Official Journal of
ARRL
The national association
for AMATEUR RADIO

QST

devoted entirely to
AMATEUR RADIO

September 2002

QST reviews

- Kenwood UT-20 1.2 GHz Module for the TS-2000
- M² 23CM22EZA L band antenna
- ICOM PS-125 power supply

Build the "Badger"

Understanding Solar Indices

The Very Small Array

A Log Periodic Array for 10-30 MHz

New IC-746PRO. Supercharged Performance!

Purchase an IC-746PRO and receive a FREE PS-125 power supply. With 25 amps continuous, quieter RF operation, and a look matching the latest ICOM rigs, the PS-125 is the perfect companion to the '746PRO. Better hurry though, a deal this good won't last too long. See your participating ICOM dealer for more details.

IC-746PRO. Leave the competition in the dust.

HF/6M/2M • 100W • All Mode • Enhanced Rx • 9600 Baud Ready • 32 Bit IF-DSP & 24 Bit AD/DA Converter • Independently Selectable IF Filter Shapes For SSB & CW • SSB/CW Synchronous Tuning • Built-in RTTY Decoder • Variable Level Noise Blanker • Auto & Manual Notch Filter • Digital Twin Passband Tuning • Mic Equalizer • CW Memory Keyer • VOX • Auto Antenna Tuner

IC-746PRO Features

- **32 BIT FLOATING POINT DSP & 24 BIT AD/DA CONVERTER.** At the heart of the '746PRO, the DSP is an incredible tool for handling the QRM found on the bands.
- **SELECTABLE DIGITAL IF FILTER SHAPES FOR SSB & CW.** Tailor the filter shape & bandwidth to your personal operating preferences or band conditions. Sharp for selectivity and signal fidelity or soft for readability.
- **AGC LOOP MANAGEMENT.** Multiple AGC loops, controlled by the 32 bit DSP, filter out unwanted interfering signals, eliminating pumping of the AGC.
- **AUTOMATIC NOTCH FILTER.** Perfect for SSB operation to eliminate annoying heterodynes and "tune up", without effecting the receive audio.
- **MANUAL NOTCH FILTER.** Perfect for CW or digital operations, the 70db manual notch filter eliminates unwanted signal without effecting the actual passband of your filters.
- **DIGITAL TWIN PASSBAND TUNING.** Great for crowded bands, or contests, eliminates interfering signals by narrowing or or shifting the IF passband.
- **BUILT-IN RTTY DEMODULATOR & DECODER.** External units or PCs are no longer required for RTTY decoding. Twin peak audio filter, using the DSP unit, significantly reduces interfereing signals overlapping the tones.
- **TWIN PEAK AUDIO FILTERS.** Peak the signal audio used in the digital modes.
- **DIGITAL RF SPEECH COMPRESSOR.** Utilizes the 32 Bit DSP to provide the maximum punch without the fuzzy sound.
- **MICROPHONE EQUALIZER.** A total of 121 varieties of equalized audio can be set with the built-in microphone audio equalizer, tailored to operating style & microphone characteristics.
- **TX AUDIO PASSBAND.** Great for the "Perfect Audio" you are looking for by selecting from 2.2, 2.4, & 2.8 kHz bandwidths.
- **RECEIVE AUDIO EQUALIZER.** Allows you to set the audio style to ease listening fatigue during long hours of operation.
- **SSB/CW SYNCHRONOUS TUNING.** You no longer have to worry about changing from SSB to CW, the radio automatically shifts the VFO without losing the CW station you were copying.
- **ADJUSTABLE NOISE BLANKER.** Adjustable in 101 steps, this gives you control of the level of the noise blanker, to eliminate distortion of the desired signal.

*Manufacturers Suggested Retail Price.

Get in the drivers seat

www.icomamerica.com

ICOM®

IC-756PROII

The '756PROII transceiver has all the features today's DXer needs to be competitive. But don't take our word for it - ask the guys who use them. It's no wonder the world's best DXers choose ICOM. Find out more about the 'PROII at your authorized ICOM dealer today.

IC-756PROII. The best just got better.

HF/6M • 100W • All Mode • Enhanced Rx • Dual Watch • 32 Bit IF-DSP • Independently Selectable IF Filter Shapes For SSB & CW • Variable Level Noise Blanker • Auto & Manual Notch Filter • Twin Passband Tuning • Improved 5" TFT Color Display • CW Memory Keyer • VOX • Auto Antenna Tuner • SSB/CW Synchronous Tuning • External Control For Voice Memory & Memory Keyer • Adjustable RIT Clear • 1/4 Tuning Steps In Digital Mode

Heard it. Worked it. Logged it. Again!

"ICOM supplied a 'PROII for a recent DXpedition. It worked so well, that I bought TWO as soon as I returned home. Others on the DXpedition bought them, too. I can't believe the performance of the receiver, particularly on the low bands! The pre-amp REALLY works without distortion. The adjustable filters and twin passband tuning are a dream and so easy to operate. The digital noise reduction is truly amazing. You can't get "lost" with the operation of the controls....it's simple to back out a level. I've operated literally every HF radio made in the last 30 years, contesting and DXing, and the 'PROII is in a class all by itself! We have a six ham family and we all love our new PROII's!!! The "fun" is back into ham radio more than ever now."

-Glenn Johnson WØGJ , A50A WW SSB Contest

The IC-756PROII's worked great - we ran them for 11 days, non-stop, ...5 radios, 80,000 QSO's... all bands 160 through six meters... SSB,CW, RTTY, and PSK31! The built-in antenna tuners nice... we could run antennas on other bands... the 40m vertical on 15m... the 30m vertical on 10m... . Temps always above 80...sometimes 110 deg in the operating tents. Humidity above 90% all the time! Radios performed flawlessly. Everything you could want for operating convenience in one box. When you are on the receiving end of the entire world calling you in a pileup, it helps to have a top-notch rig to work them all! I liked the radio so much, I bought one and brought it home!

-Bob Voss N4CD, TI9M DXpedition

I was very impressed with the reliability of the IC-756PROII transceivers and IC-PW1 linear amplifiers, given that our environment on the island was challenging in some respects. At the CW site, there was so much talcum-powder fine volcanic ash blowing around that the radios, amplifiers, and everything else in the tent was covered with a thick layer of dust. I was especially concerned about the 'PW1s given that the fans were running almost continuously, pulling in this dust. We also had a troublesome generator which caused large fluctuations in voltage and frequency (we eventually replaced it). Even with these conditions, the ICOM equipment ran perfectly for 10 days, 24 hours per day. I'd feel confident taking your equipment to any location on the planet.

-Michael Mraz N6MZ, XRØX DXpedition

Find out more

www.icomamerica.com

ICOM

MFJ Enterprises, Inc.
300 Industrial Park Road
Starkville, MS 39759 USA

THANK YOU!

September 1, 2002

Dear Fellow Ham,

MFJ Enterprises, Inc. humbly started its business in a small downtown Starkville, Mississippi hotel room in October of 1972. The original product, a CW Filter Kit CWF-2, sold for $9.95 plus shipping.

This October, 2002 will mark the 30th Anniversary of our ham radio adventure and I am deeply thankful for the remarkable support we have had from our fellow hams.

Today, MFJ Enterprises, Inc. is a total of five different ham radio companies and manufactures well over 2000 different products.

I wish to extend this heartfelt THANK YOU to all of you who have helped MFJ Enterprises Inc. reach this monumental milestone.

Without the support of our fellow hams, the hard work and dedication of our employees and the tremendous support from our countless friends of MFJ, this 30 Year Anniversary milestone could not have been achieved -- let's celebrate again in another 30 years.

Thank you again for your support!

Sincerely yours,

Martin F. Jue, K5FLU

Martin F. Jue
K5FLU
President and Founder
MFJ Enterprises, Inc.

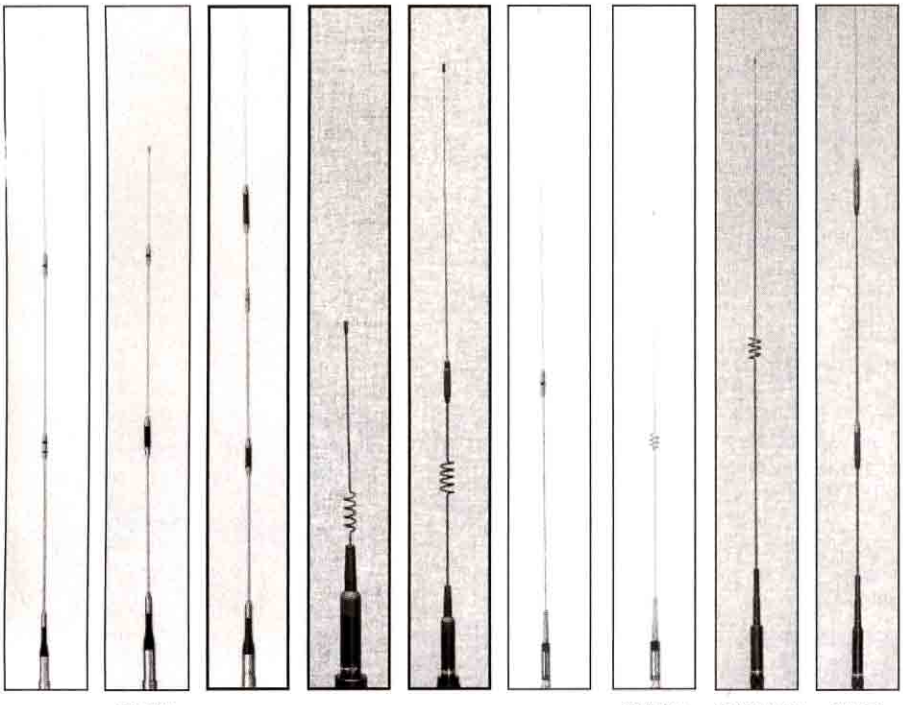
P.S. Please come visit us during our 2nd Annual MFJ/ARRL Day in the Park, October 4 & 5, 2002 to commemorate MFJ's 30th Anniversary. *For more info, visit: http://www.mfjenterprises.com.*

DIAMOND ANTENNA

DIAMOND'S STATE-OF-THE-ART

VHF/UHF And HF/VHF Mobile Antennas– Maximum Performance Without Compromise

You've seen the rest...now own the BEST!



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

HV7A Mobile Antenna System

For New HF/VHF transceivers NEW!

(Such as: IC706 series and FT100)

Optional Loading Coils

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

Recommended Antenna Mounts: K400C or K600M

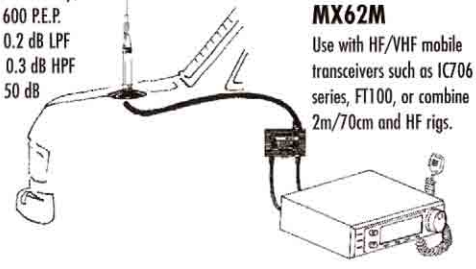
MX62M Duplexer

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

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.

* 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

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QST

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See page 10 for detailed contact information.

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Technical

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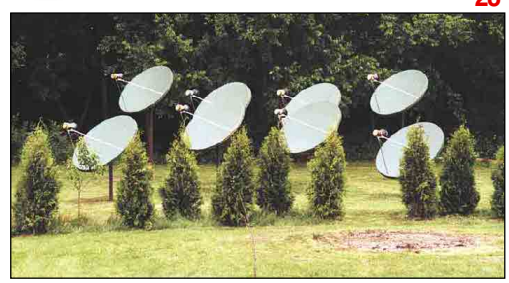

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News and Features

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QST Workbench

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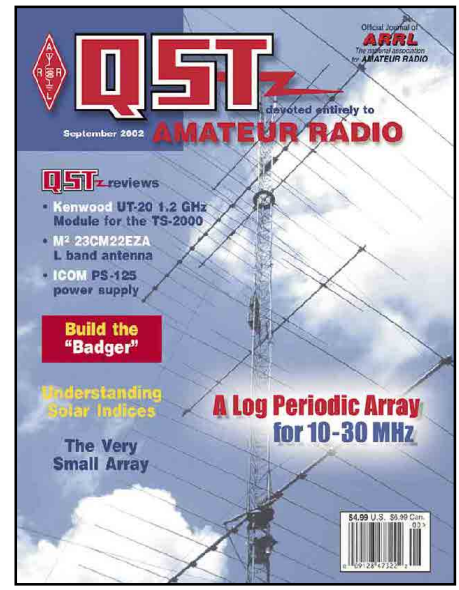
55


100

Operating

Departments



Our Cover:
There are high performance antennas and there are these log-periodics—two computer-optimized antennas that are designed to provide superior results. Photo courtesy Bill Jones, K8CU.

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.

International
To compensate for additional postage for mailing outside the US, the following rates apply:
Canada: Membership in the ARRL, including a one year subscription to *QST*, $49, payable in US funds. Life Membership, including a subscription to *QST* is available at $1225.* Subscription rate for libraries and institutions is $49 per year.
All Other Countries: Membership in the ARRL, including a one year subscription to *QST*, $62, payable in US funds. Life Membership, including a subscription to *QST* is available at $1550.* Subscription rate for libraries and institutions is $62 per year.
*Payment arrangements available. Please write for details.
Membership without *QST* is available to the immediate family of a member living at the same address, and to anyone who is legally blind, for $8 per year.
Foreign remittances should be by international postal or express money order or bank draft negotiable in the US and for an equivalent amount in US funds.

QST is available to blind and physically handicapped individuals on audio cassette from the Library of Congress, National Library Service for the Blind and Physically Handicapped. Call 1-800-424-8567.
Indexed by Applied Science and Technology Index, Library of Congress Catalog Card No: 21-9421.

Throughout the years, Kenwood has engineered many significant feature and hardware advancements that earned us the nickname "Pacesetter in Amateur Radio". Kenwood continues to show this leadership in advanced design and technology with the TH-D7A(G) handheld and the TM-D70OA mobile dual-banders. Not only do our radios perform all the functions of any other radio, but you can also explore the exciting digital world of APRS™, which has become the fastest growing and most dynamic part of the hobby. Most Disaster Communication organizations use APRS™. Identifying someone's location with APRS™ can save a life.

The TH-D7A(G) and the TM-D700A are the only radios ever produced that have both built-in TNC and APRS™ operating software, allowing you to send and receive exact GPS positions. You can even send text messages over 144.390 MHz, an international APRS™ frequency. Position reports and two-way messaging can also be achieved over the Internet, across the country or around the world. Street level mapping can also be employed using a PC, palm device or GPS. And yes, the TM-D700A is great for receiving satellite packet!

Venture into the future of Ham radio today and experience Kenwood's "Dynamic Digital Duo". They may just be the excitement and enjoyment you have been waiting for!

KENWOOD
COMMUNICATIONS CORPORATION

AMATEUR RADIO PRODUCTS GROUP
3975 Johns Creek Court, Suwanee, GA 30024
P.O. Box 22745, Long Beach, CA 90801-5745, U.S.A.
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outbacker 2 The Performance Antenna

We Make it Simple ... But GOOD!

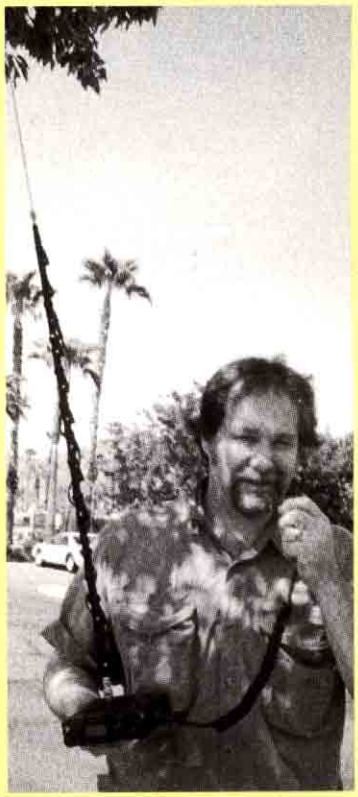
Most mobile antenna installations are notoriously inefficient and complex to install. Some are so big and cumbersome, they need guy ropes and special mounts to handle the wind load when under way. Some are single band only, others need a bag full of resonators for multi-band operation. Whips with automatic tuners or "screwdriver" types are nice, but even more cumbersome to install, usually requiring extra wiring and a controller.

The OUTBACKER eliminates these "big antenna" problems while providing efficient, multi-band performance in a rugged, lightweight, single whip design. Its sleek, low profile design allows use with standard 3/8-24 bases and trunk-lip mounts.

Fiberglass shaft construction, using a pre-tuned copper helical winding with clearly marked brass band taps at points along its length. A final coating of smooth epoxy resin and polyurethane, gives the OUTBACKER a toughness and durability not found in other brands, while making a really good looking mobile installation.

Changing bands is a snap; simply plug into the desired band tap and resume operating without changing whips, resonators, or re-tuning.

MODEL	BANDS	POWER	LENGTH	PRICE
OB 8	75-10M	300W P.E.P.	6 ft.	**$279.00**
OB HP (HIGH POWER)	75-10M	500W P.E.P.	6 ft.	**$299.00**
OB SPLIT*	75-10M	300W P.E.P.	6 ft.	**$299.00**
*Breaks down into two 3 ft. sections, includes a cloth carrying pouch				
TRI-SPLIT Same as OB SPLIT except it breaks down into three 2 ft. sections, pouch included				**$329.00**
PERTH*	75-10M + WARC	150W P.E.P.	7.5 ft.	**$289.00**
*The Most Efficient model for HF Mobile				
PERTH PLUS*	75-10 + 6/2M	150W P.E.P.	6 ft.	**$299.00**
*Perfect for HF Radios with added 6 & 2 meter capability				
STEALTH PLUS*	75-10 + 6/2M	150W P.E.P.	4 ft.	**$269.00**
*Perfect for HF Radios with added 6 & 2 meter capability				
OUTREACH*	160-10M+ WARC	300W P.E.P.	12 ft.	**$399.00**
OUTREACH 500*	80-6M + WARC	500W P.E.P.	12 ft.	**$439.00**
*OUTREACH and OUTREACH 500 perfect for use with the OUTPOST, below				
MARINER*	Marine/HAM*	150W P.E.P.	6 ft.	**$429.00**
*Marine: 2.182, 4.1, 6.2, 8.2, 12.4, 16.5, 22 MHz • HAM: 75, 40, 20, 17, 10M				
Joey New for the FT-817 and other QRP rigs – full description lower right				**$249.00**



the OUTBACKER Joey

Added performance for the FT-817 and other QRP rigs

- Utilizes the famous OUTBACKER band tap system for ultimate convenience
- Covers complete HF/VHF range from 80 thru 2M, including 30, 17 and 12M
- Separate taps for 80 CW and 75 SSB
- Rated at 20W, all modes.
- The antenna has a 30 in. body and a 20 in. stinger when fully extended.
- Complete with a 12 ft. durable copper braid counterpoise, and a custom anti-twist 90 degree SO-239 to PL259 adapter.
- Weighs just over 1 lb. **$249.00**

Alpha Delta OUTPOST
Tripod Mount / Ground Coupler

- Provides a convenient method of utilizing OUTBACKERS for Base/Portable operation.
- Compact, fold-up design sets up quickly and collapses in seconds; no holes, no concrete!
- 36 x 3 in. blades on each leg unfold and lie flat providing increased ground coupling for a better impedance match and increased radiation efficiency.
- A mobile-type mount on top accepts a 3/8" x 24 antenna stud and PL-259 connector.
- A fold-over top bracket, allows the antenna to be easily removed or folded down for changing bands, or to be out of view.
- Rugged 6061-T6 aircraft aluminum members,18 lbs. Stainless steel hardware and wing nuts, comes all assembled.

MicroMount
Lightweight Miniature Desktop Tripod

- Ideal for the Joey!
- 8 in. tall, 12 in. footprint
- 12 ft. counterpoise
- Collapses, portable

$49.95

MasterCard

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hy-gain Rotators

. . . the first choice of hams around the world!

Hy-Gain rotators are the first choice of hams around the world!

Hy-Gain's world famous Bell Shaped Rotator™ design is the standard that other rotators are measured against.

Its bell construction gives you total weather protection for super reliable operation. Its super heavy duty steel gear drive gives you years of superior and trouble-free performance. Many Hy-Gain rotators still provide excellent service after over 25 years of outstanding performance.

The last thing you want to fall apart is your rotator that's mounted on the top of your tower. You won't make any compromises when you buy and install high quality Hy-Gain rotators.

And we're the only manufacturer to offer a full line of rotators that are completely MADE IN THE USA.

HAM-IV, $559.95. *The heavy duty Ham-IV is the most popular rotator in the world!* It is designed for medium size antenna arrays up to 15 square feet wind load area when mounted in-tower, or 7.5 square feet when mast mounted with an optional lower mast bracket. New alloy ring gear gives extra strength up to 100,000 PSI for maximum reliability. New low temperature grease permits normal operation down to -30 degrees Fahrenheit. New wire-wound potentiometer gives reliable and precision directional indication, new ferrite beads reduce RF susceptibility, new Cinch plug connector plus 8-pin plug at control box (no screwdriver needed). Dual 98 ball bearing race for load bearing strength. Strong electric locking steel wedge brake prevents wind induced antenna movement. Easy-to-use Control Box has illuminated directional meter with North or South center of rotation scale, separate snap-action brake and rotation switches. Uses low voltage control for safe operation. Accepts masts up to $2^{1}/_{16}$ inches diameter. Rotator size is $13^{1}/_{2}$Hx8D inches.

T-2X, $649.95. *Extra heavy duty Tailtwister antenna rotator!* For large antennas up to 20 square feet wind load when mounted in-tower, or 10 square feet when mast mounted with optional support bracket. Triple 138 ball bearing race, strong electric locking steel wedge brake. Control Box has an illuminated directional indicator with North or South center of rotation scale, separate snap-action brake and rotation control switches. Accepts masts up to $2^{1}/_{16}$ inches diameter. Rotator size is $14^{1}/_{16}$Hx$9^{3}/_{16}$D in.

CD-45II, $389.95. *Medium duty antenna rotator.* Handles antenna arrays up to 8.5 square feet windload area when mounted in-tower, or 5 square feet when mast mounted with supplied lower support. Dual 48 ball bearing race, disc brake system. Control Box has an illuminated directional indicator with North or South center of rotation scale, separate snap-action brake and rotation control switches with disc brake release. Accepts mast sizes up to $2^{1}/_{8}$ diameter. Includes light duty lower mast support. Rotator size is $17^{3}/_{8}$Hx8 D inches.

AR-40, $289.95. *Lightweight antenna rotator.* Handles smaller ham antennas and large TV/FM antennas up to 3.0 square feet windload area when mounted in-tower, or 1.5 square feet when mast mounted using the supplied lower support bracket. Dual 12 ball bearing race, disc brake system. Silent, automatic control box -- just dial and touch for desired direction. Accepts mast sizes up to $2^{1}/_{8}$ diameter. Includes light duty mast support. Rotator size is $17^{3}/_{8}$Hx8D inches.

Call your dealer for your best price!

Rotator Specifications	T2X	HAM-IV	CD-45II	AR-40
Wind Load capacity (inside tower)	20 sq. ft.	15 sq. ft.	8.5 sq. ft.	3.0 sq. ft.
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
Mounting Hardware	Clamp plate	Clamp plate	Clamp plate	Clamp plate
Control Cable Conductors	8	8	8	5
Shipping Weight (pounds)	28	24	22	14
Effective Moment (in tower)	3400 ft/lbs.	2800 ft/lbs.	1200 ft/lbs.	300 ft/lbs.

HAM IV

$559.95
Suggested Retail

T-2X

$649.95
Suggested Retail

CD-45II

$389.95
Suggested Retail

AR-40

$289.95
Suggested Retail

Free Hy-Gain Catalog
Nearest Dealer/Free Catalog . . . 800-973-6572

hy-gain

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http://www.hy-gain.com

"IT SEEMS TO US..."

The Maxim Memorial Station, W1AW

Whether or not they have amateur licenses, visitors to ARRL Headquarters in Newington invariably find that the Hiram Percy Maxim Memorial Station, W1AW, is the high point of their tour. W1AW is Amateur Radio's flagship station, transmitting bulletins and Morse code practice on a regular schedule and offering licensed visitors the thrill of putting a famous call sign on the air. Thousands of contacts are made from W1AW every year, each one a special event.

The story of today's W1AW began in 1928 when the first ARRL Headquarters station went on the air from Hartford as W1MK. The station we know today was conceived in 1936. It was a difficult year for the ARRL. On February 12 longtime Vice President Charles Stewart passed away. An even greater blow came five days later with the unexpected death of the only president the ARRL had ever known, Hiram Percy Maxim. Today we can only imagine the despair that must have been felt when, just five weeks later, a major flood wiped out W1MK.

But the human spirit is indomitable. Mr. Maxim's genius had created an organization that would grow and flourish long after he was gone. New officers were elected in May 1936. At that same meeting the Board appropriated a sum for a headquarters station as a memorial to our founding President. Seven acres of land was purchased in Newington, far from any threat of flooding, from Miss Elsie Starr. (The street that runs along the southern boundary of the property still bears her family's name.) Construction was completed in 1938 and the FCC assigned Mr. Maxim's famous call sign, W1AW, to the station as the first-ever *in memoriam* call sign. Formal dedication took place that year on his birthday, September 2. Before the month was out the new station already had seen service in the aftermath of the worst hurricane ever to hit New England.

Since then, generations of hams have experienced the thrill of a first contact with W1AW. Perhaps you yourself have benefited from the daily code practice sessions, picked up news from one of the daily bulletins, or operated in one of W1AW's state-of-the-art operating studios. Perhaps you've contacted W1AW, or visited the station on tour and walked in the footsteps of thousands of hams before you.

Even as technological advances and newer modes of communicating with the Amateur Radio community are developed, W1AW lives in the hearts and minds of hams nationwide. The Hiram Percy Maxim Memorial Station embodies the history and traditions so important to all of us.

As the current trustee for the FCC license for W1AW I often wonder—what lies ahead for the Maxim Memorial Station? The building itself is still in good shape following a major renovation in 1989, paid for by the generous donations of thousands of members. However, the transmitters installed in 1989 that carry on the bulletin and code practice service are showing their age after more than 20,000 hours of operation. The antenna towers are sound, but the antennas themselves are feeling the effects of a dozen New England winters. Keeping W1AW in top condition is a growing challenge.

Every year as we wrestle with the growing financial demands of frequency defense, challenges to amateurs' rights to effective antennas, member services, and support for our important volunteer and educational programs, the ongoing cost of operating W1AW becomes a greater concern. How will we continue to meet the demands of replacing equipment and maintaining topflight operations?

W1AW is the most prominent historic symbol of Amateur Radio. But we must find new and creative ways to fund its operation. So here's the question: Is the Amateur Radio community willing to ensure that the dream is kept by funding a permanent endowment for W1AW to pay for its annual operation and capital equipment needs?

As a start, this year our Development Office will try to raise $150,000 earmarked for the endowment of W1AW. If you have provided financial support to W1AW or to another ARRL program in the past you may receive an invitation to contribute by mail. Anyone is welcome to contribute; the most convenient way to do so is by visiting the ARRL Web site and going to **www.arrl.org/endoww1aw.html**.

Please make the most generous contribution you can today. If we can meet our initial goal of $150,000 this year it will send a strong message that ARRL members care about the future of W1AW. Together we can create a solid financial future for W1AW so that it will continue to fulfill its mission as Amateur Radio's flagship station.

When you stop in to tour ARRL Headquarters and to operate W1AW you will see your generosity at work. And every time you hear "Whiskey One Alpha Whiskey" on the air, you'll know that thanks to you, the traditions that have served us so well will continue to guide future generations of radio amateurs.—*David Sumner, K1ZZ*

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If all else fails, send e-mail to hq@arrl.org and it will be routed to the right people or departments.

ARRL on the World Wide Web

You'll find the ARRL on the World Wide Web at:

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At the ARRL Web page you'll find the latest W1AW bulletins, a hamfest calendar, exam schedules, an on-line ARRL Publications Catalog and much more. We're always adding new features to our Web page, so check it often!

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Would you like to write for QST?

We're always looking for new material of interest to hams. Send a self-addressed, stamped envelope (1 unit of postage) and ask for a copy of the *Author's Guide*. (It's also available via the ARRL Info Server, and via the World Wide Web at www.arrl.org/qst/aguide/.)

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Just pick up the telephone and call toll free 1-800-326-3942, or send e-mail to newham@arrl.org. We'll provide helpful advice on obtaining your Amateur Radio license, and we'll be happy to send you our informative Prospective Ham Package.

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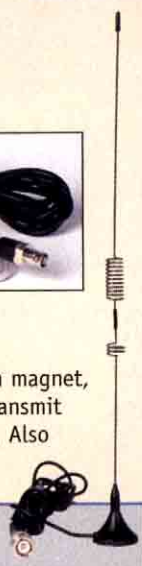

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West Central Florida	Dave Armbrust, AE4MR, 3024 Salem Ave, Sarasota, FL 34232 (941-378-1701); **ae4mr@arrl.org**

Southwestern Division

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Orange	Joe H. Brown, W6UBQ, 5444 La Sierra, Riverside, CA 92505 (909-687-8394); **w6ubq@arrl.org**
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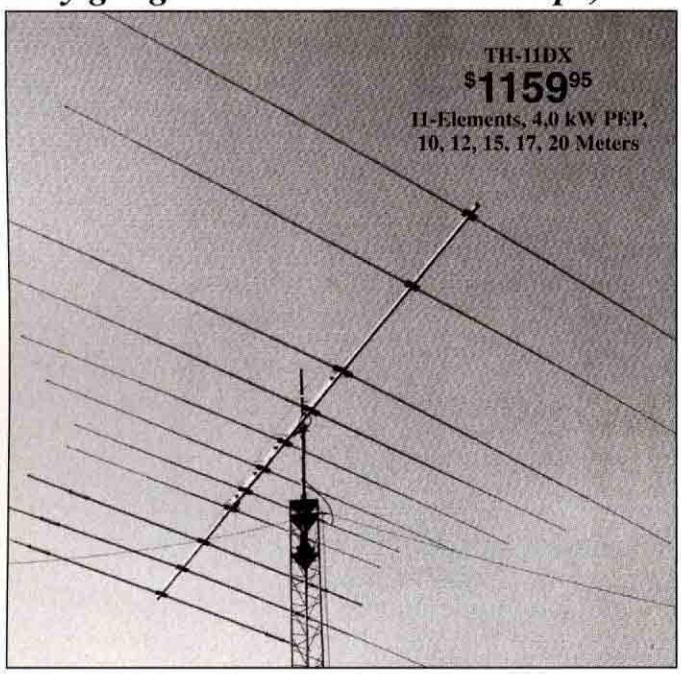

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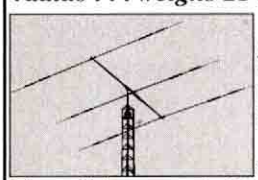

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TH-11DX	11	*For Gain and F/B ratio--See...*		4000	10,12,15,17,20	12.5	100	24	37	22	88	1.9-2.5	T2X	$1159.95
TH-7DX	**7**			**1500**	**10, 15, 20**	**9.4**	**100**	**24**	**31**	**20**	**75**	**1.5-2.5**	**HAM-IV**	**$869.95**
TH-5MK2	5	• www.hy-gain.com		1500	10, 15, 20	7.4	100	19	31.5	18.42	57	1.5-2.5	HAM-IV	$759.95
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**	**$469.95**
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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**	**$369.95**
EXP-14	4			1500	10,15,20 (with WARC)	7.5	100	14	31.5	17.25	45	1.9-2.5	HAM IV	$599.95

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2. *Tooled* *Boom-to-Element Clamp*

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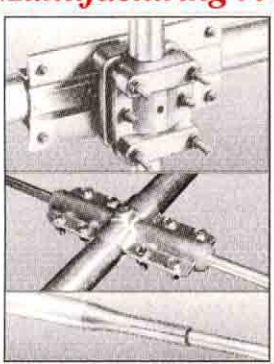

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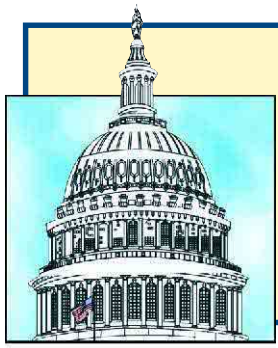

DC Currents

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.

Voss Senate Testimony Cites Value of ARISS

International Space Station Expedition 2 crew member Jim Voss got in a few good words for Amateur Radio when he appeared June 19 before the US Senate Committee on Commerce, Science and Transportation. A retired US Army colonel, Voss cited the value of the Amateur Radio on the International Space Station (ARISS) program in helping to inform and educate youngsters about space exploration and life aboard the ISS as well as to demonstrate scientific principles. ARISS is an international project, with US participation by ARRL, AMSAT and NASA.

NASA

Astronaut Jim Voss checks out the view from the ISS during his Expedition 2 tour.

Although not an amateur licensee, Voss participated in several ARISS school QSOs from the controls of NA1SS, the ARISS station, during his duty tour aboard the ISS. The other Expedition 2 crew members were Crew Commander Yury Usachev, RW3FU, and Susan Helms, KC7NHZ. The crew spent 167 days in space aboard what Voss called "a permanent orbiting classroom that brings education and research out of textbooks and into real life."

Voss' remarks before the committee included these excerpts about his ARISS experiences:

NASA's in-flight education programs use the unique environment of space to inspire the next generation of explorers. Using tools of modern technology—including the Internet, a digital camera, and Amateur Radio and video downlinks—students are able to study and explore Earth from space, learn about life aboard an orbiting laboratory, and conduct demonstrations that illustrate scientific and mathematic concepts.

While in space I also communicated with students using the Amateur Radio on the ISS (ARISS). ARISS is a NASA education program that offers the opportunity for students to experience the excitement of space flight by talking directly with crewmembers of the ISS via amateur radio. During the year and a half that we have had humans on board the International Space Station crews have had contacts with 65 schools in 26 states and 10 countries. These contacts involved astronaut crews on board answering questions asked by students while over 15,000 of their classmates listened. Many of the contacts were broadcast live over the Internet and most were covered by local, state and national news media. A typical reaction to the impact of one of these educational outreach contacts can be seen in a note I received from Mr Allen White [WB4MIO], who coordinated my contact with Admiral Moorer Middle School in Eufaula, Alabama. Mr White wrote:

Did the contact with the ISS have educational benefits? Yes! *Would we spend the time and preparation to do it again?* Yes! *There is no way I can adequately describe the excitement this created in our school and community. I think this was the most exciting educational event of the year for these students. Nearly a hundred students submitted questions. All three of the science teachers at AMMS, the principal and school administrators supported this effort in every way possible. Interest in the space studies unit was heightened. The US Space program and the ISS became real to both the students and our community because our kids actually talked directly to an astronaut in space! The space program was no longer just something they had read about. This event was the talk of the town for weeks!*

Space exploration is a powerful motivator for young people and is a tremendous tool for teachers. I am extremely proud of the work that NASA has done to maximize our country's investment in the Space Shuttle and International Space Station by using them as education platforms. Students, teachers, faculty, and the public will continue to be inspired, motivated, and taught using these national space assets.

Meeting Mulls Enhanced Public Safety Role for Amateurs

● Exploring an enhanced post-9/11 public safety and homeland security role for Amateur Radio was the focus of a National Public Safety Telecommunications Council (NPSTC) Amateur Radio Working Group meeting June 25. ARRL President Jim Haynie, W5JBP, hosted the daylong session at ARRL Headquarters. Several ARRL staff members participated.

"It's our goal to increase the credibility of the Amateur Radio Service, especially after 9/11," Haynie said. "We know we have a great service that we can offer, and the resources are at no cost to the taxpayer, and it just makes good sense to us to use the Amateur Radio operators of America to help with homeland security and defense."

ARRL Field and Educational Services Manager Rosalie White, K1STO, briefed the gathering on ARRL's Amateur Radio Emergency Communications on-line training course series. Copies of the Level I emergency communications course were distributed to meeting participants for their suggestions and comments.

Chairing the session was Gene McGahey, AL7GQ, who is deputy manager of Communications Technology Technical Assistance for the National Law Enforcement and Corrections Technology Center. NPSTC—pronounced "nipstick"—is a coalition of organizations involved in public safety communications, and ARRL is a NPSTC participant. The June meeting was a followup to a brainstorming session last February in Washington, DC, in which ARRL took part.

McGahey said discussion at the June gathering included the public safety aspects of the proposed secondary domestic amateur allocation at 5 MHz; the relevance of accreditation and training programs and their role in validating Amateur Radio's participation in public safety communications support; the potential of 4.9 GHz to

relieve public safety pressure from 2.4 GHz; and proposed research involving Amateur Radio's public safety role. Two surveys are under consideration for sometime within the next 12 months. One would determine Amateur Radio's specific emergency resources and capabilities. A second would assess the utilization and need for Amateur Radio resources by public safety officials.

Haynie said after the meeting that he's optimistic about Amateur Radio's greater involvement in public safety and homeland security communications. "It's a whole new mindset since September 11," he said, "and we now need to pay attention to how all Americans—whether they're in public safety or Amateur Radio—can cooperate to make this a safer nation."

Others attending the session were APCO International's Ron Haraseth, N7SKJ; Jay Ferron, N4GAA, of the American Red Cross; ARRL Chief Executive Officer David Sumner, K1ZZ; ARRL General Counsel Chris Imlay, W3KD; ARRL Field and Educational Services Manager Rosalie White, K1STO, and ARRL Technical Relations Specialist Jon Siverling, WB3ERA.

The NPSTC Amateur Radio Working Group will meet again in September in the Washington, DC, area in conjunction with NPSTC's board meeting.

ARRL General Counsel Chris Imlay, W3KD (center), comments on an issue as Jay Ferron, N4GAA (left), of the American Red Cross and Gene McGahey, AL7GQ (right), chair of the NPSTC Amateur Radio Working Group, look on.

FCC Inches Closer to Full Strength as Adelstein Undergoes Senate Grilling

The FCC moved closer to its full complement of five commissioners as the White House in July forwarded the nomination of Jonathan S. Adelstein to the US Senate for confirmation. The Senate Commerce, Science and Transportation Committee, chaired by Sen Fritz Hollings (D-SC), held a hearing July 16 on the nomination of Adelstein to serve out the remaining term of former FCC Commissioner Gloria Tristani, which expires next June 30. Following the hearing, Adelstein's nomination was sent to the full Senate, but as of press time, no vote had been set.

President George W. Bush in February announced his intention to name Adelstein, a Democrat, to fill the remaining vacancy on the regulatory panel. The nomination, which subsequently became embroiled in political wrangling, now appears to be on a fast track.

According to *NECA Washington Watch*, during the hearing, members of the Senate committee lauded Adelstein's commitment to rural issues, including broadband deployment, universal telecommunications service and spectrum management. Some also apologized to Adelstein for the delay in bringing his nomination to the Senate. Sen John McCain (R-AZ), who was among those vowing to hold up all pending nominations, used the occasion of the hearing to voice his displeasure with the current FCC leadership and with the Telecommunications Act of 1996. When all was said and done, however, McCain praised Adelstein's qualifications and called him a "fine young man."

Earlier this year, Senate Republicans were vowing to block the nomination of Adelstein, a longtime aide to Senate Majority Leader Tom Daschle (D-SD), after Senate Democrats rejected Bush's nomination of Charles Pickering to the Fifth US Circuit Court of Appeals. As we reported earlier this year, after a March vote by the Democrat-controlled Senate Judiciary Committee to reject Pickering, Senate Minority Leader Trent Lott of Mississippi—a close friend of Pickering's—announced that he would kill the Adelstein FCC nomination.

Daschle, who recommended Adelstein—his former telecommunications aide—for the job, introduced Adelstein at the July 16 hearing. FCC appointments traditionally are divided along party lines, with the party holding the White House getting three of the five seats.

Adelstein, 39, is from Rapid City, South Dakota. "Having someone like Adelstein on the Commission means that rural America will not get left out of the discussion," the South Dakota Telecommunications Association said in a statement applauding the nomination. If confirmed, Adelstein would be the first South Dakotan ever to serve on the FCC.

Before joining Daschle's staff, Adelstein served on the staffs of senators David Pryor and Donald Riegle. According to a White House statement, Adelstein has been a teaching fellow in Harvard College's Department of History and a communications consultant to Stanford University's Graduate School of Business. Adelstein holds bachelor's and master's degrees from Stanford University. He's also completed graduate-level work in public policy at Harvard's Kennedy School of Government.

CC&R Bill HR 4720 Gains Additional Cosponsors

• The bill now in Congress aimed at providing relief to amateurs faced with private deed covenants, conditions and restrictions—CC&Rs—in erecting antennas has gained additional cosponsors. Freshman Rep Steve Israel (D-NY) introduced the "Amateur Radio Emergency Communications Consistency Act" on May 14. The measure—HR 4720—would require private land-use regulators—such as homeowners' associations—to "reasonably accommodate" Amateur Radio communication consistent with the PRB-1 limited federal preemption. PRB-1 now applies only to states and municipalities. Rep Greg Walden, WB7OCE (R-OR) and Rep Pete Sessions (R-TX) signed on as original cosponsors of HR 4720.

Since its introduction, the bill also has attracted several additional cosponsors—Rep J.D. Hayworth (R-AZ), Rep Patrick Tiberi (R-OH), Rep Patsy Mink (D-HI), Rep Ken Calvert (R-CA), Rep Rick Boucher (D-VA), Rep Joseph Hoeffel (D-PA), Rep John Duncan Jr (R-TN), Rep Dennis Moore (D-KS), Rep Charles Stenholm (D-TX) and Rep David Price (D-NC).

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 ARRL 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, HR 4720, as well as their name and address on all correspondence.

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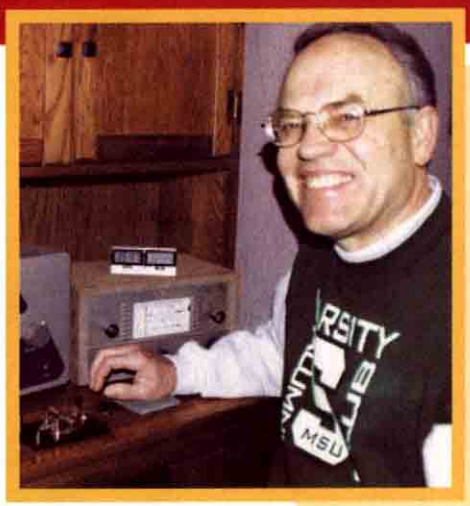

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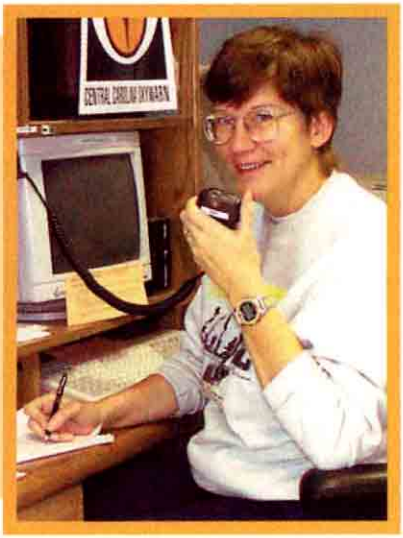

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WHO IS THE DUMMY?

Indubitably, Ed, W0SD, of South Dakota, was the most outstanding super operator in the November 2001 phone Sweepstakes. He must have ears that can copy prairie dogs howling way up to North Dakota. Let me explain, and see if you don't agree.

When the contest began, I took a quick tune across 10 meters to get a feel for the band. It seemed to be open across the country, so I decided to S&P (search and pounce) for a few QSOs to see if I could work a few tough states before settling in for the long weekend grind.

Ahhh, there was W0SD, who we all look to for that rare South Dakota QSO. I called him and he came back to "the W6." I repeated my call. He said, "W6IS something." I gave the "Q" a few times and he called me and gave me his report numbers. I went back and gave my numbers. He asked for a repeat of the number. I gave him "number 1." Okay, next he asked for my check. I gave "35." He asked for it again. I said "35" again. Now please repeat my section. "SCV SCV." "Roger," he says. "Good luck."

Well, I got SD. Now look quickly for any other tough ones. Call a W4 few times. No luck. I think it's them "9s" beat me out again. So, try something closer. Ah, Kansas. No luck with several calls. How about Wyoming? He's about the same distance as SD. Call few times. Can't make it. This is gonna be a long contest!

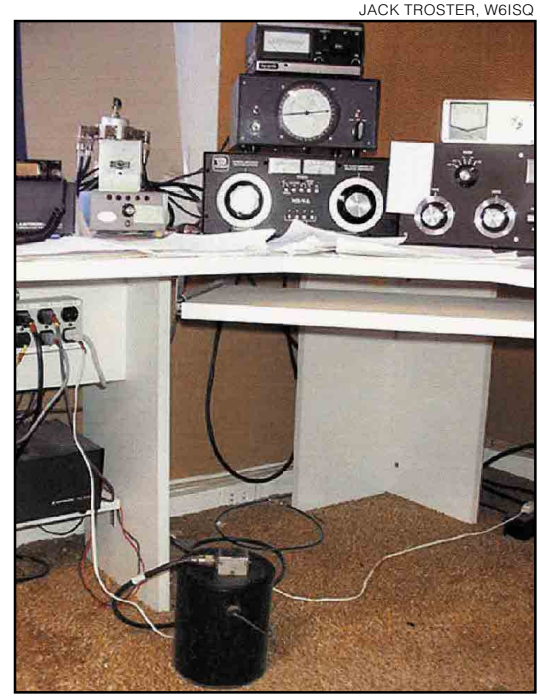
Maybe something not quite working here. Call a couple a locals a few times who are bending my meter.

Cheesh! No reply. What's going on? Check the rig. Yeah, all switches and dials are correct for 10 meters. Check the tired old final. Yep, band switch okay and got all them vibrating, excited RF watts raring to explode. Check the antenna switch . . . whoooops. The antenna switch is ... ahhhhh . . . still on dummy load. That plain, black 40-year-old gallon can of 40-year-old oil is my radiator to the ionosphere! And W0SD heard it. What ears! Omagosh. Maybe he can even copy them prairie dogs barking all the way up to *Canada*!

W0SD admits to a "great" location, but, methinks he had all them antennae vibrating in phase and all them certificates fluttering in that cool South Dakota breeze . . . and all rotated west when we worked in SS on my dummy load.

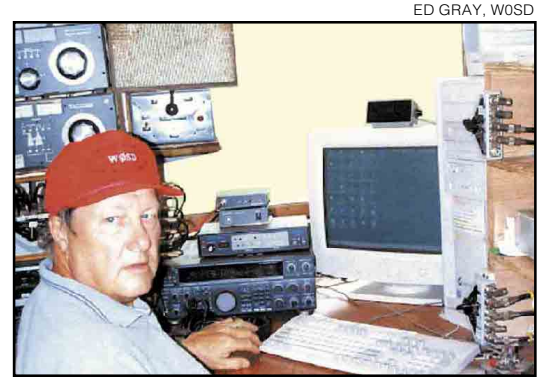
But, the question must be asked: Who is the real dummy? That 40-year-old dummy load. . . or 80-year-old me?—*Jack Troster, W6ISQ*

JACK TROSTER, W6ISQ



The 40-year-old dummy load at W6ISQ.

ED GRAY, W0SD



The man with the golden ears: Ed Gray, W0SD, at his South Dakota "super station."

RONNIE M. HIRSH, N2YP

Dr Ronnie M. Hirsh, N2YP, of New York, volunteers as a clinician at the Stress Center for Police Officers near Ground Zero. The center is operated by Police Officers Providing Peer Assistance (POPPA). The volunteer clinicians, from the New York area as well as other parts of the US and Canada, provide Critical Incident Stress Management services to NYPD officers as a result of the 9/11 attack. This framed patch display was sent to the center by a group from South Dakota. "I was surprised and pleased to notice an ARES patch among those of the police and fire rescue teams," Ronnie writes.

ACE ADKINS, K4KV

Back on September 7, 2001, Dr A. W. (Ace) Adkins, Jr, K4KV, of Boerne, Texas, had decided to mount his "Ben Franklin" flag with 13 stars on his living room wall. After September 11, he immediately decided to fly it on his 60-foot tower, on top of the highest hill in his area of the Texas Hill Country.

BERNIE PARKER, K5BP

At the annual Old Timer's Night of the Dallas Amateur Radio Club earlier this year, ARRL President Jim Haynie, W5JBP, a long time DARC member, received the "The Whit and Anne Griffith Community Service Award." The award is bestowed annually to Dallas radio amateurs who give their time, talents and use of facilities to provide for the safety and quality of life experienced by people of the greater Dallas area and who, by their actions, work for the betterment of Amateur Radio and the community through their public service activities. From the left: Haynie, N. T. "Len" Carlson, K4IWL (DARC president), and Whit Griffith, N5SU.

HENRYK KOTOWSKI, SM0JHF

***QST* on CU:** **Well-known contester and ARRL member Eduardo Machado, CU2AF, lives in the village of Faja de Baixo, close to Ponta Delgada, the main town of Sao Miguel Island in the Azores archipelago. The photo was taken during the ARRL 10 Meter Contest last December. Results appear elsewhere in this issue.**

W3TKQ/W3AA—50 Years at The Franklin Institute: Since 1952, members of the Philmont Radio Club and other area clubs have brought Amateur Radio face to face with the public at Philadelphia's science museum, The Franklin Institute. The station has been at its present 4th floor location since 1989. Long-time trustee W3PWG (now 91 years of age) writes: "The station was first set up by Fred Shaw, W3ADV, and the Havertown Emergency Radio Club in 1952… In 1992 the station was completely rebuilt with all new equipment—Kenwood, Ten-Tec and ICOM—covering all modes of operation. Marconi's daughter came down for the dedication of the station. Our main job is to tell people about Amateur Radio, and to get the young people interested by allowing them to participate." Hams can operate the station if they bring a copy of their license.

COURTESY STEVEN HOCH, WU3I

Late 1970s postcard of W3TKQ, the Amateur Radio station at The Franklin Institute in Philadelphia. The station, now W3AA, celebrates its 50th anniversary this year.

14er Radio Event: Each August, on a Sunday morning, hikers with all kinds of ham gear in tow can be seen working their way to the summits of Colorado's 14,000-foot peaks. This year's Colorado 14er Radio Event will be August 25, with prime operating hours from 9 AM to noon (1500-1800Z). There are several ways to participate: work the mountaintop stations from your home QTH (VHF for Colorado, HF for others); set up your mobile or portable station in a high spot in Colorado and see how many summits you can work, or operate from one of the summits.
(A tip: Roads go the top of two 14,000 foot peaks, Mount Evans and Pikes Peak. For some reason, they seem to have the most activity…)
For more information, see **www.Colorado14erEvent.org**.
—Bob Witte, K0NR

GREG WILSON, KC0ADT

Kristin, KC0INX, and Carol, KC0MOM, operating from the summit of Mount Lincoln, at 14,286 feet above sea level, one of peaks to be activated August 25 during this year's Colorado 14er Radio Event.

NICK BASSOLINO, K6FFY

The Estero Radio Club of San Luis Obispo, Morro Bay, Los Osos and Cayucos, California, took part in the Cayucos 4th of July Parade, which was attended by about 40,000 people. Their float took 2nd place in their division, following up two consecutive first place finishes. The float depicts the landmark Piedras Blancas Lighthouse, which the club is helping to restore.—*Jim Palmer, W6FOB*

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GOTA STATIONS WORK!

♦ For various reasons, I have been inactive for several years. As I gradually got back into the swing of Amateur Radio this year, I found myself looking forward to Field Day and the chance to get back on HF. Nothing elaborate, but I hoped to brush up on my CW, get the little QRP rig set up out in the back yard with wire antennas and gel cell batteries and get some operating time in.

I decided to drive out to one of the local club FD operations. The Ak-Sar-Ben ARC operation was set up at a local lakeside park operating K0USA, so I loaded up my youngest son and we drove out to take a look around. At 13, he is slowly working his way to his own license.

Once on site we met a few of the hams and toured the various operating "shacks." Eventually we ended up back at the main tent setup where the club had its public information and talk-in, along with packet, ATV and a couple of other positions set up. One was the GOTA [Get on the Air—a replacement for the old Novice/Technician station—*Ed.*] station, equipped with an HF rig connected to a relatively low dipole and a laptop for logging. There was someone operating that position, but he was ready to leave so I volunteered to take over operating for a while. Mitch, KC0MXV, quickly offered to assist with logging, so with our young son alongside we fired up the 15 meter station.

It was a (very) modest success with around eight new contacts over the course of an hour or so, mostly operating "search-and-pounce." A newly licensed Technician, Mitch was interested in the operation of an HF station, and we got to explain the contact format and the object of the operation to the next generation of hams. My last HF rig was a Yaesu FT-757GX, so for me it was an opportunity to operate one of the new HF rigs from a manufacturer I'd never tried before.

Kudos to the League for the GOTA concept. I can tell you first hand that it worked exactly as intended, at least for this ham that wanted to get back on the air. My thanks to the Ak-Sar-Ben ARC for the opportunity to get back on the air, and to show my son why we do some of the things we do.—*Dale Botkin, N0XAS, Omaha, Nebraska*

ON LOOPS

♦ I read with interest your recent articles about loop antennas. I have been using a loop since I first read about them in Dave Fischer's November 1985 *QST* article, and can attest to the antenna's excellent performance. Over the years I have used loops at heights of 25 to 40 feet to successfully work both DX and stateside stations. An added bonus to go with the antenna's excellent receive characteristics is that many stations don't believe I am only running my TS-440S at 100 W output power.

I have fed my loops with both coax and ladder line, and while I find the ladder line matches easier when the antenna is used on other frequencies, I usually use coax due to my station situation.

I am active in the NTS system, and use my loop when participating in the Ohio Single Sideband Net (I'm the Tuesday afternoon NCS), and for Eighth Region Net and Eastern Area Net duties when assigned to those nets.

The loop antenna's low noise on receive makes copying traffic under bad band conditions easier compared to the verticals, standard dipoles and off-center-fed antennas I have had up at the same time—so much difference that I have taken those other antennas down.

While many smaller lots will not accommodate the loop size requirements, you don't need a huge estate to put one up. I have slightly less than an acre here, and have plenty of room to get the loop up in the air using the trees on my lot. I have actually had two loops up at the same time (80 and 40 meter versions). If you have the yard space to put up one of these excellent performers, I urge you to give one a try.

I have outstanding neighbors, and one has given me permission to put up a 160-meter loop covering my lot and his adjoining 5-acre lot. So look for me on 160 meters later this year. (Being a good neighbor to your neighbors pays off. Remember—they are affected by our hobby also.)

This same neighbor has expressed interest in the hobby, and when I convince him he has the time to study for, and take the test, I hope to have a new ham for a neighbor. For now, he seems content with the occasional visit to my shack to participate.

I enjoy the many homebrew articles that *QST* runs (particularly the antenna ones), and have tried many of them over the years. Keep up the good work.—*Jim Williams, N8IBR, Johnstown, Ohio*

LET OUR GOOD WORKS BE KNOWN

♦ I wish that I could disagree with K5ZC's observations of the problems in finding a suitable place to live which will also allow full participation in Amateur Radio, but my own observations over the years show him to be quite accurate. Any ham with an attitude to the effect of "just find another place to live" probably has not lived in certain places which he and I could name.

A couple of observations that I can make are that in addition to legal strategy, it seems to me that we need more visibility and we need to make it understood that we are more than a hobby. In fact, it might even be reasonable to say that we are not really a hobby, but something more. Amateur radio might better be described as an unpaid profession or volunteer vocation.

There are other hobbies that require licensing to participate fully, and in some of them the licensing requires qualification and testing as well. But only Amateur Radio has a license which allows someone to design and build anything which that license allows him or her to use. Can a pilot build and fly his own airplane without telling the FAA about it? So, it seems that we have been given quite a vote of confidence.

While I have no idea of what statistics would show, my personal guess is that of the various unpaid pursuits which have a potential public service role, a higher percentage of Amateur Radio operators do something in the name of public service. We need to let this be known. We do not do this solely for our own pleasure.—*Cal Lippitt, AA3YZ, Collingdale, Pennsylvania*

THANKS

♦ I was able to access the *NistTime* program with the help of your suggestion of Web sites posted on the ARRL technical information service area. So far the program is working perfectly. In your business I guess that you don't get much in the way of "Thank You's," so this is my heartfelt thanks to you. I read "The Doctor is IN" column in each and every *QST*, and have benefited from your technical assistance on a number of occasions. Thanks for being there!—*G. Weldon Troyer, K9UHI, Goshen, Indiana*

♦ A big *thanks* for the prompt replies—I've been really pleased with the responses to my questions sent to ARRL HQ. I would also like to let you know the people writing in *QST* have been most helpful in answering my questions. It is great to know that help is there for the asking.—*Dick Battle, AK4RB, Greensboro, North Carolina*

QRP DXCC

♦ I am enjoying the new "QRP Power" column immensely. I commend the ARRL for now offering a QRP DXCC award, as announced in May *QST*. I am also thrilled that Bob Rosier, K4OCE, is offering a QRPp 300 award for working 300 entities, also announced in the May issue. I was, however, very discouraged at the comments that "in the grand scheme of things qualifying for QRP DXCC is no big deal." This statement serves to demean the announcement placed right beside it for the QRP DXCC award. It also lowers the prestige of the entire DXCC program, which many attain with power levels much higher than QRP. I believe, and I think most amateurs would agree, that achieving 100 DXCC entities QRP is indeed quite an accomplishment in itself. New amateurs reading Bob's comments would have little incentive to try for the ARRL award if it is "no big deal."—*Jeff Richardson, VA3QSL, Bramalea, Ontario*

LEARN ABOUT DX VIA THE WEB

♦ As usual I am tuning the 20 meter CW amateur band to see who is on and what countries are represented. I don't hear any stations outside of the US. Then I hear this Russian station, RA1AI. Wow, I figure it must be a station in Western Russia. That would be interesting. One thing that puzzled me—why did he send /ANT after his call letters. Anyway I gave him a call. He answered me and said that he is in Vostok, Antarctica. Now I know that Ant. is for Antarctica, not antenna. In the past I have worked Russian stations on King George Island. This is great—another station near Antarctica.

In order for me to keep track of all the stations I have talked to that are outside the United States, I have a map on my wall with little red pins at each city that I have contacted. Now I need to put a red pin at Vostok. Where is Vostok? I check both my atlases and an atlas CD, but no Vostok. Next step is to call up Google on the Internet [the Google search engine can be found at **www.google.com**.—*Ed.*].

Google had pictures of the buildings at Vostok, and maps and information about what was going on down there. Vostok is at the geomagnetic South Pole, 1000 miles from the South Pole, and it sits atop a 2.5 mile high pile of ice.

Since Vostok is out in the middle of nowhere in Antarctica, it is really hard to get supplies or mail there. Only once or twice a year a ship leaves New Zealand for Vostok with a year's supply of food and oil. This ship unloads to a tractor train that hauls the supplies and personnel overland for Vostok. Then the tractor train picks up some personnel and returns to the loading dock. So if I mail my QSL card now it is just starting winter down there and I have probably missed the ship for this year. The next ship may go there in January or February. If Mike has my QSL written already, then I should get it about next April; otherwise it will be April 2004. Not bad for QSL mail. If conditions are right, an aircraft can fly to Vostok. I'm not sure whether they deliver general mail.

It is very exciting learning about unusual places like Vostok and knowing that you had contact with such a place. Google is a great place to learn about foreign countries. The next time you contact an island or foreign city call on Google to tell you about it and show you what it looks like.—*Hugh L. Moore, W6UDZ, Santa Monica, California*

CRUSTACEAN AIRS HIS VIEWS

♦ I was disappointed to see "antennae" instead of "antennas" used several times in the August 2002 issue. It may have seemed more erudite to the writers, but only arthropods (such as insects and lobsters) have antennae. We poor mortals have antennas. On the other hand, since my antennae went up when I read the issue, I might be described as an arthropod…specifically, a crab.—*Roy A. Raney, K0OVQ, Denver, Colorado* QST

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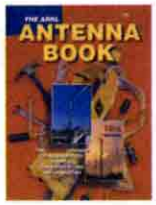

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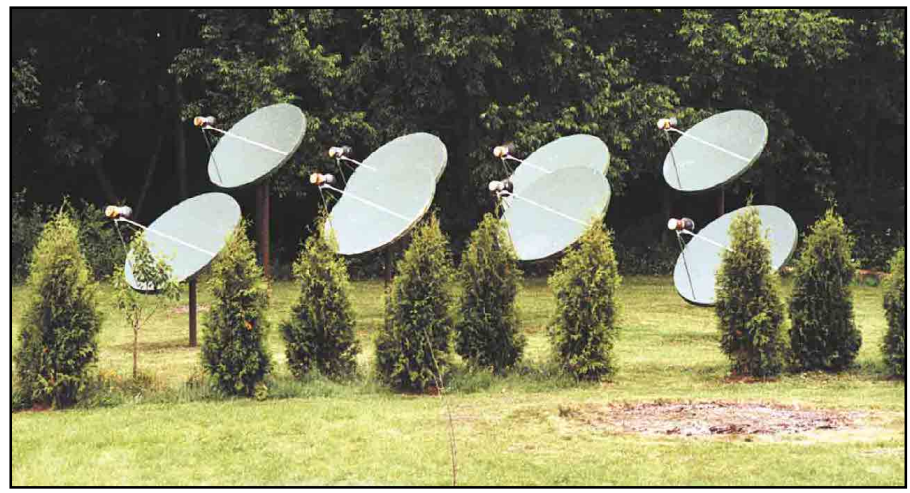
By Dr H. Paul Shuch, N6TX

The Very Small Array

A prototype array of small dishes taking shape in rural Pennsylvania is evidence that the SETI League is thinking big on a small scale.

The nonprofit SETI League began conceptual design work in 1999 on *Array2k*, a planned phased array of satellite TV dishes, to be used as an Amateur Radio telescope of unique flexibility. Although the funding required to implement this design still eludes us, the SETI League has amassed, through a multitude of grants and small contributions, the resources necessary to permit us to begin construction of a small-scale prototype. Thus, an eight-dish Very Small Array (VSA) is now taking shape in the backyard of the author's rural Pennsylvania home. This article shows how donated dishes, student labor and ham ingenuity are being combined to test a high-tech concept on a shoestring budget.

The VSA project is funded in part by generous grants from the American Astronomical Society and the ARRL Foundation.



Introduction

The SETI League launched its *Project Argus* sky survey in April 1996, with the ambitious goal of real-time all-sky coverage.[1] Our experience in implementing a global network of small radio telescopes has underscored the importance of developing larger scale telescopes with improved sensitivity.[2] Due to negative economies of scale, we early decided to explore the arraying of a quantity of the very type of antennas used in the current Project Argus network—that is, extrapolating from our area of greatest expertise.

Array2k is an array of small satellite dish antennas all interconnected to accomplish specific beam patterns.[3] As presently envisioned, the array comprises 32 individual parabolic dish antennas on az-el mounts. Four sub-arrays, each comprised of eight individual antennas, are established in a cross-like formation, with one sub-array each running north, south, west and east of the array's phase center.

Fiscal Reality

The SETI League set a preliminary hardware budget of $160,000 for *Array2k*. Overhead and infrastructure needs can be expected to raise the total cost to around $250,000. Though roughly 1% of the cost of professional radio telescopes, this is still a substantial sum, beyond the reach of Amateur Radio clubs like the SETI League. Nevertheless, fundraising efforts were initiated in May 2001, resulting in a handful of modest (but hopelessly inadequate) contributions. The generosity of our 1300 members in 62 countries around the world notwithstanding, significant grant monies or major corporate sponsorship will be required to bring *Array2k* to fruition.

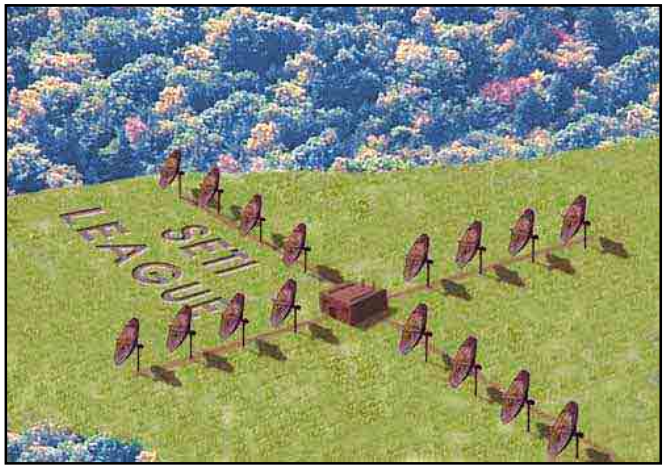
A small-scale prototype to test the technologies proposed for *Array2k*, on the other hand, is within both amateur capabilities and existing budget, and may help us attract major donors. Thus, I began in the spring of 2002 to construct the Very Small Array (VSA) in the backyard of my rural Pennsylvania home.

To facilitate completion of this prototype, the American Astronomical Society very generously provided a NASA Small Research Grant in the amount of $2000, and the ARRL Foundation kindly kicked in an additional $3000. Thanks to matching funds contributed by more than 50 radio amateurs, $10,000 has now been allocated to implementing the eight-dish VSA. A quantity of donated 1.8-meter dishes and azimuth-elevation mounts should allow us to complete the VSA prototype within budget, hopefully by early next spring, about a year after the project was begun.

Mounting the Masts

The VSA requires that its antennas be laid out in true North-South and true East-West baselines. Establishing these baselines requires precision surveying. Fortunately, I spent a few years as a Professor of Electronics at the Pennsylvania College of Technology, Penn State University. That institution boasts an exemplary Civil Engineering program, whose students take courses in surveying. Through the good graces of my former colleague Professor William Sprinsky, CE student Timothy Wentz was recruited to sight the Sun with a theodolite. Using solar ephemeris tables and an accurate clock, he was thus able to establish precise baselines and to stake out the locations of the individual antennas. A 24-inch auger on a Bobcat track vehicle was rented, and eight holes of 42-inch depth were dug, centered on the indi-

[1]Notes appear on page 30.



Noted space artist Jon Lomberg created this conception of *Array2k*, the next-generation radio telescope now in preliminary design phase at SETI League headquarters.

Since we intend to use the VSA at L-band, on a frequency of 1296 MHz, one can scale the dimensions of the standard C-band feed by a factor of three. As is the amateur tradition this feedhorn is constructed from low-cost materials!

vidual antenna locations.

Concrete block was laid in the bottom of each of the antenna holes, to support the antenna masts. Each mast was cut from 4 inch OD, 3½-inch ID schedule 40 galvanized steel pipe. A hole was drilled near the bottom of each mast section, and a length of steel reinforcing bar placed through it, to prevent twisting of the mast under wind loading.

The terrain at the VSA site is quite uneven. Leveling the masts was accomplished with two bubble-levels with magnetic backings, stuck to each mast 90 degrees apart. Temporary guys held the masts in place, while 0.4 cubic yards of concrete were poured into each of the eight holes. Curing time for the concrete was two days, after which time the guy wires could be removed.

Because of the VSA site's rolling terrain, and the fact that proper phasing of the array elements requires that the antennas all be at approximately the same absolute altitude, a string level was used to mark trim lines on all eight masts, which were then adjusted to proper height with a cutoff wheel.

Aesthetic Mitigation and PRB-1

As is good practice in residentially zoned neighborhoods, the author received approval from his Township Board of Supervisors prior to commencing construction of the VSA. However, with eight masts planted, the neighbors immediately began protesting the project to that same Township Board.

To any radio amateur planning an antenna project which might impact on his or her neighbors, I can highly recommend K1VR's fine book on antenna zoning, available through the ARRL.[4] Had I bothered to consult it before I started working on the VSA, I could have spared myself considerable grief.

Legalities notwithstanding, one must take the concerns of one's neighbors very seriously. We radio amateurs in the United States enjoy a degree of legal protection which our counterparts in other countries well may envy. As the holder of a US Amateur Radio license, constructing an antenna to be used under the rules of the Amateur Radio Service in the allocated ham bands, my antennas fall under the protection of PRB-1, the FCC's federal preemption of local zoning regulation over ham radio antennas. Since the VSA is designed to operate within the 23 cm Amateur Radio band, for reception tests in connection with our W2ETI moonbounce beacon (clearly a ham radio educational and scientific activity), I invoked PRB-1 to my local Township Supervisors.

In brief, PRB-1 recognizes the value to the community of the Amateur Radio Service, acknowledges the importance of antennas to achieve effective ham radio communications, and prohibits local governments from unrealistically restricting ham antennas. And, to my surprise and delight, the local township Solicitor informed my Supervisors at a local Township meeting that PRB-1 did indeed apply, protecting the VSA from zoning restrictions and local regulation.

If you think that ruling allayed my neighbors' concerns, you overestimate the power of reason. Federal regulations aside, they argued to our Township Supervisors, they moved onto our scenic hilltop to enjoy the wonders of nature, not the terrors of technology. Since membership on the Township Board is an elected position, whose voice do you suppose carries best, that of one lone ham, or a dozen of his voter/neighbors?

Without belaboring the ensuing legalities, suffice it to say that compromise carried the day. Since an Amateur Radio telescope points generally "up," and since moonbounce activities can be conducted when the Moon is relatively high in the sky, it was practical to mount the dishes of the VSA relatively close to the ground, pointing up. This permitted me to plant a ring of trees around the dishes, shielding them from the view of my neighbors. The sad irony is that the cost of the shrubbery ended up exceeding the cost of the sheet metal. But I have to admit that the 40 arbor vitae recently planted in my backyard are attractive—almost as pretty to my eye as the dishes they mask!

The bottom line is that the Township solicitor sent me a letter, stating "that in the Township's view your backyard antennae and related facilities *are* within the protection of certain FCC Rulings, and *do* comply with all applicable Township regulations such as screening and setback requirements. Your continuing effort to deal openly and above-board with the Township about your property and your projects has been very much appreciated."

In summary, we each can choose between confrontation and conciliation. Our legal rights notwithstanding, as good neighbors it behooves us, and benefits our hobby, to choose the latter.

Moving Ahead

Trees planted, the first dish appeared within a day. It flies the same Flag of Earth that graces SETI facilities worldwide. The Flag symbolizes the fact that SETI is carried out on behalf of humankind as a whole. The individual people, organizations and nations involved are immaterial, since any signal received will belong to all of humanity, and represent Earth's entry into the Galactic community. I can think of no symbol more appropriate for an Amateur Radio edu-

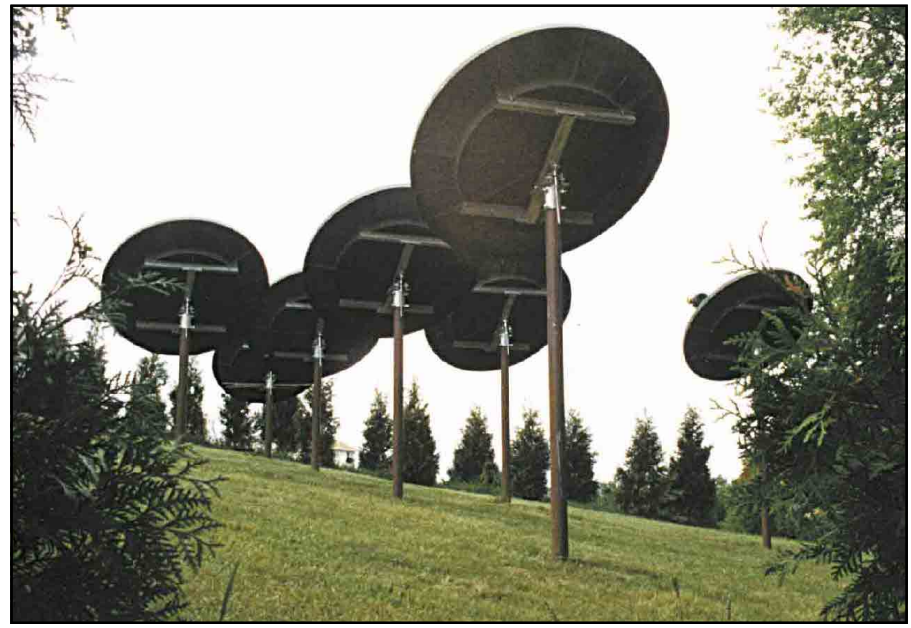
cational and scientific project.

Next, each of the VSA masts was topped with an azimuth-elevation mount, and the mounts began to receive their dishes. Offset feedhorn-support tripods were then affixed to the reflectors. As these dishes are designed for non-blocked apertures, the feed points appear significantly off-center.

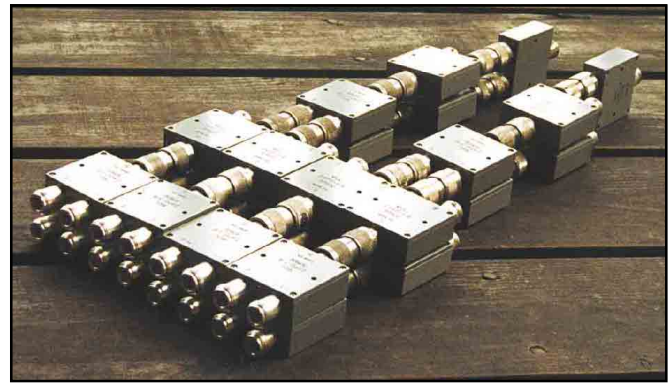
Feeding an offset dish is a bit trickier than it would be to feed a standard prime-focus parabola. With offset dishes, the reflector is only a sector of a paraboloid, rather than a full parabola. Thus, the effective focal length to diameter ratio (F/D) is greater than it would be for the equivalent prime-focus dish, and the required beamwidth of the feedhorn is correspondingly narrower (in the case of the VSA antennas, 41 degrees). Design considerations for the required high-gain feedhorns have been well documented by W1GHZ.[5] But I chose a different approach.

Commercial feeds were supplied with the Prodelin dishes donated for the VSA. They were built for the 3.7 to 4.2 GHz C-band satellite TV allocation. Since we intend to use the VSA at L-band, on a frequency of 1296 MHz, one can scale the dimensions of the standard C-band feed by a factor of three. The result is shown in the accompanying photo. As is the amateur tradition, and should be evident in the photos, this feedhorn is constructed from low-cost materials!

At press time, 1296 MHz feedhorns had just been installed on the eight dishes of the VSA. The VSA has begun to look like a real antenna array. Over the coming months, those eight dishes will begin to acquire the necessary electronics to recover echoes off the Moon from the W2ETI 1296 MHz EME beacon.[6] The continuous availability of EME calibration signals will enable us to optimize the array's receive circuitry. We plan to try out new ways to phase and combine signals from multiple dishes, providing limited electronic beam steering. Then, it will be on to radio astronomy, and SETI research, and (just maybe) a shot at the ultimate DX.



Masts are set on concrete blocks in each hole, with reinforcing bar to prevent twisting (see text).



The VSA phasing matrix. These bias Ts and power dividers/combiners will produce four different beam patterns simultaneously, in two orthogonal circular polarizations.

Conclusion

Once the Very Small Array becomes operational, I hope its success will enable the grassroots SETI League to attract major corporate funding for its much more complex *Array2k*, a massive radio telescope array first contemplated in 1999. The bargain-basement VSA will be used to test engineering concepts for the planned $250,000 *Array2k*, which is itself a hundred times cheaper than conventional radio telescope designs. Thus, we hope to help bring radio astronomy and SETI research to the masses. Already, several SETI League members in the Third World have used amateur techniques to build the first radio telescopes in their respective countries. But whether the VSA paves the way for more ambitious projects or not, it shows the world how donated dishes, student labor and ham ingenuity can combine to test a high-tech concept on a shoestring budget.

Notes

[1]H. Paul Shuch, *Project Argus and the Challenge of Real-time All-sky SETI*, in *Astronomical and Biochemical Origins and the Search for Life in the Universe*, IAA Colloquium 161, 693-700, 1997.

[2]H. Paul Shuch, Project Argus: O*ne Hundred Up, 4900 to Go!* IAA-00-IAA.9.1.04, Oct 2000.

[3]H. Paul Shuch, *Array2k: Multiple Dishes, Multiple Modes.* IAA-01-IAA.9.1.02, Oct 2001.

[4]Fred Hopengarten, *Antenna Zoning for the Radio Amateur*, ARRL, Newington, CT, 2001. ARRL publication no. 8217. Available from **www.arrl.org/shop/**.

[5]H. Paul Shuch, "2001: A Moonbounce Odyssey," *QST,* Nov 2001, pp 38-43.

[6]Paul Wade: *W1GHZ Microwave Antenna Book Online*, **www.w1ghz.org/antbook/preface.htm**.

Dr Paul Shuch, who serves as executive director of the SETI League, is a long-time engineering professor credited with designing the first commercial home-satellite TV receiver. A Fellow of the British Interplanetary Society and Fellow of the Radio Club of America, he is the author of more than 300 publications, has received numerous honors and awards and (as N6TX) has operated in all 20 ham bands between 1.8 MHz and 24 GHz. Paul served as director, technical director and chairman of the board of Project Oscar Inc, predecessors to AMSAT. He lives on a radio-quiet hilltop in northern Pennsylvania with his biologist wife, five of their seven recombinant DNA experiments, 10 networked computers, three motorcycles, two radio telescopes and an antique MG-TD. You can reach the author c/o The SETI League, Inc, PO Box 555, Little Ferry, NJ 07643; **n6tx@setileague.org**; **www.setileague.org**.

By Bill Jones, K8CU

Practical High Performance HF Log Periodic Antennas

This article describes the electrical and mechanical design process for two LPs that cover the HF bands from 10-30 MHz.

How do you go about achieving good DX performance on all HF amateur bands from 10 to 30 MHz without using separate antennas for each band? One alternative that occurred to me was the log periodic (LP) antenna. Although I thought that the penalty for using this type of antenna was poor front-to-back (F/B) ratio and forward gain when compared to other antennas, I decided to take a closer look.

Electrical Design

I had used three-element monoband Yagi antennas for years and considered them to be good DX antennas, so I chose that design as the performance standard for comparison. Using modeling software, I tested several log periodic antennas of six to eight elements with boom lengths of 16 to 20 feet. The software confirmed that these antennas were inferior, just as I expected. I then found that adding more elements on a longer boom would work much better.

The antenna modeling software I used for this project is *NEC-WIRES*, a *NEC2*-based software package from K6STI,[1] and *NEC-Win Plus*, a *Windows*-based product from Nittany Scientific.[2] If you choose to use other software to model log periodic antennas, make sure the software will correctly model the phasing transmission line that runs down the center of the boom and connects each element together. *MININEC* programs won't handle this transmission line properly. *NEC2* antenna models use the *TL* (transmission line) facility for modeling, which produces a nonradiating, lossless mathematical transmission line for the model. Don't expect to model this line accurately with a number of small wires and connections as part of the antenna.

The quantity of model segments for the elements must be odd so that the phasing line is centered. The number of segments per wire is stepped in accord with the wire length and is the nearest odd integer to a calculated number. Starting with eleven segments for the shortest element, longer elements have progressively more segments for the best possible alignment of segment junctions. The *NEC2* antenna file is available and may be downloaded from the author's Web site at **www.realhamradio.com** and imported into your antenna design software:

- .ANT for the VOA Export File (filename LOG.ANT)
- .NWP for the *Nittany NEC-win Plus+* (filename LOG.NWP)
- .NEC for the *NEC* file (filename LOG.NEC)

I tested dozens of various log periodic arrays—from very small ones to those with impractically long booms. As the boom length and number of elements increased, the F/B ratio became respectable. My final 14-30 MHz antenna has the same gain and F/B characteristics as a set of three-element monoband antennas, with the advantage of a single feed line.

Some log periodic antennas have reduced performance at each end of the desired frequency span. This is because few elements are active at the frequency extremes to provide good gain and F/B ratio. Some antenna designers have resorted to using passive reflectors or directors to boost performance. I tried to modify the antenna element spacing and lengths of traditional log periodic designs and was able to successfully optimize the antenna to give good 14-30 MHz performance without requiring additional passive elements. The optimized antenna has 13 elements and a boom length of 36 feet.

I wanted 30-meter coverage, so I

[1]Notes appear on page 37.

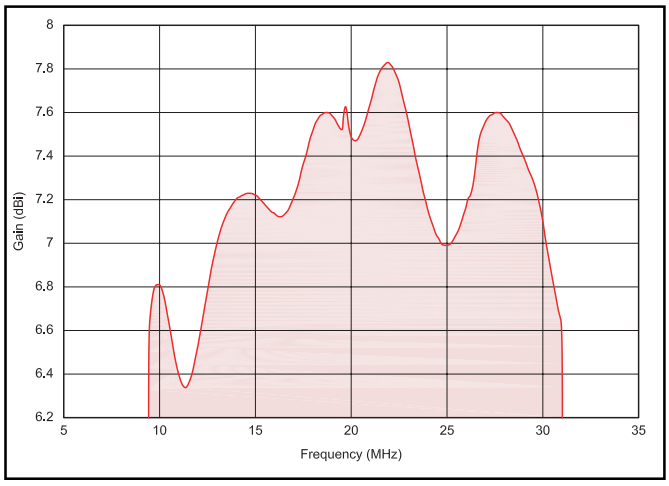


Figure 1—Calculated free-space forward gain for the 15-element 10-30 MHz Log Periodic.

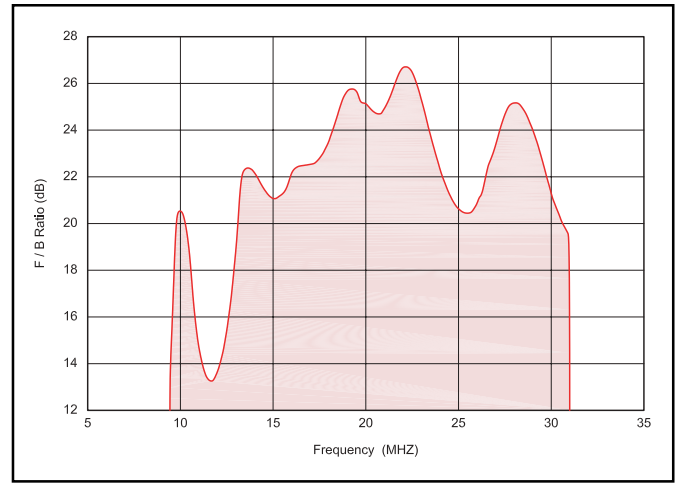


Figure 2—Calculated free-space F/B ratio for the 15-element 10-30 MHz Log Periodic.

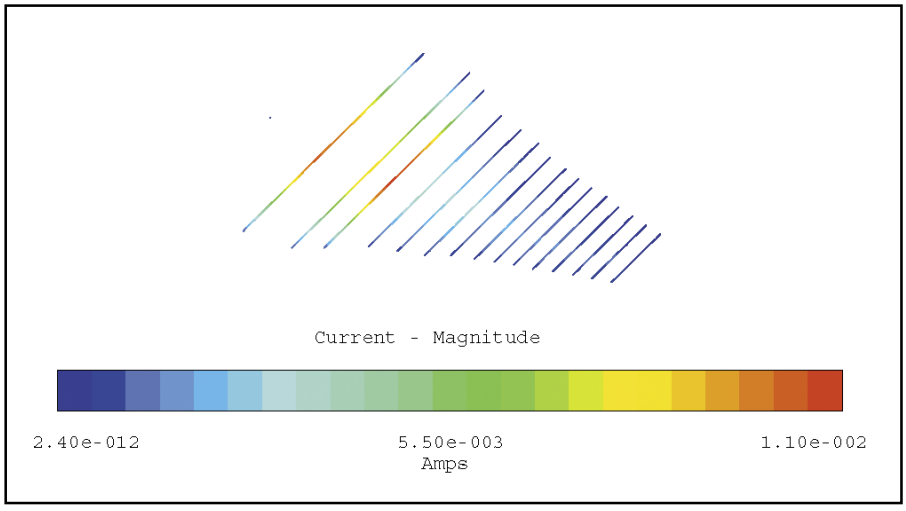


Figure 3—Element current magnitude at 10.1 MHz. Note that while all of the elements show some current, the first and third are the most active.

created a second antenna by adding two more elements, lengthened the boom, and optimized again for the 30-meter band. The new design had a boom length of 48 feet. 30-meter performance was down somewhat from the standard 3-element monoband antenna—within $^1/_2$ dB in forward gain and a good F/B ratio of 20 dB. Since only two elements were added to give this additional coverage, I decided that reduced forward gain was acceptable.

Sweeping the design frequency in steps of 100 kHz and tabulating the results across the entire operating bandwidth resulted in the gain and F/B ratio plots shown in Figures 1 and 2. It's interesting to note the 30-meter performance of the antenna. Only two elements have been added to give coverage for this band, but the forward gain falls midway between that of a two and three element monoband Yagi. F/B ratio is 20 dB, which is better than a two-element monoband Yagi and almost as good as a full-sized three-element Yagi at 25 dB.

A recently published article[3] stated that all elements in a log periodic antenna are active at all frequencies. All elements are active forward of the one most active at any given frequency. Figure 3 shows a modeling software graphic of element current magnitudes when the array is operating at 10.1 MHz. Significant element current at this frequency is present on some elements other than the two added for 30 meters. This makes sense and explains the improved 30-meter performance.

Another improvement to 10 MHz performance resulted from adding a shorted stub to the rear element. This consists of an electrical length (100% velocity factor) of 78.74 inches of 450 Ω open-wire transmission line connected at the rear element's antenna terminals with the far end shorted. To get the physical length, multiply this by the line's velocity factor. Adding the stub improves F/B ratio on 30 meters, the band on which the rear element has the most effect, by 9 dB without significant effect on gain or SWR on the other bands. As I constructed it, the stub is coiled up and attached to the boom with acceptable results. To eliminate interactions in the coiled line or with the boom pipe, the best solution would be to use a lightweight extension of 1-inch diameter PVC pipe fastened to the boom using stainless hose clamps, with the ladder line then taped to the PVC pipe. The resulting pattern and SWR response make for a nice 30-meter antenna.

The main feed-point impedance of both antennas is 200 Ω. I matched this value to a 50 Ω coaxial line using a homemade broadband 4:1 toroidal balun suitable for legal limit power operation.

Mechanical Design

NEC2 antenna design software uses a single wire of a constant diameter for each element to calculate antenna characteristics. Since most HF antennas require elements of tapering size, a conversion method is required. I used a spreadsheet template from Dave Leeson, W6NL's, Yagi design book,[4] which calculates the conversions from practical elements to their theoretical equivalents. The spreadsheet is constructed with multiple columns—one column per element section. Element section diameters, wall thickness and lengths are entered. The software does more than just tapered element conversion. Antenna element

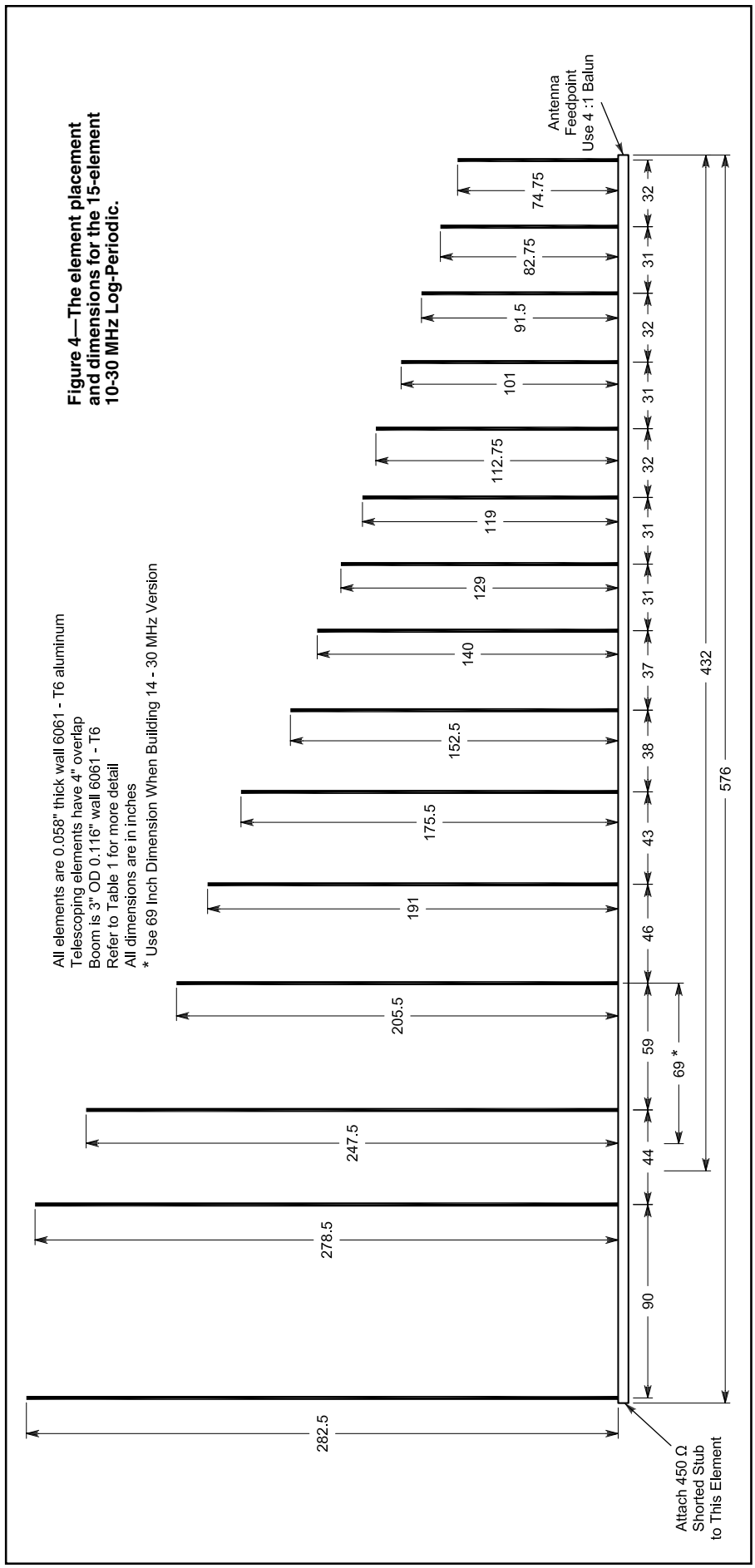


Figure 4—The element placement and dimensions for the 15-element 10-30 MHz Log-Periodic.

weight, wind speed survival, ice loading characteristics, and more are calculated as you design each element. Many of Leeson's ideas for Yagi antenna physical design in this book apply directly to log periodic antennas. Reading this book and applying the mechanical design fundamentals along with using the software is recommended without hesitation. Using it, you can make mechanically reliable antennas that perform electrically as intended.

Another spreadsheet template, entitled "Calculation of Element Strength and Equivalent Length," calculates the wind speed survival of an element. My county in Ohio has a 70 MPH requirement.[5] Enter the physical tubing diameters and lengths for the element, adjusting the lengths of each tapered section to keep the calculated reactance as close to 0 Ω as possible. (When the spreadsheet shows a low reactance, the tapered element is equivalent to the *NEC-2* single diameter length.) If the wind speed survival of each element section is at or above your required wind speed survival, and the element section is practical to build, you are done. If not, increase the diameter, wall thickness, or shorten the lengths of individual element sections (always keeping the reactance near zero) until the element design will survive at the required wind speed. High wind speed survival speeds are relatively easy for the shorter elements. Those in the 14 MHz range and below require more care.

Once each element is designed, the weight and area calculations of each are then used in another spreadsheet that calculates boom survival characteristics in a similar way. Start with single elements, and then work on the boom and boom guys.

The advantage of this spreadsheet technique is simplicity and speed. You are only working on one element (or boom) at a time, and the spreadsheet runs very quickly, even on older computers. The spreadsheets are provided in *Lotus 1-2-3* format (WKS) and will work with practically any spreadsheet program, such as Borland/Corel *Quattro Pro* or Microsoft *EXCEL*. This algorithm for tapered element conversion is summarized in *The ARRL Antenna Book*.[6]

Construction

The center section of the 10 MHz and the 14-30 MHz elements are different because the larger 10 MHz elements are 50 feet long and require a heavier boom to element mounting method. The tubing diameter of the 14-30 MHz elements is all standardized at an initial 1-inch diameter, while the two 10 MHz elements start

out at 2 inches. Each element type has a standardized construction method. All use the same tubing diameters and initial lengths, then taper in a uniform fashion. The individual element's final tip length then determines the resonant frequency. The complete set of element tubing sizes and dimensions is shown in Table 1. Note that these dimensions are for the exposed lengths of tubing visible after assembly. Four inches of tubing overlap are required for assembly where a smaller tube fits closely into the next larger tube.

The larger antenna may be built from the smaller one by adding a boom extension and two elements. With one exception, the element lengths and boom spacing on the smaller antenna remain the same when the larger antenna components are added. The boom position of the largest element on the smaller antenna moves 10 inches. More details of these changes and the element layout are shown in Figure 4.

A log periodic antenna requires each element center to be split and insulated from the supporting boom. The insulating center for the large 2-inch elements is a solid rod of PVC, UHMW, or similar insulating material, 1.875 inches in diameter and 12 inches long. One rod is required for each of the two larger elements.[7] Since this isn't a standard diameter, it will be necessary to turn a larger diameter rod to this size using a lathe. Most machine shops can handle this job for you. Use a section of 2-inch diameter aluminum tubing to verify proper fit. Thanks to George Crego, WD8ATX, for his expert lathe work making my insulators. The mechanical drawing for the larger 2-inch 10 MHz element is shown in Figure 5.

The boom guy detail of Figure 5 shows how 0.25-inch-thick 3-inch aluminum angle is used as the basis for the boom guy anchors. Galvanized 1-inch closed-end eyebolts are attached to the aluminum angle, which is attached to the boom using one McMaster #8896T57 3-inch stainless U-bolt clamp. One U-bolt is required for each boom guy. Two identical U-bolts are also used to attach the 2-inch element-mounting bracket to the boom.

Surrounding the aluminum element is a 12-inch long piece of Schedule 40 PVC pipe with a 1/4-inch slit cut lengthwise in it. This allows the PVC pipe to compress securely around the aluminum element. A pair of 1/4-20 × 2.5-inch stainless steel machine screws with double nuts serves as terminals to connect the phasing transmission line. This assembly is then mounted using four McMaster #3042T57 stainless U-bolts on a support plate made of 3-inch aluminum angle, 8 inches long. These two larger elements are about 50 feet long, and this mounting arrangement has proven to be trouble-free. All elements are mounted below the boom.

The insulating center for the smaller 14-30 MHz elements was originally made with a custom designed UHMW polyethylene block with an integral ultraviolet light inhibitor that has worked well in this application. To make it easier for others to duplicate this antenna design, I have redefined the elements to now use commercially available components.[8]

The mechanical drawing for the smaller 14-30 MHz element is shown in Figure 6. The construction method for the smaller elements uses similar, but smaller components. A solid fiberglass rod of 7/8-inch diameter fits inside the two 1-inch diameter aluminum element ends. One-inch PVC pipe with a 1/4-inch slot cut lengthwise fits around each tubing end. This assembly is supported by two aluminum saddles mounted on a flat 1/4 inch thick aluminum plate measuring 8 × 3.5 inches. Stainless machine screws with double nuts serve as the element electrical terminals. The entire element plate assembly is held to the boom using two McMaster #8896T57 stainless U bolts.

Closed-end 1/8-inch aluminum pop rivets are used to join the overlapping tub-

Table 1
Aluminum Tubing Construction Lengths for 10-30 MHz Log Periodic Antenna

Element Spacing on Boom (Inches)	*Element Resonance (MHz)*	*Half-element Tubing Sizes (inches)*
0	10.33	2.000 × .058 × 36 1.875 × .058 × 32 1.750 × .058 × 32 1.625 × .058 × 32 1.500 × .058 × 32 1.375 × .058 × 32 1.125 × .058 × 32 1.125 × .058 × 53
90	10.48	2.000 × .058 × 36 1.875 × .058 × 32 1.750 × .058 × 32 1.625 × .058 × 32 1.500 × .058 × 32 1.375 × .058 × 32 1.250 × .058 × 32 1.125 × .058 × 48.5
134 (124 for 14-30 MHz version only)	11.69	1.000 × .116 × 72 0.875 × .058 × 68 0.750 × .058 × 68 0.625 × .058 × 39.5
193	14.0	1.000 × .116 × 72 0.875 × .058 × 68 0.750 × .058 × 65.5
239	15.05	1.000 × .058 × 72 0.875 × .058 × 68 0.750 × .058 × 51
282	16.35	1.000 × .058 × 72 0.875 × .058 × 68 0.750 × .058 × 35.5
318	18.7	1.000 × .058 × 72 0.875 × .058 × 68 0.750 × .058 × 12.5
355	20.3	1.000 × .058 × 72 0.875 × .058 × 68
386	22.0	1.000 × .058 × 72 0.875 × .058 × 57
417	23.85	1.000 × .058 × 72 0.875 × .058 × 47
449	25.15	1.000 × .058 × 72 0.875 × .058 × 40.75
480	28.0	1.000 × .058 × 72 0.875 × .058 × 29
512	30.85	1.000 × .058 × 72 0.875 × .058 × 19.5
543	34.0	1.000 × .058 × 72 0.875 × .058 × 10.75
575	37.5	1.000 × .058 × 72 0.875 × .058 × 2.75

ing sections together. Two were used to join the smallest sizes, while eight were used for the largest. Just prior to assembly, coat the overlapping area with a thin coating of aluminum joint compound (Penetrox or equivalent) to inhibit corrosion between the aluminum tubing sections. Stainless or galvanized hardware is used throughout, not just on the electrical connections.

