was quieter."

73–"This is a real DX antenna, much quieter than other verticals."

RF–"To say this antenna is effective would be a real understatement. Switching back and forth on 40m between another multiband HF vertical and the GAP, there was no comparison. Signals were always stronger on the GAP, sometimes by S units, not just DB's."

Worldradio – "These guys have solved the problem associated with verticals. That is, an awful lot of RF is wallowing around and dropping into the dirt instead of going outward bound. A half-wave vertical does need radials if it is end fed (at the bottom). But the same half-wave vertical does not (as much, hardly at all) if is fed in the center."

IEEE–"Near field and power density analyses show another advantage of this antenna (asymmetric vertical dipole): it decreases the power density close to the ground, and so avoids power dissipation in the soil below it. The input impedance is very stable and almost independent of ground conductivity. This antenna can operate with high radiation efficiency in the MF AM standard broadcast band, without the classical buried ground plane, so as to yield easier installation and maintenance."

Celebrating 10 Years 1989-1999

TITAN DX

This all purpose antenna is designed to operate 10m-80m, WARC bands included. It sits on a 1-1/4" pipe and can be mounted close to the ground or up on a roof. Its bandwidth and no tune feature make it an ideal antenna for the limited space environment as well as a terrific addition to the antenna farm.

MODEL	BANDS OF OPERATION											HT	WT	MOUNT	COUNTER-POISE	COST
	2m	6m	10m	12m	15m	17m	20m	30m	40m	80m	160m					
Challenger DX	■	■	■	■	■		■		■	■		31.5'	21 lbs	Drop In Ground Mount	3 Wires @ 25'	$299
Eagle DX			■	■	■	■	■		■			21.5'	19 lbs	1-1/4" pipe	80" Rigid	$309
Titan DX			■	■	■	■	■	■	■	■		25'	25 lbs	1-1/4" pipe	80" Rigid	$339
Voyager DX							■		■	■	■	45'	39 lbs	Hinged Base	3 Wires @ 57'	$419

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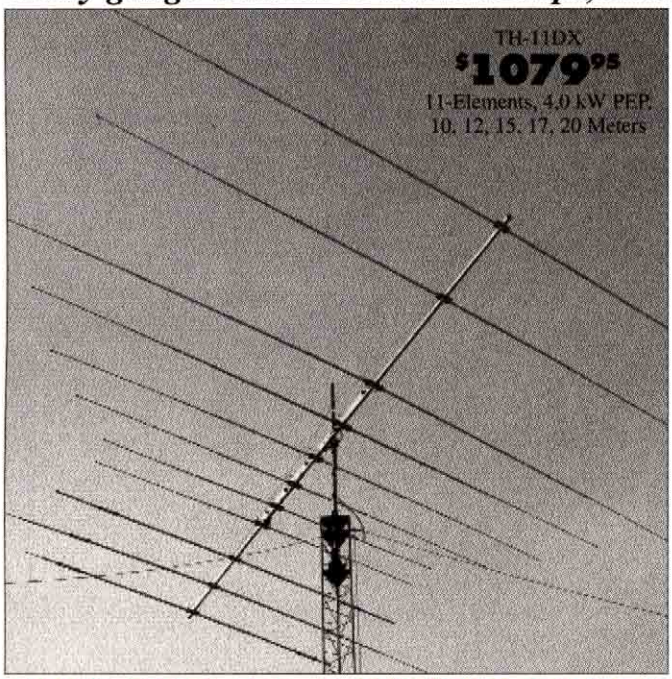
...are stronger, lighter, have less wind surface and last years longer. Why? Hy-Gain uses durable tooled components -- massive boom-to-mast bracket, heavy gauge element-to-boom clamps, thick-wall swaged tubing -- virtually no failures!



TH-11DX, $1079.95. 11-element, 4.0 kW PEP, 10,12,15,17,20M

The choice of top DXers.

With 11-elements, excellent gain and 5-bands, the super rugged TH-11DX is *the "Big Daddy" of all HF beams!*

Handles 2000 Watts continuous, 4000 Watts PEP.

Every part is selected for durability and ruggedness for years of trouble-free service.

Features a low loss log-periodic driven array on all bands with monoband reflectors, BN-4000 high power balun, corrosion resistant wire boom support, hot dipped galvanized and stainless steel parts.

Stainless steel hardware and clamps are used on all electrical connections.

TH-7DX, $819.95. 7-element, 1.5 kW PEP, 10,15,20 Meters

7-Elements gives you the *highest average gain* of any Hy-Gain tri-bander!

Dual driven for broadband operation without compromising gain. SWR less than 2:1 on *all* bands.

Uniquely combining monoband and trapped parasitic elements give you an excellent F/B ratio.

Includes *Hy-Gain's* diecast aluminum, rugged boom-to-mast clamp, heavy gauge element-to-boom brackets, BN-86 balun. For high power, upgrade to BN-4000.

TH-5MK2, $699.95. 5-element, 1.5 kW PEP, 10,15,20 Meters

The broadband *five element* TH5-MK2 gives you outstanding gain.

Separate air dielectric *Hy-Q* traps let you adjust for maximum F/B ratio on each band.

Also standard is *Hy-Gain's* exclusive *BetaMATCH™*, stainless steel hardware and compression clamps and BN-86 balun.

TH-3MK4, $439.95. 3-element, 1.5 kW PEP, 10,15,20 Meters

The super popular TH-3MK4 gives you the *most gain for your money* in a full-power, full-size durable Hy-Gain tri-bander!

You get an impressive average gain and a whopping average front-to-back ratio. Handles a full 1500 Watts PEP. 95 MPH wind survival.

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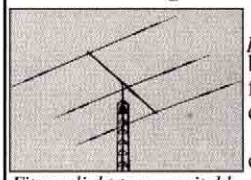

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TH-11DX	11	*For Gain and F/B ratio--See...*		4000	10,12,15,17,20	12.5	100	24	37	22	88	1.9-2.5	T2X	$1079.95
TH-7DX	**7**			**1500**	**10, 15, 20**	**9.4**	**100**	**24**	**31**	**20**	**75**	**1.5-2.5**	**HAM-IV**	**$819.95**
TH-5MK2	5	• www.hy-gain.com		1500	10, 15, 20	7.4	100	19	31.5	18.42	57	1.5-2.5	HAM-IV	$699.95
TH-3MK4	**3**	• Hy-Gain catalog		**1500**	**10, 15, 20**	**4.6**	**95**	**14**	**27.42**	**15.33**	**35**	**1.9-2.5**	**CD-45II**	**$439.95**
TH-3JRS	3	• Call toll-free		600	10, 15, 20	3.35	80	12	27.25	14.75	21	1.25-2.0	CD-45II	$329.95
TH-2MK3	**2**	800-973-6572		**1500**	**10, 15, 20**	**3.25**	**80**	**6**	**27.3**	**14.25**	**20**	**1.9-2.5**	**CD-45II**	**$339.95**
EXP-14	4			1500	10,15,20 (30/40)	7.5	100	14	31.5	17.25	45	1.9-2.5	HAM IV	$549.95

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"IT SEEMS TO US..."

Progress on 40 Meters

On this page in January we provided an update on the decades-old effort to separate the amateur and broadcasting allocations at 7 MHz. As anyone knows who has ever listened to the amateur 40-meter band, the upper two-thirds is used by broadcasters in Europe, Africa and Asia, and to a limited extent in the Pacific. Originally a worldwide amateur allocation, the band began suffering incursions by broadcasters just before the outbreak of World War II. The situation deteriorated further in the early years of the Cold War. Attempts to resolve the incompatibility between high-powered broadcasting stations and relatively low-powered amateur stations failed at World Administrative Radio Conferences in 1979 and 1992, but at least things got no worse.

Now the 7-MHz issue is one of more than three dozen on the agenda of the 2003 World Radiocommunication Conference (WRC-03) in Caracas. More than 2000 delegates from 150 countries will spend four weeks grappling with these agenda items. Of course, they will not simply show up in Caracas unprepared; with the conference still a year away, countless hours already have been devoted to the study and discussion of these issues. While we are still a long way from knowing what the outcome of the conference will be—nothing will be final until the closing gavel, scheduled for next July 4—there is some progress to report.

To summarize the current situation, in Region 2 (the Americas) the amateur allocation is 7000-7300 kHz. There is no broadcasting allocation in Region 2 although a worldwide allocation of 7300-7350 kHz is slated to take effect on April 1, 2007. In addition, a number of broadcasting stations operate out-of-band above 7300 kHz. In Regions 1 and 3 (the rest of the world) the amateur allocation is just 7000-7100 kHz and broadcasters have 7100-7300 kHz. So, taking the 2007 expansion band into account, broadcasters have as much as 250 kHz and amateurs have as much as 300 kHz between 7000 and 7350 kHz. Obviously, if these bandwidths are to be maintained any separation of the amateur and broadcasting allocations will have to impact the adjacent fixed service allocations (6765-7000 kHz and 7350-8100 kHz). While these bands had commercial significance in the past, today they are primarily of interest to the military for fixed and mobile operations.

Earlier formulations of possible solutions dating back as far as the 1970s envisioned a downward shift in the amateur band to reduce the amount of upward shift that broadcasters would be required to make. As recently as last fall such a solution still seemed viable. However, it now appears to be off the table. In recent months it has become increasingly apparent that the lower band —6765-7000 kHz—is of prime importance to the fixed and mobile services. At a May meeting of the ITU group responsible for drafting various methods of satisfying the WRC-03 7-MHz agenda item, no administration supported a downward shift.

Of the three methods the group came up with, two envision a two-stage implementation (to be completed by 2010) to mitigate the impact on broadcasters. The method favored by the IARU and the United Kingdom ultimately achieves a worldwide amateur allocation of 7000-7300 kHz and a worldwide broadcasting allocation of 7300-7550 kHz. The method favored by a number of European administrations also achieves a worldwide amateur allocation of 7000-7300 kHz, but with 7200-7300 kHz shared with the fixed and mobile services in Regions 1 and 3; while not as desirable as an exclusive allocation, this is a significant improvement over the *status quo* and does achieve the desired separation of the amateur and broadcasting allocations.

The third method, suggested by France, falls short of entirely separating amateurs and broadcasters. It simply shifts broadcasters up by 100 kHz, doubling the size of the amateur band in Regions 1 and 3 and making 7100-7200 kHz more useful in Region 2 while maintaining the *status quo* at 7200-7300 kHz. While an improvement, this method is much less desirable than the other two.

These three methods and their relative advantages and disadvantages (along with the unstated "no change" option) will be in the draft report of the Conference Preparatory Meeting (CPM) that will meet in Geneva in the latter half of November. However, that is not the end of the story. Administrations may propose amendments or additional methods for inclusion in the CPM Report, which is intended to provide the technical basis for WRC-03 decisions. And no matter what the CPM Report says, WRC-03 will only consider proposals from administrations and regional telecommunications organizations; the CPM Report will be helpful to us only if favorable proposals are offered that are consistent with the Report. Even then, we will need the support of many administrations that have yet to be heard from.

You can follow progress on WRC-03 preparations in the United States via the FCC Web site, **www.fcc.gov/ib/wrc-03/**. Important work also is underway in other countries and in the regional telecommunications organizations, particularly CEPT (Europe), CITEL (the Americas) and APT (Asia-Pacific).

We are not merely passive observers of WRC-03 preparations. ARRL staff members Paul Rinaldo, W4RI, Walt Ireland, WB7CSL, and Jon Siverling, WB3ERA, devote full time to preparing for and attending US, CITEL and ITU meetings. Volunteers in our sister IARU member-societies in several countries as well as in the three IARU regional organizations are performing similar functions. IARU Vice President David Wardlaw, VK3ADW, has been a regular attendee at APT meetings. IARU representatives at the key ITU meetings have included President Larry Price, W4RA, Wojciech Nietyksza, SP5FM, Ken Pulfer, VE3PU, and the undersigned.

To every ARRL member and especially to those of you who have gone above and beyond the membership dues with a contribution to the ARRL Fund for the Defense of Amateur Radio Frequencies, ***thank you!*** We could not have come this far without your support. We hope to give you something to celebrate next July!

—David Sumner, K1ZZ

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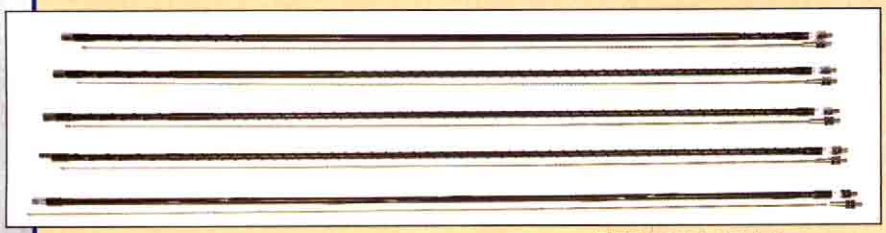

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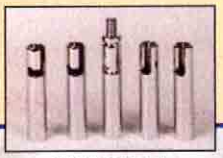

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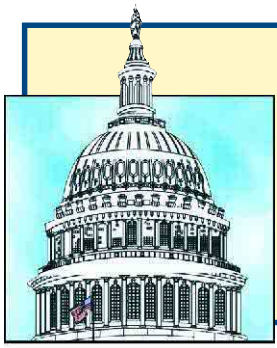

DC Currents

By Steve Mansfield, N1MZA
Manager, Legislative and Public Affairs

Just as radio waves aren't constrained by artificial boundaries, neither is ARRL's government relations effort. "DC Currents" covers behind-the-scenes activity you need to know about in Congress, at the FCC and other regulatory agencies, as well as at worldwide bodies such as the International Telecommunication Union.

Landmark Bill Could Provide Relief to Amateurs from Restrictive Covenants

A bill introduced in Congress could provide relief to amateurs who are prevented by private deed covenants, conditions and restrictions—CC&Rs—from installing outdoor antennas. Rep Steve Israel (D-NY) introduced the "Amateur Radio Emergency Communications Consistency Act" May 14. The measure—designated H.R. 4720—would require private land-use regulators—such as homeowners' associations—to "reasonably accommodate" Amateur Radio antennas consistent with the PRB-1 limited federal preemption. PRB-1 now applies only to states and municipalities.

The measure contains but one sentence:

> *For purposes of the Federal Communications Commission's regulation relating to station antenna structures in the Amateur Radio Service (47 CFR 97.15), any private land use rules applicable to such structures shall be treated as a state or local regulation and shall be subject to the same requirements and limitations as a state or local regulation.*

Israel, whose father, Howard, is K2JCC, said in a statement read into the *Congressional Record* that under current law, the FCC does not apply its PRB-1 policy consistently. "My bill addresses this issue and provides Amateur Radio licensees with the ability to negotiate reasonable accommodation provisions with homeowners' associations, just as they do now with public land-use regulators," he said.

In his statement, Israel called CC&Rs "a growing challenge" to Amateur Radio's ability to provide public service communication. Good faith negotiations, he said, "ensure that an Amateur Radio operator's technical needs are met, while preserving the aesthetics and interests of a neighborhood."

Rep Greg Walden, WB7OCE (R-OR)—the only Amateur Radio operator in Congress—and Rep Pete Sessions (R-TX) have signed on as original cosponsors. H.R. 4720 was expected to be assigned to the Telecommunications and Internet Subcommittee of the House Energy and Commerce Committee.

The measure certainly seems to have resonated within the amateur community. Within a week of the bill's filing, more than 270 amateurs had written letters of support to 173 different Members of Congress.

Last December, the FCC affirmed a November 2000 staff-level decision that declined to include CC&Rs under PRB-1, which is reflected in the FCC's Part 97 rules at §97.15(b). In its *Memorandum Opinion and Order,* the FCC asserted that there was not sufficient showing that CC&Rs prevent Amateur Radio operators from pursuing the basis and purpose of the Amateur Service because licensees could operate at a location other than their residence, operate mobile or use a club station.

The FCC itself hinted that a congressional remedy might be the key to resolving the issue for radio amateurs. "However, should Congress see fit to enact a statutory directive mandating the expansion of our reasonable accommodation policy," the FCC declared in its *MO&O* last winter, "the Commission would expeditiously act to fulfill its obligation thereunder."

ARRL took up the challenge, and the League's Board of Directors agreed to pursue the issue on Capitol Hill. Earlier this year, ARRL President Jim Haynie, W5JBP, and other League officials met with Israel, Walden, Sessions and others on Capitol Hill to discuss the prospect of such a bill and how it should be worded.

"Now, that's going to be a tough row to hoe," Haynie conceded in assessing the bill's chances during the ARRL Forum at Dayton Hamvention. "We're fortunate in the fact that we've got both parties signed onto it," he added. "We feel like it has a chance, but it's not going to be easy."

"But if there was ever a time in Amateur Radio's history that, in my view, we can do this, it's now," he said, referring to Amateur Radio's role after the September 11 attacks and its potential role in homeland security. "We're very visible."

Haynie says the measure "doesn't mean you can put up whatever you want to put up, but at least it brings the people to the table so you can negotiate something." He said the important thing to point out is that the bill, if passed by both houses of Congress and signed by the president, would give amateurs living under CC&Rs an opportunity for reasonable accommodation they don't have now, without becoming involved in expensive and time-consuming litigation.

Israel, in urging his colleagues to support H.R. 4720, said the Amateur Radio Emergency Communications Consistency Act "will help to protect the vital function of Amateur Radio as an emergency communications and public safety resource."

The ARRL has been encouraging members to contact their congressional representatives and urge them to sign on as cosponsors and to support the H.R. 4720. Visit the US House of Representatives "Write Your Representative Service" Web page, **www.house.gov/writerep/** for information on how to contact your representative.

The League requests those writing or e-mailing members of Congress—whether or not they are supporting this legislation—to copy ARRL on their correspondence—via e-mail to **ccr-bill@arrl.org** or via US Mail to CC&R Bill, ARRL, 225 Main St, Newington, CT 06111. Correspondents should include the bill number, H.R. 4720, as well as their name and address on all correspondence.

Members wishing to keep things simple can support the legislation by just mailing a QSL card to their Member of Congress and writing, "I urge you to cosponsor and support H.R. 4720, the Amateur Radio Emergency Communications Consistency Act."

Senate NETGuard Bill Would Create Volunteer Technology Cadre

The Senate Commerce, Science and Transportation Committee has okayed legislation seeking to address the problem of emergency communication during terrorist related disasters. Sen Ron Wyden (D-OR), is the catalyst behind this effort. His bill, S. 2037, the "Science and Technology Emergency Mobilization Act" stems from the events of September 11 and the challenges faced by emergency workers trying to operate voice and data equipment.

After receiving bipartisan support within the Senate committee, the bill was approved on May 17, 2002 and forwarded to the full Senate, where passage was expected sometime this summer. Rep Sherwood Boehlert (R-NY), chairman of the House of Representatives' Science Committee, is expected to introduce similar legislation in the US House.

Wyden says his ultimate vision for S. 2037 is to create "a National Technology Guard, or NETGuard, a cadre of volunteers with extensive technology expertise to move in at a moment's notice." Extending to both voice and data communication, NETGuard would allow communities across the US to locate science and technology volunteers in times of emergency.

There are several primary components to the bill. Foremost, it directs the president to establish an office within his administration to mobilize technology and science experts to form a National Emergency Technology Guard. The NETGuard would provide technology-based assistance to federal, state, and local emergency response agencies as well as to non-governmental emergency aid organizations.

The director of this office would be required to develop a procedure by which a group of individuals with technological expertise may form teams of volunteers to be activated in an emergency. They would be provided access to emergency sites and assist in disaster situations.

In developing these NETGuard "teams," the director of this new office would be responsible for establishing the criteria by which they would be certified. Among the requirements listed in the bill, "minimum training and practice requirements, including participation in not less than 2 emergency drills each year" is highlighted.

Additionally, the legislation also requires the director of the National Institute of Standards and Technology (NIST) to establish a Center for Civilian Homeland Security Technology Evaluation. NIST would be charged with evaluating anti-terrorism and disaster response technology.

The ARRL submitted written testimony on this legislation during a December 2001 hearing held by the Subcommittee on Science, Technology and Space. The League outlined Amateur Radio's capabilities and its longstanding commitment to working with government and relief agencies during times of crisis. Although the legislation contains only broad instructions for developing a NETGuard, the ARRL will continue to monitor its progress and work with congressional staff to ensure that amateur operators' abilities and resources are kept under consideration.

If the legislation passes Congress and is signed into law, ARRL will take an active role in working with the administration as it develops its policies and procedures for this program.

Tauzin Moving Ahead with Spectrum Management Policy

♦ US House Energy and Commerce Committee Chairman Rep Billy Tauzin (R-LA) says he intends to move forward with plans to develop and implement a broad-based spectrum management policy for Congress. Tauzin, a supporter of H.R. 4560—the "Auction Reform Act of 2002"—had expressed a desire to see this comprehensive spectrum management plan in place before the FCC moved forward with any future spectrum auctions. As this went to press, however, the FCC announced that it would proceed with part of the 700-MHz band auction and delay the rest.

The FCC has indicated it will proceed with the auction of 698-746 MHz (broadcast TV channels 52 to 59) on June 19. The Commission said it would put on hold the auction of the 747-762 MHz and 777-792 MHz bands (currently broadcast channels 60 to 69) until next January. The FCC said the delay would allow time for Congress to consider legislation affecting the timing of the auction.

Tauzin and Rep John Dingell (D-MI), the Energy and Commerce Committee's ranking member, believe that attempts to generate revenue quickly have led to unreasonable and uncoordinated spectrum auctions. The wireless industry had wanted to delay this and further auctions until a spectrum-management plan is in place and previous spectrum auction issues have been settled.

Tauzin, meanwhile, intends to organize a panel to review spectrum policies and make a recommendation to his full committee. These recommendations would ultimately form the basis of future House spectrum management legislation. The ARRL is already working with its supporters on the House Energy and Commerce Committee to ensure that the needs of Amateur Radio will be considered during the panel's deliberation.

Media Hits

• Several members brought a noteworthy "hit" to our attention. The League's Web site and a brief, general description of ARRL's activities is included in the 2002 edition of the "Whole Internet Page-A-Day Calendar." ARRL was featured on May 21. Some either had the calendar themselves or were alerted to the ARRL reference by co-workers.

• The April issue of *Mobile Radio Technology* featured two pieces on Amateur Radio—one an editorial. The cover story on public service highlighted Amateur Radio emergency communications activities in the wake of September 11. Those interviewed included Virginia Section Emergency Coordinator Tom Gregory, N4NW, and New York City District Emergency Coordinator Charles Hargrove, N2NOV. The article discussed some of the difficulties volunteers face when dealing with a complex emergency situation and multiple service organizations. In the same issue, a lengthy editorial touched on many of the same issues and strongly urged all municipalities to realize how important Amateur Radio is during disasters.

• The Antietam Radio Association Inc recently garnered some favorable press in the *Herald-Mail* in Hagerstown, Maryland. The article appeared the same day that the 50-year-old club held its hamfest. The well-written piece covered various aspects of Amateur Radio, including what's involved with getting into ham radio today. Several club members shared a few of the fun experiences they've had being ham radio operators. Among those club members featured were club Public Information Officer Donnie Sue Mulligan, KB3AOO; Charlie Mulligan, N3MVR; Page Pyne, WA3EOP; and Stan Klick, W3YGC.

• Amateur Radio on the International Space Station (ARISS) school contacts continue to get a lot of play in the media. Reporters from four television stations, one radio station and two newspapers were on hand during a recent contact between astronaut Dan Bursch, KD5PNU, at NA1SS aboard the ISS and Hambright Elementary School in Lancaster, Pennsylvania. The Lancaster *New Era* devoted a large section on the local news front page to the contact, reaction from the students and details about the ham radio set up at the school. Bursch attended the school in the 1960s.

• In New Jersey, the weekly *Hawthorne Press* covered an Earth Day special event station set up at Hawthorne High School. Event organizer Fred Buchner, KO2FB, included the young people from his middle school Amateur Radio club along with several members of the community. Buchner was assisted by members of the Bergen Amateur Radio Association, and was featured in a press photo with club member David Minster, NA2AA. Positive publicity for Amateur Radio doesn't have to come via the national news programs or the metropolitan daily papers. Don't forget about the smaller weekly papers. They're well read and often very popular among people in *your* town!

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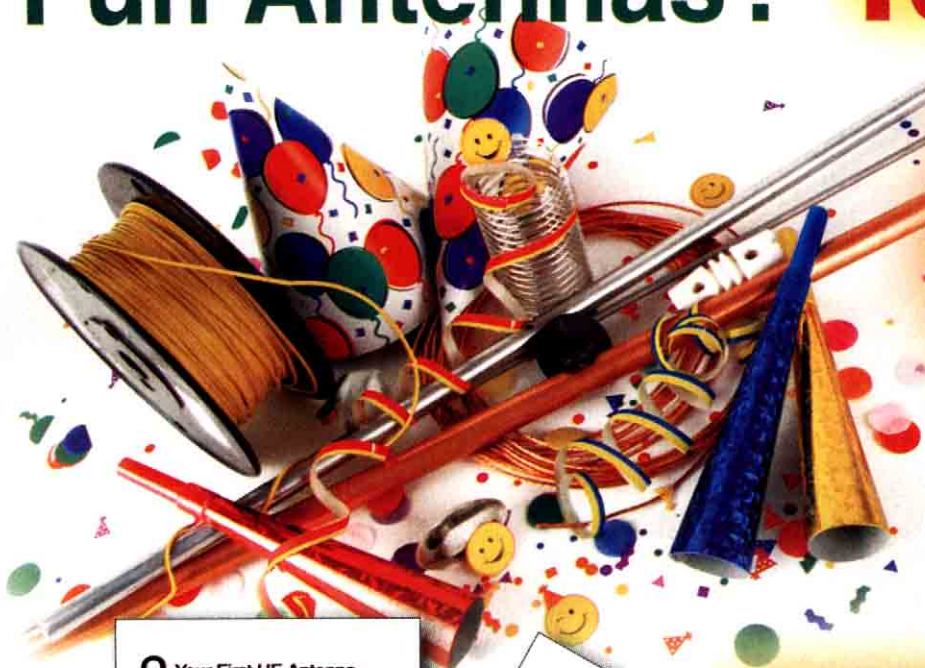

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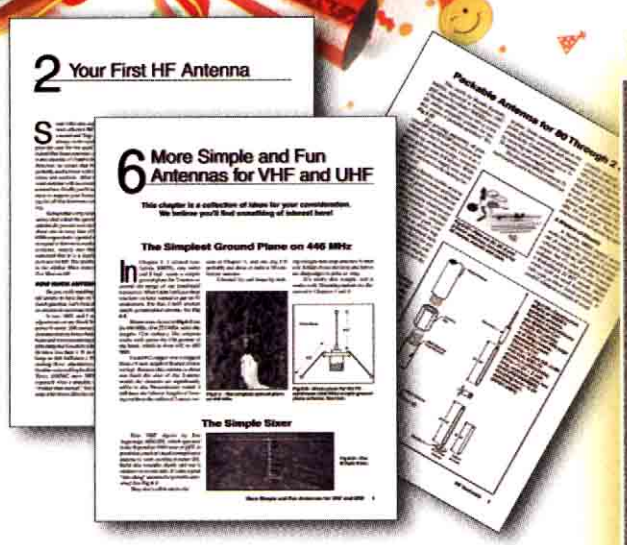

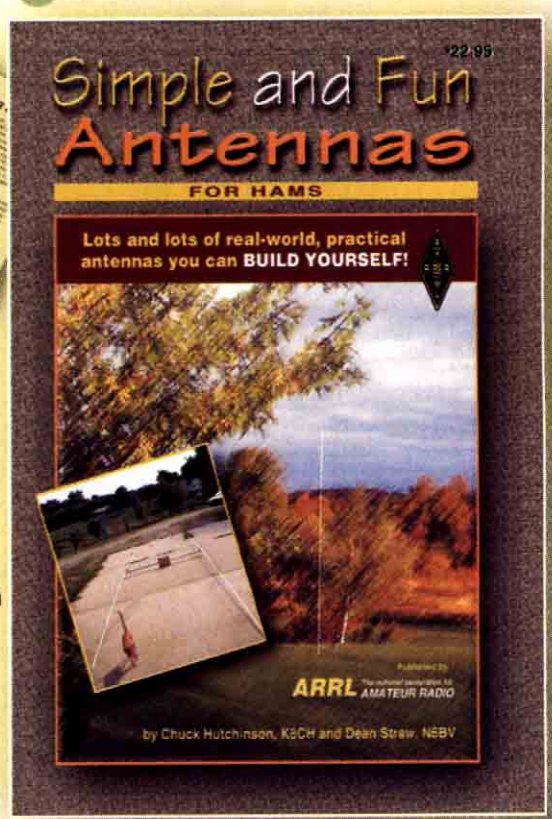

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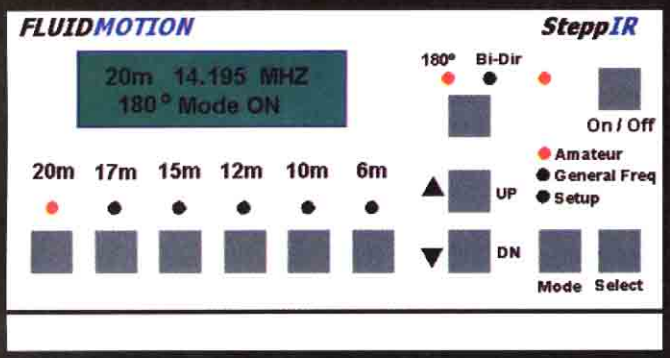

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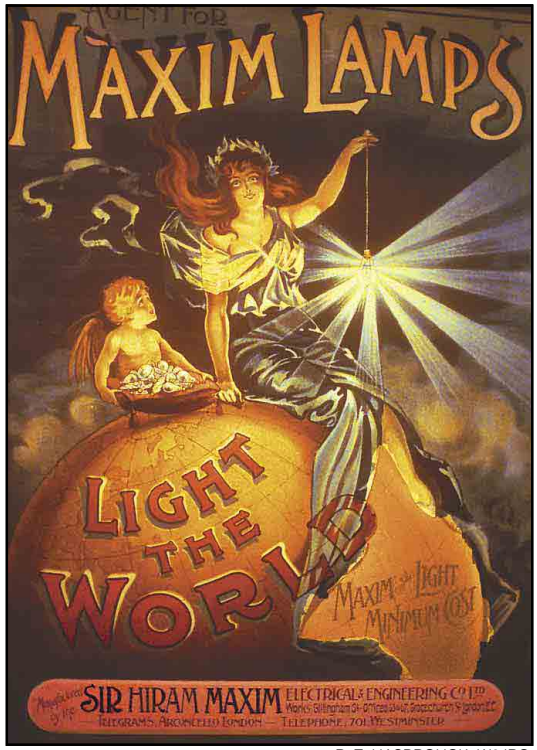


R. T. HASBROUCK, W6JRO

MAXIMum light, minimum cost—who could argue with that? R. T. Hasbrouck, W6JRO, of Pleasanton, California, found this poster in the Castle Museum, York, England. Sir Hiram Maxim, the father of the cofounder of the ARRL, was the noted inventor of the Maxim machine gun, a smokeless powder and an airplane. Our Hiram Percy Maxim, 1AW, was no slouch as an inventor himself, of course. Aside from being The Father of Amateur Radio, he invented the Maxim silencer and won renown as a pioneer experimenter with the automobile. If you'd like to learn more, see *Hiram Percy Maxim* by Alice Clink Schumacher (**www.arrl.org/shop/**).

HENRYK KOTOWSKI, SM0JHF

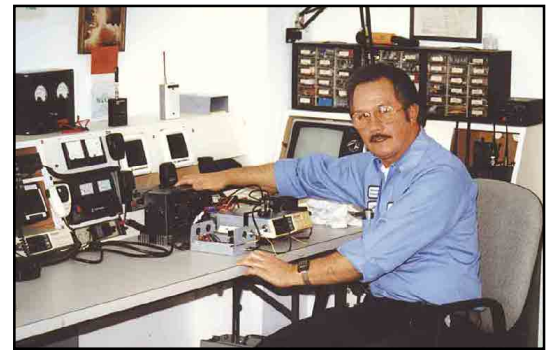
Sture, OH0JFP, who lives in Mariehamn in Finland's Åland Island archipelago, has built a complete VHF-UHF contest station outside his town on a hill close to an electric wind generator. Many Finnish contesters live on the mainland and come to the islands only for major events. OH0JFP is the most active permanent Amateur Radio operator in the islands.

W0CIA

One way to keep in touch while away from home. David Quam, W0CIA, of Bemidji, Minnesota, sent us this photo of his mobile comm center. It features a Yaesu FT-100 transceiver, SWR meter, dc control panel and cell phone, FT-2600 transceiver, scanner, FT-8100 transceiver, GPS receiver, two speakers and an antenna switch for 6/40 meters and 80 meters.

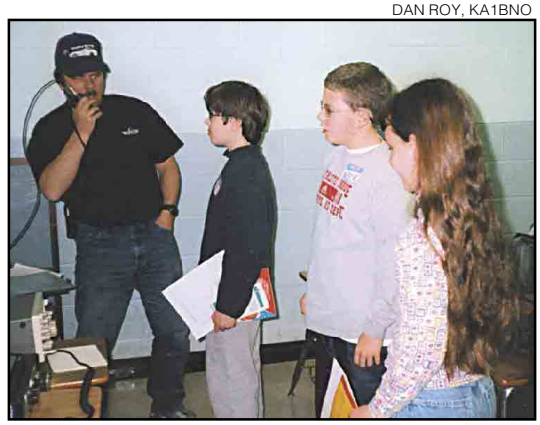
Since January 2002, Terri Cresap, KD5NGI, age 12, of Belen, New Mexico, has volunteered for a turn each month to run the Rusty's Raiders Net. The two hour net meets each weekday morning for two hours over linked New Mexico repeaters that cover 70 percent of the state's population. Since receiving her license in February 2001, Terri also has regularly taken her turn running her club's (Valencia County ARA) net. This month, she takes on an added responsibility—editor of the club newsletter.

RALPH H. CLARK, NM5RC

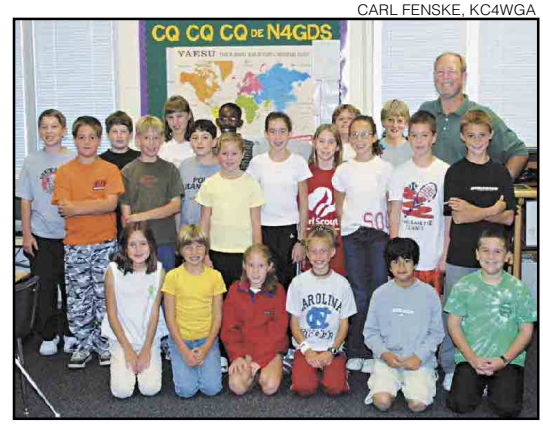


Active on 33 cm? Jim Labor, KE4NZG, of Daytona Beach, Florida, certainly is. He describes his 902-MHz repeater as "Central Florida's first and only simplex repeater."

DAN ROY, KA1BNO



CARL FENSKE, KC4WGA



Amateur Radio in the classroom: (Left) In early April, the Pawtuxet Valley ARC demonstrated Amateur Radio at a daylong series of seminars for gifted and talented students of Warwick, Rhode Island. Three of the elementary students watch intently as Ron Bouthillier, W1VET, demonstrates VHF communication. Other demos included a Power Point overview of Amateur Radio, HF QSOs and I-Link. (Right) Carl Fenske, KC4WGA, a teacher at Greensboro (NC) Day School, pursues two passions—teaching various subjects to his fifth graders and swelling the ranks of Amateur Radio operators by introducing them to his favorite pastime. He incorporates Morse code and phonetics into the general curriculum, and for those whose interest he has stimulated, sponsors a school Amateur Radio club, N4GDS. The station is set up in the classroom, with a Yagi antenna on the roof.

QSL DESIGN BY W2CE

For both the 50th and 60th anniversaries of the crash of the Airship *Hindenburg* at Lakehurst, New Jersey, the Jersey Shore Amateur Radio Society operated special event stations from the actual crash site. I decided at the last minute to see if I could receive a special event call sign, and once being authorized gathered people to operate. Operators were on the air Sunday, Monday and Tuesday, 24 hours before and after the actual anniversary of the event, at 7:35 PM May 6, 2002.—*Bob Reed, W2CE*

Verticals Three for Urban Living and Vacation Cottages

Bruce MacAlister, W4BRU, of Richmond, Virginia, has a unique approach to a portable HF antenna. He writes:

It's a trend: people are moving back into the city. The commute is shorter. The plot of land is smaller. There are power lines nearby. Antenna farms with beams are often impractical. If you're lucky, as I am, you've got a steel roof on your house, your garage or your back porch. That vacation cottage you own or rent may have a steel roof. The motor home or travel trailer is full of steel. A steel roof is radial nirvana.

My 1910 Victorian townhouse has an 80 by 15 foot steel roof, 1200 square feet of radiant surface 33 feet in the air! John Watkins, NB4B, had the idea. He had used a monoband vertical with great success on the steel-roofed porch at a family cottage. So why not mount 75, 40 and 20-meter monoband verticals on a single magnetic mount and put it on the roof? You can see the results in the photos. This is a portable antenna assembly—you can remove and reattach the antennas in less than 10 minutes. Pack it up and take it to the beach or the mountains on vacation. I am planning to buy a roll of heavy-duty aluminum foil, stake it to the beach sand, put my triple-vertical in the center, connect the ground with alligator clips and try some seaside DX.

The bottom view shows how the antennas are attached to the mount, which features three magnets for self-leveling.

My mag-mount HF antenna has been a great improvement over the trap dipole I had been using.

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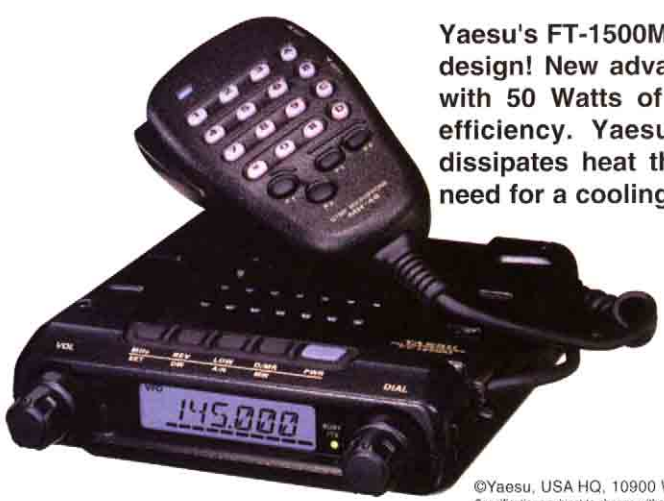

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We read every letter received, but we can only publish a few each month. We reserve the right to edit your letter for clarity, and to fit the available page space. Of course, the publishers of *QST* assume no responsibility for statements made by correspondents.

EASING THE LEARNING PROCESS

♦If I were to mention names like Albert Einstein, Thomas Edison, Pablo Picasso, Muhammad Ali, Sir Winston Churchill, Werner von Braun and Gen George S. Patton and ask you what they all had in common, how would you answer? You might say that they were all famous people who excelled at their given career field. But did you know that all also were diagnosed with a condition now known as dyslexia?

Dyslexia is a condition that can make traditional learning methods quite difficult. One very challenging task for the dyslexic is Morse code. In fact only about 16% of all dyslexics can comprehend the code; the remaining 84% transpose sounds just as they do with letters.

Given this, why do we not have methods in place to enable people with this condition a means of gaining HF privileges? While code is indeed important, devices have been developed that will assist the deaf or dyslexic in translating code into text. Knowing the statistics that we do, why don't we allow the use of these aids for those who have this learning disability when seeking code testing?

We should seek to allow code translators to be used as an assistive device for people who have proven diagnoses for dyslexia, just as we allow assistive devices for other established disabilities.

If I were to tell you that if six of the seven people I listed above would be unable to pass a 5 WPM code test because of dyslexia, wouldn't you think our hobby would be missing out on some very amazing people?—*Rob Hoitt, KB1FSK, Manchester, New Hampsh*ire

A CASE FOR 5-2

♦The use of simplex VHF radio seems to have died out in ham radio. Repeaters and multi-mode rigs have overshadowed a more basic and in many ways a very important means of communication.

Early crystal controlled 6 or 12 channel mobile rigs came factory equipped, crystaled up with what was called the National Simplex Calling Frequency of 146.520 MHz. We learned that mobile coverage on 5-2 wasn't half bad and with a base station antenna it provided rather good range and in some ways extended several miles depending on terrain.

If your state had a repeater it may not have had complete coverage in your home and work area, and a simplex channel was very desirable if not necessary. Because of this, 5-2 was used to establish initial contact with someone and if a ragchew was pursued, they switched to a secondary working channel. This Calling and Working method was used successfully for decades in worldwide marine CW communications.

In organizations like Civil Defense and Disaster Control, RACES and the Red Cross, volunteers found simplex FM emergency nets a giant leap in performance over the old AM mode. Repeater directories listed the new and popular repeaters but coverage was always a question left unanswered for a mobile outside his home area. Since 5-2 was well monitored, you could always roust up a local ham to get recommendations for repeaters that would cover your particular mobile route.

By the early 1980s 5-2 lost popularity because these first generation rigs didn't have built-in PL (CTCSS), were not synthesized and couldn't keep up with the proliferation of repeaters.

Often as I travel the East Coast I monitor 5-2. When I spot a call sign license plate or an ARRL window sticker and a 2 meter whip I would pull up alongside, wave my microphone at the window and hold up 5 fingers and then 2 fingers until I got an acknowledgment. On one trip from Rhode Island to New Jersey, a long and tiring drive, I gave a call on 5-2 and raised another mobile not far away. I discovered he and his wife were heading in the same direction and we were in contact for over 100 miles. It was most pleasant. No break-ins asking "How am I doing?" nor was I worried about how many minutes I was using on my "monthly plan." Our wives shared the mic and joined in on a topic they liked also. The lively QSO kept us both alert and time flew by.

But this is not always the case. On a recent 700 mile trip from New Jersey to Bar Harbor, Maine, I could only raise one ham on 5-2. I found a local repeater but coverage through the mountains of Vermont didn't hold a signal for very long. I barely got driving instructions to a lunch counter and gas station. I have driven several thousand miles and seldom find someone on 5-2. But when I do, I congratulate them for their attention to the NSCF. It's nice to know someone is out there if you need help.

Some hams do not use 5-2 but instead use secondary channels. They tell me they consider 5-2 an Emergency Channel and do not want to tie it up. I encourage them to continue to use the NSCF. How would any of us know someone is listening if nobody uses it? All they have to do is leave a long pause between transmissions to let a stranger in.

I believe so strongly in 5-2 that I have resurrected my old Clegg MK-3 crystal rig and permanently mounted it in my car. To ease congestion under the dashboard, I mounted the radio in the trunk and ran mic, speaker and on-off wires to the front of the car. I preset the 2 W volume control for comfortable audio even with the windows open. The Clegg puts out 15 W of RF and uses direct FM so I always get good reports. A 2 by 4 speaker is Velcroed under the seat and is out of sight. The rig can't be seen and therefore I never have to remove it when I park in strange places. Having the rig preset means I never have to take my eyes off the road to check a display or the positions of dual function push buttons.

With a designated 5-2 setup, your favorite multi-band or HF/combo rig doesn't have to do double duty, which means only one duty at a time. It can supplement your mobile or home base operations and be a great help to others in time of need. *5-2 should be for you.*—*J. M. (Mike) Shaw, K2LRE, Caldwell, New Jersey*

THOSE DIRTY DEEDS

♦W1CLL's letter in June 2002 *QST* is based on a simple assumption, and one that the courts use when ruling on cases involving deed restrictions: that the home buyer has a meaningful choice between buying property with them and property without them. Unfortunately, in many places around the country, this is simply false.

When I was looking for a house in the Houston area several years ago, it was literally impossible to find one in any neighborhood constructed since 1970 that did not have severe restrictions against anten-

nas, if not an outright ban. Developers write antenna prohibitions into deed restrictions as a matter of routine. To buy a house without such restrictions means living in a much less desirable area.

Should we be in a position of telling people to move to the inner city, or far out into the country, in order to enjoy ham radio? That's exactly the situation now.

I agree that we need volunteerism, mentoring and tutoring. They won't do a bit of good, however, if those we mentor can't use the privileges they earn. Deed restrictions are killing ham radio as surely as anything else.

The situation in Scarborough, Maine might well be different from Houston. I suggest W1CLL examine the question around the country before deciding we're all out to "promote our cause to the exclusion of the rights of others." If deed restrictions are allowed to proliferate, we won't have a cause to promote.—*Jay Maynard, K5ZC, Fairmont, Minnesota*

ACCESSIBLE GEAR

♦I must admit that I disagree with a letter written regarding the use of computer control programs to make up for the small controls on radios [Correspondence, Apr 2002]. Being blind, I fail to see how this will help. Sure, the control programs may be nice and enhance radios, but where does that leave us? Why must amateurs with disabilities be denied the hobby they love and enjoy? After all, we studied hard and passed our exams just like everyone else.

My solution is a simple one. If only we could "lobby" radio manufacturers to make controls larger again, and integrate speech synthesizers into more radios (ICOM and some others already do this in a few of their mobiles), hams with disa-bilities, as well as others, would benefit greatly. And, heck, even operating radios in the dark would become easier.—*Nick Rothermel, N8WLE, Columbus, Ohio*

ALIVE AND WELL

♦Your correspondent W. A. Brown [Correspondence, May 2002] might like to know that electronic construction is alive and well at *audioXpress* magazine, a monthly dealing with all aspects of audio electronics construction. We also publish a full line of books dealing with the basics of solid state, loudspeaker and tube technology. Details on all our offerings are available on our Web site: **www.audioxpress.com**. We've been doing this for 32 years and share Mr Brown's enthusiasm for hands-on experience.—*Ed Dell, Peterborough, New Hampshire*

LIFETIME OF LEARNING

♦Re the note from Mr Brown [Correspondence, May 2002]: I think you're missing a point about ham radio. It is the opportunity to explore and extend your education in communication electronics. On page 9 it states that ARRL is an association "for the promotion of interest in Amateur Radio communication. . . ." Similarly the ITU (International Telecommunication Union) describes "amateur service: A radiocommunication service for the purpose of self-training, intercommunication . . ."

Ham radio is diverse, and can include self education in electronic hardware. It offers the ability to learn and try things out on the air. But it does not prevent you from getting education elsewhere. Education comes in many ways, from the classroom, from books and from getting your fingers into hardware. As you indicate, books are an excellent tool, but curiosity is needed to drive one to gain answers to questions by research.

For example, you indicate that you didn't understand A_L in an article, did you contact the writer to ask for an explanation, a clarification or for information as to where to look for more information (try **www.micrometals.com**)? Or did you contact the eBay person and ask for the publisher and ISBN number for the book? The point is, part of self education is digging for the facts. Getting on the Web and searching newsgroups is another way to find help. I am interested in old radios so I read **rec.antiques.radio+phono**. This group ranges from interest (but no technical knowledge) to experts. People post questions and get answers, an excellent way to learn from others, but not as good as doing it yourself. Have you considered starting a Q & A session on your repeater? With the linking coverage I am presuming that there are experts out there that you might entice into supporting the sessions on a periodic basis.

Excellent resources are the *ARRL Handbook*, articles in *QST* and other publications. One I like is *Nuts & Volts* (**www.nutsvolts.com**); contact them for a free copy. You comment about reprinting old articles: why? ARRL offers both CD ROMs and article photocopies. You can search for some of them at ARRL's site. As far as tube information, I would suggest searching for back copies of the *ARRL Handbook* in the '50-'70s era.

As I have told my Novice/Tech students, the 10 week class is only to get them educated to pass the test, not to provide them all of the education they will need. This is just the beginning for a lifetime of learning.—*Denis Kuwahara, K2TEA, Steilacoom, Washington* QST

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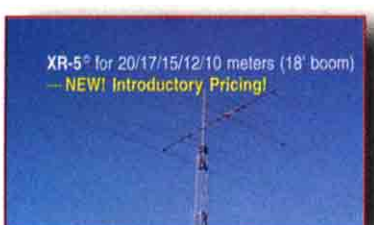

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By Phil Salas, AD5X

A Simple and Portable HF Vertical Travel Antenna

How to build a portable, efficient antenna without bursting your budget.

With all the small HF rigs available today, the ability to take an HF station on business trips, vacations, family visits, camping and other activities is becoming very easy. Often, the limiting factor is an effective portable antenna to go with the radio. As I'm sure most of you know, the bigger the antenna the better the performance. I usually prefer a full-size dipole. Depending on your location, a dipole may be inconvenient because it needs some form of support. I decided to look into building an inexpensive, portable, vertical antenna for use when a dipole is not practical.

My goal for this antenna was for it to be as long as possible so as to maximize its radiation resistance and hence, efficiency; yet it must also be easily packed in a small suitcase. In addition, it needed to be multiband, covering 40 through 10 meters. The parts needed had to be readily available and, of course, it shouldn't break the bank! Finally, I wanted the antenna to provide low (nearly 1:1) SWR so no antenna tuner was needed.

The resulting antenna described here breaks down into three 2-foot mast sections, a small center-loading coil (air-wound for efficiency), a short telescoping whip and a small base support. When the antenna is put together (a matter of minutes), it has a total height of about 12 feet.

Read through all the directions first to become familiar with the project, but don't be intimidated by all the assembly directions. This antenna is easier to build than it is to explain how to build it. No more than about two hours should be necessary for its construction.

Gathering the Parts

Except for the loading coil, all parts are available from either your local hardware store or RadioShack. I obtained the loading coil from Surplus Sales of Nebraska (www.surplussales.com). The coil (Miniductor 4027) is 2 inches in diameter by 10 inches long, with 10 turns per inch of 16-gauge wire. The cost is $15 for one of these coils. As this price, it is not worth trying to build your own coil, and you'll have enough of the coil left over for other projects (maybe a second antenna for a friend?). The complete parts list is shown in Table 1.

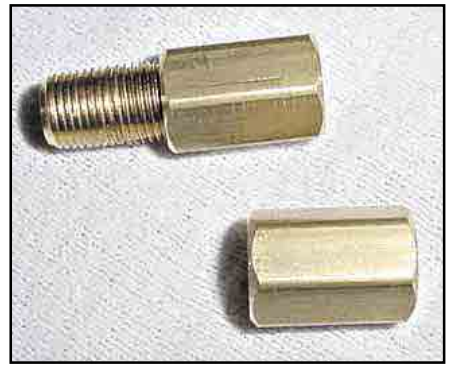


Figure 1—Nipple (top) and coupling (bottom).

Riser Preparation and Assembly

First, screw each of the three 0.7-inch 1/8-NPT nipples into three separate 1/8-NPT couplings. Screw these in as tight as you can. I used pliers to screw the coupling on

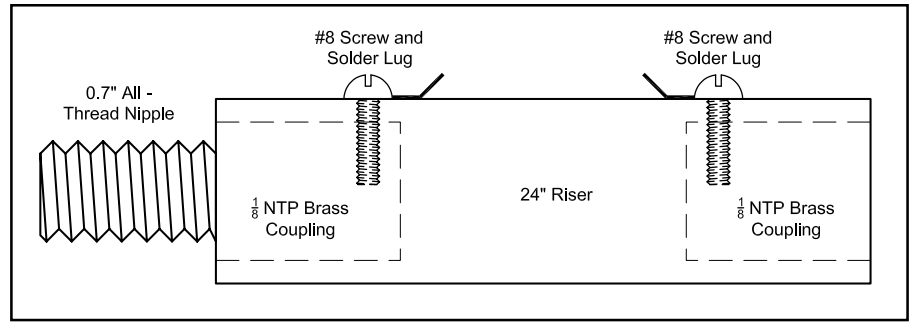


Figure 2—Middle section assembly.

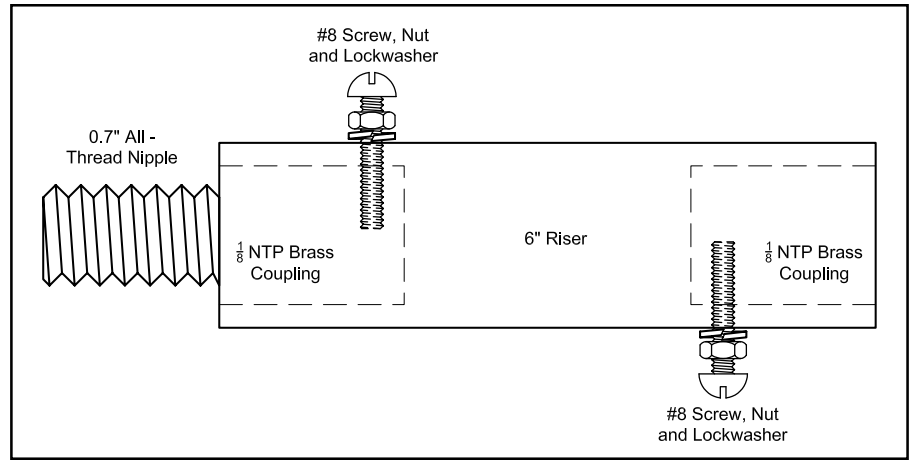


Figure 3—Coil section assembly.

Table 1
Parts List

Qty	*Description*
1	Coil, Miniductor 4027, Surplus Sales of Nebraska
3	24-inch sprinkler system risers[1]
1	6-inch sprinkler system riser
1	¾-inch PVC-T
1	¾-inch to ½-inch PVC adapter
2	¾-inch PVC threaded plugs
7	1/8-NPT brass couplings
3	1/8-NPT 0.7-inch all-thread nipple "NIPPLE 1/8-inch × CLOSE"
1	1/8-NPT 1-inch nipple
2	#8 × 1¼-inch brass screws
6	#8 × ½-inch brass screws
2	#8 brass nuts
8	#8 copper-plated steel split lock washers
8	#8 brass flat washers
1	3/8 × 12-inch threaded brass rod
2	3/8-inch brass nuts
2	3/8-inch brass flat washers
2	3/8-inch copper-plated steel split lock washer
6	#6 stainless steel 3/8-inch sheet metal screws
1	72-inch telescoping antenna (RS 270-1408)
1	Chassis-mount SO-239 connector (RS 278-201)
3	Banana jacks, 2 red and 1 black (RS 274-661)
10[1]	#14 solid copper house wire, insulation removed
10	¼-inch solder lugs

Note: RS is RadioShack.
[1]The adjustable center-loading coil will be a little over 6 feet above the ground. If this is too high, you may wish to change one or more of the 24-inch risers to 18-inch risers, or place the coil assembly between the second and third riser.

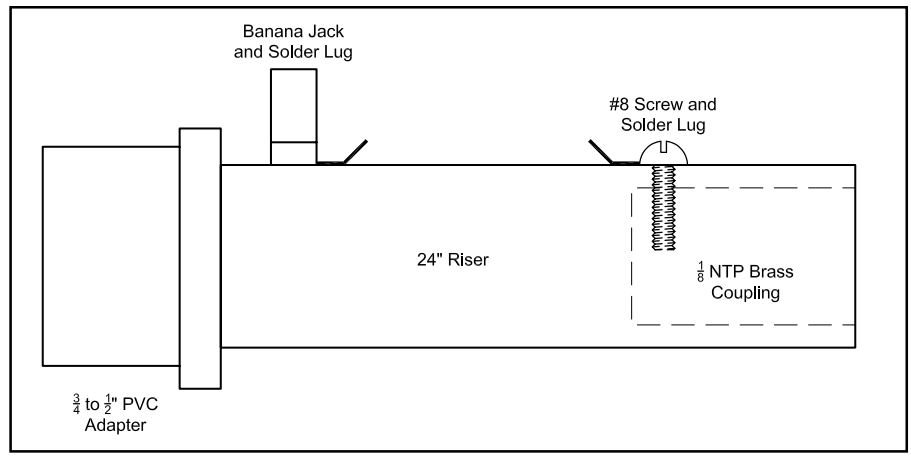


Figure 4—Bottom section assembly.

each end of a nipple as tight as I could. Then I unscrewed the couplings. One end will break loose right away, and the other will stay tight in the remaining coupling. Next, heat up each nipple/coupling assembly with a large soldering iron and carefully run a bead of solder around the nipple/coupling interface. See Figure 1.

Now insert the couplings *without* the nipples into one end of each of the four sprinkler system risers (one 6-inch and three 24-inch risers). I found this to be a very tight fit on some risers, so you may need to gently tap these in place so they are flush with the ends of the risers.

Next insert the remaining three 1/8-NPT couplings (with nipples) into the opposite ends of two of the 24-inch risers, and the 6-inch riser. See Figures 2 and 3. Remember, one of the 24-inch risers does not have a nipple/coupling installed. Again, these nipple/coupling assemblies may need to be tapped into place. To do this without damaging the nipple, insert the coupling-end of the nipple/coupling assembly into the riser as best you can. Then place the nipple-end on a piece of wood, and gently tap the opposite side of the riser with a hammer until the coupling is fully seated in the riser. Make sure that the nipples extend out of the risers.

Next drill and tap a #8 threaded hole through each end of the risers into the inserted 1/8-NPT brass couplings. Each of the inserted 1/8-NPT couplings is 0.7-inches long. Measure back from the end of each riser 0.5-inch and drill a hole (#29 drill, 0.135-inch diameter) through the riser and one side of the brass coupling. The holes should be positioned on the same side of the long (24-inch) risers, and on opposite sides of the short (6-inch) riser. Tap the holes with a #8 tap. Insert the ½-inch long brass screws with lock washers and flat washers into the tapped holes in the 24-inch risers.

Now, insert each of the two #8 1¼-inch brass screws through a #8 nut, lock washer and flat washer. Screw them into the tapped holes on the 6-inch riser. Leave most of the screw protruding out from the riser. Tighten the nut to secure everything in place. These screws will be used for the coil support.

Remember that one of the 24-inch risers did not have a nipple/coupling assembly installed. This riser is the bottom antenna section. To prepare this section, drill a 1/8-inch hole in the riser just above the open threaded end of the riser. Into this hole, mount a red banana jack with its associated solder lug mounted on the outside of the riser. After you get everything tightened, you might want to drip a little epoxy on the mounting screw inside the riser to keep the banana jack from coming loose. Next, screw this end of the riser tightly into the ¾ × ½-inch PVC bushing. See Figure 4.

It is finally time to install the antenna wires. Strip the insulation off of three 30-inch pieces of #14 solid copper house wire. Solder one end of each of the three wires to a #8 solder lug. Attach each of these solder lugs to the brass screw on one end of each of the 24-inch risers. Now wrap two turns of the wire around each of the 24-inch PVC risers and determine where the wire should be cut and another solder lug attached to connect the wire under the far-end brass screw on each riser. The bot-

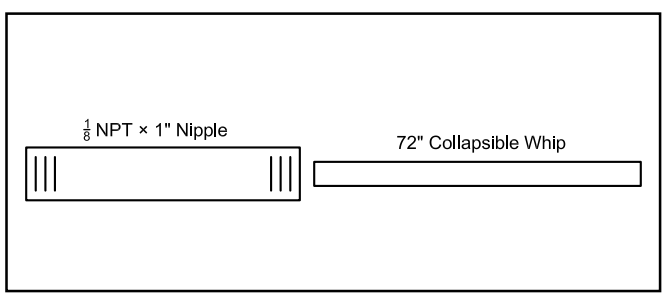


Figure 5—Collapsible whip assembly.

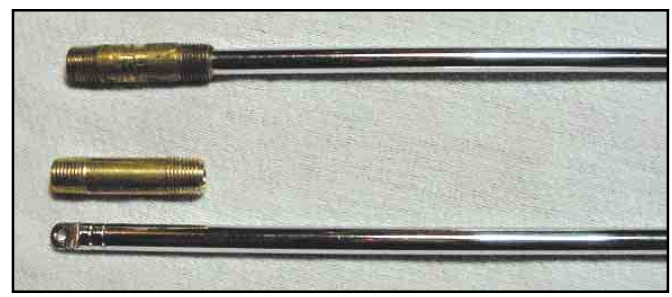


Figure 6—Whip and coupling.

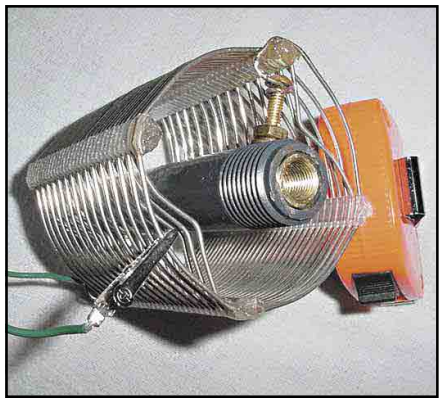


Figure 7—Coil assembly.

tom section riser should already have a solder lug attached under the banana jack.

Collapsible Whip Preparation

File the plating off the small mounting stub at the base of the RadioShack 72-inch collapsible whip antenna. Once the bare brass is exposed, tin this with solder. Now insert the whip antenna base into the 1/8-NPT × 1-inch brass nipple such that the antenna base is just below the lip of the nibble. Temporarily hold these pieces together with some masking tape. Now heat the nipple with a soldering iron and solder the brass antenna base to the inside of the nipple. See Figures 5 and 6. Incidentally, I did find that some brass nipples were a little small on the inside to pass the collapsible whip. Nipples I purchased at True Value Hardware cleared the whip, and nipples purchased at Home Depot did not. If you can't find a nipple with a 0.275-inch ID, you can easily drill it out with a 9/32-inch drill bit.

Loading Coil Assembly

Cut off a 5-inch length of the Minductor 4027 coil. Unfold about half a turn from each end of the coil. On one end of the coil, solder a 6-inch piece of insulated wire terminated with an alligator clip. Using a screwdriver, indent every other turn of the coil. Finally, solder the coil leads to the brass screw heads on the 6-inch riser (adjust the brass screw lengths as necessary). The coil end, with the clip lead soldered to it, should be on the end of the riser that has the brass nipple showing. See Figure 7.

Base Assembly

The base can be built easily just by referring to Figures 8 and 9. First, drill a 3/8-inch diameter hole into each of the ¾-inch PVC threaded plugs (one plug will be used for the ground support 3/8-inch threaded rod, the second plug will be used for the SO-239). Note that the plugs are threaded and the T is smooth. I used threaded plugs since they slip easily into the T. They will be held in place with #6 sheet metal screws. I also cut off about half of the threaded part of these plugs so as to leave more room inside the PVC T for the wiring. Place the SO-239 temporarily over the 3/8-inch hole just drilled in one of the ¾-inch threaded plugs and mark the location for two #6 stainless steel machine screws which will hold it in place. Also mark four points on the T as shown for the #6 stainless steel screws that will hold the two ¾-inch threaded plugs in place. Before finally connecting the SO-239 to the base, solder wires to the center conductor and to the ground for connecting to the internal connections as shown. You will probably need to file out a little more of the hole in this threaded plug so as to easily pass the ground wire. I used a short piece of copper braid from a piece of RG-58 cable from the SO-239 ground to the black ground banana jack, and soldered the end directly to the 3/8 × 16 brass nut. Drill 1/16-inch diameter holes for the six stainless steel sheet metal screws and complete the assembly of the base. I rounded the end of the 3/8 × 16-inch brass rod with a file to make pushing the base into the ground a little easier. I didn't sharpen the end, since this could cause a problem if you are trying to carry this through airline security!

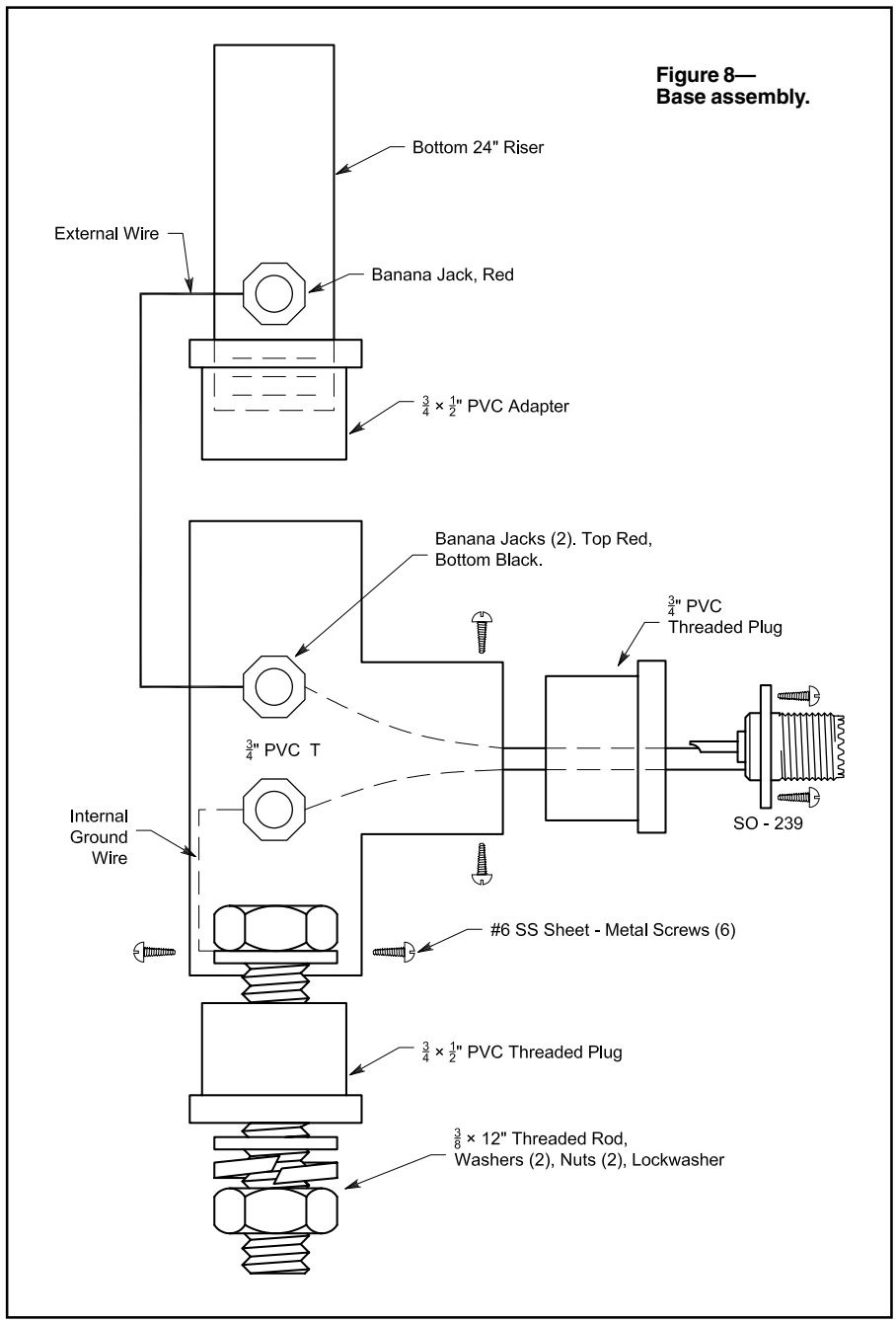


Figure 8—Base assembly.

Figure 9—Base, prior to final assembly.

Figure 10—All of the antenna components.

Finally, attach ¼-inch spade lugs to each end of a 2½-inch long piece of bare #14 copper house wire. This will be the piece of wire that is used for attaching the base assembly to the bottom section of the antenna.

Ground Radial Network

To minimize your ground losses, you really need some form of ground radials. These radials should be at least as long as the antenna is high. Therefore, I made six 12-foot radials using #22 insulated wire. Almost any gauge wire, insulated or not, can be used here. In my case, I attached all the wires together and to a ¼-inch spade lug on one end. This lug will attach to the lower black banana jack on the base assembly. You may wish to have six separate ground wires with their own spade lugs as unraveling the six folded-up radials takes longer than putting the rest of the antenna together. On each outer end of the radials, I soldered a 1-inch long piece of brass 1/8-inch rod. These ends are then pushed into the ground to help hold the radials in place.

The entire antenna, broken down into individual pieces, can be seen in Figure 10.

Antenna Assembly

To assemble the antenna, first press the bottom antenna section (24-inch riser with banana jack) into the top of the base assembly and attach the 2½-inch length of interconnecting wire between these two red banana jacks. Then screw one of the remaining 24-inch risers into the top of the bottom antenna section (finger tight). Push this base/riser assembly firmly into the ground, keeping it as vertical as possible.

Now, assemble the remaining 24-inch riser with the loading coil assembly and the collapsible whip. Again, finger tight is all that is necessary for all brass fitting interconnections. Extend the whip, and screw this entire assembly into the open end of the 24-inch riser that is available on the assembly pushed into the ground.

Finally, extend the six radials, and attach the common end to the bottom black banana jack on the base assembly. See Figure 11.

Initial Antenna Setup

The idea here is to find permanent adjustment points on the coil for each band. So, starting with 40 meters, use an antenna analyzer to find the coil tap that gives the best SWR. See Figure 12. Mark this tap point. Move to 30 meters and repeat. Repeat again for 20 and 17 meters.

For 15, 12 and 10 meters, the entire coil will be shorted out and the top whip will be adjusted for resonance in these bands. I marked the top whip with a permanent black marker at the points necessary for these bands.

Now pull the loading coil/collapsible whip top assembly off, and solder short pieces of wire to the tap points determined for the 40 through 17 meter bands. From this point forward, you can just go back to these tap points, or adjust the top collapsible whip, and not have to worry about making SWR measurements. You'll find that in all cases, the SWR is under 1.5:1.

Conclusions

I've described an inexpensive, yet efficient, portable vertical antenna for your operating excursions away from home. It assembles in minutes. While it is easily packed in a small travel bag or suitcase, you'll be amazed at the performance of this antenna. And, you'll have the pride associated with knowing that you built it yourself!

Photos by the author.

Phil Salas, AD5X, has been a ham for 38 years and is an ARRL Life Member. He holds a BSEE from Virginia Tech and an MSEE from Southern Methodist University. He is currently Director of Hardware Engineering at Celion Networks in Richardson, Texas. At home he shares his station with his wife Debbie, N5UPT, and daughter Stephanie, AC5NF. You can contact Phil at 1517 Creekside Dr, Richardson, TX 75081-2913; **ad5x@arrl.net**.

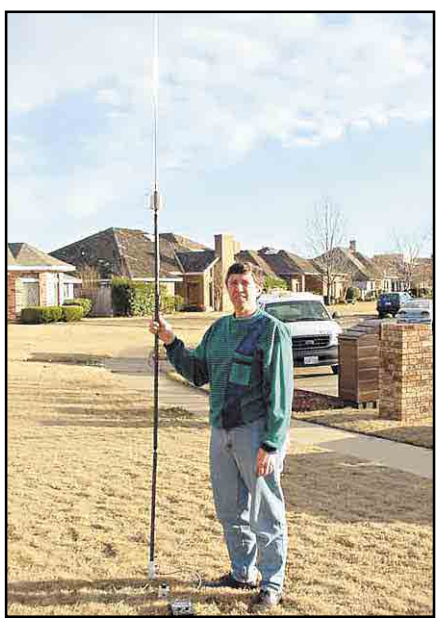


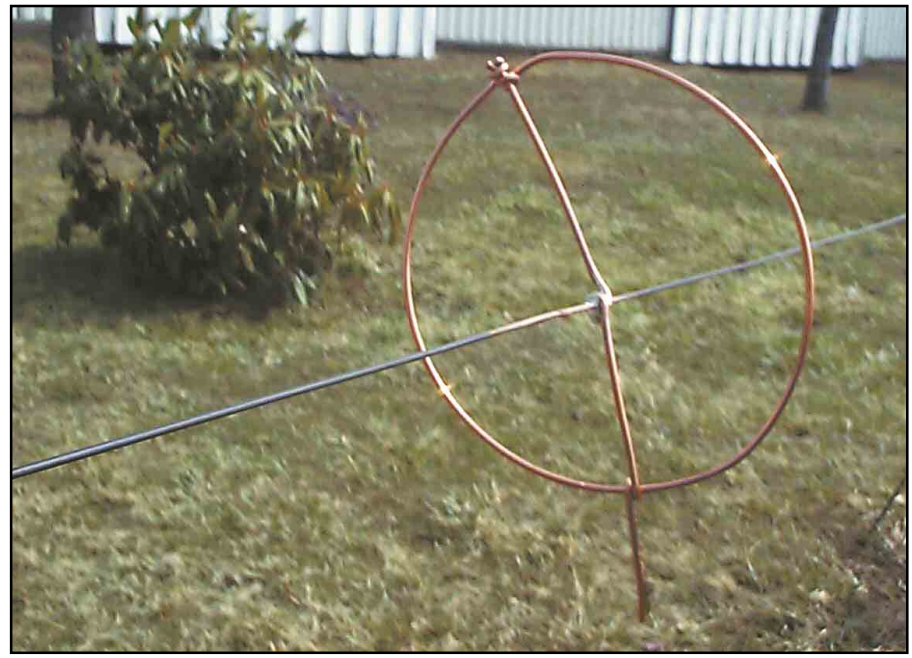
Figure 11—Phil, AD5X, and the finished antenna.

Figure 12—Finding the permanent adjustment points on the coil for each band.

By Sylvia Hutchinson, K8SYL

K8SYL's 75 and 10-Meter Dipole

On getting licensed, upgrading and entering the wide world of HF.



In June 2000, I retired after 36 years of teaching and moved from Connecticut to my native state of Michigan. At first, my days were completely consumed with getting settled into our house and working around the lawn and gardens. It wasn't easy, but it was fun.

As Labor Day approached, I had the feeling that it was time to get ready for school. The outdoor work, while not over, was under control. I had time for me, and because I wouldn't be teaching I decided to be the student.

Chuck, K8CH, had received his first ham license while we were still dating. Back then, I learned a phrase in Morse code because he would tap it out on my hand during church. Even today, I can recognize "I love you honey" at 25 wpm but I'm not sure if I'd recognize my own call sign at that speed. A few years later, I remember sitting in a school gymnasium with my husband of nearly a year as he handled messages for the Red Cross. It was interesting, but it wasn't for me—not then. I was a full-time student at Michigan State University, and my first son was on the way.

For 40 years I had watched Chuck enjoy operating his radio, and I knew he would like to share that with me. I too wanted to share it with him. It looked like fun, and now I finally had the time for Amateur Radio. Being a wife, mother and bilingual (Spanish) special-education teacher had been very demanding of my time. I decided to go for my Technician class license. We had a copy of *Now You're Talking!* on the bookshelf.[1] I spent about an hour a day studying, and in the process set the goal of achieving 100% on the exam.

In February 2001, I met my goal, passing the exam with a perfect score. (Thanks, HQ staff who wrote the book!) The first thing I did as a new ham was to send my money and application for life membership in ARRL. The second was to apply for a vanity call sign. I didn't want to be KC8QKB if I could be, say, K8SYL. Then I checked into the Ionia County ARES (ICARES) net on the N8ZMT repeater in Portland, Michigan. That's something I continue to do regularly. I had met these folks at their monthly Saturday morning breakfast meetings. They were all supportive and made me feel welcome.

One of the ICARES group is long-time family friend Donna Burch, W8QOY. As soon as I had that Technician class license, she and Myriam Gregg, K8ILN, began to encourage me to upgrade to General. I would have 75-meter privileges and could join The Auto State YL Net (TASYLs). That sounded like fun and besides I was ready to learn more code than "I love you honey."

Time to study for that General. Back to the books, this time *The ARRL General Class License Manual*.[2] I set the same 100% goal for the written exam as before, and thanks again to Larry, WR1B, and the ARRL HQ staff, I reached that goal.

I had learned the Morse characters a long time before, but now I needed to relearn the characters and build some proficiency. Chuck downloaded the program *Morse Academy* from the Internet and I got started. Soon after, we ordered *Morse Tutor Gold* software from ARRL and that became my favorite learning tool. Once my code speed began to approach 5 wpm, I started using W1AW code practice. I particularly liked the *Real Audio* files available online at: **www.arrl.org/w1aw/morse.html**. Those files allowed me to listen at my convenience. For other code learning ideas check out **www.arrl.org/FandES/ead/learncw/** on *ARRLWeb*.

My First HF Antenna

With my new General class license about to arrive, I wanted antennas for 75 and 10 meters. With help from Chuck, I put together a 120-foot center-fed dipole and we installed it about 35 feet high. This allowed me to join the other members of the TASYLs on their weekly 75 meter (3940 kHz) net. With leg lengths of 60 feet, my dipole was resonant at 3.900 MHz and the 2:1 SWR points were at 3.830 and 3.980; see Figure 1. It was good enough for my purposes, so we didn't bother pruning it further.

I was doing very well on 75 meters, but what was I to do for 10? Chuck had a

[1]Notes appear on page 34.

partially built 10-meter ground-plane antenna in the basement that he was building for the book he was writing.[3] That was nice, but that ground plane wasn't going to do me much good until it was finished and he was working on other chapters. I wasn't going to wait. One afternoon I was tuning across the 10-meter band when I heard KP4NU calling CQ from Caguas, Puerto Rico. I really wanted to have a QSO in Spanish, so I did what you would probably do—I called José using my 75-meter dipole (after first engaging the internal antenna tuner in my transceiver). I had a nice QSO. Was it luck, good conditions or what? After I bragged about my contact, I asked Chuck what he thought about it.

The Explanation

We both knew that a dipole is resonant on odd harmonics (3rd, 5th, 7th, etc), but 28 MHz is 8 times 3.5 MHz. That's true, but my dipole is cut for the high end of the band—closer to 4 MHz. Hmm, 4 times 7 is 28, and harmonic resonance is higher than one would expect. In other words, while you might expect that a 75-meter antenna that is resonant at 3940 kHz would have a 7th harmonic resonance at 27.58 MHz, it will actually be over a MHz higher.

We both understood the theory, but to better answer my questions Chuck next connected our MFJ-259B analyzer to the antenna feed line. The analyzer showed a resonance just below 29 MHz with an SWR of less than 3:1. He then modeled my antenna in *EZNEC*, which confirmed what the analyzer had just shown. At this point there were two options. The first was to leave well enough alone and use the transceiver's automatic antenna tuner.

The second option was to make my 75-meter antenna usable on 10 meters without the need of an antenna tuner. That's what we opted to do.

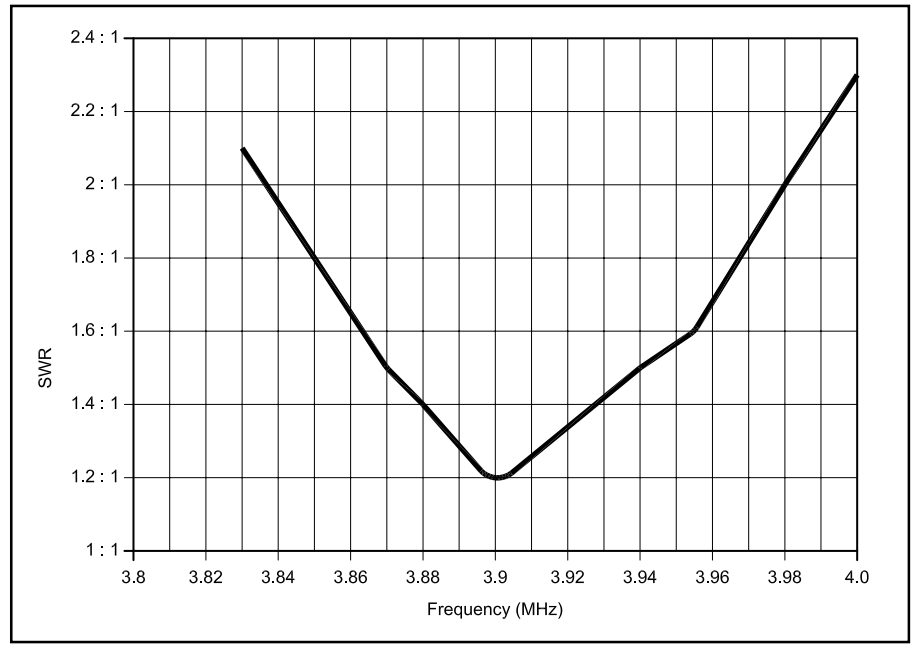


Figure 1—SWR of K8SYL's original 75-meter dipole with 60-foot legs.

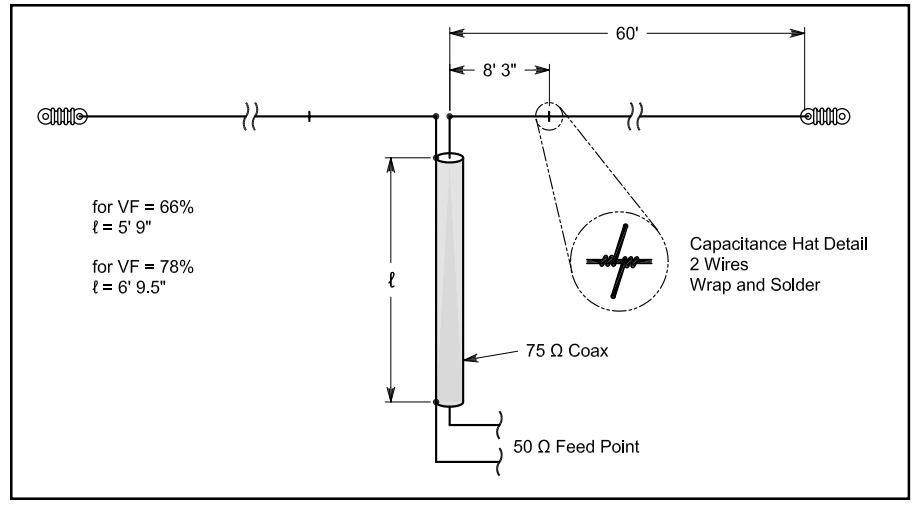


Figure 2—K8SYL's dipole as first modified for 75 and 10-meter operation. A quarter-wave section of 75-Ω coax transforms the 10-meter impedance. Capacitance hat wires wrap securely around the dipole and are soldered. They extend about 5 inches from the main dipole wire. See text for tuning instructions and final dimensions. This drawing is not to scale.

The Design

We had to deal with two issues in order to use my dipole on 10 meters. The first was to improve the 10-meter match without upsetting 75-meter operation. The second was to move the dipole's 10-meter resonance point a bit lower in the band.

At resonance on 10 meters, the feedpoint impedance is about 120 Ω. We used a calculator to confirm that a quarter-wave transformer made with 75-Ω coax would take care of the 10-meter impedance match. At the same time, the length of this coaxial transformer is short enough to have no significant effect on the antenna's 75-meter operation.

I used RG-11 to build the series-matching transformer. For low-power operation, RG-59 can substitute. The physical length of the stub depends on the velocity factor. My RG-11 (Belden 8238) has a 66% velocity factor, which means the stub is 5 feet, 9 inches long. If you use 75-Ω coax with a 78% velocity factor such as Belden 8213 or 8212, you'll need to make your stub 6 feet, 9.5 inches long.

I had built my antenna to cover the upper (General class) end of the 75-meter band. Chuck and I thought about lengthening the dipole to move 10-meter resonance to the vicinity of 28.4 MHz. The *EZNEC* model said it would only require 4.5-inch extensions to each dipole leg. The downside to this is that it moves the 75-meter resonance to 3.89 MHz, and that's lower than what I wanted. I asked if we could find a method to lower the 10-meter resonance without substantially moving the 75-meter resonant frequency? Chuck had an affirmative answer.

He told me that Rus Healy had described adding capacitance hats on a 40-meter dipole to move the 3rd harmonic resonance lower in the 15-meter band.[4] We could use a similar technique to lower the 7th harmonic resonance of the 75-meter dipole. In the case of my antenna, *EZNEC* indicated that it took only the little bit of loading provided by a pair of short (3-inch) wires on each leg of the dipole. We modified my 75-meter dipole as shown in Figure 2. It was easy, and tune-up went smoothly.

Tuning the Antenna

First I'm going to explain the process to follow in tuning this two-band dipole. Then I'll tell you how it worked for me.

With the 75-Ω quarter-wave transformer section in place, tune the antenna for resonance in the upper part of the 75-meter band. As I found out through experience, you should do your tuning with the antenna in its final position. You'll need to trim for best SWR above about 3.89 MHz or you're apt to lose some 10-meter coverage. If you tune for about 3.925 MHz, you should cover the entire General class band of 3.850 to 4.000 MHz with an SWR of 2:1 or better.

Next, check the 10-meter resonant frequency. (For the dipole dimensions given in Figure 2, it was just below 29 MHz.) If you need to lower that frequency, add the capacitance hats as shown in the drawing. You may want to make the wires a bit longer to start with. Check the resonant frequency again—it will be lower. To raise the frequency you can trim the fingers of the capacitance hat or you can just bend them a bit. It's that easy—at least in theory.

Chuck used the support mast for my dipole to hold a 2-element 17-meter Yagi (a project for his book). That meant we had to move my dipole, and it ended up being only 28 feet above the ground. Between that move and the addition of the 75-Ω quarter-wave transformer, my dipole's 75-meter resonant frequency shifted another 20 kHz lower. To compensate, I ended up shortening each leg by 8 inches, making the leg lengths 59 feet 4 inches. This gave me an SWR of 2:1 or better across the entire General class portion of the 75-meter band (see Figure 3).

As you might guess, that raised the 10-meter resonant frequency so that the simple loading wires were not sufficient to give me good SWR at the lower end of the band. I used a couple of 16-inch lengths of bare copper wire to make capacitance hats. I formed these into circles by wrapping them around a piece of 4-inch PVC drainpipe. I then fastened and soldered the circles to the loading wires as shown in the title photo. As you can see, I didn't bother to trim the extra loading wire. This gave me coverage of 28 to 29.1 MHz with an SWR of 2:1 or better, as you can see in Figure 4.

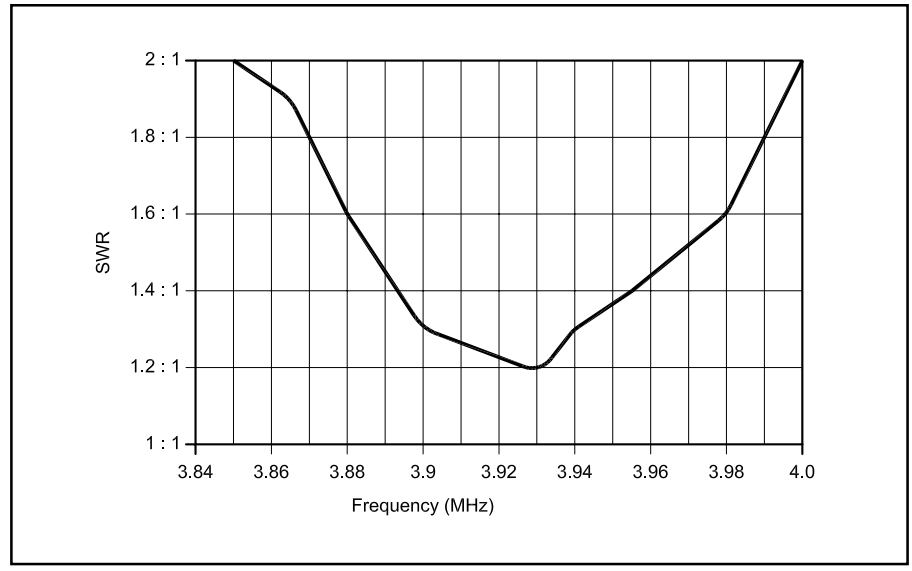


Figure 3—SWR of the modified K8SYL dipole after the two legs have been shortened to 59 feet 4 inches. The dipole now covers the entire General class portion of the 75-meter band with an SWR of 2:1 or better.

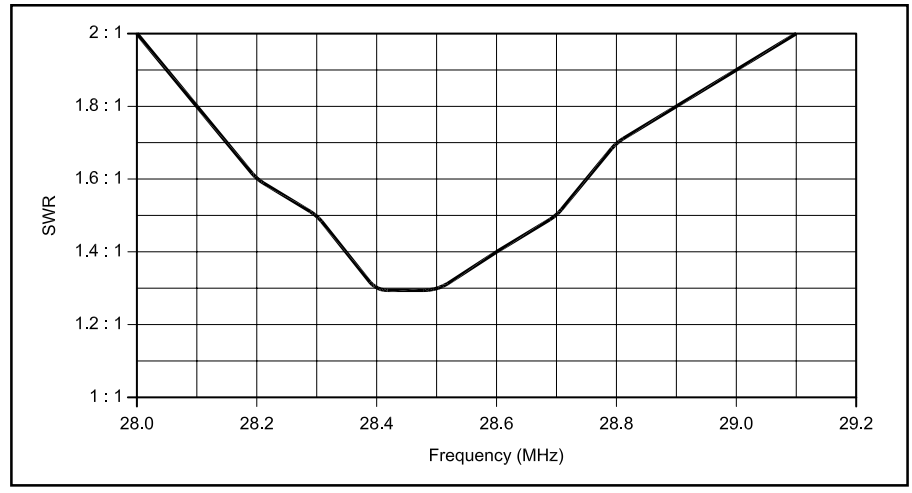


Figure 4—SWR of the K8SYL dipole covers over 1 MHz of the 10-meter band with an SWR of 2:1 or better. If you operate CW, you may want to lower the 10-meter resonant frequency by adding a bit more loading with larger capacitance hats.