I chose a boom diameter of three inches for both antennas. The mechanical properties of this boom were tested using the mechanical design template from W6NL's book. Boom guys are necessary to keep the boom straight. I checked for possible interaction between the metal boom guy wires and the elements using the *NEC-2* design software. No problems were discovered, probably because the guys are parallel to the boom and at a right angle to the elements. This eliminates the need for Kevlar guy cable. For these antennas, $^{3}/_{16}$-inch EHS guy wire works well. Use the mating grips for clean and good looking boom guys.

The booms are 6061-T6 aluminum, 3-inch OD × 0.125-inch wall. I used two 24-foot pieces of 3-inch diameter aluminum pipe for the 48-foot boom. The 36-foot boom was made with a 24-foot piece joined to a 12-foot piece. I connected both boom pieces together using a larger outside pipe as a coupler between each section. The boom coupler is made of a 4-foot length of 6061-T6 Schedule 40 aluminum pipe that is 3.5-inch OD × 0.216-inch wall. Pipe doesn't fit closely like tubing does, but the joint was close enough to be practical. I considered using 0.025-inch thin metal shims to make up for the somewhat loose connection, but it wasn't necessary. Use two 2 × 13 × 5 inch galvanized bolts at right angles through the entire boom joint to secure the boom splice section to each boom end. Four boom bolts are required for each antenna.

Any boom sag resulting from a slightly loose boom joint is removed when the boom guys are tightened. Boom guy tension is determined by hanging the antenna at the center of gravity from a cable. With the antenna elements level, sight along the boom and adjust the turnbuckles until it looks straight. The larger 48-foot boom requires four boom guys, while the 36-foot version needs only two. Once in the air, the perfectly straight boom looks great and it stays that way. The mechanical drawing for the boom couplers and vertical guy support is shown in Figure 7.

Make sure to align the eyebolt holes in the vertical boom support to be directly over the boom. This will prevent the boom from bowing when the turnbuckles are adjusted. Two $^{1}/_{2}$ × 12 inch galvanized turnbuckles are used for the 36-foot boom antenna. The 48-foot boom version requires four turnbuckles and eye bolts. The vertical boom support is fabricated from a single 2-foot length of $^{1}/_{4}$-inch thick, 3-inch aluminum angle.

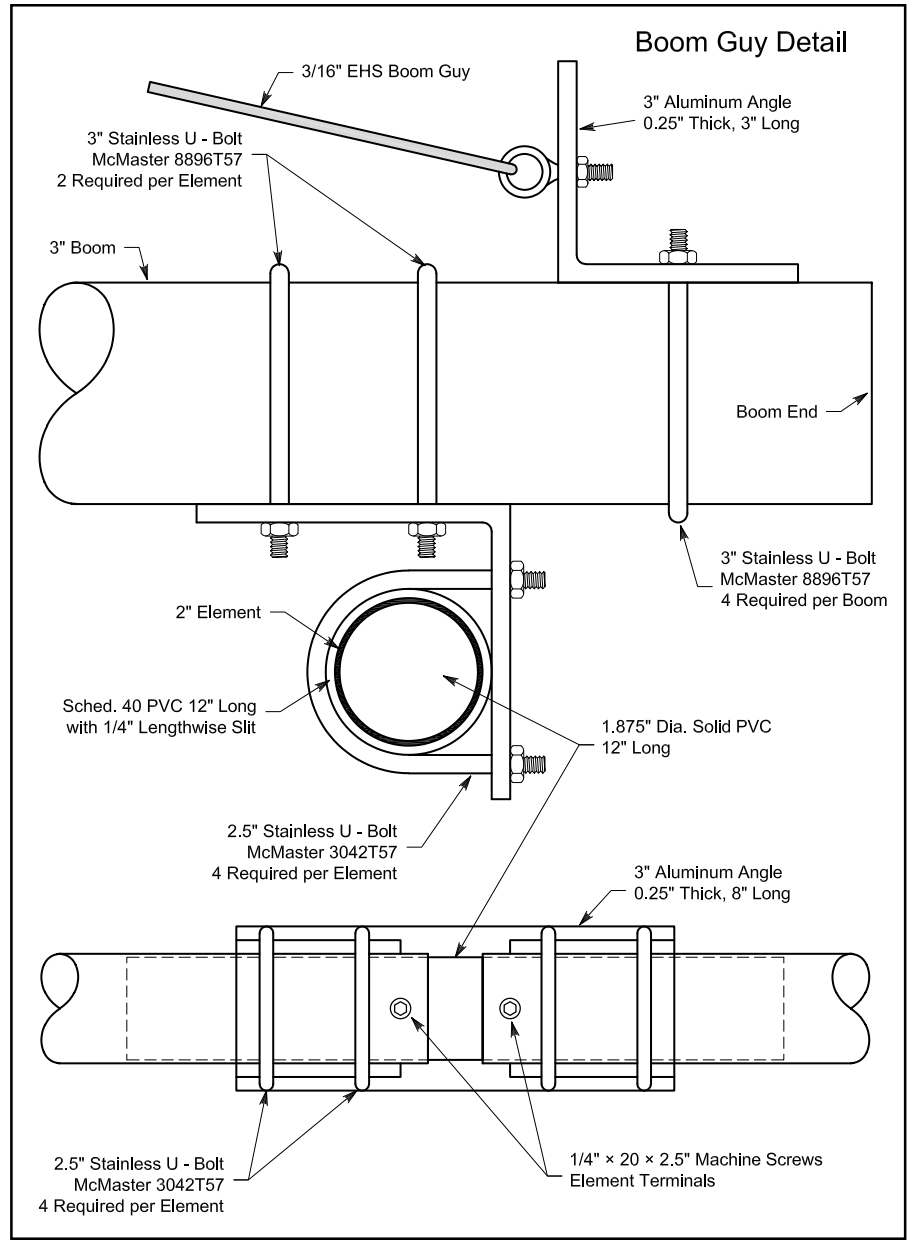


Figure 5—Construction details for the 10 MHz element.

The characteristic impedance of the element phasing transmission line is 325 Ω. This value was chosen for best SWR performance as shown in Figure 8. The measured results agree closely with this graph. I made this using 14-gauge solid copper wire with a spacing of $^{1}/_{2}$ inch. I made small insulating standoffs from a plastic block and supported the wires every 18 inches along the boom. Keep the wire spacing close to the desired $^{1}/_{2}$-inch spacing and support the phasing line an inch from the boom. To make this phasing line easier to fabricate, consider using commercially available high power 300 Ω twin-lead.[9] Don't use the common TV variety or 450 Ω open-wire line. Remember to connect each element out of phase with the next element by flipping the twin-lead one-half turn between elements. Keep the phasing line spaced an inch from the boom.

The feed-point balun is made using 11 bifilar turns of 14 gauge Teflon-covered wire wound on a relatively low permeability F240-67 ferrite core that fits inside a PVC pipe for weather resistance.[10] Commercial alternatives are also available.[11]

The two antennas were mounted on a

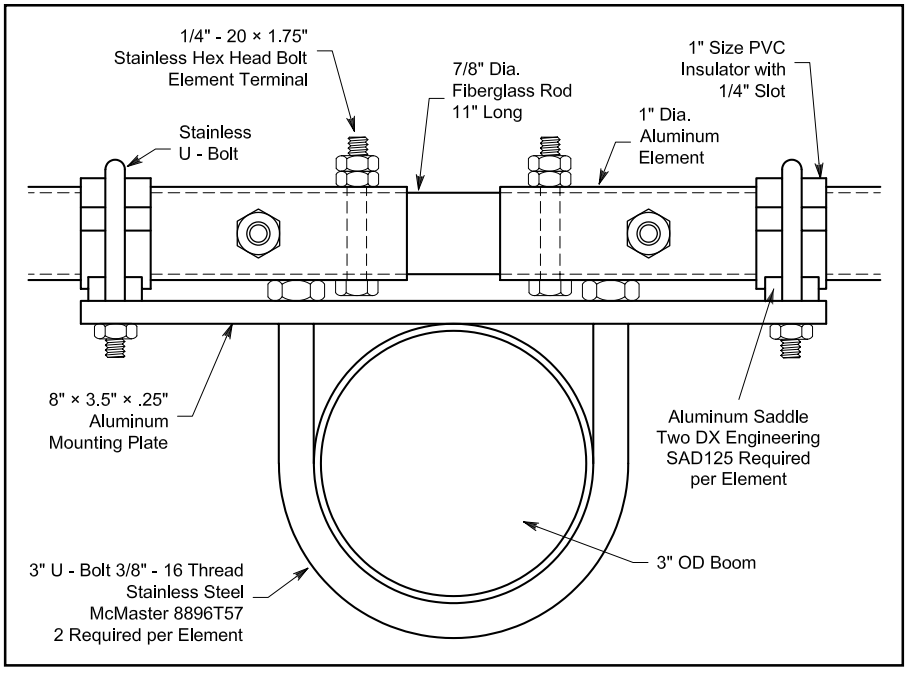


Figure 6—Construction details for the 14-30 MHz elements.

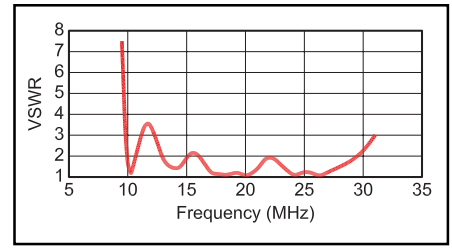


Figure 8—This graph shows the calculated SWR from 10-30 MHz.

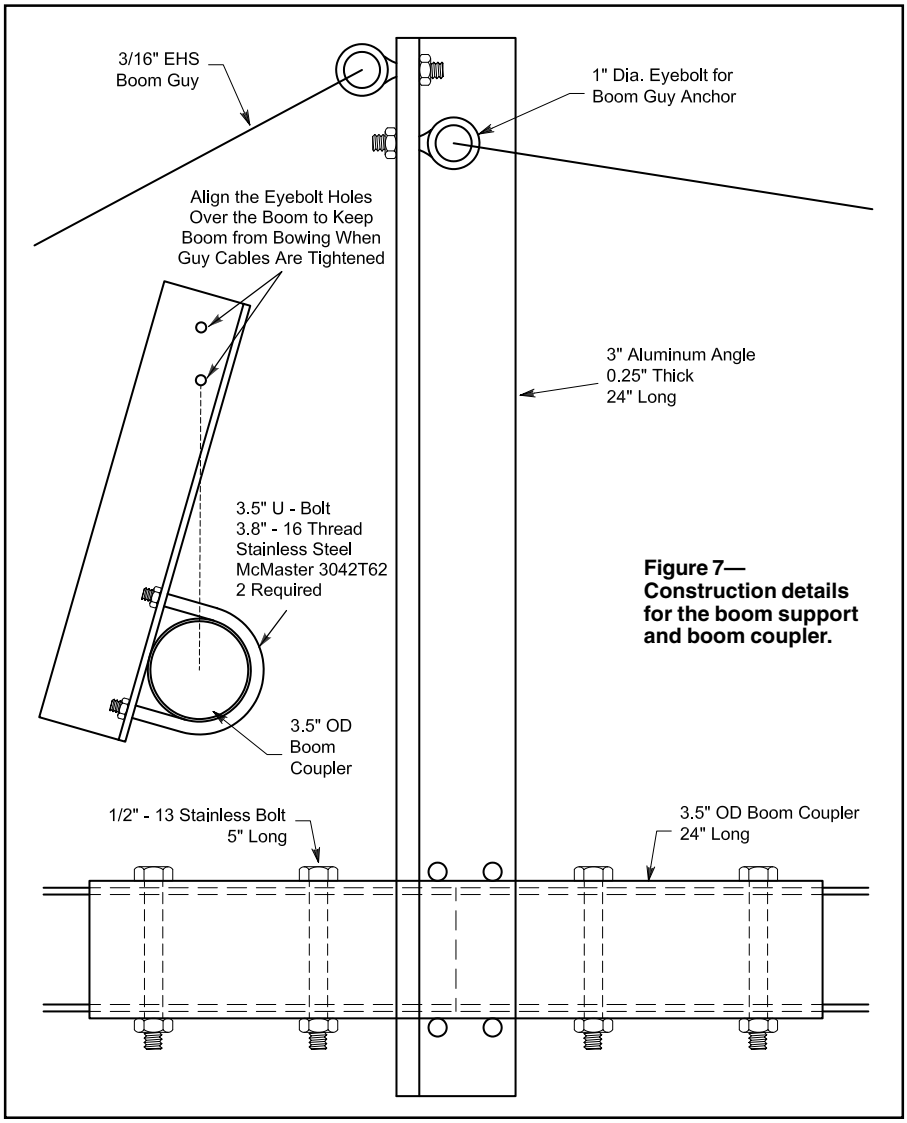


Figure 7—Construction details for the boom support and boom coupler.

100-foot tall RTS rotating tower made of Rohn 55 tower sections. On 14-30 MHz I have a stacked array of the two antennas, with the 48-foot boom antenna at a height of 88 feet, and the 36-foot boom antenna at a height of 44 feet, for a separation of 44 feet. On 30 meters, I have a single gain antenna at a height of 88 feet. Tower guy wire placement prevented the stacking of two identical larger antennas. The boom-to-tower mount is a flat aluminum plate $24 \times 12 \times 0.25$ inches thick. The antenna mounts to it using four 3.5-inch U bolts that fit around the boom section coupling. The plate is secured to the tower using U bolts that fit the Rohn 55 tower legs. A similar plate could be used to make a mount for a single vertical mast.[12] A homemade bottom-both-upper antenna switch using vacuum relays and a stack-matching network allows flexible antenna switching.

Material Sources

The best sources I have found for the aluminum tubing elements are the advertisers in *QST*. They were cheaper than a local supplier, and they had all sizes necessary for these antennas. I have had good luck using the 6063 alloy. The 6-foot sizes required for these antennas may be shipped by UPS. I found the long aluminum pipes for the boom at a local supplier. It costs a lot to ship this material, so look for it locally first. The stainless U-bolt hardware may be hard to find locally. Specific U bolts used in these antennas are identified on the mechanical drawings with the supplier's part number. Other sources may be helpful in supplying these and other necessary parts.

Conclusion

I'm happy with these antennas since they meet my design objective. The performance of the large antenna on 30-meters has been gratifying. Prior antennas on this band were dipoles or verticals. Going to a gain antenna with a good F/B ratio was a pleasant change.

These antennas have been in service since 1995. Seven years later, no prob-

lems have developed, due in part to the mechanical design method and conservative construction. No maintenance of any kind has been necessary. Electrical performance has been very good, and the flexible stack arrangement and independent antenna selection have proven to be useful.

Notes

[1]Brian Beezley, K6STI, 3532 Linda Vista, San Marcos, CA 92069; **k6sti@n2.net**. (No longer sold.)

[2]Nittany Scientific, 1733 West 12600 South, Suite 420, Riverton, UT 84065, 801-446-1426; **sales@nittany-scientific.com**; **www.nittany-scientific.com**.

[3]L.B. Cebik, W4RNL, "Notes on Standard Design LPDAs for 3-30 MHz PT2: 164-Foot Boom Designs" *QEX*, Jul/Aug 2000, p 17.

[4]David B. Leeson, W6QHS, *Physical Design of Yagi Antennas*, ARRL, 1992. The software is available for download at **www.arrl.org/notes**. The software is also available on the author's Web site, **www.realhamradio.com**.

[5]Leeson, Figure 2-3, p 2-8. A registered PE who also used this local wind speed number independently evaluated my tower installation. Look up your county's minimum wind speed rating with Champion Radio's wind speed locator at **204.27.195.206/champion/windspeed.html**.

[6]R. Dean Straw, Ed., *The ARRL Antenna Book*, 19th Ed., ARRL, 2000, p 2-17.

[7]Aluminum tubing, guy wire, guy grips, and turnbuckles are available from Texas Towers, **www.texastowers.com**.

[8]A suitable commercial choice is Harbach stainless saddle clamps available from DX Engineering, **www.dxengineering.com**. See their Hints and Ideas page for SAD 125 information on using these clamps as insulated supports. Specific U-bolt part numbers are those of McMaster-Carr Supply Co, **www.mcmaster.com**. They also have the PVC rod used for two of the element insulators, closed end aluminum pop rivets, solid fiberglass and UHMW rod, eyebolts, tubing plastic end caps, and general stainless and galvanized hardware. Two-inch diameter, solid UHMW rods are sold by McMaster-Carr Supply in 1-foot increments as their part number 8701K49. Another source for the solid fiberglass rod is Max Gain Systems, **www.mgs4u.com**.

[9]High-power 300 W #18 ladder line (#562) is available from The RF Connection **www.therfc.com**. The conductors are 19 strands of Cu-clad with poly jacket.

[10]Jerry Sevick, W2FMI, *Transmission Line Transformers*, ARRL, 1987, section 8-3.

[11]An assembled high power 4:1 balun is available from Amidon Corp, **www.amidon-inductive.com/associates_prod_baluns.htm** as part number W2FMI 4:1-HBHT200. W4COX also offers a suitable balun; part #C-4, 5K, **w4cox.hypermart.net**.

[12]*The ARRL Antenna Book* (see Note 6) chapter on construction and antenna materials contains alternative construction methods and many helpful hints on other related topics. Aluminum tubing specifications, element assembly, element clamping techniques, tips on antenna longevity and more are discussed in detail.

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NEW BOOKS

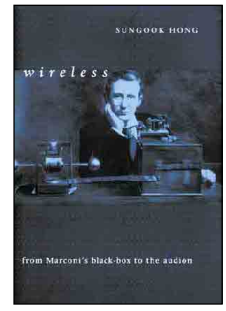
WIRELESS: FROM MARCONI'S BLACK-BOX TO THE AUDION

By Sungook Hong

Published by the MIT Press, Massachusetts Institute of Technology, Cambridge Massachusetts 02142; **mitpress.mit.edu**. *First edition, 2001, hardcover, 6×9 inches with black and white photographs and illustrations. ISBN 0-262-08298-5, 272 pp. $34.95*

Reviewed by Gil McElroy, VE3PKD

◊ Guglielmo Marconi is one of those figures in the early history of wireless and radio communications who have never seemed to shake off controversy. Though generally accepted as valid, his claim to have successfully made the first transatlantic wireless transmission on December 12, 1901 is still subject to debate by some scholars. And he has been accused by many over the decades of having pilfered ideas and the inventions of others. Marconi has had his ups and downs, and in *Wireless: From Marconi's Black-Box to the Audion*, University of Toronto professor Sungook Hong seeks to reclaim the high ground for this seminal figure. Along the way, he offers fascinating insights into the historical context for such inventions as the vacuum tube, and why Marconi's first transatlantic transmission was the three dits of the Morse code letter "S."



Marconi's initial experiments with wireless were conducted at his family's home in Italy, but in early 1896, he moved to England (his mother's homeland) to continue his work in earnest. While he impressed some of the leading British wireless researchers, the 22 year-old Italian upstart succeeded in ruffling the feathers of others. Foremost amongst those was Oliver Lodge, a pioneer in British wireless circles who would proclaim technological precedence over Marconi. Hong delves in detail into Lodge's claim of having successfully demonstrated a wireless telegraphy system before Marconi, arguing that a combination of wounded professional pride and nationalistic fervor led Lodge and his apologists to assert themselves against Marconi and build a claim upon the flimsiest of evidence.

Perhaps the most interesting aspect of *Wireless* is Hong's examination of the professional relationship between Marconi and John Ambrose Fleming, inventor of the vacuum tube. In 1899, well before that achievement, Fleming was formally involved with Marconi as a scientific advisor, acting as an important intermediary between the self-taught inventor and the British scientific establishment, and beginning work on developing the technology that would be needed to make a transatlantic attempt. (The Morse Code letter "S" was chosen for the attempt because of a defect in the transmitter; when keyed, it was unable to produce dashes without generating a dangerous arc across the spark gap apparatus.) A professor of Electrical Engineering at University College in London, Fleming brought to Marconi's work a solid foundation in electrical theory and practice that would prove invaluable. Fleming was aware of the importance of his contributions, and was disappointed by the lack of recognition afforded them, especially following the success of the transatlantic transmission for which he was given virtually no credit.

The strain between Marconi and Fleming reached the breaking point during what came to be known as the "Maskelyne Affair." On June 4, 1903, Fleming delivered a public lecture in London on Marconi's newly developed system of tuning as a means of avoiding interference between separate wireless signals. To demonstrate its importance, a series of prearranged transmissions were to be received at the lecture site. To Fleming's anger and great embarrassment, they were deliberately interfered with by another station that transmitted the word "rats" and an unflattering limerick about Marconi. The culprit was one Nevil Maskelyne, a self-taught wireless experimenter who had become a major critic of Marconi's after an unsuccessful attempt at devising a wireless system for the insurance company Lloyd's of London (which then turned to Marconi to provide them with a proven communications system). Fleming's credibility was damaged by the event, and his value to Marconi diminished. When his contract expired several months later, it was not renewed.

It was Fleming's desire to rehabilitate himself in Marconi's eyes and reestablish a working professional relationship that, in part, led to his invention of a high-frequency ac rectifier—the vacuum tube—a year later. It succeeded, and in 1905 he rejoined the Marconi Company in his old position of scientific advisor. Though Fleming's claim to the invention is not in question, he saw the device as little more than a useful laboratory tool. Hong asserts Marconi's visionary preeminence by stating that it was he, not Fleming, who "transformed the thermionic valve into a sensitive detector for wireless telegraphy." In doing so, he transformed wireless.

Wireless is marred only by minor, albeit annoying, errors. A photograph of Marconi posing with the wireless apparatus he brought to England from Italy is misdated as having been taken in 1869 (five years before his actual birth) when in fact it was the year of his move to England, and radio pioneer (and co-inventor of coaxial cable) Lloyd Espenschied's name is consistently misspelled. However, Sungook Hong's cogent arguments for reasserting Marconi's right to a place at the apex of the wireless pantheon makes *Wireless: From Marconi's Black-Box to the Audion* a valuable addition to the growing body of literature devoted to achievements of this complex and controversial figure.

By Ian Poole, G3YWX

Understanding Solar Indices

When someone tells you that the flux is up to 200 and the K is 3, do you know what they are talking about? You will after you read this article!

NASA

An ultra-close view of a sunspot taken by the NSO Sacramento Peak Vacuum Tower Telescope.

One of the key skills for any HF DXer is to know how to judge what band conditions may be like. Conditions may be excellent one day with many stations audible from all over the world, but a few days later it may be that only a few stations are audible. To be able to gain an idea about conditions, three main indices are used: solar flux, and the Ap and Kp indices. A good working knowledge of what these numbers represent and what they mean is an advantage even for the ham with most well-equipped station.

Synopsis

The ionosphere can be visualized as containing a number of layers. In fact, there is ionization throughout the ionosphere; the layers are really peaks in the levels of ionization, as we can see from Figure 1. The ionosphere affects radio waves because according to the level of ionization, the signals are refracted, i.e., bent away from traveling in a straight line. Often the level of ionization is sufficiently high to enable the signals to be returned to Earth.

Conditions are continually varying on the HF bands as a result of the varying levels of ionization in the ionosphere. The radiation coming chiefly from the Sun hits the upper ionosphere, causing molecules to ionize, creating positive ions and free electrons. A state of "dynamic equilibrium" exists. The free electrons that affect radio waves recombine with the positive ions to reform molecules. When levels of ionization are higher (when there are more free electrons) the ionosphere is more capable of bending back radio signals to Earth. Also, high levels of ionization mean high maximum usable frequencies and better HF conditions.

The level of ionization at any given point above the Earth is dependent upon a number of factors including the time of day, the season and most important of all the sunspot cycle. It is found that the level of radiation from the Sun increases as the number of sunspots increases. Accordingly, the level of radiation received from the Sun peaks around the top of the sunspot cycle. In fact, it is the bright area just around the sunspot called the *plage* that emits most of the extra radiation.

It is not all good news, though. At the sunspot peak the level of geomagnetic activity also rises. This happens as the Sun emits vast quantities of particles. There is normally a steady flow of these

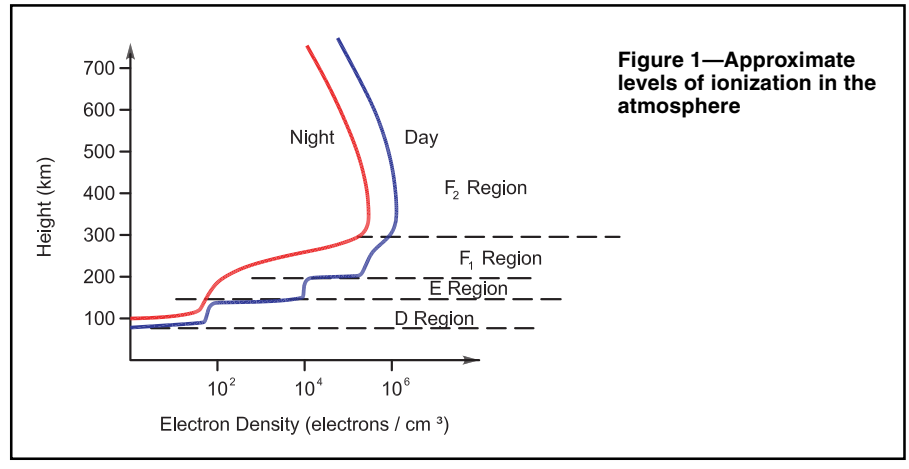
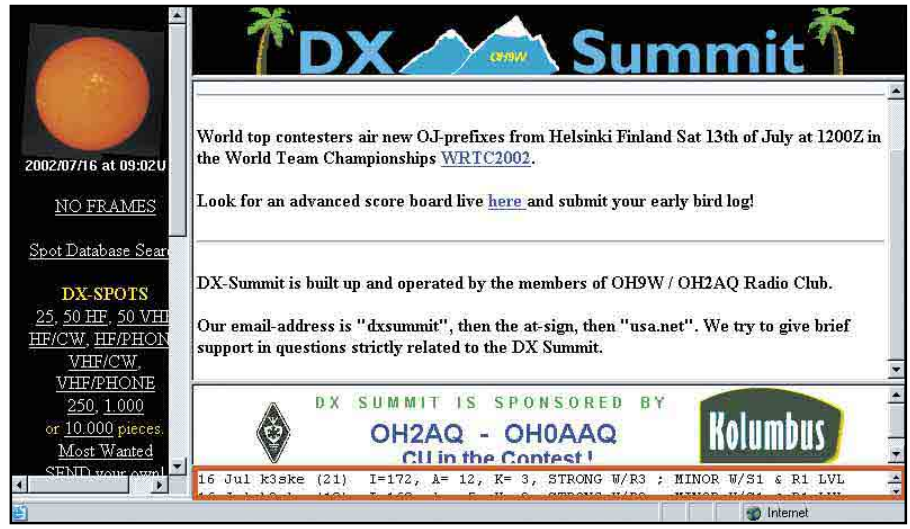


Figure 1—Approximate levels of ionization in the atmosphere

particles, but at times such as when there are solar flares the level of these emissions greatly increases. When they hit the Earth's magnetic field it becomes disturbed, creating a magnetic storm that can be detected at points around the globe. Another effect is that the ionosphere itself can be disturbed, giving rise to an ionospheric storm. This will degrade HF communications and when particularly bad it can lead to a total HF blackout. For a more in-depth recap on radio propagation, get on the Web and go to **www.radio-electronics.com/info/propagation/radio_prop_list.html**, or just visit **www.radio-electronics.com** and navigate from there.



The DX Summit Webcluster at oh2aq.kolumbus.com/dxs/ provides solar activity reports in the frame near the bottom of the window (framed in red).

Solar Flux

A measure known as the *solar flux* is used as the basic indicator of solar activity, and to determine the level or radiation being received from the Sun. The solar flux is measured in solar flux units (SFU) and is the amount of radio noise or flux that is emitted at a frequency of 2800 MHz (10.7 cm). The Penticton Radio Observatory in British Columbia, Canada reports this measure daily. The solar flux is closely related to the amount of ionization and hence the electron concentration in the F2 region. As a result it gives a very good indication of conditions for long-distance communication.

The figure for the solar flux can vary from as low as 50 or so to as high as 300. Low values indicate that the maximum useable frequency will be low and overall conditions will not be very good, particularly on the higher HF bands. Conversely, high values generally indicate there is sufficient ionization to support long-distance communication at higher-than-normal frequencies. However, remember that it takes a few days of high values for conditions to improve. Typically values in excess of 200 will be measured during the peak of a sunspot cycle with high values of up to 300 being experienced for shorter periods.

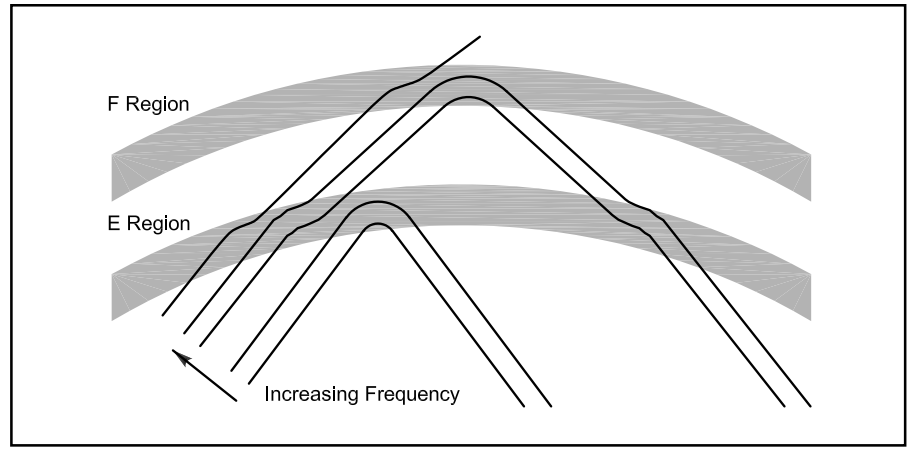


Figure 2—Signals traveling through the ionosphere will be refracted and may be returned to Earth.

Geomagnetic Activity

There are two indices that are used to determine the level of geomagnetic activity: the *A index* and the *K index*. These give indications of the severity of the magnetic fluctuations and hence the disturbance to the ionosphere.

The first of the two indices used to measure geomagnetic activity is the K index. Each magnetic observatory calibrates its magnetometer so that its K index describes the same level of magnetic disturbance, no matter whether the observatory is located in the auroral regions or at the Earth's equator. At three hourly intervals starting at 0000 UTC each day, the maximum deviations from the quiet day curve at a particular observatory are determined and the largest value is selected. This value is then manipulated mathematically and the K index is calculated for that location.

The K index is a "quasi logarithmic" number and as such cannot be averaged to give a longer-term view of the state of the Earth's magnetic field. Thus was born the A index, a daily average. At each 3-hour increment the K index at an observatory is converted to an equivalent "a" index using Table 1, and the 8 a-index values are averaged to produce the A index for that day. It can vary up to values around 100. During very severe geomagnetic storms it can reach values of up to 200 and very occasionally more. The A-index reading varies from one observatory to the next, since magnetic disturbances can be local. To overcome this, the indices are averaged over the globe to provide the Ap index, the planetary value.

Similarly, the Kp index is the planetary average of all the K indices at observatories around the globe. Values between 0 and 1 represent quiet magnetic conditions and this would indicate good HF band conditions, subject to a sufficient level of solar flux. Values between 2 and 4 indicate unsettled or even active magnetic conditions, and are likely to be reflected in a degradation of HF conditions. Moving up the scale, 5 represents a minor storm, 6 a larger storm and 7 through 9 represents a very major storm that would result in a blackout of HF communications.

Although geomagnetic and ionospheric storms are interrelated, it is worth noting that they are different. A geomagnetic storm is a disturbance of the Earth's magnetic field and an ionospheric storm is a disturbance of the ionosphere.

Table 1
The General Relationship between A and K Values

A	*K*	*Comments*
0	0	Quiet
2	1	Quiet
3	1	Quiet
4	1	Quiet to unsettled
7	2	Unsettled
15	3	Active
27	4	Active
48	5	Minor storm
80	6	Major storm
132	7	Severe storm
208	8	Very major storm
400	9	Very major storm

Glossary of Solar Index Terms

ap index: A measure of the general level of geomagnetic activity over the globe for a given day. A mean, 3-hourly "equivalent amplitude" of magnetic activity based on K index data from 11 Northern and 2 Southern Hemisphere magnetic observatories between the geomagnetic latitudes of 46 and 63 degrees.

Ap index: A daily index determined from eight ap index values.

Geomagnetic activity: Natural variations in the geomagnetic field classified into quiet, unsettled, active and geomagnetic storm levels.

Geomagnetic storm: A worldwide disturbance of the Earth's magnetic field, distinct from regular diurnal variations. A storm occurs when the Ap > 29, a minor storm when 29 < Ap < 50, a major storm when 50 <= Ap < 100 and a severe storm when Ap >= 100.

K index—A quasi-logarithmic local index of the 3-hourly range in magnetic activity relative to an assumed quiet-day curve for a single geomagnetic observatory site. First introduced by J. Bartels in 1938, it consists of a single-digit 0 through 9 for each 3-hour interval of the universal time day (UT).

Kp index—The planetary 3-hour-range index Kp is the mean standardized K-index from 13 geomagnetic observatories between 44 degrees and 60 degrees northern or southern geomagnetic latitude. The scale is 0 to 9 expressed in thirds of a unit; e.g., 5– is $4^2/_3$, 5 is 5 and 5+ is $5^1/_3$. This planetary index is designed to measure solar particle radiation by its magnetic effects. The 3-hourly ap (equivalent range) index is derived from the Kp index.

Note: Kp, Ap and other indices can be downloaded via FTP at **ftp.ngdc.noaa.gov/STP/GEOMAGNETIC_DATA/INDICES/KP_AP/**. Indices can also be downloaded from **www.sec.noaa.gov/Data/alldata.html**.

From "A Glossary of Space Weather Terms" (**www.irfl.lu.se/HeliosHome/spacew9.html**) and the National Geophysical Data Center Web site (**www.ngdc.noaa.gov/stp/GEOMAG/kp_ap.html**).

Interpreting the Figures

The easiest way to use these figures is to enter them into a propagation prediction program. This will provide the most accurate prediction of what might be happening. These programs will take into account factors such as signal paths because some will cross the poles and they will be far more affected by storms than will those across the equator.

If you don't own propagation software, it is still possible to gain a good insight into what the figures mean purely by assessing them mentally. Obviously, high levels of solar flux are good news. Generally the higher the flux the better the conditions will be for the higher HF frequencies and even 6 meters. However, the levels need to be maintained for some days. In this way the overall level of ionization in the F2 layer will build up. Typically values of 150 and more will ensure good HF band conditions, although levels of 200 and more will ensure they are at their peak. In this way the maximum usable frequencies will rise, thereby providing good conditions.

The level of geomagnetic activity has an adverse affect, depressing the maximum usable frequencies. The higher the level of activity as reflected in higher Ap and Kp indices, the greater the depression of the MUFs. The actual amount of depression will depend not only on the severity of the storm, but also its duration.

Summary

As a broad rule of thumb, check out the levels of solar flux and the K index. These figures can be found at a variety of places, including on the Internet at a variety of sites including **www.eham.net**, **www.qrz.com/**, DX Summit at **oh2aq.kolumbus.com/dxs/** and in the K7VVV Solar Updates that are posted regularly on *ARRLWeb* at **www.arrl.org**. If you connect by radio or telnet to a DX spotting network, you can obtain this information by sending the command SHOW/WWV. Please note that the A and K indices broadcast by WWV represent the "mid-latitude" values for Boulder, Colorado, and may not be representative of conditions around the whole world.

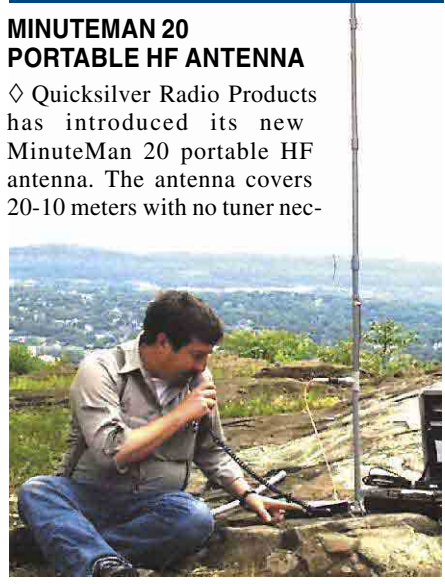
For best conditions, the solar flux should remain above about 150 for a few days with the K index below 2. When these conditions have been met, check out the bands and expect some good DX to be about!

Ian Poole has been licensed as a radio ham for over 30 years and has been active on many bands favoring HF SSB and CW. He is also author of several books including Your Guide to Propagation *(and* VHF/UHF Antennas*) that is available through the ARRL bookstore. You can contact Ian at 5 Meadway, Staines, TW18 2PW, United Kingdom;* **ian_poole@lineone.net**.

NEW PRODUCTS

MINUTEMAN 20 PORTABLE HF ANTENNA

◊ Quicksilver Radio Products has introduced its new MinuteMan 20 portable HF antenna. The antenna covers 20-10 meters with no tuner necessary in most cases. According to company owner John Bee, N1GNV, "On 15, 12, and 10 it's a full quarter-wavelength vertical. On 17 and 20 we use a small amount of high-efficiency coil loading. We designed this antenna to be efficient, lightweight and affordable." While the MinuteMan is primarily intended for portable operation, it's also a solution for hams facing antenna restrictions of any type.



The antenna comes preassembled and needs no tools or other supports for setup. With no piece longer than 17 inches, the MinuteMan fits easily into a briefcase, backpack, airplane carry-on, etc. It weighs just 5 pounds and will handle 100 W of power (although the photo shows N1GNV operating QRP).

Contact Quicksilver Radio Products, PO Box 146, Williston Park, NY 11596; **johnbee@qsradio.com**; **www.qsradio.com**. List price is $130 plus $10 shipping.

Next New Products

By Dave Patton, NT1N

The 2002 Second Meeting of the Board of Directors

During a hot New England weekend touched with both beautiful weather and violent thunderstorms, the ARRL Board met for its second meeting of 2002. The atmosphere inside the meeting room seemed to follow the weather outside although certainly the "violent weather" inside wasn't quite as violent as that outside!

On Thursday evening, July 18, at the pre-Board meeting dinner, ARRL Chief Development Officer Mary Hobart, K1MMH, announced that ARRL had been selected to receive a Corporation for National and Community Service grant to expand emergency communications training for amateurs. The three-year grant, funded in its first year at $181,900, will renew in years two and three depending on performance and fund availability. It should provide funds to train 5200 hams through an expansion of ARRL's Level I Amateur Radio Emergency Communications Course! Earlier this year, United Technologies Corporation (UTC), headquartered in Connecticut, gave the ARRL a large grant to expand ARRL's emergency communications training in Connecticut. This pilot project is well underway, and UTC has expressed interest in a national program. These grants are the latest successes in the ARRL's Certification and Continuing Education Program, which the Board created in January 2000.

The tragedy of September 11 seemingly mobilized amateurs like never before—and the public as well as government agencies are taking notice. In addition to studying the feasibility of creating a September operating event to demonstrate Amateur Radio to government, another result of the increased attention to emergency preparedness is the Board's desire to develop new tools and public relations materials to help explain Amateur Radio to our peers. More than once during this Board meeting held July 19-20 in Windsor, Connecticut, attendees stated their desire to have new handouts and brochures to leave with congressmen, government employees, media and the public. The Board approved the creation of such materials. Great Lakes Division Director George Race, WB8BGY, showed the Board an example of what could be done to improve public relations through a pocket-sized compact disc that contains a wealth of information about Amateur Radio. The technology of today has given us powerful tools to supplement the traditional world of paper brochures.

Development at ARRL

In January 2001, the Board created the position of Chief Development Officer to concentrate on new funding opportunities for ARRL programs. We are already see-

ARRL President Haynie presents Radio Amateurs of Canada President Bill Gillis, VE1WG, with ARRL apparel. Earlier in the meeting President Haynie received RAC clothing from President Gillis.

Vice President Kay Craigie, WT3P, received her DXCC Challenge Award from CEO Sumner, K1ZZ, at the Board Meeting.

Summary of Major Board Actions

The Minutes of the Second Meeting of the Board, *Moved and Seconded* are published on *ARRLWeb* at **www.arrl.org/announce/board-0207/**. If you do not have Internet access you may request a printed copy of the Minutes by writing to: ARRL Secretary, 225 Main St, Newington, CT 06111.

Minute	*Purpose*	*Action*
Organizational		
29	**ARRL Endowment** *Provides a true endowment composed of major ARRL mission-related funds for those donors who prefer this form of giving.*	**Approved**
30	**Planned Giving Program** *Creates a program for donors to structure gifts to ARRL in their estate plans and enjoy tax and other financial advantages.*	**Approved**
31	**Premium Membership Program** *Adds new, tiered, annual memberships with additional benefits and rewards.*	**Approved**
33	**Enterprise Software System Enhancement** *Authorizes funding to update Headquarters system software to handle premium memberships and other new programs.*	**Approved**
34	**Section News Moved to ARRL Web Site** *Section News Reports to be published on ARRL Web site where there are no space, content or timeliness restrictions. Begins January 2003.*	**Approved**
35	**Contest Line Scores Moved to ARRL Web Site** *Contest line scores to be published on ARRL Web site where greater depth of reporting, statistical analysis, and unlimited photographs take contest reports to a new level. Field Day results will continue to appear in* QST *in their entirety. Begins January 2003.*	**Approved**
50	**ARRL Web Site Status included in By-Laws** *Makes the ARRL Web site official. The Board modified the ARRL By-Laws to require maintenance of a Web site by the League, with its policy to be determined by the Board of Directors.*	**Approved**
51	**By-Law 33** *Officially removes the requirement to publish the Board's meeting Minutes in* QST.	**Amended**
52	**Standing Committees and Executive Committee** *The Executive Committee, in consultation with the Standing Committees, will evaluate the composition, duties, and viability of each of ARRL's committees.*	**EC Study**
54	**Affirmative Vote for Cameroon's AR Association's entry into IARU** *ARRL will vote in favor of Cameroon's entry into IARU.*	**Approved**
55	**Vote for Macau's AR Association's entry into IARU** *ARRL will vote in favor of Macau's entry into IARU.*	**Approved**
56	**902 MHz through 24 GHz bands** *With the United States Congress now reviewing spectrum management policy, it is vitally important for ARRL to evaluate its spectrum use policies in these upper UHF bands so as to develop options for better protecting and efficiently deploying Amateur Radio.*	**TRO Study**
57	**Multi-Media Materials Development** *ARRL will develop new materials for use in public relations and external communications in order to take advantage of new technology and ideas.*	**Approved**
58	**September Emergency Preparedness Operating Event** *The Volunteer Resources Committee will investigate a September operating event that would emphasize Amateur Radio's ability to assist government agencies and relief organizations such as it did during the September 11 tragedy.*	**VRC Study**
59	**ARRL Science Fair Project** *The Volunteer Resources Committee will study how best to integrate an Amateur Radio science fair project into the Amateur Radio Education and Technology Program.*	**VRC Study**
62	**Ad-Hoc Planning Committee** *The President is authorized to appoint members to a new ad-hoc committee designed to engage in short and long term planning for ARRL.*	**Authorized**
63	**Ad-Hoc Digital Modes Committee** *The President is authorized to appoint members to a new ad-hoc committee that will study the new HF data modes in the Amateur Service. The Committee is to develop recommendations for introduction of voice-bandwidth data modes and advise the Board on amateur-internet HF linking and HF automatic control.*	**Authorized**
Regulatory		
64	**Petition FCC for Band Segmentation Based on Signal Bandwidth** *At the next practical opportunity, the ARRL shall petition the FCC to revise Part 97 to regulate subbands by signal bandwidth instead of by mode.*	**Authorized**

Awards Conveyed

October *QST* will contain the full stories behind these award winners.

Sherri Brower, W4STB
2002 Philip J. McGan Silver Antenna Award

William Dumond, W7QT
2001 ARRL Professional Educator of the Year

Richard W. Crockett, W0PC
2001 Herb S. Brier Instructor of the Year Award

Thomas Henderson, WD5AGO
2001 ARRL Professional Instructor of the Year Award

John Stephensen, KD6OZH
2001 Doug DeMaw, W1FB, Technical Excellence Award

Tamara M. Stuart, KF6RIV
2001 ARRL Hiram Percy Maxim Award

Keith Lamonica, W7DXX
ARRL Technical Innovation Award

Bob Arnold, N2JEU
ARRL Technical Innovation Award

Stan Schretter, W4MQ
ARRL Technical Innovation Award

ing some results from this initiative. In addition to the grants noted above, the Board heard about the generosity of League members in recent fundraising campaigns to support defense of frequencies, the ARRL Education and Technology Program, and a W1AW endowment. At this meeting, the Board officially approved a wide-ranging ARRL Endowment program, a planned giving program, and a premium membership program. Each program provides a different vehicle for people to help ARRL accomplish its objectives now and into the future.

200,000 Members and Beyond

When President Haynie took over the reins of the Presidency, he related his belief that ARRL should have more than 200,000 members. "I want everyone to understand how important it is that they support their national society, and I want every US Amateur Radio operator to want to be a member of the ARRL," he stated in his remarks recapping the last six months of his activities. Unfortunately, over the last couple of years, the ARRL has endured a small dues increase, a suffering national, and indeed worldwide, economy with higher rates of joblessness than expected. All these factors help to suppress membership, but each of the ARRL officers touched on this important subject and offered suggestions for growing the membership. So important now is the issue of increasing membership numbers, that President Haynie led a

lively two-hour brainstorming session on membership issues that was carved out of a meeting full of critical issues.

As more and more competition for our spectrum surfaces, it is more important than ever for ARRL to earn the support of US amateurs in protecting the spectrum that we all enjoy. Relations with the FCC are excellent—an important climate for us to be heard. Riley Hollingsworth, K4ZDH, FCC's Enforcement Bureau Officer in charge of Amateur Enforcement, spoke to the Board during an informal session on Thursday. Riley spoke highly of the League's activities and praised ARRL for its work to bring the FCC back onto the scene of Amateur Enforcement after many years of neglect. While the amateur bands are still in need of work, he says that he expects them to achieve "maintenance status" in the next year or two indicating the continued good work of the national association.

The ARRL Web Site

The success of the ARRL's Web site is hard to debate. The number of daily, weekly, and monthly visitors increases constantly as the content and features improve at the same rate. At the Annual Board Meeting last January, the Board discussed moving Section News and contest line scores from *QST* to the Web site. They chose to hold off on such action for at least six months with the goal of showing the membership what could be accomplished with these subjects on the Web site first. And indeed, the Web development staff created fabulous tools for Section News and contest reports that by and large were well received by the membership.

With plans to revisit the subject at this meeting, the Board decided that it was time to complete the move of these items to the Web beginning with the January 2003 issue of *QST*. These changes will allow the editorial staff to use the space in the magazine for more articles of a wide nature to better portray today's Amateur Radio Service. Contest reports will be written in a more in-depth fashion to better show off the fun and achievements of contesters. The extra space from *Section News* will allow for more coverage of public service activities and the ARRL Field Organization and its volunteers. Those members who are unable to use the Internet to see their Section's reports can request them via mail service.

The growing importance of the ARRL Web site was recognized by the Board and thus will be written into the organization's By-Laws—in effect raising the status of the Web site to that of *QST—The Official Journal of the ARRL*. Rest assured: We will continue to publish the great magazine that you have come to know and love. And there will also be an *Official Web Site of the ARRL* to fully complement *QST*.

Other Matters

The next six months will see several studies performed by ARRL committees and staff, including the Technical Relations Office, which will look at the spectrum management policy of our amateur bands between 902 MHz and 24 GHz. The Volunteer Resources Committee will study September special operating activities and the possibilities for an ARRL Science Fair project. The Executive Committee will study the structure and viability of each of ARRL's standing committees and the Executive Committee itself. And President Haynie will soon be appointing members to ad-hoc committees that will study planning the ARRL's future and the world of digital operating modes in today's highly used Amateur Radio spectrum. Many of these studies will be the subject of reports at the January 2003 Annual Meeting.

Until then, stay tuned, be alert and ready as always to perform the public service required of our licenses, and for good measure see if you can help us reach our goal of 200,000 members by reminding your friends of how important is the mission of the ARRL. QST

Great Lakes Division Leadership Changes

In an unexpected move halfway through the Board meeting, George Race, WB8BGY, of Albion, Michigan, stepped down as Great Lakes Director. Race, 66, had served on the Board for 12 years. Prior to that, he'd held numerous other field organization positions over the years, including several terms as Michigan Section Manager.

Race said that while the vote to shift "Section News" to the Web did play a small part in his decision to resign, it was not the primary factor and he harbors "no bad feelings" that the vote went the other way. "My wife Barb and I just decided we needed some time for ourselves," said Race, who resigned in a letter to Sumner, the Secretary to the Board. "There's life beyond the League." Legendary within the ARRL field organization for his travels around the Great Lakes Division, Race said he's spent some 45,000 to 50,000 miles a year on the road on the League's behalf and "wore out three cars."

"I've enjoyed so much working with the membership and with the Board," said Race, who is the technical services supervisor at Albion College, where he's worked for nearly 35 years.

Great Lakes Vice Director Gary Johnston, KI4LA, of Edgewood, Kentucky, was declared the new director. ARRL President Jim Haynie, W5JBP, has appointed Michigan Section Manager Dick Mondro, W8FQT, of Dearborn Heights, Michigan, to be the new Great Lakes Vice Director. The Great Lakes Director's and Vice Director's positions are up for re-election in the fall.

NEW PRODUCTS

FLUIDMOTION INTRODUCES STEPPIR ADJUSTABLE VERTICAL

◊ Fluidmotion has introduced a new quarter-wave vertical antenna in its SteppIR line. The 32-foot vertical is remotely adjustable in length and provides coverage from 40 through 10 meters. The SteppIR vertical is end fed, and claims to have SWR of no more than 1.3:1 on every frequency.

The antenna is operated through an independent microprocessor based controller, and an optional transceiver interface is available that allows the antenna to automatically adjust to wherever the user tunes the radio.

Price: $479. Control cable and radials not included. For additional information, contact Fluidmotion Antenna Systems, 14135 233rd Pl, Issaquah, WA 98027; tel 425-456-0200; fax 425-391-6031; **SteppIRYagi@aol.com**; **www.SteppIR.com**.

HANDY MINI COMPRESSOR FROM CAMPBELL HAUSFELD

◊ Tired of wasting money on "canned air" to clean your computers and delicate ham radio equipment? Need a truly compact air compressor for powering air tools, paint guns or for inflating the air mattress you crash on during 48-hour DX contests? Campbell Hausfeld's new Model FP2003 mini compressor may be just what you've been looking for.

The compact unit runs on 117-V ac, weighs less than 20 pounds, has a 1-gallon tank, a top-mounted carrying handle, twin pressure gauges and a quiet compressor/motor.

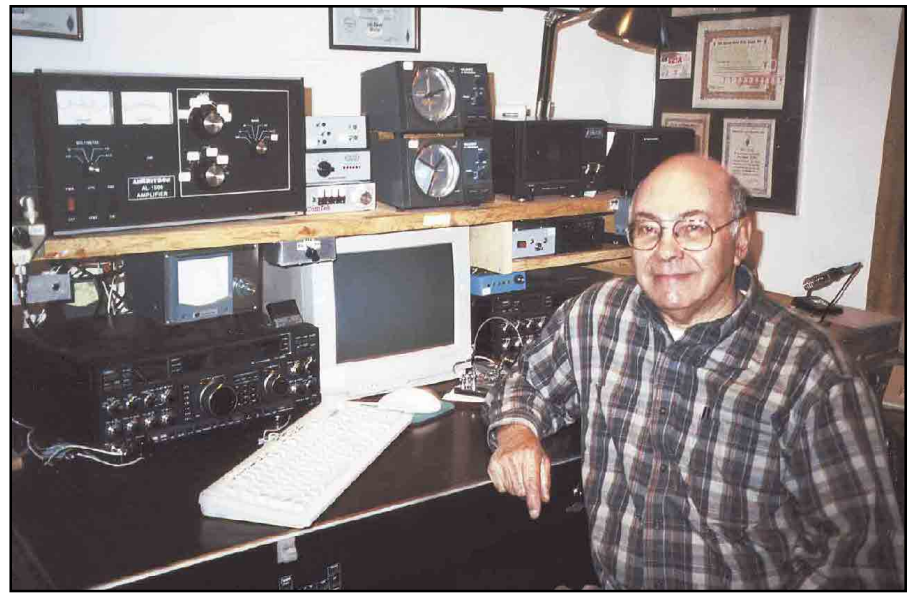
Price: $99. The FP2003 can be found at most Wal-Mart stores. For more information, contact Campbell-Hausfeld at 866-CHPOWER (toll-free in the US); **www.chpower.com**.

Previous • Next New Products QST

By Jack Schuster, W1WEF

The Thrill of it All

Contesting isn't just for, well, contesters.



What a great avocation we have! There are so many interesting facets we can participate in. From homebrewing to slow-scan TV to PSK31 to microwave communications to satellites to ragchewing to DXing to contesting, and on and on it goes. Let me stop at contesting and tell you where I get my best kicks from Amateur Radio.

For me, it all started when I was a kid 50 years ago. Not long after becoming a Novice, I discovered contesting and a neighbor ham whose wire antenna I never had noticed, the end being in a tree only about 100 feet from my bedroom window. Roger Corey, W1JYH (now W1AX), was a top-10 HF contester in those days, doing amazingly well with modest antennas. After listening to Roger in both CW and SSB contests, and getting to meet him when he bailed me out of a problem with my new homebrew rig that blew its 807 tubes as soon as I turned it on, I decided to give it a whirl in a contest. I can't really remember my first contest, but it didn't take long until I was enjoying CW "CD parties" and Sweepstakes. Living a block away from another contester, we had a gentleman's agreement that if he came on a band, I would move to another!

It's Still a Blast

Almost fifty years later, I'm still enjoying contesting, both phone and CW, and want to share the thrill of it all with those who haven't yet given it a try. Let me wander through my log with you in the 2002 ARRL DX CW contest, and try to convey what makes it so much fun for me.

While monitoring the DX PacketCluster (an on-the-air and on-line DX and contest-spotting network) one hour before the contest, I saw P5/4L4FN spotted on 15 meters. Next to contesting, DXing is another favorite aspect of the hobby, and North Korea was the only country I hadn't worked. I tuned to his frequency and his signal was outstanding, a sure sign that the band was in good shape for the start of the competition. Within 10 minutes, North Korea was in the log, and if acceptable paperwork gets to the DX Century Club desk at ARRL HQ, I will have worked every DXCC entity! I took this as a good omen for the 48 hour long contest about to begin.

About 20 minutes before the start, I checked the bands for propagation and it sounded like 40 meters was the place to be. While working a few guys on 7007 kHz, a Bulgarian station tells me I have the loudest signal he ever heard from North America. What a way to get psyched!

Off and Running

Zero Zulu and the contest starts. I have a clear frequency on 7003 and call CQ TEST DE W1WEF. Several stations call at the same time and I'm off and running.

In this contest the object is to work as many stations on each band, 160 through 10 meters, in as many DXCC entities as possible. Each station can be worked once per band. My computer logging program updates my score as I go, tells me if I already have worked a station (if you work him again on the same band, the contact is a duplicate, or *dupe*, and doesn't count toward your score). When I hear a DX station, the software also tells me I need his country on that band, and whether I need that country on any other band. The computer even tells me my QSO rate for the last 10 Qs, or for the last 100 Qs, to help me plan my next move.

Back to the start of the contest. My first contact is with UX7IA in Ukraine. I enter him in my computer log, hit the INSERT key and the computer keys my radio and sends the CW exchange "599 CT." I enter his exchange, my signal report and his power, hit the + key and the computer sends "TU W1WEF" (translation: Thank you. W1WEF). The next station calls me from Slovenia, and the next from Croatia. I stay on 7003, working one station after another—known as *running* in contestspeak—and also send occasional CQs to rejuvenate the pileup. After 20 minutes in the contest I decide to search and pounce, tuning from the bottom to the top of the band and working any stations calling CQ. After 53 minutes on 40, I go to 20 meters and by the end of the first hour of the contest I have 116 contacts and 48 countries in the log.

Band Hopping

I find a clear spot on 14004 kHz. Twenty meters is in great shape. I stay on that frequency running mostly Euro-

peans with ZC4DW in Cypress, UA0ZY in Asiatic Russia, and a few South Americans calling as well. At 0114 the run slows down, so I decide to search and pounce again to pick up the rate until 0141 when I move to 80 meters. I've been looking forward to using my newest version of a four square antenna on 80—four phased verticals suspended from trees with inverted V top loading and eight elevated radials on each.

Eighty meters has plenty of good European signals, and I can't believe I found a hole at 3501 kHz and managed to get a run going! After 35 stations are in the log, it's time to go to 160 meters. Around the top of the hour many DX stations move to Top Band (the affectionate moniker for 160 meters) and stay for 10 minutes or so. It's a bit early at 0200Z, but I log Isle of Man, Venezuela and France before going back to 80 meters two minutes later. I stay on 80 until 0250 when I revisit 160, and put 10 more stations in the log including fellow Yankee Clipper Contest Club member Kurt Pauer, VP9/W6PH.

During every DX contest, many contesters take off to set up or operate from existing stations in remote locations. I have had the pleasure of being sought after DX 10 times from PJ2, Curacao and three times from KH6 (Hawaii). DX contests are a good chance for casual contesters or DXers to look for needed band-countries that are not active outside of contests.

During this hour I revisit 40 and 160, but it's late in Europe and my rate is slowing down with only a 77 contacts per hour. At the same time, 160 is improving, and I pick up half a dozen new multipliers (see the sidebar, "Seek the Multipliers") in six minutes. Back to 80 for three more contacts and then to 20 meters, which is really hopping.

I operate with one radio in the Single Operator High Power category. Many contesters today are using two radios in this same category. While calling CQ on one band, they can tune another band looking for needed multipliers or stations they haven't worked yet. Running 1500 W, this takes good filters, stubs, antenna separation as well as skill to concentrate on doing two things at once. By changing bands frequently, and going into the search-and-pounce mode every hour I hope to find most of those needed multipliers.

Plenty of activity from Europe in this contest keeps it interesting. If anyone thinks CW is dead, take a listen to any of the six HF bands during the big DX contests! I have my computer CW speed set at 36 words per minute, a bit slower than usual, but I have my memory keyer and paddle connected in parallel with my CW interface to the computer. I send manually about half the time, and can quickly slow down by turning the speed knob on my keyer for anyone who answers me at a slow speed. Many stations that perhaps can't copy 36 WPM will listen long enough to copy my call, and then let their computer do the rest. The number of log submissions in CW contests has actually been increasing over the past few years.

Contesters set goals for themselves. One can just try to better his previous year's scores, beat a buddy in a bet for a steak dinner, shoot for a certain score, beat those guys who beat you last year or…try to win the contest! Knowing my own limitations, my goal this year was to beat those two guys in the club...and to be one of the top 10 single op scorers. Now I know I have to find more multipliers, and at the same time keep my rate up. I got carried away on 10 meters, having too much fun running the pileup and forgetting to search and pounce. The high rates are exhilarating, though, and I probably haven't seen a 194-contact-per-hour rate since Curacao!

I'm back on 15 for another 300 Qs. Lots of new multipliers here because it's still a fresh band for me. It's 1811Z and 3V8SM in Tunisia calls me. I know I need him on other bands because I haven't worked a 3V8 in the contest anywhere. I ask him to move to 20 meters, giving him the frequency to move to. He obliges with a quick contact on 20, and I move right back to my run frequency on 15.

Wow, am I hearing right? YA5T calls me from Afghanistan. I give my exchange and he says "Hi, Jack" before giving his! I have no idea who the operator is, but camaraderie among contesters is unmatched in any other hobby. Contesters not only get to know each other from working over and over through the years in contests, but from Qs outside of contests and conventions like Dayton where contesters flock together and chat well into the night. It's really a pleasure to meet the guys you've worked from all over the world, with dozens of countries represented in the hotel where contesters hang out.

Now 10 is wide open to Japan and I run JAs with a couple ZLs (New Zealand) and South Americans mixed in, putting about 75 in the log during the next hour. I finish my first 24 hours with 2451 contacts and 357 multipliers in the log. Last year I had 2058 contacts and 359 multipliers at this point, but last year I had taken about three hours off by now to sleep. This year I still feel great and my preparation for sleep deprivation seems to be paying off. I got more sleep than normal the week before, and managed to sleep a couple hours before the contest started Friday afternoon. I deprived myself of my normal two cups of coffee for three days before, only drinking a half cup of regular and a half cup of decaf. I avoided eating turkey before the contest (since something in turkey makes me sleepy) and avoided a big meal on Friday. During the contest I also avoided my usual bag of snacks, like chocolate chip cookies, and ate less than usual. I drank regular coffee during the contest and diet cola.

Day Two

The first hour finds me on 10, 15, 20 and 40 meters. At 0155 I go to 160 and put 16 Europeans in the log, but spend too long there and my rate suffers, even though my Inverted L antenna seemed to be doing well at cracking pileups in short order. Back to 15 meters and I put about 50 more Japanese stations in the log before returning to 160 on the hour at 0300Z to nab four more Europeans and a YO (Romania) multiplier. At 0307 I decide that things have slowed enough for me to take my first off-time and I sleep for an hour and a half.

Back at it at 0500 I hit 80, 160 on the hour and then 20. Twenty was open around the clock last night and again tonight. I returned to 80 for European sunrise and another 60 Europeans in the log, a few more on 40 and a few on 20. At 0730 I decide it's slow enough and I'm tired enough to sleep, and I take almost 4 hours off. I get a good 3 hours solid sleep and manage to get out of bed when the alarm goes off. In past contests it's at this point

Seek the Multipliers

Every contest has multipliers, often referred to as *mults*. These are US states, DXCC entities, ARRL sections, grids and so on, depending on the rules of the contest. A multiplier is valuable because it multiplies your total score.

Let's say that DXCC entities are multipliers for our hypothetical contest. You've amassed a total of 200 points so far, and in doing so you made contacts with 50 different DXCC entities.

200 × 50 = 10,000 points

Those 50 multipliers made a huge difference in your score! Imagine what the score would have been if you had only worked 10 multipliers?

If given a choice between chasing a station that isn't a new multiplier and pursuing one that *will*, most contesters will spend much more time trying to bag the new multiplier.—*Steve Ford, WB8IMY*

where I said "I'd rather sleep," and stayed in bed. But with conditions as good as they were (and maybe the best we'd see in a long time), I wanted to make my goal.

On again at 1114Z I pick up VK (Australia) and VP5 mults on 40 and go to 20 to run Europe. I put another 100 Qs in the log including HS0 (Thailand), YB0 (Indonesia), and C31 (Andorra). With 12 hours to go, the rate is slowing and I hop from band to band looking for new multipliers, moving VP2MDY to add Montserrat on 20, 15 and 10 meters and remembering what my old friend K1RM told me years ago: To win you have to work *every* station on the band! I started combing the bands methodically, keying every station's call into the computer to see if I'd already worked it, and finding that about one in five was a needed station! By now the calls all sound familiar, but this was really paying off, and I'd even find new multipliers every once in a while.

With three hours to go, CX2AL (Uruguay) moves for me from 10 to 15 meters. ZS6AJS moves from 20 to 15 to add South Africa on two bands. My good friend Fergus, YV1NX, moves from 15 to 40 to give me two more in the last hour. The last hour produces only 52 contacts with 5 new multipliers. It's all over at 0000Z and I'm not even tired!

How Did I Do?

I met my goal to beat my last year's score. I have a total of 3736 contacts and 443 multipliers. Last year I had 3336 and 422, so I'm quite pleased. Of course, this is my "raw score," yet to be checked when I submit my log and it is cross-checked against logs submitted by the stations I worked, I'm bound to lose points. I just have to hope I don't lose more than my fair share!

I mentioned goal setting earlier, and knowing one's limitations. With this in mind, I know when I can feel good looking at results and seeing what kind of hardware I was competing against. By big-gun contest station standards, my station with one tower and tribanders is modest. I have a 108-foot tower with three stacked Hy-Gain TH6s and two Cushcraft 40-2CDs Yagis, and wire antennas on 80 and 160 meters. Contesters are known for planting antenna farms bigger than any others in the hobby. Multiple high towers and stacked monoband Yagi antennas are common. Continuous improvement is part of every contester's repertoire.

Within a couple weeks, most stations submit their raw scores to an Internet reflector that goes by the name "3830" (you can view the archives of the 3830 Reflector on the **www.contesting.com** Web site). Scores are tabulated before the official adjudicated scores appear in print eight months later, and to my delight I'm in sixth place! Even if I drop down a couple of notches, I should remain in the top 10. And yes, I did beat those two guys who whipped me last year, but I know they'll *really* be out to get me next time!

If you've never done it, give a contest a whirl. For more information about contesting, including rules and contest calendars, jump on the Web and go to the *National Contest Journal* site at **www.ncjweb.com/** or the ARRL Web site at **www.arrl.org/contests**.

And to those who worked me and those who "moved," thanks for the thrill of it all. See you in the next one!

I was first licensed in 1952 after becoming interested in ham radio through a friend in Boy Scouts. In those early days I did a lot of homebrewing, both HF and VHF. From the start, I enjoyed CW, and developed my CW skills through participation in the National Traffic System. CD parties were probably the first contests I entered, and the contesting bug bit despite my very modest station. I also discovered Sweepstakes back them, but never did much DXing until I became active again following an 18-year hiatus after college.

In 1978 when I returned to the hobby, it was amazing to see how much equipment had changed. Almost no one owned a transceiver in 1960; we used separate receivers and transmitters. Now with a TS-520S and dipole I worked DXCC and WAS in a month! DXing and DX contests became a passion, and when I receive my P5 and Ducie cards I'll be back on top of the DXCC Honor Roll again.

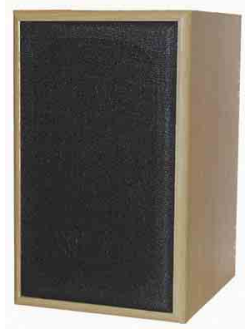
I found mobile CW to be great company on long weekend drives, which I always seemed to be making while I was working. Now that I'm retired after a 32 year career in Instrumentation Engineering at Pratt and Whitney, my wife and I have been enjoying RVing about 2 months each year, but we always come home for the ARRL CW contest, and then head South again after it's over. Of course I have an HF rig in the RV!

I was fortunate to have operated in ARRL DX CW and SSB contests many times with my good friend John Thompson, W1BIH, from his place in Curacao, and together we took First Place World multi-single two or three times. From home, I've placed in the top 10 several times in the ARRL and CQWW contests, and especially enjoy the high speed CW Sprints. When I'm not contesting, I can often be found putting up a new antenna...or salt water fishing

You can contact the author at 408 Thompson St, Glastonbury, CT 06033; **w1wef@arrl.net**.

NEW PRODUCTS

DELUXE CLEARTONE COMMUNICATIONS SPEAKER FROM MFJ



◊ MFJ's deluxe Cleartone communications speaker incorporates advanced speaker components and an acoustically rigid cabinet aimed at producing exceptional audio clarity and improved speech and CW intelligibility. Whether you're into high-fidelity SSB or simply want to improve your station's audio in general, the Model 385 will give your rig's internal speaker a run for its money.

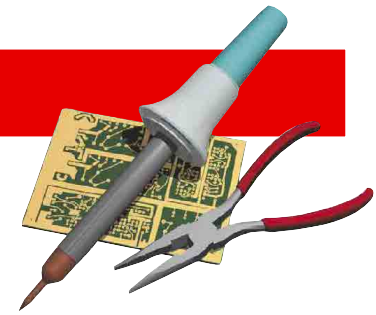
Price: $39.95. For more information, contact your favorite Amateur Radio products dealer or MFJ, 300 Industrial Park Rd, Starkville, MS 39759, tel 800-647-1800, fax 662-323-6551; **mfj@mfjenterprises.com**; **www.mfjenterprises.com**.

MINIATURE TRIMMER CAPACITORS FROM VOLTRONICS

◊ Voltronics has extended the range of its A4-series miniature trimmer capacitors to 7 pF (1 to 7 pF). With 5 turns and positive stops, the "A4-7" is designed for tuning applications in amplifiers, filters and oscillators. A4 caps come in PCB and surface-mount packages, with high-voltage and non-magnetic versions available for special installations. Q factors are greater than 1000 at 100 MHz.

Price: $2.99 in lots of 1000. For more information, contact Voltronics at 100 Ford Rd, Denville, NJ 07834, tel 973-586-8585, fax 973-586-3404; **info@voltronicscorp.com**; **www.voltronicscoro.com**.

Previous • Next New Products



The Doctor is IN

Q Bryan Chick, K5KFL/KP2, writes: I have been inactive for many years, but now I wish to get on the air again. If I make an 80-meter 1/2-wavelength dipole, can I then use an antenna tuner to operate on the higher bands, or must I make a multiband antenna? I live on St Thomas and do not want to erect a beam and tower due to our hurricanes.

A Yes, you can erect a dipole of any reasonable size and use an antenna tuner to operate on different bands. In that sense, any dipole is effectively a "multiband" antenna.

There are some points to consider. First, the larger the antenna the better and an 80-meter dipole is a good size to use. Depending on many factors, such as orientation, height, obstacles, length of feed line, design of the tuner, etc, you may not be able to get a good match on each and every band. Regardless, you will still be able to make contacts on some bands. Be prepared to experiment with the length of the feed line and tuner settings.

Because you'll be using the antenna on bands where SWR at the antenna may be high, try using windowed "ladder-line." You'll have *much* less loss under high-SWR conditions than if you fed the dipole with coax. However, this means that you'll also need to purchase an antenna tuner with a built-in balun. That usually isn't a problem because most good-quality antenna tuners on the market today include these baluns.

One last tip: Try to find ladder line with *stranded* conductors. This type of line tends to hold up better in breezy conditions. Twist the feed line once every 18 inches or so to reduce the wind surface area.

Q Martha Colburn, K4VM, writes: My new motor home has a Trace Engineering converter to charge the batteries from ac power. This converter is creating severe interference from the broadcast bands up through 20 meters. I have looked through the owner's manuals and on the device itself and find nothing about interference. Does the FCC have any jurisdiction over this device? Do I have any grounds to insist that the manufacturer fix this "transmitter"?

A The legal part of this issue is very clear. The converter is in violation of FCC Part 15 Rules and Regulations that state that the operator of the device must correct any harmful interference that is being emitted, or cease operating it if so ordered by the FCC. Unfortunately, in this case you are the operator and your only recourse is through your dealer and/or the manufacturer. You can show or refer them to relevant sections of Part 15, which can be found at **www.arrl.org/tis/info/part15.html**. If your motor home is under warranty and the converter is original equipment, you may be able to pursue a warranty claim.

Q John Mosley, N6MZN, writes: I am building my first HF station. Can you use a piece of angle iron for a ground rod or does it have to be copper? There are no cold-water pipes near my station. How do I ground the equipment?

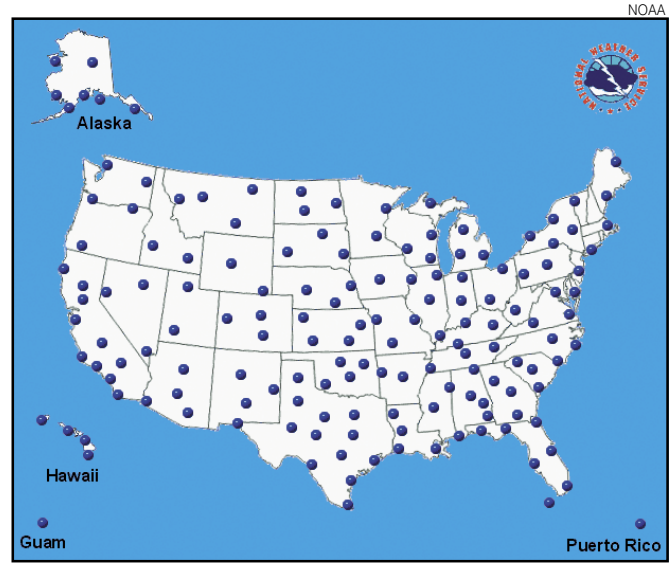
A While inexpensive steel can be used for grounding material indoors, it is absolutely not suitable for use outdoors because it will very quickly rust and lose its effectiveness. Copper does oxidize fairly quickly, but it does not corrode like plain steel does. Copper piping is a reasonably priced alternative to conventional ground rods.

Your station equipment should have a connection to an outdoor ground rod, connected to the equipment by a heavy wire run as short a distance as possible. A safety ground is required by electrical codes. A good article on grounding, both safety and RF, is available on the ARRL's Technical Information Service Web site at **www.arrl.org/tis/info/grounding.html**.

Q Fill Nutter, W8FIL, writes: I'm planning to move to a house within 1 mile of the Charleston, West Virginia NOAA Doppler radar station. The radome overlooks the area where I will be installing antennas for HF, VHF and UHF. Will my proximity to the radar cause any problems with my ham operations?

A It is possible for radar to cause interference to Amateur Radio, particularly to broadband receivers that offer little immunity from out-of-band signals. The NOAA sites are distributed throughout the country and since many of our allocations are shared, there is no guarantee that radar signals will even be out of band—and in-band interference can be tough to deal with.

NOAA



A map of NOAA weather radar sites throughout the US.

It may be worthwhile to inquire about what frequencies are in use—keeping in mind they may change as technology improves. Putting narrow-band filters in front of VHF, UHF and microwave receivers significantly improves performance at locations with strong transmitters. One source for these filters is DCI Digital Communications Inc, Box 293, Hummingbird Bay, White City, SK S0G 5B0, Canada, 306-781-4451, **dci@dci.ca**, **www.dci.ca/**. You may need to homebrew suitable filters. One possibility is a helical filter. A good article to read is "A Low-Cost 222-MHz Helical Band-Pass Filter" by W1VT in the May 2001 issue of *QEX*.

Q Andy Strubbe, K8AND, of Akron, Ohio writes: I live on the top floor of an apartment building. I have a balcony with a metal railing about 4½ feet high. I've mounted a 10-foot long 2-meter vertical on three 5-foot sections of 1¼-inch TV mast held to the railing with two hose clamps. Do you think I could raise the mast to 20 or 25 feet? Regular guying wouldn't be possible.

A There are a few things to consider. Will the railing be able to stand up to the wind loading of 20-25 feet of mast plus the 10 feet of antenna? If your balcony is made of wood, this is likely to cause the bolts holding the railing to work loose over time. If the railing and its mounts are sturdy enough, stacking five unguyed sections of TV mast won't be stable—the RadioShack 19 foot telescoping mast (15-5065, $39.99) is a better choice. Guying is going to be a problem for a permanent installation. Guying at two points 180 degrees apart is not enough. With a structure totaling some 30 feet, you need at least three guys, 120 degrees apart.

Q What is the thread size for an SO-239, and where can a tap in that size be found?

A According to the Amphenol catalog, the thread size is ⅝-24. As to where to get a ⅝-24 tap or die, try Enco, 400 Nevada Pacific Hwy, Fernley, NV 89408; tel 800-873-3626; fax: 800-965-5857; **sales@use-enco.com**; **www.use-enco.com**.

Q Mike Laney, AG4MY, of Acworth, Georgia writes: I have a 2-meter rig connected to a new 6-meter transverter that feeds a 6-meter dipole through RG-213 coax. The dipole is about 20 feet off the ground with about 30 feet of coax. The 2-meter rig is working fine and I assume the transverter is as well, since it is new. I don't seem to be getting any signal out of the transverter. Is there something wrong with my antenna?

A There are several possibilities. You may not be switching the transverter between receive and transmit properly. Some transverters require a connection to the PTT (push to talk) line. Some need an external relay to perform antenna switching. Improper adjustment of transmit power level can also keep a transverter from working. Too much power from the 2-meter radio can actually damage the transverter while not enough results in a weak output.

Check your antenna wiring to be sure one half of the dipole is connected to the coax center conductor and the other half to the shield with no connection between them. Have you checked the SWR with a wattmeter or SWR bridge? Use an ohmmeter to be sure the coax is not shorted. If all seems to be working well, remember that 6 meters is an unpredictable band—you can listen for some time without hearing anything in some parts of the country. Try a QSO on a local FM repeater or calling frequency to check your equipment. The following Web page lists the band plans for all amateur bands: **www.arrl.org/FandES/field/regulations/bandplan.html**.

Q Clif Inabinet, Jr, KF4UOR, of St Matthews, South Carolina writes: I want to use a 100 A/h deep-cycle marine battery for emergency radio operation during electric power outages. Is there a danger of hydrogen gas buildup if I keep it under the operating table inside my home? What about using it in the home when there is no power outage and the central heat and air is available for circulating the air in the room? I will not be charging it inside.

A While batteries normally give off hydrogen gas while charging, they can also release low levels of gas while being discharged. As the battery nears low voltage, the cells with more charge remaining will begin to charge the cells with lesser charge, so good ventilation is still very important to use lead-acid batteries inside. A good Web site reference on deep-cycle batteries is **www.uuhome.de/william.darden/dcfaq.htm**.

Q Frank Connelly, W7ND, of Seattle, Washington writes: last night I was on 20 meters running pretty high power. My neighbors called me and told me their TV set went "extra nuts." The picture blacked out from the interference, but after a couple of minutes the screen started shrinking as if the vertical/horizontal outputs were decreasing. Eventually the set turned off and now won't turn back on. In section 6 of the *ARRL RFI Book* "over voltage sense circuitry" is discussed that will trip if the TV power supply voltages exceed a set limit. Does this sound to you like what happened?

A It sounds like you may be experiencing the relatively rare nightmare of having had a neighbor's piece of equipment fail in the presence of strong RF. What you describe could be caused by two factors: RF getting into the set's power supply, changing a voltage inside the TV, or RF getting into the CRT's high-voltage regulator, causing the picture tube high voltage to go up. Either of these could have the effect of making the picture appear smaller on the screen. Unfortunately, this may have caused permanent damage to the TV if it won't return to normal when you are not transmitting. This is a case of plain old fundamental overload and the FCC would not expect you to fix the neighbor's TV. Your neighbor will probably see it differently, though.

The problem you describe is not caused by RF getting into the tuner, so a high-pass filter probably won't help. The Doctor suggests common-mode chokes on the TV feed line and ac line cord, and especially if the power supply is involved, a brute-force ac-line filter. Generally, an F-240-43 ferrite core is best. The little "clamp-on" ferrites don't usually have enough inductance to function well as chokes on HF. See **www.arrl.org/tis/tisfind.html** to look up ferrite and ac-filter suppliers.

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

STRAYS

I would like to get in touch with . . .

◊hams who are pharmacists. International Pharmacists Ham Group, **www.malpensa.it/iphg/index.htm**.—*Andrea Pagliula, IZ7ECB*

◊anyone who either has a certificate or won a certificate for the Mighty Midget transmitter contest from February 1966 *QST*. Contact Scott Freeberg, WA9WFA, at **wa9wfa@qsl.net**.

Next Strays

By George Heron, N2APB

Build the Badger

An enjoyable project for all ages, this "smart badge" blinks the owner's call sign in Morse code. That only describes Mode A, however—there are eight more ways to have fun with this one!

Small, single-IC keyer chips have been around for some time, starting with the Curtis chips from the early '80s up to contemporary PIC (programmable interface controller) designs. None, however, have yet been so small and lightweight that you could consider *wearing* it. With the low power, surface mount CMOS Ubicom SX18AC/SO microcontroller, you can use this programmable device clipped to your shirt pocket or tossed in with your lightweight portable QRP station.

The Badger is a unique and programmable "smart badge," an intelligent call sign badge that sounds and blinks the owner's pre-programmed call sign in Morse code. Not only can you have fun with this smart badge at a local club meeting or while walking around at a hamfest, you can also use its extra features as an integral part of your portable station.

The Badger consists of a piezo audio transducer, a high efficiency LED and a small push button on the front of a thin circuit board. The Ubicom SX18 microcontroller and several other components reside on the rear of the board and the whole thing is overlaid with a laminated surface that you can custom decorate for any occasion.

You can put your call sign on it and include a shirt clip to make a badge. You could place your QSL card design on it to make a novel portable keyer or display the Morse code character set on the laminated card to use as an inexpensive and fun code practice oscillator at the next Scout meeting. (The author was quite successful using this last approach at a local Girl Scout meeting.)

An onboard 3-V lithium battery allows the Badger to operate free of a heavier encumbering battery. Add a common badge clip and wear it at club meetings and other Amateur Radio events to the amazement of everyone!

Circuit Description

Refer to Figure 1 for the following discussion. The Badger features are driven by the software resident in the SX18 microcontroller. An on-chip oscillator provides the SX18 clocking. Timing accuracy of the tone frequency and the Morse code speed is not overly critical so we can live with slight chip-to-chip variations in clocking rates when using the built-in oscillator mode—an acceptable price to pay for reduced parts count.

Power is supplied from an on-board 3-V lithium battery when jumper J1 is in place as shown on the schematic. With J1 in the pin 2/pin 3 position on pin header P3, the Badger is powered by an external 5-V source. External 5 V is only required when a new program is being burned into the SX18 chip. This "in-circuit programming" capability of the SX18 device makes it very easy to reuse for other projects.

When the Badger is quiet, the SX18 controller is "asleep." In this state, the SX18 clock oscillator has stopped and the chip only draws a few µA from the 3-V battery. When the Badger is triggered by the push button, however, the SX18 controller wakes up and annunciates the programmed call sign through the piezo-transducer.

Upon initially installing a battery, the SX18 controller software generates a constant tone from the piezo-transducer and allows the user to adjust for the loudest resonant tone. See Mode C for further instructions for this once-only condition.

When triggered by the push button, the Badger operates in one of several modes. Normally, the Badger is in Mode A. in which the programmed call sign is sounded once with each actuation of the push button. At the end of the call sign an-

Features of the Badger

Badge size (suggested)—A 2×3.5-inch board is ideally sized, using a 2.5×3.5 inch laminated overlay.

Piezo-transducer—The resonant tone from most piezo-transducers is about 4 kHz. The microcontroller provides a means of adjusting the output frequency for the user to peak the Badger to individual piezo-transducer variation.

LED—A red super-bright LED is recommended for better visible output.

Push button—A micro-size switch located on the board initiates the annunciating sequence.

Annunciation—The piezo-transducer and LED are modulated using Morse code at given speed to announce call sign and other features.

Key/Paddle—Pads can be provided so you could add a miniature, on-board key or paddle; signals are provided for standard off-board paddles via a 3-position pin header.

Key-line output—A buffered output line delivers Morse to an external transmitter via a 2-position pin-header.

Expansion connector—Additional connectors provide access to special functions.

Programming connector—The 4-position pin-header allows user to connect an SX-Key or SX-Blitz programming tool for custom programming the microcontroller chip.

Operating modes—The Badger has eight separate operating modes: annunciate call sign via piezo-transducer and/or LED, repetitive "beacon mode," iambic keyer and speed adjustment, piezo-transducer tone control and straight key tone oscillator.

3-V lithium battery—A standard watch battery provides circuit power. The SX18 chip "sleeps" during quiet times, providing very low current draw and long battery lifetime.

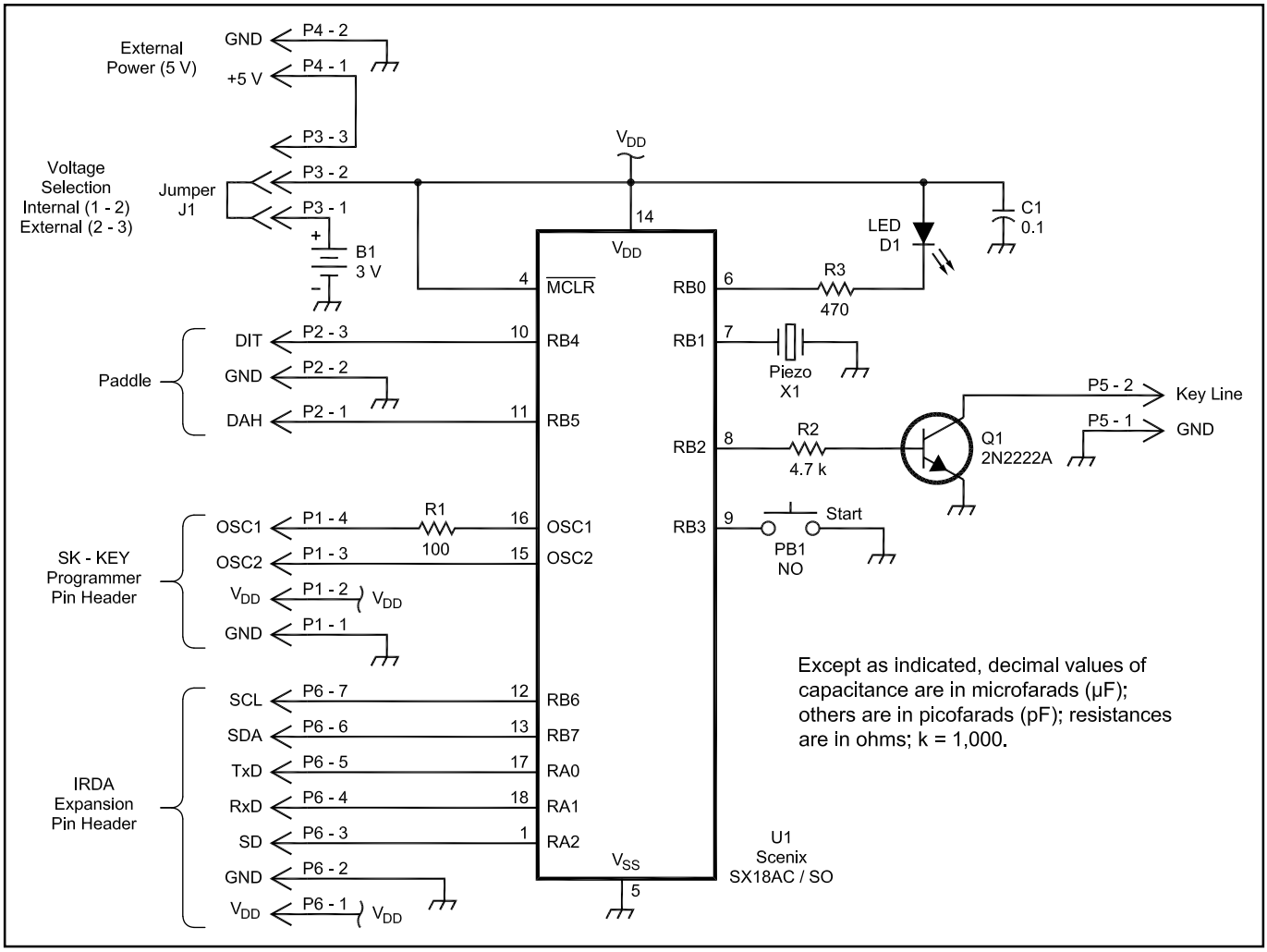


Figure 1—Schematic diagram of the Badger. The SX microcontroller does all the timing and I/O processing based on the push button trigger into port RB3 and the paddle inputs into ports RB4 and RB5. The SK-Key programming cable (from Parallax.com) enables the user to change the annunciated call sign or to place an entirely different software program into the SX chip. The IRDA Expansion port (P6) provides for an infrared TX LED and RX detector to be easily added, giving two Badgers in close proximity the ability to "talk" to one another. Mouser Electronics, 1000 N Main St, Mansfield, TX 76063-1514, sales 800-346-6873, local 817-804-3888, fax 817-804-3899; sales@mouser.com; www.mouser.com/. Digi-Key Corporation, 701 Brooks Ave S, PO Box 677, Thief River Falls, MN 56701-0677; tel 800-344-4539 or 218-681-6674, fax 218-681-3380, sales@digikey.com; www.digikey.com/.

B1—3 V lithium battery CR2025 (Digi-Key P188-ND).
BH1—3 V, 20 mm coin cell holder (Digi-Key 103K-ND).
C1—Capacitor, 0.1 µF (Mouser 80-C317C104M5U).
D1—Super Bright LED (Digi-Key 160-1104-ND).
J1—Pin header jumper (Mouser 151-8000).
P1—P6—Pin header (cut as needed) (Mouser 517-500-0136).
PB1—Push button switch (Mouser 539-PT1550W).
Q1—Transistor, 2N2222A (Mouser 625-MPS2222A).
R2—Resistor, 4.7 kΩ, ¼ W (Mouser 291-4.7 kΩ).
R3—Resistor, 470-Ω, ¼ W (Mouser 291-470).
U1—SX18AC/SO microcontroller (Unique Technologies, tel 800-556-0225). This IC must be programmed. Programmed versions available from NJQRP. See Note 2 at the end of this article.
X1—Piezo-transducer (Mouser 539-PT1550W).
Laminated badge—Use color printer and laminate.
Plastic badge clip (available at office supply stores).

nunciation, the Badger goes to sleep to conserve battery power.

Pressing and holding the push button at the end of the call sign annunciation sequence will change the operating mode. It may take some practice to get the timing right, but you'll get it every time when you press the button right at the end of the last call sign letter. When this push button press (and hold) is detected, a series of Morse letters is annunciated in sequence—an audible menu list—with each letter signifying a specific mode as indicated below. When the operator hears the desired mode letter, the push button is released and that mode of operation is entered. The modes are described below according to their assigned letter.

Mode A—Normal

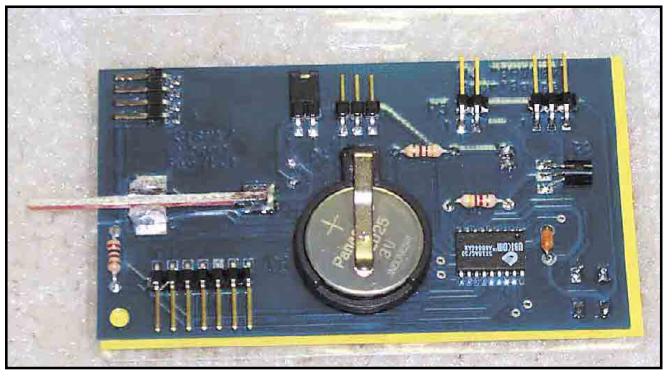
The call sign is played once whenever the push button is tapped and then the SX18 chip goes to sleep. Tapping the push button at any time during call sign annunciation will silence the Badger and put it to sleep.

Mode B—Beacon

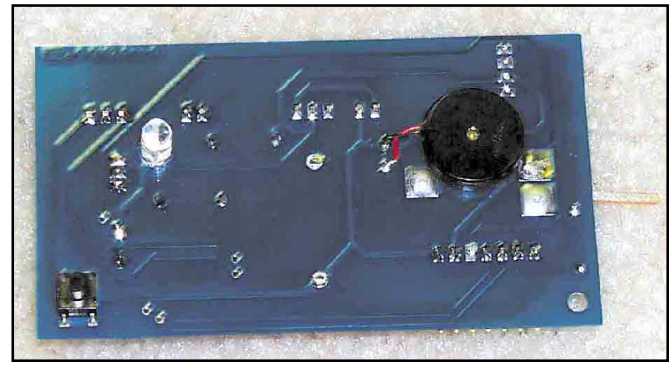
The call sign is played repeatedly, separated by a short pause in between iterations. Holding the push button for a second anytime during this mode will silence the Badger, return it to Normal mode (A), and put it to sleep.

Mode C—Calibrate

The piezo-transducer produces a steady tone. The user can adjust the frequency for the specific piezo-transducer and battery voltage. A single quick tap on the push button will raise the frequency of the steady tone. Two quick taps will lower the fre-



The rear of the Badger. The 3-V lithium battery is held in place via a clipped socket in the center of the board, and the surface-mount SX18 microcontroller is just to the right of it. A piece of clear acetate is glued over top the components on the back side of the Badger, protecting it from possible shorts when worn. Note the homebrew paddle on the left side of the board. It is constructed from scrap PCB material and soldered to the larger pads as shown. This paddle enables the Badger to send Morse code using the iambic keyer mode.



The front side of the Badger circuit board with laminated badge removed. Only three components are mounted on this side: the push button (left), LED (middle) and the piezo-transducer (right). The laminated badge, with corresponding holes, slips over the components and is glued to the surface of the board.

quency. The operator should adjust the pitch for maximum output. Holding the push button for one second stores the tone setting, returns the Badger to Normal mode and puts it to sleep.

Mode D—Iambic Keyer

The paddle inputs to the SX18 chip are activated. Grounding the dit input sounds a short tone, and grounding the dah input sounds a longer tone. Actuating the push button for one second returns the Badger to Normal mode and puts it to sleep.

Mode E—Morse Speed Adjust

A constant series of Morse dits is played. Tapping the push button once increases the Morse speed and tapping the push button twice lowers the speed. Pressing the push button for one second stores the speed setting, returns the Badger to Normal mode and puts it to sleep.

Mode F—Straight Key

The piezo-transducer and LED are activated whenever the dah input line is grounded. Connecting a straight key to the dah line will allow the Badger to perform as a code practice oscillator. Pressing the push button for one second returns the Badger to Normal mode and puts it to sleep.

Mode G—Piezo-transducer Only

Only the piezo-transducer will be active for call sign and keyer annunciation. The Badger is returned to Normal mode and put to sleep.

Mode H—LED Only

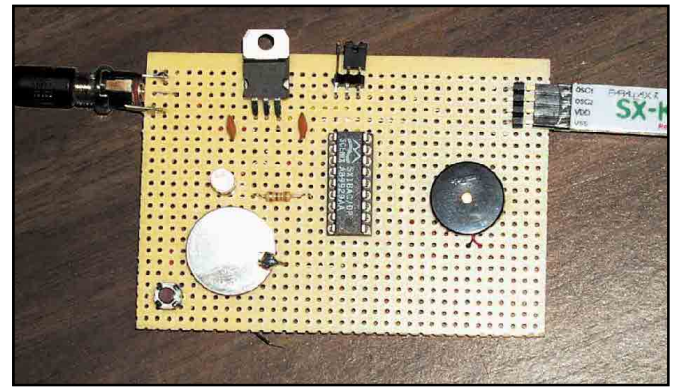
Only the LED will blink (no piezo-transducer) for call sign and keyer annunciation. The Badger is returned to Normal mode and put to sleep.

Mode I—Both Piezo-transducer and LED

Both the piezo-transducer and LED will be used for call sign and keyer annunciation. The Badger is returned to Normal mode and put to sleep.

Construction

The Badger can easily be constructed on perforated circuit board. The SX18 chip may be programmed using the techniques previously outlined in the *QST* article "Build a PSK31 Audio Beacon" (Aug 2001, pp 28-33) and described in detail in this



A homebrew version of the Badger illustrates the bare minimum of components. (The LM7805 regulator provides 5 V needed for programming the SX18 chip.)

project's Web pages referenced at the end of this article.[1] The Badger kit is available from the New Jersey QRP Club (NJQRP).[2]

Summary

No matter how you build and use the Badger—as a regular call sign badge, as a fun novelty topic at a radio club event, or as a keyer for your portable QRP rig—the project is a fun exercise in understanding how microcontroller devices can be programmed to create a useful ham project.

George Heron, N2APB plays a lead role in the New Jersey QRP Club. He edits and publishes the quarterly 64-page QRP Homebrewer *magazine. An inveterate homebrewer by nature, N2APB's latest project is the design of a PC-less, single board controller for digital mode (PSK31) portable operation. First licensed in 1970 and now holding an Extra Class ticket, he obtained a BSEE degree in 1975 from the Rochester Institute of Technology and has been in high technology assignments ever since. He is currently the Vice President of Engineering for SafeNet, a company specializing in encryption technologies. N2APB may be contacted at 2419 Feather Mae Ct, Forest Hill, MD 21050, or by e-mail at* **n2apb@amsat.org**.

Notes

[1]The Badger Web page **www.njqrp.org/badger/** contains the latest building information, tips, corrections, source code listings and software versions.

[2]The circuit board, pre-programmed SX18 chip, laminated call sign badge and shirt clip are available as a kit from the NJQRP Club. Send $20 check or money order payable to Dave Porter, AA3UR, 647 Middle Holland Rd, Holland, PA 18966. QST

GOwin

In the DX game there are four pathways to that precious QSL:

- via the bureau
- electronically (via e-mail or an online service)
- directly
- through a QSL manager

DX stations will usually pass along their QSL information on the air, but in the frenzy of a pileup those details are often neglected. As you bask in the glow of your pleasure at working yet another DXCC entity, you suddenly realize that you don't know where to send your QSL. Now what?

You can search a call sign database for a clue, or hope that some kind soul will post the information on the DX cluster. Or you can double click on the *GOwin* icon on your PC desktop and have the information in a matter of seconds.

GOwin

The GOList, currently owned by John Shelton, K1XN, has been the bible of QSL information. With *GOwin* you can enjoy the power of the GOList at your own computer. It's as easy as typing in the call sign that you wish to look up (Figure 1). *GOwin* instantly zips through its DX QSL database. With my 1.8-GHz PC, *GOwin* produced results so quickly that the information was on the screen before my fingers lifted from the keyboard.