The Results

I have been using my dual-band dipole for nearly a year with very good results. I make 75-meter contacts with ease. Okay, I don't chase exotic DX, but I have no trouble talking with my friends. On 10 meters, I'm able to make contact with the US and most of the world. Amateur Radio is really fun!

In case you're wondering, Chuck completed that 10-meter ground-plane antenna shortly after we finished this project. In head-to-head comparisons, sometimes his ground plane works better, and sometimes my dipole comes out ahead. The reason for that is wrapped up in the antenna patterns and angle of arrival of the signals. I could show you the theoretical patterns of our antennas, but you will probably put yours up in a different configuration. The point for telling you this is to let you know that it's always good to have a choice between antennas—especially when you're talking about simple antennas like dipoles and verticals.

Around here, we're pretty much convinced that my dipole has become a permanent fixture in our ham station. I'd like to get up it a bit higher for better 75-meter performance, but it works very well on 10 meters. Perhaps this is what you should try for your next (or first) HF antenna.

Notes

[1]L. Wolfgang and J. Kleinman, *Now You're Talking!*, ARRL, Newington, CT, 2000.
[2]L. Wolfgang, *The ARRL General Class License Manual*, ARRL, Newington, CT, 2000.
[3]C. Hutchinson and R. D. Straw, *Simple and Fun Antennas for Hams*, ARRL, Newington, CT, 2002.
[4]J. W. (Rus) Healy, *Antenna Here is a Dipole*, *QST*, Jun 1991, pp 23-26.

In addition to Amateur Radio, the author enjoys reading, gardening and spending time with family—especially her granddaughter, Briana. You can contact Sylvia at 9145 Bliss Rd, Lake Odessa, MI 48849; **k8syl@starband.net**.

By Hal Kennedy, N4GG

The N4GG Array

Need a simple, nearly invisible wire antenna with reasonable gain, low-angle radiation (for DXing) and multiband capabilities? Check out this long-overlooked design that requires no antenna tuner.

Having been relegated to a "no antennas," deed-restricted neighborhood five years ago, I started a search that's unfortunately becoming more and more familiar to hams everywhere. It's the search for a stealthy multiband antenna that has decent DXing performance. Wire antennas seem right for invisibility, but on-air testing of dipoles mounted close to the ground confirmed what seasoned hams and antenna modeling packages will tell you: A dipole mounted less than 1/4-wavelength above ground is essentially radiating straight up! The earth makes an effective, if lossy, reflector, and the emitted RF does a great job of warming the clouds. Low dipoles and inverted Vs are fine for local contacts, but are relatively poor performers for long-haul DX.

Searching through various antenna handbooks led me to consider verticals and a variety of vertical arrays, but the radial field usually required for efficient operation can't be practically implemented in my suburban setting. And even under the best of circumstances it's a major project. Ever try putting 60 radials for 80 meters on top of, or under, a grass lawn without your neighbors asking you what you're doing? Even the placement of ground-mounted verticals at my location was problematic. The vertical(s) would have to be inside a dense stand of trees or very near the house. Traditional verticals were out.

Self-contained verticals looked promising. These include delta loops and quad loops, among others. They yield low-angle radiation and do not require radials. They're also large and hard to operate on multiple bands without an antenna tuner. Closed loops cut for different bands often can't be fed in parallel. Most multiband approaches include some combination of relay switching, multiple feed lines, matching networks and antenna tuners. Did I forget to mention that in addition to gain, low-angle radiation and stealth, I wanted this antenna to be simple? Also, because I don't own a high-power antenna tuner, I wanted a reasonable SWR at the operating frequencies of interest.

Among the self-contained verticals is the *half square*, which looked like a nearly ideal approach except, again, for the difficulty in erecting a version that works on multiple bands without a tuner. The bobtail curtain also had possibilities, but it's usually shown fed at ground level against radials and is not inherently multiband in nature. It was time to fire up *EZNEC* and see if some new variation of a self-contained vertical could be devised. A few hours later the N4GG Array debuted—at least on paper!

Design Details

Technically, an N4GG Array consists of two top-fed, 1/4-wavelength verticals spaced 1 wavelength apart, fed 180 degrees out of phase. Think of the array as a bobtail curtain with its center wire replaced by the feed line. Bobtails aren't particularly well-known, so if the bobtail analogy is hard to grasp, think of the N4GG Array as a 3/2-wavelength horizontal dipole with the last 1/4 wavelength of wire on each dipole leg bent at 90 degrees (hanging vertically). Figure 1 shows a bobtail antenna (A) and the single-band version of the N4GG Array (B).

Not too familiar with a 3/2-wavelength dipole? If you've ever used a 40-meter dipole on 15 meters, you were using a 3/2-wavelength dipole. Figure 1B shows the current distribution along the wires. Note that maximum current (and therefore maximum RF radiation) is at the *top* of the antenna. The antenna is center-fed with coax and should include a 1:1 current-type balun.

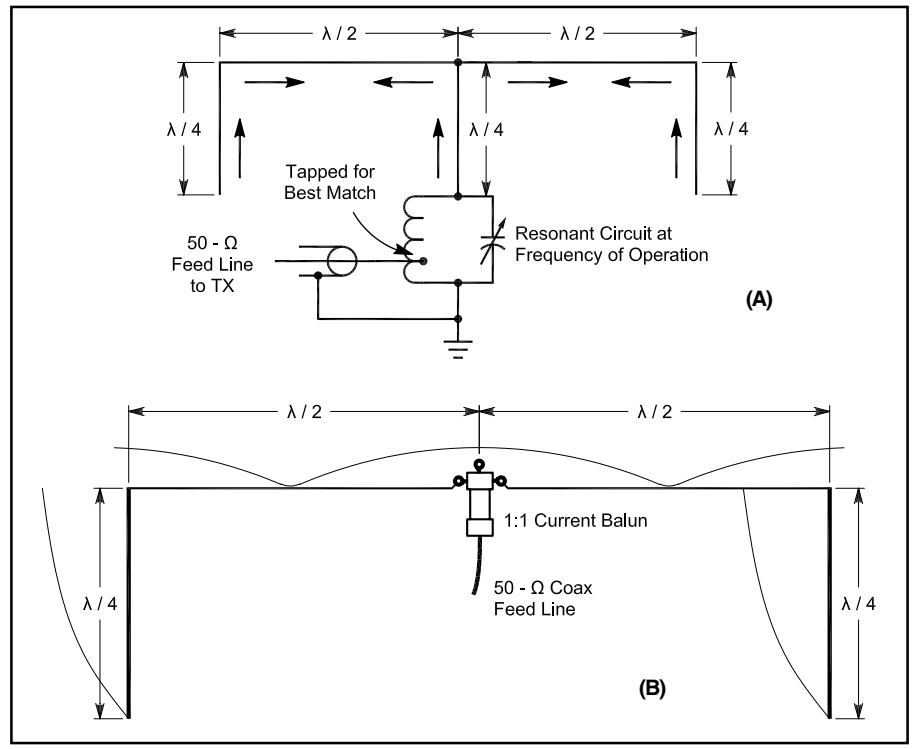


Figure 1—A bobtail curtain (A) compared to the N4GG Array (B). The diagram of the N4GG Array shows current distribution. The antenna is essentially a 3/2-wavelength dipole with the outer 1/4-wavelength part of each dipole leg hanging vertically.

The elevation radiation patterns for an N4GG Array and a dipole at the same height are shown in Figure 2. The outer circle in the figure is +5.96 dBi. The gains of the antennas are equal at a 23.5-degree take-off angle, but the gain of the N4GG Array is approximately 3.4 dBi higher than that of the dipole at elevation angles of between 10 and 15 degrees, and a whopping 11 dBi higher at 5 degrees.

For DXers, the Array's dismal performance at high take-off angles is just as important as its excellent low-angle performance. For DXers, high-angle reception is simply a source of interference and additional atmospheric noise. Straight up, the gain of the N4GG Array is more than 20 dB below that of the dipole. All of the data presented in this article was obtained using *EZNEC* 3.0, with the ground model set to "average, pastoral heavy clay." The elevation plots shown in Figure 2 are for the azimuth angle yielding maximum gain, which is 90 degrees (broadside) for the dipole, and 40 degrees from the plane of the horizontal wires for the N4GG Array.

A tremendous amount of information has been published lately about the effects of the number of radials used in a particular antenna, elevated radials and ground characteristics on the performance of vertical antennas. Restating it all here is beyond the scope of this article but, in summary, ground radials and the earth itself provide two things for verticals mounted near the ground: (1) a return path for antenna current and (2) a surface that reflects the lower half of the free-space radiation pattern upward, adding to the upper half.

Return-current losses are usually minimized by the use of radials, while radiation reflection losses are determined by the ground conductivity out to 10 wavelengths or more from the antenna (in most cases reflection losses are out of our control). Verticals work well over good-conducting earth and particularly well over or near saltwater. The N4GG Array follows these same principles, and radials aren't required, as the "return current" is within the antenna and nearly lossless.

The actual gain of an N4GG Array over a dipole, however, particularly at low elevation angles, will depend on the height of the antenna above ground and the conductivity of the ground underneath it. Figure 2 shows an installation with average ground conductivity and near-worst-case proximity to the ground. If your location has average ground conductivity you should be able to achieve at least the gain performance shown in Figure 2. Increased height and/or increased ground conductivity will yield even better performance.

Depending on your point of view, the azimuth radiation pattern of an N4GG Array could be considered one of its two drawbacks—the other being that the horizontal size is twice that of a standard dipole. The azimuth radiation pattern for an N4GG Array at an elevation angle of 25 degrees is shown in Figure 3. As you can see, the phased verticals produce nulls both broadside and along the plane of the horizontal wires, together with four peaks that occur at 40 degrees from the horizontal wires. If a truly omnidirectional antenna is what you want, this antenna doesn't quite fill the bill. But how bad is it?

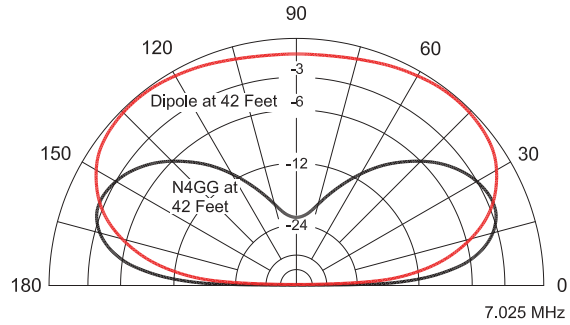


Figure 2—Comparison of the elevation radiation patterns of an N4GG Array and a dipole, both mounted at the same height, close to the ground. The outer ring is +5.96 dBi.

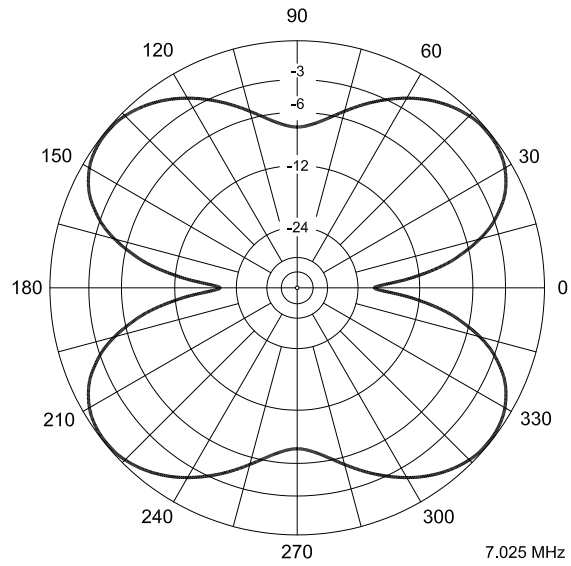


Figure 3—Azimuth radiation pattern for a "close to the ground" N4GG Array at an elevation angle of 25 degrees. Note the dipole-like nulls along the horizontal wires and the pattern dips broadside to the horizontal wires. As modeled, the antenna is not omnidirectional.

As modeled, the –3 dBi azimuth beamwidth of the antenna is 187 degrees out of 360 degrees, and the deep nulls along the horizontal wires are very narrow and not much different than those of a dipole. The "as modeled" pattern could actually be used to your advantage. At my mid-Atlantic location, an N4GG Array could be positioned to provide peak gain toward Europe, Africa, VK/ZL and JA—not bad! But maybe not so good, either, as the broadside pattern dips would be toward South America and parts of Asia.

The real answer to how objectionable the departure from an omnidirectional pattern is lies in a fuller investigation of the modeled performance, the difference in real antenna performance compared to idealized models and some on-air observations.

The model indicates that the broadside pattern dips lessen as elevation angle increases. Some DX signals arrive at higher elevation angles, particularly during band openings and band closings on the lower frequencies. More importantly, the models are idealized in all respects except for the characterization of the earth, which is set to a point-estimate that may or may not accurately reflect a specific location. The actual radiation pattern for a real N4GG Array will depend on proximity to local objects, local topology, actual ground characteristics, and so on.

I decided simply to put one up to get some real-world results with respect to the modeled antenna and its theoretical radiation pattern. My on-air observations are at the end of the article, but I can assure you that the strength of long-haul DX signals—from any direction—is nearly always better on my N4GG Array than on a reference dipole at the same height, and is *never* worse than equal. On a receive signal-to-noise basis, the N4GG Array is always better, which is understandable given its lower gain at high elevation angles.

The dimensions for an N4GG Array are L_1 (feet) = 489/f (MHz), and L_2 (feet) = 257/f (MHz), where L_1 is the length of each of the two horizontal wires, and L_2 is the length of each vertical wire. These formulas are correct for a height of approximately 0.3-wavelength above ground and will vary slightly as a function of height.

As with most wire antennas, it's reasonable to make the antenna a bit larger than the formula suggests (in this case the vertical sections) so the antenna can be trimmed for minimum SWR at the desired operating frequency. Beyond trimming for SWR, the dimensions are not critical to performance. At resonance and at 0.3-wavelength above average ground, the feed-point impedance is 73 Ω, providing a near-perfect match for 75-Ω coax and less than 1.5:1 SWR when fed with 50-Ω coax. Using 50-Ω coax, the 2:1 SWR bandwidth on 20 meters is greater than 200 kHz.

Table 1 provides dimensions and some operating characteristics for single-band HF N4GG Arrays. The table values are for arrays where the bottom of the vertical wires are 7 feet above the ground (out of harm's way) and for resonant frequencies where the 2:1 SWR envelope starts at the lower band edge (for bands other than 30, 17 and 12 meters), or at the center of the band (for 30, 17 and 12 meters, which are entirely contained in the 2:1 SWR envelope). The 2:1 SWR bandwidths shown are for 50-Ω feed line.

An important consideration in achieving reasonable performance is to keep the feed line from radiating and becoming an additional antenna element. This can happen by not using a balun at the feed point to make the transition from an unbalanced transmission line to a balanced antenna. A high-quality 1:1 current-type balun should be used at the feed point to prevent this problem.

A nice feature of an N4GG Array is that the fields from the two vertical radiators cancel at the center of the antenna, resulting in no parasitically induced current on the shield of the coax feed line (at least in theory). In practice, the near-field radiation pattern from the verticals may not perfectly cancel, and the feed line placement may deviate somewhat from the ideal. Induced current on the coax shield should be sufficiently small to not affect the antenna's performance significantly, however.

Let's Build an Array

Construction of an N4GG is straightforward. Physically this is just a center-fed dipole of twice the traditional length, with vertical wires at the dipole ends. "Invisibility" *and safety* dictate the exact construction techniques.

A few words about "invisible" antennas might be useful at this point. My various wire antennas have been built using 18 or 19-gauge galvanized steel wire, which is available at home supply stores and is very inexpensive. Copper would be somewhat better electrically, but the galvanized wire has good strength at nearly invisible diameters. Galvanized wire has only moderate life, however, and will eventually rust and fail mechanically. Copperweld is probably the best choice for strength and life, and it is good electrically.

Strength is particularly important if you're going to build a multiband N4GG, and a critical necessity if you do not have a center support for the feed line and balun. The vertical wires in an N4GG Array only support themselves and can be of a smaller gauge if necessary. Remember, however: the smaller the wire gauge, the narrower the bandwidth.

The galvanized wire takes on a dull gray finish after a few days outdoors, which helps with invisibility. I paint the insulators and the balun with flat gray spray paint. Feeding with RG-8X also helps, and I have found that RG-8X will handle 1.5 kW without problems as long as the feed line SWR is low enough (as it is with this antenna).

My multiband N4GG Array uses trees for skyhooks and a line tossed over another tree limb to support the balun and feed line at a height of 66 feet. The balun is very close to the center support tree limb and the coax runs down the side of the tree that can't be seen from the street. The antenna has been up for three years and has been detected only once, by a neighbor who strayed onto the property.

The vertical wires can be terminated with insulators and held taut by tying them to ground stakes with nylon or heavy-duty monofilament line. This approach is prone to breaking, however, if you are using trees for end supports, as the wind will cause the antenna to move up and down, stressing the lines and wires. I prefer to simply let the vertical wires hang, using two-ounce fishing weights at the bottom to keep them somewhat taut. This way, the vertical elements tend to swing in a breeze, but this isn't noticeable on the air.

N4GG Arrays can be installed as low as a $^1/_4$-wavelength above the ground, but two hazards arise when the vertical ends are lower than about seven feet above the ground. First, the bottom end of the vertical wires are obstacles for people and animals to run into (the use of "invisible" components makes this problem worse). Second, the lower end of the vertical elements are the high-voltage points in the antenna and can cause RF burns to people or animals that may be in contact with them while you're transmitting.

Use common sense during your installation and, if at all possible, install the antenna high enough to keep the bottom ends of the vertical elements above harm's way. If the ends *must* be near the ground, running the wires inside a few feet of 1-inch (or greater) PVC pipe can add significantly to safety, at some expense to stealth. N4GG Arrays can actually be installed even closer to the ground if linear loading, loading coils or capacitance hats are used to shorten the length of the vertical elements.

Simple Multiband Operation

What about multibanding? Simple fan-dipole construction allows connecting multiple N4GG Array wire sets to a common center insulator/balun. Figure 4 shows the schematic of a triband 10, 15 and 20-meter N4GG Array. Figure 5 shows the actual antenna, suspended

Table 1
HF N4GG Arrays—Dimensions and Characteristics

Resonant Freq (kHz)	*Height (feet)*	*L_1 (feet)*	*L_2 (feet)*	*Bandwidth (kHz) (2:1 SWR at 50 Ω)*	*Max Gain (dBi)*	*Takeoff Angle (degrees)*
1810	147.5	268	140.5	40	4.03	22.5
3525	80	137.5	73	45	3.54	23
7050	43.5	69	36.5	100	3.58	23
10,125	32.6	48	25.6	140	3.89	23
14,100	25	34.9	18	210	4.19	22.5
18,118	21.25	27	14.25	290	4.48	21.5
21,200	19.1	23.2	12.1	340	4.65	21.5
24,940	17.35	19.6	10.35	420	4.79	20.5
28,250	16.3	17.2	9.3	480	4.91	20

Note: The figures here assume that the bottom of the vertical elements will be 7 feet above the ground.

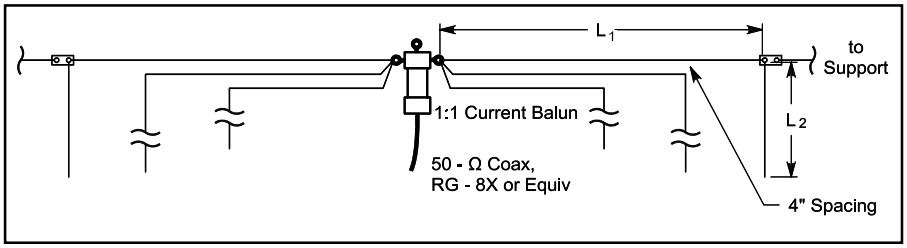


Figure 4—Fan-dipole construction of a 10, 15 and 20-meter N4GG Array.

Figure 5—A tri-band N4GG Array stretched out 3 feet above the ground for easy assembly. Half-inch PVC spreaders are used to separate the wires by 4 inches.

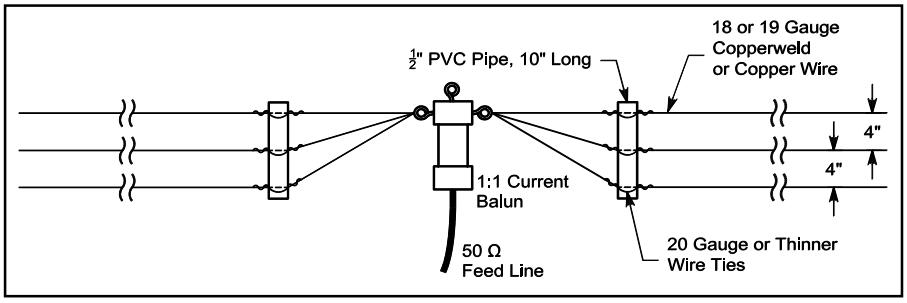


Figure 6—The Array wires travel through the spreaders and are secured with 20-gauge wire ties.

Figure 7—Close-up of the center insulator/balun of a tri-band N4GG Array. Note that all support of the lower wires is provided by the uppermost wires.

about 3 feet off the ground during assembly. Half-inch PVC pipe was used to hold the wire sets 4 inches apart. Figure 6 provides details of how the PVC spreaders were installed.

This is actually a four-band antenna, as the wires that make up the 15-meter N4GG Array are the length of a standard $^1/_2$-wavelength dipole on 40 meters. The antenna displays a low SWR on that band, but does not function as an N4GG Array there. On 40, the setup is simply a dipole with bent ends, and offers commensurate performance. The antenna's SWR is below 2:1 on all four bands and does not require the use of an antenna tuner.

Figure 7 shows a close-up of the center insulator/balun. After these pictures were taken, the balun and PVC spreaders were spray painted flat gray.

There is a second approach to multibanding that can yield an N4GG Array from an existing low-band dipole. Figure 8 shows the addition of the vertical wires for a higher-frequency N4GG Array directly onto the horizontal wires of a lower-frequency dipole. In this case no spreaders are used and there is only one connection to each side of the balun. This arrangement works because the vertical wires act as low-impedance stubs, inserted onto relatively high-impedance points on the horizontal dipole.

I added a set of 15-meter $^1/_4$-wavelength vertical wires onto an existing 160-meter dipole using this method, getting a second band essentially "for free." The addition of the 15-meter wires had no measurable effect on the 160-meter dipole. This approach can be used for adding one—or perhaps more than one N4GG Array—onto existing large dipoles. Before you start stitching vertical elements onto your monster dipole, be sure to see how things might play out by modeling the antenna first. For example, a 15-meter N4GG Array can't be added to a 40-meter dipole because they're both resonant on that band!

Actual Performance

Okay, so how well does one of these things actually work? Based on my observations, signals from stations that are more than 3000 miles away are typically a few dB stronger on my N4GG Array than on my dipole at the same height. For long-haul DX, this is the difference between working them and not. I added XU and XW as new countries lately—and I couldn't hear either station on the dipole. When 15 meters is hot, as it is now near the top of cycle 23, I can sometimes call CQ on the N4GG Array and start a pileup of European and Asian stations, something I've never accomplished with the dipole!

Your first impression operating with

an N4GG Array may not be good—mine wasn't. Tuning quickly, the whole band sounded down, both stations and noise. "Something's broken," or "These things don't work as modeled," were my first thoughts. If you put up an N4GG Array and it sounds dead at first, it's working—it's supposed to sound somewhat dead! Most of the signals we tend to hear when quickly tuning a band are close in. These signals—and much of the band noise—arrive at high elevation angles, where an N4GG Array can be 20 dB down from a dipole. After you get over how quiet the band sounds, find a DX station and switch between an N4GG Array and a dipole. That will put a smile on your face! Then try one in a major DX contest and get ready for even more smiles.

Make no mistake, this antenna isn't nearly as good as a decent Yagi. It is, however, the best DX antenna design I've found to date that offers stealth, low-angle radiation (even when installed close to the ground), tuner-free multiband operation when fed with 50-Ω coax, radial-free installation, simplicity and affordability. That's a lot of benefits in one package!

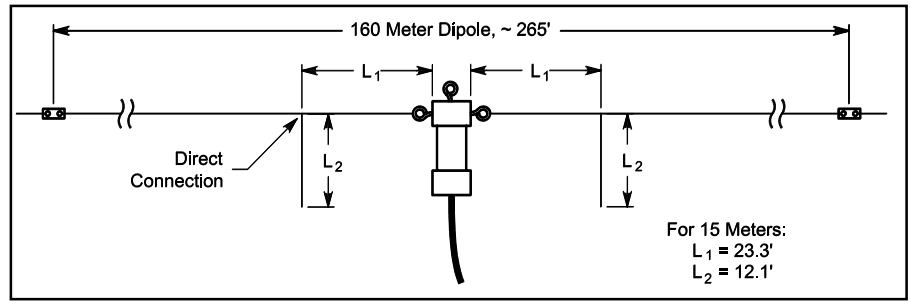


Figure 8—A higher-frequency N4GG Array can be formed by adding 1/4 wavelength vertical wires to a lower-frequency dipole.

Photos by the author.

Hal Kennedy, N4GG, is the Vice President for Technology Commercialization at Lockheed Martin Corporation. He was first licensed in 1961 and holds an Amateur Extra license as well as a General Radiotelephone license. He received a BSEE degree from Lafayette College and an MS in Management from The Sloan School at MIT. An ARRL and PVRC member, Hal spends his time DXing, contesting and trying to improve his signal from a suburban lot. The author may be reached at 110 Fox Trail Terr, Gaithersburg, MD 20878; **n4gg@hotmail.com**.

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FEEDBACK

◊ Through no fault of the authors, K1KP and N2EA, the caption of Figure 1 in "The ICOM 756PRO—A Cure for the Rumble" (Technical Correspondence, June 2002, page 68) is incorrect. It should read "Add a capacitor to cure audio rumble in the ICOM IC-756PRO" (and not the PROII as stated). The authors did not claim that the IC-756PROII had any audible rumble. The figure correctly shows the main board of the '756PRO. Also see the ICOM "Tech Talk" on page 149 in this issue for a response by ICOM to this Technical Correspondence.

◊ The right-hand photo in "At the Foundation," May 2002, p 100, was taken by Andrew McLuckie, K3AWM. The young man in the center of the photo is Brian Edelman, who made 22 contacts during his first on-the-air experience at the scout camp in Pennsylvania.—*K3AWM*

◊ The title of the book written by "VC" Angell, KCØEM [Strays, Jun 2002, p 50] is *The Last Holey Man*.

By Lew Gordon, K4VX

The K4VX Linear-Loaded Dipole for 7 MHz

Here's a very simple and practical way to make a short but efficient 40-meter dipole.

One of the easiest antennas to build is the half-wavelength dipole fed with coax. Every *ARRL Handbook* since 1930 contains the information required for constructing one. The only limiting aspect to the antenna is the space, or span, required to support it. This becomes a particular concern at the frequencies 7 MHz and below. While in my own personal situation space is not a problem, I decided to design a shortened dipole for use where space *is* limited.

At 7 MHz a standard horizontal dipole requires approximately 66 feet of wire, and with center and end insulators, approaches 68 feet between rope supports. Obviously one must add several more feet to the total span for support. My concept was to design a dipole that is approximately 70% of the length of a standard dipole, yet be very inexpensive and simple to construct. It also had to perform nearly as efficiently as a full-sized antenna. Linear loading seemed to be the simple way to go.

Linear Loading

Linear loading has been around for many years in the design of 80 and 40-meter Yagis. One of the first antennas I can recall was the Hy-Gain 402BA, a 40-meter, 2-element design with 46-foot elements on a 16-foot boom. Other manufacturers copied the concept in their Yagi designs. The shortened dipole presented here is the result of using computer modeling initially to verify the concept, and actual construction to verify the modeling. Not surprisingly theory and reality are very close.

In order to keep the design of this antenna inexpensive I decided that I would try 450-Ω ladder line as the linear-loading mechanism. I pursued two methods of applying the loading:

1. Inserting the loading midway on each side of the span, which requires two additional insulators.

2. Inserting the loading at the center, supported by the antenna wires.

After modeling with *NEC-2*, and later with *NEC-4*, I could see very little difference between these two methods. Since the first method requires two additional insulators, I chose the second method. Both modeling programs provided encouraging results and I decided to construct the antenna.

My initial construction consisted of a 46-foot span of #12 Copperweld fed in the center, and linear loaded with two 12-foot sections of 450-Ω ladder line[1] on

[1]Notes appear on page 42.

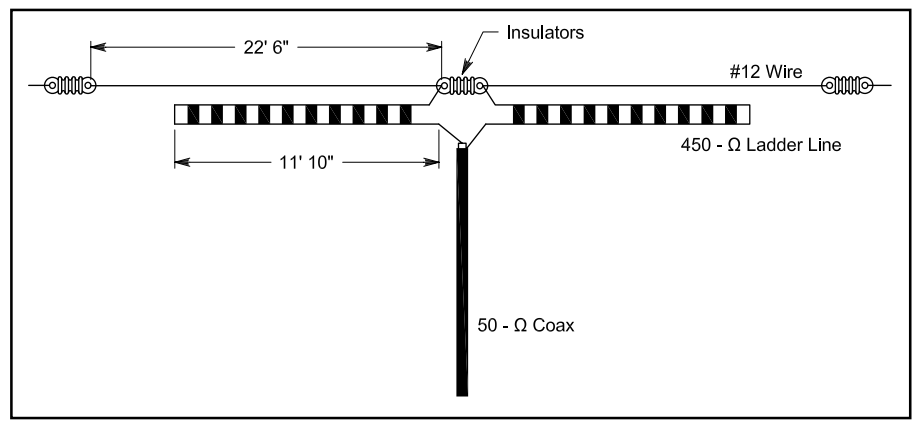


Figure 1—Layout of K4VX linear-loaded dipole. Although the #12 wire is threaded through the 450-Ω window line to support it, this is not shown in this drawing for clarity.

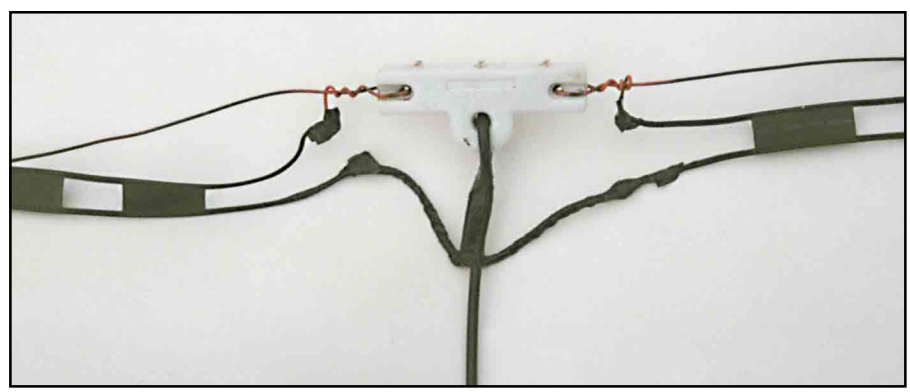


Figure 2—Details of feed point. Note that the feed coax loops through the center insulator for mechanical strain relief.

each side of the center insulator, and shorted at the end away from the center. Where this design differs from previous ones is that in mine the #12 wire is interlaced into the ladder line to provide physical support to the ladder line. See Figure 1, a schematic of the wiring arrangement. Figure 2 is a photo showing details of the feed point, and Figure 3 shows the final method I used for interlacing the #12 wire through the open windows of the ladder line. I'll discuss this in more detail later.

I can hear the purists now, "That contraption will never work. The wires are too close." Well, this is the proverbial bumblebee—it doesn't know it can't fly!

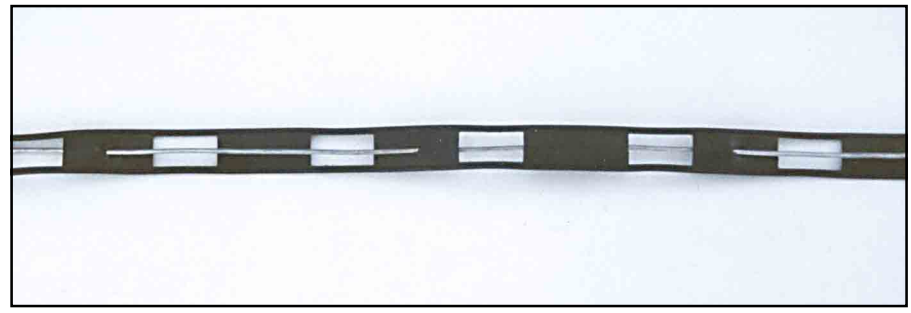


Figure 3—Final assembly method using interlaced #12 Copperweld wire through holes punched in the windowed ladder line.

Construction

In actual construction I used approximately 54 feet of RG-8X Mini Foam from RadioShack[2] to provide a half-wavelength feed line at 7.025 MHz. Since I assumed I would encounter impedance that was different from 50 Ω, I wanted to make an exact half wavelength that would repeat the value at the center insulator.

I measured the electrical line length using a General Radio 916-A RF bridge, using a Measurements Corporation Model 65-B signal generator as the source, and an IC-740 transceiver as the null detector. For those readers who are not familiar with using a bridge to measure a half wavelength length of coax, the technique is to short one end and look for an impedance at the other end that is zero reactance and a very low resistive value. In this case after some pruning the resultant impedance was 3.1 + *j*0 Ω.

After the antenna was up in the air, I could then measure the impedance at the feed point and proceed with matching it. As a point of interest, RadioShack states that this coax has a velocity factor of 78%. My measurement was remarkably close, at 77%.

Installation

Once the antenna was constructed, I hoisted it up to about 40 feet. I then used the MFJ-247 bridge to measure SWR. To my shock, the SWR was perfectly flat at 7.025 MHz, the frequency for which I had designed the antenna! Having been a ham for almost 55 years, I can honestly say that the chances of this happening are almost nonexistent. Figure 4 shows the measured SWR for this initial antenna.

Obviously the design center at 7.025 MHz is too low to cover the entire 40-meter band. However, perusal of the data indicates that the 2:1 SWR bandwidth approaches 300 kHz, which is broad enough to cover the entire band with some scaling of the center frequency. In my own case I would probably have left the antenna as is, but since this is an article for the general amateur population, I proceeded to scale the design to 7.125 MHz.

Frequency Scaling

The first thing learned is that a 1.4% (7.125/7.025) proportional change of both wire length and 450-Ω ladder line length will not provide the correct frequency shift. Originally, I shortened each wire tip 4 inches and each linear loading line 2 inches. This moved the resonance to 7.200 MHz, rendering it less than useful at the bottom of the CW band.

Next, I decided to leave the linear loading alone and just lengthen the ends of the #12 wire. After several attempts, resonance is now 7.125 MHz. Figure 5 shows the SWR of the completed antenna. The 2:1 SWR bandwidth is approximately 275 kHz, which covers practically the entire 40-meter band. The measured final dimensions of the antenna are 22.5 feet of #12 Copperweld, and 11 feet 10 inches of ladder line each side of center.

While conducting these tests, I discovered that raising and lowering the antenna alone could shift resonance as much as 20 kHz. This was with no length changes being made. I then decided to secure the #12 Copperweld as closely as possible to the center of the ladder line with electrical tape. It appears that as the secured Copperweld shifted, the coupling between the ladder line and the Copperweld changed—not much, but enough to be detected by the MFJ-247. Electrical tape alone is not the best final solution for this. A better solution is to punch holes in the center of the ladder line insulation and lace the wire through at about 6-inch intervals. This prevents any deviation in the spacing of the conductors. See Figure 3 again.

There are several ways to secure the end of the ladder line to the #12 wire. I chose electrical split-bolt connectors with nylon cord for mechanical strain relief. Care should be taken to insure that the shorted end of the ladder line does not come in

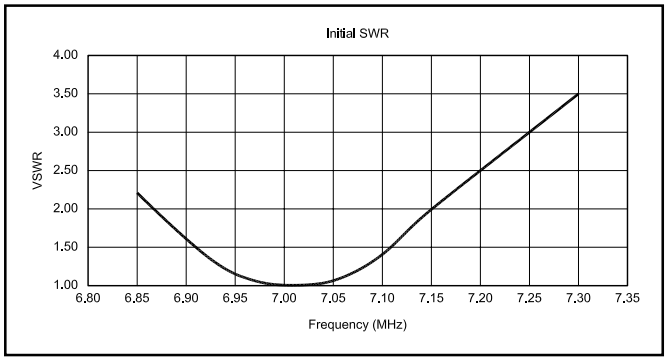


Figure 4—SWR curve for initial model built by K4VX.

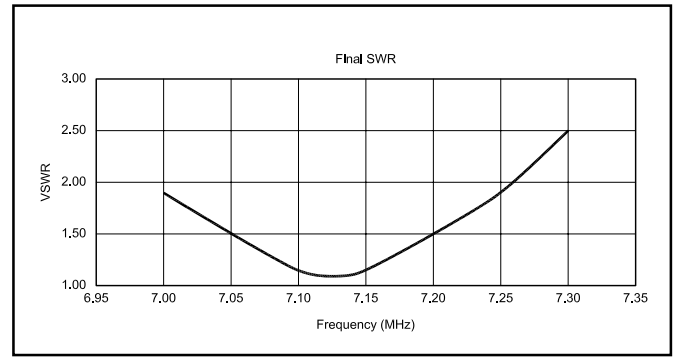


Figure 5—SWR curve for finalized model.

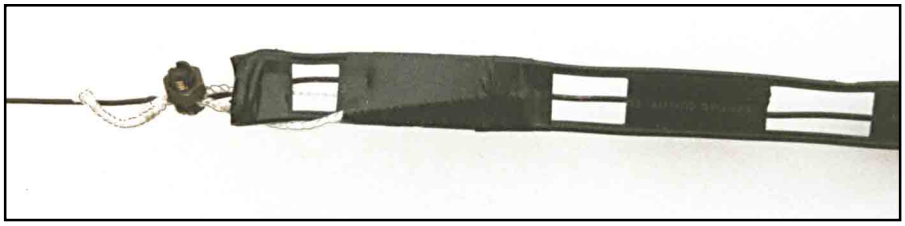


Figure 6— There are several ways to secure the end of the ladder line to the #12 wire. I chose electrical split-bolt connectors with nylon cord for mechanical strain relief. Care should be taken to insure that the shorted end of the ladder line does not come in contact with the wire.

Figure 7— The K4VX 40-meter linear-loaded dipole deployed at 40 feet.

contact with the wire. See Figure 6.

Performance

There appears to be little measurable on-the-air difference between this shortened dipole and a full-sized dipole. Computer modeling indicates less than 1 dB difference also. Figure 7 is a photo of the antenna at 40 feet.

The total cost of this antenna (minus coax) should be less than $25 with all-new materials. The 450-Ω ladder line is available for approximately $0.25/foot and Copperweld #12 wire for less. New insulators should be less than $10, but junk boxes and flea markets can usually suffice.

Conclusion

This design provides a dipole that is 70% of the span of a full-size dipole with little observable difference in performance. On 40 meters this amounts to a reduction of over 20 feet. An 80-meter version requires only a 90-foot span. I can envision an 80-meter 4-square with a 45-foot high linear-loaded vertical element and a single 45-foot linear-loaded radial supported by a 60 to 70-foot tower based upon the ON4UN design.[3]

Another application might be a linear-loaded quarter-wave 160-meter sloper supported from an 80-foot tower. As with most new concepts, experimenters will not necessarily get perfect matches on the first try as I did with this antenna, but for those willing to make adjustments and use some cut-and-try, the rewards will prove worth the effort.

Notes

[1]Available from The WIREMAN, 261 Pittman Rd, Landrum, SC 29356, orders 800-727-WIRE; **cahaba.net/~thewirem/index.shtml**. Part #CQ-552.

[2]RadioShack #278-1313.

[3]*ON4UN's Low-Band DXing* (Newington: ARRL, 1999) p 11-72, Section 5.3.

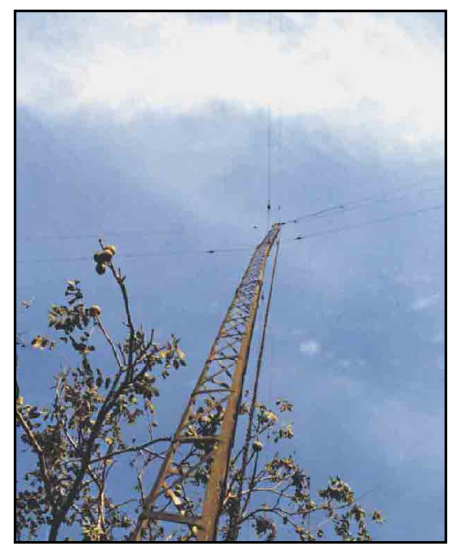
Photos by the author.

Lew Gordon has been licensed continuously since 1947, and earned his Extra Class license in 1952. He has previously held the calls W9APY, WA4RPK and W4ZCY. He has held K4VX since 1973. Lew's wife holds NS0Z, and his daughter is N0HVY. Lew earned a BS degree in Physics from Purdue University and did graduate work at Georgetown University. Lew is a retired US Government systems engineer. He was elected ARRL Midwest Division Director in 1993 and retired in 2000. An active contester, Lew's main love in Amateur Radio is antenna design and construction. His antenna farm consists of 10 towers ranging from 50 to 170 feet with rotaries on 40, 20, 15 and 10 meters. He has written several human interest articles as well as articles on band-pass filters, antenna designs and other subjects. His freeware program YAGIMAX *is in use all over the world. You can contact the author at PO Box 105, Hannibal, MO 63401;* **k4vx@arrl.net**.

STRAYS

LANDMARKS MAY BE COMING DOWN

◊ Anyone who's driven past the two impressive antenna structures just off I-71 in Oregonia, Ohio (between Wilmington and Rte 73), won't soon forget them. The two 80-foot homemade towers, one of which had a homemade sign with the owner's call sign, are about 150 feet apart—a comforting landmark to travelers to the Dayton Hamvention. The sign has come down, and the towers may soon follow, as Estle Hagemeyer, W8FMV, became a Silent Key last year and his farm is to be sold. —*Charles J. Stinger, W8GFA*



One of the towers, which have stood at the site in Warren County, Ohio, since 1950.

Next Strays

By Rosalie A. White, K1STO

Amateur Radio Hits the *Big* Screen

A behind-the-scenes look at how IMAX and Amateur Radio got together to produce an unforgettable and compelling movie.

What's better than dreaming of seeing yourself on the silver screen? For many of us, it would be having your favorite hobby and service up there, with you proudly pointing it out to friends! Here's the story of how Amateur Radio got famous via the big screen—and *we do mean BIG*.

The new IMAX film, *Space Station*, had its world premiere April 16 at the National Air and Space Museum in Washington, DC. If you've seen an IMAX film, you know the silver screen stretches as high as a six-story building. *Space Station* is the first 3D IMAX *space* movie. Actor Tom Cruise narrates the film, and a portion of the footage portrays an ARISS (Amateur Radio on the International Space Station) school contact with Space Station Commander William Shepherd, KD5GSL. More than 70 million people worldwide visit an IMAX theater every year, and we've heard from a lot of you who have already enjoyed this one.

A Whole Lot of Filming Going On

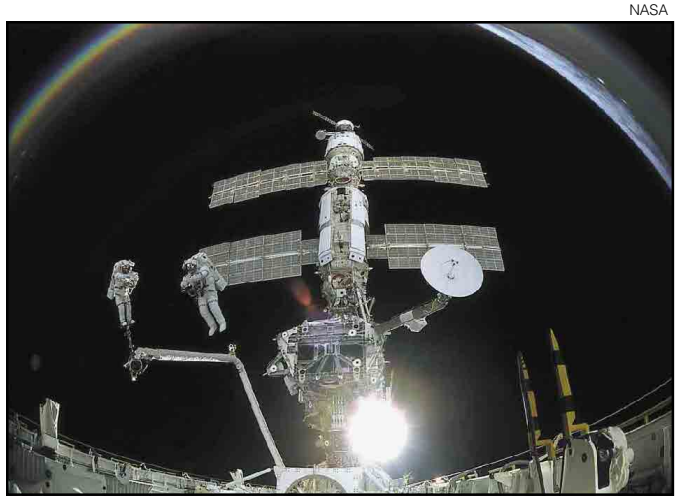
According to NASA media notes, "Between December 1998 and August 2000, more than 13 miles of film flew into space for use in two IMAX cameras. Working closely with IMAX, 25 astronauts and cosmonauts were trained to use the high-tech equipment. They had to learn how to be directors, cinematographers, and lighting and sound experts." The movie was filmed at 17,500 miles per hour as the ISS orbited the Earth. Seven space shuttle crews and two resident station crews were filmed in action for Lockheed Martin, which sponsored the movie with NASA's cooperation.

Space Station captures the challenges, roadblocks and ultimately the shared achievement of women and men representing 16 partnering nations, ensuring a successful first international space laboratory in low Earth orbit. You find out more about *Space Station* and where it's showing at **www.imax.com/spacestation**. Marilyn Jones, a non-ham Connecticut viewer, recalls a couple of scenes: "The camera eye was on the base of a rocket about to launch, engines igniting. Bits of grass and pebbles began flying toward me. I ducked in my seat, then caught myself—it was so realistic!—and straightened back. IMAX must have known I'd surreptitiously sit up, because another pebble immediately appeared to hit and shatter my glasses! When I watched the kids talking via ham radio to the astronaut I was very proud, and wanted to stand up to tell everyone around me that I know volunteer hams who were instrumental to the success of that!"

The Scene behind the Scenes

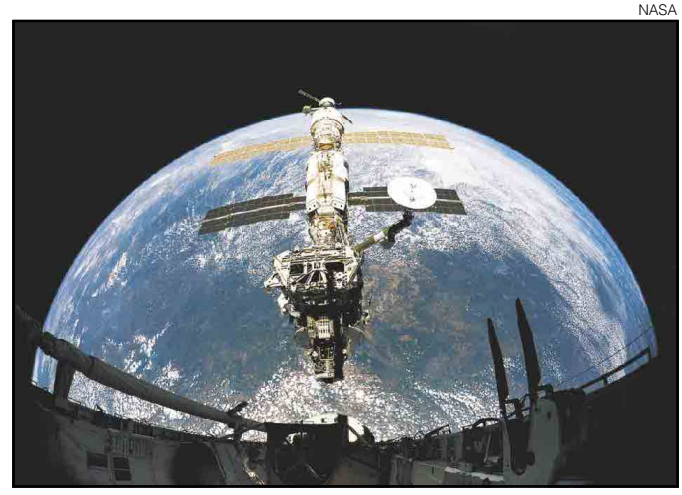
The original idea proposed and sold to IMAX producer Toni Myers for including a school QSO in *Space Station* was

NASA



Astronaut and cosmonaut filmmakers archived the transition of the ISS from a small outpost to a regularly inhabited research station. Moviegoers experience amazing IMAX 3D effects, starting with a Russian Proton launch vehicle blasting off into space and leading into building a complicated research project. Photo copyright © 2001 U.S. Government as represented by NASA.

NASA



Frank Bauer, KA3HDO, described the movie as breathtaking. "It was awesome to see Bill Shepherd talk to the Texas students with our ARISS equipment...in 3D! The comments we heard at the exhibit were glowing thank you's for the volunteers and the tremendous QSO with students and with crew families." Photo copyright © 2001 U.S. Government as represented by NASA.

conceived by Carolynn Conley, KD5JSO, subcontractor at Johnson Space Center in Houston and stalwart ARISS supporter. Carolynn cited how families at museums and entertainment centers view IMAX films, yet they contain little footage specifically aimed at youth. The ARISS footage, she reasoned, would inspire children worldwide to follow technical studies! Toni bought the idea.

The audio of the QSO you will hear in *Space Station* is of Seabrook, Texas students, simulating an ARISS QSO. Spliced in is Bill Shepherd's voice from a real QSO that took place in January 2001 at George West (Texas) Elementary School. Bradley Henicke, KD5FAL, 13-year-old George West student, and back-up operator Alonzo Cuellar, KD5FAM, age 15, of Alice, Texas, had set up the ham equipment at the school, initiated the QSO and led students through it. ARISS school mentor Gene Chapline, K5YFL, said Commander Bill Shepherd's crewmates filmed him in space calling, "KD5FAL, this is NA1SS." That footage and more of Shepherd answering questions asked by George West students appears in the movie. Chapline reported Henicke "graciously consented" to the use of his call sign—wouldn't *we all* be thrilled to hear ours in a movie? IMAX producer Myers invited Henicke to a private screening on May 1 at the San Antonio Challenger Center. He got to meet astronaut John Blaha, KC5TZQ, who attended the screening, and encouraged Henicke in his goal to become an astronaut. John recounted that he decided while in college to be an astronaut, and in 1961 had come home for a visit. His parents warned, "Now when friends arrive, don't embarrass us telling them you want to be an astronaut." The two scouts were special guests at the movie premiere on May 3 at the San Antonio IMAX theater, and were introduced to the audience by shuttle astronaut Mark Polansky, who visited the ISS in February 2001, participating in the filmmaking. Polansky chatted with the two hams about space communications, and presented autographed posters to them and for the George West Elementary School.

Seabrook Intermediate School students played a different role in *Space Station*. Last August, an IMAX crew came to the Seabrook, Texas school and staged 300 students for a mock-up ARISS QSO. The youths thrilled to the task of being filmed, though their nerves were set on edge by the dire warning that if any one of them looked at the camera... "the film would end up on the cutting room floor." The IMAX folks matched this video to footage shot of Commander Shepherd answering questions from George West students. Seabrook kids were equally excited to know their turn for a real ARISS QSO was coming in a month. What better practice could they get for it than being "up in lights"?

Promoting Amateur Radio

The invitation-only world premiere of *Space Station* was preceded by a news conference. There, a teacher eloquently communicated the tremendous positives the movie, in particular the ARISS scene, provides to students. Bauer said, "It's good to see ham radio continue to provide a once-in-a-lifetime experience for students." Astronauts, cosmonauts, me-

GENE CHAPLINE, K5YFL

In early May, IMAX recognized two young hams for providing the communication skills that played a part in the movie. KD5FAL (left), an Eagle Scout and Troop 277 senior patrol leader, and KD5FAM (middle), who is sight-disabled and in the top 10 of his senior class, along with astronaut Mark Polansky and Josie Chapline, accept a poster on behalf of George West Elementary School.

ART FELLER, W4ART

From the left: Cosmonaut Yuri Lonchakov, RK3DUL; astronaut Robert Curbeam; cosmonaut Yuri Usachev, RW3FU (with photo of crewmate Susan Helms, KC7NHZ); and ARISS Chairman Frank Bauer, KA3HDO. Bauer spearheaded a campaign to highlight Amateur Radio, designing a display for ARISS team members to demonstrate ham radio to attendees at the film premiere, and issuing ham radio kits to the media. IMAX producer Toni Myers and National Air and Space Museum Curator Jack Dailey also visited the display.

Interview with Toni Myers, Producer of IMAX 3D film *Space Station*

By Frank Bauer, KA3HDO, ARISS Chairman

Bauer: I saw the new IMAX movie, *Space Station,* and I must say it was pretty awe-inspiring. In a nutshell, could you explain the differences between an IMAX film and standard movies?

Myers: The IMAX film is a completely different format. In order to see IMAX, which is a very large, six-story-high screen and a very bright, intense sharper-focused picture, we use a much larger film format. It is a 70-mm film that runs horizontally through the projector and camera, whereas the 35 mm, what most conventional Hollywood films are shot on, runs vertically through the camera and is one-tenth the size. The large format allows for a lot more light because of the speed the film runs at through the camera. The bright, steady picture immerses you in it.

Bauer: What were some of the technical challenges you and your team had to overcome to bring this film to fruition?

Myers: Our main challenge was that this was the first IMAX 3D picture shot in space. IMAX 3D is technically challenging in itself; you need a left eye and a right eye to result in a 3D effect. Our normal projectors for 3D on the ground use two strips of film for each of these eyes. Those cameras are too big to stow in a mid-deck locker for a shuttle launch. We had to completely re-design cameras, amazingly compressing them in size — one for inside the cabin, one for outside in the shuttle's cargo bay, and one for training. We re-designed cameras to shoot the left and right eye *simultaneously* on a *single* strip of film. This means the film had to travel twice as fast as is conventional, resulting in half the yield of an IMAX 2D film. The roll of film, about the size of a large pizza, goes through the camera in about 108 seconds — this is about 3 shots per roll! When the film gets back on earth, it has to be optically re-separated to left eye and right eye. That was pretty technically challenging.

Bauer: Given that you can burn through a roll of film in 108 seconds, how did you ensure that the shots all worked on the first take?

Myers: There is no "take two" in space...we don't have the resources. Astronauts and cosmonauts are the best learners in the world. They are extremely smart people, and a joy to teach! Our training manager does a super job teaching them to be great cinematographers on-orbit. We also give them 70 mm film to play with on the training camera. They light their own scenes, use crewmates as actors, and direct the scenes. We don't give them any input. Once the film is processed, we go to the nearest 3D IMAX theater, and critique it with the crews.

Bauer: The film shows a segment where students are talking via ham radio with astronaut Bill Shepherd on board ISS; hams worldwide will be appreciative of this film clip in the movie. Why did you decide to meld it in?

Myers: I think the ham radio program is extremely important. It is a very valuable link between all of us who are Earthbound, particularly children who are interested in space, and the crews on-orbit doing these incredible things. Ham radio is the opportunity for young people to talk directly to the space station crews; I think nothing can better inspire the next generation of explorers than that opportunity. When this sequence was proposed, I heard from the crews how much they enjoyed their ham radio contacts with kids and ham operators. When we asked Commander Shepherd if he was interested in shooting a scene — no problem; he was very interested in doing it! He felt it was an important thing to show.

Bauer: Tell us how you edited this ham radio contact.

Myers: To make a film sequence you have a series of parts, a bit like a jigsaw puzzle. For efficiency or economy you cannot always shoot movies in order of the script. What we did with the ham segment was ensure the Commander and crew shot the on-orbit scene first, and got it back to Earth to make sure it was good. Once we had that, we planned the ground sequence to make it fit. An IMAX crew was at Johnson Space Center; they went to the Texas school to shoot the rest. Then we intercut the segments.

Bauer: Any other thoughts you want to give to Amateur Radio operators?

Myers: My comment to them is to congratulate all who support the ARISS program because I think it is a wonderful program. It is a fantastic way for everybody on the ground to have a special kind of contact with people who are in space in real time. It is a very important component for engendering and spreading interest in space exploration. We get updates on CNN and the news, but this doesn't convey in a personal way the marvelous things happening up there. The ham radio program does a particularly great job of this because it is such a good connector with the people on-orbit doing fantastically interesting things. So my comments are, carry on and spread the good word!

dia types, IMAX representatives, NASA staff and other dignitaries stopped at a booth set up at the premiere to showcase ARISS. These included ISS Commander Bill Shepherd, KD5OPQ; ISS crew member Susan Helms, KC7NHZ; future ISS crew member Koichi Wakata, KC5ZTA; and ISS Commander Yuri Usachev, RW3FU. Bauer thanked Susan for her outstanding 2001 Field Day effort. She retorted: "The only bad part was I couldn't operate the whole event because NASA requires that we get sleep, and that was right in the middle of Field Day! It was a blast!...There were small signals calling out of nowhere, including Boy Scouts." Frank relayed that she had made a great impression on the whole international ham community. "It was quite obvious she was pleased," Frank reported. Astronaut Wakata expressed his excitement at the prospect of using the ARISS rig when he flies in 2004-2005.

At the public film debut the following day, April 17, ARISS volunteers set up the display again, this time orchestrating an ARISS QSO between Quogue (New York) School students and ISS crew member Dan Bursch, KD5PNU. Moviegoers listened to what they termed ham operators doing cool stuff. Bauer said, "We now have a permanent legacy in film."

Highest Percentage of Hams in Any One Industry?

Is aerospace the industry with the highest concentration of us hams? In this movie alone, stars include astronauts Robert Cabana, KC5HBV; Jerry Ross, N5SCW; Brian Duffy, N5WQW; Koichi Wakata, KC5ZTA; Bill Shepherd, KD5GSL; Sergei Krikalev, U5MIR; Marsha Ivins, KC6WKF; James Kelly, KC5ZSW; and Yuri Lonchakov, RK3DUL.

Space Station premieres in cities around the USA through the summer. When you see it, watch the credits roll—you'll spot ARISS in the listing. Most movies are in theaters a month, but IMAX movies run for years. Bauer is right: "ARISS now has a permanent legacy in film; *Space Station*'s footage has put Amateur Radio in a positive light." At the world premiere in Washington, DC, NASA and a Lockheed Martin representative said they are considering a sequel, covering new aspects of the ISS. Amateur Radio may be in yet another IMAX film. We can't wait!

The Doctor is IN

Q Madhu, VU2MUD, writes: I am interested in joining any discussion groups on antenna topics. I am new to the Internet. Can you provide some guidance for me?

A There are several mechanisms for discussion on just about any topic on the Internet. The most popular are probably chat rooms, reflectors and newsgroups. Each has its advantages and disadvantages.

Chat rooms are live discussions with a group of people keyboarding back and forth. All the comments appear on the screen as they are sent. AOL has an easy to use chat room mechanism, as does Microsoft's MSN. The disadvantage is that there is no record of what has gone on before. Most chat rooms are populated by folks who just want live conversation. The subject matter often strays from the posted subject.

Reflectors are e-mail based groups. An e-mail sent to the reflector is automatically sent to all its members. These groups tend to stay on topic and some very good information is exchanged. Another advantage is that (as opposed to chat rooms, where everything is "on-the-fly" whizzing by as fast as people can keyboard) you have the luxury of being able to digest a message and formulate a response or addition if you are so inclined. The down side is that your e-mail In-box can be filled with messages almost every day. Most e-mail programs contain filtering protocols that allow you to have e-mail from the reflector automatically go to a separate folder in your In-box. This makes your regular e-mail easier to manage. **mailman.qth.net/** is a place to look for active reflectors. A drop-down alphabetical list contains many reflectors, including those covering Antennas.

Newsgroups can be compared to the bulletin board at work or school. They are also divided into special interests on almost every topic on (or off) the planet. It is very simple to "subscribe" to a newsgroup. The advantage over the reflector is that nothing is sent to your computer. Subscribing means only that of all the thousands of newsgroups (there are upward of 45,000) only the ones you "subscribe" to will appear on your newsreader when you open it. Most e-mail programs have a newsreader included.

You access a newsgroup of choice and see a list of messages posted by Subject, Date, Sender, etc. Clicking on the subject line will open the individual message for reading (much like reading e-mail). Individuals can post a reply to a message, thereby creating a "thread," or you may post new messages. Newsgroups are an excellent resource for obtaining "how-to" information because they have the widest audience. Instruction on accessing newsgroups is best obtained by contacting the Tech Support for your ISP (the company that provides your access to the internet; if you are in a university or a corporation, contact your network administrator).

The newsgroup for antenna discussions is **rec.radio.amateur.antenna**.

A word of caution: You're likely to find language that can best be described as "no holds barred." Those who post messages to newsgroups often express strong opinions.

Q Ray Collins, WX3A, of Sterling, Pennsylvania, writes: Our club recently received a used HF beam that may have spent its earlier life near salty air. What is an effective method of removing significant salty residue?

A If the beam has traps and you are pretty sure that salt water or salt air has not gotten into them, be careful not to get any moisture inside the traps. Clean them sparingly with a detergent such as 409 or Fantastic—then dry thoroughly. If you suspect that salt *has* penetrated the traps, open them and flush them with water, then dry all parts thoroughly.

The antenna should first be cleaned with a mild detergent (dishwashing liquid) and copious amounts of water to remove any crystalline salt that may remain (again being careful not to get any traps wet. The remaining discoloration is due to severe oxidation. This will have to be removed with fine-grained emery cloth or sand paper. When as much as possible has been removed, the aluminum can be polished to a high luster using Nevr-Dull. This product can be purchased in most hardware and home improvement stores—a can should last many years. See **www.nevrdull.com/How.htm**. Replace any rusted hardware and use a corrosion inhibitor such as Penetrox inside the telescoping tube sections.

Q Bob Rice, W7HAP, of Wheatland, Wyoming, writes: I am constructing a 600 foot horizontal loop and it has to be fed with 450 Ω ladder line. My problem is that I cannot attach 450 Ω ladder line to my equipment; it must be fed with 50 Ω coax. I need to construct a 9:1 balun. I have not been able to figure out what toroid core to use to wind the balun on and what wire to use or number of windings. My power will be no more than 500 W.

A Unless your loop has a 450-Ω impedance, a 9:1 balun isn't the ratio you want because the impedance will vary on the various HF bands on which you will use the antenna. Any time you have a feed line connected to something with an impedance that is different than the characteristic impedance of the feed line, the impedance at the other end of the line will vary according to the length of the line and several other factors. As a good example, recall a ¼ wavelength matching stub. If one end is shorted, the other end will be a very high impedance—regardless of whether the line is 50 Ω or 450 Ω. A ½ wave line will give you the same exact impedance at both ends (eg, 50 Ω at the antenna gives 50 Ω in the shack).

I assume that you will be using this antenna on multiple bands, so you will need to use an antenna tuner. You may be able to use the balanced output of the antenna tuner to feed the balanced line. The actual impedance looking in the line may range from a few ohms to a few thousand ohms, possibly with a lot of reactance. Baluns work well when they are used near their design impedance — for example, most amateur 4:1 baluns are designed to match 200 to 50 Ω. If you deviate significantly from that impedance, one of two things may happen — the balun may overheat or it may not function well to choke off the common-mode currents on the line. In many cases, especially at low power, the

latter may not be very important — the result could be no worse than the slight radiation from the feed line filling in the nulls that may exist in your antenna pattern. If the balun in the tuner is not overheating, you can be comfortable that you can use it safely. The balun may be quite warm to the touch, but it should not be too hot to handle. If it is, you will either have to forgo operation on that band or try a different length of feed line. This will not change the SWR on the line, but will result in a different impedance at the tuner—hopefully one the tuner's balun can handle. Of course, you may solve the problem on one band and create a similar problem on another, so be prepared to experiment a bit. The 19th edition of *The ARRL Antenna Book* has some excellent information on feed lines and baluns.

Q Denny Bowman, W7SNH, of Edmonds, Washington, writes: One of the newer hams I was helping to get into this hobby just passed his General and was putting up a new tower and beam antenna. His question: The maps/charts put out by the ARRL showing headings for DX entities: Are these headings referenced to *Magnetic* Headings (without Declination) or *True* (Geographic) headings (with Declination added for your particular location)?

A The ARRL maps are calibrated in True degrees, referred to True North ("straight up" on the maps). Magnetic headings are calculated by taking the True headings and adding the Magnetic Declination (also called the Magnetic Variation in nautical applications). For example, if the map shows a variation (declination) of 12° east, this means that Magnetic North is 12° east of "straight up." So, a heading of 45° True is equivalent to a magnetic heading of 45° + 12° east = 57° magnetic. For a westerly variation (for example 6° west), subtract the value for variation. Thus, 45° True – 6° west = 39° magnetic.

The magnetic north pole is presently located in northwestern Canada, near 78° N, 104° W. It shifts in location a small amount each year. If the magnetic pole were actually located at the true north pole, it would be at 90° north latitude, and the longitude wouldn't matter.

Q Allan F. Falcoff, K3YZ, of Chadds Ford, Pennsylvania, writes: Last week I bought a new IC-756PRO and was amazed to note that the rig will allow you to transmit quite a bit outside of US band limits even though the unit was purchased from a US dealer. Investigating further, I downloaded an expanded tech evaluation ARRL performed several years ago. You documented the very broad transmitting range that my rig also has:

	Frequency Limit (MHz)	
Freq (Band)	***Low***	***High***
160	**1.800.000**	**1.999.999**
80	**3.400.000**	**4.099.999**
40	**6.900.000**	**7.499.999**
30	**9.900.000**	**10.499.999**
20	**13.900.000**	**14.499.999**
17	**17.900.000**	**18.499.999**
15	**20.900.000**	**21.449.999**
12	**24.400.000**	**25.099.999**
10	**28.000.000**	**29.999.999**
6	**50.000.000**	**54.000.000**

The rig has provision for a band edge beep that goes off at the edges of the above limits. There doesn't seem any way to modify the beep to US edges. Unfortunately, ICOM does not provide documentation to modify band limits either by software of hardware modification to ensure legal transmission. I was under the impression that a rig had to be limited to transmit within US band limits if sold commercially within the US. Am I wrong?

A HF amateur transceivers do not go through the certification process, as it is not required for the Amateur Service (with the exception of amplifiers and the receiver portion of VHF/UHF transceivers). That is why individuals are free to build and sell as many HF transceivers as they might wish.

There are no particular rules governing the transmit range of amateur equipment, but all of the commercial manufacturers restrict the output to ranges only slightly larger than the amateur bands because of the possibility of misuse in other services where certification is required. One of the reasons ham rigs often transmit somewhat outside the ham bands is to accommodate MARS operation. It also tends to simplify the design of the transceiver, helping keep the cost reasonable.

Note that it is perfectly legal to own a transmitter capable of operation on frequencies outside of the bands, but is not actually legal to use them there (unless you are a MARS operator participating in that operation).

As far as I can determine, the "beep" in ICOM transceivers is intended to indicate the limit of transmit range, rather than the amateur band limits. This has been the case for about a decade.

Even if you are using equipment that does have transmit range limits set to the edges of the amateur bands (in 7 years of testing, I have seen perhaps a half-dozen such rigs), however, you still have to be alert to your operating frequency. Consider a radio set to 7.300 MHz (carrier frequency), operating in LSB. Although theory states that all of the transmit energy would be within the band, practical circuit design precludes this, so it is wise to stay a kHz or 2 below the band edge. If you are using CW, you could probably get much closer. For this reason, it isn't really practical to depend on the radio to keep the operation legal. To operate legally, of course, you'll need to stay within the limits of your class of amateur license.

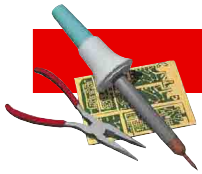
Q James Crawford, AE6BO/VK8JAC, writes: My ham shack is located on the 2nd story of a townhome style complex. If I want to keep my wife happy, and I do, moving the shack to the ground floor is not an option. I rent the place as well, so making any modifications to the property is not authorized. There is not a single water pipe accessible upstairs. The only way I can get a ground is to run a line out the ham shack window to the ground into a grounding stake. This makes the run 15 to 20 feet in length approximately, maybe a little bit more. I believe this is too long of a run and may radiate at certain frequencies.

Is there any other way to safely get a ground for my rig from a second floor ham shack?

A Yes. Safety ground can be accomplished by connecting to the ground in your house wiring. A way to do this is to check with an ohmmeter (with the circuit breaker off) that the little screw that holds your wall plug plate is grounded to the ground hole in the socket (the third D shaped hole). If it is, you can connect all your station equipment together with a ground strap (one made from the braid of discarded coax is fine) and then connect this to the little screw. That takes care of the safety ground.

Now you must provide an RF ground. This can be accomplished in two different ways. The MFJ-931 Artificial RF Ground (www.mfjenterprises.com/) can do the job. Or, you may choose to you lay a counterpoise (wires) along the floor, possibly one for each band used. One place that works well is out of sight along the baseboards.

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; www.arrl.org/tis/. Add your comments: "The Doctor is On-line" at www.arrl.org/members-only/qst/doctor/. QST



By Ron Block, KB2UYT

Lightning Protection for the Amateur Radio Station

Part 2—Last month, the author discussed the characteristics of lightning and the hazard it presents to the amateur, and presented a method of preparing a schematic of a protection plan. This installment shows us the type of protection to apply and how to design the protective installation.

The process described in Part 1 of identifying the equipment to be protected can be applied to any item or set of electronic equipment. With some adjustment, it can be applied to tower-top electronics such as preamps or power amplifiers, to a computer installation in another room, a TV or a stereo system. The principle is the same: identify all of the electrically and proximally connected equipment, identify all of the I/O (input/output) lines, add protectors and ground. The theory is easy; it's the implementation that can be challenging.

Protecting Each I/O Line

Let's examine each of the I/O lines identified in the box-level schematic, dividing them into broad categories for discussion. Each I/O line represents a potential source or sink (ground) for lightning strike energy, either directly from Mother Nature or indirectly via a connecting wire or arc. We must provide a protector that is physically and electrically appropriate for the type of I/O line we are protecting. The protector has a relatively simple job to do—short circuit when threatened (over voltage). While this may seem like a relatively simple thing to do, it is surprisingly difficult to accomplish without first sharing much of the strike energy with your equipment. This is especially important for receivers with sensitive FET front-end stages and electronic interfaces (RS-232, 422, and so on) where the maximum tolerable interface voltage is just a few volts above the operating voltage.

The best I/O line protectors are connected in series between the surge and the circuit they are intended to protect. Series protectors, by design, have the capability to limit the amount of lightning strike energy your equipment will receive. The "better manufacturers" will specify the maximum amount of "let-through energy" your equipment will receive during a strike. It is normally specified as a quantity of energy in the milli- or microjoule range. When choosing a protector, select the one with the least let-through energy that meets all of the requirements for the connection.

Coaxial Cable

The first category of protector we will examine is the coaxial cable line protector. Coaxial protectors are unique in that they should not add to system SWR or signal loss, and at the same time they need to operate over a very broad frequency range at both receive and transmit power levels.

Each coax line leaving the circle around the protected equipment must have an appropriate coaxial protector. As we will discuss later, the coax protector along with all of the other I/O protectors must be mounted on a common plate (or panel) and connected to an external ground system.

Two typical PolyPhaser protectors for Amateur Radio use below 1 GHz are shown in Figure 7. While both of these protectors are shown with UHF-female connectors on both the antenna and equipment sides of the protector, type N connectors are available, as are combinations of male and female connectors. Please note, however, that there are other manufacturers of quality lightning-protection products. See the "Resources" sidebar at the end of this article.

Special coaxial protectors to protect I/O lines for GPS, DBS, broadcast and cable TV are available, as well as those for tower-top amplifiers and remote antenna switches that require an ac or dc voltage fed through the feed line. All protectors come with the appropriate type of connector commonly used for these applications.

Figure 7—Typical coax protectors, the PolyPhaser IS-50UX and IS-B50LU.

Figure 8—An in-line ac power protector.

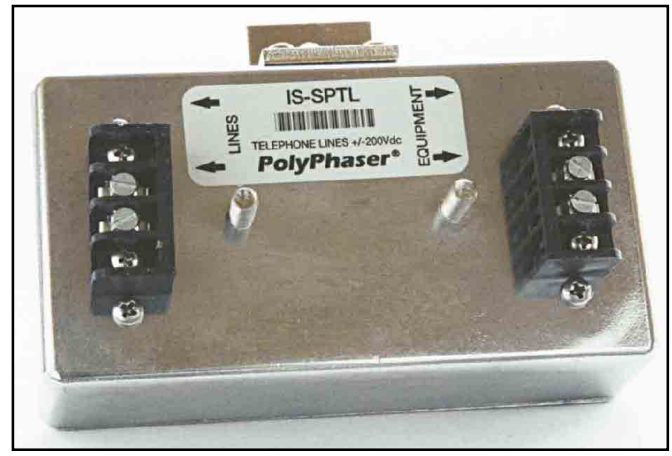


Figure 9—A telephone line protector.

Open-Wire or Ladder Line

Although protecting an open-wire or ladder line is not as convenient as with a coax line, some protection is warranted and possible. Select two identical gas tube protectors and connect them from each leg of the feed line to ground near the entrance point. Each gas tube should be specified as capable of handling an instantaneous peak current of approximately 50,000 A based on the 8/20 µS IEEE standard test waveform and have a turn-on voltage that is well above the normal transmission line operating voltage. Be sure to consider the highest SWR and the highest transmit power in your calculations. Typical turn-on voltages range from 600 to 1200 V. The voltage chosen should be about twice the calculated voltage to minimize the potential for the accidental firing of the gas tubes during tune-up or other transmitter anomalies.

Keep in mind that the application of the gas tubes to the open-wire or ladder line represents a shunt-type connection, as opposed to the coaxial protectors, which are an in-line connection. That means that the transmission line will share a significant amount of lightning strike energy with your equipment before the gas tubes begin to conduct. Unfortunately, this type of transmission line makes it difficult to achieve a high level of confidence in protecting high performance receivers.

AC Power

AC power protectors are available in many shapes, capabilities, and method of connection. Some caution should to be exercised in choosing your protector. There are many rather inexpensive power line protectors on the market that are clearly not suitable lightning protection. Many of these protectors depend on the safety ground wire to carry away the surge energy. While the safety ground may provide a dc path to ground, the #14 AWG wire commonly used is too inductive with respect to the rise time of the currents (RF energy) in the strike that it must conduct to ground. In addition, some low-end manufacturers who do provide in-line ac protectors use ferrite core inductors to maintain a small sleek physical appearance.

While this approach works well when the protection is merely handling power line noise, the inductor saturates under the massive current of a real strike and the benefit of the inductance disappears. Plastic housings and printed circuit boards should be avoided where possible since they will most likely not hold up under real strike conditions when you need it.

Since you are establishing a local zone of protection for the radio room you need to choose an in-line ac power protector, as shown in Figure 8, that matches your voltage and current requirements. For most small to medium size stations, a single 120 V ac protector with a capability of 15 or 20 A will satisfy all of our ac power needs. Each of the electronic items with an ac power line extending beyond the circle should be aggregated into a single line as long as it is comfortably within the maximum amperage of the selected protector (usually 15 or 20 A). Larger stations with high-power amplifiers or transmitter will most likely have a separate 120 V ac or 240 V ac power circuit that will require a separate ac power protector. Some high-end stations may require 100 A or 200 A in-line protectors.

If station ac is sent outside for convenience, for safety lighting, or to run motors (not the common antenna rotator), then that ac circuit must be separately protected as it leaves the radio room.

Telephone

Telephone lines come in many types, but by far the most common is the plain old telephone service (POTS). This is a balanced line with a –48 V dc battery talk circuit and up to 140 V ac ringing voltage. An in-line protector is the most effective type for POTS with different types of protectors available for different telephone line characteristics. One device for this purpose is shown in Figure 9.

A word of caution—many of the protectors on the market use modular connectors (RJ-11, -12, -45). While this is a great convenience for the installer, electrically this is a very fragile connector and common amounts of surge energy are very likely to destroy the connector by welding it or fusing it open. In addition, there are also issues of flammable plastic housings, ground wire characteristics, and printed circuit boards that allow arcs to the equipment side.

Control Circuits

Control circuits for all external devices must be protected, especially those that are tower-mounted. In the amateur station, this usually consists of an antenna rotator. Since most of the control circuitry managing the antenna rotator is relay-based (as opposed to electronic), we can use a less expensive shunt type protection device, such as that shown in Figure 10.

There are some new rotators on the market that use optical encoders and a modestly protected digital interface. These must

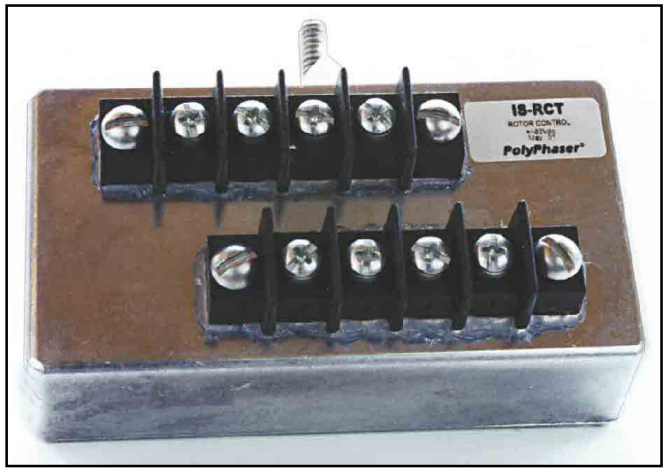


Figure 10—This shunt-type device is capable of protecting up to eight circuit lines with an operating voltage of up to 82 V dc.

also be protected. The method of protection will change, however, since the interface is electronic. Once the peak operating interface voltages are determined, it is relatively straightforward to choose the appropriate inline protector for the individual conductors.

Miscellaneous

Depending on the equipment in the radio room there may be additional I/O lines remaining to be covered. While I'll address a few of the more common ones, the others will probably require some special attention based on the physical conditions of the site.

Ethernet network cable connections linking the amateur station to the outside world or the computer in another room must also be protected as apart of the protection plan. For 10 and 100 Mbit UTP (unshielded twisted pair) networks, the use of an ITW LINX protector for Cat5-LAN (four pair) cable is recommended. This protector is wired in series with the network using 110-type punch-down blocks and grounded similarly to other protectors.

For those radio rooms that have broadcast or cable TV, protection is similar to the coaxial protectors described above with the exception that the impedance of the unit is 75 Ω and F-type connectors are used.

For single and dual-LNB DBS dishes the protector is required to have a very broad band-pass and pass dc through the coax center conductor.

GPS feed lines also are commonly required to carry a dc voltage. A high quality protector will separate the RF from the dc and protect each to its own voltage and power specification.

I/O Wrap-up

Every line that penetrates the circle and goes to the edge of the page should now have an identified protector. If you are having trouble, identify the problem area and mail the drawing to the author. The ARRL staff has compiled a list of potential sources of lightning-protection products. See the "Resources" sidebar at the end of this article.

Single Point Ground

The next step in the process will take us away from the theoretical work that we have been doing and into the real world of practical design and component layout. It's not hard, but there are a lot of things to consider as we take each step. Most of the considerations will be unique to the physical circumstances associated with your radio room.

I mentioned earlier that the primary purpose of the protector is relatively simple—to short-circuit when threatened. By shorting all of the wires associated with an interface no current can flow through the equipment between the wires of the interface. Extending this premise further, by mounting all of the protectors in common, no current will flow between the I/O interfaces. Hence, no lightning surge current will flow *through* a protected piece of electronic equipment.

To make this possible in the radio room it is necessary to establish what is known as a "Single Point Ground." This is the *one and only point* in the radio room where a ground connection is present. We need to be a little careful with the term "ground." During a strike a ground can be anything that is capable of being an energy sink. By this definition absolutely anything that is not at the same electrical potential can be a sink. Because electrical signals travel at about 1 nanosecond per foot, fast rise times may create significant potential differences for short times due to travel differences.

The creation of a single point ground will be different for every installation. It can be as simple as a couple of protectors bolted together or a through-wall entrance panel, or as complex as a copper-covered wall upon which the protectors are mounted. Whatever form your single point ground takes it must be the only ground point for all of the equipment within the circle of the box-level schematic diagram.

Figure 11 shows a single-point ground panel. This is a high-density fiberboard-backed copper panel suitable for small to medium radio rooms. It comes with a 1½ inch wide copper strap to connect the panel to the external ground system and a second 1½ inch copper strap to connect to all your operating table equipment. The panel is intended to be mounted on a wall near the radio equipment. For convenience of reference, I'll use its abbreviation—SPGP, for Single Point Ground Panel.

Now that you have a mounting surface that will become the single-point ground, a *lot* of consideration must be given to the physical placement of the protectors on the SPGP. Remember that a protector is required for each I/O line that leaves the circle of the box-level schematic. As you examine a protector, most are labeled with respect to which connector faces the surge (the outside world) and which connector faces your equipment. This is important, since the protectors are not necessarily symmetric in their design. They cannot be reversed and be expected to function properly.

A significant factor in the layout of the protectors on the SPGP is maintaining a physical separation between the incoming unprotected cables (antenna feed lines, incoming ac power, rotator lines, etc) and the protected side of the same connections. As a result of going through an in-line protector, there will be a "spark-gap level" voltage difference for a short time between

Figure 11—A typical single-point ground panel.

the input and output sides of the protector. You must take this into consideration when planning the layout of the SPGP.

A general guideline is to draw an imaginary diagonal line near the center of the panel as shown in Figure 12. Designate the area above the line as protected and the area below the line as unprotected (or vice versa). Make sure you consider how the panel will be mounted; how the (unprotected) cables will enter the unprotected area and how the (protected) cables will leave the panel. One of the nice things about a two-dimensional drawing is that the effects of gravity do not show. In Figure 12, the cables leaving the panel to the right above the dotted line must be anchored. If they are not, real world gravity will cause them to eventually bend down and come close to, and maybe even touch, the unprotected cables. If this happens, during the strike event there is the potential for a spark-gap breach of the protectors between the cables—a failure of the protection plan.

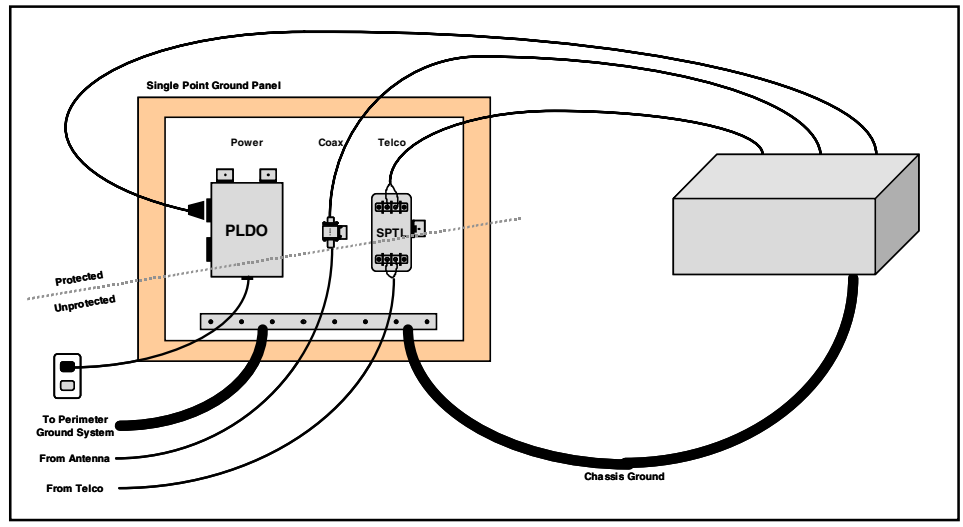


Figure 12—The SPGP showing the division of the protected and unprotected cables.

Neatness counts—cables (transmission lines, power (ac and dc), speaker, microphone, computer, control) should be cut to length and routed neatly and cleanly between boxes using the most direct practical route. The coiling of excess cable length on the protected side should be avoided since it can act as an air-wound transformer coupling magnetic energy from a nearby lightning strike back into the protected equipment.

The chassis ground for each element of radio equipment must also be connected to the SPGP. The SPGP is our reference point during the strike event and it is important that all elements of the radio station be at the same potential at the same time (nanoseconds). For small to medium size stations, where all for the equipment fits on a desk/table top, a single interconnect copper bus or strap to the SPGP is usually sufficient.

For stations with freestanding cabinets or racks in addition to an operating desk, the issue of rise time becomes more significant due to distance. This necessitates separate cabinet/rack direct ground connections to the SPGP. In addition, stations of this size have other special considerations, such as concrete floor conductivity, that are not covered here.

Don't forget to allow for future growth of your station in the SPGP layout. Typically this means leaving room for an additional feed line protector or two and maybe a rotator control protector. It is easier to plan for expansion now, rather than have to rearrange the protectors on the panel later.

If the form of SPGP you have chosen is a metal plate mounted in a window or a full-fledged through-wall entrance panel, you can ignore the remainder of this paragraph. The next major consideration is the placement of the SPGP with relation to the radio equipment. The SPGP is ideally mounted on the inside of an exterior wall with access to an earth ground and within a few feet of the radio equipment. That sounds easy, but depending on your radio room, it may be next to impossible. Let's work it through.

These real-world constraints sometimes present real challenges. One of the biggest challenges is grounding the SPGP. A #6 AWG wire to a radiator or water pipe is usually *not* acceptable! I say "usually" because if your radio room is on the top of a high-rise building, that may be all that you have. I'll discuss the real requirements and address this type of problem later.

The purpose of the ground connection is to take the energy arriving on the antenna feed line cables and control lines (and to a lesser extent on the power and telephone lines) and give it a path back to the earth, our energy sink. The impedance of the ground connection should be low so the energy prefers this path and is dispersed harmlessly. To achieve a low impedance the ground connection needs to be short (distance), straight, and wide.

Short

We all know that a conductor, no matter what size or shape, has inductance that increases with length. Connecting the SPGP to the external ground system should be done with the shortest possible wire. Did I say wire? Be sure to read about "wide."

Straight

Rarely is it possible, in the context of an Amateur Radio station (unless the structure was designed around the radio station), to go directly from the SPGP to the external ground system in a short, straight line. Most of the time we are encumbered with an existing structure that is less than ideal and further encumbered with esthetic constraints regarding just how much of a mess we can make. So, we do the best we can. Straight becomes a relative concept. Run the ground wire (there's that word again) as straight as possible. Keep in mind that every time the wire makes a turn, the inductance of the path is increased a small amount; ~0.15 µH for a 90-degree turn in less than 1 inch. The cumulative effect of several turns could be meaningful. By the nature of its current (magnetic) fields, a wide wire (strap) has lower inductance per length, compared to round conductors, and has minimal inductance for turns.

Also keep in mind that speeding electric fields don't like to change direction. The inductance in each bend or turn represents a speed bump, causing a large change in the fields over a short distance. If the change is large enough, some of the electrons are likely to leave the wire and find another path to ground; that is, an arc. This is not desirable; we have lost control.

Wide

We all know that no matter what size, wire has inductance. Larger wire sizes have less inductance than the smaller sizes. We also know that RF energy travels near the surface of a wire as opposed to within the central core of the wire (skin effect). If we put these together and extend the hypothesis a little, it would seem reasonable to use a railroad rail-sized bus bar as an excellent connector between the SPGP and the earth ground.

While the large bus bar would work well, it has lots of surface area and a massive core, the cost would be prohibitively expensive and it would be extremely cumbersome to work. We can have the benefits of the large bus at a very reasonable cost if we use multi-inch-wide copper strap instead, however.

One and a half inch wide, #26 AWG (0.0159 inch) copper strap has less inductance than #4/0 AWG wire, not to mention that it is less expensive and much easier to work. We can use thin copper strap to conduct lightning surge energy safely because the energy pulse is of very short duration and the cross-sectional area of this strap is larger than #6 AWG wire. The strap has a large surface area that makes it ideal for conducting the strike's RF energy.

The goal is to make the ground path leading away from the SPGP more desirable than any other path. In order to achieve this we need to find the total amount of coax surface area coming to the SPGP from the antennas. The circumference of a single 9913 coaxial cable represents about 1.27 inches of incoming conductor surface. To make our ground path appealing to the surge energy, we ideally need more than 1.27 inches of conductor surface leaving the SPGP. Where the use of a single 1½ inch wide conductor leaving the panel is reasonable, a strap three or more inches wide would be better. Inductance is calculated on the length of the connection between the SPGP and the ground, as well as the number and sharpness of the turns. If you had three $^7/_8$-inch Hardlines, a minimum strap width of 9 inches would be needed and 12 would be better.

You now have determined what protective devices are needed and how to mount them for an effective barrier to lightning energy. Next month, the final part of the article will present guidelines for developing a good external ground to absorb and dissipate the lightning's energy.

Photos of various PolyPhaser products by the author.

Ron Block, KB2UYT, has been a distributor and consultant for PolyPhaser, a vendor of lightning protection systems, since 1989 and has completed The Lightning Protection Course *by PolyPhaser. He is the chairman of the* Amateur Radio Station Grounding *forum at the Dayton Hamvention and has been a guest speaker at various Amateur Radio club meetings. The author's brother, Roger, founder of PolyPhaser, reviewed this article for technical accuracy.*

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Clarksboro, NJ 08020
ron@wrblock.com

Resources

The following manufacturers and suppliers supply lightning protection products for the Amateur Radio market. Please note that this list has been compiled by ARRL staff from the ARRL *TISFind* database, **www.arrl.org/tis/tisfind.html**. There's more on the subject of lightning protection on the ARRL Technical Information Service Web site, **www.arrl.org/tis/info/lightning.html**.

Alpha Delta Communications
PO Box 620
Manchester, KY 40962
Orders only: 888-302-8777
Phone: 606-598-2029
Fax: 606-598-4413
sales@alphadeltacom.com
www.alphadeltacom.com/

Ameritron
116 Willow Rd
Starkville, MS 39759
Phone: 662-323-8211
Fax: 662-323-6551
ameritron@ameritron.com
www.ameritron.com/

Cushcraft Corp
48 Perimeter Rd.
Manchester, NH 03103
Phone: 603-627-7877
sales@cushcraft.com
www.cushcraft.com/

Joslyn Electronic Systems Corporation
Phone: 800-752-8068
Fax: 805-968-0922
www.joslynsurge.com/

Lightning and Noise Protectors, Inc
PO Box 380054
Birmingham, AL 35238-0054
Phone: 205-995-1472;
800-PRO-TEKS (776-8357)
Fax: 205-980-4916
lnp-inc@bham.mindspring.com

MFJ Enterprises
PO Box 494
Mississippi State, MS 39762
Phone: 800-647-1800
Technical: 800-647-8324
Fax: 662-323-6551
mfjcustserv@mfjenterprises.com
www.mfjenterprises.com/

PolyPhaser Corporation
2225 Park Pl
PO Box 9000
Minden, NV 89423-9000
Phone: 800-325-7170
Fax: 775-782-4476
info@polyphaser.com
www.polyphaser.com

Rabun Labs, Inc.
PO Box 1076
Mason, TX 76856
Phone: 800-788-1824; 915-347-5800
Fax: 915-347-6544
staff@rabunlabs.com
www.rabunlabs.com

Radioware
PO Box 209
Rindge, NH 03461-0209
Phone: 800-457-7373
603-899-6957
Fax: 603-899-6826
radware@radio-ware.com
www.radio-ware.com/

ROHN Industries, Inc
PO Box 2000
Peoria, IL 61656
Phone: 309-697-4400
Fax: 309-697-5612
mail@rohnnet.com
www.rohnnet.com/Index.htm

Stormwise
Lightning Detectors
PO Box 284
Yantis, TX 75497
Phone: 903-383-7047
Fax: 903-383-7047
lightningsails@topher.net
www.stormwise.com

The Wireman Inc
261 Pittman Rd
Landrum, SC 29356-9544
Orders only: 800-727-WIRE (800-727-9473)
Technical: 864-895-4195
Fax: 864-895-5811
n8ug@juno.com
www.thewireman.com/

WR Block and Associates, Inc
PolyPhaser Distributor
327 Barbara Dr
Clarksboro, NJ 08020
Phone: 800-421-7170
Fax: 856-423-0891
ron@wrblock.com
www.wrblock.com

Zero Surge, Inc
944 State Rte 12
Frenchtown, NJ 08825
Phone: 800-996-6696
Fax: 908-996-7773
info@zerosurge.com
www.zerosurge.com

HINTS & KINKS

IMPROVE AUDIO—AT THE *OTHER* END!

◊ Much has been done to improve transmit audio, from fancy microphones to speech compressors, but what about the receive end? With those itty-bitty speakers typical in modern radios, it seems like only a small percentage of the efforts put toward good transmit audio are realized at the received end. Through a bit of investigating, I found several solutions. They can be mixed and matched to suit the needs of the reader, or combined for an even better effect.

Initial experiments showed that even something as simple and minor as using a speaker larger than the one provided with the radio shows an improvement in audio response, but the effect is still relatively small. The biggest improvement came when the speaker was put inside of a baffle (for initial experiments, this consisted of an empty tissue box—in addition to being low-cost, it also easily fit on the ham shack desk). The next step was a bookshelf-sized stereo speaker. When I hooked one of these up to my 220-MHz transceiver, the improvement was so great I told my friend Ken (N9HXD) that he sounds better through this speaker than in person! I found that a two-way (a three-way is overkill for speech, I noticed) car speaker intended for rear-deck mounting works equally well.

The received audio in my station has now improved to the point where working HF for hours is no longer a chore! Also, operating VHF opened up a totally new world—the differences in audio responses between repeaters became much more obvious, as every little nuance could be heard. With a little extra effort, I thought I could bring a level of consistency to what I heard—in addition to doing a bit of additional tweaking. To do this, I wanted to design an audio equalizer. Although there are units available commercially, they are too big and definitely overkill, since they are designed for use with stereos. At this point, I remembered the Heathkit "Microlizer" (microphone equalizer) that I had many years ago. Through some helpful hams on the Internet, I not only found out the model number (so I could order the manual), but a few folks actually sent their old manuals to me!

With schematic in hand, I set about to modify the circuit for my needs. I no longer needed the switch. Since I am powering my circuit from the same 13.8-V supply that powers the transceivers, I didn't need the battery-saving LED "blinky" circuit either. I also updated the op-amp, in that I used a single IC containing four op amps. Also, the mic-gain control became the preamplifier gain setting. The resulting schematic is shown in Figure 1. (A few updates have been made as suggested by the ARRL Lab.—*Ed*)

No commonly available quad op amp can handle the higher power levels required by a speaker, so I needed a power amplifier after the equalizer output. I had no need of rattling the windows in my ham shack, so I picked another commonly available part: a $^1/_2$-W AF amplifier. If you feel more power is needed, other amplifier ICs are available. Because of higher gain of these parts, however, I strongly recommend buying one as a part of a kit. Kits include a PC board that will minimize the chances of feedback that might occur with a homebrew layout.

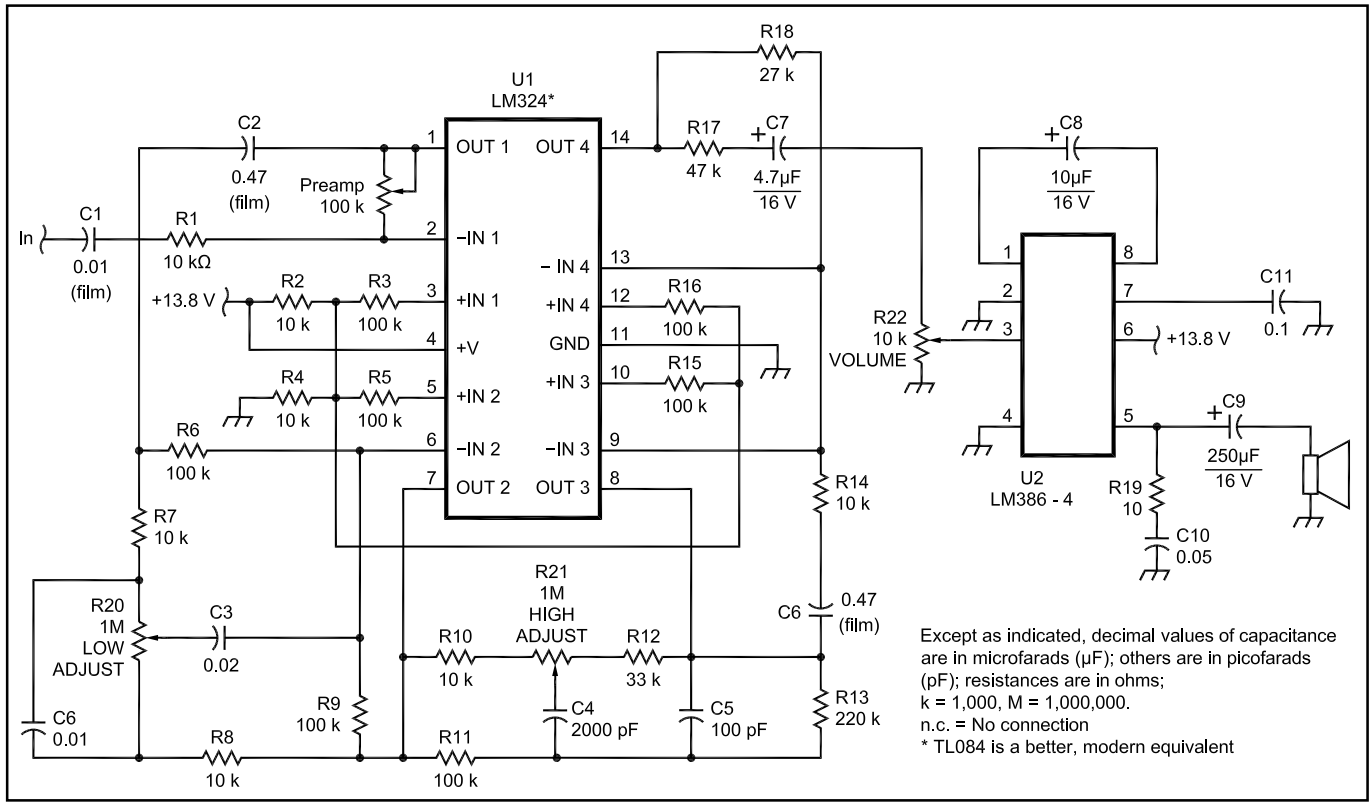


Figure 1—A schematic of an op-amp based AF equalizer from WB9YBM.

Bob Schetgen, KU7G ♦ Senior Assistant Technical Editor

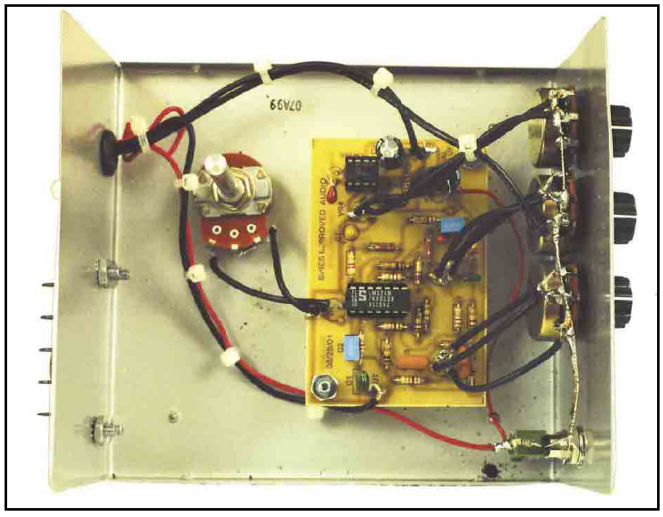


Figure 2—Here's a version of the AF equalizer built on a PC board from FAR circuits.[1] The preamplifier gain is set with the potentiometer inside the box. The front-panel volume control sets the gain of the ½-W AF amplifier.

Construction

To shield the circuit from stray RF in the ham shack, I enclosed the project in a metal box (RadioShack #270-253) and connected the electrical ground to chassis ground. Especially for the higher impedance of microphone cables, use a shielded cable with the shields grounded at both ends. Also, use bypass capacitors and/or ferrite beads on all leads entering the box; they are cheap insurance against potential problems. I routed all incoming and outgoing leads to terminal blocks at the rear of the cabinet (you can use plugs if you want), to minimize the chance of wires breaking inside the box from too much flexing. The three front-panel controls adjust the low-frequency gain, high-frequency gain and volume. I used very thin, shielded audio wire to avoid picking up any stray signals, either from inside the box or from whatever may have made it through the box. Some of this shielding might be overkill for normal operation, but it may be needed when you take this box out to Field Day and a few nearby people key up at full legal power. That is *not* the place to start troubleshooting a new squeal!

For a bit of final "dressing up," I add a professional looking equipment label. Some office-supply stores sell plastic nametags with two or three lines of inscribed print, like the call badges sold at hamfests. I get one without a clasp on the back and have a device description inscribed in the place of a name. A bit of double-sided tape affixes the label.

Operation

The only operating quirk I noticed came from the radios. When the transceiver volume is set too low and most of the audio amplification is done by external circuitry, hum can become objectionable. To prevent this, simply leave the transceiver volume control at a normal setting, and use this circuit only to tailor frequency response.—*Klaus Spies, WB9YBM, 815 Woodland Heights Blvd, Streamwood, IL 60107-2029;* **wb9ybm@juno.com**

MAKING AN LED AUDIBLE

◊ I published an earlier solution to this problem in *Electronic Design* (May 28, 1992), but it required an LM3909 IC, which is no longer widely available.

Quite often, a piece of equipment contains an LED where an audible indicator would be handier. This audible alarm can be connected across any red or green LED and runs entirely on current "stolen" from the LED. The LED still lights with nearly full brightness.

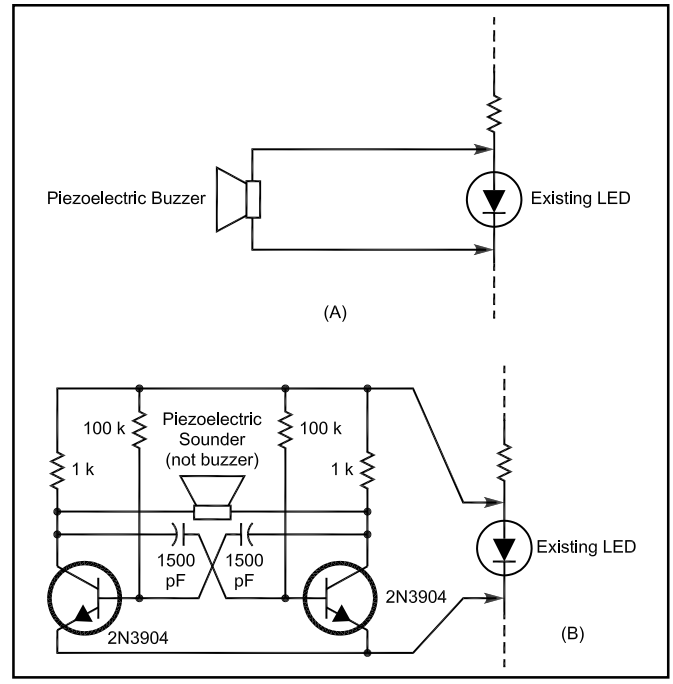


Figure 3—At A, a 3-V piezo-electric buzzer will sound faintly on power from an existing red or green LED. The circuit at B oscillates to place 3 V across a piezo speaker. Choose the resistors for the best performance with a particular sounder.

Figure 3A shows the simplest solution. If the sound doesn't need to be very loud, you can connect a 3-V piezoelectric buzzer (such as RadioShack #273-074) across an LED and it will buzz faintly. Figure 3B shows how to get louder sound, although a lot more components are needed. Bipolar drive puts over 3-V (pk-to-pk) across the piezoelectric sounder. You can vary the resistors or capacitors to get the frequency that sounds best.—*Michael A. Covington, N4TMI, 285 St George Dr, Athens, GA 30606*

TM-D700 (AND OTHERS) MIKE EXTENSION

◊ I recently did a mobile installation of my new Kenwood TM-D700 under the front passenger's seat and discovered that, while the control-head cable was plenty long enough, the mike cord was stretched uncomfortably. When faced with the $70 cost of a complete extension kit, I decided there had to be a better way. At the local electronics/computer discount store, I found a seven-foot Level 4 network patch cord. These cords contain four twisted pairs and they are terminated with the same connector as the Kenwood TM-D700 microphone cable. I also found a straight-through coupler for the cord (Fry Electronics #1727841 and 1794104). This makes a neat $6 alternative to the Kenwood extender kit, and it is long enough for any installation location using the standard control-head cable.—*Randy Thomson, K5MW, 4905 Westhaven Dr, Fort Worth, TX 76132-1522;* **k5mw@arrl.net**.

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 (see page 10), 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

[1]PC boards for this project are available from FAR Circuits, 18N640 Field Ct, Dundee, IL 60118; tel 847-836-9148; **www.farcircuits.net**. $4.50 plus $1.50 shipping and handling. $3 additional charge for credit-card purchases. Illinois residents add 6.5% sales tax.

ICOM IC-V8000 VHF FM Transceiver

Reviewed by Steve Ford, WB8IMY

ICOM has gone back to basics with the IC-V8000 transceiver. Gone are the elaborate menus, the multitude of buttons and the endless features—most of which you may never use. Instead, the V8000 puts the focus on simplicity, durability and power—*lots* of power.

Although it is designed as a 2-meter FM mobile, the V8000 does just as well on your desk (as long as you have a hefty dc power supply handy). The display is large and easy to read. You can vary not only the display brightness, but also the *color* (amber or green). VOLUME and SQUELCH controls are separate. The tuning knob is sizeable and the speaker is forward firing. There is enough audio power to overcome most mobile noise environments. In fact, one of our reviewers characterized it as "deafening."

The HM-133V microphone that's packed with the V8000 is particularly nice. Nearly all front-panel operations can also be controlled using the mike keypad—even the squelch level. The 25 buttons on the keypad are translucent and backlit. The key size and spacing is generous. The microphone cable connects to the radio via an RJ45 connector. The mike cable connects to the mike itself with an RJ45 connector as well, making it easy to replace the cord. Extension microphone cables—16.4 and 8.2 feet long—are available as optional accessories. There are so many functions on the microphone, you could probably store the radio out of sight and use the microphone as the remote "front panel."

At about 6 × 2 × 6 inches, the V8000 is relatively compact. But don't let the size fool you—this transceiver is built like a tank. The V8000 has quite a bit of heft at nearly 3 pounds. In fact, its die-cast single-piece chassis reminded me of several commercial marine radios on the market.

Features

Repeater input/output offset frequencies are programmable in all of the 207 memory channels, or you can use the "auto repeater" function to let the V8000 set them automatically. Subaudible tones for repeater access can be programmed and stored in the same manner. The V8000 can even scan for subaudible tones and write them to memory. The V8000 also offers DTMF "TouchTone" transmission for autopatch and control functions. DTMF decoding is available as an option.

Speaking of tones and decoding, the IC-V8000 makes good use of both audible and subaudible tone decoding for its various tone squelch, pocket beep and paging functions. You can set the V8000 for complex group-calling schemes where, for example, your V8000 will spring to life only when it receives your code or the code of your group. Not many hams will use these functions in normal day-to-day operation, but they are excellent for public service applications.

There is one feature in the V8000 that I wish was standard equipment in every FM transceiver. It's called "Repeater Lockout" and its function is straightforward. When it is active, Repeater Lockout will not allow you to transmit while there is a signal present. Even if you become impatient on the push-to-talk button, the V8000 will not let you interfere. Think of it as a courtesy enforcer. Of course, you have to have the initial courtesy to turn the function on in the first place!

I've already mentioned the ample memory channels. The well-written V8000 manual devotes a number of pages to describing how to program them. In truth, the process is much easier than it appears. It follows the procedures that have become standard in most modern FM radios. I was able to program the V8000 memories without referring to the manual, although I did have to glance at the pages when I tried to *transfer* the memory contents. Programming the memory channel names (up to 6 alphanumeric characters per channel) also required a little time with the book. If you travel with your V8000, you'll be pleased to learn that the memories can be stored in up to 10 different "banks" of about 20 slots each. You could have one bank of settings for your hometown, another for the city where your buddy lives, and so on.

Toggling between the frequency and name display is easy—just a long press of the MON/ANM button. And the choice of showing the frequency or channel name display is independent for each memory position.

The memory channels store power output settings, which is very handy. Repeaters that are within easy range can be programmed in with low output power settings. Memory channels for repeaters that are on the fringe can be set up with the higher levels.

You can clone memory programming from another V8000, or from a personal computer. The rear-panel external speaker jack functions as a data port in this application. To program from your PC, however, you need an optional ICOM

Bottom Line

ICOM's IC-V8000 packs a substantial RF punch in a no-nonsense package.

Steve Ford, WB8IMY ♦ QST Editor

Table 1
ICOM IC-V8000, serial number 01825

Manufacturer's Claimed Specifications	Measured in the ARRL Lab
Frequency coverage: Receive, 136-174 MHz; transmit, 144-148 MHz.	Receive and transmit, as specified.
Power requirement: Receive, 1.0 A (maximum audio); transmit, 15 A (high power).	Receive, 0.8 A; transmit, 12 A. Tested at 13.8 V.
Modes of operation: FM.	As specified.
Receiver	**Receiver Dynamic Range**
FM sensitivity: 12 dB SINAD, 0.15 μV typical.	For 12 dB SINAD, 0.15 μV.
Weather band sensitivity,12-dB SINAD (tested at 162.400 MHz): Not specified.	0.14 μV.
FM adjacent channel rejection: Not specified.	20-kHz channel spacing: 74 dB.
FM two-tone, third-order IMD dynamic range: Not specified.	20-kHz channel spacing: 74 dB.* 10-MHz channel spacing: 87 dB.
FM two-tone, second-order IMD dynamic range: Not specified.	93 dB.
S-meter sensitivity: Not specified.	S9 indication: 1.8 μV.
Squelch sensitivity: 0.08 μV typical.	At threshold: 0.09 μV.
Receiver audio output: 2.0 W at 10% THD into 8 Ω.	2.4 W at 10% THD into 8 Ω.
Spurious and image rejection: 75 dB typical.	First IF rejection, 99 dB; image rejection, 93 dB.
Transmitter	**Transmitter Dynamic Testing**
Power output (H/M/ML/L): 75/25/10/5 W (approximately).	69 / 26 / 9.3 / 5.0 W.
Spurious-signal and harmonic suppression: ≥60 dB	64 dB. Meets FCC requirements for spectral purity.
Transmit-receive turnaround time (PTT release to 50% audio output): Not specified.	S9 signal, 168 ms.
Receive-transmit turnaround time (tx delay): Not specified.	130 ms.

Size (HWD): 2.0×5.9×5.9 inches; weight, 2.4 pounds.

*Note: Unless otherwise noted, all dynamic range measurements are taken at the ARRL Lab standard spacing of 20 kHz.

interface and software.

When it comes to scanning, the V8000 features the typical full scan (band edge to band edge), programmed scan and memory scan. You can opt to skip channels during a memory scan and adjust the scan-resume conditions for all three scan types. The V8000 receiver covers 136 to 174 MHz, so you can eavesdrop on more than just amateur activity.

Weather Alert

One of the most interesting features of the IC-V8000 is the "weather channel operation." When this feature is switched on, the V8000 will quickly scan through the NOAA Weather Radio channels every five seconds. The V8000 scans through 10 channels:

US—162.550, 162.400, 162.475, 162.425, 162.450, 162.500, 162.525 MHz

Canada—161.650, 161.775, 163.275 MHz

If it detects a weather alert tone, the V8000 gets your attention by sounding an alarm and flashing a display message. This is ideal for hams involved in SKYWARN and other severe-weather support activities.

You can test the weather channel alarm by switching on your V8000 each Wednesday between 10 AM and noon local time when the NOAA Weather Radio stations run their tests.

Power

As I stated at the beginning of this review, the V8000 offers more power than you are likely to need. The output is variable from 5 W to 75 W. We found the 5-W setting to be adequate most of the time, but when the going became rough, the 75-W punch made the difference. This is particularly true when you are operating at the fringe of a repeater coverage area, or when operating simplex.

We were pleasantly surprised at how cool the V8000 was when running high power. Even after a couple of hours of net operation, the case remained cool to the touch. That's thanks in large part to the sizeable fan on the rear panel. Our reviewers described the fan noise as "moderate." Fan operation is adjustable as part of the V8000 programming.

ICOM rates the 75 W output level as "approximate." The ARRL Lab measured 69 W with our V8000. In random tests ICOM reported output between 71 and 74 W. It's important to note that you must use a heavy dc power cord, preferably the one supplied by ICOM. This transceiver draws almost 15 A in high-power transmit, so an inadequate power cord may create resistive loss, resulting in lower voltage and lower output. However, it is highly unlikely that you or anyone else will notice a performance difference based on the lack of a few watts of RF.

Manufacturer: ICOM America, 2380 116th Ave NE, Bellevue, WA 98004; 425-454-8155, fax 425-454-1509; **amateur@icomamerica.com**; **www.icomamerica.com**. Manufacturer's suggested list price: $306.65. Typical current street price: $250. List prices of selected optional accessories: CS-V8000 *Windows 95/98/ME* programming software (on CD ROM), $35; OPC-478 cable for computer to transceiver programming, $45; OPC-474 cable for transceiver to transceiver cloning, $18; OPC-440 microphone extension cable (16.4 feet), $85; UT-108 DTMF decoder unit, $35.

QST Compares HF/VHF Wattmeters

By Steve Ford, WB8IMY

One of the most important pieces of test gear you'll ever own is your wattmeter. With a wattmeter you can measure the output of your transceiver and adjust it accordingly. A wattmeter can alert you to a problem with your antenna system by displaying the forward and reflected power at a particular point. With the forward and reflected power values, you (or the meter) can calculate the Standing Wave Ratio (SWR). You can even use a wattmeter to calculate feed line loss—just compare the power at the input of the feed line to the power at the output.

Many modern radios and antenna tuners include wattmeters, but these are tied to the equipment in which they are installed. In contrast, a stand-alone wattmeter can be used anywhere. This is convenient when you're trying to troubleshoot a problem—especially when you need to take a measurement at the feedpoint of an antenna, or in a mobile station.

Wattmeters differ in several ways. Some models display forward power, reflected power and SWR simultaneously. Some display only forward and reflected power, leaving it up to you to "ask" for the SWR by flipping a switch or twisting a calibration knob. Other wattmeters display *only* forward or reflected power—you have to jot down the measurements and calculate the SWR yourself.

Many wattmeters claim to be *peak reading*. That is, they can display power levels that are present at extremely brief periods of time. A good example is an SSB signal that can have a relatively low *average* power, but include numerous bursts of higher peak power that exist for only fractions of a second.

There are two types of peak-reading meters: *active* and *passive*. The active wattmeters sample peak power levels electronically and then amplify and display the results. These meters require an external dc power source. Passive models use unamplified meter-damping circuits for peak-power readings. As you might guess, active wattmeters provide the most accurate peak-power readings. In most instances you'll be concerned with *average* power readings, and passive meters often do an adequate job in this department.

The ARRL Laboratory tested the meters at 2, 14, 28, 50 and, for those meters with extended coverage, 144 MHz. Power accuracy tests were conducted at 5, 100 and 1000 W (for those meters rated at 1 kW) in key-down CW (100% duty cycle), 50% duty cycle CW (60 WPM keying), two-tone SSB (700 and 1900 Hz) and standard voice SSB. SWR accuracy testing was performed with resistive loads that created 1:1 and 2:1 SWRs.

The wattmeters chosen for this review are *not* laboratory-grade meters. Although we measured them against calibrated ARRL Lab equipment, it isn't fair to expect the same level of performance. If you require extreme accuracy, you have to pay for it, often to the tune of hundreds or even thousands of dollars. But for most Amateur Radio applications you can tolerate *reasonable* accuracy; you don't need to split hairs at tiny fractions of watts.

DIAMOND SX-200

The Diamond SX-200 uses vertically stacked scales and a single meter movement to measure power and SWR. The display is lighted, but you have to supply an external 12-V power source (Diamond includes the power cable, though). To operate the SX-200 you have to use the front-panel switches to jump between forward power, reflected power and SWR functions as necessary. The SX-200 is a passive peak-reading meter with a switch to select either average or peak-power modes. To measure SWR, you must first calibrate the SX-200 in the calibrate mode using the front-panel CALIBRATE control, then switch to the SWR mode. The SX-200 specifies a frequency range of 1.8 to 200 MHz and power scales of 5, 20 and 200 W. The minimum power required to obtain an SWR reading is 1 W. Primarily a desktop meter, the SX-200 measures 6 × 2 × 4 inches and weighs 2 pounds, making it one of the heftier meters of the bunch.

The SWR accuracy of the SX-200 was quite good in our Lab tests, but the forward power accuracy could have been better. From a user standpoint, we found the need to frequently change switch settings a little cumbersome. The meter is ruggedly built, however, with a sleek, attractive appearance.

Manufacturer: Diamond Antenna, 435 South Pacific St, San Marcos, CA 92069; tel 760-744-0900; **www.rfparts.com/diamond/**. $99.95.

DIAMOND SX-200
Frequency Range: 1.8-200 MHz
Power Range(s): 5/20/200 W
PEP Measurement: Passive†

Actual Forward Power (Average/Peak)

Frequency (MHz)	*2*	*14*	*28*	*50*	*144*
5 W CW*	6.0/6.0	6.0/6.0	5.8/5.8	5.2/5.2	4.5/4.5
5 W 50%	–/4.7	–/4.7	–/4.8	–/4.3	–/3.5
100 W CW	130/130	125/125	125/125	120/120	100/100
100 W 50%	–/130	–/120	–/125	–/100	–/90
100 W Two-Tone	–/100	–/90	–/100	–/95	–/85
100 W Voice	–/110	–/90	–/90	–/80	–/80
SWR Accuracy					
1:1 SWR	1:1	1:1	1.1:1	1.1:1	1.1:1
2:1 SWR	2:1	2:1	2:1	1.9:1	2:1
Insertion Loss	–	<0.1 dB	–	<0.1 dB	<0.1 dB

Notes
†For PEP monitoring, "Active" indicates that a circuit requiring external power is used. "Passive" indicates a circuit that requires only RF.
*Used 20-W scale for 5-W tests.

DIAMOND SX-20C

The SX-20C is a compact meter ($3^5/_{16} \times 3^5/_{16} \times 3^3/_4$ inches) designed to be as "hands off" as possible. The SX-20C is intended for mobile use, but it works just as well in the shack or just about anywhere else. This passive meter uses two meter movements that sweep across each other (the so-called "cross needle meter" design). When you apply RF, the SX-20C displays forward and reflected power simultaneously. Beneath the arcing forward and reflected power scales there is an SWR nomograph. Just watch where the needles cross and that's your SWR. The SX-20C has two power settings that are selected with a front-panel pushbutton: 30 and 300 W (average reading only). The minimum power necessary for a reading is 5 W. The SX-20C is rated for operation over three frequency ranges: 3.5-30 MHz, 50-54 MHz and 130-150 MHz.

The SX-20C seems not to be as ruggedly built as the Diamond SX-200. In performance, however, the SX-20C turned in impressive results with good forward power and SWR accuracy.

Manufacturer: Diamond Antenna, 435 South Pacific St, San Marcos, CA 92069; tel 760-744-0900; **www.rfparts.com/diamond/**. $89.95.

PALSTAR WM150

The WM150 is the only active peak-reading wattmeter in the group. The WM150 is also one of the few meters in this review to boast the ability to measure up to 3 kW. The WM150 display uses the cross-needle approach that allows forward power, reflected power and SWR to be measured at the same time. There are two pushbutton-selectable power ranges: 300 W and 3 kW. Another pushbutton selects average or peak power displays. The frequency range of the WM150 is 1.8 to 150 MHz.

The WM150 is a durable instrument housed in a $4^1/_2 \times 3^1/_4 \times 3^1/_4$-inch aluminum case. The display is illuminated and, unlike many wattmeters in this price range, the WM150 package includes a 12-V dc "wall wart" supply to power the lamp and the active circuits.

The WM150 provided reasonably accurate forward measurements on HF, but seemed to suffer on VHF. The same was true for SWR accuracy. Although the

DIAMOND SX-20C
Frequency Range: 3.5-150 MHz
Power Range(s): 30/300 W
PEP Measurement: None

Actual Forward Power (Average only)

Frequency (MHz)	*2*	*14*	*28*	*50*	*144*
5 W CW	–	4.9	5.0	4.8	4.8
100 W CW	–	100	100	97	98
SWR Accuracy					
1:1 SWR	–	1:1	1:1	1.1:1	1.1:1
2:1 SWR	–	2.2:1	2:1	2:1	2:1
Insertion Loss	–	<0.1 dB	–	<0.1 dB	<0.1 dB

PALSTAR WM150

Frequency Range: 1.8-150 MHz
Power Range(s): 300/3000 W
PEP Measurement: Active†

Actual Forward Power (Average/Peak)

Frequency (MHz)	*2*	*14*	*28*	*50*	*144*
5 W CW	8/–	7/–	7/–	6/–	110/90*
100 W CW	103/105	103/102	102/101	103/102	110/90
100 W 50%	–/102	–/102	–/102	–/102	–/70
100 W Two-Tone	–/100	–/102	–/100	–/100	–/90
100 W Voice	–/100	–/98	–/100	–/100	–/90
1 kW CW	900/1250	950/1260	900/1250	–/–‡	–/–‡
1 kW 50%	–/1250	–/1250	–/1250	–/–	–/–
1 kW Two-Tone	–/1250	–/1250	–/1250	–/–	–/–
1 kW Voice	–/1250	–/1250	–/1250	–/–	–/–
SWR Accuracy					
1:1 SWR	1:1	1:1	1:1	1.2:1	2.5:1
2:1 SWR	2:1	2:1	1.7:1	1.4:1	–
Insertion Loss	–	<0.1 dB	–	<0.1 dB	<0.1 dB

Notes
*Input SWR at 100 W on 144 MHz was 1.7:1 (2.5:1 indicated on meter), possibly affecting accuracy.
**Peak detector circuit in this unit requires more than 5 W for proper operation.
†For PEP monitoring, "Active" indicates that a circuit requiring external power is used. "Passive" indicates a circuit that requires only RF.
‡Amplifiers for 6 meters or 2 meters were not available at the time of testing.

DAIWA CN-101L

Frequency Range: 1.8-150 MHz
Power Range(s): 15/150/1500 W
PEP Measurement: Passive†

Actual Forward Power (Average/Peak)*

Frequency (MHz)	*2*	*14*	*28*	*50*	*144*
5 W CW	4.6/4.6	5/5	5/5	4.2/4.2	4.8/4.8
5 W 50%	–/2.2	–/2.5	–/2.3	–/2.1	–/2.2
100 W CW	90/90	95/95	93/93	88/88	100/100
100 W 50%	–/63	–/68	–/65	–/62	–/70
100 W Two-Tone	–/55	–/52	–/60	–/55	–/70
100 W Voice	–/30	–/30	–/30	–/25	–/30
1 kW CW	1050/1050	1100/100	1050/1050	–/–‡	–/–‡
1 kW 50%	–/900	–/1070	–/900	–/–	–/–
1 kW Two-Tone	–/750	–/800	–/720	–/–	–/–
1 kW Voice	–/900	–/800	–/900	–/–	–/–
SWR Accuracy					
1:1 SWR	1:1	1:1	1:1	1:1	1:1
2:1 SWR	2.2:1	2.3:1	2.3:1	2.2:1	1.6:1
Insertion Loss	–	<0.1 dB	–	<0.1 dB	0.1 dB

Notes
*According to the CN-101L manual, "For monitoring PEP, a condensor is placed into detector circuit. This function can not hold peak envelope power."
†For PEP monitoring, "Active" indicates that a circuit requiring external power is used. "Passive" indicates a circuit that requires only RF.
‡Amplifiers for 6 meters or 2 meters were not available at the time of testing.

WM150 is specified to function at VHF, Palstar states that the meter is not specifically designed for accuracy above 50 MHz.

Manufacturer: Palstar Inc, 9676 N Looney Rd, PO Box 1136, Piqua, OH 45356; 937-773-6255; **www.palstarinc.com/**. $89.95.

DAIWA CN-101L

Daiwa Industry Company pioneered the cross-needle meter design more than 20 years ago, and it has been showing up in their wattmeters ever since. The CN-101L is a desktop meter with three switch selectable power levels: 15, 150 and 1500 W. The frequency range is 1.8 to 150 MHz. You can toggle between average and peak power (passive) readings.

The cross-needle meters provide simultaneously forward power, reflected power and SWR displays, which is extremely convenient. No calibration or other adjustments are necessary. The meter face is backlighted and a power cable is included.

The enclosure is quite attractive with a large, easy-to-read meter. The front panel switches, however, lacked a solid feel. We found the CN-101L to be accurate on average power, but unacceptably inaccurate when attempting to measure peak envelope power (PEP). The CN-101L isn't well designed for peak power measurement, and the manual says as much (see the note in the data table).

Manufacturer: Daiwa Industry Company, 60 9th Floor, TOC Building, 22-17-7 chome, Nishi-Gotanda Shinagawa-ku, Tokyo, Japan. Available from several US dealers. Typical street price $94.75.

DAIWA CN-410M

The CN-410M is a compact wattmeter that also features Daiwa's famous cross-needle design. Being able to read power and SWR at a glance is a boon to portable and mobile operators—and it is a pleasant experience in the shack as well. The CN-410M is designed for operation from 3.5 to 150 MHz at pushbutton-selectable 15- or 150-W power levels (peak or average). The CN-410M comes with a mobile mounting bracket. According to its specifications, the CN-410M can provide readings with as little as 3 W, but this aspect of its performance was not tested.

It is important to point out that the CN-410M has been discontinued. However, this meter is still quite popular at hamfest fleamarkets and on-line auctions.

The CN-410M held its own on HF, but we noticed that its accuracy declined at the high end of its range. Also, on 2 meters, the CN-410M presented an SWR of 2:1, a significant figure at this frequency.

DAIWA CN-410M
Frequency Range: 3.5-150 MHz
Power Range(s): 15/150 W
PEP Measurement: None

Actual Forward Power (Average only)

Frequency (MHz)	*2*	*14*	*28*	*50*	*144*
5 W CW	–	5.2	5.0	4.3	4.6
100 W CW	–	110	105	90	*
SWR Accuracy					
1:1 SWR	–	1:1	1:1	1:1	1.2:1
2:1 SWR	–	2:1	2:1	2:1	2.7:1
Insertion Loss	–	<0.1 dB	–	0.1 dB	–

Note
*SWR on input was 2:1 at 100 W on 144 MHz, so test was not performed.

MFJ ENTERPRISES MFJ-860
Frequency Range: 1.8-54 MHz
Power Range(s): 30/300 W
PEP Measurement: None

Actual Forward Power (Average/Peak)

Frequency (MHz)	*2*	*14*	*28*	*50*
5 W CW	4.6	4.6	4.8	4.3
100 W CW	110	110	115	110
SWR Accuracy				
1:1 SWR	1:1	1:1	1:1	1.3:1
2:1 SWR	2:1	2:1	2:1	2.2:1
Insertion Loss	–	<0.1 dB	–	<0.1 dB

Manufacturer: Daiwa Industry Company, 60 9th Floor, TOC Building, 22-17-7 chome, Nishi-Gotanda Shinagawa-ku, Tokyo, Japan. Available from several US dealers. Typical street price $98.75.

VECTRONICS PM-30

The PM-30 is the second wattmeter in the group to include the ability to measure up to 3 kW output. With its large cross-needle display, the PM-30 can simultaneously measure forward power, reflected power and SWR. The power is selected by pushbutton in two ranges: 300 and 3000 W with average or peak power display (selectable). The frequency range is 1.8 to 60 MHz. The meter can be backlighted if you connect an external 12-V dc source. You can turn the backlighting on or off from the front panel.

VECTRONICS PM-30
Frequency Range: 1.8-60 MHz
Power Range(s): 300/3000 W
PEP Measurement: Passive†

Actual Forward Power (Average/Peak)

Frequency (MHz)	*2*	*14*	*28*	*50*
5 W CW	8/8	8/7	8/8	7/8
100 W CW	125/125	125/125	130/130	125/120
100 W 50%	–/120	–/120	–/125	–/115
100 W Two-Tone	–/92	–/90	–/100	–/100
100 W Voice	–/80	–/85	–/90	–/80
1 kW CW	1000/1000	920/900	920/900	–/–‡
1 kW 50%	–/900	–/900	–/900	–/–
1 kW Two-Tone	–/800	–/800	–/750	–/–
1 kW Voice	–/900	–/800	–/1000	–/–
SWR Accuracy				
1:1 SWR	1.2:1	1:1	1.1:1	1.3:1
2:1 SWR	1.7:1	1.7:1	1.5:1	1.5:1
Insertion Loss	–	<0.1 dB	–	<0.1 dB

Notes
†For PEP monitoring, "Active" indicates that a circuit requiring external power is used. "Passive" indicates a circuit that requires only RF.
‡Amplifiers for 6 meters or 2 meters were not available at the time of testing.

The PM-30's construction is sturdy and at 5 × 3½ × 5 inches it is the largest meter tested for this review. A Lexan face protects the meter movements.

The PM-30's forward power accuracy varied considerably according to the power level and frequency. SWR accuracy was fair.

Manufacturer: Vectronics, 300 Industrial Park Rd, Starkville, MS 39759; 800-363-2922; **www.vectronics.com/**. $79.95.

MFJ ENTERPRISES MFJ-860

The MFJ-860 is the least expensive wattmeter in this group. At about 4½ × 3½ × 2½ inches, it is also among the smallest. It sports the convenient cross-needle meters for instant SWR and power readings. In fact, the only switch on the meter is a pushbutton to select one of two power ranges: 30 and 300 W. The MFJ-860 is average-reading only. The frequency range is 1.8 to 60 MHz.

Despite the lower cost, the MFJ-864 was surprisingly accurate. Its insertion loss was also acceptable and well within specifications. The only criticism was related to the small size of the meter display itself. It can be difficult to read under some lighting conditions.

Manufacturer: MFJ Enterprises, PO Box 494, Starkville, MS 39759; 800-674-1800; **www.mfjenterprises.com/**. $44.95.

Amateur Radio Poised to Gain Two New Bands!

The FCC has proposed going along—in full or in part—with ARRL requests to allocate a new domestic (US-only), secondary HF band at 5.25 to 5.4 MHz plus a new low-frequency amateur "sliver band" at 136-kHz, and to elevate Amateur Radio to primary status at 2400 to 2402 MHz.

"I'm just as tickled as I can be," ARRL President Jim Haynie, W5JBP, said upon hearing the news.

The FCC voted unanimously May 2 to adopt the *Notice of Proposed Rule Making* in ET Docket 02-98, released May 15. Comments were due 45 days after publication of the *NPRM* in *The Federal Register*. The FCC was expected to make this proceeding available for comments filed via the Electronic Comment Filing System (ECFS), **www.fcc.gov/e-file/ecfs.html**. Click on "Search for Filed Comments" and enter "02-98" in the "Proceeding" field.

First New HF Allocation Since 1979

Eighty-seven comments were filed in response to the ARRL's petition for a band in the vicinity of 5 MHz, which has become known as the 60-meter band. The League's request to the FCC followed a period of operation on the band by about a dozen stations across the US under the ARRL's WA2XSY experimental license.

The FCC agreed with ARRL that propagation and interference in the 3.5 and 7 MHz bands could hinder effective amateur HF communications. The new band at 5 MHz would help amateurs "better match their choice of frequency to existing propagation conditions," the FCC concluded. The FCC said ARRL's WA2XSY experimental operation appears to support the League's contention that a 60-meter band could fill a "propagation gap" between 80 and 40.

If approved, the band would be the first new amateur HF allocation since World Administrative Radio Conference 1979 gave amateurs 30, 17 and 12 meters—the so-called "WARC Bands."

The FCC has proposed letting amateurs operate at full legal limit on 5 MHz, but it left open for further discussion whether to restrict the band to Amateur Extra Class licensees or make it available to General and higher class licensees, as the ARRL has proposed. The FCC also invited further comment on whether the band should be broken down into mode-specific subbands. The ARRL has recommended opening the entire band to RTTY, data (including CW), phone and image emissions.

The band 5.250 to 5.450 MHz now is allocated to Fixed and Mobile services on a co-primary basis in all three ITU regions. If allocated to the Amateur Service on a secondary basis, hams would have to avoid interfering with—and accept interference from—current occupants, just as they're doing already on 30 meters. Assuming the 5-MHz band eventually is authorized, it could be a few years before it actually becomes available to amateurs.

FCC Proposes First Ham LF Allocation

The proposed allocation at 136 kHz would be the first-ever LF band for US hams. In 1998, the ARRL had asked the FCC for two LF allocations—at 136 kHz and 160 to 190 kHz. In its *NPRM*, however, the FCC indicated it was willing to go along with the former but not the latter.

The 135.7 to 137.8 kHz band proposed adheres to the European Conference of Postal and Telecommunications Administrations (CEPT) band plan. Several countries in Europe and elsewhere already have 136-kHz amateur allocations. The first amateur transatlantic contact on the band was recorded in February 2001.

I'm just as tickled as I can be!—President Haynie

The Commission said its reluctance to propose an amateur band at 160 to 190 kHz stemmed from concerns about possible interference to unlicensed power line carrier (PLC) systems operating in that portion of the LF spectrum. The FCC noted it had turned down a 1978 ARRL petition for the same reason. Unallocated Part 15 PLC systems are used by electric utilities to send control signals, data and voice. Unlicensed experimenters—some of them hams—currently operate on the 160-190 kHz band in the US under the FCC's Part 15 rules. Amateur allocations there exist in New Zealand and Australia.

The FCC said it was persuaded by ARRL's arguments to consider a secondary LF allocation because "amateur experimentation could lead to a better understanding of communication techniques in this frequency range." The FCC proposed no restrictions on antenna size or design, saying it did not want to inhibit experimentation.

Technical limits proposed call for 1 W effective isotropic radiated power (EIRP) and a transmission bandwidth of only 100 Hz. The ARRL had asked for 2 W EIRP and a maximum transmitter power of 200 W PEP. The FCC proposed to limit access to the band to General and higher-class licensees, as ARRL had requested.

Hams would be secondary to the Fixed and Maritime Mobile services in the 136-kHz allocation. The FCC said most of the 32 comments received supported the LF proposal.

Amateurs Poised for Primary at 2400-2402 MHz

The ARRL asked the FCC to elevate the domestic status of Amateur and Amateur-Satellite services at 2400 to 2402 MHz from secondary to primary in July 2000. In its *NPRM*, the FCC agreed that the League's request "has merit" and that the proposed upgrade "seeks to protect current amateur use of this band." It did not propose any changes in service rules or operational requirements.

Amateurs already are primary at 2390 to 2400 and from 2402 to 2417 MHz. The ARRL has said primary status in the intervening spectrum slice was needed "to provide some assurances of future occupancy of the band segments for the next generation of amateur satellites."

Thank You for Your Support!

ARRL's Chief Development Officer Mary Hobart, K1MMH, was among those welcoming the good news from the FCC. "This a wonderful example of the work ARRL conducts in Washington on matters important to the Amateur Radio community," she said. "Thanks to the 10,000 hams who contributed so generously to the 2002 Defense of Frequencies Fund."

SHUTTLEWORTH ENJOYS BUSY WEEK IN SPACE

South African Mark Shuttleworth spent a busy, but apparently highly enjoyable, week in space in late April and early May that included lots of time on ham radio and in the laboratory. In exchange for the time of his life and the opportunity to conduct a little research, Shuttleworth paid Russia an estimated $20 million.

During his week-long tour, Shuttleworth squeezed in four Amateur

Rick Lindquist, N1RL ♦ Senior News Editor

NASA

Shuttleworth

Radio on the International Space Station (ARISS) school contacts. His April 29 QSO with students at Bishops College—his *alma mater*—marked the first ARISS QSO with a school in Africa.

"I'm living my own dream here," the 28-year-old Shuttleworth told the Bishops students. "We need to think about our future and dream about a better future, and I hope that this project—the realization of a dream—will inspire some other people to pursue theirs."

Shuttleworth also thrilled several US amateurs by showing up unannounced on 2 meters during a North American pass May 1. Shuttleworth's solo casual operation—at the encouragement of ARISS—resulted in a string of contacts. Those who routinely monitor the ISS 145.80 MHz downlink frequency got a hint that something was up when they began hearing Shuttleworth's British-accented English instead of packet bursts.

"As you can imagine, I was thrilled to work him," said Stan Vandiver, W4SV.

"Wow!" was the simple reaction of Bruce Weaver, K3LTM, the advisor to the Cowanesque Valley School Amateur Radio Club in Pennsylvania, after the school's KB3BRT club station made its own brief contact with Shuttleworth.

Among several other stations, Shuttleworth also spoke briefly with ARISS International Group Chairman Frank Bauer, KA3HDO. "Thanks very much for your help with A-R-I-S-S," Shuttleworth said, spelling out the acronym.

During a May 2 ARISS QSO with students gathered in Gauteng, South Africa, Shuttleworth spoke at some length about his research projects, one of which involved carrying sheep and mice embryos and stem cells into space to see how they would react to weightlessness.

Other research involved attempts to crystallize HIV and human immune system proteins to study their structure and provide insights into developing drugs to treat AIDS, a major health problem on the African continent.

Shuttleworth now lives in London. He and his crewmates—Russian cosmonaut and ISS veteran Yuri Gidzenko and European Space Agency astronaut Roberto Vittori, IZ6ERU, blasted off April 25 aboard a Soyuz "taxi mission." They returned to Earth May 5.

ARISS

Loud and clear: **During a break at the ARISS International meeting, ARRL's Rosalie White, K1STO (right) tries out the ARISS headset that's used aboard the ISS to chat with Lou McFadin, W5DID, of AMSAT. The ARISS flexible tape antenna is in the middle of the hardware table that was on display.**

ARISS, Canadian Space Agency Agree to Cooperate

The ARISS International Group and the Canadian Space Agency have agreed in principle to cooperate in areas of mutual interest such as educational outreach, public relations and Amateur Radio licensing of Canadian astronauts. The announcement

FCC News

FCC WON'T REQUIRE DATE OF BIRTH AFTER ALL

The FCC can't seem to make up its mind about whether or not it wants to know the date of birth of an Amateur Service applicant. Supplying a date of birth used to be a requirement on amateur applications, and the FCC used to make the information public as part of a licensee's record. But a few years ago, the FCC dropped the requirement and hid the database field that once displayed birth date information.

Last year, the FCC flip-flopped and announced it was revising FCC Form 605 to include a date of birth field and would again require the information—although it would not be made public. Now, the FCC has changed its mind once more. Missing from the latest version of Form 605 is the requirement for Amateur Service applicants to supply a date of birth, although they may do so if they wish (it is a requirement for certain other wireless service applicants).

The latest version of FCC Form 605 (dated April 2002) is available on the FCC Web site.

The FCC now requires applicants to have an FCC Registration Number (FRN) before applying.

Amateur Enforcement

♦ **FCC bumps back privileges following exam session audit:** The FCC has reduced the privileges of six Amateur Radio licensees after they failed to appear for retesting in the wake of a Georgia FCC examination session audit. Earlier this year, the FCC asked the six applicants—all Technicians—to retake the Element 1 (5 WPM Morse code) examination by April 15, 2002. The FCC request followed the discovery of apparent irregularities in code test administration during a May 27, 2000, ARRL-VEC test session in Statesboro.

"You did not appear for the code test," FCC Special Counsel Riley Hollingsworth wrote the six in identically worded letters. "Accordingly, your license privileges have been modified by the Wireless Telecommunications Bureau to those of a 'no-code' Technician licensee."

The "modification" is academic, however, since the FCC no longer distinguishes in its database between Technicians who have Element 1 credit—formerly called "Technician Plus" licensees—and those who do not. Technicians with Element 1 credit have limited privileges on HF, including "Novice" CW privileges on 80, 40 and 15 meters and CW and SSB privileges on 10 meters.

Licensees notified were Eugene Walker Jr, KG4HHT; James W. Brannen, KG4HIS; Roxanne T. Brannen, KG4HSH; Joyce B. Martin, KG4EXG; Larry D. Hagan, KG4IHE; and Thomas F. Evans, KF4YLF.

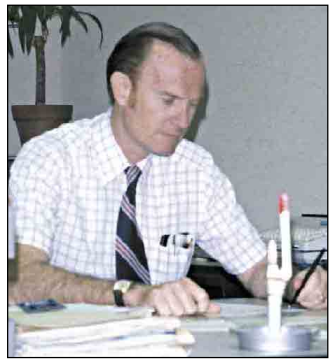
Hollingsworth told all six amateurs that the irregularities uncovered were "in no way a reflection upon you or your qualifications to be an amateur licensee." In response to the FCC's January 31 retesting request, two other candidates did appear for retesting and passed Element 1.

The ARRL VEC called apparent irregularities to the FCC's attention last June. Earlier this year, the FCC wrapped up an audit that was expanded to include five examination sessions in Georgia during 2000 and 2001 conducted by the same ARRL VEC team. The ARRL VEC discontinued VE accreditation for all but two of the VEs involved.

Hollingsworth said it appeared that some test candidates "had been shown or had access to" the Morse code answer key used by the VEs to grade the exam and that some VEs had taught classes and supplied sample tests to the students using the same test editions later given at actual examination sessions.

NOTABLE SILENT KEYS

Former ARRL Staff Member E. Laird Campbell, W1HQ, SK



Former ARRL Headquarters staff member Laird Campbell, W1HQ, of Amarillo, Texas, died April 26 following a long battle with multiple sclerosis. He was 70. During his distinguished 35-year HQ career, he served in a variety of roles, including *QST* managing editor and ARRL advertising manager. He was an ARRL Charter Life Member.

"Laird was an uncommonly decent human being—I was proud to call him my friend," said current *QST* Managing Editor Joel Kleinman, N1BKE. "Despite the setbacks he had after he left the ARRL HQ staff, he never lost his sense of humor. He was the quintessential gentleman."

Campbell developed his interest in electronics while attending Texas Tech. Following an active duty stint in the US Naval Reserve, he was licensed in 1951 as WN5TQD (later W5TQD). He joined the ARRL staff as a contest log checker in 1954 and became W1CUT. His later choice of W1HQ reflected his close association with ARRL Headquarters.

While at ARRL HQ he met his future wife, Connie, who later became W1CIE. She died in 1990, and the couple's daughter Mary now holds her mother's call sign.

As a technical assistant at HQ, Campbell in 1955 was believed to have made the first Amateur Radio contacts on 160 and 20 meters using transistorized transmitters. After a stint as advertising manager, he was promoted to assistant general manager for business operations in 1976. He served as managing editor of *QST* from 1978-89.

ARRL Chief Executive Officer David Sumner, K1ZZ, recalled that, for many years, Campbell made a point of working—and getting a QSL card from—every new licensed ARRL HQ staffer.

When Campbell retired in 1989, it was said in *QST*, "Few persons have contributed as much to the League or in as many different ways as has Laird."

Among his closest friends during his ARRL career were HQ staff members Bob and Ellen White, W1CW and W1YL, and their son Jim, K4OJ. "We've all lost something very special in our lives," Ellen White said.

A memorial service was held May 4 in Amarillo. Survivors include a son, Michael, and his wife Rie; a daughter Mary Campbell-Barry, W1CIE, and her husband, Will Barry, N1XRK—an ARRL Volunteer Counsel; and Laird Campbell's partner of the past six years, Shelli Mosier of Amarillo. The family invites memorial contributions to the Maine Chapter, National Multiple Sclerosis Society, PO Box 8730, Portland, ME 04104.—*some information provided by the Amarillo Globe-News*

Past ARRL President Robert W. Denniston, W0DX/VP2VI, SK

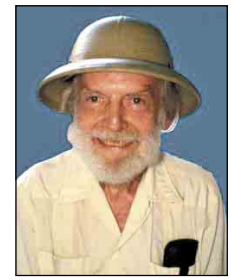
Past ARRL President and DXpedition pioneer Bob Denniston, VP2VI and W0DX, of Tortola, British Virgin Islands, died May 12. He was 83. Denniston served as ARRL president from 1966 until 1972 and as International Amateur Radio Union president from 1966 until 1974. He was an ARRL honorary vice president.

"He was an Amateur Radio icon, and he will be missed," said ARRL President Jim Haynie, W5JBP.

Denniston traveled extensively during his years as IARU president to promote IARU membership and build support for Amateur Radio in anticipation of what eventually became the 1979 World Administrative Radio Conference, where Amateur Radio gained allocations at 30, 17 and 12 meters.

Denniston was a founding director of the IARU Region 3 Association in 1968 and served as chairman of the Second IARU Region 3 Conference in Tokyo in 1971. Japan Amateur Radio League President Shozo Hara, JA1AN, called Denniston "a great leader" of Amateur Radio who would be long remembered. After a major earthquake struck Nicaragua in 1972, Denniston delivered equipment and assisted in providing emergency communication.

After heading up the so-called "Gon-Waki" VP7NG DXpedition to the Bahamas during the 1948 ARRL International DX Contest (see *QST*, Jul 1948, page 80), Denniston—then W4NNN—became known as "the father of the modern DXpedition." The DXpedition's name was a spoof on Thor Heyerdahl's "Kon-Tiki" expedition the previous year. Denniston has said he didn't realize at the time that he was inventing the concept, and he credited CM9AA with coining the expression "DXpedition."



In recent years, he and a group of friends commemorated the 1948 "Gon Waki" milestone each March, setting up vintage equipment and using simple wire antennas and hand keys to replicate the flavor of the original DXpedition from his Tortola QTH.

Long-time friend Jim Livengood, W0NB (ex-KP2L), who operated during some of the "Gon-Waki" recreations, credited Denniston with "lighting the fire" that led him into Amateur Radio and a career in broadcasting. "Bob loved our hobby, promoted its growth and was an ardent supporter of the League as long as I knew him."

Denniston's other firsts included Clipperton Island (FO8AJ) in 1954 and Malpelo (HK0TU) in 1969. His strategy of visits to rare prefixes helped earn him a world record ARRL International DX Contest score in 1960 from VP1JH (now Belize).

"Bob Denniston was the operator's operator," said former ARRL staffer John Nelson, K0IO (ex-W1GNC), who lives in Denniston's hometown of Newton, Iowa. Nelson said Denniston promoted use of 160 meters years ago and always encouraged newcomers to get on the air during Field Day.

First licensed some 70 years ago as W9NWX at the age of 13, Denniston served for four years in the US Army Signal Corps and was chief of the radio control section of radio station WAR at the Pentagon. While at WAR he met his wife, Nell—a Women's Army Corps CW operator. At the end of World War II, Denniston was the radio operator aboard the presidential train.

Denniston was ARRL Midwest Division Director from 1956 until 1966, when he was elected as the League's sixth president. While in Iowa, he had been active in ARES and RACES. He was a Charter Life Member of the ARRL as well as a charter member and past president of the Potomac Valley Radio Club. He was the founder and president of the Virgin Islands Amateur Radio Club.

In his professional life, Denniston was president of Denniston and Partridge, a firm that operated more than two dozen lumberyards at one point. When he retired to the British Virgin Islands, he ran Smugglers Cove Hotel in Tortola.

Denniston's wife, Nell, died two years ago. A son, Matt, and daughter, Carol, are among his survivors.

VP2VI QSL Manager Rick Casey, W6RKC, continues to handle requests for VP2VI cards to 10640 Tabeaud Rd, Pine Grove, CA 95665.

came during the ARISS committee meeting at the Canadian Space Agency in Ste Hubert, Quebec, April 4-6.

Those attending the meeting, moderated by Roy Neal, K6DUE, learned that the remaining two Amateur Radio antennas are scheduled for installation on the ISS Service Module. ARISS International Chairman Frank Bauer, KA3HDO, said the antennas would be installed during spacewalks either this summer by the Expedition 5 crew or in late 2002 or early 2003 by the Expedition 6 crew. The flexible tape antennas are designed for VHF and UHF. The gathering also heard updates on so-called Phase 2 Amateur Radio hardware.

An ARISS slow-scan television system called *SpaceCam* also may be in the offing, although no installation timetable has been set.

ARISS is an international project with US participation by the ARRL, AMSAT and NASA.

New Section Managers Take Office July 1 in Four Sections

ARRL members in Oregon have made their choice for a new Section Manager. Marshall D. Johnson Sr, KK7CW, of Albany defeated Lewis N. Williams, WB7NML, 582 to 417, in the only contested race in the current SM election cycle. Ballots were counted May 21 at ARRL Headquarters.

Johnson replaces SM William Sawders, K7ZM, who did not seek another term. He'll be among four new ARRL Section Managers taking office July 1. The other three candidates ran unopposed, and incumbent Section Managers were re-elected in four other ARRL sections.

In Indiana, James Sellers, K9ZBM, of Middlebury, will succeed Peggy Coulter, W9JUJ. Coulter has held the office since 1990. An ARRL Life Member, Sellers has been Indiana's Section Emergency Coordinator since 1991.

In Vermont, the new SM is Paul Gayet, AA1SU, of Colchester. He is the president of the Radio Amateurs of Northern Vermont, an ARRL Special Service Club. Gayet succeeds Bob DeVarney, WE1U, who did not run for another term.

In Illinois, Sharon Harlan, N9SH, of Rockford, takes the reins from Bruce Boston, KD9UL, who has served as Section Manager since 1994. Harlan was SM from 1990 to 1994.

Incumbent section managers re-elected without opposition were William Woodhead, N1KAT, Maine; Rudy Hubbard, WA4PUP, Northern Florida; Glenn Thomas, WB6W, Santa Clara Valley; and Donald Michalski, W9IXG, Wisconsin.

ARRL JOINS AMERICAN ASSOCIATION OF RADIO ENTHUSIASTS

The ARRL has joined the American Association of Radio Enthusiasts (AARE), a nonprofit industry trade group formed to promote Amateur Radio and emergency communications outside traditional amateur circles. Its stated goal is to double the number of hams in five years.

"We look forward to encompassing all aspects of the Amateur Radio Industry—retail dealers, manufacturers and distributors," said AARE's first president Ray Novak, KC7JPA, of ICOM. The trade group for dealers and manufacturers was created during an informal annual meeting of Amateur Radio manufacturers held April 5 in Milwaukee in conjunction with AES Superfest 2002.

In addition to Novak, the executive team chosen to lead AARE's debut year includes Vice President Rick Ruhl, W4PC, of Creative Services Software, and Secretary-Treasurer Evelyn Garrison, WS7A, who represents Alinco. Gordon West, WB6NOA, of Gordon West Radio School; Bob Heil, K9EID, of Heil Sound; and Randy Gawtry, K0CBH, of Timewave Technology will serve on the Board of Directors.

The AARE Web site, **www.aaregroup.org**, now under construction, will provide additional information. The organization has scheduled a meeting for August 17 at the Huntsville Hamfest. Dealers and manufacturers of radio products interested in joining AARE may contact Evelyn Garrison, **evelyn@aaregroup.org**, for details.

Amateur Electronic Supply Advertising Manager Ray Grenier, K9KHW (right), presents the first membership check from AES to AARE President Ray Novak, KC7JPA. Looking on are (left to right) AARE Board Member at Large Randy Gawtry, K0CBH; AARE Vice President Rick Ruhl, W4PC; and Secretary-Treasurer Evelyn Garrison, WS7A.

SECTION MANAGER ELECTION NOTICE

To all ARRL members in the Eastern Massachusetts, Missouri, Nebraska, New York City-Long Island, Northern New York, South Carolina, Southern New Jersey, and West Central Florida, Western Pennsylvania. You are hereby solicited for nominating petitions pursuant to an election for Section Manager (SM).

You are hereby solicited for nominating petitions pursuant to an election for Section Manager (SM). Incumbents are listed on page 12 of this issue.

To be valid, a petition must contain the signatures of five or more full ARRL members residing in the section concerned. Photocopied signatures are *not* acceptable. No petition is valid without at least five signatures, and it is advisable to have a few more than five signatures on each petition. Petition forms (FSD-129) are available on request from ARRL Headquarters but are not required. We suggest the following format:

(Place and Date)

Field & Educational Services Manager,
ARRL
225 Main St
Newington, CT 06111

We, the undersigned full members of the _____ ARRL section of the _____ division, hereby nominate _____ as candidate for Section Manager for this section for the next two-year term of office.

(Signature___ Call Sign___ City___ ZIP__)

Any candidate for the office of Section Manager must be a resident of the section, a licensed amateur of Technician class or higher and a full member of the League for a continuous term of at least two years immediately preceding receipt of a petition for nomination. Petitions must be received at Headquarters by 4 PM Eastern Time on September 6, 2002. Whenever more than one member is nominated in a single section, ballots will be mailed from Headquarters on or before October 1, 2002, to full members of record as of September 6, 2002, which is the closing date for nominations. Returns will be counted November 19, 2002. Section Managers elected as a result of the above procedure will take office January 1, 2003.

If only one valid petition is received from a section, that nominee shall be declared elected without opposition for a two-year term beginning January 1, 2003. If *no* petitions are received from a section by the specified closing date, such section will be resolicited in the January 2003 *QST*. A Section Manager elected through the resolicitation will serve a term of 18 months. Vacancies in any Section Manager's office between elections are filled by the Field & Educational Services Manager. You are urged to take the initiative and file a nomination petition immediately.—*Rosalie White, K1STO, Field & Educational Services Manager*

Nominees Sought for ARRL Board of Directors

If you're a full ARRL member in one of the following five divisions and are interested in playing a part in the League's democratic organization, here's the opportunity. Nominations are open for the offices of director and vice director for the 2003-2005 term in the Atlantic, Dakota, Delta, Great Lakes and Midwest divisions.

ARRL Divisions

The policies of the League are established by 15 directors who are elected to the Board on a geographical basis to represent their divisions and constituents (see page 10 of any recent *QST* for a list of the divisions, directors and vice directors). These 15 directors serve for three-year terms, with five standing for election in each.

Just as in national or state politics, ARRL voters/members have the privilege and responsibility to decide that they like the actions of their incumbent representatives and support them actively for reelection or to decide that other representatives could do a better job, and to work for the election of those persons. Vice directors, who succeed to director in the event of a midterm vacancy and serve as director at any Board meeting the director is unable to attend, are elected at the same time.

Call for Nominations

Nominations are open for director and vice director in the five divisions mentioned above for the three-year term beginning January 1, 2003.

How to Nominate

1. *Obtain official nominating petition forms.* This package consists of a cover letter; a reprint of this election announcement; blank Official Nominating Petition forms and Candidate's Questionnaires for the offices of director and vice director; a copy of the ARRL Articles of Association and Bylaws; and an informational pamphlet for candidates.

Any full member residing in a division where there is an election may request an official nominating petition package. You don't need to be a candidate to request the forms. Your request for forms must be received by the Secretary *no later than noon Eastern Time on Friday, August 9, 2002.* There are separate forms for director and vice director nominations.

2. *Submit petition with statement of eligibility and willingness to serve.* Official forms bearing the *signatures of 10 full members of the division* and naming a full member of the division as a candidate for director or vice director, must be submitted, with a statement *signed by the candidate* attesting to his or her eligibility, willingness to run and willingness to assume the office if elected. These documents must be filed with the secretary *no later than noon Eastern Time on Friday, August 16, 2002*. Only original documents can be accepted; *no facsimiles of any kind are acceptable.* On Monday, August 19, 2002, the secretary will notify each candidate of the names and call signs of each other candidate for the same office. Candidates will then have until Friday, August 30, 2002, to submit 300-word statements and photographs, if they desire these to accompany the ballot, in accordance with instructions that will be supplied.

3. *Election Committee to certify eligibility.* In accordance with the Bylaws, an Election Committee, composed of three directors not subject to election this year, is responsible for the conduct of the election. This year, the Election Committee consists of Walt Stinson, W0CP (chair), Art Goddard, W6XD, and Frank Fallon, N2FF.

The nominee must hold at least a Technician amateur license, be at least 21 years of age and have been licensed and a full member of the League for a continuous term of at least four years immediately preceding nomination. No person is eligible whose business connections are of such nature that he or she could gain financially through the shaping of the affairs of the League by the Board, or by the improper exploitation of his or her office for the furtherance of his or her own aims or those of his or her employer. The primary test of eligibility is the candidate's freedom from commercial or governmental connections of such nature that his or her influence in the affairs of the League could be used for his or her private benefit. The idea behind these rules is to ensure that candidates: (1) possess a lasting interest in Amateur Radio and the League, (2) have the legal capacity to make decisions for the ARRL and (3) are free from conflicts of interest.

Balloting Will Follow

If there is only one eligible candidate for an office, he or she will be declared elected by the Election Committee. Otherwise, ballots will be sent to all full members of the League in that division who are in good standing as of September 10, 2002. (You must be a licensed radio amateur to be a full member.) The ballots will be mailed not later than October 1, 2002 and, to be valid, must be received at HQ by noon Eastern Time on Friday, November 15, 2002. A group of nominators can name a candidate for director or vice director, or both, but there are no "slates," as such. Each candidate appears on the ballot in alphabetical order. If a person is nominated for both director and vice director, the nomination for director will stand and that for vice director will be void. A person nominated for both offices does have the option, however, of declining the higher nomination and running for vice director if he or she wishes. Because all the powers of the director are transferred to the vice director in the event of the director's death, resignation, recall, removal outside the division or inability to serve, careful selection of candidates for vice director is just as important as for director.

Absentee Ballots

All ARRL members licensed by the FCC, but temporarily residing outside the US, are eligible for full membership. Members overseas who arrange to be listed as full members in an appropriate division prior to September 10, 2002, will be able to vote this year where elections are being held. Members with overseas military addresses should take special note of this provision; in the absence of information received to the contrary, ballots will be sent to them based on their postal addresses. Even within the US, full members temporarily living outside the ARRL division they consider home may have voting privileges by notifying the Secretary prior to September 10, 2002, giving their current *QST* address and the reason that another division is considered home. If your home is in the Atlantic, Dakota, Delta, Great Lakes and Midwest divisions but your *QST* goes elsewhere, let the ARRL Secretary know as soon as possible, but no later than September 10, 2002, so you can receive a ballot from your home division.

The Incumbents

These people presently hold the offices of director and vice director, respectively, in the divisions conducting elections this year:

Atlantic—Bernie Fuller, N3EFN and Bill Edgar, N3LLR

Dakota—Jay Bellows, K0QB and Twila Greenheck, N0JPH

Delta—Rick Roderick, K5UR and Henry Leggette, WD4Q

Great Lakes—George Race, WB8BGY and Gary Johnston, KI4LA

Midwest—Wade Walstrom, W0EJ and Bruce Frahm, K0BJ

For the Board of Directors:

May 24, 2002

David Sumner, K1ZZ
Secretary

SCCA Pro-Rally—Northwest Style

By Lee Chambers, KI7SS,
ARRL State Government Liaison,
Northwestern Division

Unlike most forms of auto racing, Sports Car Club of America (SCCA) "Pro-Rallies" are timed automobile races on *real* roads, not race courses, with real cars, not custom race machines. Contestants—there is a driver and navigator in each car—drive an unfamiliar route either at precise but legal speeds (the cops are looking), or a closed-to-the-public roadway as fast as possible. Route directions detailing sharp corners, off-camber turns, humps where a car might get airborne, and other hazards are read to the driver by the navigator as they blast along. For most contestants, the event will be the first time they've been on the road, and at 130+ mph these northwest dirt "logging road" "stages" won't give them time to sightsee! A full-speed stage may be short, only a mile or so, or up to 30 miles in length, and there will be six to ten stages in a day. Typically, a rally is a two-day affair. This is a real test of man and machine.

In a day, each rally car will go over two hundred miles — half at full speed, half at ordinary, legal speeds with ordinary traffic. Rally cars have to be street-legal: the headlights, brakes, and mufflers must work! For the contestants, the switch between all-out racing and highway cruising is a difficult psychological test and it's common to see the team soaked in sweat at the end of a stage. Navigators who try to read the route book and odometer and keep an eye on physical locations at the same time, get car-sick—an occupational hazard! Disaster can come quickly if the driver or navigator loses concentration even for a second on these rough and twisty roads. Tires and suspension, engine and drive train are truly tested as the cars careen where you and I might drive at twenty miles per hour, tops.

In the northwest, serious mountains may be in the path between the start and finish lines of a stage. These are usually miles apart. Overall the event may stretch over sixty miles of uninhabited woods, hills and valleys. Clearly, there needs to be a way to keep track of the contestants as a mishap may put a car out of action, alone, miles from aid—and possibly in immediate need of it. Cell phones, by the way, don't work in the woods!

Ham Radio Watches for Safety

Enter Amateur Radio. A typical event, and we have four or more a year here in the Olympia, Washington, area, will have 35 or more radio amateurs to help provide communications. The plans are sent to each ham along with maps and additional instructions just before each event. Getting 35 hams to commit to helping often means calling two hundred during the weeks before an event, but northwest hams have a reputation for supportive action! It's not as hard as it looks!

From a hilltop location, one radio operator called "Mountaintop" keeps tabs on hams at the "start" and "finish" of each stage, at dangerous intersections, and additional support crews. Mountaintop's job is to resolve problems by acting as net control, by relaying messages if necessary, by calling for emergency medical technicians (EMTs) or an ambulance, wrecker, fire truck or service crew if

KI7SS

With back to the camera, Diane Duran, KD7AJQ, and Tiffany Braford, KD7KHE (right) talk with race participants.

KD7KHE

Amateur Radio Operations Planner Lee Chambers, KI7SS, is in contact with "Mountaintop," the station that serves as net control.

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

ARRL

(L-R) ARRL Pacific Division Director Jim Maxwell, W6CF; Sacramento Valley Section Emergency Coordinator Dave Thorne, K6SOJ; Sacramento Valley Section Manager Jerry Boyd, K6BZ; and Steve Ewald, WV1X, from ARRL HQ.

Special event station W6E operated from EMCOMM 2002 April 20-21.

needed. Mountaintop may not ever see the cars, but he or she has a controlling influence on the whole rally.

Most hams are much closer to the action. Hams are positioned at the start and finish and at "spectator" locations at each stage. If a car is missing, the "Start" ham asks the next car leaving to look for it. If it's not found, a ham-equipped search crew with a medic aboard, called "Sweep," is sent to find it.

"Advance" and "Pace" crews assure that the course is properly "banner-guarded" with obstructions and warnings posted. Hams with these crews help coordinate the stage's readiness and quickly find whatever support is needed. "Spectator" hams are assigned locations where the public is expected or could inadvertently get onto the course. Spectator locations are often intersections and the drivers, distracted by the sudden appearance of a couple hundred people by the roadside, often put on quite a show as they broadside around the turn.

An SCCA road rally is a two-day effort. The "Wild West" event, in September 2001, started with 61 cars on a Friday night (night racing is unique—the drivers go faster because they can't see the dangers!) and finished with 43 still running on Saturday. Other events are true weekenders—Saturday and Sunday.

These events are great communications skill-builders. From the ham-strategists who plan the events, working with spreadsheets and maps and simplex frequency lists, to the hams on the course, our communications skills and understandings are tested and polished. It's a delight to listen to brand-new hams on a stage for the first time, and literally hear them acquire confidence and expertise with every transmission. That's what this is all about—providing public service communications, acquiring communications expertise, and having fun with radios.

EMCOMM 2002 A SUCCESS

By Jerry Boyd, K6BZ, ARRL Section Manager, Sacramento Valley

EMCOMM 2002 was held at Bishop Quinn High School near Redding, California on April 20 and 21. While in its third year as a conference focused on Amateur Radio emergency communications (EMCOMM), this year (for the first time), EMCOMM was a sanctioned ARRL convention. As such, it was privileged to have ARRL Headquarters Staff member Steve Ewald, WV1X, in attendance. Also in attendance was Pacific Division Director Jim Maxwell, W6CF.

EMCOMM has grown each year it has been presented. It is one of the premier Amateur Radio emergency communications training conferences in the United States. This year nearly 150 amateurs, a number of non-amateurs and local/state government officials at-

Mac McCulley, W6MAC, had the best of show in the individual category for EMCOMM's competition.

EMCOMM 2002 sponsored a competition for best-equipped Amateur Radio emergency communications vehicle. The Humboldt Amateur Radio Club (California) won the trophy in the group/club category.

tended the two-day event. Seven states were represented as the reputation of this event continues to spread.

The convention, which is sponsored by the Sacramento Valley Section ARES, had in addition to a number of forums, a VE testing session, a special-event station (W6E), and a display/competition of mobile vehicles. Overnight camping was available on site and the food greatly exceeded the usual convention fare. The American Red Cross provided breakfast, the Amateur Radio Club of Anderson prepared a barbecue lunch and the Saturday evening dinner was catered tri-tips, chicken and all of the trimmings. Dinner entertainment was provided by the very capable Bishop Quinn High School Jazz Band.

The convention opening comments followed a presentation of the colors and flag pledge by Boy Scout Troop 311 of Palo Cedro, California. Pacific Division Director Jim Maxwell, W6CF, and Sacramento Valley Section Manager K6BZ welcomed those in attendance. Forums were many and interesting. Bill Pennington, WA6SLA, an employee of the State Office of Emergency Services, provided an update on "mutual aid" policies and procedures. Dave Thorne, K6SOJ (Sacramento Valley SEC and convention chairman) discussed the historical role of volunteer organizations in America.

Bill Frazier, W7ARC, discussed his experiences as a volunteer for the American Red Cross at the World Trade Center site in New York following the tragedies of September 11. Paul Cavnar, NN7B, of Nevada, gave an interesting presentation on Amateur Radio involvement surrounding the Winter Olympics, held this past February in Salt Lake City.

Ready kits, radiograms, traffic handling, the Incident Command System and SKYWARN were all featured during the variety of forums and training seminars. The Red Cross presented, for credit, its Introduction to Disaster Services course. The National Weather Service offered a weather spotter class to those interested.

EMCOMM concluded Sunday afternoon with an ARES leadership meeting, a raffle of dozens of door prizes and a closing ceremony. The convention, evaluated by the attendees, was rated as extremely beneficial. Amateur Radio groups interested in pursuing an emergency communications conference in your vicinity are invited to contact the author, JerryBoyd (**k6bz@arrl.org**) or the Conference Chairman, Dave Thorne (**k6soj@arrl.net**), for detailed organizational information.

AMATEUR RADIO ON SCENE IN MARYLAND

Amateur Radio Emergency Service (ARES) teams activated or stood by to assist as severe weather struck several states in late April. National Weather Service (NWS) said storms over the April 27-28 weekend left pockets of devastation from Kentucky to Maryland. "It has been a wild 24 hours in Charles County, Maryland," said Maryland-DC ARRL Section Manager Tom Abernethy, W3TOM.

A tornado April 28 badly damaged the business district in La Plata. Among structures destroyed or damaged were the Charles County Chapter of the American Red Cross office and the building housing the Charles County Emergency Operations Center (EOC). Abernethy said Michelle Sack, N3YRZ—on the job at the LaPlata hospital at the time—broke into a SKYWARN net to report a tornado only one-half mile away to the west heading directly for her location. "She tracked and described the tornado until it struck her location and then continued to provide on-the-scene assessments," Abernethy said.

Other amateurs along the storm's track also provided reports on severity and damage. Charles County ARES Emergency Coordinator and RACES Officer Mike Tackish, KA3GRW, activated the Charles County ARES/RACES team's emergency plan. Amateurs established a UHF command/control net while VHF tactical nets supplied communications for the hospital, which was left without telephone service or internal communication. ARES/RACES also worked with the county's Director of Emergency Services.

Field Organization Reports

Public Service Honor Roll
April 2002

This listing is to recognize amateurs whose public service performance during the month indicated qualifies for 70 or more total points in the following 8 categories (as reported to their Section Managers). Please note the maximum points for each category:
1) Checking into a public service net, using any mode, 1 point each; maximum 60.
2) Performing as Net Control Station (NCS) for a public service net, using any mode, 3 points each; maximum 24.
3) Performing assigned liaison between public service nets, 3 points each; maximum 24.
4) Delivering a formal message to a third party, 1 point each; no limit.
5) Originating a formal message from a third party, 1 point each; no limit.
6) Serving as an ARRL field appointee or Section Manager, 10 points each appointment; maximum 30.
7) Participating in a communications network for a public service event, 10 points each event; no limit.
8) Providing and maintaining an automated digital system that handles ARRL radiogram-formatted messages; 30 points. New criteria took effect on May 1, 2002, and August *QST* will begin reporting those results.

834 NM1K
466 K9JPS
342 AC4CS
297 N7CEU
284 N9VE
277 W9RCW
260 KB2RTZ
254 W7TVA
241 KK3F W5ZX
238 N1IQI
220 KW1U KK5GY
217 WA9VND
207 KA4FZI
195 KF4KSN
189 N2LTC KB2VRO
188 KL5T
187 W6DOB
185 KX0N KG4FXG W5RDM
182 K4IWW AC5XK
180 WA5OUV
179 WB5ZED
178 WB2UVB
177 W0WWR
176 N5NAV KX0N
175 N8IO
174 W4PIM
172 K4RLD KA2ZNZ
171 K2UL
170 WX4H
169 W1GMF
168 W4EAT K6YR
167 KC5OZT
166 W9YCV
164 KT4TD
163 NN7H WN0Y
160 K4BEH W6IVV
159 WB2GTG K9FHI
157 W6QZ N8BV
156 W2MTA
154 KB1DSB K2BCL N5JCG
153 K0IBS K4RBR
152 N2RPI
151 N2CCN
150 AF4QZ K4SCL
149 W3BBQ K5UPN
148 W3YVQ N7YSS
147 KC8CON
146 KD1LE
NR2F N5OUJ KC4ZHF
145 W5GKH
143 WA1FNM W8YS WA4DOX
142 KE4JHJ
141 K2CSS N9KNJ N2AKZ KC2EOT W0LAW
140 KB2KLH WD9FLJ
139 N1LKJ N9BDL N8OD WD9F
138 N7CPP N2YJZ N0SU NC4ML
W4ZJY KA2GJV W7ZIW
136 WA2YL K4DGR
134 N3WK
133 N4VVX KB2ETO WB2LEZ
130 WA0TFC K1JPG K5VV KA2CQX NN2H K6SOJ
129 W0OYH WB4BHH N3RB KB5TCH WA0TFC N7DRP
128 KC2DAA K5IQZ W9CBE W7GB
127 NZ1D
126 K1TSV K2VX N2BVM
125 KI4YV WB2QIX KA0DBK
124 K5DPG KM5YL KV4AN WI2G KG4CHW
123 AB2IZ
122 KF6OIF W1ALE KF4WIJ AG9G AA2SV K4FQU W7QM
121 K2DBK W7GHT
120 KB2KOJ W7LG
119 N4TAB W4DGH N9TVT AC5Z
118 N8PAM W4NTI KA8WNO N9MN KA4UIV KA2DBD KJ2N K7GXZ
117 WA5KQU AD4XV W5PY KA4LRM KF4OPT
116 KB0DTI
115 K2PB KE4UOF
114 K3CSX AK6DV AB4XK
113 WW8D K8KV W8JEB WD0GUF
112 WA1JVV
KG2D W2MTO
111 N8DD
110 W0LAW WB0TAQ W8IM AF4NS K4BB N2HQL W4AUN K4DZM
109 AF2K W2LC
108 KJ7SI
107 N8FXH N2GJ WA4EIC
106 KC2HUV WA1QAA WA9JWL K3SS K4YVX
105 KC6NBI WA8SSI KD4EFM
104 KB8NDS WA2YOW WJ4F KA2BCE
103 N5SIG W5AYX
102 W3CB 101 KB6QIB
100 KB8GFC N0BN NB4K
99 KE4GYR
N2WKE WA2CUW K2DN
98 WB4PAM
97 KC3Y KB2SNP WD5FEE
96 WA2GUP KO4OL
95 N3SW WA4CSQ W7DPW WB7VYH
94 KD1SM W4CC KU6Z KE2SX N6NKO KC8HTP WB2IJH
93 AL7N N3WAV
92 K6IUI W6JPH WB4UHC
90 AA4YW KA1GWE WD5GDB W4WXA WB4GGS W4WKT WB4BIK W4CAC
89 N2RTF WA2EDN N5WSW
87 KJ9J W4VLL
86 KA1VED
W2CC
85 KC6SKK K4MVO
84 K2YS K4WKT W4QAT KB2SGT W2PII
83 N0ZIZ K5MC
82 K8SH KA2YKN KB2CCD
81 WD0GUF N8NMA
80 W4CKS N4FNT AA4AT
79 KE4DNO
78 KE3FL KJ5YY
77 W7EP N2AVY
75 W8WWF WA2MSU
74 KG4DZN KC8KYP
73 N1IST KC0HOX
72 WB9OFG W9RSX W5XX AA4BN
70 KB5WY

The following stations qualified for PHSR points during the past months, but were not previously recognized in this column: WA5KQU (Dec '01) 98; (Jan '02) 76. Feb: W4ZJY 168, W4PIM 152, W4DGH 124, W4NTI 108, KC4VNO 107, W4QAT 77. Mar: K0IBS 159, W3BBQ 148, KV4AN 143, K4YVX 119, K3SS 106, W4VLL 104, KG4OTL 103, WB4UHC 87, N6NKO 81, N4FNT 80, KD4FUN 80, W4JLS 43.

Section Traffic Manager Reports
April 2002

The following ARRL Section Traffic Managers reported: AK, AL, AZ, CO, CT, ENY, EPA, EWA, GA, IA, ID, IL, KS, KY, LA, MDC, ME, MS, MO, NC, NE, NFL, NH, NLI, NNJ, NNY, NTX, OH, OK, OR, ORG, SBAR, SC, SD, SFL, SNJ, STX, TN, VA, VT, WCF, WI, WMA, WNY, WPA, WV, WWA.

Section Emergency Coordinator Reports
April 2002

The following ARRL Section Emergency Coordinators reported: AK, AR, AZ, EWA, IN, KS, KY, LA, MDC, MI, MO, NC, NFL, NLI, SD, SFL, STX, SV, OH, WNY.

Brass Pounders League
April 2002

The BPL is open to all amateurs in the US, Canada and US possessions who report to their SMs a total of 500 points or a sum of 100 or more origination and delivery points for any calendar month. All messages must be handled on amateur frequencies within 48 hours of receipt in standard ARRL radiogram format.

Call	*Orig*	*Rcvd*	*Sent*	*Dlvd*	*Total*
KK3F	27	2110	2064	46	4247
WX4H	0	1056	818	3	1877
KF5A	2	821	882	0	1756
NM1K	731	213	785	11	1740
N2LTC	0	690	728	21	1439
W1PEX	0	1311	30	0	1341
W0WWR	0	257	1063	19	1339
W1GMF	0	383	796	21	1200
WB5ZED	7	582	486	4	1079
W4TJM	490	22	490	2	1004
KW1U	3	515	423	49	990
K9JPS	0	409	33	388	830
WA9VND	6	468	301	33	808
KA1VED	3	313	316	3	635
W6DOB	0	251	307	29	587
KA5KLU	0	272	275	21	568
K7BDU	76	233	249	4	562
WB2GTG	30	208	305	11	554
W7TC	0	258	220	42	520
K5UPN	9	247	259	2	517
KA4FZI	2	251	217	37	507

BPL for 100 or more originations plus deliveries: W9RCW 216, K9GU 184, AC4CS 174, N9VE 168. Correction: W4EAT earned 520 BPL points in March.

A Micronesian Adventure —The story of T88ZZ / V63RF

By Tony Buscaglia, K2NV
K2NV@arrl.net

Part 1: There's more to life than ham radio? And sailing?

I was tuning the bands one summer morning when the phone rang. (Don't you just hate it when that happens?) Hi, Tony, this is Bill Scanlon! It was Father Bill Scanlon, a Jesuit priest friend calling from New York City. He was planning a trip to western New York in mid-July and wondered if we could get together. We have known Bill for many years. We worked together in the late '70s in several church-related activities. Bill had spent over 15 years in the Jesuit missions in Nigeria and was working on this side of the pond in support of the missions. He sounded like he needed a rest! I said, Hey Bill, while you're in western New York, why not go for a sail with us? Bill immediately responded, "I'd love to!"

Rose and I spend most of our free summer days on Lake Ontario aboard our sailboat BellaDonna. (I am often heard on the CW bands during the summer as K2NV/VE3 while in Canadian waters.)

As we were sailing and munching on goodies, Bill asked, "How would you guys like to join me on a trip to Micronesia?" I immediately thought about the possibilities of getting on the air from a remote DX location. Bill, on the other hand, was planning to visit the Jesuit missions in the Philippines, Guam, Palau, Pohnpei and the Marshall Islands. I felt a stirring inside. Could I be experiencing a "calling"? Rose was not so quick to respond to the call, but she was open to the possibility. The mission thing sounded interesting.

Yuichi, JN1WTK; Hiroko; Tony, K2NV; and Rose.

The tower and beams at T88ZZ.

We returned home. I couldn't get the whole idea out of my mind. I did a quick Internet search for "Ham Radio—Palau." I found an interesting article entitled "QRV in Palau: A DXpedition in Paradise with Room Service," by Steve Herman, K7USJ. I was beginning to feel the "call" even stronger. A T88 operation was a real possibility!

After many hours of e-mails and more Internet searches, I found a very helpful Japanese travel agent named Hiroko Ito via the Internet. Hiroko was able to obtain a Palau ham license for me. I was delighted to hear that the call I requested, T88ZZ, was available and assigned to me! The excitement was building. I think Rose's apprehension about the whole trip was directly proportional to my excitement!

Hmmm, now that I have T88ZZ planned, I wondered where else I might be able to operate? Thought I best finalize the Palau operation first. After all, Rose had not agreed to the trip yet.

Rose agreed. We would make the trip! We had a planning meeting with Fr Bill a few weeks later. At the meeting I explained that I would prefer to be operating on the weekends so as to maximize my hamming experience. We planned accordingly, and decided to spend the first weekend in Palau and the second weekend on the Island of Pohnpei in the Federation of Micronesia.

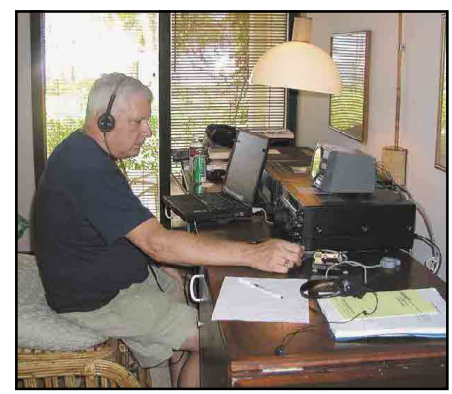
Hiroko was able to get a copy of a Micronesia amateur radio application for me. I promptly filled it out and mailed it to Pohnpei. Months went by, and nothing was heard. I was beginning to think V63 was not going to happen. Hiroko warned me that it might be difficult to obtain a V6 license in time for our trip.