Written by Tom Dandrea, N3EQF, *GOwin* is compatible with *Windows 95* and up and loads in a heartbeat. It also interfaces with QRZ, RAC and Buckmaster call sign directories for address lookup. *GOwin* is powered by the Golist database files. The files are updated and available to subscribers *weekly* from the Golist Web site. These same database files are used by these other DXing programs: *WIN-EQF, DX4WIN, SWISSLOG, DXBASE, WINLOG32, LOG WINDOWS, LOG-PLUS, LOGGER32, DX TELNET* and *TRX-MANAGER*.

GOwin can interface with the "Buckmaster HamCall," "Radio Amateur Callbook" or "QRZ! Ham Radio" call sign databases to provide you with mailing address information. To prepare *GOwin* to do this, you simply specify which call sign database you want to use, and the disk drive (or CD-ROM drive) where it is located.

"Output" to a Text File

GOwin provides a way to send all the information displayed to a text file, where you can edit, print and save as needed. The OUTPUT button on *GOwin* will become available as soon as there is any information displayed in the QSL Manager window. When you click on OUTPUT, *GOwin* will create a text file called LABEL.TXT, and display it in your favorite editor. From there, you can "Save As" to keep it in a different text file, or PRINT to send it to your printer. Each time you click on OUTPUT, *GOwin* will place the new information at the bottom of the existing LABEL.TXT file. If the LABEL.TXT file still exists when you exit *GOwin*, the program will ask if you want to delete the file. If you answer "No," then *GOwin* will continue adding to the file the next time you run *GOwin*.

Web Linking

If the QSL destination doesn't appear in the *GOwin* window, you can click the GOSEARCH button and get the latest information from the **www.golist.net** Web service (Figure 2).

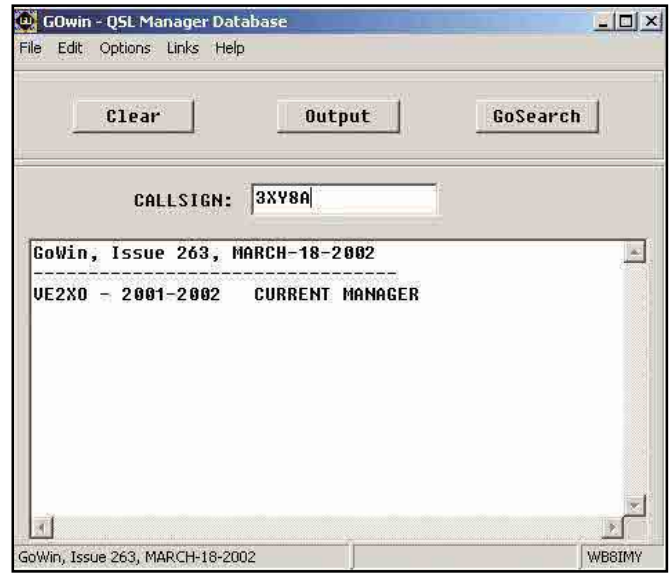


Figure 1—In this example, I entered 3XY8A. In a fraction of a second *GOwin* informed me that I needed to send my card to VE2XO (the operator's home call).

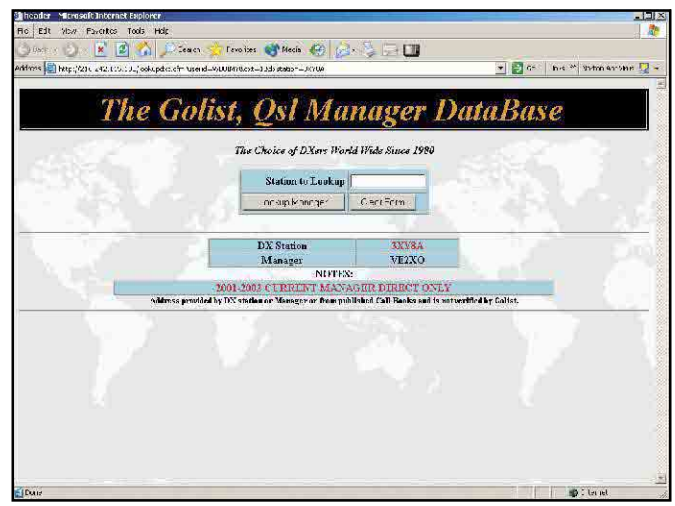


Figure 2—If *GOwin* doesn't have the answer, just click on the GOSEARCH button. *GOwin* will automatically connect you to the GoList Web site and do a rapid search.

GoSearch may contain information on DX stations that do not appear in the weekly GoList database updates.

Conclusion

You can order your own copy of *GOwin* online at **golist.net/** for $49.95. The cost includes a year of weekly updates and a subscription to *DX Alert*, a weekly listing of published DX operations. Once you make the purchase, *GOwin* can be sent to you electronically as an e-mail attachment, or by mail on a CD-ROM (add $5 for CD shipping; add $5 for international shipping).

Manufacturer: The GoList, PO Box 3071, Paris, TN 38242; tel 731-641-4354; **golist@golist.net**.

Steve Ford, WB8IMY ♦ *QST* Editor

A Solution to HF Digital Chaos?

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RTTY first appeared on the HF bands in the 1950s and has always been a "live" mode, with the operators sitting in front of their teletype machines, or more likely these days in front of their computer keyboards. In the '80s, when error-correcting modes such as AMTOR and AX.25 packet radio appeared, some amateurs saw the possibility for using computers for automatic message handling. Since then, activity on digital modes has been split between the mainstream "live QSO" fraternity and those who saw digital modes as a means to get messages from A to B, with unattended HF mailboxes as the key components in the link. Nowadays most of the HF mailboxes are using various forms of PACTOR rather than the earlier AMTOR and AX.25 modes. Networks such as Winlink 2000, for example, provide a valuable service by making it possible for hams in remote locations to exchange e-mail with the Internet.

However, live and automated HF digital activities are increasingly in conflict. A live-QSO operator will establish that a channel is clear by listening before calling, whereas a mailbox has no way of doing this. Although some mailboxes have a "busy channel detector" to detect another signal of the same type already on a frequency, these devices don't work well if there is some other type of signal present, and this often results in interference. The error-correction (ARQ) techniques in use by these mailboxes do not suffer major disruption from such interference, just a slowing down of the store-and-forward process. But the live-QSO operators get understandably angry when their real-time two-way conversations are disrupted by a mailbox that "doesn't listen first." This conflict is not just competition for spectrum space. It's a fundamental incompatibility between different ways of using the spectrum.

Both the FCC and the IARU have tried to solve this problem by placing mailboxes in one part of the digital sub-bands and live operators in the other. This worked while the majority of mailbox activity was AX.25, but the PACTOR stations never embraced this scheme. Today there are few PACTOR mailboxes that operate in the section allocated for automatic activity—they are spread over the whole of the rest of the data sub-bands and the level of interference is now higher than ever. The present rules are ineffective.

If one asks the average PACTOR mailbox operator why he won't use the automatic sub-bands along with the remaining automated AX.25 packet stations, he will typically reply, "You wouldn't like to suffer interference from AX.25, so why should we?"

To understand the reasoning behind this response, it is necessary to study how ARQ systems handle interference. If the interference is due to natural causes like fading or noise, the link halts briefly then carries on. Even random man-made interference only causes pauses in the traffic and the slowdown factor is tolerable. But if the interference persists, the ARQ link keeps repeating until the interference stops. Worse still, if the interference tries to continue until the ARQ link itself stops, then the slowdown factor becomes rapidly worse. Here then is the real reason why ARQ mailbox operators are reluctant to share spectrum with AX25 packet. *ARQ is not good at fighting interference that fights back.*

This is not only true for a ARQ link suffering interference from AX25 packet; it's actually worse for an ARQ link suffering interference *from another ARQ link*. Because of this, ARQ systems have naturally tended to spread out so that no mailbox will suffer interference from another, particularly over the part of the band where the expected interference does not "fight back," namely the "live-QSO" part of the band. No matter where two live operators start a two-way conversation on a clear channel, there will always be a chance that it will be hit by an automatic ARQ system.

Note that the AX.25 packet protocol has the "back-off" feature that allows several AX.25 links to equitably share a channel, so AX.25 mailboxes are happy to operate in a bunch. The above analysis explains why ARQ mailboxes will always prefer to spread out and why they dislike the "automatic" sub-bands.

The present situation, in which the majority of live-QSO operators are subjected to interference from a small minority of unattended mailboxes, cannot be allowed to continue. The problem can be solved if the ARQ mailbox fraternity can accept that it has to find ways for ARQ systems to operate in the presence of interference from their own kind. This could take the form of a much higher use of "busy channel detect" devices, or simply to program them not to keep repeating when there is persistent interference, but to quickly abort a stalled link and try again later, in a process equivalent to the AX.25 back-off protocol. Such techniques could enable them to operate in a contiguous group of shared channels rather than on a one-per-channel basis; that is, with their total traffic load concentrated into a much smaller number of fully loaded channels rather than spread thinly across the digital sub-bands. With the automatic sub-bands being busy most of the time, the live-QSO operators will know to keep away and will not therefore either suffer or cause interference. The present automatic sub-bands, which are now very little used by AX.25 packet, can easily accommodate the expected traffic levels.

This proposal, if embraced by the mailbox fraternity, could enable the present problem to be solved without any changes to the present ineffective rules.

I would like to thank Peter Martinez, G3PLX, for his invaluable assistance in preparing this editorial.

QST Op-Ed Policy

The purpose of Op-Ed is to air member viewpoints that may or may not be consistent with current ARRL policy.

1) Contributions may be up to two-thirds of a *QST* page in length (approximately 900 words).

2) No payment will be made to contributors.

3) Any factual assertions must be supported by references, which do not necessarily have to be included in the body of the article to be published.

4) Articles containing statements that could be construed as libel or slander will not be accepted.

5) The subject matter chosen must be of general interest to radio amateurs, and must be discussed in a way that will be understandable to a significant portion of the membership.

6) With the exception that the article need not be consistent with League policy, the article will be subject to the usual editorial review prior to acceptance.

7) No guarantee can be made that an accepted article will be published by a certain date, or indeed, that it will be published at all; however, only articles that we intend to publish will be accepted, and any article we have decided against publishing will be returned promptly.

8) Send your contributions to ARRL Op-Ed, 225 Main St, Newington, CT 06111. QST

NuMorse Professional version 1.30

Aids to mastering Morse code certainly have come a long way since the days of code tapes—or, if you're a real old timer, phonograph disks or, older yet, the punched-tape Instructograph. *NuMorse Pro* software by Tony Lacy, G4AUD, not only contains all the tools needed to learn Morse from scratch, it also has the means to generate an actual Element 1 examination or serve as a keyboard CW program.

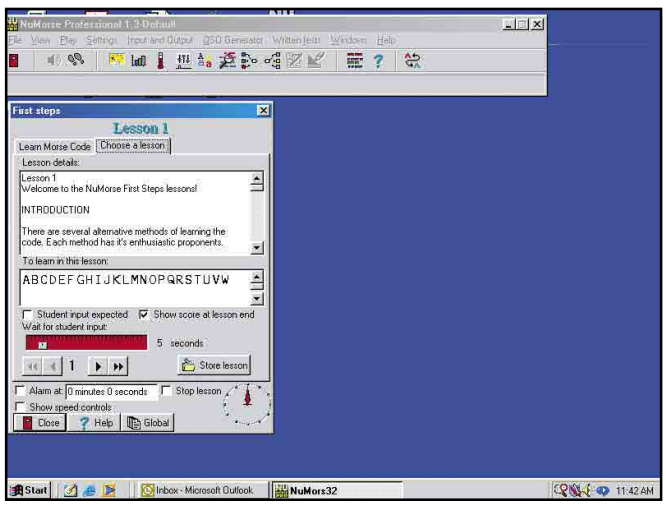
NuMorse Pro includes a 29-lesson Morse code tutorial. For newcomers, the program assigns mnemonics for each letter—like "kangaroo" for the letter K, and "a jar" for the letter A. Some of these were a bit obtuse, such as "binocular" for B. "Pea in a pod" for P, while cute, *sounds* more to me like it should be the mnemonic for the letter X.

True to its name, *NuMorse Pro* is not just for beginners. If you aspire to the ranks of the QRQ (high-speed) ops, *NuMorse Pro* might help boost you to the 50 WPM level too. Beyond that, you're on your own—that's as high as it goes. It's also a great source of practice for those priming for a contest like ARRL November Sweepstakes or CQ World Wide CW and who lack complete confidence in their ability to copy code at, say, the 30 WPM level.

At startup *NuMorse Pro* offers a choice of Koch or "default" method. In Koch, you start right out at your "target" speed (say, 25 WPM) with just two characters. Get those down pat and the program adds more characters, until, eventually, you've mastered them all. For multiple users, the program permits storing several user profiles—a handy feature for classroom-type applications.

The program has two basic user modes—"drill" and "play." The "input devices" for *NuMorse Pro* include text files (you can, of course, generate your own with your word processor and save them as .txt files). Also, the program will do random character generation, play CW from the keyboard (and you can map special characters, such as prosigns), and intercept keystrokes.

The "intercept keystrokes" selection is supposed to play the code characters you type into other *Windows* programs, such as a word processor. This could be a handy way to learn (or at least become more familiar with) the code while doing other work, but I had limited success with it. The program only "intercepted" occasional characters, not all of them. I tried different settings but couldn't seem to get this feature to work as advertised—at least not with *MS-Word* and my e-mail program on the aging 233-MHz Pentium-class machine I have in the ham shack. The program did create a file of what I'd typed, however.



Of course there's a QSO generator, so you can practice "taking the test." There's even an option to ensure the program follows FCC Element 1 testing guidelines for this. The call sign generator is a terrific contest primer, especially if your last contest Log Checking Report indicated a surfeit of busted call signs!

You can set a virtual keyboard to show the keypresses as the letters are sent, display the text sent and accept—and evaluate—input from the user, although this sometimes seemed more like a test of my keyboarding skills than my ability to copy Morse code—especially at higher speeds (I never did learn how to copy fast CW on a typewriter—only in my head).

Drill settings let you, among other things, decide how many times to repeat code just sent if it detects an error (ie, the student presses the wrong key), or how long to wait before restarting drilling after an error.

If you like, this program can be set up to send Morse from the PC keyboard or from a text file to your transceiver for on-the-air use, so it's plenty versatile.

"Real Morse" options was my absolute favorite feature. This lets you apply real-world conditions to the Morse you're listening to. Here you can add background noise and fading (both adjustable) to the signal, as well as impulse noise and ignition noise. The end result very much resembles on-the-air CW—uncannily so, in fact. The only problem I noticed was that—at least on my PC—there were actual dropouts in the background noise (sort of like a squelch or noise gate) that sometimes affected your ability to read the characters. This was disconcerting.

The "Sound board options" window even lets you apply a time constant to the CW waveform you're hearing (or none at all); *NuMorse Pro* recommends 1 ms. There are three choices of CW pitch—400, 600 and 800 Hz, which ought to satisfy most users.

The "Speed (WPM)" window permits adjustment of several variables to obtain an overall code speed. You can set the "code speed of characters" and then adjust the spacing (*a la* Farnsworth) and insert extra spacing (on a scale of 0-10, the longest being about 1 second) between individual words. The resulting overall code speed is displayed. Other buttons let you store and later recall up to three particular settings. An "automatic speed control" setting can adjust speed according to your ability to copy it on the keyboard. It also can vary sent code speed (eg, increase speed at a preset increment and interval) during a code session.

Other odds and ends include a small library of sound files (the sound of a spark gap is among them) and the text of the *Titanic* distress call sent by Radioman Phillips from MGY that fateful night.

NuMorse Pro is a useful tool for either learning Morse code from scratch or for ratcheting up your CW skills. The help files are, well, helpful, and organized and clearly written, with lots of hyperlinks to specific topics. Most users will be able to install the program and have it up and running in short order.

Manufacturer: NuWare, Llanoris, Llanerfyl, Welshpool, Powys, SY21 0EP United Kingdom; **www.nu-ware.com**. NuMorse Pro *can be downloaded free of charge at* **www.nu-ware.com/NuMorseP/nmpdload.htm**. *Registration is $34. You can also receive* NuMorse Pro *on CD-ROM by postal mail for $59.95. Minimum system requirements: 130-MHz Pentium PC running* Windows 95/98/NT/ME/2000/XP *with a Soundblaster-compatible sound card and a printer driver installed (even if a hardware printer is not actually connected).*

Rick Lindquist, N1RL ♦ ARRL Senior News Editor ♦ rlindquist@arrl.org

ROTATING PEGBOARD STORAGE

◊ Would you like to store tools and hardware on pegboard, but you don't want to cover a wall with the stuff? Would you like to transport the pegboard and parts to wherever you're working? Why not build some space-saving, portable pegboard storage? You will need a few hand tools (drill, wrench, saw, hot glue gun and glue) and the materials in Table 1.

The simplest way to construct this project is shown in Figure 1. (With precise cutting and fitting, craftspeople could produce smoother corners—*Ed.*) Cut four of the sticks to the length of the pegboard less the thickness of two plywood sheets ($24 - {}^3/_8 - {}^3/_8 = 23{}^1/_4$ inches). Hot glue two of the sticks to the long edges of one pegboard piece (A). The sticks should be flush with each long edge of the pegboard, and the pegboard should overhang the sticks by $^3/_8$ inch at each end to allow room for the plywood squares. Prepare a second pegboard piece (B) using the other two cut sticks. The $^3/_8$-inch square sticks will support the pegboard *from the inside* at each corner.

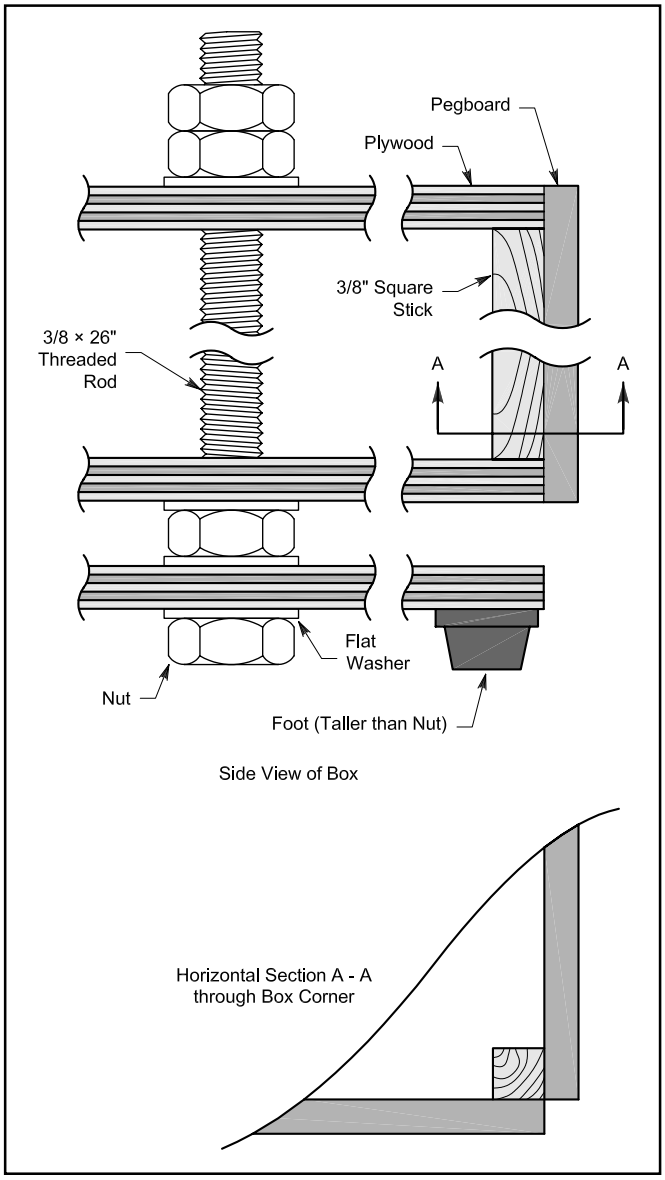


Figure 1—A mechanical drawing of the rotatable pegboard storage assembly.

Figure 2—The author's finished pegboard carousel.

Table 1—Materials Required

1—24×48-inch piece of pegboard cut into quarters (4 pieces, 24×12 inches)
4—Wood sticks $^3/_8$-inch square by 36 inches long
1—$^3/_8$-inch-diameter threaded rod, 26 inches long
4—Nuts and 4 flat washers to fit the threaded rod
3—12×12-inch pieces of $^3/_8$-inch-thick plywood
4—Rubber feet (high enough to clear the washer and nut)

Drill holes in the centers of the three pieces of plywood for the threaded rod. Glue the edge of one plywood square (E) to the end of prepared pegboard piece A. Glue the edge of another plywood square (F) to the opposite end of A. Glue one of the remaining pegboard pieces (C) to plywood squares E and F and the stick at one edge of piece A. Glue one stick of pegboard piece B to the free edge of piece C and the edges of plywood squares E and F. This forms a pegboard U with plywood squares at both ends. Finally, glue the remaining pegboard piece to the plywood edges and sticks at the open side to finish the box.

Spin a nut and washer about one inch onto one end of the threaded rod and insert that end through the remaining plywood piece. Install a washer and nut under the plywood and tighten the first nut snugly against the top of the plywood. Place a flat washer on top of the nut and feed the end of the rod through the box. Install a flat washer and two nuts on the rod that extends from the top of the box. Tighten the upper nut against the lower one, as a jam nut, so that the box turns freely. Trim off any extra rod or install a cap nut as a safety measure. Add rubber feet on the bottom plywood piece to form a stable platform. Now you have space-saving rotatable pegboard storage (Figure 2) for your tools or electronic parts.—*Dave Malara Jr, KB2UBO, 40 E Fieldstone Cir # 5, Oak Creek, WI 53154;* **dmalarajr@wi.rr.com**

SOLDERING-IRON CONTROLLER

◊ I suffer from a common problem, forgetfulness. Some people call it "senior moments." I simplify it to "Oops!" Specifically, I'm talking about leaving my soldering iron hot and ready at the workbench for days or weeks without being touched. Before I designed and built this project, my iron was constantly wasting energy, or even failing with barely any real use.

When I learned about the BASIC stamp microprocessor, I thought a good first project would be a soldering-iron controller to turn off the iron when I'm not using it. As the project developed, more "features" came to mind and were added to the design. The current version (Figure 3) includes a warm-up timer, restart switch, shutdown warning and an on/off switch.

The on/off switch wasn't a necessity, since the controller will switch off the iron automatically after a predetermined time. I added the feature when I realized there was no way to manually switch off the iron, for those days when I "remembered."

The controller is basically a series of timers. A push of the start switch applies ac to the power supply, which powers the stamp. The start-up code of the stamp immediately activates the relay, latching the power on. A tone is sounded then the warm-up timer then starts; an LED flashing approximately twice each second indicates warm-up operation. Pressing the restart button during the warm-up cycle extends the cycle by two minutes.

When the warm-up cycle is complete, the unit sounds a few quick beeps to signal that the iron is "hot and ready." The LED then stays on constantly and a second timer starts. This is the "quiet" time, when I can use the iron.

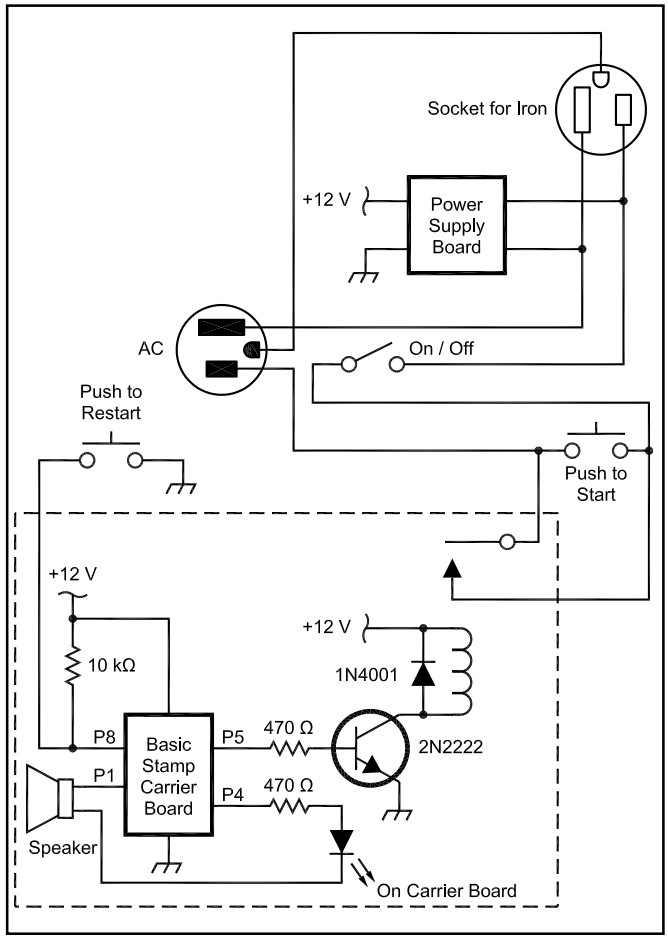


Figure 3—The soldering-iron controller.

When the second timer expires, about 30 minutes later, the unit flashes the LED and emits a short beep every second for a minute. This is the shutdown warning period. During this time, pressing the restart button will abort the shutdown sequence and restart the "hot and ready" cycle timer for another 15 minutes. If restart is not pressed before the shutdown warning timer expires, the unit will shutdown by deactivating the relay, removing power from the iron and the controller.

The total shutdown of power is one of my criteria for the project. When the controller is sitting there on the bench, it doesn't use *any* power. When activated, it only continues to use power as long as someone is around to press the restart button occasionally.

In the code, all timing parameters are set in the controller as constants, making it easier to change the timers to suit your preferences. Just make the appropriate changes, compile the program and install it in the stamp.[1]

From the code, you can see that the controller really is a series of timers. First we set the parameters for the warm-up timer, then call the timer procedure. When the timer procedure returns, we take action based on the result code, which indicates that either the timer expired or the user pressed the restart button.

After the warm-up timer has expired, we start the quiet-time timer. Again, we take action based on the result code, either starting the shutdown cycle or extending the quiet time.

The shutdown cycle includes sounding the tone every second. If the user presses restart, we jump back to the quiet-time cycle, extending it as designated. If the timer simply "times out," the processor deactivates the relay, which switches the unit off.

The timer procedure is the heart of the controller. It takes six input parameters, updating three of them as needed, and returns one output variable, TM_Result, which contains the reason that the procedure returned.

The input parameters include the length of the timer in minutes and tenths of a second. We use tenths because the timer uses a Pause command to pause for 0.1 second between button checks. Although it's a little inaccurate, it's close enough for this application. The timer deducts one tenth of a second from the count during every loop. When the count reaches zero, the routine checks the minutes remaining and either exits the procedure, returning "expired," or adds another minute to the tenths-of-seconds counter and keeps looping.

Other parameters control whether the time procedure will flash the LED, how fast to flash it and whether to sound tones. It's fairly simple code that could easily be modified for more accuracy or other features as desired.

Since building and using this project, I've never had to wonder if I remembered to turn off the iron. I always know it will turn itself off, saving irons, energy and money!—*Lawrence R. Houbre Jr, AA1FS, 63 Sycamore St, New Bedford, MA 02740;* **aa1fs@arrl.net**

[1]You can download the code from *ARRLWeb* at **www.arrl.org/files/qst-binaries/**. Look for 02HK09.ZIP.

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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.

The Kenwood UT-20 1.2 GHz Module for the TS-2000

Reviewed by Tom Williams, WA1MBA
ARRL Contributing Editor

The ARRL Lab reviewed the Kenwood TS-2000 several months ago (*QST*, July 2001). I read this review with great expectation, being an owner of Kenwood's TS-950SDX, a radio that is central to my VHF, UHF and microwave home station. The TS-2000 is affordable (for a high-end rig) and has several VHF and UHF bands included. The trend to include higher bands (such as in the ICOM 706 MkIIG and the Yaesu FT-817 and FT-100D) has been extended with the promised addition of the 23 cm band in the TS-2000.

When the Lab had the UT-20 module (covering 1240 to 1300 MHz) installed in this radio, they decided to have it tested on the air, and asked for my help. Unfortunately, it had a significant problem when I put it on the air; the 1296 signal was very constrained and somewhat distorted on SSB. The signal was fine on all other modes and on all modes on all other bands. It was sent back to Kenwood, and they discovered the problem, reporting that a change in the procedure for installation of the UT-20 module will eliminate the problem in the future.

Upon its return, I found that the problem was indeed fixed. So, in addition to having locals give me reports, I asked the Lab to let me use it during the ARRL June VHF QSO Party. This gave me plenty of experience quickly changing bands, listening and hunting for weak signals, dealing with interference and running many hours straight-out.

Getting Physical

This report does not cover all the basics of the TS-2000. Please read the review in July 2001 *QST* for details of all the functions that are common to all bands.

There are separate antenna connectors for HF+6M, 144, 432 and 1296 bands. N connectors are used on 432 and 1296. The 1296 connector is on a 4-inch coax pigtail. A standard circular 8-pin DIN socket EXT CONT that has a separate connection for each band and ALC inputs as well provides the T/R control. It is primarily intended for connection of an external power amplifier, but can be used to control LNAs (low noise amplifiers, or preamps) and sequencers.

There are menu controls to turn each band's T/R control off, fast or slow. In fast it switches 10 ms prior to RF output, whereas in slow it switches 25 ms prior to RF output. In a serious VHF/UHF station, even 25 ms might not be enough to ensure that all switching has completed. Many stations have 100 ms or more allotted to T/R switching so that LNAs and amplifiers can be switched in an orderly manner with the required heavy-duty mechanical relays. In such installations, one should consider use of appropriate safety controls to prevent equipment damage. As an extra precaution, I installed an isolator on the receive port of the T/R relay that I connected to the TS-2000 1296 pigtail. This prevented any RF that might have come from the TS-2000 prior to the switching of that relay from damaging my LNA.

Performance and the Numbers

Selectivity seems as good as the '950, which is quite good. The use of IF DSP is a step up from audio DSP as was offered in the TS950SDX and other radios of the mid to late '90s. The filters in the '2000 are applied in the last IF rather than after detection so that signals are rejected one step earlier in the chain. Furthermore, digital detectors can offer improved audio fidelity and better unwanted-sideband rejection.

The two-tone third-order IMD receive dynamic range of 65 dB at 5 kHz is quite respectable for a 1296 MHz radio. I found no problems whatsoever working weak ones at the same time as a crusher contest station line-of-sight 25 miles from me was calling CQ only 10 kHz away.

Image rejection is excellent at 83 dB and IF rejection is 101 dB.

The speaker audio level little weak for contesting work, especially with other radios running and fans in shack. The lab measured just over 2 W of audio power at 10% THD. Personally, I could have used 10. I suspect that the addition of more preamp gain would raise signals to the point where the audio level is not an issue. Several speaker choices are available, with two speaker outputs and ways of directing main and sub-receiver audio into either or both speakers. One of the speaker jacks mutes the internal speaker when used.

While I would say that this radio is not very sensitive on UHF (less sensitive than a typical modern UHF transverter connected to an HF radio), it was quite immune to overloading. The MDS (minimum discernable signal) measurement of –139 dBm suggests that there is room for about 6 dB of noise figure improvement on the 23 cm band. Therefore, all that is needed is an external low noise preamp. In general, this is a good situation, primarily because most amateur stations have significant feed-line loss on these frequencies requiring the use of a preamp anyway. By installing a low noise amplifier at the antenna, with slightly more gain than is needed to overcome the feed-line loss, the complete system noise figure approaches that of the LNA, and the radio remains immune to overload.

Bottom Line

The UT-20 expansion module adds transverter-free microwave capability to a solid performer.

Brennan Price, N4QX ♦ Assistant Technical Editor ♦ n4qx@arrl.org

Table 1
Kenwood TS-2000/UT-20

Manufacturer's Claimed Specifications	Measured in the ARRL Lab
Frequency coverage: Receive and transmit, 1240-1300 MHz.	Receive and transmit, as specified.
Receiver	**Receiver Dynamic Testing[1]**
SSB/CW sensitivity, 10 dB S/N: 0.11 μV.	Noise floor (mds), 500 Hz filter: *Preamp on*[2] 1240 MHz –139 dBm
AM sensitivity, 10 dB S/N: 1.0 μV.	10 dB (S+N)/N, 1-kHz tone, 30% modulation[1]: *Preamp on* 1240 MHz 0.62 μV.
FM sensitivity, 12 dB SINAD: 0.18 μV.	For 12 dB SINAD[1]: *Preamp on* 1240 MHz 0.24 μV
Blocking dynamic range: Not specified.	Blocking dynamic range, 500 Hz filter[1]: *Preamp on* 1240 MHz 20 kHz, 98 dB*; 5 kHz, 80 dB*.
Two-tone, third-order IMD dynamic range: Not specified.	Two-tone, third-order IMD dynamic range, 500 Hz filter[1]: *Preamp on* 1240 MHz 20 kHz, 86 dB*; 5 kHz, 65 dB*.
Third-order intercept: Not specified.	*Preamp on* 1240 MHz 20 kHz, –15 dBm; 5 kHz, –38 dBm
FM adjacent channel rejection: Not specified.	20 kHz channel spacing, preamp on: 1240 MHz, 58 dB.
FM two-tone, third-order IMD dynamic range: Not specified.	20 kHz channel spacing, preamp on: 1240 MHz, 58 dB*.
S-meter sensitivity: Not specified.	S9 signal at 1240 MHz, preamp on, 40 μV.
Spurious and image rejection: 70 dB.	First IF rejection, 1240 MHz, 101 dB; image rejection, 1240 MHz, 83 dB.
Transmitter	**Transmitter Dynamic Testing**
Power output: CW, SSB, FM, 10 W high, 1 W low; AM, 2.5 W high, 1 W low.	CW, SSB, FM, typically 12 W high, < 1 W low; AM, 2.7 W high, < 1 W low.
Spurious-signal and harmonic suppression: 50 dB.	70 dB.
SSB carrier suppression: 50 dB.	47 dB.
Undesired sideband suppression: 50 dB.	57 dB.
Third-order intermodulation distortion (IMD) products: Not specified.	See Figure 1.

Note: Unless otherwise noted, all dynamic range measurements are taken at the ARRL Lab standard spacing of 20 kHz.
Third-order intercept points were determined using S5 reference.
*Measurement was noise limited at the value indicated.
[1]Tested with TS-2000.
[2]The preamp is always on for this band.

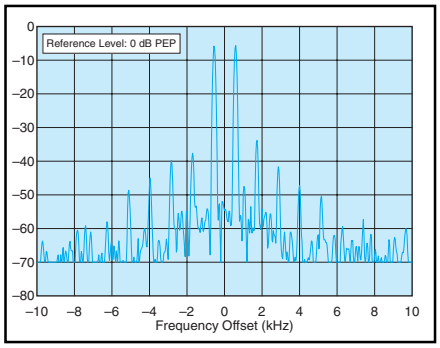


Figure 1—Worst-case spectral display of the UT-20 expansion module of the TS-2000 transmitter during two-tone intermodulation distortion (IMD) testing. The worst-case third-order product is approximately 34 dB below PEP output, and the worst-case fifth-order product is approximately 40 dB down. The transmitter was being operated at 10 W output at 1296.000 MHz.

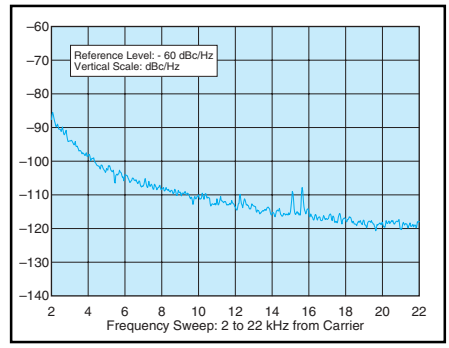


Figure 2—Worst-case spectral display of the UT-20 expansion module of the TS-2000 transmitter during composite noise testing 1296.020 MHz. Power output is 10 W. The carrier, off the left side of the plot, is not shown. The plot shows composite transmitted noise 2 to 22 kHz from the carrier.

The preamp gain in my home system is not high enough for this transceiver—I could have used another 5 dB or so. Nonetheless, I was able to work all stations during the contest that had transmit power similar to mine, and some with considerably less.

Transmitter

The output power matched the indicator very closely. I only needed 5 W to drive my power amplifier to full power. Some amplifiers will take all of the 10 W that are available. Reports of audio quality were identical at all power level settings.

The transmit IMD third-order products are down about 30 dB from peak envelope power and the fifth-order products are about 40 dB down (see Figure 1). These are respectable numbers for a 1296 signal at full power (10 W). There is no

noticeable distortion or splatter in the signal as reported by nearby amateurs receiving the signal at very high levels.

Transmitted composite noise (see Figure 2) is roughly 10 dB higher than on 432 MHz. This is expected as phase noise normally rises with frequency by just about this rate.

On the Air

Changing bands in a radio that has VHF and UHF built in is a breeze. Push one band change button a few times and you're there. Modes can be changed quickly—again, just one button.

The main dial knob is about the right size for easy tuning, and covers 10 kHz in one revolution on SSB/CW. This is a very comfortable tuning rate, especially when coupled with the (default but adjustable) 10 kHz clicks of the MULTI/CH secondary tuning knob that can assist quick QSYs during a contest ("let's go to dot two five oh"). I did not find a way to increase the mechanical drag on the primary tuning knob. Personally I would have preferred a little less freewheeling, but this is surely a matter of preference.

Although probably less of a useful feature on HF, folks that do non-FM work on VHF, UHF and microwaves will often need to switch between CW and SSB. Unfortunately, with many radios, this means moving frequency by 800 Hz to keep the signal tuned properly. I have a reminder next to my radio showing which way to move the knob when changing modes. The TS-2000 offers a menu (#37) choice to operate in the normal mode (retuning required) or in a mode that will change the radio's frequency by the necessary amount when you change modulation modes. I immediately set this mode on, and enjoyed quick mode changes that were just the way I liked them.

Two types of DSP noise reduction are provided with some control. My impression is that these can reduce fatigue, especially when listening to weak signals during rag-chew sessions, but is not very effective during contesting or DX chasing. I might form a different opinion if I lived with the radio for a while longer.

The transmit audio menu (#21) has several options for tailoring the response. I found that "conventional" worked best for me.

I tried the FM and AM modes to make sure that they worked well. The audio reports were very good and the tuning rate for FM felt right.

One thing that the higher frequency crowd will appreciate is the ability to control power independently on each band. Amplifiers all have different gain, and therefore different drive requirements. You can set the drive levels appropriately and have it all work right when you switch bands without tweaking the power or living with sub-optimal settings.

Wishes and Weaknesses

Of course, it is impossible to please everyone (especially me), and with such a compact package any radio will have some compromises. Here are some of the things that I personally would have liked to see different.

The 1296 band T/R connection has a brief "T" state (transmit relay engaged), a little over 10 milliseconds long during the power-up sequence. This is present whether or not the menu selection that chooses the T/R function for 1296 is on or off. In most installations, this will only be a small annoyance, especially considering that it only happens when the unit is turned on. This glitch does not appear on any other band.

As is the trend with HF radios, there are no transverter connections on this radio. The '950 and some of the other high-end radios had these connections in the past, but I do not know of any that have them presently. I have to assume that the designers figure that the radio has so many bands in it already that this feature would not be in high demand. Interestingly enough, there is a transverter frequency function in a menu that lets you set a readout offset (one only) if you were using the radio with a transverter! As a microwave operator who thinks of HF radios as IF radios, I find that the lack of transverter connections is a drawback. Most users, however, would not.

No doubt, because the rest of the world does not all have the 222 or the 902 MHz bands, these are not built into any of the HF+ multi-band radios. The TS-2000 follows suit, even though it does provide 222 MHz receive coverage. I'd still like to see these underutilized bands included. How else are we going to get more hams to use them?

The UT-20 vs External Transverters

External transverters have been the only way to achieve high performance on the VHF, UHF and microwave bands in the past. Recently, however, I have heard several reports of hams using this radio and others on the VHF and UHF bands for very serious and demanding applications including DX and EME. This is from amateurs who have actually given up their transverters in favor of an integrated radio! Clearly, having the other bands and a direct frequency readout built into a compact package is attractive—but EME? Well, yes.

This radio has plenty of stability, great keying and modulation, and tremendous selectivity now that IF DSP is ready for prime time. A mast-mounted preamp is a must for any serious UHF or microwave work anyway, so making sure that the gain level is right to overcome your radio's noise figure is just good practice. Is this a serious VHF and UHF radio? Sure, but add a good preamp.

A Nice Addition

If I were in the market for a new radio, I would certainly put this one on my list for comparison shopping. It has a lot going for it, and does a great job on the upper bands. As was stated in the original review of this radio, "You can't argue with success…" and I have to agree. This is one amazing package, and a great way to get started on the upper frequencies.

Manufacturer: Kenwood Communications Corp, PO Box 22745, Long Beach, CA 90801-5745; 310-639-9000; **www.kenwoodusa.com**. The UT-20 1.2 GHz module is only available installed prior to purchase, or installed after purchase of the TS-2000 by Kenwood Service. Cost: $550.

M² 23CM22EZA 1.2 GHz Antenna

Reveiewd by Dick Janssen, WD4FAB
ARRL Technical Advisor

Bottom Line

The M² 23CM22EZA offers a lot of gain in a small package and opens the door to AO-40 operation.

If you are looking for a new "magic band" these days, try the microwave bands of OSCAR 40 (AO-40). Many operators are discovering the joys of reliable armchair copy of S band (2401 MHz) downlink signals from all over the world using only a small dish antenna. They are using small uplink antennas on U band (435 MHz) and on L band (1269 MHz). The L band uplinks to AO-40 can use really small antennas—ones that nearly disappear when next to the large antennas

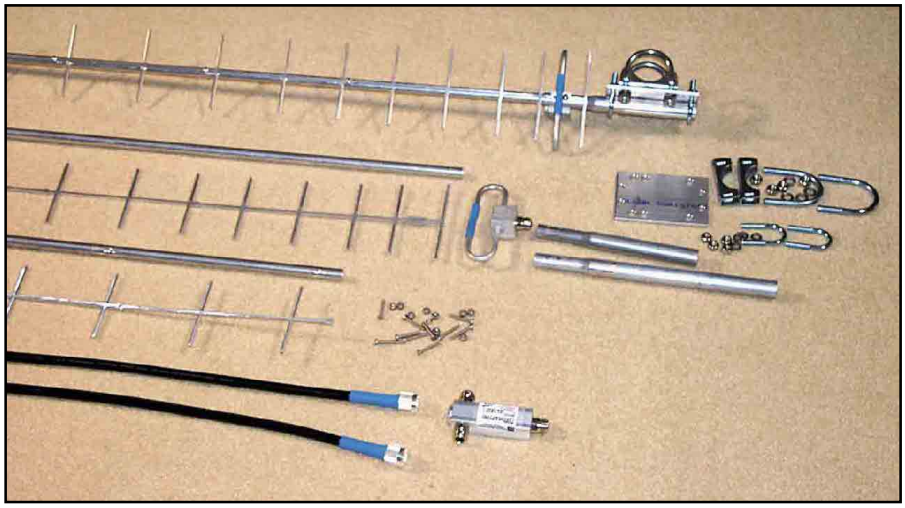


Figure 3—Before and after: a completed 23CM22EZA (top), and the parts of which it is made (bottom).

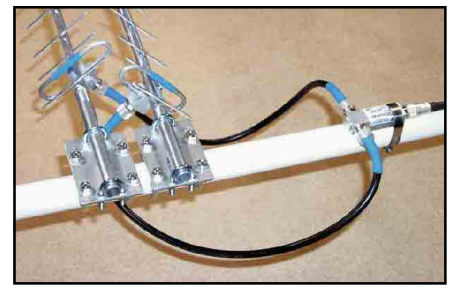


Figure 4—Mounting of two 23CM22EXA antennas for circular polarization.

that we used to use for AO-13. For my AO-40 station, I needed to find some kind of L band antenna for my uplink that would give me great performance with only the 40 W of 1269 MHz RF power that I had available at the top of my tower. My effort started a search for this high-gain antenna performance without the need for another, larger dish. I also wanted this antenna to be a right-hand circular polarized (RHCP) antenna so as to enhance my uplink signals to AO-40.

The answer for my L band needs was found in M^2's highest frequency Yagi, their 23CM22EZA. It is small, with only a 63 inch by 0.50 inch diameter boom. Two of these antennas, mounted side-by-side for circular polarization (CP) or in a stacked operation, will have practically no effect on the wind loading of your rotators.

Antenna Assembly

These antennas came in two rather small, 3.5-pound boxes less than 3 feet long. In addition to the antennas, the boxes contained a 23CM 2 Port PD (the 23 cm 2-port power divider) and a pair of phasing cables (constructed of rugged LMR400 coaxial cable with weather-sealing, silver plated type N coaxial connectors). Also included was an additional, extra-long rear mounting post needed for setting up the CP operation. All of these parts are partially shown, along with one of the assembled antennas in Figure 3.

The included screws and self-locking nuts for the antenna assembly were high-quality stainless steel. Unfortunately, this fine collection of antenna parts did not also include stainless steel U bolts and mast-mounting clamp hardware. What were included were high-quality, but conventionally plated bolts and clamps; these parts quickly corrode and do not maintain their usability. I hot-formed my own U bolts out of stainless steel threaded rod to solve the problem. Other than that, the parts for these antennas were very well made and finished.

The elements are not made of typical aluminum rods, but sheets of elements sets sheared out of 0.125 inch thick aluminum plate. There are only two of these element set "sheets" for each antenna. This construction method "allows the optimized design to be stamped out under numerical computer control, holding spacing and element lengths to 0.003 inch tolerance." The aluminum tubular boom is in two sections joined with a coupling sleeve. A folded dipole driven element is provided, attached to its sealed mounting block with an integral N connector. This antenna goes together with only ten screws, and nine self-locking stainless steel nuts. On examination, I felt a little uneasy with the firmness of the boom-coupling sleeve and so I cross drilled and installed two additional screws perpendicular to the original ones, adding to the comfort level of that joining sleeve.

As noted, there was an added "rear mounting post," which is a piece of 0.75-inch diameter aluminum tube that is swaged down on one end to slide over the boom. The large end of this post is U-bolt clamped to the boom-to-mast mounting plate, giving a rear mounting for the antenna, placing all of the active antenna completely in

Table 2
M² 23CM22EZA 23-cm Yagi

Manufacturer's Claimed Specifications	*Measured in the ARRL Lab*
Frequency of operation: 1250-1300 MHz	Tested only at 1269 MHz
Number of elements: 22	As specified.
Boom length / diameter: 63 in / 0.50 in	As specified.
Weight: 2 lb	As specified.
Wind area: 0.3 sq.ft.	
Wind survival: 100 MPH	Not measured.
Power rating: 600 W	Tested only at 40 W
VSWR, typical 1.1:1	1.19:1 at 1269, see text.
Input impedance / 50 Ω connector / N female	As specified.

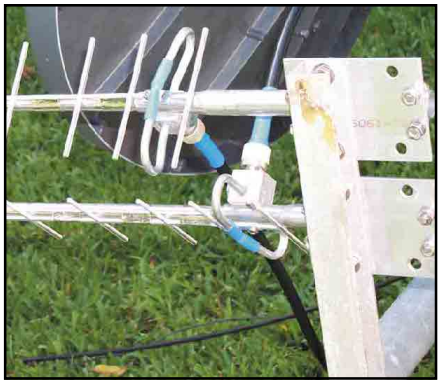


Figure 5—Channel mounting of two 23CM22EXAs for right-hand circular polarization.

front of the support structure. The extra-long rear mounting post was included to allow the mounting of one of the Yagi antennas a quarter wavelength in front of the other for the proper CP phasing. At 1269 MHz, a wavelength is 236 mm and a quarter wavelength is just 59 mm. With a tubing cutter I carefully trimmed this extra-long mounting post to 234 mm, which is exactly 59 mm (2.32 in) longer than the 175 mm long standard post, mounted on the first antenna.

M^2 provided special instructions for the use of these antennas in RHCP. They also give very specific orientation assembly information for placing the driven element on each antenna assembly and aligning the element planes with respect to each other. The driven element can be installed front-forward or front-backward, so to speak, and you must follow these instructions precisely, or be sorry about the results later.

Installation

If you are going to use these antennas in a CP array, you can follow the mounting idea shown in Figure 4, which illustrates a simple mounting of the two antennas onto an elevation boom just 0.38 wavelength (3.50 inches) apart. My final installation actually used a 25-inch-long piece of aluminum channel that I clamped perpendicular to the elevation boom. This allowed me the option of mounting the antennas in an H-plane stacked array or in a RHCP array, by providing all of the needed mounting holes when I had the channel in the shop. Figure 5 shows this channel mounting with the two antennas mounted for RHCP operation. An in-the-air view (Figure 6) shows the two 23CM22EZA antennas in operation in the stacked configuration, along with my M^2 436-CP30 U band antenna and my S band dish antenna.

M^2 also provides instructions for adjusting the antenna SWR. When I installed the antennas on my tilted-over tower, I applied power to them using a Heathkit SM-4190 Bi-Directional RF Wattmeter. For the tests, the initial con-ditions we read were Pf = 40 W and Pr = 1.5 W, for SWR = 1.48. Bending the driven element in a "bat wing" configuration quickly showed that we could get the reflected power levels down to Pr = 0.3 W, or SWR = 1.19:1. At this point I decided that the reflected power was already quite well down on the meter scale. I would have had to measure a reflected power less than Pr = 0.1 W to get the desired VSWR = 1.1:1, and that did not seem worth the effort. The really crazy looking driven elements of Figure 3 are from this tuning effort—but that is what M^2 advises!

On the Air

The 23CM22EZA antennas were first operated as a stacked H plane configuration spaced 22 inches apart. By manually adjusting my antennas I found that I had greatly improved results when I pointed the array 4° up from the computed position—and the light dawned. In the stacked configuration, these antennas have a very narrow H-plane (elevation) half-power-beam-width (HPBW) of only 11.5° in H plane, while it is still a reasonable 27.8° in E plane (azimuth). A 4° elevation pointing error will really be noticed, as I did. This was corrected on the ground in the antenna rotator control boxes.

Operation of the stacked array now provides very good performance. I hear the satellite transponder noise floor and this sets my receiving limits. Typically, the AO-40 transponder noise floor will read S3 on my IC-746's S meter. AO-40's LEILA will impose a limit on U band uplink signals, allowing them a maximum S8 (as seen on my receiver). The AO-40 beacon will normally read a S9. These conditions amount to downlink signals that are peaking 15 dB above the noise floor while the beacon is 25 dB above the noise floor, all as S+N/N values from my S meter. All this said, the stacked 23CM22EZA antennas consistently provided me S7 to S8 downlink signals, meaning that they gave me signals that were running 12-15 dB above the noise floor. Not bad.

The antennas were remounted for RHCP in the holes already provided in the channel on my elevation boom. AO-40 was in view and at its 59,000 km apogee with a low squint angle just after this work. My first signals were really a "Wow!" RHCP does make a difference and we saw it immediately, bringing back signals that were clearly S8, or 15 dB, over the S3 noise floor, all on my meager 40 W PEP of 1269 MHz RF power. Operations over the days since this work have confirmed these results.

Figure 6—On the air at WD4FAB: two completed 23CM22EXAs in action at the author's station.

In Summary

As my equipment is limited, I cannot provide a solid, side-by-side set of numbers directly comparing these antenna arrangements, the H plane stacked vs RHCP arrays. I can, however, clearly declare that there is no loss of performance on AO-40 by having the antennas in the RHCP configuration, even though they are about 3 dB lower gain than when in the stacked array. In fact, I feel that these antennas in RHCP may actually provide AO-40 downlink signals that are 1-2 dB greater than when they are in the H plane stacked array. On AO-40 these differences are noticeable.

In talking with AO-40 operators in other areas, it developed that this antenna is also popular with operators communicating over some pretty long tropospheric scatter paths on 1296 MHz. M^2 has taken pains to design this antenna for operations over a pretty wide part of the spectrum. I have not been able to test them at 1296 MHz, as my equipment for that part of the 23 cm is not working.

There is no question that the 23CM22EZA antenna is a keeper. Its design packs a lot of gain in a small package. While this antenna is very easy to put together, and its performance is just super, I felt that the element mechanical design is just a little tender. I found that the elements could be easily bent out of order if I was not especially careful.

Manufacturer: M^2 Enterprises, 7560 N Del Mar Ave, Fresno, CA 93711, tel 559-432-8873; fax 559-432-3509; **www.m2inc.com**. Manufacturer's suggested retail prices: 23CM22EZA, $138 each; 23CM 2Port PD, $65; UHF 50 Phasing Kit, $79.

ICOM PS-125 Power Supply

Reviewed by Steve Ford, WB8IMY
QST *Editor*

Thoughts of 25-A dc power supplies conjure images 2of transformers so large and dense that they substantially warp the space-time continuum in their immediate vicinities. Prior to about 1980, they were your only choice when you needed to generate lots of dc current from an ac source.

Technology marches on, though. Thanks to switching power supply design, we can now convert 60-Hz ac up to a much higher frequency. This enables small, lightweight transformers to perform the step-down magic from 110 V to 12 V, or whatever our radios require. The higher-frequency ac is also easier to filter and regulate.

The results are power supplies that can deliver high current in small physical spaces without inducing hernias whenever you attempt to move them. The trade-off—there is *always* a trade-off—is that the frequency-conversion aspect of the switching power supply tends to generate a fair amount of RF noise. So the challenge for switching power supply designers is to provide stable current and voltage without creating an unacceptable level of interference in your transceiver.

The PS-125

The ICOM PS-125 25-A power supply is about as simple and unadorned as you can get. It is a 4 × 4 × 11-inch black box that weighs less than 7 pounds. There is an ON/OFF rocker switch and an LED indicator on the tiny front panel—nothing more. The ac power cord is removable, but the dc cable is fixed. The dc cable is about a foot long and terminates in a square 6-pin Molex connector. This connector is compatible with a number of ICOM rigs, including the IC-706 series. If you are interested in using this supply with other non-ICOM radios or devices, you could attach a mating connector and run your wiring from there. Or, simply whack off the Molex connector and attach your wiring directly.

The PS-125 worked just fine with my IC-706 transceiver. The PS-125 was physically quiet and cool. It didn't break a sweat while delivering 20 A to run 100 W on RTTY.

But how "RF quiet" is the PS-125? According to ARRL Laboratory tests, at least as quiet on the HF bands as other comparable switching power supplies on the market. See Figure 7 and compare the other models including the ICOM PS-85, featured in the January 2000 *QST* Product Review column, pp 70-73.

Manufacturer: ICOM America, 2380-116th Ave NE, Bellevue, WA 98004; tel 425-454-8155; **www.icomamerica.com**. Street price: $299.99.

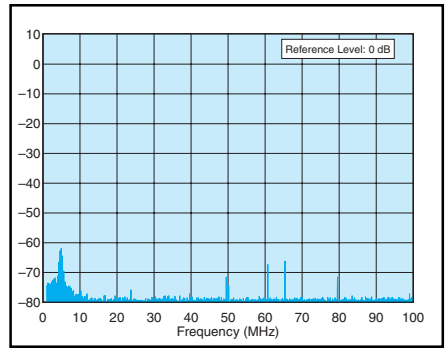


Figure 7—A spectral plot of the output of the ICOM PS-125 under load. This supply exhibited low levels of broadband noise. The most prominent peak appears between 4 and 7 MHz.

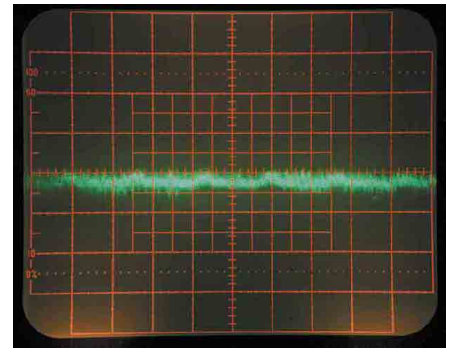


Figure 8—An oscilloscope trace of the dc output of the ICOM PS-125 while operating under a 20 A load. The vertical scale is 50 mV/div and the horizontal scale is 5 mS/div.

Table 3
ICOM PS-125 serial number 01819

Manufacturer's Specifications

Power requirement: 85-135 V ac.
Output voltage: 13.11-14.49 V dc (13.8 ±5%).
Output current (continuous): 25 A.
Size (HWD): 3.7×4.4×11.3 inches; weight, 6.6 pounds.

Lab Measurements

Output voltage, no load: 14.28 V dc.
Output voltage, 21 A load: 13.85 V dc.
Low line drop out voltage: 65 V ac.
DC variation during dynamic testing: ≈ 300 mV.

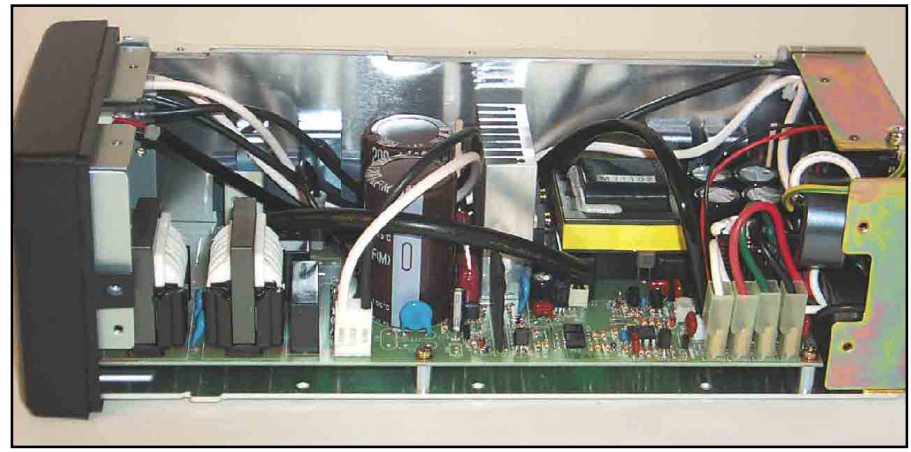


Figure 9—A view of the interior of the ICOM PS-125.

ARRL to FCC: Economics Should Not Guide Amateur Radio Spectrum Policy

The ARRL has told the FCC that marketplace forces should not determine Amateur Radio spectrum allocations and that interference management is a technical, not an economic, issue. Those opinions and others came July 8 in response to a call from the FCC Spectrum Policy Task Force for comments on various issues related to FCC spectrum policy.

"The value to the public of a vital, growing Amateur Radio Service, while perhaps only indirectly measurable in market terms, cannot translate to a marketplace ability to pay for spectrum, no matter what the mechanism," the League told the Task Force. "The non-pecuniary character of Amateur Radio makes it uniquely unsuitable for market-oriented allocation processes." Such a policy, the ARRL said, would "preclude Amateur Radio communications."

The ARRL compared Amateur Radio spectrum to a public park or right-of-way. "Given the wide availability of Amateur Radio to the general public and its value as an educational and public service resource, the concept fits well," the League said.

The ARRL said that "economic balancing" among parties is not the proper mechanism to resolve interference issues. From an Amateur Radio perspective, the League said, "any economic model for interference resolution would effectively place it and other non-commercial services at the mercy of any commercial device manufacturer or industry group." Many interference issues are dealt with using technical solutions that accommodate both parties, the ARRL said, while an economic model presumes a preference for one service over another.

The non-pecuniary character of Amateur Radio makes it uniquely unsuitable for market-oriented allocation processes.—ARRL

The ARRL again took advantage of the comment opportunity to reiterate its views on the deployment of unlicensed devices under Part 15 rules. Petitioners seeking authorization for new devices or technology that impacts licensed users should bear the burden of demonstrating the current state of use of the band by their own technical calculations or measurements in certain types of environments, the ARRL said. "As to spectrum congestion, that is perhaps the area about which the Commission has the least information and about which it should have the most."

Noting its participation in a study that will contribute to a better understanding about ambient noise, the ARRL said the FCC should require proponents of new devices or technology to provide "studies of individual and aggregate interference potential and effect on ambient noise."

The League also restated its view that unlicensed devices cannot be authorized unless the FCC determines that the devices "do not have a significant interference potential to licensed services." The ARRL said the FCC "has pushed the Part 15 concept beyond the point that it works; no unlicensed device should be permitted to substitute for licensed fixed or mobile radio services." Petitioners also should provide technical sharing studies every time they propose a new allocation or file a petition for a new unlicensed service, the ARRL said.

The League's comments also restated the goal of the Amateur Radio Spectrum Protection Act, now in Congress as HR 817 and S 549. The measure would require the FCC to provide equivalent replacement spectrum for the Amateur Service just as it typically does for users displaced as a result of spectrum auctions.

FCC WRC-03 Advisory Panel Recommends Phased-In Worldwide 7-MHz Band

The FCC in June released the draft recommendations of its World Radiocommunication Conference 2003 Advisory Committee (WAC). Among the panel's recommended draft proposals to next year's international gathering is a plan—still subject to change—that would create a worldwide amateur allocation at 7.0 to 7.3 MHz by 2010. The deadline for comments on the proposals was July 12.

The draft proposals "may evolve as we approach WRC-03 and during the course of interagency discussions," the FCC noted in a *Public Notice*. "Therefore, they do not constitute the final national position on these issues."

While US amateurs already enjoy a 7.0 to 7.3 MHz allocation, only 7.0 to 7.1 MHz is available to amateurs in all three International Telecommunication Union regions, with 7.1 to 7.3 MHz available to broadcasting in much of the rest of the world. The draft proposal for WRC-03 agenda item 1.23 dealing with possible realignment of the 7-MHz amateur allocation calls for making 7.1 to 7.2 MHz available worldwide by April 1, 2007, and the 7.2 to 7.3 MHz segment by April 1, 2010. Broadcasting allocations would shift upward by 100 kHz at the same time—to 7450 kHz by 2007 and to 7550 by 2010. The intervening periods would permit time for international broadcasters and other services to adjust their operations accordingly.

The International Amateur Radio Union already is on record in favor of the approach. An earlier suggestion to shift the 40-meter allocation down by 100 kHz came off the table earlier this year to avoid affecting Fixed Service operations between 6765 and 7000 kHz.

In other draft proposals affecting the Amateur Service, the FCC's WRC-03 Advisory Committee has recommended no change to the table of allocations in the band 420 to 470 MHz. Agenda item 1.38 will consider providing up to 6 MHz of

Rick Lindquist, N1RL ♦ Senior News Editor ♦ n1rl@arrl.org

HIGHER AMATEUR VANITY CALL SIGN FEE EFFECTIVE SEPTEMBER 9

♦ The FCC has officially set $14.50 as the cost to apply for, renew or reinstate an Amateur Radio vanity call sign. According to a *Report and Order* adopted July 3, the new fee will become effective for applications received on or after September 9. The current vanity fee is $12 for the 10-year license term. The FCC had proposed the new, higher fee in a *Notice of Proposed Rulemaking* (MD Docket No. 02-64) released March 27 to set Fiscal Year 2002 fees.

In its *R&O*, the FCC took the opportunity to justify its charging the vanity fee for vanity renewals as well as for initial applications. In comments filed in the proceeding, the FCC said, Steven Karty, N5SK, and William J. Hanrahan, W1WH, supported the payment of a regulatory fee to cover the initial administrative cost but questioned having to pay the fee upon renewal.

Hanrahan suggested that the FCC should be able to reasonably adjust the fee it charges initial vanity call sign applicants based upon actual administrative costs and that renewals should not incur any additional overhead. "Further, subsequent to the initial license term, no distinction should be made between vanity calls and systemically assigned calls," Hanrahan commented. The FCC now distinguishes between vanity and sequential call signs in its database as "HV" and "HA," respectively.

The FCC said that because it continues to incur costs related to vanity call signs even after their issuance or renewal, it believes the regulatory fee at renewal is appropriate. "Section 9 of the Communications Act, as amended, provides for the recovery of the Commission's costs associated with its enforcement, policy and rulemaking, user information, and international activities," the FCC said in its *Report and Order*. "Every day, Commission staff are engaged in activities involving amateur vanity call signs, such as protecting the assignment of vanity call signs, investigating complaints on the improper or illegal usage of call signs, requests for call signs that are already assigned to someone else, and all related research that is necessary to insure the proper assignment of call signs."

The FCC said it must collect nearly $218.8 million through regulatory fees to recover its costs for FY2002. That's $18.6 million—or approximately 9.3 percent—more than the amount designated for recovery through regulatory fees in FY2001. Of the total, the FCC estimated vanity fee revenue for FY2002 at $130,500. The FCC has estimated that 9000 applicants would apply for vanity call signs in FY2002.

PETITION FOR RECONSIDERATION FOLLOWS FCC'S DENIAL

Nick Leggett, N3NL, and Don Schellhardt have asked the FCC to reconsider its staff-level denial of their petition that would have required all electronic equipment subject to the Commission's jurisdiction—possibly including amateur gear—to be shielded against electromagnetic pulse (EMP) damage. In late May, the FCC dismissed the petition, designated RM-10330, saying that comments filed overwhelmingly favored that action. In their reconsideration request, Leggett and Schellhardt noted that they now have sent letters requesting the support of key congressional leaders as well as members of the Executive Branch, including President George W. Bush.

"We will soon see which of these individuals, if any, are willing to extend themselves on a matter of pressing national security: that is, the need for mandatory shielding to protect vital civilian electronics equipment from the possible hostile use of an Electromagnetic Pulse (EMP)," the petitioners said in an emotional appeal.

Among other things, the petition accuses the FCC of breach of statutory duty for failing to take steps to mitigate any EMP threat. The FCC said it saw no need to intervene because industry already was developing its own voluntary EMP standards, which Leggett and Schellhardt view as inadequate and incomplete.

Amateur Enforcement

♦ **FCC initiates inquiry into Tennessee ARRL-VEC exam session:** The FCC has asked two ARRL VEC volunteer examiners to explain why they took part in administering amateur exams to their family members. The inquiry involves a December 14, 1999, test session in Cookeville, Tennessee, at which the wife of VE Bobby A. Raymer, N2BR, and the brother of VE Steven G. Hunter, KF4FAV, were among the candidates. Kathy J. Raymer, KG4FWO, and Gary E. Hunter, KG4FRN, successfully passed exam elements at the session.

An FCC rule—§97.509(d)—prohibits a VE from administering an examination to a close relative. The FCC also wants to know how Steven Hunter could have been both a VE and an exam candidate at the same session.

The ARRL VEC suspended Steven Hunter's accreditation, which is standard operating procedure in such cases. Bobby Raymer resigned as a VE shortly after the examination session at issue took place. The FCC had asked Kathy Raymer to retake the Technician class examination (Elements 1 and 2) under the supervision of a volunteer examiner team affiliated with the W4VEC Volunteer Examiner Coordinator. She declined to retest, however, and, according to FCC Special Counsel for Enforcement Riley Hollingsworth, Kathy Raymer's license has been canceled.

In separate letters May 30, Hollingsworth asked Bobby Raymer and Steven Hunter to "explain in detail the justification, if any" for administering Amateur Radio examinations to close relatives. In addition, the FCC wants to know how Steven Hunter was able to serve as a VE at a session during which he also upgraded to Extra class.

Hollingsworth pointed out that the rules prohibiting VEs from testing their own family members are in place "to help insure the integrity of the volunteer testing process."

spectrum to the Earth exploration-satellite service (EESS) in the band. So-called synthetic aperture radars (SARs) are used to measure soil moisture, tropical biomass and Antarctic ice thickness, and to document geological history and climate change. At issue is whether the EESS allocation could be established without interfering with incumbent services, including radiolocation and amateur.

Agenda item 1.5 will consider spectrum requirements and regulations for new and additional allocations to the mobile, fixed, EESS and space research services at 5.15 to 5.725 GHz. The FCC expressed reservations about WAC proposals for this frequency range, citing concerns expressed by the ARRL and others. Amateur and Amateur-Satellite services allocations could be negatively affected by new mobile allocations.

The full texts of the FCC WRC-03 Advisory Committee draft proposals are available on the panel's Web site, **www.fcc.gov/wrc-03**. World Radiocommunication Conference 2003 will take place in Geneva, Switzerland, from June 9 until July 4, 2003.

FLORIDA MAN CONVICTED OF DELIBERATE INTERFERENCE, UNLICENSED OPERATION

A Florida CBer accused of jamming Amateur Radio operations and transmit-

ting without a license was convicted in federal court June 19 on eight misdemeanor counts. Willam Flippo of Jupiter was found guilty of four counts of operating without a license and four counts of deliberate and malicious interference. The jury deliberated about 30 minutes.

Federal District Court Judge Daniel T. K. Hurley noted that, while the charges were misdemeanors, it was important that the amateur airwaves be free of interference in the event of an emergency. He ordered that Flippo, 60, remain in custody and undergo a psychiatric evaluation prior to sentencing. Flippo has been confined in the Federal Detention Center in Miami since the trial.

Federal prosecutor Neil Karabdil credited members of the Amateur Radio community with bringing Flippo to justice. The list included 1999 ARRL International Humanitarian Award winner Ed Petzolt, K1LNC, who helped the FCC gather evidence in the case; Bert Moreschi, AG4BV; Palm Beach County Emergency Coordinator Dave Messinger, N4QPM; and Chuck Mulligan, N4SDW.

"This is a very good day for Amateur Radio, and a very good day for justice," Petzolt said following the trial. "Let the word go out that we will not tolerate this sort of thing on our frequencies, and you will be caught."

Petzolt cited local amateurs and the efforts of the FCC, including Special Counsel for Enforcement Riley Hollingsworth "and everyone else who kept the faith," for helping to bring the case to a successful conclusion. He advised those facing similar malicious interference situations to not give up the battle. "If you do, they win," he said.

According to Petzolt, who testified in the trial, Flippo primarily had targeted the Jupiter Tequesta Repeater Group for jamming and regularly interfered with amateur operations, especially on 10 and 2 meters, over an approximately three-year period. Following up on the amateurs' complaints, personnel from the FCC's Tampa District Office visited the Jupiter area at least twice in 1999 and reported tracking the offending signals to Flippo's residence.

Known as "Rabbit Ears" within the CB community, Flippo was arrested by federal authorities in July 2000. Even before his trial, Flippo already faced a $20,000 fine levied in 1999 for unlicensed operation, willful and malicious interference to Amateur Radio communications, and failure to let the FCC inspect his radio equipment.

The six-and-a-half-day trial was anything but routine. One day after attempting to fire his court-appointed attorney, Robert Adler—who countered that Flippo was trying to undermine his own trial—Flippo, then still free on $100,000 bond, drove himself to the hospital June 13 claiming he'd suffered a stroke. He was released the following day.

Hurley subsequently recessed the trial but took the unusual step of revoking Flippo's bond June 17 after a physician told the judge that medical tests determined that Flippo had not had a stroke.

Hurley said he was concerned that Flippo might not return to court for his sentencing hearing and ordered him returned to jail. Flippo reportedly hung his head after the jury returned a guilty verdict on the second count. He had no comment for a reporter as he was led back to jail.

Sentencing was scheduled for August 29. According to the FCC, Flippo faces a maximum penalty of eight years in prison—one year on each count. He also could be fined up to $80,000.

ANOTHER ALL-HAM CREW SETTLES IN ABOARD THE ISS

The International Space Station Expedition 5 crew of US astronaut Peggy Whitson, KC5ZTD, Russian cosmonaut and crew commander Valery Korzun, RZ3FK, and cosmonaut Sergei Treschev, RZ3FU, now is aboard the space outpost. The increment 5 crew is the second all-ham crew to serve a duty tour aboard the ISS. The Expedition 5 team will be in space for 4 1/2 months.

Scheduled Amateur Radio on the International Space Station (ARISS) school contacts resumed in early July. A successful QSO took place July 3 between Whitson and the Progymnasium Rosenfeld in Rosenfeld, Germany. A contact between the ISS crew members and the Adler Planetarium and Astronomy Museum in Chicago and the Kansai Ham Festival 2002 (8N3ISS) were on the tentative schedule for late July and early August. Other scheduled contacts in September with US schools were still being worked out at press time.

Although scheduled school contacts were on hold during the crew transition, all was not silent on the ARISS front. Korzun occasionally has been active on 2 meters as RS0ISS and even made dozens of contacts during the June 22-23 ARRL Field Day weekend. RS0ISS was active during several US passes over the Field Day weekend. Among those reporting QSOs was Huntsville, Alabama, AMSAT Area Coordinator Tim Cunningham, N8DEU. He worked Korzun from the K4BFT Field Day setup, where he managed the satellite station. Brian Mileshosky, N5ZGT, in New Mexico, also reported a quick Field Day QSO with Korzun while using only a 5 W hand-held transceiver and an Arrow antenna.

NASA

The Expedition 5 ISS crew of Russian cosmonaut and crew commander Valery Korzun, RZ3FK (left); US astronaut Peggy Whitson, KC5ZTD; and cosmonaut Sergei Treschev, RZ3FU.

Stan Vandiver, W4SV, in Indiana, reports he worked Korzun on June 10. Vandiver managed to sprinkle a few Russian words into his exchange. "I hope this is a sign of things to come for this crew!" Vandiver said.

On June 12, Lonny Kelly, W7LGK, in Washington struck up a casual QSO with Korzun after he heard some activity on the ARISS downlink frequency (145.800 MHz) and put out a call. "Man, what an exciting moment!" he said afterward. "I had been trying for a little over a year to talk to one of the astronauts aboard the ISS, and I had finally made it."

The Expedition 5 crew officially began its duty tour June 7, arriving aboard the shuttle *Endeavour*. Still undetermined at press time was the effect on the ISS schedule resulting from the grounding of the shuttle fleet while NASA looks into possible fuel line cracks. The Expedition 6 team is scheduled to arrive aboard the shuttle in October, when the Expedition 5 crew is scheduled to return home.

ARRL VEC LOSES KEY TEAM MEMBER TO RETIREMENT

Wayne Irwin, W1KI, retired June 12 after seven years of service as assistant to the ARRL Volunteer Examiner Coordinator manager. An ARRL Life Member and Extra class licensee, Irwin came to work at ARRL headquarters following a 25-year career as a business machine technician with Xerox Corporation. Outside of ARRL HQ, Amateur Radio is an important factor in his fam-

In Brief

• **2003 ARRL National Convention set for Texas:** In response to a proposal from Ham-Com, the ARRL Board of Directors has authorized an ARRL National Convention to be held June 20-22, 2003, in Arlington, Texas, coinciding with the next Ham-Com. The Board's vote was unanimous. "I'm extremely pleased that the 2003 national convention will be held in the Dallas-Fort Worth area," said ARRL President Jim Haynie, W5JBP, who lives in Dallas. Besides the honor of having the national convention held in his home state, "it gives me an opportunity to at least not spend the night in a hotel," Haynie quipped. ARRL West Gulf Director Coy Day, N5OK, and Ham-Com organizers made a formal announcement at Ham-Com June 8-9. Additional details will follow.

• **Dayton Hamvention attendance dips again in 2002:** Dayton Hamvention reports that attendance for this year's 50th anniversary event was 24,832—down about 5 percent from 2001's crowd of 26,151. The 2002 number marks the second year in a row that Hamvention attendance has dipped. Over the past five years, attendance numbers had climbed to 28,804 in 2000, the year of the ARRL National Convention at Dayton. Hamvention attendance peaked in 1993 at 33,669—before the event date changed from April to May.

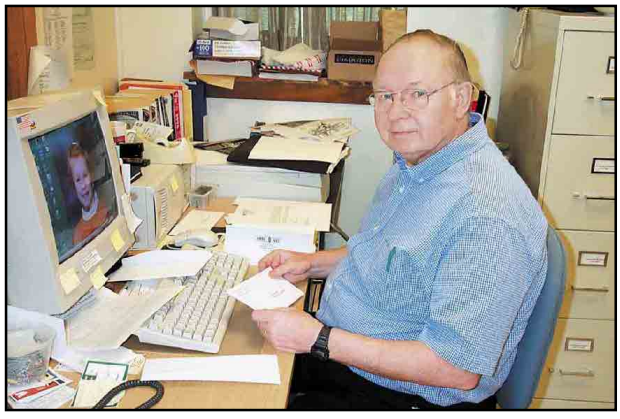
• **Vote on *QST* Cover Plaque Award:** The winner of the *QST* Cover Plaque Award for April was James C. Garland, W8ZR, for is article "The EZ-Tuner." May's winner was Matt Kastigar, W0XEU, for his article "The St. Louis Switcher." The winner for June was Ron Block, KB2UYT, for his article "Lightning Protection for the Amateur Station—Part 1." Congratulations, Jim, Matt and Ron! The winner of the *QST* Cover Plaque award—given to the author of the best article in each issue—is determined by a vote of ARRL members. Voting takes place each month on the Cover Plaque Poll Web page, **www.arrl.org/members-only/qstvote.html**. As soon as your copy arrives, cast a ballot for your favorite article.

• **ARRL offering satellite communications course:** Satellite Communications (EC-007) is the newest on-line ARRL Certification and Continuing Education Program course. *QST* Editor and satellite enthusiast Steve Ford, WB8IMY, developed the curriculum for the course—the sixth in a growing list of continuing education offerings from ARRL. Ford has written many *QST* articles on amateur satellites and is the author of ARRL's *HF Digital Handbook*. The course incorporates material from Ford's various articles on the topic as well as new material. Resources were also provided by AMSAT-NA. The satellite course primarily is aimed at satellite newcomers. It opens with a review of amateur satellite history then moves on to a study of satellite tracking, orbiting relay stations, FM repeater satellites and the International Space Station. It continues with lessons and exercises on FM satellites, the Fujisats, and AMSAT-OSCAR 40 setup and operation. The final lessons cover store-and-forward digital satellites, APRS and future satellites. More course information is available at the C-CE Course Listing Page, **www.arrl.org/cce/courses.html**. Details about the ARRL Certification and Continuing Education Program are on the ARRL Certification and Continuing Education Web page, **www.arrl.org/cce/**.

• **ARRL Outgoing QSL Service tops one million cards for 2002:** ARRL Outgoing QSL Service Manager Martin Cook, N1FOC, reports that, as of June 30, the bureau had mailed 1,095,400 cards to various incoming QSL bureaus in other countries. Cook says the number represents an increase of 54,000 cards over one year earlier.

• **Antarctic ledge named after amateur:** A ledge in the Antarctic has been named after a Connecticut ham who provided phone patches for scientists working in the region. Larry Skilton, K1IED, says that to his knowledge, he's the first Amateur Radio operator who's never been to Antarctica to have a place named after him for services rendered. Skilton Ledge is described as a relatively flat rectangular rock platform at the southeastern margin of Midnight Plateau in the Darwin Mountains. The upper surface is ice-covered, but a rock cliff forms the southern end. Skilton made phone patches in the US to complete radio communications from US Antarctic Project science stations including Palmer, McMurdo, Byrd surface station and particularly South Pole. He worked a regular nightly schedule for 11 years, between 1990 and 2001 and arranged the completion of several thousand calls.

• **ARRL 2001 *Annual Report* is available:** The ARRL *2001 Annual Report* is now available free-of-charge by request. ARRL members can obtain a copy by sending a request to Media Relations Manager Jennifer Hagy, N1TDY, **jhagy@arrl.org**; 860-594-0328. The *Annual Report* also is available for viewing via the ARRL Web site, **www.arrl.org/announce/annualreport/01ar.pdf**.



Wayne Irwin, W1KI. On the screen is a photo of his daughter, Becky.

ily. His wife, Louise, W1LRI, and oldest daughter Laura, KA1TMJ, are ARRL family members. They hope to soon be joined by youngest daughter Becky, who just completed kindergarten and already wants to know when she can get her own call sign. (Her dad tells her, simply, "As soon you can pass the exam.") Irwin plans to resume service as a VE as soon as he and his family are established in their new home in Ocala, Florida. ARRL VEC Manager Bart Jahnke, W9JJ, said he would miss Irwin's assistance and good counsel and wished him a happy retirement. QST

ARES/RACES and Wildland Communications

By Mark Hall, KD6ZEK, Communications Unit Leader, Jefferson County, Colorado, Incident Management Team

"Hotel! This is India! Do you copy?" I heard in my Yaesu HT. Daniel Hazen, N0BN, assigned to support the Division I Group Supervisor for a shift during the June 2000 Hi Meadow Fire, was desperately trying to maintain contact with me. He was on the upwind side of the fire and I and my partner, Elke Ueblacker, KB0YWO, were on the receiving end. I suddenly found out that, no matter how hard you train, nothing quite prepares you for the reality of a "blowup"—a 300 foot high running-crown fire bearing down on your position.

Elke and I were supporting Division H, positioned to defend an ultimately indefensible saw mill. As the flame front approached, we headed to our safety zone—a 2 acre paddock with four of the nicest burros you've ever met. We had no cell phone coverage and only marginal performance from the federal radio issued to me. The saving grace? My amateur HT. The amateur repeater coverage guaranteed contact with our incident communications center and the Operations Section Chief no matter where we were in the fire zone.

The Eye-Opener

So how in the world did a bunch of ham radio operators end up in the middle of one of the bigger fires of the 2000 fire season? In May 1996, the 11,000-acre Buffalo Creek Fire opened the door for the Jefferson County, Colorado, ARES/RACES organization ("JeffCo") to expand beyond the recognized bounds of public communications services. Serving the county Department of Emergency Management, they were called to duty that Saturday afternoon and put to use—not in a way they were used to, such as shelter and health and welfare communications, but in a role they had not practiced: providing operational and tactical communications support for a disparate group of wildfire suppression organizations.

In after-action reports, participants repeatedly stated that a communications disaster had been averted by the injection of ARES/RACES support. Fire managers were able to spend more time managing the incident and less time worrying about communications. In the 48 hours spent on the fire, the group achieved a change in thought that would normally have taken years to accomplish. Amateur Radio and its public-service groups could provide a much larger supporting role in wildland fire operations than anything previously conceived.

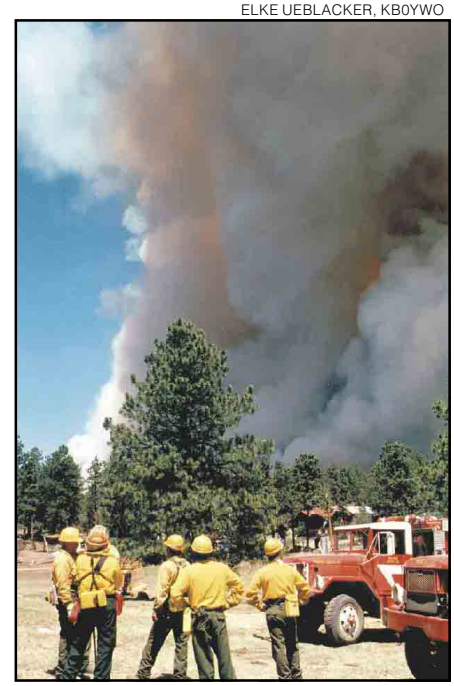
Soon after Buffalo Creek, the group became an active member of the Jefferson County Fire Council. The group then embarked on an aggressive program to get the membership trained and equipped to support the vital mission of wildland communications for the county's fledgling Type III Incident Management Team (IMT).

Specialized Training

Backed by Emergency Management, JeffCo embarked on a training program that is so far unparalleled in the United States. In the past 4 years, 61 members have completed I200 Basic Incident Command System (now a requirement for membership), 55 have completed S130/190 Basic Wildland Firefighter/Intro to Fire Behavior, 45 are holders of a valid federal Red Card (a national qualification card), and 22 are qualified as wildland firefighters. Additional coursework completed by members includes Intermediate Incident Command System (I300), Communications Technician (S258), Dispatch Recorder (D110), and many advanced fire operations classes, all in compliance with the requirements of the National Wildfire Coordinating Council (NWCG).

The JeffCo group fully participates with the IMT in tabletops, field exercises, and incident deployments. Select members also support the 285 Wildcats and

ELKE UEBLACKER, KB0YWO



Comm team members and firefighters await the arrival of the flame front during the Hi Meadow Fire, June 2000.

MARK HALL, KD6ZEK

Part of the JeffCo Wildland Communications Team. L to R, above: Brent Haberer, KB0ZCO, Gary Keane, KD6DEZ, Mark Hall, KD6ZEK. L to R, below: Mike Kendall, KC0ATI, Charles Duey, KI0AG, Jean Heyer, KC0IBI, Jeff Martin, K1FT, Patrick O'Reilly, KC0HNI, and Daniel Hazen, N0BN.

the North JeffCo Wildland Team, two local Type II hand crews. These members train and deploy with the crews to provide on-scene communications and support the fire suppression efforts.

A Critical Communications Tool

Why go to all this trouble if communications support is rarely needed beyond a staging area or Incident Command Post? The reasons became obvious when the Hi Meadow Fire started in June 2000. A careless cigarette ignited a fire that quickly grew out of control, destroying 53 structures. The first operational period was pure chaos. RACES officer Jeff Martin, KI0FT, ARES Emergency Coordinator Bill Thompson, KI0IN, and Park County ARES EC Padre Bova, W0WPD, working under the principle of unified command, established the Communications Unit and set about to make things function.

Communications was so poor due to terrain problems and the frequency incompatibility of equipment from responding departments that the ARES/RACES group was directed to deploy its fire-qualified members into the heat of the battle. Working side-by-side with line officers and the Incident Command staff, Amateur Radio became a critical tactical communications tool. Having the only functioning repeater network, the communications team quickly established a way for all resources to be linked to the Operations Section Chief and the Incident Commander, putting their own welfare at significant risk in the process.

Managing five public safety bands plus Amateur Radio was a challenge, to say the least. As dispatchers and human repeaters, field-deployed ARES/RACES members carried up to three different radios: a VHF HT with local fire channels, a VHF HT with the federal incident frequencies, and a VHF amateur HT, all so that everyone who needed to could talk.

Other ARES members worked hard to keep communications flowing between the ICP, two Staging Areas, the local high school (the main evacuation center—staffed primarily by Salvation Army and Red Cross hams), and the county Emergency Operations Center (EOC).

Together, the IMT communications team, supported by hams from Boulder (District 11), Park (District 6), Arapahoe (District 22) and Douglas (District 24) counties, held things together until the arrival of the Type I Incident Management Team, ordered up through the National Interagency Fire Center (NIFC).

After the Type I IMT established command, ARES/RACES members worked under the new Communications Unit Leader (COML) for the next three days

KIT LAMMERS

Mark Hall, KD6ZEK, Communications Unit Leader, acting as a human repeater during a recent prescribed fire exercise.

as federal Radio Operators (RADOs), functioning as human repeaters, fire line communicators, and Incident Communications Center staff. Never had a federal Type I team had so many qualified communicators to assist in their efforts, nor had anyone from that system ever used Amateur Radio in a primary support role.

Report on Present Status

Today, ARES/RACES members fulfill roles as RADOs, Communications Technicians (COMTs), COMLs and staff in the Operations, Plans and Logistics sections. They staff all Staging Areas, providing packet and voice communications and functioning as Status Check-in Recorders as well.

A new tool that JeffCo deploys on behalf of the IMT includes the Incident Commander's Radio Interface (ICRI—from Communications Advanced Technologies, Inc.). These "black boxes" allow up to 5 different radios of different frequencies or bands plus a cellular telephone to all be linked as a single channel. Two are deployed to create both Command and Logistics radio nets. This unique tool may eventually reduce the need to deploy ARES members on the fire line except in the most extreme cases.

It has been a goal of the members of the group to never become obsolete in the eyes of our served agencies. By being willing to take on roles far outside of the traditional ones filled by most ARES and RACES members, this organization has become a vital part of the county's Incident Command structure.

Today, leadership of the JeffCo ARES/RACES organization is shared by Charles Duey, KI0AG, ARES EC, Jeff Martin, KI0FT, RACES Officer, and Mark Hall, KD6ZEK, IMT Communications Unit Leader. In an ARES twist on the traditional ICS (Incident Command Structure) communications structure, additional positions include a Data Unit Leader (Gary Masters, KC0HQW and Bill Thompson, KI0IN), managing all packet operations, a Staging Communications Manager (Brent Harberer, KB0ZCO and Bryan Steinberg, KC0CUA), a Resource Manager (Len Brown, W0FDD and Jim Petry, WD0CYX), an EOC Team Leader (Keith Barnes, KC0FIX), and a Training Officer (Chris Rand, KB0QQW). Together, a total of nearly 70 active members support this effort.

JeffCo's mission statement says it best: "Our mission is to provide the highest quality incident communications and operations support to Jefferson County by demonstrating consistency and reliability, technical competence, professional attitude, and responsible action in all activities we are called on to perform. This is achieved through extensive training and practice, reasoned and professional response, dedication to the principles of the Incident Command System, and personal ethics and discipline."

Special thanks is extended to all members of the Jefferson County ARES/RACES group for their tireless contribution and to all ARES and RACES members worldwide who contribute time and sacrifice a part of themselves every time they deploy.

Questions and comments can be directed to Mark Hall, KD6ZEK at **jeffcoares@earthlink.net**.

50TH ANNIVERSARY OF RACES

The Radio Amateur Civil Emergency Service (RACES) was first started in 1952, and this year (2002) marks its golden anniversary! To recognize the 50th year of RACES, the Lake County RACES/ARES of Lake County, Illinois, has taken the initiative to organize an on-the-air operating event on Saturday, September 28. The time: 12 noon to 9 PM your local time. This special operating event is in cooperation with the ARRL.

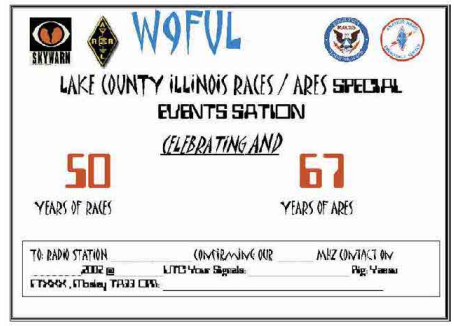
All groups and/or individual participants of RACES and/or ARES and other Amateur Radio emergency/public service-groups are invited to go on the air to make contact with each other and other stations in the event. This is an opportunity to gain awareness of and share knowledge with RACES and ARES groups and its members along with other public service-oriented operators throughout the country and in your own area. The Lake County RACES/ARES is an ARRL affiliated club, and it invites other ARRL-affiliated clubs to join as well.

Prepare and be Recognized

Since the main weekend for the 2002 ARRL Simulated Emergency Test weekend is scheduled for October 5 and 6, the last Saturday of September, the 28th, is a great time to test your group's station equipment in preparation for SET. Does your RACES or ARES group or club operate from an emergency operations center, a communications van or other station? If so, stand up and be recognized. Talk about it on the air!

There are two main categories: group/club and individual. When exchanging information as a group or club operation, here are some suggested topics to cover: Call sign, the opearator's location and first name, and the name of the emergency communication group that your group or club is associated with. If you are operating with emergency power and/or from an emergency-like setting, please mention that during the contact.

If you are operating the event as an individual, exchange your call sign, location, and any emergency communication affiliation or membership that you may have. If you hold a RACES position, or an ARRL Field Organization or National Traffic System appointment, please be sure to mention that. Also, are you operating with emergency power or emergency station equipment? This event is a chance to recognize one another and to help initiate awareness of all the emergency communications groups, and individual operators.



One good way to enhance recognition for yourself, your club or group, is to create and issue your own special-event QSL card. If you have room, why not include a brief profile of your group on the card to accompany details of the contact?

Where to Tune?

The Lake County RACES/ARES suggests that participants operate around the following frequencies (in MHz) for the RACES Golden Anniversary Celebration:

SSB: 7.283, 14.283, 28.383
CW: 7.037, 14.037, 28.037
PSK-31: 14.07015
VHF: Your area's favorite repeater(s).

Check with the repeater's sponsor to ensure this is okay.

As always, please listen to make sure the frequency is clear before transmitting.

Results

Please share your results and comments with the Lake County RACES/ARES (**www.races.org**) **lcares@races.org** and/or Steve Ewald, WV1X, at ARRL Headquarters, **sewald@arrl.org**. Postal service mail is via: ARRL HQ, 225 Main St, Newington, CT 06111.

Field Organization Reports

Public Service Honor Roll
June 2002

This listing is to recognize radio amateurs whose public service performance during the month indicted qualifies for 70 or more total points in the following 6 categories (as reported to their Section Managers). Please note the maximum points for each category:
1) Participating in a public service net, using any mode. —1 point per net session; maximum 40.
2) Handling formal messages (radiograms) via any mode. —1 point for each message handled; maximum 40.
3) Serving in an ARRL-sponsored volunteer position: ARRL Field Organization appointee or Section Manager, NTS Net Manager, TCC Director, TCC member, NTS official or appointee above the Section level. — 10 points for each position; maximum 30.
4) Participation in scheduled, short-term public service events such as walk-a-thons, bike-a-thons, parades, simulated emergency tests and related practice events. This includes off-the-air meetings and coordination efforts with related emergency groups and served agencies. — 5 points per hour (or any portion thereof) of time spent in either coordinating and/or operating in the public service event; no limit.
5) Participation in an unplanned emergency response when the Amateur Radio operator is on the scene. This also includes unplanned incident requests by public or served agencies for Amateur Radio participation. — 5 points per hour (or any portion thereof) of time spent directly involved in the emergency operation; no limit.
6) Providing and maintaining a) an automated digital system that handles ARRL radiogram-formatted messages; b) a Web page or e-mail list server oriented toward Amateur Radio public service — 10 points per item.
Amateur Radio stations that qualify for PSHR 12 consecutive months, or 18 out of a 24 month period, will be awarded a certificate from Headquarters upon written notification of qualifying months to the Public Service Branch of Field and Educational Services at ARRL HQ.

611 K6SOJ
565 W2MTA
464 KC2DAA
384 N7LV
365 KC2HUV
354 N0BN
325 N2JBA
322 AE4MR
315 K2CSS
310 N2LTC
295 N1IST
290 N2YJZ
285 AD0A
268 W5ZX
255 N5JCG
246 NZ1D
240 KB2KOJ
239 NN2H
236 W5IM
235 KM5YL W7TVA
234 KA2IWK
232 KC8KYP
220 K4BEH WI2G
215 KB8ZYY
210 K4IWW W8JEB
209 N7LV
208 KA0DBK
206 K5DPG
205 AB4XK
193 KA2GJV
186 KD1LE
185 KB2VRO
180 KK1A KB2RTZ
177 KD1SM N2RTF
175 K8FE KA7TTY
168 WD9F
167 KB2ETO
165 NN7H N5NAV
162 KC0GMI
161 WN0Y
160 N2OPJ
158 W6IVV
156 KG4CHW
155 WB2UVB
152 N4VVX
150 W2LC N3WAV
147 N8FPN
145 KB0DTI
142 N9KNJ WB2ZCM
140 AC5XK W5RDM
139 W5XX
138 K2GW
136 KC8LBZ
135 AF2K VE3EUI
132 KJ9J W6JPH
130 KA4LRM NM1K N2AKZ N2HQL WX4H
128 AC5SU K2GJ
126 WA1QAA
125 WB5ZED
N2JRS AG9G W9YCV KC8CON K4RBR
123 N3RB
120 NJ5M K4RLD W4EAT K6YR N5WSW KW1U KA4FZI KD4GR KC5OZT W8YS W4ZJY W6QZ
119 N8JAT
115 KL5T KK5GY N4TAB WA2YBM AB2IZ WA2YL K9FHI
114 WA2GUP
112 K2DBK
110 AF4QZ N7YSS KE4JHJ KK3F W0LAW WA1JVV W5GKH AF4NS N1LKJ W7GB KC4ZHF K5UPN K9LGU KB9KEG W9RCW K2UL WW8D K8KV WB0TAQ N7YSS
WD4GDB NR2F
109 N8NMA N0ZIZ
105 K4FQU
104 W4CC KB3GFC W7TC
103 K5MC AG4DL
101 KC6NBI
100 K8CQF AC7DD WD4LSS KA1VED WA0TFC W1ALE KB2KLH WA2YOW N5OUJ K4BB K7GXZ WA9VND N2RPI WB2QIX W5AYX KB5TCH W9CBE K8GA WA8DHB W7LG W7QM KF4OPT W7GHT N9MN WA8SSI
99 AA8PI W1GMF W5OMG
98 N0SU W0OYH KJ7SI
97 K4SCL
96 W7ZIW WA5KQU
95 KA2BCE N8OD W8STX
94 WA9JWL
93 KD4EFM W5RXU
91 KC0HOX
90 KA4UIV AL7N K8ZJU KC7SRL KF6OIF W3CB N3WK WB2GTG N5SIG W4WXA WB4GGS WB2NYM N1IQI WB4PAM K2PB N9TVT WA2CUW AA2SV KA8WNO W0WWR W4CKS W4DGH W4PIM K8AE WX8Y K2BCL N8DD
89 AK6DV WJ2F
88 WA4CSQ K2DN K9JPS W8IM
87 N8SW K6IUI
86 N3KB
85 KE4UOF
KG4MLD
84 WB4BIK WA2MSU N2BVM W4QAT
83 KE2SX KB8NDS W7DPW
82 KU6Z KA2YKN KC6SKK
81 W7VSE KC7SGM W4AUN
80 KE4AHC AA4YW K1TSV KG4MLC W2MTO K8VFZ KF4WIJ K1JPG
79 WD0GUF
78 K8SH
77 W7EP W2CC KA2DBD
76 W5YP KF4KSN WB7VYH
75 K4WKT W4NTI
74 WA2EDN KC4VNO
73 AD4BL
72 N8PAM
71 N2VQA
70 KG4QIP KA2CQX

The following stations qualified for PSHR points during May, but were not previously recognized in this column: KB9KEG 145, N9VE 143, K9LGU 120, KF9HI 120, AG9G 115, W9RCW 110, W9CBE 100, W9YCV 90, K9JPS 86, WD9FLJ 86, N9NKO 83.