Fr Bill told me of a Jesuit ham living in Pohnpei named Fr Joe Cavanagh. I did a scan of my Callback CD and found Fr "Cav" listed as V63JC. In checking through my DXCC stack, I found a KC6JC QSL. Hey, I already worked him! As it turns out, Fr "Cav" was already aware of our plans to visit. I sent off an e-mail to him along with a scanned picture of the QSL from our contact in 1967. He did much legwork in helping me to obtain my license and a place to operate from in Pohnpei. He notified me that he had my license in hand. My first choice of calls, V63RF, was granted. Yippee!

The licenses were ready. I was ready. The itinerary was set. I put together a bag of tools, wires, solder, coax, cables, and packed it carefully in my suitcase. I also put a note in for airport security in case they were worried about all the stuff in my suitcase. I am ready! Let's do it!

On January 4, Rose and I left for Hawaii. Fr Bill headed for Manila first and met us in Guam. We spent a few days in Guam visiting some of the missions there and meeting some of the locals. Next we were on to Palau.

Hiroko told me to look for Mr Kurosaki. He would be on the plane from Guam to Palau. I had recently purchased a Yaesu rig, which came with a nice new Purple Yaesu cap. I told Hiroko, I would put on my Yaesu cap so Mr Kurosaki could identify me when we got off the plane in Palau. Rose, Bill and I tried to guess. Which one is Mr Kurosaki? Was it the chubby bald gentlemen or the young good-looking guy going through immigration? And where was Mr Hiroko Ito?



Tony, K2NV, operating as T88ZZ.

Bernie McClenny, W3UR ♦ 3025 Hobbs Rd, Glenwood, MD 21738-9728 ♦ w3ur@arrl.org

What a shock! I didn't realize Hiroko was a YL until I met her and Yuichi Kurosaki at the airport in Palau. Hiroko and Yuichi drove Fr Bill to the Jesuit residence, while we headed for the Palau Pacific Resort. I had butterflies in my stomach! When we arrived, we were checked in to the now-famous Room 214. Yuichi and Hiroko soon arrived. Yuichi and I quickly assembled the station. The setup included a FT1000MP, FT-920, VL-1000 linear, Force-12 Yagi, WARC rotary dipole, R7 Vertical and some wire dipoles.

I brought my laptop, interface cables, and had Writelog loaded and I was ready to go. The whole setup was operational within 30 minutes of our arrival. Though we were exhausted from our trip, I couldn't wait to get on the air. I was afraid of what would happen when I called my first CQ. T88ZZ was on the air! It was midnight but my biological clock was still very confused. I worked a few hundred contacts and was ready to collapse! I shut down at 2 AM.

I awoke the next day and looked out the window at beautiful Palau. Was Rose right? There's more to life than ham radio? Maybe she had a point, but then again she says the same thing about sailing. Sometimes I just don't get it. I did manage to take some time off to go snorkeling and eat meals, but by the end of the day I had made close to 1200 contacts. Remember that this is supposed to be a vacation and a visit to the missions! (That calling …) I also had to have something left in me for the ARRL DX Contest in February!

The next day I managed to work another 1200+ QSOs and by the end of our time in Palau I had made over 3000 QSOs and I still had time to visit the Rock Islands twice, visit the missions and go snorkeling in Jellyfish Lake. Palau is one beautiful island! Rose was right!

I shut down from the Palau Pacific Resort at 0200 UTC and spent the rest of the day enjoying Palau. We went spear fishing with Fr Rusk Sabaro, a local Catholic priest. I witnessed him spearing a 25 lb fish right in front of my eyes! The fish was served later as Sushimi (raw fish) for our evening meal! That night we headed for the Jesuit residence, waiting for our 2:30 AM flight to Chuuk. I was assigned to rest in the shack of Fr Felix Yauch (T88SJ). Fr Felix was in Honolulu at the time and said I could use his shack while I was there. I fired up his rig on 20 m and 15 m CW and worked another 60 stations in the one-hour I had left before we left for the airport! T88ZZ was now QRT.

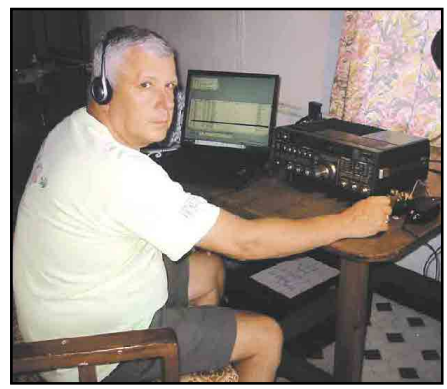
We will always remember beautiful Palau! And I will always remember the thrill of being on the other side of the pileups! Now on to Micronesia!

The remains of the wind tower at Xavier High School. Looks like a great place to put up a beam!

Part 2: On to Micronesia

After a wonderful time in Palau, we boarded our flight from Palau to Guam and then on to the Island of Chuuk (Truk) in Micronesia. Chuuk is a famous dive site.

The United States attacked the Japanese fleet here in February of 1944, creating a World War II underwater museum, the largest collection of dividable shipwrecks in the world. We arrived in Chuuk at 10 AM local time. Yet another night without much sleep! I was in very bad need of rest. We checked into the Blue Lagoon Resort Hotel and I was out like a light. The next few days, we took a tour of the island, and visited Xavier High School. It was an opportunity to meet young people from throughout all of Micronesia. The site of Xavier was a Japanese telecom center during WWII. The Jesuits had a failed attempt at installing a wind generator leaving a nice 60 ft tower with a non-working wind generator at the top. What a waste! I could picture a 40 meter Yagi with a large multi-band Yagi above it. What a location for ham radio! Over the years the Jesuits had operated ham radio from this location, but no such luck on this trip. Oh well…



Tony, K2NV, operating as V63RF.

We left Chuuk after two very interesting days for Pohnpei, the capital of the Federation of Micronesia. We went to lunch with some of the local Jesuit mission priests and then on to the South Park Hotel. I had arranged to borrow an FT-767GX to use while I was there. In my handy tool bag were several pre-cut dipoles, 100 ft of RG-8X and my handy SWR bridge. In short order several dipole antennas were up and ready.

The antennas were on the edge of a ridge, which overlooked the pacific with a clear shot to the North and Northeast. V63RF was ready to roll! I settled into an operating pattern, which allowed me to visit during the day and operate at night. Sleep would have to wait!

While we were in Pohnpei we were invited to a reception at the Jesuit mission house, and had the honor of having dinner with the President of Micronesia, Leo Falcom and wife Iris. We also visited the Pohnpei Agriculture and Trade School and traveled by boat to see the ancient ruins of Nan Madol.

In the four days that V63RF was on the air in Pohnpei, I made over 3600 contacts. Of the almost 7000 contacts I made in the Pacific, all but two were CW. I did have a microphone, honest... One of the most beautiful views of Pohnpei can be seen from the Village Hotel near the village of Awak.

I chose that view for my V63RF QSL card. The five days we spent in Pohnpei were wonderful. I wrapped up the V63RF operation and we were on our way to Majuro in the Marshall Islands. We spent a few days in Majuro and then headed home by way of Honolulu.

The memories of Palau and Micronesia still linger in our minds. After returning home, one of my buddies gave me a 3-hour audiotape of my pacific operations. What great background music when catching up on my duties as QSL Manager for T88ZZ and V63RF!

WRAP UP

That's it for this month. Don't forget to get on the air and help support the World Radio Team Championship event the weekend of July 13-14. The teams will be using the new OJ1-8 prefixes. Check out the WRTC Web site at **www.wrtc2002.org** for any last minute details. If you have any DX news, pictures or DX newsletters, please send them to **bernie@dailydx.com**. Until next month, see you in the pileups!—*Bernie, W3UR* QST

YLs in YK

What could be more exciting than going to a far-off country and being at the other end of a pileup? Vicky Luetzelschwab, AE9YL, and her husband Carl, K9LA, of Fort Wayne, Indiana were offered just that opportunity at the Northwest DX Convention held in Vancouver, British Columbia in August 2000. "We were enjoying a four-day mini-vacation chasing lighthouses (a hobby they both share) and listening to many great DX presentations. At breakfast in the hotel Saturday morning, Al, K7AR, asked if we'd like to join him on a DXpedition to Syria (YK). It didn't take long at all to say 'yes'!"

Al was part of the 1994 YK0A operation to the Syrian Arab Republic and was anxious to go back to take advantage of better sunspot cycle conditions. The group was joined by two other ham couples, Rosie, N4CFL, and Bob, W4DR, and Melissa, VA7MI, and Lee, VE7CC, plus Jim, W4PRO. "Our motivation for accompanying our husbands was threefold: to give out as many YL QSOs from YK as possible, to see a very historic and religious area of the world and to get a taste of being at the other end of a pileup," said Vicky. "There are many hams that take an intense interest in chasing YL DXCC." Vicky is a relative newcomer to contesting and DXing. She was first licensed in 1987 as a Technician and upgraded to Extra in April 2000. Rosie, N4CFL, had been on the VP5JEX DXpedition and is on the Honor Roll DXCC phone.

Anyone who has been involved in any type of DXpedition knows that a successful trip entails a lot of planning and a dedicated group of volunteers. The trip was planned for February 2001 and there was a lot to do! One of the first steps was to get visas and plane tickets, and put together the first of many lists. All the equipment had to be brought with them for the four stations they planned to set up, including the antennas. "Most everyone ended up paying excess baggage and/or overweight charges," Vicky's husband Carl noted.

They planned to meet in Paris on Friday morning February 2 and then fly together to Damascus. Omar, YK1AO, president of the Technical Institute of Radio, the Syrian Amateur Radio Society, met them at the airport and after clearing customs they transported all their equipment to the operating site (the top floor of the Syrian Telecommunications Establishment building). Next stop was the hotel, a short distance away. "Our host Omar, YK1AO, and other members of the local radio club were instrumental in getting us licensed and providing our operating site," Vicky said.

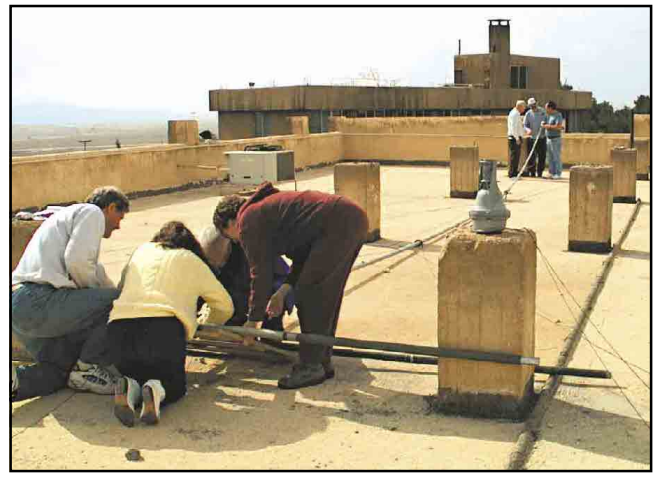
The first order of business was the rooftop antennas. "All the YLs helped set up the four stations and the antennas," Vicky said. "We got a bit dirty putting up the antennas, but it made us part of the team." Once the stations were set up, the fun began. Vicky tells the story:

> All told, we gals contributed about 2100 QSOs to the effort—that's about 8% of the YK9A total. I am also ZF2YL and I was glad to have had previous experience being a YL on the DX end of a pileup. Another big help in dealing with the huge pileups was reading the Pileup Management chapter in the book *DXpeditioning Basics* by Wayne Mills, N7NG. Thanks to the International DX Association (INDEXA) for donating five copies.
>
> Due to the camaraderie between ham radio operators of all nations, DXpeditions give you an excellent opportunity to mingle with locals and really learn about a country.

Syria is located between Lebanon and Turkey and borders the Mediterranean Sea. The official language is Arabic, and Sunni Muslim is the major religion. Vicky added, "Not only did Omar give unselfishly of himself to make our DXpedition a success, he also arranged our tours and took us to places we never would have gone to otherwise." Some of the places they visited were the marketplace of old Damascus and the ruins at Palmyra. They also went to west central Syria to view Crac des Chevaliers, a mountaintop castle built during the Crusades. "We also enjoyed afternoon tea with Omar and his lovely wife Silham, YK1YL."

Vicky summed it up with this comment, "So to all of you other gals out there—I encourage you to experience the thrill of a DXpedition, whether it is with your husbands or with a group of other gals. It will be something you'll never forget." QST

K7AR



All of us on the roof Saturday morning (we arrived late Friday evening) putting the Battle Creek Special together. Up front, that's Melissa, VA7MI, in the yellow sweater and Rosie, N4CFL, bent over in the red jacket. Vicky, AE9YL, is toward the back on the right taking a picture. Carl, K9LA, is in the white sweatshirt in the foreground, along with Bob, W4DR. In the back, from left to right, are Jim, W4PRO; Lee, VE7CC; and Dick, N7RO.

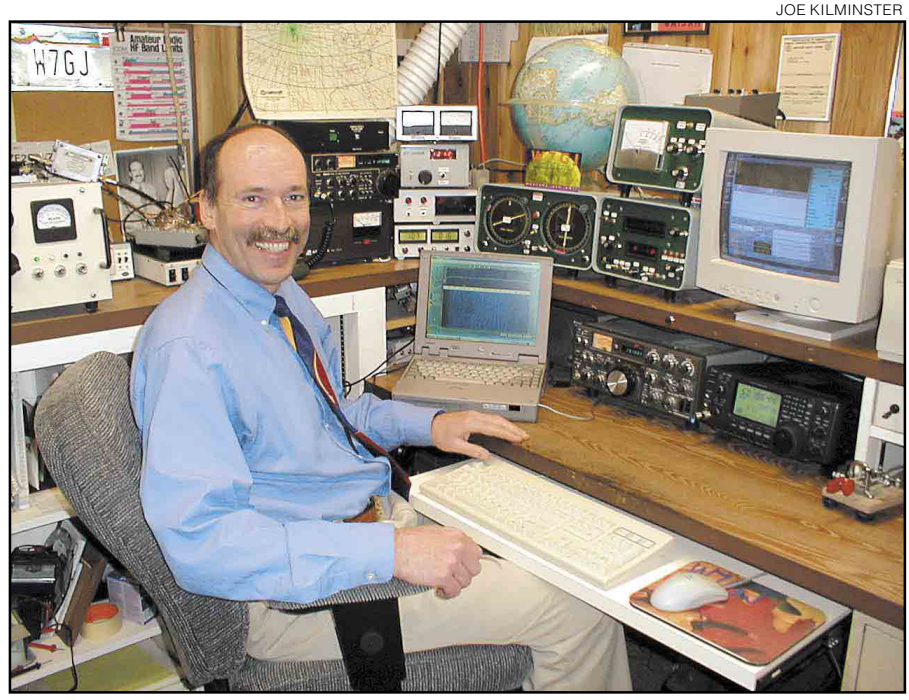
From the left: Rosie, N4CFL, Melissa, VA7MI, and Vicky, AE9YL.

Silham, YK1YL, wife of Omar, YK1AO.

Diane P. Ortiz, K2DO ♦ PO Box 296, Bellport, NY 11713 ♦ k2do@arrl.org

Record Keeping

JOE KILMINSTER



Lance Collister, W7GJ, in his neatly arranged shack at Frenchtown, Montana. Lance monitors weak signals visually using *Spectran* on a laptop computer, while JT44 runs on the second computer.

Those who inhabit the World Above 50 MHz are inveterate record keepers and have been for more than 50 years. The main reason is that making contacts beyond a few hundred kilometers on any band above 50 MHz is rarely a routine matter. The effort to extend distances worked on various bands has been a constant quest that has stimulated activity, technical improvements and experimentation over the years, and keeping track of distance records has been one way to mark progress.

For a similar reason, contacts with different countries, states and grid locators have been much more difficult to accomplish than on any of the HF bands. It took several decades for the first few stations to work all states or earn DXCC on any band above 50 MHz. These accomplishments still present considerable challenges and also continue to make record keeping toward cumulative goals a friendly competition among those on the VHF bands and higher.

Thus, standings boxes, lists of longest contacts and other records of progressive accomplishments have been a feature of this column for many decades. As these tallies have grown in number and complexity over the years, the rules and understandings governing them have also become more involved. Perhaps it is time to review the ground rules for each and discuss some specific points that have caused the most confusion over recent years.

Standings Boxes

The complete VHF/UHF/Microwave Standings, which tally DXCC entities, states and grids worked, along with the distance of the longest single contact made via terrestrial propagation, are maintained on the World Above 50 MHz pages on *ARRLWeb*. Only call-area leaders by band are published annually in this column. A separate EME Annual Standings table, which also includes number of unique stations worked, is also maintained like other Standings Boxes.

There have been some misunderstandings about Standings Boxes rules. All listed contacts must be made from a single location, as defined by rules for the VUCC program. A single location on the VHF bands means all contacts must be made from one grid, or from locations in two or more grids that are within a single 50-km radius. VUCC definitions of a single location on the higher bands are even more restrictive. It is fine to maintain several different VUCC tallies on the same band from different portable locations, as several microwavers do. In the published tables, multiple listings for the same call are distinguished by six-place grid locators.

The location rule holds true even on 50 MHz, even though the DXCC program does not require all contacts for that award to take place from a single location. Some listed calls may be reporting unfairly DXCC tallies made from different locations thousands of kilometers apart, although this may not be obvious to most readers.

The listing of distance for the single longest contact made via terrestrial propagation has also resulted in some confusion. Some operators have reported distances that are so improbably long that they could only have been accomplished via EME or other extra-terrestrial means. These obvious errors are not published. Distance between two stations is calculated using W9IP's bearing and distance program, *BD*, along the great-circle path between the centers of their six-place grid locators, regardless of the alleged radio path. Relatively short-distance contacts on the microwave bands may be calculated by more precise means.

Many stations have reported working all 50 states on 144 MHz and higher in the Standings Boxes. All such accomplishments have been made with the aid of at least a few EME contacts and are indicated with an asterisk. Some operators choose to list only contacts made via terrestrial means in the regular Standings Boxes and report their EME accomplishments in the EME Annuals. Until now, the choice was left to each operator, but there has been discussion that perhaps the Standings Boxes should report only terrestrial accomplishments. Any comments out there?

This Month

July 14	Very good EME conditions
July 20-21	CQ World Wide VHF Contest, 1800-2100
July 26-28	Central States VHF Society Conference (Milwaukee, WI)

Grid Chase

Grid-total leaders in the ARRL VHF/UHF/Microwave Century Club (VUCC) awards program are listed by band on the

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ARRLWeb World Above 50 MHz pages. A separate category recognizes grids worked via amateur satellites regardless of mode or frequency. VUCC totals are maintained at ARRL headquarters and are updated automatically on *ARRLWeb* as endorsements are issued. All initial VUCC members and those reaching new endorsement levels are published by band in *QST* every other month.

The Grid Chase leaders are not published regularly in this column. Current leaders on the popular bands have accumulated impressive totals of grids confirmed. K1TOL has reached 1000 grids on 50 MHz and three others have at least 900 each. On 144 MHz, three stations have at least 500 grids. Seven stations have accumulated 100 grids on 222 MHz and five have attained the 200-level on 432 MHz.

Six-Meter Firsts

Claimed first contacts with DXCC entities on 50 MHz present fewer opportunities for misunderstandings than do some other areas of interest. This table lists the first contact made by any station in one of the 48 continental states with a legal station in each DXCC entity on the 6-meter band. Conflicting claims have most often resulted from time differences of only a minute or two, sometimes the result of clock or logging inaccuracies. In these and other questionable cases, only QSL cards can resolve the conflict. Yes, there has been at least one case in which two stations did work the same DX station in the same minute and had QSL cards to substantiate their claims, yet only one could have been first. That situation was resolved by asking the DX station to check his log. Six-meter firsts are maintained only on the *ARRLWeb* World Above 50 MHz pages. US 6-meter stations now have contacted more than 220 DXCC entities.

DX Records

DX records were discussed in some depth in last month's column. Up to six of the longest contacts, by band and propagation mode, are maintained on the *ARRLWeb* World Above 50 MHz pages. A list of longest contacts are published in April or May of each year in this column. Until recently, it was assumed that all contacts, whether by CW, SSB, AM or FM, were heard and understood by ear alone and made in real time.

The recent explosion in the use of digital modes, such as JT44 (which decode weak signals that cannot even be heard conventionally), has the potential to significantly increase distances worked via tropospheric and perhaps other propagation modes. In the future, digital DX contacts will be specially indicated in some way.

ON THE BANDS

Six-meter F-layer activity continued its slow decline, yet interesting contacts were still made during April, especially along near-equatorial paths. VHFers around the world put JT44 to use for EME and other contacts on 6 meters and throughout the microwave bands with great success. Europeans had several afternoons of good aurora conditions, but the timing was wrong for North Americans to participate in most of the excitement. A few short sporadic-E openings hinted at the coming season. Finally, a widespread ducting event began to develop over the Gulf of Mexico at the end of the month, as stations throughout Florida made contacts into south Texas on 144 through 1296 MHz.

Six-Meter DX

Activity in some parts of the world continued to hold up remarkably well through April. This included Japan and East Asia to much of the Pacific, and Europe to southern Africa and South America. Transatlantic opportunities were almost nil from the US, save for some unusual skewed-path contacts NN4X and others in Florida made to EH, I and other southern Europeans on April 19 and 21. ZD8JA (N1ZZZ operating) made 38 contacts into South American and Mediterranean countries as far east as 5B from Ascension Island; N1ZZZ/mm made more than 250 QSOs to South America, Europe, Africa and Australia from the South Atlantic. ZD8DB provided VU2ZAP with a new country on April 22.

Six-meter DX activity from North America slowed considerably in April. A few US stations, mostly scattered across the southern third of the country, reported a few contacts with HC, CP, ZP, CE, LU and CX in South America. K0AZ (MO) worked CX, LU and CE on April 20 along paths skewed 150° to 200°; N9TF (IL) caught CE3SAD about the same time. Other stations widely distributed from southern California to Florida worked KH6, ZL and VK, along with AH8A, FO3BM and FO5RA. N6RA and other Californians caught VK9ML (Mellish Reef) on April 23. XE2EED also had success with VK9ML, FK8CA, FO3BM and numerous ZL and VK stations.

Several flurries of contacts from Florida and Hawaii were remarkable. On the morning of April 6 (1445-1600), southern Florida stations worked Japan and Taiwan via long path with remarkably strong signals. K2RTH/4 worked BX2AB at 1502, for the first ever US-Taiwan contact on 6 meters and went on to log BX2ST and BV2ST among 20 JAs, mostly in southern Japan. K4SUS worked BX2AB and BV2KS along with a dozen JA6s. NN4X had high noise levels and could only manage four JA6 contacts, but made it with BX2AB on April 19. K2RTH/4 also worked one JA6 on April 7.

Hawaiians worked Europe early on the mornings of April 7 and 29. KH6/K6MIO, KH6SX, KH7RO and others found CT1EEB, ON4ANT and I7CSB on the 7th between 1000 and 1200. DL7QY logged KH6/K6MIO, NH7RO and KH7R on the 29th between 1040 and 1055 on a heading due south. NH7RO gave YV4DDK a new country on April 19. Finally, NH7RO, NH6YK, NH7CJ and other Hawaiians were the first to work K1B, the expedition to Baker Island, on April 29.

Jack Henry, CP6/N6XQ, made 312 QSOs in 42 DXCC entities, including OD, XR0X, CE0Z, JY and 5B by April 4. Nearly all of his 32 European contacts were made via skew paths heading 100° to 120°. Jack also worked VU2LO at midnight, local time, and completed with 130 US stations in all call areas save W3, 8 and 9.

JT44 Digital Activity

Lance Collister, W7GJ, had been frustrated during this past solar cycle peak by the rarity of European and other 6-meter DX into Montana, despite his 70-foot Yagi and 1500 W. He built an array of four Yagis on an az-el mount in hopes of making up for the lack of F-layer propagation with EME contacts. Lance made a few CW contacts off the Moon, but these proved to be quite difficult—until he tried the new JT44 program. He discovered it was much easier to complete EME contacts with single-Yagi stations when the Moon was near the DX station's horizon using the new digital mode.

W7GJ's first such contact was with ZS6WB on April 21, perhaps the first 6-meter EME contact using JT44. Lance could make out a clear trace on his *Spectran* digital audio filter waterfall display during his QSO. Based on his initial experiences, Lance thinks he could complete with any 100-W station having a moderately sized Yagi and a good receiver preamplifier. It also seems likely that pairs of well-equipped single-Yagi stations could make EME contacts using JT44 when the Moon was near the horizon for both stations.

Others have been having success with JT44 as high as 1296 MHz. DF2ZC completed 144-MHz EME contacts with N0PB (130 W into a single long Yagi) and K0AWU (400 W into a single Yagi). DF2ZC and GM4JJJ made it off the Moon while both were running just 60 W and four 3-λ Yagis. On April 20, W7MEM and G4YTL made a JT44 EME contact on 432 MHz. W7LHL (40 W to a 10-foot TVRO dish) and W7SZ made a 1296-MHz contact; signals were just visible on a digital waterfall display. ZS6WB and ZS6NK made 6-meter backscatter contacts with ZD8DB, who was running just 80 W and a three-element Yagi.

K1JT released *WSJT* version 2.0 in April, which includes a debugged JT44 program and a new 35-page manual in PDF format. Free downloads are available at **pulsar.princeton.edu/~joe/K1JT**. You will also need a computer running Microsoft *Windows* and a simple interface for audio input and output lines to your transceiver.

24 GHz EME

RW3BP completed his first 24-GHz EME contacts with W5LUA, VE4MA and AA6IW between April 18 and 21, according to Barry Malowanchuk, VE4MA, who has been one of the pioneers of microwave EME activity. The Moon was just 7.5° above the horizon for RW3BP during his third QSO, which added considerably to atmospheric absorption and noise. VE4MA went on to work VE7CLD and AA6IW for his third and fourth initial contacts. All stations ran at least 75 W from traveling-wave tube amplifiers.

CQ World Wide VHF Contest

The annual CQ VHF Contest runs from 1800 on July 20 to 2100 on July 21. Complete rules are available at **www.cq-amateur-radio.com/VHFRUl02.pdf**. The results of the 2001 contest appeared in June *CQ* magazine. QST

Any Day You're Vertical is a Good Day!

In the past I've heard vertical antennas described as "vertical polarized, omnidirectional, non-radiating, air cooled dummy loads." In some cases that is a very accurate appraisal. It need not be. There is really no need for a QRPer to erect a trap vertical antenna and endure substandard performance. With a little understanding of the principles involved, the QRPer can install a multi-band trap vertical and reap the benefits.

Starting in the late 1960s, antenna companies such as Cushcraft, HyGain and Newtronics (Hustler) all had quarter-wave trap vertical antennas in their respective product lines. These antennas are almost identical in their design and operation: a single vertical radiating element with several traps (LC tuned circuits) that isolate the flow of RF energy along various parts of the vertical element. As you change bands, the traps regulate the flow of RF, enabling the single vertical element to assume the role of multiple quarter wavelength elements. This "automatic electronic band switching" is quite convenient, although the traps are somewhat lossy.

Typically priced between $10 and $50 at hamfest flea markets, these four or five-band trap vertical antennas offer a small physical footprint and multi-band performance at a great price.

Vertical Antennas 101

Before we begin, let me state that what follows is by no means designed to be the final word on vertical antennas. The following information was gleaned from back issues of *QST* and *The ARRL Antenna Book*. My goal is to provide a brief overview of how vertical antennas work and why we need to put some effort into their installation in order to make them perform at an acceptable level.

The vertical radiator of a quarter wavelength monopole antenna makes up one half of the antenna. The other half is a ground plane (some call it a "counterpoise") comprised of a series of wires affixed to the shield side of the coaxial connector terminating at the base of the vertical radiating element. In essence, you have the equivalent of a half wave dipole, one-quarter wavelength (λ/4) sticking straight up in the air (the *monopole*) and the other λ/4 (the *radial system*) spread out around the vertical element like spokes in a wheel.

The terminal impedance of a quarter wavelength vertical radiator over a "perfect ground" is about 36 Ω. In the real world this impedance figure varies tremendously depending upon the method of mounting and how many radials are included in the ground plane. A ground-mounted vertical with 15 buried radials (all under λ/4 in length) typically has a terminal impedance of 30-60 Ω, depending upon ground conductivity. The same antenna elevated above ground with only four λ/4 radials will exhibit a terminal impedance very close to 36 Ω.

Why the big difference in the number of radials needed between ground-mounted and elevated verticals? The soil around the base of a ground mounted vertical antenna is typically very lossy. Dryer soil means more loss. Adding radials just beneath the ground level increases the conductivity near the base of the antenna, and provides a low loss return path for antenna currents. The more radials, the more conducting area is presented to the antenna currents and the more efficient the antenna installation becomes. Elevated verticals only require a couple of radials per band since there is no lossy conductive path present to interfere with the antenna currents at the base of the antenna.

For Ground Mounted Verticals

Ground mounting a trap vertical antenna is the most common method found in Amateur Radio. Although easier to initially install, a ground-mounted vertical requires an extensive radial system to be efficient. There is no getting around this point: you need lots of radials or buried metal screen material ("chicken wire") at the base of the antenna in order to make the antenna radiate efficiently.

Bury as many radial wires as you can around the base of the antenna. It is common practice in the broadcast industry to use 120 radials at the base of a broadcasting antenna! That's a lot of wire and a *lot* of work! In reality you will want to add as many radial wires as possible, making them as long as possible, while taking into consideration nearby objects like buildings, trees and fences, etc. Most of us are lucky if we can put 20 to 30 radials down due to the physical length of the radial wires and the proximity of nearby objects. Remember that due to ground capacitance the buried radials will be detuned. Cutting them to quarter-wavelength resonant lengths will be a waste. The best approach is to use quarter wavelengths for the lowest frequency of operation. The radials are detuned by the presence of the ground so they don't have to be tuned precisely, but there's no harm in cutting them to quarter wavelengths.

For Elevated Verticals

Vertical antennas that are mounted above ground or on a roof need only four radials (cut to a quarter wavelength at the operating frequency) to obtain optimal results. Actually, two radials per band has worked out pretty well in past practice. Most people use four radials mainly because it looks pretty and symmetrical.

These elevated radials need to be tuned for each band. The only practical way to do this is to take an antenna analyzer, such as the MFJ 269 or Autek Research RF-1, and connect it to the feedpoint of the vertical and trim the radial leads until the best match is found on each band. Again, *lots* of work, but very much worth the effort. Another way to tune individual radial sets, two by two, is to tune them as though they were a low dipole. See *The ARRL Antenna Compendium Vol 6*, page 223, for an explanation.

One thing to be aware of is that the ends of these elevated radials are high impedance points, as are the ends of a dipole. Therefore, they develop large RF voltages at their ends. This is especially critical when the vertical is mounted above ground. You must keep people and animals away from the ends of these radials, lest they acquire a nasty RF burn.

Quarter wave trap vertical antennas are a great way for the "antenna challenged" QRPer to realize low profile, multi-band performance at a reasonable cost. A properly installed vertical will enable the QRPer to rag chew, work DX and enjoy the low power hobby.

For more in depth information regarding vertical antennas, consult *The ARRL Antenna Book*, 19th Ed.; Stanley, "Optimum Ground Systems for Vertical Antennas, Dec 1976 *QST*, p 13; and Sevick, "Short Ground-Radial Systems for Short Verticals," Apr 1978 *QST*, p 30. Don't forget *The ARRL Antenna Compendium* series (**www.arrl.org/shop/**). QST

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New Extra Class Question Pool Effective July 1; FCC Says Date of Birth Not Required

Effective July 1, 2002, a new Element 4 Extra class question pool takes effect for examinations. VECs and VEs will have new test designs for use in exam rooms effective that date. All question pools can be found at **www.arrl.org/arrlvec/pools.html**.

The new pool contains 806 questions, up from 685 in the existing Amateur Extra class pool.

Technician Pool Review Up Next

Next up for review is the Element 2 Technician class question pool. A new syllabus for this pool was recently released by the Question Pool Committee (QPC) of the National Conference of VECs. Public input is invited and requested on our future Technician exam questions. Consistent with the new syllabus (found at **www.arrl.org/arrlvec/pools.html**), interested parties can submit input on questions, answers or distractors to the entire QPC via e-mail to **qpc@arrl.org**, or to the individual committee members: Chairman, Scotty Neustadter, W4WW (**w4ww@arrl.net**); Fred Maia, W5YI (**fmaia@texas.net**); John Johnston, W3BE (**johnston.john1@worldnet.att.net**); and to Bart Jahnke, W9JJ (**w9jj@arrl.org**).

When submitting new question material, or suggesting changes to existing questions, please limit question length to 210 characters, and answer or distractor lengths to 140 characters. For new or existing questions being modified, please indicate the subelement reference number and topic and existing question number if any with your submission (eg, "**T1D**, Qualifying for a license").

Date of Birth Not Required

The FCC can't seem to make up its mind about whether or not it wants to know the date of birth of an Amateur Service applicant. Supplying a date of birth used to be a requirement on amateur applications, and the FCC made the information public as part of a licensee's record. But a few years ago, the FCC dropped the requirement and hid the database field that once displayed birth date information. Last year, the FCC flip-flopped and announced it was revising FCC Form 605 to include a date of birth field and would again require the information—although it would not be made public. Now, the FCC has changed its mind once more. Missing from the latest version of FCC Form 605 is the requirement for Amateur Service applicants to supply a date of birth, although they may do so if they wish (it is a requirement for certain other wireless service applicants). The latest version of FCC Form 605 dated April 2002 is available on the FCC Web site (see **www.fcc.gov/Forms/Form605**).

FCC Registration Numbers (FRNs)

As has been the case since August 1999, FCC encourages all Amateur Service licensees to register their taxpayer information (for amateurs this is typically our Social Security Number). Under their present "CORES" system, for persons seeking to obtain any service from FCC, registration must first be in place before FCC will process the application. If the application is filed at a VEC test session, registration is automatic as a part of the VEC data submission to FCC. For persons interacting directly with FCC on-line, these persons must first register themselves in CORES (if not already registered) and only after that can the person then file an application on-line (for things like renewals, address changes or Vanity/Systematic call sign changes).

Registering On-Line: If you are not already registered in FCC CORES, go to the FCC Web site at **wireless.fcc.gov/uls/** and choose *REGISTER CORES/Call Sign*. Either choose *REGISTER NOW*, or if you are not sure you are already registered (or if you are already registered) choose *UPDATE REGISTRATION INFORMATION*. [Questions can be directed to the CORES Help Desk at 1-877-480-3201.] Complete your registration information (ignore the contact person, and SGIN references). If you are not a US Citizen, where FCC tells you to supply your SSN, leave that blank—and in the next screen choose the *Exception Reason* of *The applicant is Foreign*.

When the system confirms that you are registered, and the page goes on to read "To continue on to another FCC Filing system, select: *AUCTIONS, BLS, CDBS, CSRS, ETFS, IBFS, or ULS,* be sure to associate your call sign with your new registration by choosing *ULS*; then choose *Proceed to Call Sign/ASR Number Registration*, then re-enter the FRN number FCC just assigned to you and enter the password you previously specified (if you have any problems, for password help contact FCC Tech Support weekdays at 202-414-1250). Lastly, choose *ENTER CALL SIGNS* and enter your Amateur Radio call sign in the first block of the 100 blocks—then click on *Submit,* and you are now finished with your CORES/FRN Registration. You may update your registration at any time in a similar fashion (eg, change address, passwords, or registered call sign).

Have you registered, but can't see your FRN in your license record? Some persons who believe they are registered in CORES, but never see their FRN number in their FCC license record, may not yet have associated their call sign with their CORES FRN registration. To resolve this, see the above paragraph.

Registering by Mail: To register by mail, obtain from FCC their Form 160. See **www.fcc.gov/Forms/Form160/**.

Having CORES Password Problems? Contact FCC Tech Support at 202-414-1250 weekdays.

Do you have Multiple FRNs? To have FCC remove any duplicate FRNs, contact the CORES Help Desk at 1-877-480-3201 weekdays. QST

Question Pool Schedule

Amateur Extra (Element 4)
Current: Expires midnight June 30, 2002
New: Effective July 1, 2002-June 30, 2006

Technician (Element 2)
Current: Expires midnight June 30, 2003
New: Effective July 1, 2003-June 30, 2007

General (Element 3)
Current: Expires midnight June 30, 2004
New: Effective July 1, 2004-June 30, 2008

Reminder: The year 2002 ARRL/VEC Test Fee is $10 for any applicant seeking a new license or an upgrade. An applicant can take any or all four exam elements one time for the single $10 fee. A retest of any element if failed will be charged an additional $10 test fee.

Bart Jahnke, W9JJ ♦ ARRL VEC Manager ♦ bjahnke@arrl.org

Microwave Antennas

Microwavers are faced with low power, high losses and poor noise figures (at least until recently), so how do they make contacts? The answer is simple—high-gain antennas. The principles of antennas apply to all frequencies, but most common HF designs, such as long-wires, dipoles, rhombics and 3-element Yagis, provide insufficient gain for serious microwave communications, and some antenna approaches used on microwaves are not practical for lower frequencies. A typical 2-foot diameter dish on 10 GHz would scale to over 2000 feet for use on the 40-meter band!

To understand antenna gain, let's visualize the pattern of power in the radiated RF wave. Imagine that we have a magic balloon. It is quite easy to expand this balloon, and its magical property is that instead of being expanded by air pressure, its expansion (out from the center) is based on the amount of RF power that is hitting its surface. We place this balloon on an antenna and feed it with some power. If we had a perfectly *isotropic* radiator, it would radiate equal energy in all directions (by definition), and the balloon would form a sphere. The power balloon for a dipole would look like a doughnut. In both of these low gain antennas, most of the energy is spread across a large percentage of the volume. Far away from such an antenna the amount of energy that crosses one unit of area is fairly small. This is because the total transmitted energy is distributed over very many such units of area.

By comparison, a high-gain antenna will radiate most of its power over a narrow angle, mostly in one direction. Our balloon will have a long sausage shape. Unlike the low gain antenna, the majority of the radiated power is heading in one direction, so that when intercepted at some far away distance, much more of the original power will cross a unit of area than with the dipole radiator. The formal name for our power balloon is "antenna radiation pattern" and it is often sliced and presented as a two-dimensional diagram.

An exact reciprocal situation exists on receive. A high gain antenna will receive more of its energy from one direction than others. This means that it is more directive than a lower gain antenna. It is also physically larger than a lower gain antenna and thereby intercepts a larger area of the incident wavefront, delivering more power to the receive terminals than a lower gain antenna would.

To get greater gain we need larger apertures, similar to camera lenses, where greater apertures increase exposure. This can be accomplished by creating a flat grid of phased antennas (dipoles, patches, Yagis) or by constructing a horn with a large opening, or by using a parabolic dish and a proper feed.

Q: What is gain and what units are used?

A: Gain is the measure of how much more energy is delivered at the peak of the antenna pattern in relation to the energy that would be delivered (at the same distance and power level) from an isotropic radiator. It is expressed in units of dBi, or *d*eci*b*els relative to *i*sotropic. Another unit used is dBd, which relates to a dipole rather than an isotropic radiator.

Decibels are a logarithmic expression of the relationship between two amounts of power. It is not a measure of power, but rather is a measure of relative power. The decibel is one tenth of a bel. Saying that X is one bel stronger than Y means that X is 10 raised to the one power ($10^1 = 10$) times the watts of Y. Saying that X is 2 bels stronger than Y means that X is 10^2 (which is 100) times the watts of Y. For example, if Y was 5 W and X is 2 bels stronger, then X would be 500 W. If we want to express that X is only twice as much power as Y (eg, X is 10 W when Y is 5 W) then it would be 0.302 bels because $10^{0.302}$ equals 2 (twice the power). To make units more convenient, we use tenths of bels, or "decibels." So 10 dB (1 bel) is a factor of 10, 20 dB is a factor of 100 and 3 dB (rounded from 3.02) is a factor of 2.

To determine that an antenna has a gain of 20 dBi we could set up an experiment. At some reasonable distance from a mast we place a receiving antenna. We would place an isotropic antenna on the mast, put a known unit of power into the isotropic antenna and measure the power delivered to the receiving antenna. Then, we would replace the isotropic antenna on the mast with the high gain antenna and put the same power into it. After peaking the setup for greatest gain, we measure the received power and should see that the high gain antenna delivers 20 dB more power (100 times more) than we received from the isotropic antenna. Unfortunately, an isotropic antenna is very difficult to construct, so in real antenna measurements, antennas with well-known gains are used instead as the standard, and the standard's gain is subtracted to achieve a measurement of dBi.

Q: How is gain related to aperture?

A: In general, larger apertures (bigger antennas) have higher gain, but only if the antenna is designed well and efficient. The gain increases with the square of the diameter, and inversely with the square of the wavelength. Twice the effective aperture diameter results in 4 times the gain, or a 6-dB increase.

Horns and dishes have physical areas that are simple and obvious. They can be measured directly. Yagis are not physically flat, and so it is not obvious that they have apertures that grow in diameter, as they get longer—but they do. Longer Yagis affect larger and larger areas around them and radiate and receive more directive patterns. Aperture efficiencies typically run from 50% to 70% in well-designed and constructed antennas.

Q: What is beamwidth and how is it related to gain?

A: Beamwidth is the angle over which most of the energy is transmitted, or the width of the primary protrusion in the power balloon. The technical term used is HPBW or half power beamwidth. It is the angle between the directions where the power drops to half of the peak. Higher gain antennas have narrower beamwidths (as shown in Table 1) making them tricky to point. Pointing an antenna often requires that it is within the 1-dB beamwidth, which is about 1/4 of the HPBW in the table. When the pointing beamwidth is smaller than one

Table 1
Approximate Relation between Gain and Beamwidth for Typical Amateur Microwave Antennas

Gain (dBi)	*Beamwidth (degrees)*
10	50
15	30
20	16
25	9
30	5
35	3
40	1.3

Tom Williams, WA1MBA ♦ PO Box 28, Shutesbury, MA 01072 ♦ wa1mba@arrl.org

Table 2
Some Example Sizes and Typical Gains of Amateur Antennas for Microwave Bands

Band (MHz)	*Loop Yagi (feet)*	*Gain (dBi)*	*Dish Diameter (feet)*	*Gain (dBi)*	*Horn Height (inches)*	*Gain (dBi)*
903	18	20	12	25	—	
1296	15	21	10	29	—	
2304	12	23	4	27	18	17
3456	8	23	4	30	12	15
5760	Not practical	—	3	32	10	20
10,368	Not practical	—	2	35	6	22
24,192	Not practical	—	1	35	4	26

or two degrees, pointing is very difficult at best. When starting in microwaves, it is advisable to use a moderate gain antenna and spend effort on making electronics that are stable rather than adding to frustration with a difficult narrow beamwidth antenna.

Q: Why are some types of antennas more widely used on certain bands?

A: Yagis are the antennas of choice at 903 and 1296 MHz, unless a very large dish (10 feet or larger) is available. At 2 and 3 GHz with wavelengths of 5 inches and less, the requirements for precision and stability put demands on the mechanical structure of a Yagi. Nonetheless, there are a number of successful designs in regular use, in particular the "Loop Yagi" for these bands that can achieve 20-dBi gain or more. Often, amateurs will try using parabolic dishes on 2 and 3 GHz, where a 4 ft dish is sufficiently large to yield good results. On the 5 GHz band and higher, Yagi type antennas are not practical. Even a dish as small at 2 feet diameter or a horn with an aperture of one square foot will give very good results on these and higher frequencies. A good rule of thumb is that a dish should be at least 10 wavelengths in diameter. Table 2 shows some approximate gain values for different sizes and types of microwave antennas.

The horn antenna is a very simple device, reasonably easy to construct with some metalworking skills, and can provide sufficient gain for microwave contacts under all but the most demanding situations. The gain of a horn is directly related to its size when reasonably narrow flare angles are used. Horn antennas become impractical at high gains, as the length needed for proper operation becomes excessive. Because their gain is less than a typical dish, they are easier to point (not quite as narrow a beamwidth), and they do not require the difficult adjustments that a dish and feed do for good performance.

Q: Can I purchase an antenna?

A: Several sources can supply microwave antennas, ready-built and kit form. Often there are good microwave antennas at ham fests, either surplus from commercial or government or used amateur home-brew. Unless you are experienced and can get some help, it is unwise to expect immediate good results from a dish and feed. However, horns and Yagis are very likely to perform well if they appear to be in good physical shape.

Q: Can I build my own antenna?

A: Many amateurs build their own antennas. There are articles in various publications over the years that get into details of all types of microwave antennas. The resources listed are good starting places to learn more, and give theory and practical advice.

Q: What about transmission line?

A: The transmission line is always a very important part of a microwave system. Because transmission line losses grow significantly with frequency, microwavers put a lot of thought into making them very short, or overcoming the loss with additional gain (amplifiers) as close as possible to the antenna. At 5 GHz for example, 1/2-inch Hardline coax can lose over 1/2 dB every 10 feet. A 100-foot run could lose 6 dB, delivering only 1/4 of the original power to the antenna. The best advice is to plan out the power levels and losses well in advance of designing and building a system, and talk to others who have constructed systems similar to the one you are working toward. They will know what to do and what not to do, and probably know where to get some good transmission line, too!

Q: What is waveguide?

A: Waveguide is rectangular (or circular) empty metal tube, used as transmission line. RF will propagate inside the tube with fairly low loss compared to coaxial cable. Any particular waveguide size has a limited frequency range, usually less than one octave (less than a factor of two from the lowest to highest frequency recommended). It can be directly connected to a horn or a horn type of dish feed, or an adapter can be used to convert back to coaxial cable. Waveguide is quite large for lower frequencies, such as 1296 or 2304 MHz, but is manageable at 5, 10, 24, 47 GHz and higher. At 5 GHz and below, most amateurs use coaxial cable for transmission line functions. Some amateurs use waveguide at 10 GHz. Coaxial cable becomes very lossy, to the point of being almost useless in most amateur applications at 47 GHz and above. Some amateurs have used copper water pipe as waveguide on 10 GHz with success.[1]

Long runs of waveguide will condense moisture inside causing significant losses and corrosion. To overcome this, commercial users pump dried air or bottled nitrogen into the waveguide at low pressure, allowing it to leak out toward the end of the run. The cost of the waveguide and continuous maintenance are high enough hurdles to force most to find other ways of getting the signal to the tower. One interesting way is to use no transmission line at all. Instead, a reflector can be put on the tower and a high gain antenna pointed toward it from the ground.[2]

Next time we will discuss just how amateurs get on microwaves and give some advice on how to do it.

I wish to thank Paul Wade, W1GHZ, for his help in reviewing the column. Paul has contributed to amateur microwaves—publishing, giving talks, building and operating for decades. His on-line antenna book[3] is an excellent treatment of the subject of Amateur Radio microwave antennas. I highly advise that you download and keep this on hand whenever you want to learn about and build a microwave antenna.

Resources

- Directive Systems
  RR 1, Box 282, Lebanon, ME 04027
  www.directivesystems.com
- Down East Microwave
  954 Rte 519, Frenchtown, NJ 08825
  tel 908-996-3584
  www.downeastmicrowave.com
- SSB Electronic USA
  124 Cherrywood Dr
  Mountaintop, PA 18707
  tel 570-868-5643
  www.ssbusa.com/
- Various publications in the Microwave section of *ARRLWeb* at **www.arrl.org**

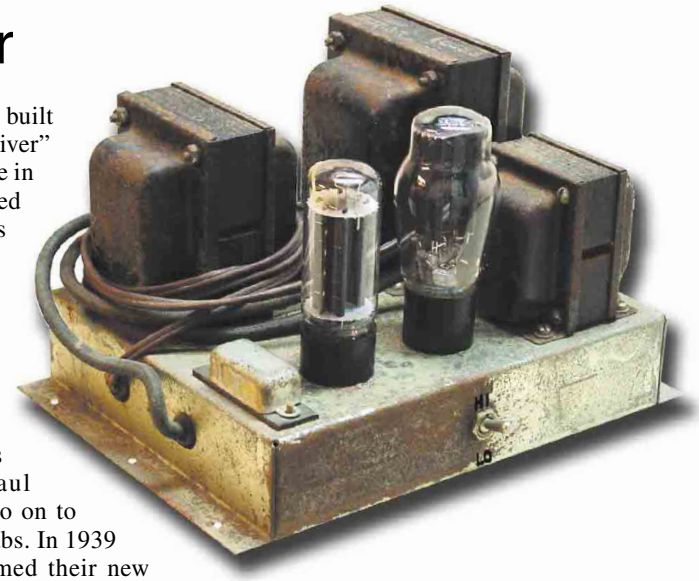
Notes

[1]Paul Wade, W1GHZ , "Understanding Circular Waveguide—Experimentally," *QEX*, January 2001.

[2]Paul Wade, W1GHZ, "Periscopes for Microwaves: 10 GHz without Feed-Line Loss," *QEX*, May/June 2002.

[3]Paul Wade W1GHZ, *The On-line Antenna Book*, **www.w1ghz.com**.

The Harvey-Wells Bandmaster



John Wells, W1ZD, and Clifford Harvey, W1RF, came together to start the Harvey-Wells Electronics Company in Southbridge, Massachusetts in 1939. During World War II they produced many items for the war effort, earning the prestigious "E" award. After the war they would go on to produce ham radio equipment, including the popular Bandmaster transmitter.

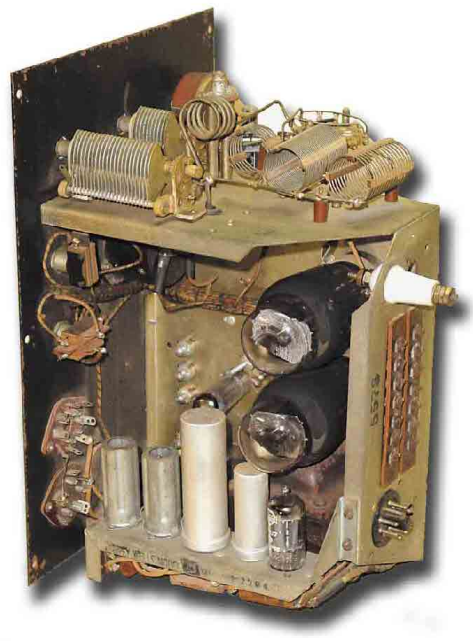
John Wells started in ham radio while in high school during 1919. His call then was 1BQJ. Wells went to Harvard and was active in their radio club. In 1926 he developed a crystal-controlled transmitter and wrote an article in the June 1926 *QST*. He was one of the first to use crystal control, grinding his own. During WW II his crystal expertise would come in handy, as the Harvey-Wells Company produced thousands for the Army and Navy. His call became 1ZD in 1926.

Also a pilot, in 1932 Wells flew his autogyro aircraft to an altitude of three thousand feet to experiment in the "56-mc Eclipse Expedition" (October 1932 *QST*). While there he met Paul Hendricks, W1AXV. Hendricks was at that time entering into a partnership with Clifford Harvey. Their company, Hendricks and Harvey, built the "Single Signal Receiver" that was advertised once in 1932 in *QST*. It is believed that this is where Wells met his future partner, Clifford Harvey.

Clifford Harvey was born in Philadelphia and went to college at MIT. He graduated in 1931 as a radio engineer. Shortly after his partnership with Paul Hendricks, he would go on to found Harvey Radio Labs. In 1939 Harvey and Wells formed their new company.

When war was winding down, they planned new radio products to sell. They produced radios for marine, aircraft and, of course, ham radio. The 1947 Bandmaster would become one of their most popular, with many being sold. The one shown here, model TBS-50D, serial number 5573, was produced after 1950.

There were three basic TBS-50 models. The "B" or Junior version was CW only at $87.50, the "C" or Senior was for mobile operation with a carbon microphone at $111.50, and the "D" or Deluxe model with additional audio preamps for crystal microphones was offered at $137.50. Optional power supplies for mobile or fixed station operation were offered, from $39.50 for the ac supply to $87.50 for the 6-V mobile supply. Shown is the ac supply.



As you might expect, it was physically well designed and used many parts that were on the "surplus market" to keep costs low. Shown in the interior view is the heavy-duty modulator with a pair of 6L6s in push-pull. They would modulate the single 807 final to a full 100%.

You can see the various final coils on the top. This transmitter had band switching and would cover from 80 to 2 meters. That was a lot of spectrum and as you might expect, with the increasing popularity of home television, they became less popular with hams. I had one back in the late 1950s and tried to use it on 6 meters. I was into every television in the neighborhood. In no time at all, my mother encouraged me to sell it and get another one "that wouldn't bother the neighbors."

The VFO shown at the bottom of the transmitter is a hard-to-find accessory today. The transmitter is still popular with the AM crowd and makes a decent "first" vintage restoration project, as parts can be easily found at hamfests. It looks good, too.

My thanks to Peter Laur, SM5HUA, for helping me find some of the historic information. For more history, schematics and photos of the Bandmaster and Harvey and Wells, visit my Web site **www.eht.com/oldradio/arrl/index.html**.

Look for my hat at the hamfests and say hello.—*K2TQN*

John Dilks, K2TQN ♦ 125 Warf Road, Egg Harbor Township, NJ 08234-8501 ♦ k2tqn@arrl.org

Hall of Science Museum Station Showcases Hands-On Technology

By Stephen Greenbaum, WB2KDG, Chairman, Hall of Science ARC

The New York Hall of Science Museum, located on the grounds of famous 1964-65 World's Fair, has attracted national and international attention as a leading innovator in exhibit technology and educational programming. The Hall of Science is New York City's only hands-on science and technology museum and features the city's largest interactive exhibits. Attendance is nearly 300,000 per year.

Every weekend and Wednesdays, amateur station WB2JSM opens on the main exhibit floor. As an active station, it provides the public with an introduction to the science of radio and the world of Amateur Radio, in particular. Members of the Hall of Science Amateur Radio Club, a 501(c)(3) entity, operate the station.

Our latest project was improvements to our state-of-the-art satellite station.

We've been fortunate to receive donations from Kenwood, Robot Research, AEA, Star Micronics and Mosley Electronics.

In January of last year, we received an ARRL Foundation grant of $3500 to help purchase two new computers, a laser printer, a 17-inch monitor and a flat screen monitor used to entice the public into our exhibit. This assistance has been a great help and we thank you for your contribution to our museum effort.

STEPHEN GREENBAUM, WB2KDG

This smart-looking station is located at the New York Hall of Science Museum. Note the flat-screen monitor that tells passersby about Amateur Radio when operators are temporarily out of the shack.

TUNING IN TO FUN FOR TEXAS VISUALLY IMPAIRED STUDENTS

By Stephen Bosback, KW5V, Trustee for K5TSB, Texas School for the Blind and Vision Impaired

The wheels of a bureaucratic state agency move slowly, and more slowly for a volunteer program that has no mandated portion of the budget. It took months for the items I had ordered for K5TSB Radio Club of the Texas School for the Blind and Visually Impaired to come dribbling in. Finally in December, everything was in place and we are now well on our way to a new level of ham radio participation. The $500 provided by the ARRL Foundation was matched by our School for the Blind and Vision Impaired in the form of an up-to-date computer with JAWS (Jobs Access for Windows) software to give my students access to data from ARRL CD-ROMs, which we obtained. We now have the capability to run a first-rate instruction program. Our capability as a club is greatly increased, as we have audio access to the best of ARRL's materials and a logging program that some of the students can access and use without outside assistance. We have started experimenting with PSK31, although yours truly also needs to master the new mode before my students can fully utilize it. We were able to purchase four code practice oscillators and practice tapes for those who want to pursue HF privileges, along with a programmed course for each license class.

The students at TSBVI have a high interest in Amateur Radio, but many are compromised by multiple disabilities. A few will pursue a license and earn their ham ticket in due course. These students will go far and ham radio will be a lifelong companion and tool for accessing the world. For others, we provide a hands-on experience with radio and teach as much as they are able to absorb without dampening their interest. Just making third party contacts across the US is a great experience that builds listening skills, conversation etiquette, rules of contact, receiver tuning, and the larger concepts of distance, worldwide time and geography.

Our ham shack is now fully accessible to our blind and vision-impaired students. I want to express my sincere thanks to the Foundation and its contributors for our Victor C. Clark Youth Incentive Program grant.

Contributor's Corner

We wish to thank the following for their generous contributions to:

The WRTC-USA Youth Fund
Kenneth Widelitz, K6LA

The Victor C. Clark Youth Incentive Fund
Jean H. Dupree, KB4OHX, and Horace Dupree, in fond memory of Andrew Greene, KE4WD, Louis Dupree, W4NRG, and Wayne Williams, K4MOB
Joan and William Keck and Automotive Systems, Inc (Washington), in fond memory of Albert W. Dunn, K2ARD

Jesse Bieberman Meritorious Membership Fund
Iris F. Sullivan, KA8NRT, in fond memory of Bert Sullivan, WZ8Q

The L. Phil and Alice J. Wicker Memorial Scholarship Fund
Mr and Mrs Ercel C. Skeen and Dr and Mrs David N. Taylor, in fond memory of Alice J. Wicker, WA4ZMA

The General Fund
Tuck Miller, NZ6T
C. R. Barrow, K7BVT, in loving memory of Ramona Barrows, WA7UFS, and Edna Relyea, WA7ZND
William C. Edgar, N3LLR
Anthony J. Immorlica, KC2TV and Annette Immorlica, in fond memory of John B. May, KF2TW
Jay Bellows, K0QB
Dr and Mrs Ron Levy, K2CO, and Morris Radio Club, Inc (New Jersey), in fond memory of Edgar Weed, K2BO
Dade Radio Club of Miami, Inc (Florida), in fond memory of Joseph F. Kallaher, KG4GTS
David Monfried, W2PK
Roper ASW (Minnesota)
The Rev David A. Novak, N0DN, in fond memory of Joseph J. Novak, W0PGI
Jack Schaller, K9CDM, in loving memory of Barry N. Norrgran, WZ7V

As received and acknowledged during the months of **March** and **April**.

Mary E. Lau, N1VH ♦ Secretary, ARRL Foundation Inc.

COMING CONVENTIONS

ROCKY MOUNTAIN DIVISION CONVENTION

July 12-14, Bryce, UT

The Rocky Mountain Division Convention, sponsored by the Utah Hamfest Committee, will be held at Ruby's Inn, 1 mile before the gate to Bryce Canyon National Park. Features include swapmeet, dealers, forums and seminars, VE sessions (Saturday 9-11 AM, best to pre-register; Fred Villanueva, N7FV, **villa72@juno.com**), special guests (ARRL President Jim Haynie, W5JBP; Rocky Mountain Division Director Walt Stinson, W0CP), T-hunts, QLF contest, Dutch Oven Dinner (Saturday, 5:30-7:30 PM, Campground Picnic Area, $12), Wouff-Hong ceremony, Special Event Station, camping, refreshments. Talk-in on 146.98 or 447.575. Admission is $7 in advance, $10 at the door; youth $3 in advance, $5 at the door. Contact Kathy Rudnicki, N7JSH, 306 N 1500 E, Layton, UT 84040; 801-547-9218; **jimkatpa@aol.com**; **www.utahhamfest.org**.

GEORGIA STATE CONVENTION

July 13, Gainesville

The Georgia State Convention ("Coolest Hamfest in Georgia"), sponsored by the Lanierland ARC, will be held at the Georgia Mountains Center, 305 Main St; I-85 to I-985, take Exit 20, left onto Queen City Pkwy, go to 4th traffic signal, take right onto Jesse Jewell Pkwy (SR 369), GMC is on left at 3rd light. Doors are open for setup on Friday noon to 8 PM, Saturday 6-8 AM; public 8 AM to 3 PM. Features include Hamfest/Computer Expo, air-conditioned facilities, dealer tables and booths, large covered tailgate area ($10 per marked spot), forums (ARRL, ARES, antennas, QCWA), special guest speaker (Brennan Price, N4QX, from ARRL HQ), VE sessions (walk-ins, promptly at noon; Norman Harrill, N4NH, 704-253-1192, **NormanHarrill@worldnet.att.net**), free on-site golf cart transportation for the handicapped, free parking, refreshments. Talk-in on 146.67 (131.8 Hz) or 147.55. Admission is $5 in advance, $6 at the door; under 12 free. Tables are $15 each (8-ft, with 2 chairs; ac power $15 per connection). Contact Terry Jones, W4TL, 4816 Windwalker Dr, Flowery Branch, GA 30542; 770-967-6364; **w4tl@arrl.net**; **www.lanierlandarc.org/hamfest.htm**.

OKLAHOMA STATE CONVENTION

July 19-20, Oklahoma City

The Oklahoma State Convention ("Ham Holiday 2002"), sponsored by the Central Oklahoma Radio Amateurs, will be held at the Oklahoma State Fair Park, (Made in Oklahoma Building), NE of the intersection of I-40 and I-44. Doors are open Friday 5-8 PM, Saturday 8 AM to 5 PM. Features include flea market, technical and non-technical programs, WAS card-checking, VE sessions. Talk-in on 146.82. Admission is $7 in advance, $9 at the door; under 16 free. Tables are $10 in advance, $15 at the door (if available); electrical hookup $5. Contact Ronald McCubbin, KC5QCV, c/o "CORA Ham Holiday 2002", Box 265, Ft Supply, OK 73841-0265; 405-341-0591; **kc5qcv@arrl.net**; **home.mmcable.com/coranews/flyer.html**.

MONTANA STATE CONVENTION

July 19-21, East Glacier

The Montana State Convention (68th Glacier-Waterton International Peace Park Hamfest), sponsored by the Glacier-Waterton International Hamfest Committee, will be held at the Three Forks Campground, 16 miles W of East Glacier on Hwy 2, between mileposts 191 and 192. Features include flea market, tailgating, vendors, dealer displays, junque auction, QCWA meeting, bunny hunt, contests, seminars and programs, VE sessions, BBQ supper (Saturday eve), camping. Talk-in on 146.52. Admission is $12 in advance, $15 at the door. Tables are $8 (for bazaar). Contact Gerry Leach, VE6BVZ, 55 Templegreen Place NE, Calgary, AB, Canada T1Y 4Z2; 403-285-5547; **leachg@cadvision.com**; **www.gwhamfest.org**.

June 28-30
San Francisco Section, Ferndale, CA*

August 16-18
Southwestern Division, Escondido, CA

August 17-18
Alabama Section, Huntsville

August 18
Kansas State, Salina

August 23-24
New Mexico State, Albuquerque

August 23-25
New England Division, Boxboro, MA

August 24
West Virginia State, Weston

September 7-8

Maryland-DC Section, West Friendship

September 8
Western Pennsylvania Section, Butler
Roanoke Division, Virginia Beach, VA

***See June *QST* for details.**

ARIZONA STATE CONVENTION

July 26-28, Flagstaff

The Arizona State Convention (Fort Tuthill Hamfest), sponsored by the AR Council of Arizona, will be held at the Coconino County Fairgrounds, 3 miles S of the junction of I-40 and I-17; Exit 337 off I-17 (Airport Exit), turn W (crossing Rte 89A) into Fairgrounds. Doors are open for exhibit hall on Friday noon to 5 PM, Saturday 9 AM to 5 PM, Sunday 9 AM to 2 PM; hamfest hours are from dawn to dusk Friday and Saturday and dawn to 2 PM Sunday. Features include commercial vendors, major manufacturers, tailgating, seminars, ARRL forum, tech sessions, junque sale (Sunday), VE sessions (Saturday, 8:30 AM to noon; 602-881-2722), RV camping. Talk-in on 146.98 (162.2 Hz). Admission is $1. Contact Christine Kesauer, N7PVL, 16845 N 29th Ave, No 312, Phoenix, AZ 85053-3041; 602-881-2722; **www.arca-az.org/arca**.

CENTRAL STATES VHF SOCIETY CONFERENCE

July 26-28, Milwaukee, WI

The Central States VHF Society Conference, sponsored by the Badger Contesters - the Wisconsin and Northern Illinois VHF/UHF Weak Signal Group, will be held at the Sheraton Four Points, 4747 S Howell Ave, near the Milwaukee Airport; I-94 E or W, take Exit 318 (Glen Mitchell Airport), follow signs towards the airport for ¾ mile, take Howell Ave Exit just before Airport. Features include Antenna Range operation (Friday, 8 AM), Noise Figure workshop, technical presentations by various guest speakers, flea market (Friday, 7 PM), party suites for socializing, family program, CSVHFS business meeting, banquet (Saturday, 7 PM, $28; special guest speaker ARRL President Jim Haynie, W5JBP), Sunday morning breakfast. Registration fee is $37 in advance, $42 at the door (plus $5 yearly membership dues). Contact Bruce Richardson, W9FZ, 2330 Lexington Ave S, No 312, Mendota Heights, MN 55120; 651-686-8017; **w9fz@ix.netcom.com** or **w9fz@csvhfs.org**; **www.csvhfs.org**.

TEXAS STATE CONVENTION

August 2-3, Austin

The Texas State Convention (Austin Summerfest 2002), co-sponsored by the Austin ARC, the Austin Repeater Organization, and the Texas VHF-FM Society, will be held at the Red Lion Hotel, NE corner of the intersection of IH-35 and US Hwy 290 N. Doors are open Friday 6-9 PM, Saturday 8 AM to 4 PM. Features include indoor and outdoor swapfest, tailgating, dealers, exhibits, forums and technical sessions (ARRL, DX, emergency communications, weather, packet radio, AMSAT, QRP, microwave), Texas VHF-FM Society annual meeting, VE sessions (Saturday, all classes of licenses; Larry Gunter, WB5BEK, **wb5bek@arrl.net**), hospitality suite. Talk-in on 146.94. Admission is $8 in advance, $10 at the door, under 18 free. Tables are $10 (6-ft, electricity $5 additional through advance registration only; limit of 3 tables to a customer; first-come, first-served). Contact Joe Makeever, W5HS, 8609 Tallwood Dr, Austin, TX 78759; 512-345-0800; **w5hs@arrl.net**; **www.repeater.org/summerfest**.

PACIFIC NORTHWEST DX CONVENTION

August 2-4, Portland, OR

The Pacific Northwest DX Convention, sponsored by the Willamette Valley DX Club, will be held at the Monarch Hotel, 12566 SE 93rd Ave (Clackamas); I-205 S from Portland Airport to Sunnyside Rd Exit (approximately 7 miles), exit at Clackamas Prominade. Features include Hospitality Suite, programs and presentations, ARRL DXCC forum (Dave Patton, NT1N, from ARRL HQ), banquet (Saturday, $25), Sunday breakfast ($12), DXCC card checking. Talk-in on 147.14. Admission is $60 by Jul 12 (for complete package including programs, Saturday dinner and Sunday breakfast); additional $5 after Jul 12. Contact Al Rovner, K7AR, 18809 NE 21st St, Vancouver, WA 98684; 360-256-7437; **k7ar@arrl.net**; **www.wvdxc.org/convention.htm**.

KENTUCKY STATE CONVENTION

August 4, Lexington

The Kentucky State Convention, sponsored by the Bluegrass ARS, will be held at the National Guard Armory, 4301 Airport Rd, adjacent to Bluegrass Airport; I-75 to Exit 115, KY Rte 922 S for 1.5 miles, New Circle Rd W for 4.6 miles, US Rte 60 W for 1.5 miles, Man O' War Blvd S for 1.3 miles, Parkers Mill W for 1.2 miles, Airport Rd N 1 block, turn left onto Armory grounds. Doors are open for setup Saturday 6-8 PM, Sunday 6-8 AM; public Sunday 8 AM to 4 PM. Features include indoor and outdoor flea market, commercial vendors, tailgating (free with admission), forums (ARRL, ARES, ATV), Electrical Safety Around Powerlines demonstration, Special Event Station, banquet (Saturday, Aug 3), VE sessions (contact Bob Cooper, AF4OI, by Jul 25; 859-272-6460, **af4oi@cs.com**), handicapped accessible, free parking, free overnight self-contained camping, refreshments. Talk-in on 146.76. Admission is $5 in advance, $6 at the door. Tables are $15 before Jul 25, $25 after Jul 25. Contact John Barnes, KS4GL, 216 Hillsboro Ave, Lexington, KY 40511-2105; 859-253-1178; **jrbarnes@iglou.com**; **www.bluegrassars.org/**.

WESTERN NEW YORK SECTION CONVENTION

August 4, Williamsville

The Western New York Section Convention (Greater Buffalo Hamfest and Exposition), sponsored by the Lancaster ARC, will be held at the Main Transit Fire

Gail Iannone ♦ Convention Program Manager ♦ giannone@arrl.org

Department Recreation Grounds, 6777 Main St; NYS Thruway (I-90) to Exit 49 (Depew), take Rte 78 (Transit Rd) N to Rte 5 (Main St), turn left (W) on Rte 5, proceed approximately 0.2 miles, grounds on left (S) side of street. Doors are open 6 AM to 4 PM. Features include huge outdoor flea market (tailgating fee $4 plus admission; Bob, 716-681-4419), commercial vendors, WNY section club championship competition, contests, demos, ARRL talks, forums, foxhunt, VE sessions (Main Building, 9:30 AM; Bill, WB2AIV, 716-832-0031, **wb2aiv@arrl.net**; walk-ins accepted), all-you-can-eat pancake breakfast, Pig Roast, refreshments. Talk-in on 147.255. Admission is $5. Tables are $12.50 (8-ft). Contact Luke Calianno, N2GDU, 1105 Ransom Rd, Lancaster, NY 14086; 716-634-4667 or 716-683-8880; **luke@towncountryflorist.com**; **hamgate1.sunyerie.edu/~larc**. QST

HAMFEST CALENDAR

Attention: 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 **July 1** to be listed in the **September** issue. Hamfest information is accurate as of our deadline; contact sponsor for possible late changes. For those who send in items for Hamfest Calendar and Coming Conventions: Postal regulations prohibit mention in *QST* of prizes or any kind of games of chance such as raffles or bingo.

(Abbreviations: *Spr* = Sponsor, *TI* = Talk-in frequency, *Adm* = Admission.)

Arizona (Flagstaff)—Jul 26-28, Arizona State Convention. See "Coming Conventions."

British Columbia (Vernon)—Jul 26-28; RAC National Convention, Roy McNeil, VE7DTT, **ve7dtt@rac.ca.**

†Colorado (Loveland)—Jul 20; set up Friday 5 PM (overnight security provided), Saturday 6 AM; public 8 AM to noon. *Spr:* Northern Colorado ARC. Larimer County Fairgrounds, 710 S Railroad Ave; take I-25 to Exit 255, go W on Colorado 402 approximately 4.5 miles, past Hwy 287, then N on Railroad Ave. Swapmeet, tutorials, demos, VE sessions, "QRP Corner". *TI:* 145.115 (100 Hz), 146.52. *Adm:* $4, under 13 free. Tables: $12 (includes 1 admission). Rod Cerkoney, N0RC, 5000 Boardwalk Dr, No 39, Ft Collins, CO 80525; 970-225-0117; **n0rc@arrl.net**; **www.radioactivehams.com/superfest**.

†Florida (Milton)—Jul 26-27; Friday noon to 9 PM, Saturday 8 AM to 2 PM. *Spr:* Milton ARC. County Auditorium, 4530 Jimmy's Way. VE sessions (Saturday 8 AM to noon). *TI:* 145.49. *Adm:* $3. Tables: $8. Walter Yarbrough, WA4TFR, 4301 Bell Ln, Pace, FL 32571; 850-994-7335; **wa4tfr@worldnet.att.net**; **home.att.net/~k4ozl/marc.htm**.

Georgia (Gainesville)—Jul 13, Georgia State Convention. See "Coming Conventions."

†Illinois (Quincy)—Aug 10, 8 AM to 2 PM. *Spr:* Western Illinois ARC. Eagles Alps, 3737 N 5th St; follow 5th St, 4.5 miles N of downtown Quincy. Indoor and outdoor facilities, VE sessions, refreshments. *TI:* 147.03. *Adm:* advance $4, door $5. Tables: $8 (indoor). Bob Crockett, N9KUT, Box 3132, Quincy, IL 62301; 217-222-4467; **w9awe@arrl.net**; **www.qsl.net/w9awe**.

†Illinois (Sugar Grove)—Jul 21; set up Saturday 7 PM, Sunday 6-8 AM; public 8 AM. *Spr:* Fox River Radio League. Waubonsee Community College, Rte 47 at Waubonsee Dr, 5 miles NW of Aurora. Flea market, commercial dealers, computer vendors, VE sessions (10 AM, bring original and copy of license, photo ID, CSCE, fee), overnight camping (Bliss Woods, Kane County Park; 630-466-4182), free paved parking, refreshments. *TI:* 147.21 (103.5/107.2 Hz). *Adm:* advance $4, door $5. Tables: $12 (8-ft). Maurice Schietecatte, W9CEO, c/o FRRL, Box 673, Batavia, IL 60510; 815-786-2860; **w9ceo@arrl.net**; **www.frrl.org/hamfest.html**.

Indiana (Angola)—Aug 4. Bill Brown, WD9DSN, 260-475-5897.

Indiana (Indianapolis)—Aug 10. Joe Lobraico, K9OOA, 317-255-3000.

Kentucky (Lexington)—Aug 4, Kentucky State Convention. See "Coming Conventions."

†ARRL Hamfest

†Louisiana (Slidell)—Jul 20, 8 AM to 2:30 PM. *Spr:* Ozone ARC. Slidell Municipal Auditorium, 2056 2nd St, corner of 2nd and Bouscaren Sts; from I-12 take US 11 Exit, go S on US 11, turn left on Bouscaren St, go 2 blocks; from I-10 take US 190, head W to US 11, follow above. Flea market, dealers, forums, VE sessions, QLF contest. *TI:* 147.27 (114.8 Hz). *Adm:* $3. Tables: $20 (dealers), $7 (flea market). Jerry Finnegan, KC5WLA, Box 553, Slidell, LA 70459; 985-639-9690 (home) or 504-589-2538 (work); **kc5wla@arrl.net**.

†Maine (St Albans)—Aug 10, 8 AM to noon. *Spr:* Piscataquis ARC. SnoDevil's Snowmobile Club, N of St Albans on Rte 152 (Todd's Corner Rd). Tailgating (free), VE sessions (9 AM, all classes), camping and RV spaces (no hookups), free parking, refreshments. *TI:* 147.39, 146.52. *Adm:* $5, under 12 free. George Dean, WA1JMM, Box 365, Brownville Junction, ME 04415; 207-965-8864; **wa1jmm@midmaine.com**; **www.qsl.net/parc/**.

†Maryland (Timonium)—Jul 28; set up Saturday 2 PM; public Sunday 8 AM to 4 PM. *Spr:* Baltimore RA Television Society. Timonium Fairgrounds, York Rd; take I-695 (Baltimore Beltway) to Exit 24 (I-83 N); from I-83 take Exit 17 (Padonia Rd) E, turn right at 3rd traffic light onto York Rd, (MD Rte 45), continue S on York Rd to Fairgrounds entrance. Hamfest/Computerfest, giant flea market (opens 6 AM), vendors, electronics, equipment, antennas, tailgating (first-come, first-served basis; no advanced reservations), VE sessions (check in 8:30 AM, free exams 9 AM; pre-registration required; John Creel, WB3GXW, 301-572-5124, 6-9 PM; **creewb3gxw@aol.com**), handicapped accessible, free parking, refreshments. *TI:* 147.03, 224.96, 448.325. *Adm:* $6, under 12 free. Tables: $60 each (in air-conditioned Main Exhibit Hall). Bob Bennett, W3WCQ, c/o BRATS, Box 5915, Baltimore, MD 21282-5915; 410-828-1605 or 410-461-0086 (phone/fax); **hamfest@bratsatv.org** or **bbennett@ketron.com**; **www.bratsatv.org**.

Massachusetts (Cambridge)—Jul 21. Nick Altenbernd, KA1MQX, 617-253-3776.

†Michigan (Jackson)—Aug 10, 8 AM. *Spr:* Cascades ARS. Jackson Community College Fieldhouse, 2111 Emmons Rd; US-127 S to M-50, W on McDevitt Ave to Hague Rd, S to Emmons Rd. VE sessions. *TI:* 146.88. *Adm:* $5, under 12 free with paying adult. Tables: floor $10, wall $15, outdoor space $5 (each table includes one admission). Dennis Byrne, KC8IJZ, 10265 Mack Island, Grass Lake, MI 49240; 517-522-4058; **kc8ijz@arrl.net**; **www.w8jxn.org**.

†Michigan (Tawas)—Aug 3, 8 AM to 2 PM. *Spr:* Iosco County AR Enthusiasts. Tawas Area High School, 255 M-55, 2.5 miles W of town; US 23 to M-55, M-55 W for 1.4 miles. Indoor flea market, commercial vendors, VE sessions (pre-register). *TI:* 146.64, 146.9. *Adm:* advance $4, door $5. Tables: $7 (commercial or private). John Alexander, W8GZF, 327 E Washington St, East Tawas, MI 48730; 989-362-2398; **jalexander@glr.cap.gov**.

†Minnesota (Brainerd)—Jul 20, 9 AM to 2 PM. *Spr:* Brainerd Area ARC. National Guard Armory, 1115 Wright St; from Hwy 371 turn E on Wright St, go 4 blocks to Armory. Commercial vendors, Amateur Radio and computer equipment, DXpedition and SKYWARN videos, free parking, refreshments. *TI:* 147.03, 145.13, 444.925. *Adm:* $5, under 12 free. Tables: $10 (plus admission; best to reserve in advance). Al Doree, W0RC, 3876 E Shamineau Dr, Motley, MN 56466; 218-575-2404; **doreeaj@brainerd.net** or **w0rc@arrl.net**; **www.brainerdham.org**.

†Missouri (Licking)—Jul 13, 8 AM to 3 PM. *Spr:* Ozark Mountain Amateur Repeater Club. Intercounty Electric Building, 102 Maple Ave; Hwy 63 N and S to Maple Ave, go 1 block E to building. Tailgating, vendors, refreshments. *TI:* 146.85. *Adm:* $3. Tables: $5. Blanche White, N0FLR, 628 Cleveland Rd, Houston, MO 65483; 417-967-3000.

†Missouri (Warrensburg)—Jul 20, 8 AM to 1 PM. *Spr:* Warrensburg Area ARC. Central Missouri State University, Hwy 13; Hwy 50 to Warrensburg, turn S, travel 1 mile, follow signs. Vendors, VE sessions (all classes, walk-ins accepted), RV parking. *TI:* 146.88. *Adm:* $3. Tables: $10. Keith Raihala, N0VJ, 457 NW 501 Rd, Warrensburg, MO 64093; 660-422-7273; **raihala@yahoo.com**.

†Missouri (Washington)—Jul 21, 6 AM to 2 PM. *Spr:* Zero Beaters ARC. Bernie E. Hillerman Park, Grand Ave; from Hwy 47 take 5th St, go right onto Grand Ave, just past lake. Ham Radio/Computer Flea market, commercial vendors, VE sessions, technical sessions, free parking, refreshments. *TI:* 147.24. *Adm:* Free. Tables: 8-ft (inside pavilion). Keith Wilson, K0ZH, 385 S Main, St Clair, MO 63077; 636-629-7368 (days) or 636-629-1196 (eves); **n0mfd@arrl.net**.

Montana (East Glacier)—Jul 19-21, Montana State Convention. See "Coming Conventions."

†Nevada (Reno)—Jul 27, 7 AM to noon. *Spr:* Sierra Nevada ARS. International Game Technology, 9295 Prototype Dr; from US Hwy 395 on S side of Reno, take S Meadows Parkway Exit, go E, turn left on Gateway to Prototype Dr. Swapmeet, VE sessions, refreshments. *TI:* 146.61 (123.0 Hz). *Adm:* Free. Tables: Bring your own. Steve Lybarger, NU7T, 745 Aitken St, Reno, NV 89502; 775-786-6735; **nu7t@arrl.net**.

†New Jersey (Augusta)—Jul 14; set up Saturday after 6 PM; public Sunday 8 AM. *Spr:* Sussex County ARC. Sussex County Fairgrounds, Plains Rd; Rte 80 W to Rte 15, Rte 15 turns into Rte 206, turn right onto Plains Rd. Large indoor selling area in Exhibition Building, acres of tailgating ($15 per space), DXCC card checking, handicapped accessible, unlimited free parking, refreshments. *TI:* 147.3. *Adm:* $5, nonham spouses and children free. Tables: $15 (indoor, limited basis). Dan Carter, N2ERH, 8 Carter Ln, Branchville, NJ 07826; 973-948-6999; **n2erh@email.com**; **www.sussexhamfest.org**.

†New York (Alexander)—Jul 20, 6 AM to 3 PM. *Spr:* Genesee Radio Amateurs. Fireman's Recreation Center, Rte 98; I-90, go S on Rte 98 for approximately 7 miles to Fireman's Hall. Batavia Hamfest, indoor/outdoor flea market, vendors, ham radio equipment consignment table, foxhunt (10:15 AM), Chicken BBQ, camping. *TI:* 147.285. *Adm:* $5. Tables: $5. Harold Hay, W2ABQ, 5066 Clinton State Rd, No 10, Batavia, NY 14020; 716-343-2844 or 585-343-1330; **wa2abq@localnet.com**; **www.hamgate.net/~gram/**.

†New York (Frankfort/Utica)—Jul 27; set up 6-8 AM; public 8 AM to 2 PM. *Spr:* Utica ARC. Herkimer County Fairgrounds, Cemetery St; NYS Thruway to Exit 30 (Herkimer), at stoplight from exit take left and proceed over bridge, take ramp to right (NYS 5S W), proceed 5 miles to Frankfort Exit

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marked Fairgrounds. Outdoor and indoor flea market (outdoor space $2 plus admission; indoor space $3 plus admission), VE sessions (9 AM), refreshments. *TI:* 145.45. *Adm:* $4. Tables: $5, must reserve in advance. Bob Decker, AA2CU, 4 Forest Rd, Utica, NY 13501; 315-797-6614; **ktrnd@borg.com**.

†New York (Ithaca)—Aug 3, 7 AM to 2 PM. *Spr:* Tompkins County ARC. Tompkins County Airport, 72 Brown Rd; from I-81 take Cortland Exit, follow signs to Rte 13 and Ithaca, turn right on Warren Rd, follow Airport signs. Flea market, vendors, tailgating, seminars, VE sessions. *TI:* 146.97. *Adm:* advance $4, door $5. Tables: $10 (inside), $2 (per outdoor space). Doug Reid, NE2T, 105 Sheldon Rd, Ithaca, NY 14850-2501; 607-257-6066; **jdreid@lightlink.com**; **www2.compcenter.com/~tcarc/**.

New York (Williamsville)—Aug 4, Western New York Section Convention. See "Coming Conventions."

†North Carolina (Cary)—Jul 20, 8 AM to 3 PM. *Spr:* Cary ARC. Herb Young Community Center, corner of N Academy and Chapel Hill Rds; Exit 290 off I-40 towards Cary, stay on Chapel Hill Rd to N Academy (approximately 3 miles), turn left. Indoor air-conditioned swapfest, VE sessions (walk-ins accepted, registration 10 AM, testing 11 AM). *TI:* 145.39. *Adm:* advance $4, door $5. Tables: $10 (6-ft). Lee Swanson, N4AJF, 1025 Warren Ave, Cary, NC 27511; 919-467-8128; **n4ajf@arrl.net** or **n4nc@arrl.net**; **www.qsl.net/n4nc**.

†North Carolina (Waynesville)—Jul 27, 8 AM to 4 PM. *Spr:* Western Carolina ARS. Haywood County Fairgrounds, 758 Crabtree Rd, near Waynesville and Lake Junaluska; approximately 25 miles W of Asheville; I-40 to Exit 24, S on Hwy 209 for 2½ miles, hamfest on left. Covered flea market, dealers, tailgating, VE sessions (2 PM, Haywood Community College, walk-ins only), forums, free parking, refreshments. *TI:* 146.91 (91.5 Hz), 147.39, 145.19. *Adm:* advance $4, door $5. Tables: $10. Pat Kelsey, WA4OLA, 158 Brickyard Rd, Asheville, NC 28806; 828-236-0181; **wa4ola@arrl.net**; **wcars.org/hamfest/index.htm**.

†Ohio (Cairo)—Aug 4; set up Saturday 3-9 PM, Sunday 6-8 AM; public 8 AM to 2 PM. *Spr:* Northwest Ohio ARC. Cairo Community Center, SE corner of Church and Wall Sts; from US 30 take SR 65 N, go 0.3 mile to E Main (E Lincoln Hwy traffic light), turn E and proceed to Church St, turn S on Church St and go 1 block to Wall St. Outdoor flea market ($10, 12-ft x 20-ft space), handicapped parking available. *TI:* 146.67. *Adm:* $5, under 13 free. Tables: inside $10 (plus admission; includes 1 chair); additional table including 1 chair $7; additional chairs $1 each. Mike Nichols, W6MDN, 6237 Ottawa Rd, Cairo, OH 45820; 419-641-5623; **w6mdn@hotmail.com**.

†Ohio (Cincinnati)—Jul 27, 8 AM to 2 PM. *Spr:* OH-KY-IN ARS. Diamond Oaks Career Development Center, 6375 Harrison Rd; approximately 1 mile SE of Rybolt Rd/Harrison Rd Exit, from I-74 (Exit 11). Technical and ARRL forums, transmitter hunt, DXCC card checking, indoor vendors, outdoor flea market (first space free with admission, additional spaces $3 each), VE sessions (8 AM, walk-ins accepted), free parking, handicapped parking, refreshments. *TI:* 146.67, 146.925. *Adm:* advance $5, door $6, under 13 free. Tables: $10 (6-ft, indoor with electricity; no outside tables or electricity provided). Mr. Lynn Ernst, WD8JAW, 10650 Aspen Place, Union, KY 41091-7665; 859-657-6161; **wd8jaw@arrl.net**; **www.ohkyin.org**.

†Ohio (Columbus)—Aug 3, 8 AM to 3 PM. *Spr:* Voice of Aladdin ARC. Aladdin Shrine Complex, 3850 Stelzer Rd; exit I-270 at Easton Exit, turn right onto Stelzer Rd. Flea market (advance $5 per spot, door $7 per spot), lectures, foxhunt, VE sessions. *TI:* 147.24. *Adm:* advance $4, door $5. Tables: inside, advance $8, door $10. James Morton, KB8KPJ, 6070 Northgap Dr, Columbus, OH 43229-1945; 614-846-7790; **kb8kpj@cs.com**; **www.qsl.net/w8fez**.

†Ohio (Randolph)—Jul 28, 8 AM to 3 PM. *Spr:* Portage ARC. Portage County Fairgrounds, 4215 Fairgrounds Rd; between Akron and Youngstown on State Rte 44, 4 miles S of I-76. Outside flea market, indoor vendors, VE sessions, ARRL officials, free parking, handicapped parking, restaurant on grounds. *TI:* 145.39. *Adm:* advance $4, door $5. Tables: $10 (flea market $3 each). Joanne Solak, KJ3O, 9971 Diagonal Rd, Mantua, OH 44255; 330-274-8240; **ljs@config.com**; **parc.portage.oh.us**.

†Ohio (Van Wert)—Jul 21, 8 AM to 3 PM. *Spr:* Van Wert ARC. Van Wert County Fairgrounds, 1055 S Washington St; located at the S edge of Van Wert along Rte 127 S. Radio/Computer/Electronics Flea Market, free outdoor trunk sales. *TI:* 146.85. *Adm:* $5. Tables: $10 (includes 1 free ticket). Bob Barnes, WD8LPY, c/o Van Wert ARC, Box 602, Van Wert, OH 45891; 419-238-1877; **barnesrl@bright.net**; **www.w8fy.com**.

†Ohio (Wellington)—Jul 20; set up Friday eve until 11 PM, Saturday 6 AM; public 8 AM to 2 PM. *Spr:* Northern Ohio ARS. Lorain County Fairgrounds, Rte 18; Rte 58 to Rte 18 in Wellington, W on Rte 18, 1 mile to Fairgrounds entrance on S side of Rte 18. Huge outdoor flea market area ($5 per 8-ft space), ample indoor commercial space (reservations required), dealers, overnight parking for RVs and campers (no hookups), VE sessions (walk-ins, register 9-9:30 AM, exams 10 AM). *TI:* 146.7, 444.8. *Adm:* $5, under 12 free. Tables: $15 (8-ft, plus admission). Tom Porter, W8KYZ, c/o NOARSfest, Box 432, Elyria, OH 44036-0432; 440-930-9115; **n8pzd07@email.com**; **www.apk.net/noars/hamfest.htm**.

Oklahoma (Oklahoma City)—Jul 19-20, Oklahoma State Convention. See "Coming Conventions."

†Oregon (Bandon)—Jul 27; set up 8 AM (no early transactions); public 9 AM to 1 PM. *Spr:* Coos County RC. The Barn, Eleventh St SW; northbound take a left or southbound take a right off Hwy 101 at 11th St, follow signs. Flea market, vendors, VE sessions, refreshments. *TI:* 146.61, 146.52. *Adm:* $3, nonham spouses and children free. Tables: $15. Paul Andersen, K7AIA, 410 S Cammann St, Coos Bay, OR 97420; 541-888-2050; **k7aia@arrl.net**; **www.coosradioclub.org/**.

Oregon (Portland)—Aug 2-4, Pacific Northwest DX Convention. See "Coming Conventions."

†Pennsylvania (Beach Haven/Salem Township)—Jul 20; set up 6 AM; public 8 AM. *Spr:* Jonestown Mountain Repeater Assn. Beach Haven Carnival Grounds; Rte 11 between Berwick and Shickshinny. Hamfest/Computer Show, electronics, new and used equipment, tailgating, VE sessions (10 AM), balloon launch (weather permitting), handicapped accessible, refreshments. *TI:* 145.13 (77.0 Hz), 146.52. *Adm:* advance $4, door $5 (nonham spouses and children free). Tables: advance $8, door $10. Frank Wolfe, KB3ETK, 570-825-8856; **jmra@post.com**; **www.weluvntservers.com/jmra/**.

†Pennsylvania (Kimberton/Valley Forge)—Jul 14; sellers 7 AM, buyers 8 AM. *Spr:* Mid-Atlantic ARC. Kimberton Fire Company Fairgrounds, Rte 113, S of intersection with Rte 23. Hamfest/Computer Fair, Amateur Radio and computer gear dealers, electronics, demonstrations, tailgating ($6 per space, plus admission; no reserved tailgate space), refreshments. *TI:* 146.835, 443.8 (131.8 Hz). *Adm:* $6, nonham spouses and children free. Tables: with electricity $10 each (1-4 tables), $8 each (5 or more tables), plus admission (Rick Miskinis, N3AGS, 610-825-9590, **reservations@marc-radio.org**). MARC, Box 2154, Southeastern, PA 19399-2154; or call Mike Pilotti, KF3CD, 610-935-4429; **Hamfest-info@marc-radio.org**; **www.marc-radio.org/hamfest.html**.

†Pennsylvania (North Hills/Pittsburgh)—Jul 14, 8 AM to 3 PM. *Spr:* North Hills ARC. Northland Public Library, 300 Cumberland Rd, approximately 10 miles N of Pittsburgh on McKnight Rd (truck Rte 19); at 3rd traffic light after Northway Mall, turn left onto Cumberland Rd, Northland is on left at top of second hill. Free paved tailgating (for 1 vehicle only, additional spaces $5 each), handicapped accessible, free parking, refreshments. *TI:* 147.09. *Adm:* Free. Tables: $15. Joe Springer, AA3TA, 2601 Clare St, Glenshaw, PA 15116; 412-486-1681; **aa3ta@bellatlantic.net**; **www.nharc.pgh.pa.us**.

Pennsylvania (Union City)—Jul 13. Bill Young, W7RVY, 814-438-2151.

†South Dakota (Clear Lake)—Jul 28, 8 AM to 3 PM. *Spr:* Deuel County ARC. Ulven City Park, NE shore of Clear Lake; from junction of Hwys 15 and 22 go 1 mile N to Fairgrounds Dr, follow road around lake to Ulven Park. Flea market, VE sessions (registration 9 AM), camping. *TI:* 147.18 (146.2 Hz). *Adm:* $5 per person; $10 per family. Tables: Free with admission. Dan Kelly, WA0YIN, Box 742, Clear Lake, SD 57226; 605-874-2701; **dkelly@itctel.com**; **www.qsl.net/dcarc/**.

Tennessee (Cleveland)—Jul 13. Ray Myers, KG4LZB, 423-472-1660.

†Tennessee (Dayton)—Jul 20, 6 AM to noon. *Spr:* Rhea County ARS. Cedar Point Park, E of the intersection of Hwy 27 and Hwy 30. Tailgating, refreshments. *TI:* 147.39. *Adm:* Free. Larry Lyda, WA4PJP, 435 Lakeview Dr, Spring City, TN 37381; 423-365-6684; **wa4pjp@arrl.net**; **www.volstate.net/~ko4sy**.

Texas (Austin)—Aug 2-3, Texas State Convention. See "Coming Conventions."

†Texas (Denison)—Jul 20. *Spr:* Grayson County ARC. Silver Wings Club, Grayson County Airport; take Exit 65 (Hwy 691 from US Hwy 75), go W on Hwy 691 to Airport entrance, follow signs to Hamfest. VE sessions (11 AM). *TI:* 147.0. *Adm:* advance $5, door $7. Tables: advance $8, door $10. Gene Hodge, K5DPS, 211 N Brinkley, Sherman, TX 75092; 903-893-6082; **kc5aft@gte.net**; **home1.gte.net/wb5dcu/nortex00.html**.

Texas (Greenville)—Aug 3. Jenell Robertson, KD5DXW, 214-213-5920.

†Texas (Texas City)—Jul 20, 8 AM to 3 PM. *Spr:* Tidelands ARS. Doyle Convention Center, 2010 5th Ave; I-45 to Texas City (take Exit 16), go 8 miles E to 21st St, turn right, go 1 block down on left. Swap tables, major vendors, contests, VE sessions, refreshments. *TI:* 147.14. *Adm:* advance $3, door $4. Tables: $5. Joe Wileman, AA5OP, Box 73, Texas City, TX 77592; 409-945-6794; **tidelandshamfest@aol.com**; **www.tidelands.org**.

Utah (Bryce)—Jul 12-14, Rocky Mountain Division Convention. See "Coming Conventions."

†Virginia (Berryville)—Aug 4. *Spr:* Shenandoah Valley ARC. Clarke County (Ruritan) Fairgrounds; I-81 (at Winchester), Exit 315 to Rte 7 E (9 miles), bear right onto Business Rte 7, just before traffic light, Fairgrounds on left; or intersection of Rte 340 and Rte 7 in Berryville, go W approximately 2 miles, Fairgrounds on right. VE sessions. *TI:* 146.82. *Adm:* $5. Tables: $12, $15, and $20. Jane Barb, KD4IET, 2549 Senseny Rd, Berryville, VA 22611; 540-955-1745; **ibarb@visuallink.com**; **www.Vvalley.com/svarc/hamfest**.

†Washington (Longview)—Aug 10, 9 AM. *Spr:* Lower Columbia ARA. Cowlitz County Expo Center, corner of 7th Ave and Washington St; take Exit 36 or 39 off I-5, travel W, follow signs for County Fairgrounds, now known as the Expo Center. Commercial dealers (get free tables and admission), tailgating ($6 per space), APRS display, free tables for NW radio clubs. *TI:* 147.26 (114.8 Hz). *Adm:* $5. Tables: $12. Bob Morehouse, KB7ADO, 2437 Allen St, Kelso, WA 98626; 360-425-6076 (after 6 PM weekdays); **kb7ado@aol.com**; **www.qsl.net/nc7p/swapmeet.htm**.

†West Virginia (Huntington)—Aug 10, 8:30 AM to 2:30 PM. *Spr:* Tri-State ARA. Veteran's Memorial Field House, 2590 5th Ave; I-64 to Exit 11, go N (right) on Hal Greer Blvd to 5th Ave, go E (right) on 5th Ave to Field House (large facility on N side of street). Flea market, dealers, forums, VE sessions. *TI:* 146.76. *Adm:* $5. Tables: advance $8 (if received by Jul 31), $12 (after Jul 31). Philip Beckett, AB8ME, 29 Valley View Dr, Huntington, WV 25704; 304-429-6114; **ab8me@hotmail.com**.

Wisconsin (Baraboo)—Aug 10. Steve Schulze, N9UDO, 608-356-2313.

Wisconsin (Milwaukee)—Jul 26-28, Central States VHF Society Conference. See "Coming Conventions."

SILENT KEYS

It is with deep regret that we record the passing of these amateurs:

W1AXJ, Leonard Thombs, Woolwich, ME
W1GKK, George L. De Grenier, North Adams, MA
**W1HQ, E. Laird Campbell, Amarillo, TX
KA1HZH, Shirley A. Heywood, Portsmouth, RI
W1KYD, Peter F. Zakrzewski, Plainville, CT
‡W1LC, Herman R. Sanborn, Worcester, MA
K1MQI, Norma J. Shaw, Colrain, MA
K1RGM, Roger E. Mascoll, Cambridge, MA
K1SVH, Edward N. Franco, Windsor, CT
N1UGT, Daniel E. Quinn, Lynn, MA
KA1WM, Donald O'Toole, Kittery Point, ME
W1YZV, Charles A. Forte, Brighton, MA
KA1ZUK, Alfred A. Decoteau, Westfield, MA
K2AGZ, David A. Mann, Kinnelon, NJ
KA2AQM, Joseph J. Favata, Rochester, NY
K2ARD, A. W. Dunn, Seattle, WA
WA2BRW, Thomas S. Wieczorek, Saddle Brook, NJ
W2GLF, Theodore Malinowski, West Long Branch, NJ
W2GQE, William B. Byrd, Johnson City, NY
K2GXX, John Irvine, Old Tappan, NJ
WB2JSB, Robert A. Sprague, Wolcott, NY
W2KTF, Charles P. Baker, Bellmore, NY
K2PTS, Steve M. Fried, Schaumburg, IL
WB2QDF, William G. Babian, Cortlandt Manor, NY
W2TJL, Timothy J. Lynch, Bridgeport, NY
*WB2VNM, Joseph C. Pinckney, Norwich, NY
N3CFO, Victor W. Sinopoli, Willow Street, PA
NU3D, Gerald R. Gavin, Glen Burnie, MD
W3GC, John F. Williamson, Narberth, PA
WB3HIK, Marvin L. Kornblum, Phoenixville, PA
‡W3KRQ, James A. De Wald, Danville, PA
W3MQ, Harris J. Nadley, Philadelphia, PA
N3NCD, Dean C. Karstetter, Loganton, PA
W3TFP, W. E. Mitchum, Lanett, AL
W4COG, John M. Beck, Palm City, FL
ex-W4DNH, Edward C. Norman, Norfolk, VA
N4DVH, Joseph H. Harrelson, Reidsville, NC
N4EZS, John C. Camarata, Athens, TN
KI4FN, Rene E. Pittet, Tampa, FL
NS4F, Anthony B. Spirek, Boynton Beach, FL
KG4GTS, Joseph F. Kallaher, Miami, FL
WD4HDG, Ray T. Barton, Adairsville, GA
KC4KJF, Alden R. Ott, Mount Pleasant, SC
K4LQL, Ervin B. Corn, Birmingham, AL
K4PUX, Walter A. Emery, Pikeville, TN
K4QHZ, Harvey S. Tackett, Morehead, KY
ex-WB4QVJ, Samuel C. Lee, Tampa, FL
K4RE, Frank M. Kratokvil, College Park, MD
AD4UE, James D. Saffel, Darien, GA
W4UIM, Harlan Cohn, Miami, FL
K4ZOD, William T. Molloy, Macon, GA
N5BLK, Gene R. Willbanks, Pollock, LA
KC5BXZ, Arlin W. Steen, Hattiesburg, MS
K5DHX, Lawrence L. Daily, Albuquerque, NM
KC5ESL, Margie G. Carr, Jackson, MS
N5FGO, Donald D. Buchanan, Penacook, NH
W5HBI, Raymond V. Davis, San Antonio, TX
W5MCN, Leland E. Black, Norman, OK
W5MJD, Joe L. Pryor, Amarillo, TX
N5PSC, Louise B. Williams, Covington, LA
W5QJT, Milton Levy, Fredericksburg, TX
WN5Q, Alfred W. Maddock, Hondo, TX
N5WJ, Jerry C. Stroud, Cabot, AR
KA5WQY, Frank Looney, Houston, TX
W6ABV, Cedric E. Hickman, Santa Cruz, CA
K6AFL, Rowland W. Haegele, Menlo Park, CA
KN6BB, Stewart Ballinger, Visalia, CA
N6DI, Robert A. Dahlquist, Kingsburg, CA
N6EHR, Robert W. Killeen, Thousand Palms, CA
W6FSB, Homer R. Denton, St Helena, CA
K6IUK, Charles F. Connor, Lakeport, CA
*W6LLB, Perry Westrope, Montclair, CA
W6PNH, Victor M. Snow, Amity, OR
WA6RTE, Al Creel, Dana Point, CA
WB6WAA, Gerald D. Minnick, Torrance, CA
N6ZYL, Grant R. Cary, Kelseyville, CA
W6ZYR, Frank Maul, Fresno, CA
W7ALR, Robert P. Laxton, Prescott Valley, AZ
WO7C, Ruby J. Peterson, Spokane, WA
W7DAD, Jerome G. Broudy, Norman, OK
W7FCQ, Truman O. Moore, Scottsdale, AZ
W7HIT, Gilbert Johnson, Vancouver, WA
W7JPQ, Wilmont L. Hunter, Seattle, WA
N7LML, Charles E. Scarborough, Carson City, NV
K7SAJ, Keith R. Anderson, Pleasant Grove, UT
*W7TMF, Elmore D. Spencer, Medford, OR
K7VB, Frederick H. Rieck, Snowflake, AZ
*N7VOC, Patricia Bertschi, Tucson, AZ
K8BPZ, Ross Litman, Davisville, WV
WA8ERT, Galen H. Burger, Baltic, OH
K8GHX, George J. Wood, Lansing, MI
WB8HVW, John T. Moore, Roscoe, IL
W8IIS, Lawrence W. Benjamin, Middlebury, IN
*W8NR, Calvin R. Basham, Charleston, WV
WZ8Q, Bert W. Sullivan, New Carlisle, OH
KB8TVW, Gavin T. Marks, Fraser, MI
*ex-W8TWB, David C. Craycraft, Bradenton, FL
K8VTP, George H. Wetterhahn, Pontiac, MI
K8ZUW, James J. Schmidt, Williamstown, WV
W9AFZ, Keith E. Bouhl, Lake Geneva, WI
WD9CNI, Jerry Troxel, Ridge Farm, IL
KA9EIT, Patricia A. Flowers, DeKalb, IL
*K9FBI, David R. Morgan, Dale City, VA
KB9HIO, Mary R. Rose, Fort Wayne, IN
WA9HPC, Ronald D. Winn, Fort Wayne, IN
W9MXV, Sheldon A. Whitcomb, Marion, IN
WA9OCO, George A. Vanada, Newburgh, IN
K9OVZ, Eugene G. Boyes, DeKalb, IL
WS9O, Walter E. Beatty, South Bend, IN
NF9Y, Don R. Weger, Flat Rock, IL
ex-W9ZNY, Frank G. Eskuchen, Rolling Meadows, IL
N0DES, Alice Hathaway, Pueblo, CO
**W0DX/VP2VI, Robert W. Denniston, St Thomas, VI
WA0EAY, Darrell W. Stevens, Red Oak, IA
W0FNC, John H. Taylor, Buffalo Grove, IL
K0IB, Otto Bosch, Roseville, MN
KA0LCU, Harold H. Tracy, Ohio City, CO
W0PAH, William G. Schrenk, Manhattan, KS
*W0QIZ, James Patterson, Lavaca, AR
W0UYL, Joseph T. Smisek, Minnetonka, MN
I1ZAQ, Franco Pauly, Milano, Italy
LA7Y, Christian Amundsen, Oslo, Norway
*VE1OC, Aaron D. Solomon, Dartmouth, NS, Canada
VE3BFO, George "Bud" Roberts, Windsor, ON, Canada

*Life Member, ARRL
**Charter Life Member, ARRL
‡Call sign has been re-issued through the vanity call sign program.

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. 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

Kathy Capodicasa, N1GZO ♦ Silent Key Administrator

STRAYS

CLUB PROVIDING REIMBURSEMENTS FOR ARRL EMERGENCY COMMUNICATIONS COURSE

◊ The Northern Lakes Amateur Radio Club of Itasca County, Minnesota, has approved reimbursements of $40 apiece to the first 20 members who complete the ARRL's Level I Emergency Communications course. "I recently completed Level I and recognize the obvious benefit this course would have in getting our club members on the same track toward being good communicators," said club president Bruce Aiton, K0NII, who made the reimbursement recommendation to the club. "I'm pleased to say the plan was met with enthusiasm and received unanimous approval." Aiton says the course gives newer members the confidence to jump into various nets and also helps veteran ops a chance to brush up on their operating procedures. "I encourage everybody interested in net operations to take the Level I course," Aiton said. "It is a beginning for better operating procedures on all nets." To learn more, visit the ARRL Certification and Continuing Education Web page (**www.arrl.org/cce**) and the C-CE Links found there. For more information, contact Certification and Continuing Education Program Coordinator Dan Miller, K3UFG, **cce@arrl.org**.

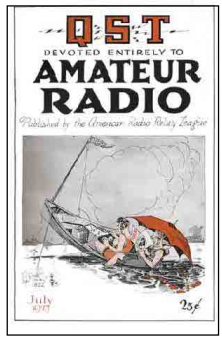
SWAN JAMBOREE 2002

◊ Swan radio net and Swan radio users will come together in Las Vegas, Nevada September 20-22 and meet fellow Swan users. Families are welcome. For information, contact Jim Singleton, WA5BDR, at 775-266-9586, or e-mail Norm, W7RXG, at **w7rxg@swan.com**. Reservation deadline July 1.

Previous • Next Strays

75, 50 AND 25 YEARS AGO

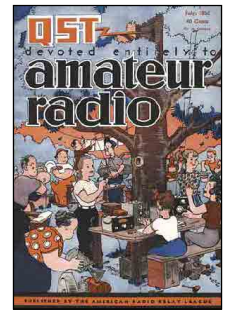
July 1927



◊ Clyde Darr, 8ZZ's, cover art shows two hams in a small rowboat—one reading *QST* and fishing with a cane pole, the other "fishing" for contacts with a battery-powered ham station. The editorial publishes a letter from 3GG, making the point that "the accomplishments of a skilled amateur are such that he has made a valuable citizen out of himself for his country."

Chester Rice presents Part 1 of "Short-Wave Radio Transmission and Its Practical Uses," with theoretical considerations and experimental results. Rice's Figure 5 summarizes radio communication in one chart—it shows the general propagation characteristics at different wavelengths over varying distances. J. Katzman tells how to build "A Bridge to Measure Capacity, Power Factor, Resistance and Inductance." In "Army Amateurs in Joint Army-Navy Maneuvers" (held in New England), David Boyden tells how hams helped with radio intercept efforts during the war play. Ross Hull tells how to build a "monitor-box" to shed "Some Light on Transmitter Tuning." Interest in the 5 meters continues to run high, with E. M. Guyer and O. C. Austin presenting the results of "An Investigation of the 5-Meter Band." W. H. Hoffman shows how he is licking the problem of transmitter drift on the higher-frequency bands, in "A Constant Frequency Transmitter." Bob Kruse presents "Another View on Crystal Control," reporting on experiments performed at 5AJJ.

July 1952



◊ The cartoon cover by "Gil" Gildersleeve, W1CJD, shows the Podunk Hollow ARC's Field Day in progress—the women are operating, fueling the generator, and performing all the radio chores, while the men pour coffee for them, hold babies, hang diapers on the clothesline, and do the dishes. The editorial tells how the original 1923 charter and by-laws, which have served the League well over the years, have finally been replaced with more up-to-date renditions of those documents. The editorial also promotes the new ARRL booklet written for prospective Novices, "*You* can be There," urging members to get copies to distribute, especially to youth groups.

Ed Tilton, W1HDQ, describes "A High-Powered Driver-Amplifier for 144 Mc." In "The Siamese Paddle," Myron Hexter, W9FKC, tells how he made a keyer paddle by mounting two J-38 keys back to back—a clever idea! Robert Metzger, W2BLL, describes "A Phase-Angle Detector for R.F. Transmission Lines," which will help with antenna matching. Dick Smith, W1FTX, gets back to fundamentals to tell about "Getting the Most into Your Antenna." Charles Schauers, W6QLV, describes his 50-watt rig, "A Quadriband Mobile Transmitter," that is small enough to mount under the car's dashboard. L. A. Moxon, G6XN, discusses "Two-Element Driven Arrays," telling how to use a simple method to adjust the phasing. In "Happenings of the Month," new ARRL President Goodwin Dosland, W0TSV, is introduced, as is the new F.C.C. Chief of the Amateur Branch, Bill Grenfell, W4GF. Charles McDowell, W4JJX, tells about "Simple VFO Construction for the 75-Meter 'Phone Band." In "A 200-Watter for 160," Bob Resconsin, W1TRF, tells about his compact 6AG7-6AG7-813 200-watt VFO rig. National Emergency Coordinator George Hart, W1NJM, reports on amateur work following the "Arkansas-Tennessee Tornados" of March 21.

July 1977

◊ The cover photo shows W0MCN tending his wind-driven generator. The editorial recognizes those who have helped with the preparations for WARC-79.

Dick Baldwin writes that "A Domestic Crisis Looms," what with FCC not having enough funding to do its job. Carl Heinen, W0MCN, gets "Watts from the Wind" to power his amateur station. Ben Saylor, K6TG, tells about "Full Break-in and RIT for the HW-8 QRP Transceiver." Doug DeMaw, W1FB, advises, "Beat the Noise with a 'Scoop Loop'." Jerry Hall, K1TD, discusses "A Simple Approach to Complex Circuits." David Sumner, K1ZZ, explains "FCC WARC Proposals, Round 2," urging amateurs to take part in the preparations. QST

Al Brogdon, W1AB ♦ Contributing Editor

W1AW Schedule

PACIFIC	MTN	CENT	EAST	MON	TUE	WED	THU	FRI
6 AM	7 AM	8 AM	9 AM		FAST CODE	SLOW CODE	FAST CODE	SLOW CODE
7 AM-1 PM	8 AM-2 PM	9 AM-3 PM	10 AM-4 PM	VISITING OPERATOR TIME (12 PM-1 PM CLOSED FOR LUNCH)				
1 PM	2 PM	3 PM	4 PM	FAST CODE	SLOW CODE	FAST CODE	SLOW CODE	FAST CODE
2 PM	3 PM	4 PM	5 PM	CODE BULLETIN				
3 PM	4 PM	5 PM	6 PM	TELEPRINTER BULLETIN				
4 PM	5 PM	6 PM	7 PM	SLOW CODE	FAST CODE	SLOW CODE	FAST CODE	SLOW CODE
5 PM	6 PM	7 PM	8 PM	CODE BULLETIN				
6 PM	7 PM	8 PM	9 PM	TELEPRINTER BULLETIN				
6:45 PM	7:45 PM	8:45 PM	9:45 PM	VOICE BULLETIN				
7 PM	8 PM	9 PM	10 PM	FAST CODE	SLOW CODE	FAST CODE	SLOW CODE	FAST CODE
8 PM	9 PM	10 PM	11 PM	CODE BULLETIN				

W1AW's schedule is at the same local time throughout the year. The schedule according to your local time will change if your local time does not have seasonal adjustments that are made at the same time as North American time changes between standard time and daylight time. From the first Sunday in April to the last Sunday in October, UTC = Eastern Time + 4 hours. For the rest of the year, UTC = Eastern Time + 5 hours.

♦ **Morse code transmissions:**
Frequencies are 1.818, 3.5815, 7.0475, 14.0475, 18.0975, 21.0675, 28.0675 and 147.555 MHz.

Slow Code = practice sent at 5, 7½, 10, 13 and 15 wpm.

Fast Code = practice sent at 35, 30, 25, 20, 15, 13 and 10 wpm.

Code practice text is from the pages of *QST*. The source is given at the beginning of each practice session and alternate speeds within each session. For example, "Text is from July 2001 *QST*, pages 9 and 81," indicates that the plain text is from the article on page 9 and mixed number/letter groups are from page 81.

Code bulletins are sent at 18 wpm.

W1AW qualifying runs are sent on the same frequencies as the Morse code transmissions. West Coast qualifying runs are transmitted on approximately 3.590 MHz by K6YR. See "Contest Corral" in this issue. At the beginning of each code practice session, the schedule for the next qualifying run is presented. Underline one minute of the highest speed you copied, certify that your copy was made without aid, and send it to ARRL for grading. Please include your name, call sign (if any) and complete mailing address. The fee structure is $10 for a certificate, and $7.50 for endorsements.

♦ **Teleprinter transmissions:**
Frequencies are 3.625, 7.095, 14.095, 18.1025, 21.095, 28.095 and 147.555 MHz. Bulletins are sent at 45.45-baud Baudot and 100-baud AMTOR, FEC Mode B. 110-baud ASCII will be sent only as time allows.

On Tuesdays and Fridays at 6:30 PM Eastern Time, Keplerian elements for many amateur satellites are sent on the regular teleprinter frequencies.

♦ **Voice transmissions:**
Frequencies are 1.855, 3.99, 7.29, 14.29, 18.16, 21.39, 28.59 and 147.555 MHz.

♦ **Miscellanea:**
On Fridays, UTC, a DX bulletin replaces the regular bulletins.

W1AW is open to visitors from 10 AM until noon and from 1 PM until 3:45 PM on Monday through Friday. FCC licensed amateurs may operate the station during that time. Be sure to bring your current FCC amateur license or a photocopy.

In a communication emergency, monitor W1AW for special bulletins as follows: voice on the hour, teleprinter at 15 minutes past the hour, and CW on the half hour.

Headquarters and W1AW are closed on New Year's Day, President's Day, Good Friday, Memorial Day, Independence Day, Labor Day, Thanksgiving and the following Friday, and Christmas Day. In 2002, Headquarters and W1AW will also be closed on July 5. QST

CONTEST CORRAL

Feedback

In the 2001 September VHF QSO Party, **KD4HIK** should be listed as Single Op Low Power from the TN section with a score of 11,286 131 QSOs and 66 multipliers.

In the 2002 Straight Key Night, **N8XMS** is missing from the list of participants.

In the 2001 ARRL International EME Competition, the report of **F6KSX** was omitted. The entry is a Single Band 10 GHz Multioperator entry with a score of 19,800, 18 QSOs and 11 multipliers. The operators included **F1EHN, F1SXC, F4UPG, F6DLA and F6ECX.**

W1AW Qualifying Runs are 10 PM EDT Monday, July 8, and 9 AM EDT Wednesday, July 24. The K6YR West Coast Qualifying Run will be at 9 PM PDT Wednesday, July 10 (10-40 wpm). Check the W1AW Schedule for details.

Abbreviations: SO—Single-Op; M2—Multiop, 2 Transmitters; MO—Multiop; MS—Multiop, Single Transmitter; MM—Multiop, Multiple Transmitters; AB—All Band; SB—Single Band; S/P/C—State/Province/DXCC Entity; HP—High Power; LP—Low Power; Entity—DXCC Entity

No contest activity on 30, 17, 12 meters. Refer to the contest Web sites for information about awards. Unless stated otherwise, regional contests only count QSOs with stations in the region. Publication deadline for Contest Corral listings is the first of the second month prior to publication.

July 1-7

Canada Day Contest, CW/Phone—sponsored by the Radio Amateurs of Canada (RAC) from 0000Z to 2359Z Jul 1. Frequencies: 160, 80, 40, 20, 15, 10, 6 and 2 meters. Categories: SOAB-HP, LP, QRP (<5 W), SOSB, MS. Exchange: VE1-9 send RS(T) and province or territory, VE0 and non-VE send RS(T) and serial number. QSO Points: VE and VE0s—10 pts, non-VE—2 pts, RAC official stations (suffix of -RAC)—20 pts. Score: QSO points × Provinces/Territories counted once per band and mode. For more information—**www.rac.ca/CANDAY.htm**. Logs due Jul 31 to **ve6sv@rac.ca** or to Radio Amateurs of Canada, 720 Belfast Rd, Ste 217, Ottawa, ON K1G 0Z5, Canada.

MI QRP July 4th CW Sprint—2300Z Jul 4 to 0300Z Jul 5 (see Jan *QST*, p 107).

Venezuelan Independence Day Contest—SSB—sponsored by the Radio Club Venezolano from 0000Z Jul 6 to 2400Z Jul 7. Frequencies: 160-10 meters. Categories: SOAB, SOSB, MS, MM. Exchange: RS(T) plus serial number. Work any station, not just YV. QSO Points: Own country—1 pt, different country, same continent—3 pts, different cont—5 pts, work any station worldwide. Score: QSO points × YV call areas + DXCC entities counted once per band. For more information—**www.radioclubvenezolano.org**. Logs due Jul 31 (Sep 15 for CW) to **haroldojr@cantv.net** or Radio Club Venezolano, Concurso, Independencia de Venezuela, PO Box 2285, Caracas 1010-A, Venezuela.

Kentucky QSO Party—CW/SSB/Digital—sponsored by the Bullitt Amateur Radio Society from 1600Z Jul 6 to 0400Z Jul 7. Frequencies: SSB 3.900, 7.200, 14.300, 21.400, 28.400 MHz; CW 3.550, 7.050, 14.050, 21.050, 28.050 MHz (digital QSOs count as CW). Categories: SSB, CW, Mixed-Mode or Rover; use of packet spotting encouraged. Rovers identify as "Rover" or "/R" and may be worked once per county. QSO points: SSB—1 pt., CW/Digital—2 pts, Rovers—2 pts both modes. Score: KY stations—QSO Points × SPC + KY4KY and W4KBR (count VE provinces, KL7/KH6 count as states), non-KY stations—QSO Points × KY counties plus KY4KY and W4KBR, multipliers count only once. For more information—**www.qsl.net/ky4ky/kyqsopartyrules.html**. Logs due 14 days after the contest to **KC4WQ@mis.net** or KY QSO Party, c/o KC4WQ,1229 Zoneton Rd, Shepherdsville, KY 40165.

July 13-14

IARU HF World Championship, 1200Z Jul 13 to 1200Z Jul 14 (see Apr *QST*, p 96). Note that **WRTC-2002** runs during this contest—see **www.wrtc2002.org** for more information.

FISTS Summer Sprint, CW, 1700Z to **2100Z** Jul 13 (see Feb *QST*, p 109, for FISTS Sprint rules). Logs due 30 days after the contest to **W8PIG@yahoo.com** or Dan Shepherd, N8IE, 1900 Pittsfield St, Kettering, OH 45420.

QRP ARCI Summer Homebrew Sprint—CW—2000Z to 2400Z Jul 14 (see Dec *QST*, p 98 for ARCI Sprint rules). Add the following bonus points for each band on which homebrew gear is used: 2000 pts for homebrew transmitter, 3000 pts for homebrew receiver, 5000 pts for homebrew transceiver.

July 20-21

Pacific 160 Meter Contest, CW/SSB—Sponsored by the Wireless Institute of Australia, 0700-2330Z Jul 20. Work P2, ZL and VK only between 1825-1850 kHz. Categories: SO and SWL. Exchange: RS(T) and serial number. QSO points: 5 pts/QSO. Score: QSO points × P2, ZL and VK call areas. To avoid QRM between modes stations are asked to operate in 15 minute blocks—CW on the hour and hour + 30 minutes; SSB on the hour + 15 minutes and hour + 45 minutes. Logs due Aug 31 to **vk3did@eudoramail.com** or to Ian Godsil VK3DID, 57 Nepean Hwy, Aspendale 3195, Australia.

AGCW QRP Summer Contest—CW—sponsored by Arbeitsgemeinschaft Telegrafie (AGCW-DL) from 1500Z Jul 20 to 1500Z Jul 21, operate up to 9 hours. Frequencies: 80-10 meters. Categories: VLP (<1 W), QRP (<5 W), MP (<25 W), QRO. Exchange: RST + serial number + category. QSO Points: QRP-VLP, QRP-QRP, VLP-QRP and VLP-VLP—3 pts, all others 2 pts, no QRO-QRO. Score: QSO Points × DXCC entities counted once per band. For more information—**www.agcw.de**. Logs due Aug 31 to **qrp-test@agcw.de** or to Lutz Noack, DL4DRA, Hochschulstr. 30/702, D-01069, Dresden, Germany.

North American RTTY QSO Party, sponsored by the *National Contest Journal* from 1800Z Jul 20 to 0600Z Jul 21. Frequencies: 80-10 meters. Categories SOAB and M2, SO stations operate 10 hours max. with off times of at least 30 min. Exchange: Name and SPC. QSO Points: 1 pt/QSO. Score is QSO Points × SPC (NA entities only) counted once per band. DX QSOs count for QSO points, but not as multipliers. For more information—**www.ncjweb.com**. Logs due 30 days after the contest to **naqp@ewarg.org** (same address for team registration) or Jay Townsend, WS7I, PO Box 644, Spokane, WA 99210.

CQC Great Colorado Gold Rush—CW—sponsored by the Colorado QRP Club, from 2000Z to 2200Z Jul 21. Frequencies: 20 meters only. Categories: Wire, Vertical, Beam, or Portable. Exchange: RST + SPC + Category + CQC member number or power output. Work stations up to three times during the contest, with at least 30 min between QSOs. QSO points: 1st QSO—3 pts, 2nd QSO—2 pts, 3rd QSO—1pt. Score: QSO points × SPC + CQC members. For more information—**www.cqc.org/contests/gold2002.htm**. Logs due 30 days after the contest to **contest@cqc.org** or to Goldrush, c/o CQC, PO Box 371883, Denver, CO 80237-1883.

CQ WW VHF Contest, all modes—sponsored by *CQ* Magazine from 1800Z Jul 20—2100Z Jul 21. Frequencies: 50 and 144 MHz bands, except 146.52 MHz (and other national simplex calling frequencies) and repeater frequencies. Please avoid the DX windows and international calling frequencies. Categories: SOAB, SOSB, MM, Rover, QRP (<25 W). Exchange: Call sign and four-digit Maidenhead grid. Work Rover stations in each grid. QSO points: 50 MHz—1 pt, 144 MHz—2 pts. Score: QSO points × Grids counted once per band. (Rovers count grids from each activated grid.) For more information—**www.cq-amateur-radio.com/VHFRUl02.pdf**. Logs due Sep 1 to **cqvhf@cqww.com** or to CQ VHF Contest, 25 Newbridge Rd, Hicksville, NY 11801.

Georgia QSO Party—CW/SSB—sponsored by SECC and SEDXC, in two periods, from 1800Z Jul 20 to 0359Z Jul 21 and 1400Z Jul 21 to 2359Z Jul 21, no time limit. Frequencies: 80-10 meters. Categories: SOAB, MS, MM, Rover, Novice/Tech, all categories can be HP, LP (<150 W), or QRP (<5 W). Rovers must activate at least 6 GA counties. Mobiles and portables must move the complete station including antennas at least 100 yards to change counties—no county line operations. Work stations once per band and per mode. Exchange RST and GA county or SPC. QSO Points: SSB—1 pt., CW—2 pts. Score: QSO Points × GA counties (GA station use states and provinces) counted once per mode. For more information—**secc.contesting.com**. Logs due Aug 22 to **jshort@mindspring.com** or to Jeff Short, KD3UC, 5106 Cypress Ct, Alpharetta, GA 30005.

W/VE Islands Contest, CW/Digital/SSB—sponsored by the US Islands Awards Program from 1500Z Jul 20 to 2359Z Jul 21. Frequencies: 160-10 meters. Categories: W/VE-phone, W/VE-CW/Digital, as Non-Island, Island, or Island Rover, plus DX and SWL. Exchange: RS(T), SPC, and island name and USI number (CISA no. for VE islands). Non-island stations work island stations only. Work stations once per island per mode. QSO points: island—5 pts, non-island—1 pt. Score: QSO points × states + provinces. For more information—**www.eng.mu.edu/~usi/**. Logs due Aug 31 to **ad4lx@arrl.net** or to Ray Phelps, AD4LX, 1440 SW 53 Terr, Cape Coral, FL 33914.

Six Club Six Meter Sprint—CW/SSB—sponsored by the Six Club, 2300Z Jul 20 to 0400Z Jul 21. Frequencies: 50 MHz. Exchange: 4-digit Maidenhead grid. QSO points: own country—1 pt, diff country—2 pts (KH6 and KL7 count as countries). Score: QSO points × grids. For more information—**6mt.com/contest.htm**. Logs due Jul 22 to **sixclub@6mt.com** or to Six Club, PO Box 307, Hatfield, AR 71945.

July 27-28

Venezuelan Independence Day Contest, CW 0000Z, Jul 27 to 2400Z, Jul 28 (see Jul 1-7 contests).

RSGB Islands-On-The-Air Contest, CW/SSB—sponsored by the RSGB from 1200Z Jul 27 to 1200Z Jul 28. Frequencies: 80-10 meters. Categories: SOAB (SSB/CW/Mixed), SOAB-Limited (SSB/CW/Mixed, 12 hours max.), MS-Island. Exchange: RS(T), serial no. and IOTA reference number. QSO Points: own country or IOTA—2 pts, other IOTA—15 pts, other countries—5 pts. Score: QSO points × IOTA refs, counted once per band and mode. For more information—**www.rsgb.org**. Logs due Aug 31 to **iota.contest.logs@rsgb.org.uk** or to RSGB IOTA Contest, PO Box 9, Potters Bar, Herts EN6 3RH, England.

H. Ward Silver, N0AX ♦ 22916 107th Ave SW, Vashon, WA 98070 ♦ n0ax@arrl.org

SPECIAL EVENTS

Pittsburgh, PA: Butler County Amateur Radio Public Service Group, K3PSG. 1300-2100Z **Jun 22**. 3rd Annual Wings Over Pittsburgh—911 Airlift Wing. 28.440 21.340 14.240 7.240. Certificate. BCARPSG, PO Box 141, Prospect, PA 16052.

Los Alamos, NM: Los Alamos Amateur Radio Club, W5PDO. 1800-2200Z **Jun 29**. Earthwatch Institute's Student Challenge Awards Program from Fenton Hill Observatory. 28.450 21.350 14.250. Certificate. Don Casperson, AA5PA, 984 Nambe Loop, Los Alamos, NM 87544.

Duncan, OK: Chisholm Trail Amateur Radio Club, WD5IYF. 1600Z **Jun 29**-0001Z **Jun 30**. 110th Birthday of Duncan, OK. 146.730 28.410 21.325 14.255. QSL. Wade Norris, K5WPN, 1214 S 9th St, Duncan, OK 73533.

Midland, TX: Midland Amateur Radio Club, W5G. 0000Z-2359Z **Jul 2**. Hometown celebration of President George W. Bush's Birthday. 10-40 meters. Certificate. Midland Amateur Radio Club, PO Box 4401, Midland, TX 79704. **www.w5qgg.org**.

Beecher, IL: Hams of Monee, W9B. 1600-2300Z **Jul 4**. Second Annual Welcome Home Beecher Train Depot. 28.340 14.270 14.040 7.270. Certificate. Gene Backlin, 26811 Greenbriar Dr, Monee, IL 60449.

Hannibal, MO: Western Illinois ARC and Hannibal ARC, W0MTL. 1300-2300Z **Jul 4**. National Tom Sawyer Days (America's Hometown). 28.450 21.325 14.250 7.250. Certificate. Robert Mitchell, 816 Long Dr, Quincy, IL 62301.

Thompson, OH: Lake County Amateur Radio Association, N8GB. 1400Z **Jul 4**-0100Z **Jul 5**. Happy Birthday America on the 4th of July. 28.455 7.248. Certificate. George R. Bair, 386 Cedarbrook Dr, Painesville, OH 44077.

Van Wert, OH: Van Wert Amateur Radio Club, W8FY. 1500-2300Z **Jul 4**-1500-2300Z **Jul 7**. Club's 50th Anniversary, plus Little Red Caboose from the Van Wert Museum for Holiday at Home on the 4th. 28.470 14.270 7.270 7.045. Certificate. VWARC, PO Box 602, Van Wert, OH 45891.

Arlington, TX: Kontak Family Radio Club, W8KPJ. 1500-2300Z **Jul 6**. Honoring 50 years as a ham, Marv Kontak, N5MK, ex-KI5TL, W8KPJ. 28.450 21.350 14.250 7.250. QSL. Marv Kontak, 2820 Yorkshire St, Irving, TX 75061-6468.

Smithville, TN: DeKalb County Amateur Radio Club, KC4GUG. 1500-2200Z **Jul 6**. 31st Annual Smithville Fiddlers Jamboree & Crafts Festival. 28.425 21.335 14.280 7.275. QSL. Wm Freddy Curtis, DeKalb Co ARC, 288 Dogwood Cr, Smithville, TN 37166-2712. **www.geocities.com/kg4bto1/darc_warc.htm**.

Traverse City, MI: Cherryland Amateur Radio Club, W8TCM. 2000-0000Z **Jul 6** and 2000-0000Z **Jul 7**. National Cherry Festival. 14.260 7.260. QSL. Dave Erlewein, N8CN, 2738 Ra-Wa-Si, Traverse City, MI 49684.

DeSmet, SD: Lake Area Radio Klub and Huron Amateur Radio Club, W0WTN. 1600Z **Jul 6**-2200Z **Jul 7**. During the annual Little House on the Prairie Pageant. 28.465 21.365 14.265 7.265. Certificate. LARK, PO Box 642, Watertown, SD 57201.

Laurel, MD: Laurel Maryland ARC, W3LRC. 1200-2400Z **Jul 7**. Laurel's 25th July 4 celebration/ Volunteer Fire Squad's 100th anniversary/Rescue Squad's 50th anniversary. 147.54 7.200 3.920. Certificate. Jim Cross, WI3N, PO Box 1259, Laurel, MD 20707.

Austin, TX: Naturist Amateur Radio Club, NU5DE. 0000Z **Jul 8**-2400Z **Jul 14**. 27th Annual North American Nude Awareness Celebration. 28.465 21.365 14.265 7.265. QSL. Naturist Amateur Radio Club, PO Box 200812, Austin, TX 78720-0812.

Milwaukee, WI: West Allis Radio Amateur Club, W9C. 1800Z **Jul 10**-0200Z **Jul 13**. The Great Circus Parade Showgrounds. 145.170 28.400 14.240 7.240. Certificate. Richard Wood, S46 W22328 Tansdale Rd, Waukesha, WI 53189.

Bryce Canyon, UT: Utah Hamfest, K7H. 1800Z **Jul 12**-0000Z **Jul 14**. ARRL Rocky Mountain Convention and Hamfest 2002 Special Event Station. 28.460 21.260 14.260 7.260. QSL. Dan Farwell, W8EQA, 95 N 2300 E, St George, UT 98790-2437.

Trenton, MI: Motor City Radio Club, W8MRM. 1400Z **Jul 12**-2359Z **Jul 14**. 27th Annual Trenton Mid-Summer Festival. 14.244 14.044 7.244 7.044. Certificate. Motor City Radio Club, W8MRM, Trenton Mid-Summer Festival Station, PO Box 337, Wyandotte, MI 48192.

Mansfield, OH: Ohio Hammin Sams, Chapter 71, K8OBD. 1200-2100Z **Jul 13**. Commemorating 35 years of the Ohio Good Sam Club. 14.250. Certificate. L. Miracle, 7560 Malibu Dr, Parma, OH 44130.

Fulton, NY: Amateurs of Oswego County, NB2M. 1300Z **Jul 13**-2200Z **Jul 14**. Canal Heritage Days—100th Anniversary of Fulton, NY. 28.350 21.350 18.130 14.250. Certificate. Brian Mathews, KA2AON, 82 Peat Bed Rd, Hannibal, NY 13074.

Lake Chelan, WA: Lake Chelan Radio Club, W7H. 0000Z **Jul 13**-2359Z **Jul 14**. Commemorating the World Hang Gliding Championship. 28.450 21.325 14.275 7.250 3.875. QSL. Lake Chelan Radio Club, PO Box 1445, Lake Chelan, WA 98816-1445. SASE for QSL; $4 for certificate. **www.lakechelanradioclub.com/index.html**.

Westwego, LA: Westside Amateur Radio Club, Inc, W5ABD. 1500Z **Jul 13**-0300Z **Jul 14**. 50th Anniversary of the Westside Amateur Radio Club. 28.450 21.350 14.250 7.250. Certificate. Westside Amateur Radio Club, Inc, PO Box 2322, Marrero, LA 70073-2322. **www.qsl.net/w5abd**.

Des Moines, IA: REACT International, K0I. 1800Z **Jul 14**-1800Z **Jul 18**. REACT International 40th Anniversary. 21.350 14.325. Certificate. Joe Hoepfner, 1612 Scoggin St, Cedar Falls, IA 50613.

Fremont, MI: Newaygo County, W1B. 1500Z **Jul 16**-2100Z **Jul 20**. 12th Annual Baby Food Festival. 21.350 14.260 7.245 3.857. Certificate. Shawn Gibson, KC8LGD, 3377 West 80th St, Newaygo, MI 49337.

Bradford, PA: McKean County Amateur Radio Club, W3VV. 1400-2200Z **Jul 20**. 70th Anniversary of the founding of Zippo Lighter. 28.460 14.260 7.260 3.960. QSL. MCARC, PO Box 107, Bradford, PA 16701. **www.mcarc.net**.

Minneapolis, MN: Gopher Amateur Radio Club, W0YC. 1600-2000Z **Jul 20**. University of Minnesota 2002 NCAA Hockey Championship. 28.450 21.350 14.250. Certificate. Gopher Amateur Radio Club, 73 Shepherd Laboratories, 100 Union St, Minneapolis, MN 55455.

Sandusky, OH: Sandusky Radio Experimental League, W8LBZ. 0000-2400Z **Jul 20**. Commemorating the 70 year anniversary of the club. 28.350 21.330 14.340. Certificate. SREL, 2909 W Perkins Ave, Sandusky, OH 44870.

Wapakoneta, OH: Reservoir Amateur Radio Association, K8QYL. 1300-2000Z **Jul 20**. Celebrating the Neil Armstrong Festival of Flight. 28.400 21.360 14.250 7.260. Certificate. Michael Harvey, 316 Columbia St, St Marys, OH 45885.

Quincy, MA: USS *Salem* Radio Club, K1USN. 0000Z **Jul 20**-2359Z **Jul 21**. 6th Annual Worldwide Museum Ships Weekend. 21.360 18.160 14.260 14.039. QSL. Harold Pugh, K1RV, 78 Temple St, Abington, MA 02351. Certificate available for 10 contacts or more. **www.qsl.net/k1usn**.

Warren, OH: Warren Amateur Radio Association, W8P. 1400Z **Jul 20**-2000Z **Aug 3**. 3rd Annual Packard Museum Car Show. 28.450 14.260 7.260 3.860. Certificate. WARA, PO Box 809, Warren, OH 44482.

Akron, OH: Cuyahoga Falls Amateur Radio Club, W8D. 2000Z **Jul 22**-2000Z **Jul 27**. 65th Running of the All-American Soap Box Derby. 28.340 21.275 14.250 7.275. Certificate. Cuyahoga Falls Amateur Radio Club, PO Box 614, Cuyahoga Falls, OH 44222.

Oshkosh, WI: Fox Cities Amateur Radio Club, W9ZL. 1400Z **Jul 26**-2200Z **Jul 28**. Experimental Aviation Association's Airventure Fly-In, from Lone Rock Flight Service Station, Pioneer Airport. 28.343 21.343 14.243 7.243. Certificate. Wayne Pennings, WD9FLJ, 913 N Mason, Appleton, WI 54914.

Marcella, NJ: Nutley Amateur Radio Society, W2GLQ. 1500-2200Z **Jul 27**. New Jersey Camp for the Blind. General class portions of 10-40 meter bands. QSL. Nutley ARS, American Red Cross Building, 169 Chestnut St, Nutley, NJ 07110.

Memphis, TN: Delta Amateur Radio Club, W4BS. 1500-2200Z **Jul 27**. Annual Mid-South Rally of Antique Military Vehicle Collectors. 28.345 21.245 14.245 7.345. QSL. DARC, PO Box 750482, Memphis, TN 38175-0482.

Cleveland, OH: Woodchuck ARC, KC8KLU. 1700-2400Z **Jul 28**. North Coast on the Air. 442.125 145.310 14.275 14.260. Certificate. WARC-NCOTA, PO Box 29202, Parma, OH 44129.

Fairplay, CO: Park County Radio Club, AB0PC. 1600-2100Z **Jul 28**. 54th Annual World Championship Pack Burro Race. 28.465 21.375 14.307 7.250. Certificate. PCRC, PO Box 16, Bailey, CO 80421.

Clearfield, PA: Quad County ARC, N3QC. 2200Z **Jul 29**-0100Z **Jul 30**. 142nd Clearfield County Fair and Parade. 146.865 28.440 14.240 7.240. QSL. Quad County ARC, RR1 Box 493, Morrisdale, PA 16858.

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.

Special Events Announcements: For items to be listed in this column, you must be an Amateur Radio club, and use the ARRL Special Events Listing Form. Copies of this form are available via Internet (**info@arrl.org**), or for an SASE (send to Special Requests, ARRL, 225 Main St, Newington, CT 06111, and write "Special Events Form" in the lower left-hand corner). You can also submit your special event information on-line at **www.arrl.org/contests/spevform.html**. Submissions must be received by ARRL HQ no later than the 1st of the second month preceding the publication date; that is, a special event listing for **Sep** *QST* would have to be received by **Jul 1**. Submissions may be mailed (Attn: Maty Weinberg), faxed (860-594-0259) or e-mailed (**events@arrl.org**) to ARRL HQ. QST

Maty Weinberg, KB1EIB ♦ Special Events ♦ maty@arrl.org

By Steve Ewald, WV1X

2001 Simulated Emergency Test Results

Looking Back on 2001

By Jim Oberhofer, KN6PE
EC, Cupertino ARES
(Santa Clara Valley Section)

This is a portion of their "2001 State of CARES" report that CARES submitted to the Cupertino City Manager and other served agencies. It highlights the necessity of having a trained team of radio amateurs that is ready to provide service whenever needed.

2001 marked Cupertino ARS' (CARES) 15th year of service to the City of Cupertino (California) and the community. This was also a year of significant challenges for our nation, California, and CARES. In particular, two events will clearly differentiate this year from all others:

In January 2001, rolling blackouts threatened to disrupt how Californians live and work. Cupertino was directly impacted when homes, schools and businesses lost power. Early during the emergency, it was predicted to be a very dismal year for power shortages.

The events of September 11, 2001, redefined the threats that all Americans face and a magnitude of the disasters that could result when they are realized. In the end, we developed a new appreciation for life and freedom, and realized that the risk of their loss gave us the strength to rally in their defense.

The mission of the Cupertino Amateur Radio Emergency Service is to maintain and train Amateur Radio volunteers capable of providing professional emergency communications, increasing the City's emergency response effectiveness, and speeding the recovery of our community. The events of last year turned out to be a sobering test of our training, readiness, and commitment to our mission.

CARES shifted to Increased Readiness Operations on three occasions in preparation for a formal activation. Our members also looked for and found ways to improve their personal readiness with the goal of making a difference in their community. In the end, CARES response was professional and overwhelming.

CARES also ended 2001 operating in

CHET HALLBERG, K0TCB

The Greater Kansas City Chapter of the American Red Cross parked its Family Service Vehicle (FSV) at the International Brotherhood of Electrical Workers union hall during the Jackson County (Missouri) ARES simulated emergency test. This is where the Red Cross would establish a job headquarters in case of a real disaster. For this exercise, the Red Cross permitted the vehicle to be used as a communications center. The FSV is equipped with an AC generator, Red Cross low-band VHF radio, and other communications equipment.

2001 SET Top Ten

Section	*Points*
ARES Activity	
North Carolina	8131
Michigan	3982
Oregon	2714
South Carolina	2088
Mississippi	2039
Ohio	1969
Arkansas	1646

Section	*Points*
Western New York	1608
North Texas	1564
Maine	1361
Section/Local Nets	
North Carolina	4247
Ohio	2123
Michigan	1662

Section	*Points*
Western New York	852
Mississippi	675
Oregon	652
Eastern New York	405
Kansas	346
Indiana	292
Western Pennsylvania	239

SET Scorecard

The points for ARES activity were awarded in the following manner:

Category	*Points*
A) Number of amateurs participating	2 (each)
B) Number of new amateurs (licensed since 1998)	3 (each)
C) Number of formal third party messages originated on behalf of served agencies	1 (each)
D) Tactical communication was conducted on behalf of served agencies: (<0.5 hour, 5 points; 0.5-1 hour, 10 points; >1 hour, 20 points)	
E) Number of stations on emergency power during test	2 (each)
F) Number of emergency-powered repeaters used in test	10 (each)
G) Dual membership in ARES and RACES is encouraged	10
H) Liaison was maintained with an NTS section/local net	10
I) Digital modes were used during test	10
J) Number of different agencies for which communication was provided.	5 (each)
K) Number of communities in which agencies were contacted	10 (each)
L) Press release was submitted	10

The points for net activity were awarded in the following manner:

A) Total number of messages handled.	1 (each)
B) Number of different stations participating	2 (each)
C) Number of different stations checking-in on emergency power	2 (each)
D) Number of new amateurs (licensed since 1998) in test	3 (each)
E) Number of net control stations	5 (each)
F) Number of different stations performing NTS liaison	5 (each)

a state of Increased Readiness. The standing Operational Objectives are (1) support the City as required, and (2) increase our personal capabilities as much as possible. Activities to accomplish these objectives are still in progress.

An SET in Northern New York

By C. Paul Jefferson, KB2RKW
EC, Clinton County

The Clinton County New York ARES unit participated in the annual ARRL SET on Sunday, October 7, 2001. It was conducted under the direction of Alvah Haggett, KB2LML, District Emergency Coordinator (DEC) for Clinton, Franklin and Essex counties. The events of September 11, 2001, altered the scenario planned for the SET. The DEC requested that Clinton County ARES team operate from the Clinton County Emergency Operations Center (EOC) Radio Room. Operating from that location would provide the team with invaluable familiarization, training and operating experience.

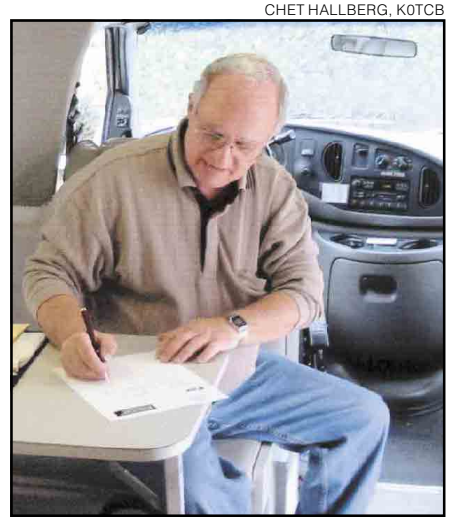
Thirty minutes prior to the start of the SET, American military forces began retaliatory strikes against terrorist targets in Afghanistan. Because of the importance of the SET and Amateur Radio support provided after the terrorist attacks, the decision was made to proceed.

In summarizing the lessons learned from the 2001 SET, KB2RKW wrote, "Training amateurs in emergency procedures in the middle of a disaster is neither the time nor the place to receive on-the-job training. Thanks to the assistance and cooperation of the CVARC, RACES and Clinton County Emergency Services, Amateur Radio training and equipment has improved dramatically in Clinton County. One day at a time."

The Story from Story County, Iowa

ARRL Emergency Coordinator Dan Case, KB0JUL, reported, "This was the first time in several years that Story County ARES participated in a formal SET exercise. As Story County ARES has become more organized over the past several months, participation in the SET was identified as an activity to increase the awareness in ARES and enable ARES participants to test procedures and gain experience operating in an emergency operation."

CHET HALLBERG, K0TCB



Larry Widener, KA0YJE, Logistics and Communications Program Manager, is shown writing a message from inside the Family Service Vehicle during the exercise that included 25 radio amateurs and 44 Red Cross volunteers and staff members.

"A simulated 911 outage due to a lightning strike at the dispatch center was the scenario used to activate ARES," Dan explained. "Amateur Radio operators were requested to report to the fire station in each community in Story County to pass potential emergency traffic between community and the Story County Emergency Operations Center at the courthouse in Nevada."

"Over thirty radio amateurs participated in the event, which was much higher than expected", Dan said. "The majority had capabilities to go mobile, with most having emergency power. In fact, enough radio operators participated that we were able to also test communications for other key facilities." Those included medical centers, city police stations, Iowa Department of Transportation, and Story County Red Cross.

Polk County, Oregon, in Statewide Test

Polk County EC Claude Smith, N7BUD, described their test scenario: "The statewide exercise was based upon an 8.9 magnitude earthquake centered west of Netarts, Oregon, with severe collateral damage within the Willamette Valley.

"Since the emergency covered a large area, HF nets were established. Polk County ARES provided the relay to link incoming 40 meter-traffic and the State Emergency Operations Center. To facilitate this traffic and avoid over-taxing local VHF voice repeaters, this traffic was converted to VHF packet mode for transmittal to State Operations. Plans were also made to support the 75-meter net operator located southwest of Dallas (Oregon)."

Following the test, Claude made this evaluation: "All present believed this to be a very successful exercise with considerable traffic communicated locally and statewide."

Looking Ahead to 2002

Thanks to everyone for taking part in the annual Simulated Emergency Test! The above reports are just a few that were received and are representative of the efforts by radio amateurs across the country who are active in public service through radio clubs, ARES, RACES, SKYWARN, the ARRL National Traffic System and other public service groups and individual operators. Those ARES groups and nets from around the country that reported scores for SET-related activity in 2001 are noted in the following results.

October 5 and 6, 2002, is the main weekend for this year's SET. Please contact your local ARRL Field Organization leaders to find out specific dates, times, and places for the Simulated Emergency Test in your area.

ARES Activity

Area	Reporter	Points	Section Points
Atlantic Division			
Eastern Pennsylvania			**961**
Montgomery Co	W3ZQN	745	
Monroe Co	N3ZQJ	216	
Maryland-DC			**114**
Anne Arundel	N3QXW	114	
Northern New York			**293**
Clinton Co	KB2RKW	157	
Franklin Co	WA2RP	136	
Southern New Jersey			**112**
Section wide	KC2HGG	112	
Western New York			**1608**
Otsego Co	N2NQH	476	
Onondaga Co	WA2PUU	303	
Chenango Co	K2DAR	201	
Broome Co	KB2YEN	195	
Tioga Co	W7GUN	150	
Herkimer Co	N2ZWO	122	
Delaware Co	WB2JOW	103	
Oneida/Madison Co	N2UC	58	
Western Pennsylvania			**829**
Erie Co	N3HPR	460	
Blair Co	KA3EJV	194	
Fayette Co	K3FQI	175	
Central Division			
Illinois			**773**
Lake Co	K9DRW	368	
Schaumburg	N9MYC	180	
DeKalb Co	W9ICU	171	
Champaign	N9XDC	54	
Indiana			**634**
Whittey Co	WB9UNL	266	
Pike Co	WB9NCE	153	
Fourth District	WB9VQK	78	
Vigo Co	N9YNF	90	
Watertown	WA9KCU	47	
Wisconsin			**370**
Adams Co	WA9SZH	128	
Door Co	K9KJM	128	
Calumet Co	KN9P	114	
Delta Division			
Arkansas			**1646**
Cross Co	W5WPN	402	
Benton Co	W5JSR	294	
Statewide RACES	W5AUU	235	
Little Rock	W5RXU	175	
Boone Co	N5QYC	117	
Washington Co	K1ARK	117	
Baxter Co	N5LH	102	
Packet network	AC5DK	80	
Pope Co	W5RZ	76	
Hempstead Co	W5LZQ	48	
Mississippi			**2039**
Jones Co	N5NQ	326	
Central MS	AB5WF	246	
Lowndes Co	KD5FUO	206	
Metro Jackson	W5PES	189	
Jackson Co	NN5AF	188	
E Central MS	WB5OCD	183	
Lamar Co	KC5TYL	147	
Oktibbeha	AC5MR	134	
NW MS	KD5CKP	121	
SW Mississippi	N5ZNT	119	
Attala Co	KB5ZEA	92	
Clay Co	W0CIR	88	
Tennessee			**471**
McMinn Co	KC4KUZ	278	

Area	Reporter	Points	Section Points
Blount Co	KF4QVI	193	
Great Lakes Division			
Kentucky			**168**
Fayette Co	N4MOM	168	
Michigan			**3982**
Alcona Co	W8SZ	489	
Chippewa Co	N8AJT	400	
Monroe Co	KB8AIZ	345	
Shelby Co	N8KZL	255	
Iosco Co	KB8ZYY	242	
Oakland Co	N8USP	218	
Leelanau Co	W8WFN	213	
Jackson Co	N8RDP	209	
District 3	N8EXV	202	
Ottawa Co	KC8GDH	199	
Ontonagon Co	W8UXG	196	
Ionia Co	N8ZMT	187	
Benzie Co	K8BTE	176	
Lenawee Co	K8YZA	153	
St Clair Co	WD8DUV	131	
Midland Co	KB8QWQ	117	
Allen Co	W8TY	82	
Mecosta Co	W8PET	74	
Muskingum Co	N8LJF	52	
Branch Co	W8SST	42	
Ohio			**1969**
Clermont Co	K8EC	303	
Stark Co	WD8AYE	288	
Seneca Co	KC8BUJ	196	
Erie Co	K8HLH	188	
Jefferson Co	WA8DRL	164	
Summit Co	K8EIO	152	
Greene Co	W8LLY	144	
Van Wert Co	WB8YIH	117	
Adams Co	N8HIA	89	
Montgomery Co	KI8O	89	
Allen Co	W8TY	82	
Wyandot	N8WLB	76	
Preble Co	N8XP	73	
District 4	K8NSA	8	
Hudson Division			
Eastern New York			**227**
Dutchess Co	KC2DAA	227	
New York City/Long Island			**142**
Southhold	N2QHV	142	
Northern New Jersey			**173**
The Chathams	W2UH	130	
Englewood	W2CC	43	
Midwest Division			
Iowa			**346**
Story Co	KB0JUL	346	
Kansas			**1128**
Johnson Co #1	KB0WEQ	358	
Johnson Co #2	KB0WEQ	322	
Dist 3, Zone 39	K0FJ	115	
Leavenworth Co	KC0CIG	172	
Zone 19A	N0OBM	132	
Jefferson Co	KB0KBE	29	
Missouri			**447**
St Charles Co	KB3HF	210	
Jackson Co	K0UAA	169	
District D	K0PHI	68	
Nebraska			**48**
Sarpy Co	N0POM	48	
New England Division			
Eastern Massachusetts			**125**
Cape Cod	WQ1O	125	
Maine			**1361**
Cumberland Co	K1GAX	929	
Hancock Co	W1KRP	150	
Piscataquis Co	WA1JMM	145	
Washington Co	N1EP	137	
New Hampshire			**998**
Belknap Co	N1RCQ	144	
MARS Liaison	K1BBQ	128	
NHOEM	N1HKO	121	
Strafford Co	K1BD	121	
Capital Area	N1SKZ	116	
S Grafton	N1HAC	87	
E Rockingham	KA1GJU	86	
W Rockingham	K1WX	78	
Manchester	W1ZIZ	76	
Coos	KH6GR	41	
Western Massachusetts			**12**
Franklin Co	N1SCC	12	

Area	Reporter	Points	Section Points
Northwestern Division			
Eastern Washington			**962**
Spokane Co	KI7QT	723	
Whitman Co	KD7EWV	239	
Montana			**242**
Missoula Co	K7DER	122	
Central Montana	W7MBV	120	
Oregon			**2714**
Clackamas Co	KA7IJK	571	
State EOC	W0SPK	290	
Washington Co	N7OGM	268	
Polk Co # 2	N7BUD	184	
Multnomah Co	KK7UE	163	
Portland	KD7EYM	163	
Polk Co #3	N7BUD	163	
Umatilla	N7ZHG	161	
Curry Co	KA7GNK	148	
Klamath Co	K7DDI	144	
Linn Co	WB9HZT	134	
Polk Co #1	N7BUD	122	
Clatsop Co	N7DAL	105	
Benton Co	KC7QAE	98	
Western Washington			**181**
Pacific Co (Dist 4)	KB7L	122	
Thurston Co	KB7DFL	59	
Pacific Division			
Nevada			**214**
West Central (Dist.4)	KA7AJQ	214	
Sacramento Valley			**70**
Siskiyou Co	KE6MZT	70	
Santa Clara Valley			**172**
Cupertino	KN6PE	172	
Roanoke Division			
North Carolina			**8131**
NC Central Branch	K4NSM	2122	
Pitt Co	K4ROK	1528	
Guilford Co	KE4IAF	999	
District 12	WD4PIC	481	
Piedmont	KB1G	476	
Charlotte SKYWARN	WB4HRR	389	
Gaston Co	KC4YCT	294	
Jackson Co	AD4XV	294	
NC Eastern Branch	WA4MOK	286	
Nash Co	KE4LXW	255	
Alamance Co	N4MIO	229	
Forsyth Co	WA4NOT	175	
Wilson Co	KF4OFP	172	
Durham Co	KB4WGA	111	
Cabarrus Co	KA4ATT	101	
Craven Co	N8UTY	89	
Union Co	WA3RTC	74	
Area 3	KBOHX	56	
Virginia			**800**
Virginia Beach	WA4TCJ	247	
Williamsburg	KC4CMR	115	
Newport News	N4ZBV	102	
York Co	WB4UHC	97	
Gloucester Co	KE4NBX	93	
Area 12	W4KMA	75	
Portsmouth	K5SFM	71	
South Carolina			**2088**
Statewide	K8AFP	2088	
West Virginia			**675**
Fayette Co	N8BJY	191	
Raleigh Co	W4PQK	149	
Upshur Co	WD8PAD	133	
Summers Co	KB8WSK	102	
Marshall Co	N8FQN	100	
Rocky Mountain Division			
Colorado			**262**
Pueblo, Huerfano Co	KJ0T	154	
District 25	KI0KY	108	
Wyoming			**149**
Statewide	WE7MA	149	
Southeastern Division			
Georgia			**463**
Carroll Co	K4DEY	222	
Rockdale Co	KC4ELV	145	
Long Co	KF4ZUR	96	
Northern Florida			**239**
Orlando	W1WLH	239	

Area	Reporter	Points	Section Points
Southwestern Division			
Arizona			**508**
Pima Co	WB7NXH	508	
Orange			**1025**
Hemet, San Jacinto	N6PLV	382	
Riverside Co	N7PPF	365	
Coachella Valley	KC6WLF	278	
Santa Barbara			**120**
Ventura, SLO, S Barb.	KD6HHG	120	
West Gulf Division			
North Texas			**1564**
Wichita Co	W5GPO	1155	
District 6	KA5OZC	215	
Nacogdoches Co	KK5BE	194	
Oklahoma			**129**
Kay Co	KD5FX	129	
South Texas			**724**
Travis Co #1	W5LHC	332	
Nueces Co	WA5MPA	232	
Travis Co #2	W5LHC	160	
West Texas			**197**
Brewster Co	N5DO	197	

Section/Local Nets

Area/Net Name	Net Mgr	Points	Section Points
Atlantic Division			
Maryland-DC			**167**
Maryland Slow Net	KC3Y	87	
Anne Arundel	N3QXW	80	
Western New York			**852**
OCTEN	KA2ZNZ	362	
Western District Net	KA2IWK	278	
NY State/Early	WB2QIX	146	
CARES	K2DAR	66	
Western Pennsylvania			**239**
Erie Co	N3HPR	125	
Blair ARES	KA3EJV	114	
Central Division			
Illinois			**142**
Lake Co	K9DRW	142	
Indiana			**292**
Whitley Co	WB9UNL	126	
Wabash Valley	N9YNF	70	
Pike Co ARC	WB9NCE	58	
IN Traffic Net	WB9VQK	38	
Wisconsin			**149**
Door Co	K9KJM	85	
CARES	KN9P	64	
Delta Division			
Arkansas			**199**
Cross Co	W5WPN	177	
Hempstead/Nevada Co	W5LZQ	22	
Mississippi			**675**
MSPN	WJ5K	315	
Jackson Co	WM5W	142	
Attala Co	KC5YCH	96	
JARC	AB5WF	72	
Capital Area	K5XU	50	
Tennessee			**198**
Blount Co	KF4QVI	198	
Great Lakes Division			
Michigan			**1662**
Monroe Co	KB8AIZ	215	
SEMTN	WI8K	195	
Jackson Co	N8RDP	142	
Oakland Co	N8USP	140	
Macomb Co	WD8R	136	
Benzie Co	K8BTE	114	
Ontonagon Co	W8UXG	106	
Lenawee Co	K8KIC	94	
Leelanau Co	W8WFN	78	
Midland Co	KB8QWQ	77	
District 2	K8MFK	76	
Iosco Co	KB8ZYY	74	
Ottawa Co	KC8GDH	72	
MI ACS	W8RNQ	56	
BRAARC	W8PET	50	
Branch Co	KB8ZGX	37	
Ohio			**2123**
OSSBN	N8IO	1094	

Area/Net Name	Net Mgr	Points	Section Points
COTN	N8RRB	489	
Shelby Co	NO8C	319	
NW Ohio	N8TNV	121	
Burning River Net	KF8FE	54	
Wyandot Co	KC8NWJ	46	
Hudson Division			
Eastern New York			**405**
Hudson Valley	N2JBA	405	
New York City-Long Island			**118**
Peconic ARC	N2QHV	118	
Northern New Jersey			**41**
NJPN	W2CC	41	
Midwest Division			
Kansas			**346**
KS SSB, Phone	N0KFS	230	
Wheat St Wireless	KB0DTI	47	
Trojan ARES	K0FJ	35	
Marais de Cygnes	KB0DTI	25	
Jefferson Co	KB0KBE	9	
Missouri			**141**
Jackson Co	K0UAA	141	
New England Division			
Maine			**149**
Sunrise Co ARES	N1EP	77	
PARC On Air	WA1JMM	72	
New Hampshire			**209**
Strafford Co	K1BD	71	
CAARES	K1CFI	61	
Upper Valley	N1HAC	47	
Manchester	W1ZIZ	30	
Vermont			**236**
VPTN	KB1DSB	144	
CVTN	KB1DSB	92	
Northwestern Division			
Oregon			**652**
Dist 4 ARES	N7DRM	225	
Multnomah Co	KK7UE	113	
HEART	W7ENK	112	
Klamath Co	KK7XO	84	
Curry Co	KA7GNK	67	
UMESRO	KC7KI	51	
Pacific Division			
Nevada			**181**
Douglas Co	KA7AJQ	181	
Roanoke Division			
North Carolina			**4247**
Four Co ARES	KC4WXA	1006	
Guiford Co	KG4IYH	699	
Triad SKYWARN	KB1G	521	
Tar Heel Emerg Net	K4CWZ	431	
Forsyth Co	WA4NOT	429	
Charlotte SKYWARN	WB4HRR	309	
Lincoln Co	KG4AWP	226	
Gaston Co	KC4YOT	224	
Nash ARES	KE4LXW	130	
WARA	KF4OFP	72	
Stanly Co ARES	W4KMA	70	
Union Co	WA3RTC	68	
Cabarrus /Rowan Co	KA4ATT	62	
Virginia			**135**
Newport News	N4ZBV	73	
Williamsburg	KC4CMR	43	
PARES	K5SFM	19	
West Virginia			**86**
Marshall Co	N8FQN	49	
Summers Co	KB8WSK	37	
Rocky Mountain Division			
Colorado			**74**
Pueblo, Huerfano Co	KJ0T	74	
Southwestern Division			
Orange			**196**
Riverside Co RACES	N7PPF	100	
Hospital Drill	K6TQM	96	
West Gulf Division			
North Texas			**236**
Nac Amateur Net	KK5BE	136	
IrvingRACES/ARES	KA5OZC	100	
West Texas			**91**
Big Bend	WA5ROE	91	

2002 ARRL August UHF Contest Rules

1. Object: To work as many amateur stations in as many 2 degrees by 1 degree grids as possible using authorized amateur frequencies above 222 MHz and all authorized modes of emission.

2. Date and Contest Period: First full weekend of August. Begins 1800 UTC Saturday, ends 1800 UTC Sunday (**August 3-4, 2002**). Entrants may use as much of this time as they wish.

3. Entry Categories:

3.1. Single Operator—Low Power

3.2. Single Operator—High Power

3.3. Rover.

3.3. Multioperator.

4. Exchange: Grid locator (see April 1994 *QST*, page 86 or **www.arrl.org/locate/gridinfo.html**).

4.1. Exchange of signal report is optional.

5. Scoring:

5.1. QSO points:

5.1.1. Count three points for each complete 222- or 432-MHz QSO.

5.1.2. Count six points for each complete 902- or 1296-MHz QSO.

5.1.3. Count 12 points for each 2.3-GHz (or higher) QSO.

5.2. Multiplier: The total number of different grids worked per band. Each 2 degree by 1 degree grid counts as one multiplier on each band it is worked.

5.3. Final score: Multiply the total number of QSO points from all bands operated by the total number of multipliers for final score. Example: W1AW works W3CCX in FN20 on 222, 432 and 1296 MHz. This gives W1AW 12 QSO points (3 + 3 + 6) and also three grid multipliers. Final score is 12 QSO points × 3 multipliers, or 36.

5.4. Rovers only: The final score consists of the total number of QSO points from all bands times the sum of unique multipliers (grids) worked per band (regardless of which grid they were made in) plus one additional multiplier for every grid activated (made a contact from).

5.4.1. Rovers are listed in the contest score listings under the Division from which the most QSOs were made.

6. Miscellaneous:

6.1. Partial QSOs do not count. Both call signs, full exchanges and acknowledgment must be sent and received.

6.2. A transmitter, receiver or antenna used to contact one or more stations under one call sign may not be used subsequently during the contest period under any other call sign (with the exception of family stations). The intent of this rule is to accommodate family members who must share a rig, not to manufacture artificial contacts.

6.3. All equipment and antennas used by entrants must be owned and operated by amateurs. Use of non-amateur owned gear is not prohibited, but use of such equipment places the entrant in a separate category, ineligible for awards.

6.4. Contacts made by re-transmitting either or both stations, whether by satellite or terrestrial means, are prohibited. Frequencies regularly occupied by a repeater in a locality may not be used for contest work, even if the repeater is turned off.

7. Awards: Certificates will be awarded in the following categories:

7.1. Top single-operator High and Low power score in each ARRL Division.

7.2. Top single operator High and Low power score on each band (222, 432, 902, 1296 and 2304-and-up categories) in each ARRL Division where significant effort or competition is evidenced. (Note: Since the highest score per band will be the award winner for that band, an entrant may win a certificate with additional single-band achievement stickers.) For example, if K2SMN has the highest single-operator multi-band score in the Atlantic Division and his 432-MHz score is higher than any other Atlantic Division single-operator's, he will earn both a certificate for being the single-operator Division leader and an endorsement sticker for 432 MHz.

7.3. Top multioperator score in each ARRL Division where significant effort or competition is evidenced. (Multioperator entries are not eligible for single-band awards.)

Additional certificates may be awarded where significant effort or competition is evidenced.

8. Submission: Deadline for submission of entries for this contest is **Tuesday, September 3, 2002**. Logs and properly completed summary sheets should either be e-mailed to **AugustUHF@arrl.org** or should be mailed August UHF Contest, ARRL, 225 Main St, Newington, CT 06111. Entries postmarked or e-mail dated after the deadline will only be considered checklogs. If log files are generated using a computer, the entrant is to submit the proper log files to the Contest Branch in acceptable electronic format.

9. Other: See "General Rules for All ARRL Contests" and "General Rules for ARRL Contests on Bands above 50 MHz (VHF)," November 2001 *QST*. These are also available at the Contest Branch Web site at **www.arrl.org/contests**. Questions regarding this contest should be e-mailed to **contests@arrl.org**. Only use the contest-name e-mail for submission of entries. All contest forms and rules may be downloaded at **www.arrl.org/contests/forms/**. QST

STRAYS

WRTC2002 UPDATE

◊ The World Radiosport Team Championship—the so-called "Olympics of Amateur Radio"—will be held July 13-14 in Finland. The competing teams will be working within the IARU Hf World Championship Contest, running their own serious competition by using special OJ call signs. We invite everyone to participate in this event.

Worked All WRTC2002—"Worked All New OJ prefixes"

OJ1-OJ8 prefixes activated for the first time

The WRTC2002 teams will be using special 2×1 type of call signs with special OJ1-OJ8 prefixes (e.g., OJ1A). The OJ1-OJ8 prefixes are activated for the first time in history to honor WRTC2002—the Olympics of Amateur Radio contesting in Finland.

Worked All WRTC2002—Rules for non-WRTC2002 stations

The same WRTC2002 station can be worked once on CW and once on SSB on each band. Each correct two-way CW or SSB QSO with a WRTC2002 station counts 1 point. A duplicate QSO on same band and mode counts 0 points.

Score = total sum of QSO points

Logs

Only e-mail logs (ASCII) are accepted. The preferred log formats are Cabrillo, CT.ALL and TR.DAT. The "Early Bird" logs should be submitted by 1800 UTC on Sunday, July 14, 2002. Regular latest submission date is July 31, 2002. All logs should be sent via e-mail to **logs@wrtc2002.org**. Note: The subject field of the e-mail should contain *your* contest call sign, e.g., "Subject: WRTC2002 OH2AAA"

Request for stations working the IARU 2002 contest

The WRTC2002 organizing committee kindly asks stations working the IARU 2002 contest to also send their electronic IARU contest logs to the WRTC2002 contest committee to be used as reference data within the official WRTC2002 log-checking procedure. The committee guarantees that these logs will be used only for cross-checking the WRTC2002 team championship.

Awards and Categories

The following "Worked all WRTC2002" awards will be issued based on the above contest rules: Worked All WRTC2002 awards; Worked all WRTC2002—Single op CW; Worked all WRTC2002—Single op SSB; Worked all WRTC2002—Single op Mixed; Worked all WRTC2002—Multi op CW; Worked all WRTC2002—Multi op SSB; Worked all WRTC2002—Multi op Mixed; Worked all WRTC2002—IARU HQ stations.

Special Plaques

Worked all WRTC2002 Stations—CW; Worked all WRTC2002 Stations—SSB; Worked all WRTC2002 Stations—Mixed.

For more on WRTC 2002, see Patton, "The Evolution of the World Radiosport Team Championship," *QST*, May 2002, pp 60-62, and for more on the IARU HF World Chapionship, see *QST*, Apr 2002, p 96. QST

Previous • Next Strays

By Kelly Taylor, VE4XT

2001 ARRL November Phone Sweepstakes Results

When you're as far north as Wasilla, Alaska, the northern lights are unlike anything you've ever seen. If you see them the third weekend in November, best just pull up a chair, sit back and watch the show. There'll be no SS glory for you.

That's the reality that Dan, KL7Y, and John, WA2GO, have faced year in and year out: at least one day of Phone or CW SS destroyed by aurora. Yet, they dreamed what magic was possible if the aurora could stay away. They found out in the 2001 running of the ARRL November Phone Sweepstakes.

John, an East Coast transplant, has been in the chair for SS at Dan's station for four years. Mostly, it's been a lot of shouting into (and at) the borealis. But last year, the solar winds abated and for one brief 21-hour period, the ether cooperated: 1187 QSOs, 189,920 points, First Place and an all-time record in the Single Operator QRP category.

It wasn't easy. "I think I lost my frequency in about three minutes because nobody could hear me through the QRM," Worthington says. So he moved up the band. In a few minutes, he figures, someone spotted him. "I ran fast and furious until QRM got me again, and I kept on moving around to find clear spots."

Finishing a solid second in the always challenging category in 2001 was Dan, K7MM, with a score of 125,112. The Top Ten also includes N7VY, WA8ZBT, N4RZ, K0FRP, N0UR, N3UR, N8WL and AD8J

Meanwhile, at a place that would have seemed a world away to Worthington, Rich, KE3Q, was looking out his window not at snow but at the lush tropical countryside of Puerto Rico. The warm Caribbean sun may not have needed any help from the Ameritrons, but they were glowing anyway. With Rich at the controls, WP3R went into 2001 SS having been the class of high power for three Sweepstakes running, including an all-time high-power record in 2000. 2001 became victory No. 4 but the record from 2000 would stand.

Owned by Jim, WA3FET, and borrowing the call sign of local operator Angel, WP3R commands a dominance in SS not unlike Michael Jordan's basketball supremacy in his glory days.

WP3R won high power phone, as it did high power CW. Rich is on an impressive streak but he realizes it could end any year. "I have a large target printed on me, but the same is true of anyone who wins from anywhere," he says.

Aiming for that target is No. 2 Mike, KH6ND, op at KH6J. Asked if WP3R is unbeatable, Gibson was resolute in his answer. "No. I plan on beating him just as soon as I can make it to the Caribbean! The geographical advantage there is just too great," Mike says, affirming Rich's unparalleled ability to stay high. W7WA, K5TR, K6NA (N6ED op), K4XS, W0SD (WD0T), K6LL, VE7CC and N5RZ round out the top 10.

The QRP record wasn't the only one to fall, either. W6YL's (KX7M, op) 207,040 points would have been a School Club record except for one thing: W1YK beat him. Both the No. 1 W1YK (222,080 points) and No. 2 W6YL eclipsed the previous mark set by W9PU (180,480) in 2000.

The aurora is a thing of beauty to behold. Fortunately for John, WA2GO, he was able to operate the contest aurora-free from Dan, KL7Y's shack to a new Single Operator QRP record.

Top Ten—Phone

Single Operator, QRP

KL7Y (WA2GO,op)	189,920
K7MM	125,112
N7VY	110,880
WA8ZBT	93,132
N4RZ	89,428
K0FRP	81,744
N0UR	79,790
N3UR	67,032
N8WL	65,832
AD8J	65,676

Single Operator, Low Power

K7RI	260,800
K6LA	238,560
K7QQ	232,960
VE5SF	227,680
VE4XT	219,200
K5KA	215,040
WQ5W	211,840
VE4GV	204,960
WN0G	204,640
K6RO	197,760

Single Operator, High Power

WP3R (KE3Q,op)	389,920
KH6J (@KH7R) (KH6ND,op)	349,920
W7WA	337,280
K5TR	331,360
K6NA (N6ED,op)	315,200
K4XS	312,000
W0SD (WD0T,op)	309,120
K6LL	306,400
VE7CC	304,800
N5RZ	304,000

Single Operator, Unlimited

K7BV	287,200
WB1GQR	260,000
W4MR (AA4NC,op)	254,880
N5ZC	251,520
W2CS (@N4AF)	248,160
K6XX	245,120
K4MA	232,160
N2BJ	228,960
W4NF	225,600
W9BS	212,960

Multi-Operator

WP2Z	340,800
K9NS	308,160
W7GG	293,440
W5NN	285,920
KT0R	282,720
KI1G	271,840
W6EEN	269,760
W6YX	267,200
K0DG	262,400
W7CT	261,280

School Club

W1YK	222,080
W6YL (KX7M,op)	207,040
N9UC (WO9S,op)	172,000
W5YM	154,720
W7ASU	153,734
W2CXM	153,600
KG4PDS	117,920
W6PRB (AG6RT,op)	92,160
KC7KFF	78,848
W5OCC	61,950

Affiliated Club Competition

	Score	Entries
Unlimited Category		
Society of Midwest Contesters	22,071,024	342
Northern California Contest Club	17,793,244	159
Potomac Valley Radio Club	15,870,516	184
Minnesota Wireless Assn	6,134,332	73
Yankee Clipper Contest Club	5,607,890	83
Medium Category		
Mad River Radio Club	4,852,478	47
Southern California Contest Club	4,211,952	32
North Texas Contest Club	3,340,178	32
Florida Contest Group	2,839,816	28
Central Texas DX and Contest Club	2,518,386	21
Tennessee Contest Group	2,480,570	27
Frankford Radio Club	2,267,264	25
Western Washington DX Club	2,215,536	18
South East Contest Club	1,930,030	25
Kentucky Contest Group	1,390,450	23
Motor City Radio Club	1,201,298	29
Willamette Valley DX Club	1,113,110	11
Rochester (NY) DX Assn	1,032,764	16
Grand Mesa Contesters of Colorado	994,540	15
Oklahoma DX Assn	760,092	10
North Coast Contesters	675,320	10
AK-SAR-BEN	673,414	9
Lincoln ARC	615,224	7
Texas DX Society	589,252	7
Order of Boiled Owls of New York	566,502	6
Rip Van Winkle ARS	469,310	11
Kansas City DX Club	465,144	4
South Jersey Radio Assn	408,492	13
Schenectady ARA	398,108	8
Central Arizona DX Assn	326,784	6
Western New York DX Assn	323,928	6
Salt City DX Assn	317,386	3
Southern California DX Club	295,098	6
Radio Amateurs of Northern Vermont	293,552	4
Woodbridge Wireless	288,838	9
Bergen ARA	274,856	12
Northern Arizona DX Assn	273,422	6
Mile High DX Assn	217,170	3
Hazel Park ARC	209,256	10
West Park Radiops	201,070	6
Carolina DX Assn	191,332	3
Magnolia DX Assn	176,744	3
Central Michigan ARC	169,886	5
Radio Club of Tacoma	133,756	4
Virgin Islands ARC	110,068	3
Poughkeepsie ARC	102,720	3
Local Category		
River City Contesters	1,418,052	10
Hudson Valley Contesters and DXers	1,061,400	10
Raytown ARC	495,040	3
Eastern Connecticut ARA	430,528	7
Northern New York Contest Club	263,286	5
St Clair Amateur Radio Club	254,480	4
Sussex County ARC	240,148	4
Loudoun ARG	232,022	8
County Line ARA	199,798	3
Meriden ARC	179,352	6
Harvard Wireless	158,770	4
Redmond Top Key Contest Club	150,868	5
Sterling Park ARC	115,160	8
West Essex ARC	81,540	3
10-70 Repeater Assn	65,716	4
Motorola ARC - K4MOT	57,408	4
Poinsettia ARC	41,988	3
Old Barney ARC	35,486	3
Northwest ARC	8,004	3

2001 Phone Sweepstakes Sponsored Plaque Winners

The following is the list winners of Overall and Division-level sponsored plaques. The complete list of Division Winners for the ARRL 2001 November Phone Sweepstakes may be found on-line at **www.arrl.org/members-only/contests/**. Category winners in Divisions where a plaque is not sponsored may purchase the plaque for $60 by contacting the ARRL Contest Department at **contests@arrl.org** or by phone at 860-594-0295.

Division	*Plaque Category*	*Winner*	*Plaque Sponsor*
Overall	Single Operator High Power Phone	WP3R	Carl Cook, AI6V
Overall	Single Operator Low Power Phone	K7RI	Ken Adams, K5KA
Overall	Single Operator QRP Phone	KL7Y	QRP Amateur Radio Club Intl
Overall	Single Operator Unlimited Phone	K7BV	ARRL Contest Branch
Overall	School Club College Division Phone	W1YK	Mark Smith KD4JLC Memorial
Overall	Multioperator Phone	WP2Z	Central Texas DX & Contest Club
Atlantic	Single Operator High Power Phone	K3MM	North Coast Contesters
Atlantic	Single Operator Low Power Phone	W3SY	Potomac Valley Radio Club
Atlantic	Multioperator Phone	K2NNY	Mark Sickmeyer, KB3GJ Memorial
Central	Single Operator High Power Phone	WB9Z	Society of Midwest Contesters
Central	Single Operator Low Power Phone	AJ9C	Society of Midwest Contesters
Central	Single Operator QRP Phone	W9DZ	Don Haney, W9WW
Central	Single Operator Unlimited Phone	N2BJ	Society of Midwest Contesters
Central	Multioperator Phone	K9NS	Don Haney, W9WW
Dakota	Single Operator High Power Phone	W0SD	Minnesota Wireless Association
Dakota	Single Operator Low Power Phone	AC0W	Minnesota Wireless Association
Dakota	Single Operator QRP Phone	N0UR	Tod Olson, K0TO
Dakota	Single Operator Unlimited Phone	K0AD	Minnesota Wireless Association
Dakota	Multioperator Phone	KT0R	In Memory of Jim Dokmo, K0FVF by MWA
Great Lakes	Single Operator High Power Phone	K8DX	North Coast Contesters
Great Lakes	Single Operator Low Power Phone	W8MJ	Mad River Radio Club
Hudson	Single Operator Low Power Phone	KD2RD	Bob Langston, W2ENY
Midwest	Single Operator High Power Phone	K4VX	Bill Hendrick, N0AC
Midwest	Single Operator Low Power Phone	WN0G	Society of Midwest Contesters
Midwest	Single Operator Unlimited Phone	NU0Q	Kirk Pengelly, N0KK
New England	Single Operator QRP Phone	W1PG	QRP Club of New England
New England	Single Operator Unlimited Phone	WB1GQR	William Lawless Jr, K1UQ
Pacific	Single Operator High Power Phone	KH6J	Rich Hallman N7TR
Pacific	Single Operator Low Power Phone	N6NF	Jim Hollenback, NK6L
Roanoke	Single Operator High Power Phone	WW4M	Potomac Valley Radio Club
Roanoke	Single Operator QRP Phone	N5FPW	NoVa QRP Group
Roanoke	Multioperator Phone	W4DC	Shenandoah Valley ARC
Rocky Mountain	Single Operator Unlimited Phone	W7UT	Michael Mellinger, WA0SXV
Rocky Mountain	Multioperator Phone	W7CT	Terry Dillahunty, K7TD
Southeastern	Single Operator QRP Phone	N4KG	Frank Merceret, NA4CW
Southwestern	Single Operator QRP Phone	N7VY	Ray and Donna Day, N6HE and N6HTH
Southwestern	Single Operator Unlimited Phone	W6TK	Bob Brehm, AK6R
West Gulf	Single Operator Low Power Phone	K5KA	Ralph Gator Bowen, N5RZ
West Gulf	Multioperator Phone	W5NN	Oklahoma DX Association
Canada	Single Operator QRP Phone	VE6JY	Frank Merceret, NA4CW

Go big or go home? Well, it depends on where home is. If you're like Western Washington's Tom, K7RI, or Rex, K7QQ, going big means going up against section mate and high-power third place contestant W7WA. Not a pleasant prospect. So both stayed in low power. Tom, K7RI, won handily over Ken, K6LA, while Rex was third.