Section Traffic Manager Reports
June 2002

The following ARRL Section Traffic Managers reported: AK, AL, AZ, CT, CO, EB, ENY, EPA, EWA, GA, IA, ID, IL, KY, KS, LA, MDC, ME, MI, MN, MO, MS, NC, ND, NFL, NH, NLI, NM, NNJ, NTX, NV, OH, OK, OR, ORG, SB, SC, SD, SFL, SJV, SNJ, STX, TN, WCF, WI, WMA, WNY, WPA, WV, WWA, WY.

Section Emergency Coordinator Reports
June 2002

The following ARRL Section Emergency Coordinators reported: AK, AR, EWA, IN, KS, KY, LA, MDC, MO, MI, NC, NFL, NLI, SFL, SNJ, STX, SV, WMA, WNY, WPA, WV.

Brass Pounders League
June 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*
NM1K	819	388	995	5	2207
W1PEX	0	1838	49	0	1887
N2LTC	0	598	603	26	1227
KF5A	0	337	555	153	1093
WX4H	0	470	555	0	1025
W0WWR	0	226	724	20	970
KK3F	13	475	448	24	960
WB5ZED	10	520	414	14	958
W1GMF	0	296	617	23	936
K9JPS	0	482	32	371	888
W4EAT	0	444	427	3	874
KW1U	0	436	300	39	775
KA1VED	4	289	323	3	619
K7BDU	2	296	274	1	572
K8PJ	250	64	254	1	569
N5IKN	0	279	279	0	558
K5UPN	11	268	257	2	538
W7TVA	51	211	129	133	

BPL for 100 or more originations plus deliveries: AC7CS 197, W9RCW 192, N1IQI 192, N9VE 170, K9GU 160, KK5GY 152, NJ5M 140

WA4QXT qualified for BPL in May with 502 points but was not listed in this column last month.

Ham-Com DXtravaganza II

"This was the best ever Lone Star DX Association (LSDXA) DX program at Ham-Com," said Bill, W5SJ, president of the LSDXA. LSDXA was the first DX club to have Tom Christian, VP6TC/VP6DI speak on Ducie after the new one went on the air. Other great programs were Skip, W5GAI on beginners in DX; Bob, K4UEE on South Sandwich/South Georgia DXpedition this year; Bob, KK6EK speaking on San Felix XR0X also of this year with Tom Christian holding a packed house spellbound at the DX luncheon. Antenna presentations of interest to DXers and top band enthusiasts came from John, ON4UN, and Dick, K5IU. There was also an update from ARRL, with Wayne, N7NG/1.

Area DX clubs helped put it all together with new clubs participating for the first time, TDXS from Houston and the Delta DX Association from New Orleans. "We thank them all but the real "pats on the back" go to the LSDXA board and committee, particularly Herb, K5AT and Tom, WW5L," said Bill. Herb, K5AT added, "it will be a real challenge to better this year when the ARRL national convention is held here at Ham-Com 2003, but I know the LSDXA can do it."

Bill Priakos, W5SJ; Wayne Mills, N7NG; Tom Christian, VP6TC (ex VR6TC), and Bernie McClenny, W3UR, celebrate the very successful DXtravaganza II after Ham-Com at the Lone Star DX Association's hospitality suite. Plan ahead to attend next year!

Tom Christian (sitting), VP6TC, enjoyed a few days' stay at the QTH of L. T. Gilmore, W5VFM.

DX NEWS FROM AROUND THE GLOBE

9M6—EAST MALAYSIA

9M6/GM4DMA will be on 6 meters September 12-30. He will be operating from Sabah using 100 watts with stacked 5/8 wavelength verticals. Not sure if he will be on HF at all.

AFRICAN TOUR

5V7XO, operator Francois, VE2XO, will be on from Togo August 25-31, mainly RTTY but also SSB, 10, 12, 15, 17 and 20 meters, always split, he says. 6 meters is also possible. His equipment will consist of a TS850SAT, IC-706 MKIIG and ACOM 1000, Sigma-5 vertical, Sigma-6M and Sigma-20 four square vertical array. He also has plans to visit Benin (TY) during September. Francois will also go back to Guinea (3XY6A/3XY8A) at the end of September. In late December and early January his work will take him to Senegal (6W) and Mali (TZ6XO). Francois is brand new to RTTY and says he enjoyed it so much on his last trip to Guinea that he will now spend 50% of his time on this mode. QSL via VE2XO.

CARIBBEAN DXPEDITION

The Low-Land DXpedition Team (LLDXT) is organizing its next expedition, this one October 12-November 1 to J7, Dominica and VP2M, Montserrat. Ops will be Bouke, PA0ZH; Ronald, PA3EWP; Enno, PA5EA; and Rob, PA5ET. They expect to be on the air October 14. Henk, PA3GCV, and Martin, PA4WM, will join them October 23. They will be multi-single in the CQ WW SSB Contest from Montserrat. They are trying for both a special 160-meter call sign and a special contest call sign.

DU—PHILIPPINES

Ken, G3OCA, will activate some Philippine islands in September. Among them, the Calamian group (OC-090), the Cuyo Islands (OC-120) and Sarangani islands (OC-175). He will be CW and SSB with 100 W to a Yagi or vertical.

HK0—SAN ANDRES AND PROVIDENCIA

Roberto, EA4DX, plans to be on from San Andres and Providencia August 20-August 30. He will actually be QRV as HK0/EA4DX from Providencia (NA-049) and will take along a TS-50, Finnfet kW amp, 40 and 80 verticals and Yagi for 20-10. His goal is 18,000 QSOs. You can get more information at **www.geocities.com/TheTropics/Shores/4909/new2002.htm**. Pilot stations will be JI6KVR, for Japan, and EA5BY and EA5FID for the rest of the world. QSL via EA4DX.

GJ—JERSEY

Chris, G0WFH, is heading back to Jersey Island. He'll be running QRP with a K2 and an FT-817 on the bands October 5-12. Suggested frequencies are 1845, 3780, 7045, 7090, 14,180, 14,280, 18,135, 21,285, 24,960 and 28,360.

HP—Panama

Maurice, F5NQL, reports that hams in Panama (HP) again have access to 30 meters. HP1IBF, Enrique Preciado, credits "tenacious

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efforts of the Radio Club of Panama and of many individual amateurs." He says that "after lengthy discussions, debates and public hearings, Panama's amateurs convinced authorities to reconsider the value of amateur activity to the community—as well as the importance of having Panama's regulations conform to international conventions and agreements that it had already signed."

JT—MONGOLIA

Ken, K4ZW, is planning another trip to Mongolia, JT, to concentrate on 80 and 160 meters. Karl, K4YT, plans to go along this time. The trip is set for September. The two Virginians will put up some Beverages and improve the ground system under the Titanex vertical installed last November at JT1CO's QTH.

LU—ARGENTINA

Mariano, LU4EJ/D, and maybe others will be on Ariadna Island (SA-021) October 4-6. Chosen frequencies: 3680, 7080, 14,260, 14,200, 21,260, 21,300, 28,460, 28,560 and 50,110.

RSGB INTERNATIONAL HF AND IOTA CONVENTION 2002

This year the convention will be held October 11-13 and will be moving to a new venue a few miles within the Windsor Great Park, just minutes away from London Heathrow Airport. The weekend event, which starts with the IOTA Buffet on the Friday evening, has up to four streams of lectures covering all aspects of HF and LF DXing, contesting, operating as well a technical lecture on design and construction. Details and on-line ordering for the Convention packages can be found at **www.rsgb.org/shop/acatalog/index.html** with "HFC2002" typed into the "search box." Details and the provisional program are on the Convention's Web site at **www.rsgb.org/hfc/**.

SOUTH PACIFIC TOUR

Elizabeth, VE7YL; June, VK4SJ; Mio, JR3MVF, and Gwen, VK3DYL, plan to put VK9YL on the air from Lord Howe Island September 15-29. The ladies also plan to be on from the Aitutaki Island (OC-083), South Cook Islands, ZK1 October 1-6 and Rarotonga (OC-013) October 7-15. QSL via VK3DYL.

TK—CORSICA

Rainer, DL2RVL, will be active from Corsica (EU-014) as TK/DL2RVL August 24-September 14. Look for him mostly on CW with an FT-817 operating QRP.

V6—MICRONESIA

Spike, W7AVA, will be vacationing on Pohnpei, Micronesia September 14-23. He hopes to work as many "first ever" as he can. He'd like to know what nets (times and frequencies) would welcome a visit from V6. Please let him know at **W7AVA@arrl.net**. The assigned call is V63VB. Please QSL via his home call.

W9DXCC

Mark your calendars for the 50th annual W9DXCC, which will be held September 20-21. To be held in the Chicago area, this is one DX event you won't want to miss. Details of last year's event and this year's agenda can be found at **www.qth.com/w9dxcc/**.

WRTC

During the July 13-14 2002 annual running of the IARU HF Championship, 52 top-notch two-man teams from all over the world competed in the fourth running of the World Radio Team Championships held in Helsinki, Finland. As of press time the official results had just been made at a ceremony in down town Helsinki with over 400 people in attendance. Your editor spoke directly with Martti Laine, OH2BH, Co-Chairman of WRTC2002. Here are the top 10 finishers. Scores and other details are posted at **www.wrtc2002.org**.

1	N5TJ—K1TO
2	RA3AUU—RV1AW
3	DL2CC—DL6FBL
4	N6MJ—N2NL
5	KQ2M—W7WA
6	VE3EJ—VE7ZO
7	K5ZD—K1KI
8	UT4UZ—UT3UA
9	LY1DS—LY2TA
10	DK3GI—DL1IAO

Dan Street, K1TO, and Jeff Steinman, N5TJ, from the US, won the event. This is the third straight win for the dynamic duo. Congratulations to all the team members and a special thanks to the SRAL and Contest Club of Finland for hosting this fantastic event.

ZK1—COOK ISLANDS

W7VV, W7TSQ, AA7PM and VE7XF are heading back to the Cook Islands. First stop will be Rarotonga, South Cooks as ZK1VVV, ZK1TSQ, ZK1APM and ZK1AXF. Next they'll operate with the same calls from Manihiki, North Cooks October 17-31. There they will be QRV during the CQ WW SSB as ZK1MA.

ZL7—CHATHAM ISLANDS

The Kermadec DX Association is undertaking a DXpedition to Chatham Island (ZL7) October 15-29, 2002. This DXpedition follows on from their previously very highly successful DXpeditions to ZL8RI (Raoul Island) in May 1996 and ZL9CI (Campbell Island) in January 1999. The operators realize that ZL7 is not on the most wanted country list but the timing of this event will coincide with the CQ WW SSB DX Contest, which will give DXers and contesters alike, the opportunity to perhaps gain a new band/mode for their awards, etc.

This ZL7 DXpedition will be international in make up with members from the USA, England, Germany, Japan, New Zealand and possibly Canada participating. There is an exceptionally good mix of talent within the team, most of whom have been on previous DXpeditions. They hope to be able to operate on 160-10 meters on all bands where possible, realizing of course that this may not be the best time to undertake such an event due to the position of the solar cycle.

The operation site has been arranged and the call sign confirmed. The group prefers not to release the call sign until closer to the time of the operation for fear that "Pirates" may use the call prior to the DXpedition as has happened with past DXpeditions. The team is very well aware that the costs of undertaking even the easiest and simplest of DXpeditions are high. KDXA welcomes donations of support for ZL7. If you are able to support this DXpedition in any way please contact the group. In addition to financial support they are also looking for equipment support in the way of filters, WARC and low band antennas, radios, etc. All correspondence goes to Kermadec DX Association—ZL7, PO Box 7, Clyde, Central Otago, New Zealand.

WRAP UP

That's all for this month. Thanks to KE3Q, OH2BH and ZL2HU for helping to supply the news for this month's column. Until next month, see you in the pileups!—*Bernie, W3UR*

STRAYS

Francisco O. Felizardo, CT1ALF, of Caidas Da Rainha, Portugal, sports an impressive antenna farm: Titanex V160 vertical for 40-80-160, and Yagis for 6 (PKW), 12/18 (Hy-Gain), 15 (PKW), 40 (PKW), 20 (Force 12) and 10 (Force 12) meters.

Previous • Next Strays

OSCAR 7 Lives Again

Imagine the astonishment of Pat Gowan, G3IOR, on June 21 when he copied CW telemetry from a satellite that was given up for dead more than 20 years ago—OSCAR 7.

Launched on November 15, 1974, OSCAR 7 featured a Mode A (now called Mode V/T) transponder that listened on 2 meters and repeated signals on 10 meters. OSCAR 7 also carried a Mode B (now Mode U/V) transponder that listened on 70 cm and repeated on 2 meters. The satellite went silent in 1981.

Today the resurrected OSCAR 7 seems to be flip-flopping between the two transponders (see Table 1) on a random basis each time it zips into sunlight. The transponder that has attracted the most attention (and operation) is the 2-meter/70-cm combo. More about that in a moment.

Listen to the Beacon

You can hear OSCAR 7's CW telemetry beacon at approximately 29.502 or 145.972 MHz. Gowan reports he came across the slow-speed CW beacon as he was checking out some interlopers in the 2-meter satellite segment while using a new vertical antenna he'd installed. "It sounded *very* familiar," he said, but he wasn't sure at first which of the early OSCAR satellites he was hearing. Gowan said the beacon peaked at S9 and, at times, "took on a rough quality, wobbling in frequency, then coming back strong and quite stable again."

AMSAT says it seems certain the satellite is running only off its solar panels, not from the onboard batteries, so it will only remain operational while it's in sunlight. The speculation is that the batteries, which shorted as they failed two decades ago, now are "un-shorting" and causing the satellite to come back to life as long as it's in the sun.

If you own satellite-tracking software, you will find that OSCAR 7 is now included in the orbital elements available from AMSAT at **www.amsat.org**. You can also view OSCAR 7 pass predictions up to 24 hours in advance on the Web at **www.heavens-above.com**.

Can You Make Contacts Through OSCAR 7?

The answer to this question is a tentative "yes," but the situation is mired in controversy.

Operating Mode V/T (2 meters up/10 meters down) is not a problem, but Mode U/V (70 cm up/2 meters down) *is*. Because of changes in the international *Radio Regulations* that went into effect in the 1970s as AO-7 was under construction, the 432.1 MHz uplink frequency is no longer authorized for space communications.

"Potential users should realize that when they are uplinking to a satellite, they are no longer operating in the Amateur Service but instead operating in the Amateur-Satellite Service," AMSAT-NA advises on its Web site. AMSAT says uplinking to AO-7 "is possibly illegal since the Amateur Satellite Service is not permitted at 432.1 MHz." AMSAT also notes that the current band plan earmarks the 432.1 MHz range for weak signal work.

ARRL Regulatory Information Specialist John Hennessee, N1KB, notes that §97.207(c) of the FCC's rules authorizes space station operation only in the 435-438 MHz segment. It's also not clear at this point if the satellite still can be controlled from Earth—a requirement for a space station. Given the current situation, plans are reportedly under way to set up an AO-7 Earth station.

Regardless of the legalities involved, quite a few stations have reported making contacts through AO-7. This is a rare, almost magical, event in the amateur satellite community. With luck the grand old bird will still be singing when you read this column. If so, listen while you can. You may not have another chance.

Table 1
AMSAT-OSCAR 7 Transponder Frequencies

Mode	*Uplink (MHz)*	*Downlink (MHz)*
V/T	145.850-145.950	29.400-29.500
U/V	432.125-432.175	145.925 -145.975

W1AW ON AO-40

After a bit of trouble-shooting and frustration, W1AW made its first contacts through AMSAT-OSCAR 40 in July.

For the 2.4-GHz downlink the station sports a "barbeque grill" dish and a Downeast Microwave downconverter atop its satellite tower. W1AW station manager Joe Carcia, NJ1Q, could hear AO-40, but the downlink signal wasn't particularly strong. Some investigation turned up an out-of-calibration rotator. An aiming error of just a few degrees is sufficient to seriously degrade the downlink signal when you're using a dish antenna.

W1AW station manager Joe Carcia, NJ1Q, tweaks the antenna rotator as he enjoys another contact through AMSAT-OSCAR 40.

With the downlink problem solved, Joe attempted an uplink, but he could barely hear his own signals through the transponder. The W1AW uplink antenna is a 15-element cross-polarized Yagi and Joe was pumping it with 100 W of 70-cm RF through 150 feet of hardline.

One morning I brought in my own 11-element Yagi and we gave it another try using a ground-mounted tripod. Success! Joe had a minor pileup going in a matter of minutes. We hope to have the main uplink antenna repaired or replaced within a month after you read this. By autumn, W1AW should making more frequent appearances on AO-40. QST

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What is a Contact?

For nearly fifty years, the minimum requirements for a valid contact were those defined by Ed Tilton, W1HDQ, in his March 1957 "World Above 50 Mc." column. Despite continuous advances in radio technology and the use of a variety of new transmission modes, that definition remains unshaken today, even if widely misunderstood and abused.

Tilton emphasized that a reasonable definition of a QSO must include a complete exchange of useful information. At a minimum, call signs and one other piece of presumably unknown data, such as a signal report or location, must be sent and acknowledged by both stations. Implied in his criteria was that valid contacts take place in real time and that signals are copied by ear. Tilton was primarily thinking in terms of audio-based AM and CW modes, as RTTY, slow-scan television and other non-audio modes available at the time played little role in VHF operating.

Abuses

Although this definition is clear enough, it is widely abused in certain operating situations. Contest operators running several contacts per minute, for example, typically do not give their own call signs for each contact, and those replying rarely repeat the call of the run station. In such cases, signals are generally strong and there is usually little chance that there will be any confusion about the calls. Although this practice saves a bit of time, it probably does not meet the minimum requirements for a valid ARRL contest contact. General Rule 3.2 (see *QST* for November 2001, page 101) states that "All call signs and exchange of information must be sent, received, acknowledged and logged correctly by each station for a complete QSO." This is essentially Tilton's definition codified in contest rules.

Stations running pileups, such as those in rare DXCC entities or grids, may also follow operating practices similar to those in contests. These situations may be more problematic than contest operating, because signals may not be strong on either end. Weak signals make it difficult for either station to pull call signs out of the noise and QRM. Poor operators are attracted to pile ups and dump their calls into the fray, whether or not they have clearly heard the DX station's call sign. More confusion results, leading some stations to demand of the DX station out of turn, "What is your call?" or to send repeatedly "QRZ?" on CW, never mind the misuse of QRZ.

During this past F_2 season, a 6-meter DX station, who was not giving his call during every contact or even every second or third contact, responded to such a query with "If you do not know my call by now, go get it from the packet cluster!" Such a cynical attitude undermines the fundamental purposes of Amateur Radio communication and does little to resolve underlying problems. If all operators, especially those of rare DX stations running pileups, gave complete calls during every over, such situations could not arise, there would be little question about the validity of contacts, pileups would be more orderly and they might even go faster as a result.

It was also painful to listen to some contacts among local stations a few kilohertz away from pileups lamenting a muffed contact or expressing other frustrations. Even worse was the would-be DXer who asked his buddy, "Who was it that I worked on .110?" The answer was quite simple. He did not work anyone, as clearly that operator did not meet the minimum criteria for a contact. When he heard that EH8XYZ (or some other DX station) was on that frequency, he replied in disgust, "I worked that guy three times already!" That seems doubtful. DX stations contribute to this problem by not sending their own calls frequently enough, and the local station added to the QRM and confusion by not identifying the DX station before calling. You cannot make a contact if you do not know the other station's call. It is that simple.

WWW-based DX spotting networks have made possible new variations of these poor habits. It is not uncommon to see a KF4XYX, for example, spot G7ABC or some other DX station on 6 meters, with the attached comment, "Did we complete?" The answer is quite obvious to everyone who saw the spot. No, KF4XYZ could not have possibly completed the contact. A valid contact requires a complete exchange and acknowledgement of calls and one other piece of information. If he did not clearly hear the roger, QSL or other indication that all essential information was received, a contact did not take place.

A similar and even more chaotic situation arises when unusual propagation provides only short or uncertain opportunities to make contacts, such as during meteor showers or 2-meter sporadic-E openings. Perhaps the worst such situation occurs around the 2-meter calling frequency. Two or three stations will be calling CQ on 144.200 MHz, an inexcusable practice in itself, especially when all three are hearing each other. A chorus of distant stations all reply with their own calls, but not the calls of stations they are trying to attract. Each of the two or three CQing stations shout back a call sign they have picked of the mess and give their grid locators. A confused babble of rogers, grid locators and QRZs comes back on the next overs. Two stations think they have made contacts. Have they?

Recordings and Modern Variations

Tilton argued that a valid contact could not take place on the basis of a subsequent review of a recording to determine whether minimum criteria were met. He argued that rogers cannot be honestly sent until calls and another piece of information were sent, received and acknowledged. If an operator had to listen to a recording to pick out the required information after the alleged contact, a valid contact never took place. This situation arose during the 1950s, when high-speed meteor-scatter operators scanned slowly played tape recordings for bits of Morse code received during the course of scheduled sequences. Tilton's criteria implied that contacts had to be copied by ear in real time to be valid.

Perhaps for this reason, there was a

This Month

September 8	Very good EME conditions (new Moon)
September 14-16	ARRL VHF QSO Party
September 21	Transequatorial propagation peaks ±2 weeks
September 21-22	ARRL 10-GHz+Up Cumulative Contest
September 27-28	Pacific Northwest VHF/UHF Conference (Bend, Oregon)

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long-standing prejudice against high-speed meteor-scatter operating in North America, even though it was popular in Europe for several decades. In North America, meteor scatter was more typically accomplished using conventional CW and AM, until the use of SSB became widespread on the VHF bands in the early 1970s. That changed dramatically just two or three years ago, when computer programs made it possible to generate, record, and decode CW at speeds impossible to copy by ear. The technique still required operators to scan the recorded 15 or 30-second sequence for tell-tale signs of CW bursts, slow them down, and decode the bursts, usually while transmitting their own computer-generated sequences. Rogers were not sent until required minimum information was sent, received and finally decoded by ear. Some programs will decode the Morse code automatically and display letters and numbers on screen, but the basic process is the same.

Tilton may have had a bit of trouble with this technique, opposed as he was to recordings used to validate the exchange of useful information. Still, the delay between receiving information via high speed CW and decoding it using the computer is slight, perhaps a minute at most. Rogers are sent only after operators have confirmed that they have received all expected information necessary for a valid contact. The decoding is still done by ear, even if a computer slows selected portions of the audio stream to a manageable speed.

Digital Technology

The features and performance of radio equipment has continually improved over the past century. During the past decade, the incorporation of digital circuitry has provided astonishing advances in receiver capabilities, especially when combined with external computer-based audio signal processors, filters and visual displays. This latest technological leap is simply another step in a long tradition of technological development that has made it possible to hear progressively weaker VHF, UHF and microwave signals over longer distances. This much has not fundamentally changed the nature of a contact, operating techniques or modes of operation.

The many digital transmission modes that have become popular over the past decade are something else entirely, most especially JT44 and FSK441 released during the past two years. Digital-mode communications are likely to change the very nature of VHF operating and our notions about what constitutes a valid contact. In the first place, the new digital modes do not improve our ability to hear stations in the traditional way, because they do not depend on hearing the other station by ear at all. Second, digital modes exhibit their most impressive advantages over CW or SSB when signals are too weak or too short in duration to convey useful information that can be heard and understood directly.

These new computer-assisted techniques hold the potential of extending the range of some propagation modes (such as normal tropospheric scatter) and the usefulness of short-lived propagation (such as meteor scatter) well beyond what could be accomplished by directly by ear. Although digital modes constitute an entirely different way of communicating, the same criteria defining a valid contact apply. Complete contacts require the exchange and acknowledgement of calls and one other piece of information in real time. Tilton may have been dismayed that the human ear plays no role at all in such communications, yet digital-mode contacts otherwise conform to his criteria.

The Future of Contacts

The use of advanced digital techniques may soon raise some philosophical questions about the meaning of communications that a mere definition of a contact cannot answer. It is not difficult to imagine a radio system in which computers do all the work of communicating. Digital-mode receivers will scan for other digital signals on the band, which might be too weak to hear in the normal way. The computer would then decipher the digital stream, such as a simple CQ, reply with an appropriate message, wait for a reply and acknowledge the completion of a contact. The computer-controlled station might initiate a CQ of its own or go searching for another station according to its instructions. It could do this indefinitely.

Such a system is already possible, at least in a rudimentary fashion, using packet and similar systems. When combined with the superiority and speed of digital modes, the ease and effectiveness of communication could be mind-boggling. Imagine, for example, a whole contest run by computer-controlled stations. Contesters would simply turn on their computer-controlled transceivers and come back a few hours later to see how their stations were doing. Computers would automatically send electronic logs via e-mail for scoring as soon as the contest ended, and the sponsor's computer would post complete contest results and analysis on its Web page within the hour. What a contest!

Systems like this imaginary one are probably not far off in the future, but think of the implications for communications. Can automatic computer-controlled digital radio transceivers make contacts in the way we have traditionally understood, if no human intervention is required? If so, who is doing the communicating and what sort of information is being exchanged? Indeed, does communication require human beings at all?

ON THE BANDS

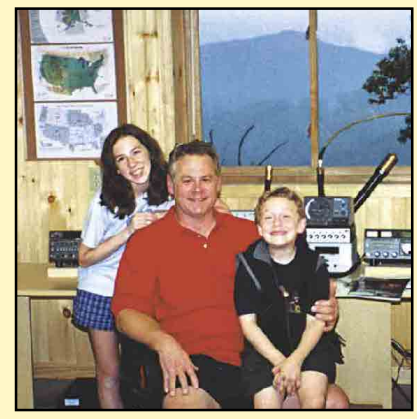
There was probably a lot less sporadic E this past June than is typical, but still enough to keep the bands active. There were no reports of extensive openings by any other propagation mode, making this June one of the dullest in many years. Thanks to W1ZC, WB2EZG, W3BTX, AC3A, WA5KBH, W7XU, K0ETC, N0JK, G4UPS and SM7SCJ for reports that made these summaries possible. Dates and times are all UTC.

Six Meters

By most accounts, sporadic-E in June seemed to be less intense and widespread than average. Pat Dyer, WA5IYX, reported from his listening post in southern Texas that he has never recorded fewer minutes of 88-108 MHz E-skip during any other June in 30 years of careful logging. Many days passed without any reports of 50-MHz sporadic E anywhere in the US or Canada, but even so, there were some good opportunities.

The 6-meter openings during the ARRL VHF Contest weekend, June 8-9, were generally short-lived and limited geographically. In contrast, there was intense E-skip across the eastern half of the country on the following weekend (June 15-16) for the SMIRK contest and quite widespread openings during Field Day (June 22-23). Double-hop opportunities were rare. K6LMN noted Florida stations on June 4, N7DB (OR) found stations in the Southeast and Midwest on the mornings of June 14 and 15, and K7ICW (NV) worked into New England on the afternoon of June 20.

Sporadic-E signals are often quite strong, making contacts possible using modest or novel equipment. David Greer, K4KZ (EM77), was astonished to make a dozen SSB contacts



Roger Webb, W4MW, pictured with his two children Mariel and Collin, has a scenic view of Grandfather Mountain through the window of his radio shack. Roger boasts a view of five states from his home in the "Carolina High Country" region of the Blue Ridge Mountains.

432-MHz Standings

Published 432-MHz standings include call-area leaders as of July 1. For a complete listing, check the Standings Boxes on the World Above 50 MHz pages of *ARRLWeb* at **www.arrl.org/qst/worldabove/**. To ensure that the Standings Boxes reflect current activity, submit reports at least every two years by e-mail to **standings@arrl.org**. Printed forms are available by sending a request with an SASE to Standings, ARRL, 225 Main St, Newington, CT 06111.

Call Sign	State/ Prov	States	DXCC	Grids	Best DX (km)†
AF1T*	NH	24	7	—	1375
K1TEO	CT	22	3	104	1900
K1LPS*	VT	22	3	33	1357
K1UHF	CT	20	2	64	1604
W3EP/1	CT	19	2	50	1760
W1AIM	VT	17	2	43	1323
KU2A	NH	13	2	31	1090
WA1ECF	MA	12	2	32	1122
WA1HOG	NH	10	2	24	745
AA1YN	NH	10	1	13	821
K1WVX	CT	10	1	13	—
K2AN	NY	23	2	64	1401
K2OVS	NY	16	3	30	720
WA2ZFH	NY	16	1	30	1463
K2KIB	NJ	14	1	25	487
W2FCA	NY	13	2	32	646
K1JT	NJ	13	2	31	757
W3HHN	NY	13	2	27	1180
AE3T	PA	23	2	—	—
K3KEL	PA	15	2	23	1025
WA3DMF	MD	10	1	13	603
WA4MVI*	SC	50	12	—	1771
W4TJ*	VA	43	40	190	—
K4QI*	NC	40	51	236	—
KD9KP	TN	34	1	101	1680
K4MRW	AL	30	2	134	—
K4RF	GA	28	2	96	1742
K4ZOO	VA	23	2	77	1444
AA4H	TN	21	1	56	1737
W4EUH	GA	20	2	53	1180
K4RWP	TN	20	1	46	—
NB2T	FL	20	1	22	1294
N4MM	VA	18	3	58	—
W4WTA	GA	18	1	54	1319
WB5APD	GA	16	1	53	1306
KU4WW	AL	15	1	30	1285
K0VXM	FL	11	3	52	1974
W5LUA*	TX	50	—	—	—
W5RCI*	MS	47	26	224	1775
WD5AGO*	OK	40	23	100	1740
W5ZN*	AR	35	32	132	1850
K5UR	AR	31	2	198	—
K5SW	OK	30	2	143	1979
W5HNK*	TX	20	1	—	1651
WB5YWI	OK	19	1	71	—
AA5C	TX	18	1	102	1721
N5QGH	TX	17	—	48	—
K5LLL*	TX	13	2	63	1532
W5UWB	TX	11	1	27	2167
N5HYV	LA	11	—	48	—
W6TOD*	CA	9	3	—	—
K6TSK	CA	5	2	50	4125
N6RMJ	CA	4	3	46	4017
K6QXY	CA	4	3	36	3794
KC6ZWT	CA	4	2	50	3934
AJ6T	CA	4	2	32	3672
W7HAH*	MT	47	41	195	—
W7ID*	ID	26	13	85	—
WA7KYM	WY	13	1	50	1323
K7XC*	NV	8	5	52	743
W7RV	AZ	7	4	56	712
NJ7A	UT	6	1	28	1122
WA8WZG*	OH	41	20	158	1844
K8MD	MI	31	2	113	2166
W8PAT	OH	28	2	72	1631
K2YAZ	MI	26	2	105	2167
N8KOL	OH	25	2	83	1235
KB8O	MI	15	1	50	—
N8PUM	MI	11	2	40	1368
WA8EOJ	OH	11	1	40	869
WB9SNR	IL	35	2	109	1420
K3SIW/9	IL	31	2	127	1450
N9NJY	IL	25	2	76	1211
W0UC	WI	21	2	100	1471
KA9UVY	IL	21	1	—	1409
KA9UZW	WI	20	2	68	1681
W9JN	WI	14	2	74	1402
N0AKC	WI	10	1	25	—
K0RZ*	CO	45	45	252	1116
W0OHU	MN	26	2	118	1842
W0JRP	MO	25	2	94	1750
KM0A	MO	23	2	77	1524
KA0PQW	MN	22	2	—	1814
N0HJZ	MN	22	1	85	1530
KD0PY	IA	22	1	71	1380
W0GHZ	MN	21	2	92	1430
N0LL	KS	21	1	113	1690
K0FF	MO	20	1	74	1189
N0NZ	NE	20	1	39	1224
W7XU/0	SD	18	1	94	2040
K0SQ	MN	17	2	75	1295
K0CJ	MN	16	2	—	1375
KM0T	IA	14	2	77	1151
KB0VUK	MN	13	2	63	1124
K0AWU	MN	13	2	50	1555
N0UK	MN	12	2	62	992
WA2HFI/0	MN	10	2	41	932
N0KE	CO	10	1	38	500
VE1ALQ*	NB	32	31	175	—
VE3DSS	ON	15	2	—	—
VE3TMG	ON	13	2	65	1305

*Includes EME contacts
–Not given
†By terrestrial propagation modes

using his FT-817 with the built-in 15-inch rubber-ducky antenna, while sitting in his bedroom. Bill Bibeau, K1FPV (FM16), is hampered by antenna restrictions, but found a clever solution. He put up a short RadioShack TV antenna, which is exempt from regulation and discovered that it worked well on 50, 144 and 432 MHz after modifications. In June, Bill worked many stations on 6 meters with this antenna, including FP/NA1CW, while running just 20 W from his Ten-Tec 526.

It is often difficult to separate sporadic-E from auroral-E contacts across northern latitudes. That was surely the case during a few openings in June. K7ICW (DM26) worked KL7NO (BP54) on June 1 several times between 2145 and 2300 and heard the Alaskan work several W6s as well via what was probably double-hop sporadic-E. On June 16, VE5UF heard VE8BY/b and found FP/NA1CW after 0330, while N7DB (CN85) heard VE8BY/b, VE6EMU/b,VE6ARC/b, VE4VHF/b, K0GUV/b and worked VA6SZ (DO33), mostly after 0500. The timing suggests these were all via auroral-E.

Six-Meter DX

Despite generally poor sporadic-E conditions, there were half-a-dozen days with transatlantic propagation. East Coast stations enjoyed most of the openings to Europe and adjacent North Africa on June 3, 4, 10, 11, 16 and 29, but there were some surprises. On the morning of June 5, K0GU (DN70) began hearing 49.750 video, presumably from northern Europe. He subsequently worked SM3UZS at 1550 and OH7PI at 1645, both with weak signals. Several Oklahoma stations worked EH (Spain) and EH9 (Cueta and Melilla) around 1530 on June 11. K5CM brought his DXCC tally to 159 by his contact with EH9AI. Later in the morning W4TJ (VA) and K4QI (NC) worked SV1DH. GM4PLM reported that his longest contact on June 16 was with N4XCE (AL).

Single- and double-hop E-skip openings within the Americas also provide opportunities to work DX. Among DXCC entities and calls reported by widely scattered US stations during June were 8R1RPN, 8R1WD, 9Y4TL, C6AIE, CO8LY, FJ5DX, FS/W6JKV, several KP4s, P43JB, PJ7/K2GSJ and YV4DDK.

C6AIE (WZ8D when home in Ohio) ran more than 800 6-meter contacts from the Bahamas during early June, but thought this was down from previous trips. About 500 of those came on a single day—June 12. In contrast, John found only 58 takers during the ARRL contest weekend. He also spent some time on 2 meters and worked into Florida and along the southeastern coast as far as W4SSO (NC) via tropo, K2TXB (NJ) using the WSJT digital protocols and W5UN via EME with the aid of JT44.

FP/NA1CW was a 6-meter-only expedition to Miquelon Island, on June 14 to 26. Operators NA1CW and K1TOL found the band open every day and made more than 1150 contacts with 900 different stations in 42 states and 30 DXCC entities. Their longest contacts in North America were with K7ICW (NV), W7CI (AZ) and WA6PEV (CA). Their longest contacts in Europe were to Finland (OH), Estonia (ES) and Bulgaria (LZ). During some early morning hours, they heard strong auroral-E video from Northern Europe, but made no contacts at these times.

Summertime 6-meter E-skip would not be complete without at least some activity from Japan. JN1JFC worked WA6JRA on June 1 about 0625. Hatsuo Yoshida, JA1VOK, reported K6QXY on June 5 at 0420, K6FV/b on June 12 at 0605 and K6QXY again on June 18 just after 0000. K6QXY also worked JA9LSZ on the 18th and WD5COV (DM79) nabbed JH1EAP. These were not the tremendous runs of some past years, but they still suggest that the long transpacific path opens nearly every summer.

Two-meter Sporadic E

Four consecutive days of spectacular 144-MHz E-skip appeared across Europe on June 1 to 4. On the second, Europeans as widespread as Ireland and Portugal in the west to Russia and Greece in the east, south to Malta and north to Sweden made hundreds of contacts. The openings on subsequent days were less extensive, but still remarkable. In all, there was 2-meter sporadic-E somewhere in Europe on 10 days in June. DK5YA posted detailed maps of these openings on his Web pages. Follow the links from **www.dk5ya.de**.

In contrast, 2-meter sporadic E across the US and Canada was limited to one opening on June 14-15, 2340 to 0130. Most of the contacts were from South Dakota, Nebraska, Kansas, Missouri and Oklahoma to Ontario, Quebec and the New England states south to Virginia. Several reports noted better success calling CQ away from the calling frequency.

Microwaves

The July issue of *Cheese Bits* provided details of a 596-km 10-GHz rain-scatter contact made between K4EDF (EM78 in Indiana) and W4DEX (EM95 in North Carolina) on June 2. This is the second-longest such contact reported so far in North America. The pair aimed at towering thunderstorms that had formed over western Tennessee. K4EFD ran 5 W to a 2-foot dish mounted just inside a cargo van. W4DEX pushed about the same amount of power through 110 feet of waveguide to a 2-foot dish at 105 feet. QST

NEW PRODUCTS

NCS OFFERS ACCESSORY SWITCHER, PATCH PANEL

◊ New Communications Solutions announces two new products, the Model 3240 Multi-Switch and the Model 3400 Multi-Patch. The Multi-Switch is a console which can route connected accessories, such as microphones, headsets, TNCs and keyers, to up to four attached radios. The Multi-Patch can be configured for five to ten rows of up to 10 connectors on each row. Connectors include RCA, 3.5 mm and ¼ inch phone jacks and RJ11 telephone jacks.

Price: Multi-Switch, $249.95; Multi-Patch, $129.95. For additional information, contact New Communications Solutions, 5364 Valley Mist Trace, Suite 101, Norcross GA 30092; tel or fax 888-883-5788; **ncs@ncsradio.com**; **www.ncsradio.com**. QST

Previous • Next New Products

The First "YL"

While certainly not the first female ham radio operator, M. Adaire Garmhausen, 3BCK, is the first "YL," and she was an excellent example. It all came about when she submitted an article to *QST*, "How to Build a Wireless Station," in early 1920. She received a letter back on the official ARRL *QST* letterhead from Edwin C. Adams. It was dated May 13, 1920 and read:

Miss M. Adaire Garmhausen,
516 W. 27th St.,
Baltimore, Md.

My Dear YL:-

We have had to coin a new phrase for your benefit as you will readily see that OM will not fit and OL would certainly be most inapplicable. Thank you very much indeed for your most amusing history of the trials and tribulations of a lady ham. We will be very pleased to present this to the radio fraternity in an early issue of QST.

Again thanking you and assuring you of our best wishes, we remain

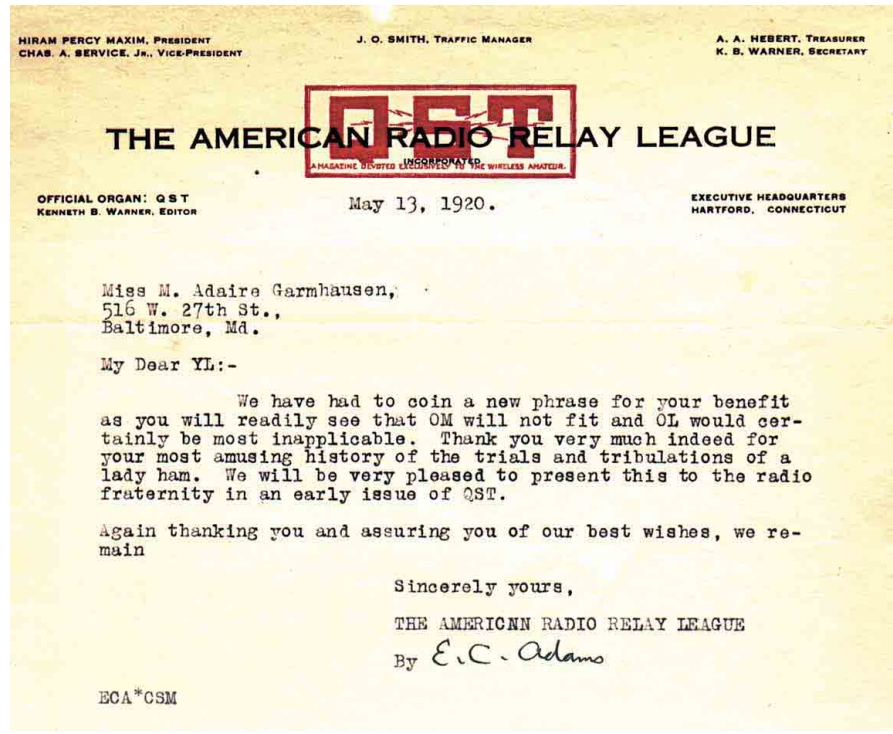
Sincerely yours,
THE AMERICAN RADIO RELAY LEAGUE
By E. C. Adams (signed)

Her article was published in the July 1920 issue of *QST*. She became quite a celebrity, both in Baltimore and in Hartford. She was an excellent operator and many a local, single, young ham became smitten with her good looks and radio abilities. A second article, "Breaking Out," was published in May 1921 *QST*.

By 1922 she was already into more ham radio activities than most of us will ever do in a lifetime. *QST* editors, and many others, were trying to find out more about her and wondered, "What did she look like?"

While not the first female ham radio operator, M. Adaire Garmhausen, 3BCK, is the first "YL."

The answer came in the October 1922 *QST* column, "Who's Who in Amateur Wireless." The column featured her photo and started by saying, "Ahh! At last! The Ladies' Number of Hooshoo! You know, gang, we have been wondering all this time what these Y.L.'s look like and now after years of pestering we have got them to come across with enough dope to introduce themselves." (The column also profiled Miss Winifred Dow, 7CB, from Tacoma, Washington.)



HIRAM PERCY MAXIM, President
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THE AMERICAN RADIO RELAY LEAGUE

INCORPORATED
A MAGAZINE DEVOTED EXCLUSIVELY TO THE WIRELESS AMATEUR.

OFFICIAL ORGAN: QST
KENNETH B. WARNER, EDITOR

May 13, 1920.

EXECUTIVE HEADQUARTERS
HARTFORD, CONNECTICUT

Miss M. Adaire Garmhausen,
516 W. 27th St.,
Baltimore, Md.

My Dear YL:-

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Again thanking you and assuring you of our best wishes, we remain

Sincerely yours,

THE AMERICNN RADIO RELAY LEAGUE

By E.C. Adams

ECA*CSM

From "Who's Who in Amateur Radio," *QST*, Oct 1922

Miss Marion Adaire Garmhausen hardly needs any introduction as most of us have heard of her in one way or another. She admits she was born May 28, 1899, but swears she does not look a day over sixteen. Being a telegraph operator by trade, she went to wireless school just after the war and found a *QST* somebody had left lying about (careless!). Our budding Y. L. says she was struck by the spirit of the organization and wrote Mr. Duvall, whose name she found in the magazine, for further particulars. His reply harmonized exactly with the spirit of the magazine.

When she put in her first set the reigning forces offered her every discouragement known to mankind, so she retired to her shell. Her articles in July 1920 *QST* ("How to Build a Wireless Station") and May 1921 ("Breaking Out") tell in her own words of her experiences in getting started, so any attempt on our part to repeat the tales of woe would at best be infringing on her original masterpieces. 3BCK (for that is her call) remained in her shell until the organization of "The Radio Condenser," sometime Third District organ, when the remorseful crowd invited her to join them. And she was not merely decorative, either—she was of real help on the "Condenser;" and she likewise was an active force in the planning and management of the hugely successful Third and Fourth District Convention in Washington last February.

However, they say she doesn't often venture out thusly. No ham has ever laid eyes an her station, despite sundry pleadings, and she swears "no ham ever shall until I get darn good and ready to let him." Ain't it like a woman! She admits her room "looks more like a blacksmith's shop than a young lady's 'boojwar,'" and in view of all of this discouragement we have given up hopes of having a photo of 3BCK in our "Amateur Radio Stations" department.

In spite of all her modesty we find that Miss Garmhausen holds two certificates in electrical engineering and is working for the last one necessary to get a diploma. We know she has been an ardent booster of the League and always will be, and it is her ambition some day to have to move to some place where her set will be able to fill a necessary place in A.R.R.L. relays.

I will continue the story about 3BCK in a later column. I'm still searching for more information about her life and her radio career. I know she lived in Baltimore her entire life and never married. She became a SK, I believe, in the late 1990s. She was good friends with Elizabeth Zandonini, 3CDQ, of Washington DC, a well-known YL.

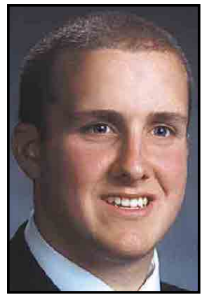
Anyone with any information, a QSL card, photo, obituary, etc. of 3BCK, please contact me at my address below or via e-mail. I'm also looking for issues of *The Radio Condenser*; an early 1920s Baltimore-based ham radio publication.
—*K2TQN* QST

John Dilks, K2TQN ♦ 125 Warf Road, Egg Harbor Township, NJ 08234-8501 ♦ k2tqn@arrl.org

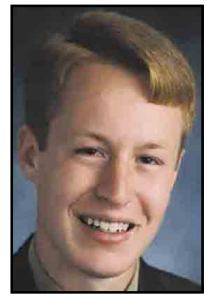
The Results of Scholarships and Academic Excellence

You might be wondering if youth still values scholastic achievement in the post-9/11 world. We can assure you it does. Tomorrow's leaders are exerting even greater effort (especially in after-class public service and emergency communications) while carrying course loads that would make many of us blanch! Across the US, young hams have avoided a pessimistic outlook by focusing on goals that spell a brighter future for all. Let's meet a few of these busy, forward-thinking achievers.

Matthew A. Ferrara, KI0NH
Fargo, North Dakota
The ARRL Scholarship to Honor Barry Goldwater—$5000

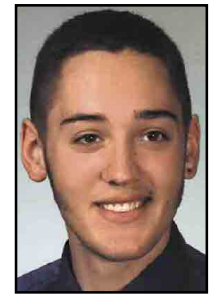


Andrew F. Schaefer, KB2ZWZ
Binghamton, New York
The Perry F. Hadlock Memorial Scholarship—$2000



Jaymes S. Kenyon, KC8DJH
Eaton Rapids, Michigan
The Earl I. Anderson Scholarship—$1250

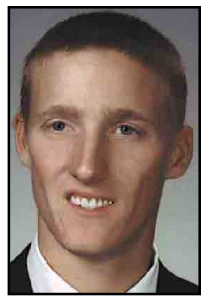
Victoria M. Reid, AA3OT
Sigel, Pennsylvania
You've Got a Friend in Pennsylvania—$1000



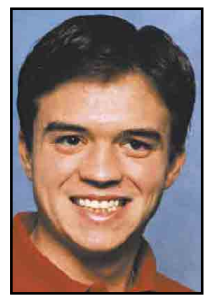
Patrick A. La Fratta, AG4JQ
Lynchburg, Virginia
The L. Phil and Alice J. Wicker Scholarship—$1000

James J. Wenner, K6NSY
Westminster, California
The Charles N. Fisher Memorial Scholarship—$1000

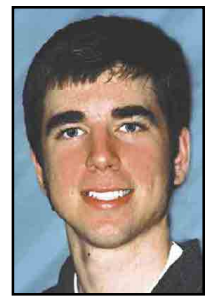
Therese G. Long, KC8PEZ
Imlay City, Michigan
The K2TEO Martin J. Green Memorial Scholarship—$1000



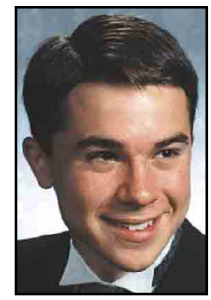
Ethan C. Gartrell, KC0EGZ
Stockton, Kansas
The PHD-ARA Scholarship—$1000



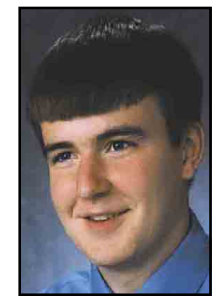
John LaWayne Walker, N4DMR
Cullman, Alabama
The Charles Clarke Cordle Memorial Scholarship—$1000



Martin C. Worster, KD5LJT
Harrison, Arkansas
The Tom and Judith Comstock Scholarship—$1000



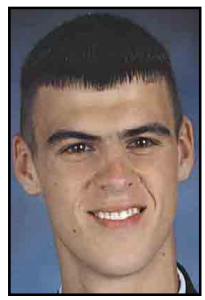
Andrew J. Maroney IV, W2AJM
New Windsor, New York
The Henry Broughton Memorial Scholarship—$1000



Mark R. Annis, KB9VUG
Waukesha, Wisconsin
The Donald Riebhoff Memorial Scholarship—$1000

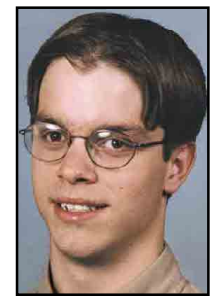
Megan R. McClary, KG6JCG
Cupertino, California
The General Fund Scholarship—$1000

Jevon P. Gegg-Mitchell, KE6YLH
Chico, California
The General Fund Scholarship—$1000



Thomas W. Moyher, N1UNT
Stratford, Connecticut
The New England FEMARA Scholarship—$600

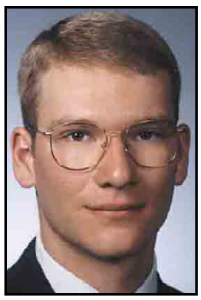
Chad E. Bulkley, N1UDN
Westport, Connecticut
The New England FEMARA Scholarship—$600



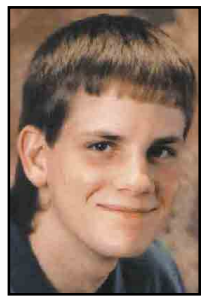
Gregory W. Bennett, K1GWB
Jaffrey, New Hampshire
The New England FEMARA Scholarship—$600

John T. Hart, KB1EEN
Wallingford, Connecticut
The New England FEMARA Scholarship—$600

Mary E. Lau, N1VH ♦ Secretary, ARRL Foundation Inc ♦ n1vh@arrl.org



Scott E. Brock, KB9SZW
Rushville, Indiana
The Edmond A. Metzger Scholarship—$500



Jared M. Greenwalt, KD5GSE
Carlisle, Arkansas
The Fred R. McDaniel Memorial Scholarship—$500

Scholarships were awarded to the following students not shown:

Timothy R. Whitcomb, AB7LP, Vancouver, WA, ***The Mary Lou Brown Scholarship*—$2500**; Chad A. Wasinger, KC0IZV**,** Scott City, KS, ***The Irving W. Cook, WA0CGS Scholarship*—$1000**; Brent M. Miller, KB0JXQ**,** Kalona, Iowa, ***The Paul and Helen L. Grauer Scholarship***—$1000. Joshua W. Williams, KD5CAN, Garland, Texas**,** ***The General Fund Scholarship***—$1000; Philip T. Sage, KF8JW, Mantua, OH, ***The General Fund Scholarship*—$1000**; Will D. Hamilton, KD5LQG, Ellisville, MS, ***The Mississippi Scholarship***—$500; Lori A. Erbrederis, N9WRD, Somonauk, IL, ***The Six Meter Club of Chicago Scholarship***—$500; and Shannon M. Kelly, KC7SVV, Phoenix, AZ; ***The Central Arizona DX Association Scholarship***—$500.

To apply for Year 2003 scholarships, download our application at **www.arrl.org/arrlf** or write to *The ARRL Foundation, Inc, 225 Main St, Newington, CT 06111.*

Applications accepted after October 1, 2002 and January 31, 2003, only. Deadline for postmarked applications with transcripts affixed is **February 1, 2003**.

Wendie E. Johnson, KB9UPI
Cameron, Wisconsin
The Chicago FM Club Scholarship—$500

Daina M. Rollor, KG4GKH
Watkinsville, Georgia
The Eugene "Gene" Sallee, W4YFR, Memorial Scholarship—$500

Jennifer L. Coleman, KD5QJX
Belen, New Mexico
The Albuquerque ARC/Toby Cross Memorial Scholarship—$500

Contributor's Corner

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The Tom and Judith Comstock Scholarship Fund
Tom Comstock, N5TC

The Edmond A. Metzger Scholarship Fund
John L. Swartz, WA9AQN
Richard D. Cox, K9PGN

The Goldwater Scholarship Fund
Ian Elliot, W7JMX, in fond memory of Robert "Bob" Hart, WA7NHZ

The Victor C. Clark Youth Incentive Program Fund
Dr Phil Sager, WB4FDT, in fond memory of Casey Norrisey, K4MTX, and Marcus Weinstein, W4TZC
Peter O. Brackett, VE1AEX/K1PO, in fond memory of Donald E. Brackett, VE1QZ
Paul A. Thompson, N5PT, in appreciation of OCARES (Oklahoma)

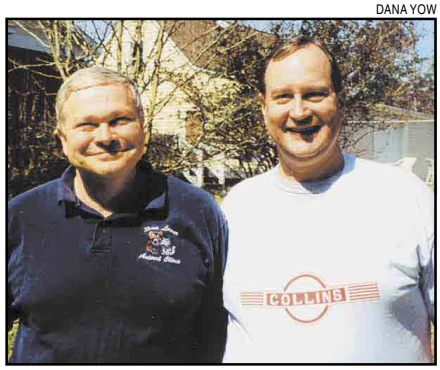
The Jesse Bieberman Meritorious Membership Fund
Steel City ARC, in fond memory of Roger W. Lory, K3TP
Steel City ARC, in fond memory of Anthony F. Gessler, W3YDP

The General Fund
L. Dennis Shapiro, W1UF
David D. Selbert, KA2BOK, in loving memory of Chester Selbert, WB2ZFS
William R. Baker, N4WAN
David L. Noble, AA6GU, in loving memory of Ann Noble Fiedler, N1ZDJ
Thelma M. Miller, in loving memory of Rex Miller, W0VGX
Jim Gregg, in fond memory of Lewis Elicker, W3ADE
In appreciation of OCARES (Oklahoma): Walter D. Ballew, K5WMY; Mark Cashion; Brent Erwin, AB5VK; Tim McAnally; Mark Smith, KI5MV; Rey Victorio, N5ZHN; Rick Vidmer, K8KK; Joseph Garland, WA5FLT, and George Lower, W5TOQ

As received and acknowledged during the months of **May** and **June**.

STRAYS

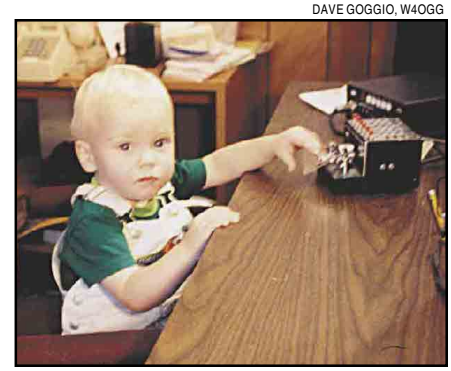
DANA YOW



Two avid hams got together at a tower-raising party in Fort Lawn, South Carolina recently. William J. Lazenby, KC4CBY (left), is president of the South Carolina Association of Veterinarians, while R. Duren Johnson, Jr, MD, KG4NYV, is president of the SC Medical Association.

Aubrianna Keith, KG4LTB, of Ashburn, Virginia, winner of the VA QSO Party High Single Operator Novice/Technician plaque, is congratulated by ARRL Roanoke Division Director Dennis Bodson, W4PWF. The presentation took place at the Manassas Hamfest in June.

DAVE GOGGIO, W4OGG



At age 1½, JonPaul Jones, great grandson of long-time ham Dave Goggio, W4OGG, of Memphis, Tennessee, enjoys listening to Morse code. Although he's a bit young to actually *send* code, JonPaul looks to be well on his way.

Previous • Next Strays

Testing the Precision of APRS for Aircraft Emergencies

In response to the events of last September 11, the Rome Research Site of the Air Force Research Lab in upstate New York planned and conducted an experiment using Amateur Radio operators to locate aircraft that are in trouble. The plan for the experiment was simple, but effective. Fly an airplane with an APRS station on-board and then start transmitting APRS emergency beacons on the national APRS 2-meter frequency (144.39 MHz) and see if anyone responds. [The Air Force Research Lab scheduled the Precision Emergency Automated Position Reporting System (PEAPRS) test to occur in conjunction with the annual Team Patriot exercise. The ARRL cosponsored the test.]

The objective of the test was to measure the timeliness and accuracy of the reports received from the amateur community. If the test proved successful, PEAPRS could provide the initial alert and position information of an aircraft in distress to authorities by taking advantage of the Amateur Radio operators monitoring the international APRS network. In a real-life situation, a panic button, power loss, loss of cabin pressure, other on-board sensors or ground interrogation could trigger the distress signal.

The experiment was not a complete surprise. Announcements were broadcast two weeks beforehand on various Amateur Radio channels (including all the ARRL outlets) indicating that the experiment would occur between June 3 and 8, and that the aircraft "in distress" would transmit emergency beacons using the call sign WA2ZXS.

Stations receiving the emergency beacons should e-mail or phone in their reception reports. The reception reports should have included the contents of the message received and the method used for reception, that is, whether direct, digipeater, the Internet or other means. As an incentive, participating hams qualified for a special certificate from ARRL in recognition of their efforts.

There were two test flights. The first occurred shortly after noon Eastern Time on Tuesday, June 4 and lasted approximately 20 minutes. The second flight occurred on Saturday, June 8, also shortly after noon and lasted approximately 40 minutes.

The flight path was over the northern portion of upstate New York at 35,000 to 45,000 feet. From that altitude, hams in New York, New England and Quebec should be able to receive the emergency beacons directly and countless other hams beyond the direct coverage of the aircraft should receive reports via APRS digipeaters and the APRS interface on the Internet. Approximately 290 reports were received split evenly between the two flights.

Murphy came on-board the second flight when the APRS station stopped working. The crew contacted Wheeler-Sack airfield at Fort Drum for approval to land the aircraft and fix the problem. Apparently, the GPS antenna, which was stored in the PEAPRS box, came loose and toggled off the TH-D7's beacon (BCN) button, thus, turning off the beacon. (What are the odds!) The crew was able to reprogram the TH-D7 and the rest of the test went off without a hitch

The people from the Air Force Research Lab who were responsible for the PEAPRS experiment were Major Buzz Szarek, WM1W, Chief; Michael Little, KB2CCD, Technical Lead; Norm Bernstein, K2KLV, supplied radios; Chet Cichon, Aircraft Pilot; MSgt John Connelly, Aircraft Coordinator; Lt Col Dwayne Frye, AA8EQ, Aircraft Control Operator (first flight); Dan O'Shea, N2MRE, Aircraft Control Operator (second flight); Andy Cleary, KC2GVE, Asst Digipeater Installation; Tom Corigliano, Electronics Technician; and James Perretta, Aircraft Payload Specialist.

Major Buzz Szarek, WM1W, asked that if other hams conduct similar tests, they send the results to **peaprs@rl.af.mil**. Buzz added that hams who are private pilots could build their own PEAPRS stations and coordinate their own tests locally. But, they should be sure to inform the FAA and emergency-response agencies of the test to prevent those agencies from scrambling when an unknowing ham misinterprets the test as a genuine emergency.

Figure 1—The PEAPRS station consisted of a Kenwood TH-D7 handheld transceiver and a Garmin GPS III Plus GPS receiver contained in a metal box. The GPS calculated the position of the aircraft and fed that data to the APRS software that is integral to the TH-D7.

Figure 2—The map display of *WinAPRS* software was integrated into the large display inside the PEAPRS command tent.

Stan Horzepa, WA1LOU ♦ One Glen Ave, Wolcott CT 06716-1442 ♦ wa1lou@arrl.net, www.tapr.org/~wa1lou

Getting on the Microwave Bands

Amateurs who are considering moving to the higher bands are usually driven by some desire to take on new challenges or just to have fun. In a survey of amateurs who are active on the microwave bands, "the technical challenge" was the most prevalent answer to the questions of why they got interested in microwaves in the first place, and why they continue active. I don't intend to scare you away with this comment—I know that many hams consider themselves nontechnical. Consider that more than half of those who took the survey did not have technical jobs or engineering training.

These challenges are the kind that you decided to take on when becoming an amateur in the first place. Getting involved with and operating on the microwave bands is a learning experience where you can apply most of what you have learned already about communications and extend it. All learning is in steps, and getting active on microwaves can and should be accomplished in steps as well. As most microwavers will tell you, the rewards are tremendous.

Rather than just answer the question "How do I get on the microwave bands?" myself, I asked a few well-known microwave operators for advice to new microwavers. This advice could take the form of a list of things to do, or examples of what they have or are doing. Here is what they said, followed at the end by my advice as well.

Bill Seabreeze, W3IY, *is a very active rover, stimulating activity by constantly inviting others to get on the air when conditions are good—and going out to hilltops himself to get the ball rolling.*

Here's what I think is important for someone getting on microwaves.

1. Find someone in your area with experience. This is really a good idea to save you time and money. There are often inexpensive ways to get on various bands, and making contact with other hams is the best way to stay aware of things that become available. Also, maybe your friend will have access to test equipment, which is often very helpful. Another microwave ham with working equipment can be all the test equipment you will need.

2. Consider making your new microwave project portable. This will allow you to take it up in the mountains, where you will have much better luck working other stations. It's really fun to be able to travel to areas with activity, so you can work more stations. It makes them really happy in contests, and will probably be very fulfilling for you as well. Being a microwave-enabled rover is really loads of fun! (Set your browser to **members.fcc.net/wseab/**.)

3. Be prepared to spend a few bucks. There is precious little surplus microwave gear anymore that is really cheap. Lots of guys are making profit from reselling used gear, and you really have to look around for bargains. Your friend from item 1 will hopefully help you to get the best bang for your bucks. Consider purchasing part of your microwave station new, to make the project more manageable. For example, buying a local oscillator can really help you avoid the pitfalls of integrating a new microwave band. Even crystals for existing surplus oscillators are getting more expensive.

4. Be active on the lower microwave bands (including VHF/UHF). You will find many stations with similar interests, with whom you can learn lots of good stuff. Learning who the active hams are will really pay off when you are searching for possible QSOs, or information about a new microwave band.

5. Read. There is much great information available in the microwave conference proceedings, RSGB and ARRL manuals, microwave magazines, etc. You should also subscribe to some of the microwave reflectors available on the Internet.

Doug Millar, K6JEY, *is president of the San Bernardino Microwave Society. His contributions to activity and construction are numerous.*

I have a few suggestions for those struggling to get on microwaves:

1. Work together: two radios are as easy to build as one.

2. Work around problems. Don't let them stump you, work on some other part of the project until an answer comes to you.

3. Shoot the engineer: Don't dote over design. Get building so that you see what the real problems are.

4. Get on the air! You will certainly modify your rig after you use it the first time, so plan on modifying it. You don't need to have the perfect radio when you go out in the field the first time. It takes several times for your radio to get close to the final form.

Al Ward, W5LUA, *is president of the North Texas Microwave Society. Al is probably best known for his preamplifier designs and pioneering work with microwave EME.*

Microwave is often a part of VHF/UHF contesting. This "rover" station by W3IY was used in the 2002 June VHF QSO Party.

N1MU crafted this homebrew 10-GHz transverter.

Tom Williams, WA1MBA ♦ wa1mba@arrl.org

These links and others can be found at **www.wa1mba.org/interest.htm.** Please visit this site for listings of other clubs and overseas resources.

• The San Bernardino Microwave Society publishes an excellent newsletter. To learn more, set your browser to **www.ham-radio.com/sbms/**. As of my last checking, there is no way to join on-line. Send your requests to the Corresponding Secretary, as listed on the site.

• North Texas Microwave Society newsletter is called *Feed Point*. NTMS has a Web site at **www.ntms.org/**. For a subscription, click on "Membership" and follow directions.

• The North East Weak Signal Group publishes a newsletter called *NEWSLetter*. Subscriptions can be obtained by setting your browser to **www.newsvhf.com/**. Click on the membership application form link.

• Mt Airy VHF Radio Club has a newsletter called *Cheesebits*. For subscription go to **www.ij.net/packrats/** and follow the links to subscribe.

• The European *DUBUS* magazine, perhaps one of the best technical amateur microwave periodicals, is available for subscription by setting your browser to **www.dubus.org/** and sending e-mail to the address for your country.

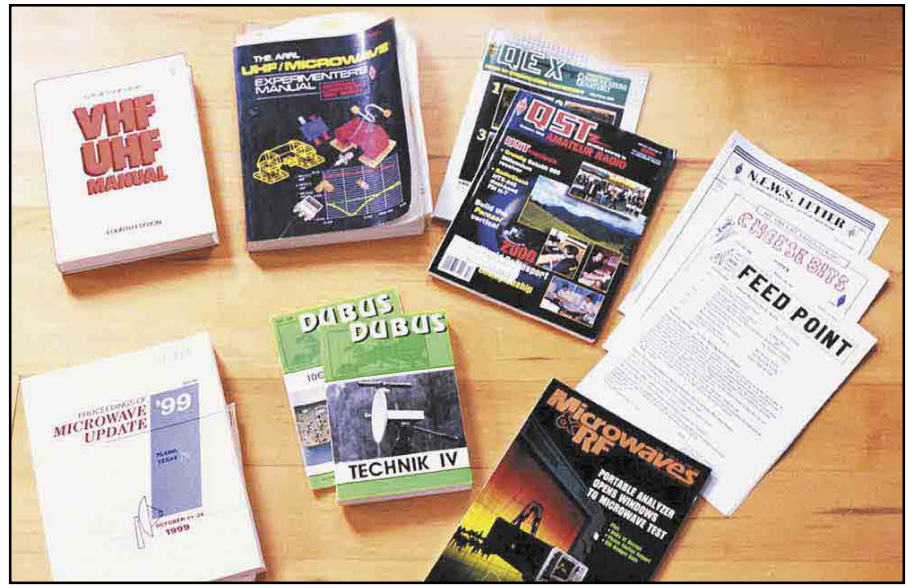
• The latest Microwave Update conference information can be found at **www.microwaveupdate.org/**.

In order to increase local activity in the North Texas Microwave Society, we have started a club project, which consists of building the Down East Microwave 10 GHz transverters.

The basic transverter coupled with a 2-meter multimode IF provides a 4-dB noise figure and 10 mW output at 10 GHz. The basic transverter connected to an 18-inch dish with a 3/4 inch copper pipe feed has allowed our members to make many 30 plus mile contacts in the flatlands of Texas.

Some of the members have also purchased the Qualcom 1-W PAs and have successfully made the modifications to get them tuned up on 10 GHz. The entire NTMS group looks forward to participating in the annual ARRL 10 GHz contest this year.

Tom Whitted, WA8WZG, *is a very active VHF and above operator from Ohio, and often places well in contests.*



Some of the publications of interest to microwavers.

First, try to network with someone who is currently using the microwave bands. This will allow you to overcome many of the pitfalls of starting from scratch, plus, for the experienced microwaver, it allows them to have someone new to work!

Second, read and study as much info as you can; the ARRL manuals and the RSGB series are great sources on info.

Don't try to reinvent the wheel at first. Copy, copy, copy what has worked for others.

The microwave bands are a great place for experimentation, but it will take some time to learn the do's and don'ts.

Above all, don't become disappointed. A good station takes some time and energy to put together.

And Now For My Input...

There is no single answer to the question of getting on the microwave bands because every person asking has different resources and expectations. Here are some useful tips.

Community. Find some other hams that live nearby who are also interested in getting started or are already active. You won't make contacts without other hams, and the first contacts you make will be with others nearby. As the sage said, "Learn from the mistakes of others because you won't live long enough to make them all yourself." Hams are attracted to microwaves because of the technical challenges, and sharing that learning is a very rewarding experience. Many areas of the country have active clubs, often with group projects. Seek them out.

Take your time. Getting on microwaves can be more complicated than getting on other bands. Each part of a radio system is a little more finicky and deserves some effort to learn just what is critical and how to get it right. When the signals are weak, Morse code is often used (usually at a low speed). Without it you will only work the stronger stations—but working the strong ones is a lot better than working none at all. So, even if you haven't learned the code yet, get on microwaves!

Expect some failure. Many hams who try microwaves do not make a contact the first time out. Usually there is something that goes wrong. When you do make your first contact, it will probably be weaker or more difficult than expected. Microwave operation is a process of learning and improving. You are likely to improve your station every time you use it.

Start small. Try a lower microwave band first, such as 1296 MHz. Or try 10 GHz, where there is perhaps the most activity when the weather is good. If you are getting on 10 GHz the first time, use a horn antenna and don't buy a power amplifier. You can get a dish and more power later.

Scrounge for surplus. Go to lots of flea markets and hamfests, especially with your microwave friends. You will quickly learn what is good and what is not. The vast majority of microwavers purchase most of their parts at a small fraction of their original cost, and often swap to get what they need.

Get information. Join a club, subscribe to a few newsletters, get on the Internet, and join mail and news groups. Read publications. See the list of resources that I have found to be continuously valuable. Go to Microwave Update or other weak signal conferences when they are in your part of the country. (Microwave Update 2002 is in Connecticut October 24-27.)

New Multiband HF Antenna

Wanna have some fun? Go on any of the QRP or FT-817 Internet lists and post a message saying you think short "miracle" antennas for HF portable operations are Voodoo Science in action. Then sit back and watch the fireworks! In general, there are two camps: One believes that these super-short antennas perform well and are the answer to a portable QRP operator's prayers. The other camp bases their disdain for these short HF antennas on proven antenna theory, which basically states "longer and higher is better."

Now, it's no secret that, given the right propagation conditions and location, you can load up the proverbial "wet noodle" and make contacts. Problems arise when you need to do this consistently using an extremely short, inefficient antenna. None of these "super shorties" are a match for a dipole, even if the dipole is only a few feet off the ground. My problem with these super-short HF antennas is one of consistency. Why pack an inefficient antenna on a hiking or camping trip that won't provide consistent results? QRP can be frustrating enough without adding substandard antenna performance into the mix.

I was well on my way to designing and building my own portable HF vertical antenna when Mark Forbes, KC9C, of Ventenna (**www.ventenna.com**) approached me about their newest product, a multi-band HF portable antenna, the HFp.

My HFp arrived at the Cromwell Bridge Holiday Inn, in Towson, Maryland, during Atlanticon 2002. To say this new Ventenna offering stirred up some interest with the QRPers in attendance would be an understatement. Everyone wanted to try it out.

The Ventenna HFp consists of six 18-inch fiberglass elements that screw together to form a helical loaded whip. A short telescoping whip screws into the topmost element. The entire radiator attaches to the base fixture, made from two pieces of aluminum flat stock that form an X. The base has adjustable leveling feet to ensure vertical orientation.

The antenna is assembled in accordance with the plastic laminated tuning sheet, which describes how the elements are to be placed together, and in what order, for each band. Total height of the HFp varies from about 10.5 feet on 40 meters down to about 3 feet on 10 meters.

K7SZ

The 2.2-pound HFp (except for the coax) fits into a compact carrying case.

K7SZ

Close-up of the feedpoint of the HFp. When configured for 40 meters, the antenna stands 10 feet 6 inches high.

Rough resonance is obtained by adding, subtracting and inverting selected elements, to place the loading coils at different points along the whip. Fine-tuning is accomplished by altering the length of the telescoping whip at the top of the antenna. The tuning sheet specifies the length of the whip and radials for each band segment. The radials are extended to preset lengths using small sections of heat shrink tubing placed along the length of each radial which correspond to a particular band. Six anchor stakes are provided to keep the three radials and three guy wires taut once deployed.

Whip length is specified, on the laminated card, in terms of "number of whip sections," which is easier and faster to implement than measuring the physical length of the whip. In practice the tuning sheet data was sufficient to resonate the antenna on each band. I used an MFJ-259B analyzer to double-check the settings, only to find that very little tweaking was needed to get the antenna exactly on the frequency I wanted.

Band changes are a bit cumbersome, taking about 5 minutes to reposition the helical elements, adjust the whip length and resize the radials. However, the convenience of having 40-10 meters available in one small, lightweight (2.2 pound) and efficient package offsets this.

The HFp is coaxially fed and any 50-75 Ω cables can be used. This antenna comes with all the parts necessary for easy setup and operation, including the base, radials, guy wires, elements, whip and an excellent manual with laminated tuning sheet for portable use. Everything tucks neatly into a portable nylon bag with Velcro fasteners. The HFp covers 40-10 meters; optional 80 and 6-meter coils are available from Ventenna, however.

The Ventenna HFp offers a new degree of freedom and flexibility for working in the bush. Its lightweight, compact design makes it ideal for most portable/emergency applications where weight, space, bulk and the need for a discreet installation are factors. It is longer than the super-shorties, and the entire length of the antenna radiates so efficiency is much improved. The HFp works very well. Initial testing resulted in surprising bandwidth on 40 meters (about 115 kHz between 2:1 SWR points) with 1.2:1 SWR at resonance. On the higher bands the HFp covered the entire amateur segment with an SWR no higher than 1.7:1, band edge to band edge. Using my FT-817 at 5 W and a ground mounted HFp (only 56 inches high for 15 meters), with three radials, I bagged 8J1ITU, Antarctica, from my backyard! He was S0 on the meter and I got him first shot! Life is soooooooooo good!

If you're in the market for an efficient portable HF vertical antenna for your outdoor QRP activities, check out the Ventenna HFp. Retail price is about $179. For further information and specifications, contact Ventenna Co, LLC, PO Box 445, Rocklin, CA 95677, tel 916-624-7069, 888-624-7069 (credit card orders from the US), or fax 978-285-7981. QST

Rich Arland, K7SZ ♦ 25 Amherst Ave, Wilkes Barre, PA 18702 ♦ k7sz@arrl.org

SILENT KEYS

It is with deep regret that we record the passing of these amateurs:

KW1B, John H. Nichols, Dedham, MA
W1CBN, Robert H. Kugell, Greenfield, MA
N1CWA, Robert F. Wyman, Norwood, MA
W1FMU, Ken Hallstrom, Stratford, CT
W1IKU, William H. Fishback, Harwich, MA
W1JCI, Waldo H. Clark, Waltham, MA
W1LHP, Joseph E. Rose, Waltham, MA
W1MQT, Gerald J. San Giacomo, Flagstaff, AZ
WB1USN, Joseph B. Witkin, New Britain, CT
KA2AEC, Carl E. Dufft, Horseheads, NY
K2BRJ, Frederick W. Cole, Oak Harbor, WA
W2DDN, Samuel Pavone, Boonton, NJ
W2DTF, Ernest L. Dawson, Java Village, NY
*W2DYQ, Charles J. Glassbrenner, Paxton, MA
WB2FHY, Richard A. Fabiszak, Bayport, NY
WB2FXJ, Richard Swartz, Elmira Heights, NY
W2GEN, Maxwell Hitlin, Woodhaven, NY
KT2G, Walter Kronimus, Southampton, NY
W2RTG, Harold E. Wood, Clinton, NY
W2RVR, Arnold L. Trenn, Teaneck, NJ
W2TQY, Albert G. Proseus, Venice, FL
W2ZZJ, George P. Sadlon, Stratford, NY
W3ADE, Lewis E. Elicker, York, PA
WB3BZH, Paul L. Boyer, State College, PA
NF3T, Joseph W. Smolkowicz, West Lawn, PA
W3VTX, William C. Redpath, Gibsonia, PA
W3YAH, Elmer R. Boyer, Lewes, DE
KM4DJ, James H. Bailey, Durham, NC
N4DLH, David L. Highland, Marietta, GA
KP4DQ, Donald L. Alberty, Rio Piedras, PR
WA4FTG, Alvin B. Burnett, Louisville, KY
KG4GFO, William B. Clark, Brevard, NC
W4HNI, William C. Binkley, Lewisburg, KY
KD4HUH, Clarence F. Edwards, Cedartown, GA
W4IOA, Jesse R. Mansfield, Vass, NC
K4JPI, Ray T. Mason, Memphis, TN
K4LCK, James H. Daniels, Auxier, KY
N4MMI, Joseph S. Ciardi, Jupiter, FL
WB4NBC, Pasquale Gugliotta, Pikeville, KY
WA4NGG, Wyndell L. Hogan, Adairsville, GA
*WA4PRA, William F. Porter, Meridian, MS
*WA4QFG, Laurence A. Arenson, Jacksonville, FL
W4RNB, Walter D. Lawrence, Daytona Beach, FL
W4RTX, Norman M. Kelly, West Palm Beach, FL
KE4UUR, Elmer D. Kendrick, Elkhorn City, KY
KA4WTT, Jerry Porter, Louisville, KY
W4WVV, William V. Vance, Brevard, NC
*N4XT, Glen M. Moon, Audubon, PA
W4YXT, William P. Spreher, Highland Heights, KY
KC4ZNN, Edwin C. Eisenbeis, Louisville, KY
W5BGK, E. Hubert Ruble, El Paso, TX
WA5DWI, Marvin F. Williams, Bacliff, TX
W5EWL, Ann B. Yeager, Jasper, TX
*K5FM, Herman C. Wall, Houston, TX
N5FTU, Russell B. MacMillan, Tulsa, OK
WD5GAE, Tom G. James, Florence, MS
W5KFD, Robert M. Sutton, Brookeland, TX
KD5LCQ, Keith W. Domrose, Alexandria, LA
*W5MHH, Lee V. McKinnis, Godley, TX
K5PKT, Lorene McNulty, Lumberton, TX
*N5SW, Charles M. Guschke, Lusby, MD
K5TFW, Thomas F. Wren, Universal City, TX
WA5WWV, Richard M. Mansfield, Schertz, TX
W6BAF, H. E. Spaulding, Upland, CA
K6DQ, William M. Miller USN, Coronado, CA
AH6E, Norman Thompson, Kailua, HI
*WA6FOU, Gerald L. Nadler, San Jose, CA
W6HNR, Norman E. Fredman, Sunnyvale, CA
AA6IL, Roger Caukin, Redondo Beach, CA
KE6JVS, Al Schiessl, Pahrump, NV
W6KOO, John B. Sholander, Norwalk, CA
KB6LG, Custer Back, Sacramento, CA
WB6RZX, Peter Bergman, Cowan Heights, CA
*W6SO, Aubrey J. Hopkins, La Jolla, CA
KF6UHL, Joseph Gimbel, S El Monte, CA
W6VKM, Allen F. Clary, Sacramento, CA
W6VKP, Edgar A. Hilton, Los Altos, CA
WA6WNN, John A. Stroud, Sacramento, CA
W7ABH, Edwin H. Lofquist, Tacoma, WA
WA7BVH, William C. Ristine, University Place, WA
K7DSR, Michael W. Keevan, Spokane, WA
N7DZK, William H. Kilbourne, Bremerton, WA
K7GOI, Robert D. Brediger, Seattle, WA
N7GOZ, Keith B. Stovall, Woodburn, OR
W7ILY, Harrison C. Gilmore, Newport, OR
KL7IXO, Donald E. Richter, Juneau, AK
*W7KEQ, Arthur J. Burgh, Redmond, WA
WA7KGE, Raymon A. Quinn, Olympia, WA
KN7L, Charles T. Parker, Clarkston, WA
W7NFL, David G. Hambrick, Riverton, WY
W7NZD, W. J. Pickering, Seattle, WA
WB7OXT, Cleo R. Seimer, Chewelah, WA
KB7PIQ, Donald H. Hedges, Edmonds, WA
W7PXX, Alfred A. Allworth, Gold Beach, OR
K7RJV, George T. Leslie, Olympia, WA
KA7RQP, Maynita A. Gehring, Seattle, WA
K7SLI, James E. Berry, Marysville, WA
N7WFB, Richard V. Pitner, Coupeville, WA
W7ZLS, Ione T. Jorgensen, Onalaska, WA
WA7ZQX, Ray Sytsma, Sandy, OR
KA7ZZJ, Art J. Schulz, Seattle, WA
K8CSW, Robin Anderson, Steamboat Springs, CO
KA8DXX, Diana M. Macik, Weirton, WV
WA8EPO, Robert A. Lange, Benton Harbor, MI
W8FUR, Norman F. Pingel, Mount Clemens, MI
N8GNV, Jasper L. Neel, Kent, OH
WD8NVW, Ralph S. Seibert, Ft Worth, TX
W8SKP, Jack Ball, Palm Harbor, FL
W9GOS, Frank E. Timmons, Richmond, IN
ex-N9NQL, David S. Pierzchalski, Birnamwood, WI
W9PPR, Carl Hook, Carlinville, IL
WA9WAA, Joseph J. Shachman, Evanston, IL
KA9YRV, Charles I. Kelly, River Falls, WI
W0BSA, Jack G. Schuman, Greeley, CO
W0CON, Lloyd B. Brown, Primghar, IA
KC0DNB, Martin R. Burnham, Rose Hill, KS
KA0FCS, John Wesseling, Kerrville, TX
N0FOT, Alfred V. Richards, Roeland Park, KS
W0FPT, Wilfred A. Coe, Hillsboro, KS
KC0GH, Frank Niederkorn, Chesterfield, MO
W0GK, Charles O. Files, Lawrence, KS
K0HVS, Gerald Boos, Owatonna, MN
W0KRD, Don W. Bullard, Marion, IA
WB0NMW, John H. Swartzendruber, Manson, IA
KB0NRX, Charles W. Frisch, Springville, IA
*K0PGM, Lys J. Carey, Lakewood, CO
W0YBG, Jack Pinkston, Clinton, IA
N0ZVR, Rex A. Brooks, Topeka, KS
G3KHS, Thomas Cutmore, Lincoln, Great Britain
JA1EPK, Goro Obikata, Saitama, Japan
VE1QZ, D. E. Brackett, Halifax, NS, Canada
VP9X, Horace A. Frith, St Georges, Bermuda

*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 ♦ n1gzo@arrl.org

NEW PRODUCTS

"MINI BUGCATCHER" MOBILE WHIP FROM MFJ

◊ Covering 40 through 6 meters in classic style, MFJ's new Model 1624 Mini Bugcatcher mobile whip (5.5 feet when fully extended) attaches in minutes via MFJ's magnet mount (MFJ-338T), mirror mount (MFJ-342) or trunk lip mount (MFJ-347). The antenna handles 300 W PEP and can be adjusted to resonance by moving the jumper lead on the air-wound inductor. The antenna attaches to any standard $^3/_8$ × 24 mobile mount and collapses to 2.5 feet for easy storage or transport.

Price: $79.95. For more information, contact your favorite Amateur Radio products dealer or MFJ, 300 Industrial Park Rd, Starkville, MS 39759; tel 800-647-1800, fax 662-323-6551; **mfj@mfjenterprises.com**; **www.mfjenterprises.com**

COMPACT ZEROBEAT INDICATOR KIT FROM JACKSON HARBOR PRESS

◊ Need help finding that pesky zerobeat frequency when working Morse code? Son of Zerobeat, an easy-to-use zerobeat indicator designed by Ed Nisley, KE4ZNU, may be just what you're looking for. The compact unit uses seven LEDs to visually display the audio frequency of received CW signals. When you hear a CW station calling CQ, tune in the station until the green LED lights and your transmitted signal will be within 10 Hz of the station calling CQ. The kit can accommodate offset frequencies of 400 to 1200 Hz with the push of a button.

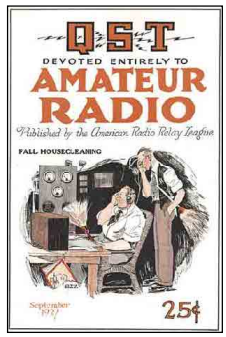
The Son of Zerobeat kit consists of a 1.5 × 2-inch circuit board and all board-mounted components. Just add a case, input and power jacks and a switch and you're ready to transmit on frequency every time you press the key.

Price: $28 (with manual) + $2 s/h to US addresses, $5 overseas. For more information (including the manual, schematic and other documentation), point your Web browser to **jacksonharbor.home.att.net** or e-mail **jacksonharbor@att.net**.

Previous New Products QST

75, 50 AND 25 YEARS AGO

September 1927



♦ Clyde Darr, 8ZZ, shows two hams doing "Fall Housecleaning" of their shack…but the two have been distracted by the lure of radio, and are listening with earphones rather than exercising their dust brushes. The editorial discusses the upcoming (October) International Radiotelegraph Conference, and assures readers that "the American delegation will be the amateur's strongest friend when the conference meets."

F. Johnson Elser, op3AA and xop1ZA (with the new international intermediates, "o" indicates Oceania; "p," the Philippines; and "x," experimental) tells about his mobile operating, in "Following the Sun with a Radio Flivver." Elser's travels took him and the radio flivver to Singapore, Penang, Ceylon, Egypt, Italy, Switzerland, France, England, and the USA. Because of the increasing congestion on the amateur bands, David Grimes discusses "A Harmonic Method of Increasing Selectivity." "QSY—5, 20, 40 and 80 Meters," by James McCormick, 9BHR, tells about his design of a transmitter that can be moved quickly from one band to another. Clair Foster describes "nj2PZ" (Jamaica), which emits one of North America's outstanding amateur signals. "The First Filter Condenser," by James Millen and D. E. Replogle, explains the importance of the input condenser in the power-supply filter.

September 1952

♦ The cover photo shows the "measuring-cup band spotter," described in this issue. The editorial explains the latest (and really weird) FCC idea of having calling segments in each amateur band, where only *very* brief calls can be made, and if contact is established, *only* information about what frequency to move to can be passed. Oh, brother!

Vern Chambers, W1JEQ, describes "A Two-Band Miniature Mobile Transmitter" that runs 10 watts on 75 and 40, in a compact package. Dick Hay, W4LW, solves the problem of antenna restrictions by putting small "Ham-Band Transmitting Loops" on his balcony railing. Dick Smith, W1FTX, tells how to build "The Measuring-Cup Band Spotter" in an aluminum measuring cup, to use as an absorption wavemeter. Bob DeCamp, W2AFG, explains the fine points of "Matching Coax Line to the Ground-Plane Antenna." Ed Tilton, W1HDQ, ventures down into the upper H.F. range with "A Bandswitching Exciter for 50, 28 and 21 Mc." A. D. Mayo, W5DF, describes his switchable array of eight vertical elements in "7-Mc. Beam for the Small Yard." Looking for a low-cost indicator of transmitter output, George Grammer, W1DF, discusses "R.F. Voltmeters." I. F. Wolk, W6HPV, looks at how Underwiters' Laboratory rules are applicable to the amateur, in "Are You U.L. Approved?" Bob Pittman and Gerald Summers, W5FKQ, describe "The 'Ultimate' C.W. Receiver," featuring simplified construction and using military surplus parts. "YL News and Views" presents a photo of Carlie Hull, W2YCX, apparently the first woman to pass the Extra Class exam.

September 1977

♦ The cover illustration shows hams wandering in a maze of electronic symbols, with the caption promising, "Say goodbye to confusion." The editorial, "In Search of Ethics," takes a look at radio suppliers who kick their ethics under the counter when they help CBers break the law.

Jim Bartlett, WB9VAV, helps hams understand circuit symbols, in "The Schematic Diagram—A Maze or a Road Map?" Dick Olsen, N6NR, presents Part 2 of "Designing Solid-State RF Power Circuits." Tim Hulick, W9QQ, tells how to "Add Variable-Bandwidth Tuning to Your Fixed-Bandwidth Receiver." Joe Ratkiewicz, N0EL, describes "The 160-Meter Monster Antenna," built into a ball park and using the stadium light poles as antenna supports. Also on a large scale, Jim Frasier, K2ANJ, tells about "A Quarter-Wavelength Vertical for 75 Meters," using a wooden tower that looks right out of a *QST* of 50 years earlier! "The W1NG Accu-Repeat," by Ken Bolin, W1NG, tells about his addition to the WB4VVF Accu-Keyer to further help the operator. C. H. Albaugh, W6KOS, tells of the joy of operating "Maritime Mobile around South America." 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	10PM	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. QST

COMING CONVENTIONS

CENTRAL DIVISION CONVENTION

September 13-15, Peoria, IL

The Illinois State Convention (Peoria Superfest 2002), sponsored by the Peoria Area ARC, will be held at the Exposition Gardens, 1601 W Northmoor Rd; I-74 to Exit 91B, N on University, 3.8 miles to Northmoor Rd, left on Northmoor, go 1 block. Doors are open Friday 3 PM to dusk, Saturday 6 AM to dusk, Sunday 6 AM to 3 PM. Features include Amateur Radio Hamfest and Computer Show, giant outdoor flea market ($5 per space, covers both days), new and used amateur radio equipment and accessories, commercial dealers, manufacturer reps, computers and software, electronic parts and components, technical forums, DXCC card checking (Saturday; Mike Nowack, NA9Q, **mnowack@rnet.com**), VE sessions (Sunday, 10 AM to 1 PM; Bob Davis, AA9MY, **Bob@GlassComp.com**), acres of free parking, refreshments. Talk-in on 147.075, 146.76. Admission is $5 in advance (2 stubs), $7 at the door (1 stub). Tables are $15 (premium in main building), $10 (other commercial buildings), includes electricity. Contact John Coker, N9FAM, c/o Peoria Superfest, Box 3508, Peoria, IL 61612-3508; 309-694-3917 or 309-692-3378 (info line); **w9uvi@arrl.net**; **www.w9uvi.org**.

ALASKA STATE CONVENTION

September 14, Anchorage

The Alaska State Convention, sponsored by the Anchorage ARC, will be held at the old Pay 'n Save Store in the University Mall on the old Seward Hwy. Doors are open 10 AM to 5 PM. Features include commercial vendors, APRS and Satellite demos, two free VE sessions (noon and 2 PM; bring original and copy of license and photo ID), special guest from ARRL HQ (Martin Cook, N1FOC, QSL Service Manager). Talk-in on 147.3 (103.5 Hz). Admission is free. Tables are $25. Contact Mike Romanello, KL7BK, Box 877669, Wasilla, AK 99687; 907-376-7474; **kl7bk@arrl.net**.

W9DXCC CONVENTION

September 20-21, Rolling Meadows, IL

The W9DXCC Convention (50th W9DXCC DX Convention and Banquet), sponsored by the Northern Illinois DX Assn, will be held at the Holiday Inn "Holidome," 3405 Algonquin Rd; I-90 N to Rte 53 to Algonquin Rd Exit, left at light, hotel on right. Doors are open Friday 7:30 PM for "Welcome Reception," Saturday registration at 8 AM, convention begins at 9 AM. Features include DXpedition presentations, programs, antennas, new equipment, ARRL forum, DXCC QSL card checking (Dave Patton, NT1N, from ARRL HQ), CW Pileup Contest, hospitality suites (Friday and Saturday), banquet (Saturday, 7 PM). Talk-in on 147.36. Admission is $50 in advance (before Sep 14), $55 at the door (convention and banquet); $28 in advance, $30 at the door (convention only). Contact Bill Smith, W9VA, 1345 Linden Ave, Deerfield, IL 60015; 847-945-1564; **w9va@aol.com**; **www.w9dxcc.com**.

ARKANSAS STATE CONVENTION

September 21, North Little Rock

The Arkansas State Convention ("All-Arkansas Hamfest"), sponsored by the Central Arkansas Radio Emergency Net (CAREN), will be held at the ALLTEL Arena, Washington Ave; take Exit 141B (Broadway) from I-30. Doors are open for setup Friday 5-7 PM, Saturday 7 AM; public 8 AM. Features include flea market, dealers, tailgating, club exhibit tables ($10), forums (ARRL, APRS), VE sessions (8:30 AM; Mike Porter, N5UZT, 501-847-2793; **n5uzt@swbell.net**), plenty of general and handicapped parking, refreshments. Talk-in on 146.94. Admission is $5. Tables are $20 (flea market and dealers; includes 2 chairs; free limited electricity, bring your own extension cords). Contact Mark Barnhard, KD5AIV, Box 2893, Little Rock, AR 72203; 501-221-3909; **kd5aiv@arrl.net**; **www.carenclub.com**.

ROANOKE DIVISION CONVENTION

September 28-29, Virginia Beach, VA

The Roanoke Division Convention, sponsored by Tidewater Radio Conventions, will be held at the Pembroke Mall; take I-64 E to I-264 E, follow it until Exit 17B N, go 4 stop lights, turn in front of Sears Auto Center, first large building on right after Sears. Doors are open Saturday 9 AM to 5 PM, Sunday 9 AM to 3:30 PM. Features include hamfest and electronics flea market, dealers, seminars, special guest from ARRL HQ (Bill Moore, NC1L, DXCC Manager). Talk-in on 146.97. Admission is $6, under 12 free when accompanied by paying adult. Tables are $30. Contact Mr. Lynn Lilla, W9DJQ, 848 Stacey Pl, Virginia Beach, VA 23464; 757-479-1597; fax 757-486-0757; **lynnmlilla@aol.com** or **hamfest@exis.net**; **www.vahamfest.com**.

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*

October 12
Northern New York Section, Lake Placid
Eastern Washington Section, Spokane

October 13
Connecticut State, Wallingford

October 18-20
Pacific Division, Concord, CA

November 2-3
Georgia Section, Lawrenceville

***See August *QST* for details.**

Attention Hamfest and Convention Sponsors:
ARRL HQ maintains a date register of scheduled events that may assist you in picking a suitable date for your event. You're encouraged to register your event with HQ as far in advance as your planning permits. Hamfest and convention approval procedures for ARRL sanction are separate and distinct from the date register. Registering dates with ARRL HQ doesn't constitute League sanction, nor does it guarantee there will not be a conflict with another established event in the same area.

We at ARRL HQ are not able to approve dates for sanctioned hamfests and conventions. For hamfests, this must be done by your division director. For conventions, approval must be made by your director and by the executive committee. Application forms can be obtained by writing to or calling the ARRL convention program manager, tel 860-594-0262. Note: Sponsors of large gatherings should check with League HQ for an advisory on possible date conflicts before contracting for meeting space. Dates may be recorded at ARRL HQ for up to two years in advance. 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 **September 1** to be listed in the **November** 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.)

Alaska (Anchorage)—Sep 14, Alaska State Convention. See "Coming Conventions."

†**Alaska (Fairbanks)—Sep 15**, Noon to 5 PM. *Spr:* Arctic ARC. Alaskaland Civic Center, corner of Airport Way and Peger Rd. Swap 'n Sell, major equipment manufacturers, local vendors, Arctic ARC Annual Meeting (1:15 PM), VE sessions, FCC commercial exams available, banquet (7:30 PM, River's Edge Resort), ARRL forum (Monday, Sep 16, at the River's Edge Resort). *TI:* 146.28/146.88 (103.5 Hz), 444.8/449.8 (103.5 Hz). *Adm:* Free (optional donation of a can of food for the Food Bank). Tables: $10 (reserve). Jim Movius, KL7JM, Box 83992, Fairbanks, AK 99708; 907-452-6347; fax 907-452-6349; **ajmovius@gci.net**; **www.mosquitonet.com/~fbrown/02hamfest.html**.

†**Arizona (Kingman)—Sep 21**; set up 6 AM; public 6 AM. *Spr:* Hualapai ARC. Mohave Community College parking lot, 1971 Jagerson Ave; I-40 to Exit 51 (Stockton Hill Rd), N to Jagerson Ave, go E on Jagerson to College. Flea market, dealers, tailgating (no charge), VE sessions, ARCA meeting, refreshments. *TI:* 146.76 (131.8 Hz). *Adm:* Free. Bill Beaman, KA0IYS, 2652 E Mary Ave, Bullhead City, AZ 86426; 928-758-6780.

Arkansas (North Little Rock)—Sep 21, Arkansas State Convention. See "Coming Conventions."

British Columbia (Aldergrove)—Sep 29. Mike Holley, VE7AVM, 604-534-6466.

†**Connecticut (Newtown)—Sep 22**; set up 7 AM; public 9 AM to 1 PM. *Spr:* Candlewood ARA. Edmond Town Hall, Rte 6; Exit 10 off I-84, follow signs. Flea market, new equipment dealers, computers, electronics, tailgating ($6, includes 1 admission), refreshments. *TI:* 146.67, 147.3. *Adm:* $4, under 12 free. Tables: $10 (includes 1 admission). John Ahle, W1JMA, 120 Fire Hill Rd, Ridgefield, CT 06877; 203-438-6782; **w1jma@aol.com**; **www.danbury.org/cara/**.

†**Florida (Melbourne)—Sep 14**, 9 AM to 5 PM.

†ARRL Hamfest

Gail Iannone ♦ Convention Program Manager ♦ giannone@arrl.org

Spr: Platinum Coast ARS. Melbourne Auditorium, 625 E Hibiscus Blvd; from I-95 take US 192 E to US 1, N to Hibiscus Blvd, turn left. Large outdoor tailgating area ($10 per spot), indoor swap, commercial booths. *TI:* 146.85. *Adm:* $5. Tables: $20 (swap), $80 (commercial). Tim Madden, KI4TG, 1450 Creel Rd NE, Palm Bay, FL 32905-3857; 321-724-9339; **hamfest@pcars.org**; **www.pcars.org**.

†**Florida (New Port Richey)—Sep 21**, 9 AM to 4 PM. *Spr:* Suncoast ARC. New Port Richey Recreation Center, 6630 Van Buren St; US 19 to New Port Richey, E on Main St to Van Buren, N on Van Buren to Recreation Center. Largest hamfest in Pasco County, inside and air-conditioned, tailgating ($3 per space plus admission). *TI:* 145.35. *Adm:* $5, nonham spouses and under 12 free. Tables: $15 (8-ft, electricity $5). Tim Robinette, WD8MVU, Box 1992, New Port Richey, FL 34656; 727-848-0353; **trobin@homemail.com**.

Georgia (Dallas)—Sep 14. Bill Houston, WD4LUQ, 770-445-9191.

†**Illinois (Grayslake/Chicago)—Sep 21-22**; Saturday 8 AM to 4 PM, Sunday 8 AM to 3 PM. *Spr:* Chicago FM Club. Lake County Fairgrounds, Rtes 45 and 120; I-294 N to Rte 120, W to Rte 45. Huge outdoor flea market (open both days at 6 AM), indoor vendors, exhibitors, VE sessions (both days, walk-ins), free parking, outdoor electrical hookups available. *TI:* 146.76 (107.2 Hz). *Adm:* advance $8, door $10 (good both days); under 12 free. Tables: $25. Jerry Spearman, W9EG, 348 W Natoma Ave, Addison, IL 60101; 630-628-1501; **n9pa@attbi.com** (Phil Amato, N9PA); **www.chicagofmclub.org**.

Illinois (Peoria)—Sep 13-15, Central Division Convention. See "Coming Conventions."

Illinois (Rolling Meadows)—Sep 20-21, W9DXCC Convention. See "Coming Conventions."

†**Indiana (Bedford)—Oct 5-6**; Saturday 8 AM to midnight, Sunday 6 AM to 3 PM. *Spr:* Hoosier Hills Ham Club. Lawrence County 4-H Fairgrounds, US 50 W; from Bedford take SR 37 S to US 50 W, turn W (left) onto US 50, 1½ miles to entrance on right. Vendors, VE sessions, forums (QRP, APRS), foxhunt, free chili supper (Saturday), refreshments. *TI:* 146.73 (107.2 Hz). *Adm:* $7. Jerome Kutche, N9LYA, 342 Wade St, Mitchell, IN 47446; 812-849-0095; **n9lya@arrl.net**; **www.hoosierhillshamfest.org**.

†**Iowa (West Liberty)—Oct 6**, 7 AM. *Sprs:* Muscatine and Iowa City ARCs. Muscatine County Fairgrounds; 17 miles NW of Muscatine, 15 miles E of Iowa City; from I-80 take Exit 259 S 10 miles, follow signs. "Southeast Iowa Hamfest," flea market, commercial vendors, computer dealers with new equipment and software, Saturday evening prehamfest Wiener Roast (6 PM), VE sessions (all classes, walk-ins welcomed; Tom Kramer, K0VSV, 563-264-3259), overnight parking, refreshments. *TI:* 146.91, 146.85, 146.52. *Adm:* $5. Tables: $8. Mike Hayden, KB0TFT, 1215 Lincoln Blvd, Muscatine, IA 52761; 563-262-8790; **kb0tft@arrl.net**; **www.qsl.net/kc0aqs/hamfest.html**.

†**Kentucky (Bowling Green)—Oct 5**, 8 AM to 1 PM. *Spr:* Kentucky Colonels ARC. WKU Community College South Campus, 2355 Nashville Rd; from I-65 take Exit 20 to Exit 4; from E Natcher Pkwy take Exit 4 towards Bowling Green, 2 miles on left. *TI:* 147.33. *Adm:* $5, under 13 free. Tables: $10 (with 1 admission). Jean Odum, KE4WVX, 680 Blue Hole Rd, Elkton, KY 42220; 270-277-9922; **vjodum@kih.net**; **k4lol.org**.

Massachusetts (Cambridge)—Sep 15. Nick Altenbernd, KA1MQX, 617-253-3776.

†**Michigan (Adrian)—Sep 15**, 8 AM. *Spr:* Adrian ARC. Lenawee County Fairgrounds, Dean and Addison Streets. 30th Annual Hamfest and Computer Show, trunk sale spots ($3 each), VE sessions, camping facilities, handicapped parking. *TI:* 145.37 (85.4 Hz). *Adm:* $5. Tables: $10 (8-ft). Eric Smith, K8JVW, 5398 Hunt Rd, Adrian, MI 49221; 517-263-5407; **kc8jvw@tc3net.com**; **www.qsl.net/w8tqe**.

†**Michigan (Grand Rapids)—Sep 14**; set up 6 AM; public 8 AM. *Sprs:* Grand Rapids ARA, Lowell ARC, and Michigan AR Alliance. Forest Hills Northern High School, 3801 Leonard St NE; Hwy I-96 to Exit 38; Hwy M-44, N 1 mile to Leonard St, turn right (E). Electronics/Computer/Ham Radio Equipment Swapmeet, flea market, trunk sales, commercial vendors, VE sessions (11 AM, all walk-ins), overnight self-contained camping (Friday, no hookups). *TI:* 147.26 (94.8 Hz), 146.52. *Adm:* $5 (not required of HS or younger students with student ID). Tables: $8 (8-ft, reserved by Sep 3), $5 (5-ft cafeteria-style). Ed Novakowski, N8UXN, Box 3282, Grand Rapids, MI 49501-3282; 616-458-9029; **hamfest@w8dc.org**; **www.w8dc.org/swap.htm**.

†**Missouri (St Charles)—Aug 25**. *Spr:* St. Charles ARC. American Legion Post 312, 2500 Raymond Dr; I-70 to Hwy 94, N to West Clay, W to Drostie, N to Raymond, W across the street from the License Bureau. VE sessions. *TI:* 146.67. *Adm:* $3. Tables: $15. Mark Ward, KC0JNT, 636-940-0376; **thescreendoctor@charter.net**; **www.wb0hsi.org**.

†**Missouri (Warsaw)—Oct 5**, 8 AM to 2 PM. *Spr:* Twin Lakes ARC. Community Center, 181 W Harrison; NW 7 Hwy from 65 to Casey's Store at Main St, turn S, go to stop sign and turn right, go 1 block to hamfest. Flea market, dealers, VE sessions, handicapped accessible, free RV and general parking, refreshments. *TI:* 147.3. *Adm:* $1. Tables: $5. Robert "Gene" Payne, KC0DRL, 942 W Jackson St, Warsaw, MO 65355; 660-438-8650; **gpo@advertisnet.com**.

Nebraska (Springfield)—Sep 7. Pat Joseph, N0HPP, 402-492-9156.

New Hampshire (Hopkinton)—Oct 4-5. Hosstraders; Joe Demaso, K1RQG; **k1rqg@aol.com**.

†**New Jersey (Lawrenceville)—Sep 28**; set up 6 AM; public 8 AM. *Spr:* Delaware Valley RA. National Guard Armory, 101 Eggerts Crossing Rd; from NJ Tnpk take 195W to 295N to 95S to 206S (Exit 7) to Eggerts Crossing Rd. Hamfest/Computerfest, flea market, Amateur Radio and computer equipment, tailgating ($10, includes 1 admission), free parking, refreshments. *TI:* 146.67 (131.8 Hz). *Adm:* $6, under 12 free. Tables: indoor $15 (includes 1 admission), $10 each additional, $20 with electricity. Glenn Costello, N2RPM, Box 7024, W Trenton, NJ 08628; 609-882-2240; **abbott0903@aol.com**; **www.w2zq.com**.

†**New York (Bethpage)—Sep 15**; set up 6:30 AM; public 8:30 AM to 1 PM. *Spr:* Long Island Mobile ARC. Briarcliff College, 1055 Stewart Ave. Long Island Expressway to Exit 44S to Exit 9 (Broadway), turn right onto Broadway, bear right onto Cherry Ave, turn right onto Stewart Ave. Hamfair and Electronics Show, flea Market, vendors, dealers, tailgating ($15 per space, includes 1 admission, additional workers $6 each; no advanced registration needed), equipment, computers, ARRL info, VE sessions, tune-up clinic, refreshments. *TI:* 146.85 (136.5 Hz). *Adm:* $6, nonham sweethearts and under 12 free when accompanied by paying adult. Tables: $15 (admits 1 person). Diane Ortiz, K2DO, Box 392, Levittown, NY 11756-0392; 631-286-7562 or 516-520-9311 (24-hour info line); **hamfest@limarc.org**; **www.limarc.org**.

†**New York (Horseheads)—Sep 28**, 6 AM to 3 PM. *Spr:* ARA of the Southern Tier. Chemung County Fairgrounds; in Horseheads on Rte 17, at 2nd light turn S on Grand Central Ave, proceed ½ mile to Fairgrounds. Elmira International Hamfest/Computerfest, large flea market area, dealer displays of new equipment, VE sessions (9 AM, walk-ins accepted; John, 607-565-4020), Bunny Hunt, camping, pancake breakfast, free parking, refreshments. *TI:* 146.7, 147.36, 444.2. *Adm:* advance $5, door $6, under 11 free. Tables: $10 to $15 (8-ft). David Lewis, WA2HTL, 607-589-7495; or Randy Viele, N2SYT, Box 44, Elmira, NY 14902-0044; 607-732-2822 or 607-738-6857; **n2syt@arast.org**; **www.arast.org**.

New York (Syracuse)—Sep 14. RAGS, 315-698-4558.

†**Ohio (Cincinnati)—Sep 22**; set up 6 AM; public 8 AM to 4 PM. *Spr:* Greater Cincinnati ARA. Scarlet Oaks Vocational Campus, 3254 E Kemper Rd; from I-275 N of Cincinnati, exit OH SR 42 S (Exit 46), go S on Rte 42 to Kemper Rd W, right on Kemper, 1 mile W to Great Oaks sign, turn right to hamfest. Flea market, commercial exhibits, dealers, vendors, forums, hidden transmitter hunts, VE sessions, free parking, refreshments. *TI:* 145.27. *Adm:* advance $5, door $6 (under 13 free). Tables: indoor $35, outdoor $8. Jim Weaver, K8JE, 5065 Bethany Rd, Mason, OH 45040; 513-459-0142; **k8je@arrl.net**; **CincinnatiAmateurRadio.com**.

†**Ohio (Cleveland)—Sep 22**, 8 AM to 2 PM. *Spr:* Hamfest Assn of Cleveland. Cuyahoga County Fairgrounds, 164 Eastland Rd, Berea; 1½ miles W of I-71 and Bagley Exit 235, ½ mile S on Eastland Rd. Flea market, indoor vendors, ARRL forum, VE sessions, card checking, refreshments. *TI:* 146.73 (110.9 Hz). *Adm:* $5. Tables: $15. Hamfest Assn of Cleveland, Box 81252, Cleveland, OH 44181-0252; 800-CLE-FEST; **info@hac.org**; **www.hac.org**.

†**Ohio (Medina)—Oct 6**, 8 AM to 2 PM. *Spr:* Medina Two Meter Group. National Guard Armory, 920 Lafayette Rd (State Rte 42); take Rte 18 off I-71, go W into downtown Medina to junction of Rte 42, go S for approximately 2½ miles, Armory on left side of road. Flea market (advance $7, door $8), VE sessions, refreshments. *TI:* 147.03. *Adm:* advance $4, door $5. Tables: advance $10, door $11. Mike Rubaszewski, N8TZY, 4264 Alpine Hill Ct, Brunswick, OH 44212; 330-273-1519; **n8tzy@m3net.net**; **www.qsl.net/m2m**.

Ontario (Oakville)—Sep 20-22. Harold Sellers, 905-853-3518.

Oregon (Bend)—Sep 27-28. Pacific Northwest VHF Conference; Don Krug, K7HSJ, **ghcdk@bendnet.com**.

†**Pennsylvania (Brownstown)—Oct 5**, 8 AM to 2 PM. *Spr:* Red Rose Repeater Assn. West Earl Community Park, Rte 722; take Brownstown Exit off Rte 222 (Rte 722), go E through Brownstown across bridge, on left. Tailgating ($3 per space plus admission), electronics. *TI:* 147.015 (118.8 Hz). *Adm:* $1. Tables: $5. Dave Phillips, W3CWE, 344 N George St, Millersville, PA 17551; 717-872-6578; **jjcd@prodigy.net**; **www.qsl.net/rrra**.

†**Pennsylvania (Schnecksville)—Sep 21**. *Spr:* Delaware Lehigh ARC. Schnecksville Fire Company Grounds, on Rte 309; 4.3 Miles N of Rte 22. Tailgating ($7). *TI:* 146.7 (151.4 Hz). *Adm:* $5. Tables: $11 (indoor only). Malcolm McClay, N3XRL, 2907 Stephens St, Easton, PA 18045; 610-258-9802 (until 8 PM local time); **malcolm4@ptd.net**; **www.dlarc.org**.

†**Pennsylvania (Winfield)—Sep 28**; set up 5 AM; public 8 AM. *Spr:* Milton ARC. Union Twp Fire Co, Reitz Ave; located on SR 15 between Lewisburg and Selinsgrove. Ham Radio/Computerfest, vendors, tailgating ($5), VE sessions. *TI:* 146.985, 146.52. *Adm:* $3, under 12 free. Tables: $10. Kevin Dozpat, KB3ENW, Box 398, New Berlin, PA 17855; 570-966-6208; **kb3enw@hotmail.com**; **www.geocities.com/k3flt/events**.

Rhode Island (Forestdale/North Smithfield)—Sep 21. Rick Fairweather, K1KYI, 401-725-7507 (7-8 PM only).

†**South Carolina (Rock Hill)—Oct 5**, 6 AM. *Spr:* York County ARS. Knights Baseball Stadium, Exit 88 off I-77; near SC and NC state line, E on Gold Hill Rd. Giant paved outdoor flea market, equipment auction, new equipment dealers, VE sessions (10 AM, all classes; 2nd floor in Concourse Bldg), breakfast and BBQ lunch, free parking. *TI:* 147.03. *Adm:* $6. Tables: none available for flea market; booths $30 (12×15 with 1 table), $50 (12×28 with 2 tables); additional tables $6 each. Shelia Parrish, KG4CDF, 2358 J. P. Dirt Rd, Edgemoor, SC 29712; 803-328-5983; **coy@cetlink.net**; **www.ycars.org**; or Billy Hallman, KG4GSE, 803-366-6906; **bhallman@cetlink.net**.

†**Tennessee (Sevierville)—Sep 27-28**; Friday 5-9 PM, Saturday 9 AM to 3 PM. *Spr:* Ten-Tec. Ten-Tec Factory, 1185 Dolly Parton Pkwy, 2 miles E of Sevierville on Hwy 411 N. Tailgating (free), VE sessions. *TI:* 146.94. *Adm:* Free. Tables: bring your own for tailgating. Stan Brock, WD0BGS, 1185 Dolly Parton Pkwy, Sevierville, TN 37862; 865-453-7172; **sales@tentec.com**; **www.tentec.com**.

Virginia (Virginia Beach)—Sep 28-29, Roanoke Division Convention. See "Coming Conventions."

†**Washington (Chehalis)—Sep 28**, 9 AM to 2 PM. *Spr:* Chehalis Valley ARS. Lewis County Fairgrounds, 255 N National Ave; from I-5 take Exit 79, go E to the "T" and turn left, stay on this road for 3 miles, turn left onto Exibitor St, go 1 block to stop sign, turn left and go 100 ft, turn right into Fairgrounds, follow signs for parking. VE sessions (by reservation). *TI:* 147.06, 146.46. *Adm:* $3. Tables: 6-ft, advance $10 (without power), $15 (with power); after Sep 14 $15 (without power), $20 (with power). Bill Harwell, KC7QHJ, 362 SW Chehalis Ave, Chehalis, WA 98532; 360-748-8086; **kc7qhj@arrl.net**; **www.cvars.org/hamfest.htm**.

†**Washington (Graham)—Sep 14**; set up Friday 2-7:30 PM, Saturday 6-8:30 AM; public 9 AM to 3 PM. *Spr:* Radio Club of Tacoma. Frontier Park, Pierce County Fairgrounds, 21718 Meridian Ave E; from I-5 take Exit 127 to SR 512 E; go 8.6 miles to SR 161, turn right onto Meridian Ave, go S 7 miles to Frontier Park on your right. Flea market, VE sessions (10 AM, on site), demo building (Antique Station W7OS will be "On the Air," antenna construction, IRLP, PSK-31, more), ham gear, commercial displays, computers, Country Store (consignment sales), radio and antenna testing, overnight camping (on site), free parking. *TI:* 147.38 (103.5 Hz). *Adm:* $5, under 17 free. Tables: non-commercial $20 (includes 1 seller admission, helpers $5 each), commercial $30 (includes 2 helper admissions). Frank Palmer, AC7JY, 3817 169th St, Ct E, Tacoma, WA 98446-2928; 253-539-1685; **hamtalker@aol.com** or **ac7jy@msn.com**; **www.w7dk.org**.

Attention All Hamfest Committees!

Get official ARRL sanction for your event and receive special benefits such as donated ARRL publications, handouts, and other support.

It's easy to become sanctioned. Contact the Convention and Hamfest Branch at ARRL Headquarters, 225 Main St, Newington, CT 06111. Or send e-mail to **giannone@arrl.org**.

Promoting your event is guaranteed to increase attendance. As an approved event sponsor, you are entitled to advertise your event in *QST* at special rates. Make your hamfest a success by taking advantage of this great opportunity. Call the ARRL Advertising Department at 860-594-0209, or e-mail **hanan@arrl.org**.

SPECIAL EVENTS

Fire Island National Seashore, NY: Great South Bay ARC, W2GSB. 1400Z **Aug 17**-2000Z **Aug 18**. International Lighthouse Weekend at Fire Island Light. 28.460 21.350 14.260 7.260. QSL. W2GSB/Lighthouse, PO Box 1356, West Babylon, NY 11704.

Evanston, IL: Metro Amateur Radio Club, K9Y. 1700Z-2300Z **Aug 18**. Grosse Point Lighthouse. 28.030 21.030 14.030 7.030. QSL. Michael Dinelli, N9BOR, 9423 Kolmar Ave, Skokie, IL 60076-1321. **www.qsl.net/mac**.

Elko, NV: Elko Amateur Radio Club, W7LKO. **Aug 31**-**Sep 1**. Elko County Fair. SSB 21.285 14.285; RTTY 21.085 14.085. QSL. Dave Hough, W7GK, PO Box 2072, Elko, NV 89803.

Marshfield, WI: Marshfield Area Amateur Radio Society, W9F. 1300Z **Aug 31**-2300Z **Sep 1**. 100 Years of the Central Wisconsin State Fair. 28.460 14.260 7.260. QSL. **www.eqsl.cc/** (preferred method), or Marshfield Area Amateur Radio Society, PO Box 1171, Marshfield, WI 54449.

Parsons, WV: Mountain State Transmitters Amateur Radio Club, W8T. 1400Z-2100Z **Sep 1**. Annual Tucker County Hick Festival. 14.230 14.050 7.235 7.050. Certificate. Mountain State Transmitters Inc, PO Box 1492, Elkins, WV 26241.

Nutley, NJ: Robert D. Grant United Labor Amateur Radio Association, N2UL. 1200Z-2300Z **Sep 2**. CQ Labor Day, Great Falls Festival in Paterson, NJ. 28.420 21.375 14.260. Certificate. RDGULARA, c/o WA2VJA, 112 Prospect St, Nutley, NJ 07110-1716.

Schaumburg, IL: Schaumburg Amateur Radio Club, N9RJV. 1400Z **Sep 2**-0100Z **Sep 3**. Village of Schaumburg Septemberfest. 28.425 21.335 14.280 7.275. QSL. Schaumburg Amateur Radio Club, 1430 Yorkshire La, Schaumburg, IL 60194.

Hebron, CT: NARL, W1H. 2200Z **Sep 5**-0100Z **Sep 8**. Hebron Fair—Promoting Amateur Radio Hobby and Licensing. 28.365 21.325 14.255. Certificate and QSL. Ronald F. Cady, 110 Four Mile Rd, West Hartford, CT 06107.

Lexington, KY: Aviation Museum of Kentucky, KG4NRL. 0200Z **Sep 6**-1400Z **Sep 7**. General frequencies 10-80 m. Certificate. Aviation Museum of KY, Bluegrass Airport, PO Box 4118, Lexington, KY 40544.

Platteville, WI: Hidden Valleys ARC, W9D. 1500Z **Sep 6**-2100Z **Sep 8**. 55th Annual Platteville Dairy Days at Mound View Park. CW and SSB 80-6m; 2m FM. Certificate (QSL on request). HVARC, PO Box 112, Platteville, WI 53818-0112.

North Judson, IN: Starke County Amateur Radio Club, W9JOZ. 1400Z-2100Z **Sep 7**. Hoosier Valley RR Museum Annual Open House. 14.290 7.240. QSL. Starke County ARC, 405 W Jackson St, Knox, IN 46534.

Virginia Beach, VA: Virginia Beach Amateur Radio Club, Inc, W4UG. 1300Z-2200Z **Sep 7**. 221st Anniversary of the Battle of the Virginia Capes. 28.370 21.370 14.270 7.270. Certificate. VBARC, PO Box 62003, Virginia Beach, VA 23466.

New London, CT: Radio Amateur Society of Norwich, N1NW. 1000Z **Sep 7**-1600Z **Sep 8**. Activation of New London Ledge Lighthouse, USA-542. 28.370 21.370 14.270 7.270. QSL. Radio Amateur Society of Norwich, PO Box 329, Norwich, CT 06360.

San Pedro, CA: United Radio Amateur Club, Inc, K6AA. 0000Z **Sep 7**-2359Z **Sep 8**. 75th Anniversary of URAC/Tall Ships 2002 in LA. 14.275 14.075 7.275 7.075. QSL. United Radio Amateur Club, Inc, Berth 84, Foot of 6th St, San Pedro, CA 90731.

Highland, CA: Citrus Belt ARC, K6A-K6M. 0400Z **Sep 7**-1900Z **Sep 15**. 3rd Annual Rte 66 on the air. 28.466 21.266 14.266 7.266. Certificate. Citrus Belt Amateur Radio Club, PO Box 3788, San Bernardino, CA 92143. **www.qsl.net/w6jbt**.

Big Rock, IL: Hams of DeKalb County, W9P. 1400Z **Sep 12**-2200Z **Sep 15**. 108th Big Rock Plowing Match. 28.390 14.280 14.038 7.280. Certificate. Bob Yurs, W9ICU, 1107 Commercial St, Sycamore, IL 60178.

Greenwood, MS: Tupelo Mississippi Amateur Radio Club, W5F. 0001Z **Sep 13**-2359Z **Sep 27**. 75th anniversary of the 1927 Mississippi River Delta Flood. 28.362 18.162 14.262 3.862. QSL. Travis Casanova, W5GED, 209 Grand Blvd, Greenwood, MS 38930.

Boulder, CO: Boulder Amateur Radio Club Youth Auxillary, W0W. 1600Z-2200Z **Sep 14**. Celebrating our 10th anniversary of working with children. 28.305 21.305 14.305. Certificate. Ellie Van Winkle, 903 Parago Dr, Boulder, CO 80303.

Brooklyn, NY: Kings County Repeater Association ARC, N2Y. 1300Z-1900Z **Sep 14**. From Owls Head Park, commemorating the victims and heroes of September 11 tragedy. 28.340 21.340 14.250. QSL. Kings County Repeater Association ARC, WA2ZWP/N2Y, PO Box 280285, Brooklyn, NY 11228. **www.kcra.org**.

Hamersville, OH: USS *Jurassic*, K8SSJ. 1700Z-2100Z **Sep 14**. 8th anniversary of the USS *Jurassic* ARC and ST Club. 28.450 14.300 7.230. Certificate. Carolyn Donner, PO Box 158, Hamersville, OH 45130.

Long Branch, NJ: K2IQN. 1300Z-2300Z **Sep 14**. Renaming Long Branch Post Office in honor of police officer Pat King who perished in the line of duty, making the ultimate sacrifice. 14.245 7.240 2 m (local) W6OI on 10 m. QSL. K2IQN, Firefighter/EMT, 22 Daisy Ct, Whitehouse Station, NJ 08889.

Port Alberni, BC: USS *Jurassic*, VE7SSJ. 1700Z-2100Z **Sep 14**. 8th anniversary of the USS *Jurassic* ARC and ST club. 28.450 14.300 7.230. Certificate. Garry Cameron, 3528-11th Ave, Port Alberni, BC V9Y 4Y7, Canada.

Slidell, LA: Ozone Amateur Radio Club, W5SLA. 1300Z-2200Z **Sep 14**. 38 years of community service and Amateur Radio fun. 14.250 7.250. QSL. Michael White, 404 Holmes Dr, Slidell, LA 70460.

Tulsa, OK: Tulsa Repeater Organization, WA5LVT. 1400Z-2100Z **Sep 14**. TRO's 35th anniversary. 28.400 21.360 14.270 7.270. QSL. TRO, PO Box 1422, Tulsa, OK 74101.

Bennington, VT: Southern Vermont Amateur Radio Club, N1B. 1300Z **Sep 14**-2000Z **Sep 15**. Bennington Antique Car and Cycle Show. 14.285. Certificate. Skip Crego, N1RRW, RR 1 Box 316C, West Mt Rd, Shaftsbury, VT 05262.

Corona, CA: Corona Norco Amateur Radio Club, W6PWT. 1500Z **Sep 14**-2300Z **Sep 15**. Barney Oldfield Days commemorating the 1912-1914 Road Races. 28.450 21.350 14.250 7.250. QSL. Fred Roberts, W6TKV, 5464 Peacock Ln, Riverside, CA 92505.

Lolo Hot Springs, MT: Hellgate Amateur Radio Club, W7PX. 1700Z **Sep 14**-0200Z **Sep 16**. Commemorating the Lewis and Clark Expedition on the Lolo Trail. 28.360 21.360 14.260. Certificate or QSL. HARC, PO Box 3811, Missoula, MT 59806-3811. **www.riversdreams.com/k7vk**.

Athens, GA: Athens Radio Club, KD4QHB. 1800Z-2200Z **Sep 15**. Athens Canine and Disc

Maty Weinberg, KB1EIB ♦ Special Events ♦ events@arrl.org

Day. 28.440 14.240 7.270. Certificate. Ed Rollor, N4ZRA, 69 Thrasher Dr, Watkinsville, GA 30677.

Atlantic City, NJ: Southern Counties Amateur Radio Association, K2BR. 1400Z **Sep 16**-0400Z **Sep 22**. Miss America Special Event Station. 28.325 21.325 14.250 7.250. QSL. SCARA, PO Box 121, Linwood, NJ 08221.

Freedom Township, OH: Portage Amateur Radio Club, KB8UUZ. 2000Z **Sep 20**-2400Z **Sep 22**. National POW/MIA Recognition Day. 28.375 21.325 7.240. Certificate. Tom Parkinson, KB8UUZ, 9992 State Rte 700, Mantua, OH 44255.

Delphos, OH: Tri-County Amateur Radio Club, W8YEK. 1400Z-2200Z **Sep 21**. Canal Days Celebration/Miami Erie Canal. 7.240 14.240 28.420. QSL. Tri-County ARC, W8YEK, 228 N Bredeick St, Delphos, OH 45833.

Eldon, MO: Lake of the Ozarks ARC, W0NA. 1600Z-2200Z **Sep 21**. Early days gas engine and tractor show. 28.400 21.340 14.240 7.240. Certificate. John Baremore, KC0CRO, 182 Bear Paw Cir, Camdenton, MO 65020.

Okeechobee, FL: Okeechobee Amateur Radio Club, KF4BPX. 0900Z-1600Z **Sep 21**. Five County contacts surrounding Lake Okeechobee. 21.375 14.275 7.255. Certificate. Okeechobee Amateur Radio Club, PO Box 368, Okeechobee, FL 34973-0368.

Milton, ON, Canada: Mississauga Amateur Radio Club, VE3MIS. 1400-2000Z **Sep 21** and **Sep 22**. Halton County Radial Railway Museum. 28.340 14.240 7.230. Certificate. MARC, C/O Michael Brickell, VE3TKI, 2801 Bucklepost Cres, Mississauga, ON L5N 1X6, Canada. (Note: US postage not usable in Canada; remit 1 US dollar or IRC.)

Cambridge City, IN: Whitewater Valley Amateur Radio Club, K9D. 1300-2100Z **Sep 21** and **Sep 22**. From McMaze at Dougherty Orchard. 14.340 7.265. QSL. Herb McAdams, N9XC, 2800 S E St, Richmond, IN 47374.

Rio Grande, NJ: Cape May County Amateur Radio Club, N2CMC. 1400Z **Sep 21**-1800Z **Sep 22**. NAS Wildwood Museum 5th anniversary, in memory of 38 airmen who perished while training at air NAS Wildwood 1943-1945 and their ultimate sacrifice. 21.330 14.260 7.035. QSL. Cape May County Amateur Radio Club, PO Box 352, Rio Grande, NJ 08242.

Belleville, MI: Yankee Air Force Museum, W8YAF. 1200Z-2000Z **Sep 22**. WAF Founders' Day Open House. 7.270. Certificate. Frank A. Nagy, N8BIB, 24315 Waltz Rd, New Boston, MI 48164-1965.

Fort Payne, AL: DeKalb County ARC, W4GBR. 2200-0100Z daily **Sep 26-Sep 28**. VFW Agricultural Fair. 28.470 21.270 14.270 7.270 147.270. Certificate. KD4ADC, 2113 Dogwood Blvd NE, Fort Payne, AL 35967.

Kingwood, WV: Preston County Amateur Radio Operators, W8B. 1400Z **Sep 26**-0200Z **Sep 29**. 61st Annual Buckwheat Festival. 40, 20 and 10 m. Certificate. Richard V. Wolfe, KA8UEU, PO Box 512, Kingwood, WV 26537.

Appleton, WI: Military Veterans Museum, W9M. 2300Z **Sep 27**-0300Z **Sep 30**. Octobertfest to remember that freedom is not free. 28.380 21.380 14.280 7.280. Certificate and QSL. Fred Tegge, N9FT, PO Box 1805, Oshkosh, WI 54903.

Fairmount, IN: Grant County Amateur Radio Club, W9EBN. 1500Z-2200Z **Sep 28**. "James Dean Country Where Cool Was Born," 2500 antique cars. 146.79 28.410 14.258 7.258. Certificate. L. B. Nickerson, K9NQW, 517 N Hendricks Ave, Marion, IN 46952.

Middletown, NJ: Middletown RACES, WC2ADW. 1600Z-2100Z **Sep 28**. Middletown Day. 14.227. QSL. Mario Sellitti, 36 Morningside Ave, Keansburg, NJ 07734.

Otsego, MI: Allegan County Amateur Radio Club, KC8ITU. 1400Z-2100Z **Sep 28**. Fine Arts Festival. 28.435 21.335 14.235 7.235. QSL. ACARC, c/o Dave Catalano, N8KQS, 3323 Pine Tree Dr, Allegan, MI 49010.

Pittsburgh, PA: Breezeshooters Inc, K3BRZ. 1400Z-2200Z **Sep 28**. 50th anniversary—dedicated to promoting 10 meters. 146.88 28.350 21.350 14.250 7.250. Certificate. K3BRZ, PO Box 100158, Pittsburgh, PA 15233-0158.

Lake County, IL: Lake County RACES/ARES, W9FUL. Noon-9 pm your local time **Sep 28**. 50th anniversary of RACES. 28.383 14.283 7.283 CW PSK-31. QSL. Lake County RACES/ARES, 1303 N Milwaukee Ave, Libertyville, IL 60048. **www.races.org**. RACES/ARES groups invited to participate. See page 67 in this issue.

Santa Barbara, CA: Santa Barbara ARC, K6TZ. 1230Z-2200Z **Sep 28**. Birthplace of the hot tub, Class E Amp and ISDN. 28.455 21.365 14.255. Certificate. SBARC/KG6ENA via **www.sbarc.org/event** or PO Box 3232, Santa Barbara, CA 93130-3232.

Woodbine, IA: Boyer Valley Amateur Radio Club, K0BVC. 1500Z-2200Z **Sep 28**. 14th Annual Applefest of Western Iowa. SSB 21.256 14.256 7.256 CW 14.035 7.035. Certificate. Karen Stultz, AD4UI, 505 Lincoln Way, Woodbine, IA 51579.

Noblesville, IN: Hamilton County ARES Club, N9I. 1800Z **Sep 28**-0200Z **Sep 29**. Bison Stampede—55th anniversary of IRCC. 28.450 14.250 7.230 3.850. QSL. Eric Eilers, 19486 Diamond Way, Noblesville, IN 46060. **www.hcares.hamilton.in.us/bison**.

Smithfield, VA: Western Tidewater Radio Association, K4S. 1500Z **Sep 28**-2100Z **Sep 29**. 250th Anniversary of the founding of Smithfield, VA. 28.350 21.250 14.250. Certificate. Erwin Heins, 97 Lumar Rd, Smithfield, VA 23430.

Springfield, IL: Sangamon Valley Radio Club, W9I. 1500Z **Sep 28**-2300Z **Sep 29**. International Route 66 "Mother Road" Festival. 14.300 14.275 14.250 14.225. QSL. Sangamon Valley Radio Club, c/o Sangamon Valley Chapter American Red Cross, 1025 S 6th St, Springfield, IL 62703.

Certificates and QSL cards: To obtain a certificate from any of the special-event stations offering them, send your QSO information along with a 9x12 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 **Nov** *QST* would have to be received by **Sep 1**. Submissions may be mailed (Attn: Maty Weinberg), faxed (860-594-0259) or e-mailed (**events@arrl.org**) to ARRL HQ. QST

STRAYS

MILITARY RADIO COLLECTORS TO MEET

◊ The Military Radio Collectors Association will hold its third annual meet at the West End Fairgrounds, Gilbert, Pennsylvania, September 6-8, 2002. Hours are 0800 to 1700 local time. Activities include equipment displays, on the air operation, formal presentations and a swapmeet. For more information, see **www.milradio.org/** or contact Pete Hamersma, WB2JWU, PO Box 467, Holderness, NH 03245, e-mail **pehamers@worldpath.net**.

Previous • Next Strays

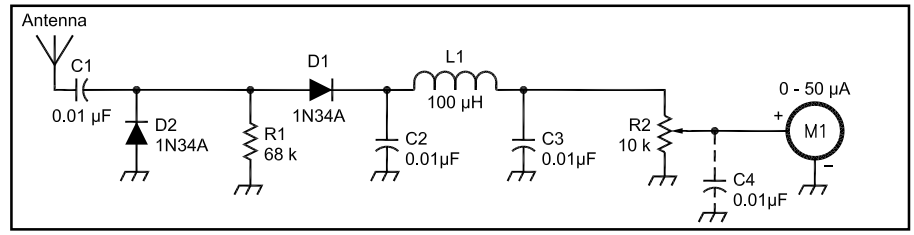
FEEDBACK

◊ In the item concerning magnetic headings in "The Doctor is IN," *QST*, Jul 2002, p 47, the Doctor reversed his plus and minus signs. The first paragraph should read:

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 subtracting 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 = 33° magnetic. For a westerly variation (for example 6° west), add the value for variation. Thus, 45° True + 6° west = 51° magnetic. An old mariner's ditty, "east is least; west is best," can help you remember that you subtract an easterly declination or add a westerly declination to convert True to Magnetic.

◊ An error appears in Figure 1 of "The 'No Fibbin' RF Field Strength Meter" (Aug 2002 *QST*, p 28). The correct way to wire D2 is the anode to ground and the cathode to the anode of D1 (also the junction of R1 and D1). As shown in the photos, C1 is optional and an additional 0.01 µF bypass capacitor can be installed across the meter movement.—*John Noakes, VE7NI*

Previous • Next Feedback



Revised Figure 1 QST

CONTEST CORRAL

W1AW Qualifying Runs are 10 PM EDT Thursday, September 5, and 7 PM EDT Wednesday, September 18. The K6YR West Coast Qualifying Run will be at 9 PM PDT, Wednesday, September 11. Check the W1AW schedule in this issue for details.

September 2-3

MI QRP Labor Day CW Sprint, 2300Z September 2–0300Z September 3 (see Jan *QST*, p 107 or **www.qsl.net/miqrpclub/rules01.htm**)

September 7-8

All-Asian DX Contest—Phone, 0000Z September 7–2400Z September 8 (see June *QST*, p 90 or **www.jarl.or.jp/English/0-2.htm**).

IARU Region 1 Field Day—SSB, 1300Z September 7–1300Z September 8 (see June *QST*, p 90 or **www.iaru.org**).

North American Sprint—CW, 0000Z–0400Z September 8 (see Feb *QST*, p 109 or **www.ncjweb.org**).

DARC 10-Meter Digital Contest—Digital Modes—sponsored by the Deutsche Amateur Radio Committee, 1100Z–1700Z September 8. Stations may be worked on each mode, but count for multipliers only once. Exchange: RST + serial number. QSO Points: 1 pt/QSO. Score: QSO Points × WAE countries + DXCC entities + W/VE/JA districts. For more information: **www.darc.de/referate/hf/contest/**. Logs due 4 weeks after the contest to **df5bx@darc.de** or Werner Ludwig, DF5BX, PO Box 1270, D-49110 Georgsmarienhuette, Germany

QRP ARCI End of Summer PSK31 Sprint, 2000Z–2400Z September 8. 20 meters only. 14,070.15 kHz suggested frequency (see Dec 2001 *QST*, p 98 or **personal.palouse.net/rfoltz/arci/arcitst.htm**).

September 11-13

YLRL Howdy Days—CW/SSB—sponsored by the YL Radio League, 1400Z September 11–0200Z September 13, work 24 out of the 36 hour period. Exchange: YLRL Member or not. QSO Points: non-YLRL member—1 pt, YLRL members—2 pts. Score is total points. For more information—**www.qsl.net/~ylrl**. Logs due 30 days after the contest to Cleo Bracket, K0JFO, 810 Towne Square Dr, Fremont, NE 68025, USA.

September 14-15

ARRL September VHF QSO Party, 1800Z September 14–0300Z September 16 (see Aug *QST* or **www.arrl.org/contests**).

North American Sprint—SSB, 0000Z–0400Z September 15 (see Feb *QST*, p 109 or **www.ncjweb.com**).

WAE DX Contest—SSB, 0000Z September 14–2359Z September 15 (see Aug *QST* or **www.darc.de/referate/dx**).

September 21-22

ARRL 10 GHz & Up Cumulative Contest, 0800 local–2000 local, September 21 and 0800 local–2000 local, September 22 (see July *QST*, p 96 or **www.arrl.org/contests**).

Scandinavian Activity Contest—CW—sponsored by Experimenterende Danske Radioamat0rer (EDR), 1200Z September 21–1200Z September 22 (Phone, 1200Z September 21–1200Z September 22). Frequencies: 80–10 meters. Categories: SOAB (QRP <5 W, LP <100 W, HP), MS, SWL. Exchange: RS(T) + serial number. QSO Points: EU stations—1 pt, Non-EU—1 pt on 20–10, 3 pts on 80–40. Final score is QSO pts × Scandinavian call areas counted once per band. For more information: **www.sk3bg.se/contest/text/sacnsc.txt**. Logs due Oct 31 to **sac@contesting.com** or EDR HF Contest Manager, Peter Vestergaard OZ5WQ, Vestervej 74, DK-4960 Holeby, Denmark

Washington State Salmon Run—CW/SSB—sponsored by the Western Washington DX Club, 1600Z September 21–0700Z September 22 and 1600Z–2400Z September 22. Frequencies: 160–6 meters. Categories: SO (CW, SSB or Mixed Mode, QRP <5 W, LP <200 W, HP), MS, Washington Club Station, Mobile, Washington County DXpedition, SWL. Exchange: RS(T) and SPC or county (for WA stations). QSO Points: SSB—2 pts, CW—4 pts. Work Portables and Mobiles from each county, log county line QSOs as 2 separate QSOs. Score: QSO points × WA counties (WA stations use SPC + WA counties) counted once only. QSO W7DX to add 500 bonus points for each mode—total 1000 points. For more information—**www.wwdxc.org**. Logs due Oct 31 to **salmonrun@wwdxc.org** or Western Washington DX Club, PO Box 395, Mercer Island, WA 98040.

Panama Anniversary Contest—Phone—sponsored by the Panama Radio Club,1200Z–2359Z September 22. Frequencies: 20, 40 meters. Exchange: RS. QSO Points: 1 pt/QSO, with HP1RCP—5 pts. Score: QSO Points × DXCC entities. For more information: **eventosrcp.hypermart.net/stats/index.html**. Logs due 25 November to **hp1rcp@hotmail.com** or Radio Club of Panama, Contest, PO Box 10745, Panama 4, Republic of Panama

Fall QRP Homebrewer Sprint—CW/PSK31—sponsored by New Jersey QRP Club, 0000Z–0400Z September 23. Frequencies: QRP CW and PSK31 frequencies on 80-10 meters, CW and PSK31 are considered separate bands. Exchange: RST + SPC + Output Power. QSO Points: Commercial Equipment—2 pts, Homebrew Xmtr or Rcvr—3 pts, Homebrew Xmtr and Rcvr—4 pts, Homebrew PSK31 station—5 pts. Kits okay as homebrew. Power Multiplier: 0>250 mW = ×15, 250 mW>1 W = ×10, 1-5 W = ×7, >5 W = ×1. Score: QSO Points × SPC (counted once per band) × power multiplier. For more information: **www.njqrp.org/data/qrphomebrewersprint.html**. Logs due 30 days from the contest to **n2cq@arrl.net** (text format) or Ken Newman, N2CQ, 81 Holly Dr, Woodbury, NJ 08096.

The Classic Exchange—CW/Phone—1900Z September 22–0500Z September 23. Frequencies: CW—1810, 3545, 7045, 14,045, 21,135, 28,180 kHz; Novice/Tech Plus—3695, 7120, 21,135, 28,180 kHz; Phone—1890, 3880, 7290, 14,280, 21,380, 28,320, 29,000 kHz. Exchange: Name, RST, SPC, Rcvr and Xmtr type. Okay to change equipment and work stations again on each band and mode. Count the total number of receivers (Rx) and Transmitters (Tx) Score: QSOs × (Rx + Tx + SPC counted on each band and mode) × CX Mult. The CX Multiplier is the total of the ages of all equipment used for 3 QSOs or more. Transceivers count ×2. Homebrew age is min. 25 years, unless documented as older. For more information: **qsl.asti.com/CX**. Send logs to **WQ8U@arrl.net** or "Mac" MacAulay, 6235 Wooden Shoe Ln, Centerville, OH 45459-1557.

QRP Afield—CW/Phone/Digital—sponsored by the New England QRP Club, 1500Z September 21–0300Z September 22, submit a log for the best 6-hr period of the contest. Frequencies: 160–10 meters (QRP calling frequencies), work stations once per band and mode. Categories: SO and MS. Exchange: RS(T), SPC, and NE-QRP number or power. QSO Points: HP (>5 W) fixed station—1 pt, HP mobile or portable—2 pts, QRP fixed—5 pts, QRP mobile or portable—10 pts. QSOs with WQ1RP score triple points. Score: QSO points × SPC (counted once only). For more information: **www.qsl.net/wq1rp/main.htm**. Logs due Oct 15 to **kc1l@arrl.net** or Chuck Ludinsky, K1CL, 6 Prancing Rd, Chelmsford, MA 01824-1922.

September 28-29

CQ/RJ Worldwide RTTY DX Contest—sponsored by *CQ Magazine* and *The New RTTY Journal*, 0000Z September 28–2400Z September 29. Frequencies: 80–10 meters. Categories: SOAB (LP, HP>150 W), SOSB, Assisted (AB only), MS (LP, HP), M2, MM. Exchange: RST + CQ Zone (W/VE stations also send state/province). QSO Points: own country—1 pt, different country, same continent—2 pts, diff. cont.—3 pts. Score: QSO points × SPC (incl. WAE countries) + CQ Zones counted once per band. For more information: **www.cq-amateur-radio.com/rtty.html** or **www.rttyjournal.com/rules/cqww.html**. Logs due 31 Oct to **wwrtty@kkn.net** or to CQ/RJ RTTY DX Contest, 25 Newbridge Rd, Hicksville, NY 11801 USA.

Scandinavian Activity Contest—SSB—1200Z September 28–1200Z September 29 (see September 21-22).

Texas QSO Party—CW/Phone/Digital—sponsored by Northwest Amateur Radio Society (NARS), 1400Z September 28–0200Z September 29 and 1400Z—2000Z September 29. Exchange: RST + SPC or MM region, TX stations send RST + TX county. QSO Points: Phone—2 pts, CW/Digital—3 pts. Score: non-TX stations—QSO points × TX counties, TX stations—QSO points × TX counties+SPC. Multipliers counted once only. For each TX Mobile worked in 5 counties, add 500 points to final score plus 500 points for each 5 additional counties. TX Mobile stations add 5000 points for each 5 counties activated with 5 or more QSOs. For more information: **www.k5vuu.com/tqp/rules.htm**. Logs due 31 Oct to **k5vuu@arrl.net** or Texas QSO Party Committee, 17007 Hillview Ln, Spring, TX 77379

Louisiana QSO Party—CW/Phone—sponsored by the Twin City Ham Club, 1400Z September 28–0200Z September 29 and 1400Z–2000Z September 29. Frequencies: 80–2 meters. Categories: SOAB (QRP <5 W, LP <150 W, HP, CW, Phone, Mixed Mode), MS (QRP, LP, HP, Mixed Mode only). Exchange: RST and SPC or LA parish. QSO Points: Phone—2 pts, CW—3 pts. Score: QSO points × LA counties (LA counties use SPC) counted once per band. For more information: **www.tchams.org/users/contest/laqp**. Logs due 31 Oct to **laqp@tchams.org** or TCHC Contest Committee, PO Box 1871, West Monroe, LA 71294.

Alabama QSO Party—CW/Phone—sponsored by the Central Alabama HF/VHF Contesting Club, 1800Z–2400Z September 28. Frequencies: 160–10 meters, SSB, CW, and FM contacts count separately. Categories: SO, MS, Rover, QRP(< 5 W), LP (< 200 W), HP. Exchange: RST and SPC. Work Rover stations in each county. QSO Points: AL stations count for 2 pts, others 1 pt. Scoring: AL stations—QSO points × SPC counted once per band. Non-AL stations—QSO points × AL counties counted once per band. Rovers add 500-point bonus for each county activated with 10 QSOs or more. For more information: **web.dbtech.net/~dxcc/rules1.htm**. Logs due 30 days after the contest to **dxcc@dbtech.net** or Alabama QSO Party, 4525 Eastern Hills Ln, Cottondale, AL 35453. QST

H. Ward Silver, N0AX ♦ 22916 107th Ave SW, Vashon, WA 98070 ♦ n0ax@arrl.org

2002 ARRL RTTY Roundup Results

By **Jay Townsend, WS7I**

After the long holiday season and many New Year's football bowl games, the contest season is kicked-off with the ARRL RTTY Roundup. The Roundup is the operator's contest. Talk to any operator and what creates excitement in contesting is rate. This is the highest rate RTTY contest. Operators can equal QSO numbers with those found in most 48-hour RTTY contests.

What makes Roundup so special are the stations that are looking for a few new RTTY band countries or new states for WAS RTTY. PSK31 use during the contest continues to expand. Large numbers of rare states and countries were easy to find on PSK31.

As the Roundup's popularity grew over the years, operator activity has increased. This year conditions weren't quite as good as the prior year and participation was down judging by the number of stations submitting logs. A total of 572 logs were received this year, down from 691 in 2001 but still up from 523 in 2000.

Sound cards along with the enormous popularity of the *Writelog for Windows* contest software have started pulling some of the familiar larger SSB and CW stations and operators into the RTTY Roundup. That increases the quality of competition.

RTTY Roundup is really the story of the average station. These operators are the ones who make this so much fun. Jim Johnson, KC4HW, of Melbourne, Florida represents these stations. Jim's a good example of an average entrant in the Roundup. KC4HW operated about 12 hours and missed just two states. He also had a high rate hour of 70 and most importantly had a blast in the contest.

Looking over the shoulder of W/VE Single Operator Low Power runner-up Steve, N9CK, gives us a glimpse into the world of RTTY contesting.

Expanded Contest Results Available on *ARRLWeb*

Expanded contest results for the 2002 ARRL RTTY Roundup and other ARRL operating events may be found at www.arrl.org/contests/results. This site features an expanded write-up of the contest results, more photographs, a user-searchable database, soapbox and expanded features related to each contest. We invite you to visit the site, and to send in your suggestions for improvements and additions.

Top Ten Scores

Single Operator

W/VE—Low Power

AA5AU	174,928
N9CK	125,430
W4GKM	124,956
N2WK	120,772
N0AT	112,924
WX4TM	111,888
VE6WQ	107,642
W1TY	103,180
VE4COZ	101,008
KI6DY	100,800

W/VE—High Power

K1RO	208,375
W1ZT	170,156
K4GMH	147,804
AC1O	143,635
W0DC	140,985
N4BP	139,860
K6LL	138,137
K9JY	136,504
W7NN	135,410
NE3H	133,515

DX—Low Power

ZX2B (PY2MNL, op)	97,175
9A7P	81,480
RA3WA	80,745
LV5V (LU5VV,op)	72,318
UN6P	68,442
YU7AM	67,914
IK2RZP	63,036
LZ2PI	57,225
HA5BSW	50,601
ES1QV	50,600

DX—High Power

ZF2NT	165,093
PJ2T (NW0L, op)	160,854
9A5W	140,500
OT2T (ON4UN, op)	139,080
UX0FF	123,280
EA1AKS	119,240
S54E	111,561
M0SDX	96,672
OH2BP	96,621
YU7YG	84,132

Multioperator

W/VE—Low Power

N5ZM	104,902
W6YX	88,776
W5VZF	64,296
K8VT	62,112
N1MGO	58,058
KB1HRI	56,715
VE3FJB	47,785
KE4YVD	43,254
N7PWZ	40,586
KO0Z	23,947

W/VE—High Power

K9NS	202,752
W0SD	178,364
W3PP	171,336
W5KFT	168,990
W7RY	141,398
NN6NN	133,001
KE7AJ	111,780
K8AA	110,400
K0BX	106,790
KJ7TH	98,124

DX—Low Power

IK4JSI	37,905
UT1HZM	30,172
S57IIO	11,970
AL7LI	2,409

DX—High Power

KL7FH	135,864
OL5Q	125,652
UT9F	108,612
MW2I	105,160
RW9C	100,548
RI4M	94,394
SN5Z	69,324
SM7BHM	32,078
I2OKW	20,560

Multi-Single High Power

The battle lines have been forming in the stateside multi-single class with K9NS, W0SD, W3PP and W5KFT all fielding serious entries. K9NS established a new record and overtook last year's winner W0SD for the victory. The W3PP crew brought us Delaware while fielding an impressive array of operators to capture third place. Ron, K5DJ, a long time multiple time winner in both Single Operator and the Multi-single classes at W5KFT, finished just behind in 4th place. All four of these stations set new Division Records in the 2002 contest.

Out west the team from W7RY managed to edge out an impressive effort by the KL7FH operators for 5th place overall. NN6NN, K0BX and K8AA all established new Division records.

On the DX side it was KL7FH victorious, with OL5Q in second, followed closely by operators from UT9F and MW2I.

Multi-single Low Power

Earl, N5ZM, and his partner N5RN fell a little short of their 2001 record but again notched top in class. Out west the guys from the Stanford University station, W6YX, turned in a nice score for second place. W5VZF, K8VT and N1MGO bunched up for third through fifth places. K8VT and N7PWZ set new Division records.

Across the water a newcomer IK4JSI with I4HNW won while doing their first RTTY contest. UT1HZM and S57IIO finished up the top three finishers.

Single Operator High Power

Mark, K1RO, is a long-time RTTY operator who has dabbled for years in the contest. This year Mark took the gloves off. Getting previously waxed by Randy, K5ZD, he decided to make a run in 2002. There are two ways to improve antenna farms. Put up some more, or borrow a station. Mark took door number two and

got himself invited to Dave, K1ZZ's QTH. Bringing his own gear, Mark rode the station to a first place finish and the top score in the contest, but a bit off the record 2001 pace of K5ZD.

Another East Coast guy, George, W1ZT, captured second place. K4GMH beat out AC1O and W0DC for third. K4GMH, W0DC, N4BP, ND5S and K6LL all set new Division records. Again we had a wide geographic representation in the top 10 finishers of the Roundup.

The DX race on the High Power Single side of things became the battle of warm waters. Bruce, ZF2NT, using his vast experience edged out NW0L operating the PJ2T super station. Bruce managed the trade-off between EU and NA contacts when both are available and squeezed out an extra 50 QSOs for the victory.

Single Operator Low Power

Roundup was the first RTTY contest to have a low power single operator class. This class remains the most popular, with 374 low power entries. From the Delta Division, AA5AU won this category again. The race was for second through fourth place. Steve, N9CK, running Hal Communications DXP38s, edged out Nick, W4GKM, for second. Steve had 27 less QSOs but the magic of three more multipliers. N2WK from New York beat Nick in mults but was a little less than 50 QSOs out of the race. N9CK, N2WK and N0AT all set new Division records.

On the DX side of things PY2MNL, operating ZX2B put on a great effort from South America for first place. In Europe it was Patrick, 9A5AEI, operating station 9A1P with the call of 9A7P beating out RA3WA for second place.

Strategy and Geography

The strategy of Roundup is unlike that of most other contests. It is a delicate balance between high rate and getting the right number of multipliers. Nearly a third of submitted logs were from non-North American entries. There is no limited number of multipliers so the hunt is always on for yet another multiplier.

The biggest choice in the contest is that of the two rest periods. The key thing is actually the start time on day number two. It's when you will get on the band with enough rate and/or multipliers to make it worthwhile. This is also one of the differences between stations of differing geographical locations. What is good for the east coast usually is far different from that of the southern areas. West coast choices are different from the heartland of the midwest.

The 2003 ARRL RTTY Roundup will be contested January 4-5. Now is the time to get your antennas in shape and sound cards ready. Come and join in on the digital fun!

RTTY Roundup Plaque Program

The following have won sponsored plaques. All Division winners in each category are eligible to purchase a Division-level plaque. Winning stations overall in the DX categories may also purchase plaques. The cost is $60 and may be ordered by contacting Kathy Allison, KA1RWY at 860-594-0295. The complete list of division winners may be found online at **www.arrl.org/contests/results** and selecting the link for the 2002 RTTY Roundup.

Plaque Category	*Winner*	*Plaque Sponsor*
W/VE Single Operator Low Power—NM7M Memorial	AA5AU	Wayne Matlock, K7WM
W/VE Single Operator High Power—W7RM Plaque	K1RO	Frank Fallon, N2FF
Dakota Division Single Operator High Power	W0DC	Lawrence Gandy, AH8LG
Delta Division Single Operator High Score	W4GKM**	Great Lakes DX/Contest Club, K9PXV
Great Lakes Division Single Operator High Power	ND5S	Amateur Radio Transmitting Society—W4CN
Hudson Division Single Operator High Power	NO2T	Frank Fallon, N2FF
Pacific Division Single Operator High Power	NA6E	Lawrence Gandy, AH8LG
Southwestern Division Single Operator High Power —TG9VT Memorial	K6LL	Jules Freundlich, W2JGR
Canadian Single Operator High Power	VY2SS	Foothills Amateur Radio Teleprinting Society

** indicates that a sponsored plaque has been awarded to a runner-up, where the Division winner has won an overall category sponsored plaque.

Scores

Scores are listed by DXCC entities and ARRL/RAC Sections. Line scores list call sign, score, QSOs, multipliers, Single or Multioperator and power (A = Low Power, B = High Power).

Africa

Canary Islands

EA8/DJ1OJ	26,832	312	86	S	A

South Africa

ZS6RVG	25,670	302	85	S	A
ZS1JY	378	21	18	S	A

Asia

Azerbaijan

4K6DI	15,125	275	55	S	A

Israel

4X6UU	6,072	132	46	S	A
4Z5KJ	3,510	78	45	S	A

Japan

JM1LPN	39,221	431	91	S	A
7L4IOU	35,490	390	91	S	A
JH3SIF	27,482	302	91	S	A
JL6HKJ	23,822	277	86	S	A
JA1XRH	22,800	304	75	S	A
JA2BY	19,740	235	84	S	A
JS1OYN	18,172	236	77	S	A
JA5ATN	7,752	136	57	S	A
JA1BHK	6,720	112	60	S	A
JA1XUY	6,466	122	53	S	A
JA3PYC	5,096	98	52	S	A
JA2QVP	3,320	83	40	S	A
JK6ISK	2,628	73	36	S	A
JF2IGP	1,560	52	30	S	A
JA8AGI/1	1,457	47	31	S	A
JE3UHV	504	36	14	S	A
JQ1AHZ/2	221	17	13	S	A
JA2MNB	168	14	12	S	A
JL3OXR	117	13	9	S	A
JR3RIY	9	3	3	S	A
JA1BWA	39,060	420	93	S	B
JA2AXB	17,860	235	76	S	B

Turkey

TA1EJ	1,008	36	28	S	A
TA1EQ	80	10	8	S	A

Asiatic Russia

RU0AM	38,626	434	89	S	A
RG9O (RZ9OU, op)	35,668	482	74	S	A
RA9XF	28,786	389	74	S	A
RU0LL	26,325	325	81	S	A
RX9SR	23,433	321	73	S	A
UA9CR	17,922	309	58	S	A
RA9AU	8,366	178	47	S	A
UA9AX	4,841	103	47	S	A
UA0LMO	3,485	85	41	S	A
RA9DA	3,060	85	36	S	A
UA9OSV	2,856	102	28	S	A
RD0C (UA0CA, op)	67,798	622	109	S	B
UA0FZ	45,600	475	96	S	B
UA0CW	12,160	190	64	S	B
RW9C (UA9CGA, RW9CF, RU9CK, ops)	`100,548	931	108	M	B

Kazakhstan

UN6P	68,442	671	102	S	A

Europe

Croatia

9A7P	81,480	776	105	S	A
9A3CY	13,184	206	64	S	A
9A5W	140,500	1124	125	S	B

Portugal

CT4MS	2,542	62	41	S	A

Fed. Rep. of Germany

DL4RCK	44,280	492	90	S	A
DK3VN	33,570	373	90	S	A
DL1ZBO	24,747	339	73	S	A
DJ9XB	17,860	235	76	S	A
DL4MFP	17,538	222	79	S	A
DM5GI	16,864	248	68	S	A
DK2GZ	9,450	135	70	S	A
DF7ZS	5,424	113	48	S	A
DL2ZAV	2,112	64	33	S	A
DL3ARK	1,736	56	31	S	A
DJ3NG	55,195	581	95	S	B
DJ3IW	30,176	328	92	S	B
DJ5JK	26,790	285	94	S	B
DL6JZ	15,622	214	73	S	B

Spain

EA4BT	9,387	149	63	S	A
EA5FSC	2,006	59	34	S	A
EA4BNQ	1,612	52	31	S	A
EA1AKS	119,240	1084	110	S	B
EA7NK	24,138	298	81	S	B
EA5DFV	14,400	200	72	S	B
EA4OI	10,370	170	61	S	B
EA1HF	3,040	76	40	S	B

Estonia

ES1QV	50,600	550	92	S	A
ES4RD	15,012	278	54	S	A

Belarus

EW1EA	41,280	480	86	S	A
EU6TV	990	45	22	S	A

France

F6AUS	31,584	336	94	S	A
F6FJE	17,784	234	76	S	A
F8BDQ	3,201	97	33	S	A
F6FTB	4,935	105	47	S	B
F5RD	3,959	107	37	S	B

England

G4WFQ	40,158	414	97	S	A
G0KRL	35,002	407	86	S	A
G0URR	33,150	425	78	S	A
G0MTN	24,948	324	77	S	A
G0/N9LYE	6,950	139	50	S	A
M0BEX	5,684	98	58	S	A
M0COP	4,512	94	48	S	A
M0AEJ	3,735	83	45	S	A
M0SDX	96,672	912	106	S	B

Northern Ireland

GI4KSH	27,692	322	86	S	B

Guernsey

GU0SUP	24,300	243	100	S	A
MU3EFB	4,400	110	40	S	A

Wales

GW4KHQ	38,608	508	76	S	B
MW2I (M0FRE, G4FRE, GW5NF, GW4JBQ, G4VXE, ops)	105,160	956	110	M	B

Hungary

HA5BSW	50,601	501	101	S	A
HA3JB	24,682	287	86	S	A
HA1WD	31,110	366	85	S	B

Italy

IK2RZP	63,036	618	102	S	A
IK2QCF	45,540	495	92	S	A
IV3ARJ	39,964	412	97	S	A
IK2XRW	18,798	241	78	S	A
IV3KSE	6,608	118	56	S	A
IK2WYI	3,654	87	42	S	A
IK3CST	588	28	21	S	A
I1COB	76,965	733	105	S	B
IT9BLB	70,914	669	106	S	B
I2SVA	53,045	515	103	S	B
IK7RVY	13,500	150	90	S	B
IK2NCJ	9,408	147	64	S	B
IK4JSI (+I4HNW)	37,905	399	95	M	A
I2OKW (+IK2DHU)	20,560	257	80	M	B

Norway

LA5TFA	8,316	231	36	S	A
LA9DK	5,500	100	55	S	A
LA7CL	57,888	603	96	S	B

Luxembourg

LX1NO	24,101	313	77	S	B

Lithuania

LY3BH	15,833	223	71	S	B

Bulgaria

LZ2PI	57,225	545	105	S	A
LZ9R (LZ3YY, op)	46,906	499	94	S	A
LZ2MP	25,432	289	88	S	A
LZ2JA	20,572	278	74	S	A
LZ2PL	20,100	300	67	S	A
LZ1ZM	4,218	111	38	S	A

Finland

OH2LZI	7,682	167	46	S	A
OH2GI	4,715	115	41	S	A
OH3KOK	2,134	97	22	S	A
OH7JJT	2,052	57	36	S	A
OH2BP	96,621	903	107	S	B
OH6N	28,275	325	87	S	B
OH2LU	399	21	19	S	B

Czech Republic

OK2PCL	13,725	183	75	S	A
OK1DCP	11,792	176	67	S	A
OK1FHI	9,333	153	61	S	A
OK2PYA	4,171	97	43	S	A
OL5Q (OK1VSL, OK1FFU, OK1INC, ops)	125,652	1132	111	M	B

Slovakia

OM5NA	1,200	48	25	S	A

Belgium

ON4AME	26,487	327	81	S	A
ON4ADZ	15,554	202	77	S	A
ON4BG	2,128	56	38	S	A
OT2T (ON4UN, op)	139,080	1159	120	S	B

Denmark

OZ5MJ	21,489	247	87	S	A

Netherlands

PA3BGQ	8,607	151	57	S	A
PA0LSK	8,352	144	58	S	A
PA0WRS	2,067	53	39	S	A

Slovenia

S57MHA	3,772	82	46	S	A
S54E	111,561	907	123	S	B
S56A	45,570	490	93	S	B
S57IIO (+S57KRI)	11,970	210	57	M	A

Sweden

SM6BSK	41,283	417	99	S	A
SM5UFB	35,076	444	79	S	A
SM7BJW	20,559	267	77	S	A
SM6SRW	20,501	247	83	S	A
SM7ATL	18,688	256	73	S	A
SM3ETC	14,592	256	57	S	A
SM6WQB	62,685	597	105	S	B
SM7BHM (+packet)	32,078	373	86	M	B

Poland

SP9ODY	43,290	481	90	S	A
SP9BBH	37,947	417	91	S	A
SP6AXW	22,854	293	78	S	A
SP8FHJ	12,675	195	65	S	A
SP9CQ	10,432	163	64	S	A
SP7FBQ	1,161	43	27	S	A
SP3RBT	2,135	61	35	S	B
SN5Z (SQ5VJB, SQ5EBJ, SQ5HAB, SQ5BPM, SP5UAF, SP5LCC + swl, ops)	69,324	654	106	M	B

Greece

SV1DKL	24,960	320	78	S	A

Iceland

TF3AO	28,773	417	69	S	B

European Russia

RA3WA	80,745	769	105	S	A
RZ1AZ	45,672	519	88	S	A
RW3LB	39,952	454	88	S	A
RA4CTR	38,552	488	79	S	A

UA3SAQ 28,137 339 83 S A
UA4FCO 26,316 306 86 S A
UA6ADC 15,762 222 71 S A
RA2FB 11,764 173 68 S A
RA1QIX 8,319 141 59 S A
RZ6AEW 6,075 135 45 S A
RA4AFZ 880 44 20 S A
RK6BZ 42,880 536 80 S B
RV1CC 16,344 227 72 S B
RI4M (RA4LBE, RA4LW, RN4LP, RW4LBE, RW4LE, RW4LR, ops) 94,394 866 109 M B

Ukraine
UW5U (UY2UA, op) 43,343 487 89 S A
US9QA 20,971 313 67 S A
UT5DL 3,740 85 44 S A
UR5FCM 2,325 75 31 S A
UU9JQ 1,920 60 32 S A
UT8EL 1,218 58 21 S A
UX0FF 123,280 1072 115 S B
UZ7U (UT3UA, op) 76,856 739 104 S B
UT1HZM (+ops) 30,172 397 76 M A
UT9F (UT9FJ, UR0FO, UT0FT, ops) 108,612 862 126 M B

Latvia
YL2NS 6,327 111 57 S A
YL2KF 12,350 247 50 S B

Romania
YO3APJ 44,160 460 96 S A
YO3JF 26,166 294 89 S A
YO3III 10,080 210 48 S A

Yugoslavia
YU7AM 67,914 693 98 S A
YU7YG 84,132 779 108 S B
YU7AE 43,296 492 88 S B

North America

Alaska
AL7BB 60,858 621 98 S A
AL7LI (+packet) 2,409 73 33 M A
KL7FH (+KL9A, AL1G) 135,864 1224 111 M B

Mexico
XE1L 31,950 426 75 S A

Cayman Islands
ZF2NT 165,093 1461 113 S B

Oceania

Australia
VK4DZ 14,700 210 70 S A
VK2DPD 2,450 70 35 S A
VK6GOM 16,965 261 65 S B
VK5GN 10,200 170 60 S B

Hawaii
KH6GMP 45,880 620 74 S A
AH6OZ 46,768 592 79 S B

Indonesia
YB5QZ 17,886 271 66 S A

New Zealand
ZL2AMI 50,964 548 93 S B

South America

Argentina
LV5V (LU5VV,op) 72,318 709 102 S A
LU7DNN 12,816 178 72 S A
LU7FFD 7,504 112 67 S A

Netherland Antilles
PJ2T (NW0L, op) 160,854 1411 114 S B
PJ2EL 72,114 707 102 S B

Brazil
ZX2B (PY2MNL, op) 97,175 845 115 S A
PR7AR 154 14 11 S A

Venezuela
YV5AAX 49,858 514 97 S A

USA

1

Connecticut
WA1EHK 93,132 796 117 S A
N1NB 52,416 546 96 S A
KD1J 32,886 378 87 S A
WB8IMY/1 16,200 225 72 S A
N8TDL 9,945 153 65 S A
KE1AU 5,537 113 49 S A
K1RO 208,375 1667 125 S B
N8WXQ 46,736 508 92 S B

Eastern Massachusetts
WG1Z 2,496 64 39 S A
W1ZT 170,156 1442 118 S B
N1UVA 57,230 590 97 S B

Maine
NY1S 48,974 521 94 S A
WN1OTV 27,600 368 75 S A
AC1O 143,635 1249 115 S B
K1US 25,800 300 86 S B

New Hampshire
AA1KL 28,658 322 89 S A
K1DAN 2,205 63 35 S A
AA1QD 1,650 50 33 S A

Rhode Island
KB1HRI (KE1AK, N1QLZ, N1LDY, ops) 56,715 597 95 M A

Vermont
N1HLP 24,674 338 73 S A
W1CX 21,684 278 78 S B

Western Massachusetts
W1TO 44,135 455 97 S A
K5ZD 13,090 187 70 S A
N1MGO (+WN1E) 58,058 638 91 M A

2

Eastern New York
KA2CYN 36,312 408 89 S A
K6SEM/2 23,621 299 79 S A
N2KAD 13,680 190 72 S A
W2WB 11,880 198 60 S A
NA2M 35,100 390 90 S B

NYC-Long Island
KF2XF 38,880 432 90 S A
KA2D 18,080 226 80 S A
N2LEB 9,145 155 59 S A
N2FF 74,881 727 103 S B

Northern New Jersey
K2YG 54,392 523 104 S A
WA2LXE 38,976 448 87 S A
KF2QS 19,280 241 80 S A
W2VTV 9,516 156 61 S A
ND2K 9,039 131 69 S A
KO2FB 6,307 119 53 S A
WA2NXK 156 13 12 S A
NO2T 85,026 766 111 S B
N2ED 43,830 487 90 S B
W2KD (+packet) 3,950 79 50 M A

Northern New York
NT2W 1,178 38 31 S A

Southern New Jersey
KC2SZ 18,270 261 70 S A

Western New York
N2WK 120,772 1108 109 S A
W1TY 103,180 938 110 S A
K1PY 78,780 780 101 S A
WB2FYZ 8,580 143 60 S A
W2MKW 5,704 124 46 S A
K2CF 2,368 64 37 S A
N2UM 1,980 60 33 S A
KF2VX (+K2ZUW, KB2YTC) 8,427 159 53 M A

3

Delaware
W3PP (+N4GN, N3HW) 171,336 1416 121 M B

Eastern Pennsylvania
W3ZV 59,290 605 98 S A
WA3AAN 49,049 539 91 S A
WA3IIA 35,757 411 87 S A
K3OK 15,984 216 74 S A
W3DZH 6,440 115 56 S A
N3JIX 2,257 61 37 S A
NE3H 133,515 1161 115 S B
K3SV 95,658 894 107 S B
K3WW 49,062 481 102 S B
K3QIA 33,088 376 88 S B
N3NZ 11,590 190 61 S B
N3RN (+KA3EEO, KA3ZHT) 3,936 82 48 M A

Maryland-DC
AF3D 36,223 407 89 S A
WN3C 10,921 163 67 S A
W3BUI 10,738 182 59 S A
K3UG 7,068 124 57 S A
W3FQE 4,704 84 56 S A
AJ3M 13,467 201 67 S B
W2GG (+packet) 16,929 209 81 M A

Western Pennsylvania
WW3S 76,272 681 112 S A
N3FR 72,474 771 94 S A
K3FH 37,496 436 86 S A
WA3GPP 13,664 224 61 S A
N3RDV 7,616 136 56 S A

4

Alabama
WX4TM 111,888 1008 111 S A
KE4KWE 61,380 660 93 S A
AG4W 49,495 521 95 S B
N2AUK 28,350 378 75 S B

Georgia
AE4Y 33,660 374 90 S A
WA4LXU (WB4AEG,KB4OXA,ops) 11,396 148 77 M A

Kentucky
W4LC 71,300 713 100 S A
K4SET 18,389 259 71 S A
NA4D 12,240 153 80 S A
K4WW 98,112 876 112 S B
KE4YVD (AC4PY, KE4ISW, WT4KY, AD4JJ, ops) 43,254 486 89 M A

North Carolina
W4UEF 61,936 632 98 S A
AE4EC 2,052 57 36 S A
KW4DA 131,758 1166 113 S B
K4MA 120,990 1110 109 S B
N4CW 29,610 329 90 S B
AA4NC (+W4CC) 11,592 138 84 M A

Northern Florida
AC0M 33,440 380 88 S A
KX5U 504 24 21 S A

South Carolina
N4IQ 104,500 950 110 S B
W4UK 87,710 895 98 S B
K0COP 1,280 40 32 S B

Southern Florida
KC4HW 50,731 523 97 S A
K4QD 37,230 510 73 S A
WT5L 13,348 188 71 S A
N4BP 139,860 1260 111 S B

Tennessee
W4GKM 124,956 1157 108 S A
W4AUI 42,840 510 84 S A
KE4DX 34,684 377 92 S A
WB9BSH 10,293 141 73 S A
K4OOO 7,695 135 57 S A
K4EZS 7,623 121 63 S A
W4JH 418 22 19 S A
K4RO 38,984 443 88 S B
W4CBX 35,752 436 82 S B
W4CZ 32,045 377 85 S B
W5BEN 27,057 311 87 S B

Virginia
WD4GBW 41,420 436 95 S A
N3MA 24,716 334 74 S A
W2YE 18,924 249 76 S A
N6MW 14,076 204 69 S A
W4JLS 9,632 172 56 S A
WA4FXX 4,450 89 50 S A
K4GMH 147,804 1308 113 S B
W6IHG 42,370 446 95 S B
KO4XB 16,302 247 66 S B

West Central Florida
WB3D 22,015 259 85 S A
W4TIJ 16,650 225 74 S A
K8OSF 6,156 114 54 S A

5

Arkansas
W5MK 26,784 372 72 S A
W5JE 9,860 170 58 S A
W5RZ 6,440 115 56 S A
N5ZM (+N5RN) 104,902 889 118 M A
K5BAT (K5NRC, WB5BHS, ops) 19,312 272 71 M A

Louisiana
AA5AU 174,928 1508 116 S A
KD5CFB 3,916 89 44 S A

Mississippi
AE5RM 14,144 208 68 S A
W5VZF (+WA4DDE, KB4HB) 64,296 684 94 M A

New Mexico
K4KIY 11,786 166 71 S A
KD5JAA 9,384 136 69 S A
WA0SXV 92,368 1004 92 S B
K5AM 9,796 158 62 S B

North Texas
AE5P 55,704 633 88 S A
KB5KYO 37,584 432 87 S A
N5RFX 15,616 256 61 S A
N5EG 1,104 46 24 S A
N5TY 56,066 578 97 S B
N5JR 45,684 486 94 S B
KD5LDV (+KD5KZG, K5WI) 9,180 170 54 M A

Oklahoma
K0CIE 70,397 697 101 S A
WA9AFM 18,330 282 65 S A
NE0P 651 31 21 S A

South Texas
N5XUS 57,408 624 92 S A
AJ4F 2,268 54 42 S A
K5NZ 28,560 340 84 S B
KK5CA 19,788 291 68 S B
WA5ZAF 11,144 199 56 S B
AC5AA 11,050 170 65 S B
K5HDU 7,290 135 54 S B
W5KFT (+K5DJ, K5PI) 168,990 1310 129 M B

West Texas
KE5OG 77,028 786 98 S A
WR5O 1,404 52 27 S A

6

East Bay
N6TQS 24,492 314 78 S A
K6BIR 17,688 264 67 S A
KE6QR 11,280 188 60 S A

Los Angeles
WA6BOB 23,166 351 66 S A
KB6WKT 20,880 290 72 S A
W6FFH 18,936 263 72 S A
WO6M 14,742 234 63 S A
K6TY (WB6VRN,op) 25 5 5 S A
KE6YTT (+W5LAX, KE6YTW, KR6E) 81,130 854 95 M B

Orange
WK6I 52,345 551 95 S A
W7TI 93,215 905 103 S B

Santa Barbara
W6KNB 75,735 765 99 S B

Santa Clara Valley
AC6JT 36,936 486 76 S A
W6OAT 24,888 366 68 S A
N6RJB 18,224 272 67 S A
K6EP 16,650 222 75 S A
KN6OZ 12,988 191 68 S A
K6RFM 11,859 177 67 S A
W6ZZZ 42 7 6 S A
W6YX (W6ENT, N6DE, ops) 88,776 822 108 M A

San Diego
WA6FPP 13,736 202 68 S A
N6PC 4,851 99 49 S A
W6IWO 57,967 637 91 S B
N6VH 42,744 548 78 S B
N6QEK 17,208 239 72 S B

San Francisco
N6OJ 62,046 766 81 S A
K6OWL 7,830 135 58 S A
W6JOX 29,760 372 80 S B

San Joaquin Valley
NT6K 44,370 522 85 S A
K6ZJ 21,012 309 68 S A
K6MAR 11,055 201 55 S A
K6MI 736 32 23 S A
NN6NN (W6XK, N6EE, ops) 133,001 1177 113 M B

Sacramento Valley
K6TA 8,580 156 55 S A
NA6E 71,145 837 85 S B

7

Arizona
W7BWI 13,467 201 67 S A
WB6CGZ 6,380 116 55 S A
AB7VO 6,264 116 54 S A
KI7NW 4,004 91 44 S A
K6LL 138,137 1291 107 S B
W7WW 121,900 1150 106 S B
N7PWZ (+N7IZM, KB7YEB, AA5IC) 40,586 446 91 M A

Eastern Washington
K7MM 48,462 591 82 S A
K7UK 24,716 334 74 S A
KB7HJM 3,960 90 44 S A
W7RY (+K7GS, WS7I) 141,398 1159 122 M B
KE7AJ (+K7OX) 111,780 1035 108 M B

Idaho
N7UVH 52,373 631 83 S A
KJ7TH (+KW7N) 98,124 962 102 M B

Montana
K7VK 29,848 364 82 S A

Nevada
N7ON 5,760 128 45 S A

Oregon
AA6TY 40,180 490 82 S A
N7OR 16,620 277 60 S A
AA7IH 12,000 200 60 S A
N7DB 4,836 93 52 S A
WW7OR (W7GG, op) 131,328 1216 108 S B
K7ZUM 63,272 719 88 S B

Utah
WA7YAZ 43,040 538 80 S A
W7TU 12,920 170 76 S A
W7CT 99,845 1051 95 S B

Western Washington
W7LD 60,680 820 74 S A
KB7N 48,240 603 80 S A
N7VGO 6,837 129 53 S A
W7NN 135,410 1231 110 S B
W7DPW 24,790 335 74 S B
WA7OJI 999 37 27 S B

Wyoming
KD7RX 20,493 297 69 S A
WG7Y 75,552 787 96 S B

8

Michigan
W8EB 82,008 804 102 S A
K8IR 54,351 549 99 S A
W8HCS 38,520 428 90 S A
K8SIA 19,175 295 65 S A
WA8RTP 15,124 199 76 S A
K8RLM 14,528 227 64 S A
ND5S 121,701 1077 113 S B
WA8LCZ 55,700 557 100 S B
K8YE 39,710 418 95 S B
K8VT (+WA8RTP) 62,112 647 96 M A
K8AA (+packet) 110,400 960 115 M B
AA8TC (+packet) 10,570 151 70 M B

Ohio
NI8Z 91,260 845 108 S A
WB8K 48,500 500 97 S A
N8IS 42,363 523 81 S A
W8IDM 17,596 212 83 S A
N8CPA 8,460 141 60 S A
K8ZT 6,360 106 60 S A
KC8RRS 690 30 23 S A
AB8K 105,952 946 112 S B
K3GP 43,440 543 80 S B
N8KM 20,482 266 77 S B

West Virginia
KG8WB 60,672 632 96 S A
K8MN 70,834 662 107 S B

9

Illinois
K9BJM 30,461 367 83 S A
N9BX 29,058 334 87 S A
KB9SIZ 8,313 163 51 S A
N9KO 8,176 146 56 S A
AA9NF 7,600 152 50 S A
K9JY 136,504 1208 113 S B
N2BJ 71,232 636 112 S B
W9SE 66,144 689 96 S B
K9NU 24,336 312 78 S B
K9NS (K9DX, K9HMB, K9RO, KS9W, N9NCX, ops) 202,752 1584 128 M B

Indiana
W9HLY 73,185 697 105 S A
WC9C 23,814 294 81 S A
WD9GMK 19,199 263 73 S A
N9MR 8,505 105 81 S A
KJ9C 5,832 108 54 S A

Wisconsin
N9CK 125,430 1130 111 S A
N9SDL 22,890 327 70 S A
KB9Q 10,653 159 67 S A
K9DJ 100,430 913 110 S B
N9PQU 99,858 979 102 S B
AA9PB (+packet) 77,115 795 97 M B

0

Colorado
CO8ZZ 61,456 668 92 S A
N0CDA 40,098 489 82 S A
W0SM 22,253 289 77 S A
N0IBT 21,280 280 76 S A
K0RZ 5,805 129 45 S A
KC0KSA 4,998 102 49 S A
W0LSD 15,768 219 72 S B
AA0YX (+WA0RSX) 48,980 620 79 M B
K0DU (+W0DET) 42,120 468 90 M B
WV7T (+WB0DUL,N0GJS) 13,774 194 71 M B

Iowa
N0AC 59,280 624 95 S A
K0SRL 6,731 127 53 S A

Kansas
KI6DY 100,800 1050 96 S A
AK0A 52,032 542 96 S A
K0BJ 34,830 387 90 S A
WW0F 9,515 173 55 S A
WD0BNC 7,995 123 65 S A
KC0IDI 600 30 20 S A
W0BR 34,400 430 80 S B
K0FJ 2,660 70 38 S B

Minnesota
N0AT 112,924 1036 109 S A
WA0LPV 64,584 702 92 S A
K0TG 31,032 431 72 S A
W0FLY 28,728 342 84 S A
KE0WW 16,215 235 69 S A
W0DC 140,985 1205 117 S B
W0HW 74,880 780 96 S B
W0ML 35,910 399 90 S B
W0MN 72 8 9 S B

Missouri
AE9B 53,196 572 93 S A
KE0LY 37,310 410 91 S A
K0GN 35,100 390 90 S A
WA0WIK 15,400 200 77 S A
N0JRN 10,848 226 48 S A
N0EID 7,614 141 54 S A
NM0X 6,440 161 40 S A
KF8UN 5,936 106 56 S A
W0TY 26,130 390 67 S B
K0FG 9,728 128 76 S B
KO0Z (+NF0Q) 23,947 311 77 M A
K0BX (+packet) 106,790 905 118 M B

Nebraska
K0IDT 54,636 628 87 S A
K0XU 16,717 229 73 S A

South Dakota
WB0ULX 9,408 147 64 S A
W0SD (+W0OE, W0DB, W7XU, WA0ARZ, N0ABE) 178,364 1462 122 M B

Canada

Maritime-Newfoundland
VE1AOE 23,025 307 75 S A
VY2LI 1,456 52 28 S A
VY2SS 122,640 1095 112 S B

Quebec
VE2OWL 47,520 540 88 S A
VA2BF 35,816 407 88 S A

Ontario
VE3GLN 81,106 758 107 S A
VE3IAY 57,888 603 96 S A
VE3WQ 31,980 410 78 S A
VA3SB 31,856 362 88 S A
VE3BUC 23,268 277 84 S A
VA3PC 17,440 218 80 S A
VE3OXX 143 13 11 S A
VA3DX 57,443 527 109 S B
VE3GLA 20,250 250 81 S B
VE3FJB (+VA3CW, VE3IJM, VA3DG, V3THR) 47,785 503 95 M A

Manitoba
VE4COZ 101,008 944 107 S A

Saskatchewan
VE5SF 49,966 602 83 S A
VE5CPU 85,008 924 92 S B

Alberta
VE6WQ 107,642 1006 107 S A
VE6RAJ 58,855 745 79 S A
VE6RRD 41,028 526 78 S A
VE6YR 69,092 751 92 S B
VA6MM 31,671 391 81 S B
VE6JY 630 30 21 S B

British Columbia
VA7XX 111,982 949 118 S B
VA7BM (+packet) 4,687 109 43 M A

Checklogs: 7Z2SJ, AD6PC, G4EMT, OK2CJM, OK2VXM, OZ6TL, SP2GWZ, UY8IF

Results, 2001 ARRL 10-Meter Contest

By **Dan Henderson, N1ND**
Contest Branch Manager

Yes, I realize that many aficionados refer to 6 meters as "the magic band" and I don't intend to take anything away from them. Six has a special aura about it, and at times contacts do appear like "magic" on that special band.

Ten meters is popular today for a wide variety of reasons. You may live in an antenna-restricted environment, but there always seems there is a way to sneak up a 10-meter dipole or vertical. Mobile transceivers are more plentiful, and a simple setup in the car opens up the band to thousands of operators. During the past couple of years, we have enjoyed the peak of the current sunspot cycle and a wide range of stations on the air. When the band is open, there always seems to have been good propagation somewhere—and *lots* of folks to work.

All of this came together the weekend of December 15-16, 2001 for the ARRL 10 Meter Contest. A total of 2585 logs were received. Approximately 10.5% of all entries were in the QRP category. This is up 8.5% from 2000 and a strong indication that QRP is alive and well. Low power was the most popular category, at 57.5% and High power was listed by 32% of all entries. Entries were received from 153 different multipliers in the contest.

Ken, WM5R, mugs for the camera before continuing the pile-up that allowed him to place 5th among W/VE stations in the Single Operator Phone Only High Power category from K5TR.

Mixed Mode

The growing competition in the QRP category resulted in a new overall category record. Fred, KG9X, wrote in his soapbox that this was his "first ever QRP contest entry. [My] goal was to work 100 countries for the new QRP DXCC award. Well, if all Qs hold up, made it with 105!" Good news, Fred—your log held up very well. Fred's entry sets a new Single Operator Mixed Mode QRP category record, with a score of 886,650. On the DX side, Stephan, DL6RDR, brought home top honors—and a new DX Single Operator Mixed Mode QRP record with a score of 509,850.

In the Single Operator Mixed Mode Low Power category, Chad, WE9V, in Wisconsin emerged victorious scoring over 1.5 M points and a new W/VE Category record while Paulo, PV8DX, finished on top of the DX stations with 1,458,688 points,

In the Single Operator Mixed Mode High Power category, the top score overall was posted by Jim, N6TJ, operating as ZD8Z. Though not an overall category record, Jim was able to handily defeat his nearest competitor (and fellow California-based operator) Ken, K6LA, who operated portable from FG, by a score of 3.3 M to 2.86 M.

Bob, KQ2M, once again took top honors in the W/VE SO Mixed High power category from his QTH in Connecticut for the third straight year. Bob missed matching his 2000 W/VE category record by a measly 3280 points. For fun, check out the great battle in Tennessee between N4ZZ and K4RO—QSOs vs mults, with the most mults winning!

Phone Only

There are those who love a challenge, which certainly includes contesting in a QRP Phone category. Jim, K5RX from Texas, related "This was my first time to single op this contest seriously, so I didn't know what to expect." Jim got more than he bargained for, as he ended up at the top of the overall Single Operator Phone QRP category with a W/VE record score of 301,630. From the DX perspective, Pat, F8BON, dominated the SO Phone QRP arena with a score of 168,590.

Single Operator Phone Low power was the most popular single category in the contest, representing a total of 21.5% of all entries. Taking overall top honors in the category in 2001 was Art, N2NB. Operating from his New York/Long Island section QTH, Art posted a score of 744,432—easily outdistancing the competition. Runner-up was the top DX category score of 626,926 posted by Antonio, CT1DVV.

It is not easy to break the 1 Meg point barrier in the Single Operator Phone High power category. In fact, it has only happened nine times in the last five ARRL 10 Meter contests (1997-2001). No station broke that mark—either W/VE or DX—during the 2001 contest. Coming closest (missing by a minuscule two QSOs) was Pekka, OH1RY, operating from EA8AH, with a score of 999,600. On the W/VE side of the category, Chuck, W5PR, placed first among W/VE stations with a score of 952,798.

CW Only

The Single Operator CW QRP category also saw a W/VE record-setting performance in 2001. Dale, KG5U, one of the hyper-active Texas contest crowd, outgunned the competition with a W/VE record score of 429,024—about 27 k better than his previous record set in the category in 2000. We have almost all heard the call JA1YNE on during a contest. If you worked it during this contest, you were working Atsushi, JR1NKN as the operator. Atsushi took first place among DX stations in the SO CW QRP category with a score of 308,660—the only DX station above the 300 k mark in the category.

Dan, K1TO, tried another run at the CW Low Power category again this year. When the final results were in, Dan was challenged, but not beaten. As in the 2000 contest, Dan was the only operator in this class above 1 meg. His score of 1,028,600 from his Florida QTH was not quite as high as last year but was plenty good to fight off all challengers—W/VE or DX. On the DX side, ZP6M with Rasa, YU1RL, at the key was the frontrunner with 966,528 points.

The Single Operator CW High power category saw the top W/VE and top DX entrants finish within a couple thousand points of each other. Tom, K1KI, set a new W/VE mark from Connecticut with a score of 1,511,048. DX winner Bruce, ZF2NT, trailed Tom by only 2620 points at 1,508,428. Bruce had the highest QSO total of any of the CW-only entrants, while Tom had the highest multiplier count.

Multioperator

Multioperator stations are always fun—and present their own set of challenges. Four stations broke the 2.5 megapoint mark in 2001. Congratulations go to N9RV (IN), KV0Q (CO) and N2NT (NJ) for placing 1-2-3 in the W/VE standings. Less than 23 k points separated first from third in the category. Higher point value CW QSOs also made the difference in the DX Multioperator competition. The top DX multi, LT1F, placed fourth overall, with a score of just over 2.5 M.

Affiliated Club Competition

The Affiliated Club Competition saw a category with a heated battle and a close finish, one with a runaway winner, one with a strong effort by both clubs and lots of fun and participation. A total of 727 entries from US participants submitted logs with scores to be credited toward a club's total.

The Society of Midwest Contesters again battled the Potomac Valley Radio Club in the Unlimited Club category. SMC emerged with just over 30 million points for the win, about 2 million ahead of PVRC. Seven clubs posted scores of over 10 million points in the Medium Club Category. In the end, the Yankee Clipper Contest Club edged out the Florida Contest Group by less than a meg—17,959,348 to 17,189,872. In the Local Club Category, the decision was "nolo contendre" as the Hudson Valley Contesters and DXers overwhelmed the competition with 4,525,390 points to runner-up West Valley Amateur Radio Association's 1,929,598.

Be sure to visit the ARRL Contest Results Online site at **www.arrl.org/contests/results**. There you will find an expanded version of the results, additional sidebar information, photographs, and a user-searchable database of the contest's final results.

During the height of the sunspot cycles, the ARRL 10 Meter Contest has proven to be among the most popular operating events. The band may be losing some of its magic (after all, we are on the downside of the current sunspot cycle), but there should still be some exciting propagation for the 2002 event. Tune in December 14-15 and work everyone you hear! Who knows what rabbits may pop out of the hat as you search for new opportunities on this special band?

Top Ten, W/VE

Mixed Mode, QRP

KG9X	886,650
N0KE	615,832
K6XX	565,060
WA8ZBT	379,832
N2CU	369,472
WA7LNW	367,812
WA6FGV	312,816
K0PC	298,832
W4DEC	271,200
K1EPJ	262,816

Mixed Mode, Low Power

WE9V	1,520,610
W1HR	1,434,720
W7UQ (KL9A, op)	1,359,150
VX5UF	1,354,500
N0AT	1,351,336
K0OB	1,128,064
KD2RD	1,110,112
VE5SF	997,904
AA6PW	960,400
WO4O	937,720

Mixed Mode, High Power

KQ2M	2,743,884
K9NW	2,374,848
W9RE	2,343,780
K3ZO	2,287,520
VX6JY (VE6WQ, op)	2,246,508
WC4E	2,195,100
VX7CC	2,168,716
W2RE	2,058,110
K6AM	2,053,558
N8OO	1,997,456

Phone Only, QRP

K5RX	301,630
W7YA	182,528
WA0VBW	168,990
W7PE	136,348
KK0Q	112,918
W4TD	111,720
AB2IW	95,256
W6QU (W8QZA, op)	71,820
AA2VK	66,690
N8WL	57,594

Phone Only, Low Power

N2NB	744,432
W7ZR	536,364
AC0W	472,472
W9XG (K2DRH, op)	447,552
N4OX	441,464
KT0DX	399,052
N1SV	388,884
W3ZZX	349,952
K4XDX	340,824
KT3RR	334,788

Phone Only, High Power

W5PR	952,798
K4XS	886,424
W7EJ	837,380
K7RI	833,712
K5TR (WM5R, op)	802,944
VG5DX	738,090
W1SJ	721,648
N2BJ	692,750
N1IC	691,164
W0ETC	690,384

CW Only, QRP

KG5U	429,024
N0UR	385,728
N7OU	362,792
K5WO	350,060
N9NE	339,040
W6JTI	338,360
K7MM	309,872
K7RE	296,100
AA1CA	247,280
W9WAQ	178,308

CW Only, Low Power

K1TO	1,028,600
WE1USA (WA1LNP,op)	957,312
N4ZI	802,788
K1VUT	734,944
NY3A	732,028
VA3RU	729,504
K5KA	728,576
WQ5W	715,140
N5DUW	695,960
K3FT	694,536

CW Only, High Power

K1KI	1,511,048
W4ZV	1,416,064
K2VV	1,344,440
W6EEN (N6RT, op)	1,279,016
W4AN (K4BAI, op)	1,268,436
KR1G	1,243,584
W0SD (W0DB, op)	1,237,236
W1WEF	1,227,448
VA3UZ	1,224,308
K7GM	1,181,952

Multioperator

N9RV	2,533,496
KV0Q	2,515,716
N2NT	2,510,748
NX5M	2,445,518
K1SE	2,429,232
W0AIH	2,396,672
W4MYA	2,381,760
KH6ND	2,376,682
N5YA	2,337,600
W4MR	2,115,564

Top Ten, DX

Mixed Mode, QRP

DL6RDR	509,850
OK2PP	424,352
JA2AXB	288,684
OK2VWB	232,432
9A2EY	167,552
DL1DQY	156,978
RV3QX	130,900
F8CED	126,084
OK2WTM	119,652
YU1LM	99,756

Mixed Mode, Low Power

PV8DX	1,458,688
EA7GTF	1,142,848
EI5DI	1,025,200
ER6A (ER1LW, op)	863,902
YU1OJ	822,160
RD4M	814,368
LZ9W	772,664
RZ4FA	755,298
RA1ACJ	698,168
ZL1TM	657,980

Mixed Mode, High Power

ZD8Z (N6TJ, op)	3,337,668
FG/K6LA	2,860,560
JY9NX (JM1CAX, op)	2,291,058
OK1RF	1,757,970
UA2FB	1,505,560
JA8RWU	1,468,698
OM5M (OM3BH, op)	1,430,094
HA6NF	1,384,620
S50K	1,382,500
RK4FF	1,346,110

Phone Only, QRP

F8BON	168,590
LU1VK	113,014
LT2D (LW3DX, op)	93,252
S57MSU	87,720
RK9KWB (UA9KGH, op)	56,448
US5WDL	54,032
G3FNM	36,900
SP5XMU	34,602
RA3DGH	23,920
SV1DZB	13,500

Phone Only, Low Power

CT8T (CT1DVV, op)	626,924
TF8GX	528,808
VP5AZ (KN4UG, op)	520,982
ZX2B (PY2MNL, op)	420,300
9A1P	401,962
LU4DX	400,724
G3VAO	372,650
WP4BV	367,770
G0AEV	364,000
F5TDK	333,878

Phone Only, High Power

EA8AH (OH1RY, op)	999,600
TI5N (AC8G, op)	966,736
TM5C	856,044
GM4YXI	836,022
LX1NO	707,232
HR3J (JA6WFM, op)	699,696
TM2V (F6GLH, op)	697,318
DL2ARD	666,496
I4UFH	658,260
ZF2AH	625,944

CW Only, QRP

JA1YNE (JR1NKN, op)	308,660
F5PTM	265,608
CT1ETE	250,860
SP5DDJ	219,780
JA2IU	171,304
OM0TT	130,400
RA1OZ	130,220
OM7PY	126,400
HG4I	121,176
UA0KCL/3	115,940

CW Only, Low Power

ZP6M	966,528
FM/G3SQX	654,360
OT1H (ON5YR, op)	585,732
C6A/W9AU	583,440
CX9AU	552,288
JF1SQC	548,340
4Z5AX	541,448
IK7JWY	529,740
EU1DX	522,600
OM6T	522,500

CW Only, High Power

ZF2NT	1,508,428
GM3POI	1,086,016
9A3GW	1,061,456
LX5A (HA1AG, op)	1,054,208
A61AJ	989,456
JH3AIU	935,788
OD5/OK1MU	896,480
JH1AEP	705,372
F6BEE	646,272
ZL6QH (ZL2BSJ, op)	613,080

Multioperator

LT1F	2,500,932
VP5DX	2,411,920
CX5BW	2,232,890
CT3EE	2,164,620
OQ1T	2,025,824
RU1A	1,989,952
M5X	1,986,468
TK5T	1,963,116
PJ2T	1,808,708
DL6RAI	1,719,062

Affiliated Club Competition

	Score	Entries
Unlimited Category		
Society of Midwest Contesters	30,517,922	96
Potomac Valley Radio Club	28,416,164	65
Medium Category		
Yankee Clipper Contest Club	17,959,348	50
Florida Contest Group	17,189,872	30
Frankford Radio Club	16,459,666	29
Minnesota Wireless Assn	15,194,392	37
Northern California Contest Club	13,651,286	29
Mad River Radio Club	10,545,668	23
Tennessee Contest Group	10,142,474	25
Southern California Contest	8,455,832	13
South East Contest Club	6,661,174	21
Willamette Valley DX Club	5,909,066	12
Grand Mesa Contesters	5,652,450	12
Central Texas DX and Contest	5,403,728	8
Western Washington DX Club	5,240,332	9
North Texas Contest Club	5,220,936	8
Southwest Ohio DX Assn	5,150,170	4
Kentucky Contest Group	3,829,012	10
Texas DX Society	3,416,286	7
Magnolia DX Assn	3,115,484	4
Order of Boiled Owls	2,890,944	6
Kansas City DX Club	2,409,756	4
North Coast Contesters	1,767,284	5
Rochester (NY) DX Assn	1,535,158	7
Bay Area Wireless Assn	1,215,024	5
Green River Valley ARS	1,172,672	4
Northern Arizona DX Assn	1,083,284	4
Lincoln ARC	1,039,168	4
AK-SAR-BEN	997,080	4
Central Arizona DX Assn	711,000	3
Schenectady ARA	646,944	3
Carolina DX Assn	580,444	4
Bergen ARA	473,066	9
Eastern Iowa DX Assn	404,070	3
Mother Lode DX/Contest Club	390,220	3
West Park Radiops	354,116	3
Northrop Grumman Radio Club	286,540	4
Holiday City ARC	186,482	5
Six Meter Club of Chicago	161,886	5
Poughkeepsie ARC	84,898	3
Local Category		
Hudson Valley Contesters & DXers	4,525,390	5
West Valley ARA	1,929,598	5
River City Contesters	1,738,530	6
Florida Contest Club	1,274,040	3
Utah Contest Club	1,201,196	4
American Red Cross Emergency	436,098	3
Medina 2 Meter Group	433,020	3
Columbia-Montour ARC	330,096	6
Loudoun ARG	297,094	5
Sterling Park ARC	290,364	4
Northern New York Contest Club	271,086	3
Athens County ARA	107,702	5
10-70 Repeater Assn	68,002	3
Meriden ARC	62,922	5
Williamsburg Area ARC	52,242	3

Scores

Scores are listed by DXCC Countries and ARRL/RAC Sections. Line scores list call sign, score, QSOs, multipliers, class (A = Mixed Mode, B = Phone only, C = CW only, D = Multioperator), and power (A = QRP, B = Low Power, C = High Power).