"I choose LP so maybe I can win a class for the toughest section in SS, western Washington, with W7WA in HP, K7RI LP, and N0AX QRP. It can really be a challenge to even make an effort from here and we are all located within 10 miles of each other with me in the middle," Rex says. "It's hell when one can come in third (overall) and not win their section." Sam, VE5SF, took fourth, while Kelly, VE4XT, took the reins of VE4YU and claimed fifth. VE4GV, K5KA, WQ5W, WN0G and K6RO also finished Top 10.

Multiop in SS just never seems to work. Inevitably, the top single ops beat the multis by large margins. Yet it's a popular category for some ops who don't have 24 hours or for ops who want to bring in some new blood to radiosport. The winners hail from Michigan and Minnesota but played in St Croix. Stan, K8MJZ and Eric, KT8O, piloted WP2Z to an impressive 340,800 points. This year there were 178 multiops manned by a multitude of operators. Not too distantly second was K9NS with 308,160 points. W7GG, W5NN, KT0R, KI1G, W6EEN, W6YX, K0DG and W7CT round out the Top 10. Only 66 QSOs separated sixth and tenth places.

In unlimited, ex-*NCJ* editor Dennis, K7BV, eked out a relatively narrow victory over East Coast stalwart WB1GQR, with Mitch, W1SJ, operating. They were followed byW4MR (AA4NC, op), N5ZC, W2CS (N4AF, op), K6XX, K4MA, N2BJ, W4NF and W9BS.

Club competitions in contests are a bit like political leadership conventions: the competitor who sells the most party memberships wins. So it should surprise nobody that the Society of Midwest Contesters, emerged victorious. With 342 entries, SMC rocketed to the top of the Unlimited Category with 22,071,024 points. The Northern California Contest Club was second with 17.8 million points. But with only 159 entries, NCCC participants logged an impressive average of 111,907 points each. SMC's average was 64,535 by comparison. The Potomac Valley Radio Club was third with 15.97 million points (84,491 avg).

The Mad River Radio Club won the Medium Club Category with a score of 4.8 million (47 entries, 103,244 points). The Southern California Contest Club (4.2 million, 32 entries, 131,424 avg) finished second. Their main competition came from the North Texas Contest club (3.3 million, 32 entries, 104,381 avg) and the Florida Contest Group (2.8 million, 28 entries and 101,422 avg). A total of forty clubs entered into the Medium Category in 2001.

The River City Contesters (1.4 million, 10 entries, 141,805 avg) won the Local Category. Finishing second in what has become another strong rivalry was the Hudson Valley Contesters and DXers (1 million, 10 entries, 106,100 avg). Raytown ARC finished third, even though only 3 entries submitted entrants (495k, 165,013 avg). Nineteen clubs met the eligibility requirements for the Local Category.

Scores

Within each Section, scores are listed in descending order by entry category with single ops followed by multioperators. Line scores list call sign, score QSOs, multipliers, hours, class (Q = QRP, A = Low Power, B = High Power, U = Single Unlimited, M = Multioperator, S = School Club).

1

Connecticut

W1WEF	122,400	765	80	B
AA1GW	20,216	133	76	B
W1AW (K3UFG,op)	8,904	106	42	B
W1JQ	98,118	621	79	A
W1EQ	74,536	484	77	A
WV1M	73,944	468	79	A
WA1LJD	55,616	352	79	A
W1AZT	53,878	341	79	A
NX1Q	44,352	288	77	A
W1CTN	43,920	305	72	A
WA1ZEK	37,908	243	78	A
W1AMF	31,800	212	75	A
W1SAM	24,034	197	61	A
KE1LI	22,936	188	61	A
NT1N	17,490	159	55	A
W1DMM	12,932	122	53	A
KE1AU	10,800	108	50	A
K1KAV	9,504	108	44	A
WB1CZX	242	11	11	A
W1PG	43,650	291	75	Q
N1JEO	20,160	168	60	Q
W1QK	182,332	1154	79	U
N1NQD	99,360	621	80	U
K1JN	59,680	373	80	U
N1MD	10,608	102	52	U
N1XS (@KB1H)	99,520	622	80	M
W1NRG	50,560	320	79	M
KB1GTB (N4QX,op)	34,086	247	69	S

Eastern Massachusetts

KD1EA	15,400	140	55	B
K1VUT	174,116	1102	79	A
N1DD	165,120	1032	80	A
WG1Z	99,200	620	80	A
K1HT	79,632	504	79	A
K1YA	75,840	480	79	A
KC1SQ	59,436	381	78	A
W1TI	41,040	270	76	A
K1VU	26,196	177	74	A
K1BFD	23,546	193	61	A
WA1OLV	23,010	195	59	A
K1TOC	11,160	124	45	A
KA1YDH	9,936	108	46	A
KY1B	6,912	72	48	A
KR1B	6,232	76	41	A
KB1GDQ	1,776	37	24	A
K1GU	1,558	41	19	A
K1RC	39,270	255	77	Q
K1JE	41,440	259	80	U
K1TW	18,492	134	69	U
KV1R	17,500	125	70	U
W1SMH (KA1EZH,KA1JWP,KA1EIV, AE1X,W1FNM,ops)	43,362	297	73	M
W1AF (N1QZY,KC8RXT,KU4ONC,ops)	37,392	246	76	M
AG1C (+KB1HJW)	18,054	153	59	M
N1OEF (+logger)	13,312	128	52	M

Maine

NY1S	106,860	685	78	A
N1FQ	59,444	386	77	A
K3UQC	58,904	398	74	A
N1LW	57,876	371	78	A
N1NUA	48,160	301	80	A
K1JB	11,330	103	55	A
N1YIS	2,280	38	30	A

New Hampshire

WT1M (N1HKO,op)	173,010	1095	79	B
AF1T	148,320	927	80	B
WB1ADR	132,756	851	78	B
K1DG	39,360	246	80	B
W1VE	38,148	289	66	B
K1TR	44,700	298	75	A
W1DAD	31,720	244	65	A
AC1J	26,220	190	69	A
KA1OEO	24,000	200	60	A
N1NKC	22,650	151	75	A
W1LZ	10,272	107	48	A
K1MOM	5,600	70	40	A
AE1D	600	20	15	A
W1XV	22,378	167	67	Q
WA1ZYX	17,608	142	62	U
KC1F (+N1AU)	60,480	378	80	M

Rhode Island

K1VSJ	64,160	401	80	A
AB1BX	28,304	244	58	A
K2MN	24,192	192	63	A
KB1LN	15,688	106	74	A
K4IJK	2,808	54	26	A
N1HRA	39,312	252	78	U
KI1G (+WF1B,K1SD)	271,840	1699	80	M
W1OP	84,552	542	78	M

Vermont

N1BCL	98,560	640	77	B
W1ECH	51,520	322	80	A
K1HD	12,012	77	78	A
WB1GQR	260,000	1625	80	U
N1ZUK	11,858	77	77	U
WX1O (+W1UT)	59,200	370	80	M

Western Massachusetts

K1BZM	65,570	415	79	B
W1TO	63,040	394	80	B
KZ1M	187,200	1170	80	A
K5ZD	63,360	396	80	A
N1FUS	27,264	192	71	A
K1KBU	10,000	100	50	A
W1YK (N1PFC,N2YHK,ops)	222,080	1388	80	S

2

Eastern New York

N2SA	123,040	769	80	B
KB2SSZ	37,008	257	72	B
N2LH	24,054	211	57	B
K2UF	127,980	810	79	A
W2ENY	117,120	732	80	A
K2ETA	61,754	401	77	A
KA2VBI	54,054	351	77	A
N2MTG	47,180	337	70	A
W2UI	44,352	288	77	A
WD2K	31,008	204	76	A
WB2KHE	28,810	215	67	A
N2XPW	27,336	201	68	A
K2RI	22,050	175	63	A
KC2AGM	18,900	135	70	A
K2RAD	16,240	140	58	A
WK2S	16,072	164	49	A
KF2SC	14,012	113	62	A
W2WC	13,108	113	58	A
N2UZQ	9,078	89	51	A
WE2G	9,804	86	57	Q
W2IX	7,392	112	33	Q
KG2H	390	15	13	Q
KE2DX	162,080	1013	80	U
W2GDJ	18,352	124	74	U
KY2J (+NA2N,WA2JQK)	237,760	1486	80	M
N2POS (+N2PEN,WB2FOB,KF2WA, KC2BJC,KC2BYL,N2EKU)	164,640	1029	80	M
N2SQW (KC2DMI)	82,560	516	80	M
KB2KDY (+KB2SRC)	27,470	205	67	M

Northern New Jersey

W2RQ	78,880	493	80	B
K2AF	27,018	171	79	B
WX2T	23,680	148	80	B
K4BNC	12,800	80	80	B
W2KXD	392	14	14	B
WA2LXE	61,600	400	77	A
K2WA	51,744	336	77	A
N2LK	40,612	286	71	A
N2GM	35,140	251	70	A
K2VU	33,740	241	70	A
K2YLH	33,740	241	70	A
KB2SYD	23,380	167	70	A
W2PI	22,540	161	70	A
W2LRO	22,440	187	60	A
KB2UTD	20,224	128	79	A
KA2ANF	18,352	148	62	A
WB2IDV	18,290	155	59	A
KG2MV	17,690	145	61	A
K2AMI	17,516	151	58	A
WA2QHL	16,416	144	57	A
N3RB	13,750	125	55	A
WA2BKN	10,332	82	63	A
N2NYR	9,702	99	49	A
W2VU	8,200	100	41	A
WB2AZE	6,150	75	41	A
KJ2N	5,170	55	47	A
KA2NJP	2,944	46	32	A
W2AZK	50,172	339	74	Q
W2JEK	9,384	92	51	Q
W2LE	50,076	321	78	U
W2NO	29,072	184	79	U
N2WM	19,312	142	68	U
W2KD	19,032	122	78	U
KZ2A	15,820	113	70	U
N2TTT	9,936	69	72	U
W2YR	9,568	104	46	U
WV2V (+N2NHN)	187,520	1172	80	M
N2ED (+N2UCP,KC2INX)	143,520	897	80	M
AB2DE (KC2AVE,N2ZAS,KC2ILF,ops)	117,468	753	78	M
NN2T (+NO2T)	39,468	253	78	M
KF2EW (+KC2GDT,KC2HYR,KCTINZ)	29,260	190	77	M

Northern New York

NS2P	95,160	610	78	A
NG2C	33,750	225	75	A
NN2L	17,760	111	80	A
N2BO	2,760	46	30	A
N2USN	110,284	698	79	U
K2NNY (K2CS,K2DB,N2OPW,AF2K, N2TWI,AE2T,N1OKL,ops)	207,360	1296	80	M

NYC-Long Island

AD2S	105,450	703	75	B
KD2RD	145,376	944	77	A
KS2G	105,702	669	79	A
K2DO	99,224	628	79	A
N1XL	60,960	381	80	A
N2MUN	46,664	307	76	A
N2PN	44,616	286	78	A
WA2OJK	28,704	208	69	A
WB2OQQ	27,676	187	74	A
K2RED	21,576	186	58	A
WB2BXO	15,660	145	54	A
N2FF	12,444	122	51	A
N2KYP	11,200	112	50	A
WA2RXS	7,350	105	35	A
N2LEB	1,672	38	22	A
WB2CAO	1,380	30	23	A
WM2V (+N2GA)	195,360	1221	80	M

Southern New Jersey

N2MM	227,040	1419	80	B
N1RK	89,760	561	80	B
K2UR	14,896	98	76	B
W2RDS	89,760	561	80	A
KB2MMI	39,312	273	72	A
W2ORA	38,776	262	74	A
W2SWL	36,432	253	72	A
N2RF	12,932	122	53	A
KD2P	11,130	105	53	A
N2OO	9,702	99	49	A
WA2IAU	4,940	65	38	A
N2LGH	3,366	51	33	A
K2BL	2,538	47	27	A
W2QOB	1,088	32	17	A
AD3Y	4,514	61	37	Q
KF2YX	396	18	11	Q
KV2M	35,574	231	77	U
NJ2DX	16,560	115	72	U
K2WB	6,552	78	42	U

Western New York

N2MF	169,920	1062	80	B
W2FU	154,720	967	80	B
NA2A	75,050	475	79	B
W2LC	39,330	285	69	B
K2KRB	23,424	183	64	B
N2USB	12,376	119	52	B
KG2AU	135,360	846	80	A
W2KA	133,920	837	80	A
K1PY	123,396	791	78	A
AA2IZ	46,968	309	76	A
K2CF	38,184	258	74	A
KB4VL	25,296	204	62	A
WB2SXY	16,940	154	55	A
W2EZ	14,384	124	58	A
N2LQQ	14,148	131	54	A
WB2WPM	11,742	103	57	A
W1TY	11,096	73	76	A
KC2DGC	8,918	91	49	A
N2NRV	1,134	27	21	A
N2XT	49,120	307	80	Q
N2CU	35,466	257	69	Q
N2DM	9,810	109	45	Q
AA2MU	92,092	598	77	U
K2MP	69,520	440	79	U
K2FU	67,050	447	75	U
NG2P	48,510	315	77	M
KF2VX (+KB2YTC)	45,396	291	78	M
KG2DE (+KA2WCM,KC2FUW, KB2TRU)	40,392	297	68	M
K2IWR (KB2FAF,KB2LUV,KB2NCW, N2MRE,ops)	31,740	230	69	M
N2WDS (+N2XPG)	22,320	155	72	M
W2CXM	153,600	960	80	S

3

Delaware

N3KW	113,280	708	80	B
NY3C	75,840	480	79	A
KB3FEI	11,330	103	55	A
N3ME	8,280	138	30	A
W3PP	199,040	1244	80	U

Eastern Pennsylvania

K3MD	118,026	747	79	B
W3AP	69,994	443	79	B
W3ZV	67,792	446	76	A
NE3H	57,096	366	78	A
K3XR	52,572	337	78	A
N3WL	48,600	324	75	A
W3SSS	38,106	261	73	A
WB3IZF	34,018	233	73	A
W3RT	32,472	246	66	A
WA2FGK	24,800	200	62	A
KE3TC	19,200	150	64	A
W3DWH	17,168	232	37	A
W3JM	15,400	100	77	A
AB3BB	11,872	112	53	A
NM3O	11,000	110	50	A
WN3USA	4,352	64	34	A
N3GXY	5,852	77	38	Q
K3WW	137,600	860	80	U
K3SV	78,880	493	80	U
KD3TB	22,892	194	59	U
N3RM	18,942	123	77	U
WY3T (+N3JRX,WR3H)	161,392	1048	77	M

Maryland-DC

K3MM	258,080	1613	80	B
W2GG	243,360	1521	80	B
K2PLF	197,760	1236	80	B
N3FX	175,360	1096	80	B
N3HXQ	166,690	1055	79	B
K3TM	152,628	966	79	B
K3ZO	145,834	923	79	B
N3UM	110,604	709	78	B
K3DNE	95,906	607	79	B
W3DWJ	73,632	472	78	B
W3YD	66,400	415	80	B
K3GV	58,500	375	78	B
AJ3M	54,720	360	76	B
W3UL	52,416	364	72	B
N3HS	48,984	314	78	B
W3AZ	42,778	293	73	B
WD3A	30,888	234	66	B
N4GG	21,216	156	68	B
W3SY	164,960	1031	80	A
AI3M	120,160	751	80	A
W3UJ	94,400	590	80	A
K3AN	91,630	595	77	A
KM3V	70,560	441	80	A
N1WR	68,480	428	80	A
W3CB	68,016	436	78	A
W3MR	56,960	356	80	A
W3LL	49,742	323	77	A
K2YWE	49,704	327	76	A
K3TN	33,396	242	69	A
W3ARS	31,536	219	72	A
K3DSP	29,536	208	71	A
N3EYB	27,156	219	62	A
K3GHH	25,326	189	67	A
N3ZNU	17,784	156	57	A
K3YDX	12,960	120	54	A
NS3T	10,620	90	59	A
W3DAD	10,208	116	44	A
W1RD	10,028	109	46	A
KA3UIH	7,770	105	37	A
N3SZW	7,216	82	44	A
W3ERU	3,920	49	40	A
K3ZE	2,080	40	26	A
W3FQE	1,428	34	21	A
N0MSB	690	23	15	A
WA4MQY	50	5	5	A
N3UR	67,032	441	76	Q
K3TW	5,950	85	35	Q
KD4D (@N3HBX)	184,640	1154	80	U
N3OC	116,960	731	80	U
N3HUV	108,230	685	79	U
K3IXD	84,056	532	79	U
N3GPU	83,304	534	78	U
W3HVQ	82,792	524	79	U
W3OU	33,726	219	77	U
W3EKT	30,056	221	68	U
W3KHZ	15,470	119	65	U
K3SKE	12,960	90	72	U
WX3B	134,240	839	80	U
WR3L (+KA3TUL,N3WJA,K3FT)	194,560	1216	80	M
K3DI (+W3OQ)	135,680	848	80	M
K3PZN (N3YIM,N3GQK,N3SOK, WX3F,N3VOP,W3JJH,ops)	39,468	253	78	M
N3GWZ (+logger)	29,016	186	78	M
N3FJP (+KA3SEQ)	28,598	181	79	M

Western Pennsylvania

W3GH	166,080	1038	80	B
N3EMF	43,920	305	72	B
KA3WIK	10,340	110	47	B
WO3Z	103,360	646	80	A
WA3SES	54,978	357	77	A
AA3ML	46,950	313	75	A
W3TWI	44,928	288	78	A
KB3RH	37,728	262	72	A
KE3KD	31,500	225	70	A
W3RJM	29,106	231	63	A
NX3P	28,832	212	68	A
KA3SMF	13,664	122	56	A
W8ZM	12,896	124	52	A
KE4BIN	11,988	111	54	A
WB3AVD	8,800	110	40	A
N3YTD	6,622	77	43	A
WA3GQU	432	18	12	A
AD8J	65,676	421	78	Q
WA3WAW	10,486	107	49	Q
W3SO (W3TEF,W3YOZ,ops)	86,520	618	70	M

4

Alabama

K4GW	118,720	742	80	B
N4YQ	67,520	422	80	B
K4AB	19,500	150	65	B
N8DSG	18,744	142	66	B
KD4Y	66,682	433	77	A
W4NTI	34,506	243	71	A
K4OE	21,760	170	64	A
W5DLM	11,800	100	59	A
N4KG	41,920	262	80	Q
W4DEC	2,132	41	26	Q
K4WI	171,520	1072	80	U
KS4YT	98,904	634	78	U

Georgia

K4BAI	231,520	1447	80	B
K4FYM	26,268	199	66	B
W4AN	23,826	209	57	B
K9AY	13,176	122	54	B
AA4LR	99,382	629	79	A
KT4ZB	52,884	339	78	A
NE4S	45,662	289	79	A
K5OT	43,808	296	74	A
N4XQN	33,180	210	79	A
W4KTN	21,016	148	71	A
K2UFT	10,812	102	53	A
WW4W	21,114	153	69	Q
N4TOL	7,680	80	48	Q
WB6BWZ	7,128	81	44	Q
W4AQL (W4ATL,W4EGT,WJ2RM, KE4QLH,ops)	212,480	1328	80	M
N4QXI (+KG4PTO)	24,080	172	70	M

Kentucky

K4IE	70,880	443	80	B
N4XM	10,560	110	48	B
KY4AA (K9GX,op)	186,240	1164	80	A
AC4PY	72,960	456	80	A
AE4GH	53,720	340	79	A
WX8V	52,288	344	76	A
KM4FO	45,600	300	76	A
WT4KY	37,000	250	74	A
K3VIN	32,096	236	68	A
W4LC	18,170	115	79	A
K3RXK	16,576	148	56	A
KD4PYR	14,706	129	57	A
KG4NNK	12,200	122	50	A
N4RZ	89,428	566	79	Q
KD9B	2,220	37	30	Q
K4WW	99,698	631	79	U
KD4SN	86,400	540	80	U
KO4OL	16,092	149	54	U

North Carolina

WW4M	216,480	1353	80	B
NX9T	181,280	1133	80	B
AD4L	136,828	866	79	B
KW4DA	98,240	614	80	B
KO7X	53,676	378	71	B
NT4D	40,248	258	78	B
W4YDY	38,056	284	67	B
N4YDU	23,546	193	61	B
AE4NR	18,444	159	58	B
KZ2I	154,720	967	80	A
N2NFG	135,722	859	79	A
K4QPL	101,600	635	80	A
NI4S	80,964	519	78	A
WJ9B	69,600	435	80	A
W4IDX	62,472	411	76	A
N4CW	57,986	367	79	A
N2BT	40,950	273	75	A
K4YFH	33,496	212	79	A
K4TMC	33,120	240	69	A
N4TL	28,840	206	70	A
KG4DZU	24,522	201	61	A
NC4MI	19,028	134	71	A
KK4RV	17,228	118	73	A
W4KAZ	15,732	138	57	A
KV4CN	11,664	108	54	A
K4WES	10,400	104	50	A
KS4S	8,364	102	41	A
KI0Y	6,800	100	34	A
WD4NCQ	2,450	49	25	A
N5FPW	52,500	350	75	Q
N4BNO	41,734	271	77	Q
W2VMX	6,364	74	43	Q
W4MR (AA4NC,op)	254,880	1593	80	U
W2CS (@N4AF)	248,160	1551	80	U
K4MA	232,160	1451	80	U
KG4PQX (KG4CZU,N4VHK,ops)	96,480	603	80	M

Northern Florida

W7QF	22,032	153	72	B
W3TMZ	8,844	66	67	B
N4PN	161,280	1008	80	A
WB4OMM	156,160	976	80	A
NF4A	120,238	761	79	A
KC4R	62,050	425	73	A
KB4N	49,050	327	75	A
W4EBA	43,928	289	76	A
WA4NWO	22,400	175	64	A
KE4MVK	15,360	128	60	A
W9CNF/4	1,248	39	16	A
KQ4YY	27,336	204	67	Q
KX5U	1,886	41	23	Q
K0LUZ	88,000	550	80	U
K4UCF (NS3W,op)	42,076	314	67	S

Puerto Rico

WP3R (KE3Q,op)	389,920	2437	80	B
N6VUY	44,104	298	74	A
KP4WK	23,408	209	56	A

South Carolina

W8CNL	32,760	210	78	A
K4ADI	32,708	221	74	A
WA8OJR	15,624	126	62	A

Southern Florida

N4BP	220,320	1377	80	B
KC4PX	66,400	415	80	A
WA4ASJ	51,504	348	74	A
K5EEE	48,816	339	72	A
KK4TA	46,472	314	74	A
KC4HW	34,040	230	74	A
N4BG	25,900	185	70	A
KR4ZA	25,276	178	71	A
WT5L	24,948	162	77	A
K4RFK	21,760	170	64	A
KA1VY	11,232	117	48	A
WN4F	8,800	100	44	Q
N4CU (+KI4US,W9ZGU,KN4HX, KD4FRB,K4BVL)	37,260	270	69	M
W4MOT (AF4YS,KE4ESV, KG4CHW,ops)	7,296	76	48	M
KT4XK (+W9WLF,N4CU)	6,888	84	41	M
K9WLF (+KT4XK)	2,322	43	27	M
KD4GR (+N4CU,WD4CLZ)	1,280	32	20	M

Tennessee

AA4NU	179,200	1120	80	B
K4LTA	133,848	858	78	B
W4PA	64,680	420	77	B
K4BP	52,728	338	78	B
N4DW	15,606	153	51	B
W4OGG	3,840	60	32	B
NA4K	171,200	1070	80	A
NY4T	119,840	749	80	A
KE4OAR	74,418	471	79	A
W4DAN	68,096	448	76	A
KG4CKX	60,192	396	76	A
K4USN	59,584	392	76	A
KW4JS	52,514	341	77	A
KU4AW	51,128	332	77	A
WA4JA	47,278	307	77	A
K4BEV	44,400	300	74	A
W9WI	26,352	216	61	A
W4NI	23,790	183	65	A
W4DWB	18,980	146	65	A
WO4O	13,104	84	78	A
KA4MRR	12,576	131	48	A
KC4URW	9,408	96	49	A
W4JH	9,350	85	55	A
W4MEA	8,550	95	45	A
K3CQ	6,314	77	41	A
WB9BSH	2,590	37	35	A
KA4BNI	928	29	16	A
W4TDB	23,316	174	67	Q
AA0BA	31,040	194	80	U
N4FR (KA4OTB,KF4BBH,W4GHD,ops)	41,250	275	75	M
KG4PDS (K0EJ+loggers)	117,920	737	80	S

Virgin Islands

WP2Z (K8MJZ,KT8O,ops)	340,800	2130	80	M
NP2B (+W4OV,W2UDT)	244,640	1529	80	M
KP2D (KP2N,KP2VI,NP2W,NP2DJ,ops)	75,680	473	80	M

Virginia

K1GG	179,400	1150	78	B
AC8Y	167,480	1060	79	B
W4NYY	104,052	667	78	B
K4IQ	90,376	572	79	B
W3BP	65,824	484	68	B
W4ZYT	62,252	394	79	B
K4YT	60,480	378	80	B
KC1YC	37,240	266	70	B
N4PD	27,360	190	72	B
N6ZO	22,968	174	66	B
W2YE	14,784	132	56	B
AL7HW	89,832	591	76	A
N4JED	65,208	418	78	A
AD4DG	53,900	350	77	A
N4MM	49,920	312	80	A
W4YE	49,434	321	77	A
AA4KD	49,200	328	75	A
N4KIT	39,000	260	75	A
K4PZC	37,520	268	70	A
WX1H	34,560	240	72	A
KE4MIL	32,832	228	72	A
K7SV	32,234	227	71	A
WB4ZPF	31,200	208	75	A
KU4FP	31,050	207	75	A
W4VG	29,104	214	68	A
N8IK	28,840	206	70	A
W4DAV	25,326	201	63	A
K4KML	24,700	190	65	A
WA0DYJ	21,712	184	59	A

K3MZ 21,576 174 62 A
AF4MO 21,420 170 63 A
KG6AR 21,352 157 68 A
KA4GFY 20,956 169 62 A
WA4FXX 20,636 154 67 A
W4ZY 15,776 136 58 A
K3EP 15,340 130 59 A
W4XP 14,580 135 54 A
NQ4K 11,832 102 58 A
K1SO 11,250 75 75 A
K4KJL 11,040 115 48 A
K4GMH 10,944 114 48 A
KD5CTJ 10,608 104 51 A
N4DWK 10,528 94 56 A
KA4RRU 9,282 91 51 A
KS4JB 8,184 93 44 A
N8CH 8,008 91 44 A
KV4DJ 7,488 96 39 A
WA3RGH 6,600 75 44 A
KB3CDF 3,400 50 34 A
KG4CGR 2,580 43 30 A
KF4TJI 540 18 15 A
WB2SAI 374 17 11 A
G3ZCZ 264 12 11 A
W4/VU2VKU 264 12 11 A
KR4KF 168 6 14 A
K3SS 38,624 272 71 Q
KC4ATU 30,774 223 69 Q
W4HJ 14,268 123 58 Q
KT4FJ 8,190 105 39 Q
N4EVK 6,080 76 40 Q
W4NF 225,600 1410 80 U
W4MYA 175,040 1094 80 U
N2QT 170,400 1065 80 U
N4RV 164,160 1026 80 U
W4TNX 40,888 269 76 U
N4SR 13,200 88 75 U
N6MW 12,168 78 78 U
W4DC (+N8CIA,KC4SZT)
186,400 1165 80 M
AF4UU (+W4IM,KG4MJV)
77,104 488 79 M
WM3T (+KF4OKG)
57,280 358 80 M
KR4XM (+K4FPF)
48,160 301 80 M
W4AU (+logger)
23,584 176 67 M
K4KDJ (K4EP,KF4YLM,N1KH,ops)
59,092 374 79 S

West Central Florida

K4XS 312,000 1950 80 B
WC4E 276,000 1725 80 B
K8XS 160,960 1006 80 B
K5KG 110,284 698 79 A
N4IG 74,576 472 79 A
N4PK 69,732 447 78 A
WD4AHZ 47,002 331 71 A
K8DSS 30,084 218 69 A
N2EGO 29,540 211 70 A
N4GI 27,392 214 64 A
WN4DX 14,762 121 61 A
K4FB 20,412 162 63 Q
KA6R (+KA6AFK)
42,884 302 71 M

5

Arkansas

KW5RF 46,800 312 75 A
N5ZIV 21,352 157 68 A
KA5QOF 19,388 131 74 A
KE4W 10,340 110 47 A
N5QC 6,480 81 40 A
AC5DK 28,000 175 80 U
W5RL (+W5OX,AD5GB)
164,320 1027 80 M
N5AT (AF5M,N5OOI,N5LE,AC5YM,
KC5NPU,KB5PLQ,KD5PWX,ops)
70,200 450 78 M
N5ZM (+N5RN,KC5KJE)
50,880 318 80 M
W5YM (KB5ZYC,KC5ATF,KD5LJS,
AC5RR,K5GOE,K5FXB,ops)
154,720 967 80 S

Louisiana

W5WMU 262,560 1641 80 B
K9DN 12,628 82 77 B
N5SMQ 43,956 297 74 A
WA5TRX 32,412 222 73 A
KD5NOY 9,660 105 46 A
KC5R 45,738 297 77 Q
W5GAD
(N5TEK,W5LMR,KD5QEL,ops)
148,800 930 80 M
KI5EE (+KC5FGO,WB5TUG,
AC5TQ,KD5GHQ)
98,434 623 79 M
W5YW (KC7MOC,N5IB,ops)
52,668 342 77 S

Mississippi

WA5OYU 182,400 1140 80 B
W5UE 112,164 719 78 A
AC5SU 73,320 470 78 A
WJ5K 60,000 375 80 A
KE5K 48,160 301 80 A
WD5JNC 26,780 206 65 A
KJ5RC 24,000 150 80 A
KK5PM 10,400 100 52 A
N5PU 7,680 80 48 A
KD5CKP 1,334 29 23 A
W5LAR (N5PA,N5NQ,KB5IXI,KB5VLA,
KI5HI,KC5YDR,KC5QZW,KB5FET,
N5KKG,ops)
182,240 1139 80 M

New Mexico

KD5JAA 30,940 221 70 B
W5JOV 12,296 116 53 B
KM5P 54,896 376 73 A
W5GZ 44,772 287 78 A
W5IV 42,120 270 78 A
KD5AYW 16,770 129 65 A
KB6ATT 16,000 125 64 A
K5MJE 31,780 227 70 Q
WA0SXV 164,640 1029 80 U
NA5S 115,520 722 80 U
W6TER (+KE5BL,W5DEZ)
151,838 961 79 M
KK5OV (+KB5ZSK)
39,760 280 71 M

North Texas

K5RX 207,360 1296 80 B
W5WW 155,680 973 80 B
KB5AB 122,880 768 80 B
W5MYA 110,418 717 77 B
KB5YIA 44,872 284 79 B
WQ5W 211,840 1324 80 A
NT5V 74,568 478 78 A
WD5K 64,752 426 76 A
N1CC 60,830 395 77 A
N5NJ 43,808 296 74 A
N5CHA 30,800 220 70 A
WA5VKS 23,660 182 65 A
W5WB 20,320 127 80 A
N0XLR 17,632 116 76 A
N5DUW 13,038 123 53 A
KC5OZT 12,992 116 56 A
WA5MS 12,100 121 50 A
N5ZIS 10,878 111 49 A
NN5T 9,086 77 59 A
KB5VKJ 6,720 70 48 A
N5TJ 2,904 44 33 A
KC0GTR/M 900 25 18 A
WA8ZBT 93,132 597 78 Q
KJ5RM 19,952 172 58 Q
KC5NT 16,302 143 57 Q
AA5NT 123,714 783 79 U
W5GN 71,360 446 80 U
W5ZQ 12,482 79 79 U
N5KM 7,488 96 39 U
N5YA (+K5WO,N5KR)
208,640 1304 80 M
NC7I (+KD7JWV+logger)
18,724 151 62 M
W5SPS 25,350 169 75 S
WN5D 25,296 186 68 S
K5CCC (N5EE,op)
20,760 173 60 S

Oklahoma

KB5BOB 105,860 670 79 B
K5ADI 79,474 503 79 B
N5RXF 17,250 125 69 B
KC5NYO 10,976 112 49 B
K5KA 215,040 1344 80 A
AA5CK 35,712 248 72 A
N5UW 10,608 104 51 A
N5PT 10,600 106 50 A
AD5BN 8,360 110 38 A
AB5FS 7,560 84 45 A
N9NE 9,212 94 49 Q
WD0GTY (+WB0ZWW)
67,680 423 80 M
N5PMP (+KB5TUV)
38,690 265 73 M
KB1ZQ (N1LPN,N5VWF,ops)
20,368 134 76 M
W5OCC (N5ZO,KO6RM,ops)
61,950 413 75 S
NE0P 2,450 35 35 S

South Texas

K5TR 331,360 2071 80 B
K5NA (KI5DR,op)
203,360 1271 80 B
W5ASP 192,800 1205 80 B
W5RQ 165,760 1036 80 B
KM5VI 51,000 340 75 B
W5XD 12,528 116 54 B
NA4M 1,288 28 23 B
K5OE 82,720 517 80 A
KK5VN 63,080 415 76 A
N5RLQ 53,900 350 77 A
K5PI 41,470 319 65 A
K5IX 35,200 220 80 A
N5AF 25,296 204 62 A
AD5CA 13,416 129 52 A
W5EB 11,700 90 65 A
N5RBC 9,964 106 47 A
N5WU 20,536 151 68 Q
KC1MK 10,368 108 48 Q
KK5LO 68,160 426 80 U
WA5AA 62,094 393 79 U
N5MT 31,360 224 70 U
K5WW 12,348 126 49 U
W5NN (AD5Q,K5GA,K5NZ,ops)
285,920 1787 80 M
NX5M (+N5XJ,W5SB,W5PF,W5IDX)
251,040 1569 80 M
N5XU (W5JLP,KB5LBN,KM5TY,
N8DVM,K5PI,WM5R,ops)
188,960 1181 80 M
KM5EW (+KD5AWS,KD5PUJ)
98,276 622 79 M
N5KAE (+KD5CXD,KJ5MW,KC5TAR,
KA5VZM,KD5CMN,KA5QKL,KD5NYP,
KD5HTM,KD5OKA)
39,520 260 76 M
N5OW (+KK5XM)
31,950 225 71 M
W5SSV (N5MTX,KD5GKV,
KD5QDM,ops)
30,192 222 68 M

West Texas

N5RZ 304,000 1900 80 B
N5LUL 23,140 178 65 A
NZ5M 660 22 15 A
N5ZC 251,520 1572 80 U
KE5OG 139,040 880 79 U
N5DO (+K5FD)
212,480 1328 80 M
N5ZMP (+N5XKD)
37,600 235 80 M

6

East Bay

N6BV 286,080 1788 80 B
K6AUC 180,800 1130 80 B
KF6RIP 175,200 1095 80 B
AI6V 167,680 1048 80 B
W6CUS (K6SRZ,op)
142,990 905 79 B
N6RO 126,516 811 78 B
K6XV 92,430 585 79 A
KE6QR 32,760 234 70 A
WZ6Z 26,980 190 71 A
K6BIR 22,750 175 65 A
K6WG 11,770 107 55 A
KK6WT 11,440 110 52 A
KS6Q 7,360 80 46 A
K6SV 5,460 78 35 A
AK6DV 540 18 15 A
W6RGG 166,560 1041 80 U
WA6O 159,520 997 80 U
W6BSY 151,200 945 80 U
W6ZO 24,804 159 78 U
N6TQS 11,124 103 54 U
KD6KQW (+W6ATV)
33,120 207 80 M
W6YL (KX7M,op)
207,040 1294 80 S

Los Angeles

W6AFA 75,848 499 76 B
W4EF 69,762 453 77 B
K6LA 238,560 1491 80 A
K6RO 197,760 1236 80 A
K6ZCL 56,544 372 76 A
N6TW 46,800 312 75 A
W3SE 38,844 249 78 A
WB6NFO 23,004 162 71 A
KB6HT 16,146 117 69 A
N6OPR 13,916 98 71 A
AI6Z 10,900 109 50 A
KF6HZN 9,270 103 45 A
N6XJG 1,140 30 19 A
W6RCL 3,240 54 30 Q
WA9STI 1,254 33 19 Q
W6KC 89,280 558 80 U
W6UE (W6DR,N6VI,KA6SAR,ops)
152,960 956 80 M
N6XTT (+N6RMJ,KE6CTI,
KC6TXO,N6ZII)
119,764 758 79 M
K1SL (+KB6WKT)
19,740 141 70 M

Orange

K6AM 284,242 1799 79 B
W6TKV 92,588 586 79 B
AA6PW 188,480 1178 80 A
KQ6YI 63,990 405 79 A
KO6XB 60,988 386 79 A
N6BM 46,610 295 79 A
W6HT 35,700 255 70 A
KI6X 25,996 194 67 A
WW6O 20,584 166 62 A
KA6GMA 10,890 99 55 A
KE6GFI 9,964 94 53 A
KQ6Q 6,232 76 41 A
WA6GFR 2,296 41 28 A
KI6SN 360 15 12 Q
N6RT 12,800 80 80 U
W6EEN (+K6XC,W6AQ,KI7WX,
W6ORD,N6TR)
269,760 1686 80 M
K6SB (W6GL,KF6KQL,N6TVS,ops)
11,110 101 55 M

Pacific

KH6J (@KH7R) (KH6ND,op)
349,920 2187 80 B
N6HC 27,008 211 64 A
AH6P 7,200 75 48 A
KH7V (+AH6U, N6HC)
122,616 786 78 M

Sacramento Valley

N6IG 290,880 1818 80 B
K6KM (N6KT,op)
282,720 1767 80 B
W1SRD (@K6IDX)
253,748 1606 79 B
W6EU 252,800 1580 80 B
N6XI 231,520 1447 80 B
WX6V 197,184 1248 79 B
K6LRN 149,440 934 80 B
W6IXP 127,920 820 78 B
W6RKC 46,080 288 80 B
WT6P 43,452 306 71 B
KI6T 27,186 197 69 B
KU6J 91,520 572 80 A
K6SG 44,550 297 75 A
W6RFF 35,742 259 69 A
KI6IV 12,852 119 54 A
KO6CX 36,120 258 70 Q
K6UT 149,600 935 80 U
K6KYJ 55,380 355 78 U
N6ZS (+N6SNO)
242,720 1517 80 M
K0BEE (@K6IDX) (+W6OAT)
233,280 1458 80 M
K6NO (+K6RC)
231,680 1448 80 M
W6UT (+K6GV)
198,448 1256 79 M
K6KO (+K6TA)
196,960 1231 80 M

San Diego

K6NA (N6ED,op)
315,200 1970 80 B
WN6K 178,698 1131 79 A
AA6EE 25,704 189 68 A
WB6NJA 2,030 35 29 A
W6MOT (WB6OIL,op)
30,464 224 68 Q
NX6T (+N6KI)
87,984 564 78 M

San Francisco

K6IF 151,360 946 80 B
K6CTA 109,920 687 80 B
K6OWL 15,950 145 55 B
N6ZFO 138,528 888 78 A
K6UM 83,898 531 79 A
AA6DX 46,650 311 75 A
W6ESJ 21,736 143 76 A
AD6TF 19,712 176 56 A
NC6P 17,112 138 62 A
WA6QCL 13,452 118 57 A
K1EP 11,552 76 76 A
N6NVF 3,840 48 40 A
K6RIM 207,840 1299 80 U
K6PUD (+KQ6OB)
137,280 858 80 M

San Joaquin Valley

WC6H 252,160 1576 80 B
W6UDX 17,980 145 62 B
N6YMM 77,420 490 79 A
WI7F 29,882 223 67 A
KI6PG 17,952 136 66 A
AA6K 16,720 110 76 A
K6MI 2 1 1 Q
NT6K 134,240 839 80 U
KA6BIM 131,360 821 80 U
W6XK (N6EE,W6WK,ops)
233,440 1459 80 M
N6TNW (+N6TNX)
109,494 693 79 M

Santa Barbara

W6NK 140,000 875 80 B
W7CB 33,228 213 78 B
WA6FGV 113,920 712 80 A
W6BKY 28,470 219 65 A
KA6WZR 13,338 117 57 A
KE6DKU 180 10 9 A
W6TK 115,840 724 80 U
K6R (N6KS,K6RSD,ops)
27,300 182 75 M
W6PRB (AG6RT,op) (+loggers)
92,160 576 80 S

Santa Clara Valley

W0YK 255,520 1597 80 B
AE6Y 226,720 1417 80 B
K6RB 209,280 1308 80 B
WJ6O 194,182 1229 79 B
K6GT 174,240 1089 80 B
AJ6V 171,444 1099 78 B
AD6E 155,360 971 80 B
AB6WM 153,418 971 79 B
K6HNZ 152,960 956 80 B
W6ISO 81,054 513 79 B
N6ZB 75,922 493 77 B
AA6W 74,936 493 76 B
N6XG 73,296 509 72 B
W6NL 67,548 433 78 B
K6ST 61,152 392 78 B
N3ZZ 50,468 341 74 B
K2KW 46,292 326 71 B
NR3Y 36,450 243 75 B
W6XB 31,688 233 68 B
W6FDU 27,876 202 69 B
W4NJK 5,120 64 40 B
N6NF 185,334 1173 79 A
KA6MAL 77,154 501 77 A
N6EM 73,786 467 79 A
W6RYI 52,298 331 79 A
N6NZ 39,600 264 75 A
W6WS 30,030 231 65 A
W6ZZZ 25,668 207 62 A
N6YD 21,120 165 64 A
KG6DEX 2,436 42 29 A
N6BXO 32 4 4 A
W6LPW 48,840 330 74 Q
AD6GK 10,152 108 47 Q
KF6QNC 6,776 77 44 Q
K6XX 245,120 1532 80 U
NI6T 194,560 1216 80 U
K6EP 104,320 652 80 U
W6ISQ 80,000 500 80 U
K6III 74,418 471 79 U
AK6L 36,680 262 70 U
W7SW 25,956 206 63 U
W6YX (W6LD,N7MH,ops)
267,200 1670 80 M
N6DE (+W6KNS,W7SW)
193,760 1211 80 M

7

Alaska

KL7FAP 62,456 422 74 A
KL7Y (WA2GO,op)
189,920 1187 80 Q
KL7GN 570 19 15 Q

Arizona

K6LL 306,400 1915 80 B
W7WW 220,640 1379 80 B
WA0KDS 159,680 998 80 A
K7HP 92,664 594 78 A
NF7E 89,700 575 78 A
K7JWD 77,104 488 79 A
KG9JP 53,760 336 80 A
K7TR 46,176 312 74 A
K7ON 39,026 247 79 A
W7ZMD 35,642 251 71 A
N3AIU 32,960 206 80 A
W0CEM 16,920 141 60 A
W7MQ 13,824 128 54 A
W7JED 11,220 110 51 A
W7YS 9,588 102 47 A
KN6MN 9,464 91 52 A
N7MAL 7,238 77 47 A
KD7JJQ 7,052 86 41 A
KD7HGV 768 24 16 A
N7VY 110,880 693 80 Q
N7JXS 31,878 231 69 Q
NQ7X 18,632 137 68 Q
W0YHE 7,544 82 46 Q
WX7P (+AL7LB)
112,160 701 80 M
KK6IF (+K6RFA,W6BBL)
63,358 401 79 M
W7ASU (KC7MOD,KD7LCS,KC7EFP,
KC7RZR,ops)
153,734 973 79 S
KC7KFF (KD7LBU,KD7LGM,
N7UJJ+loggers)
78,848 512 77 S

Eastern Washington

WA7LT 202,872 1284 79 B
WS7V 116,480 728 80 A
KC7WUE 6,300 70 45 A
K7MM 125,112 802 78 Q
K7OX 37,760 236 80 U

Idaho

K0TO 148,320 927 80 A
WO7Y 117,552 744 79 A
WA7DX 98,904 634 78 A
KW7N 55,932 354 79 A
N7LB 44,696 302 74 A
K0IP 28,350 189 75 A
KG7WZ 8,058 79 51 A
KK7A 23,920 184 65 Q
AB7YB (+KB7LFO,KD7DIG,KI7RO)
68,320 427 80 M
KJ7TH (+KD7JEG)
44,320 277 80 M

Montana

NA7NA 177,592 1124 79 B
KS7T 142,358 901 79 B
AA7YA 134,142 849 79 A
KE7NO 100,000 625 80 A
KC7NY 63,048 426 74 A
K7SAM 52,416 336 78 A
KG7VQ 52,288 344 76 A
AC7OW 46,718 329 71 A
K7ABV 33,728 248 68 A
KK7UV 29,484 189 78 A
KC7NX 29,040 220 66 A
AC7GM 13,338 117 57 Q
WC7L (AA7LU,AB7CE,WA7FBJ,ops)
31,824 221 72 M

Nevada

NB7X 52,104 334 78 B
N7WVZ 57,670 365 79 A
N7QN 43,200 270 80 A
K7NV 41,020 293 70 A
KK7SL 630 21 15 A
K7BV 287,200 1795 80 U

Oregon

K7VS 170,324 1078 79 B
K4XU 179,804 1138 79 A
AI7W 156,000 975 80 A
KI7Y 87,516 561 78 A
KU7K 43,212 277 78 A
N7VS 29,920 220 68 A
N7TL 23,760 165 72 A
N7ZO 18,176 128 71 A
KC7ZFP 12,644 109 58 A
K7FD 12,482 79 79 A
W7BX 4,864 64 38 A
W7IZ 4,662 63 37 A
N7JI 9,212 94 49 Q
KD7IEB 1,518 33 23 Q
W7DNS (+W7BJB)
46,950 313 75 U
W7GG (+K7ZUM,W7WLL)
293,440 1834 80 M
NK7U (+K7ZO)
249,324 1578 79 M
KA7IUG (+KA7AGH)
22,648 149 76 M

Utah

K1IF 117,216 814 72 B
K7MZ 37,240 266 70 B
K7ACE 39,516 267 74 A
K7ESU 10,710 105 51 A
KB7QYI 9,996 98 51 A
W7UT 204,960 1281 80 U
W7CT (+K7CO)
261,280 1633 80 M
KB7TYA (+N7GTE)
131,040 819 80 M
N7VM (+KD7GVF)
19,588 166 59 M

Western Washington

W7WA 337,280 2108 80 B
N7LOX 218,560 1366 80 B
WB7AKE 44,252 299 74 B
W7MRG (N4SL,op)
19,080 180 53 B
N4SL 11,704 76 77 B
N7DOE 9,600 100 48 B
K7RI 260,800 1630 80 A
K7QQ 232,960 1456 80 A
KK7LU 43,776 304 72 A
AA7VT 27,020 193 70 A
KG7P 25,944 188 69 A
K1LKR 23,328 162 72 A
W7LKG 21,700 175 62 A
KC7WDL 20,532 174 59 A
N7WA 18,724 151 62 A
KB7N 12,168 117 52 A
W7OVJ 9,696 101 48 A
KJ7WN 2,904 44 33 A
NN7P 2,610 45 29 A
NW7DX 23,736 172 69 Q
W7OM 172,320 1077 80 U
KB7PKC 39,624 254 78 U
NR7RR 27,808 176 79 U
KT7G 12,644 109 58 U
N7PP (N7DOE,WA7IVO,NF7Y,
WG7X,W7BUN,ops)
213,300 1350 79 M
K7PAR (N7UK,KD7KKR,KJ7BP,
KD7KUN,ops)
53,562 339 79 M

Wyoming

ND7O 176,160 1101 80 B
K7VU 136,640 854 80 B
W0ETT/7 71,260 509 70 A
KD7RX 28,676 214 67 Q
AC7AF 26,000 200 65 Q
N7JT 32,000 200 80 U

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Michigan

K8AO 199,520 1247 80 B
W8RC 157,850 1025 77 B
AA8PA 115,498 731 79 B
N8EA 83,680 523 80 B
K8KHZ 61,904 424 73 B
W8RU 14,144 136 52 B
W8MJ 196,000 1225 80 A
KC8KAK 138,400 865 80 A
KC8KAM 102,080 638 80 A
K8UH 88,640 554 80 A
K8IR 85,636 542 79 A
K8GT 81,760 511 80 A
K8REN (+WB8AFO)
76,076 494 77 A
N8ZFH 74,724 479 78 A
N8NX 68,838 447 77 A
K8IA 66,202 419 79 A
K8RDJ 66,066 429 77 A
AB8JR 54,600 350 78 A
WA8FRD 53,312 392 68 A
KE8FO 53,196 341 78 A
K8SAK 48,162 349 69 A
KC8CY 43,168 284 76 A
WB0WAO 42,880 268 80 A
N8BHT 39,760 284 70 A
K8AAX 38,016 264 72 A
W8KZM 34,932 246 71 A
KB8TXZ 33,120 240 69 A
W8EGI 30,888 234 66 A
WD8S 29,808 216 69 A
KD8BD 29,532 214 69 A
WB8GUS 28,542 201 71 A
K8AE 25,704 204 63 A
K8RWG 23,316 174 67 A
WA8OLD 22,512 168 67 A
W8PDI 19,964 161 62 A
WB8NXG 19,140 165 58 A
W8KQ 19,038 167 57 A
K8IKW 18,910 155 61 A
N8KC 18,774 149 63 A
KB8TWM 17,864 154 58 A
N8VR 17,516 151 58 A
KC8PKN 16,356 141 58 A
W8UE 15,158 143 53 A
WS8M 14,560 91 80 A
K8TEM 14,384 116 62 A
W8KZP 14,338 107 67 A
N8KZG 13,250 125 53 A
K8WUZ 13,208 127 52 A
W8HL 12,900 129 50 A
NX8K 10,712 103 52 A
KC8MBK 8,096 88 46 A
AA8UU 6,600 75 44 A
N8KLX 6,068 82 37 Q
K8CV 5,472 72 38 Q
KC8LTL 4,148 61 34 Q
NU8Z 166,720 1042 80 U
N8SNM 146,080 913 80 U
K8AQM 28,080 195 72 U

KG8OU 19,750 125 79 U
N8KR (+KN8R,N8EA)
240,000 1500 80 M
K8CC (+N8MG,N8RHV,W8OW,WX3M)
228,800 1430 80 M
NT8V (+AC8W,K8DD,K8WMW,W8XI)
145,440 909 80 M
N8MR (+KC8NAH)
65,760 411 80 M
K8MEG (+WA8MEG)
47,952 324 74 M
K8EO (+K8RO,N8PYN,)
41,440 259 80 M
KC8ELY (N8NJE,N8MMF,N8MPO,ops)
38,982 267 73 M
N8DEF (+N8DEH,N8WTH)
37,576 244 77 M
K8CHR (KI8BU,WQ8X,WD8DJB,
KB8TIL,KB8SXS,KC8SKF,ops)
32,232 237 68 M
KC8OBH (+KC8PKY)
24,012 174 69 M
KI8GR (+W8ISS)
19,886 163 61 M
N8UZE (+KB8BSG)
18,032 161 56 M
KA8KGW (+N8KWQ)
10,980 122 45 M

Ohio

K8DX 226,572 1434 79 B
K8MR 185,920 1162 80 B
K8ND 158,080 988 80 B
N8KM 128,232 822 78 B
K9TM 116,376 746 78 B
K8NU 12,650 115 55 B
W8DD 174,400 1090 80 A
K8BL 162,720 1017 80 A
KW8W 103,840 649 80 A
AK8B 68,838 447 77 A
W8XU 52,822 343 77 A
KB8UUZ 52,160 326 80 A
AF8C 50,560 320 79 A
K8CI 48,450 323 75 A
ND8L 47,874 303 79 A
W8KNO 47,278 307 77 A
KF8UN 46,400 290 80 A
KB8SHE 46,240 289 80 A
W8TTS 41,736 282 74 A
N8BV 40,848 296 69 A
WD8BMP 40,050 267 75 A
W8CAR 31,000 250 62 A
WD6ADM 28,050 187 75 A
KC8LA 25,760 161 80 A
W8WTS 20,520 180 57 A
N8JP 16,368 132 62 A
W8XS 15,232 112 68 A
W9OBQ 15,096 102 74 A
KC8QHT 14,630 133 55 A
K8VUS 13,392 124 54 A
KU8E 13,090 119 55 A
KJ8F 10,176 106 48 A
KB8STP 9,752 106 46 A
WA8YRS 9,492 113 42 A
W8NHO 7,986 121 33 A
KC8JYU 5,400 75 36 A
N8WL 65,832 422 78 Q
N8IE 60,514 383 79 Q
N8TR 101,600 635 80 U
N8OH 88,800 555 80 U
K3GP 57,120 357 80 U
W8KEN 51,680 323 80 U
N8BJQ 46,080 288 80 U
N8HR (WZ8P,K8CZ,KE8YP,ops)
226,240 1414 80 M
K8AZ (+K8MR)
60,000 375 80 M
AA8KJ (WM8W,KA8ZMY,ops)
51,840 324 80 M
W8DYY (N8IPO,N8DNG,N8SSE,
KC8LUJ,WD8BSI,WA8VIW,N8TW,
WD8ATS,ops)
34,932 246 71 M
AF8A (+KC8SCH)
17,582 149 59 M
W8ID (+KB8SOU,KG8UP,KC8RHC,
KC8BUJ,WB8REI)
12,848 88 73 M

West Virginia

N8RAT 125,440 784 80 B
N4ZR 100,640 629 80 B
K8OQL 55,500 370 75 B
K2UOP 43,800 292 75 B
K8KFJ 18,178 149 61 B
K5IID 127,680 798 80 A
WR0N 36,680 262 70 A
WA8WV 35,108 262 67 A
K8DXN 8,436 111 38 A
KV3R 149,120 932 80 U
W8ZA 23,530 181 65 U
WA8ZDL 22,484 146 77 U

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Illinois

WB9Z 248,160 1551 80 B
K9BGL 222,080 1388 80 B
KG9X 177,600 1110 80 B
W9SMC (KB9UWU,op)
163,214 1033 79 B
W8LVN 103,520 647 80 B
K9DX 102,336 656 78 B
K9SD 100,330 635 79 B
KS9W 91,322 593 77 B
N9TK 60,800 380 80 B
W9SE 51,520 322 80 B
W9OL 51,508 326 79 B
W9YYG 46,224 321 72 B
W9GIG 40,640 254 80 B
KG9N 36,000 225 80 B
N9GH 34,656 228 76 B
KC9IL 32,120 220 73 B
WA9DRE 28,258 199 71 B
W9TMW 26,180 170 77 B
N9PS 14,518 119 61 B
W9FO 9,800 100 49 B
N9RJX 1,620 45 18 B
KX9DX 105,644 686 77 A
N9IJ 92,320 577 80 A
N9REP 91,956 582 79 A
WO9LF 87,040 544 80 A
W9FGH 80,640 504 80 A
N9MSG 76,960 481 80 A
AK9F 76,960 481 80 A
NV8V 74,240 464 80 A
K9JE 72,640 454 80 A
AA9RT 71,700 478 75 A
KO9A 68,684 446 77 A
K9MMS 66,720 417 80 A
N9NT 59,680 373 80 A
N9CO 59,500 425 70 A
N9RK 54,668 346 79 A
K9QVB 52,440 345 76 A
K9ZA 52,000 325 80 A
KM9M 46,282 317 73 A
K9KM 44,100 294 75 A
W9SZ 40,996 277 74 A
KF9KP 37,592 254 74 A
K9KUP 37,440 260 72 A
NW9V 35,234 223 79 A
N9KHR 35,112 228 77 A
W9LYA 32,472 246 66 A
K9HS 31,688 233 68 A
KB9YSI 31,552 232 68 A
W9OF 29,394 213 69 A
N9KO 29,256 212 69 A
WB9IGB 27,528 222 62 A
K9KJ 25,480 196 65 A
W9JJT 24,768 172 72 A
W9LNQ 24,300 162 75 A
K9VIC 22,848 168 68 A
K9CC 22,072 178 62 A
KA9NPT 21,600 172 64 A
N9TF 21,840 168 65 A
WD9EJK 21,128 139 76 A
WI9B 20,878 143 73 A
K9OWC 20,412 162 63 A
K9IR 18,512 178 52 A
WR9N 18,480 154 60 A
AA9D 18,200 140 65 A
WB9RRO 16,244 131 62 A
W0HED 15,840 99 80 A
K9BF 15,810 155 51 A
WA9FET 13,832 133 52 A
NW9S 13,806 117 59 A
N9ALC 13,640 110 62 A
KG9GK 11,872 112 53 A
K9NA 11,448 106 54 A
K9CJ 11,234 137 41 A
N9XR 10,810 115 47 A
WB9STR 10,800 100 54 A
K9WJC 10,080 105 48 A
KB9WQJ 9,216 96 48 A
N9BPK 9,000 100 45 A
K9ZG 8,800 100 44 A
K9SB 7,440 93 40 A
WD9DJD 7,140 105 34 A
KB9ZEH 6,174 63 49 A
K9OR 4,028 53 38 A
K9GY 3,834 71 27 A
KA9R 3,200 50 32 A
KA9FEL 2,640 55 24 A
NA9DM 2,160 40 27 A
N9TJC 1,518 33 23 A
N9VVS 1,134 27 21 A
N9MYC 960 30 16 A
W9TUD 504 21 12 A
ND9G 360 20 9 A
WK9O 120 10 6 A
K0PG 19,782 157 63 Q
N9US 13,500 125 54 Q
NC9O 6,480 81 40 Q
N9WW 3,888 54 36 Q
N2BJ 228,960 1431 80 U
K9LU 208,640 1304 80 U
WA9TPQ 207,200 1295 80 U
NA9D 200,640 1254 80 U
WX9U 170,240 1064 80 U
W9YK 144,000 900 80 U
K9JLS 126,080 788 80 U
KI9A 123,200 770 80 U
KX9X 113,280 708 80 U
KK9A 92,500 625 74 U
NA9A 88,640 554 80 U
N9GUN 84,160 526 80 U
KB9CRY 81,760 511 80 U
N9AVY 77,600 485 80 U
K9UQN 74,240 464 80 U
N9QQK 71,360 446 80 U
K9RR 68,800 430 80 U
KD0AV 66,728 439 76 U
N9LCR 66,400 415 80 U
KU9Z 57,920 362 80 U
K9RS 57,920 362 80 U
N9OH 51,436 334 77 U
K9CS 49,280 320 77 U
KK9DX 47,680 298 80 U
N9BQR 45,864 294 78 U
WE9A 42,186 267 79 U
W9FX 41,080 260 79 U
K9JY 40,700 275 74 U
W9YS 40,560 260 78 U
W9LYN 38,924 263 74 U
W9VA 27,064 199 68 U
K9TMS 25,988 178 73 U
N9MBR 19,276 158 61 U
KG9IL 15,456 138 56 U
KB9VHA 14,762 121 61 U
KG9PF 13,426 137 49 U
W9LIZ 7,350 75 49 U
W9BB 5,402 73 37 U
W9WU 5,376 96 28 U
K9NR 286 13 11 U
AH6EZ 2 1 1 U
K9NS (K9HMB,K9PW,K9XW,
W9RM,ops)
308,160 1926 80 M
K9ZO (+AG9A)
222,080 1388 80 M
N9STL (+K9HUH)
179,680 1123 80 M
K9QT (+K9NR)
117,920 737 80 M
K9MOT (N9EP,N9MUC,K9QI,AA9AE,
N9KNS,N9RKB,K9RJZ,ops)
117,920 737 80 M
WD9CIR (+N9SJ)
117,440 734 80 M
N9IO (+N9IOQ)
108,704 688 79 M
N9JF (+NG9R)
88,480 553 80 M
W9EM(+N9MA,N9LZ,W9GWP,W9RRR,
KB9WXA,W9QL,N9HP,K9RIS,KE9SD)
85,760 536 80 M
K9AA (KG9PF,KB9LNE,ops)
71,360 446 80 M
K9IOC (+W9IOU)
69,888 448 78 M
AE9D (+N9TZQ+logger)
46,664 307 76 M
N5UWY (+KB5TFX)
21,744 151 72 M
K9DRW (+N9IHW)
19,276 158 61 M
N9UC (WO9S,op)
172,000 1075 80 S
W9UIH (W0TPO,op)
45,396 291 78 S
KR9L (KB9SWB,KB9UNQ,
KB9WFC,ops)
12,508 118 53 S

Indiana

KE9I 230,720 1442 80 B
N9RV 209,664 1344 78 B
W9RE 190,080 1188 80 B
WA1MKE 62,678 407 77 B
K9MI 24,924 201 62 B
K9XV 20,634 181 57 B
WO9Z 8,460 94 45 B
N9QX 4,158 63 33 B
AJ9C 168,960 1056 80 A
N4TZ 139,198 881 79 A
K9BG 120,640 754 80 A
WT9U 119,840 749 80 A
W9AU 81,600 510 80 A
N9NS 48,440 346 70 A
KC9FC 47,804 323 74 A
KK9V 42,912 298 72 A
K6OMB 38,778 281 69 A
KB9IVB 30,380 217 70 A
NE9O 25,254 183 69 A
WA0JTL 24,382 167 73 A
K9ZX 23,312 188 62 A
KF9UP 21,452 173 62 A
WB9FQS 21,168 168 63 A
KB9ORH 14,238 113 63 A
KB9STQ 13,500 125 54 A
WN9O 10,800 100 54 A
AE9YL 9,996 98 51 A
N9GKE 560 35 8 A
W9DZ 56,722 359 79 Q
W9BS 212,960 1331 80 U
W9IU 187,360 1171 80 U
WA9PIE 156,960 981 80 U
KJ9C 143,040 894 80 U
K9RU 112,480 703 80 U
K9VV 91,324 578 79 U
K9WX 79,520 497 80 U
N9KT 71,680 448 80 U
N9LF 65,280 408 80 U
K9MV 60,388 323 78 U
W9TN 44,160 276 80 U
K9IG 29,614 221 67 U
KC9TV 25,950 173 75 U
KC9RR (KB9THU,K9IG,ops)
10,168 124 41 U
WA9ALS 5,166 63 41 U
K9DA (+KF8VS)
70,720 442 80 M
K8IAT (+KB9YTT)
60,984 396 77 M
N1ND (@K9LA) (+AE9YL,K9LA)
42,400 265 80 M
W9YB 53,976 346 78 S

Wisconsin

W0AIH (WR0DK,op)
201,600 1260 80 B
WE9V 145,518 921 79 B
WI9WI 95,164 643 74 B
W9XY 50,876 322 79 B
WA9IRV 20,970 233 45 B
WA1UJU 138,880 868 80 A
N9CK 100,960 631 80 A
WT9Q 85,316 554 77 A
W9GXR 74,550 497 75 A
N9UA 70,532 458 77 A
AA9RB 57,196 362 79 A
W9WUU 52,320 327 80 A
AI9X 38,592 268 72 A
N9CIQ 38,400 240 80 A
W9FBC 38,106 261 73 A
KA9JAC 37,600 235 80 A
K9KR 37,240 266 70 A
K9ARF 30,810 195 79 A
WJ9H 30,096 228 66 A
K9VS 25,864 212 61 A
W9RN 23,808 186 64 A
AB9CD 17,760 148 60 A
K9QET 17,600 110 80 A
KB9S 16,530 145 57 A
W9GA 16,016 154 52 A
WB9BWP 12,138 119 51 A
K9DQ 10,908 101 54 A
WD9GWH 10,086 123 41 A
K9OSH 3,234 49 33 A
W9ISC 2,304 48 24 A
K9JPS 48 6 4 A
K9WIS 8,370 93 45 Q
N9FH 68,480 428 80 U
N9XX 67,680 423 80 U
W9XT 57,920 362 80 U
NF9V 55,680 348 80 U
KF9YR 50,232 322 78 U
KB9KEG 41,920 262 80 U
KA9FOX 36,010 277 65 U
AA9RR 15,750 105 75 U
W9YV (KA9WXN,N9FH,N9SD,N9VA,
WB9UAI,ops)
164,000 1025 80 M
NE9U (+KB9TTO)
135,252 867 78 M

0

Colorado

K0KR 264,480 1653 80 B
K0GAS 121,600 760 80 B
W0OSK 74,250 495 75 B
KF0LA 23,360 146 80 B
W6NIZ 20,944 136 77 B
W0AJ 8,342 97 43 B
KF0U 1,624 28 29 B
K0UK 175,680 1098 80 A
W0ZA 147,680 923 80 A
N4VI 69,008 454 76 A
AB0MV 47,892 307 78 A
N0LP 44,928 312 72 A
KC0GBC 41,664 336 62 A
KF0XD 38,198 269 71 A
NA3J 26,928 204 66 A
KB0CY 26,910 207 65 A
W0CBH 25,488 177 72 A
K0IRL 21,798 173 63 A
WM0F 20,976 152 69 A
KC0KSA 17,228 146 59 A
KG0LH 13,200 120 55 A
AE0Q 1,050 25 21 A
K0FRP 81,744 524 78 Q
KI0II 63,492 407 78 Q
KI0RB 13,530 123 55 Q
WB0HZL 9,240 105 44 Q
WV7T (+N0QJS)
13,200 132 50 M

Iowa

N0AC 208,480 1303 80 B
W0PPF 43,650 291 75 B
WN0G 204,640 1279 80 A
WK0F 122,608 776 79 A
N0HD 43,608 276 79 A
AD0H 36,314 271 67 A
K0RX 25,056 174 72 A
NS0B 19,440 162 60 A
W0IYH 14,910 105 71 A
N0SPP 13,786 113 61 A
N0YWI 672 21 16 A
K9IUA 37,240 266 70 Q
W0ETC 10,080 105 48 Q
NU0Q 52,000 325 80 U
KE0FT 33,920 212 80 U
N0MA (N0LNO,WE0F,AA0KW,W9FMS,
KD9KX,ops)
57,828 366 79 M

Kansas

W0BH 168,480 1053 80 B
W0MW 173,120 1082 80 A
N0YYO 61,152 392 78 A
WB0YJT 58,650 391 75 A
KC0GL 55,650 371 75 A
KC0IUW 53,352 351 76 A
N0QE 46,768 316 74 A
W0IE 32,562 243 67 A
KB0ZF 29,820 213 70 A
K0VGB 29,260 209 70 A
WW0H 28,566 207 69 A
KA0EIC 25,344 176 72 A
KC0ADP 17,556 154 57 A
N0OMC 11,340 105 54 A
W0SAS 9,494 101 47 A
K0LLS 4,422 67 33 A
W0NO (+K0WA,AB0S)
237,280 1483 80 M
K0FJ (+K0BJ,KC0JAO)
189,920 1187 80 M
N0NB (+KK0SS)
156,960 981 80 M
W0BR (+KC0KDH,KD5GNO,N0BTN,
N0SZE) 113,918 721 79 M
W0MI (K0BAJ,KA0RID,AC0E,ops)
74,892 474 79 M
KA0BHO (+KA0BAT)
26,572 182 73 M

Minnesota

K0HB 224,960 1406 80 B
N0IJ 220,160 1376 80 B
K0COM 124,894 811 77 B
W0OR 98,592 624 79 B
NY0C 69,920 437 80 B
N0AT 62,440 446 70 B
AA0Y 59,680 373 80 B
K0IR 44,872 316 71 B
K9WIE 37,118 277 67 B
N0MGQ 13,452 114 59 B
AC0W 190,720 1192 80 A
N0KK 163,214 1033 79 A
N0HJZ 138,560 866 80 A
WJ0M 123,520 772 80 A
K0TG 101,752 644 79 A
K0PC 92,196 591 78 A
K0MPH 80,542 523 77 A
K0LR 76,128 488 78 A
N0PI 71,732 454 79 A
WA0MHJ 66,240 414 80 A
AD0W 62,868 403 78 A
WA0RBW 60,750 405 75 A
K0BUD 53,144 364 73 A
N0ADQ 53,120 332 80 A
WB0TNH 41,588 281 74 A
WA2HFI 38,982 267 73 A
W0ZQ 37,950 275 69 A
K0TK 32,630 251 65 A
N0BM 30,514 209 73 A
KJ0B 30,192 222 68 A
K3WT 25,220 194 65 A
WA0WWW 23,188 187 62 A
WA2MNO 22,784 178 64 A
N0PO 16,640 104 80 A
W0VC 14,850 99 75 A
KB0GTW 13,860 154 45 A
WA0WOV 11,016 108 51 A
K0VH 11,000 100 55 A
WA0OTO 10,816 104 52 A
K0SR 9,200 100 46 A
N0UR 79,790 505 79 Q
K0AD 76,160 476 80 U
K4IU 16,356 141 58 U
KT0R (+K0AD,K0OB,K0MX)
282,720 1767 80 M
KI0F
(+KF0Q,K0NY,KE0S,KB0THN,N0WE)
160,960 1006 80 M
NV0P (+AJ0P)
131,328 864 76 M
W0YC (KC0KYN,N0BYH,N0YNT,
KB0PJV,ops)
99,712 656 76 M
W0SV (N0MY,KA0DAQ,WB0TRA,ops)
80,408 529 76 M
K0JE (+K0JA)
65,052 417 78 M
W0EF (N0HRL,ND0M,N0MGQ,ops)
64,650 431 75 M
N0RPM (+KA0HRT,KD5EMB,KC0IYT)
6,132 73 42 M
KC0EPV (+KC0HEW)
3,968 62 32 M

Missouri

K4VX (K9PG,op)
283,680 1773 80 B
K0DEQ 139,356 882 79 B
KI0MB 138,240 864 80 B
K0FG 34,400 215 80 B
K0JPL 15,372 126 61 B
WA0OTV 630 21 15 B
KA0GGI 97,440 609 80 A
KK2C 65,052 417 78 A
K0KY 55,784 367 76 A
K0EMT 47,432 308 77 A
WB0QLU 45,904 302 76 A
W0SLW 39,664 268 74 A
WW0Y 32,558 223 73 A
K0GN 31,758 237 67 A
AA0PO 29,784 219 68 A
KN0E 28,350 225 63 A
AA0RT 23,668 194 61 A
WA0IYY 20,790 165 63 A
WA0CNS 17,202 141 61 A
KI0HA 16,402 139 59 A
AD9P (KI9A,op)
10,800 120 45 A
KG0KP 10,368 108 48 A
K0LWV 5,280 66 40 A
AB0OX 2,754 51 27 A
AA0A 42,486 291 73 U
K0CA 17,440 109 80 U
K0GQ (K0OU,KC0ELZ,KC0EMA,ops)
208,960 1306 80 M
KG0UT (+KB0VVT,KG0US)
176,320 1102 80 M
K0RAY (+KA0GGI,N0BDS,N0PKX)
160,640 1004 80 M
NM0X (+KC0CZI,WN0X,NI0IB,KC0ACQ)
133,920 837 80 M
K0LIR (W0SLW,WA0IYY,W0RL,N0YV,
KI9A,W0HBH,ops)
132,088 836 79 M
KB5ENP (+KC8SDQ)
23,312 188 62 M
W0EEE (KC9UMR,KC0JEO,KC0HBM,
KI0PX,N8YXR,ops)
43,680 273 80 S

Nebraska

N0WY 88,764 569 78 A
K0PFV 80,738 511 79 A
K0IL 64,148 406 79 A
KG0ED 43,200 288 75 A
KK0DX 38,016 297 64 A
N0LGU 24,480 204 60 A
W0UVC 19,680 123 80 A
NE0DX 14,136 93 76 A
NO0D 24,600 164 75 U
K0DG (+W0DB)
262,400 1640 80 M
K0GND (+WD0EGK,K0NC)
128,320 802 80 M
K0KKV (N0GVK,KE0BZ,W0AVM,
KC0CDQ,ops)
77,920 487 80 M
WA0ASM (+WD0FGV,KC0DFR,
KB0LQR) 29,376 216 68 M

North Dakota

WB0O (VE5MX,op)
290,560 1816 80 B
W0WT 57,596 374 77 A
K0UD 53,100 354 75 A
N0UD (WB0OAJ,KC0HXF,N0LVW,ops)
28,380 215 66 M

South Dakota

W0SD (WD0T,op)
309,120 1932 80 B
KD0S 51,680 340 76 B
KC0IOX 50,224 344 73 A
WB0ULX 37,884 246 77 A
KA0VME 24,180 186 65 A
N0VEK 8,944 104 43 A
N0PV (+WJ0S,KC0JZO,KE0Z,AB0RE,
N0LPO) 45,440 284 80 M

VE

Maritime

VE9WH 37,440 240 78 A
VE9BL 17,444 178 49 A
VE9FX 73,120 457 80 U

Newfoundland-Labrador

VO1MP 160,320 1002 80 B
VO1WET 54,720 360 76 B

Quebec

VE2AWR 109,968 696 79 A
VA2IC 27,456 208 66 A
VE2OWL 6,768 72 47 A
VE2MAB 33,726 231 73 M

Ontario

VE3MIS (VE3IMG,op)
84,600 564 75 B
VA3UZ 147,520 922 80 A
VE3BUC 91,840 574 80 A
VE3MQW 81,760 511 80 A
VE3AGC 71,520 447 80 A
VE3RCN (VA3OR,op)
29,252 206 71 A
VE3EBN 28,908 219 66 A
VA3TPV 9,944 113 44 A
VE3WZ 8,232 98 42 Q
VE3VSM 126,400 790 80 U
VA3PC 46,080 288 80 U
VA3PRC (VA3JRH,VE3HCF,VE3KVD,
VE3YBM,VE3TPZ,ops)
14,490 105 69 M
VE3UOT (VE3GD,op)
16,720 152 55 S

Manitoba

VE4XT 219,200 1370 80 A
VE4GV 204,960 1281 80 A
VE4HAZ 31,640 226 70 A
VE4VV 37,440 288 65 Q

Saskatchewan

VE5CPU 192,000 1200 80 B
VE5SF 227,680 1423 80 A
VE5ZX 145,202 919 79 A
VE5AAD 114,660 735 78 A

Alberta

VE6TN 82,288 556 74 A
VE6JY 41,272 268 77 Q
VE6BF 14,734 139 53 Q
VE6RFM 44,082 279 79 U
VE6AO (VE6KC,VE6TC,VE6BWJ,
VE6WWW,VE6WSI,VE6BIR,ops)
234,080 1463 80 M
VE6YR (+VE6MPM)
48,100 325 74 M

British Columbia

VE7CC 304,800 1905 80 B
VE7IN 173,600 1085 80 A
VE7FO 147,040 919 80 A
VE7UQ 74,888 506 74 A
VE7NA (VE7TWO,VE7SPI,VE7BGP,
VA7RS,VE7GDE,VE7JLO,VE7DXH,
VE7FCO,ops)
47,596 326 73 M

Checklogs: K0DAT, K7DPT, K9HY, KA1TFU, KC2TR, KE6ZSN, N5DZX, VE5GC, VE8AE, VY1MB, W8EO, WB2KLD

2002 ARRL 10 GHz and Up Cumulative Contest Rules

1. Object: North American amateurs work as many amateur stations in as many different locations as possible in North America on bands from 10-GHz through Light.

2. Date and Contest Period: Third full weekend of August and September. The dates are **August 17-18, 2002 and September 21-22, 2002**. Operations may take place for 24 hours total on each contest weekend. Each weekend begins at 6 AM local Saturday though 12 midnight local Sunday. Listening times count as operating time. Times off must be clearly indicated in the log.

3. Entry Categories:

3.1. 10 GHz only.

3.2. 10 GHz and up.

4. Exchange: Six-character Maidenhead Locator (see April 1994 *QST*, p 86 or www.arrl/org/locate/gridinfo.html).

4.1. Signal report is optional.

5. Miscellaneous:

5.1. Scheduling contacts is both permissible and encouraged.

5.2. Stations are encouraged to operate from more than a single location. For purposes of the contest, a change of location is defined as a move of at least 16 km (10 miles). A station may be reworked on each band for additional credit by either end of the contact moving to a new location.

5.3. Contacts may not be duplicated on the second weekend (that is at least one end of the QSO must be from a different location).

5.4. Contacts must be made over a minimum distance of 1 km.

5.5. A transmitter used to contact one or more stations may not be used subsequently under any other call during the contest period. The intent of this rule is to prohibit "manufactured" contacts.

5.6. Contacts with aeronautical mobiles do not count.

6. Scoring:

6.1. Distance points: The distance in km between stations for each successfully completed QSO is calculated. Distance = distance in km.

6.2. QSO points: Count 100 QSO points for each unique call sign worked per band. Portable indicators added to a call sign are not considered as making the call sign unique.

6.3. Total Score: Equals distance points plus QSO points.

6.4. There are no multipliers.

6.5. In making the distance calculations, a string (or ruler) and map may be used. However, calculations by computer program are preferred. Several such programs are available in the commercial market, including a BASIC program listing in *The ARRL World Grid Locator Atlas* ($5). For purposes of making calculations, stations are defined as being located in the center of the 6-character locator sub-square (most computer programs make this assumption).

6.6. Scoring example: On the first weekend, W9JJ operating from Mt Greylock, MA works W1VD (distance 97 km) and W1LJ/1 (distance 107 km) on 10 GHz; and W1LJ/1 (distance 107 km) on 24 GHz. On the second weekend, W9JJ operating from Pack Monadnock, NH works the following stations: W1VD (154 km), W1VT (205 km), W1LJ (157 km), and K1RO (147 km) on 10 GHz; and K1RO (147 km) on 24 GHz.

Distance points = 97 + 107 + 107 + 154 + 205 + 157 + 147 + 147 = 1121

QSO points = 100 × 6 = 600 (10 GHz: W1VD, W1LJ, W1VT, K1RO; 24 GHz: W1LJ, K1RO)

Final Score = 1121 + 600 = 1721

7. Schedules:

7.1. Schedules may be set up by use of the HF calling frequency of 3818 kHz on the evenings of Tuesday, Wednesday and Thursday before the contest weekends starting at 7 PM local. Also, 144.230 and 146.55 MHz can be monitored during the contest to arrange schedules with other stations. Paired stations should move off these frequencies once contact has been made.

8. Reporting:

8.1 Official forms are available at the ARRL Contest Web Page at www.arrl.org/contests.

8.2. Electronic entries must include the required information from the ARRL summary sheet (available online) completely filled out and a log file indicating band, date, time, call sign, the exchange information plus distance of contacts in km. The Cabrillo format is not required for the 10 GHz and Up Contest.

8.3. Logs must be submitted no later than 30 days after the end of the contest (**October 15, 2002**). Paper logs may be mailed to ARRL Contest Branch, 225 Main St, Newington, CT 06111. Electronic logs should be e-mailed to 10GHZ@arrl.org. Incomplete or late logs may be classified as checklogs.

8. Awards: Suitable awards will be presented.

9. Other: See "General Rules for All ARRL Contests" and "Rules for ARRL Contests above 50 MHz" in November 2000 *QST* or at www.arrl.org/contests. QST

STRAYS

CALL FOR PAPERS—DIGITAL COMMUNICATIONS CONFERENCE 2002

◊ Technical papers are solicited for presentation at the 21st Annual ARRL and TAPR Digital Communications Conference to be held September 13-15, 2002 in Denver, Colorado, and publication in the Conference Proceedings. The Conference location is the Denver Marriott Southeast Hotel, 6363 E Hampden Ave, Denver, CO 80222. Annual conference proceedings are published by the ARRL. Presentation at the conference is not required for publication. Submission of papers is due by August 5, 2002. Conference registration details and updates are available on the Web at www.tapr.org/dcc.

The ARRL and TAPR Digital Communications Conference is an international forum for radio amateurs to meet, publish their work, and present new ideas and techniques. Presenters and attendees will have the opportunity to exchange ideas and learn about recent hardware and software advances, theories, experimental results, and practical applications. E-mail your paper in electronic format to Maty Weinberg at ARRL HQ at maty@arrl.org.

3905 CENTURY CLUB CELEBRATES 25 YEARS

The 3905 Century Club, an organization of hams in the US, Canada and Mexico, operates nets designed to provide an opportunity to work all 50 states, Canadian provinces and DX. Incorporated in Florida in 1977, the club operates nets 365 days a year on the 80, 40 and 20 meter bands using the more popular modes. SSB nets are operated daily at 0300Z on or about 3904 kHz, and at 0000Z around 7233.5 kHz. During the winter months, the group operates SSB nets around 1985 kHz several nights a week. There are also nets using RTTY, PSK and CW. For a complete schedule, check the club Web site, www.3905ccn.com.

In celebration of the club's 25th anniversary, many club members are operating 1×1 special event call signs during 2002. Club members welcome newcomers; stop by and give the nets a try. Complete information is on the Web site, or send 2 units of first class postage to James Higgins, KB3PU, 210 Mallard Dr, Sumter, SC 29150.—*Kevin Burkhart, WM0F*

Previous Strays

MONTE DRAPER, BEMIDJI PIONEER

"You are my first West Virginia–please QSL!" Marian Qvern, KB0OAQ, of Bemidji, Minnesota, makes her first contact, at age 79, with Milt, KA8PZY, of Masontown, West Virginia. Harold Borchers, KB0ROB, her proud Elmer, sent us the photo.

SECTION NEWS

The ARRL Field Organization Forum

ATLANTIC DIVISION

DELAWARE: SM, Randall Carlson, WB0JJX—Many thanks to the Penn-Del Club and all who helped, for sponsoring the 2002 Delaware State Convention. It was good to see many of you turn out despite the weather. One of the key issues brought out at the ARRL club leaders forum, is that in order to continue to draw members, clubs must provide something of interest to its members aside from conducting a business meeting. This can be something in the way of programs, discussion periods, or even food. Many clubs set aside a time, like a Saturday breakfast, or a Friday lunch to meet at a local restaurant, just to enjoy each other's company. These causal get together do a lot to keep folks interested in the club and in the hobby. Other groups sponsor contests and operating events at various times during the year. Yet others have regular speakers on a variety of subjects. You can even have things where everyone participates, like bringing in their most unusual QSL cards, or a homebrew night. What ever works for your club. The point is to keep doing things that are interesting on a regular basis. 73 Randall Carlson.

EASTERN PENNSYLVANIA: SM, Eric D. Olena, WB3FPL—SEC: Michael O. Miguelez, N3IRN. ACC: Steve Maslin, N3ORH. BM: Fredric Serota, K3BHX. OOC: Alan Maslin, N3EA. PIC: Robert Josuweit, WA3PZO. STM: Vacant. SGL: Allen Breiner, W3ZRQ. TC: Lawrence Thomas, AA3PX. ASMs: Robert Josuweit, WA3PZO, Pietro DeVolpi, K3PD. L. James Biddle, W3DCL, George Law, N3KYZ, Vincent Banville, WB3YGA. DXCC Card Checker E. Pa.: Glenn Kurzenknabe, K3SWZ. Congratulations to Loring Kutchins, W3QA. Loring recently became an OES and he will be a great asset to the Chester County organization. Another addition to the E. Pa. Staff is Chris Snyder, NG3F. Chris agreed to take over as EC in Snyder County when Clem Rohrer, NR3U asked to resign in order to pay full attention to the RO position in Snyder County. Working together, NR3U and NG3F will make an excellent team and Snyder County will benefit greatly. Clem acted as EC for over ten years. In Lebanon County another long serving EC also has resigned. Lanny E. Hoffman, KD3TS, resigned in order to make way for a more vigorous effort from some fellow Hams. It is, indeed rare for such an experienced person to recognize the advantage of stepping aside for a new team. Lanny's replacement has not been named as of the time of this writing. However, I am sure that his replacement will want to take advantage of Lanny's experience and have him on their staff. Nothing brought to our attention the need for change in some areas like the incidents of September 11, 2001. As a direct result of the incidents, of which we are so familiar, other happenings drove home the need for change especially in the Commonwealth of Pennsylvania. During the hours in the late afternoon of September 11th the activation of a few of the nets was an utter fiasco. In an effort to avoid some of the mistakes of that day the E. Pa. Staff is looking over the W. Pa. Section Emergency Plan with the hopes of formulating an plan for E. Pa. which is similar and together the two plans give some cohesiveness and direction for all of Amateur Radio in Pennsylvania. Make no mistake about my comments here there were many locations manned by a lot of dedicated Hams throughout Eastern Pa. and they performed flawlessly and have my deep admiration. Perhaps we do owe a bit of gratitude to those few who caused some confusion. Without their efforts we might not have noticed how much more organization was necessary. Tfc: K3BCL 442, N3EFN 241, N3SW 153, W3NNL 96, W3HK 72, W3UAQ 43, W3TWV 37, N3AO 33, KB3CEZ 23, W3JKX 18, KB3CVO 18, KA3LVP 15, N8JSO 15, AD3X 11, KB3BBR 7, K3ARR 7, N3ZXE 7, W3BNR 3, N3IRN 2, KB3DDL 2, W3ROQ 1, N3HR 1: Net Reports; EPA 134, EPAEPTN 97, PTTN 84, PFN 19, D3ARES 14, CATN 14, SEPPTN 8, LCARES 8, MARCTN 5, MCOES 2.

MARYLAND/DC: SM, Tom Abernethy, W3TOM, 301-292-6263-w3tom@arrl.org—ASM/RACES, Al Nollmeyer, W3YVQ (w3yvq@arrl.net). SEC: Mike Carr, WA1QAA (bamcc@erols.com) 410-799-0403. MDC Section Webpage: http://www.qsl.net/w3tom/. Congratulations to the Antietam Radio Association on the occasion of celebrating its Golden (50th) Anniversary! Special event station W3CWC operated on June 24-30 with a special 50th Commemorative QSO Certificate available. ANAR EC N3SEO reports ANAR ARES active for Strider's Cherry Pit 10 Mi. and Volvo Restart Festival. CALV EC N3QHC reports on Apr 28 CALV ARES Team was activated for tornado in CALV & CHAR. Apr 29 SCOT team of 5 members responded to CHAR to assist. SCOT Team members included N3ZIZ, N3YR, WD8OYG, N2ZIY & KF3AA. CHAR EC KA3GRW reports on Apr 28 an F-5 tornado struck CHAR & CALV. The CHAR ARES/RACES Team was activated to provide critical communications to County Government & CHAR Chapter of ARC while teams from PRGE & CALV were placed on standby. The CALV Team provided relief for the CHARS Team on Apr 29. This was a 72-hour operation involving the coordination of many agencies and personnel. The Team effort included: N3YRZ, N3YWZ, KB3GHI, K3GRG, KA3VNF, W3TOM, KB3FQE, AA3RT, KE3RE, KB3HNP, N2OMC, AA3WS, W7UH, KB3EPA (on stand-by), & EC/RO KA3GRW. Check out: http://www.arrl.org/news/stories/2002/04/30/2/?nc=1 FRED EC N8AAY reports N2CSQ, N3TWN, & N8AAY participated in the WASH County ARES/RACES Airport Disaster Drill 20 April. KENT EC WA6LHQ reports 20 members and 4 sessions of the KARS Net. PRGE EC/RO WI3N reports participation in 2 Public Service events including a MS Walk-A-Thon with members K3HDM, KB3DVC, KT3D, & K3HU & "Christmas in April". 73, Tom, W3TOM. With the nets: Net/NM/QND/QTC/QNI: MSN/KC3Y/30/38/307, MEPN/N3WKE/NO REPORT/, MDD/WJ3K/58/145/574, MDD TOP BRASS W3YVQ/145 AA3SB/157 K3JL/178 , BTN/AA3LN/30/46/389, Mar MEPN/N3WKE/27/70/426/, Tfc: KK3F 4247, W3YVQ 128, N3WK 62, KC3Y 51, K3CSX 34, KB3GFC 25, N3WKE 24, WA1QAA 18, W3CB 17, N3OR 10, KE3FL 0, PSHR: KK3F 241, W3YVQ 148, N3WK 134, K3CSX 114, WA1QAA 106, W3CB 102, KB8GFC 100, N3WKE 99, KC3Y 97, KE3FL 78.