Africa

Tunisia
3V8BB 280,502 1017 139 B B

Nigeria
5N8BRC (UA3AGW, op)
45,600 182 76 A B

Zaire
9Q0AR (F6BLQ, op)
539,560 1955 140 B C
9V1UV 30,240 271 56 B C

Madeira Islands
CT3KU 49,468 244 83 A B
CT3BD 233,376 872 136 B B
CQ3T (CT3KN,CT3KY, ops)
667,680 1127 208 D B
CT7A (CT1GFK and ops)
1,012,650 1682 215 D C

Canary Islands
EA8/DJ1OJ
61,380 180 93 A B
EA8AH (OH1RY, op)
999,600 2956 170 B C
EA8/SM6CUK
21,828 107 51 C A
EA8CN 103,596 270 97 C B
EA8/DL5XL
6,032 52 29 C B

Ascension Island
ZD8Z (N6TJ, op)
3,337,668 3874 278 A C

South Africa
ZS1NF 98,368 263 116 A B
ZS5NK 154,812 686 114 B C
ZS6HO 2,200 44 25 B C
ZS5RON 79,200 274 75 C B

Asia

Israel
4Z5FL/M 6,816 71 48 B B
4Z5AX 541,448 1290 106 C B
4Z5OL 64,120 229 70 C B

Kuwait
9K9Z 616,680 2303 135 B C
9K9O (9K2RR, op)
322,620 855 95 C B

United Arab Emirates
A61AJ 989,456 1870 134 C C

Kyrgyzstan
EX2M 936,856 1862 181 A C
EX8MIO 109,674 683 81 B B
EX2T 213,622 1042 103 B C

Turkmenistan
EZ3A 7,400 99 37 A B

South Korea
HL5UOG 80,190 258 81 A B
HL1/WX8C 52,080 174 93 A B
HL3AMO 8,820 85 42 A B

Japan
JA2AXB 288,684 550 162 A A
7K2PBB 6,800 62 34 A A
JN2FSE 5,576 49 34 A A
JH7XMO 637,686 1129 189 A B
JH5OXF 418,984 730 166 A B
JA0FVU 313,252 659 142 A B
JH6WHN 208,080 484 136 A B
JA2BQX 181,500 452 150 A B
JG3NKP 168,072 327 141 A B
JF3KQA 159,120 340 130 A B
JA1XRH 136,500 323 125 A B
JA3PYC 129,444 306 134 A B
JM2RUV 98,888 363 82 A B
JR4PMX 93,252 253 114 A B
JH0IXE 64,372 234 77 A B
JA2QVP 61,884 212 81 A B
JA9XBW 56,550 293 75 A B
JA1XUY 30,248 135 76 A B
JA1RRA 20,276 115 74 A B
JA1XPU 16,016 97 56 A B
JF2SKV 13,886 85 53 A B
JQ1AHZ 13,000 119 50 A B
JG4DDN 9,652 66 38 A B
JA1EMQ 3,410 46 31 A B
7K1SLY 3,024 58 27 A B
7N1BHO 1,500 31 15 A B
JE3UHV 400 13 10 A B
JA8RWU 1,468,698 2070 231 A C
JK1OLT 492,470 934 185 A C
JA1CG 341,330 1137 145 A C
JA1HP 290,752 558 154 A C
JF2FIU 92,344 301 119 A C
7J1ABD 20,764 112 58 A C
JH8DHV 11,726 106 41 A C
JL3VUL 78,300 450 87 B B
JH1UUT 67,116 357 94 B B
JR3RIY 63,000 352 90 B B
JG2REJ 55,752 303 92 B B
JA6EFT 52,780 290 91 B B
JG4OOU 48,140 290 83 B B
JM1GHT 43,688 258 86 B B
7N2UQC 41,328 257 82 B B
JA2GHP 33,852 221 78 B B
JE7DOT 33,696 234 72 B B
JR1MRG 28,712 195 74 B B
JA1ALX/9 28,500 190 75 B B
JA1GYO 25,842 178 73 B B
JH1CML 16,074 141 57 B B
JH1RMH 15,372 126 61 B B
JA2KPW 12,862 111 59 B B
JA6QDU 11,872 107 56 B B
JA3PYH 6,396 82 39 B B
JI8BUR 6,364 88 37 B B
JR3CVO 5,772 74 39 B B
JE1GZB 3,696 56 33 B B
JE1PJR 3,510 65 27 B B
JK7DWD 2,296 42 28 B B
JH3OXM 2,240 40 28 B B
JA1IZ 1,584 33 24 B B
JR3CVJ 714 21 17 B B
JH1TUX 588 22 14 B B
JK1BII 560 20 14 B B
JA1AAT 144 9 8 B B
JG1GCO 50 5 5 B B
JA7NVF 381,178 1456 133 B C
JR1UJX 134,520 715 95 B C
JH2AVO 78,792 406 98 B C
JA3WFQ 494 19 13 B C
JA1YNE (JR1NKN, op)
308,660 675 115 C A
JA2IU 171,304 435 98 C A
JA9MAT 66,600 227 75 C A
JA5CDL 26,840 128 55 C A
JJ6WYS 8,120 58 35 C A
7K1CPT 3,280 41 20 C A
JF1SQC 548,340 1242 111 C B
JI1RXQ 473,536 1066 112 C B
JR7ZIT (JQ1UKK, op)
448,224 972 116 C B
JH1AZO 413,888 922 116 C B
JO3JYE 412,476 946 111 C B
JI7NUF 361,580 902 101 C B
JR7OMD 282,480 655 110 C B
JN1NOP 226,080 635 90 C B
JA5ATN 222,892 545 103 C B
JA3YPL (JJ3TBB, op)
208,000 506 104 C B
JA2CXF 178,920 428 105 C B
JA1NLX 177,120 500 90 C B
JH0SDA 173,184 512 88 C B
JA2KKA 159,980 421 95 C B
JI1HFJ 126,248 375 86 C B
JA1CP 110,424 331 86 C B
JA6CYL 107,088 295 92 C B
JG2TKH 83,664 260 84 C B
JA4AQR 81,168 233 89 C B
JA4BAA 81,000 225 90 C B
JP1SRG 77,080 246 82 C B
JA7ARW 76,212 260 73 C B
JH6OPP 60,984 199 77 C B
JK3GWT 58,236 214 69 C B
JH0NVX 56,560 204 70 C B
JH7QNG 56,160 202 72 C B
JJ4PPK 49,140 189 65 C B
JA0BMS/1 46,080 180 64 C B
JA3DAY 43,740 138 81 C B
JO1QZI 41,756 143 73 C B
JA0XZD 36,952 150 62 C B
JA3BQC 32,208 132 61 C B
JH0EPI 28,080 130 54 C B
JK1KFO 27,636 148 47 C B
JI1EFP 24,288 142 44 C B
JH2NWP 23,760 138 44 C B
JA1AZS 23,320 110 53 C B
JA0IOF 21,600 109 50 C B
JN7OJA 19,600 100 49 C B
JF7GDF 18,988 101 47 C B
JH1NXU 18,612 99 47 C B
JO1WIZ 17,444 89 49 C B
JH3LFL 15,960 100 42 C B
JQ1COB 12,956 87 41 C B
JA1BCP 12,780 71 45 C B
JA3RK 12,320 81 40 C B
JK8NLB 10,880 71 40 C B
JR2TMB 7,776 56 36 C B
JJ4CDW 7,072 52 34 C B
JR3NDM 5,452 53 29 C B
JA4AKV 1,680 30 14 C B
JA0GZ 900 25 9 C B
JO1CRA 560 14 10 C B
JA3LZC 156 13 3 C B
JH3AIU 935,788 1776 133 C C
JH1AEP 705,372 1384 129 C C
JI1ACI 508,500 1164 113 C C
JA0QWO 390,280 895 110 C C
JA5APU 269,280 684 102 C C
JA9CWJ 248,240 586 107 C C
JI1CQA 181,600 460 100 C C
JA1PS 154,380 415 93 C C
JH7CJM 44,496 206 54 C C
JH4UTP (+packet)
1,075,704 1624 228 D C
JA3ZML
(JI3NST,JK3HZH,JH0XUP,ops)
506,920 811 190 D C
JA2YKA (JI4RDO,JN2FMH,ops)
238,944 565 152 D C
7L4IOU (+packet)
83,536 468 92 D C

Jordan
JY9NX (JM1CAX, op)
2,291,058 2895 261 A C

Lebanon
OD5/OK1MU
896,480 1729 130 C C

Turkey
TA5FA 17,316 223 39 B C
TA3J 32 4 4 B C

Asiatic Russia
RZ9IB 44,220 223 67 A A
RG9O (RZ9OU, op)
649,980 1405 157 A B
UA9CI 537,864 1197 146 A B
UA9HN 193,242 574 107 A B
UA9OSV 81,844 350 74 A B
UA9OUB 58,220 293 71 A B
UA9AX 28,730 114 85 A B
UA9CDV 855,044 1459 181 A C
UA9MA 776,650 1475 175 A C
RK9CZO (RX9CAZ, op)
774,528 1286 192 A C
UA9CLB 768,060 1359 170 A C
UA0ANW 472,758 1051 143 A C
RA0BA 442,860 1052 121 A C
UA9CKS 14,280 95 42 A C
RK9KWB (UA9KGH, op)
56,448 445 64 B A
UA9YAB 215,424 1092 99 B B
RA9FLW 145,728 766 96 B B
RA9FRD 93,760 593 80 B B
UA0IV 192 12 8 B B
RS0F (UA0FZ, op)
351,680 1269 140 B C
RV0AR 150,672 883 86 B C
RA9WW 83,824 340 62 C A
RZ9CX 44,304 214 52 C A
RV9COI 3,780 46 21 C A
RU0LL 296,640 728 103 C B
UA9OA 230,100 767 75 C B
RA0FN 181,440 546 84 C B
UA0ACG 179,140 706 65 C B
RX9FB 153,192 495 78 C B
RA9XF 152,592 569 68 C B
RW9QA 128,936 458 71 C B
UA9AB 127,764 351 91 C B
RV9WZ 111,440 401 70 C B
RW0LZ 88,740 264 85 C B
UA9APA 47,040 171 70 C B
UA9XC 44,916 198 57 C B
UA0LMO 20,116 110 47 C B
RZ3AZ 504,320 994 128 C C
UA9MC 178,488 609 74 C C
UA0LS 171,120 472 93 C C
RT9W (RU9WX,RX9WR,RW9WW, RW9WY,RA9WR,ops)
1,187,100 1675 225 D C
RZ9AWK (RA9-24CB,RA9-28CB, RZ9AE,UA9AFS,ops)
264,100 658 139 D C

Kazakhstan
UN6P 623,410 1318 155 A B
UQ1D 119,680 750 80 B B
UN6G 175,344 566 78 C B

UK Sov. Base Areas on Cyprus
ZC4BS 404,820 904 130 A B
ZC4DW 301,104 741 102 C B

Europe

Croatia
9A2EY 167,552 443 112 A A
9A4W 526,060 1510 145 A C
9A6DM 159,768 528 126 A C
9A1P 401,962 1346 151 B B
9A3VM 519,552 1074 123 C B
9A3CY 89,600 283 80 C B
9A3GW 1,061,456 1807 148 C C

Andorra
CT3EE (DK1BT,DL3DXX,ops)
2,164,620 2850 258 D C

Portugal
CT1AOZ 378,480 802 190 A B
CT8T (CT1DVV, op)
626,924 2163 146 B B
CT1ETE 250,860 560 113 C A
CT1FNT 34,528 172 52 C B
CQ2T (CT1FAC,CT2FUN,CT2FVL, CT2GDF,ops)
225,148 946 119 D C

Azores
CU2AF 233,020 976 122 B B

Fed. Rep. of Germany
DL6RDR 509,850 725 225 A A
DL1DQY 156,978 302 153 A A
DL1ARJ 51,192 200 79 A B
DL1DRD 6,580 52 47 A B
DF5RF 1,292 22 17 A B
DK2OY 817,190 1316 209 A C
DL1WA 467,526 785 201 A C
DM3ML 125,208 309 148 A C
DK1MM 212,160 821 130 B B
DL7UIO 47,040 249 96 B B
DF7YU 20,672 154 68 B B
DH8AF 15,872 125 64 B B
DL4RCK 14,880 126 60 B B
DL8DXL 6,786 87 39 B B
DL1HSR 3,136 49 32 B B
DL8SDI 2,744 49 28 B B
DL2ARD 666,496 2041 164 B C
DF3KV 497,640 1754 143 B C
DL4MCF 454,440 1627 140 B C
DJ3HJ 292,056 1132 129 B C
DF1LON 245,474 888 139 B C
DH8BQA 184,464 739 126 B C
DL5ME 118,080 825 72 B C
DL0TS (DF7ZS, op)
90,524 432 106 B C
DL1PT 52,332 278 98 B C
DL9ZWG 1,408 32 22 B C
DM3XI 38,060 179 55 C A
DL1LAW 20,880 152 36 C A
DL1CW 202,464 450 114 C B
DL8MUG 113,076 352 81 C B
DL2RUG 98,560 312 80 C B
DL9ABM 74,128 227 82 C B
DL3YEI 48,416 179 68 C B
DF5ZV 42,228 155 69 C B
DL2LRT 38,776 133 74 C B
DL1TH 33,984 152 59 C B
DL4JYT 4,800 60 20 C B
DL2ZAV 3,900 40 25 C B
DK3KD 494,088 1057 119 C C
DL1JF 292,100 648 115 C C
DL6KVA 180,744 445 102 C C
DJ2QV 100,696 307 82 C C
DK7ZT 49,136 166 74 C C
DL0DX 5,168 68 19 C C
DL6RAI (+packet)
1,719,062 2068 277 D C
DF9ZP (+DK8ZB)
1,686,930 2319 277 D C
DL7AOS (+DL9SFB)
118,800 471 120 D C

Spain
EA7GTF 1,142,848 1763 224 A B
EA5URP 579,336 882 202 A B
EA7AKJ 267,380 506 145 A B
EA3EFQ 63,558 242 107 A B
EA3KT 46,230 192 115 A B
EA2CR 28,324 102 73 A B
EA7GSU 16,225 104 59 A B
EA3AAW 1,008 24 21 A B
EA7NK 593,538 1140 187 A C
EA1HF 378,360 706 180 A C
EA4ABW 4,550 69 35 B A
EA3CI 217,728 868 126 B B
EA1FDI 162,604 696 118 B B
EA7IA 161,414 676 121 B B
EA1ACP 132,048 525 126 B B
EA1BIM 100,800 488 105 B B
EA5AAJ 84,800 402 106 B B
EA5BJG 36,064 196 92 B B
EA3CS 19,404 156 63 B B
EA3FHP 17,582 149 59 B B
EA1AAW 15,960 140 57 B B
EA3AKA 7,986 121 33 B B
EA4WC 4,560 67 38 B B
EA7HE 3,600 60 30 B B
EA3GHQ 1,092 26 21 B B
EC7AGF 1,026 27 19 B B
EA5DFV 452,760 1724 132 B C
EA1DLU 277,016 1126 124 B C
EA1DDO 134,838 689 99 B C
EA3DUZ 70,560 315 112 B C
EA3BJM 9,752 92 53 B C
EA1DFP 510 17 15 B C
EA7AJR 404,032 954 107 C B
EA7ASZ 285,600 610 119 C B
EA1CS 130,032 379 86 C B
EA1WX 107,712 309 88 C B
EA5EOH 70,560 210 84 C B
EA2AHZ 33,280 138 64 C B
EA3BOW 32,944 142 58 C B
EA5WU 13,728 90 39 C B
EA7CA 616 14 11 C B
EA4BT (+packet)
66,928 382 89 D B

Balearic Islands
EA6AFA 90,500 250 117 A B
EA6XQ 9,282 95 51 B C

Ireland
EI5DI 1,025,200 1482 200 A B
EI2JC 48,048 159 88 A B
EI4DW 489,808 998 184 A C
EI7DJ 485,676 1432 162 A C
EI4CF 120,904 516 119 B B
EI8IR 480,912 1876 129 B C
EI8GS 442,260 1781 126 B C

Moldova
ER6A (ER1LW, op)
863,902 1199 223 A B
ER0ND (UT7ND, op)
1,308,882 1827 227 A C
ER5DX 25,088 197 64 B B
ER1EA 5,712 51 28 C A
ER1OO 346,528 738 119 C B
ER3R (ER3HW,ER3DW,ER3DX, ER3OO,ER3ZZ,ops)
549,072 944 186 D B

Estonia
ES6CO 54,282 205 83 A B
ES6PZ 76,506 220 123 A C
ES5RW 182,710 757 121 B B
ES5CX 6,138 99 31 B B
ES5GI 283,718 1131 127 B C
ES2JL 26,260 101 65 C A
ES2DJ 225,344 502 112 C B
ES5KQ (ES5RY, op)
68,096 231 76 C B
ES5QX 271,648 659 104 C C
ES5QA 118,680 351 86 C C
ES2X (ES2RJ,ES1LAA,ES2NA,ops)
821,490 1540 197 D C

Belarus
EW6OO 198,170 460 149 A B
EU1SA 52,800 163 96 A B
EU1GA 17,888 174 52 B B
EU1DX 522,600 986 134 C B

France
F8CED 126,084 339 133 A A
F5NLY 614,656 824 224 A B
F5JY 354,090 639 185 A B
F5TNI 127,328 362 92 A B
F5VHJ 688,788 1967 171 A C
F8BON 168,590 737 115 B A
F5TDK 333,878 1212 139 B B
F8CFE 26,910 197 69 B B
F2RO 4,032 56 36 B B
F6CLM 560 20 14 B B
F8BMG 512 16 16 B B
TM5C 856,044 2721 158 B C
TM2V (F6GLH, op)
697,318 2319 151 B C
F5MOO 413,664 1505 139 B C
TP5CE 405,268 1439 142 B C
F5AMH 256,540 1026 127 B C
F5BBD 166,904 677 124 B C
F8CTY 145,672 540 139 B C
F5PTM 265,608 543 126 C A
F6FTB 93,960 294 81 C A
F6AUS 295,320 671 115 C B
F5PLC 241,120 551 110 C B
F8PDR 196,736 477 106 C B
F5ICC 133,216 364 92 C B
F5SGI 84,444 227 93 C B
F6KRK 80,088 282 71 C B
F5JBR 40,068 159 63 C B
F6HHR 38,500 178 55 C B
F5LJY 33,264 195 44 C B
F5AKL 21,952 113 49 C B
F6DZD 21,364 115 49 C B
F6BEE 646,272 1232 132 C C
F6ETI 495,616 1041 121 C C
F5YJ 30,580 140 55 C C
F6KDF (F5PXT,F5SIH,F5ROP, DL7FER,ops)
1,074,240 1648 240 D C
F8KCF (F6FNL,OM3CGN,F6BGC, F1ADG,F1BGO,F0DIA,F5UAM,ops)
961,650 1583 225 D C
TM2E (F6CQU,F8BPN,ops)
787,904 1338 208 D C
F5KSE (F4CIB,F5IJT,F5TMJ, F6IHY,ops)
782,496 1303 228 D C
TM2USA (F5LJA,F5PVK,F1UVN,ops)
522,600 1763 150 D C
F6KJX (F5MLJ,F5MFL,F5SOH,F5ROX, F6CBX,F8DFK,F8CDM,ops)
363,168 736 156 D C
F5KEQ (F5LMJ,F6GIN,ops)
105,196 288 119 D C

England
G0WMW 361,896 617 204 A B
G0MTN 128,380 316 131 A B
G4EDR 19,456 100 76 A B
GM4UYZ 10,176 95 48 A B
G3ORY 781,728 1283 204 A C
G4IUF 100,300 301 85 A C
G3FNM 36,900 250 75 B A
G3VAO 372,650 1292 145 B B
G0AEV 364,000 1306 140 B B
M/N2FF 1,428 34 21 B B
G4OJH 378,358 1377 139 B C
G3VMY 84,660 269 83 C A
G3RSD 273,280 620 112 C B
G3KKP 265,960 548 122 C B
M0CFW (JK3GAD, op)
252,968 621 103 C B
G3ZRJ 169,680 421 101 C B
G3TJE 161,160 397 102 C B
M5AMD 62,856 198 81 C B
M4T (G0VQR, op)
62,832 242 66 C B
G4ZME 48,888 193 63 C B
G3JKY 25,676 131 49 C B
G2QT 237,148 605 101 C C
G4BUO 153,600 401 96 C C
G3TXF 96,832 273 89 C C
G4BJM 91,168 298 77 C C
M5W (M0COP,G0EYO,G0MTN,ops)
74,778 363 103 D B
M5X (G0IVZ,G4TSH,ops)
1,986,468 2057 298 D C
M2V (M0TTT,M5ZAP,ops)
1,339,712 1820 242 D C
G5X (G4RCG,G4OSY,G0RUZ,ops)
1,151,016 1721 241 D C
G3SSO (G0HVQ,G3LVP,ops)
203,072 537 152 D C

Northern Ireland
GI0OUM 13,970 127 55 B B

Scotland
GM4YXI 836,022 2636 159 B C
GM3POI 1,086,016 1919 142 C C
GM3CFS 256,932 549 117 C C
MM7I (MM0ERK,GM4AFF,ops)
725,904 1360 213 D C
GM2T (GM0CLN,MM0CCC, GM4ZRR,ops)
679,780 1023 205 D C
MM0BQI (+packet)
101,920 288 130 D C

Guernsey
GU4YOX 28,028 145 49 C B

Wales
MW5EPA 127,012 574 113 B B
GW0AJI 49,612 314 79 B B
GW3KJN 81,648 244 84 C B
GW3NJW 548,000 1108 125 C C
GW7X (GW4BLE,GW0RYT,ops)
625,260 1813 170 D C

Hungary
HG5Z 18,576 132 43 A A
HG8W 518,756 869 191 A B
HA7PL 399,840 672 196 A B
HA6NF 1,384,620 1720 282 A C
HA5ORK 12,600 140 45 B A
HA8CQ 9,144 127 36 B B
HG4I 121,176 328 99 C A
HA8FK 411,136 813 128 C B
HA1ZH 46,104 235 51 C B
HG5C (HA5LV,HA5MA,HA5MO, HA5WE,HA7JJS,ops)
940,612 1387 226 D C

Switzerland
HB9DCM 323,164 618 173 A B
HB9YC 311,112 784 149 A B
HB9ACA 97,020 498 98 B C
HB9IAL 43,596 182 63 C A
HB9AYZ 26,840 122 55 C A
HB9ARF 341,172 730 117 C B
HB9DOT 32,712 144 58 C B
HB9EP (HB9DOS,HB9DQP,HB9DOM, HB9FBL,ops)
216,012 552 141 D C

Italy
IC8CQF 378,760 800 170 A B
IK2QPR 326,032 729 164 A B
IK2AIT 21,228 117 74 A B
IK3SCB 4,624 62 34 A B
IK1TWC 12,896 129 52 B A
IK5WGK 9,396 87 54 B A
IZ5CML 152,712 610 126 B B
IZ4AFW 83,160 390 108 B B
IT9VCE 71,302 466 77 B B
IK7RVY 55,776 332 84 B B
I8UZA 49,784 256 98 B B
IK0BAL 47,502 273 87 B B
IZ4DJZ 20,296 176 59 B B
IK2WFN 3,850 56 35 B B
I4UFH 658,260 2087 159 B C
IK6GPZ 184,710 710 131 B C
IT9ZMX 114,680 481 122 B C
IZ6CST 34,860 249 70 B C
IZ4DYQ 28,140 210 67 B C
IZ0BNR 18,544 152 61 B C
IZ5DKF 7,224 84 43 B C
IK7JWY 529,740 990 135 C B
IT9GXE 2,880 36 20 C B
IK0YVV 536,536 1012 134 C C
IZ3ALF 377,600 808 118 C C
IK2AHB 147,568 407 92 C C
IT9BLB 12,956 80 41 C C
IK2NCJ (+IK2JUB,IK2PFL,IK2FIL,ops)
1,202,034 1560 267 D C
IK4VET (+IK4ALM,IK4HLQ,IK4RQJ, IK4XCL,IK4ZHH,IZ4DIJ,logger,ops)
879,814 1318 247 D C
I2SVA (+packet)
627,912 887 243 D C

IT9GAC (+IT9EJW,IT9TPJ,IW9FY)
374,272 678 172 D C

Sardinia

IS0OMH 29,796 191 39 C B

Norway

LA8OM 253,080 498 148 A B
LA6PB 114,056 319 106 A B
LA8SDA 1,181,760 1620 240 A C
LA5JX 88,992 432 103 B B
LA9TY 960 25 20 B B
LA6YEA 393,210 1292 153 B C
LA1YE 293,712 636 116 C B
LA9DK 10,640 72 38 C B

Luxembourg

LX1NO 707,232 2231 159 B C
LX5A (HA1AG, op)
1,054,208 1865 142 C C

Lithuania

LY2FN 412,566 632 209 A B
LY7Z (LY2TA, op)
1,216,292 1675 242 A C
LY2CY 1,130,976 1479 238 A C
LY3CY 9,360 105 45 B B
LY5A (LY3MM, op)
513,010 1789 145 B C
LY2BVB 9,588 94 51 B C
LY2MM 70,956 244 73 C B
LY3BA 56,028 204 69 C B
LY2BBF 7,280 56 35 C B
LY1CX 503,808 985 128 C C
LY2OX 412,528 881 118 C C

Bulgaria

LZ9W 772,664 1130 236 A B
LZ2GS 243,750 401 195 A B
LZ2JE 238,264 517 158 A B
LZ1HB 134,176 605 112 B B
LZ2MP 17,600 111 40 C A
LZ2LDS 98,172 303 81 C B
LZ1EP 31,920 140 57 C B
LZ2PL 502,272 993 128 C C
LZ2RF 15,836 107 37 C C

Austria

OE2M (OE2WPO, op)
61,740 206 90 A B
4U1VIC (JH4RHF, op)
878,508 1552 207 A C
OE2S (OE2LCM,OE2MON, OE2VEL,ops)
1,551,792 2039 264 D C

Finland

OH4XX 520,536 1052 164 A C
OH2BPA 45,100 275 82 B B
OG3R (OH3TY,op)
3,840 60 32 B B
OH4R (OH4JFN, op)
97,410 575 85 B C
OH3XR 92,700 314 75 C A
OH2EJ 85,244 211 101 C B
OH6RC 76,368 221 86 C B
OH3IR 34,456 148 59 C B
OH2PM 307,248 697 111 C C
OH1BOI 157,664 382 104 C C
OH6QU (+packet)
439,928 873 127 D C

Czech Republic

OK2PP 424,352 720 178 A A
OK2VWB 232,432 507 146 A A
OK2WTM 119,652 303 118 A A
OK1AIJ 18,900 117 54 A A
OK1DVK 43,380 150 90 A B
OK1FCJ 42,192 158 72 A B
OK1RF 1,757,970 2321 255 A C
OK2FD 794,728 1182 242 A C
OK1VBA 45,036 163 81 A C
OL5Z (OK1CDJ, op)
181,780 749 122 B B
OK1KDT 117,072 548 108 B B
OK1CJN 34,200 237 75 B B
OK2BRX 25,024 184 68 B B
OK1IEI 20,880 180 58 B B
OK1CYC 20,400 153 68 B B
OK1TRM 10,914 114 51 B B
OK2PPM 8,160 102 40 B B
OK1DZR 278,058 1171 121 B C
OK1HX 393,108 802 123 C B
OK1GI 309,760 654 121 C B
OK2MBP 297,360 635 118 C B
OK2HI 137,180 360 95 C B
OK2PBG 69,720 210 83 C B
OK2BND 65,604 215 77 C B
OK2BNC 44,928 156 72 C B
OK1VD 39,360 167 60 C B
OK1FHI 35,152 172 52 C B
OK1DKM 34,720 138 62 C B
OK2TCW 21,528 119 46 C B
OK1FPG 13,920 89 40 C B
OK2PDT 386,712 792 123 C C
OK1AOV 301,056 594 128 C C
OK1AES 222,640 490 115 C C
OK1ARN 172,608 468 93 C C
OK1OX 141,680 388 92 C C
OK1AOU 62,160 222 70 C C
OK1CF (+packet)
717,324 1218 226 D C
OK6A (OK2CMW,OK2MTW,OK2PSE, OK2INW,ops)
269,276 618 163 D C

Slovakia

OM5NL 185,220 386 147 A B
OM7JG 175,968 375 144 A B
OM7IR 15,840 86 55 A B
OM5M (OM3BH, op)
1,430,094 1984 241 A C
OM3PC 961,248 1589 152 A C
OM3YK 23,892 181 66 B B
OM0TT 130,400 326 100 C A
OM7PY 126,400 320 100 C A
OM6T 522,500 1059 125 C B
OM4XA 163,620 418 101 C B
OM7VF 74,784 260 76 C B
OM1AW 59,724 199 79 C B
OM7AT 31,096 169 46 C B
OM7YC 20,680 119 47 C B
OM8AG 2,080 53 10 C C

Belgium

OQ4UW 168,480 516 144 A B
OQ4CAS 107,100 342 119 A B
ON6LY 8,216 78 52 A B
ON6DJ 196,326 846 117 B B
ON5CZ 1,200 40 15 B B
OT1H (ON5YR, op)
585,732 1114 133 C B
OQ6CW 237,120 493 120 C B
ON4XG 206,928 479 108 C B
OQ6TJ 127,224 347 93 C B
OQ5ZO 64,480 252 65 C B
ON4LDP 49,140 190 65 C B
ON4KVA 10,080 73 36 C B
OQ1T ON4UN
2,025,824 2327 296 D C
OQ1Z (ON5XX,ON4AMX,ON7GB, ON4CGY,ON5UR,ON6NP,ON2MRT,ops)
1,141,720 1924 230 D C
OT1N (ON2VS,ON5PU,ON6LY, ON6UQ,ON7TQ,ON7YX,ops)
683,984 1151 217 D C

Faroe Islands

OY1CT 362,304 894 102 C C

Denmark

OZ1JVX 42,282 265 81 B B
OZ5EV 60,500 275 110 B C
OZ8AE 103,740 287 91 C B
OZ1BMA 103,488 315 84 C B
OZ0RS 66,172 233 71 C B
OZ5UR 48,960 204 60 C B
OZ4FF 14,136 92 38 C B
OZ4OC 20,296 122 43 C C
OZ9MM 5,808 49 33 C C
OZ5ESB (OZ1INN,OZ4AFQ,ops)
270,600 1103 123 D C

Netherlands

PA3AAV 239,364 516 122 A B
PA0LSK 122,262 339 123 A B
PA3FDO 441,216 728 192 A C
PA0JNH 164,430 389 145 A C
PA9TT 21,240 181 60 B B
PA1PAT 7,800 100 39 B B
PA3DCU 6,278 73 43 B B
PA3DVA 1,344 35 21 B B
PA9KT 499,240 1795 140 B C
PA1AW 246,168 528 117 C B
PA0RRS 167,616 435 97 C B
PA3BFH 110,004 309 89 C B
PA3BGQ 52,824 216 62 C B
PA3AFF 3,640 38 26 C B
PA5WT 159,808 460 88 C C
PA3GRM 66,368 280 61 C C
PI4RCK 366,860 839 170 D B
PA1TT (+PA3FGI,PA2AWU,PA5RA, PB0AOL,PA3GEF)
1,213,650 1889 261 D C
PI4TUE (ON9CC,PA0NZH,PA3EZL, PA3GLZ,PE1PRG,ops)
1,084,072 1368 254 D C

Slovenia

S50K 1,382,500 2048 250 A C
S57MSU 87,720 433 102 B A
S51DX 384,748 1279 151 B C
S51F 380,520 761 126 C B
S51B 180,928 521 88 C B
S57Q 495,936 999 126 C C
S56A 248,412 498 127 C C
S50C (S51TA,S53ZO,S53MM,S53CC, S53RM,S57NOB,S55OO,ops)
1,675,644 2017 282 D C
S59KW (+HB9SUL,IK3UNA,S57C, S55M) 1,441,594 1902 259 D C
S57M (+S58A)
1,424,544 1764 264 D C
S59ABC (S51DS,S53W,S57JGV, S59O,ops)
912,066 1432 213 D C

Sweden

7S6J (SM0JSM, op)
63,540 214 90 A B
SM3EAE 55,062 223 63 A B
SM6DER 43,360 158 80 A B
SM6IQD 39,672 163 76 A B
8S5W (SM5IMO, op)
1,120,500 1772 225 A C
7S2E (SM2DMU, op)
1,035,408 1549 212 A C
SM7AIL 31,360 196 80 B B
SM7CQY 88,008 386 114 B C
SM7DXQ 42,370 228 95 B C
SM5G (SM5JBM, op)
313,148 650 121 C B
SM6BSK 242,136 518 118 C B
SM7CIL 119,592 302 99 C B
SM0J 117,836 338 89 C B
SM4SX 114,580 340 85 C B
7S5C (SM5CBM, op)
45,240 183 65 C B
SM7EH 36,288 149 63 C B
SM7BHM 33,920 161 53 C B
7S5Q (SM5COP, op)
29,952 158 48 C B
SM0Y (SM0OY, op)
13,440 81 42 C B
SM5AJV 2,520 35 18 C B
SM2T (SM2EZT, op)
437,896 867 127 C C
SM2IXM 75,480 265 74 C C

Poland

SP9JZT 1,880 24 20 A A
SN6M (SP6JKH, op)
457,500 762 183 A B
SQ9PM 285,120 600 162 A B
SP7PGK 206,568 505 151 A B
SP5ICS 125,280 313 135 A B
SP2MKT 89,598 237 109 A B
SP2BLC 66,300 255 65 A B
SP5BB 5,768 101 28 A B
SP5WA 585,684 938 187 A C
SP4DGN 567,548 1023 199 A C
SP4CQU 5,762 61 43 A C
SP5XMU 34,602 238 73 B A
SP1DID 59,520 325 93 B B
SP3BVI 33,180 237 70 B B
SP4DC 24,624 163 76 B B
SP1MVG 21,280 140 76 B B
SQ5ABG 18,960 158 60 B B
SQ9MZ 10,720 80 67 B B
SP3YM 4,320 54 40 B B
SP7LHX 3,468 51 34 B B
SP6DHD 1,640 41 20 B B
SP9MRQ 748 34 11 B B
SP7VC 498,464 1696 148 B C
SP6IXF 445,884 1544 146 B C
SP5DDJ 219,780 498 111 C A
SP6AYP 9,600 50 48 C A
SP4Z 75,680 216 88 C B
SP5GH 45,792 106 106 C B
SO5BX 38,160 162 60 C B
SP7FBQ 20,972 113 49 C B
SQ9FMU 15,552 84 48 C B
SN8V (SP8GQU,SP8GWI,SP8LBK,ops)
939,610 1446 217 D C
SP9KJT (SP6AXW,SP9IKF,ops)
133,000 533 125 D C

Greece

SV1DKL 461,104 903 184 A B
J41YM (OK1YM, op)
260,260 574 143 A C
SV1DZB 13,500 128 54 B A
SV1XV 3,038 50 31 B B

Bosnia-Herzegovina

T94KW 10,716 85 38 A B

Iceland

TF3VS 111,252 272 127 A B
TF8GX 528,808 1992 133 B B

Corsica

TK5T (F5IQA,F6GRC,F6HYE,F6IOC, F6IRF,ops)
1,963,116 2656 249 D C
TK1W (F5HRY+packet)
856,680 2607 165 D C

European Russia

RV3QX 130,900 368 119 A A
RX3AEX 62,128 243 88 A A
RW3DY 320 10 8 A A
RD4M 814,368 1267 204 A B
RZ4FA 755,298 1256 197 A B
RA1ACJ 698,168 1142 197 A B
RV3ACA 635,356 1100 193 A B
RA3AD 612,360 930 210 A B
RU3QW 512,548 969 194 A B
RU3FM 358,146 580 197 A B
RA3AF 148,240 368 136 A B
RX3DBG 115,128 424 82 A B
UA1OMS 27,816 122 76 A B
RX3MM 20,564 102 53 A B
RN3RC 19,012 99 49 A B
UA3RE 13,328 107 56 A B
RX3RZ 12,852 73 51 A B
UA2FB 1,505,560 1918 266 A C
RK4FF 1,346,110 1978 227 A C
RJ1Z (RW1ZA, op)
1,334,712 1801 228 A C
RU4HP 989,954 1592 217 A C
RF4R (UA4RC, op)
609,440 1057 208 A C
UA4LY 468,066 876 181 A C
RA3DGH 23,920 230 52 B A
RA3QPY 143,010 697 105 B B
RA3DNC 138,648 637 109 B B
RZ3DW 126,792 593 108 B B
UA3LHL 91,560 437 105 B B
RA6AZ 66,564 388 86 B B
UA1CKC 61,060 359 86 B B
U1BA 37,380 267 70 B B
RU3DNN 33,600 240 70 B B
RU3DVR 20,640 176 60 B B
RN3AQ 1,620 45 18 B B
R73A 567,180 2061 138 B C
UA4LCH 420,686 1398 151 B C
RK4FD 299,596 1248 121 B C
UA3BM 39,468 255 78 B C
UA1ORT 15,416 167 47 B C
RA1OZ 130,220 391 85 C A
UA0KCL/3 115,940 341 85 C A
RN6FO 100,716 331 77 C A
RW3VZ 97,888 325 76 C A
UA1ACC 6,720 60 28 C A
RN6AL 426,684 966 111 C B
RA6LW 351,960 847 105 C B
RA3AN 232,128 633 93 C B
RA4CTR 221,400 621 90 C B
RA3UAG 183,524 473 97 C B
UA1ZZ 166,320 540 77 C B
UA6AAY 143,152 400 92 C B
RK3BA 101,120 324 80 C B
RN1AO 69,120 245 72 C B
RV1CC 68,544 206 84 C B
RK1NA 62,660 243 65 C B
RU4WE 60,320 265 58 C B
RA3WDK 52,536 199 66 C B
RA6LAE 37,332 156 61 C B
RV3DAK 27,608 119 58 C B
UA3MLU 17,952 96 51 C B
RA3TT 17,080 122 35 C B
RA9AC 1,872 27 18 C B
RM4W (RW4WR, op)
599,192 1241 121 C C
UA3TU 446,124 998 113 C C
UA4FER 436,872 1002 109 C C
RM3C (RA3CW, op)
436,224 854 128 C C
RN3AY 131,840 325 103 C C
RW3SK 79,328 286 74 C C
RX4HX 52,704 217 61 C C
RU3AA 3,360 35 24 C C
RN2FA (+packet)
3,850 44 25 D B
RU1A (RW1AC,RV1AW,UA1ARX,ops)
1,989,952 2540 272 D C
RM6A (RN6BN,RA6CO,RA6CM, RN6AA,ops)
1,595,008 1932 272 D C
RI3A (+ops)
1,031,480 1696 214 D C
RA3AJ (+packet)
1,000,674 1365 261 D C
RK3EWA (RZ3EC,RZ3EM,UA3EJN, UA3EKG,ops)
243,576 541 153 D C

Ukraine

UT5UBJ 1,900 29 25 A A
UT2UZ 379,708 622 191 A B
US7IGF 276,696 558 162 A B
UY5TE 197,524 490 113 A B
UR2E 157,300 463 110 A B
UR7EU 155,122 427 121 A B
US5WDP 65,232 234 108 A B
EO3Q (UR3QCW, op)
1,054,134 1430 241 A C
UZ7U (UT3UA, op)
857,466 1160 237 A C
UT4EK 437,536 815 176 A C
US5WDL 54,032 307 88 B A
US4MDO 4,964 73 34 B A
UT1T (UR7TZ,op)
138,880 620 112 B B
UY7MM 134,310 617 111 B B
UR5ZMK 67,818 381 89 B B
UY0MF 37,674 299 63 B B
UT2WL 32,830 245 67 B B
UT7QL 23,040 181 64 B B
UR4EI 7,128 100 36 B B
US5WDS 1,110 37 15 B B
US5WMS 1,008 26 21 B B
UR5FCM 42,180 192 57 C A
US4QWX (UT3QT, op)
242,340 582 105 C B
US2WU 221,340 475 119 C B
UW5U (UY2UA, op)
163,924 388 107 C B
UR6QS 145,512 424 86 C B
UU2JQ 128 8 4 C C
UU7J (UU4JMG,UU4JDD,UU4JGR, UU5JBO,UU6JM,UU8JK,UU0JM,ops)
1,507,156 1978 266 D C
UU5A (UU2JQ,UU3JM,UU5YL, UU0A,ops)
282,948 773 146 D C
UX2FXX (UR5FFY,UR5FAI,ops)
66,722 233 73 D C
UU5J (UU3JD,UU5JR,ops)
4 1 1 D C

Latvia

YL0A (YL2KA, op)
349,330 600 181 A B
YL2SM 1,058,358 1662 223 A C
YL2GD 954,900 1421 225 A C
YL2KO 740,880 1216 196 A C
YL2KF 7,740 51 45 A C
YL3BZ 54,736 311 88 B B
YL2MF 6,432 67 48 B B
YL2LY 325,520 637 130 C B
YL2PN 76,128 245 78 C B
YL2NK 22,256 107 52 C B
YL2GTD 11,868 75 43 C B
YL7C (YL2MD,YL2GQT,ops)
772,440 1004 246 D B

Romania

YO6EZ 23,900 150 50 A A
YO5OHO 18,216 109 44 A A
YO4AAC 9,792 85 32 A A
YO3APJ 571,644 980 201 A B
YO3III 3,200 64 25 B A
YO9XC 27,404 221 62 B B
YO3FLQ 11,270 115 49 B B
YO3KYO 396 18 11 B B
YO6ADW 55,948 197 71 C A
YO6BHN 128,068 321 101 C B
YO4NF 577,920 1211 120 C C
YP8A 447,840 955 120 C C
YO9FJW 325,068 796 103 C C
YO2KHK (YO2CMI,YO2BEH,ops)
9,898 90 49 D B

Yugoslavia

YU1LM 99,756 300 102 A A
YU1OJ 822,160 1341 215 A B
4N1SM 646,408 1132 194 A B
YU8/9X0A 187,236 454 126 A C
YT7A 293,020 1132 130 B B
YT1BB 377,986 1443 133 B C
YU7SF 168,480 404 104 C B
YU7KM 80,000 250 80 C B
YT1Z (+ops)
226,798 492 143 D B
YU1EW (+YT7AA)
1,132,742 1508 247 D C

North America

Jamaica

6Y4Y 70,740 394 90 B B

Bahamas

C6A/W9AU 583,440 1333 110 C B

Cuba

CO8DM 387,090 878 153 A B
CO2TK 171,498 860 101 B B
CL6LPB 3,136 56 28 B C
CO8ZZ 486,588 997 123 C B

Guadeloupe

FG/K6LA
2,860,560 3498 274 A C

Martinique

FM/G3SQX
654,360 1342 123 C B

Panama

HP1AC 132,860 363 91 C B

Honduras

HR3J (JA6WFM, op)
699,696 2731 129 B C

Virgin Islands

KP2BH 54,918 343 81 B B
NP2DJ 34,080 214 80 B B
NP2B (+K0IP)
477,508 1974 122 D C

Puerto Rico

WP4BV 367,770 1615 115 B B
NP3OD 6,348 71 46 B B
KP4/AA3GM
40,200 165 67 C A
KP4AH (WP3C, op)
268,380 647 105 C B

Guatemala

TG9AJR 20,196 202 51 B B

Costa Rica

TI2KAC 14,544 101 72 B B
TI5N (AC8G, op)
966,736 3284 148 B C

Turks & Caicos Islands

VP5AZ (KN4UG, op)
520,982 2196 119 B B
VP5DX (N4KE,NU4Y,ops)
2,411,920 3254 280 D C

Mexico

XE1CT 191,520 804 120 B B
4A1AC (XE1BEF,op)
177,216 923 96 B B
XE1RCF 92,576 526 88 B B
XE2AC 286,400 734 100 C B
XE1ZOI 277,776 650 108 C C

Nicaragua

H6C (YN4SU,op)
420,640 707 176 A B

Cayman Islands

ZF2AH 625,944 2401 132 B C
ZF2NT 1,508,428 2727 139 C C

Oceania

Philippines

DU1BP 11,304 160 36 B B
DU7/N7ET 33,408 172 58 C A

Australia

VK5GN 894,450 1432 201 A C
VK4NEF 85,632 449 96 B B
VK2CZ 300,806 1251 121 B C
VK4WPX 132,312 598 111 B C
VK4TT 109,792 378 73 C B

Indonesia

YB2ERL 33,370 239 71 B B
YB5QZ 158,080 510 80 C B
YE1A 29,184 135 57 C B

New Zealand

ZL1TM 657,980 1021 197 A B
ZL1ALZ 11,696 84 43 A C
ZL3GA 23,668 195 61 B B
ZL1ANJ 345,720 1299 134 B C
ZL1AIH 85,768 310 71 C A
ZL2BR 297,648 694 108 C B
ZL1GO 207,600 529 100 C B
ZL6QH (ZL2BSJ, op)
613,080 1324 117 C C
ZL1BYZ 272,600 740 94 C C

South America

Chile

CE4U (CE4USW, op)
38,780 281 70 B B
CE6AMN 6,408 89 36 B B

Uruguay

CX9AU 552,288 1059 132 C B
CX5BW (+CX7BY,CX8CP,CX4DX)
2,232,890 2708 265 D C

Colombia

HK3AXY 151,116 429 147 A B

Argentina

LT5Y (LU1YU,op)
171,348 786 109 A C
LU1VK 113,014 471 121 B A
LT2D (LW3DX, op)
93,252 419 114 B A
LU4DX 400,724 1419 142 B B
L40E (LW7EIC, op)
225,320 874 131 B B
LU2EC 111,724 532 106 B B
LU5EVK 102,506 483 107 B B
LW1HDJ 76,840 460 85 B B
LU1VV 59,192 312 98 B B
LU1NDC 475,348 1595 151 B C
LU4DPO 264,384 979 136 B C
LU4DRC (LW1DTZ, op)
232,078 981 121 B C
LU1EWL 288,880 627 115 C B
LU1DZ 371,664 807 116 C C
LU7DIR 268,800 573 120 C C
LW9EOC (LU8DW,LU5EML,ops)
1,082,518 1627 233 D B
LT1F (LU1FKR,LU1FT,LU1FGE, LU5DX,LU1FAM,ops)
2,500,932 3276 266 D C
LT5F (LU2FA,LU4FPZ,ops)
1,632,420 2288 270 D C
LP5F (LU1FZR,LU5FC,LU2FLN, LU8FPT,ops)
1,605,800 2282 259 D C
LW7DX (+LU6EF,LW9DAH)
1,426,896 1886 243 D C

Peru

OA4O (OA4AHW,OA4BHY,OA4DJW, OA4DKC,ops)
1,218,228 1993 242 D C

Netherland Antilles

PJ2T (W9VA,W9JUV,K8CJQ, W9EFL,ops)
1,808,708 2682 242 D C

Brazil

PY2NY 11,716 70 58 A A
PV8DX 1,458,688 1850 259 A B
PY2TNT 171,108 470 97 A B
PY3KN 65,992 274 113 A B
PP7ZZ 36,408 148 82 A C
ZX2B (PY2MNL, op)
420,300 1405 150 B B
ZV2V (PY2LED, op)
164,034 712 117 B B
PR8RZJ 67,680 362 94 B B
PR7FN 35,850 250 75 B B
PT2ND 20,100 135 75 B B
PU4EYE 12,852 122 54 B B
PP5ZP 7,896 85 47 B B
PY2DJ 3,630 57 33 B B
PP2RON 3,572 47 38 B B
PY3BV 1,804 41 22 B B
PY3MT 672 26 14 B B
PR7AR 520 20 13 B B
ZW5B (PY5EG, op)
143,640 637 114 B C
PT2OM 69,628 342 103 B C
PY3PA 33,128 209 82 B C
PY3AU 149,076 376 101 C B
PY4FQ 130,152 320 102 C B
PY7ZY 24,592 223 58 C B
PY7OJ 23,280 102 60 C B
PY2PAI 24 3 3 C B

PQ2Q (PY1KS,PY1KX,PY1SL,PY2KC, PY2WC,ops)
1,662,208 1800 302 D C
PY3KK (+PY3DX,PY3FOX,PY3YY)
1,194,522 1630 239 D C
PY3MHZ 439,348 764 182 D C

Venezuela

YZ1V (YT1HA, op)
383,844 729 174 A B
YV7QP 83,160 251 90 A B
YY5JMM 7,144 96 38 B B
YY5JRU 2,058 52 21 B B
4M3Y 10,600 100 53 B C
YZ1AU (+YT1XX,YU1XX,YU1EXY)
1,527,900 1983 275 D C

Paraguay

ZP6M 966,528 1697 144 C B

United States

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Connecticut

NX1Q 178,192 404 148 A B
N1NQD 64,108 259 94 A B
KE1AU 6,072 70 44 A B
KQ2M 2,743,884 3320 286 A C
W1AW (N1ND, op)
264,702 674 157 A C
N8WXQ 220,440 483 165 A C
W1/F5MJW 46,872 287 84 B A
N1JEO 34,286 220 79 B A
K5GMX 17,568 122 72 B A
W1AMF 238,212 1032 117 B B
W1AIR 126,474 596 107 B B
W1AZT 89,496 401 113 B B
W1JQ 80,784 377 108 B B
N1IXF 67,156 328 103 B B
N1NB 44,270 240 95 B B
NJ1Q 17,940 139 65 B B
K1MKF 11,172 117 49 B B
W1IVB 11,092 118 47 B B
N1OPO 10,464 110 48 B B
W1DMM 10,152 113 47 B B
K1JBS 4,136 47 44 B B
W1NRG (KB1CIW,op)
1,240 31 20 B B
KB1FYL 552 23 12 B B
K1ZE 138,180 330 105 C A
K1KI 1,511,048 2461 154 C C
W1WEF 1,227,448 2181 142 C C
NT1N 588,432 1076 138 C C
NZ1U (KB1DFB,KB1H,N1XS,ops)
44,352 188 96 D C

Eastern Massachusetts

WG1Z 546,744 925 218 A B
W1VIV 351,190 639 173 A B
K1HT 271,392 492 176 A B
N3KCJ 267,168 626 176 A B
W1MMM 82,432 374 112 A B
K1YA 60,536 296 92 A B
N1SV 388,884 1422 138 B B
KA1EIV 126,936 519 123 B B
WA1VIL 62,566 287 109 B B
K1VU 51,506 288 91 B B
W1DYJ 37,296 230 84 B B
N1WRK 17,780 127 70 B B
K1VUT 734,944 1359 136 C B
W1WAI 676,620 1258 135 C B
W1MK 354,672 835 108 C B
N1DC 211,432 500 107 C B
K1MXF 19,012 108 49 C B
WO1N 10,560 81 33 C B
K5MA 551,440 1135 122 C C
W1AA (K1DC, op)
285,664 639 113 C C
K1GU 184,140 498 93 C C
K1TH 17,444 93 49 C C
W1SMH (+ops)
123,256 441 124 D B
AG1C (+NK1L)
892,434 1327 177 D C
KD1EA (+packet)
53,088 239 112 D C

Maine

W1CEK 684 20 18 B A
N1LW 156,736 637 124 B B
N1YIS 10,494 101 53 B B
NY1E 500,678 1804 139 B C
AB1R 259,290 1009 129 B C
K1JB 558,080 1092 128 C B
K1PQS 407,528 842 121 C B
N1CGP 74,036 226 83 C B
K1SWG 43,168 142 76 C B
KD1OG 22,440 110 51 C B
AC1O 300,500 603 125 C C

New Hampshire

K1EPJ 262,816 441 172 A A
W1XV 990 76 50 A A
W1HR 1,434,720 2023 245 A B
KG1V 652,680 940 222 A B
WA1Z 33,456 132 82 A B
K1PDY 29,160 138 81 A B
AC1J 17,700 138 59 A B
W1VE 1,725,024 2576 238 A C
W1DAD 3,162 51 31 B A
AF1T 382,524 1506 127 B C
AA1CA 247,280 563 110 C A
KN1H 48,508 188 67 C A
WE1USA (WA1LNP,op)
957,312 1669 144 C B
W1END 279,948 573 123 C B
AE1T 27,120 114 60 C B
KR1G 1,243,584 2176 144 C C
KZ1O (+N1TMZ,KB8BAL)
370,062 636 189 D B
KC1F (+packet)
444,708 873 198 D C
WA1ZYX (+packet)
13,144 124 53 D C

Rhode Island

N1HRA 112,968 394 108 A B
K1VSJ 32,308 135 82 A B
KI1G 446,040 968 180 A C
W1VET 155,524 688 118 B B
AB1BX 109,652 356 79 C B
K2MN 34,720 140 62 C B

Vermont

KA1BSZ 58,828 365 77 A B
K1KD 8,342 76 43 A C
KB1FTX 63,756 332 99 B B
KC1WH 31,668 212 78 B B
W1SJ 721,648 2450 148 B C
W1SA 85,500 225 95 C A
K1IB 308,264 686 113 C B
K2LE 1,022,400 1808 142 C C
AA1VT (AA2DY,KC1MP,KD1DP, KD1UP,ops)
280,884 589 178 D B
W1PU (KB1EXM,N1ZUK,KM1Z, AA1SU,K1KD,K1HD,ops)
1,191,456 2111 216 D C

Western Massachusetts

KK1W 156,450 403 149 A B
KX1X 223,002 959 117 B B
W1KT 171,360 598 144 B B
WT1S 137,824 588 118 B B
N1SR 50,730 269 95 B B
N1VOR 50,220 272 93 B B
N1MHH 30,820 238 67 B B
N1IC 691,164 2406 146 B C
K1SF 65,182 300 109 B C
K1TS 116,436 318 93 C A
W1TO 197,496 424 117 C B
K5ZD 393,328 797 124 C C
KK1H (+packet)
234,090 871 135 D B
KB1GHC (+KB1FWN)
2,668 60 23 D B
AA1JD (+NC1M, AA1LH, AA1MT, K1FFX)
1,550,060 2249 235 D C

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Eastern New York

N2IW 489,590 801 173 A B
K2RI 46,662 184 101 A B
N2BZP 38,192 212 88 A B
W2ENY 20,280 134 60 A B
AA2OI 17,360 111 56 A B
W2RE 2,058,110 2482 277 A C
AB2IW 95,256 441 108 B A
WA2YEI 17,810 137 65 B A
N2VZA 131,672 613 109 B B
KA2VBI 118,326 546 111 B B
N2MTG 29,346 205 73 B B
KC2DTJ 29,032 193 76 B B
WA2HNG 1,518 35 23 B B
W2FCA 103,424 406 128 B C
K2UF 368,460 811 115 C B
K2DW 245,952 567 112 C B
K2SX 755,440 1358 140 C C
NA2M 46,096 175 67 C C
K2UG (KE2DX,WA2JQK,W2IX,ops)
1,098,090 1736 249 D C
W2MU (KD2NE,KY2J,N2MCI, WA2MMX,WB2AQU,W2XL,ops)
859,320 1323 231 D C
N2POS (+N2PEN,WB2FOB)
72,770 386 95 D C

NYC-Long Island

WB2AMU 234,432 456 148 A A
KD2RD 1,110,112 1571 226 A B
KA2D 399,360 677 195 A B
WB2TPS 43,228 139 101 A B
WB2BXO 19,256 104 58 A B
AA2VK 66,690 352 95 B A
K2WX 2,760 46 30 B A
N2NB 744,432 2402 156 B B
KS2G 272,568 1115 123 B B
WB2ZTH 255,968 848 152 B B
WA2OJK 66,792 363 92 B B
N2MUN 63,124 368 86 B B
K2RED 13,284 123 54 B B
KC2CJI 11,000 110 50 B B
N2AUK 163,750 639 131 B C
WO2N 112,520 300 97 C A
N2GA 440,440 1010 110 C B
WW2G 16,380 104 39 C B
N2GC 461,644 885 131 C C
N2UN 354,000 754 118 C C
N1XL (+K2GH,NY2L,KC2IPG)
365,560 794 190 D B
WB2JSM(WB2KDG,WB2TYJ,KC2CBA, KA2JSV,KC2ITB,ops)
25,200 189 72 D B
N2NI (+packet)
261,072 476 168 D C

Northern New Jersey

N2NH 231,822 496 159 A A
W2JEK 7,772 67 29 A A
K2WA 340,092 636 201 A B
N2LK 211,878 467 149 A B
WA2LXE 145,124 391 146 A B
WA2VQF 62,310 218 93 A B
K2YLH 45,746 262 89 A B
N2ED 934,348 1291 218 A C
K2ZB 57,368 283 101 A C
WA4ATJ 46,592 261 91 A C
NO2EL 153,972 612 126 B B
WQ2M 77,330 412 95 B B
K2VU 50,660 306 85 B B
N2OPJ 31,008 204 76 B B
WA2BKN 19,656 126 78 B B
WA2QHL 9,682 107 47 B B
WB2AIU 6,930 81 45 B B
AB2FA 4,232 46 46 B B
WA2DAX 3,264 51 32 B B
K2AMI 840 31 15 B B
K2AF 13,098 111 59 B C
N2CFD 11,782 139 43 B C
W2BVH 36,480 159 57 C A
W2CVW 194,432 434 112 C B
N2GM 148,944 350 107 C B
W2GD 34,720 143 62 C B
W2LE 28,060 115 61 C B
WA2VYA 570,240 1052 135 C C
AB2BK 447,120 982 115 C C
NA2U (+packet)
1,099,500 1297 250 D B
K2DBK (+packet)
25,212 193 66 D B
N2NT (+N2NC,W2RQ)
2,510,748 2854 291 D C
K2XR (+K2OWR,N2YFH)
1,845,920 2388 278 D C
AB2DE KC2AVE
383,910 865 191 D C
W2NO (+packet)
137,196 337 103 D C
N2WM (+packet)
54,880 171 98 D C
W2KD (+packet)
45,990 198 105 D C

Northern New York

NS2P 214,266 876 123 A B
KA2AWE 3,770 65 29 B A
N2JNZ 39,360 166 60 C A
W2IB 17,460 100 45 C B

Southern New Jersey

WA2IAU 53,116 195 98 A B
W2RDS 44,678 248 89 A B
W2LEC 49,708 289 86 B B
KV2M 46,926 303 79 B B
AC2F 30,732 197 78 B B
KB2PD 18,368 116 82 B B
KD2IN 15,246 129 63 B B
W2QOB 4,662 64 37 B B
WB2FXE 360 15 12 B B
N2CQ 12,312 84 38 C A
WK2G 515,944 1079 121 C B
K2UR 200,304 433 117 C B
WA2VQV 102,800 260 100 C B
K2MK 27,328 123 56 C B
W5KI 14,960 85 44 C B
AD3Y 4,788 57 21 C B
NJ2BB (AA2WN,WA2TVS,WK2W,ops)
388,400 639 200 D B
N1RK (+packet)
29,032 193 76 D B
NQ3N (+KD2I)
1,149,624 1666 252 D C
K2SB (+packet)
88,736 244 94 D C
N2VW (+packet)
4,424 48 28 D C

Western New York

N2CU 369,472 627 184 A A
N2XT 202,044 473 149 A A
N2WK 852,380 1170 230 A B
KM2L 319,384 610 166 A B
K2YEH 214,912 391 184 A B
KC2GEP 67,554 302 81 A B
N2CK 34,632 211 78 A B
N2DCH 2,490 70 25 A B
N2PP 1,859,034 2322 249 A C
K2FU 1,186,542 1559 219 A C
WB2HJV 132,000 305 125 A C
WB7OCV 16,356 141 58 B A
N2IM 10,192 110 49 B A
KB2SGX 55,260 312 90 B B
N2LQQ 46,368 257 92 B B
KC2GFS 2,688 48 28 B B
WB2SXY 234 13 9 B B
AF2K 262,890 1035 127 B C
K2SM 148,104 380 99 C A
WB2DVU 370,804 782 119 C B
WA2EYA 44,640 180 62 C B
NE2T 41,760 159 72 C B
W2TZ 35,264 153 58 C B
W2FUI 141,512 360 98 C C
W2LC 12,936 78 42 C C
W2KA (packet)
400,072 645 172 D B
K1PY (+N2KKB,KC2DQR,N2HKD)
205,056 490 178 D B
WB2ELW (K2CF,KB2MGE,KB2KOL, KC2GJX,K2OO,ops)
55,680 225 80 D C
KF2VX (+K2ZUW)
44,352 259 88 D C
WA2AAZ (N2MKR,N5THV,KC2HUP,ops)
16,896 128 66 D C

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Delaware

NY3C 206,724 536 138 A B
N3ELK 11,832 116 51 B A
KE3UY 45,408 264 86 B B
K0UWO 6,790 97 35 B B
KA3IJO 6,110 65 47 B B
N9GG 11,840 80 40 C A
K3LT 1,960 34 14 C A
K3FT 694,536 1363 129 C B
N8NA 26,596 109 61 C B
W3PP (+packet)
30,780 173 90 D B
KB3FEE (+AA1K)
1,602,456 1846 276 D C

Eastern Pennsylvania

W3SSS 10,812 86 51 A B
K3WW 1,738,590 2091 255 A C
WA2FGK 417,268 789 146 A C
W2OX 400,020 764 177 A C
WT3P 393,960 628 201 A C
W3BYX 331,128 566 189 A C
N3GXY 24,156 183 66 B A
WC3A 5,096 94 28 B A
N3KYZ 54,096 297 92 B B
N3JPV 16,200 135 60 B B
N3YGL 9,040 116 40 B B
N3RVK 5,920 75 40 B B
KB3EXB 1,672 38 22 B B
WB3CIW 95,760 408 120 B C
N3EMF 85,956 377 114 B C
K3XR 11,232 107 54 B C
N3KGC 5,184 83 32 B C
WA3IIA 95,976 285 86 C A
W3ZMN 17,460 97 45 C A
NY3A 732,028 1408 131 C B
W3BGN 519,720 1069 122 C B
WF3M 249,480 634 99 C B
WA3AAN 116,816 311 98 C B
NE3H 82,080 223 95 C B
KC3Q 77,252 217 89 C B
N3KR 57,816 198 73 C B
K3VA 32,224 154 53 C B
K3SV 781,284 1503 131 C C
W2UP 368,160 710 130 C C
K3QIA 149,688 384 99 C C
W8FJ 33,920 163 53 C C
N3NZ 4,428 42 27 C C
KD3TB (+packet)
201,168 776 132 D B
KS3F (+NE3F)
1,318,384 2013 262 D C
K3ZV (+packet)
300,810 505 185 D C
K3NZ (+packet)
213,474 503 141 D C
K3ATO (+packet)
205,350 342 185 D C
N3ED (+packet)
139,222 287 151 D C

Maryland-DC

K3TW 210,900 415 150 A A
AI3M 619,962 887 203 A A
W3UJ 469,860 737 205 A B
KE3VV 320,050 626 173 A B
K3DSP 310,184 639 191 A B
N3II 309,750 535 177 A B
W3DQ 297,850 663 175 A B
W3IP 167,832 480 148 A B
N3GPU 156,744 616 126 A B
W3RR 87,462 314 129 A B
W3ZZ 63,954 227 99 A B
W3FQE 46,930 186 95 A B
K3TN 34,560 140 72 A B
K3YDX 27,258 141 77 A B
N3WK 22,388 120 58 A B
W3XG 1,850 31 25 A B
K3ZO 2,287,520 2829 272 A C
W3GNQ (WI2T, op)
459,952 1128 178 A C
K3MM 157,614 450 109 A C
WX3B 76,302 472 81 A C
KT3RR 334,788 1218 138 B B
K3DNE 236,592 964 124 B B
W3LL 91,428 406 114 B B
WA2VUM 80,200 405 100 B B
W3LEO 57,246 330 87 B B
K3VY 28,392 187 78 B B
N3EYB 19,152 155 63 B B
N3HXQ 16,124 139 58 B B
N0MSB 10,904 117 47 B B
KT3D 3,808 57 34 B B
WA4MQY 1,040 26 20 B B
N3HBX 601,592 2183 139 B C
N3FX 196,262 817 121 B C
4U1WB (AJ3M, op)
138,306 781 89 B C
W3KHZ 14,136 115 62 B C
K3GV 836 22 19 B C
KI5TD 67,268 250 67 C A
W3CB 438,872 928 119 C B
NG3K 249,912 535 117 C B
W3CP 216,056 479 113 C B
K3TM 145,540 385 95 C B
W3DAD 144,540 369 99 C B
NS3T 98,256 283 89 C B
W3EE 66,528 201 84 C B
K1EFI 65,736 199 83 C B
KF3CV 80 6 5 C B
K2PLF 806,520 1420 143 C C
N3UM 513,864 1059 122 C C
N4GG 198,400 506 100 C C
W3GG 181,908 496 93 C C
W3GN 60,680 208 74 C C
W2CDO 23,976 111 54 C C
K8GP (K8ISK,W2GG,ops)
2,074,176 2489 277 D C
N3AM (+packet)
1,197,416 1343 242 D C
K3DI (+packet)
471,366 773 203 D C
N3WD (+W3DWJ,N3NYC,KB3FOX, W3QYL) 320,264 1214 133 D C
W3UL (+packet)
253,638 446 183 D C
K3IXD (+packet)
243,386 855 143 D C
W3OU (+packet)
129,050 360 145 D C
W3YD (+packet)
102,480 427 122 D C
N3KTV (+packet)
72,480 309 120 D C
W3LRC (WI3N,K3HDM,N3TZA, KD5ENP,KB3DVC,KA8YPY,KT3D, W3YD,ops)
68,400 364 100 D C
K3PZN (N3SB,WX3B,KB3HHK,ops)
31,496 232 62 D C

Western Pennsylvania

K3DE 211,968 1152 184 A B
AA3ML 87,010 255 113 A B
WB0IWG 4,836 62 39 B A
N3MBC 27,336 204 67 B B
WB3EPE 26,560 160 83 B B
N3WMC 20,956 172 62 B B
KB3DPU 19,832 151 67 B B
KB3GOT 676 26 13 B B
WA3GQU 4,920 60 41 B C
K3GW 278,256 568 124 C B
WA3SES 246,440 613 101 C B
N3LL 144,060 351 105 C B
K3VX 76,736 229 88 C B
K3FH 58,400 201 73 C B
NB4J 36,192 156 58 C B
K3JHT 8,520 71 30 C B
K3CR (LZ4AX, op)
1,125,432 1921 147 C C
AD8J 228,480 514 112 C C
N3SD (+packet)
20,300 99 58 D B
N3UE (+packet)
3,392 53 32 D C

4

Alabama

W4DEC 271,200 533 150 A A
W4NTI 34,384 174 56 A B
K4AB 1,767,532 2306 247 A C
N4YQ 254,160 623 180 A C
KE4BF 21,600 153 72 B A
K4XDX 340,824 1305 132 B B
WB4HUX 598 23 13 B B
AG4W 90,850 400 115 B C
KC3QU 140,624 373 94 C B
K4WI (+KD4Y)
1,470,696 2305 263 D C

Georgia

WB6BWZ 8,364 76 34 A A
N4NX 388,800 583 225 A B
KT4Q 267,960 519 174 A B
NE4S 194,688 360 169 A B
K4GA 103,812 280 123 A B
K4ESP (K4YJ, op)
94,068 291 134 A B
AA4LR 87,984 340 117 A B
AE4Y 45,954 198 69 A B
AA4GA 18,894 99 67 A B
AK4XX 1,520 24 19 A B
W4WA 1,130,016 1595 237 A C
K4SB 755,290 980 235 A C
KJ4EX 96,288 408 118 B B
WB4SQ 52,052 294 91 B B
WA4TII 477,694 1615 149 B C
W4DD 102,128 497 104 B C
AD4J 19,200 98 50 C A
N4PN 462,480 949 123 C B
K2UFT 237,144 484 123 C B
W4ATL 159,152 411 98 C B
K9AY 128,880 361 90 C B
WA4TT 79,716 221 91 C B
K4OGG 36,000 153 60 C B
K4AAA (W4AN, op)
24,408 114 54 C B
W4AN (K4BAI, op)
1,268,436 2253 141 C C
N4XMX (+packet)
11,628 103 57 D C

Kentucky

K4IE 285,120 529 180 A B
KE4TZJ 9,718 117 43 B A
AC4PY 68,694 322 107 B B
KN4IV 39,500 264 79 B B
KM4CH 16,896 102 44 C A
K4FXN 134,292 368 93 C B
KM4FO 129,752 345 98 C B
W5MX 793,936 1395 143 C C
K4WW (+packet)
170,560 491 130 D B
N4GN (+K9GX)
1,598,016 1803 287 D C

North Carolina

N5FPW 74,496 389 97 A A
N4YDU 482,784 787 188 A B
N3DRK 407,790 718 207 A B
W4IDX 131,544 354 108 A B
KO7X 227,126 503 139 A C
N4TL 119,556 309 123 A C
N4ZAK 19,328 155 64 B A
W2VMX 2,300 50 23 B A
K4TMC 232,830 999 117 B B
W4NC 121,920 519 120 B B
KO4MM 87,740 415 107 B B
KK4RV 29,848 182 82 B B
W4KAZ 27,876 203 69 B B
KC4YOT 16,464 148 56 B B
K4AHC 3,744 58 36 B B
KG4DZU 2,116 46 23 B B
WD4NCQ 1,406 40 19 B B
NX9T 381,840 1488 129 B C
K4DXA 119,520 503 120 B C
NC4NC 103,960 471 113 B C
W4YDY 46,750 277 85 B C
N4IJ 143,232 377 96 C A
WJ9B 475,800 996 122 C B
WA4DOU 342,696 655 131 C B
K4CIA 219,500 442 125 C B
KW4DA 173,952 458 96 C B
AE4EC 13,320 98 37 C B
W4ZV 1,416,064 2409 148 C C
K7GM 1,181,952 2062 144 C C
N4CW 793,584 1509 132 C C
W4MR (AA4NC,K4MA,ops)
2,115,564 2420 282 D C
W4WS (WB4MSG,N4VHK,KG4MQD, KB6MTH,KG4CZU,ops)
834,110 1221 239 D C
K3KO (+packet)
627,840 1092 144 D C
AD4L (+WW4M)
404,388 1446 141 D C
K8YC (+packet)
14,268 97 58 D C

Northern Florida

K9RB 89,050 228 137 A A
KB4N 424,020 750 191 A B
W4EBA 177,896 391 148 A B
NF4A 21,462 162 49 A B
NN4DF 10,508 72 37 A B
W7QF 94,764 303 106 A C
AD4E 5,576 70 34 A C
KQ4YY 47,850 283 87 B A
N4OX 441,464 1593 139 B B
K4JAF 96,212 362 134 B B
KA1QFV 9,996 102 51 B B
KX5U 4,992 64 39 B B
AG4MO 4,480 70 32 B B
KE4MVK 1,768 35 26 B B
KG4KLR 1,750 40 25 B B
W9CNF/M 242 11 11 B B
NS4W 350,836 1273 139 B C
N4EK 96,300 451 107 B C
W4UEA 16,660 119 70 B C
KD4BRJ 480 22 12 B C
K4WA 444,312 928 121 C B
KN4Y 215,488 540 104 C B
ND4AA 50,112 218 58 C B
W3TMZ 9,984 53 48 C B
KO4E 8,556 70 31 C B
NO4S 341,440 788 110 C C
K4RV 40,020 116 87 C C
K0LUZ (+packet)
898,200 1507 150 D C
KE1F (+packet)
241,800 462 155 D C
W4FDA (+packet)
59,670 159 117 D C

South Carolina

K4TSU 50,764 261 98 B B
W2JJC 403,876 1516 134 B C
K4ADI 26,288 128 53 C B
WA8OJR 14,652 101 37 C B
K0COP 83,520 237 90 C C
W4UK 50,920 194 67 C C

Southern Florida

K9ES 398,200 767 181 A B
AE4RO 383,940 503 243 A B
W4OV 202,462 405 169 A B
N3GD 182,120 506 116 A B
K4RFK 172,992 616 136 A B
WT5L 77,376 251 124 A B
W4OX 1,136,772 1688 234 A C
W4SAA 767,440 1072 212 A C
AA4HP 725,764 1213 221 A C
WA4MSU 84,072 227 124 A C
KS4GW 53,400 267 100 B A
KU4OS 21,900 154 73 B A
KC4PX 96,744 418 116 B B
K1DCB 57,512 316 91 B B

KK4TA 53,912 295 92 B B
KU4GY 53,196 292 93 B B
N3HO 51,192 316 81 B B
KA1VY 11,284 91 62 B B
N8PR 203,218 737 139 B C
NJ2F 114,816 557 104 B C
KW4CW (N4GM, op)
267,800 518 130 C B
N4BG 204,768 482 108 C B
N4PSE 61,272 223 69 C B
N4BP 1,137,020 2054 139 C C
W4QM 606,096 1111 138 C C
K4WJ 274,044 560 123 C C
WC4H 119,232 370 81 C C
K1PT (+packet)
1,831,676 2322 266 D C
W4UM (+W4DTA)
620,712 1052 222 D C
K4PB (+packet)
123,264 328 96 D C

Tennessee

W4TDB 2,236 44 26 A A
WO4O 937,720 1195 238 A B
K4BEV 245,760 452 192 A B
WD4OHD 200,944 452 152 A B
W4DAN 176,176 388 154 A B
WD4PTJ 17,202 115 61 A B
K3CQ 13,132 78 49 A B
N4ZZ 1,776,222 2207 259 A C
K4RO 1,774,584 2250 252 A C
WB4YDL 101,500 294 145 A C
W4TD 111,720 493 114 B A
KF4TJE 13,328 136 49 B A
NY4T 233,280 869 135 B B
NQ4U 203,364 811 126 B B
K4OOO 86,242 406 107 B B
WA4JA 78,840 370 108 B B
K4USN 61,938 339 93 B B
W4JH 48,576 265 92 B B
KS2X 23,904 167 72 B B
WB9BSH 21,896 161 68 B B
N7DLS 7,980 97 42 B B
KE4OAR 142,688 642 112 B C
K4BP 89,556 446 102 B C
K4EQ 121,452 352 87 C A
K4BX 6,656 55 32 C A
N4ZI 802,788 1524 133 C B
NA4K 461,648 951 122 C B
W4CBX 139,944 351 102 C B
K0EJ 132,696 345 97 C B
AA3VA 104,760 275 97 C B
W4TYU 62,088 204 78 C B
W4AUI 2,080 28 20 C B
W9WI 759,240 1414 135 C C
K4AMC 704,256 1347 131 C C
K4LTA 607,332 1198 129 C C
W4NZ 16,632 100 42 C C
W4BSF 27,972 144 74 D B
W4JPG (+N4RRW,N4UXQ)
25,916 145 62 D B
W4CAT (W1KLM,KB5YJC,NY4N,K1KY, KC4QFR,N4KN,ops)
1,155,138 1679 237 D C
K4TTA (+packet)
56,870 187 121 D C

Virginia

KG4NXP 7,260 56 33 A A
N4JED 207,868 471 157 A B
K3MZ 62,418 249 101 A B
WB4DNL 47,526 140 89 A B
W4XP 25,456 148 74 A B
N6MW 20,992 87 82 A B
WA4JUK 388,752 695 168 A C
N4MM 296,780 524 209 A C
W2YE 260,624 507 179 A C
K4VV 81,320 283 107 A C
KC4ATU 19,840 155 64 B A
W3MGL 19,630 154 65 B A
K4PZC 97,308 468 106 B B
AD4DG 74,072 396 94 B B
KG4FSP 46,228 262 91 B B
KE4MIL 44,820 254 90 B B
W4/VU2VKU
40,404 231 91 B B
N4RA 28,674 187 81 B B
NA4MA 27,150 184 75 B B
KD4QL 24,624 162 76 B B
KG4CGR 8,632 83 52 B B
KF4TJI 6,132 73 42 B B
W4PWF 5,880 60 49 B B
WA3RGH 3,700 65 37 B B
W3WFF 3,080 49 35 B B
WA4FXX 1,472 32 23 B B
KU4FP 29,532 217 69 B C
KE4VA 20,592 161 66 B C
K4UK 81,672 253 82 C A
W4/LZ3SM 224 8 7 C A
W4HM 283,464 575 127 C B
K4ORD 220,008 540 103 C B
W4AU 198,380 460 109 C B
N4PD 56,800 203 71 C B
K4JM 54,672 201 68 C B
W4HJ 29,512 123 62 C B
K6ETM 27,776 124 56 C B
K4MX 14,948 101 37 C B
KB3CDF 2,640 36 20 C B
W4YE 249,780 545 115 C C
K4GMH 124,960 368 88 C C
W4TNX (+packet)
494,340 740 210 D B
K1SE (+K4EU,K4ZW)
2,429,232 2740 312 D C
W4MYA (+packet)
2,381,760 2843 288 D C
W4EI (+N4MO, K4UVT)
762,960 1119 204 D C
KB4OLM (+W4PJW, WA4ITY, N8BCC, KF4QZG, AD4TJ, N3JB, KZ1A)
642,400 1163 220 D C
K4YT (+packet)
344,876 628 218 D C
N4EHJ (+packet)
100,848 389 132 D C
KO4MR (+packet)
49,300 171 145 D C
N4DEN (+packet)
42,098 223 97 D C
N8IK (+packet)
6,512 88 37 D C

West Central Florida

N4IG 894,216 1174 228 A B
K4GKD 363,216 629 184 A B
N4GI 173,602 396 143 A B
WC4E 2,195,100 2876 270 A C
K5KG 1,288,872 1788 243 A C
K9HUY 187,530 699 105 A C
W4JTA 8,512 76 56 B A
AF4YL 1,976 38 26 B A
N4PK 206,238 931 111 B B
K8FK 56,454 296 97 B B
K4ALH 27,740 194 73 B B
WN4DX 14,560 113 65 B B
AB4EZ 10,404 103 51 B B
N2EGO 9,630 107 45 B B
K4XS 886,424 2890 154 B C
K1TO 1,028,600 1860 139 C B
WD4AHZ 619,760 1226 127 C B
KW7R 76,608 253 76 C B
K4OJ 624,312 1140 138 C C
W4IR 68,708 196 89 C C
KA6R (+KA6AFK)
43,560 168 90 D B
W4ZW (+ops)
572,544 840 192 D C
W4GAC (N2MNC,N9MIU,W4KEN, KU4BT,WA9USD,WA9LXM,ops)
127,400 364 130 D C

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Arkansas

W5MK 545,804 901 193 A B
KB5EKX 81,000 450 90 B B
N5QC 2,790 46 31 B B
N9KS/M 1,320 30 22 B B
KE5TT 6,256 92 34 B C

Louisiana

W5WZ 4,020 50 30 A A
WA5CHX 59,736 268 114 A B
N8OO 1,997,456 2632 254 A C
AA5FJ 237,900 993 122 B B
K5MC 63,600 213 75 C B

Mississippi

W5KK 51,786 155 137 A B
W5XX 1,293,248 1776 242 A C
N5KGY 144,970 545 133 B B
N5PU 46,784 283 86 B B
WD5JNC 14,632 122 62 B B
KE5K 139,100 539 130 B C
K5MDX (WQ5L,W5UE,N5FG,KK5EW, N5ID,ops)
1,636,352 2020 256 D C

New Mexico

KD5JAA 142,790 356 131 A C
W5GZ 80,000 403 100 B B
K7IA 30,104 150 53 C A
N5MF 246,568 524 119 C B
W5YZ 244,188 516 119 C B
N7DF 973,248 1657 148 C C
N6ZZ 867,780 1620 135 C C
W6TER (+KE5BL,W5DEZ)
1,161,000 2094 215 D C
NA5S (+packet)
479,312 889 232 D C
KK5OV (+KB5ZSK)
18,354 167 57 D C

North Texas

WA8ZBT 379,832 829 158 A A
K5QX 133,712 286 137 A B
W5FL 250,584 499 212 A C
KC5SDY 7,920 70 33 A C
K5RX 301,630 1090 139 B A
AA5NT 381,160 1474 130 B C
K5WO 350,060 775 115 C A
KB5KYO 67,144 220 77 C A
WQ5W 715,140 1312 137 C B
W3DYA 157,200 399 100 C B
AD5GS 91,200 308 75 C B
W5KAU 86,000 250 86 C B
N5CHA 57,936 205 71 C B
N5NJ 51,480 197 66 C B
WD0HWX (+packet)
65,612 350 94 D B
N5YA (+N5KR,N5UM)
2,337,600 2674 300 D C
N5JR (+packet)
744,800 1118 245 D C
N1CC (+packet)
339,066 765 161 D C

Oklahoma

NE0P 357,504 604 196 A B
N5OHL 153,500 567 125 A C
KD5DLL 50,050 284 91 B B
AD5BN 22,204 182 61 B B
N0NOU 16,848 165 52 B B
K5WPN 11,130 105 53 B B
N5BFD 2,356 31 38 B B
N5RXF 237,416 1018 118 B C
WA9AFM 29,768 249 61 B C
K5OI 12,028 99 31 C A
K5KA 728,576 1434 128 C B
AA5CK 49,920 212 60 C B
W5OSU (+N7HRT)
169,650 731 117 D C

South Texas

N5XZ 235,428 514 138 A B
K5IUA 391,352 586 212 A C
K1TU 161,596 377 142 A C
WD5FGZ 15,300 150 51 B A
N5WU 2,400 52 24 B A
W5AJ 322,800 1352 120 B B
KC5RPF 89,436 525 87 B B
KA5BKG 86,580 566 78 B B
WB0YEA 30,294 187 81 B B
N5KAE 24,648 156 79 B B
WX5I 13,200 120 55 B B
K2RD 6,536 90 38 B B
N5AFV 6,460 85 38 B B
N5AF 48 8 3 B B
W5PR 952,798 2973 161 B C
K5TR (WM5R, op)
802,944 2973 136 B C
K5NA (KI5DR, op)
681,378 2472 139 B C
KM5VI 151,698 586 131 B C
W5UFA 41,888 245 88 B C
KG5U 429,024 877 123 C A
KI0G 23,552 139 46 C A
N5DUW 695,960 1386 127 C B
W5GAI 314,400 605 131 C B
NO5W 162,864 485 87 C B
AD6G 99,528 292 87 C B
NZ5A 91,500 395 61 C B
AF5Z 69,088 254 68 C B
AD5Q 1,015,200 1703 150 C C
K5XR (W5ASP, op)
774,884 1619 121 C C
AC5AA 134,520 358 95 C C
NX5M (N5XJ,K8EP,NX5N,N5JA, K1OJ,ops)
2,445,518 3089 289 D C
W5NN (N1LN,W5BAK,K5NZ,ops)
1,956,768 2404 272 D C
N5JJ (+N5MV,KZ5M,N5XZ)
1,438,076 2116 233 D C
N5MT (+packet)
539,756 840 259 D C
N3BB (+packet)
259,920 694 95 D C
N5PV (+WA4PSO)
247,070 603 155 D C
KG5TA (+N5IKQ)
215,760 880 120 D C

West Texas

N5LUL 5,616 62 36 A B
KE5OG 250,776 1173 108 A C
N0UST 1,640 41 20 B B
WR5O 31,536 148 54 C A
NZ5M 48,384 189 64 C B
WA5PFJ (+WA5PFI)
104,632 638 82 D C

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East Bay

KA6SGT 20,608 117 46 A A
KE6QR 116,052 359 114 A B
K6BIR 31,824 238 68 B B
AK6DV 9,396 81 58 B B
KS6Q 3,300 50 33 B B
K6SRZ 138,432 415 84 C B
K6WG 134,680 372 91 C B
WA6O 835,128 1669 126 C C
NF6S 474,636 1078 111 C C
KF6UVB (+KG6HM)
47,466 206 81 D A
N6CCL (+packet)
196,248 966 102 D C

Los Angeles

NK6A 79,920 275 90 A A
N5BF 5,152 51 28 A A
WO6M 420,672 777 168 A B
K6ZCL 208,320 534 140 A B
AD6SC 28,120 191 76 B A
W6AFA 304,448 1136 134 B B
K6NDV (DK9TN, op)
172,600 871 100 B B
KB6WKT 80,750 485 85 B B
KD6KHJ 72,960 391 95 B B
WB6NFO 66,310 349 95 B B
WA6HXF 58,638 343 87 B B
N6IJB 18,560 149 64 B B
AD6AF 90 9 5 B B
W6BIV 138,976 412 86 C A
W3SE 70,840 255 70 C A
WA6BOB 119,024 354 86 C B
N6GL 80,668 303 67 C B
K6SE 67,340 262 65 C B
ND6P 26,288 125 53 C B
N6NO 35,076 110 79 C C
N6AA 27,448 148 47 C C
W6UE (KA6SAR,N6AN,N6LL,W6DR,W4EF,ops)
1,725,460 2526 242 D C
W6KC (+packet)
319,360 734 160 D C
W6TRW (K6OUE,KE6PI,KF6II,ops)
35,584 278 64 D C

Orange

AA6PW 960,400 1588 196 A B
K6EY 142,496 371 122 A B
WA6BFW 135,000 341 125 A B
W6QZ 4,488 59 33 A B
K6AM 2,053,558 2743 247 A C
K6HRT 28,512 149 54 A C
W7YA 182,528 736 124 B A
AC6WD 172,256 781 112 B B
KQ6QW 143,736 687 106 B B
W6SA 77,710 411 95 B B
W6JQ 58,784 338 88 B B
K6ACZ 48,076 244 101 B B
KR6ER 27,720 214 66 B B
W6ZQ 21,868 154 71 B B
N6WIN 17,664 138 64 B B
WW6O 213,118 947 113 B C
AD6WL 77,400 432 90 B C
KC6UIX 20,424 111 92 B C
W6KK 382,720 933 104 C B
AC6VN 207,100 551 95 C B
W6FZA 155,800 410 95 C B
WA6OGO 119,364 344 87 C B
WD0AVV 116,624 416 74 C B
W6EEN (N6RT, op)
1,279,016 2155 149 C C

Pacific

KH6CDO 60 6 5 B A
KH6GMP 205,196 1198 86 B B
AH7R 14,496 152 48 B B
NH7/N6HC (N6HC, op)
467,740 1310 91 C C
KH6ND (+WH6H,AH6OZ)
2,376,682 3664 253 D C
KH6IN (KH6ZM, KH6B,ops)
221,500 489 125 D C

Santa Barbara

WA6FGV 312,816 627 147 A A
AG6RT 734,160 1493 190 A C
W6TK 708,084 1413 178 A C
N7WLC 35,632 264 68 B B
W6RJQ 35,040 219 80 B B
K6RSD 15,312 133 58 B B
WB6L 323,046 1241 131 B C
WA5VGI 682,244 1357 127 C C
AC6DD 636,864 1296 124 C C
W7CB 205,128 531 99 C C
W6BKY 25,480 130 49 C C
WA6BMH (KE6DKU,KO6WZ,KA6WZR, KE6BBP,ops)
14,994 110 51 D B

Santa Clara Valley

K6XX 565,060 936 190 A A
K6EP 168,462 369 147 A B
W6YX (N6DE, op)
1,474,954 2280 221 A C
K6RB 996,060 1792 195 A C
K6GT 418,320 836 168 A C
AE6Y 125,856 317 114 A C
KF6UTE 55,338 401 69 B B
AD6CL 10,736 128 44 B B
AD6ID 966 26 21 B B
K6III 101,592 309 83 C A
W4NJK 46,644 181 69 C A
KB6FPW 27,048 138 49 C A
WD6DX 144,072 419 87 C B
K8PO 839,016 1644 129 C C
N6ZB 518,752 1128 116 C C
W9MAK 68,340 252 67 C C
W6ISQ 988 19 13 C C
K6EI (+KG6HRK)
111,644 302 113 D B
K6IF (+N6NF)
1,378,608 2254 231 D C
W6OAT (+packet)
367,416 660 162 D C

San Diego

WN6K 730,184 1515 182 A B
K7JJ 411,950 782 175 A C
N6VH 363,072 680 183 A C
W6QU (W8QZA, op)
71,820 402 90 B A
W6CN 45,318 251 91 B A
AA6EE 35,192 165 53 C B
W6MVW 19,796 102 49 C B
N6KI (+packet)
341,700 1013 85 D C
K6HAI (N6UN,WB6LLO,K6VMI,KB9DD, KQ6YQ,W7JBC,W6JXA,W6REW, W6SDW,ops)
112,040 445 113 D C

San Francisco

N6KM 24,444 125 63 A A
K6PUD 286,744 756 146 A A
K6OWL 71,232 239 106 A B
KC6AWX 238,876 988 122 B B
W6ESJ 60,520 343 89 B B
K6UUW 28,944 208 72 B B
N6NVF 21,168 171 63 B B
K9GQ 7,360 84 46 B B
W6JTI 338,360 770 110 C A
AD6TF 219,648 639 88 C B
KM6TG 154,560 419 92 C B
W6IYS 140,448 427 84 C B
AA6DX 90,596 325 71 C B
KQ6NN 87,216 317 69 C B
K6RIM 52,488 246 54 C B

San Joaquin Valley

NT6K 775,456 1488 176 A A
N6IV 918 21 17 A B
KA6BIM 1,133,528 1942 242 A C
KS6H 738,916 1255 202 A C
W6TE 367,800 1116 150 A C
W6FRH 36,288 253 72 A C
N6IIU 249,612 1033 122 B B
WI7F 42,900 292 75 B B
KI6PG 34,080 213 80 B B
AA6GZ 13,780 134 53 B B
K6ZJ 34,800 179 50 C B
N6HK 20,604 100 51 C B
KN6YD 8,096 45 44 C B
WA6ALA (+KA6VAO)
56,376 327 87 D C

Sacramento Valley

W6UT 901,728 1491 202 A B
WX6V 589,040 1008 185 A B
K6LRN 321,100 614 169 A C
KI6T 267,976 526 164 A C
KC6SEH 227,424 1115 103 B B
N6SNO 55,892 319 89 B B
KJ6RA 24,310 191 65 B B
K6NO 26,558 272 49 B C
W6EU 61,320 213 73 C A
K6KYJ 232,064 594 98 C B
K1ES 231,012 627 93 C B
K6SG 180,048 491 93 C B
N6JV 462,720 961 120 C C
K6TA 111,584 321 88 C C
KM6SE 35,040 147 60 C C
K6KM (W6QD,W6SR,ops)
1,462,648 2075 242 D C

7

Alaska

KL7Y 425,020 892 158 A B
AL7PJ 66,976 274 92 A B
KL7FAP 257,136 1470 88 B B
KL7JR 39,312 273 72 B B
WL7DB 29,536 145 52 C B
KL7WV (W3YQ, op)
241,632 841 72 C C
KL7RA (+KL7AC,N1TX,NL7Y)
1,978,636 3044 233 D C

Arizona

N3AIU 472,196 813 194 A B
K7TR 193,032 696 126 A B
KN5H 106,088 315 89 A C
NQ7X 31,200 199 80 B A
W7ZR 536,364 1908 141 B B
W3ZZX 349,952 1378 128 B B
KB7XL 268,940 1135 119 B B
KG9JP 56,938 346 83 B B
K0TW 47,376 252 94 B B
KR4QI 14,152 123 58 B B
N7TWB 12,768 115 56 B B
K7XZ 489,056 1981 124 B C
WX7P 294,192 1366 108 B C
NF7E 190,960 1096 88 B C
K7RE 296,100 716 105 C A
K7ON 440,892 1004 111 C B
K7HP 260,760 623 106 C B
W7YS 212,160 520 102 C B
KJ7WY 207,968 577 97 C B
N7MAL 200,208 523 97 C B
W2HTX 54,824 178 77 C B
W7ZMD 28,912 141 52 C B
N7KU (NJ6D, op)
1,087,720 1949 142 C C
K7UAZ (N4OGW, op)
906,660 1686 135 C C
W7IBM (N0ADI,WR7A,N7DZ,K7NX, KF7SI,N7SQF,ops)
877,600 1534 200 D C

Eastern Washington

KC7WUE 35,616 168 84 A B
W7LGG 93,564 299 113 A C
W7WKB 28,730 224 65 B B
K7MM 309,872 730 107 C A
K7GS 140,592 410 87 C A
NU7F 88,956 360 63 C A
W7GB 21,008 100 52 C B
N5AR (+K7OX,WA7LT)
1,170,596 2290 194 D C
N7BES (+WB7VNY)
513,246 2271 113 D C
K7JAR (N7CKJ,AB7IZ,KC7TTM, KC7KPA,ops)
102,660 596 87 D C

Idaho

W7UQ (KL9A, op)
1,359,150 2116 221 A B
KD7JEG 31,598 258 61 A B
KG7WZ 9,266 113 41 B B
K7ZO 134,460 749 90 B C
K0TO 27,324 300 46 B C
KK7A 14,000 100 35 C A
WX7G 12,276 92 33 C A
K7TQ 12,212 80 43 C A
W7QDM 220,728 544 102 C B
KA7T 194,012 542 91 C B
N7ZN 5,376 48 28 C B
KJ7TH (+KW7N,KD7AKN)
378,102 1544 123 D C

Montana

K7PGL 340,690 950 155 A B
N7YY 219,744 471 144 A B
NA7NA 293,728 678 137 A C
K7ABV 36,022 192 83 A C
WB0SMS 228,032 1023 112 B B
AC7OW 220,180 1099 101 B B
KK7UV 157,732 845 94 B B
KC5YED 117,370 621 97 B B
KD7IIC 32,996 226 73 B B
AC7GM 2,604 29 21 C A
KE7NO 162,288 496 84 C B
K7BG 913,376 1687 136 C C
KS7T 307,352 751 103 C C
K7ETT (+AB7RS)
286,464 1127 128 D C

Nevada

W1RO 28,832 179 53 A A
W7PW 22,820 163 70 B B
W7EB 429,624 1839 117 B C
N7NTN 381,024 1522 126 B C
N7ZT 243,980 1109 110 B C
K7QE 62,220 370 85 B C
N7ON 115,900 311 95 C B
N7PU 36,540 148 63 C B
K7NV 929,280 1775 132 C C
NV7A (K5RC+Packet)
1,958,220 2608 253 D C

Oregon

KI7Y 848,138 1344 199 A B
AA7LE 134,708 476 119 A B
K7MI 1,735,284 2573 246 A C
K7ZZ 1,132,880 2213 196 A C
K0JJ 470,112 1131 177 A C
KD7IEB 23,140 178 65 B A
N7XB 28,860 227 65 B B
N5ZR 384 16 12 B B
W7EJ 837,380 2818 149 B C
W7ZB 581,360 2246 130 B C
W7FP 279,654 1112 127 B C
KE7GI 233,130 1234 95 B C
WB7TIR 33,120 230 72 B C
N7OU 362,792 895 101 C A
KD7CTF 60,268 249 61 C A
K7EL 29,808 163 46 C A
N7OR 509,960 1165 110 C B
W7YAQ 105,644 343 77 C B
AD7L 34,128 158 54 C B
AA7IH 23,312 129 47 C B
N6TR 5,684 50 29 C C
W7NYW (KD7IEB,N7CMH,KK7OF, KD7IDO,KD7GHR,N7DLH,ops)
8,448 96 44 D B
K7EMI (+packet)
8,112 79 52 D B
W7GG (+K7ZUM,KC7TWZ,KD7BSW)
1,556,986 2632 223 D C
K7UQT (+W7OT)
294,048 835 144 D C

Utah

WA7LNW 367,812 718 153 A A
W7TU (W8EQA, op)
353,808 625 182 A B
WA7YAZ 307,768 632 146 A B
NS7K 219,402 499 153 A B
N7VM 85,212 529 81 B B
K1IF 480,128 1991 121 B C
W7CT 690,176 1356 128 C B
W7HS 142,680 408 87 C B
W7GT 72,000 245 75 C B
AK7O 39,008 191 53 C B
W7UT 808,896 1541 132 C C

Western Washington

W7CD 149,184 360 126 A A
W7QN 508,032 892 162 A B
KD7GTI 435,520 745 160 A B
AC7LX 168,960 405 132 A B
N0AX 111,860 368 85 A B
K7LOG 52,272 203 88 A B
N7LOX 1,381,856 2188 217 A C
W7PE 136,348 766 89 B A
KG7RZ 33,086 233 71 B A
KB7PKC 178,416 836 108 B B
NS7N 52,152 320 82 B B
KB7OIE 22,538 191 59 B B
KC7MAW 17,160 161 55 B B
K7ATA 13,572 117 58 B B
W7JAM 9,700 100 50 B B
K7RI 833,712 3172 132 B C
WB7BST 218,768 976 113 B C
KG7P 44,880 264 85 B C
WG7X 32,266 224 73 B C
KD7E 20,048 181 56 B C
KH7YD 158,780 497 85 C A
N7FDU 29,700 176 45 C A
AB7RW 258,020 672 97 C B
N7WA 218,088 703 78 C B
K1LKR 119,196 394 77 C B
NG7Z 110,704 382 74 C B
WB7FJG 49,712 236 52 C B
K7QQ 884,000 1639 136 C C
N4SL 566,364 1314 109 C C

N7ETC 289,872 730 99 C C
N7YX (+N6HR)
951,200 1609 205 D C
N7KE (KB7N,N7BSR,W7QC,W7VP, KD7GIM,N9KAH,NW7DX,W7FU, AC2K,ops)
553,356 1263 171 D C
N7PP (N7DOE,WA7IVO,W7NTF,N7FIT, NN7L,W7BUN,ops)
515,862 2109 123 D C

Wyoming

W0ETT/7 11,016 153 36 A B
N7JT 16,750 125 67 B A
WG7Y 252,846 1299 99 B B
AC7AF 60,928 271 56 C A

8

Michigan

K8GT 348,840 579 190 A B
K8AAX 237,380 500 143 A B
WX3M 198,852 407 146 A B
K8IA 62,814 239 87 A B
WA8OLD 52,992 210 72 A B
N8VEN 25,740 154 55 A B
KD8DX 22,218 124 69 A B
N8MG 14,208 115 48 A B
WA8AEN 1,364 31 22 A B
ND5S 1,086,072 1345 236 A C
N8KIE 113,448 496 116 B B
N8WK 74,496 388 97 B B
K8KHZ 68,544 367 96 B B
N8KZG 59,032 316 94 B B
K8ESQ 58,422 322 91 B B
W8BFX 50,730 269 95 B B
KD8BD 28,000 200 70 B B
KG8AO 20,880 181 58 B B
WA8YLZ 1,178 31 19 B B
KC8IJZ 616 24 14 B B
K8CC (K8NX, op)
530,816 1863 143 B C
W8WD 519,116 1755 149 B C
AA8PA 398,748 1430 141 B C
W8JY 139,440 582 120 B C
K8SIA 104,052 302 87 C A
W8MJ 683,008 1348 128 C B
K8IR 384,680 821 118 C B
W8DO/M 137,720 313 110 C B
K8KU 57,024 202 72 C B
KB8PGW 12,800 104 32 C B
KB8UMD 1,224 34 9 C B
N8EA 652,764 1234 133 C C
KT8X 373,932 807 117 C C
K8JM 292,448 710 104 C C
W8RU 249,536 561 112 C C
K8DD 67,536 206 84 C C
KC8ELY (N8NJE,N8MMF,N8MPO,ops)
16,900 173 50 D B
K8MV (+packet)
506,880 891 144 D C

Ohio

N8OH 134,730 406 135 A B
K8NVR 76,320 252 120 A B
WT8E 38,250 190 85 A B
N8BJQ 1,204,280 1675 238 A C
K8MR 696,780 1190 210 A C
N8KM 529,340 1284 190 A C
K8AZ (K8MR, op)
354,908 719 166 A C
ND8L 237,336 420 186 A C
K9TM 201,150 536 135 A C
NC8V 10,404 71 51 A C
N8WL 57,594 333 87 B A
N8XA 36,400 200 91 B A
W8DD 305,532 1112 138 B B
N8GZE 153,750 639 123 B B
KB8UUZ 134,552 564 121 B B
KC8OPP 121,104 525 116 B B
W8KNO 92,560 445 104 B B
N1IZP 89,244 406 111 B B
WD6ADM 59,784 324 94 B B
K8VUS 29,088 205 72 B B
KA8JXG 14,560 132 56 B B
N8XWO 6,132 73 42 B B
N8MFS 4,680 60 39 B B
WZ8P 210,420 844 126 B C
W8PG 38,356 228 86 B C
WB8RTJ 133,128 387 86 C A
W8VE 118,864 327 92 C A
K8ZT 20,160 145 48 C A
AF8A 232,300 506 115 C B
W8PN 217,124 534 103 C B
W8IDM 107,904 281 96 C B
AD8P 98,644 275 91 C B
N8CPA 92,820 261 91 C B
W8GOC 65,520 212 78 C B
N8EW 52,852 183 73 C B
K8FH 51,168 165 82 C B
N8XP 44,800 192 64 C B
W8AV 933,792 1659 142 C C
N8PW 155,736 393 103 C C
K8AJS (+packet)
465,888 848 138 D B
W8TTS (+packet)
60,800 306 100 D B
N8HUG (+packet)
17,816 139 68 D B
N8NR (+N9AG)
1,842,400 1984 280 D C
N0FW (+W8GEX,WA8NJR,W8KJ, W8QID,K8FL,WA8LOW)
1,136,754 1885 243 D C
K8ND (+packet)
422,646 693 203 D C
W8FT (N8ET,AA8UP,AD8P,N8RMT,N8RMF, AA8IV,AA8KJ,ops)
342,210 607 187 D C

West Virginia

K5IID 334,640 588 178 A B
N4ZR 1,667,250 2029 247 A C
K2UOP 621,150 982 205 A C
W8UMR 90,620 394 115 B B
WR0N 22,512 169 67 B B
KV3R 372,672 1300 144 B C
N4SEA 167,500 679 125 B C
WA8WV 112,424 300 94 C A
K8OWL 37,800 175 54 C A
N8II 206,028 536 97 C B
K3JT 674,416 1391 122 C C
K8OQL 340,548 772 111 C C
W8ZA (+packet)
11,330 75 55 D C

9

Illinois

KG9X 886,650 1064 257 A A
W9HL 28,728 146 63 A A
N9WW 14,740 110 55 A A
KX9DX 588,242 1094 197 A B
W9IL 508,400 721 205 A B
K9JE 301,088 591 194 A B
K9AA (K9PG, op)
227,650 487 157 A B
K9OR 182,682 346 153 A B
K9XE 151,504 323 136 A B
N9KO 127,452 316 129 A B
KB9CRY 122,880 408 128 A B
K9IJ 114,954 307 119 A B
N9TF 105,600 253 110 A B
KG9PF 94,070 346 115 A B
W9LYA 66,794 220 91 A B
AK9F 63,080 205 95 A B
KB9YSI 50,112 220 96 A B
K9OZ 46,656 189 81 A B
AA9NF 44,844 171 74 A B
WA9FIH 40,698 205 63 A B
N9EP 36,380 131 85 A B
N9GUN 28,656 128 72 A B
AB9BH 22,704 132 66 A B
W9LNQ 22,458 111 57 A B
N9KHR 21,204 135 57 A B
N9BT 10,528 74 47 A B
KK9DX 8,560 59 40 A B
W9DY/M 8,362 80 37 A B
WA9LAY 7,380 89 41 A B
WB9RRO 2,688 49 28 A B
WB9Z 1,503,326 2398 253 A C
K9UQN 423,256 674 191 A C
KG9N 266,166 557 159 A C
N9QQK 260,480 494 176 A C
WX9U 79,288 224 106 A C
NC9F (K0PG, op)
29,536 140 71 A C
W9XG (K2DRH, op)
447,552 1563 144 B B
NA9D 307,032 1180 132 B B
K9JLS 241,488 942 129 B B
NV8V 79,104 415 96 B B
N9MSF 72,708 438 83 B B
NW9V 65,096 320 103 B B
KD9AC 65,000 331 100 B B
N9VKE 63,168 346 94 B B
W9XB 53,568 279 96 B B
WA9CCQ 45,730 276 85 B B
W9JJT 41,664 248 84 B B
K0HNM 38,916 207 94 B B
AA9RT 34,632 226 78 B B
KF9US 32,528 220 76 B B
KC9ARR 25,480 201 65 B B
W9LYN 25,134 178 71 B B
WD9CIR 24,816 189 66 B B
KM9Z 17,554 131 67 B B
K9VIC 13,824 129 54 B B
N9LAH 12,296 118 53 B B
N9MYC 10,272 107 48 B B
N9TUQ 9,752 109 46 B B
K9KMD 7,462 91 41 B B
WO9S 7,120 91 40 B B
K9WJC 4,818 75 33 B B
N9EYF 2,538 54 27 B B
KA9NPT 2,160 47 24 B B
N9ALC 1,620 30 27 B B
N9YPN 1,200 30 20 B B
N9MBR 1,040 28 20 B B
WA9LKZ 476 20 14 B B
N2BJ 692,750 2136 163 B C
K9ZO 489,600 1714 144 B C
N9LCR 293,520 1228 120 B C
K9MOT (K9PW, op)
287,496 1095 132 B C
KF9TI 93,772 416 119 B C
W9TMW 43,700 232 95 B C
KB9ORA/M 1,656 46 18 B C
AA9KH 34,048 134 64 C A
WB9MII 1,400 25 14 C A
N9IJ 1,380 23 15 C A
K9WA 425,040 806 132 C B
W9OA 331,520 749 112 C B
K9QVB 296,576 669 112 C B
K9CW 171,628 403 107 C B
WA9AQN 118,976 341 88 C B
K9CC 101,320 307 85 C B
K9GY 99,360 279 90 C B
WD9ISG 75,140 227 85 C B
W3HDH 66,192 199 84 C B
N9BOR 65,604 233 71 C B
AD4OS 47,280 202 60 C B
N9MZP 22,600 119 50 C B
N9LGP 4,864 64 19 C B
K9BGL 994,000 1784 140 C C
W9YYG 617,760 1161 135 C C
W9OF 612,168 1111 138 C C
N9CO 83,100 280 75 C C
K9NU 45,240 178 65 C C
KF9TL (+KE0FT,KG9IE)
298,792 646 169 D B
N9MSG (+packet)
90,304 252 136 D B
KI9A (+WE9A)
1,880,046 2127 301 D C
K9RR (+packet)
273,854 401 217 D C
N9OH (+packet)
24,012 128 58 D C
W9OL (+packet)
12,240 66 51 D C

Indiana

N4IY 15,548 101 46 A A
K9DIY 10,880 90 34 A A
KJ9C 914,368 1138 224 A B
K9BG 588,748 828 206 A B
KC9FC 172,584 455 153 A B
WT9U 159,444 383 129 A B
W9TN 108,790 284 115 A B
W9BS 88,404 209 139 A B
K6OMB 85,690 251 95 A B
K9MI 76,336 270 104 A B
K9NW 2,374,848 2775 279 A C
W9RE 2,343,780 2929 261 A C
W9IU 1,167,012 1744 198 A C
K8LEE 877,800 1353 228 A C
K9RU 356,748 741 186 A C
N9LF 20,992 164 64 B A
N9NGG 121,158 477 127 B B
KB9IVB 89,604 404 114 B B
WA1MKE 81,792 427 96 B B
WA8UEG 74,472 348 107 B B
WD9ATU 8,064 113 36 B B
KG9HG 1,404 27 26 B B
KC9OP 127,750 518 125 B C
AE9YL 65,302 320 103 B C
K9JWI 143,208 352 102 C B
K9IG 36,816 156 59 C B
N9RV (+W8LVN)
2,533,496 2909 281 D C
K9IZ (KE9I,AJ9C,N9LAH,ops)
1,055,902 1522 239 D C
NZ9R (+packet)
232,800 495 120 D C
K9WX (+packet)
198,450 411 147 D C

Wisconsin

AF9J 20,448 135 48 A A
WE9V 1,520,610 1844 273 A B
N9UA 437,976 715 198 A B
K0SN 410,310 780 141 A B
W9WUU 178,528 410 112 A B
K9KR 140,140 376 143 A B
W9XT 1,475,496 1962 243 A C
N9CK 1,151,572 1412 223 A C
WA9IRV 253,518 504 141 A C
KF9YR 115,200 343 128 A C
NF9V 111,930 314 91 A C
NE9U 316,470 1161 137 B B
NS9R 109,890 495 111 B B
WB9PUB 53,820 299 90 B B
NG9L 49,242 290 87 B B
K9UJH (N9MUC, op)
30,222 209 73 B B
K9JIG 26,910 200 69 B B
KB9LIE 21,808 189 58 B B
K9VS 3,444 82 21 B B
N9PQU 203,840 793 130 B C
W9JA 123,234 446 141 B C
N9NE 339,040 656 130 C A
W9WAQ 178,308 381 117 C A
N9CIQ 157,748 350 113 C A
AA9PB 106,304 314 88 C A
WA1UJU 74,760 268 70 C A
N9XX 263,064 583 113 C B
W9LO 184,576 461 103 C B
KB9Q 13,440 84 40 C B
N9GBB 13,328 98 34 C B
N9EZ 12,556 74 43 C B
W9OP 539,220 1053 129 C C
W9GXR 460,044 982 117 C C
KB9KEG (+packet)
17,388 124 63 D B
W0AIH (+KB9S,KM0O,KT0R)
2,396,672 2845 302 D C
K9WIS (+KB9OHO)
90,678 262 119 D C

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Colorado

N0KE 615,832 1005 196 A A
W0HEP 189,216 465 146 A A
WV7T 6,384 52 38 A A
WB0HZL 6,080 49 40 A A
W0RSR 261,284 493 166 A B
K0XE 49,980 162 98 A B
K0KR 1,964,592 2593 252 A C
N0KV 1,161,430 1841 215 A C
W0DET 61,074 215 117 A C
KK0Q 112,918 566 101 B A
KI0ND 37,008 264 72 B A
KT0DX 399,052 1493 134 B B
KF0UR 269,266 1344 101 B B
KC0GBC 128,968 692 94 B B
KC0KSA 26,384 195 68 B B
KF4MDW 13,050 149 45 B B
W0CBH 5,504 66 43 B B
KC0LGY 2,160 40 27 B B
W0LSD 455,328 1596 144 B C
N0TK 88,800 300 74 C A
K0CV 53,312 238 56 C A
K1EQA 34,400 172 50 C A
K0CO 17,120 112 40 C A
K0UK 91,924 353 67 C B
N2WW 946,620 1770 135 C C
W0CP 400,472 891 113 C C
KF0U 228,096 586 99 C C
K0USN (WV7T,N0QJS,ops)
816 24 17 D A
N0IO (+KC0LEF)
92,820 460 102 D B
KV0Q (+N0NR,KT0F)
2,515,716 3017 298 D C
AB0MV (+AE0Q)
846,498 1378 193 D C
K0GAS (+KJ0G)
676,296 1212 202 D C
N0LM (W0CBH,N0LP,W0ETT, KB0UBZ,KB0YRZ,W0HXB,KC0FXI,ops)
326,060 662 170 D C
W0RUN (+KC0JXW)
156,780 546 134 D C

Iowa

K9IUA 14,000 105 40 A A
K0SRL 37,398 186 69 A B
NS0B 35,644 158 67 A B
K0XD 19,788 126 51 A C
K1GD 84,864 410 104 B B
K0VM 56,070 320 89 B B
W0ISU (N0YWI, op)
35,768 270 68 B B
W0ETC 690,384 2288 152 B C
K0DAS 281,952 1075 132 B C
W0PPF 66,048 344 96 B C
NO9S 1,288 23 14 C A
KB0JSH 251,328 632 102 C B

Kansas

WB0YJT 129,774 421 129 A B
KB0MZG 111,492 481 114 A B
N0QE 89,496 378 99 A B
KC0IDI 38,332 191 74 A B
WB0ZWW 25,584 151 78 A B
K0XM 22,952 124 76 A B
KA0BHO 19,328 145 64 A B
N0VMW 22,048 208 53 B A
KC0IUW 52,548 307 87 B B
KC0GL 47,712 343 71 B B
W0IE 31,050 211 75 B B
WA5SWN 12,420 115 54 B B
K0LLS 8,140 74 55 B B
KA0EIC 6,256 70 46 B B
N0UU 378,162 1352 141 B C
K0WA 143,080 373 98 C A
K0FPC 7,920 66 30 C A
K0RY 87,048 287 78 C B
K0BJ 83,904 280 76 C B
WN8P 50,688 198 64 C B
KI6DY 40,068 191 53 C B
KG0UA 247,244 549 113 C C
K0GY (+W0TM)
1,115,932 1592 227 D C
W0NO (+AB0S)
1,057,122 2055 209 D C

Minnesota

K0PC 298,832 588 152 A A
N0AT 1,351,336 1869 236 A B
K0OB 1,128,064 1678 224 A B
N0HJZ 928,738 1671 233 A B
K0MPH 248,200 545 146 A B
WB0GGM 243,552 555 177 A B
WJ0M 212,128 529 112 A B
WA2MNO 126,558 453 89 A B
WB0TRA 71,760 461 78 A B
N1UW 44,380 206 70 A B
N0BM 32,744 121 69 A B
W0ZQ 632,412 1063 198 A C
K0KX 610,490 927 205 A C
W0OR 386,310 725 163 A C
K9WIE 355,816 635 158 A C
W0MN 2,208 41 24 A C
WA0VBW 168,990 645 131 B A
KF0GX 18,666 183 51 B A
WD9EWK 782 24 17 B A
AC0W 472,472 1657 143 B B
KA0DAQ 144,480 694 105 B B
AD0W 141,696 592 123 B B
K0COM 125,760 536 120 B B
WB0TNH 99,792 468 108 B B
WR0DK 88,752 524 86 B B
WA2HFI 64,152 398 81 B B
K0BUD 54,400 345 80 B B
N0PI 50,086 318 79 B B
KB0GTW 15,744 166 48 B B
KB0OQQ 11,792 134 44 B B
N0PO 9,462 85 57 B B
W0TFS 3,068 61 26 B B
KA0HRT 2,600 54 25 B B
K4IU 48,306 294 83 B C
N0MGQ 9,090 105 45 B C
N0UR 385,728 793 123 C A
K0VH 13,284 85 41 C A
W0GXQ 284,480 632 112 C B
KN0V 272,360 624 110 C B
KE0UI 230,928 579 102 C B
WA0BNX 184,008 451 102 C B
K0TK 91,872 272 87 C B
K0TG 22,000 110 50 C B
N0XTN 21,320 129 41 C B
W0HW 15,308 91 43 C B
K0SR 993,524 1830 137 C C
N0IJ 302,280 689 110 C C
K0QC (+packet)
208,376 427 122 D B
KR0B (+N0BKL,KS0T,KJ0B,N0RA, K0KP) 1,719,648 2379 252 D C
W0BV (+K0YV)
685,520 986 220 D C
KI0F (+N0BUI)
681,120 929 240 D C
K0AD (+packet)
331,016 599 161 D C
K0HB (+K0CKB)
50,716 207 62 D C
WG0M (+packet)
44,370 191 85 D C

Missouri

AE9B 935,088 1502 231 A B
KG0US 753,990 1242 205 A B
KA0GGI 743,886 988 221 A B
K0GN 666,094 1040 187 A B
W0YZZ 113,336 332 124 A B
KF9UN 96,150 333 85 A B
WA0IYY 73,980 237 90 A B
AA0RT 17,346 129 49 A B
K0DAT 24,648 158 78 B B
N9TRO 21,248 166 64 B B
KK2G 16,302 147 57 B B
KG0KP 8,712 102 44 B B
KC0LCX 2,080 53 20 B B
K0EMT 1,800 45 20 B B
AB0OX 160 10 8 B B
K0DAN 385,984 1308 148 B C
KB0LW 34,960 241 76 B C
W0RL 1,768 36 26 B C
N0SS 56,736 198 72 C A
KS0M 110,592 296 96 C B
K2VV 1,344,440 2328 145 C C
K0JPL 104,192 297 88 C C
KB5ENP (+KC8SDQ)
77,120 252 80 D C
K0LIR (K0RAY,WA0IYY,ops)
2,652 43 17 D C

North Dakota

WC0G 9,512 107 41 A A
K0UD 252,960 894 136 A B
W0WT 76,744 724 106 A B
WB0O 901,016 1690 134 C C

Nebraska

KT0K 845,012 1308 206 A B
K0IL 160,284 430 114 A B
K0XU 84,456 370 108 A B
K0PFV 24,832 197 64 A B
K0DG 805,980 1937 190 A C
KI0II 198 14 9 B A
NU0C 114,760 612 95 B B
N0LGU 78,182 408 97 B B
KE0BZ 69,184 376 92 B B
W0MDS 64,080 362 89 B B
NE0DX 30,096 152 99 B B
N0SCE 10,212 74 69 B B
WZ0L 2,592 54 24 B B
N0LZ 1,120 35 16 B B
AB0FX 720 15 12 C B
WN0L 182,856 415 114 C C

South Dakota

WB0ULX 76,518 353 109 B B
N0UD/M (WB0OAJ,op)
270 15 9 B C
W0SD (W0DB, op)
1,237,236 2173 143 C C
KD0S (+WD0T,KC0CHJ)
923,560 1636 220 D C

Canada

Maritime

VE1JS 142,040 418 134 A B
VE1OP 1,594,104 2017 254 A C
VY2SS 258,804 626 158 A C
VX1ASJ 50,396 296 86 B B
VX9UN 46,410 263 91 B B
VY2LI 2,496 50 26 B B
VX9DX 282,552 588 122 C B
VE1GN 170,280 430 99 C B
VX9FX (+packet)
77,988 235 134 D C

New Brunswick

VX9DXR (VE9DXR,op)
139,284 657 106 B B
VE1KB 89,640 249 90 C B

Newfoundland-Labrador

VO1MP 1,097,796 1881 147 C C
VO1S (VO1WET,VO1MX,ops)
508,762 2015 127 D C

Quebec

VX2AWR 690,100 1009 206 A B
VA2ADB 86,726 430 103 B B
VE2LHP 42,432 278 78 B B
VE2OWL 101,160 285 90 C B
VX2EM 118,440 327 90 C C
VX2CUA (VE6TC,VA2SMF,VE2OCT, VE2ARW,VE2KXD,ops)
153,402 695 111 D C

Ontario

VE3WZ 49,434 187 77 A A
VG3EF (VE3MQW, op)
562,666 877 221 A B
VA3IX 18,576 139 54 A B
VX3AT 1,964,326 2567 251 A C
VX3KZ 1,320,060 1889 245 A C
VE3EJ 97,180 248 113 A C
VE3BUC 235,710 878 135 B B
VE3SHL 83,022 411 101 B B
VA3SWG 62,016 327 96 B B
VE3UDK 49,858 261 97 B B
VY2MGY 42,742 320 71 B B
VE3EBN 27,974 199 71 B B
VE3NQM 17,784 157 57 B B
VE3DUN 5,850 76 39 B B
VA3TSL 342 19 9 B B
VE3IGJ 6,000 63 25 C A
VA3OR 3,744 36 26 C A
VA3RU 729,504 1349 136 C B
VA3MO 485,044 1028 119 C B
VE3KP 370,188 822 113 C B
VE3UKR 117,216 339 88 C B
VA3UZ 1,224,308 2034 151 C C
VA3UA 711,816 1363 133 C C
VE3HG (+VE3RZ,VE3HKC,VA3GGF)
917,168 1213 266 D B
VA3PRC (VA3ALT,VA3MAH,VE3HTW, VE3KVD,VE3TPZ,VE3YBM,ops)
33,048 208 81 D B

Manitoba

VE4YU 563,170 951 199 A B
VE4HAZ 29,120 235 65 B B
VE4IM 221,704 520 107 C C
VX4GV (VE4GV,VE4EA,ops)
394,784 1063 146 D B
VX4VV (VE4XT,VE4VV,ops)
1,094,324 1733 238 D C

Saskatchewan

VE5QRP 45,650 183 83 A A
VX5UF 1,354,500 2162 210 A B
VE5SF 997,904 1753 188 A B
VE5AAD 43,364 293 74 B B
VE5JL 21,708 137 81 B B
VG5DX 738,090 2666 139 B C
VE5CPU 19,400 197 50 B C
VE5BCS/M 2,808 54 26 B C

Alberta

VE6TN 65,472 210 93 A A
VX6JY (VE6WQ, op)
2,246,508 2878 279 A C
VE6ZA 233,512 1166 101 B C
VX6BF (VE6BF,op)
105,952 342 77 C A
VX6LB VE6LB
95,408 271 89 D C

British Columbia

VE7IN 349,648 848 164 A B
VE7XB 218,960 607 136 A B
VE7UQ 45,414 225 87 A B
VX7CC 2,168,716 3060 253 A C
VG7DP 253,368 1388 92 B B
VE7NS 141,708 727 98 B B
VG7DX 382,204 1792 107 B C
VE7XO 53,136 328 81 B C
VA7DER (VE6BIR, op)
37,944 186 51 C A
VE7UF 441,384 1046 106 C B
VE7FO 399,832 956 106 C B
VE7XF 325,632 770 106 C B
VE7NH 223,488 581 97 C B
VA7LC 166,148 575 73 C B
VA7MAR (VE7EMN,VE7EOE,VE7ZBK, ops) 83,168 347 92 D C

Northwest Territories

VY1JA 211,700 733 73 C C

Checklogs

9A7ZZ, DK3AX, DL5NA, DL7VRG, EA5VR, EO1I, EW6MM, G3IGW, G3PJV, HA8DL, HS0ZCW, JA0BPY, JM1NHZ, K2DEI, K6FA, K6FM, KE0F, KK0SS, KU4TF, L99D, LW7EGO, LZ2DD, LZ4UU, N0RIW, OH2HEN, OK1DSU, OK1DZD, OK2BOV, P49MR, PA0IJM, PA3CNI, PA3HGF, PY3CQ, RA3SL, RU9FS, RV3ID, S53AU, SM0CMH, SM5ENX, SM6MVL, SP3DIK, SP3XR, SP4IGV, SP5BYC, SP5JSZ, SP6CDP, SP9CVY, SP9MCU, UA0BA, UA3AVR, UA3DEE, UA4AVN, UA6HON, UR5GDX, UR7M, V44NK, VE3HMK, VE5GC, W8UE, W9JJS, WA7ND, YL2UZ, YL5W, YO4RHK

By Jean Wolfgang, WB3IOS

Jamboree on the Air 2002

The 2002 Jamboree on the Air (JOTA) is just around the corner. Have you been wondering what other hams are doing to make JOTA interesting to Boy Scouts and Girl Scouts of all ages? I have been reading JOTA surveys and logs for five years. Here are a few excerpts from surveys I have received.

"Troop 1139 does a 25-mile bike hike with the JOTA overnight."—*Wisconsin*

"The fourth grade Junior Girl Scout Troop 1236 constructed Morse Code Keys and a poster to show the Morse Code. We learned how to talk on the air using phonetics."—*Illinois*

"We were working 15 meters till 2 hours after sunset on a North-South path. We coupled JOTA with a Merit Badge weekend for Electricity, Electronics and Radio. Thirteen boys passed the Radio Merit Badge. Scott, KD5FBA, had a quick chat with the ISS from a vertical mag-mounted to a trash can lid!"—*Texas*

"We were camping in a cow pasture. Most of the boys enjoyed talking to scouts in other countries rather than scouts in the US. We enjoyed a 30-minute QSO with a Canadian troop. This troop was co-ed and that got the older boys' attention. If you want to know how to start a fire without a match, just get boy scouts and girl scouts on the radio talking"—*Oklahoma*

"The 20 meter dipole was built by Troop 26 at their regular meeting the previous Monday. Three club members, Brad Beaman, KB7PYZ, Chris Beaman, KB7OYG and Don Rankin, KF7BR, supervised the project and fielded any questions asked."—*Wyoming*

"This event was excellent. The weather was beautiful, and the radio conditions even during the day were great. We found many hams that were more than willing to take the time to talk with the boys. The real highlights of the event were making contact with McMurdo Station, Antarctica, and working five continents during the time we were on air. The biggest pride builder with the boys was working with them to build a 10 meter dipole that we then put in the air and the boys worked 24 stations on the antenna that they built."—*Ohio*

"We operated from the Amateur Radio Education Center at Discovery Place science museum in Charlotte. Everyone enjoyed the opportunity to learn and send his or her name (among other things) via the Morse Code oscillators. They enjoyed operating the HF station, some took a liking to the PSK-31 station, but everyone was entranced with the satellite station when NA1SS was making a pass. My daughter, Kara, KG4GVS, finally made contact with ISS on Sunday and cheers erupted from all the other Girl Scouts. That was obviously the highlight of the weekend."—*North Carolina*

Jason Jodon, N8VUA, from Ohio, sums it up in his comments.

"I encourage any ham that has not participated in Jamboree on the Air (JOTA) to give it a try. You'll definitely walk away with a warm fuzzy feeling knowing that you helped broaden the horizon of a young mind."

After JOTA 2002 is over, please complete the simple survey at **www.arrl.org/FandES/ead/jotalog/**. Completing this form will help ARRL track the growth of this activity and will enable us to improve it in the future. Last year we received surveys representing 30 states. Please submit your survey by December 1, 2002 so we can include your activity.

Jean Wolfgang, WB3IOS, is ARRL Educational Programs Coordinator. She can be reached at **wb3ios@arrl.org**.

Worldwide Scout Frequencies

JOTA 2002 begins on Saturday, October 19, at 0001 local time, and ends on Sunday, October 20, at 2359 local time.

Band (m)	*Phone (MHz)*	*CW (MHz)*
80	3.740 + 3.940	3.590
40	7.270	7.030
20	14.290	14.070
17	18.140	18.080
15	21.360	21.140
12	24.960	24.910
10	28.390	28.190

Go to **www.arrl.org/FandES/ead/#scout** for more information on JOTA 2002.

DOUGLAS COOK, KD5PDN

In a pasture in Oklahoma, John Dronberger, N5YZA, begins a contact while Brendon Williams (left) and Jesse Christensen wait their turn.

STEVE MCREYNOLDS

During JOTA 2001, Kara, KG4GVS, made a successful contact with Commander Frank Culbertson, KD5OPQ, aboard the International Space Station. There are no guarantees, but perhaps the Space Station will be on the air again for JOTA 2002. QST

By Lew Malchick, N2RQ

School Club Roundup 2002

"We only had one hour and were set up in the school lobby for maximum exposure (and noise). We did not go for the points, only playing with radios" (WB4APR and K8JW). The Severn School turned in the lowest total score this year, but showed the best spirit of the School Club Roundup—to get our young people interested in ham radio. Why the low score? Most "contacts" could not be counted. They had three radios on HF—one for contacts, one for spotting and one for PSK-31—and another on VHF FM for the local repeater and APRS.

Our 16th School Club Roundup brought back some of our stalwart participants. W3NCS (North Clarion School ARC) returned after a year off to narrowly retake the elementary school lead while KB3BRT (Cowanesque Valley School ARC) repeated as second, but with a 21% higher score than 2001. N0Z (AD8B, Zion ARC) and KC0CXB (Mt Garfield Middle School) moved up by more than 70% each to second and third, while N8KR (St John Radio Club) led the Junior High/Intermediate/Middle School category on their first attempt. The top three high school clubs were repeats. KC7KFF (Carl Hayden Community HS ARC), W6PRB (Paso Robles HS ARC) and K1BBS (Burr and Burton ARC) all scored at least 20% higher than in 2001. The College/University group saw the continued domination by W7ASU (ARS of Arizona State University) followed by W5YW (Louisiana State University ARC). W6YRA (University of California at Los Angeles ARC) moved up to third by increasing their score by more than 15 times.

In the individual category, we had four of our most supportive participants. N2IZM (Herbert), KB3AGZ (Jack), WO8L (Rick) and KA2NRR (Marty).

Overall participation was up substantially from 2001 with 64 schools entering, reversing two years of decline, but not quite topping the 68 reached in 1999. Elementary schools stayed at 12. Junior High/Middle/Intermediate Schools went up from 12 to 20. High Schools increased from 15 to 17. Perhaps most noticeable is the apparent trend in the College/University category which has increased from 6 to 10 to 15 entries. It was disappointing not to have DX or Club entries this year.

We started this article by highlighting our smallest score entry, but for some, a contest is still about winning. Allen Cameron, N7UJJ, has guided his students at KC7KFF to top scores for years. It has been previously noted that Nicholas Radtke, KC7MOD, one of the Hayden HS alumni has been instrumental in the operation of W7ASU, Arizona State University. Now Meghan Radtke, KC7MOC, has brought those winning traits to W5YW, at Louisiana State University.

DEBBIE ROGNER, KB8IKJ

One of the highest scoring school groups, N8KR, at the St John Lutheran School in Michigan.

For the first time, this year, we implemented the rule recognizing Canadian provinces for multipliers, similar to US states. This seemed to cause some confusion and we will review all comments and suggestions we receive before setting the rules for 2003.

For more information about the School Club Roundup, try our e-mail reflector. You can subscribe at **www.groups.yahoo.com/group/SCR-L** or by sending an e-mail **to SCR-L-SUBSCRIBE@yahoogroups.com**. You can also get information by postal mail. Please send a return address label and two units of First Class postage to Lew Malchick, N2RQ, c/o Brooklyn Technical High School, 29 Fort Greene Pl, Brooklyn, NY 11217.

The 17th SCR will be the week of February 10-14, 2003.

Soapbox

This was the first involvement with Amateur Radio for the 18 student SCR participants at Trask MS (K4T). They worked the SCR after school and many parents attended to watch their children operate.—*Bill, N2WG*

High school radio clubs are like football teams. Sometimes you have to start from scratch when all your stars graduate. This year we only had three operators, but still enjoyed the contest greatly. The SCR is a great way to help the students overcome their mic-shyness and gain skill in on-the-air operation.—*Thomas, KA3WSQ at KB3BKW, Belle Vernon HS ARC*

The whole school got involved this year. Three kindergarten, three first grade, a second grade, a third grade, two fourth grade and three fifth grade classes took time to visit the club station. Sixty-three different students had a chance to experience the thrill of being "on the air." Thanks to everyone involved with the sponsorship of this great activity. Special thanks go to all the great hams who took time to visit with the future hams of this great hobby.—*Bruce, K3LTM (advisor CVSARC KB3BRT)*

Beth, KF2BQ, started in a new position at a different school. One of her duties is to organize parent-school-student activities during *and* after school hours. SCR was a perfect fit! KC2AHK was set up on a freezing and windy morning for an all day and night operation and demonstration. Hundreds of students and parents took part in the operation, which included QSOs, a CW lesson and some great DX (7Z1AB, American Consulate in Jeddah, Saudi Arabia; BA4DX, Shanghai, China; JA3KW, Kumatoto, Japan; and XW0X from Vientiane, Laos)! We would like to see the "6 hour rule" modified or dropped.—*Bob, KF2BQ and Beth, KF2BQ*

Ed Roller, N4ZRA, operated from the University of Georgia College of Pharmacy as part of a new course entitled "Training Health Care Professionals for Weapons of Mass Destruction Events and Natural Disasters." Forty of the 55 class members took part in the SCR and spent time talking with other schools and individuals. During this demonstration, which also involved students at the Medical College of Georgia in Augusta, Dr Dallas, director of the Center for Leadership in Education Assessment, and Research in Mass Destruction Defense (CLEARMADD), encouraged students to consider getting involved in Amateur Radio.

The School Club Roundup has always been one of our favorite activities because many younger people are getting their first introduction to Amateur Radio and

that's part of our volunteer work—recruiting newcomers to Amateur Radio at UCLA.—*Dave, WA6AYI, Club President*

We blew away our 7 QRP 10 meter QSOs from last year with 51 on the same band! Our 25 W nearly worked all continents to the delight of our students. Many thanks to the school stations that listened for our weak signal and all the great ops who said hello to our class!—*Phil, KD7CJV*

2002 School Club Roundup Scores

Call Sign	Score	Rank	QSOs	States	Can Prov	Countries	Clubs	Schools	Hours	Operators	Club Name	School
Elementary School												
W3NCS	44,156	1	166	41	4	29	6	36	18	44	N Clarion School ARC	N Clarion County Elementary School
KB3BRT	40,950	2	150	38	5	10	0	44	19	64	Cowanesque Valley School ARC	Westfield Area Elementary
N3ZXK	20,758	3	107	26	2	4	1	32	19	1	Clark Wood Third Grade ARC	Clark Wood Elementary
KB2VBU	13,534	4	101	28	3	9	2	18	15	36	Intervale School ARC	
N1IFP	12,960	5	81	33	0	7	0	24	10	3	Bean School ARC	James Bean School
KB2VAP	9443	6	71	35	1	7	0	18	13	19	RC of South Colonie Schools	Shaker Road Elementary School
KC2AHK	8004	7	69	24	1	13	4	14	7	200	Stafford Schools ARC	Ocean Acres Elementary School
KK8STA	5525	8	58	31	3	6	0	9	18	8	St Antoninus School Radio Club	
KB2RMS	5251	9	59	21	2	5	3	11	17	42		Chapin School
KD7CJV	2907	10	51	19	0	16	1	4	24	5		Mill Park Elementary
K6LSR	2254	11	23	13	1	3	3	15	11	4	Lodi Schools Radio Clubs	Nichols Elementary School
KC2AXZ	1360	12	20	13	0	5	0	10	6	1	Kernan Elementary School ARC	
Junior High/Middle School												
N8KR	147,600	1	400	49	5	29	3	56	22	12	St John Radio Club	St John Lutheran School
N0Z	75,816	2	234	46	5	12	3	51	23	58	Zion ARC	Zion Lutheran School
KC0CXB	73,486	3	362	41	3	7	6	28	24	37	Mt Garfield Middle School ARC	
KB9ZQV	65,260	4	251	43	4	7	3	40	14	62	Memorial Park Middle School ARC	
K7BZN	42,444	5	262	39	3	20	5	18	12	12	Sacajawea Middle School HRC	
W7ERY	22,790	6	215	42	3	0	3	11	24	14		Maple Grove Middle School
K4T	20,943	7	117	33	2	5	2	27	13	18		Trask Middle School
KR9L	18,124	8	91	34	1	3	2	31	6	9	Liberty Radio Explorers	c/o Liberty Community Unit #2
K0EMS	17,576	9	104	32	2	1	2	26	23	57	East Middle School ARC	
K5OMS	11,868	10	69	31	1	6	2	26	5	1	Olle Middle School Club	
K5ARK	9052	11	73	28	2	4	0	18	9	5	Dunbar Intl Magnet ARC	Dunbar Magnet Middle School
KC2ILA	4600	12	40	20	0	5	0	18	13	7	Central Square MS ARC	
W9CJS	3240	13	27	17	1	0	1	20	2	3		Christian Liberty Academy
WD4OHD	2850	14	25	17	0	0	1	19	5	10	Baylor School ARC	
KC8KOH	1848	15	24	14	0	2	0	10	6	6	Ritchie Co Middle School ARC	
W5ADC	992	16	14	10	0	2	0	10	6	4	Carpenter Middle School ARC	
K4B	756	17	18	11	0	1	0	6	6	1		Williston Middle School of Math, Science & Technology
W2SKY	312	18	12	10	0	1	0	3	6	1	RARA Radio Coaches	Jefferson Middle School
KE4JZM	288	19	8	6	0	0	0	6	6	5	Phillips Amateur Radio Club	Guy B. Phillips MS
K8JW	100	20	5	5	0	0	0	3	1	8		Severn School
High School												
KC7KFF	348,138	1	921	49	8	53	14	48	24	27	Carl Hayden Community HS ARC	
W6PRB	215,496	2	699	50	10	40	11	34	24	20	Paso Robles High School ARC	
K1BBS	171,450	3	450	43	6	39	4	57	24	35	Burr and Burton ARC	Burr and Burton Academy
KB3GWS	44,720	4	197	36	4	17	3	29	16	11	North Hills HS Amateur Radio and Electronics Club	
N4LZJ	30,450	5	145	38	4	9	2	31	16	8		Colonial Forge HS
KC2AIF	23,368	6	127	33	2	4	5	27	16	6	Pioneer HS ARC	
KG8DN	22,311	7	111	33	2	14	6	28	13	4	Gilmour Academy ARC	
WW4BPH	13,440	8	80	27	1	10	5	24	14	5	Brooke Point High ARC	Brooke Point High School
KB3BKW	11,700	9	78	29	1	8	1	22	7	3	Belle Vernon HS ARC	
W2CXN	8909	10	59	26	1	13	3	21	10	10	Brooklyn Technical High School ARC & Soc	
KD5QWK	4266	11	54	27	0	2	0	10	8	8	Antonian ARC	Antonian College Prep HS
KB3BRD	3596	12	31	16	1	0	2	19	5	6	Carver HS Radio Club	G. W. Carver HS of Engineering and Science
KC2AXX	3441	13	31	17	0	10	2	16	11	5	AMAR	SCT BOCES Tech Program
KC0ENB	2544	14	48	13	1	0	2	7	4	1	Russell High School Radio Club	
N7TAK	1116	15	31	14	3	4	0	3	14	9		Casa Grande Union HS
AD4SY	1098	16	18	11	0	0	0	10	10	2	CGS Spotsylvania	Commonwealth Governor's School
K5TSB	462	17	14	12	0	1	0	4	2	2	Texas School for the Blind RC	Texas School for the Blind and Vision Impaired
College/University												
W7ASU	369,720	1	908	49	8	47	23	49	24	5	ARS at Arizona State University	
W5YW	197,708	2	613	48	5	20	7	47	24	4	Louisiana State University ARC	
W6YRA	132,615	3	421	48	4	4	2	51	12	5	UCLA ARC	
W5ASU	103,689	4	281	42	2	3	6	62	18	14	Arkansas State Technical Institute ARC	Arkansas State Univ
W9YT	40,317	5	151	36	2	12	1	43	8	1	Badger ARS	University of Wisconsin Madison
W9NIU	32,512	6	123	37	1	5	4	41	17	5	NIU Amateur Radio Club	Northern Illinois University
WA2NPP	21,328	7	124	36	3	1	1	26	8	3	Rutgers University ARC	
W4BUC	20,670	8	106	35	4	1	0	31	5	2	University School of East Tennessee State University	
KE4WLL/5	19,837	9	83	44	0	0	0	39	10	1	SOSU ARC	Southeastern Oklahoma State University
W3UD	17,400	10	87	32	1	0	1	33	11	5	ARA at the U of Delaware	
AG0EU	9546	11	74	30	3	1	0	19	7	1	Jack Blizzard ARC	Evangel University
W8YX	2175	12	25	14	1	0	1	14	7	2	University of Cincinnati ARC	
N4ZRA	2158	13	26	16	0	0	1	13	6	41	College of Pharmacy	University of Georgia
KC2IVQ	1189	14	29	13	1	7	0	4	3	1	Montclair State University ARC	
W5AC	858	15	33	10	1	0	0	3	2	1	Texas A&M University ARC	
Individual												
N2IZM	10,692	1	44	23	0	0	0	44	16	1		
KB3AGZ	7511	2	37	20	0	1	1	36	12	1		
WO8L/M	816	3	12	8	0	0	0	12	3	1		
KA2NRR	400	4	10	8	0	2	0	6	12	1		

2002 ARRL International EME Competition Rules

1. Object: Two-way communications via the earth-moon-earth path on any authorized amateur frequency above 50 MHz.

2. Date and Contest Period: Two full weekend 48-hour periods (0000 UTC on Saturday through 2359 UTC Sunday). **The 2002 dates will be the weekends of October 26-27, 2002 and November 23-24, 2002.**

3. Entry Categories:

3.1. **Single Operator**: One person performs all operating and logging functions, equipment adjustment and antenna alignment.

3.1.1. Multiband.

3.1.2. Single Band: Single-band entries on 50, 144, 222, 432, 902 and 1296-and-up categories will be recognized in awards offered. Contacts may be made on any and all bands without jeopardizing single-band entry status. Such additional contacts are encouraged and should be reported. Also see Rule 8, Awards.

3.2. **Multi-operator**: Two or more persons participate; includes neighboring amateurs within one call area, but with EME facilities for different bands on different team members' premises, as long as no two are more than 50 km (30 miles) apart. Multi-operator neighborhood groups may use the same call signs at each location if permissible under national licensing rules and regulations. If not permissible, separate call signs may be used for the multi-operator neighborhood entry. When operating under this neighborhood provision, all logs must be submitted together in a single envelope or e-mail with a single summary sheet showing the combined operation, designating the principal call sign for the entry. All multi-operator call signs will be shown in the results.

3.3. Commercial equipment: Stations using equipment that is not amateur (such as a dish antenna for lab equipment owned by an institution or government agency) will have their scores listed separately.

3.4. Only one log may be submitted per call sign.

4. Exchange: For a valid contact to occur, each station must send and receive both call signs and a signal report in any mutually understood format, plus a complete acknowledgment of the calls and report. Partial or incomplete QSOs should be indicated on your log, but not counted for contest credit. Stations may be worked once per band for credit.

5. Scoring:

5.1. QSO Points: Count 100 points for each complete EME contact.

5.2. Multiplier: Each US and Canadian call area, plus each DXCC entity (not US/Canada) worked via EME on each band.

5.3. Final Score: Multiply QSO points by sum of multipliers worked on each band for your final score.

6. Miscellaneous:

6.1. Fixed or portable operation is permitted. Stations operating outside traditional call areas must indicate so, identifying the call area of the operating site (such as W1AW/4 operating in Florida).

6.2. Contacts may be on CW or SSB. Only one signal per band is permitted.

6.3. A transmitter, receiver or antenna used to contact one or more stations under one call sign may not be used subsequently under any other call sign during the contest. An exception is made for family stations where more than one call has been issued, and then only if the second call sign is used by a different operator.

6.4. There is no specified minimum terrestrial distance for contacts, but all communications must be copied over the moonbounce path, regardless of how strong (or weak) a nearby station's terrestrial signal may be.

7. Reporting: Entries must be postmarked no later than December 24, 2002 (30 days after the contest) and must include complete log data as well as a complete summary sheet. Official forms are available in the ARRL Website (**www.arrl.org/contests**) or with a self-addressed stamped envelope request to the Contest Branch. Your summary sheet should show a band-by-band breakdown of QSOs and multipliers, and include details of your station setup and a photo. **Cabrillo format is not required for electronic submission in the EME Contest. Entries must include the log file and a fully completed standard summary sheet.** E-mail entries should be submitted to **EMEcontest@arrl.org** and paper/diskette entries should be submitted to EME Contest, ARRL, 225 Main St, Newington, CT 06111.

8. Awards:

8.1. Certificates will be issued to the top five stations worldwide in each of the entry categories: single operator multiband; single operator single band (separate awards for each band); and multioperator.

8.2. Additional awards will be issued where significant achievement or competition is evident. In addition, each station that successfully completes at least one EME contact during the contest period will receive a certificate commemorating that achievement.

9. Other: See "General Rules for All ARRL Contests" in November 2001 *QST*.

9.1. In addition to their official entries, participants are invited to submit contest stories and photographs to the ARRL Contest Online Soapbox at www.arrl.org/contests/soapbox. QST

STRAYS

While preparing for April's H26 contest with the club station HB9AA (Radio Club of Saint-Cergue VD), four of us were trying to mount a 2-element 40-meter antenna. Ben, HB9SJV, offered us the use of his vehicle to accomplish this task. There's more about the Helvetia Contest at home.online.no/~janalme/htmlrules/h26.html.
—Enrique Gutierrez, HB9DCM

Previous Strays

ENRIQUE GUTIERREZ, HB9DCM

By Steve Ewald, WV1X

Test Emergency Skills in SET

The Simulated Emergency Test is October 5-6

This past summer, unfortunately, we have has witnessed many fires in the western United States and flooding in Texas and elsewhere, too. Homeland security issues are still upon our minds, too. Once again, this past year, Amateur Radio operators have performed in commendable fashion. Thanks to your efforts, the public service tradition continues!

The public service spirit of Amateur Radio is carried on through training, and the annual ARRL Simulated Emergency Test (SET) is one such way to experience that necessary training and to test your capabilities and equipment to perform in emergency situations. The main weekend for the SET is October 5 and 6, 2002. It involves the Amateur Radio Emergency Service (ARES), the ARRL National Traffic System (NTS), the Radio Amateur Civil Emergency Service (RACES), SKYWARN and many more groups as they work through simulated emergency scenarios.

Cooperation between Amateur Radio operators and community and public service agencies has been a key ingredient for commendable service. Simulated emergencies are a ready invitation for served agencies like the American Red Cross, the Salvation Army, the Federal Emergency Management Agencies and the National Weather Service to learn first-hand how Amateur Radio operators are able to assist in emergency situations.

Organization Behind the Service

ARRL Field Organization officials in your section and area are making plans for the SET weekend. Their emergency-like scenarios typically require participants to report to pre-assigned locations and operation centers with little or no advanced notice. On-the-air nets are also activated to support the communication.

Under the direction of a test coordinator, Amateur Radio equipment and repeaters are often demonstrated with emergency power for a certain period of time. Also, those operators involved will receive on-the-job training on various types of gear, antennas, and modes of operation. The Simulated Emergency Test encourages all operators to learn and/or review message-handling (traffic) skills and net procedures. In a real emergency, the situation dictates how the Amateur Radio community must respond. All the experience gained beforehand really proves its value.

ARES member Larry Weinstein, K0NA, of Littleton, Colorado, cross trains with a drip torch. ARES members were asked to train as the normal wildland firefighter would train.

Your Help is Needed

To help in this year's Simulated Emergency Test, please contact your local ARRL emergency coordinator (EC) or net manager (NM). Whom should you contact? Check with your Section Manager (see page 12 of *QST*) or log onto your ARRL Section Web page at **www.arrl.org/sections/**. This will lead you to a listing of the ARRL Field Organization leaders and pertinent news in your section.

If you're a Field Organization official making plans for SET, you should be receiving SET guidelines and reporting forms either electronically or via the postal service mail soon. The information will also be posted on *ARRLWeb* at **www.arrl.org/FandES/field/forms/**. Although October 5 and 6 is the weekend to focus on for the national Simulated Emergency Test, ARRL Field Organization leaders may conduct their exercise anytime between September 1 and November 30.

Be Ready to Respond

Joe Dorn, W5VEX, Temple Amateur Radio Club Emergency Coordinator, experienced what can happen when regular communications are out. Here is a first-hand account.

The Bell County, Texas, Communications Center, located about 60 miles north of Austin, was struck by lightning at 0925 CDT on Tuesday, July 2. The main antenna was destroyed and all radio communications for the county were terminated with one bright blue flash. The center handles 9-1-1 calls and dispatches fire, emergency medical services and police units while also providing coverage for city and county infrastructure support.

Shortly after the lightning hit, Joe Dorn, W5VEX, made a comment to another ham that he could hear nothing on the county channels. Joe was on the way to a "coffee session" with several other retired amateurs at a local restaurant. Terry Hashman, KC5EGC, an off-duty Bell County dispatcher, overheard this comment. Terry contacted the Center's shift supervisor, Linda Northam, and offered Amateur Radio operator assistance. The Center's training supervisor, Ann Brown, responded with a request for operators.

Immediately, the amateurs in the coffee bunch were dispersed to various Temple fire stations. Charlie and Kay Schlieper, N5TD and KB5C, reported to the central station, Al Lawrence, K5JLB, Bob Jett, W7KPW, Ed Stewart, N7IGA, and Vernon Starnes, W5WDW, covered the outlying stations.

John Galure, KC5IJL, had activated the EOC. The emergency event required the cooperation of several different Amateur Radio groups in Bell County and the responses and attitudes were great considering that it happened during the workday of a short work week. The Bell County public service agencies should now realize they have a significant resource to assist when communications become critical. QST

SECTION NEWS

The ARRL Field Organization Forum

ATLANTIC DIVISION

DELAWARE: SM, Randall K. Carlson, WB0JJX—Once again Field Day has come and gone. I appreciated all the hospitality that was shown me at all the Field Day Sites I visited. It was good to see all the folks who took the time to come out and join the fun. As usual the creativity showed by the various clubs shows that we indeed have many tools available to us, if and when we are faced with a communication emergency. As we approach the fall months, we begin to enter into the high point of the hurricane season. It's always a good idea to keep an eye on the weather during these months. We have been pretty lucky in the past, but we always need to be prepared. Traffic (June): DTN QNI 136 QTC 11 in 20 sess. DEPN QNI 30 QTC 5 in 4 sessions. K3JL 40. 73 Randall WB0JJX.

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, John Holmes, WX3W. DXCC Card Checker E. Pa.: Glenn Kurzenknabe, K3SWZ. On several occasions over the past eighteen months I have made mention of the outstanding ARES/RACES organization in Chester County. Although the complete success of that group cannot be credited entirely to one person, the leadership and influence of Vern Nelson, KC3XL, cannot be under rated. Vern has resigned as EC for Chester County effective August 1, 2002. As SEC for quite a few years I have known Vern for quite some time. To paraphrase what Vern told me – at seventy-eight years of age I feel ready to step aside as EC. However, I will be around to lend my experience and support. Vern's EC position is being taken over by Lloyd Roach, W3QT. Lloyd is a fine replacement and will do an outstanding job. In a previous article I mentioned that Lebanon County was looking for a new EC. I am happy to say that Kevin L. Broughton, KA3BAB, has taken the position. Kevin did a lot of careful research prior to accepting the EC position, showing that he wants to do things right. With Kevin's leadership Lebanon County ARES/RACES is likely to emerge as an outstanding organization. Another very note worthy appointment is that of ASM to John A. Holmes, WX3W. John's duties as ASM will be to help coordinate the efforts of Skywarn in Eastern Pa. Our Section is covered by three National Weather Service Offices located in Mt. Holly, NJ, Binghamton, NY, and State College, PA. John's background includes, five years as Skywarn Coordinator for Lehigh and Northampton Counties, member of the MT. Holly NWS Skywarn Technical Committee and Special Event Chairman for WX2PHI. John also holds several ARRL E. Pa. Field Appointments and was also a member of the E. Pa. Cabinet as ACC. I am very happy to have WX3W on the E. Pa. Cabinet. The list of Hamfests is growing quite long for Sep and Oct but I will try to make it to all. I am out of state during August sorry I had to miss the August Hamfests. Tfc: K3BCL 395, W3IPX 182, N3EFW 98, W3UAQ 66, W3NNL 62, W3HK 51, N3SW 49, W3JKY 30, KB3CEZ 24, N3AO 23, W3TWV 21, KB3BBR 19, KA3LVP 11, N8JSO 15, KB3CVO 9, W3ZQN 8, KB3CKD 8, K3ARR 4, N3IRN 4, W3ROQ 3, N3AS 2, KB3DDL 2, N3HR 1:Net Reports; EPA 129, EPAEPTN 98, PTTN 68, PFN 6, LCARES CATN 8, MARCTN 8, D3ARES 7, SEPPTN 6, MCOES 1.

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 Web page: http://www.qsl.net/w3tom/. Please pass along important Amateur Radio information and events to your Section Manager for reporting to ARRL HQ, inclusion in QST MDC Section News, and display on the Section Web page. The new Maryland/DC Section ARRL Convention sponsored by the Foundation for Amateur Radio & Columbia Amateur Radio Association is the weekend of September 7 & 8. Many outstanding speakers and Skywarn Classes are planned in addition to an excellent flea market. Come join the fun by attending! For more information checkout: http://www.amateurradio-far.org/ ANAR EC N3SEO reports 5 training sessions totaling 37 man-hours and Field Day participation including another 150 man-hours. CALV EC N3QHC reports the GAP HF antenna is installed on the CALV EOC & the team conducted a foxhunt. CHAR EC KA3GRW reports COMMEX participants included KE3RE, KA3GRW, AA3RT, N3YWZ & N2OMC. FRED EC N8AAY reports proofing work continues on the latest LMOU draft between FRED ARES & Fredrick Memorial Hospital. Field Day activities used an antenna tower trailer. SEC WA1QAA reports a June 11 training exercise in lieu of COMEX was announced to ROs on June 9 by W3YVQ. HF Net participants included: W3YVQ, WA3WRT, N3VNG, KK3F, & WA1QAA. CRN participants included: K3FT, WB3FMT, N3WOF, KB3HER, W3ETC, W3FUO, N3IJK, WA3EOQ, KA3GRW, K3ARS, WA1QAA, KK3ZF, & KB3DCA. Job well done by all! 73, Tom – W3TOM. Tfc: KK3F 960, AA3GV 62, N3WK 52, W3CB 51, WA1QAA 45, N3OR 30, KB3GFC 18, WA3GYW 5. PSHR: WA1QAA 126, KK3F 110, KB3GFC 104, W3CB 90, N3WK 90.

NORTHERN NEW YORK: Thomas A. Dick, KF2GC, http://www.northnet.org/nnyham http://www.geocities.com/nnyara. Email: kf2gc@arrl.org—ASMs: WB2KLD, WZ2T, N2ZMS, WA2RLW. ACC: WA2JPM. BM: KA2JXI. OOC: N2MX. PIC: N2SZK. SEC: WN2F. STM: N2ZGN. TC: N2JKG. The NNYARA's Hamfest / Convention 2002 in Lake Placid, NY will be on Oct 12th, 2002 from 8 AM – 4 PM and will be even better than last years. We will have food service and much more. This year we will have Bernie Fuller, N3EFN, Atlantic Div. Director as speaker. Dan Henderson, N1ND, will be doing a contesting forum and also available to check cards etc. WB2JKJ, Joe from JHS 22, will be here to do a forum on Educom and talk about his many years of helping students and integrating Amateur Radio into the curriculum. Tom Woznack, N2SQO, from NYS RACES will be here to speak. Clinton Co. or Essex County Emergency Services Personnel will speak and much more. We will also have N2Y special event station operating again from grid FN24. WZ2T has QSL cards for stations requesting one. RV room available, but no hookups please! Tailgating and Vendors are welcome. Tickets are $4 advance, $5 at the gate per person, includes tailgate space. Tables; $9.00 includes one admission. Additional tables $2.50. Contact: Tom Valosin – valosin@midtel.net. We have lots of tables this year and even more space. Many vendors are scheduled to participate and we look forward to seeing you at the Hamfest/Convention. I want to thank all the Hams that plan to support this years NNYARA-Hamfest! This year we are having a Dinner/Banquet at the Cascade Inn in Lake Placid. Happy hour 6-7 PM and Dinner at 7 PM. For more Info on this and the Hamfest/Convention & Banquet visit our Web page www.geocities.com/nnyara. 73, Thomas Dick, KF2GC.

SOUTHERN NEW JERSEY: SM, Jean Priestley, KA2YKN (@K2AA) e-mail ka2ykn@voicenet.com ASM: W2BE K2WB W2OB N2OO N2YAJ N2XYZ N2HQL. SEC: W2GW. STM: K2UL. ACC: KB2ADL SGL: W2CAM. OOC: K2PSC. TC: W2EKB. TS: W2PAU, WB2MNF, AA2BN, KD4HZW, WB3IJB, WA2NBL, N2QNX, N2XFM. Gary, K2WG, was successful in appointing ECs in counties previously unfilled. It was a pleasure to present several 25 yr and 2 40 yr ARRL membership awards. 25 yr was given to K2QWQ at the New Jersey Battleship Radio Club. At Old Barney, AI9P and WA2TVS received for 25 yrs. Gloucester County ARC, K2ZA and N2SS received 40yr awards while W2LYL, WB2LNR, K2JF, WA2NPD received for 25yrs. At SJRA WA2NBL received his 25 yr award. Traffic for June QNI rpt NJM 55, WA2OPY NJPN 204, W2CC NJSN 158, K2PB NJN (E) 193, AG2R NJN (L) 167 AG2R (above dual with NNJ) SJTN 74 KB2RTZ JSARS 389 K2ATQ SJVN 192, WB2UVB SAR rpt K2UL 145 AA2SV 97 WA2CUW 82 KB2RTZ 55 WA2YL 50 K2UL-4 50 WB2UVB 49 WJ2F 39 W2AZ 30, N2VQA 24, KC2IYC 13, KA2CQX 10, KB2VYZ 3, KB2YBM, KB2VSR, KC2ETU 1. PSHR: KB2RTZ 180, WB2UVB 155, K2GW 138, N2HQL 130, K2UL 110, WA2CUW 90, AA2SV 90, WJ2F 89, KA2YKN 82, N2VQA 71, KA2CQX 70. Thanks to Jim, K2ATQ for years of service as a leader of JSARS Net. A big welcome to a new net manager, Jim WJ2F.

WESTERN NEW YORK: SM, Scott Bauer, W2LC— The Central District Emergency Net reports all 6 counties reporting in with either the EC or their rep, with ARES/RACES checkins. Agenda is a monthly topic of conversation, test message etc. Thanks to Al, N2CCN, who got things going, and all the others who help with this effort. The Madison Oneida Amateur Club (MOARC) provided communications for the annual American Diabetes Association 2002 Tour-de-Cure Bicycle race. 18 ARES members participated. Erie County ARES provided communications for the medical team during the Corporate Challenge, a 5K run with 12,000 runners. Erie, Genesee and Orleans ARES groups, with over 50 members participating. They also provided communications for the Ride for Roswell. The ride had 5 courses the longest being 100 miles and spanning 4 Western New York counties. Thanks, Karl, N2NJH, and Ed, W2GUT, for the info. Binghamton Emergency Amateur Radio Service (BEARS) provided health and welfare communications for the Vestal XX, a 20K road run in the Town of Vestal. AB2HS, KB2YEN, N2RWH, N2WGM, W2OLB, and WA2QEL participated in the approximately 3-hour event. Thanks to all who sent me a Field Day message. I hope your FD went well. I was one of the 80CW guys for W2AE, the Radio Amateurs of Greater Syracuse. Hamfests: Sept 14, RAGS Hamfest, by the Radio Amateurs of Greater Syracuse, at the Pompey Hill Fire Dept; Sept 28, Amateur Radio Association of the Southern Tier at the Chemung County Fair Grounds. There are several unreported nets and stations this month. We've got to do better guys and gals, please get those reports in early at the end of each month. Net Summaries (June 2002): Net Manager Sessions QNI QSP. BRVSN N2OYQ 20 114 0; CNYTN WA2PUU 30 364 60; ESS WI2G 30 311 54; NYPHONE N2LTC 30 189 313; NYS/L W2YGW 30 251 201; NYS/M KA2GJV 29 180 41; NYSCN W2MTA 5 20 2; NYSPTEN WB3CUF 30 349 60; OCTEN/E KA2ZNZ 30 1325 278; OCTEN/L KA2ZNZ 30 602 254; OMEN N2UC 1 10 0; STAR N2NCB 29 370 19; TIGARDS W2MTA 5 38 4; WDN/E N2JRS 30 401 104; WDN/L W2GUT 28 382 61; WDN/M KA2IWK 10 137 16. Traffic (June 2002), * for PSHR, # for BPL: N2LTC#* 1373, W2MTA* 494, KA2ZNZ* 458, WB2IJH* 243, KA2GJV* 218, KB2KOJ* 215, WI2G* 209, NN2H* 197, N2CCN* 119, KG2D* 108, W8JEB* 68, W2LC* 66, AF2K* 64, KB2SNP* 62, KC2EOT* 61, W2PII 47, N2JRS* 36, KA2IWK* 34, KB2CCD* 33, K2DN* 28, KB2ETO* 28, KA2DBD* 27, W2GUT 24, KA2BCE* 10, W2RH 9, KG2HA 9, WA2GUP* 9. Digital, Rx/Tx: N2LTC 408/347.

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. On September 8, the Western Pennsylvania Section Convention will be held once again at the Butler Farm Show grounds. This annual event is an excellent opportunity to attend a hamfest but also meet with many of the officials of the ARRL. This year Dan Miller, K3UFG, plans to attend from league headquarters and will conduct forums during the day. Dan is a certification specialist and actively involved in the online courses being offered by the league. Once again Atlantic Division Director Bernie Fuller, N3EFN, will be attending the convention and will also be conducting a forum on the league activities. Please stop at the league table and say hello to us when you attend the convention. This fall section emergency coordinator Rich Beaver, N3SRJ, his staff and key members of the section staff will be looking at ways to restructure the ARES organization in W. Pa. This will include personnel changes and procedural changes. We would like to hear any ideas from the members on the issue. Individuals interested in taking an active part in the ARES operation should contact Rich or myself. Please visit the section Web page at http://www.bfdin.com/wpasec/index.htm. Also check out the new ARES information page that is available via a link. Information on the emergency communications courses can also be found at that location. Remember the section traffic net of 3983 Hz nightly at 6 PM. 73 de John Rodgers, N3MSE, WPA-SM n3mse@arrl.org.

CENTRAL DIVISION

ILLINOIS: SM, Sharon Harlan, N9SH—I am very pleased to be back as SM for the Illinois Section. I would also like to thank Bruce Boston, KD9UL, for his work as SM for the last eight years. I wish Bruce all the best in whatever endeavor he pursues. It was a pleasure for me to attend the Starved Rock Radio Club Hamfest on June 2nd. I had a great time and even though it rained the turnout was good. I also attended the Egyptian Radio Club Hamfest June 9th and also had a great time meeting all the IL Section hams. My first official visit to a hamfest was the KARSFEST on July 7th. This was also well attended and word has it that this is the third straight year for growth for this hamfest. Thanks to Chip, K9IOC, and Clay, N9IO, for inviting me. I'm sorry to report that Bruce Burton, KU9A, a former SRRC member is now a SK. He passed away July 3rd. 21 members and friends of the Six Meter Club provided communications support at the annual Run For The Roses on May 18 in La Grange Park. Those who assisted were: W9AUB, KA9BVQ, WA9CCQ, K9ENZ, N9EYF, WA9FIH, KB9FUR, K9LPL, KB9NGI, W9NHX, W9NSP, KB9OYO, WA9RIJ, N9TUP, N9TUQ, N9TVM, N9VKE, KB9VMR, AK9Y, N9ZCK, KB9ZKG, and WA9BXB, deputy Chief of Police monitored from his squad car. Everything worked well and no problems were encountered. 8 members of the ARES group in Rockford provided communications for the 1st annual 4th of July Classic. The promoters expected 250 people, the actual count of participants was 587 people. Those helping out were N9XUG, N9EGF, KA9IMX, WA9KSS, N9HPG, KB90XS, KB9FXD and WA9AXG. Everything worked well and the promoters want the radio communications back next year. June tfcWB9TVD 36; KA9IMX 24; W9HLX 34; W9FIF 30; NC9C 14. ISN report for June, QNI 175, QTC 100, Sessions 29. From KF4UBX 9RN cycles 1 & 2 59 sessions traffic 184, average per session-3.11, checkins-96% of IL traffic handled by AG97, N9GZ, N9PLM, W9AAD, KA9IMX, KB9TXI.

INDIANA: SM, Jim Sellers, K9ZBM—ACC: N9RG. BM: KA9QWC. OOC: AA9WD. PIC: WA9ZCE. SEC: N9YNF. SGL: K9JZZ. STM: WA9JWL. TC: W9MWY. Do you hold an ARRL Field Appointment? Needed are Net Managers (NM), Official Relay Stations (ORS), Official Emergency Stations (OES), Official Observers(OO), Public Information Officers(PIO), and Technical Specialists (TS). Let me know your interests. There is always room for volunteers who are willing to share their interests and talents toward the furtherance of Amateur Radio. It is not too soon to think about the annual Simulated Emergency Test (SET). ARES groups need to be actively participating in this annual training exercise. The SET is also a time to check out the kinks in our NTS nets. Remember: In an emergency, you will operate like you train. So, be prepared! ARES Groups can hold their annual SET anytime between September 1st, and November 30th. Our SEC, Dave Pifer, N9YNF, will have a suggested scenario for this year's SET ready shortly. Don't forget the monthly Indiana Section ARES/Emergency Net for all interested amateurs on 3910 kHz at 8:00AM(1300Z) on the 4th Sunday of each month. Does your local Net Manager report your VHF Net activity to our Section Traffic Manager? If not, he/she should be. This is public service activity, especially if your net is for local emergencies and/or traffic handling. Is your club in need of programs to pique interest at monthly meetings? Check out the Speaker's Bureau portion of the Indiana ARRL Web site at: www.inarrl.org. If you have items of newsworthy interest, please send it to me either via USPS, or E-mail. 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	1377	198	1590	82
QIN	3656	1430/2400	133	74	644	51
ICN	3705	2315	31	19	205	18
ARES	3910	1300/4th SUN/MO	12	2	21	1
Hoosier VHF Net (8 reporting)			399	3	617	31

9RN Cycle 1 and 2 for June: Sessions 59, checkins 437, traffic 184. Avg. per session 3.11 Participation 90% represented by: N9KNJ, WB9QPA, K9GBR, WA9JWL, K9PUI, KE9AK. (fm KF4UBX). Tfc: WA9JWL 108, KJ9J 104, K9PUI 67, N9KNJ 66, KO9D 40, K9GBR 30, WB9OFG 23, W9EHY 19, K9CUN 15, K9DIY 11, KA9QWC 8, AB9AA 8, KB9TUI 8, WB9NCE 5, KC9BZL 2.

WISCONSIN: SM: Don Michalski, W9IXG. BWN 3985 0500-0715 W9RCW. BEN 3985 1200 KE9VU. WSBN 3985 1730-1800 K9FHI. WNN 3723 1800 KB9ROB . WSSN 3645 1830 N9BDL. WIN-E 3662 1900 WB9ICH. WIN-L 3662 2200 W9UW. CTN 3994 Mondays @ 2000 KC9IS. With regret, I inform you that N9PFQ, Mary Muckerheide, 66, is a SK. Mary was active in ARES and Tomahawk Repeater Association. Wayne Burgdorff, W9HAX, 76, is a SK. Emil Rasmussen, KB9UOD, 78, is a SK.

Continued on page 112.

Steve Ewald, WV1X ♦ Public Service Specialist

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- Remotable front panel w/opt. YSK-7100

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- 160-10M @ 100W
- 12V Operation
- Simple to Use
- CW Keyer Built-in
- One Touch Band Switching
- Direct frequency input
- VOX Built-in
- 101 alphnumeric memories

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Back by popular demand!

- 2M, & 70CM @ 5W
- V/V, U/U, V/U
- Independent controls for each band
- 200 alphnumeric memories
- Auto repeater
- CTCSS encode/decode w/tone scan
- IRLP compatible

IC-V8000 2M Mobile Transceiver

- 75 watts
- ICOM DMS scanning
- CTCSS/DCS encode/decode w/tone scan
- Weather alert
- Weather channel scan
- 200 alphanumeric memories
- Backlit remote control mic

IC-756PROII All Mode Transceiver

- 160-6M @ 100W
- 32 bit IF DSP
- Enhanced 5 inch color TFT w/spectrum scope
- Selectable IF filter shapes for SSB & CW
- Enhanced Rx performance
- SSB/CW Syncronous tuning
- Multiple DSP controlled AGC loops
- Advanced CW functions
- 101 alphnumeric memories

IC-T7H 6W, Dual Band Transceiver

Dual Bands at a Single Band Price!

- 2M/70CM
- 70 alphnumeric memories
- 6W output
- CTCSS encode/decode w/tone scan
- Auto repeater
- Easy operation!
- Mil spec 810, C/D/E*1

IC-Q7A Dual Band Transceiver

- 2M/70CM
- Wide band receiver - 30 to 1300 MHz**
- 200 alphnumeric memories
- Auto repeater
- Includes AA Ni-Cad's & charger
- CTCSS encode/decode w/tone scan
- Mil spec 810, C/D/E*1

IC-2720H Dual Band Mobile

Remote Mounting Kit Included

- 2M/70CM
- VV/UU/VU
- Wide band RX inc. air & weather bands
- Dynamic Memory Scan
- CTCSS/DTCS encode/decode w/tone scan
- Independent controls/each band
- DTMF Encode
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- 10-2M @ 100W
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- Drop-in trickle charger included

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- Cool dual display
- 50 watts
- CTCSS encode/decode w/tone scan
- Backlit remote control mic
- Mil spec 810, C/D/E*1
- Auto repeater
- 113 alphnumeric memories

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- 45W VHF (2M), 35W UHF (70CM)
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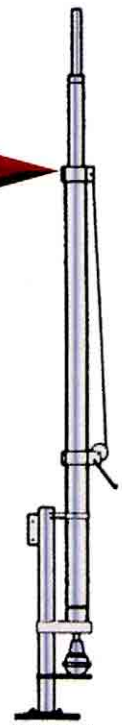

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Assistant News Editor

The ARRL Publications Group is seeking a full-time Assistant News Editor. The position is located at ARRL Headquarters in Newington, Connecticut.

The Assistant News Editor will write and edit news and feature articles for publication on *ARRLWeb* and in *QST*.

Responsibilities include:

- Write news items for publication in *QST* and on *ARRLWeb*.
- Seek out and write news stories describing how ARRL is actively involved in promoting and defending Amateur Radio in the US and around the world.
- Write feature articles for publication on *ARRLWeb Extra*.
- Edit feature articles written by outside authors and prepare them for publication on *ARRLWeb Extra*.
- Prepare a monthly summary for *ARRLWeb* covering what the ARRL has done on behalf of its members during the previous month.

Qualifications include:

- The successful candidate will have demonstrated news writing ability, attention to detail and the ability to meet deadlines.
- Amateur Radio license and on-the-air experience helpful.
- Familiarity with personal computers, especially Microsoft Word and the Internet, helpful.
- College degree in English, Journalism, Public Relations or related field helpful.
- Some familiarity with ARRL membership benefits and programs helpful.
- Some experience with a digital camera helpful.

To be considered for this position, send a resume, cover letter and salary expectations to Assistant News Editor Position, Robert Boucher, ARRL, 225 Main St, Newington, CT 06111-1494; fax 860-594-0298; **rboucher@arrl.org**. No telephone calls, please. ARRL is an Equal Opportunity Employer.

Emil was a member of the RRRC. I appreciate the FD reports from Eau Claire ARC (20 ops- 5042 pts); Hidden Valley ARC (20 ops); Tri-Cnty ARC (5 ops); RRRC (27 ops); West Allis RAC (18 ops); W9HD & KF9D working QRP; Amateur Eagle Independent (5 ops). Well done to all the clubs that participated in FD! My appreciation to W9DGI, N9LIA, W6BSF, and the many amateurs who supported the weeklong Northwood's Tour. We provided 350 cyclists lots of TLC and they really appreciated it. Interested in becoming involved with ARES/RACES? We could use your help. Please contact the EC in your county. A complete EC listing is provided at www.wi-aresraces.org/ or contact Stan Kaplan, WB9RQR, or myself, W9IXG, at (608) 274-1886. A reminder to sign up for receiving email messages from me regarding important WI issues through the ARRL. Almost 1000 Wisconsin amateurs are signed up. Join them! 73, Don, W9IXG, w9ixg@arrl.org. Tfc: K9JPS 888, W9RCW 413, N9VE 397, K9GU 352, N9TVT 217, K9LGU 134, W9IHW 103, W9CBE 81, AG9G 66, KE9VU 50, K9FHI 47, W9UW 47, W9YCV 40, KG9B 36, W9BHL 30, WA9ZTY 26, AA9BB 26, KB9ROB 20, WB9ICH 18, W9PVD 3.

DAKOTA DIVISION

MINNESOTA: SM, Randy Wendel, KMØD—I will revisit the topic of packet in this column as I did about a year ago. A renewed interest has been appearing in regards to bringing back a statewide (give or take) packet network, possibly using 145.01 at 1200 baud. This comes, in part, with a renewed interest in public service comms' connecting as many public safety EOC's as possible. The days of @allusabbs are probably gone due to advent of the internet, and we no longer need to be bombarded by hundreds of messages of someone on the coast trying to sell a mag mount antenna. I encourage anyone (or club) interested in putting a packet node on the air to consider dropping a message to Twinslan packet club...of which members thereof are interested in working with those of you who may be able to help fill in some "dead spots". Email tlan@twinslan.org. I also suggest those with packet or an interest in it to check out the MN packet Web page at http://www.spacestar.net/user/wb0tra/mn_pkt.html. It's easy to say the Internet has replaced Amateur Radio, but we should also consider our capabilities without relying on the Web. We can, once again, enjoy what packet radio has to offer, and regain the enjoyment of exchanging emails via OUR mode without depending on the Internet. And, we can take advantage of providing statewide comms using OUR mode (packet) without depending on the Web to be there when we need it. Use the Web to email Grandma. Use Amateur packet packet radio...for Amateur Radio...and public service. I don't know about you, but I didn't get my Amateur Radio license to visit Ebay! Try doing that without a telephone line while running solely off a 12v battery.

Net	*Freq*	*Time*	*QNI/QTC/Sess*	*Mgr*
MSPN/E	3860	5:30 P	730/89/30	KBØOHI
MSPN/N	3860	12 P	414/70/30	WAØTFC
MSSN	3710	6 P	N/A	Vacant
MSN/1	3605	6:30 P	221/85/30	KØWPK
MSN/2	3605	9:50 P	94/4/25	Vacant
PAW	3925	9A-5P	1679/64/66	KAØIZA

Tfc: NØUC, WAØTFC, WØLAW, KØWPK, W6IVV, WØGRW, W3FAF, WØHPD, KØPSH, KBØOHI, KAØIZA, WDØGUF, KCØHAW, NØJP, WAØYSL.

NORTH DAKOTA: SM, Kent Olson, KAØLDG —Field Day is complete once again, and I hope all had fun. Thunderstorms plagued some of the operations as well as mosquitoes, of course. I was only able to make it to the Fargo site as family reunion commitments prevented me from others. I hope next year will be different. Fargo 146.76 repeater needs an 82.5 Hz tone for access. The machine has been suffering from intermod problems, and so far, this is the only way in which the repeater will work. Bismarck group has been busy this summer with helping to set up a 911 center at the airport, a "Take a kid fishing" event, and the "Buggies-and-Blues" event. Strange weather has been affecting the state this summer. From too dry to too wet, as well as fires south along the ND / SD border. Please contact Rep. Earl Pomeroy and ask him to support HR 4720 and end the CC&R curse. For further information and a sample letter, see http://www.arrl.org or Section's web site at: http://home.earthlink.net/~qtipf16/. HF NM KEØXT reports Goose River Net, 4/53/0; WX Net 28/729/15; Data Net 27/529/10.

SOUTH DAKOTA: SM, Roland Cory, WØYMB—The Midwest Dakota Division convention held at South Sioux City is now history. It was in the convention center this year with much more room. A large crowd attended, and it was an excellent convention. The banquet speaker was Jim Haynie, W5JBP, President of ARRL, an excellent speaker. Minnehaha County Emergency Management is erecting a 60-ft tower at their HQ and have reserved space for two amateur antennas for the use of the Sioux Empire ARC. The Hub City Technical School at Aberdeen has started a new ham club and will be working with the Hub City Club to promote Amateur Radio. Watertown hams helped with the First Annual Lake Poinsett Triathlon. South Dakota ham activity has been reduced due to severe heat and bad band conditions. Checking into the SD evening net has been difficult and sometimes impossible for many stations due to the bad band conditions. Total traffic reported for June was 265.

DELTA DIVISION

ARKANSAS: SM, Bob Ideker, WB5VUH —Hope you're having a good summer. Mark your calendars now for 3 upcoming Arkansas Hamfests in the fall. Queen Wilhelmina (Mena) on Sept 6-7, contact: www.qwha.org; Benton County Radio Operators Club (Bentonville) on Sept 13-14, contact: ad5am@mc2k.com; & CAREN (Little Rock) on Sept 21, contact: www.carenclub.com. Let's all show up at these last three hamfests for the year in our section. Tnx to everyone who holds a position within our section. Your efforts are paying off. Others are encouraged to help by taking an active role in both section & club activities. Your club needs you to attend their meetings & to participate in their planned events to help make it easier on everyone. Visit our section Web site often for lots of good updated information. Elmer, N5OCG, our Web master has done a terrific job keeping it interesting. Have you seen all of the pictures that have been posted from your FD

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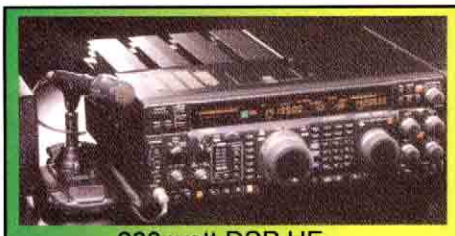

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activities? Go to www.all-arkansas-hams.org for more details. Did you see the live broadcast on ham radio prior to FD? Special tnx to Fred Shay, N2JAS, for his efforts in getting Proclamations out to all clubs & recognition from our Governor. Traffic for June includes: K7ZQR 54, W5RXU 27, WA5KQU 26, WB5HIL 18, W9YCE 16, KO5E 10, KC5VQW 4 & KC5TMU 3. Tnx to those that "bring" the traffic & especially to those stations that "take" the traffic.

LOUISIANA: SM, Mickey Cox, K5MC —The following stations have earned Public Service Commendation certificates for their participation in the National Hurricane Test: WA5LQZ, KC5FGO, KD5HQP, KC5JBJ, KI5EE, KM5QB, W5HHD, KD5OZJ, KC5RJW, WB5AYW, KC5NAD, K5BPA, and W5CKP. New officers for the Westside ARC are W5OS, President; N5SC, Vice President; N5UXV, Treasurer; KC5QKA, Secretary; KC5MFA, Publicity Manager; and W5DFI, Activity Manager. Club officers for the Minden ARA are KB5PKW, President; KD5MNT, Vice President; KB5WFE, Treasurer; and KD5LKB, Secretary. Field Day messages were received from the following: Atchafalaya Amateur DX Assn. (WA5MC), Delta DX Assn. (W5RU), Baton Rouge ARC (W5GIX), Acadiana ARA (W5DDL), Twin City HC (W5EA), South West LA Amateur Repeater Club (W5BII), and Thibodaux ARC (W5YL). It seems that the GOTA stations were quite popular at many FD sites this year! With FD behind us now, it's time to start thinking about the Simulated Emergency Test. Everyone interested in public service is encouraged to be active in SET. Ask your local EC how you can participate in the upcoming SET. Don't forget about the new PSHR criteria (page 77, April 2002 *QST*) that should enable many ARES members to qualify for the Public Service Honor Roll. Tfc: KM5YL 70, K5MC 68, K5DPG 45, W4DLZ 31, W5NK 17, W5PY 6. PSHR: KM5YL 235, K5DPG 206, K5MC 103, W5PY 76, W5NK 67. Net Reports: sessions/QNI/QTC. LTN: 30/310/87. LCW: 30/167/56.

MISSISSIPPI: SM, Malcolm Keown, W5XX—Section Web Site: www.arrlmiss.org. Did you check page 87 of the July *QST*? Mississippi had the 5th highest score in the country for the 2001 SET! Jones County ARES had the highest ARES Activity score and the MSPN the highest score for section/local nets. The 2003 SET will be September 28 starting at 8 AM on 3862. DECs and ECs will organize local emergency exercises that will run parallel to the statewide scenario. 2002 Field Day activities kicked off with Governor Ronnie Musgrove signing a proclamation designating June 17-24 as Amateur Radio Week in Mississippi. Those present for the signing were AB5WF, N5JGK, AC5SU, KD5KWS, KC5OSM, KC5FUY, KD5NYV and W5XX. Mississippi Hams then went to the field to combat mosquitoes and summer time radio conditions, and most importantly demonstrated emergency preparedness capability. Those known clubs/groups operating in the field were the Bluff City ARC (W5KHB), Delta ARA (N5PS), Jackson ARC (W5PFC), Hattiesburg ARC (K5PN), Laurel ARC (W5LAR), Lowndes/Magnolia/Clay ARCs (AA5MT), MCARA (W5CR), MDXA (K5MDX), Meridian ARC (W5FQ), NW MS Amateurs (K5K), SW MS ARC (KD5QNC), Tippah ARC (K5KIR), and the Tupelo ARC (KK5K). The Jackson ARC provided communications for the Heat Wave Classic Triathlon including handling emergency traffic regarding injured riders and an automobile-bike accident involving the Mayor of Ridgeland. City officials were very impressed with JARC efforts. Those participating were AB5WF, KD5JPB, W5GEJ, KD5QQF, KD5QQG, KC5WYY, KD5FUY, KD5EDV, and AC5SU. Welcome to new Mississippi hams: Ricky, KD5SJB - Natchez; Joseph, KD5SLS - Gulfport; Kevin, KD5SOR- Kiln; and Benjamin, KD5SOT-Perlington. Regret to report the passing of KG5SF of Greenville, KA5NYB of Vicksburg, and WA5BMP of Belleville, Michigan. Les was one of the founders of the West Jackson ARC. Net Reports: sessions/QNI/QTC. MSPN 30/3164/77, MTN 30/85/46, MSN 30/1416/13, PBRA 30/465/4, Jackson Co ARES/RACES 30/339/8, MSSN 20/39/2, West Coast MS ARES 12/108/0, MLEN 5/79/0, MAEN 5/65/0, HAEN 5/56/0, MBHN 4/34/0, LARC and Jones Co ARES 4/88/0, JARC EN 4/85/0, MCARA 4/49/0, SW MS ARES 4/69/0, Attala Co ARES 4/30/0, Metro Jackson ARES 4/21/1 Central MS Skywarn Net 1/83/0. PSHR: N5JCG 255, W5XX 139, AC5SU 128, WB5ZED 125. Traffic: WB5ZED 958 (BPL), N5JCG 78, W5LEW 18, KJ5YY 17, W5XX 14.

TENNESSEE: SM: Terry Cox, KB4KA—ACC: KB4KA. ASM: Ken, K4DIT & David, K4PZT. SEC: Sheila, KB4G. STM: Tim, KR4TT. TC: James, KB4LJV. OOC: Mike, KE4KMG. SGL: Dwayne, K4UTV. PIC: Greg, WN4M. Section web page at www.tnarrl.org. Recent appointments included OES James, N4YIS, NM Eric, KE4KGF (Chattanooga ARC Net). The primary news this month is about Field Day 2002. Based on the input I have received, many Tennessee hams participated and had a lot of fun, solidified old friendships and made new ones, and learned a lot about establishing stations under adverse conditions. Participation ranged from Class A through Class E. Pictures from several groups may be accessed from the Section web pages as listed above. If your photos and comments are not there, or at least links to your pages of pictures, please email me and they will be posted. The Stones River ARC supported the Tour de Cure 2002 bike ride to raise money for medical research. Over $100,000 was raised by the event. One of the participants, Jim, WB4OFM, had great things to say about the support the event received from the SRARC ham operators and the Goldwing riders. As I mentioned last month, H.R. 4720 is facing an uphill battle in the U.S. House of Representatives and we need to prod our representatives to support this bill; even be a co-sponsor if possible. At the state level we will have a lot of new faces next year, as many are not running for re-election. Work for the candidate of your choice and tell him/her on the front end we expect them to support our upcoming state PRB-1. This is a bi-partisan issue and members of both parties should be able to support us. The June issue of RACK Panels had a nice recap of the Knoxville Hamfest. This was a well attended fest and I encourage everyone to attend as many Section hamfests as possible. The Andrew Johnson ARC has applied for re-affiliation, the William Blount High School Amateur Radio Club has received their ARRL affiliation charter and the Dickson County Amateur Radio Club is in the application process. Welcome to everyone! DRN5 Report Cycle 1 & 2 (SSB), June 2002. TN 73% (Missed 16 sessions) W4OGG, KE4GYR. Nets/ Sess/QNI/ QTC: TCWN 17/113/1; TEMPN 20/779/25; TEPN 19/1499/36; K4QQ 30/2569/29. Tfc: KE4GYR 46, WA4KHU 4, WA4GLS 8.

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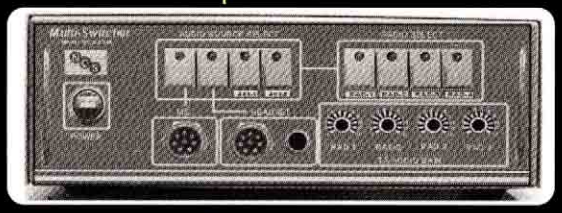

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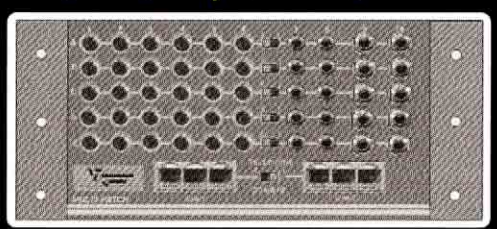

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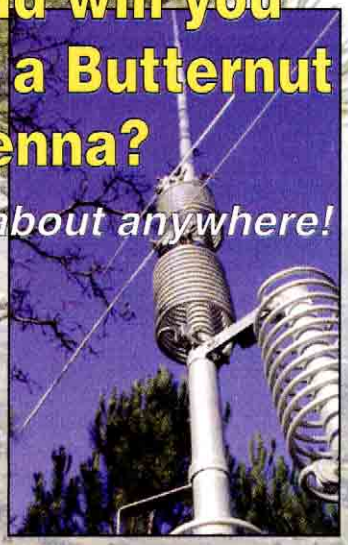

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GREAT LAKES DIVISION

KENTUCKY: SM John D. Meyers NB4K. Silent Keys for June as reported by Tom Lykins, K4LID Silent Key Administrator K4LCK-James H. Daniels, W4HNI-William Binkley, KC4ZNN-Edwin Eisenbeis and KI4EV-James Binion. Field Day was very well represented this year in the Commonwealth with over 20 clubs, ARES organizations and individuals participating. One big attraction this year was the Get On The Air (G.O.T.A.) Stations and many have expressed their returns next year. I received five radiograms from different field day groups and Ron Dodson, KA4MAP SEC received one, these folks where able to add 100 points to their scores for the radiograms. Start planning for the ARRL S.E.T next month and let Kentucky have a great turn out. Send many radiograms for this field exercise. Check with Ron Dodson, KA4MAP, the SEC, for details.

Name	*Sess*	*Tfc*	*QNI*	*NM*
MSUARC	4	0	48	KG4SGA
NKEN	4	7	70	WD8JAW
7DARN	4	8	72	WD8JAW
TSTMN	30	30	475	KB8GWL
4ARES	30	30	560	WA4RRR
KYN	33	39	289	K4AVX
9RN CY 1 & 2	59	184	437	KF4UBX
KSN	30	31	222	KO4OL
WTEPN	4	1	43	KO4OL
KTN	60	96	1530	KB4VKS
CARN	29	28	448	KG4KGY

Tfc: WA4SWF 4, K4AVX 48, KG4ABA 10, WD8JAW 19, NB4K 34, K4TXJ 2, K4DZM 87, WB4ZDU 14, K4UNW 6, KO4OL 43PSHR: K4DZM 113, NB4K 97, KO4OL 100.

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: (KA8YKK, Acting). 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) October brings about the annual Simulated Emergency Test (SET). Many questions have arisen as to what this year's SET scenario would be. Well, at this time, I can only tell you this is going to be an interesting weekend. SET is an opportunity for us to test our skills as traffic handlers and emergency communicators using a predetermined scenario in the simulation. It is an opportunity for us to display these abilities to our served agencies. I would like to thank everyone that participated in last years SET, a great job was done by all. For the newcomers to amateur radio, this years SET in Michigan will take place October 5th and 6th. Be sure to check out the State Emergency Frequency 3932 kHz or the alternate frequency of 7232 kHz and look for WC8EOC our State Emergency Operations Center (SEOC). Some new coax has been installed and antennas have been relocated. It should be a good year. If you have never participated and would like to get involved, please be sure to drop me a line and I will get you in touch with your local ARES organization. A big Thank You to all our speakers and the entire Section Staff for their participation and efforts in making our 4th Annual Family Outing another success. Please check out the MI Section Website at www.arrl.org/sections/MI.html. 73, Dick. Traffic reports for June 2002: KC8LBZ 442, KB8ZYY 282, K8GA 226, K8LJG 162, W8RTN 152, K8KV 134, AA8PI 133, K8AE 109, VE3EUI 96, KC8SZR 80, AA8SN 74, N8JAT 71, N8FPN 66, WR8F 60, WX8Y 55, KA8DDQ 45, K8ZJU 41, K8UPE 39, W8RNQ 38, WA8DHB 38, W8EIZ 37, W8YIQ 29, N8UN 27, W8WOJ 23, K8AMR 23, N8EXV 15, K8FE 15, K8YB 14, KA8LAR 12, KI8GR 10, NX8S 2. Deadline 5th of the month. Please support the following MICHIGAN SECTION NETS:

Net	*QNI*	*QTC*	*Sess*	*Net Mngr.*	*Freq.*	*Time*	*Day*
QMN	636	325	60	WB8SIW	3.663	6:30&10 PM	Daily
MITN	460	388	30	N8FPN	3.952	7 PM	Daily
GLETN	541	120	30	VE3SCY	3.932	8:30 PM	Daily
UPN	848	37	35	AA8SN	3.921	5 PM	Daily (Noon Sun.)
WSSBN	679	36	30	WB8ICN	3.935	7 PM	Daily
SEMTN	308	84	30	K8JN	145.330	10:15 PM	Daily
MACS	176	44	28	W8RNQ	3.953	11 PM	Daily (1 PM Sun.)
VHF	386	09	16	KB8ZYY	Various		
MI-ARPSC	42	4	3	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: Reuben Meeks, W8GUC, Vandalia...Before we discuss the 2002 Ohio Section Conference, let's welcome Reuben Meeks, W8GUC, of Vandalia and former president of the Dayton Amateur Radio Association, as the new Ohio Section State Government Liaison. He succeeds Jeff Ferriell, K8ZDA, of Columbus. Reuben, a ham for 45 years (first licensed KN6GUC), is a Broadcast Engineer retired from government service (mainly for the USAF) but continues as a private engineering consultant. He holds degrees from Sacramento State College in both Business Engineering and Theology. Reuben has 30 years experience in the US Air Force completing from 1983 to 1993 at Wright Patterson AFB, Dayton, and also holds a private pilot license. He is currently contacting our LGLs as well as developing that program. Welcome him at w8guc@arrl.net...For the September 14 Ohio Section Confer-

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ence, an ARPS presentation will focus on the software, hardware and networks of this new and fascinating mode. But awards (Severson Memorial and News Letter Contest) will also be announced. And the pizza lunch party plus other eyeball QSO chances are the highlights of our Ohio social scene. All this begins 9 AM. Saturday, September 14 at the Ohio EMA facility (as in the past three years) at 2855 W. Dublin-Granville Rd. Columbus (Ohio 161 in northwest Columbus)...The 2003 Ohio Bicentennial is already started. We are encouraging local ham radio events. These need to be planned now. The Ohio Section will be promoting all these local events - in newsletters, in the OSJ and, if possible, QST Section News. For more info and for listing a local event, contact ASM Bob Winston, W2THU, (w2thu@arrl.net). He is the Coordinator of Bicentennial Events for the Ohio Section and will liaison with the Ohio Bicentennial Commission...And if you get this in time, remember the Ohio QSO Party on August 24 by the Mad River Radio Club. More info? Check www.mrrc.net/oqp.OHIO SECTION CONGRATS (A) To Shawn Engl., 12, Milford Amateur Radio Club, the 10th family member to receive his license; and (B) Hank Greeb, N8XX, Cincinnati, awarded at Dayton Hamvention the ARRL/TAPR certificate of merit for lifelong dedication to digital commun-ications...OHIO SECTION SEPTEMBER HAMFESTS AND CONFERENCE; (8) Findlay RC at Hancock County; (14) Ohio Section Conference in Columbus; (22) GCARA at Cincinnati and (22) Hamfest Assn. at Cleveland - yes Cincinnati and Cleveland hamfest are the same day this year; happens once every eight years...de Joe, K8QOE. Now for the June traffic reports:

Net	QNI	QTC	QTR	Sess	Time	Freq	NM
BN (E)	119	48	222	30	1845	3.577	WD8KFN
BN (L)	173	62	252	29	2200	3.577	NY8V
OSN	99	25	403	29	1810	3.708	WB8KQJ
OSSBN	1428	906	2229	90	1030, 1615, 1845	3.9725	N8IO

Tfc: N8IXF 360, N8OD 245, KD8HB 190, W8PBX 170, WD8KFN 162, WA8SSI 157, WA8EYQ 148, KA8CXG 144, N8BV 131, N8DD 124, W8STX 120, W8QIW 118, N8IBR 111, W8RPS 111, KC4IYD 92, N8TNV 91, WB8SIQ 75, KA8FCC 74, WB8HHZ 73, WB8SBK 60, KX8B 51, WB8HHZ 50, KI8IM 49, KC8DWM 44, NS8C 41, N8CW 41, KD9K 41, N8IO 35, K8CAV 34, W8RG 31, NY8V 30, KC8HJL 29, N8GP 28, WB8PMG 28, AB8KB 27, K3RC 22, N8WLE 19, KC8PDY 15, KB8ESY 10, KC8KYP 7, KC8QOE 4, KC8HTP 3, KA8VWE 3, K8WC 1, K8QIP 1, N8RAK 1(May) WD8KBW 17, KC8QOE 5.