NORTHERN NEW YORK: SM, Thomas A. Dick, KF2GC http://www.arrl.org/sections/?sect=NNY http://www.geocities.com/nnyara e-mail: kf2gc@arrl.org. The hot summer weather is upon us and many NNY Clubs are busy here doing Public Service, events like The Tin-man Triathlon on June 29th in Tupper Lake. If you're interested in this event contact: brumloff@adelphia.net. The Ironman USA event in Lake Placid will be on Sunday July 28th. We will need many amateurs to do health & welfare traffic working very closely with the Essex Co. EMS. We traditionally have amateurs man the ambulances and water stations & medical tent. If you are interested in doing this event contact: dickt4@capital.net. This is great training for us as we learn to work with emergency medical personnel and communicate under the direction of experienced net controls like Tony - WA2LRE Chuck-KD2AJ, etc. The NNYARA's Hamfest Committee has been very busy bringing together a day's full of forums & fun. We have Bernie Fuller, N3EFN, from the ARRL to do a forum. Also, Tom-N2SQO, from NYS-RACES, WB2JKJ - Joe & the 22 crew from JHS in NYC, Jim King, from the Clinton Co. EMO. Also, we hope to have N1ND, Dan Henderson of the ARRL do a forum on DXCC & contesting. You are really going to enjoy this year's NNYARA's "Lake Placid Hamfest 2002" on Saturday Oct. 12th from 8 AM-4 PM. Next test session at EOC in Plattsburgh, NY, in July contact: wn2f@arrl.net. Next test session in Schoharie Co. please contact: wb2kld@arrl. net. Next test session at TLARC contact: wizardr@adelphia. net.

SOUTHERN NEW JERSEY: SM, Jean Priestley KA2YKN (@K2AA) e-mail ka2ykn@voicenet.com. ASM: W2BE, K2WB, W2OB, N2OO, N2YAJ, N2XYZ, N2HQL. SEC: K2GW. STM: K2UL. ACC: KB2ADL. SGL: W2CAM. OOC: K2PSC. TC: W2EKB. TS: W2PAU, WB2MNF, AA2BN, KD4HZW, WB3IJB, WA2NBL, N2QNX, N2XFM. I regret that Vicki, SEC, KC2GID, has to step down. Vicki is dedicated to emergency work. But equally so is our new SEC, Gary Wilson, K2GW. In the next few months Gary will be gearing up. Welcome Gary! Be sure to do field Day with your club or give points from home. FD is a good time to join a club and make new friends. This is also a good time to mention the importance of keeping commitments made in ARES, club activities, net control slots or any commitment we make in life. Something to do? Visit the Battleship New Jersey. Rpt for April. QNI rpts NJM 47 WA2OPY NJPN 195 W2CC NJSN 163 K2PB NJN (E) 188 AG2R NJN (L) 174 AG2R CMCNTS 14 KB2YJD JSARS no rpt SJTN 96 KB2RTZ SJVN 319 WB2UVB SAR rpts K2UL 91, KB2RTZ 89, AA2SV 76, WA2CUW 64, WB2UVB 56, WJ2F 48, K2UL-4 37, N2VQA 23, KA2CQX 9, KC2IYC 6, N2WFN 6, W2AZ 6, KB2VYZ 4, N2QWR 2, KB2YBM KB2VSR KC2ETU 1 PSHR: KB2RTZ 260, WB2UVB 178, K2UL 171, KA2CQX 130, AA2SV 122, N2HQL 110, WJ2F 104, WA2CUW 99, KA2YKN 82, KB2YJD 56, N2WFN 44. Keep in touch, originate a message.

WESTERN NEW YORK: SM, Scott Bauer, W2LC— The WNY DX Association reports that Peter K2RSK won the club's Broken Filament Award, as it's called, by completing DXCC the fastest in 2002. It took Peter until February 14 to work 100 countries. This is a great example of a fun event, and a way to spur club activity by getting your members active and on the air. Cortland County EC Andrew KB2LUV report 17 Amateurs including AK2K, N2MGU and the W2SYR communications van, provided communications for the YMCA/YWCA Canoe Classic. Chemung County EC Elliot N2OJM reports plans for a new tower base and equipment bays for the repeater and packet systems at the county site. Elliot also says mouse proofing is needed. How about a cat? Duane WV2B, WNY Official Observer Coordinator, reports 212 hours of monitoring by the WNY OOs, with 11 notices and 1 good operator report sent. Were you one of the lucky recipients? The Official Observers and Amateur Auxiliary provide a great service to the Amateur community through on-the-air monitoring and helpful assistance. The Skyline ARC recently recognized Bill, N2BC, for 10 years of service as a club officer, Bill, KB2ETO, for his service in traffic handling and being a liaison for the STAR net, Stan, W2EWM, for 50 years as grounds keeper, and Ron AA2EQ for all of his coordination efforts at the club contest station. Congratulations to all for your years of hard work for your club. Hamfests: July 20, Batavia Hamfest at Alexander Fireman's Recreation Center, Rt 98, by the Genesee Radio Amateurs; July 27, Utica Hamfest at Frankfort, Utica Amateur Radio Club. Net Summaries (April 2002): Net Manager (Sessions) QNI QSP. Sessions in ( ) if less than 30. CNYTN WA2PUU 315 58; ESS WI2G 389 102; NYPHONE N2LTC 224 379; NYPON N2YJZ 329 126; NYS/E WB2QIX 356 201; NYS/L W2YGW 250 214; NYS/M KA2GJV 174 27; NYSCN W2MTA (4) 18 0; OARCN N2KPR (4) 40 5; OCTEN/E KA2ZNZ 1361 244; OCTEN/L KA2ZNZ 524 201; OMEN N2UC (1) 15 1; STAR N2NCB 394 18; TIGARDS W2MTA (4) 23 1; WDN/E N2JRS 540 89; WDN/L W2GUT 499 51; WDN/M KA2IWK (8) 121 4. Traffic (April 2002), * for PSHR, # for BPL: N2LTC#* 1439, W2MTA* 424, KA2ZNZ* 385, KA2GJV* 369, WB2IJH* 325, NN2H* 235, WI2G* 184, KB2KOJ* 156, WB2QIX* 99, KC2EOT* 88, W2LC* 71, KB2CCD* 65, KG2D* 65, KA2DBD* 59, W8JEB* 44, AF2K* 41, N2CCN* 41, W2PII 40, KB2SNP* 35, KB2ETO* 27, KB2SGT* 22, WA2GUP* 16, K2DN* 15, W2RH 12, KA2BCE* 11. Digital, Rx/Tx: N2LTC 414/306.

WESTERN PENNSYLVANIA: SM, John Rodgers, N3MSE—ASM: N3MYZ. SEC: N3SRJ. ASM-ARES: WB3KGT. ASM-Packet: KE3ED. ASM-Youth: AA3LX. OOC: W3ZPI. PIC: W3CG. STM: N3WAV. TC: WR4W. DEC: N3YEA. DEC-SO: KD3OH. DEC-N1: KB3A DEC-N2: KA3UVC. DEC-S1: KA3HUK. DEC-S2: WD9GYC. DEC-Rapid Response: N3ZZI. DEC-OES: K3TB. Several new appointments to the ARES leadership team have been made by Section Emergency Coordinator Rich Beaver, N3SRJ. K.T. Newlin, WD9GYC, has been appointed as District Emergency coordinator for the south 2 region. Chris Mincemoyer, KB3GGP, has been appointed as Emergency Coordinator for McKean County. Mike Miller, N3HBH, is the new Emergency Coordinator for Clearfield County. I would like to congratulate and thank them for volunteering to help in this much needed area. There are still a few counties that have a need for individuals to serve as the Emergency Coordinator. Interested individuals should contact Rich Beaver at n3srj@arrl.net. Along with the nice weather of summer also comes numerous opportunities for the amateurs to help with the various public service events. There will be bike-a-thons, parades, air shows, and the countless other events sponsored by various agencies. Severe weather is also associated with this time of year and I encourage all amateurs to participate in SKYWARN training sessions in their area in order to receive training to support the National Weather Service agency. Any groups that would like a speaker for a club meeting should contact me to schedule. Remember the section traffic net of 3983 Hz nightly at 6 P.M. 73 de John Rodgers, N3MSE, WPA-SM n3mse@arrl.org.

CENTRAL DIVISION

ILLINOIS: SM, Bruce Boston KD9UL—SEC: W9QBH. ACC: N9KP. STM: K9CNP. PIC: N9EWA. OOC: KB9FBI. TC: WA9IL. DEC-Central: N9FNP. DEC-S/W KB9AIL. Illinois Section Manager, KD9UL, would like to thank every amateur and radio club for their volunteer efforts and assistance during the past eight years. There were always more things to do and places to go than time or resources would permit, but it was quite a ride nonetheless. Sharon Harlan, N9SH, will take on the duties of Section Manager in July. Club newsletters should now be forwarded to her, and all e-mail reflector managers should update their member lists. The Starved Rock RC has been making final plans for their annual hamfest. The group has decided to drop their long-standing hamfest tradition of giving amateur rigs to prize winners, and will now give gift certificates from a ham radio dealer. The club recently decided to purchase a new dual-band FM rig for the clubhouse. Members of the Egyptian RC helped with the annual March of Dimes Walk America event in April. More than a dozen amateurs participated in the LaSalle Nuclear Power Station drill on March 20. The volunteers used voice and packet during the simulated operation. The Western Illinois ARC has learned its repeater system will be allowed to remain on the WGEM-TV tower following that station's upgrade to HDTV. Lake County RACES member K9KRY has been elected to the LC RACES board of directors. He fills the unexpired three year term of AA9NK. The group provided radio communications for the 45th running of the Des Plaines River Canoe Marathon in May. Hamfesters RC will operate Field Day from Moraine Valley Community College this year due to construction at their regular site. K9DRF gave a presentation on the Internet Radio Linking Project at a meeting of the Peoria Area ARC. IRLP uses the Internet to connect nearly 400 repeaters and remote bases around the world. The Peoria node operates on 145.600 MHz simplex and is open to everyone. DTMF tones are used to access the network. April traffic: K9CNP 118, KD9YV 115, WD9F 58, WB9TVD 36, N9DT 32, W9HLX 28, NC9T 20, W9FIF 14, N9PLM 12, WA9RUM 7, N9GZ 2. ISN report for April 02, QNI-244, QTC-93, Sessions-31. From KF4UBX: 9RN cycles 1 & 2 60 sessions, Traffic-199 average per session-3.31, checkins-562, 95% of Il. traffic handled by: KD9YV, KA9IMX, NN9M, AG9Y, N9PLM, N9GZ, KB9ZCW, W9HLX. W9VEY Memorial Net report 7 with 237 check-ins.

INDIANA: SM, Peggy Coulter, W9JUJ—SEC: K9ZBM. ASEC: WA9ZCE. STM: WA9JWL. OOC: AA9WD. SGL: K9JZZ. PIC: KB9LEI. TC: W9MWY. BM: KA9QWC. ACC: N9RG. There were no SK reported to me this month. This will be my last column I will write, after 12 years and 144 times. I want to thank my Staff for all their help and every one else who has sent me articles and tfc totals. I have enjoyed the many hamfests I've attended and all the Hams I have met. Please continue the courtesies you have shown me to the new SM, Jim Sellers, K9ZBM. Start sending him your reports and newsletters. Ten members of LCARC participated in the Lake County March of Dimes Walk. They were WN9Z, WD9GQO, KB9THY, WB9 VRG, KB9NSD, KB9TNQ, W9ZRO, K9MQ, W9CCH and KF9EX. Congratulations goes to Sandy Swartzendruber, W9JOE, receiving the 2002 NOAA Environmental Hero Award. Congratulations also to the Purdue Calumet ARS for being declared a duly Affiliated ARRL Club. NM's ITN/WA9JWL, QIN/KJ9J/K9PUI, ICN/K8LEN, VHF/WA9JWL.

Net	Freq	Time/Daily/UTC	QNI	QTC	QTR	Sess
ITN	3910	1330/2130/2300	2404	185	1503	87
QIN	3656	1430/0000	188	85	961	54
ICN	3705	2315	46	20	286	18
Hoosier VHF nets (13 nets)			631	26	1151	56

D9RN in 60 sessions with QTC 199 IN represented 88% by K9GBR, WB9QPA, WA9JWL, AA9YM, KE9AK, N9KNJ, K9QDR and WA9DSG. 9RN IN 60 sessions with QTC 215 IN represented by KO9D, K9PUI, WB9OFG, KJ9J, N9HZ, WB9UYU and W9FC. Tfc: W9FC 283, KO9D 16, WA9JWL 94, K9PUI 91, KJ9J 85, W9JUJ 48, KB9NPU 40, K9GBR 32,

Continued on page 102.

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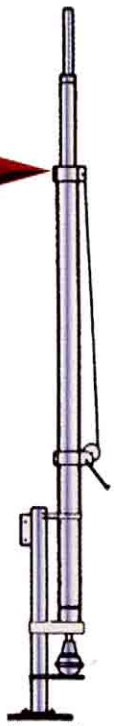

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N9KNJ 26, KB9TUI 24, WB9OFG 20, K9RPZ 20, WB9QPA 16, W9EHY 15, K9ZBM 13, N9HZ 7, AB9AA 6, W9UEM 5, WB9NCE 4, K9CUN 3, K9TFP 2, K9DIY 2.

WISCONSIN: SM, Don Michalski, W9IXG—SEC: WB9RQR. STM: K9LGU. ACC: Open. SGL: AD9X. OOC: W9DGI. PIC: W9UQ. TC: K9GDF. BM: WB9NRK. ASM: K9UTQ, W9RCW, W9CBE. Norm Lerch, W9JBF, 87, is a SK. Norm was a member of RMRA and WVRA. Eugene Schultz, NF9Q, is a SK. He was a member of SCARC and SCDXA. The M&M ARC had a SKYWARN spotter training class with 31 in attendance. Training schedules are listed on the www.w9ixg.eboard.com site. We encourage you to know how to properly report weather problems so please take one of these classes! The Waupaca County ARES donated a radio to be placed in the Waupaca County Sheriffs office for use during severe weather events. We appreciate those that attended the Governor's conference. In particular, we would like to thank WN9I and N9IAI for demonstrating Pactor at the Amateur Radio booth. Outagamie County conducted a mock attack at the Fox Valley Technical College. SEC, Stan Kaplan, WB9RQR, and Jack Morrison, N9SFG (Assistant SEC for Training), were there as referees for the ham involvement in a tri-county Full Scale exercise. Also participating, as special observers, were N9VSV and N9UUR. April 9RN report shows another perfect 100% participation by the Wisconsin traffic handlers! Thanks! When operating at Field Day, Tim, KB9TJI, recommends that every FD site have a public sign that says: "Ham Radio— yes, we still do it!!" Hopefully, that will draw people in. 73, W9IXG. Tfc: K9JPS 830, W9RCW 446, K9GU 401, N9VE 374, W9CBE 172, N9BDL 79, K9FHI 60, AG9G 59, KE9VU 52, W9UW 47, W9YCV 44, KG9B 42, KB9ROB 41, N9KHD 39, W9BHL 36, W9IHW 30, AA9BB 27, KA9FVX 24, WB9ICH 20, N9JIY 12, W9RSX 8, W9PVD 7, WD9FLJ 7, K9UTQ 4, N6NKO 2. (Mar) N6NKO 7.

DAKOTA DIVISION

MINNESOTA: SM, Randy Wendel, KMØD—In April 2002 issue of Mobile Radio Technology, the editor, Roger Lesser, wrote 2 articles regarding the role of amateur radio comms and the events of Sep 11 2001. In one article, Radio Amateurs Badge of Honor, Lesser wrote about the response of Amateur Radio at WTC and Pentagon, and how "we" had to overcome the many emotions due to the events that day, while maintaining our dedication to the many challenges of supplying comms to various agencies. In Lessors' other article, Disrespect of Amateur Radio on Sep 11, Lessor spoke about the many challenges of hams gaining access to the many secured areas to provide comm service. Asides from the usual ARES ID's, operators needed special-issue IDs' due to the nature of the incident. One major problem was only a limited number of ID's were being issued by various agencies…both govt and volunteer (i.e.Red Cross,Sal.Army). When an agency reached their limit, hams had to get ID's from another agency, etc. This limited the service ARES had to offer. Generally speaking, it's obvious the role we serve requires not only knowledgeable hams, but awareness of our role by the many agencies. Yes, the Sep 11 events were a bit out of the ordinary. However, it would be everyone's ignorance to think it can't happen again. Yet, the awareness and importance of our role will always remain the same, whether it's at a WTC, or another St. Peter tornado or Carlos Avery wildfire. Served agencies should be aware of our resources, and as much so, We should have as much understanding of their needs so we can effectively implement our services. Meetings, training, drills. When this objective is realized, it's a win-win situation for everyone. de Randy Wendel.

Net	*Freq*	*Time*	*QNI/QTC/Sess*	*Mgr*
MSPN/E	3860	5:30 P	842/112/30	KXØN
MSPN/N	3860	12 P	521/68/30	WAØTFC
MSSN	3710	6 P	N/A	Vacant
MSN/1	3605	6:30 P	271/75/30	KØWPK
MSN/2	3605	9:50 P	128/8/25	Vacant
PAW	3925	9A-5P	2656/104/89	KAØIZA

SAR/PSHR's: WAØTFC, KXØN, WØLAW, KØWPK, NØUC, KCØHAW, KBØAII, WØHPD, WØGRW, KØSPH, KAØIZA, WDØGUF, KBØAII, KBØOHI, WAØYSL, NØJP.

NORTH DAKOTA: SM, Kent Olson, KAØLDG —Congratulations to Jim Kruft, NØTSZ in becoming an Emergency Coordinator for Cass County. The Grand Forks club is working with the East Grand Forks Fire Dept on updating their disaster manual, and has developed a database of hams for weather spotting. I encourage other clubs in the state to do the same. Thanks to those who helped out with the MS Walk in Bismarck and Fargo. Congratulations to the RRRA and their General license class. All who took the class got either their General ticket or a CSCE. Our condolences go out to the friends and family of Gerald Knapkewicz, KØWND, of Beach who became a Silent Key in February. KØLU, tractor mobile, was heard in the Dickinson area. That is truly Amateur Radio at its best. The Fargo hams succeed in their tower battle with the city. Although they had to make some concessions, an agreement that all could be happy with was reached. Keep your eyes open for severe WX. Peace Gardens Hamfest to be held 12-14 July. Section's Web site at: http://home.earthlink.net/~qtipf16/. HF NM KEØXT reports Goose River Net, 4/34/0; WX Net 30/679/14; Data Net 30/770/16.

SOUTH DAKOTA: SM, Roland Cory, WØYMB—As of this writing, there has been no action on the Rapid City proposed antenna ordinance. The antenna ordinance special meeting at Rapid City Council was canceled with no further information given. This is being watched for further developments. It is reported that the Redfield group's 2-meter repeater is being shut down. At Aberdeen, Harry, WAØMFZ, showed an antique one-tube regen commercially built receiver. Ron, WDØHWL, displayed a one transistor receiver that operates from solar power. At Watertown, NTØQ was to present their club with a QRP building program. They also had a severe weather program to prepare for weather spotting. At their VE testing in April, six area residents became new ham licenses. Three people went to Extra. WØLPG from Watertown, and NØALH and WAØMHZ of Aberdeen. Watertown Club is working on a new QSL card for their club station WØWTN. Don't forget to check into the Novice net on Sunday evening at 7 PM on 3700.

DELTA DIVISION

ARKANSAS: SM, Bob Ideker, WB5VUH— Hope you had a great & safe FD this year. Now comes the patience of submitting your club info. & awaiting the results. Regardless of the outcome, I know each one of you & your clubs' did the best you could & hope that FD is more than just the contest portion but rather an opportunity to work together with fellow club members in a cohesive effort to learn more about processes that should be followed if a real emergency existed. It's all about TEAMWORK; something that's no stranger to our section and I see it more & more everyday. You may have heard of our section recruiting drive. More details about what you can do to help are found on our section Web site: www.all-arkansas-hams.org. You could qualify to have a chance of a nice gift if your name is drawn at the beginning of each month & get your name published in this article. I hope you'll help. It ought to be fun. Congratulations to N5YOR, KD5MEH & KH7YS for completion of the ARRL EC course lead by K1ARK. Traffic for April indicates we had 107 sessions, over 2700 checking in to the nets for a total of over 34 hours of operation. Outstanding work continues within our HF net structure and we all appreciate the work of WB5HIL & his team of NMs who conduct the nets. Individual efforts include: K5BOC 35, WA5KQU 34, W9YCE 28, K7ZQR 19, WB5HIL 18, AB5ZU 5, KC5VQW 4, & KA5RRU 2. Want to get your call printed here? Just help pass some traffic & you will be.

LOUISIANA: SM, Mickey Cox, K5MC —Congratulations to KD5MWL, a science teacher at Richwood High School in Monroe, for receiving an ARRL grant for his school to further the study of wireless technology in education. Don's school is one of only seven chosen as a First Round Pilot School in the League's Big Project! I hope that more schools from our section will be chosen over the next few years as Big Project Schools. Receiving such a grant would be an excellent way for a school to either start or reactivate a ham club. More information on applying for a grant can be obtained from Jerry Hill, KH6HU, at ARRL HQ. At the request of the National Weather Service, WA5LQZ, KA5SUR, and KC5NAD of the Calcasieu Parish ARES set up a ham station and gave talks to about 400 school kids at the Lake Charles airport. Sounds like the trio did a great job in promoting our hobby to the young folks! Unfortunately, I must report that Al, WD5CFC, and Joe,WE5V, are now Silent Keys. Al served as president of the New Orleans VHF Club for many years and also served in various positions for the Jefferson ARC. Joe was an active member of the Southwest LA Amateur Repeater Club and was well known for his volunteer services. Both of these gentlemen will be missed very much. Tfc: K5IQZ 123, K5MC 100, KM5YL 45, W5NK 42, W5PY 27, K5DPG 24, N5JU 9. PSHR: K5IQZ 128, K5DPG 124, KM5YL 124, W5PY 117, K5MC 83, N5JU 59. Net Reports: sessions/QNI/QTC. LTN: 28/352/88. LCW: 28/154/50.

MISSISSIPPI: SM, Malcolm Keown, W5XX— After many months of coordination and equipment installation, the Central MS SKYWARN Net linked up with the North Louisiana Linked System during the April CMSN Session on the last Sunday night of April. This resulted in a VHF backbone along I-20 from Shreveport to Meridian. Congratulations are in order for AB5WF, KB5ZVK, N5XXX, W5PPB, KA5SBK, KI5FW, W5SAR, and K5ER, who made this all happen. My apologies if I left anybody out. During early April W4ACS, KD5PGV, and KD5PGT assisted the faculty of a Boy Scout leadership course at Camp Tiak by providing communications between the main camp and the outpost camp. Hams also demonstrated HF/VHF operation to 800 Cub Scouts during a parentson weekend. Those helping were W5ACS, W5DJW, KD5BED, W5CR, KA8JRM, N4UPX, KD5RVX, N5FG, AE5RM, KB5ECZ, and N9OKV. The Jackson ARC provided public service communications in April for both the Natchez Trace Century Ride 2002 and the March of Dimes WalkAmerica. Those assisting were AB5WF, KI5MP, KD5KWS, KD5FUY, KD5HDZ, KD5QQF, AC5SU, KD5JPB, KM5WN, W5GEJ, K5TMA, K5VU, AK5J, and W5PFR. MSU Graduates K5FLU and W5EPW had nice write ups on their ham activities in Momentum, the quarterly journal of the MSU College of Engineering. The Meridian ARC set up an information booth to promote ham radio as part of the Jonathan Mars Cancer Benefit Fundraiser. Those participating were N5JCG, KB5ASR, KI5FW, KD5QIQ, WD5HLD, WA5EE, W5MAV, KD5JYJ, KD5GWM, W5OQY, KD5PBJ, and KD5PBI. Welcome to new MS hams: KD5RNY, KD5ROI, KD5RSA, KD5RTD, KD5RTE, KD5RTF, KD5RDG, KD5RTH,KD5RWH - Florence. Regret to report the passing of W5GOU and KD5KUK. Nets: sess/QNI/QTC: MSPN 30/3621/61, MTN 31/113/33, MSN 30/1485/13, MSSN 21/51/3; PBRA 30/828/8; JCARES/RACES 30/360/19; MSSN 21/51/3, WCMS ARES 13/131/0; MAEN 7/102/0; LARC-Jones Co ARES 5/119/0, Bluff City EN 5/105/1, MCARA 5/62/0, JARCEN 5/101/5, Attala Co ARES 4/35/0, Lowndes Co QSO Net 4/45/0, SW MS ARES 4/33/0, HAEN 4/52/0, NW MS Skywarn 3/16/0, MLEN 2/29/0, Central Miss SKYWARN 1/63/0. PSHR: WB5ZED 179, N5JCG 153, K5VV 130, KJ5YY 78, W5XX 72. Traffic: WB5ZED 1079 (BPL), K5VV 98, N5JCG 44, KJ5YY 18, W5LEW 8, W5XX 6.

TENNESSEE: SM: Terry Cox, KB4KA—ACC: KB4KA. ASM: K4DIT & K4PZT. SEC: KB4G. STM: KR4TT. TC: KB4LJV. OOC: KE4KMG. SGL: KC4POI. PIC: N4WSM. Section Web page at www.tnarrl.org. First, a correction from last month The Big South Fork "Train" Ride was supposed to say Trail Ride! Sorry for the goof folks. April has provided us with some additional weather generated activities through Skywarn Nets and flooding in parts of the state. MARC News reports some of their member's Skywarn messages were used by the local TV station to warn residents. Good job, guys! They also report that the Mule Days parade went well. Check their web page at www.w4ggm.org for pics. The March of Dimes Walk in Memphis on Saturday April 27th was again supported by local hams from several clubs. Those involved were Tommy-KD4TJO, JD-K4USN, Ken-K4DIT, David-KU4AS, Ben-KU4AW, Kathy-KE4UYU, Michelle-KG4IZZ, Tim-AB4NH, Sylvia-KE4WOT, Suresh-N9GSA, Steve-KG4KCW, Chris-KG4QDI, Tom-K4ZFV, Bob-KF4NDH, Terry-KB4KA, Joe-WA4OVO, Damien-KG4NBM, Ned-KA4BLL, George-KG4BZZ, Paul-WM5Q, John-K3LK, Scott-KG4OCY, Joe-KE4JFN, Arliene-AA5GX and Melinda-KE4DXN. The Tri-State Repeater Association's 146.88 repeater was used. The WTARC in Jackson supported their MOD Walk on Sunday

April 28th I believe. I haven't heard who participated there. You might be reading this prior to Field Day 2002. If so, I hope each of you have the opportunity to participate with a group. I will be working with my home club and we will be using the call W4BS. RACK Panels had a big spread on the Knoxville HamFest scheduled for June 7th & 8th. I'll be there - hope you are too! Greg-N4WSM, our PIC says he has began collecting QST magazines for placement in local Lebanon school libraries at the suggestion of fellow amateur Eddie-KD4QXR. This might be worthy of discussion at your club meetings as a project. They place a label on each magazine with the club web site URL, email address and mailing address. That's all for this month - I'll have a Dayton report for you in the next Section News. Net Sess/QTC/QNI: TEMPN 22/24/912; TEPN 20/46/2009; TMPN 30/28/2493. Late March SARs: K4UMW 9, WA4HKU 16 April SARs: KE4GYR 55, WA4KHU 16, W4SQE 111 PSHR: KE4GYR 99.

GREAT LAKES DIVISION

KENTUCKY: SM, John D. Meyers, NB4K—Silent Keys for April: Candace Hammond KE4ZKL, David White W4UVH, Lloyd Cobb K4ZWB and Troy Spear WA4VAZ. The ARRL state convention will be August 4th with the banquet being the night before. The Banquet will be held at the Holiday Inn North Located at Exit 115 of I 64 and I 75. Cost of the Banquet is $30 which includes the meal, entertainment and admittance ticket to the hamfest the next day. A block of rooms have been reserved at the Holiday Inn North for those hams desiring lodging for $80 which does not include tax. This cost includes up to four people per room. If one desires, a king-size bed can be upgraded at the same price, 5:30-6:15 social gathering with entertainment by "The Chance Brother" a duo with sax and keyboard. CASH BAR! 6:15-7:15 buffet dinner 7:15-9:00 speakers and presentation of awards. For banquet reservations contact Jeanie Dalton Pugh, KB8QLC, at P.O. Box 24188, Lexington, KY, or she can be reached at 859-245-7703. All reservation money must be received by July 19. If you desire lodging accommodations please let Jeanie know by July 19 as she will inform the Holiday Inn of the number of reservations to expect. There is a Web site that will be keep up-to-date by Pat Spencer, KD4PWL, as this special event continues to develop, you can find it at http://www.qsl.net/kd4pwl/arrl.html. (PSHR) K4DZM 110, NB4K 100, KO4OL 96.(SAR): K4DZM 56, WD8JAW 20, NB4K 13, KG4ABA 12, WB4ZDU 10, K4AVX 38, KO4OL 33.

MICHIGAN: SM, Dick Mondro, W8FQT (w8fqt@arrl.org)—ASM: Roger Edwards, WB8WJV (wb8wjv@arrl.net). ASM: John Freeman, N8ZE (n8ze@arrl.net). ASM: Lyle Willette, AB8CB (ab8cb@arrl.net). ASM: Deborah Kirkbride, KA8YKK (ka8ykk@arrl.net). SEC: Ray DeVlieg, kb8vni@arrl.net. STM: Joe Turner, K8CQF (k8cqf@arrl.net). ACC: Sandra Mondro, KG8HM (kg8hm@arrl.net). OOC: Donald Sefcik, N8NJE (n8nje@arrl.net). PIC/SNE: David Colangelo, KB8RJI (kb8rji@arrl.net). SGL: Ed Hude, WA8QJE (wa8qje@arrl.net). TC: Dave Smith, W8YZ (w8yz@arrl.net). Youth Activities: Steve Lendzion, N8GQ (n8gq@arrl.net). BM: Thomas Durfee, Jr.,WI8W (wi8w@arrl.net). I am going to devote this month's article to an important Section event that all are invited to attend. The Michigan Section Family Outing, July 11-14. There is no requirement to be an Amateur Radio Operator to attend. We have lots of activities for young and old and those in between. There are 200+ beautiful acres at the Woodlands Campground and Conference Center in Lupton, near West Branch, with Nature Trails, Wildlife, 2 Lakes, fishing, boating (no power motors), canoeing and hiking. The Family Outing will have exclusive use of the entire grounds. There are clean bathrooms and showers in the camping area and there are plenty of showers and facilities in the Conference Center. The Conference Center can sleep approximately 40 people if you are not a camper. Campsites or lodging are $12/15 per night and meals are $5 or less per person. If you have a vacation in your plans or just a weekend or a day, please join us. The forums will take place on Saturday with featured speakers such as our Great Lakes Division Director George Race WB8BGY, FEMA Region V Branch Chief, John Fell, Emergency Manager Tim London, Section Traffic Manager Joe Turner, K8CQF as well as Section Staff updates on the PRB-1 effort in Michigan. Youth and family activities all day long with a relaxed atmosphere and when the sun sets, we will have campfires and fun each evening, hayrides too. Details and photos on the Section Web site and please get reservations in early as space is disappearing fast. The MI Section Web site at www.arrl.org/sections/MI.html 73, Dick. Tfc: KC8LBZ 446, KB8ZYY 403, K8GA 251, W8RTN 234, N8FPN 196, K8LJG 115, AA8PI 111, K8AE 99, WR8F 94, WX8Y 80, AA8SN 62, WI8K 52, WA8DHB 48, W8RNQ 47, KC8SZR 45, K8UPE 33, KI8GR 32, KA8DDQ 31, N8JAT 30, W8YIQ 22, K8YB 16, N8EXV 9, K8AMR 9, K8FE 6, W8NGO 4, NX8S 2. Deadline 5th of the month. Please support the following Michigan Section Nets

Net	QNI	QTC	Sess	Net Mngr.	Freq.	Time	Day
QMN	668	302	71	WB8SIW	3.663	6:30&10 PM	Daily
MITN	448	315	30	N8FPN	3.952	7 PM	Daily
GLETN				VE3SCY	3.932	8:30 PM	Daily
UPN				AA8SN	3.921	5 PM	Daily (Noon Sun.)
WSSBN	767	36	31	WB8ICN	3.935	7 PM	Daily
SEMTN	260	74	30	WI8K	145.330	10:15 PM	Daily
MACS	204	57	30	W8RNQ	3.953	11 PM	Daily (1 PM Sun.)
VHF				KB8ZYY		Various	
MI-ARPSC	60	5	4	W8FQT	7.232	5 PM	Sunday (Alt. 3.932)

OHIO: SM, Joe Phillips, K8QOE, Fairfield, (to contact me, see page 12 or check out the Ohio Web Page at www.arrl.org/sections/OH.html): ASM-NE: Bob Winston, W2THU, Cleveland. ASM-NW: Ron Griffin, N8AEH, Findlay. ASM-Central: Mary Carpenter, N8OAM, Westerville. ASM-SW: John Haungs, W8STX, Cincinnati. ASM-SE: Connie Hamilton, N8IO, Marietta. SEC: Larry Rain, WD8IHP, Mansfield. STM: Jack Wagoner, WB8FSV, Hilliard. ACC: Brenda Krukowski, KB8IUP, Toledo. TC: Tom Holmes, N8ZM, Tipp City. PIC: Scott Yonally, N8SY, Mansfield. OOC: Alan Cook, N7CEU. Newark. SGL: Jeff Ferriell, K8ZDA, Columbus. I know it is July and probably not a good time to bring this up. If you are

not a members of a local ham radio club, please find one, join and participate in its activities. Ham clubs are the backbone of the Ohio Section. As they grow stronger, ham radio grows. Always hate to bring this up but postal rate increases (from 34 to 37 cents) means more green stamps for mailed newsletters and QSL cards. Plan accordingly. The summer issue of the Ohio Section Journal is out, thanks to Editor Ron Griffin, N8AEH, Findlay. Don't know what the OSJ is? Contact me immediately. Newsletter editors - the 11th annual Ohio Section Newsletter Contest is on. Contact PIC Scott Yonally, N8SY, Mansfield, for the rules and your entry. During the Dayton ARRL Forum on recommendation of the Section Manager, the League honored six Ohio Section hams, plus two other electrical engineers for establishing a cooperative working agreement on an interference problem with two major Cincinnati corporations - one a major commercial radio station and the other a power utility. Awarded ARRL Certificates of Merit were Bob Reiff, WA8ULW, who head the ham radio team; Paul Jellison, WD8KMX, Clear Channel Communications, who head the team from Radio Station WLW; Theodore Homan, WB8WFG; Herbert Nichols, W3EOA; Jay Adrick, K8CJY; Goeff Mendenhall, W8GNM; plus Jeff Antoni and Kelly McMahan, non-hams but engineers who headed the team from The Cinergy Corporation. OMIK ARA, which was established nationally in August, 1952, will hold its 50th Anniversary Convention in Dayton, July 17-20. The headquarters is the Best Western Hotel on Needmore Road. OHIO SECTION CONGRATS TO (A) Brian DeYoung, K4BRI, of Cincinnati who was selected the OH-KY-INARS Ham of the Year; (B) New officers for the Salem Area ARA: Pres. Mel Lippiatt, KA8OEB; VEEP Dave Sprouse, N8GOB; SEC Roger Thawley, KC8CTV; TRES Lela McClaren, KB8YPD and Trustees, Bob Tullis, W8HZ, Tom Spellman, KB8EOG, and Ernie Greenisen, KC8QPH; (C) Reuben Meeks, W8GUC, Dayton for his two years as head of DaytonARA; and (D) The Ohio Buckeye Belles who host the YLRL National Convention August 2-4 in Middleburg Hts. near Cleveland..OHIO SECTION JULY HAMFESTS; (7) WoodCountyARC at Bowling Green; (20) NorthernOhio ARS at Wellington; (21) Van WertARC at Van Wert; (27) OHKYIN ARS at Cincinnati; (28) PortageARC at Randolph...de K8QOE.

Net	*QNI*	*QTC*	*QTR*	*Sess*	*Time*	*Freq*	*NM*
BN (E)	107	57	240	19	1845	3.577	WD8KFN
BN (L)	163	54	267	30	2200	3.577	NY8V
OSN	135	51	522	30	1810	3.708	WB8KQJ
OSSBN	1781	878	2999	91	1030, 1615, 1845	3.9725	N8IO

Tfc: N8IXF 386, N7CEU 368, N8IO 276, WD8KFN 203, K8PJ 197, N8BV 186, KD8HB 182, N8IBR 153, W8STX 148, W8QIW 121, N8DD 112, N8OD 110, WA8EYQ 108, KX8B 98, N8TNV 91, W8PBX 86, KC8DWM 82, KA8FCC 82, WA8SSI 73, WB8SIQ 65, W8BZY 62, NS8C 59, W8RPS 59, W8RG 54, KB8SBK 54, WB8HHZ 50, AB8KB 41, KC8HTP 40, KI8O 39, KC4IYD 38, KC8HJL 32, KI8IM 29, KA8VWE 25, NY8U 20, WD8KBW 15, N8WLE 15, N8YWX 15, N8AJS 13, N8GOB 12, KC8PDY 12, K8KYP 10, WB8IOW 9, KC8QOE 8, N8RAK 5, K8QIP 1.

HUDSON DIVISION

EASTERN NEW YORK: SM, Pete Cecere, N2YJZ— STM: Jim Peterson, K2CSS. SEC: Ken Akasofu, KL7JCQ. ACC: Sylvia Stone, K2SLY. SGL: Herb Sweet, K2GBH. PIC: John Farina, WA2QCY. BM: Ed Rubin, N2JBA. OOC: Hal Post, AK2E. TC: Rudy Dehn W2JVF. ASM: Tom Raffaelli, WB2NHC. ASM: Bob Chamberlain, N2KBC. ASM: Andrew Schmidt, N2FTR. ASM: Richard Sandell, WK6R. ASM: Phil Bradway, KB2HQ. Let's all make sure to take a minute to realize the freedoms we have in this great country of ours this July 4th. Have a great and safe celebration. Anyone have suggestions for SET 2002? If so, talk to your DEC & EC. Would like to speak at your club meeting to inform you of all the new happenings at the League. I can also bring along our SEC and STM. E-mail or call me. 73 de Pete N2YJZ n2yjz@arrl.org April - PSHR: K2CSS 141, N2YJZ 138, KC2DAA 128, KC2HUV 106, N2RTF 89, K2YS 84. Station Traffic: K2CSS 108, N2YJZ 102, KC2HUV 100, KC2DAA 64, K2YS 44, N2TWN 39, W2AKT 22, WA2BSS 14, K2AVV 11, N2AWI 9, N2VC 7, N2RTF 7. Net Reports: QNI/QTC+QSP AES 30/10 CDN 224/106, CGESN 29/2 CHN 120/54, ESS 389/216, HVN 592/227, NYPHONE 224/759, NYPON 329/254, NYS/E 356/408, NYS/M 174/62, NYS/L 250/442, NYSPTEN 357/100, SDN 325/141.

NEW YORK CITY / LONG ISLAND: SM, George Tranos, N2GA—ASM: KA2D, N1XL, K2YEW, W2FX, KB2SCS. SEC: KA2D. ACC: N2MUN. PIC: K2DO. TC: K2LJH. BM: W2IW. OOC: N1XL. STM: WA2YOW. SGL: N2GA. HOSARC Hamfest is Sunday, June 30, in Queens. Kenwood Communications awarded SEC Tom Carrubba KA2D with one of their "Top Gun" awards for 2002 at the Dayton Hamvention in May - congratulations Tom! NY City ARES will be supporting Pepper Martin Run in Staten Island on July 4 and the Bronx Half Marathon on July 14 - contact NYC DEC Charles N2NOV to help out. Nassau County ARES will be supporting the Gold Coast Bicycle Tour on July 7 - contact Nassau DEC George WA2WKV to help out. STM Charlie WA2YOW reports Bill, WB2GTG has made the BPL again this month - congratulations! Congratulations to the Broadcast Employees Amateur Radio Society and the Kings County Repeater Association for renewing as a Special Service Club. LIMARC picnic is July 21 at Bethpage State Park. Volunteer Exam sessions, club listings, upcoming events and more are available on the NLI Web site - www.hudson.arrl/nli. Report all changes to N2GA before the 12th of the month. Tfc: WB2GTG 554, N2AKZ 181, WA2YOW 118, KB2KLH 94, AB2IZ 85, KA2YDW 41, K2GCE 38, KE2SX 30, N2AYV 18, KA2UEC 17, N2TEE 7.

NORTHERN NEW JERSEY: SM, Bill Hudzik, W2UDT—ASM: K2WJ. STM: WB2FTX. ACC: N3RB. SEC: K2SO. OOC: K2ZD. SGL: K1VX Web page:www.arrlhudson.org/nnj. As I said last month, hamfest season is here. PLEASE support our section clubs by attending their events. The annual New Jersey QSO is scheduled for August 17-18th. NNJ and SNJ Section Managers will again present a plaque to the highest scoring single operator in each section. Believe it or not, there are some NJ counties needed by the County Hunters! The Nutley RC, W2GLQ held a Special Event operation at the Thomas Edison Museum in West Orange. Mayor Paul Fader of Englewood proclaimed June 16-22 as "Englewood Amateur Radio Association Week" in the town. (Thanks to the efforts of W2CC). Piscataway ARC held a Special Event as well, with the call K2VOA commemorating the town's old VOA transmitting site. Also, the 10-70 RA participated in the Submarines On The Air weekend from the USS Ling, a restored WWII submarine. Ocean-Monmouth ARC held its fourth Fox Hunt the end of May. The club is also active in restoring the old Diana radar site at Camp Evans in Monmouth County. They plan to have small museum as well as a permanent station open to the public. It's great to see clubs throughout the section active beyond monthly meetings. These activities not only enhance camaraderie but can attract new members as well. Don't forget to let our webmaster N2WZB know of your club activities. The section Web page is a good place to get the word out! 73, Bill Hudzik, W2UDT.

Net	*Sess*	*QNI*	*QTC*	*QSP*
NJM	12	47	10	9
NJPN	34	195	26	25
NJSN	30	163	17	16
NJN/E	30	188	77	68
NJN/L	30	174	67	63
CJTN	30	212	53	51
IART	4	45	7	7
NJVN/E	30	453	55	47
NJVN/L	30	423	38	38

Tfc: W2MTO 78, K2VX 51, KB2VRO 44, N2OPJ 38, N2RPI 35, KJ2N 28, K2PB 27, N3RB 22, N2BVM 20, N2GJ 18, K2DBK 15, W2CC 13.

MIDWEST DIVISION

IOWA: SM, Jim Lasley, N0JL—ASM: N0LDD. SEC: NA0R. BM: K0IIR @ W0CXX. SGL: K0KD. STM: K0YL. Happy 4th of July! HELP WANTED: I need a little help. Things are moving toward the Web at a slow but regular rate. I am looking for someone to help me create material for the Iowa Section portion of the ARRL Web page. No, I don't know what I want. No, I don't know how much space we have. No, I don't know when we need it. No, I don't know how to do it. No, I don't really have enough time to learn. But then it will be done anyway. About all I have learned is that a mono-spaced type makes things line up when we get it to the Web. I will be including net reports on the Web as well as individual traffic stats. I have more room on the Web that I have in the Section News column, so we can be more verbose and, I hope, creative. Let me know if you are interested. I am mostly on the CW net but can be found via e-mail or telephone and I do return calls! DSM Co. ARES did a drill in April. SWIARC did a parade in May. DMRAA had 108 people at the meeting in March! Wow! We will all miss W0CON who has become a Silent Key. Iowa was 100% on TEN CY4 with WB0B, N0JL, N0SM, W0SS, KA0W, and W0YLS and that is a fine effort. Looks like lots of activity this year. Hope you had a good FD (I'm sure I did, but I'm writing this in May). Is your antenna work coming along ok? How about that new rig? Note that N0YMO was married in June. Until next time: 73 es cul de N0JL. Newsletters were received from SWIARC, DMRAA, FMARC, CVARC, GRARC, OARC, DARC. Traffic: W0SS 116, K0YL 31, WB0B 13, N0JL 12.

KANSAS: SM, Orlan Cook, W0OYH, ASM/ACC/OCC Robert Summers, K0BXF. ASM/STM: Ron Cowan, KB0DTI. SEC: Joseph Plankinton, WD0DMV. PIC: Scott Slocum, KC0DYA. TC: Rick Carver, WA0KS. SGL: Steve Hamilton. Please welcome Ron, KB0DTI, to the rank of Asistant Section Mgr. He holds several appointments and STM being one of them. Welcome to Mike, KC0JVZ, as a new Public Information Officer and Bob, N0CKI, as Technical Specialist. Both live in Levenworth. Matt May KC4WCG is the new Emergency Coordinator for Douglas Co, replacing Bud, N0APJ, who retired from the job. Thanks Bud for being there for your community! We also have a new Official Observer, Steve, KB0JYL, who is also our Sect Government Liaison. Please welcome one and all. For the max in Kansas news, go to http://www.arrl.org/sections/ . Also remember the KAR, Kansas Amateur Radio Web site at http://www.ksarrl.net/ News letter, orlan @swbell.net Mar. Kansas Nets: sessions/QNI/QTC, KSBN 31/1189/74 KPN 23/349/24 KMWN 31/657/506 KWN 31/935/652 CSTN 26/2139/ 91 QKS 61/263/83 QKS-SS 11/29/7 ARES 53/616/19 QNS KB0AMY N0BTH KC0CIG WD0DDG AA0IQ N0LKK W0NXS W0PBV KB0WEQ WD0DMV SEC Joseph. TEN 62/???/115 Ks 97% with AA0FO K0PY W0WWR NB0Z KB0DTI W0SS/Mgr. TRN 62/617/461 Ks 100% with KB0AMY KC0IDI N0KJ AA0OM W0FE W0WWR KB0RUU Mgr. Ks tfc: W0WWR 1339, KB0DTI 48, NB0Z 48, KC0JCQ 31, W0OYH 11, KC0IDI 8, KC0GL 5, N0ZIZ 5. Room for your report here. 73, Orlan

MISSOURI: SM, Dale Bagley, K0KY— This month's hamfests include the Ozark Mountain Repeater Hamfest in Licking MO on July 13th, the Warrensburg ARC Hamfest in Warrensburg on July 20th and the Zero Beater's Hamfest in Washington, MO on July 21st. There will be a Hamfest near you and a great chance to buy and sell radio gear and get together with old friends. If a Field Day operations want to send messages to the Section Manager and/or the Section EC, they plan to be available during the Missouri Traffic Net, 3.963 MHz, at 5:45 to 6:15 local time. Traffic to SM and SEC can also be forwarded through MTN CW on 3.585 MHz at 7:00 and 9:45 local time. These outlets are suggested, but other nets or systems can be utilized to send your club or group's traffic. Bill Wheeler, K0DEW, and the Lebanon ARC are to be congratulated on the excellent job they did hosting this year's MO ARRL State Convention. The event was held in Cowan Civic Center, a really outstanding venue for a Hamfest or any event for that matter. If you didn't attend, you really missed a worthwhile Hamfest. Wayne Mills, N7NG, membership services Director for the ARRL was the featured speaker and he made an outstanding presentation about the Log Book of the World, the DXCC award and several controversial DX operations. It was great to have both Wade Walstrom, W0EJ, Midwest Director and Bruce Frahm, K0BJ, Midwest Vice Director, at this year's Convention. Cliff Ahrens, K0CA, the MO Section Card Checker had one of his busiest days. Patrick Boyle, K0JPB, the MO SEC announced the appointment of John Baremore, KC0CRO as the EC for Camden County. Boone County's new EC is Greg Nunn, K0GN. Don Moore, KM0R has taken over

the duties of DEC from Kurt Bleich, KBØHNR who has become Moniteau County Emergency Services Director. Patrick presented several certificates of merit to individuals that have contributed significantly to the ARES program over the years. Greg Hibbard, WØENW, is the net manager of the MO-ARES Sunday night net. The net meets just after the MO Traffic Net on 3.963 MHz or around 6:15 local time. Greg is looking for volunteers to share the net control duties. If you're interested, let him know. There has been an average of 30 plus check-ins each week. Net sess/QNI/QTC: Audrain Co 4/46/2; MTN 30/519/99; Jackson Co ARES 5/53/0; WAARCI 4/80/0 NØVJ; Rollabillboard 30/468/15.

NEBRASKA: SM, Bill McCollum, KEØXQ—ASM: WØKVM, NØMT, WYØF, WBØULH & WBØYWO. I regret to inform you that Joe Kelley, KBØYDZ has become a Silent Key. I am pleased to announce that George Bellairs, KBØZZT, has completed the necessary requirements to become an Official Observer. He also becomes a member of the Amateur Auxiliary. A dozen amateurs from Eastern Nebraska provided communications support for the MS 50 Bike Ride on May 5th. May 6th marked the 27th anniversary of the tornado that struck Omaha. Several ARES organizations have been called up in recent weeks for storm spotting. Congratulations to Barb, KCØHLB, and Jim, KAØKCV, for completing the 3 Levels of the Amateur Radio Communications Course. Best wishes to Dick, WØHXL, for a speedy recovery in a recent mishap with his lawn mower. Net Reports: MIDNE ARES: QNI 395, QTC 4 & 30 sessions. NPPARC: QNI 40, QTC 2 & 4 sessions. NE Storm Net: QNI 835, QTC 12 & 30 sessions. NE 40 Meter Net: QNI 432, QTC 6 & 30 sessions. MARES: QNI 206, QTC 2 & 4 sessions. NMPN: QNI 1385, QTC 27 & 30 sessions. Tfc: KØPTK 82, KEØXQ 18, WYØF 6, WØUJI 5, WØDED 2, WØEXK 2, KAØO 2, WAØZCN 3, WAØZCM 4, WDØBFO 2, WØUS 2, WØRWA 2, KØSCG 2. PSHR: KBØYTM 20, KCØHOX 73, KAØDBK 125.

NEW ENGLAND DIVISION

CONNECTICUT: SM, Betsey Doane, K1EIC—ASMs: KZ1Z, NK1J, K1STM. BM: KD1YV. OOC: W1GC. PIC: W1FXQ. SEC: KD1YV. SGL: W1UTQ. STM: K1HEJ. TC: W1FAI. A hearty thank you to everyone who participated in this year's CPTV Science Fair. It was a lot of fun watching young children try to send their name in CW and look at their voice pattern on an oscilloscope! Parents and teachers were very interested in learning about our hobby—lots of good info was handed out to teachers! Many of you know that Mike, KB1CTC, had to step away from his post as SEC to take care of family matters. In the interim, Jim, KD1YV, has agreed to step into the SEC position. I am hopeful that Mike can return to some aspects of ARES management and that the SEC duties can be divided among volunteers to ease time commitments. We are all busy today doing many things and since 9-11, the demands on the SEC have increased substantially. Other sections are proceeding in the same manner. A huge thank you to both Mike and Jim for their continuing help and support. I want to thank each of you who participated in any way in the statewide Red Cross drill in May. There were many successes. Among them is the confirmation that ARC in Farmington received reports from all CT chapters! At this writing, the data has not been reported but it is well known that there were a lot of ops participating in this effort. The Digital Amateur Radio Emergency Net (DAREN) operated successfully with several chapters reporting in using PSK31. Adaptability was evident from the start of the operation. Congratulations to you all and special thanks to Allen, W1AGP, who did an unbelievable job recruiting and organizing leaders all in just six or eight weeks! Now we must work as a team to learn from the drill. Local groups and leaders will be noting successes and problems. A summary will be forthcoming on the CONNARES reflector and on the Web. If you need a copy, just let me know and I will get it to you. This is indeed a busy time—clubs are already working on field day plans! See you on the air during FD—good luck to you all! Net sess/QNI/QTC/NM: ECTN 30/253/38/WA4QXT; WESCON 30/257/68/KA1GWE; NVTN 30/148/186/KB1CTC; CPN 30/210/63/N1DIO. CN 25/73/50/N1AEH. Tfc: NM1K 1740, KA1VED 635, KA1GWE 133.

EASTERN MASSACHUSETTS: SM, Phil Temples, K9HI—ASMs: WA1ECF, N1GTB, WA1IDA, N1UGA, AA1MO. ACC: N1DHW. BM: N1IST. OOC: K1LJN. PIC: N1PBA. SEC: W1MPN. SGL: K3HI. STM: (open). TC: N1UEC. e-mail list: ema-arrl@qth.net, Web: http://www.qsl.net/ema-arrl. I want to thank outgoing STM NZ1D for his hard work and leadership. KA1RV is organizing ham help for the upcoming Groton Road Race. Billerica ARS recently held a very successful "License in a Day" class. Several area hams attended a one-day seminar hosted by the Salvation Army covering "canteen" operations and the Incident Command System. The seminar also covered the role of Amateur Radio in disaster planning. Sixteen Boston ARC hams provided communications and coordination for the Walk For Multiple Sclerosis in Boston. WD1Q and others staffed a Handi-ham booth at the Salem Health Fair at Salem State College. According to AA1MO it was well received! Minuteman Repeater Assoc. actively trains individuals as Net Control Stations on its Tuesday evening net at 2000 ET. For more info, contact K1KWP. Sturdy Memorial Hospital ARC members provided communications for the Assn. for Retarded Citizens of Northern Bristol County's annual Walk for Awareness. SEC W1MPN reports the recent "Operation Xavier" ARES/ RACES/ SKYWARN exercise was very successful in terms of interest and participation. The latest ARES info can be found at http://www.emaares.com/Newsletters/Newsletter-Latest.html. Crocker Public Service Group provided communications for the annual Walk For Hunger in Boston. The event's 42,000 walkers raised $3.2 million that will help support hundreds of food pantries and soup kitchens. CPSG offers club membership to other clubs' members in exchange for publishing its public service events. See http://amateurradio.net/arn/cpsg/bylaw2001.html for details. W1USN writes a hilariously funny satirical story entitled, "FCC to Shut Down Ham Radio" in the Quannapowitt Radio Assn. newsletter. The story can be found at http://www.rioux.org/QRA/NEWS/Back%20Issues/2001-2002/April2002/page1.html. USS Salem ARC continues to do an incredible job in bringing Amateur Radio to hundreds of scouts on the weekends! Framingham ARA's board recently approved a significant increase to its annual scholarship fund.

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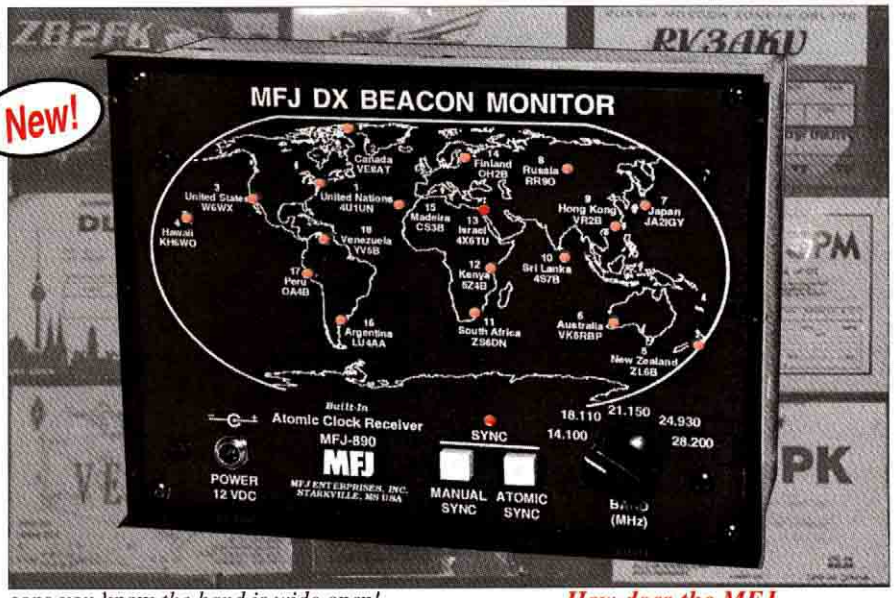
It's fascinating to hear and watch each beacon location light up as they become active across the world.

It's great for DXers, contesters, ragchewers and SWLers.



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On each frequency, each beacon transmits for ten-seconds -- its call sign at 22 wpm CW and a one-second dash at 100 Watts and three one-second dashes at 10, 1, 0.1 Watts.

When each beacon completes a transmission it goes silent on that band and switches to the next higher band.

For more information see *QST* October and November, 1994 and September, 1997.

How are band conditions?

Tune to a beacon frequency. If band conditions are good, you'll hear each beacon identifying in Morse and four dashes each at a lower power level.

The more beacons you hear, the more open the band is to different parts of the world.

The more dashes you hear per beacon, the better the quality of propagation and the more robust the band is. If you hear the 100 milliwatt dashes from many beacons you know *the band is wide open!*

In just three minutes you'll know how band conditions are worldwide.

It's interesting to see how propagation vary from day to day -- what beacons you can hear and at what power level.

You may find that the band is wide open but nobody is on.

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The world map display also tells you where to point your antenna.

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The transmit sequence of the beacons are precision timed using GPS (Global Positioning Satellites).

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http://www.mfjenterprises.com for instruction manuals, catalog, info

The club's scholarship committee is headed by KD1BF. Want to promote activity in your club? Norwood ARC is sponsoring a fun contest for its members. Points are awarded for such activities as: attending a club meeting, working at a VE session, checking into the club net. And as a special bonus: contacting the "phantom operator" on the club repeater. Full details can be found at http://www.qsl.net/k1jmr/newsletr.html. This SM had the honor and privilege of visiting Norfolk County Radio Assn. members at their annual election meeting and dinner in Stoughton. Photos of the dinner are at http://photos.temples.com/index.php?TopicID=ncra. 73 de K9HI. Tfc: W1GMF 1200, KW1U 990, N1IQI 390, N1LKJ 359, NG1A 234, NZ1D 94, WA1FNM 90, N1AJJ 84, K1SEC 78, WA1LPM 63, KD1LE 43, K8SH 31, N1TPU 30, N1IST 19, KB1EB 15, KB1CVH 12, NC1X 8.

MAINE: SM, Bill Woodhead, N1KAT- ASMs: WA1YNZ, KA1TKS. STM: N1JBD. BM: W1JTH. SGL: W1AO. ACC: KA1RFD. OOC: N1RY. PIC: KD1OW. SEC: N1KGS. Asst. Dirs: KA1TKS, K1NIT. Web Site: N1WFO. Being a Ham in Maine gives one a chance to experience the great four seasons. So far, winter gave radio operators in the most northern part of the state to participate in the three-day event, the Can-Am Dog Sled Race. Taking part were: KW1C, N1FCV, N1ZKA, N1ZBY, KB1EBE, N1KGS, N1QMC, N1ZBX, N1ZHQ, N1JHD, N1HSQ, K1ZOR, N1FG, KC1SE, KA1OOW, N1CHF, N1WRX, and from our northern neighbor, VE1PIN. Soon spring will arrive and give Hams a chance to sport their civic-mindedness in supporting walk-a-thons, and races of various types. Always be sure, when you show up for events such as these, that you have information on your local radio club, so interested prospective Hams will have the resources to get into this great hobby. The airwaves have been bristling with new calls; a direct result of the hard work of all the great mentors around the state. So, when you hear some of the new calls come on the air, welcome them to the airwaves. To welcome vacationing Hams to our state, if you drop me a note telling me when and where your group meets for coffee or breakfast, I will include the information in these comments. 73, Bill, N1KAT. Tfc: W1KX 117, W1QU 59, W1JX 40, KA1RFD 33, WA1URS 31, N1JBD 25, W1JTH 24, KA2ZKM 11.

NEW HAMPSHIRE: SM, Al Shuman, N1FIK (n1fik@arrl.org) — NH Web site (www.nhradio.org) Jul- New Amateurs forApril-23. I suspect that May will be a big month as testing activity at Hosstraders was heavy. Speaking of Hosstraders, hats off to Norm, WA1IVB, Joe K1RQG, and Bob, W1GWU, for another great show. They have been doing this gig for more than 20 years, all proceeds going the Shriners. At the time of this writing, I am in discussions with the Governor's office trying to expand the Amateur Radio Week Proclamation to cover the whole month of June. I hope to report to you next month that we were successful. Hats off to K1TSV for a great job coordinating and providing net control duties in support of the 12th annual "Souhegan Valley CROP Walk for Hunger." The services of K1TSV and his team was very much appreciated by John David the director for CROP Walk. There are over 1900 CROP walks that take place ever year raising money to battle hunger. Consider getting involved with NH-ARES and the NH Field Organization. Be part of the solution. If you are planning on holding license classes, please let me know, I am getting calls from people asking how they can get their ticket. 73, Al. Net NM/sess/QNI/QTC: GSFM N1RCQ 30/149/31; GSPN WB1GXM 30/163/72; VTNH WA1JVV 30/131/72. Tfc: W1PEX 1341, WA1JVV 92, W1ALE 45, WB1GXM 45, K1TSV 30, N1CPX 7.

RHODE ISLAND: SM, Bob Beaudet, W1YRC—ACC & ASM-Admin/Ops: WA1RI. ASM-Emerg. Comm: W1PEV. BM: KA1BNO. SEC: N2PGD. OOC: W1AOM. PIC: WB1P. TC: K1DFT. I was very pleased to see widespread activity supporting the first annual New England QSO Party. By combining the individual state's QSO Parties into one larger one, it has become much more fun and attracted a much broader number of amateurs throughout the states, Canada and many DX countries. Congratulations to the folks who put this idea on the air. Our friends at PVARC participated in the "Submarines on the Air" special event by operating from the Russian Juliette class sub, no. 484. Docked in Providence, its heavy steel hull provided a solid ground in the salt water. I was invited to attend a Fidelity club meeting held at the NE Wireless and Steam Museum. If you haven't ever been there, you must visit the place. It's a huge treat to hear and smell a real spark transmitter in action! Trust me on that. Check it out at http://users.ids.net/~newsm/. Field Day will be history when you read this. I hope you participated with one of our terrific clubs in RI and I surely hope I chatted with you on my state wide tour of all active ARRL affiliated clubs. We're still looking for an STM and SGL. Tfc: N1NVE 21.

VERMONT: SM, Bob DeVarney, WE1U—ASM: N1RJF, N1PDL, W1AD, KD1R. BM: WA1SQO. OOC: W1MP. SGL: WB1AJG. STM: KB1DSB. TC: W1SJ. ARRL VT Section Web page:www.arrl.org/sections/VT.html. April activity and Nets submitted by STM KB1DSB. Net/sess/QNI/QTC/NM: VT YL Net 4/53/0/KA1LDS; GMN 26/509/19/N1HXC; VTNH 30/131/42/WA1JVV; VPEN 4/29/0/WA1DLA; VPTN 30/304/34/KB1DSB. CVTN 24/117/13/AA1PR. Tfc: KB1DSB 92, W1RFP 12.

WESTERN MASSACHUSETTS: SM, William C. Voedisch, W1UD, w1ud@arrl.org – ASM: N1MAP. ASM (digital) KD1SM. STM: NZ1D. SEC: K1VSG. OOC: WT1W. With Field Day rapidly approaching, I hope all the plans for the event have been solidified by every club. I have not decided yet to operate or spend the day traveling to the various club sites. This will make my 56th year out in the field enjoying FD activities. Your SEC Dennis, K1VSG, is out of the hospital and recuperating. Dennis says he'll be on the Sunday morning ARES net. It will certainly be good to have him back. KA1OTQ is to be congratulated for his ARES/RACES Journal. In it, he covered operating techniques of VHF operation as well as a compendium of other subjects ranging from equipment reviews to weather emergencies. Great job, Bob. Richard, KD1XP, informed me that on the KD1XP repeater located in Amherst, MA (145.130.PL 71.9); each Tuesday night at 7:30 is an SSTV net. All are welcome. For the brave souls that are into camping, hamming, flea marketing and auctions, travel to Adams, MA, and partake in the NOHARC hamfest at Bowe Field on August 10. The Mohawk and MARA will combine forces to operate on the summit of Mt. Wachuset for FD. Tfc: W1ZPB 66, W1UD 279, K1TMA 247, KD1SM 8, N1RLX 4, KB1HPF 4. 73, Bill.

NORTHWESTERN DIVISION

ALASKA: SM, David Stevens, KL7EB – Anchorage Amateur Radio Club, Matanuska Amateur Radio Club, and South Central Radio Club had a joint Field Day at Wasilla High School in Wassilla. Teresa Nunes, KL0WW, set up the operators. Edythe Lynn, KL7EL, arranged the food. Set up and tear down included KL7CC, AL7PJ, NL7NF, KL7DY, WL7BD, NL7SK and many others including operators. Many people are to thank for the Communication Command Vehicle of Anchorage Amateur Radio Club. They include Art Morton, AL0U, Pat Wilke WL7JA, Steve Jenson, KL0VP, Randy Valley, AL7PJ, Mike O'Keefe, KL1EK, Dick Block, KL7RLB, Len Worcester, WL7IM, Bill Capers, AL7BB, Jim Larson, AL7FS, Jim Wiley KL7CC, and others. Get involved -Yukon 800 Boat Race June 22-23; Motley Group picnic at Byers Lake June 29-30. ARES Net 8:00 PM, Sunday, KL7KC repeaters. Snipers 3920 at1800; Bush Net 7093 at 2000; Motley Group 3933 at 2100 and Alaska Pacific Net M-F 0830. Tfc:AL7N 124, KL5T 102, AD4BL 48. PSHR: KL5T 188, AL7N 93.

EASTERN WASHINGTON: SM, Kyle Pugh, KA7CSP, Ruby Peterson, WO7C, of Spokane became a Silent Key on March 7, 2002. Ruby was a very active female ham for years holding an Extra class license, getting up early in the morning to relay weather information to the NWS. She received an award for doing this. She was always available on a repeater to help out anybody traveling, and she will be greatly missed. The Spokane DX Association has been formed with 21 members and meets on the first Thursday of each month. Officers are: President, K7OX; Vice-President, K7YQ; Secretary, WA7LT; Treasurer, AA7RT. Due to your SM vacationing in Florida here are the traffic and net reports for March: WSN: QNI 957, Tfc 240; Noontime Net: QNI 9111, Tfc 393; WARTS: QNI 3625, Tfc 148. Tfc: K7GXZ 148, W7GB 113, KA7EKL 62, K7BFL 45. Reports were received from 7 out of 9 OO stations. And For April: WSN: QNI 839, Tfc 229; Noontime Net: QNI 8873, Tfc 286; WARTS: QNI 3378, Tfc 145. Tfc: W7GB 173, K7GXZ 112, K7BFL 97, KA7EKL 58, KK7T 23.

IDAHO: SM, John Cline, K7BDS —ASM: K7TIH, K6ZVA, KJ7TH, KB7TYA. STM: W7GHT. OOC: W7ZU. SEC: AA7VR. TC: N7ZFE. What does a patriotic American look like? Most people probably envision a person waving the flag. I see an American patriot as holding a handheld radio on a sun-baked parade route or soaking wet in a blinding rainstorm at a flooded intersection diverting traffic away from danger. I see someone at a radio station in a Red Cross shelter. I see Idaho ham radio operators providing emergency radio communications. Every day is Flag Day in Idaho. Please check idahohamradio.com. Tfc: W7GHT 291, KB7GZU 85, WB7VYH 38. PSHR: W7GHT 121, WB7VYH 95. Nets: FARM 30/3059/64/W7WJH; NWTN-30/1260/70/KC7RNT; IDACD 22/439/9/ WB7VYH; IMN-30/401/87/ W6ZOH.

MONTANA: SM, Darrell Thomas, N7KOR—The season has arrived for increase in community public service. Several Clubs have answered the call and provided communications for community events and several more are scheduled. It is great to see the renewed interest Section wide in ARES. Several Section members have taken the ARRL C-CE Course. In addition to that, several others have taken a course sponsored by the US Forest Service that qualifies them to establish the means and provide emergency communications as needed on the fire lines in the event of another major fire season this year. Net/QNI/QTC/NM MSN 134/10 W7OW, MTN 2088/48 KD7HWV, IMN 401/87 W6ZOH.

WESTERN WASHINGTON: SM, Harry Lewis, W7JWJ—Update news for Western Washington may now be viewed on the Section Manager's Web page: http://www.arrl.org/sect/wwa. Your club news may be posted to that site. In order to qualify for the coveted Brass Pounders League (BBL) certificate one must handle many pieces of message traffic. One to consistently so qualify is George Thomas, KD6BDU, with a total of 562 pieces originated, received, sent or delivered. Resignations of two EC must be noted with a thank you for their services. First is Alan Hughes, KB7SVU, of Pierce County and second is Rick Hodges, KB7TBF, of King County. Long time State RACES Officer Jim Sutton, WA7PHD, has also retired from that position. This report from SEC N7NVP: Exercise, exercise, exercise seemed to be the mantra for Apr. Earthquake exercises were conducted in Clallam Co., Kitsap Co. and Stanwood in conjunction with a statewide EAS Drop, Cover and Hold drill. All were successful with lots of lessons learned. King Co. convened a committee to find a replacement for retiring EC Rick Hodges, KB7TBF. Rick's tireless, innovative efforts over the past several years have kept the various ARES/RACES/ACS units interactive. Thanks, Rick! The Cowlitz Co. team responded with the CommVan to a 4 day multi-agency response to a reservoir breach in Cougar, WA. Clark Co. provided communications for the Clark County Discovery Walk and Walk America. Several counties celebrated National Volunteer Week and held various events to recognize the contribution of our unpaid professionals who bring so many talents and cost saving manhours to the community. 73.

PACIFIC DIVISION

EAST BAY: SM, Andy Oppel, N6AJO—ASMs: NJ6T, KE6QJV. SEC: open. DECs: KE6QJV/Alameda County, KO6JR/Contra Costa County, WA7IND/Napa County, K6HEW/Solano County, N6UOW/Training, W6CPO/Technical Services, KQ6TM/Section Plans and Administration. OOC: KD6FFN. STM: W6DOB. ACC: NJ6T. EB Web Page: http://www.pdarrl.org/ebsec/. Webmaster is KB6MP. 24 Lark and MDARC members provided communications for the Cinderella Bike Classic Ride on April 6. 11 year-old KG6IAD was NCS! ACSCT presented their comm van in a CALEA inspection. CCCC welcomes new members KF6FMX and KF6VBQ. MDARC supported four public service events in April. HRC welcomes new member KG6JBZ. The EBARC/ORCA sponsored VE Session on 4/21 yielded five new Technicians, two upgrades to General and two upgrades to Extra. April tfc: W6DOB 587, AK6DV 142, WB6UZX 41, KE6QR 20. PSHR: W6DOB, AK6DV. BPL: W6DOB. Tfc nets: NCN1/3630/7 PM; NCN2-Slow Sess/3705/9 PM; NCN-VHF/145.21/7:30 PM; RN6/3655/7:45 PM & 9:30 PM; PAN/3651/7052/8:30 PM. Your check-ins are always welcome.

NEVADA: SM, Jan Welsh, NK7N—Welcome to newly appointed SEC Richard Creley, KJ7UK. We'll miss former NV

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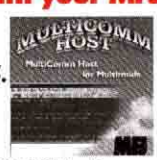

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SEC Paul Cavnar, NN7B, he's in process of moving out of state. ASM Dick Flanagan, W6OLD, DEC Glenn Hale-KB7REO. EC Charlie Kunz, AA5QJ, helping to re-arrange Clark County ARES/RACES structure with assistance of newly appointed AEC Dan Starr, AA7I. EC KA7AJQ Sheila Clement, EC Dick Grady-AC7EL. Welcome aboard to OO Tom Orzech AC7MR. Plans for Field Day from clubs around Nevada coming in. An attaboy to W7YDX Jerry Perkins and K7NKH Lee Hone, for assisting the Lincoln County Sheriffs office to locate and pack out KD7JJE Mike Morris, stranded about 25 miles off hwy 318 in the desert in a broken down vehicle. Communications took place on the 146.61 and 146.79 repeaters. Looking forward to NV ARRL forum August 24th, sponsored by Carson Valley Radio Club. Also plan on attending the SNARS HAMFEST in Reno July 27. Nothing takes the place of seeing old friends again. Pleased to see the interaction with W7BES-Ken Johnson, local MARS rep. NW7O FOR WAS-VUCC- DXCC nw7o@anv.net. 73, Jan nk7n@aol.com. Tfc: W7TC 520, K7NHP 315, N7CPP 36, W7VPK 34, KD7NIR 2, W7YDX 2.

PACIFIC: SM, Bob Schneider, AH6J—It is now May 5th. My wife and I just returned from a mainland trip. I went to the Visalia DX convention. Section money was not used for this trip. I was able to interact with many ARRL officials including President Jim Haynie, W5JBP, third VP Freid Heyn, WA6WZO and Pacific Div. Director Jim Maxwell, W6CF. Also attending from Hawaii were Wilber, KH7E, and Doris, KH6ER, Carlson and Shel, KH6HH. Ken Wages, KH6CQH, was also there. Ron Phillips, AH6HN, (former SM and now ASM East Hawaii) is out of the hospital after an operation that hopefully solved his problem. His recovery is slow but steady. Stu Johnston, KH7DX, (ASM West Hawaii) was supposed to attend Visalia as an audio Technician. He went last year but was unable due to other commitments. Jim Reid, KH6M, (ASM Kauai) received an ARRL membership list from HQ. There are 45 ARRL members of the 239 hams on Kauai. He reports there was much excitement over the Space Shuttle contact by some school kids. Dennis Niles, KH6XT, (ASM Maui) reports that Lt. Randy Leval, AH6GR, of the Maui County Police Department, spoke at the last meeting of Maui ARC on the 800 MHz communications System and the 911 call center. Members were not able to visit the center due to security and ongoing construction. Warren Munro, KH6WM, (ASM Oahu) has been busy contacting clubs on Oahu in my absence. He was the prime mover for the April 6th swap meet. He said they plan another one next year in early April. KARC has dispersed most of the ham gear given by the Salvation Army. Good Job Warren! During my trip, I wanted to visit NBS (WWV) in Boulder, CO but it is closed to visitors because of 9-11. Travel is also much more difficult. Aloha, Bob Schneider, AH6J.

SACRAMENTO VALLEY: SM, Jerry Boyd, K6BZ—Once again I had a chance to visit several Field Day sites. While FD is "not a contest" but, rather, preparation for emergency operations in the field, it proved to be some of both at the sites I visited...and that's a good thing. The contest aspect of it teaches good operating skills. The "field day" set-up helps with technical skill building. Both might be needed by your Emcomm group someday in the future. Good article in the Mt. Vaca Radio Club Newsletter regarding Amateur Radio support for the Solano Bicycle Classic. There were a number of clubs involved in this major event from both this Section and the East Bay Section. This is the month the ARRL Board of Directors meets to discuss a number of important issues. Not too late to provide W6CF, our Director, with your input. Nice article on basic ATV in the April issue of the North Hills Radio Club Newsletter. That newsletter, by the way, is well laid out, easy to read and contains articles of local interest, not reprints of material found elsewhere. Congratulations to the Tehama County ARES group for its fine job of replacing the 145.450 repeater on Tuscan Butte. The old repeater had served well for many years but was getting tired. The new box covers from Sacramento to Southern Oregon. With the vacation travel season on us another reminder to monitor 146.520 simplex. Hams transiting through an area may use it to seek local information. Also, it's fire season. For most hams in the Section I need not say more. If you are new to this area be prepared...wildland fires are common in SV and are often major problems from as early as May through early November. Until next month 73 de K6BZ.

SAN FRANCISCO: SM, Len Gwinn, WA6KLK—ASM: KH6GJV. ASM: KE6EAQ. SEC: KE6IAU. ASEC. Many of the section clubs are holding training sessions both in classrooms and as public service events. These sessions are of great value in handling traffic and finding out what you need in your ready bag. Join them! Classes for new hams are being held in Eureka, Santa Rosa, Pt Reyes, and possibly a few other locations. Upgrade classes are also available. WB6TMY (wb6tmy@arrl.net) is holding CW classes for all levels in the Santa Rosa/Novato area. He would like some folks to work at the 45 wpm range to come into the class. EARS had an overnight trip to Alcatraz Island. This was a great fun event but is threatened by the poor condition of facilities on the island. On air time was spent by some of the participants. WARS members are getting onto slow scan TV and many contacts are being made on hf and vhf. HARC took first place with their emergency communications van at EMCOMM 2002. Congratulations!! Lake County meets even months on the west side of the lake and odd months on the east side. Contact them on 146.775. Ft Bragg has coffee every Tuesday at 1030 and breakfast on Fridays at 0800. Contact them on 146.82. Send club information or newsletters to the SM so you can get into the news column. Have a safe summer.

SAN JOAQUIN VALLEY: SM, Charles McConnell, W6DPD—ASM: K6YK. ACC: W6DPD. SEC: K6IN. OOC: N1VM. STM: K6RAU. PIC: W7WN. The 2002 Fresno Hamfest was well attended. W6YEP was the chairperson and WA6OIB cooked. Sierra ARC 2002 club officers are Pres WA6ARA, 1st VP W6PTH, 2nd VP W6TOD, Sec WB6EPD, Treas KC6UUS. The club meets the 2nd Wednesday in Ridgecrest. Thanks to KC6UFL for many years of service as a PIO. The Stockton-Delta ARC 2002 Officers are Pres WA6SIV, VP N6YID, Treas KG6EFD, and Sec/Editor N6LHL. The club meets the 2nd Thurs in Stockton. The club repeater, W6SF/R has been upgraded so signals are better. Interested in improving your CW skills? Try the NCN traffic nets which meet on 3630 kHz nightly at 1900 hours or NCN-2 (slow speed) on 3705 kHz at 2100 hours daily. NCN-VHF (phone) meets on 145.21 MHz (WA6SEK) daily at 1930 hours. Congrats to K6ESL on mak-

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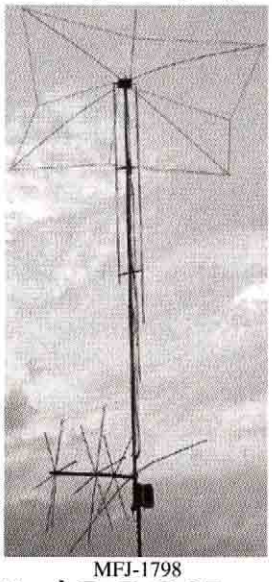

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The feedline is decoupled and isolated from the antenna with MFJ's exclusive *AirCore*™ high power current balun. It's wound with *Teflon*® coax and can't saturate, no matter how high your power.

Built to Last

Incredibly strong solid fiberglass rod and large diameter 6061 T-6 aircraft strength aluminum tubing is in the main structure.

Efficient high-Q coils are wound on tough *low loss* fiberglass forms using highly weather resistant *Teflon*® covered wire.

MFJ's Super High-Q Loop™ Antennas

MFJ-1786
$379.95
Ship Code F

MFJ's *tiny* 36 inch diameter loop antenna lets you operate 10 through 30 MHz *continuously* -- including the WARC bands!

Ideal for limited space -- apartments, small lots, motor homes, attics, or mobile homes.

Enjoy both DX and local contacts mounted vertically. Get both low angle radiation for excellent DX and high angle radiation for local, close-in contacts. Handles 150 watts.

Super easy-to-use! Only MFJ's super remote control has *Auto Band Selection*™. It auto-tunes to desired band, then beeps to let you know. No control cable is needed.

Fast/slow tune buttons and built-in two range Cross-Needle SWR/Wattmeter lets you quickly tune to your exact frequency.

All welded construction, no mechanical joints, welded butterfly capacitor with no rotating contacts, large 1.050 inch diameter round radiator -- not a lossy thin flat-strip -- *gives you highest possible efficiency.*

Each plate in MFJ's tuning capacitor is welded for low loss and polished to prevent high voltage arcing, welded to the radiator, has nylon bearing, anti-backlash mechanism, limit switches, continuous no-step DC motor -- gives smooth precision tuning.

Heavy duty thick ABS plastic housing has ultraviolet inhibitor protection.

NEW! **MFJ-1788, $429.95.** Same as MFJ-1786 but covers 40 Meters-15 Meters continuous. Includes super remote control.

MFJ-1782, $339.95. Like MFJ-1786 but control has only fast/slow tune buttons.

MFJ-1780, $249.95. *Box Fan* Portable Loop is about the same size (2x2 foot) as a box fan, complete with handle. Covers 14-30 MHz. Control has fast/slow tunes.

MFJ Portable Antenna

MFJ-1621 **$89.95** Ship Code A

MFJ-1621 lets you operate in most any electrically free area -- apartment, campsite, hotel, the beach, etc. DXCC, WAZ, WAC, WAS have been won with MFJ-1621! Work 40, 30, 20, 17, 15, 12 and 10 Meters with a telescopic whip that extends to 54 inches. Mounted on a sturdy 6x3x6 inch cabinet. Built-in antenna tuner, field strength meter, and 50 feet of RG-58 coax cable. Handles 200 Watts.

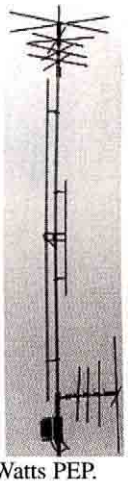
MFJ's G5RV Antenna

MFJ-1778, Ship Code A **$39.95**

Covers all bands, 160-10 Meters with antenna tuner. 102 feet long, shorter than 80 Meter dipole. Use as inverted vee or sloper to be more compact. Use on 160 Meters as Marconi with tuner and ground. Handles full legal limit power. Add coax feedline and some rope or other nonconductor and you're *on the air!*

MFJ halfwave vertical

6 bands: 40, 20, 15, 10, 6, 2 Meters . . . No radials or ground needed



MFJ-1796
$209.95
Ship Code F

Only 12 feet high and has a tiny 24 inch footprint! Mount anywhere -- ground level to tower top -- apartments,small lots, trailers. Perfect for vacations, field day, DXpedition, camping.

Efficient end-loading, no lossy traps. Entire length is always radiating. Full size halfwave on 2/6 Meters. High power *air-wound* choke balun eliminates feedline radiation. Adjusting 1 band has minimum effect on others.

MFJ-1792, $169.95. Full size 1/4 wave radiator for 40 Meters. 33 feet, handles 1500 Watts PEP. Requires guying and radials.

MFJ-1793, $189.95. Like MFJ-1792 but has full size 20 Meter 1/4 wave also.

Free MFJ Catalog
and Nearest Dealer . . . 800-647-1800

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1 Year *No Matter What*™ warranty 30 day money back guarantee (less s/h) on orders from MFJ

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Tech Help: (662) 323-0549

MFJ . . . the world leader in ham radio accessories!

ing the DXCC Honor Roll. WA2MSU is enjoying the Digital Communications Course. It is not too late to let W6CF know your feelings on Section News and Contest Scores in *QST*. Pacificon is October 18-20 in Concord. Plan to attend. The 2002 International DX Convention at Visalia was a good one.

SANTA CLARA VALLEY: SM, Glenn Thomas, WB6W—OOC: Mitchell E. Lee, KB6FPW. PIC: Alan L. Zeichick, K6ALZ. SEC: Don Carlson, KQ6FM. TC: Kit Blanke, WA6PWW. For news around the Section, check the ARRL SCV Section Web Page on the ARRL Web: http://www.arrl.org/sections/SCV.html.

ROANOKE DIVISION

NORTH CAROLINA: SM, John Covington, W4CC - SEC: KE4JHJ. STM: N0SU. BM: KD4YTU. TC: K4ITL. PIC: KN4AQ. OOC: W4ZRA. SGL: AB4W. ACC: vacant. http://www.ncarrl.org. We are fortunate to have so many newcomers on our nets. Recent upgrades have provided us with many new operators on our HF nets in particular. I hope you will take the opportunity to welcome newcomers (whether recently licensed or just now getting around to exploring your favorite mode). They will make mistakes, and when they do be sure to handle them diplomatically - most newcomers want to do things the correct way. Whenever possible, try not to correct people on the air at all - it tends to embarrass them and makes them reluctant to come back. This is especially true of the "me too" comments that sometimes follow - there's no need for everyone to pile on if the correction has been made. I always try to use e-mail or telephone to inform people of procedure, rather than singling them out over the air. If it's not important enough to make the effort to contact them off the air, then it's probably not important enough to correct them at all. It's been suggested we should have more training nets. We do have training on THEN (3923 kHz, 7:30 PM, all welcome) on Tuesday evenings, but the point some have raised about having it more often is quite valid, and we will look into ways to supplement this. We want to always be blessed by newcomers to all facets of our hobby - without them, there is no future for Amateur Radio. July Hamfests: Salisbury July 6th; Cary July 20th; Waynesville July 27th. Hope to see you there. If your hamfest is not ARRL-sanctioned, contact me for details. The procedure is easy and provides some useful benefits for your event. Tfc: W4EAT 591 (BPL), W4UEF 440, K4IWW 282, NC4ML 205, KI4YV 151, K4RLD 144, AA4YW 94, KE4JHJ 78, W3HL 68, W4IRE 59, AD4XV 41, W4FAL 36, W4CC 35, N4TAB 35, K4WKT 34, KE4AHC 34, N0SU 33, WA4SRD 26, WA2EDN 17, KR4OE 11, NT4K 11, N4NTO 10, WD4LSS 9, W4EHF 8.

SOUTH CAROLINA: SM, Patricia M. Hensley, N4ROS—This year's hurricane season has begun several weeks ago. Amateur Radio will provide essential emergency communications if this or any other disaster were to occur in SC. Therefore, it will be useful to review our ARES/RACES emergency plan. Recent changes in the state hurricane plan require that the Governor consider requesting an earlier voluntary evacuation by the population. The ARES/RACES communication plan becomes effective with this initial request for voluntary evacuation. All Red Cross emergency shelters will be opened at that time. From this period forward, no incoming traffic will be accepted by the SC SSB net. Only outgoing health and welfare traffic from Red Cross shelters or others will be sent through NTS channels handled on the SSB net (3915.0 kHz). Special forms have been developed for this outgoing shelteree traffic and can be obtained from ECs and others who have attended our emergency training seminars. At the same time, the SC ARES/RACES net will be activated on 3993.5 kHz and all subsequent emergency communication will be handled on this net only. VHF communications will be used for coordination between Red Cross shelters or other local communications. The national simplex frequency (146.52 MHz) should be monitored by all stations. This frequency will be used for coordination of incoming disaster teams as well as for an airborne simplex repeater in conjunction with the Civil Air Patrol. Operators should familiarize themselves with simplex repeater operation which is quite different from routine duplex repeater functioning. It is also probable that commercial power and existing antennae structures will be disrupted or destroyed, therefore we should be able to function with self-contained emergency power and able to erect emergency antennae. Disasters of this magnitude will require the resources of the whole SC amateur radio community and I respectfully request your support on behalf of the citizens of South Carolina. Tfc: AF4QZ 189, KA4LRM 98, KA4UIV 88, K3LM 20, WD4BUH 16, N4VVX 12. PSHR: AF4QZ 150, N4VVX 133, KA4UIV 118, KA4LRM 117. SEC Report: 321.

VIRGINIA: SM, Carl Clements, W4CAC—ASM: W4PW. SEC: N4NW. STM: W3BBBQ. PIC: W4PW. ACC: W4IM. OOC: W4NEZ. TC: KD3PC. Web page; www.arrlva.org. Eastern Shore Amateur Radio Club (ESHARC) and ARES members participated in the 2002 Chincoteague Seafood Festival. On Wednesday May 1, a dozen members of the Eastern Shore Amateur Radio Club provided Public Service communications for the 2002 Chincoteague Seafood Festival. Using handitalkies and mobile 2 meter rigs, club members handled logistics and public safety messages in support of the annual event. Conspicuous with radios and wearing yellow hats and jackets, many members fielded questions about ham radio from the public. The weather was perfect, the seafood delicious, and everyone had a great time. June was also a busy month. June 2nd was the Manassas hamfest and June 8th was the Franklin Hamfest and Pig Pickin. I hope you were able to attend, meet some friends, and get a bargain or two. Then Field Day on June 22nd and 23rd. Did you participate in Field Day, either individually or with a club? Field Day always seems to bring out the good fellowship and good food associated with Amateur Radio operators. June 1st was also the start of hurricane season. Have you signed up yet to be a part of your locality's ARES team? See our Web page at www.aresva.org for a listing of the DECs and ECs for your area. Sign up with them. There is not a DEC or EC for your locality and you would like to volunteer, get in touch with Tom Gregory, N4NW. For the latest and greatest news around the Section be sure to check Pat Wilson's Virginia Section web page at www.arrlva.org or the Section News Web page at www.arrl.org/sections/VA.html. If your club or group is sponsoring a training class, or a hamfest, or anything that the other members in the section would like to hear about, please send it to me for inclusion in the Section News and on our Web

MFJ *Switching* Power Supplies

Power your HF transceiver, 2 meter/440 MHz mobile/base and accessories with these new 25 or 45 Amp MFJ MightyLite™ Switching Power Supplies!

No RF hash . . . Super lightweight . . . Super small . . . Volt/Amp Meters . . .