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. Thanks to everyone at the Field Day sites that I was able to visit. The food and hospitality was great and I saw many innovative setups. It was quite an education. Sorry I couldn't visit everyone. 2002 SET is coming up fast. Contact your Emergency Coordinator for details on how to join in. 73 de Pete N2YJZ n2yjz@arrl.org. June - PSHR: KC2DAA 464, KC2HUV 365, N2JBA 325, K2CSS 315, N2YJZ 290, N2RTF 155, WB2ZCM 142, WA2YBM 115. Station Traffic: N2YJZ 136, KC2HUV 126, N2JBA 97, K2CSS 45, WA2WMJ 33, N2AWI 23, WA2BSS 22, N2RTF 20, W2AKT 19, KC2DAA 18, WA2YBM 17, K2AVV 6, N2VC 4, K2YS 2, Net Reports:QNI/QTC+QSP CDN 228/142, CGESN 32/1 ESS 311/108 HVN 705/288 NYPHONE 189/627 NYPON 272/194 NYS/M 180/95 NYS/L 251/429 NYSPTEN 349/120 SDN 372/151.

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. The one-year anniversary of Sept. 11 is this month. KCRA will run a special event station N2Y on Sept.14 to memorialize the victims and heroes of Sept. 11, 2001. Look for N2Y on 28.340, 21.340, & 14.250 from 1300z to 1900z. SEC Tom KA2D reports 387 ARES members section-wide. Please consider joining ARES to be ready for the next emergency. Please support House resolution 4720, The "Amateur Radio Emergency Communications Consistency Act", sponsored by Steve Israel of NY, by writing your local US Congressman. STM Charlie WA2YOW reports NTS nets are ongoing on a daily basis - newcomers are welcome. Field Day 2002 was a big success - congratulations to all the clubs setting up this year and thanks for the hospitality of all the clubs I visited. Congratulations to the Nassau ARC and the Knickerbocker ARC for renewing as a Special Service Club. 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 353, KB2KLH 123, N2AKZ 100, WA2YOW 86, AB2IZ 49, KE2SX 33, N2AVY 21, KA2UEC 19, KA2YDW 18, N2TEE 5. (May) N2AVY 42.

NORTHERN NEW JERSEY: SM, Bill Hudzik,W2UDT—ASM: K2WJ. ASM: N2WZB. STM: WB2FTX. ACC: N3RB. SEC: K2SO. OOC: K2ZD. SGL: K1VX. Web page: www.arrlhudson.org/nnj. Field Day in NNJ was a success! The weather cooperated this time and gave many clubs a chance to really shine. I did manage to visit 4 clubs on Saturday (10-70 Repeater Club, Split Rock ARA, County Line ARA and Morris RC) before flying off to W9 Land Sunday morning. My thanks to those clubs who did earn extra points by sending a FD message to me. Next year I hope to start in the southern part of the section! A few clubs such as Raritan Bay and 10-70 invited local government officials to their sites. The 10-70 group got proclamations from state, county, and local officials recognizing ham radio contributions. Welcome to the North Jersey Wireless Association as a new ARRL affiliated club! Over the past year the section has added 4 clubs to the Affiliated roster! This shows support for the ARRL. Long time GSARA member KA2OZA became a Silent Key. Senior NJDXA member W2AGW joined W2BXA at the top of the DXCC Honor Roll by working North Korea. NNJ now has two DXers at the top of the DXCC Honor Roll! Also, it is nice to see former NNJ SM W2CVW still active and chasing DX as well as contesting. Ed was SM back in the 60s while I was still in high school. Our Antenna Structure Support Committee is continuing its efforts to enact a PRB-1 Bill in the state. Check the Web site for

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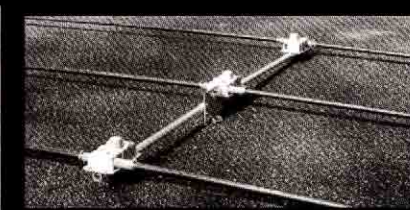

Computer Models of Free Space Gain & *Front to Rear vs. Frequency

2 Element Yagi				3 Element Yagi			
Band	Gain dBi	½ Power Angle	F/R dB	Band	Gain dBi	½ Power Angle	F/R dB
20m	6.6	+/- 35°	20.5	20m	7.4	+/- 34°	25
17m	6.6	+/- 35°	16	17m	8.3	+/- 32°	25
15m	6.5	+/- 34°	13	15m	8.5	+/- 29°	20
12m	6.4	+/- 35°	10.5	12m	8.8	+/- 28°	15
10m	6.2	+/- 35°	8.5	10m	9.0	+/- 29°	11
6m	5.0	+/- 35°	1.5	6m	6.2	+/- 35°	2.8
				6m**	10.1	+/- 25°	20

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updates. Please send club info/activities to our Web master: N2WZB for posting on the Web site. Also, continue to support our section nets. 73, Bill Hudzik, W2UDT.

Net	*Sess*	*QNI*	*QTC*	*QSP*
NJM	14	55	28	28
NJPN	35	204	40	31
NJSN	30	158	11	11
NJN/E	30	193	97	76
NJN/L	30	167	67	63
CJTN	30	170	50	46
UCTN	20	344	10	7

Tfc: W2MTO 105, KB2VRO 76, N2OPJ 57, K2PB 42, N2GJ 38, KJ2N 30, N2RPI 30, N3RB 23, N2BVM 19, K2DBK 17, W2CC 12.

MIDWEST DIVISION

IOWA: SM, Jim Lasley, N0JL—ASM: N0LDD. SEC: NA0R. BM: K0IIR@W0CXX. SGL: K0KD. STM: K0YL. TC: K0JG. Wow! Sep already! I received several invitations to FD, but was unable to keep them. Let's do it next year. Also have about a half dozen messages from FD site. Where do the rest send their messages? I understand that FD went as planned for the GRARC. They had five CW ops and they really went to work. They had 35 participants! 27 in Iowa City and 11 at Olin. TSARC made NO contacts but completed a bakers dozen projects in and around their van. They report a great potluck and they are buying a trailer to hold the gear that won't fit in the van! FD Mini Report from the SWIARC indicates two stations with two operators each. Sounds grueling to me! They also report membership at 130! Good job gang! CVARC sure puts a lot of work into Summerfest. They devote pages and pages of their newsletter to make sure everyone knows what is happening. I know that the 3900 club does the same in Sioux City. I want to thank those who make the hamfests possible. I truly enjoy them. There is a new NWS station in western Iowa on 162.525. Time to go. 73, Newsletters were received from ICARC, GRARC, TSARC, SWIARC, CVARC, FMARC. Traffic: W0SS 86, K0YL 49, WB0B 24, N0JL 22, WF0RT 4.

KANSAS: SM, Orlan Cook, W0OYH—ASM/STM Ron Cowan, KB0DTI. ASM/ACC/OCC: Robert Summers, K0BXF. SEC: Joseph Plankinton, WD0DMV. PIC: Scott Slocum, KC0DYA. TC: Rick Carver, WA0KS. SGL: Steve Hamilton. Hi gang, as you can see by this month's PSHR, things have been turned upside down. The new PSHR limits the traffic handlers to 40 nets, 40 messages, Ø originations and deliveries per month. The only way to offset this is to participate in Walk-A-Thons for 5 pt per hour including planning time. Two tfc hams have done this with good results as you can see. If PSHR points are important to you, you will need to cut back on nets and tfc time and hit the streets with your HT.I haven't received any PSHR reports from hams who only work Walk- A-Thons and reports have fallen off this month. Looks like Field Day was a success this year. I received many pictures. Stations reporting were: W0WOB, K0BJ, W0RR, W0ERH, KC4WCG, N6YR, KS0KS, N0ZIZ, WD0BNC, W0MI, AC0E, W0GCT, K0BYK, W0VZG, W0ROO, WE0C, K0KSN, KC0CMX. Thanks CU next month, Orlan. May. Kansas Nets: sessions/QNI/QTC, KSBN 30/840/63 KPN 21/276/41 KMWN 30/560/430 KWN 30/630/467 CSTN 27/2241/ 112 QKS 60/242/129 QKS-SS 8/19/6 ARES 42/542/21 QNS KB0AMY, KC0AUH, N0BTH, KC0CIG, WD0DDG, K0FJ, KC0GDV, AA0IQ, AA0ND, W0PBV, WD0DMV. SEC Joseph. TEN 62/???/181 Ks 71% wid AA0FO, K0PY, W0WWR, NB0Z, W0SS/Mgr. Ks tfc W0WWR 970, KB0DTI 54, NB0Z 42, W0OYH 13, W0FCL 12, N0ZIZ 10. ww.arrl.org/sections/?=KS

MISSOURI: SM, Dale Bagley, K0KY—ASM: John Seals, WR0R. ASM: Bill Coby, KB0MWG. ASM: Larry Ballew, AB0HP. ACC: Keith Haye, WE0G. OOC: Mike Musick, N0QBF. STM: Charles Boyd, KE0K. SEC: Patrick Boyle, K0JPB. BM: Brian Smith, KI0MB. The Missouri Section Clubs were very active during ARRL Field Day 2002. Messages were sent to ARRL SM and SEC from all over the Section. Many were relayed via the Missouri Traffic System and several were sent using other nets and modes. It was exciting to hear about all of the efforts that Section Radio Clubs were making this year. From St. Charles ARC to Southwest MO ARC and everywhere else in the Section, there was great excitement about the GOTA stations. In several Hamfest sites, the clubs held License Exam Sessions and recruitment of new Amateurs. It is a fact that every year more and more clubs are improving their Field Day effort by utilizing new modes of communication, and computer logging. Field Day provides training, fellowship, and a need for strong coffee and a cool shower when it's over. Ben Hoffman, N0OFD, has announced planning for the Central Missouri MS 150. The date of the event will be Sept. 14th and 15th with the route the same as last year. The controlled net will be on simplex with APRS being utilized to keep track of vital assets. The St. Louis/ Eastern MO MS 150 is normally held at the same time. Mike Musick, N0QBF, has been the contact person for that effort for several years. The KC/Western MO MS 150 will be held Sept 7th and 8th with Don Post, KB0MJZ the contact person for those that want to be part of that effort. The Hannibal ARC held its annual National Tom Sawyer Days Special Event Station on July 4th. If you missed the opportunity to work them, you will have another chance when they operate the International Light House Days on Aug 17th and 18th. They have a great QSL card for the Light House special event. Don't forget the Aug 24th Hamfest in Columbia, MO at the National Guard Armory north of I-79 on Hwy 63 or the St. Charles Hamfest Aug 25th South of I-70 in St Charles on VFW Lane. FYI, the MO Section News on the ARRL Website. I apologize for not keeping the site up to date. I had assumed that the News sent in for the *QST* would be automatically posted to the Web site. That was in error. I have always updated the MO Section Web site at www.qsl.net/arrl-mo, and I have begun the regular updating of the MO Section News on the ARRL Web page. Net/Sess/QNI/QTC/NM: MTN/30/496/56/K0DAT; Rollabillboard 30/477/14/NA0V; Audrain ARC 4/46/3 WB0SEN; Jackson Co ARES 4/ 74/0/K0UAA; WAARCI/5/104/0/N0VJ; 10th Region 60/236/W0SS.

NEBRASKA: SM, Bill McCollum, KE0XQ—ASM: W0KVM, N0MT, WY0F, WB0ULH & WB0YWO. It was good seeing many of you at the Midwest/Dakota Division Convention in South Sioux City, NE on June 15th. Hats off to the 3900 Club for spon-

soring this event. Fifteen Amateurs provided communications for the MS-150 Bike Ride on June 29–30. I hope that everyone and had a safe and successful Field Day. The purpose of Field Day is to see how we can operate under conditions less than normal. Amateur Radio is supposed be an enjoyable hobby and should be treated as such. Best wishes go out to Evan Anderson, KC0CWP who has just returned from Minneapolis after undergoing 3 different surgeries. Net Reports: MIDNE ARES: QNI 376, QTC 4 & 30 sessions. NPPARC: QNI 31, QTC 2 & 4 sessions. NE Storm Net: QNI 760, QTC 22 & 30 sessions. NE 40 Meter Net: QNI 350, QTC 10 & 28 sessions. MARES: QNI 172, QTC 2 & 3 sessions. NMPN: QNI 1703, QTC 45 & 30 sessions. NCHN: QNI 225 QTC 7 & 28 sessions. WNE Net: QNI 1302, QTC 32 & 25 sessions. Plattsmouth ARC: QNI 40, QTC 2 & 4 sessions. Saunders County ARES: QNI 47, QTC 8 & 4 sessions. Traffic: K0PTK 96, KE0XQ 20, KC0DVG 8, WY0F 6, W0UJI 4, KA0DOC 4, WA0ZCM 4, KG0KR 4, N0WY 4, W0DED 2, W0EXK 2, KA0O 2, WA0ZCN 3, K0RRL 2.

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. I am writing this column on our first day on which our UTC-funded Level I Ecomm training courses are beginning. At this writing, half of the seats are full. SEC Jim, KD1YV, and I are pleased to make the appointment of John, W1JMA (w1jma@arrl.net) as DEC for the coordination of ecomm activity with The Connecticut Hospital Association. John will be this Section's main contact between the ARES organization in CT and the CHA. Plans are still in the initial stages so watch for bulletins and further word on this important project. Many thanks to John for his willingness to take on this important work. Bob, KQ2M, reports that he is one of the US and CT representatives chosen by a vote of contest clubs to participate at WRTC2002 in early July in Helsinki, Finland. This is the same site of the WRTC competition during the IARU contest. Fifty two teams from over 30 countries participated in the WRTC activities during the week of July 9-16. KQ2M and partner W7WA also participated in Slovenia where they finished ninth out of 53 teams! Our Director Tom, K1KI, also participated in this exciting event. The Stamford ARA participated in the Bennett Cancer Center Walk soon after field day and reported great success. Their next activity will be the Stamford-Denmark sailboat race. Ops will man the marker boats that run the race. KY1Q is coordinating volunteers for this event. The Club also put up a new Web site at http://www.qsl.net/w1ee, Webmasters John, WB1GRB, and Mike, KB1DXC. Congrats! Practice CW traffic handling by trying The Emprie Slow Speed Net 3.590 1800 local where longtime traffic handler Joe, W1LUH, is one of the net controls. And don't forget our own Section CW net The Connecticut Net 3.640 at 1900 where there are several other enthused ops willing to give you a hand. Looking forward to seeing many of you at the Division Convention in Boxboro, MA—don't miss it, it's always a great event! Net Sess/QNI/QTC: ECTN 30/242/104; WESCON 30/307/77; NVTN 30/112/110; CPN 30/211/61; CN 25/81/67; BOMN 25/232/314. Tfc: NM1K 2207, KA1VED 619, KA1GWE 111, N1VXP 24, WA4QXT 10. (May) WA4QXT 502.

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: N1LKJ. TC: N1UEC. e-mail list: ema-arrl@qth.net, web: http://ema.arrl.org. Kudos to all the Amateurs who gave their time and effort to help make Field Day 2002 a resounding success! Nine EMA ARRL officials toured various Field Day sites. See http://www.temples.com/local/fd2002.html for this SMs photos and commentary. Several Billerica ARS members to assist with communications on a seven-day American Diabetes Assn. charity bike ride touring much of New England. Massasoit ARA prez W1JOE is donating his time and (cooking) skills to the Boy Scouts of America this summer. N1KXD presented on vacuum tubes at a recent MARA meeting. W1LIO was honored recently by the Annual Patriot's Trail Girl Scout Council for her extraordinary work on behalf of the Girl Scouts. Arline has been a part of Girl Scouting for over 60 years! Cape Cod ARES held its ninth drill recently. They tested multi-mode VHF/UHF equipment, conducted NVIS tests on 40 and 75m, and sent radiogram traffic. Sturdy Memorial Hospital ARC set up an Amateur Radio demo in downtown Attleboro over the July 4 holidays. The Framingham ARA crew took down a 60-foot tower from atop the old Marlboro fire station. FARA to hold its annual "FARA Night Out" at the Pacific Buffet. USS Salem RC members will soon sport colorful blue and gold tee shirts, thanks to K1RV. Southeast MA ARA hosted visitors from the Southeast MA Shrine Club. The Shriners operate burn and orthopedic hospitals for children. MA RACES Officer N1CPE has created "NTS traffic and RACES in MA," a PowerPoint presentation for training use. N1JDU has been playing "kite aerial photographer." The latest Waltham ARA newsletter "Prospect Hill Intermod" features a photo and description of W1FBI's unique "Amphicar" at http://www.wara64.org/phi/phi9/. The ham radio equipped-vehicle sports a 43-hp engine capable of reaching 75 mph on land and 10 knots on water. Salvation Army Emergency Disaster Services is recruiting new members, according to N1DHW. Falmouth ARA features a nice 2002 Field Day photo album at http://www.falara.org/fd/flday.html. Cape Ann ARA planning to purchase a new tri-band beam antenna and rotator with controller. 73 de K9HI. Tfc: W1GMF 936, KW1U 775, N1IQI 411, N1LKJ 391, K1BZD 94, WA1LPM 83, NG1A 78, K8SH 57, N1AJJ 46, N1TPU 39, NZ1D 31, N1IST 30, NC1X 30, WA1FNM 21, KD1LE 16, N1LAH 13.

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. Maine's largest public service event was a great success. The Lung Association's Bike Trek Across Maine, starting in Bethel and ending in Belfast, was given the extra margin of safety from the generous Hams who gave up their time to ensure the well being of the race participants. Helping were: KB1EZZ, W1LEE, AE1Q, N1NAF, KB1EKY, KB1GOV, KD1MM, N1VVN, KA1HMB, KA1CNG, KA1RFD, AA1WI, and KQ1L. A special thank-you goes to Dave, KQ1L, for his tireless work on the repeater system that was used for this event. The Oxford County ARES group recruited several new Hams to help with the Pottle Hill Road Race: KB1IIB, KB1IHY, and

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CXP1318FX FLEXIBLE strd BC cntr foil+95% braid 2.7dB 400MHz NC/DB/UV JKT.

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200' $284.95 150' $227.95 100' $159.95 75' $143.95 50' $114.95

w/PL259 (UHF Male) on both ends.

200' $305.95 150' $248.95 100' $191.95 75' $164.95 50' $134.95

with USA made Silver/Teflon® Gold Pin PL259 connectors.

RG213/U strd BC Mil-Spec NC/BD/UV JKT. 1.2dB 2500 watts @ 30MHz.

200' $115.95 150' $89.95 125' $77.95 100' $61.95 75' $49.95 60' $42.95 50' $37.95 25' $25.95 15' $22.95 10' $20.95 6' $14.95 3' $12.95 1' $11.95

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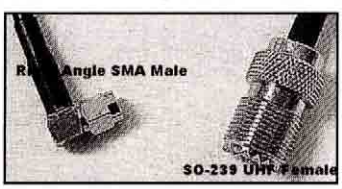

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KB1IJD. Also helping for the first time for a public service event was N1UOI. The old-timers participating were: KB1CAC, KB1EJI, N1YIS, N1WFO, W1IF, and N1GZB. This group deserves a special recognition for their development into a very viable group since their inception during the Ice Storm of '98. We should all be very pleased to know that Maine led the New England Division with 36 new Hams licensed out of the 82 total. This information was given to me at the Cabinet meeting in Warwick, RI, in June. 73, Bill, N1KAT. Tfc: W1KX 145, W1QU 59, W1JX 42, KA1RFD 31, KA2ZKM 28, N1JBD 16, W1JTH 12. (May) W1KX 72.

NEW HAMPSHIRE: SM, Al Shuman, N1FIK (n1fik@ arrl.org)—NH Web site (www.nhradio.org) Sept - New Amateurs for July is 15. Pleased to announce two appointments to my Staff. Please welcome Verne Burden, N5IEP as an ASM serving as my eyes and ears for the southwestern part of the Section. Also I am pleased to announce Peter Schipeliti, W1DAD is appointed as the Observer Coordinator. More extensive BIOs can be found at www.nhradio.org. If you are an active DXer and do not have an account with the W1QSL Bureau, you should consider sending a few bucks to open an account. Send to W1QSL Bureau POB 7388-Milford, MA 01757-7388. Also if you have moved and not updating your address with the FCC, you can do it on line of call me and I'll send you a Form 605. This is a little dated but, I visited some 7 clubs during Field Day 2002. I appreciate your kindness and the good food. Don't forget to come visit me at the Hosstraders Flea Market October 4 & 5. For more information click on www.qsl.net/k1rqg . 73, Al, N1FIK.Tfc: W1PEX 1887, WA1JVV 121, N1NH 118, W1ALE 56, K1TSV 24, WB1GXM 24, N1CPX 3.

RHODE ISLAND: SM, Bob Beaudet, W1YRC—ASM: Admin and Ops & ACC: WA1RI. ASM—Emergency Comm: W1PEV. SEC: N2PGD. BM: KA1BNO. OOC: W1AOM. PIC: WB1P. TC: K1DFT. SGL: Vacant. STM: Vacant. I had the pleasure of visiting all affiliated club FD sites even though Newport Co. was 90% torn down when I got there at noon on Sunday. I didn't take it personally (G). Fidelity and Pawtuxet get the prize for most elaborate FD setups. Great job! Rebuilding an effective ARES structure is progressing on schedule. The weekly net on 146.76 Mondays at 8:30 PM is very well attended with more joining in all the time. On-air presentations keep interest high. NVIS by W1PEV and APRS by W2DAN were great! Thanks guys. On June 11 & 12, our SATERN Leader, Denis N2NCL, led our Salvation Army team in a mock statewide disaster drill. Active stations were W1CGM, WV1H, KA1OTP, AA1XF, W1VJA, W1TEM, W1BSN, N2NCL, and W1PEV. Thanks everyone, we learned plenty through your help. We've accomplished a lot in RI but we have much to build ahead. Please contact me or any of the leadership to see how you can contribute. Summer will be nearing its end when you read this in *QST*. Check those antennas before nasty weather makes it an unpleasant task to repair in the cold or rain. Get more RI news on the web at http://www.ri.arrl.org. 73, Bob W1YRC.

VERMONT: SM, Paul N. Gayet, AA1SU—Please welcome Deb Clark, NN1C, as our Affiliated Club Coordinator and Bert Morton, W1DFU, as Section Traffic Manager. Other news and valuable information can be found on www.arrl.org/sections/VT.html. VT Hams are very active in public service. You can now claim 5 pts/hr towards PSHR! For Details search PSHR on the League Web Site. Don't forget to try out the VHF QSO Party on Sept 14-15. Please remember the victims of the vicious terrorist attack a year ago in your thoughts and prayers. My thanks to outgoing SM WE1U for 4 years of leadership and guidance. Traffic numbers are on our Web site. Name/Sessions/QNI/QTC/minutes/Mgr: VT YL Net 5/39/0/127/KA1LDS; VPEN 5/30/0/190/KC1WY; GMN 25/443/19/1264/W1ALE; VTNH 30/114/88/375/WA1JVV; VTPTN 30/256/24/778; CVTN 27/91/5/206/AA1PR.

WESTERN MASSACHUSETTS: SM, William C. Voedisch, W1UD, w1ud@arrl.org— ASM: N1MAP. ASM (digital): KD1SM. STM: NZ1D. SEC: K1VSG. OOC: WT1W. Field Day is over and the summer ham radio doldrums have set in. Clubs are on vacation until the fall. News is always difficult to find during the summer. Everybody is away on vacation. Traffic is down also. Now is the time to prepare for the upcoming season. Get that antenna work you've been putting off done. "It's hot," you say. When it gets cool, you will be on the air and then it's too late. Look on the WMA Web site for various FD photos. By the time you read this they should be uploaded. If you have any photos, either digital or regular, send them to me and I'll put them on the site. You know, one picture is worth a thousand words. Going on vacation and plan to operate in the wilds of wherever. Take a few photos and show the rest of the gang where you've been. Be sure to identify who is in the photos. I hope to see all of you at Boxboro. After reading the itinerary, it should be a good one. Add the flea market and vendors displays, and there is something for everyone. Remember, if you hear a strange call sign on your local repeater, make them feel welcome to our area. Tfc: W1ZPB 53, K1TMA 190, KD1SM, N1RLX 8, W1UD 221.

NORTHWESTERN DIVISION

ALASKA: SM, David Stevens, KL7EB—Congratulations goes to Gary McCrorey, AL7O, Brent Burnett AL7R, and Less Buchholz, KL7J, all of KPADX, for Working All Countries (332). Mt Susitna repeater is on trial (147.27+ 100 PL) in South Central. Please contact John Lynn KL7CY or his e-mail KL7CY@ARRL.NET with good and bad propagation reports. Alaska State Hamfest is Sept 14 in Anchorage and Interior Alaska Hamfest is Sept 15 in Fairbanks. It looks like Martin Cook N1FOC of ARRL's QSL bureau will be our guest this year. Check www.kl7kc.com for new information. ARES Net 2000 Sunday KL7KC repeaters; Snipers 3920 at 1800; Bush Net 7093 at 2000; Motley Group 3933 at 2100; and Alaska Pacific Net M-F 14.292 0830. PSHR AL7N 1/30 2/40 3/20 Total 90. SAR: AL7N 86.

EASTERN WASHINGTON: SM, Kyle Pugh, KA7CSP. Jeff Chenault, W7JWC, has qualified for the 50 MHz (6 Meters) Worked All States (WAS) Specialty Award, with a Single-mode SSB endorsement. This was announced in June by Carl Strode, WA7CS, who is the HF Awards Manager. Congratulations to Jeff as this is a difficult accomplishment from this part of the country for 6 meters. Also, Jeff Spinler, N7VPN, is the VHF-UHF VUCC Awards Manager, and Jay Townsend, WS7I, is the Section DXCC card checker. Glenn Moore, N7VBW, is now Spokane Co. EC, and Nathan Jeffries, KI7QT, is now ARES District

"D" DEC. The WARTS Net annual picnic was held on July 14th at Lake Kachees. Observation reports were received from 7 out of 9 OO stations for June. Net Activity for June: WSN: QNI 819, TFC 194; Noontime Net: QNI 8788, TFC 293; WARTS: QNI 3138, TFC 117. Tfc: W7GB 100, K7GXZ 80, K7BFL 66, KA7EKL 33, KK7T 17. PSHR: W7GB 110, K7GXZ 100.

IDAHO: SM: John Cline, K7BDS – ASM: K7TIH, K6ZVA, KJ7TH, KB7TYA, STM: W7GHT, OOC: W7ZU, SEC: AA7VR, TC: N7ZFE – Time can play some very nasty tricks on an ARRL Section Manager. As I write this article, it's the middle of July. Yesterday in Boise, it was 109 degrees. Today is expected to reach 110 degrees. But this won't reach you until late August in the September edition of *QST*. So what to write about this month? Of course, its time to get your antennas ready for winter. Somehow, in the middle of this heat spell, it's hard to think about winter. Time can play some nasty tricks on an ARRL Section Manager. Please check idahohamradio.com. Tfc: W7GHT 160, KB7GZU 96, WB7VYH 31, W6ZOH 19. PSHR: W7GHT 100, WB7VYH 76. Nets: FARM 30/2785/67/W7WJH; NWTN-30/1324/65/KC7RNT; IDACD 20/372/7/WB7VYH; IMN-30/428/57/ W6ZOH.

MONTANA: SM, Darrell Thomas, N7KOR—During the month of June many clubs provided public service support to local events. Two of these were lengthy bicycle marathons one in the Missoula area and one in the Dillon area. Also the Helena Club provided checkpoint communications for the annual Governors Cup Marathon. Two social ham events were held: a campout hosted by Lincoln Hams near Lincoln had a small attendance due to weather. Not many wanted to camp in the snow. The annual Fathers Day Hamfest was hosted at Wolf Point Montana by the Prairie Radio Club with approximately 57 in attendance. Governor Martz of Montana has declared the week of July 14-21, 2002 Amateur Radio Appreciation Week. She has noted the volunteer work and public service provided by the hams in the Montana Section. This week coincides with the Annual Glacier Waterton Hamfest near Glacier National Park. Some of the hams who have attended emergency communication courses have been called to duty due to the fire season. Some have been sent to South Dakota, Colorado and Arizona. Net/QNI/QTC/NM MSN 115 W7OW, MTN 1804/42 KD7HWV, IMN 428/57 W6ZOH.

OREGON: SM, Marshall Johnson, Sr., KK7CW—SEC: WB7NML. STM: W7IZ. SGL: N7QQU. STC: N7LA. ACC: K7SQ. September: After a decade of commitment and service as the Official Observer Coordinator, Bob Benafel, NB7J, is stepping down for health reasons. His appreciation for teaching the "right way" to use the airways has made our part of the world very bearable. Bob's leadership will be missed, but he assures me he is a long way from gone. And that's good news. SEC, Lew Williams, is readying the many ARES/RACES operators statewide for the Fall Simulated Emergency Test. Remember, last year Oregon was in the top ten sections in the country. We can better that effort this year. Swap-toberfest in Rickreall will be October 26th this year. This is a week later than other years due to scheduling conflicts. If your radio club has a monthly newsletter, send it to me for inclusion in Section News in "*QST*" and the web site. See page 12 in "*QST*" for address information. If you would like to serve as an Oregon Section appointee, send me a letter or email with your interest and qualifications. Yes, we can use your talents somewhere and I welcome your participation. And finally, my personal and heartfelt thanks to Bill Sawders, K7ZM, for his years of service as Section Manager. His vision and leadership have propelled Oregon to a position of leadership nationwide. Bill, thank you for your friendship, your commitment and your service. Until next month, 73.

WESTERN WASHINGTON: SM, Harry Lewis, W7JWJ—SM: The new OOC for Western Washinton is John Burke, W7BO and his first report indicates 6 OOs reporting 158 of public service monitoring. With messages being handled more frequently on Internet the making of the Brass Pounders League qualifications is becoming ever more difficult. However, Jeri, W7TVA, and George, K7BDU, have done just that. Those stations making the Public Service honor roll are W7LG, W7QM, KJ7SI, KA7TTY, W7DPW, W7TVA, N7YSS and W7ZIW. RN7 cycle two reported by K7BDUI shows 214 messages received, messages sent 295 and messages delivered 509. The Lower Columbia Amateur Radio Association has at long last secured permission to erect a 100 foot Rohn 45 tower. For suggestion in your area, contact Randy, NU7D. Section Emergency Coordinator for Western Washington and new State Radio Officer, Ed Bruette has filed this report: DEC N0WO reports the Jefferson Co. team took part in a SAR effort on the Duckabush River. The subject managed to walk out after a 3 day search. K7CEX says, Dist. 4 participation is up, training is up and attitudes are excellent. Emily, KB7L has stepped down as EC in Pacific Co. Emily has done a wonderful job of rebuilding the team. Replacing her is Rick Wilcox, KG7KB. Cowlitz Co. ARES racked up 165 Pubic Svc. hours supporting a SAR, Safety Fair and the Tour-De-Blast bike ride. LCARA has finally gotten permission to put up their 100' tower! All 10 Clark Co. teams responded to an impromptu callout in lieu of the regular meeting. Some members communicated for a local Vancouver Walk. Tom Graff, AD7R, freshly retired from the USN, has taken on the long vacant job of EC in Island Co. Welcome Tom! Field Day is done for another year and many of us learned a lesson or 2. If you missed it this year, make plans for next year's event.

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. ACSCT provided communications support for a missing person search. EBARC welcomes new members KB6IBP, AD6JE, KG6LXO, KG6USA, Chris Biocca and David McMartin. New SARS officers are WA7OBG, Pres., AC6FJ, VP, KO6FR, Sec/Treas. Also, a new ARRL VE Team has been formed to serve the Napa Valley! MDARC supported 3 events in June and one in July. June tfc: AK6DV/152, WB6UZX/47, KE6QR/7. PSHR: AK6DV. Tfc nets: NCN1/3630/7PM; NCN2-SLOW SESSION/3705/9PM; NCN-VHF/145.21/7:30PM; 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—ASM: Dick, W6OLD. SEC: Dick Creley, KJ7UK. ACC: Melissa, KK7AA. DEC: KB7REO. STM: N7CPP. EC: AA5QJ. DEC: N7TOD. OOC: NU7T. EC: AC7EL.OES: N7JEH. Emergency communication on behalf of fire victims conducted by Douglas County Emerg. group under SEC KJ7UK, Richard Creley. DEC, N7TOD, Matthew Parker's report received from the Red Cross chapter house in Washoe County including Northern Nevada Amat. Radio Society, and Lyon County Amat. Radio Emergency Service participation. Seems like these groups have competed for time spent assisting those in need. Well done, and thanks from us all. Field Day reports from Elko Amateur Radio Club, the combined Frontier Amateur Radio Society-Nellis Amateur Radio Club-Las Vegas Radio Amateur Club, Pahrump ARES group, Carson Valley Radio Amateur Club, Rural Amateur Radio Assoc., Sierra Intermountain Emerg. Radio Assoc. each reported on FD activities including some photos. One different report arrived from ASM W6OLDs on participation in a group that taught first extra class. Again, not enough space to acknowledge all of you. 73 from Jan, NK7N, NV SM.

PACIFIC: SM, Bob Schneider, AH6J—This was written in Early July. Reminder. Hurricane Season officially started on June 1. Stay prepared. The Mauna Kea Repeater is now operational. It is on 146.72 MHz (-). We will test it from noon to 1 PM on the second Tuesday of each month. Our 2nd priority is to contact our US House members to get support for HR 4720. Wayne Jones, NH6K the SGL (and others) report they are writing to our representatives. I just returned from vacation. I saw the WL7CVL repeater in Juneau thanks to KL0QZ, Glen. I met an old friend from college Terry Bills. He is now AL7ES, in Ketchikan. I worked the Vancouver Island system of four repeaters. Rick, VE7REH, in Port McNeil, talked to my brother in law Tim, KH6DM, and I for several hours as we came down the Inland Passage. I visited two field day sites in Canada & saw Warren Munro, KH6WM, at Pikes Market in Seattle. The Volcano Rim Run is July 27th. There will be a Hamfest on Sat. Oct. 12, 2002 in Keaau. This is near Hilo. Pacific Division Director Jim Maxwell will be there. We will have several forums and a giant swap-meet. Next year (2003) a State-wide convention will be held on Oahu. KH6GMP, Gary gave me this address to look at FD photos. http://www.turquoise.net/~stumanchu/kona.htm It is for a new club called Kona Hawaii DX club. Their call is KH6DXC. John Peters, K1ER, reports that long time HARC Member Norm Thompson, AH6E, passed away on June 12, 2002. Aloha, Bob Schneider, AH6J

SACRAMENTO VALLEY: SM, Jerry Boyd, K6BZ— Congratulations to SEC Dave Thorne, K6SOJ, on his development of an emergency communications "ordering system" for use within the Incident Command System (ICS). It makes requesting amateur radio resources by a non-ham public safety type much easier. It is an idea which, I believe, will spread quickly. Speaking of EMCOMM, which I often do, fire season is not yet over so let's maintain our preparedness at an appropriate high level until the rain begins to fall. Another reminder to all who use our vhf bands of the importance of monitoring the simplex calling frequencies. A local ham who mans a fire lookout monitors 146.52 with a handheld and copies stations well over a hundred miles away. He often gives directions and answers questions from traveling hams that call on .52 looking for help. With fall and winter approaching, now might be a good time for your local radio club to put together a licensing class. Our ranks need reinforcing and we not only need to develop an interest in people about our service but help them learn what is needed to become licensed. In conclusion, I would like to thank all of those appointees in the Section who contribute to our fine hobby by doing the jobs that they do on our behalf. Until next time 73 de K6BZ.

SAN FRANCISCO: SM, Len Gwinn, WA6KLK—ASM: KH6GJV. SEC: KE6EAQ. ASEC: KE6IAU. Beware of the extreme fire danger building in our section. Have plans in place and work with your local agencies. The Section Convention was a great success with vendors from WA, OR, LAX, CA, and NV. Visitors came from WA, OR, ID, NV, CA, AZ, es TEXAS! Thanks to the Humboldt group and to KE6IAU for the wonderful convention. Del Norte had a good fireworks sale for the fourth. Mendocino OES is working with the local hams for participation in a Youth Emergency Services camp, along with fire, police, and paramedics. West Marin has been working with Radio KPH several times lately for exhibition and testing. San Francisco ACS/ARES hams were on alert over the fourth for terrorist activities and received notice on local TV stations. During Field Day, only one club, Valley of the Moon Sonoma, had a message in the proper format for the SM. More drills and message passing should take place. Have a safe summer.

SAN JOAQUIN VALLEY: SM, Charles McConnell, W6DPD—ASM: K6YK. ACC: W6DPD. SEC: K6IN. OOC: N1VM. STM: K6RAU. PIC: W7WN. TC: W6TE. The Local Government Liaison (LGL) appointment is available to ARRL members who are interested in monitoring city and county government for ordinances that may contain items that are not in the best interest of Amateur Radio. Every city and county should have someone watching them. If you are interested in a LGL appointment, contact your SM, the information in on page 12 of *QST*. Thanks to WA6QYR for serving as the TC for many years. He now serves as a TS. The new TC is W6TE. W6RFR is an EC in Madera County. HR 4729 needs your support. Please contact your representative to urge support and cosponsorship. KF6POS is a Silent Key. He will be missed. New officers of the CCAC are Pres WA6ZBL, VP N6BWW, Sec N6JYW, and Treas WD6EQS. Officers of the Bakersfield Amateur Radio Association are Pres N6ZFN, VP KB6JFL, Sec KG6GMT, and Treas KD6EAG. The club meets the 2nd Wednesday at 7 PM in Bakersfield. Pacificon 2002 is October 18-20, 2002 at the Sheraton Inn in Concord. Check the Web site http://www.pacificon.org for information. The Pacificon Division maintains a Web site at http://www.pdarrl.org. Each Section has a page there. Check out the SJV page. The SJV has a page on the members only portion of the ARRL Web page. Your SM visited some Field Day sites in the section this year. Hopefully there will be more next year. WA2MSU 24, W6DPD 1, KB6QIB 21.

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.

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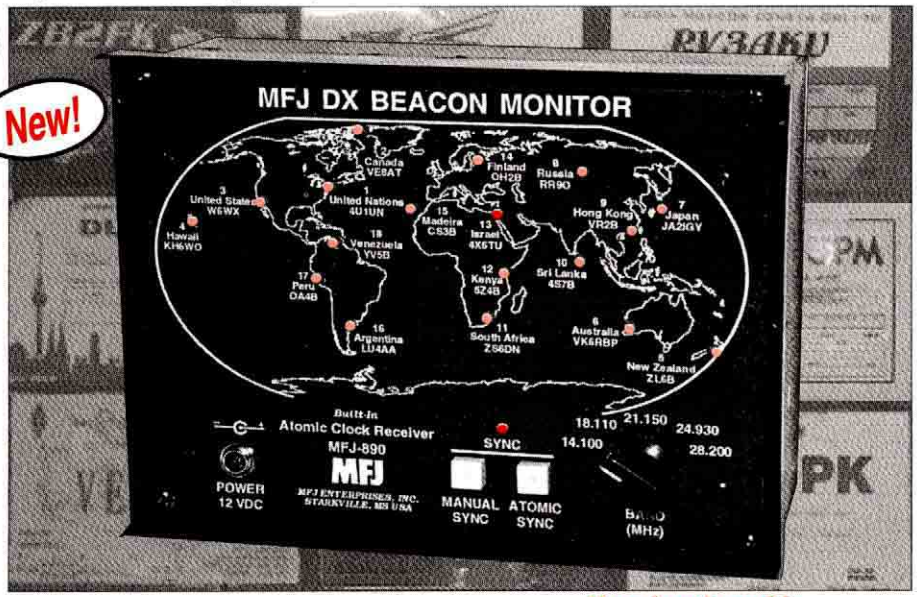
It's fascinating to hear and watch each beacon location light up as they become active across the world.

It's great for DXers, contesters, ragchewers and SWLers.



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The *International Beacon Network* provides a reliable source of signals for determining HF propagation 24 hours a day.

It consists of 18 beacons evenly located throughout the world.

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The transmit sequence moves westward from New York across North America, Asia, Pacific to Africa, Europe and South America.

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 Oct/Nov, 1994, Sept, 1997 *QST* and Jan 1999, Sept/Dec 2001, Jan 2002 *Practical Wireless* of U.K.

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.

Which band is best to reach a particular part of the world?

By storing the beacon frequencies in your transceiver's memory, you can quickly check all five bands to see which band has the best propagation to a particular part of the world.

MFJ DX Beacon Monitor lets you instantly see on world map which beacon you're hearing

You don't have to copy CW at 22 wpm to identify a beacon.

When you *hear* a beacon, an LED instantly lights up on a world map to show you its location. **You** can positively identify each beacon -- even if the signal is weak, and the CW is fluttery or distorted.

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How does it work?

The transmit sequence of the beacons are precision timed using GPS (Global Positioning Satellites).

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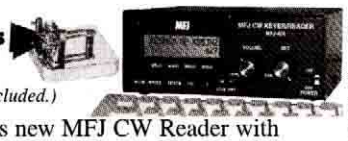
$179.95
(Keyboard, paddle not included.)



Plug this new MFJ CW Reader with built-in Keyer into your transceiver's speaker/phone jack and key jack.

Now you're ready to compete with the world's best hi-speed CW operators -- and *they won't even know you just passed the code test!*

Sends and Reads 5-99 WPM. Automatic speed tracking. Large 2-line LCD shows send/receive messages. Use single or iambic paddle or computer keyboard. Easy menu operation. Front panel speed, volume controls. 4 message memories, type ahead buffer, read again buffer, adjustable weight/sidetone, speaker. RFI proof.

Free MFJ Catalog

Visit: http://www.mfjenterprises.com or call toll-free 800-647-1800

• 1 Year *No Matter What*™ warranty • 30 day money back guarantee (less s/h) on orders direct from MFJ

MFJ ENTERPRISES, INC.
300 Industrial Pk Rd, Starkville, MS 39759 **PH:** (662) 323-5869
Tech Help: (662) 323-0549
FAX:(662)323-6551 8-4:30 CST, Mon.-Fri. ***Add shipping.***

http://www.mfjenterprises.com for instruction manuals, catalog, info

MFJ *Sound Card-to-Rig* Interface

Use sound card and rig for all digital modes!

Plug and Play -- includes software, all cables, AC power supply . . . RFI-proof . . . Isolation transformers -- no hum, noise, distortion . . . Operate PSK-31, packet, APRS, AMTOR, RTTY, SSTV, CW, Meteor Scatter, others . . . Use as Voice Keyer, CW Contest Memory Keyer . . . Monitor On/Off Switch . . .

MFJ1275/M/T
$99.95

New! *Includes AC power supply, RS-232 cable!*

Plug this new MFJ-1275/M/T sound card interface between your transceiver and computer and enjoy operating all digital modes.

Everything you need is included -- software, audio cables, RS-232 serial cable and AC power supply.

Provides fully automatic operation with audio and push-to-talk control. It matches sound card audio, eliminates ground loops and provides microphone override.

Models available for all transceivers with 8-pin round, 8-pin modular (RJ-45) or 4-pin round microphone plugs.

Operate PSK-31, packet, APRS, AMTOR, RTTY, SSTV, CW, high speed CW Meteor Scatter and many others. Also use as Contest Voice Keyer and CW Contest Memory Keyer.

Digital Modes or Normal Operation

Select the ON digital mode -- all connections are made between your rig and computer for instant digital operation.

Select BYPASS normal mode -- your transceiver and computer connections are restored for their normal operation.

Audio Isolation Transformers

Audio isolation transformers and relay eliminate ground loops, audio hum, noise and distortion.

RFI-Proof

Extensive RF suppression and line isolation eliminates RF feedback problems.

Automatic Microphone Override

Transmit mic audio at any time by pressing PTT to override digital modes -- great for SSTV and Contest Voice Keyer.

More Impressive Features

Serial port -- lets computer control radio to override/interrupt digital transmissions.

VOX Control -- lets you use VOX control when not using computer serial port control.

Level Controls -- for transmitter drive and for receiver-to-sound card drive level. No need to adjust microphone gain or sound card level when you change modes.

Stereo or Mono Audio Input -- A front panel switch selects left, right, or both sound card audio output channels to accommodate various programs.

Off-the-air recording -- for replaying or for use with spectrum analyzer programs.

Monitor on/off switch lets you have a normal QSO and receive SSTV pictures at the same time in the *"monitor on"* position. This is great for modes like SSTV and Voice Keyer operation that may require listening to receive audio during operation.

Rugged Construction -- All aluminum cabinet and surface-mount construction gives you years of trouble-free service.

Use any Transceiver

Internal jumpers program microphone wiring for any brand or model radio -- no soldering required. Order **MFJ-1275** for 8-pin *round* mic plug. Order **MFJ-1275M** for 8-pin *modular* mic (RJ45) plug.

NEW! Order MFJ-1275T, for *4-pin round* mic plug, for Ten-Tec and others.

Plug and Play!

Everything you need is included --audio and RS-232 cables, AC power supply and a CD with a collection of the most popular amateur radio software to operate PSK-31, RTTY, SSTV, PACKET, AMTOR, CW, HSCW Meteor Scatter, Contest Voice Keying and other modes. Use 12 VDC or 110 VAC.

No Matter What™ Warranty

Protected by MFJ's famous *No Matter What™* one year limited warranty. MFJ will repair or replace (at our option) your MFJ-1275/M/T *no matter what* for one full year.

Try it for 30 Days

Order from MFJ and try it -- no obligation. If not delighted, return it within 30 days for refund less shipping.

New! *Super* Sound Card Interface

MFJ-1279/M/T
$129.95

This *super* sound card interface has all of the features of the MFJ-1275 ***plus . . .***

- **Auxiliary Input Jack:** Lets you switch your sound card from MFJ-1279 so you can use your sound card for something else. No more plugging/unplugging!
- **Direct CW/FSK Keying Jack:** Allows direct CW or FSK keying operation.
- **Headphone Jack:** Use your stereo headphones so you won't disturb your XYL (also turns off external speaker).
- **Footswitch:** Use footswitch or other for PTT (push-to-talk) when not using VOX.

Plug and Play! Includes software CD, RS-232 and audio cables, AC power supply.

Order MFJ-1279 for 8-pin round mic, MFJ-1279M for 8-pin modular (RJ-45) mic, MFJ-1279T for 4-pin round mic.

Add "X" suffix for 220VAC.

New! *Basic* Digital Interface

MFJ-1273B
$59.95

Plug and Play! Has sound card, radio, speaker, RS-232 jacks. Includes: software CD and RS-232, audio, mic cables. No external power needed. Has no mic jack or mic switch. **Order** MFJ-1273B for 8 pin round mic, MFJ-1273BM for 8-pin modular (RJ-45) mic, MFJ-1273BT for 4-pin round mic.

DSP *Sound Card* Programs

MFJ-1296, $129.95. *RadioCom4* integrates PSK31, SSTV, FAX/Sat FAX, RTTY, SITOR, DSP audio filters and radio control.

MFJ-1298, $199.95. *RadioCom5* -- all features of *RadioCom4* plus DSP Audio Filter analyzer, Spectrum Analyzer, Dual Scope Display, Sound Recorder, Time and Frequency Management, Frequency Analyzer, 3D Scanner, Satellite tracking, Rig Control for over 80 radios, more! **Free demo at:** ***www.mfjenterprises.com/freedemo.php***

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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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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. I was able to visit several Field Day sites in Western North Carolina this year. Good to see some interesting techniques tried at some of these stations. Glad to see some Get On The Air stations, and some solar power. We received some good publicity, including first page coverage in Shelby. Whatever your group's specific objective was, I hope you learned some new things and had a great time. I received Field Day messages from 27 groups this year. Some of you are using my old address and phone number from over 2 years ago (fortunately they got delivered anyway). Always check page 12 of *QST* for my current address. North Carolina SET scores were good again this year. That means we are getting lots of participation and reporting it as well. I encourage you to make your SET as realistic as possible, while exploring new techniques and improving contact with our served agencies. The points are nice, but the real objective is to be ready when we are needed. This includes testing our equipment, operating techniques, and procedures for working with the various agencies we serve. I hope we will see some more digital mode operation this year. Shelby Hamfest is August 31-September 1. Hope to see you there. May traffic: W4EAT 874 (BPL), W4UEF 366, K4IWW 293, K4RLD 152, KE4JHJ 129, AA4YW 118, WA4SRD 81, W4CC 62, W4IRE 59, KE4AHC 52, WD4LSS 43, W4FAL 41, W3HL 38, AD4XV 37, N0SU 28, WA2EDN 24, W4EHF 23, N4TAB 22, K4WKT 18, N4NTO 15, KR4OE 11, NT4K 11, KB8VCZ 10.

SOUTH CAROLINA: SM, Patricia M. Hensley, N4ROS—The hurricane season is now upon us, and our emergency communication procedures have been adequately covered in my last two SM reports. Let us be vigilant during this season because "failing to prepare, is preparing to fail." Congratulations to all of the 2001 SET participants. As most of you know, our SC exercise was recognized as fourth in the nation (see July '02 *QST*). I am now in the process of reviewing the activities of our SC amateur radio community over the past year. Certain facts appear evident: a) over one-half of amateurs hold technician class licenses; b) much of the daily communication is facilitated by local repeaters; and c) a significant number of licensees do not belong to local clubs. It is possible that several conclusions may be drawn from these observations: 1) The changes in requirements have enabled more individuals (including family members) to become licensed. 2) Daily amateur radio activity is being used for more personal and routine communications. 3) Clubs with historic programming may not be meeting the needs of newly licensed amateurs which, in turn, may reduce their desire for membership. The preceding conclusions are the types of issues which are considered by the Presidents' Council which I initiated this past year. I want to continue to express my appreciation to those SC amateurs who have prepared for and have become active in the many opportunities for service to SC ARRL. Tfc: AF4QZ 184, KA4LRM 115, KA4UIV 52, KF4HAV 39, WD4BUH 29, K3LM 18, K4JIF 13, N4VVX 12. PSHR: N4VVX 152, KA4LRM 130, AF4QZ 110, KA4UIV 90. SEC Report: 317.

VIRGINIA: SM, Carl Clements, W4CAC—ASM: W4PW. SEC: N4NW. STM: W3BBQ. PIC: W4PW. ACC: W4IM. OOC: W4NEZ. TC: KD3PC. Web page: www.arrlva.org. August was a busy month. The Roanoke Valley Hamfest in Vinton was August 3rd and the Shenandoah Valley ARC Hamfest in Berryville was August 4th. From there, we went to the Lynchburg ARC meeting on August 9th. On August 10th, John Humphrey and I presented the Virginia Appalachain Wireless Association their Special Service Club Certificate. The Rappahannock Valley ARC and the Portsmouth ARC have also completed the requirements to become Special Service Clubs. For information on how your club can become an SSC, please contact John Humphrey, W4IM. The Virginia Beach Hamfest will be held on a new date and at a new location this year. The hamfest will be held in a vacant store in Pembroke Mall on the 28th and 29th of September. As in years past, the hamfest will also host the Roanoke Division Convention. This is a date change from the originally announced date of September 8th. Check their Web page at www.vahamfest.com. 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 page. Remember, YOU are the ARRL. 73 de Carl, W4CAC. Nets/QNI/QTC/NM; VTN/30/7/W3BBQ; VSBN/307/132/W3BBQ; VNE(CW)/120/18/WA4DOX VSN(CW)/30/12/WA4DOX; NVTN/745/124/KB8TNU/N8LE; SVTN/127/25/WG8X; VLN/202/83/K0IBS; PARES/27/2/K5SFM. Tfc: W3BBQ 153, WA4DOX 139, K4YVX 134, K0IBS 81, KG4OTL 74, AA4AT 52, N3FDR 53, KV4AN 50, K3SS 43, KD4FUN 32, WB4UHC 29, W4CAC 27, K4DND 26, K5SFM 16, KB4CAU 11, KU4MF 9, W4MWC 6, N4FNT 4, K4JM 1.

WEST VIRGINIA: SM, Hal Turley, KC8FS— ASM: W8YS. ASM: KB8NDS. SEC: W8XF. STM: KC8CON. OOC: W8DL. PIC: N8TMW. TC: W8DL. You should read this in time for me to get in one final plug for the WVSARC and our state ARRL Convention at Jackson's Mill on August 24th. On behalf of the Council and the convention planners, I sincerely hope you plan to attend this year. Actually, there are only 4 ARRL sanctioned hamfests in all of WV in 2002. Years ago, there were around a dozen and the grandaddy of 'em all was the state convention at the Mill. It is unfortunate that we have lost so many local hamfests, but that is probably a sign of the times. Seems like this decline would serve to boost attendance at our state convention where there are really great forums and opportunities to share ideas and information. Some new activities are slated for this year including the 2002 WV State Foxhunt. Other scheduled events and forums can be found on Web at www.qsl.net/wvsarc Let's Fill the Mill! 73 es CU there de Hal. Tfc (June.) KA8WNO 194, W8YS 149, N8NMA 71, WW8D 50, KC8CON 45, KB8NDS 13, N8FXH 10. PSHR: KC8CON 125, W8YS 120, WW8D 110, N8NMA 109, KA8WNO 90, KB8NDS 83. WVMDN 619/29/423 WW8D; WVN (E) 102/72/274 N8NMA; WVN (L) 111/37/223 N8NMA; WVFN 781/145/785 KC8CON; MSEN 57/0/50 N8TMW.

MFJ *Pocket size* Morse Code Reader™

Hold near your receiver -- it instantly displays CW in English!

Automatic Speed Tracking . . . Instant Replay . . . 32 Character LCD . . . High-Performance Modem . . . Computer Interface . . . Battery Saver . . .

MFJ-461
$79.95

Is your CW rusty?

Relax and place this tiny pocket size MFJ Morse Code Reader near your receiver's speaker . . .

Then watch CW turn into solid text messages as they scroll across an easy-to-read LCD display.

No cables to hook-up, no computer, no interface, nothing else needed!

Use it as a backup in case you mis-copy a few characters - - it makes working high speed CW a breeze - - even if you're rusty.

Practice by copying along with the MFJ-461. It'll help you learn the code and increase your speed as you instantly see if you're right or wrong.

Eavesdrop on interesting Morse code QSOs from hams all over the world. It's a universal language that's understood the world over.

Automatic Speed Tracking

MFJ *AutoTrak*™ automatically locks on, tracks and displays CW speed up to 99 Words-Per-Minute.

Simply place your MFJ-461 close to your receiver speaker until the lock LED flashes in time with the CW.

Four Display Modes

1. Bottom line scrolls and fills with text, then that entire line is displayed on top line until bottom line refills -- makes reading text extra easy! Automatically displays speed in WPM.

2. Same as **1**, without speed display -- gives you maximum text display.

3. Top line scrolls, bottom line displays speed in Words-Per-Minute.

4. Both top and bottom lines scroll.

Two-line LCD display has 32 large 1/4 inch high-contrast characters.

MFJ Instant Replay

The last 140 characters can be instantly replayed. This lets you re-read or check your copy if you're copying along side the MFJ-461.

High Performance Modem

Consistently get solid copy from MFJ's high performance *PLL (phase-lock loop)* modem. Digs out weak signals. Even tracks slightly drifting signals.

Of course, nothing can clean up and copy a sloppy fist, especially weak signals with lots of QRM/QRN.

Computer Interface

The MFJ-461's serial port lets you display CW text full screen on a bright computer monitor -- just use your computer serial port and terminal program.

More Features

When it's too noisy for its microphone pickup, you can connect the MFJ-461 to your receiver with a cable.

Battery saving feature puts MFJ-461 to sleep during periods of inactivity. It wakes up and decodes when it hears CW.

Uses 9 Volt battery (not included).

True Pocket Size

Fits in your shirt pocket with room to spare - smaller than a pack of cigarettes. Tiny 2¼x3¼x1 in. 5½ ounces.

No Instruction Manual needed!

Super easy-to-use! Just turn it on -- it starts copying instantly!

Accessories

MFJ-26B, $4.95. Soft leather protective pouch. Clear plastic overlay for display, push button opening, strong, pocket/belt clip secures MFJ-461.

MFJ-5161, $14.95. MFJ-461 to computer serial port cable (DB-9).

MFJ-5162, $5.95. Receiver cable connects MFJ-461 to your radio's external speaker 3.5 mm jack.

MFJ *Pocket* Morse Tutor

MFJ-418
$79.95

Learn Morse code anywhere with this tiny *MFJ Pocket-sized Morse Code Tutor*™! Practice copying letters, numbers, prosigns, punctuations or any combination or words or QSOs. Follows ARRL/VEC format. Start at zero code speed and end up as a high speed *CW Pro!* LCD, built-in speaker.

MFJ Code Oscillator

MFJ-557
$29.95

MFJ-557 Deluxe Code Practice Oscillator has a Morse key and oscillator unit mounted together on a heavy steel base -- stays put on your table! Portable. 9-Volt battery or 110 VAC with MFJ-1312, $14.95. Earphone jack, tone and volume controls, speaker. Adjustable key. Sturdy. 8½x2¼x3¼ in.

MFJ *Pocket* CW Keyer

MFJ-403P
$69.95

Built-in Iambic Paddle. Thumbwheel speed control. Adjustable weight. Adjustable sidetone with speaker. Iambic modes A or B. Fully automatic or semi-auto "bug" mode. Reversable paddle. Tune mode. RF-proof. Battery Saver. Tiny 2¼x3¼x1 in.

MFJ *miniature* Travel Iambic Paddle

MFJ-561, $19.95. 1¾Wx1¾Dx¾H in. *Formed* phosphorous bronze spring paddle, stainless steel base. 4 ft. cord, 3.5 mm plug.

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ROCKY MOUNTAIN DIVISION

COLORADO: SM, Jeff Ryan, KØRM—ASM: Tim Armagost, WBØTUB. ASM: Jerry VerDuft, ADØA. SEC: Mike Morgan, N5LPZ. STM: Mike Stansberry, KØTER. ACC: Ron Deutsch, NKØP. OOC: Karen Schultz, KAØCDN & Glenn Schultz, WØIJR. SGL: Mark Baker, KGØPA. TC: Bob Armstrong, AEØB. BM: Jerry Cassidy, NØMYY. Response to the wildland fires from ARES groups up and down the Front Range and in the Glenwood Springs area has been nothing short of outstanding. Special thanks to our SEC Mike Morgan, N5LPZ, and also to Ben Baker, KBØUBZ, Rob Roller, N7LV, and Geno McGahey, AL7GQ, for stepping into leadership roles and coordinating resources. I have received many notes of thanks and compliments about the professional response and operations of the ARES members supporting the many served agencies that responded to the fires. We all need to take a breath, take a moment and feel proud about Amateur Radio's role in providing emergency services and relief. To quote the director of Teller County OEM: "Stand tall and walk with pride. You have earned it." We may take for granted our superb ARES groups and our dedicated and talented volunteers but our served agencies do not. Congratulations on a job well done and heartfelt thanks for the thousands of hours of dedicated service. Public Information Coordinator (PIC) Erik Dyce has resigned in order to concentrate on other priorities. Thanks to Erik for his years of service to the ARRL members and ham radio community in Colorado. I wish him well in all his future endeavors. This creates a vacancy on the Section Cabinet and if you are interested and believe you are qualified to serve as PIC, drop me a note. The job description can be found on the ARRL Web page: enter 'PIC' in the search window. Send me an e-mail at kØrm@arrl.org. 73, de KØRM. NTS Traffic: WBØTAQ 382, KØTER 43, NØBN 29. CAWN: WØWPD 890, K4ARM 681, NØNMP 508, WØLVI 503, WØGGP 443, ABØPG 337, AAØZR 292, WØNCD 270, WBØVET 234, NØFCR 188, WBØTYT 175, WCØCKP 147, N3XT 108.

NEW MEXICO: SM, Joe T. Knight, W5PDY—ASM: K5BIS, N5ART & KM5FT. SEC: W5YEJ. STM: N7IOM. NMs: WA5UNO & W5UWY. TC: W8GY. ACC: N5ART. Most of our forest fires are contained, thanks to the recent showers over much of the state. Our thanks to all that helped in any way during the Fire Season & to the many ARES members that helped in the Search for two people, who disappeared in the Malpais, and STILL haven't been found. Excellent newsletters from PVARC, Valencia County ARS, NMRCC, Gila ARS, AARC, SARA, W5ES, Zero Beat, ADXA, Sun City ARC, DARC, Caravan Club, and perhaps others that I may have missed. Field Day was a success with FD MSGS from all over the state. Special thanks to W5FHA for his work with InfraGard Homeland Security and to WK5C for his tower work around the State. On the Borrego Fire our thanks to AH2AZ, KB5RX, AG5S, KB5ZSG, NM5BB, N5UUG, KB5NVL, KJ5KU, KJ5KH, KC5KH, KC5VWT, WD5IDL, KC5NIN, KC5RZA, KC5RZE, W5JRP, N5XDF, KD5LON, & KC5QZ for their assistance during the fire. The Flagstaff (Ft. Tuthill) Hamfest is scheduled for July 26-28th. The Duke City Hamfest (NM State ARRL Convention) is scheduled for the afternoon of August 23rd & on August 24th with Special Event Station N5M to be in operation. A Banquet will be held on Saturday Evening. For details please see "qsl.net/dchf/." The Alamogordo Hamfest is scheduled for August 31st with a Banquet that evening. The Socorro Hamfest is to be held October 26th with details to follow. Sorry to report the passing of WØRMK, KA5JWK, W5STB & Sarah Nicholson, XYL of W5ANB. They will certainly be missed. Best 73, W5PDY.

UTAH: SM, Mel Parkes, AC7CP—I would like to take a moment to express my appreciation to all those who served on the Utah Hamfest Committee and made the 2002 Rocky Mountain Division/Utah Hamfest a great success. Special kudos to Kathy Rudnicki, N7JSH, who has served as the President of the Utah hamfest for many years. Thanks Kathy! Ray Riding, AC7RR, will be the new President and plans are already being made for the 2003 Utah Hamfest. Thanks, also, to everyone who has assisted their communities with summer special events, the parades, summer festivals and marathons were successful due to the collective efforts of many of our amateur radio operators. 73 de AC7CP.

WYOMING: SM, Bob Williams, N7LKH—We have had another valued ham become a Silent Key in the Wyoming Section. Frank Moore, WB7FFK, passed away 28 June. He will be sadly missed as the perennial Net Control for the Jackalope Net. Hard to find someone to take his place. The Civil Air Patrol is forming a new squadron in the Big Horn Basin. The squadron leader, Jim Henderson, is seeking volunteers for staffing the communications group. In particular, a leader for the group is needed. Anyone interested can contact him through me. Any General Class amateur has the requisite qualifications. Tfc: NN7H 245. PSHR: 165.

SOUTHEASTERN DIVISION

ALABAMA: SM, Bill Cleveland, KR4TZ — ASMs W4XI KB4KOY. STM: W4ZJY. SGL: KU4PY. ACC: KV4CX. TC: W4OZK. PIC: WB4LXP. Field Day 2001 was a success in Alabama this year! I would like to thank all the Amateur Radio Clubs that sent their Field Day reports. I know everybody had a great time, and we're all looking forward to next year! This Alabama QSO Party will be on Saturday September 28, 2001 from 18:00 UTC to 24:00 UTC and is sponsored by AI4AA, The Central Alabama HF/VHF Contesting Club. There are multiple categories for operation: AL QRP (<5W), AL Low Power (< 200W), AL High Power (>200W), Non-AL QRP (<5W), Non-AL Low Power (<200W), Non-AL High Power (>200W) with Single Operator, Multiple Operator, and Rover Operations possible. The Exchange for AL Stations is Signal Report and County, and the exchange for Non-AL Stations is Signal Report and State. For more information go to http://web.dbtech.net/~dxcc/. There are Section Level appointments available to ARRL members who are active in the Alabama Section. If you are interested in helping me provide the service that other ARRL members in Alabama expect, please contact me at (251) 661-3892 or kr4tz@arrl.org. God Bless & 73, Bill Cleveland, KR4TZ.

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.

10 Bands -- 1 MFJ Antenna!

Full size performance . . . No ground or radials

Operate 10 bands: 75/80, 40, 30, 20, 17, 15, 12, 10, 6 and 2 Meters with one antenna Separate full size radiators . . . End loading . . . Elevated top feed . . . Low Radiation Angle . . . Very wide bandwidth . . . Highest performance no ground vertical ever . . .

Operate 10 bands -- 75/80, 40, 30, 20, 17, 15, 12, 10, 6 and 2 Meters with this MFJ-1798 vertical antenna and get *full size performance* with no ground or radials!

Full size performance gives high efficiency for more power radiated. Results? Stronger signals and more Q-5 QSOs.

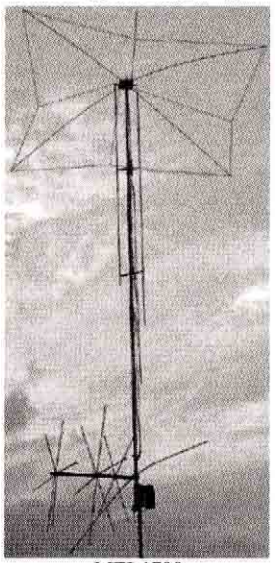
Full size performance also gives you exceptionally wide bandwidths so you can use more of your hard earned frequencies.

Full size performance is achieved using separate full size radiators for 2-20 Meters and highly efficient end loading for 30, 40, 75/80 Meters.

Get very low radiation angle for exciting DX, automatic bandswitching, omni-directional coverage, low SWR. Handles 1500 Watts PEP SSB.

MFJ's unique *Elevated Top Feed*™ elevates the feedpoint *all the way to the top* of the antenna. It puts the maximum radiation point high up in the clear where it does the most good -- your signal gets out even if you're ground mounted.

It's easy to tune because adjusting one band has minimum effect on the resonant frequencies of other bands.



MFJ-1798
$289.95
Ship Code F

Self-supporting and just 20 feet tall, the MFJ-1798 mounts easily from ground level to tower top -- small lots, backyards, apartments, condos, roofs, tower mounts.

Separate Full Size Radiators

Separate *full size* quarter wave radiators are used on 20, 17, 15, 12, 10 and 2 Meters. On 6 Meters, the 17 Meter radiator becomes a 3/4 wave radiator.

The active radiator works as a stub to decouple everything beyond it. *In phase* antenna current flows in all parallel radiators.

This forms a very large equivalent radiator and gives you incredible bandwidths.

Radiator stubs provide automatic bandswitching -- absolutely *no loss* due to loading coils or traps.

End Loading

On 30, 40, 75/80 Meters, end loading -- the most efficient form of loading -- gives you highly efficient performance, excellent bandwidth, low angle radiation and automatic bandswitching.

MFJ's unique *Frequency Adaptive L-Network*™ provides automatic impedance matching for lowest SWR on these low bands.

Tuning to your favorite part of these bands is simple and is done at the *bottom* of the antenna.

No Ground or Radials Needed

You don't need a ground or radials because an effective counterpoise that's 12 feet across gives you *excellent* ground isolation.

You can mount it from ground level to roof top and get awesome performance.

No Feedline Radiation to Waste Power

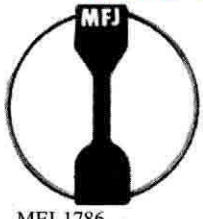
The feedline is decoupled and isolated from the antenna with MFJ's exclusive *AirCore*™ high power current balun. It's wound with *Teflon*® coax and can't saturate, no matter how high your power.

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.

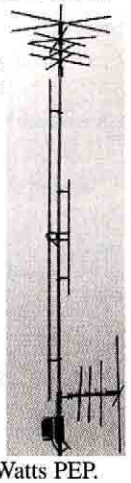
MFJ's G5RV Antenna

MFJ-1778, Ship Code A

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.

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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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MFJ . . . the world leader in ham radio accessories!

TC: Fred Runkle, K4KAZ. PIC: Matt Cook, KG4CAA. State Web site: www.qsl.net/arrl-ga and ARES site: www.qsl.net/gaares. Hi, All. Well, here it is September, and that means it's back to Falcons football with maybe an occasional spell of cooler weather here and there. Back to school for students near and far. Two of our back-to-school students deserve special recognition for earning Foundation for Amateur Radio (FAR) scholarships, and that's David Ziskind, KE4QLH, EC of North Fulton county, and Michelle Swann, KE4EZI, of Warner Robins. (FAR-OUT!!) Congratulations to both of them. Congratulations also to new club officers for the Fayette County Repeater Association: President: Brad Wagner, N4BEW; VP: Brian Haren, W8BYH; and Sec/Treas: Pat Stressel, KF4SWH. Upcoming events: Sept 7, a swapfest at Prater's Mill in Whitfield county, and September 14, a tail-gating hamfest at Paulding Meadows Park in Dallas. Members of the Athens ARC will also be operating a special event station on September 15 from the Dog and Disc event at Sandy Creek Park in Athens. Listen out for KD4QHB from 1800-2200 UTC and earn their certificate. Have you sent a letter to your representative yet about H.R. 4720? This is the best opportunity we've ever had to counteract the effects of some of those nasty CC&Rs, but it needs YOUR input. Please take the time to write your representative to support this important piece of legislation. Silent keys: Alex Boss, N4JHD; Alex Boysen, N4PES; Bob Creasman, N4PAY, B.B. Eckles, K4OUB; and Dale Harridge, W4UFQ. Condolences to the families and friends of all of these fine men. Until next month, this is AF4FO, signing clear. Take care of yourselves. And each other. June QTC: W4WXA 213; WB4GGS 181; AF4NS 97; K4BEH 60; K4BB 51; WB2NYM 36; WB4BIK 36; K4FUM 30; K4WKT 25; K1FP 1.

NORTHERN FLORIDA: SM, Rudy Hubbard, WA4PUP—ACC: WA4B. BM: N4GMU. OOC: KD4NLF. PIC: KF4HFC. SEC: WA4NDA. SGL: W1XO. STM: WX4H. TC: KO4TT. Packet: N4GMU. Nils, WA4NDA, is home and sends his regards and thanks to all for their cards and prayers. He is going to be back real soon, as looking at walls is not one of his favorite pastimes. A lot of you had very good Field Days. The groups sending traffic to me, and hopefully, have not left any out are as follows: W4IZ, NOFARS, reported over 2000 contacts, 125 ARES members, television coverage provided by local TV stations, also using solar power, OARC with 73 oprs attending, WB4OMM reports FD of 23 members and 14 ARES, W3BL reporting a very good FD, Sportsman Paradise reporting 16 oprs and visitors and congratulations to them for their 50th anniversary, PARC in Ft Walton Bch reporting 21 oprs and 14 others, KG4DZH and KG4OSQ reporting operating with batteries, KG4KLR a Crawfordville, Hernando City reporting 35 members, Lake County group reporting as opr 4a, N4UF reporting from the Jax Regional Fire and Rescue with 30 oprs, Orange Park with W1LR reporting 3a with 41 oprs, and several newly licensed hams participating. Most of the reporting groups engaged in their favorite pastime, eating. Good B-B-Q, hot dogs, and hamburgers were consumed by everyone. Some very interesting comments for those in FD, as everyone received training and the newly licensed hams enjoyed their experience setting up emergency operations. The NOFARS meeting, members voted unanimously to write the three Jacksonville-area Representatives to urge them to cosponsor HR4720. It would be a good act to follow if all Clubs would have their members to co-sign a petition requesting their Representative to co-sponsor the bill. Write your Congressman urging them to co-sponsor HR4720 and send a copy to ARRL Hdqrs. When writing, comment on the value of Amateur Radio during disasters, and disaster recovery efforts. You remember the President speaking on ham radio station back in March, and thanking hams for serving as volunteers helping local communities during emergencies. If everyone would write, we all may be surprised. It may become law. There is one Club deserving special mention and it is a new Club, Sportsman's Paradise in Crawfordville. They published a very nice folder with letters from the President, Governor, Mayor, and other activities promoting the FD. Nice work guys. de Rudy WA4PUP. Tfc: WX4H 1025, NR2F 303, KE4DNO 272, N9MN 251, KF4WIF 190, K1JPG 163, WB2FGL 111, WD4GDB 96, AB4PG 72, K4JHS 55, W4KIX 47, W8IM 38, AG4DL 33, KB4DCR 26, WX4J 22, WA1VOP 12, W4CFH 11, KF4AAF 11, WD4ILF 9, K4KAM 7, WD4NFG 6, WB2IMO 3.

PUERTO RICO: SM, Víctor Madera, KP4PQ – Se celebraron varios Field Days en la isla, entre ellos en Aguadilla, Isabela, San Juan y Fajardo. Tuvimos la oportunidad de compartir de actividades muy bien organizadas y concurridas. El Field Day de Isabela fue excepcional y estamos seguros de que su puntuación estará cerca del primer puesto. Felicitamos a NP4A y K7JA que junto a su YL KL7MF, KF6SGV, N6PEQ y W1HIJ operaron desde la playa de Isabela. El Field Day del PRARL también fue excelente. Felicitamos a KP4NNC que con un grupo de pinos nuevos y la ayuda de operadores veteranos lograron una excelente actividad. KP4IA, KP4RAT, WP4AOH, WP4F, KP4DR, NP3HD, NP3GX y muchos otros trabajaron ese fin de semana. En Fajardo el RODE también logró un gran Field Day. KP4RD junto a KP4SQ, KP4VP, KP4SK, KP4FJL, KP4RD, KP4FGL, KP4SQ, KP4RV, NP4VO, NP4AO, NP3BA, WP4N y WP4HVD lograron una vistosa actividad. En Aguadilla representando a la FRA estaban KP4ARN, WP4MJP, WP4DYV, WP4GXM, KP4AWX, KP4CY y KP4FN. Se completó el segundo seminario para AEME ya un buen grupo de empleados obtuvieron su licencia Technician. Se comenzó, con la cooperación de la FRA, un seminario similar para miembros de la Guardia Nacional. Felicitamos a WP4MJP y KP4AWX que son los instructores en Mayagüez Puedes comunicarte con tu Section Manager vía email a kp4pq@arrl.org.

SOUTHERN FLORIDA: SM, Phyllisan West, KA4FZI. SFL Web Page: http://www.sflarrl.org. It is with profound regret that I accept the resignation of our State Government Liaison, John Hills, KC4N, in Tallahassee. John has served the Northern and Southern Florida sections as SGL since 1983. John helped regain assignment of ham radio calls on license plates when some were designated for use by another organization, and acted as coordinator for all 3 FL sections as we worked to put together the scope and wording of an antenna ordinance that would help hams living in CC&R areas. John spent many hours working with the legislators on behalf of ham radio and representing us at the state EOC. We thank you, John, for the many years of service to SFL. Brevard's IRARC will miss Silent Key, Bertie Moore, KD4WLR, described as a true Southern Gentlewoman, superb net controller, and inveterate volunteer. Southern Brevard fought rain and antenna related problems on FD this year. Seems the beams pre-

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.

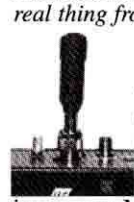
Use 10 AA Ni-MH or Ni-Cad or alkaline batteries (not incl.) or 110VAC with MFJ-1315, $14.95.

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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ferred to operate outside of the amateur bands, but dipoles saved the night. HIARC operated from a Boy Scout campground. Two boys made 18 contacts at the GOTA station and the group made the Sunday paper. They had over 1200 contacts and included using a human powered generator, solar power, and a windmill. Broward's Hollywood ARC sadly reports the passing of Bill Klecan, N4GPY. The ARES/RACES FD group fought rain-fouled generator plugs but did well on 40 meters and a 6-meter QRP solar powered station. Their next training session will be "emergency power 101." More than 80 people from the Palmetto ARC worked from TY Park in Hollywood. Congrats to the C31 Amateur Radio Group on their ARRL affiliation. Collier County's FD site was easy to ID the with their huge 40-meter beam in the parking lot of the new Red Cross Chapter house where they also have a fully equipped radio room. One of the greatest achievements is the placement of a remote base station in Carnestown allowing communication between the West and East Coast. Now they can link to Miami repeaters. Hendry and Glades Counties enjoyed greater participation when they combined manpower with Western Palm Beach County for FD this year. Indian River combined a SET with their FD activities and had an improved turnout this year. It included ham radio and other emergency-oriented agencies. The county hosted a special SKYWARN training session at the Indian River CC in Ft. Pierce with attendees from as far away as Homestead and Miami. Lee County's FD in Lehigh Acres drew at least 30 operators and made a big splash in the county's main newspaper. Martin County participated in the SKYWARN training class conducted by KE4UEI, KA1VRF, KF4PKB, and AA4PN at the Indian River CC. KD4PQQ signed up 14 students for a licensing class at the Red Cross Hurricane Fair. AC4TV of Miami-Dade reported on FD with a combined Dade Radio Club and South FL FM Association at the Dade County EOC. KA4HLO arranged the administering of license exams on site! Great idea, and congrats to all new and upgraded hams! Congrats to the Rainbow Amateur Radio Association on their ARRL affiliation in Monroe County. Osceola's FD activities appealed to all ages as children were also involved in the operation. Palm Beach EC, N4QPM, regretfully reports that Lou Goldbery, WB2SSM, a Navy Signalman during WWII, is a Silent Key. Yesteryear Village RC operated Kid's Day at their Old Radio Museum as W4YYV. K4LEW announced the new Boca Raton ARA repeater (145.290) operational. Wellington ARC manned its Lost Child and Communications Booth for the annual 4th of July celebration. Congrats to the Major Armstrong FM Association on their ARRL affiliation. June Traffic by STM WA2YL: WA9VND 429, K4FQU 260, KA4FZI 212, KD4GR 146, KC4ZHF 106, KE4UOF 67, WA2YL 57, KG4EQY 51, KG4MLD 51, WA4EIC 49, KD4HGU 48, KG4MLC 46, WB4PAM 42, KT4XK 36, KG4QIP 33, KG4CHW 26, WA4CSQ 23, KG4ILJ 21, W6VIF 19, KN4JN 19, AF4NR 16, KF4OMB 13, K4ENA 5, W3JI 4. 73, Phyllisan West, KA4FZI, Section Manager, Southern Florida.

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. News this month is that Ron, KP2N, is going to be leaving the VI to return to Florida. Ron was the first SM for the VI. Good luck, Ron! This year the St. Thomas and St. John groups had Field Day in memory of Bob Denniston, VP2VI/W0DX. George, KP2G, continues to provide current weather every morning except Sunday at 1115Z on the Caribbean Maritime Mobile Net, 7241 kHz. If there is any substantial weather in the area, he or Mike KP2CQ will come up on Sundays as well. Merv, W9UKK, is teaching a course at Southgate Baptist Church, expect to have some new hams on St. Croix soon! Area repeaters St. John 146.63, St. Thomas 146.81, St. Croix 147.25, if repeaters are down, go simplex on the receive channel or 146.52. Section Web site www.viaccess.net/~jellis. 73, 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 Chris Schwab, N4BSA, as the new EC for Pinellas County. Chris will be visiting all clubs in Pinellas. Please lend him your support. Field Day was a huge success through out West Central Florida. Paul Toth, NA4AR, and myself visited 17 sites and drove just over 500 miles. EC meeting was held in Winter Haven on June 29th. Most counties were represented. STM AB4XK reports June Net Report:

Net/NM	QNI	QTC	Bulls	QND	Sess
POK ARES/KD4EFM	47	4	0	158	5
SPARC/KF4FCW	545	34	0	955	29
TURTLE/KT4TD	304	37	0	337	29
EAGLE/KF4OPT	442	83	0	943	31

June PSHR: AE4MR 322, AB4XK 205, K4RBR 125, KF4OPT 100, K4SCL 97, KD4EFM 93, W4AUN 81, KF4KSN 76. SAR: K4SCL 174, AB4XK 131, AA4HT 84, KD4EFM 56, K4RBR 55, KF4OPT 47, KF4KSN 26, KT4TD 23, W4AUN 23, KG4FCD 15, AA4WJ 13, AE4MR 12. 73, Dave, AE4MR

SOUTHWESTERN DIVISION

ARIZONA: SM, Clifford Hauser, KD6XH—After the Show Low Fire Support, Fort Tuthill, and the Southwest Convention, I am not sure what can be done for further excitement. But I know that with the fall comes the start of our community service events (i.e. Phoenix Bike Tour, etc). I hope you have sharpened your radio procedure skills. This month is the Kingman Hamfest, 28 September 2002, at the Mohave county Community College. Talk-in will be on 146.76 (-) (PL 131.8). This is an ARCA and ARRL sponsored event. All necessary information and directions can be obtained on their web site, www.qsl.net/harc-az, or you can call Bob Kimbrell, W7KU, at 928-692-5440. I have received many calls from new hams requesting information about local clubs. If your club is not listed on the state web site or the information is not correct, please contact me or Bruce Makas, K1MY, so the changes can be made. I would like this list to be complete and accurate. Our e-mail address is "OUR CALL"@arrl.net. If your club or organization has a special event or function coming up please let me know so I can make sure it gets into this article and on the web site. We need to advertise to ourselves as well

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.

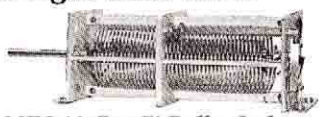
MFJ-989C **$359.95**

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.

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, custom inductor switch, 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 **$119.95**

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.

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as others whenever possible. It appears that the Central Arizona DX Club will sponsor the 2004 ARRL Southwest convention. The location in the Phoenix area for this convention has not been determined so stay tuned for details. The section ARRL volunteers and their positions are listed on the state web site, www.qsl.net/arrlaz, please review this listing and let me know if corrections are needed. Tom Fagan, WB7NXH, is the webmaster he has been adding information and links when necessary. Keep up the good work Tom. Even though Field Day was a live event for many of our North Eastern Arizona clubs, the following clubs submitted Field Day messages to me: Radio Society of Tucson, Cochise Amateur Radio Association, Hualapai Amateur Radio Association, and Eastern Arizona Amateur Radio Association. Many other clubs participated but these four (4) are the only clubs I received any message traffic from. Also start planning for the Fall Hamfest at Mesa Community College on 07 December 2002. See you in Kingman on the 28th. Clifford Hauser, KD6XH. ATEN 971 QNI; 61 QTC; 30 Sess. Tfc: W7EP 89, K7POF 67.

LOS ANGELES: SM, Phineas J. Icenbice, Jr., W6BF – Field Day was a big success at Eldorado Park, Long Beach, this year according to the Club President, John, KF6TTR. (ARALB) All three days accounted for 180 people showing up to operate eight stations plus a GOTA, SSTV, ATV and several Microwave exhibits. In addition the Associated Radio Amateurs of Long Beach had an INFO table with ARRL, Red Cross, Salvation Army, Search & Rescue, HDSCS, ARES and RACES literature. Anyway they always do a great job at Long Beach. (It may be, because Long Beach was settled by so many great Iowans.) Just so you know about HDSCS, it is Hospital Disaster Support Communications System. The Moells' Joe, K0OV and April, WA6OPS, are the prime movers of this Hospital Emergency System. For more information write to April at, ecom4hosp@aol.com - The Los Angeles Area Council of Amateur Radio Clubs, LAACARC, is promoting the next Los Angeles ARRL Section Convention. MEMBER CLUBS still have an opportunity to participate AND PROFIT in this convention by emailing the co-chairpersons Jim & Bev. (wa6mzv@worldnet.att.net) Planning meetings are scheduled monthly at the Long Beach Hilton. This short opening for Clubs to join in the planning phase and profit, is very worthwhile so get in touch with Jim & Bev. For many Clubs this is the big money maker for their Club, but even more important it is the association and learning with great personalities as teachers. Get your Club in GEAR for the race. – My best DX worked for the month is Afghanistan, YA5T, worked about 8 AM on 15 meters with a good signal both ways on SSB. Vy 73, de W6BF, Phineas.

ORANGE: SM, Joe Brown, W6UBQ, 909-687-8394. ASM/ Technical Coordinator, Art Sutorus, KQ6HF, 909-734-1485. ASM/Orange County, Richard Thompson, WA6NOL, 714-835-3295. ASM/San Bernardino County, Jeff Richardson, W6JJR, 909 886-3453. ASM Riverside County, Brett Romer, N6NLN, 760-436-6291. Our prayers and best wishes go out to Barbara Brown, SM Joe, W6UBQ, XYL, who is recovering from hip replacement surgery. During the next two months Joe will be taking some time off from his SM duties to assist her rehabilitation. ASM/TC Art, KQ6HF, will be carrying out Joe's SM functions and workload during this period. The 2002 Annual SW Div Convention in Escondido, CA during Aug 16-18 is expected to be the premier event of the year. Check the HAMCON Web site at http://sd2002.hamcon.net for registration and program information. Scanning the June mail from the Section Radio Clubs shows that the July 2002 FD planning has reached a high level of intensity. Next month's Orange Section *QST* report should have the happy... hopefully...details. SWD Director, W6XD, will have a photo album with his Field Day Impressions Reflections posted at http://home.attbi.com/~w6xd/wsb. Local Section HAMSAT operators have another reason to be excited...in addition to AO-40...it is called AO-7. Riverside County Amateur Radio Association (RCARA) hams N6ORS, K6LG and others have been routinely working AO-40 (including contacts with ARRL President, W5JBP) and now they are trying the more challenging AO-7. Congratulations to Orange County RACES members, WB6HAG, KM6BV, KC6MMF, AB6VC, KM6YH and N6ZRB plus Brea RACES member WB6DNX who received ARRL Certificates of Recognition for providing supplemental Amateur Radio Communications through SSTV during the April 2002 Placentia Train Accident response. A Well Done is also extended to the many Hospital Disaster Support Communications System (HDSCS) Amateur Radio Operator Volunteers who provided backup communications for critical medical facilities in Orange County during the same Placentia Train Incident. STM N6GIW reports for June 2002 - QTC: W6JPH 163, KC6SKK 158, W6QZ 88, K6IUI 60. PSHR: W6JPH 132, W6QZ 120, K6IUI 87, KC6SKK 82. W6QZ NTS BBS QTC 206. SCN/V NM W6JPH reports 20 Sess QNI 113, QTC 104, Avg net time 20 mins.

SAN DIEGO: SM, Kent Tiburski, K6FQ, k6fq@arrl.org, 619-575-1964. Hi folks. This may be one of the last columns you read in SM news. The Board of Directors will be meeting in a day, as I write this, to decide whether to keep or delete. Harry Hodges, W6YOO, came through his operation and might even be walking by the time you read this. Good luck, Harry! Fire season is still with us and until we get some rain, will most likely be extended. Be prepared, keep your HTs charged and your go-kit ready. SDG Section is planning a picnic in October. More details can be found on this and everything else going on. Check it out at www.qsl.net/sdgarrl. The San Diego Fair at Del Mar was a huge success! All of you that participated and came by are to be commended for all your hard work! Till next issue, best 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. 2002 Field Day activity was up in the Section. Congrats to all the clubs for stirring individual & community interest. FREE instant Section news updates? Join the SB Reflector by sending an email 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—This is being written shortly after Field Day, and I made it out to three sites this year. I spent more time at some and didn't make it to all the ones that I wanted to. However, I saw some really outstanding efforts. The folks at the Arlington ARC had a neat site at the campgrounds at Joe Pool Lake. Eight campsites with stations at most of them Frank KR1ZAN and the folks at Venture Crew 73 were set up at a nearby Girl Scout Camp however for some of his operators the swimming pool was just as popular on Saturday afternoon but no extra points for maritime mobile from 5 land. I did receive four times as many Field Day messages than last year. From Nacogdoches to Dallas to Rising Star and points in-between it to hear from the groups. HamCom was also a big success this year and we are already planning for next year, as it will be the ARRL's National Convention. On another note, I will be announcing the new newsletter editors for the section newsletter. It looks like I will have two individuals who will be covering the section and producing a monthly newsletter. But in order for this to be a success, we need all club Public Information Officers and newsletter editors to forward any announcements, special events, newsletters to us to help incorporate what is going on in your area. I hope to have this up and running by the time this arrives at your home. We will be posting it on the section Web site on the League's Web site. June SAR: K5UPN 538, KC5OZT 150, K5MXQ 142, W5AYX101, W5RDM 85, KB5TCH 60, W5OMG 34, WD5FEE 16. 73 de KA5TXL.

OKLAHOMA: SM, Charlie Calhoun, K5TTT—ASMs: N6CL, W6CL. SEC: KA7GLA. ACC: KB5BOB. PIC: N7XYO. OOC: WB9VMY. SGL: W5NZS. STM: K5KXL Field Day was fantastic. I traveled 771 miles and hit 8 Field Day sites in western Oklahoma. See the Web site for details of my trip. Mark Hamblin, WL7FT, OCAPA President reports: It is with deep regret that I announce the temporary QRT of the 146.820, 147.210, and 444.3 repeaters. They were removed from the Channel 9 tower. Plans are underway to move these machines to more receptive real estate. I'd also like to thank the owners, KWTV (Channel 9) for the use of their tower for one of the longest mutual associations in Oklahoma. For over 24 years the these machines, and the amateurs who operated them, have proudly served the amateur community, including the disasters of April 19th, and May 3rd. The 146.82 machine will be temporarily installed 4 miles south of its former home at 36th and Lincoln Ave at W5JCB/Elmo Black of Blacks radio service. Coverage area will be reduced considerably. Plans however are underway to find a more permanent home within 90 days. I'd also like to offer a hearty and appreciative thanks to the MORI group for their unconditional assistance to us for over 14 hours in the removal of these machines, antennas, and feed lines for without their support we would not have completed the process. When the .82 machine comes up we will be "Business as usual" with ARES and Saturday AM swap-n-shop. Until that time MORI has offered up the 145.210 machine for these purposes. We appreciate their support. 73 and GL, Charlie. Tfc: N5IKN 558, NJ5M 286, KF5A 1093, WB5NKC 414, WB5NKD 337, KK5GY 281, K5KXL 111, KI5LQ 96, WA5IMO 74, WA5OUV 60.

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. SGL: K5PNV. PIC: KD5HOP. September is a great month because that's the month my wife was born. I'm writing this while we're in the floods of 2002 operation in South Texas. The floods of 1998 and the Houston floods don't compare. This event started June 29 and got serious by Sunday night June 30. We have never had anything like this on record in New Braunfels nor any other place in South Central Texas. The death rate is 9 at this time and that is due to the early warning that went out, allowing some as much as 2 or 3 days to evacuate. All the deaths occurred due to people thinking they could drive into low water crossings, as far as I know at this point. Today, July 13, we're having rain with several counties under flash flood warning. I wonder if someone could bring some of the fire from New Mexico over here and put out this water. We're scheduled for heavy rain Sunday July 14 through July 17. I want to thank all those who have worked so tirelessly as net controls and out in the field. I hope you can get some rest before the next wave. Have a good month. Tfc: KA5KLU 317, W5KLV 213, W5GKH 149, N5WSW 137, AC5XK 113, W5ZX 88, N5OUJ 83, N5SIG 58, N5NAV 49, K0YNW 22, W5IM 16.

WEST TEXAS: SM, Lee Kitchens, N5YBW—Unlike other smaller (geographically) sections it is not possible for the SM to travel to more than the local Field Day. However reports from all over the section indicate that much fun and publicity for ham radio was realized. It also seems that much food was consumed in the process. Now that schools are beginning to start, it is time to start working with some of your local middle and high schools to introduce the world of electronics, math, and ham radio. The science teachers will welcome a demonstration of ham radio and how antennas are designed using practical applications of math. A demonstration of satellite reception is a great way to get the attention of the students and the school teachers and officials. This is especially true in some of the smaller towns where school budgets limit some of the more advanced subjects. An easy way to demonstrate ham radio is to invite an entire class to visit the club station as a field trip. Arrange a few schedules on the proper bands with other stations to make sure contacts are made. Invite the parents to the field trip. You might get some adult prospects for ham radio. Another way to reach the students is to donate your past issues of ham radio magazines to the school library or to the science teacher. Many issues have practical applications of math when it comes to designing antennas and erecting towers and guys.

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TH-F6A Unique features the competition is still scratching their heads over. (middle) 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 **$329.99**

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IC-207H Dualband at single band price. Dualband capabilities of the 2M/440 FM 207H are provided one band at a time through a band switching system. The 50/35W transceiver also features a detachable front panel, tone squelch, 9600bps packet operation, ultra high speed scans, and 182 memories. 5.5"w x 1.56"h x 7.31"d, 2.6 lbs **$299.99**

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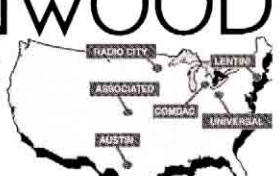


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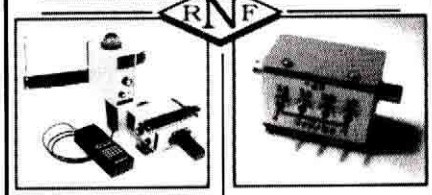

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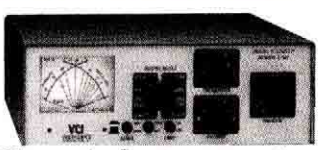

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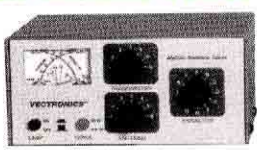

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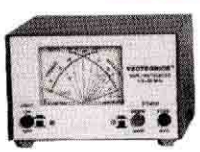

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11 FT x .12" / 12 FT x .18"	$80/150
15 FT x .12"	$105
17 FT x .25	$267
23 FT x .12" / 21 FT x .18"	$155/235

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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HUGE ICOM DEALS ★ HUGE YAESU DEALS

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 trasceiver 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-100D ..... 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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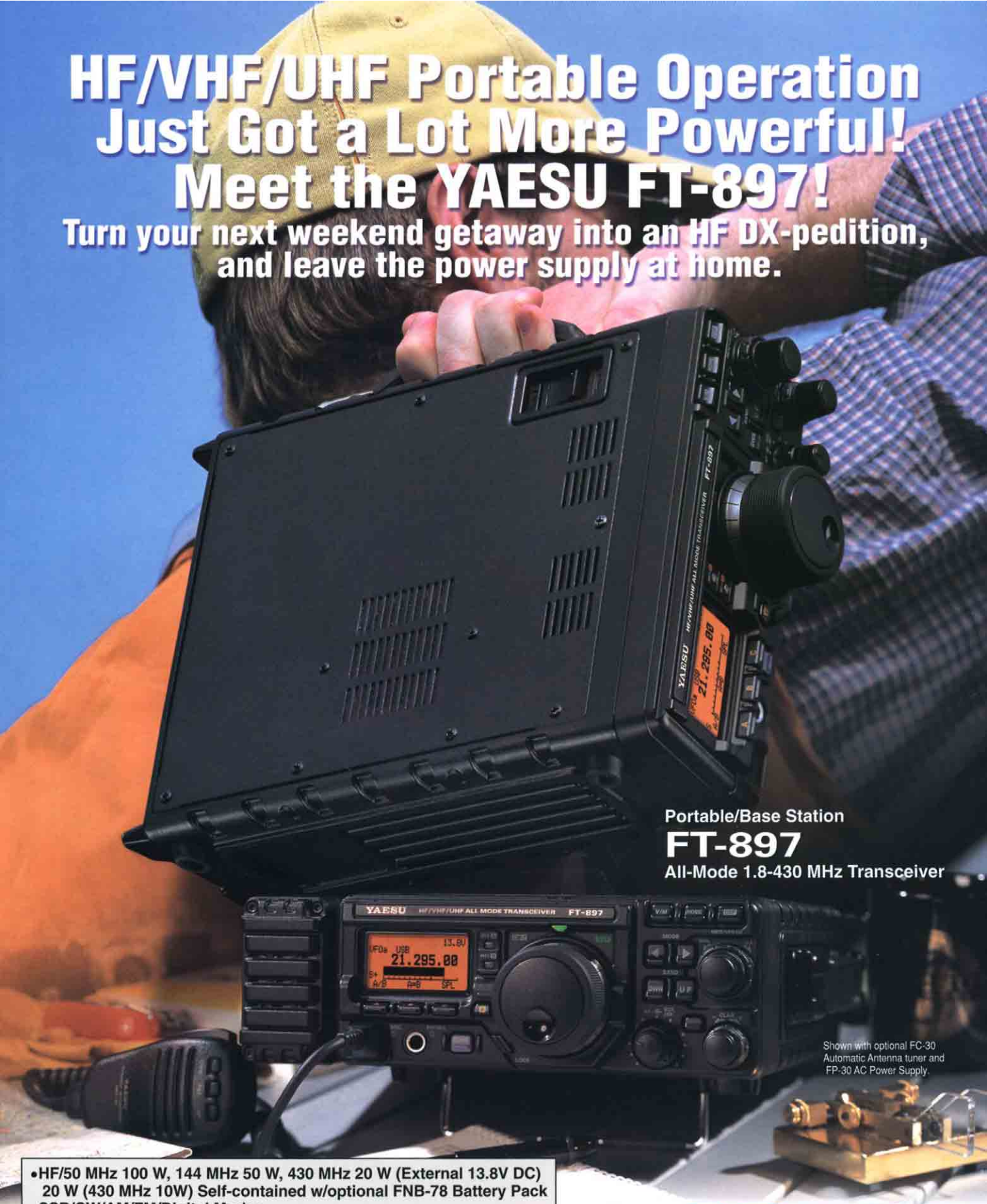

Portable/Base Station

FT-897

All-Mode 1.8-430 MHz Transceiver

Shown with optional FC-30 Automatic Antenna tuner and FP-30 AC Power Supply.

- HF/50 MHz 100 W, 144 MHz 50 W, 430 MHz 20 W (External 13.8V DC) 20 W (430 MHz 10W) Self-contained w/optional FNB-78 Battery Pack
- SSB/CW/AM/FM/Digital Modes
- Optional FP-30 Internal Power Supply and FC-30 Antenna Tuner
- Built in DSP

For the latest Yaesu news, visit us on the Internet:
http://www.vxstdusa.com

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

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