MFJ's new adjustable voltage switching power supplies do it all! Power your HF or 2M/440 MHz radio and accessories.

MFJ's *MightyLites*™ are so light and small you can carry them in the palm of your hand! Take them with you anywhere.

No more picking up and hauling around heavy, bulky supplies that can give you a painful backache, pulled muscle or hernia.

MFJ's 25 Amp *MightyLite*™ weighs just 3.7 lbs. -- that's *5 times lighter* than an equivalent conventional power supply. MFJ's 45 Amp is even more dramatic -- *8 times lighter* and weighs just 5.5 pounds!

No RF hash!

These babies are clean . . . Your buddies won't hear *any* RF hash on your signal! *None* in your receiver either!

Some competing switching power supplies generate objectionable RF hash in your transmitted and received signal.

These super clean MFJ *MightyLites*™ meet all FCC Class B regulations.

Low Ripple . . . Highly Regulated

Less than 35 mV peak-to-peak ripple under 25 or 45 amp full load. Load regulation is better than 1.5% under full load.

Fully Protected

You won't burn up our power supplies!

No RF Hash!

MFJ-4225MV
25 Amp
$149.95
plus s&h

MFJ-4245MV
45 Amp
$199.95
plus s&h

No RF Hash!

They are fully protected with Over Voltage and Over Current protection circuits.

Worldwide Versatility

MFJ *MightyLites*™ can be used anywhere in the world! They have switchable AC input voltage and work from 85 to 135 VAC or 170 to 260 VAC. Replaceable fuse.

MightyLites™ . . . Mighty Features

Front-panel control lets you vary output from 9 to 15 Volts DC.

Front-panel has easy access five-way binding posts for heavy duty use and cigarette lighter socket for mobile accessories. MFJ-4245MV has two sets of quick-connects on the rear for accessories.

Brightly illuminated 3 inch meters let you monitor load voltage and current.

A whisper quiet internal fan efficiently cools your power supply for long life.

Two models to choose from . . .

MFJ-4225MV, $149.95. 25 Amps maximum or 22 Amps continuous. Weighs 3.7 pounds. Measures 5¾Wx4½Hx6D in.

MFJ-4245MV, $199.95. 45 Amps maximum or 40 Amps continuous. Weighs 5.5 pounds. Measures 7½Wx4¾Hx9D in.

NEW! 25 Amp *MightyLite*™

Super light, super compact switching power supply delivers 25 Amps maximum/ 22 Amps continuous at 13.8 Volts DC. Low ripple, highly regulated. *No RF Hash!* Five-way binding posts for high current. Quick connects for accessories. Over voltage/current protection. 110 or 220 VAC operation. Meets FCC Class B regs. 3.5 lbs. 5½Wx2½Hx10¾D in.

MFJ-4125
25 Amp
$109.95
plus s&h

MFJ 35/30 Amp Adjustable Regulated DC Power Supply

Massive 19.2 pound transformer . . . No RF hash . . . Adjustable 1 to 14 VDC . . .

MFJ-4035MV
$149.95
plus s&h

MFJ's heavy duty conventional power supply is excellent for powering HF or 2 Meter/440 MHz transceiver/accessories.

A massive 19.2 pound transformer makes this power supply super heavy duty! It delivers 35 amps maximum and 30 amps continuous without even flexing its muscles. Plugs into any 110 VAC wall outlet.

It's highly regulated with load regulation better than 1%. Ripple voltage is less than 30 mV. *No RF hash* -- it's super clean!

Fully protected -- has over voltage protection, fold back short circuit protection and over-temperature protection.

You get front panel adjustable voltage from 1 to 14 VDC with a convenient detent set at 13.8 VDC. A pair of front-panel meters let you monitor voltage and current.

Three sets of output terminals include a pair of heavy duty five-way binding posts for HF/VHF radios, two pairs of quick-connects for accessories and a covered cigarette lighter socket for mobile accessories.

A front-panel fuse holder makes fuse replacement easy. Whisper quiet fan speed increases as load current increases -- keeps components cool. 9½Wx6Hx9¾D inches.

MFJ *High Current* Multiple DC Power Outlets

Power two HF/VHF transceivers and six or more accessories from your 12 VDC power supply

MFJ-1118
$74.95
plus s&h

MFJ-1116
$49.95
plus s&h

MFJ-1112
$34.95
plus s&h

New!
MFJ-1117
$54.95

MFJ-1118, $74.95. This is MFJ's most versatile and highest current *Deluxe Multiple DC Power Outlet*. Lets you power two HF and/or VHF transceivers and six or more accessories from your transceiver's main 12 VDC supply.

Two pairs of super heavy duty 30 amp 5-way binding posts connect your transceivers. Each pair is fused and RF bypassed. Handles 35 Amps total.Six pairs of heavy duty, RF bypassed 5-way binding posts let you power your accessories. They handle 15 Amps total, are protected by a master fuse and have an ON/OFF switch with "ON" LED indicator.

Built-in 0-25 VDC voltmeter. Six feet super heavy duty eight gauge color-coded cable with ring tongue terminals. Binding posts are spaced for standard dual banana plugs. Heavy duty aluminum construction. 12½x2¾x2½ in.

MFJ-1116, $49.95. Similar to MFJ-1118. No 30 amp posts. Has "ON" LED and 0-25 VDC voltmeter. 15 amps total.

MFJ-1112, $34.95. Similar to MFJ-1116. No on/off switch, LED, meter, fuse.

NEW! MFJ-1117, $54.95. For powering four HF /VHF radios (two at 35 Amps each and two at 35 Amps combined) simultaneously. Tiny 8x2x3 inches.

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All are protected by MFJ's famous No Matter What™ one year limited warranty.

page. Remember, YOU are the ARRL. 73 de Carl, W4CAC. Nets/QNI/QTC/NM; VTN/78/20/W3BBQ; VSBN/285/72/W3BBQ; VNE(CW)/149/32/WA4DOX; VSN(CW)/34/20/WA4DOX; NVTN/542/69/KB8TNU/N8LE; SVTN/70/16/WG8X; VNL(CW)/163/72/WA4DOX; VLN/262/118/K0IBS; PARES/9/3/K5SFM. Tfc: W3BBQ 465, WA4DOX 277, K4YVX 140, N4ABM 112, W4UQ 85, KG4OTL 85, KV4AN 71, K3SS 68, K0IBS 59, WB4UHC 35, KU4MF 29, K3FDR 32, K5SFM 18, W4CAC 12, K4JM 8, KB4CAU 7, W4MWC 5, N4FNT 4.

WEST VIRGINIA: SM, Hal Turley, KC8FS—ASM: W8YS. ASM: KB8NDS. SEC: W8XF. STM: KC8CON. SGL: K8BS. PIC: N8TMW. TC: W8DL. As I write this, portions of So. WV are reeling from yet more severe weather/flooding; ARES District 8, including McDowell, Logan, Mingo and Wyoming counties especially hard hit. Unfortunately, this district is without an Emergency Coordinator and these counties do not have ARES Emergency Coordinators! What is wrong with this picture, folks? Anyone interested in ARES from this part of the state? Contact me or SEC Mac, W8XF. Lincoln County has a new EC with Bobby Lucas AF4PQ. Thanks Bobby! Congrats to Al Heck, W3GEG, for completing Level III of the Emergency Communication course. As far as I know, Al is first one in WV to complete Level III. Don't forget the WV QSO Party 1600Z, Jun 15 - 0200Z, Jun 16. Details at www.qsl.net/wvarrl. 73 de Hal. Tfc (April.) KA8WNO 249, N8NMA 87, W8YS 83, KC8CON 60, N8FXH 45, WW8D 40, W8WWF 19, KB8NDS 16. PSHR: KC8CON 147, W8YS 143, KA8WNO 118,WW8D 113, N8FXH 107, KB8NDS 104, N8NMA 81, W8WWF 75. WVMDN 586/36/387 WW8D; WVN (E) 97/36/235 N8NMA; WVN (L) 115/66/248 N8NMA; WVFN 937/121/764 KC8CON; MSEN 60/0/65 N8TMW; BDARC (2mtr) 229/0/378, EPTN (2mtr) 14/1/40, PARA (2mtr) 44/4/72.

ROCKY MOUNTAIN DIVISION

COLORADO: SM, Jeff Ryan, K0RM—ASM: Tim Armagost, WB0TUB. ASM: Jerry VerDuft, AD0A. SEC: Mike Morgan, N5LPZ. STM: Mike Stansberry, K0TER. ACC: Ron Deutsch, NK0P. PIC: Erik Dyce, W0ERX. OOC: Karen Schultz, KA0CDN & Glenn Schultz, W0IJR. SGL: Mark Baker, KG0PA. TC: Bob Armstrong, AE0B. BM: Jerry Cassidy, N0MYY. It's been a very busy fire season in the western US, and Colorado has had its share of wildland fires. Ham radio operators have assisted in several of them including ARES Dist 23's response to the Black Mountain Fire and El Paso County RACES support of the Black Forest Fire. We remain on alert as we enter the severe weather season and expect many lightning initiated fires to break out (as I write this in early May). Contact your local ARES Emergency Coordinator if you want to help. Statewide ARES nets take place on Sunday morning with the HF SSB net at 0800 on 3928 kHz and the VHF net at 0830 on the Colorado Connection repeater system. The Colorado Council of Amateur Radio Clubs (CCARC) re-elected Bud Saum, K0GS as Chairman. Nate Duehr, WY0X is the new Secretary and the new frequency coordinator is Doug Sharp, K2AD. Congrats to all. The Colorado Secretary of State has recognized HAMCON Colorado, Inc. as a non-profit corporation authorized to 'conduct business' in the state. This is the umbrella organization created to put together our convention in 2003. The location of the convention will be Estes Park, and Riley Hollingsworth has already accepted an invitation to be the banquet speaker. Watch this space for more details. If you have information of interest to the members of the Colorado Section you'd like me to post here or on the Web page, send me an email at k0rm@arrl.org. 73, de K0RM. NTS traffic: WB0TAQ 557, AD0A 122, K0EZ 74, N0BN 66, K0TER 37. CAWN: W0WPD 898, W0LVI 648, WB0TYT 417, W0GGP 392, K0HBZ 369, AB0PG 361, K4ARM 301, N0NMP 267, N3XT 246, W0NCD 244, WB0VET 212, WD0CKP 161, AA0ZR 130.

NEW MEXICO: SM, Joe Knight, W5PDY—ASM: K5BIS, N5ART & KM5FT. SEC: W5YEJ. STM: N7IOM. NMs: WA5UNO & W5UWY. TC: W8GY. ACC: N5ART. April started off with forest fires and certainly ended with forest fires. New Mexico is a disaster waiting to happen. Our largest fire started at the end of the month near Cloudcroft. The NM State EOC requested activation of our ARES/RACES nets for possible communications support for the Penasco fire which has burned over 15,000 acres, but at this time is about 60% contained. More winds are due tomorrow, but only 20 structures have been consumed, including some homes. There is a new fire tonight near the CO border, but we hope that can be contained soon. Our thanks to our SEC, W5YEJ, and our Otero County DEC, N7DRB and to AG5S, who activated the State EOC. Our thanks also to W5UWY, AB5FG, and several others who had to evacuate their homes. The Lincoln County ARES/RACES team and others were, and still are on standby. We hope the worst is over for now, but NM remains a tinderbox and we hope for the best. A chilly spring Tail Gate was held in ABQ on April 27th and was very successful. The Bean & Chili Feed at Las Cruces was a resounding success. Sorry I didn't get to make this one, for the first time in over 25 years! The Flagstaff (Ft. Tuthill) Hamfest is scheduled for July 26-28th. The Duke City Hamfest is scheduled for the afternoon of August 23rd and on August 24th with Special Event Station N5M to be in operation. For details please see "qsl.net/dchf/" The Socorro Hamfest is to be held October 26th with details to follow. Best 73, W5PDY.

UTAH: SM, Melvin T. Parkes, AC7CP—ASM: William E Moyes, N7IE. ACC: Gary T Roberts, AG1T. BM: Dallas Barrett, W7MEL. PIC: Lonnie D Stuart, WM7E. SEC: John M Mabey, W7CWK. STM: NA7G. TC: Ron Jones, K7RJ. ARRL Utah Section Web Site: http://www.arrl.org/sections/UT.html

WYOMING: Bob Williams, N7LKH—We are sorry to report the loss of another valued member of our community. Phil Barnhart, W7PT, became a Silent Key on March 20th. Phil was one of the founding members of the Cedar Mountain ARC, and one of the first to be awarded lifetime membership for his contributions. Phil was first licensed in 1938, and remained active on the air until shortly before his death. Six CMARC members turned out on May 4 to assist with communications for the March of Dimes WalkAmerica. It was a beautiful day (big contrast to last year's snow!), and no problems were reported. Thanks to all who helped. We had a telephone call from Lee Fouts, K7MBJ. After a summer in warm, sunny Arizona, they are off to Alaska for the summer. They hope to be back in Wyoming in time for the High Plains Roundup, in September. Don't forget the Glacier-Waterton International

1.8-170 MHz *plus* 415-470 MHz
MFJ HF/VHF/UHF Antenna Analyzer

All-in-one handheld antenna test lab lets you quickly check and tune HF, VHF, UHF antennas anywhere. Covers 1.8-170 MHz and 415-470 MHz

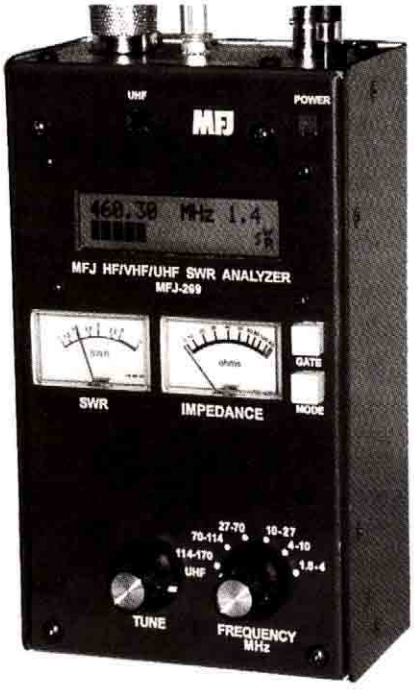
Measures: SWR...Return Loss...Reflection Coefficient...Antenna Resistance(R), Reactance(X), Impedance(Z) and Phase Angle(degrees) ... Coax cable loss(dB) ... Coax cable length ... Distance to short or open in coax ... Inductance ... Capacitance ... Resonant Frequency ... Bandwidth ... Q ... Velocity Factor ... Attenuation ... Has: LCD readout ... frequency counter ... side-by-side meters ... Ni-MH/Ni-Cad charger circuit ... battery saver ... low battery warning ... smooth reduction drive tuning ... One year No Matter What™ warranty ...

NEW

MFJ-269 **$359.95**

You can instantly get a complete picture, check and tune any antenna from 1.8 to 170 MHz and 415 to 470 MHz -- an MFJ-269 exclusive -- with this rugged easy-to-use handheld antenna test lab! You can measure virtually every antenna parameter.

You won't believe its capability and versatility. This rugged handheld unit literally replaces a workbench full of expensive delicate test equipment.



SWR Analyzer

You can read SWR, return loss, reflection coefficient and match efficiency at any frequency simultaneously at a single glance.

Complex Impedance Analyzer

Read Complex Impedance (1.8 to 170 MHz)as series equivalent resistance and reactance (Rs+jXs) or as magnitude (Z) and phase (degrees). Also reads parallel equivalent resistance and reactance (Rp+jXp) -- *an MFJ-269 exclusive!*

Coax Analyzer

You can determine velocity factor, coax loss in dB, length of coax and *distance to short or open in feet (it's like a built-in TDR).*

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

A high contrast LCD gives precision readings and two side-by-side analog meters make antenna adjustments smooth and easy.

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-1315, $14.95.

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 -- use your MFJ *SWR Analyzer™* without ever taking it out of your case. *Authentic MFJ leather logo distinguishes the real thing from imitators!*

MFJ-66, $19.95.

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, $34.95.

SWR Analyzer Power Pack. 10 Pack MFJ *SuperCell™* Ni-MH batteries, and MFJ-1315 Power supply for MFJ-269 SWR analyzers. ***Save $5!***

MFJ-98, $54.85.

MFJ-269 Accessory Pack. MFJ-39C *custom* Carrying Pouch, MFJ-66 dip coil adapters, MFJ-1315 power supply for MFJ-269. ***Save $5!***

MFJ-98B, $77.85.

MFJ-269 Deluxe Accessory Pack. Complete accessory pack! MFJ-39C Pouch, 10 Ni-MH batteries, dip coils, power supply. ***Save $7!***

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• 1 Year *No Matter What™* warranty • 30 day money back guarantee (less s/h) on orders direct from MFJ

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Tech Help: (662) 323-0549
FAX:(662)323-6551 8-4:30 CST, Mon.-Fri. ***Add shipping.***

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Hamfest/Montana State Convention, July 19-21, and the Tour de Wyoming, July 21-26. The Tour will visit Worland, Greybull, Dayton, Buffalo, Kaycee (out-and-back day ride), Tensleep, and back to Worland. Hams are encouraged to volunteer for communications support, and you'll get a neat T-shirt! Tfc: NN7H 241. PSHR: NN7H 163.

SOUTHEASTERN DIVISION

ALABAMA: SM, Bill Cleveland, KR4TZ – ASMs: W4XI KB4KOY. STM: W4ZJY. SEC: W4NTI. SGL: KU4PY. ACC: KV4CX. TC: W4OZK. Cellular Phone law dies in Committee. It appears that House Bill 527 (AKA Hands-free Cell Phone law) died in committee. The law would have required the use of Hands-Free devices when using a cell phone while driving a motor vehicle. The draft that I looked at seemed only to target cell phones, and I do not believe it posed a threat to Amateur Radio Mobile Operations. The Alabama Section staff will keep an eye on this and other bills that may arise during the next session of the Alabama Legislature. For more info on HB-527 you can go to http://www.legislature.state.al.us. How to subscribe to ALHam and ALHamClubs. We have two lists targeting Alabama Hams on QSL.net. The first list is "ALHams" and is open to anybody interested in Ham Radio Activity within Alabama. The other list is "ALHamClubs" and membership is limited to officers of Alabama Amateur Radio Clubs. To subscribe go to http://mailman.qsl.net and click on "To Subscribe to Lists click here". Look for "ALHam" and/or "ALHamClubs" and click on their link. Fill in your e-mail address and give a password that you would like to use. Press "Subscribe," and the system will process your request. Membership to "ALHam" should happen pretty quickly. For "ALHamClubs" after you submit you subscription, please send an e-mail to kr4tz@arrl.org stating that you subscribed to "ALHamClubs" and give the Club Name and your position. E-mail version of Alabama Section News. I will take advantage of a new service provided by the ARRL that will allow me to send an electronic version of Alabama Section News to you via e-mail. If you would like your club included within the newsletter, please email me a copy of your newsletter at kr4tz@arrl.org. If you would like to receive the newsletter, make sure you enabled "Division/Section notices" on the "Member Data Page" at http://www.arrl.org. New Public Information Coordinator Michael Allsup (WB4LXP) has volunteered to serve as our new Public Information Coordinator. Michael has been actively lobbying for a PRB-1 law in Alabama. I feel that as PIC, Michael will be able to make use of our PIOs throughout the Section as he lobbies on behalf of Amateur Radio in Alabama. Good job, Michael! With both Michael Allsup and Rik Doll KU4PY (our SGL) working together, we should have an excellent legislative year. God Bless & 73, Bill Cleveland KR4TZ. Tfc: AC4CS 408, W4ZJY 286, W4PIM 199, W4CKS 121, WB4BHH 38, W4QAT 24, W4NTI 14, W4DGH 9.

GEORGIA: SM, Susan Swiderski, AF4FO— ASM/South GA: Marshall Thigpen, W4IS. ASM/Legal: Jim Altman, W4UCK. ASM/Web and SEC: Mike Boatright, KO4WX. STM: Jim Hanna, AF4NS. SGL: Charles Griffin, WB4UVW. BM: Eddy Kosobucki, K4JNL. ACC: Mary Ahls, W4NZJ. OOC: Mike Swiderski, K4HBI. TC: Fred Runkle, K4KAZ. PIC: Matt Cook, KG4CAA. State Website: www.qsl.net/arrl-ga ARES site: www.qsl.net/gaares. If you haven't checked out our Web sites, give them a look-see. You'll find the section newsletters and all kinds of general info on the first site, and info about ARES, including who your DEC and EC are, on the ARES site. (Still some openings.... maybe YOU would like to help???) Well, the long hot summer is upon us, and we're all still moving, but just a little more slowly. Activities may be down, but there will be lots of you folks involved in providing communications for the various 4th of July parades around the state, and thanks go out to all of you for providing this and other public services throughout the year. (You guys are responsible for giving Amateur Radio a good name!) July 13 brings us the Lanierland ARC hamfest at the Georgia Mountains Center in Gainesville, where the air conditioning is oh-so-cool, the bone yard is in the shade, and the hospitality is unbelievably warm. The ARRL's own Brennan Price, NQ4X, will be coming home to Georgia to make an appearance at the hamfest, so don't forget to bring any QSL cards you may have for him to check for ARRL awards. (DXCC, VUCC, etc.) Congratulations to new club officers for the Georgia Tech ARC: President: David Ziskind, KE4QLH; VP: Philip Michael, KG4SJG; Secretary: John Hall, KG4RUO; and Treasurer: Tim Cailloux, W4EGT. Hope everybody had a fantabulous time at Field Day and went home with lots of good memories and new ideas on how to make next year's event even better. Y'all keep cooool, now. Until next month, take care of yourselves. And each other. 73, Susan April QTC: KG4FXG 188, W4WXA 187, AF4NS 159, WB4GGS 87, K4WKT 72, K4BB 60, K4BEH 57, WB4BIK 41, N4DOM 14, K4JNL 6, KG4QDH 4.

NORTHERN FLORIDA: SM, Rudy Hubbard, WA4PUP— ACC: WA4B. BM: N4GMU. OOC: KD4NLF. PIC: KF4HFC. SEC: WA4NDA. SGL: KC4N. STM: WX4H. TC: KO4TT. Packet: N4GMU. The staff is listed as they are responsible for the various programs. Anyone desiring to get involved in any of the ARRL programs should contact these people. Most can be reached by their call sign @arrl.net. Several people have transferred from other Sections into the Northern Florida Section, and they assume they can continue their appointment from the other Section. However, this may not be possible, as we may have someone already appointed. For example, if someone with an SEC, PIC, STM, OOC appointment were to transfer into the Section, they cannot assume to continue their previous appointment. Why? We already have someone in that position. We would welcome you to apply to other positions, such as OO, OES, ORS, and continue your involvement, and I am sure we can work something out. The FCC has proposed raising the regulatory fee it charges vanity call sign applicants from $12 to $14.50 for the 10-year license term. An Amtrak train carrying more than 400 vacationers from Central Florida to a Washington suburb derailed Thursday April 18 in the vicinity of Crescent City in Putnam County. Four people were killed aboard the Auto Train. Duval County emergency net was activated on local repeaters, 17 Duval ARES members immediately sprang into action. As many as 300 people were sheltered in the schools. Putnam County officials were greatly impressed with communications system and volunteer resources that ARES furnished them. 40 to 45 ham radio operators in the Crown and East Central Districts

MFJ TUNERS

MFJ-989C *Legal Limit* Antenna Tuner

MFJ uses super heavy duty components to make the world's finest legal limit tuner.

MFJ uses super heavy duty components -- roller inductor, variable capacitors, antenna switch and balun -- to build the world's most popular high power antenna tuner.

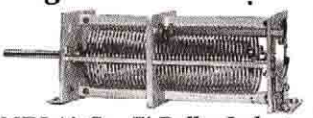
The rugged world famous MFJ-989C handles 3 KW PEP SSB amplifier input power (1500 Watts PEP SSB output power). Covers 1.8 to 30 MHz, including MARS and WARC bands.

MFJ's *AirCore*™ roller inductor, new *gear-driven* turns counter and weighted spinner knob gives you exact inductance control for absolute minimum SWR.

You can match dipoles, verticals, inverted vees, random wires, beams, mobile whips, shortwave -- nearly any antenna. Use coax, random wire or balanced lines.

MFJ-989C **$359.95**

You get everything you've ever wanted in a high power, full featured antenna tuner -- widest matching range, lighted Cross-Needle SWR/Wattmeter, massive transmitting variable capacitors, ceramic antenna switch, built-in dummy load, *TrueCurrent*™ Balun, *scratch-proof* Lexan front panel -- all in a sleek compact cabinet (10¾Wx4½Hx15D in).



MFJ AirCore™ Roller Inductor gives high-Q, low loss, high efficiency and high power handling.

MFJ's exclusive *Self-Resonance Killer*™ keeps damaging self-resonances away from your operating frequency.

Large, self-cleaning wiping contact gives good low-resistance connection. Solid 1/4 inch brass shaft, self-align bearings give smooth non-binding rotation.

MFJ *No Matter What*™ Warranty

MFJ will repair or replace your MFJ-989C (at our option) *no matter what* for one year.

More hams use MFJ tuners than all other tuners in the world!

MFJ-986 Two knob *Differential-T*™

MFJ-986 **$329.95**

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. 10¾Wx4½Hx15 in.

MFJ-962D *compact* Tuner for Amps

MFJ-962D **$269.95**

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. 10¾x4½x10⅞ in.

MFJ-969 300W *Roller Inductor* Tuner

MFJ-969 **$199.95**

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. 3½Hx10½Wx9½D inches.

MFJ-949E *deluxe* 300 Watt Tuner

MFJ-949E **$149.95**

More *hams use MFJ-949s than any other antenna tuner in the world!* Handles 300 Watts. Full 1.8 to 30 MHz coverage, 48 position *Precision48*™ inductor, 1000 Volt tuning capacitors, *full size* peak/average lighted Cross-Needle SWR/Wattmeter, 8 position antenna switch, dummy load, *QRM-Free PreTune*™, scratch proof Lexan front panel. 3½Hx10⅝Wx7D inches. **MFJ-948, $129.95.** Economy version of MFJ-949E, less dummy load, Lexan front panel.

MFJ-941E *super value* Tuner

MFJ-941E **$129.95**

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 10½Wx2½Hx7D in.

MFJ-945E HF+6 Meter *mobile* Tuner

MFJ-945E **$119.95**

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, $4.95,** mobile mount.

MFJ-971 *portable/QRP* Tuner

MFJ-971 **$99.95**

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 6x6½x2½ inches.

MFJ-901B *smallest* Versa Tuner

MFJ-901B **$79.95**

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-16010 *random* wire Tuner

MFJ-16010 **$49.95**

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 **$79.95**

MFJ-906 has lighted Cross-Needle SWR/wattmeter, bypass switch. Handles 100 W FM, 200W SSB. **MFJ-903, $49.95**, Like MFJ-906, less SWR/Wattmeter, bypass switch.

MFJ-921/924 *VHF/UHF* Tuners

MFJ-921 or MFJ-924 **$69.95**

MFJ-921 covers 2 Meters/220 MHz. **MFJ-924** covers 440 MHz. SWR/Wattmeter. 8x2½x3 inches. Simple 2-knob tuning for mobile or base.

MFJ-922 *144/440 MHz* Tuner

MFJ-922 **$79.95**

Ultra tiny 4x2½x1¼ inch tuner covers VHF 136-175 MHz and UHF 420-460 MHz. SWR/Wattmeter reads 60/150 Watts.

MFJ-931 *artificial* RF Ground

MFJ-931 **$89.95**

Creates artificial RF ground. Also electrically places a far away RF ground directly at your rig by tuning out reactance of connecting wire. Eliminates RF hot spots, RF feedback, TVI/RFI, weak signals caused by poor RF grounding. **MFJ-934, $169.95**, Artificial ground/300 Watt Tuner/Cross-Needle SWR/Wattmeter.

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1 Year *No Matter What*™ warranty 30 day money back guarantee (less s/h) on orders from MFJ

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Tech Help: (662) 323-0549

assisted in this operation. All involved in the train wreck are congratulated and while we cannot express our views directly, you know our team is one of the best. Thanks to all de Rudy. Tfc: WX4H 1877, KE4DNO 520, NR2F 430, WX4J 328, WD4GDB 281, WB2FGL 249, KF4WIJ 241, K1JPG 215, K8KV 200, KE4PRB 190, N9MN 152, KG4DZN 104, W8IM 73, AB4PG 68, K4JTD 63, W4KIX 59, KJ4HS 33, AG4DL 32, AF4PU 31, WD4IIO 28, WB2IMO 15, K4KAM 8, WD4ILF 3.

PUERTO RICO: SM, Víctor Madera, KP4PQ – Como resultado del un Acuerdo de Entendimiento firmado con la Agencia Estatal para Manejo de Emergencias se ofreció el primer curso preparatorio para empleados. Unos 50 participantes estarán listos para sus exámenes próximamente. Un segundo curso está programado donde participarán miembros de la Guardia Nacional. Se están organizando grupos de instructores para ofrecer clases en Ponce y Guayama. Las clases en Humacao, área Metro y Mayagüez siguen adelante exitosamente. Pronto se comenzará la organización del programa ARES. Se espera que esté a tiempo para la temporada de huracanes. Los interesados en participar en la red Inter-Zona que tengan privilegios en 40 y 80 metros HF deben comunicarse con el Section Manager. Se necesitan 4 operadores por zona. Se celebraron Field Days exitosos en varios puntos de la isla. La nueva estructura le ha dado a esta actividad un nuevo sabor. La FCC ha decidido considerar el segmento entre 5.25 y 5.40 Mhz para una nueva banda para mejorar las comunicaciones entre los Estados Unidos y las islas del Caribe. Puedes comunicarte con tu Section Manager vía email a kp4pq@arrl.org .

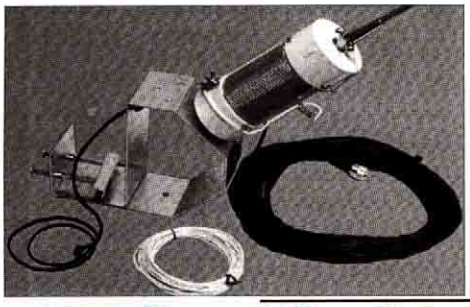
SOUTHERN FLORIDA: SM, Phyllisan West, KA4FZI—SEC: KD4GR. STM: WA2YL. ACC/TC: WA4AW. ASM/PIC: W4STB. OOC: K4GP. BM: KC4ZHF. SGL: KC4N. DEC: W4SS. ASM: W4WYR. DEC/ASM: N4LEM, K9SHT, AA4BN. SFL Web Page: http://www.sflarrl.org. Photos on the ARRL SFL Web page. Brevard's IRARC members worked the 2002 MS walk at Coco Beach. The Ride-For-The-Red involved TARC, IRARC, and SBARC communicators. Congrats to KA1ZXF and KE4PBG for winning $1000 scholarships from IRARC. During STS-110, the LISATS drew a crowd of launch viewers, many interested in ham radio. Hams also helped at the moving Memorial Wall for the Vietnam Veteran's Annual Reunion. Brevard Commissioners presented a Certificate of Appreciation to BEARS for services to the community. Broward hams participated in the county's MD Walk-a-thon. Plans for a mock emergency training sessions with Palm Beach include SSTV on VHF/HF. Lee ALERT continues to grow. Martin ARA provided communication for the county's MD Walk-a-thon with a control station and 5 along the route. Skywarn was activated by KE4UEI for a severe thunderstorm that left 1700 Jensen Beach residents without power. Miami-Dade County's ARPSC provided 472.5 man-hours of communication for their MD Walk-a-thon and also supported the MS150 Bike Tour. Organization and reports on these events were outstanding, a job well done! Congrats to K4INJ for service in the Okeechobee club and 68 years as a ham! Osceola's communication support for the MD Walk-a-thon was a big success. Palm Beach hams, directed by AF4OR, assisted with the MD Walk-a-thon supporting 2000 participants. PB South group supported the FAU Triathlon. The Wellington club provided a Lost Children and Comm. Center for the Diabetes Walk. Welcome Palm Beach ARS for ARRL re-affiliation. April Tfc by STM WA2YL: WA9VND 808, KA4FZI 507, WA2YL 162, KD4GR 135, AA4BN 99, KC4ZHF 93, K4FQU 73, KG4EQY 55, KD4HGU 54, KG4MLD 54, WB4PAM 49, KG4QIP 41, KG4MLC 37, KT4XK 32, KE4UOF 31, KG4ILJ 26, KG4CHW 26, WA4EIC 22, W3JI 5, KI4ZW 3. Thank you to those who share your activities with the section! 73, Phyllisan West, KA4FZI, SM SFL.

VIRGIN ISLANDS: SM, John Ellis, NP2B, St. Croix—ASM: Ron, KP2N, St Thomas. ASM: Mal, NP2L, St. John, Sect. Internet Mgr. Jeanette, NP2C, St. Croix. SEC: Duane, NP2CY, St Thomas. PIC: Lou, KV4JC, St Croix. ACC: Debbie, NP2DJ, St Thomas. Big news this month was the St. Croix Half Ironman Triathlon, one of the pre-qualifiers for the big one in Hawaii. Race communications were handled by Chris, NP2EL, Linda NP2FN, Ed NP2U, Larry N4FD, Al NP2V, Marc NP2BF, Bob KP2CG, Bob NP2BJ, Lou KV4JC, Matt NP2FK, Manny NP2KW, Wallace WP2AAZ, and John NP2B. Repeater in St. Croix will soon have a permanent high gain antenna which will remain up year-around. A smaller whip antenna will also be permanently installed but only connected prior to an impending storm, reason being that the whip stands a better chance of surviving than the higher gain unit. Hopefully both will remain for a long time! Repeaters: St. John 146.63, St. Thomas 146.81, St. Croix 147.25. Section Web site www.viaccess.net/~jellis. Pray for calm weather, de John, NP2B.

WEST CENTRAL FLORIDA: SM, Dave Armbrust, AE4MR ae4mr@arrl.org http://www.wcfarrl.org— ASM/SEC NA4AR. ASM-Web: N4PK. ASM-Legal: K4LAW. TC: KT4WX. BM: KE4WU. STM: AB4XK. OOC: W4ABC. SGL: KC4N. ACC: AC4MK. PIC: WX1JAD. Please welcome Richard G Brannen Jr, KA3JCA, as the new EC for Polk County. Many thanks are extended to Paul Womble, K4FB, for many years of service as EC. Paul will be moving from Polk County to Charlotte County. An ARES core leadership group has been established in Pinellas County. They are planning on recommending a new EC shortly. Field Day is June 22nd and 23rd. A new rule this year allows many FD sites to setup a GET ON THE AIR (GOTA) station that may be operated by Novice, Technicians or generally inactive hams. In WCF Class A FD sites may compete with other Class A FD sites by sending each other NTS messages. Each Class A FD site will be awarded one point for each message send and one point for each message received from other Class A FD sites. Please visit the WCF Web page for more information about this WCF competition. Be sure to take part and enjoy the fun at Field Day this year. On May 4th a WCF Club Leadership conference took place in Tampa with a turn out of about 45 club leaders through out WCF. The conference was beneficial to all. This is planned to be an annual event. On April 20-21 44 operators turned out for the MS-150 this year making the total ARES contribution worth $7,800. There were 317 cyclists that took part. Together this effort helped raise $125,000 for MS. STM AB4XK reports Apr Net Report:

MFJ Apartment Antenna

Covers 40 thru 2 Meters . . . Mounts outdoor to windows, balconies, railings . . . works great indoors mounted to desks, tables, bookshelves



MFJ-1622
$99.95
New!

New MFJ-1622 Apartment Antenna lets you operate 40 thru 10 Meters on HF and 6 and 2 Meters on VHF with a single antenna!

Its universal mount/clamp lets you easily attach it to window frames, balconies and railings. It also works great indoors mounted to a bookshelf, desk, or table. It's not a 5 element yagi, but you'll work your share of exciting DX!

Highly efficient air wound "bug catcher" loading coil and telescoping 5½ foot radiator lets you really get out! Radiator collapses to 2½ feet for easy storage and carrying.

It includes coax RF choke balun, coax feed line, counterpoise wire and safety rope. Handles 200 Watts PEP.

Operating frequency is adjusted by moving the "wander lead" on coil and adjusting counterpoise for best SWR.

MFJ Ground-Coupled Portable Antenna Base

Provides effective RF ground and stable mount for vertical antennas . . . Antennas radiate well with low SWR

MFJ-1904
$99.95
New!

MFJ *Ground-Coupled Portable Antenna Base*™ provides an *effective* RF ground 160 through 2 Meters and a stable mount for vertical antennas.

Capacitive coupling to ground is a *time-proven* principle. It needs no tuning and antenna radiates well and gives good SWR on all bands. Performance is similar to mobile stations when using a mobile antenna but is far better with longer antennas.

The base can support a lightweight multi-band vertical antenna -- like the all band Hy-Gain 18AVS and the bandswitching MFJ-1795 -- and provide a semi or permanent installation.

You can easily set up and take down vertical antennas for stealth operation and hide the base by covering it with dirt.

The MFJ-1904 is a 2x2 foot *stainless steel* square with reinforcing bends that greatly strengthens it. Folded and tapered six-inch *stainless steel* legs firmly anchor the MFJ-1904 into the ground.

Built-in antenna mount with SO-239 coax connector and two U-bolts lets you mount most standard and homebrew vertical antennas.

Standard 3/8-inch x 24 mobile mount is built-in for MFJ Mobile Whips, bug catchers, *Hustlers* and screwdriver antennas.

Two handles make carrying and removing the base fast and easy. You can also attach radials for improved performance.

33 Feet Telescoping fiberglass Mast . . .

Collapses to 3.8 feet, weighs 3.3 lbs.

Super strong fiberglass mast has huge 1¾ inch bottom section. Flexes to resist breaking. Resists UV. Put up *full size* inverted Vee dipole/vertical antenna in minutes and get *full size performance!*

MFJ-1910
$79.95

MFJ Vertical

for Antenna Restricted Areas

40, 20, 15, 10 Meters, Automatic Band Switching

Perfect for permanent or portable operation in antenna restricted areas. Hide behind trees, fences, buildings, *in* bushes -- only 7 to 10 feet tall (adjustable).

MFJ-1795
$149.95
New!

Low angle of radiation for DXing, omni-directional, handles 1500 watts PEP, low SWR.

Highly efficient end-loading. Entire length radiates.

Ground mounts with suitable ground such as MFJ-1904 *Ground-Coupled Antenna Base*, radials or ground rods. Or roof mount with radials.

HF mini-Bugcatcher

Highly efficient 40 - 6 Meter base-loaded 5½ foot Bugcatcher mobile antenna . . . Use light duty mounts

Become an *"HF Mobileer"* almost instantly with this *new* MFJ high-efficiency *mini-bugcatcher* mobile antenna! Have tons of fun rag-chewing and DXing on the HF bands. Turn boring drives into fun-filled ham adventures.

MFJ-1624
$79.95
New!

Attach a simple mount to your vehicle (*mounts*: trunk lip, MFJ-347, $39.95; mirror or luggage, MFJ-342, $9.95; tri-magnet, MFJ-338T, $19.95) . . . **Screw** in your MFJ *mini-bugcatcher* . . . **Throw** your rig into your car, plug into cigarette lighter and turn power down to 20 Watts (to avoid overloading your cigarette lighter; MFJ-1624 handles 300 Watts PEP). **Operate!**

Bugcatcher design uses large highly-efficient *air-wound* inductor -- far out performs other compact HF antennas. *Exclusive* built-in inductive matching network keeps SWR low. 5½ foot whip collapses to 2½ feet for easy storage and low garages. Base loaded for minimum wind load and light duty mounts. Change band by moving *wander lead*. 3/8x24 in. mount.

MFJ Portable Antenna

MFJ-1621
$89.95

Operate from apartments, homes, hotels, campsites, beaches or any antenna restricted area. Work all bands 40, 30, 20, 17, 15, 12 and 10 Meters.

DXCC, WAZ, WAC, WAS have been won with the MFJ-1621! Compact 6x3x6 inch cabinet has 4½ foot telescoping whip, built-in antenna tuner, field strength meter and 50 feet coax. Handles 200 Watts.

MFJ Super High-Q Loop

MFJ-1786
$379.95

MFJ's *tiny* 36 inch diameter *high-efficiency* loop antenna performs like a *full-size* dipole! Operate 10 thru 30 MHz *continuously* -- including WARC bands!

Ideal for limited space -- apartments, small lots, motor homes, attics or mobile homes.

Mounts vertically or horizontally. Low angle radiation gives you excellent DX.

Super easy-to-use! Remote control auto-tunes to desired band, then beeps. No control cable needed. Handles 150 watts.

Fast/slow tune buttons and built-in two range Cross-Needle SWR/Wattmeter lets you quickly tune to your exact frequency.

All welded construction, no mechanical joints, welded butterfly capacitor with no rotating contacts, large 1.050 inch diameter round radiator -- *gives you highest possible efficiency*. Heavy duty thick ABS plastic housing has ultraviolet inhibitor protection.

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Apr PSHR: KF4KSN 195, KT4TD 164, K4RBR 153, K4SCL 150, WB2LEZ 133, KF4OPT 117, AB4XK 114, W4AUN 110, KD4EFM 105. SAR: W4TJM 1,004, K4SCL 365, AB4XK 250, K4RBR 171, KF4OPT 72, KT4TD 51, KF4KSN 39, KD4EFM 32, W4AUN 16, KG4FCD 10, WB2LEZ 8. 73, Dave, AE4MR.

SOUTHWESTERN DIVISION

ARIZONA: SM, Clifford Hauser, KD6XH—Are you ready for Fort Tuthill? This is the month of the big event for this year, our own "Arizona State Hamfest/Convention". This year we will have many presentations along with VE exams on Saturday. Ed Hare, W1RFI from ARRL headquarters will be present. The Repeater Owners conference, ARRL Forum, and ARCA forum are all scheduled along with another ATV balloon launch at 0900 hours. Check the ARCA Web site for complete scheduled activities. Don't forget to make the necessary plans for the Southwestern Division Convention on 16-19 August. This year it will be in the San Diego area at the Holiday Inn in Escondido, California. The West Valley Amateur Radio Club has a lot of members that live in the western part of the Phoenix area. Their president is Bill Roberts, KD7JMN (telephone number 623-214-2665), and they meet the first Monday of every month at 1900 hours at Saint Clement Social Hall. The club Web page is www.qsl.net/wvarc. This club is very active with two (2) repeaters (147.30 (-), PL 162.2, and 449.800 (-), with PL of 162.2), a weekly club net on Wednesday at 1845 hours on the 2-meter repeater, and a 0900 hour brunch every Thursday at Coco's restaurant on 98th Avenue and Bell Road. Don't forget to check-out our state Web site at www.qsl.net/arrlaz. Tom Fagan, WB7NXH, is keeping this site up-to-date. Here in Arizona we have over 50 more clubs. If you need list of the clubs you can contact the club coordinator, Bruce Makas, K1MY, or me, both our e-mail address are through "arrl.net." The DeVry Hamfest, the Mohave Educational Fair in Kingman, and even with fires in the area, the CARA Hamfest were all a big success. The people responsible for putting on these events did a great job. It appears that we will have the "Westfest" at Glendale Community College in January 2003. See you at Fort Tuthill. 73, Clifford Hauser, KD6XH. ATEN 1105 QNI, 27 QTC, 30 sess. Tfc: W7EP 45, K7POF 33.

LOS ANGELES: SM, Phineas J. Icenbice, Jr. W6BF — Some times the jokes and jokers on the ham bands are better than the ones on the Internet. Last week on 15 meters a couple of old hill country boys, like Lum and Abner, were chatting about their very good mutual friend Mable. An unusual phone conversation with Mable revealed by the operator of Station A said that he couldn't understand why Mable hung up on him and left abruptly. Station B reported that he understands why she departed abruptly. You know that Mable feels that she must talk a steady stream going and coming. You interrupted her steady stream of "yacking," and further more you know that she had to wave her arms in order to continue talking. So, she told you Merry Christmas and hung up. You know that she always wants to be first in everything, so that is why she said Merry Christmas, just to be the first, to wish you a sincere Merry Christmas. The pushers and shakers of the Los Angeles Area Council of Amateur Radio Clubs (LAACARC) voted to appoint, Jim, WA6MZV and Beverly, WA6TIU, co-chair of the up coming ARRL Convention. Tenitive plans for this Sept. (5/6/7), 2003, Convention point to the Hilton Long Beach as one of the best potential locations. N6OU, Edgar reports that the DXCC card checkers did a land office business in Visalia at the International DX convention. A total of 6,276 cards were checked for DXCC credit. Edgar wanted to keep busy so he presented a lecture on Amateur Photography to the 50 Club on April 18th. If your club needs a speaker Edgar can help you understand the "STARS". He is available for speaking engagements on other subjects as listed on our Web site. Twenty other great speakers are also listed on our Web site; www.qsl.net/arrlsw/lax. Vy, 73 de W6BF, Phineas.

ORANGE: SM, Joe Brown, W6UBQ, 909-687-8394— ASM Org. Co. Richard,WA6NOL, 714-835-3295. ASM S.B. Co. Jeff, W6JJR, 909-885-3453. ASM Riv. Co. Brett N6NLN. Let us not forget the SW Div Convention, Aug 16-18, 2002. In Escondido Calif: for updates the Web site is http://sd2002.hamcon.net. From the Clarafier the first Vice President, George N6VNI, sez. This is your Club, yours and mine, so be a part of your ARC, GET INVOLVED. Inland Empire ARC president's Msg. We should use every opportunity to get young people into our hobby. Without youth the hobby will die. Please keep your ARC in your plans, and continue to make the IE ARC a great club and an asset to the Amateur Radio Community. HDSCS Serves After Metrolink Crash. A total of 28 HDSCS members provided vital links between hospitals, the county Central ambulance dispatch and the county's Emergency Medical Service Agency. Net Control for this vital operation was April WA6OPS, ARES Emergency Coordinator for this group. OCRACES dispatched operators to the train incident and operators to the EOC. SSTV pictures were sent for distribution to the Control one and the EOC. The professionalism shown by Orange County RACES and Orange County ARES Amateur Radio Operators was outstanding. " If you are looking for a meeting speaker, you might check the Orange Section Speakers Bureau. You will find a list of Speakers who might be available to for presentations at Amateur Radio Clubs or other related events on the topics indicated" The Orange Section Web site is (http://www.qsl.net/arrl-orange/). (TC) Art KQ6HF (STM) April Report QTC:KC6SKK 159, W6JPH 110, K6IUI 88. PSHR:W6QZ 157, K6IUI 92, W6JPH 92. K6SKK 85. BBS tfc: W8QZNTS BBS 125. SCN/V report, W6JPH: 21 sess. QNI 115, QTC 111, Net time avg 21 mins. 73, Joe Brown, W6UBQ, Orange SM.

SAN DIEGO: SM, Kent Tiburski, K6FQ, k6fq@arrl.org, 619-575-1964— Summer is upon us; no doubt many of us have outings with the family planned. Fire season is also upon us. With the lack of rain this year we can expect the brush will be very dry and prone to fires. We need to be ready to move into action should the need arise. Sad to report Joe Stephan, WB6ZHI, passed away. Congrats to Larry Buxton, KF6ZPN, our new Section Webmaster. The Del Mar Fair will be in full swing by the time this reaches you. Thanks to the many clubs who have taken their time to participate and show Amateur

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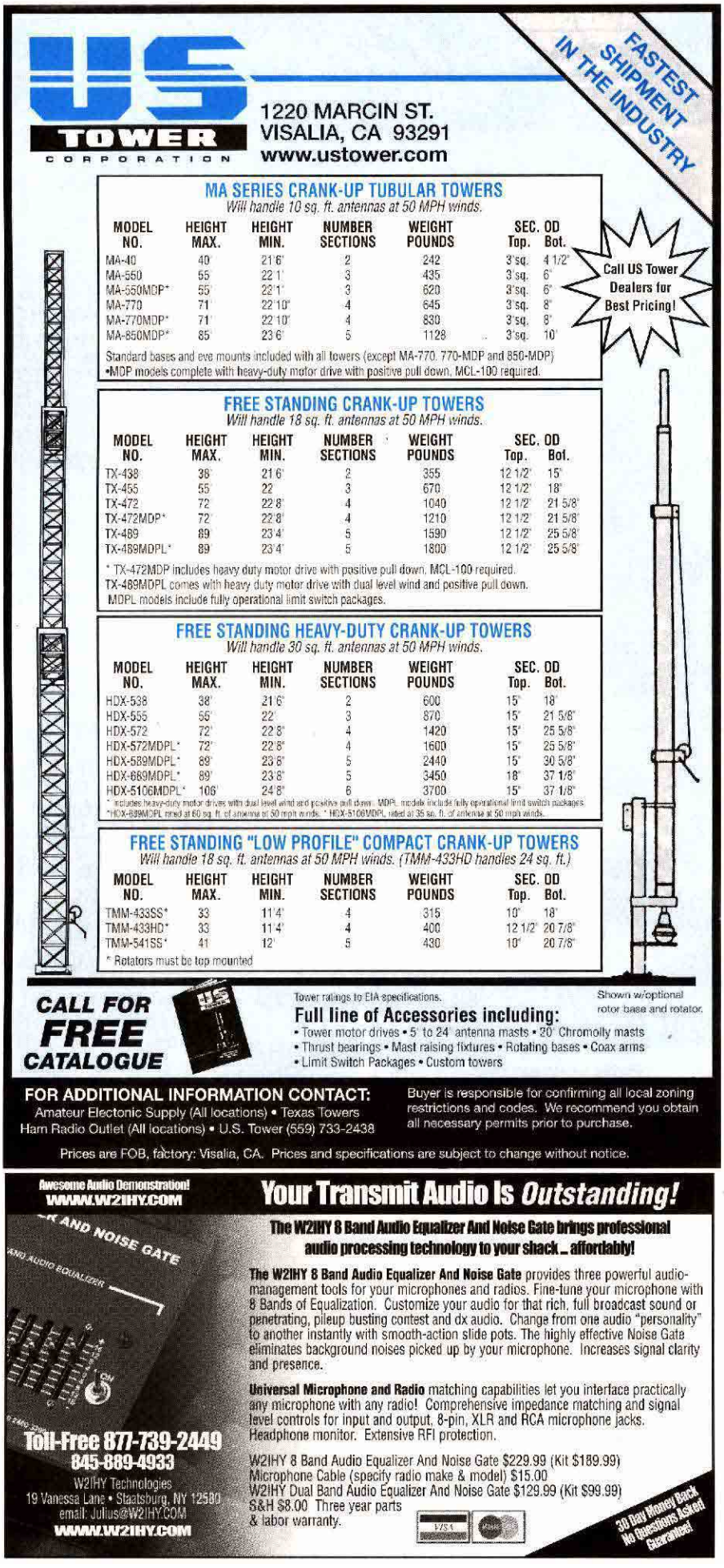

Radio to the public. Next up, the biggest event of the year, the Southwestern Division Convention in Escondido. Many of us have been waiting what promises to be the best event this year, so see you there! 73, Kent, K6FQ.

SANTA BARBARA: SM, Robert Griffin, K6YR. (k6yr@arrl.org)—SEC: Jack Hunter, KD6HHG (kd6hhg@arrl.net). STM: Ed Shaw, KF6SHU. (kf6shu@arrl.net); SGL, Paul Lonnquist, NS6V (paul@dock.net). ACC: Michael Atmore, KE6DKU (ke6dku@aol.com). OOC: Howard Coleman, N6VDV (n6vdv@arrl.net). PIC: Jeff Reinhardt, AA6JR (jreinh@ix.netcom.com). TC: Paul Andreasen, K1JAN (k1jan@gte.net). ASMs: Ventura, Don Milbury, W6YN (w6yn@arrl.net). Santa Barbara, Marvin Johnston, KE6HTS (ke6hts@sbarc.org). San Luis Obisipo, Bill Palmerston, K6BWJ, (bpalmers@fix.net) and as Webmaster, Jack Bankson, AD6AD (ad6ad@arrl.net); and DECs: Santa Barbara, Dave Lamb, (wa6brw@arrl.net); San Luis Obispo-Bill Peirce, KE6FKS (ke6fks@arrl.net) and for Ventura-Dave Gilmore, AA6VH. Not too late for Escondido on August 16-18 for the 2002 ARRL Southwestern Division Convention. See you there I hope. FREE instant Section news updates? Join the SB Reflector by sending an e-mail message "subscribe" to: "arrlsb-request@mailman.qth.net" and be automatically added to the SB Section Info Hotline! SB Sec Web: www.qsl.net/arrlsb/.SCN slow speed NTS Net, M-F, at 1915 local on 3598 kHz & SCN/SB at 2100 local on 147.000+(131.8), 224.90-(131.8) & 449.300-(131.8). That's 30. Rob, K6YR

WEST GULF DIVISION

NORTH TEXAS: SM, Larry Melby, KA5TXL—As I begin this column, it is my sad duty to report the passing of two long time members of the HAM community. The first was my privilege to know, Ed Youngblood, KE5OA. He was a long time member and former officer of the Dallas ARC and later a member of the Ellis County ARC. Ed was a fixture on the 146.88 MHz repeater always willing to help a new ham or visitor he will be missed. George Winship Sr, W5BKM was a long time traffic handler out of Jacksonville Texas who passed away recently. While I never had the privilege to know him, I understand that he leaves behind many family members who are Hams including the newest 11 year old Andrew Winship KD5LAN who just upgraded to Extra. Congratulations to J.W. Roach, W5AYX, who has just qualified for his PSHR. Also congratulations are in order to two new Emergency Coordinators, David Reeder, WAØURJ for Fannin County, and Rodney Hall, KD5KQJ for Falls County. I am looking for someone who would be interested in being the editor for the section newsletter if you are interested drop me an e-mail. 73 de KA5TXL. Tfc: (Apr) K5UPN 517, KC5OZT 167, K5MXQ 148, W5AYX 77, KB5TCH 68, WD5FEE 40, W5RDM 37, AC5Z 25, N8QVT 1. BPL for April K5UPN 517.

OKLAHOMA: SM, Charlie Calhoun, K5TTT—ASMs: N6CL, W6CL. SEC: KA7GLA. ACC: KB5BOB. PIC: N7XYO. OOC: WB9VMY. SGL: W5NZS. STM: K5KXL. It's that time of year. Field Day is almost here. Be sure and read the rules as there are some changes that may affect you and your scoring this year. I haven't heard from many of you so I don't know what my plans are yet. If there is enough activity I would like to tour the western portion of the state. Stay tuned to the section list server for updates on Field Day activities. I will be posting information on all the sites I hear about there. See the section Web page for information on how to subscribe at http://members.cox.net/arrl-ok. So far we have had no real severe wx, but the spotters have been out a few times. This may be one of the last columns printed in *QST*. The BOD will decide this month (July) on whether to continue printing section news in *QST*. Make your director aware of your opinion. Section news and other items are now posted on the ARRL's Web site, and it's likely that is where you will find future, more current section news items. That's it for now. 73, Charlie. Tfc: KF5A 1756, WB5NKD 483, N5IKN 358, WB5NKC 317, KK5GY 290, WA5OUV 228, NJ5M 110, K5KXL 94, KI5LQ 88, WA5IMO 75.

SOUTH TEXAS: SM, Ray Taylor, N5NAV—ASMs: KS5V, N5WSW, W5GKH, K5DG, N5LYG, WA5UZB, KK5CA, K5EJL, W5ZX, W5JHC, KB5AWM, WA5JYK, K5PFE, K5PNV, W5JAM. STM: W5GKH. SEC: W5ZX. ACC: N5WSW. TC: KJ5YN. BM: W5KLV. OOC: W5JAM. SGL: K5PNV. PIC: KD5HOP. July 4th is upon us. I hope all will be cautious when dealing with fireworks. As we celebrate our great Nations history of independence think about the ways we as ham radio operators can help in this time of need for volunteers in communications. We had the MS-150 from Houston to Austin which was very short of volunteers. The hams were ask to provide communications because there were too many dead spots for cell phones. I do want to thank those who did assist during the 2-day event. Those that participated received a great feeling of gratitude from the work they performed. We had 3 drills so far in the month of May with 2 more to go. Also we have Field Day coming up in June. We've had a lot of bad weather with damage. I notice in the storm reports that a lot of the ham radio spotters are assisting the NWS. Now a word to the clubs. This just came to me as a question. I hope you are aware of the insurance available to the members. This is the one thing you need to consider when you are assisting in an event or a real emergency. Please contact the ACC for South Texas for full details. Contact Don Jones N5WSW. E-mail address is n5wswdon@texas.net Don will be happy to help you in this matter. Some of you might have already gotten you club covered for liability insurance. Field Day is a time that you may need it. If your club is not an affiliated club let me encourage you to check out the benefits. We had 2 more SKs that put a great effort into the support of ham radio. Both of these hams were great role models for others. W5BKM and N5ISS. Our deepest sympathy goes out to their families. I hope every one has a great month. Tfc: KA5KLU 568, W5KLV 246, KAC5XK 207, W5GKH 185, W5ZX 95, N5SIG 57, N5OUJ 48, N5NAV 47, K5NHJ 44, N5WSW 44, KØYNW 42.

WEST TEXAS: SM, Lee Kitchen, N5YBW—It is weather season in West Texas. Some of the SKYWARN groups have already been on the road. This a great time to recruit new hams into Skywarn. Skywarn is one of the greatest public services available to hams. Next time you go out take a ham friend with you and introduce your friend to the excitement and rewards of potentially saving life and property. Skywarn has a great reputation in this area. If there is not a Skywarn group in your area, start one. You do need to be properly trained. It serves no purpose to inaccurately describe a weather event which might upset people unnecessarily. But it does serve a most valuable service to the public and the Weather services when you can accurately describe a weather event.

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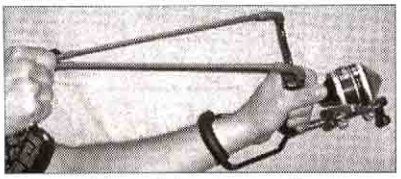

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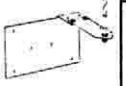

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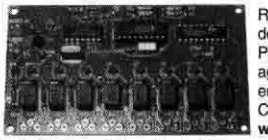

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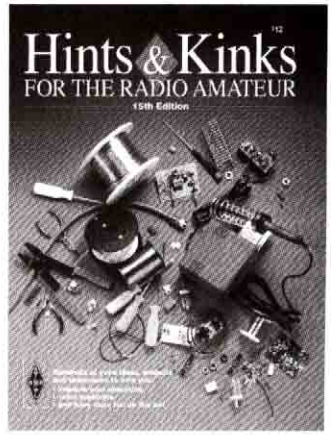

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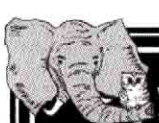

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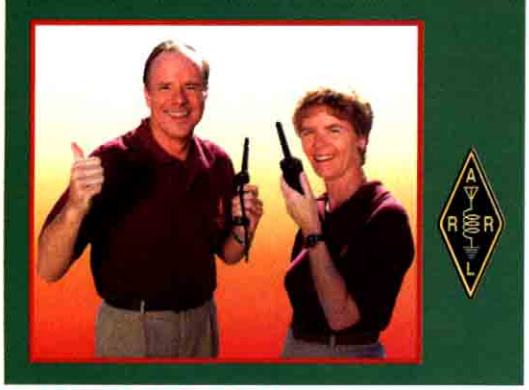

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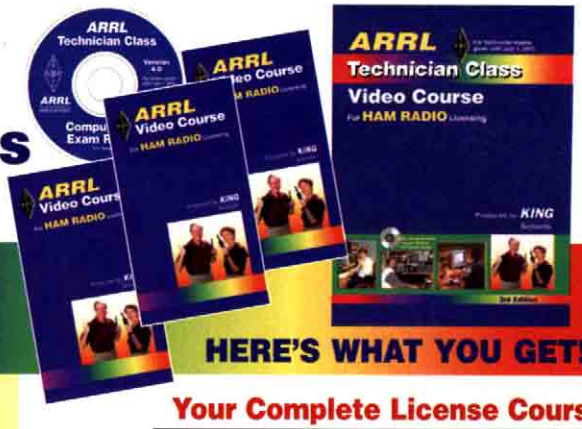

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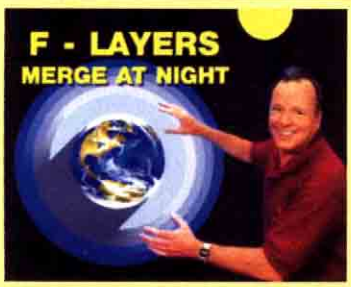

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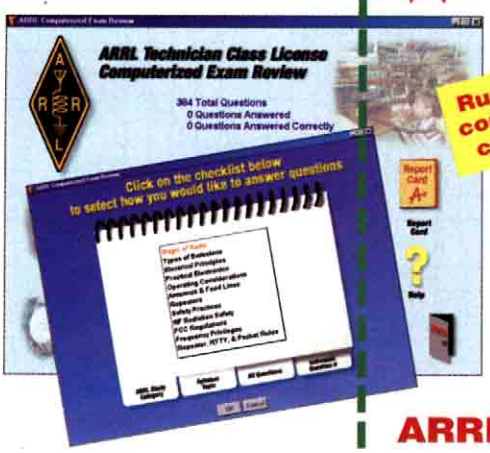

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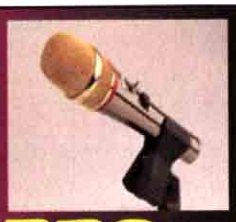

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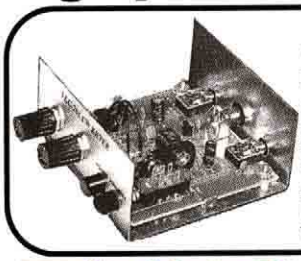

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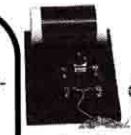

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TH-D7A(G) Explore APRS opportunities with an HT built for the future. (left) This 5W, FM, dualband (2M, 440MHz) transceiver is equipped with a TNC and provides the radio enthusiast with a range of data communications options. As well as simple packet operation, use the D7A(G) along with APRS and a GPS unit to send positioning data. Or, connect it to the VC-H1 and swap pictures with a friend. 4.75"h x 2.25"w x 1.5"d, 12 oz..... **$429.99**

TH-F6A Unique features the competition is still scratching their heads over. (right) The FM 144/220/440MHz F6A offers dual-channel RX capability, 16-key pad, multi-scroll key, and no fewer than 435 memory channels. Other attractive features of this 5W HT include built-in ferrite bar antenna for AM, backlit LCD, lithium-ion battery, and a MIL-STD design. 2.3"w x 3.44"h x 1.18"d, 8.8 oz **$359.99**

TM-G707A The essence of ease. From the extra-large panel to Kenwood's Easy Operation mode, the G707A is extraordinarily user-friendly. In addition to its regular profile, it can store four other profiles for instant recall. This 50W/35W, FM dualband (144/440MHz) also offers 180 multi-function memory channels with memory name function to identify each. 5.5"w x 1.56"h x 7.44"d, 2.65 lbs. **$299.99**

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Sad, because the loss of airwave rights could have been prevented. Back in the early part of the 21st century, commercial interests gathered together to force Amateur Radio operators out. "We need the spectrum to serve the masses," they said. There was no strong argument against them, because the ARRL and its sister groups were not able to counter with well represented legal challenges. The FCC and the IARU got a few letters from individuals but no one was able to speak clearly and forcefully enough to save the bands.

Sadder still, because all it would have taken was a few more members to join ARRL and support its efforts. Now, there are no more "CQ" calls, no Morse code exchanges cutting their way through the atmosphere, no more making friends through the airwaves and ham radios are looked on in the same context as spinning wheels and buggy whips.

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Wind Load (with mast adapter)	10 sq. ft.	7.5 sq. ft.	5.0 sq. ft.	1.5 sq. ft.
Turning Power (in pounds)	1000	800	600	350
Brake Power (in pounds)	9000	5000	800	450
Brake Construction	Electric wedge	Electric wedge	Disc brake	Disc brake
Bearing Assembly/How many	Tripl race/138	Dual Race/96	Dual race/48	Dual race/12
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TECH TALK

Save Your Hearing, Save Your Money
IC-756PRO & IC-756PROII

It's great to see so much interest in the ICOM IC-756PRO and IC-756PROII generated by the June 2002 QST Technical Correspondence (pages 68-69.) We at ICOM love to see hams trying to get the most from their rigs. However, a couple of items in the letter have caused a great deal of confusion and some suggestions in the letter could damage your radio or your hearing!

First, the caption for Figure 1 is in error. The authors do not claim that there is any 'rumble' in the '756PROII audio nor do they suggest that you should try to modify the '756PROII. Please note that the '756PROII board layout is different than the '756PRO shown in the figure, and attempting this modification to the 8VDC supply on the '756PROII could cause severe damage throughout the main board of your '756PROII. Unfortunately, ICOM can not cover this kind of damage under warranty, so you could be out-of-pocket hundreds of dollars on an unnecessary modification.

Second, only a handful of users of the '756PRO have ever claimed to have heard the 'rumble' the authors are attempting to solve. The authors state that the superb Heil Proset is only 'adequate' for you to hear his effect! Take to heart their warning, "...before you attempt this modification, you need to consider whether you have ever noticed or objected to the rumble problem. If not, there's no need to install the added capacitor...." Remember, if you make a mistake, it could cause hundreds of dollars of damage.

Third, and most important, the authors suggest that "If you have difficulty hearing it, try connecting your headphones to the rear-panel speaker jack." ICOM STRONGLY RECOMMENDS THAT YOU DO NOT CONNECT HEADPHONES TO THE EXTERNAL SPEAKER JACK!

Why such a strong warning? ICOM incorporates a 34dB attenuator in the headphone circuit to help protect your hearing. That means that if you bypass this protection by connecting to the external speaker jack, you will have over 2000 times more audio power in your headset! If a signal breaks squelch while you have the gain up under strong signal conditions listening for a 'rumble' "you have difficulty hearing", you will have a painful and potentially dangerous experience!

So let's sum it up. You have probably never heard this effect, at least without adding 34 dB of gain. An installation mistake on a surface-mount board could cost you hundreds of dollars. And trying the authors' experiments could damage your hearing. In short, ICOM does not recommend this modification!

73, ICOM America Engineering

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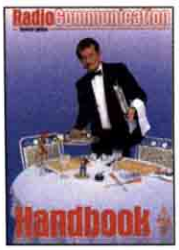

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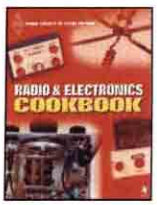

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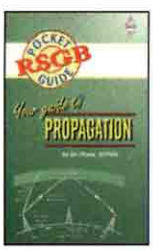

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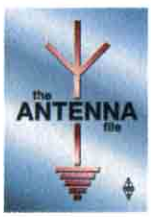

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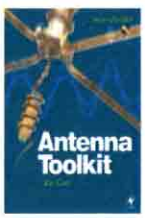

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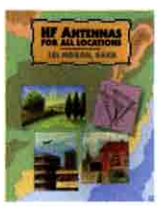

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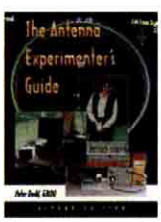

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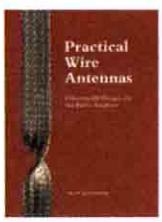

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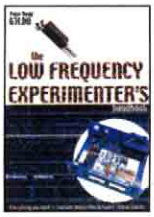

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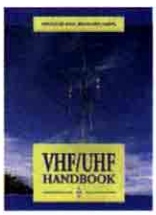

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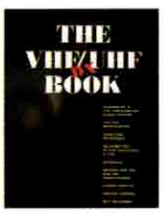

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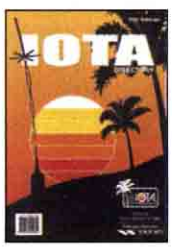

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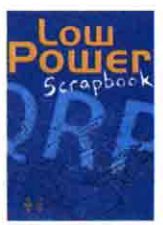

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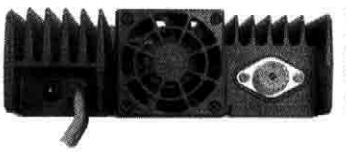

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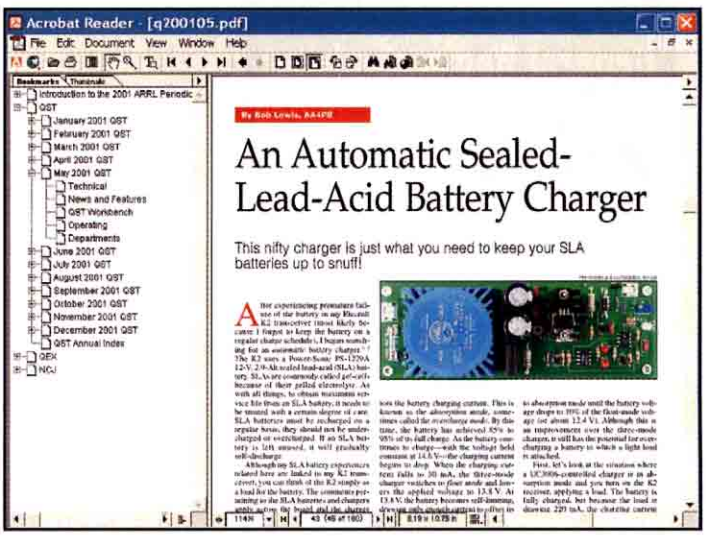

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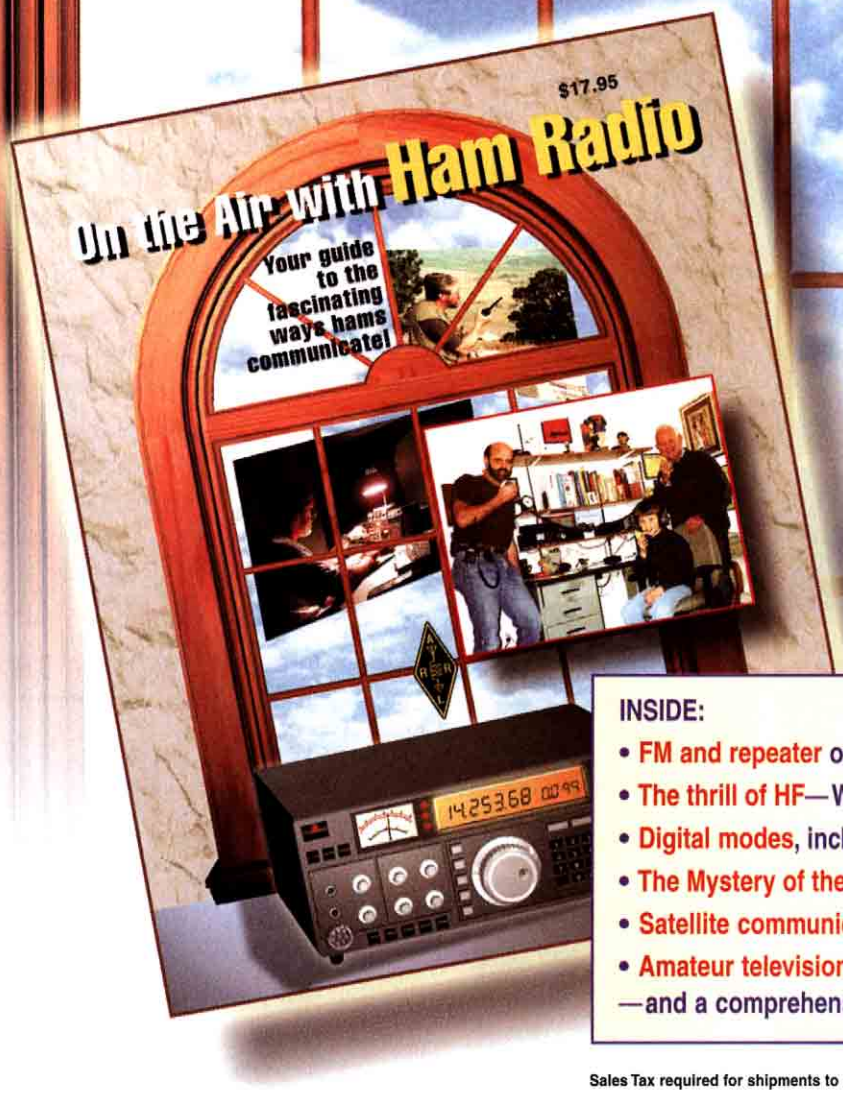

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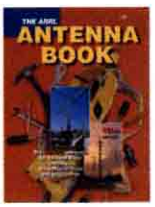

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.875" ... $1.10/ft	1.750" ... $2.50/ft
1.000" ... $1.20/ft	1.875" ... $2.75/ft
1.125" ... $1.35/ft	2.000" ... $3.00/ft

In 6' or 12' lengths, 6' lengths ship UPS. Call for 3/16"& 1/4" rod, bar stock, and extruded tubing.

CUSHCRAFT ANTENNAS

13B2/A148-10S	$139/85
A270-6S/A270-10S	$79/99
A3S/A4S	$449/539
A50-3S/5S/6S	$95/169/259
A6270-13S	$169
AR2/ARX2B	$49/69
AR270/AR270B	$85/99
R6000/R8	$319/469
X7/X740	$679/289
XM240	$719

Please call for more Cushcraft items

FORCE 12–MULTIBAND

C3	10/12/15/17/20m, 7 el	$599
C3E	10/12/15/17/20m, 8 el	$649
C3S	10/12/15/17/20m, 6 el	$539
C3SS	10/12/15/17/20m, 6 el	$559
C4	10/12/15/17/20/40m, 8 el	$759
C4S	10/12/15/17/20/40m, 7 el	$679
C4SXL	10/12/15/17/20/40m, 8 el	$979
C4XL	10/12/15/17/20/40m, 9 el	$1119
C19XR	10/15/20m, 11 el	$959
C31XR	10/15/20m, 14 el	$1299

Please call for more Force 12 items

TRYLON "TITAN" TOWERS

SELF-SUPPORTING STEEL TOWERS

T200-64	64', 15 square feet	$1099
T200-72	72', 15 square feet	$1299
T200-80	80', 15 square feet	$1499
T200-88	88', 15 square feet	$1769
T200-96	96', 15 square feet	$2049
T300-88	88', 22 square feet	$1989
T400-80	80', 34 square feet	$1899
T500-72	72', 45 square feet	$1799
T600-64	64', 60 square feet	$1699

Many more Trylon towers in stock!

BENCHER / BUTTERNUT

Skyhawk, Triband Beam	$1129
HF2V, 2 Band Vertical	$219
HF5B, 5 Band Minibeam	$429
HF6VX, 6 Band Vertical	$299
HF9VX, 9 Band Vertical	$349
A1712, 12/17m Kit	$54
CPK, Counterpoise Kit	$129
RMKII, Roof Mount Kit	$159
STRII, Roof Radial Kit	$125
TBR160S, 160m Kit	$119

More Bencher/Butternut–call

M2 VHF/UHF ANTENNAS

144–148 MHz

2M4/2M7/2M9	$89/109/119
2M12/2M5WL	$149/199
2M5-440XP, 2m/70cm	$159

420–450 MHz

440-470-5W/420-450-11	$129/89
432-9WL/432-13WL	$169/219
440-18/440-21ATV	$119/139

Satellite Antennas

2MCP14/2MCP22	$169/219
436CP30/436CP42UG	$219/259

ROHN TOWER

25G/45G/55G	$89/189/239
25AG2/3/4	$109/109/139
45AG2/4	$209/225
AS25G/AS455G	$39/89
BPC25G/45G/55G	$75/99/110
BPL25G/45G/55G	$85/109/125
GA25GD/45/55	$68/89/115
GAR30/GAS604	$35/24
SB25G/45/55	$39/89/109
TB3/TB4	$85/99

Please call for more Rohn prices

US TOWER

MA40/MA550	$849/1399
MA770/MA850	$2359/3649
TMM433SS/HD	$1139/1379
TMM541SS	$1499
TX438/TX455	$979/1579
TX472/TX489	$2459/4579
HDX538/HDX555	$1269/2269
HDX572MDPL	$5899

Please call for help selecting a US Tower for your needs. Shipped factory direct to save you money!

COMET ANTENNAS

GP15, 6m/2m/70cm Vertical	$149
GP6, 2m/70cm Vertical	$139
GP9, 2m/70cm Vertical	$179
B10NMO, 2m/70cm Mobile	$36
SBB24NMO, 2m/220/70cm	$69
SBB2NMO, 2m/70cm Mobile	$39
SBB5NMO, 2m/70cm Mobile	$55
SBB7NMO, 2m/70cm Mobile	$75
Z750, 2m/70cm Mobile	$55
Z780, 2m/70cm Mobile	$69

Much more Comet in stock–call

M2 ANTENNAS

50–54 MHz

6M5X/6M7	$199/279
6M7JHV/6M9KHW	$419/449

HO LOOPS

6M/2M/220/432	$89/39/42/43

HF ANTENNAS

10/15M4DX, 4 Element	$379/419
20M4DX, 4 Element 20m	$499
KT36XA, Triband Beam	$1199

More M2 models in stock–please call

GLEN MARTIN ENGINEERING

Hazer Elevators for 25G

H2, Aluminum Hazer, 12 sq ft	$359
H3, Aluminum Hazer, 8 sq ft	$269
H4, HD Steel Hazer, 16 sq ft	$339

Aluminum Roof Towers

RT424, 4 Foot, 6 sq ft	$159
RT832, 8 Foot, 8 sq ft	$229
RT936, 9 Foot, 18 sq ft	$389
RT1832, 17 Foot, 12 sq ft	$499

Please call for Glen Martin info

UNIVERSAL ALUMINUM TOWERS

4-40'/50'/60'	$539/769/1089
7-50'/60'/70'	$979/1429/1869
9-40'/50'/60'	$759/1089/1529
12-30'/40'	$579/899
15-40'/50'	$1019/1449
23-30'/40'	$899/1339
35-30'/40'	$1019/1569

Bold in part number shows wind-load capacity. Please call for more Universal models. All are shipped factory direct to save you money!

DIAMOND ANTENNAS

D130J/DPGH62	$79/139
F22A/F23A	$89/119
NR72BNMO/NR73BNMO	$39/54
NR770HBNMO/NR770RA	$55/49
X200A/X3200A	$129/210
X500HNA/700HNA	$229/369
X510MA/510NA	$189/189
X50A/V2000A	$99/149
CR627B/SG2000HD	$99/79
SG7500NMO/SG7900A	$75/112

More Diamond antennas in stock

MFJ ANTENNAS

259B, Antenna Analyzer	$219
269, Antenna Analyzer	$299
941E, 300W Antenna Tuner	$109
945E, 300W Antenna Tuner	$99
949E, 300W Antenna Tuner	$139
969, 300W Antenna Tuner	$169
986, 3kW Antenna Tuner	$289
989C, 3kW Antenna Tuner	$309
1798, 80–2m Vertical	$249
1796, 40/20/15/10/6/2m Vert.	$189

Big MFJ inventory–please call

COAX CABLE

RG-213/U, (#8267 Equiv.)	$.36/ft
RG-8X, Mini RG-8 Foam	$.19/ft
RG-213/U Jumpers	Please Call
RG-8X Jumpers	Please Call

Please call for more coax/connectors

TIMES MICROWAVE LMR® COAX

LMR-400	$.59/ft
LMR-400 Ultraflex	$.89/ft
LMR-600	$1.19/ft
LMR600 Ultraflex	$1.95/ft

TOWER HARDWARE

3/8"EE / EJ Turnbuckle	$11/12
1/2"x9"EE / EJ Turnbuckle	$16/17
1/2"x12"EE / EJ Turnbuckle	$18/19
3/16" / 1/4" Preformed Grips	$5/6

Please call for more hardware items

HIGH CARBON STEEL MASTS

5 FT x .12" / 5 FT x .18"	$35/59
11 FT x .12" / 12 FT x .18"	$80/150
15 FT x .12"	$105
17 FT x .25	$267
23 FT x .12" / 21 FT x .18"	$155/235

GAP ANTENNAS

Challenger DX	$289
Challenger Counterpoise	$29
Challenger Guy Kit	$19
Eagle DX	$299
Eagle Guy Kit	$29
Titan DX	$329
Titan Guy Kit	$29
Voyager DX	$409
Voyager Counterpoise	$49
Voyager Guy Kit	$45

Please Call for Delivery Information

LAKEVIEW HAMSTICKS

9106 ... 6m	9115 ... 15m	9130 ... 30m
9110 ... 10m	9117 ... 17m	9140 ... 40m
9112 ... 12m	9120 ... 20m	9175 ... 75m

All handle 600W, 7' approximate length, 2:1 typical VSWR ... $24.95

HUSTLER ANTENNAS

4BTV/5BTV/6BTV	$149/189/209
G6-270R, 2m/70cm Vertical	$169
G6-144B/G7-144B	$129/179

Hustler Resonators in stock–call

ANTENNA ROTATORS

M2 OR-2800P	$1219
Yaesu G-450A	$249
Yaesu G-800SA/DXA	$329/409
Yaesu G-1000DXA	$499
Yaesu G-2800SDX	$1089
Yaesu G-550/G-5500	$299/599

ROTATOR CABLE

R62 (6, #18)	$.32/ft.
R81/82	$.25/.39
R84	$.85/ft

PHILYSTRAN GUY CABLE

HPTG1200I	$.45/ft
HPTG2100I	$.59/ft
PLP2738 Big Grip (2100)	$6.00
HPTG4000I	$.89/ft
PLP2739 Big Grip (4000)	$8.50
HPTG6700I	$1.29/ft
PLP2755 Big Grip (6700)	$12.00
HPTG11200	$1.89/ft
PLP2558 Big Grip (11200)	$18.00

Please call for more info or help selecting the Phillystran size you need.

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IC-756PRO2 ..... In Stock!

The Icom IC-756 PRO2 is an all mode HF and 6m transceiver featuring 32-bit digital signal processing, automatic antenna tuner, 100 watts RF output, digital twin PBT, 5" multifunction color TFT LCD display with band scope function, built-in CW and SSB memory keyers, and more. Supplied with a hand mic and DC power cord.

PW-1 ..... New Lower Price!

The Icom PW-1 is a 1000 watt solid state linear amplifier for HF and 6m operation, featuring a high power automatic antenna tuner, built-in power supply, and a removable front control panel, and more.

IC-746PRO ..... In Stock!

The Icom IC-746PRO is an all mode HF/6m/2m transceiver with 32-bit IF level DSP. The radio features a built-in auto tuner, built-in RTTY demodulator and decoder (reads out on the radio's LCD display), auto notch, digital twin PBT, and more. Supplied with up/down hand mic and DC power cord.

IC-756PRO ..... New Low Price!

The Icom IC-756 PRO is an all mode HF/6m transceiver featuring DSP, automatic antenna tuner, 100 watts RF output, digital twin PBT, a 5" multifunction LCD display with band scope function, and more. Supplied with hand mic and DC power cord.

FT-1000MP-V .... Yaesu Special!

The Yaesu FT-1000MP Mark-V is a competition class HF DSP transceiver with auto tuner, 200 Watts RF output, and more!

FT-1000MP-V Field ..... New!

Low power (100W) version of the FT-1000MP-V with built-in power supply.

FT-1000D ..... Yaesu Special!

Competition class HF XCVR featuring dual RX, auto tuner, 200W, and more.

Quadra System ... Lower Price!

Solid state 1 kW autotuning amplifier.

FT-847 ..... Yaesu Special!

The Yaesu FT-847 is an all mode transceiver covering HF/6m/2m/70cm! The radio is perfect for satellite operation, and features digital signal processing, built-in RS-232 interface, tone encode/decode, and more. Supplied with an up/down microphone and DC power cord.

FT-920 ..... Yaesu Special!

The Yaesu FT-920 is an all mode HF/6m transceiver featuring digital signal processing, automatic antenna tuner, CW memory keyer, CTCSS tone encode/decode, 127 memories, and more. Supplied with up/down hand mic and DC power cord.

IC-706MK2G ..... Icom Special!

The Icom IC-706MK2G is a compact HF/6m/2m/70cm all mode transceiver with digital signal processing, automatic repeater offset, built-in CW keyer, built-in CTCSS tone encode/decode/scan, 107 memory channels and more. A detachable front panel offers convenient mounting, even in compact vehicles.

IC-718 ..... New Lower Price!

The Icom IC-718 is an all mode HF transceiver featuring a front panel mounted speaker, IF shift, optional DSP module, multiple scanning modes, noise blanker, RIT, and more.

IC-2800H.... New Lower Price!

The Icom IC-2800H is a 2m/70cm dual band mobile FM transceiver with a 3" color TFT display. The radio features a separate control face, video input, bandscope display, 9600 bps Packet jack, CTCSS tone encode/decode/scan, 232 memories, cross band duplex, and more. With DTMF hand mic, mounting brackets, and power cord.

IC-2100H ..... Great Low Price!

The IC-2100H is a rugged 2m mobile XCVR with CTCSS tone encode/decode/scan, DTMF paging/squelch, 113 memory channels, switchable display color and more.

FT-90R ..... Great Low Price!

New ultra-compact 2m/70cm dual band mobile transceiver with detachable control panel, and huge extended RX range.

FT-2600M .. New Lower Price!

Rugged 2m mobile with intermod-proof receiver, big display, and an illuminated DTMF mic. Built to MIL-STD 810.

FT-7100M ..... Great Low Price!

Great 2m/70cm dual band mobile, 45/35 Watts, removable front panel, and more!

FT-1000 ..... Yaesu Special!

Ultra-compact all mode XCVR for HF/6m/2m/70cm.Features DSP, CW memory keyer, tone encode/decode, 200 memories, VOX, and more. Supplied with a DTMF hand mic, DC power cord and mounting bracket.

FT-817 ..... Now In Stock!

A truly tiny self-contained all mode HF/6m/2m/70cm QRP XCVR featuring tone encode/decode, 200 memories, VOX, and more! With hand mic, DC cord and bracket.

IC-T7H ..... Icom Special!

The IC-T7H is a 6W 2m/70cm dual band HT. Features CTCSS tone encode/decode.

IC-T2H Sport ..... Great Price!
IC-Q7A ..... Icom Special!
IC-V8 ..... New!

IC-207H ..... Great Low Price!

A great 2m/70cm dual band mobile XCVR, featuring CTCSS tone encode/decode, 182 memories, removable control panel, and more. With a back-lit DTMF hand mic, mounting bracket, and a DC power cord.

IC-V8000 ..... New, In Stock!

A great 2m mobile XCVR with 75 Watts of output power. With a back-lit DTMF hand mic, mounting bracket and DC power cord.

IC-PCR1000 ..... Icom Special!
IC-R8500/R75 ..... In Stock!
IC-R2/R3/R10 ..... In Stock!

G-2800DXA $1089

Heavy duty antenna rotator handles 34 sq. ft. of antenna load, and features 450° rotation, preset and variable speed.

G-1000DXA $499
G-800SA/DXA $329/409
G-450A $249
G-5500 ..... $599
G-550 ..... $299

FT-50RD ..... New Lower Price!
VR-120 ..... Yaesu Special!
VR-500 ..... Yaesu Special!
VX-1R ..... New Lower Price!
VX-5R ..... Yaesu Special!
VX-150 ..... Yaesu Special!
VX7R ..... Coming Soon!

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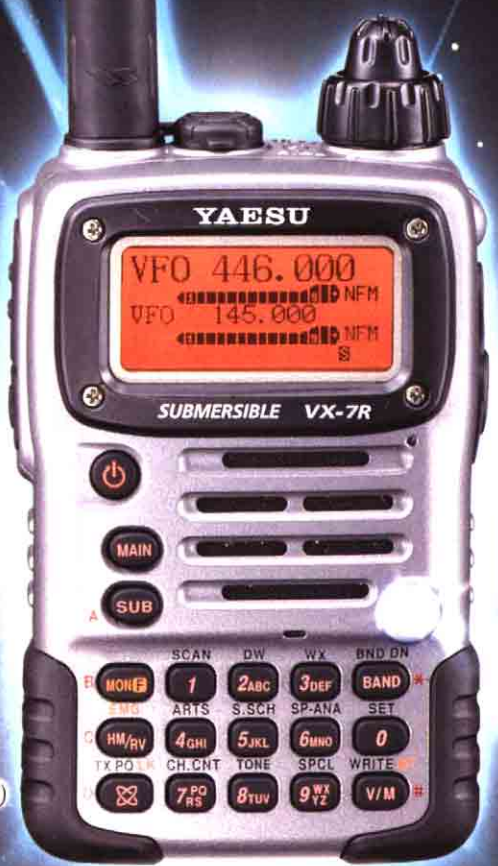

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VX-7R

50/144/430 MHz 5W FM Transceiver

Actual Size

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With the TH-D7A(G) you can achieve TS-2000 HF operation in the palm of your hand using the Kenwood SkyCommand II system. Great application for Disaster and Emergency Communications use in the classroom or even at your desk.

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